

U. S. Nuclear Regulatory Commission
November 20, 1998

DUKE ENERGY CORPORATION

OCONEE NUCLEAR STATION

ATTACHMENT 2

Calculation OSC-4467 Rev. 6

RB Pressure Needed for RBS Operation

(Recirculation Phase)

9811240190 981120
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P PDR

CERTIFICATION OF ENGINEERING CALCULATION

Station And Unit Number Oconee Nuclear Station Unit's-1,2,3

Title Of Calculation LPI and RBS pumps NPSH Analysis (Injection from BWST)

Calculation Number OSC-7248

Total Original Pages 1 Through 15

Total Supporting Documentation Attachments 29 Total Microfiche Attachments _____

Total Volumes _____ Type I Calculation/Analysis ☐ YES ☒ NO

Type I Review Frequency N/A

Microfiche Attachment List ☐ YES ☒ NO SEE FORM 101.4

These engineering Calculations cover QA Condition 1 Items. In accordance with established procedures, the quality has been assured and I certify that the above Calculation has been Originated, Checked, or Approved as noted below:

Originated By C. G. Obellano Date 11/19/98

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Verification Method: Method 1 ☒ Method 2 ☐ Method 3 ☐ Other ☐

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1.0 PROBLEM:

The purpose of this calculation is to determine if the RBS pumps will have sufficient NPSHa while injecting from the BWST following a Design Basis Accident (DBA). This analysis is performed to address concerns presented in PIP 98-4512.

PIP 98-4512 described a scenario that during the initial phases of injection from the BWST, the RBS pumps can potentially have low NPSHa due to high flows on both LPI & RBS pumps combined with decreasing level in the BWST. The limiting event requires actuation of Engineering Safeguards (ES) signals 7 & 8 (high building pressure > 10 psig) for RBS spray and ES 3 & 4 (RCS < 550 psig) LPI system. The DBA/RCS injection (accident at power) from BWST that could pose this concern is a Large Break Loss of Coolant Accident (LBLOCA) combined with maximum safeguards actuation condition. Maximum safeguards actuation condition is when all ECCS systems (LPI, HPI, & CFT), Reactor building cooling units (RBCU) and RBS spray systems are operating at peak performance and no single failure occurs. Additionally, maximum safeguards actuation condition also requires that the initial reactor building pressure/temperature must be low while the BWST and lake water temperatures are also at their lowest. Other scenarios that can be postulated are LBLOCAs at low power levels (i.e. < 100 %) that will actuate ES 3,4,7,& 8. These events will cause the RCS pressure to drop rapidly and equalize with the reactor building at a pressure bounded by 0 psig. The conditions assumed for this analysis (0 psig for both the RB & RCS) were selected to bound any credible accident scenario. These conditions should not be viewed as a new requirement for any other existing or future analysis.

The current UFSAR containment response and LOCA analyses are based on assumed single failures of equipment which would limit the effects of the responses. These single failures will either limit the flow out of the BWST or cause an elevated building response (i.e. high and long lived building pressure/temperature conditions), see UFSAR section 6.2. For the limiting large break LOCA, flow from one LPI pump can provide the long-term cooling of the core. The time of peak clad temperature (PCT) is prior to the actuation of pumped ECCS flow from the LPI and HPI pumps. Although the flow from one HPI pump is assumed in the large break analyses, the required core cooling can be provided by the core flood tanks and one LPI pump. HPI pumps are not required for large break LOCA mitigation, see UFSAR section 15.14.

Following a LOCA, the Emergency Core Cooling Systems inject borated water into the Reactor Coolant System to remove core decay heat and to minimize metal-water reactions and the associated release of heat and fission products. The Reactor Building Spray System removes heat directly from the Reactor Building atmosphere by cold water quenching of steam in the Reactor Building. The air recirculation and cooling systems remove heat directly from the Reactor Building atmosphere to the Service Water System with recirculating fans and cooling coils.

By procedure the Operator is required to throttle HPI, LPI, & RBS flowrates. Current licensing basis credits being able to throttle HPI within 10 (ten) minutes after the event initiation, then throttling LPI and RBS. UFSAR 15.14.6.5 "Long-Term Cooling" states, "Subsequent to the blowdown, refill, and reflood phases of a LOCA, long-term cooling to remove core decay heat for an extended period of time must be established. The ECCS is designed to perform this function. Operator action is assumed to be available fifteen minutes following a LOCA".

2.0 RELATION TO NUCLEAR SAFETY:

This calculation is QA Condition 1. The Reactor Building Spray pumps in conjunction with the Low Pressure Injection system are required to mitigate and limit the consequence of design basis accident (LOCA) and provide decay heat removal capability during shutdown.

3.0 DESIGN METHOD:

The LPI Hydraulic model used in this calculation is based on the model used in OSC-3560(LPI Analysis). The RBS piping will be added to this model create a combined LPI & RBS hydraulic model (Attach. # 7). The reactor building response (i.e. pressure history) which is expected to occur following a LBLOCA will NOT be used by the model, instead RB pressure will conservatively be taken as 0 psig.

To verify the accuracy of the model a computer run will be performed using flows recorded during the ES Test (TT/O/A/610/025). A comparison will be made between the suction pressures predicted by the computer model and the actual suction pressures recorded during the test. The flowrates used in the model will be error adjusted in the low direction to induce lower suction line losses. The recorded suction test pressure data will not be adjusted because these instruments were calibrated prior to the test and verified after the test and essentially zero error.

The scenario that will be evaluated in this analysis is an ES actuation in response to LBLOCA. The LPI, RBS, and HPI pump(s) will initially take suction from the BWST. The initial BWST level is @ 46ft. Based on the pump flowrates the draw down of the BWST will be calculated in one minute intervals and the NPSHa will be calculated for both the LPI and RBS pumps. The analysis is terminated after 15 minutes. Based on the results of each computer run the NPSHa will be calculated.

HPI pumps flows will be placed as a demand at the appropriate junction in the model.

The piping comparison will be performed from unit to unit on specific sections. For a given section (for example, suction from BWST or discharge piping to the RCS), the limiting section from that unit will be used in the analysis.

4.0 APPLICABLE CODES AND STANDARDS:

ANSI N45.2-11

5.0 DESIGN INPUTS:

5.1 To minimize calculated NPSHa during the initial phase of injection from the BWST the following conditions must be present:

- Maximum BWST out flow
- Maximum BWST out flow will occur due to Maximum Safeguards actuation. In this scenario:
 1. All ECCS systems function as design (no single failure)
 2. RBCU (Reactor building Cooling Units are functioning at maximum heat removal capacity (no fouling) coupled with minimum cooling water temperature
 3. BWST is at minimum Tech Spec temperature limit (50 F) for heat removal function. Tank temperature will be assumed to be at its maximum value for the hydraulic analysis.
- The RCS break location must such that combined with maximum safeguards operation, energy is rapidly removed from the RCS and RB. This will cause the RCS pressure to drop rapidly along with the reactor building pressure. Safety Analysis Group has identified this break to be a hotleg LBLOCA.

For conservatism the reactor building response (i.e. pressure history) which is expected to occur following a LBLOCA will NOT be used in this calculation. Instead, both the RCS & RB pressure will be assumed to be 0 psig.

5.2 The LPI pumps were originally tested up to a flowrate of 4000 gpm (See Ref. 8.21 letter from IR to Beau Abellana/DPco.). Note: Unit-3 pump curves have been extrapolated to approximately 4800 gpm.

5.3 The NPSHr for the pumps are : for the LPI 20 ft @ 4300 gpm and RBS 42 ft @ 1900 gpm. (Ref. 8.21 & 8.27 respectively)

5.4 No instrument inaccuracies need be considered in this calculation for LPI & RBS flow during the initial injection phase. Flows through these pumps are those expected following ES actuation before the Operator throttles the flow control valves. The HPI flows applied in the model are conservative and by procedure these pumps must be throttled within 10 minutes. In this analysis the total HPI flow demand will be set to 1600 gpm from t=0 through t=9 mins and 1500 gpm from t=10 through t=15 mins. System hydraulic flow modeling experience and test results (from Ocone ES test Jan. '97) have shown the HPI system to be incapable of exceeding 1500 gpm with no RCS pressure. ES test results (Attach. # 8) shows that with no throttling of HPI and NO RCS pressure, the total indicated flow from all 3 pumps did not exceed 1450 gpm. For conservatism, however, a value of 1600 gpm will used for the first 9 minutes of the event and 1500 gpm after "B" HPI train has been throttled by procedure. For the computer runs where LPI flow is throttled to 3000 gpm, the instrument uncertainty of 280 gpm (Ref. 8.26) will be applied, and LPI flowrates will be rounded to 3300 gpm.

5.5 The pump head/flow data points in the Wood's model will include the full range of head/flow as shown in the manufacturer's dwg. These pumps have been factory tested beyond the BEP (Ref. 8.16,17,18). It should be noted that the Woods hydraulic computer code will calculate the flow past the described curve in the input data (if system does not restrict the flow).

- 5.6 This calculation will assume the BWST fluid is 100 F. This will result in lower calculated NPSHa. The BWST temperature is administrative controlled at >60 F. Though lower BWST temperature will tend to increase line losses, the effect of lower vapor pressure would produce an overall higher calculated NPSHa.
- 5.7 ANSI N45.2-11 has been reviewed and all applicable inputs are addressed in the appropriate sections of the calculation.
- 5.8 WATDATA File C-6.10.3, Water Data (vapor pressure, specific volume, viscosity, specific gravity, etc.)
- 5.9 This computer model was initially based on the Unit-1 piping arrangement. The LPI and RBS systems in all units have similar configuration and identical components (i.e. pumps, pipe size and schedules, and valves [except for 3LP-17 & 3LP-18 which differs from Unit's 1&2 but the Cv at full open does not have an effect the model]). The pipe fittings are slightly different from unit to unit. The computer model has been adjusted to use the most restrictive suction path from the BWST to the pumps and the least restrictive discharges from the pumps to the exit nodes. Based on the review of all 3 units, the suction piping (from the BWST to the LPI & RBS pumps) is most restrictive on Unit-2. The Unit-1 BS piping has 244 spray nozzles, Unit's-2 & 3 each have ≤ 241 nozzles. As a result of having larger number of nozzles and similar number of pipe fittings, the Unit-1 piping is judged to be the least restrictive and is used in the model. The least restrictive LPI "A" and "B" header discharge piping are Unit-2 and Unit-3 respectively. As a result Unit-2 will be used in the model for train "A" and Unit-3 for train "B".

Additionally, the highest data points of all LPI & RBS pumps will be used to represent the respective pumps in the computer model.

The use of this combination of the most limiting attributes will produce a computer analysis that conservatively predicts the suction pressure.

6.0 FSAR CRITERIA:

FSAR Chapter 6.3.2.2.2 Update
The Low Pressure Injection System is designed to:

- 1) Maintain core cooling for larger break sizes
- 2) Control boron concentration in the core while operating in the recirculation mode.

FSAR Chapter 6.2.2 & FSAR Chapter 15.15.1 Update
The Reactor Building Spray System is designed to:

1. Remove and reduce post accident energy by directing borated water into the reactor building atmosphere.
2. Removal of a portion of the remaining iodine from the building atmosphere (MHA).

FSAR Chapter 15.14.6.5 "Long-Term Cooling" Update

Subsequent to the blowdown, refill, and reflood phases of a LOCA, long-term cooling to remove core decay heat for an extended period of time must be established. The ECCS is designed to perform this function. Operator action is assumed to be available fifteen minutes following a LOCA.

7.0 ASSUMPTIONS:

- 7.1 No adjustment to pipe roughness due to aging is necessary in this model. This is acceptable since the piping is stainless steel and the only fluid that flows through these pipes is RCS quality and it is closely controlled. Therefore aging mechanisms should not be a factor.
- 7.2 Assume pumps are operating within manufacturer's pump curve. Periodic testing have shown that these pumps operating within the supplied manufacturer's curve.
- 7.3 Assume the RCS pressure is equal to reactor building pressure at T=0. This is acceptable because in the unlikely event of LBLOCA pressure will initially have to be in the building to cause the ES signal to actuate. This is also conservative because it lowers the back pressure and the pressure the LPI & RBS pumps have to overcome. With low back pressures, the system curve will be lower causing higher LPI and RBS pump flows.
- 7.4 Assume initial BWST to be 46'ft above elevation 797.25'. In the past, due to procedural error the BWST level instrument was calibrated less than the current calibrated zero of 799.25' (PIP 98-707). In this analysis no instrument uncertainty will be deducted from the 46' Tech Spec level requirement because procedures stipulate that a higher level be maintained so that 46' is present when uncertainty is considered. Since present reference elevation is 799.25', "present operability" evaluation of NPSHa are 2' greater than "past operability" evaluations. Higher than analyzed BWST level will result in a slightly higher pump flows. However, the increase in flows are insignificant. Higher than analyzed level will also result in slightly higher NPSHa thereby, giving the Operator additional time to throttle the flows.
- 7.5 Assume fluid is pure water. Density, viscosity, and vapor pressure of dilute boric acid are not significantly different than pure water to affect the result of this calculation.

8.0 REFERENCES:

- 8.1 Crane Technical Paper No.410 (24th printing-1988)
- 8.2 DBD High Pressure Injection System OSS-0264-00-00-1001 Rev.8
- 8.3 DBD Low Pressure Injection System OSS-0264-00-00-1028 Rev.3
- 8.4 DBD Reactor Building Spray System OSS-0264-00-00-1034 Rev.4
- 8.5 OSC-3077 LPI Min Flow Verification Rev.1
- 8.6 LPI Hydraulic Model OSC-3560 Rev.0
- 8.7 OFD-102A-1.1,2.1,3.1 Rev.33,24,33 (respectively)
- 8.8 OFD-102A-1.2,2.2,3.2 Rev.27,23,18 (respectively)
- 8.9 OFD-102A-1.2,2.3,3.3 Rev.14,8,12 (respectively)
- 8.10 OFD-103A-1.1,2.1,3.1 Rev.7,7,6 (respectively)
- 8.11 PT/1,2,3/A/0204//006 LPI Pump Test
- 8.12 PT/1,2,3/A/0204//007 Reactor Building Spray Pump Test
- 8.13 Computer Program WATDATO (File C-6.10-3)
- 8.14 Memo to file S.L. Nader 7/23/1987 "Atmospheric pressure for Design"
(Attach. # 1)
- 8.15 Letter S.T.Apple to T.F. Wyke 11/24/86 "ONS Barometric Pressures"
(Attach. # 2)
- 8.16 OM 201-1704 IR pump Instruction Manual (Unit-1)
- 8.17 OM 1201-1121 IR pump Instruction Manual (Unit-2)
- 8.18 OM 2201-0597 IR pump Instruction Manual (Unit-3)
- 8.19 OSC-4361 Rev.0 RBS NPSH Analysis Unit1,2,3
- 8.20 Letter from IR (Paul Kasztejna) to Russ Oakley 10/27/98
(Attach. # 3)
- 8.21 Letter from IR (Manish Patel) to Beau Abellana 3/28/95
(Attach. # 4)
- 8.22 EP/1,2,3/A/1800/01 Changes 26 I, 28 H, 26 I Emergency
Procedure Unit's-1,2,3
- 8.23 Result of Simulator Exercise, Note Kevin Mc Murray to Beau
Abellana 11/16/98 (Attach. # 5)
- 8.24 Result of Simulator Exercise, Note from Kevin McMurray to Beau
Abellana (11/16/98) (Attach. # 6)
- 8.25 IP/0/0203/001A Rev. 24 BWST Instrument Level Calibration procedure
- 8.26 OSC-3566 LPI Flow Loop Instrument Accuracy Calc. Rev. 4
- 8.27 RBS pump test results 11/14/98 Fax from P. Kasztejna (IDP) to T.
Saville (DPC)

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By: CGA
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8.28 HPI Full Flow Check Valve Test PT/1,2,3/A/251/24

8.29 O-422X-13 Rev.13, O-1422X-13 Rev.11, O-2422X-13 Rev.8
Reference Level Zero for BWST Units-1,2,3 respectively

9.0 CALCULATION:

9.1 The result of the computer model are as shown below.

9.1.1 Comparison of model output to ES test (Unti-3) recorded data,
BWST at 35', RESULTS FROM ATTACH. # 8

LPI PUMPS

Model predicted :

ES Test Result :

"1A" Pump

Flow (p.6/10) = 2578 gpm
Suct.Press (p.9/11)= 23.43 psig

Flow = 2878 gpm
Suct. Press = 24.5 psig

"1B" Pump

Flow (P.7/10) = 2610 gpm
Suct.Press (p.9/11)= 23.29 psig

Flow = 2910 gpm
Suct. Press = 24.3 psig

RBS PUMPS

"1A" Pump

Flow (p.8/10) = 515 gpm
Suct.Press (p.10/11)= 24.20 psig

Flow = 675 gpm
Suct. Press = 26.5 psig

"1B" Pump

Flow (p.8/10) = 581 gpm
Suct.Press (p.10/10)= 24.24 psig

Flow = 741 gpm
Suct. Press = 27.3 psig

9.1.2 ES actuation (NO RCS or Reactor building pressure), BWST at
46', T = 0 mins RESULTS FROM ATTACH. # 9 to ATTACH. # 24
Below is tabulation of the results of the computer model results
(for Maximum Safeguards Condition):

SAMPLE NPSHa CALCULATION:

General Equation:
$$NPSHa = h_a - h_{vpa} + h_{st} - h_{fs}$$

where: h_a = atmospheric pressure (ft) (Ref.8.14&8.15)
 h_{vpa} = vapor pressure (ft) (Ref.8.13)
 h_{st} = static head (ft)
 h_{fs} = friction Loss (ft)

h_{vpa} (vapor pressure) = (.949)(2.3227) = 2.204' (Ref. 8.13)

(BWST @ 100 F)

h_a = 32.0' (Ref. 8.14, 8.15)

Woods Model result ($h_{st} - h_{fs}$)

From Attach. # 9, the analyzed suction pressures are: (Converted to ft. of
water @ 100 F)

"A" LPI node 23 = $7.44 \times 2.3227 = 17.28'$

"B" LPI node 44 = $7.59 \times 2.3227 = 17.63'$

"A" RBS node 110 = $8.01 \times 2.3227 = 16.40'$

"B" RBS node 101 = $8.86 \times 2.3227 = 18.37'$

"A" LPI NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - 2.204 + 17.28 = 48.40'$

"B" LPI NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - 2.204 + 17.63 = 50.37'$

"A" RBS NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - 2.204 + 19.77 = 49.56'$

"B" RBS NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - 2.204 + 21.72 = 51.51'$

"B" *LPI pump NPHr @ 4300 gpm = 20.0 ft (Ref. 8.21)

"B" *RBS pump NPHr @ 1860 gpm = 42.5 ft (Ref. 8.27)

Tabulation of the results of the computer model results

Time	BWST Node	BWST Level	BWST drain down	BWST drain down	LPI "A" flow gpm	LPI "A" suct. press psig	LPI "A" NPSHa ft	LPI "B" flow gpm	LPI "B" suct. press psig	LPI "B" NPSHa ft
	797.25	ft	down	down	gpm	psig	ft	gpm	psig	ft
			gpm	ft	37.00	23.00		58.00	44.00	
T=0	843.25	46.00	13974.19	1.84	4423.31	7.44	47.08	4323.75	7.59	47.43
T=1	841.41	44.16	13952.62	1.83	4415.50	6.74	45.45	4316.20	6.88	45.78
T=2	839.58	42.33	13931.16	1.83	4407.73	6.04	43.82	4308.69	6.18	44.15
T=3	837.75	40.50	13909.68	1.83	4399.95	5.34	42.20	4301.17	5.48	42.52
T=4	835.93	38.68	13888.29	1.82	4392.20	4.64	40.57	4293.69	4.78	40.90
T=5	834.10	36.85	13866.77	1.82	4384.41	3.94	38.95	4286.15	4.08	39.27
T=6	832.28	35.03	13845.35	1.82	4376.65	3.25	37.34	4278.66	3.39	37.67
T=7	830.46	33.21	13823.90	1.82	4368.88	2.55	35.72	4271.15	2.69	36.04
T=8	828.65	31.40	13802.56	1.81	4361.14	1.86	34.12	4263.68	2.00	34.44
T=9	826.83	29.58	13781.08	1.81	4353.36	1.16	32.49	4256.15	1.30	32.82
T=10	825.02	27.77	13667.55	1.80	4348.46	0.72	31.47	4251.42	0.86	31.79
T=11	823.23	25.98	13646.38	1.79	4340.78	0.04	29.89	4244.00	0.17	30.19
T=12	821.44	24.19	13625.19	1.79	4333.10	-0.65	28.29	4236.58	-0.51	28.61
T=13	819.65	22.40	13603.98	1.79	4325.42	-1.33	26.71	4229.15	-1.20	27.01
T=14	817.86	20.61	13582.75	1.78	4317.72	-2.02	25.10	4221.72	-1.88	25.43
T=15	816.08	18.83	13561.63	1.78	4310.06	-2.70	23.52	4214.31	-2.57	23.83

Time	BWST Node	BWST Level	BWST drain down	BWST drain down	RBS "A" flow gpm	RBS "A" suct. press psig	RBS "A" NPSHa ft	RBS "B" flow gpm	RBS "B" suct. press psig	RBS "B" NPSHa ft
	797.25	ft	down	down	gpm	psig	ft	gpm	psig	ft
			gpm	ft	148.00	110.00		114.00	101.00	
T=0	843.25	46.00	13974.19	1.84	1861.09	8.01	48.40	1861.55	8.86	50.37
T=1	841.41	44.16	13952.62	1.83	1858.08	7.31	46.77	1858.51	8.15	48.73
T=2	839.58	42.33	13931.16	1.83	1855.09	6.61	45.15	1855.48	7.45	47.10
T=3	837.75	40.50	13909.68	1.83	1852.10	5.91	43.52	1852.45	6.74	45.45
T=4	835.93	38.68	13888.29	1.82	1849.12	5.21	41.90	1849.43	6.04	43.82
T=5	834.10	36.85	13866.77	1.82	1846.12	4.51	40.27	1846.39	5.34	42.20
T=6	832.28	35.03	13845.35	1.82	1843.13	3.81	38.65	1843.37	4.64	40.57
T=7	830.46	33.21	13823.90	1.82	1840.15	3.11	37.02	1840.34	3.94	38.95
T=8	828.65	31.40	13802.56	1.81	1837.17	2.42	35.42	1837.33	3.24	37.32
T=9	826.83	29.58	13781.08	1.81	1834.18	1.72	33.79	1834.30	2.54	35.70
T=10	825.02	27.77	13667.55	1.80	1832.30	1.28	32.77	1832.40	2.10	34.67
T=11	823.23	25.98	13646.38	1.79	1829.35	0.60	31.19	1829.41	1.41	33.07
T=12	821.44	24.19	13625.19	1.79	1826.41	-0.09	29.59	1826.43	0.72	31.47
T=13	819.65	22.40	13603.98	1.79	1823.45	-0.77	28.01	1823.44	0.03	29.87
T=14	817.86	20.61	13582.75	1.78	1820.50	-1.46	26.40	1820.44	-0.65	28.29
T=15	816.08	18.83	13561.63	1.78	1817.56	-2.14	24.83	1817.47	-1.34	26.68

9.1.3 Computer results if LPI flow was throttled after 13 minutes into the event. (See Attach. # 25)

BWST @ 22.4'

"A" LPI node 23 = 5.61 x 2.3227 = 13.03'
"B" LPI node 44 = 5.62 x 2.3227 = 13.05'
"A" RBS node 110 = 5.67 x 2.3227 = 13.17'
"B" RBS node 101 = 6.28 x 2.3227 = 14.58'

"A" LPI NPSHa = ha- hvpa + hst - hfs = 32 - 2.204 + 13.03 = 42.83'
"B" LPI NPSHa = ha- hvpa + hst - hfs = 32 - 2.204 + 13.05 = 42.85'
"A" RBS NPSHa = ha- hvpa + hst - hfs = 32 - 2.204 + 13.17 = 42.97'
"B" RBS NPSHa = ha- hvpa + hst - hfs = 32 - 2.204 + 14.58 = 44.38'

9.1.4 Computer results of NPSHa @ Swapover (See Attach. # 26)

BWST @ 6' (Ref. 8.22)

LPI @ 3300 gpm ea., RBS @ 1660 gpm ea.,
HPI 1500 (total for 3 pumps)
RBES Isolation valves LP-19 & LP-20 Closed

"A" LPI node 23 = -.09 x 2.3227 = -.21'
"B" LPI node 44 = -.09 x 2.3227 = -.21'
"A" RBS node 110 = .70 x 2.3227 = 1.63'
"B" RBS node 101 = .18 x 2.3227 = .42'

"A" LPI NPSHa = ha- hvpa + hst - hfs = 32 - 2.204 - .21 = 29.58'
"B" LPI NPSHa = ha- hvpa + hst - hfs = 32 - 2.204 - .21 = 29.58'
"A" RBS NPSHa = ha- hvpa + hst - hfs = 32 - 2.204 + 1.63 = 31.42'
"B" RBS NPSHa = ha- hvpa + hst - hfs = 32 - 2.204 + .42 = 30.21'

9.1.5 Computer results of NPSHa @ Swapover (See Attach. # 28)

BWST @ 6' (Ref. 8.22)

LPI @ 3300 gpm ea., RBS @ 1660 gpm ea.,
HPI = 0 gpm
RBES Isolation valves LP-19 & LP-20 Open

Since the pumps (LPI & RBS) will be taking suction from the BWST & RBES when LP-19 & LP-20 are open, the vapor pressure at the pump suction will have to be adjusted due to mixed fluids. This is done by performing a ratio of flow and temperature assuming the two fluids have mixed. The maximum RBES fluid temperature is assumed to be 212 F because the RB pressure is assumed to be 0 psig.

	BWST _{flow}		RBES _{flow}
"A" (81-13)	3923.62 gpm	(0-83)	1056.48 gpm
"B" (81-19)	4299.30 gpm	(0-85)	680.7 gpm

$$T_{mix} = \frac{[(BWST_{flow})(BWST_{temp.}) + (RBES_{flow})(RBES_{temp.})]}{(BWST_{flow} + RBES_{flow})}$$

$$T_{mix} \text{ "A"} = \frac{(3923.62)(100) + (1056.48)(212)}{3923.62 + 1056.48} = 123.76 \text{ F or } 124 \text{ F}$$

$$T_{mix} \text{ "B"} = 115.31 \text{ F or } 115 \text{ F}$$

"A" LPI node 23 = $7.88 \times 2.3358 = 18.41'$
"B" LPI node 44 = $7.44 \times 2.3305 = 17.34'$
"A" RBS node 110 = $8.18 \times 2.3358 = 19.11'$
"B" RBS node 101 = $8.22 \times 2.3305 = 19.16'$

"A" LPI NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - (1.890)2.3358 + 18.41 = 45.99'$
"B" LPI NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - (1.471)2.3305 + 17.34 = 45.91'$
"A" RBS NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - (1.890)2.3358 + 19.11 = 46.69'$
"B" RBS NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - (1.471)2.3305 + 19.16 = 47.73'$

9.1.5 Computer results of NPSHa @ Swapover (See Attach. # 29)

BWST @ 2' (Ref. 8.22)

LPI @ 3300 gpm ea., RBS @ 1660 gpm ea.,

HPI = 0 gpm

RBES Isolation valves LP-19 & LP-20 Open

Since the pumps (LPI & RBS) will be taking suction from the BWST & RBES when LP-19 & LP-20 are open, the vapor pressure at the pump suction will have to be adjusted due to mixed fluids. This is done by performing a ratio of flow and temperature assuming the two fluids have mixed. The maximum RBES fluid temperature is assumed to be 212 F because the RB pressure is assumed to be 0 psig.

	BWST _{flow}		RBES _{flow}
"A" (81-13)	3580.31 gpm	(0-83)	1379.61 gpm
"B" (81-19)	3895.38 gpm	(0-85)	1064.62 gpm

$$T_{mix} = \frac{[(BWST_{flow})(BWST_{temp.}) + (RBES_{flow})(RBES_{temp.})]}{(BWST_{flow} + RBES_{flow})}$$

$$T_{mix} \text{ "A"} = \frac{(3580.31)(100) + (1379.69)(212)}{3580.31 + 1379.69} = 131.15 \text{ F or } 131 \text{ F}$$

$$T_{mix} \text{ "B"} = 124.04 \text{ F or } 124 \text{ F}$$

"A" LPI node 23 = $7.83 \times 2.3402 = 18.23'$
"B" LPI node 44 = $7.39 \times 2.3358 = 17.26'$
"A" RBS node 110 = $8.14 \times 2.3402 = 19.05'$
"B" RBS node 101 = $8.19 \times 2.3358 = 19.13'$

"A" LPI NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - (2.283)2.3402 + 18.23 = 44.98'$
"B" LPI NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - (1.890)2.3358 + 17.26 = 44.85'$
"A" RBS NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - (2.283)2.3402 + 19.05 = 45.71'$
"B" RBS NPSHa = $h_a - h_{vpa} + h_{st} - h_{fs} = 32 - (1.890)2.3358 + 19.13 = 46.72'$

10.0 CONCLUSION:

The computer model calculates lower suction pressure for LPI & RBS than the data recorded during the (Jan.'97) ES test. This indicates the model is conservative in predicting the suction pressure and therefore also NPSHa. It should be noted that the difference between actual and predicted NPSHa is expected to be higher at the maximum flowrate projected (> 13500 gpm) in this calculation.

The computer model results show that both the "A" and "B" LPI pumps **will have adequate NPSHa** for the entire duration of the transient. The results predicted that "A" and "B" RBS pumps **will have adequate NPSHa** the first few minutes of injection. The available NPSHa will decrease (due to drop in BWST inventory) until the Operator throttles LPI flow which is expected within 15 minutes of the event. The operator will sequentially throttle HPI, LPI, & RBS pump flows by procedure (Ref. 8.22). If the operator throttles LPI within 15 minutes, the results shows that NPSHa is greater than NPSHr for the RBS pumps before they are throttled. After the LPI & RBS flows have been throttled 3000 & 1500 gpm respectively, adequate NPSH is available until the Operator swaps to the RBES.

Simulator exercises (Ref. 8.23) have shown that the RBS flow can be throttled within 15 minutes assuming a conservative event (i.e. Main Steam line break and ES actuation). Additional exercises (LBLOCA only) have been performed by a different crews. These exercises show that the HPI, LPI, and RBS will be throttled sooner than 15 minutes (Ref. 8.24).

The pump manufacturer has performed a test of similar pumps operating at less than available NPSH for short durations (\approx 3-4 mins). The Vendor indicated that degradation and damage did not occur (Ref. 8.20).

In addition, a pump test was performed for the Ocone RBS pump on 11/13/98 (reference Purchase Order 703-00009-02) at the pump manufacturer's facility. This test purposely operated a pump identical to (ie, the same model and size as) the RBS pump at conditions where the NPSHa was substantially less than NPSHr. The model calculates that at the end of 15 minutes during initial injection from the BWST, the worst case NPSHa is 23.83 ft. at a flow of approximately 1850 gpm. The RBS pump test at the vendor facility operated the pump at 1850 gpm, and gradually reduced NPSH to below NPSHr. The NPSH was subsequently reduced to 23.6 ft for 20 minutes. The pump operated at reduced flow and head (1628 gpm and 262.3 ft), but the flow and head are adequate to meet the accident requirements of the pump. In no case did the pump experience notable distress. Bearing vibrations were monitored, and did not increase significantly during the NPSH deficiency test (approximately 0.5 mil maximum increase in displacement). The test showed that the pump can withstand operation with a severe reduction of NPSHa. Subsequent to the reduced NPSH test, a 24 hr. run was performed. No problems were identified as a result of this test. The result of this test is shown in Attach. # 27.

Attach. #26 shows that the RBS pumps have adequate NPSH prior to swapping to the RBES. Attach. # 28 & 29 also shows that while the pump suction is in the process of being transfer to the RBES, NPSHa is greater than NPSHr.

Calculation OSC-7248

Attachment 1

Reference for Atmospheric Pressure to be Used in NPSH_a Calculations

July 23, 1987

MBOE-87-360

MEMO TO FILE

Re: Oconee Nuclear Station
Atmospheric Pressure for Design Calculations
File: OS-3C

During a review of NPSH calculations, a concern arose over the proper value of "standard" atmospheric pressure. Consequently, the Civil Division provided a frequency distribution of observed atmospheric pressures at Oconee. Results showed that 90% of the time the atmospheric pressure is 29.00" Hg or below (14.2 psia or 32.9 ft H₂O). Therefore, the standard practice of using 14.7 psia or 34 ft H₂O is not a conservative or even a realistic assumption.

The atmospheric pressure is less than 28.76" Hg less than 1% of the time. Therefore, it is recommended that a conservative atmospheric pressure of 14.0 psia or approximately 32.0 ft H₂O be used, particularly for NPSH calculations.

If there are any questions, please call S. L. Nader at extension 3-2506.



S. L. Nader
Design Engineer I

SLN/tdw

cc: J. F. Norris
E. M. Weaver
R. A. Harris
Central Records

Calculation OSC-7248

Attachment 2

Reference for Barometric Pressures at Oconee Based on GSP Airport Data

November 24, 1986

OSC-7248
Attachment 2
page 1 of 2

T. F. Wyke

Attn: R. A. Harris → EEN

Re: Oconee Nuclear Station
Barometric Pressures
MA #532.10
File Nos: OS-161, OS-3-C

Attached is a cumulative frequency distribution of barometric pressure for Oconee NPS. Observations at the Greenville-Spartanburg Airport are extrapolated to Oconee NPS based on standard atmospheric conditions.

S. B. Hager, Chief Engineer
Civil/Environmental Division


By: S. T. Apple
Scientist II

STA/mdc

Attachment

cc w/att: Central Records
D. W. Anderson
M. A. Casper

Barometric Pressure

*Oconee NPS

OSC-7248

Attached 2

page 2 of 2

Frequency of Observations Equal To or Less Than Specified Value

	Barometric Pressure ("Hg)									
	29.00	29.08	29.13	29.17	29.22	29.26	29.30	29.35	29.43	
Cumulative Frequency (%)	10	20	30	40	50	60	70	80	90	

22.24 23.46 23.63 23.52
20 01 1 1

Note: From telephone conversation, record low
baro pressure at airport is 28.0" Hg Abs
or 28.22" Hg Abs at E1 800'.

$$28.22" \text{ Hg} \left(\frac{1.013 + \text{H}_2\text{O}}{1 \text{ in Hg}} \right) = 32.0' \text{ H}_2\text{O}$$

$$32.0' \text{ H}_2\text{O} \left(\frac{12.7 \text{ psi}}{30' \text{ H}_2\text{O}} \right) = 13.7 \text{ psi}$$

* Taken from 224,067 hourly observations at the Greenville-Spartanburg Airport
adjusted from 972' MSL to 800' MSL at an assumed pressure increase of 0.22" Hg.

Calculation OSC-7248

Attachment 3

Ingersoll-Dresser Pump Evaluation of BS Pump with Reduced NPSH_a

Ingersoll-Dresser Pump Company

Worldwide Customer Services Group
Aftermarket Businesses
942 Memorial Parkway
Phillipsburg, NJ 08865

908-859-7437
908-859-7988 (fax)

OSC-7248
Attachment 3
page 1 of 1

October 1, 1998

Russ Oakley
Duke Power Company
Oconee Nuclear Station
P.O. Box 1439 - Mail Code 0N03MS
Seneca, SC 29672

Re: Reactor Building Spray Pump Performance
IDP Pump Model 4X11A
S/N 016964, 016965, 0369141, 0369142, 037039, 037040

Dear Russ:

My previous letter dated 24 September 1998 on this same subject still applies and is valid. As for the more serious condition of service explained to me this afternoon, i.e. 21 feet NPSHA, 100°F water, 280 feet system resistance at 1450 gpm, I have the following comments:

1. We have run this type of pump during NPSH tests at nearly exactly the same conditions without experiencing any problems. Although only for time periods of up to 1 minute. (usually less)
2. We have run other pumps with 50% head breakdown of the first stage for time periods up to 3 minutes without experiencing problems or damage.
3. We have not run, or recorded any successful tests beyond the 3 - 4 minute time period.

With this as background, it is our opinion that the pump could survive this type of event, especially if NPSHA was restored, or the flow was eventually throttled to where NPSHA was greater than NPHR on the pump curve, before shutting the pump down. Shutting the pump down during a severe cavitating mode could cause a pick-up or seizure that would prevent operation at a later time.

As stated this is only our opinion and is using our Engineering judgement to extrapolate from very short duration tests to your requirements of 15 minutes. The only way to be sure the pump will survive would be to run a test either in the field or our test facility.

If I can be of any further help please advise.

Sincerely,

Paul J. Kasztejna
Supervising Design Engineer

PJK:kg

cc: Charlie Sandt
Mike Dozier

Calculation OSC-7248

Attachment 4

Ingersoll-Dresser Pump Evaluation of LPI Pump Operation

INGERSOLL-DRESSER PUMP

FAX TRANSMISSION SHEET

TO: Dean AbellanoDate: 3/28/95COMPANY: Duke PowerNUMBER OF PAGES
INCLUDING COVER3FROM: Manish Patel

VOICE NUMBER: _____

REF: Acceptable runout of 8x21/41 pumpaddition Info: 11/13/98Phone conversation: Paul Laszlejwa, Dean Abellano & Bob Gamburg.A similar pump was tested @ 4400 gpm and the NPSH_r = 20 ft.

05C-7248

Attachment 4

page 2 of 3

Ingersoll-Dresser Pump Company**Engineered Pump Group
Engineering Department**942 Memorial Parkway
Phillipsburg, NJ 08865

Fax: 908.859.7322

March 28, 1995

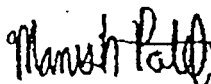
ID Mr. Beau Abellana
Duke Power Company
Oconee Power StationREF: Duke Power
Acceptable Runout Flow for IDP Model 8X21AL Pump

Mr. Abellana,

After reviewing data and curves for the subject pump style, the maximum runout flow you could expect to achieve would be 4,300 gpm. At that flow you would require 20 feet of NPSH. This is roughly 130% of the B.E.P. The only way you could come close to achieving the flow you desire is by going to a maximum diameter impeller. Even in that case you would probably runout at 4,600 gpm and might run out of NPSH.

Also, please find a letter from IDP dated 02MR92 discussing the same subject. The flow I have specified will probably result in higher vibration and some minor cavitation of the pump. The flow (4,000 gpm) specified in the 02MR92 letter allows for some margin, thereby reducing any effects of running the pump at a high flow.

Regards,

 312845Manish Patel
Design Engineer

C2: T. Brown (IDP-Customer Service)

C:\WP\OC1

I N G E R S O L L - R A N DEPD ENGINEERING
942 MEMORIAL PARKWAY
PHILLIPSBURG, NEW JERSEY

DATE: 2 March, 1992 RESEND 30DE92*

TO: Beau Abellana

COMPANY LOCATION Duke Power / Oconee Eng'g

TELECOPIER NUMBER (704) 373-7618 * (803) 885-3901

FROM David Nelson - I-R Engineering

TELEPHONE (908) 859-8464

(NUMBER OF PAGES BEING SENT one
(INCLUDING COVER)SPECIAL INSTRUCTIONS:

Regarding the acceptable run-out flow for your 8X21AL pumps S/N 0169-43/44,

0369-138/139, 0370-36/37, the pumps may be run-out to 4000 g.p.m. maximum.

As you have stated, the actual flow during your test will be approx. 3750 g.p.m.

for about one hour - which is acceptable. If you have any further concerns, please
call.

C/2 T. Brown - I-R CRD

* RE-SENT PER REQUEST OF B. ABELLANA (PHONE CONV. 15DE92)

12/30/92

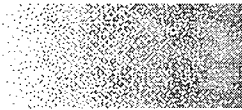
LOCATION: FOURTH FLOOR BENTLEY BUILDING
AUTOMATIC ANSWER NUMBER (201) 859-7322

Calculation OSC-7248

Attachment 5

Operator Action Response Times in Response to MSLB Events on Simulator

OSC-7248
Attachment 5
page 1 of 1



Tracy A Saville

11/16/98 08:09:03 AM

To: Russell L Oakley/Gen/DukePower@DukePower, Robert C Gamberg/Gen/DukePower@DukePower,
Camilo G Abellana/Gen/DukePower@DukePower
cc:
Subject: Securing LPI pumps on MSLB in containment

fyi

----- Forwarded by Tracy A Saville/Gen/DukePower on 11/16/98 08:08 AM -----

Kevin C Mc Murray 11/16/98 08:03 AM

To: Tracy A Saville/Gen/DukePower@DukePower, Ronnie D Lingle/Gen/DukePower@DukePower, Berry G
Davenport/Gen/DukePower@DukePower, Thomas Coutu/Gen/DukePower@DukePower

cc:
Subject: Securing LPI pumps on MSLB in containment

The following is a list of times to secure the LPI pumps with a MSLB in containment. (basically using the ES checklist to secure LPI pumps since they are not needed) This scenario also had a failure of the EFDW valve in the affected header. Crews were a 3 man team with a CR SRO, BOP, and OATC.

Team # 1	6 min 7 sec
Team # 2	4 min 43 sec
Team # 3	7 min 56 sec
Team # 4	10 min 31 sec

These may be used as extra data points for the time to throttle LPI since the ES checklist was being used as the procedure to secure the pumps.

Calculation OSC-7248

Attachment 6

Operator Action Response Times in Response to LBLOCA Events on Simulator

OSC-7248
Attachment 6
page 1 of 1

Tracy A Saville

11/16/98 08:06:22 AM

To: Camilo G Abellana/Gen/DukePower@DukePower, Russell L Oakley/Gen/DukePower@DukePower,
Robert C Gamberg/Gen/DukePower@DukePower

cc:

Subject: time validation of throttling LPI flow to 3000 gpm on LB LOCA

fyi

----- Forwarded by Tracy A Saville/Gen/DukePower on 11/16/98 08:06 AM -----

Kevin C Mc Murray 11/16/98 06:57 AM

To: Tracy A Saville/Gen/DukePower@DukePower, Berry G Davenport/Gen/DukePower@DukePower,
Thomas Coutu/Gen/DukePower@DukePower, Ronnie D Lingle/Gen/DukePower@DukePower

cc:

Subject: time validation of throttling LPI flow to 3000 gpm on LB LOCA

Tracy, here are the simulator times for throttling LPI flow to < 3000 gpm on a LB LOCA. The times are for a 3 man crew with a CR SRO, BOP, and OATC. No other failures were input to the simulator.

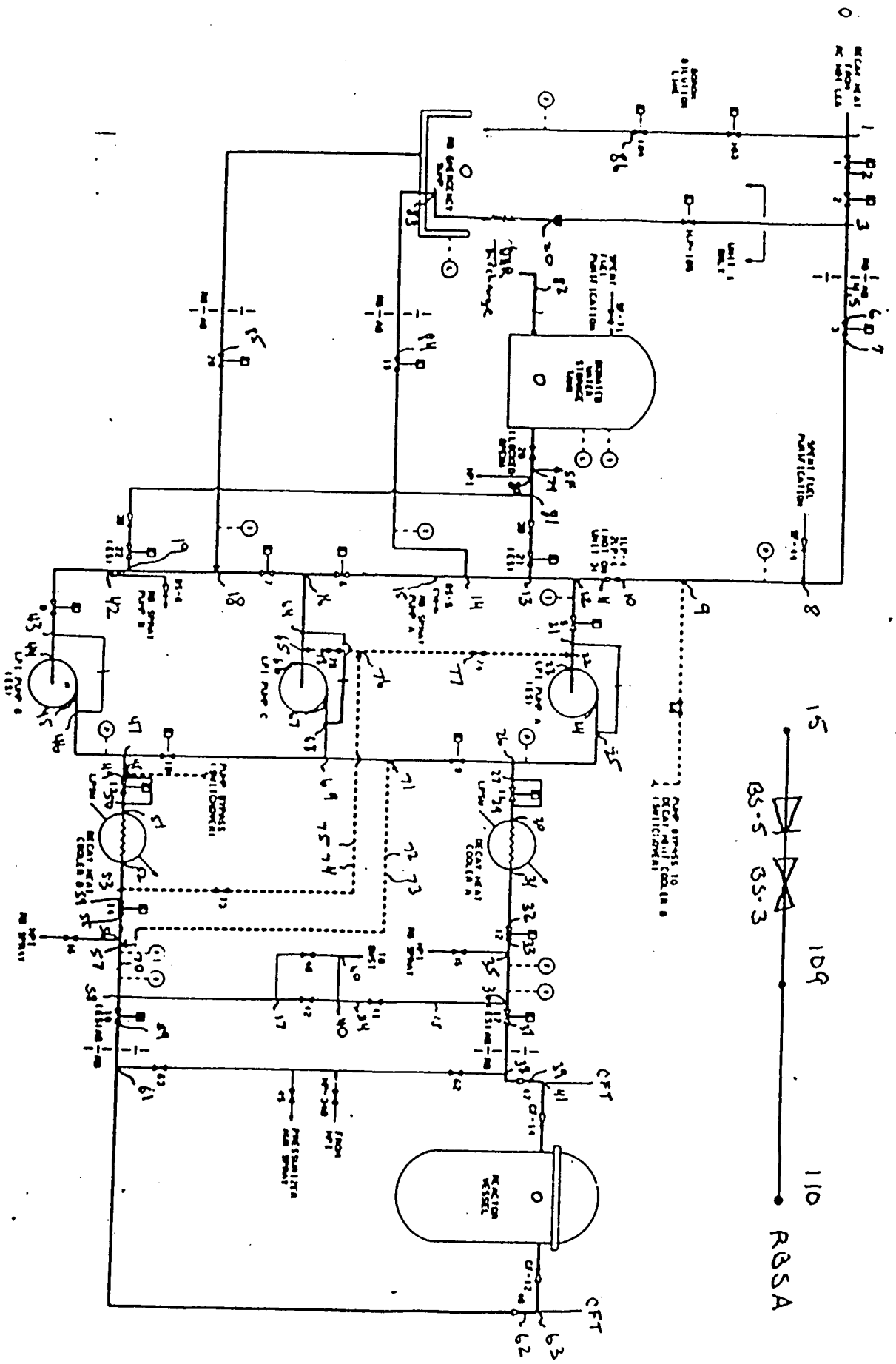
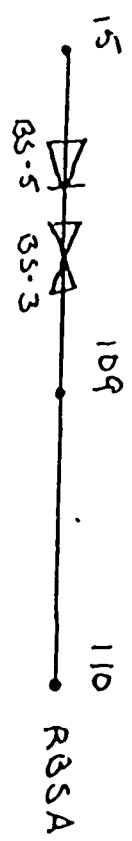
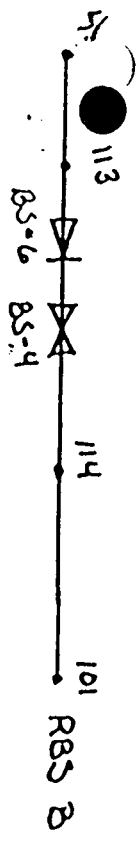
Team # 1	10 min 54 sec
Team # 2	6 min 49 sec
Team # 3	10 min 22 sec
Team # 4	5 min 58 sec
Team # 5	3 min 51 sec
Team # 6	6 min 11 sec
Team # 7	5 min 25 sec

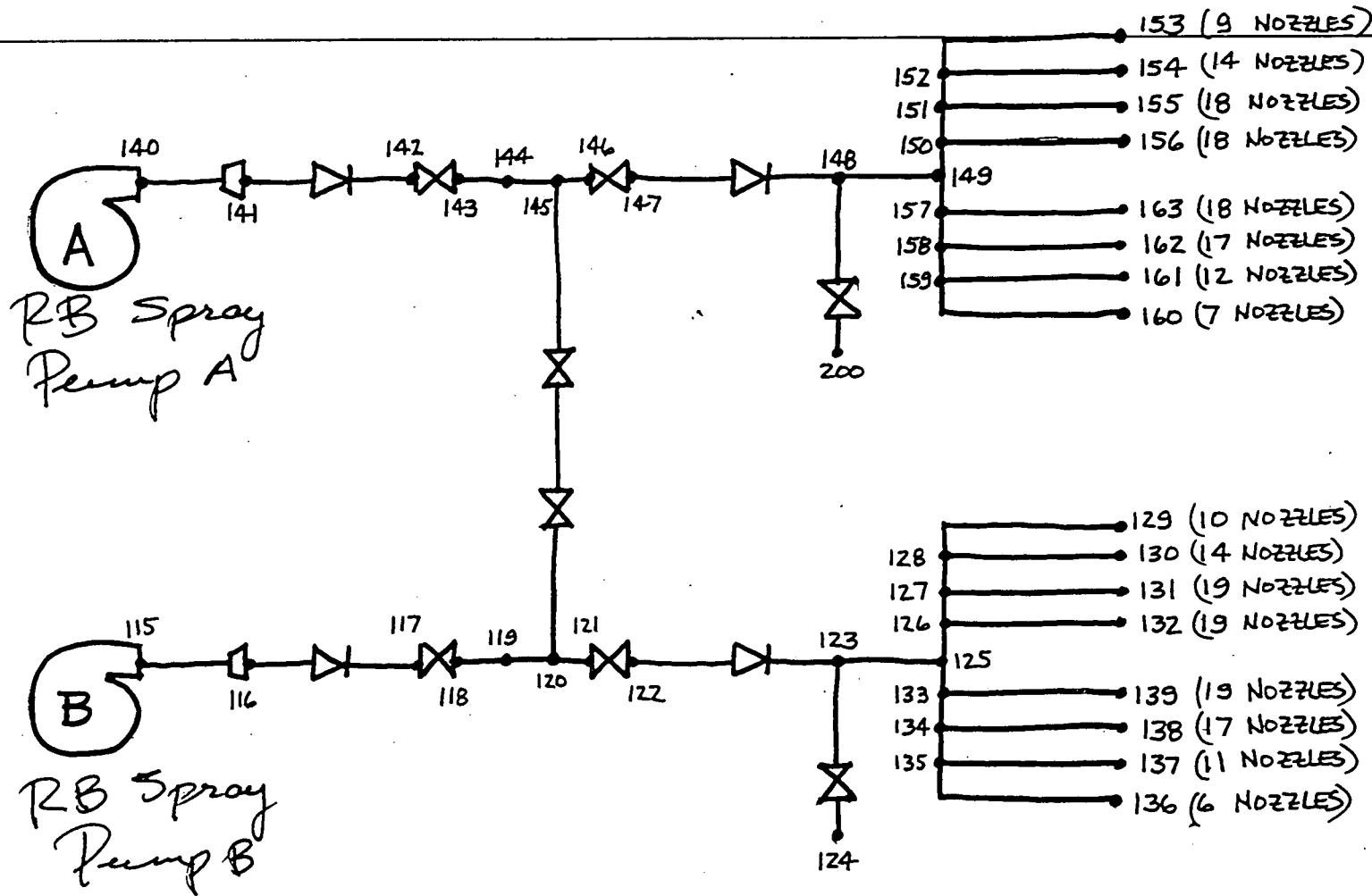
We did do other scenarios, such as a MSLB in containment, and timed the securing of the LPI pumps. I can give you those times but I did not think they were relevant to our current operability problem.

Calculation OSC-7248

Attachment 7

LPI and BS Piping System Nodalization and Piping Segment Data





OSC-7248
a/Mod. #7
Page 2 of 93

Pipe No. 13

Node 13

at Elev. 767'0"

to Node 12

at Elev. 767'0"
Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

14 in.
10
 $f =$ 0.013
 $L =$ 2.6 ft.
 $d =$ 13.5 in.
 $k =$ 0.26

References:

Crane No. 410

D-435 B, rev. 61
Piping Configuration:

"run flow" tee, 2'7 1/2" pipe, "run flow" tee

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)	<u>2</u>	X	10		<u>20</u>
tee branch portion (tee br)		X	50		
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					

Total L/D

X

f

=

k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

20

X

0.013

=

0.26

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
Total =			

Pipe No. 19

Node 0

at Elev. _____

to Node 79

at Elev. 794'3"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

$$f = 0.013$$

$$L = 84 \text{ ft.}$$

$$d = \text{_____} \text{ in.}$$

$$k = 1.42$$

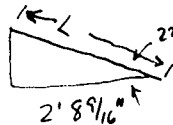
References:

Crane No. 410 (1988)

O-438C rev. 41

O-438D rev. 32

O-438B rev. 23



$$\cos(22.5) = \frac{2' 8 \frac{9}{16}''}{L}$$

Piping Configuration:

$$L = 35.143'' - 2(13.5) = 8 \frac{1}{4}''$$

Entrance from tank, 8" long tank flange, 2' 3 1/2" pipe, 90° LR elbow, 7" pipe, 90° LR elbow, 1' 5" pipe, valve LP-28, 6' 5 1/4" pipe, 90° LR elbow, (13' 4" to ϕ of 22 1/2° miter bend -- subtract 13.5" included in bend resistance) = 12' 2 1/2" pipe, 22 1/2° miter bend, 8 1/4" pipe between miter bend, 22 1/2° miter bend, (5' 7" to ϕ of 11 1/4° miter - 2x13.5") = 3' 4" pipe, 11 1/4° miter, (32' 9" - 2x13.5) = 30' 6" pipe, 11 1/4° miter, (5' 1 7/16" - 2x13.5) = 2' 10 1/2" pipe, 22 1/2° miter, 8 1/4" pipe, 22 1/2° miter, (7' 6" to ϕ RB projection, 16' 10" to ϕ elbow - 13.5" - 2' 1") = 21' 5 1/2" pipe, 90° LR elbow

model as
1/2 LR elbow
to node #79

Calculation:

$$\sum \text{pipe} = 83' 2 \frac{1}{4}'' \rightarrow 84'$$

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)	3.5	X	14		49
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)		X	10		
tee branch portion (tee br)		X	50		
Slightly rounded entrance	$K=0.28 \text{ } r/d=0.25/13 \approx 0.02$ Crane 410 p. A-29				
22 1/2° miter bend	4	X	6		24
11 1/4° miter bend	2	X	3.5		7
		X			
		X			
		X			
		X			
Total L/D =					80

Total L/D

X

f

=

k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

$$80 \times 0.013 + 0.28 = 1.32$$

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
LP-28		$K = 8 f_t = 0.104$	O-245-351 Crane 410 p. A-27
Total =		1.424	

Note: Model used $K=1.54$ } Based on Unit-2
 $L=91'$

at Elev. 779' 0"

Minor Loss Coefficient

$$\begin{array}{r} 794' 3'' \\ 779' 0'' \\ \hline 15' 3'' \\ - 3' 6'' \quad (42'') \\ \hline 11' 9'' \end{array}$$

$\frac{14}{\text{in.}}$
 $f = \frac{0.013}{\text{ft.}}$
 $L = \frac{13.5}{\text{in.}}$
 $d = \frac{0.439}{\text{ft.}}$

Crane No. 410

0- 437B. rev. 82

0-437E rev. 51

O-436 E rev. 6/6

Piping Configuration:

"downstream" side of elbow (model as 1.2 elbows*), 11'9" pipe, 90° LR elbow,
(31" pipe to 4" of 8" pipe to HPI -- model connection as a 14" tee
so subtract 11" + use 1/2 "run" tee) 20" pipe, 1/2 run tee

* Idelchik (page 366) suggests using 1.2 multiplier for miter bend elbows with a "recess". Will assume a 1.2 multiplier for the entire elbow. (Note that 0.5 of an elbow is included in pipe between $\Sigma_{in} = 13'$)

$$\sum p \cdot p_e = 13'5'' \rightarrow 13.5$$

Calculation: BWST and node 79 so "0.7 elbows" included in this pipe.)

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)	1.7	X	14		23.8
45 elbow, r/d=1.5	(45 lr)		X	10		
1/2 tee run (half)	(tee run)	1	X	10		10
tee branch portion	(tee br)		X	50		
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D =						33.8

k

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

33.8

X

$$0.013$$

11

0.439

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
		Total =	

Note: Model used $L = 7.3$

Pipe No. 21

Node 80

at Elev. 779'0"

to Node 81

at Elev. 779'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

14 in.
 $f =$ 0.013
 $L =$ 5.33 ft.
 $d =$ _____ in.
 $k =$ 0.26

References:

Crane No. 410

0-436 B rev. 66

Piping Configuration:

1/2 run T, 5'4" pipe, 1/2 run T

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (half) (tee run)	<u>2</u>	X	10		<u>20</u>
tee branch portion (tee br)		X	50		
		X			
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>20</u>

Total L/D X f = k

20 X 0.013 = 0.26

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
Total =			

Notes: Model used $L = 15.33$

Pipe No. 22

Node 81

at Elev. 779'0"

to Node 13

at Elev. 767'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

14 in.
10
 $f = 0.013$
 $L = 7.2$ ft.
 $d = 13.5$ in.
 $k = 3.01$

References:

Crane No. 410 (1988)

0-436 E, rev. 66

0-436 N, rev. 35

0-435 B, rev. 61

Piping Configuration:

branch flow tee, 90° LR elbow, valve LP-29, 7" pipe, 90° LR elbow,
 valve LP-21, 6' 6 1/2" pipe, "branch flow" part of tee

$\Sigma \text{ pipe} = 7' 1.5" = 7.2'$

Calculation:

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)	<u>2</u>	X	14		<u>28</u>
45 elbow, r/d=1.5	(45 lr)		X	10		
1/2 tee run	(tee run)		X	10		
tee branch portion	(tee br)	<u>2</u>	X	50		<u>100</u>
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D =						<u>128</u>

Total L/D X f = k

128 X 0.013 = 1.664

Note: Pipe components <(or) = 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
LP-29	4892	$K = 1.237$	OM-245-1714
LP-21		$K = 8 f_L = 0.104$	OM-201-192, Crane 410, p. A-27
Total =		<u>3.005</u>	

Note: Model number L = 6.2'

Pipe No. 23

Node 81

at Elev. 779'0"

to Node 19

at Elev. 767'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

14 in.
10
 $f = 0.013$
 $L = 21$ ft.
 $d = 13.5$ in.
 $k = 2.30$

References:

Crane No. 410

0-436E, rev. 66

0-436N, rev. 35

0-435B, rev. 61

Piping Configuration:

1/2 run tee, 13'4.5" pipe, check valve LP-30, 1' pipe, 90° LR elbow,
valve LP-22, 6'6 1/2" pipe, "branch flow" part of tee

$\Sigma \text{ pipe} = 20'11" \rightarrow 21$

Calculation:

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)	<u>1</u>	X	<u>14</u>		<u>14</u>
45 elbow, r/d=1.5	(45 lr)		X	<u>10</u>		
1/2 tee run	(tee run)	<u>1</u>	X	<u>10</u>		<u>10</u>
tee branch portion	(tee br)	<u>1</u>	X	<u>50</u>		<u>50</u>
			X			
			X			
			X			
			X			
			X			
			X			
			X			<u>74</u>
Total L/D =						

Total L/D X f = k

74 X 0.013 = 0.962

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
LP-30	4892	$K = 1.237$ $891 (13.5)^4 / (4892)^2$	OM-245-1714
LP-22		$K = 8 f_t = 0.104$	OM-201-192
		Total =	
		<u>2.303</u>	

Notes: Model used f = 17.7'

Pipe No. 109Node 42at Elev. 767'0"to Node 113at Elev. 767'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

$f = \frac{14}{10}$ in.
 $L = 3.1$ ft.
 $d = 13.7$ in.
 $k = .13$

References:

Crane No. 410

O-435B Rev. 61O-435C Rev. 57

Piping Configuration:

Tee (run) / 30416' / 14 X 10 Red

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)	<u>1</u>	X	10		<u>10</u>
tee branch portion (tee br)		X	50		
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D = <u>10</u>					

Total L/D

X

f

=

k

Note: Pipe components \leq (or $=$) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

10 X .013 = .013

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
Total =			

at Elev. 760' - 1"

References:

Nominal Pipe Diameter

8 in.

Crane No. 410

Pipe Schedule

$$f = \frac{70}{.014}$$

Turbulent Friction Factor

L = n.

Actual Pipe Length

$$d = \underline{8.125 \text{ in.}}$$

Pipe Internal Diameter

$$k = 0.00$$

Minor Loss Coefficient

O-435B Rev. 61

Piping Configuration:

[illegible]

Calculation:

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)		X	14		
45 elbow, r/d=1.5	(45 lr)		X	10		
/2 tee run	(tee run)		X	10		
tee branch portion	(tee br)		X	50		
			X			
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D =						

$$\text{Total L/D} \quad X \quad f \quad = \quad k$$

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
		Total =	

Pipe No. 112

Node 15

at Elev. 767'-0" to Node 109

at Elev. 760'-1"

Pipe Data:

Nominal Pipe Diameter

10 in.

Pipe Schedule

20

Turbulent Friction Factor

$f = .014$

Actual Pipe Length

$L = 70.09$ ft.

Pipe Internal Diameter

$d = 10.25$ in.

Minor Loss Coefficient

$k = 2.58$

References:

Crane No. 410

O-2435B Rev. 32

O-2435C Rev. 36

Piping Configuration:

<u>14X10 red Tee B</u>	<u>90</u>	<u>1.16</u>	<u>90</u>	<u>2.083</u>	<u>90</u>
<u>Tee Run / Tee Run</u>	<u>90</u>	<u>90</u>	<u>3.917</u>	<u>90</u>	
<u>BS-3</u>	<u>2.9167</u>	<u>90 red. Elb.</u>			
<u>2.9167 includes Expansion joint</u>					
<u>90° red. Elb. modeled as red. & Elb.</u>					
<u>ΣL = 10.09</u>					

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)	<u>7</u>	X	14		<u>98</u>
45 elbow, r/d=1.5 (45 lr)		X	10		
.12 tee run (tee run)	<u>2</u>	X	10		<u>20</u>
tee branch portion (tee br)	<u>1</u>	X	50		<u>50</u>
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>168</u>

Total L/D X f = k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
<u>BS-3</u> <u>10X8</u>	<u>gate</u> <u>valve</u> <u>red.</u>	$K = 8 \cdot f = 8 \cdot (.014) = .112$ $K = .8 \sin(\frac{\theta}{2}) (1 - \beta^2) / \beta^4$ $\frac{\theta}{2} = \tan^{-1} \left(\frac{(10.25 - 8.125)/2}{7} \right)$ $\beta = \frac{8.125}{10.25} = .793$ $K = .04456 / (.793)^4 = .113$	
Total =			

at Elev. 760'-1"

Minor Loss Coefficient

$\frac{8}{20}$ in.
 $f = \frac{.014}{.1}$
 $L = \frac{.1}{.1}$ ft.
 $d = \frac{8.125}{0.00}$ in.
 $k = \frac{0.00}{0.00}$

Crane No. 410

0-2435B Rev. 32

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)	X	14		
45 elbow, r/d=1.5	(45 lr)	X	10		
1/2 tee run	(tee run)	X	10		
tee branch portion	(tee br)	X	50		
		X			
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					

Total L/D =

$$\boxed{} \times \boxed{} = \boxed{}$$

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlined in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
		Total =	

at Elev. 761' ± 3"

Crane No. 410

$\frac{8}{20}$ in.
 $f = \frac{.014}{.1}$
 $L = \frac{8.125}{0.00}$ ft.
 $d =$
 $k =$

[illegible]

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)		X	14		
45 elbow, r/d=1.5	(45 lr)		X	10		
.75 tee run	(tee run)		X	10		
tee branch portion	(tee br)		X	50		
			X			
			X			
			X			
			X			
			X			
			X			
			X			
						Total L/D =

Total L/D =

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlined in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
FBS Pump "B"		<div>Head</div> <div>Flow</div> <div>622</div> <div>0</div> <div>470</div> <div>1500</div> <div>385</div> <div>1800</div>	Ref. (8.14, 8.17, 8.18)
Total =			

Pipe No. 115

Node 115

at Elev. 761'3"

to Node 116

at Elev. 762'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

4 in.
40
 $f =$
 $L =$ 0.28 ft.
 $d =$ 4.026 in.
 $k =$ 0.148

References:

Crane No. 410

0.435C-67

Piping Configuration:

4" WN RF Flange (3 3/8" → 0.28'), 4x6 "enlarger"

$\sum L = 0.28'$

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)	X	14		
45 elbow, r/d=1.5	(45 lr)	X	10		
1/2 tee run	(tee run)	X	10		
tee branch portion	(tee br)	X	50		
		X			
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					

Total L/D

X

f

=

k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

X

=

k

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
4x6 "enlarger"		$k = 2.6 \sin^2\left(\frac{\theta}{2}\right) (1 - \beta^2)^2$ $1.026 \left[\begin{array}{c} 6.065 \\ \beta = \left(\frac{4.026}{6.065} \right) \end{array} \right]$ $\rightarrow 5.5" \leftarrow L$ $\frac{\theta}{2} = \tan^{-1} \left(\frac{(6.065 - 4.026)/2}{5.5} \right)$	Crane 410 (1988) p. A-26 Grinnell Supply Sales Co "Pipe Fitters Handbook" p. 34
Total =		0.148	

Pipe No. 116

Node 116

at Elev. 762' 0"

to Node 117

at Elev. 764' 1 1/2"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

$$\begin{array}{rcl} & 6 & \text{in.} \\ \hline f = & 40 & \\ \hline L = & 1.32 & \text{ft.} \\ d = & 6.065 & \text{in.} \\ k = & 2.922 & \end{array}$$

References:

Crane No. 410

O-435C-67

Piping Configuration:

0.67' P.F.E., 6" 300# W.F. FLANGE ($3\frac{7}{8}" \rightarrow 0.323'$), check value 1BS-11,
6" 300# W.F. FLANGE (0.323'), 6"x8" "enlarger"

$$\sum L = 1.32'$$

Calculation:

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)		X	14		
Elbow, r/d=1.5	(45 lr)		X	10		
Tee run	(tee run)		X	10		
Tee branch portion	(tee br)		X	50		
			X			
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D	X					Total L/D =

Total L/D

x

f

11



k

x

11

Total L/D =

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlined in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
6" x 3" "enlarger" 	652	$K = 2.6 \sin\left(\frac{\theta}{2}\right) (1 - \beta^2)^2$  $\left(\frac{\theta}{2}\right) = \tan^{-1}\left(\frac{1.03}{6}\right)$ $\rightarrow 6" \leftarrow L$ $\beta = \frac{6.065}{8.125} = 0.746$ $K = 0.086$	Crane 410 (1988) p. A-26 L from Grinnell's Pipe Fitters Handbook p. 34
PS-11		$K = 891 (6.065)^4 / (652)^2 = 2.84$	OM-245-1790
Total =		2.922	

CRANE**NUCLEAR****CRANE NUCLEAR, INC.****860 REMINGTON BLVD, BOLINGBROOK, IL 60440****TELECOPIER TRANSMITTAL**

DATE: October 6, 1998	TOTAL PAGES: 1 (including cover)
TO: David King	FROM: Bruce Harry
TITLE: Mech/Civil Engineering	TITLE: Nuclear Product Manager
COMPANY: Duke - Oconee	
PHONE: 864-885-4369	PHONE: 630-226-4960
FAX: 864-885-3402	FAX: 630-226-4646
	E-MAIL: bruce_harry@cranevalve.com
SUBJECT: Cv Data for CRANE 8" Model 33-1/2 LUF	

Reference: Assembly Drawing No. K-6996E

Following is the Cv versus % travel information per your request;

<u>% Open</u>	<u>Cv (GPM)</u>
Full Open	5700
10	5380
20	5146
30	4600
40	3974
50	3316
60	2573
70	1858
80	1144
90	429
96	Flow Isolation

If you require any additional information, please contact me.

Best regards,

Node 118

at Elev. 765'-3" to Node 119

at Elev. 765'-3"

Crane No. 410

8 in.

20

$$f = .014$$
$$L = \frac{1000}{3} \text{ n.}$$
$$d = \underline{8.125} \text{ in.}$$
$$k = 476$$

4.75 / 45° / 45° / 9.875 / 90° / 18.75 /

$$\Sigma L = 33.3'$$
[illegible]

Total L/D = 34

$$\text{Total L/D} \quad X \quad f \quad = \quad k$$

Note: Pipe components \leq (or \geq) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

$$\boxed{34} \times \boxed{.014} = \boxed{.476}$$

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
Total =			

Pipe No. 119

Node 119.

at Elev. 765-3" to Node 120

at Elev. $816' - 6''$

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

References:

Crane No. 410

$$\begin{array}{r} 8 \text{ in.} \\ \hline 20 \\ f = \frac{\quad}{20} = .014 \\ L = \frac{103.3}{\quad} \text{ ft.} \\ d = \frac{8.125}{\quad} \text{ in.} \\ k = \frac{6.69}{\quad} \end{array}$$

O-435 B Rev. 6
C-444 Rev. 50
C-439 E Rev. 52

Piping Configuration:

Configuration:

33.5' / 90° / 2.74 / 90° / 6.33' / 90° / 37.33' /
90° / 6.83 / 45° / 7.5 / 90° / 9.08 / Tue R

$\Sigma L = 103.3'$

Calculation:

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)	<u>5</u>	X	14		<u>70</u>
45 elbow, r/d=1.5	(45 lr)	<u>1</u>	X	10		<u>10</u>
1/2 tee run	(tee run)	<u>1</u>	X	10		<u>10</u>
tee branch portion	(tee br)		X	50		
			X			:
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D =						<u>90</u>

Total L/D = 90

$$\text{Total L/D} \quad X \quad f \quad = \quad k$$

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

$$\boxed{90} \times \boxed{.014} = \boxed{1.26}$$

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
Orifice		See Pipe # 153 (144-145) $K = 5.38$	
Total =			

Pipe No. 120

Node 120 at Elev. 816'-6" to Node 121 at Elev. 812'-0"

Pipe Data:

Nominal Pipe Diameter
Pipe Schedule
Turbulent Friction Factor
Actual Pipe Length
Pipe Internal Diameter
Minor Loss Coefficient

8 in.
20
 $f = .014$
 $L = 176.64$ ft.
 $d = 8.125$ in.
 $k = 2.296$

References:

Crane No. 410

O-439E Rev. 59
O-439A Rev. 56
O-439D Rev. 59
O-439C Rev. 70

Piping Configuration:

Tu. B / 13 / 90° / 7.375 / 90° / 2.083 / 90° /
29.167 / 45° / 8.006 / 45° / 75.25 / 90° / 38.722 /
45° / 2.119 / 90° / 9.167 / 90°

 $\Sigma L = 176.64$

Calculation:

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)	<u>6</u>	X	14		<u>84</u>
45 elbow, r/d=1.5	(45 lr)	<u>3</u>	X	10		<u>30</u>
1/2 tee run	(tee run)		X	10		
tee branch portion	(tee br)	<u>1</u>	X	50		<u>50</u>
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D =						<u>164</u>

Total L/D X f = k

164 X .014 = 2.296

Note: Pipe components \leq (or $=$) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
Total =			

Pipe No. 121

Node 121

at Elev. 812'-0"

to Node 122

at Elev. 812'-0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

8 in.
20
 $f = .014$
 $L = .1$ ft.
 $d = 8.125$ in.
 $k = 5.374$

References:

Crane No. 410

C-439C Rev. 70

Piping Configuration:

BS-2

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)		X	10		
tee branch portion (tee br)		X	50		
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					

Total L/D X f = k

 X =

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
<u>BS-2</u>	<u>850</u>	$k = \frac{891(8.125)^4}{(850)^2}$ $k = 5.374$	<u>OM-201-0556</u>
Total =			

Node 122.

at Elev. 812'0" to Node 123

at Elev. 812'0"

References:

8 in.

20

$$f = .014$$
$$L = \underline{14.3} \text{ n.}$$
$$d = 8.125 \text{ in.}$$
$$k = 7.046$$

Crane No. 410

0-439C Rev. 70

O-477 Rev. 12

13.33	65.5° EL6	BS-19	1
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$$\Sigma L = 14.3$$
[illegible]

Total L/D = 10.2

X

f

11

k

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

10.2

X

0.014

11

0 112

Valve	Cv	k = $891 \cdot d^4 / Cv^2$	Reference
BS-19	750	$k = \frac{891 (8.175)^4}{(750)^2}$ $= 6.903$	019-245-168
Total =			

Pipe No. 123

Node 123

at Elev. 812'-0" to Node 124

at Elev. 810'-7"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

1 in.
40
 $f = \underline{.023}$
 $L = \underline{1}$ ft.
 $d = \underline{1.049}$ in.
 $k = \underline{23.1}$

References:

Crane No. 410

0-477 Rev. 12

Piping Configuration:

1/2 coupling 1.5' / BS-20 / .5' / pipe exit

$\Sigma L = 1'$

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)		X	10		
tee branch portion (tee br)	<u>1</u>	X	50		<u>50</u>
		X			
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>50</u>

Total L/D

X

f

=

k

Note: Pipe components \leq (or $=$) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

50 X .023 = 1.15

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
<u>BS-20</u>	<u>7</u>	$K = \frac{891 (1.049)^4}{(7)^2}$ $K = 22.00$	
Total =			

at Elev. 810'-7"

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Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)		X	14		
45 elbow, r/d=1.5	(45 lr)		X	10		
.75 tee run	(tee run)		X	10		
tee branch portion	(tee br)		X	50		
			X			
			X			
			X			
			X			
			X			
			X			
			X			
						Total L/D =

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlined in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
Pipe Exit		$k = 1$	
Total =			

Pipe No. 125

Node 123 at Elcv. 812'0" to Node 125 at Elcv. 944-0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

$$\begin{array}{r} 8 \text{ in.} \\ \hline 105 \\ f = \hline .014 \\ L = \hline 171.24 \text{ ft.} \\ d = \hline 8.329 \text{ in.} \\ k = \hline 2.072 \end{array}$$

References:

Crane No. 410

Piping Configuration:

$1'' \text{ Hbl} / \text{coupling} / 28.927' / 90^\circ / 5.625 / 90^\circ /$
 $45' / 90^\circ / 8.0365 / 90^\circ / 76.5' / 90^\circ / 90^\circ / 4.5' /$
 $90^\circ / 2.667' / \text{Tree B}$
 $ZL = 171.24'$

Calculation:

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)	7	X	14		98
45 elbow, r/d=1.5	(45 lr)		X	10		
.72 tee run	(tee run)		X	10		
tee branch portion	(tee br)	1	X	50		50
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D =						148

$$\text{Total L/D} \quad X \quad f \quad = \quad k$$

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
		Total =	

Pipe No. 126 160

Node A B at Elev. 944' 0" to Node A B at Elev. 944' 0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

8 in.
105
 $f =$.014
 $d =$ 8.329 in.
 $k =$.28

References:

Crane No. 410

O-477 Rev. 12

Piping Configuration:

Tee Run / A = 4.75' / Tee Run
 B = 4.067' /

$\Sigma L =$ A = 4.75'
B = 4.067'

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)	X	14		
45 elbow, r/d=1.5	(45 lr)	X	10		
1/2 tee run	(tee run)	X	10		<u>20</u>
tee branch portion	(tee br)	X	50		
		X			
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>20</u>

Total L/D X f = k

20 X .014 = .28

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
Total =			

Pipe No. B A
127 161

Node A B
150 126 at Elev. 944'0" to Node A B
151 127 at Elev. 944'0"

Pipe Data:

Nominal Pipe Diameter
Pipe Schedule
Turbulent Friction Factor
Actual Pipe Length
Pipe Internal Diameter
Minor Loss Coefficient

8 in.
105
f = .014
L = 12.8 ft.
d = 8.329 in.
k = .28

References:

Crane No. 410

0-477 Rev 12

Piping Configuration:

Tee Run / 12.833' / Tee Run

Σ L = 12.8'

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)	<u>2</u>	X	10		<u>20</u>
tee branch portion (tee br)		X	50		
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>20</u>

Total L/D X f = k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

20 X 0.014 = 0.28

Valve	Cv	k = 891 * d^4 / Cv^2	Reference
Total =			

Node 151 127 at Elev. 944'0" to Node 152 128 at Elev. 944'0"

A	B
15.6	15.4

$$\begin{array}{r} 6 \text{ in.} \\ \hline 105 \\ f = \hline .015 (.014) \\ L = \hline \text{ft.} \\ d = \hline 6.357 \text{ in.} \\ k = \hline .395 \end{array}$$

O-477 Rev. 12

8" Tee P / 8x6 red. / $A = 3.0$ / $B = 2.833$ / $G = 45^\circ$ / $12.6042'$ /
Lateral Run (will be modeled as a T)

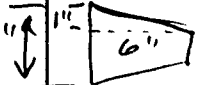
$$\Sigma L = \begin{array}{l} A = 15.6 \\ B = 15.4 \end{array}$$

Component		Number	X	L/D =	Component L/D
90 elbow, r/d=1.5	(90 lr)		X	14	
45 elbow, r/d=1.5	(45 lr)	/	X	10 (.015)	K=.15
.72 tee run	(tee run)	/	X	10 (.015)	K=.15
tee branch portion	(tee br)		X	50	
1/2 Tee Run 8"			X	10(.014)	K=.14 (6.3 8")
			X		
			X		
			X		
			X		
			X		
Total					K = .35

Total ~~LD~~ = .35

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlined in the table on p. 2-10 in Crane 410.

$$\boxed{} \times \boxed{} = \boxed{0.35}$$

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
8x6	red.	$K = .8 \sin\left(\frac{\theta}{2}\right) (1 - \beta^2)$  $\frac{\theta}{2} = \tan^{-1}(1/6)$ $= 18.43$ $K = .045$	P.A-26 Crane 410
Total =		.395	

Pipe No.

Node A B 152 128 at Elev. 944' 0" to Node A B 153 129 at Elev. 944' 0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

References:

Crane No. 410

O-477 Rev. 12

$f = \frac{4}{105} = .017$ in.
 $\delta = .015$ ft.
 $d = 4.26$ in.
 $k = .283$

Piping Configuration:

6" lateral run / 6"x4" red / $A=17.3$ / $B=17.75$ / 4" 45° e 16'

$$A = 0.57$$
$$B = 2.5'$$
$$\Sigma L = A = 17.8$$

Calculation:

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)		X	14		
45 elbow, r/d=1.5	(45 lr)	/	X	10 (.017)		K=.17
.1/2 tee run (<i>ratio</i>)	(tee run)	/	X	10 (.015)		K=.15(4)
tee branch portion	(tee br)		X	50		8
			X			.
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D =						16

Total L/D = $14 = .20$

$$\text{Total L/D} \quad X \quad f \quad = \quad k$$

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlined in the table on p. 2-10 in Crane 410.

$$\boxed{} \times \boxed{} = \boxed{.26}$$

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
6x4	red	$k = .8 \sin\left(\frac{\theta}{2}\right) (1 - \beta^2)$ $= .8 \sin\left(\tan^{-1}\left(\frac{6.357 - 4.260}{5.7}\right)\right) \left(1 - \left(\frac{4.260}{6.357}\right)^2\right)$ $= .083$	
		Total =	.283

Pipe No. 130 164

Node A B 152 128 at Elev. 944'0" to Node A B 154 130 at Elev. 944'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length A = 2.5' B = 6.0'

Pipe Internal Diameter

Minor Loss Coefficient

4 in.
105
 $f = .017$
 $L =$ ft.
 $d = 4.26$ in.
 $k = .255$

References:

Crane No. 410

O-477 Rev 12

Piping Configuration:

lateral B / A = 2.5' B = 6.0'

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
5 elbow, r/d=1.5 (45 lr)		X	10		
.12 tee run (tee run)		X	10		
tee branch portion (tee br)		X	50		
		X			
<u>45° miter bend</u>	<u>1</u>	X	<u>15</u>		<u>15</u>
		X			
		X			
		X			
		X			
		X			
Total L/D = <u>15</u>					

Total L/D X f = k

15 X .017 = .255

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
Total =			

Node $\overset{A}{151} \overset{B}{127}$ at Elev. $\underline{944'0''}$ to Node $\overset{A}{155} \overset{B}{131}$ at Elev. $\underline{944'0''}$

Minor Loss Coefficient

$$A = 1.5 \text{ B} = 5'$$

$\frac{4}{105}$ in.
 $f = \frac{.017}{.017}$
 $L = \frac{.017}{.017}$ ft.
 $d = \frac{7.26}{7.26}$ in.
 $k = \frac{.83}{.83}$

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Tree B / $A=1.5$
 $B=5$

$\sum L = A=1.5$
 $B=5$

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)		X	14		
45 elbow, r/d=1.5	(45 lr)		X	10		
1/2 tee run	(tee run)		X	10		
tee branch portion	(tee br)	/	X	50		50
			X			.
			X			
			X			
			X			
			X			
			X			
						Total L/D = 50

$$\boxed{50} \times \boxed{.017} = \boxed{.85}$$

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlined in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
Total =			

Pipe No. B 132 A 144

Node A 150 B 126 at Elev. 944'0" to Node A 156 B 132 at Elev. 944'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

4 in.
105
 $f = .017$
 $L =$ ft.
 $d = 4.26$ in.
 $k = .85$

References:

Crane No. 410

0-477 Rev. 12

Piping Configuration:

Tee B / A=1.5
B=5

$\Sigma L = \frac{A}{B} = \frac{1.5}{5}$

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)		X	10		
tee branch portion (tee br)	<u>1</u>	X	50		<u>50</u>
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>50</u>

Total L/D X f = k

50 X .017 = .85

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
Total =			

Pipe No. B A
133 167

Node A B
149 125 at Elev. 944'0" to Node A B
157 133 at Elev. 944'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length $A = 8.1$ $B = 7.7$

Pipe Internal Diameter

Minor Loss Coefficient

8 in.
105
 $f = .014$
 $L =$ ft.
 $d = 8.329$ in.
 $k = .28$

References:

Crane No. 410

0-477 Rev. 12

Piping Configuration:

Tee R / A = 8.1 / Tee Run
B = 7.7

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
5 elbow, r/d=1.5 (45 lr)		X	10		
.12 tee run (tee run)	<u>2</u>	X	10		<u>20</u>
tee branch portion (tee br)		X	50		
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					

Total L/D X f = k

Note: Pipe components \leq (or $=$) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

20 X .014 = .28

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
Total =			

Pipe No. B 134 A 108

Node A 157 B 133 at Elev. 944'0" to Node A 158 B 134 at Elev. 944'0"

Pipe Data:

Nominal Pipe Diameter
Pipe Schedule
Turbulent Friction Factor
Actual Pipe Length
Pipe Internal Diameter
Minor Loss Coefficient

8 in.
105
 $f = .014$
 $L = 13.1$ ft.
 $d = 8.329$ in.
 $k = .42$

References:

Crane No. 410

0-477 Rev. 12

Piping Configuration:

Tee R / 10.5 / 45° / 2.599 / Lateral Run

Σ L = 13.1

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)	<u>1</u>	X	10		<u>10</u>
1/2 tee run (tee run)	<u>2</u>	X	10		<u>20</u>
tee branch portion (tee br)		X	50		
		X			
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D = <u>30</u>					

Total L/D X f = k

30 X .014 = .42

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
Total =			

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
6" x 4"	red	$k = .8 \sin\left(\frac{\theta}{2}\right) (1 - \beta^2)$ $\beta = \frac{4.26}{6.357}$ $\frac{\theta}{2} = \tan^{-1} \left[\frac{(6.357 - 4.26)/2}{5.5} \right]$ $k = .083$	
		Total =	.283

Pipe No. B A
137 171

Node A B
159 135 at Elev. 944'0" to Node A B
161 137 at Elev. 944'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length A = 6.875' B = 3'

Pipe Internal Diameter

Minor Loss Coefficient

4 in.
105
 $f = .017$
L ft.
 $d = 4.26$ in.
 $k = .255$

References:

Crane No. 410

0-477 Rev. 12

Piping Configuration:

4" Lateral B / A = 6.875
B = 3'
Lateral is 45° miter Bend

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
.12 tee run (tee run)		X	10		
tee branch portion (tee br)		X	50		
<u>45° miter Bend</u>	<u>1</u>	X	<u>15</u>		<u>15</u>
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>15</u>

Total L/D X f = k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

15 X .017 = .255

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
Total =			

Pipe No. B A
138 172

Node A B
158 134 at Elev. 944'0" to Node A B
162 138 at Elev. _____

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length $A = 5.125$ $B = 1.25$ $L =$ _____ ft.

Pipe Internal Diameter

Minor Loss Coefficient

$d = 4$ in.
 $f = .017$
 $d = 4.26$ in.
 $k = .255$

References:

Crane No. 410

0-477 Rev. 12

Piping Configuration:

4" lateral B / A = 5.125
B = 1.25
lateral is 45° miter bend
 $\Sigma L = A = 5.125$
 $B = 1.25$

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)	_____	X	14		_____
45 elbow, r/d=1.5 (45 lr)	_____	X	10		_____
1/2 tee run (tee run)	_____	X	10		_____
tee branch portion (tee br)	_____	X	50		_____
<u>45° miter Bend</u>	<u>1</u>	X	<u>15</u>		<u>15</u>
_____	_____	X	_____		_____
_____	_____	X	_____		_____
_____	_____	X	_____		_____
_____	_____	X	_____		_____
_____	_____	X	_____		_____
_____	_____	X	_____		_____
Total L/D = <u>15</u>					

Total L/D

X

f

=

k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

15 X .017 = .255

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
Total =		_____	_____

Pipe No. B 139 A 173

Node A 157 B 133 at Elev. 944'0" to Node A 163 B 139 at Elev. 944'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length A=1.5 B=5

Pipe Internal Diameter

Minor Loss Coefficient

4 in.
105
 $f = .017$
 $L =$ ft.
 $d = 4.26$ in.
 $k = .85$

References:

Crane No. 410

0-477 Pa. 12

Piping Configuration:

Tee B / A=1.5
B=5

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
5 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)		X	10		
tee branch portion (tee br)	<u>1</u>	X	50		<u>50</u>
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>50</u>

Total L/D X f = k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

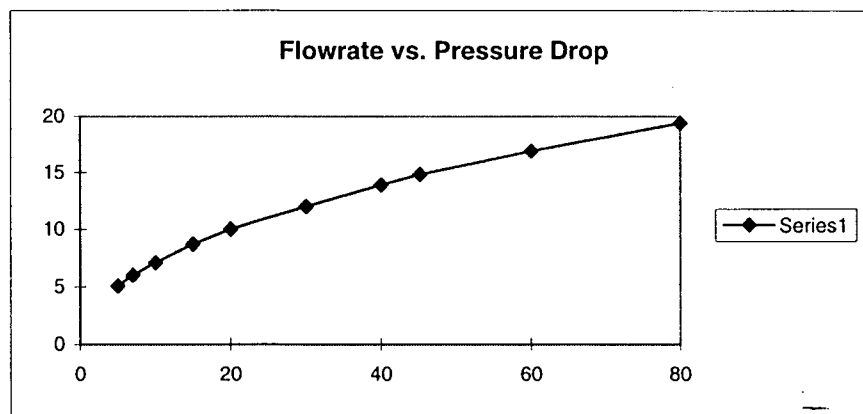
50 X .017 = .85

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
Total =			

Spray Nozzles have a capacity of 13.9 gpm @ 40 psid
Effective K based on 4" dia schedule 10s pipe, 40 psi pressure drop

			K		
Pipe Numbers	Node Number to 0 (FGN)	# of nozzles	total flow	velocity in 4" sch 10	"Effective" K
		6	83.400	1.877	1688.203
181	160	7	97.300	2.190	1240.312
147	136	8	111.200	2.503	949.614
140	129	10	139.000	3.129	607.753
174	153	11	152.900	3.442	502.275
180	161	12	166.800	3.755	422.051
146	137	13	180.700	4.068	359.617
		14	194.600	4.381	310.078
141,175	130,154	15	208.500	4.694	270.112
		17	236.300	5.319	210.295
145,179	138,162	18	250.200	5.632	187.578
142,143,144	131,132,139	19	264.100	5.945	168.353
176,177,178	155,156,163	20	278.000	6.258	151.938
		1	13.900	0.313	60775.300
		2	27.800	0.626	15193.825
		3	41.700	0.939	6752.811
		4	55.600	1.252	3798.456
		5	69.500	1.565	2431.012
		9	125.100	2.816	750.312
		16	222.400	5.007	237.404

psid	data sheet gpm	model predicts	model "error"
5	5.1	4.914	-3.64%
7	6	5.815	-3.09%
10	7.1	6.950	-2.11%
15	8.7	8.512	-2.16%
20	10	9.829	-1.71%
30	12	12.038	0.31%
40	13.9	13.900	0.00%
45.17587	14.815		
60	16.9	17.024	0.73%
80	19.4	19.658	1.33%



Node 110 .

at Elev. 760'-1" to Node 140

at Elev. _____

References:

in.

$$f =$$
$$L = \frac{\cdot}{\cdot} \Omega.$$
$$d = 8.125 \text{ in.}$$
$$k = 0.00$$

Crane No. 410

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)		X	14		
45 elbow, r/d=1.5	(45 lr)		X	10		
.75 tee run	(tee run)		X	10		
tee branch portion	(tee br)		X	50		
			X			
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D =						

Total L/D =

$$\text{Total L/D} \quad X \quad f \quad = \quad k$$

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
ZBS Pump "A"		Head Flow 622 0 470 1500 385 1800	Ref. (8.16, 8.17, 8.18)
Total =			

Pipe No. 149

Node 140

at Elev. 761'3"

to Node 141

at Elev. 762'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

4 in.
40
 $f = .017$
 $L = 0.28$ ft.
 $d = 4.026$ in.
 $k = 0.148$

References:

Crane No. 410

0-435C Rev. 57

Piping Configuration:

4" WN RF Flange (3 3/8" → 0.28'), 4x6 "enlarger"

$\sum L = 0.28'$

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)		X	10		
tee branch portion (tee br)		X	50		
		X			
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					

Total L/D

X

f

=

k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

X

=

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
4x6 "enlarger"		$k = 2.6 \sin\left(\frac{\theta}{2}\right) (1 - \beta^2)^2$ $1.026 \left[6.065 \right] \beta = \left(\frac{4.026}{6.065} \right)$ $\rightarrow 5.5" \leftarrow L$ $\frac{\theta}{2} = \tan^{-1} \left(\frac{(6.065 - 4.026)/2}{5.5} \right)$	Crane 410 (1988) p. A-26 Grinnell Supply Sales Co. "Pipe Fitters Handbook" p. 34
Total =		0.148	

Pipe No. 150

Node 141

at Elev. 762' 0"

to Node 142

at Elev. 764' 1 1/2"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

6 in.
40
 $f = \underline{0.014}$
 $L = \underline{1.32}$ ft.
 $d = \underline{6.065}$ in.
 $k = \underline{2.922}$

References:

Crane No. 410

0-435C Rev. 57

Piping Configuration:

0.67' PIPE, 6" 300# WN FLANGE (3 7/8" → 0.323'), check valve BS-11,
6" 300# WN FLANGE (0.323'), 6" x 8" "enlarger"

$\sum L = 1.32'$

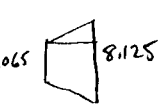
Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)	X	14		
45 elbow, r/d=1.5	(45 lr)	X	10		
1/2 tee run	(tee run)	X	10		
tee branch portion	(tee br)	X	50		
		X			
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					

Total L/D X f = k

 X =

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
6" x 3" "enlarger"		$K = 2.6 \sin(\frac{\theta}{2}) (1 - \beta^2)^2$  $(\frac{\theta}{2}) = \tan^{-1}(\frac{1.03}{6})$ $\beta = \frac{6.065}{8.125} = 0.746$ $K = 0.086$	Crane 410 (1988) p. A-26 L from Grinnell's Pipe Fitters Handbook p. 34
BS-11	652	$K = 891 (6.065)^4 / (652)^2 = 2.84$	OM-245-1790
Total =		<u>2.922</u>	

Pipe No. 151

Node 142 at Elev. 764' 1/4" to Node 143 at Elev. 765' 55/8"

ripa Data:

Nominal Pipe Diameter
Pipe Schedule
Turbulent Friction Factor
Actual Pipe Length
Pipe Internal Diameter
Minor Loss Coefficient

References:

Crane No. 410

O-435C Rev. 57

$\frac{8}{20}$ in.
 $f = .014$
 $L = .1$ ft.
 $d = 8.125$ in.
 $k = .12$

Piping Configuration:

[illegible]

Calculation:

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)		X	14		
45 elbow, r/d=1.5	(45 lr)		X	10		
1/2 tee run	(tee run)		X	10		
tee branch portion	(tee br)		X	50		
			X			
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D =						

Total L/D =

Total L/D	X	f	=	k
-----------	---	---	---	---

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlined in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
BS-12	5700	$k = \frac{891 (8.125)^4}{(5700)^2} = .120$	
Total =			

Pipe No. 152

Node 143

at Elev. 765'6"

to Node 144

at Elev. 817'6"

Pipe Data:

Nominal Pipe Diameter
Pipe Schedule
Turbulent Friction Factor
Actual Pipe Length
Pipe Internal Diameter
Minor Loss Coefficient

8 in.
20
 $f = .014$
 $L = 201.7$ ft.
 $d = 8.125$ in.
 $k = 3.304$

References:

Crane No. 410
O-435B Rev. 61
O-444 Rev. 52
O-436D Rev. 61
O-437A Rev. 64
O-439A Rev. 56

Piping Configuration:

90°/3.27' / 90°/14.75' / 90°/13.08' / 90°/1.33'
90°/4.75' / 90°/8' / 90°/4.833' / 90°/1.578'
60°/35.75' / 30°/22.03' / 30°/6.667' / 30°/5.8' / 30°/9.25'
90°/14.58' / 45°/2' / 45°/16' / 90°/2.75' / 90°/4.67' / 90°/11.375'

Calculation: 90°/20'

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)	<u>13</u>	X	14		<u>182</u>
45 elbow, r/d=1.5 (45 lr)	<u>2</u>	X	10		<u>20</u>
1/2 tee run (tee run)		X	10		
tee branch portion (tee br)		X	50		
<u>60° ELB.</u>	<u>1</u>	X	<u>2/30/90° ELB</u>		<u>10</u>
<u>30° ELB.</u>	<u>4</u>	X	<u>1/30/90° ELB</u>		<u>24</u>
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>236</u>

Total L/D X f = k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

236 X .014 = 3.304

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
Total =			

Pipe No. 153

Node 144

at Elev. 817'6"

to Node 145

at Elev. 817'6"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

8 in.
20
 $f = .014$
 $L = 24.76$ ft.
 $d = 8.125$ in.
 $k = 5.52$

References:

Crane No. 410

O-439A Rev. 56

Piping Configuration:

24.76' Tee R
orifice plate w/ 5.45" hole $\beta = .67$
 $\Sigma L = 24.76'$

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)	<u>1</u>	X	10		<u>10</u>
tee branch portion (tee br)		X	50		
		X			
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>10</u>

Total L/D X f = k
10 X .014 = .14

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
orifice plate		$h_L = k \frac{v^2}{2g_c}$ <p>Inst. calibrated for 273.93' H₂O @ 2500 gpm $v = \frac{2500}{(7.48)(60)(\pi)(\frac{8.125}{24})^2} = 12.37$ ft/sec Per chem eng'r. 2/18/75 Fig. 3 Permanent Pressure Loss is 56% $\therefore h_L = .56 (273.93')$ </p>	<p>Sheet applicable To Pipe NO. 119</p>
Total =			<u>12.78'</u>

$$K = \frac{h_L 2g_c}{v^2} = \frac{12.78 (2) (32.2)}{(12.37)^2} = 5.38$$

Pipe No. 154

Node 145

at Elev. 817'6" to Node 146

at Elev. 812'-0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

8 in.
20
 $f = .014$
 $L = 3.92$ ft.
 $d = 8.125$ in.
 $k = .896$

References:

Crane No. 410

0-439A Rev. 56

Piping Configuration:

Tee B / 3.92' / 90°

$\Sigma L = 3.92$

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)	<u>1</u>	X	14		<u>14</u>
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)		X	10		
tee branch portion (tee br)	<u>1</u>	X	50		<u>50</u>
		X			
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>64</u>

Total L/D X f = k

64 X .014 = .896

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
Total =			

Pipe No. 155

Node 146 at Elev. 812'0" to Node 147 at Elev. 812'0"

Pipe Data:

Nominal Pipe Diameter
Pipe Schedule
Turbulent Friction Factor
Actual Pipe Length
Pipe Internal Diameter
Minor Loss Coefficient

$$\begin{array}{r} 8 \text{ in.} \\ \hline 20 \\ f = \hline .014 \\ L = \hline .1 \text{ ft.} \\ d = \hline 8.125 \text{ in.} \\ k = \hline 5.37 \end{array}$$

References:

Crane No. 410

O-439A Rev. 56

Piping Configuration:

Calculation:

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)		X	14		
45 elbow, r/d=1.5	(45 lr)		X	10		
1/2 tee run	(tee run)		X	10		
tee branch portion	(tee br)		X	50		
			X			
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D =						

$$\text{Total L/D} \times f = k$$

$$\boxed{} \times \boxed{} = \boxed{}$$

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlined in the table on p. 2-10 in Crane 410.

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
BS-1	850	$k = \frac{891 (8.125)^4}{(850)^2}$ $= 5.374$	019-201-0556
Total =		5.374	

Pipe No. 156

Node 147

at Elev. 812'0"

to Node 148

at Elev. 812'0"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

8 in.
20
 $f =$ 0.014
 $L =$ 12.8 ft.
 $d =$ 8.125 in.
 $k =$ 6.90

References:

Crane No. 410

Piping Configuration:

11.833' / BS-14 / 1' / 1" Hole / coupling
ignore
Σ L = 12.83'

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
5 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)		X	10		
tee branch portion (tee br)		X	50		
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					

Total L/D

X

f

=

k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

 X =

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
BS-14	750	$K = \frac{891 (8.125)^4}{(750)^2}$ $= 6.903$	019-245-168
Total =			

Pipe No. 157

Node 148 at Elev. 812'0" to Node 200 at Elev. 810'7"

Pipe Data:

Nominal Pipe Diameter
Pipe Schedule
Turbulent Friction Factor
Actual Pipe Length
Pipe Internal Diameter
Minor Loss Coefficient

1 in.
40
 $f = .023$
 $L = 1$ ft.
 $d = 1.049$ in.
 $k = 22.55$

Reference:

Crane No. 410

0-477/Bo. 12

Piping Configuration:

1" Hwl coupling / 0.5' / BS-15 / 0.5'
Tee B

 $\Sigma L = 1'$

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)		X	10		
tee branch portion (tee br)	<u>1</u>	X	50		<u>50</u>
		X			
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					<u>50</u>

Total L/D X f = k

Note: Pipe components \leq (or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

50 X .023 = 1.15

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
<u>BS-15</u>	<u>7.1</u>	$k = \frac{891 (1.049)^4}{(7.1)^2}$ $= 21.4$	<u>019-245-0844</u>
Total =		<u>22.55</u>	

Pipe No. 158

Node 200

at Elev. 810'7"

to Node 0

at Elev. 810'7"

Pipe Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

1 in.
40
 $f = .023$
1 ft.
 $L =$
 $d = 1.049$ in.
 $k = 1$

References:

Crane No. 410

Piping Configuration:

Pipe exit

Calculation:

Component	Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5 (90 lr)		X	14		
45 elbow, r/d=1.5 (45 lr)		X	10		
1/2 tee run (tee run)		X	10		
tee branch portion (tee br)		X	50		
		X			
		X			
		X			
		X			
		X			
		X			
Total L/D =					

Total L/D

X

f

=

k

Note: Pipe components <(or =) 2" are considered fittings subject to the restrictions outlines in the table on p. 2-10 in Crane 410.

X

=

Valve	Cv	$k = 891 * d^4 / Cv^2$	Reference
<u>Pipe exit</u>		<u>k = 1</u>	<u>Crane 410</u>
Total =			

Pipe No. 159

Node 148

at Elev. 812' 0"

to Node 149

at Elev. 944' 0"

Crino Data:

Nominal Pipe Diameter

Pipe Schedule

Turbulent Friction Factor

Actual Pipe Length

Pipe Internal Diameter

Minor Loss Coefficient

References:

Crane No. 410

O-477 Rev. 12

$\frac{8''}{105}$ in.
 $f = \frac{105}{0.014}$
 $L = \frac{157.02}{8.329}$ ft.
 $d = \frac{8.329}{2.646}$ in.
 $k = \frac{2.646}{1}$

Piping Configuration:

1" Hdg/coupling / 3.27' / 79.5° E 16. / 17.06' / 90° / 2.75' /
90° / 37.5' / 90° / 2.224' / 90° / 3.5' / 90° / 5.0521' / 90° /
76.5' / 90° / 90° / 4.5' / 90° / 2.667' / True B

$$Z_L = 157.02$$

Calculation:

Component		Number	X	L/D	=	Component L/D
90 elbow, r/d=1.5	(90 lr)	9	X	14		126
45 elbow, r/d=1.5	(45 lr)		X	10		
1/2 tee run	(tee run)		X	10		
tee branch portion	(tee br)	1	X	50		50
79.5° ELB.		1	X	13		13
			X			
			X			
			X			
			X			
			X			
			X			
Total L/D =						189

Total L/D = 189

Total L/D

x

f

==

k

Note: Pipe components \leq 2" are considered fittings subject to the restrictions outlined in the table on p. 2-10 in Crane 410.

189

X

.014

11

2. (A)

Valve	Cv	$k = 891 \cdot d^4 / Cv^2$	Reference
Total =			

Based on the review of the LPI discharge pipe fitting differences (shown in Pipe Nos. 37 to 53 and Pipe Nos. 58 to 78) and tabulated in the next page, the following adjustments were made:

Pipe No. 40 was reduced from 107.8 ft to 17.5 ft

Pipe No. 48 was reduced from 107.5 ft to 14.5 ft

Pipe No. 53 was reduced from 36.5 ft to 28.58 ft

Pipe No. 61 was reduced from 70.5 ft to 10 ft

Pipe No. 62 was reduced from 26.5 ft to 10 ft

Pipe No. 73 was reduced from 179.3 ft to 72.97 ft

Pipe No. 78 was reduced from 65.8 ft to 50.08 ft

Unit 1			Unit 2			Unit 3		
Train A		Train B	Train A		Train B	Train A		Train B
Tee Runs	10	15	10	16		11		10
Tee Br	2	3	2	1		2		2
90	27	28	20	31		29		29
60			2	2		3		2
45	9	12	4	7		3		8
30			4	2		4		2
Red	2	2	2	2		2		2
Enl	3	3	3	3		3		3
Delta			Delta					
Tee Runs			0	1	Tee Runs	1		-5
Tee Br			0	-2	Tee Br	0		-1
90			-7	3	90	2		1
60			2	2	60	3		2
45			-5	-5	45	-6		-4
30			4	2	30	4		2
Red			0	0	Red	0		0
Enl			0	0	Enl	0		0
			0	10				-50
			0	-100				-50
			-98	42				14
			20.4	20.4				20.4
			-30.5	-30.5				-24.4
Total L/D differences ----->			-108.1	-58.1				-90

-92'

-77'

Number of Fittings in LPI pump discharge "Wood's Model" OSC-3560

From Node	To Node	Pipe Dia	90 LR els	45 LR els	1/2 Tees	K	Nominal Pipe Size	"T" length (inches)	"Reduction" in length
24	25	10.250	2				10	8.5	5.00
25	26	10.250	1		1		10	8.5	3.21
26	27	10.250	4	5	2		10	8.5	23.92
27	29	10.250			2		10	8.5	1.42
29	30	10.420	4		1		10	8.5	10.71
30	31								
31	32	10.420	1				10	8.5	2.50
32	33	8.125							
33	35	10.250			1		10	8.5	0.71
35	36	10.250	7		2		10	8.5	18.92
36	37	10.250	2	1	1		10	8.5	8.21
37	38	8.500				K = 0.28			
38	39	8.500							
39	41	8.750	3	3	1		10	8.5	15.71
41	0	11.500	2		1		14	11	7.92
									90.29 10" pipe
									7.92 14" pipe
45	46	10.420	1				10	8.5	2.50
46	47	10.420	1		1		10	8.5	3.21
47	48	10.420	4	2	2		10	8.5	16.42
48	49	10.420	1	2	2		10	8.5	8.92
49	50	10.420	1		2		10	8.5	3.92
50	51	10.420	2		1		10	8.5	5.71
51	52	15.500							
52	53	10.420	1		1		10	8.5	3.21
53	54	10.420	1		1		10	8.5	3.21
54	55	8.125							
55	56	10.250		1	1		10	8.5	3.21
56	57	10.250	1	1	1		10	8.5	5.71
57	70	10.250			1		10	8.5	0.71
70	58	10.250	8	3	1		10	8.5	28.21
58	59	10.250	2		1		10	8.5	5.71
59	61	8.500							
61	62	8.500							
62	63	8.750	4	2	1		10	8.5	15.71
63	0	11.500	3	1	1		14	11	14.92
									106.33 10" pipe
									14.92 14" pipe

The "boxed" values represent piping lengths that were initially included in the LPI model as piping lengths were measured from pipe E to pipe E. This results in excessive lengths of pipe as due to fitting dimensions.

Dev./Station _____ Unit _____ File No. _____

Subject _____

By DMS Date 5/22/89Sheet No. 55 of 103 Problem No. _____ Checked By _____ Date _____PIPE # 36From Junction 23 @ Elev 761.98 To Junction 24 @ Elev 763.00Pipe Internal Diameter, $d = 10.00$ in.Pipe Equivalent Length, $L_e = 0.1$ ft. Σ Minor Loss Coefficient, $k = 0.06$

Reference Drawings

OFD-10A-1.1

0-435B

0-435C

0-435K

Actual Pipe Lengths

14x12 red

LPI Pump 1A 8x10 red

 $\Sigma L = 0.1$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
14x12 red		$K = .01$	
8x10 red		$K = .05$	8.2
LPI Pump 1A		<div>HEAD (ft) FLOW (gpm)</div> <div>430 0</div> <div>375 3000</div> <div>285 4125</div>	8.16, 8.17, 8.18
$\Sigma, k = .06$			

2
1
4
4
2
0
3
8
6
6

DUKE POWER COMPANY

Form 00184 (6-81)

Dev./Station _____ Unit _____ File No. _____
Subject _____
By AMS Date 5/22/89
Sheet No. 56 of 133 Problem No. _____ Checked By _____ Date _____

PIPE # 37

From Junction 24 @ Elev 763.00 To Junction 25 @ Elev 765.25

Pipe Internal Diameter, $d = 10.25$ in.

Pipe Equivalent Length, $L_e = 0.5$ ft.

Σ Minor Loss Coefficient, $k = 0.89$

Reference Drawings

QFD-102A-1.2

0-435C

0-435B

Actual Pipe Lengths

<u>90° LR</u>	<u>14P31</u>	<u>90° LR</u>	<u>0.5</u>	<u>1" tip-in</u>
	(check)			
				$\Sigma L = 0.5$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
<u>90° LR</u>		$2 \times 14 = 28$	<u>8.1</u>
<u>14P-31</u>		<u>Turning line 1 x 30 = 30</u>	<u>OM-245-26A</u>
		$.014 (58) = .81$	
		$.81 \left(\frac{10.25}{10.2} \right)^4 = .89$	
$\Sigma k = 0.89$			

3
4
4
4

6
6
8

Unit-2
90° LR-0

Unit-3
90° LR-2

Dev./Station _____ Unit _____ File No. _____
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PIPE # 38From Junction 21 @ Elev 767.00 To Junction 25 @ Elev 765.25Pipe Internal Diameter, $d = 1.049$ in.Pipe Equivalent Length, $L_e = 8.3$ ft. Σ Minor Loss Coefficient, $k = 801.52$

Reference Drawings

OFD-102A-1.2

O-435 K

Actual Pipe Lengths

14x1 red	1.2	90 EL	1.7	1/4" orifice	3.8	90 EL
1.6	90 EL	1x10 end	Te(B)	$\Sigma L = 8.3$		

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
Te(B)		See OSC- 3077 Rev. 1	
90 EL			
14x1 red			
1x10 end			
1/4" orifice			
$\Sigma k = 801.52$			

1444
 03866

Dev./Station _____ Unit _____ File No. _____

Subject _____

By JMM Date 5/22/89Sheet No. 58 of 132 Problem No. _____ Checked By _____ Date _____PIPE # 39From Junction 25 @ Elev 765.25 To Junction 26 @ Elev 765.25Pipe Internal Diameter, $d = \frac{10^{3/4} \text{ sch } 20}{10.25}$ in.Pipe Equivalent Length, $L_e = 8.0$ ft. Σ Minor Loss Coefficient, $k = 0.49$

Reference Drawings

OFP-100A-1.1

O-4350

O-43

Actual Pipe Lengths

1" tip-in	6.5	90°LR	1LP-32	1.5	1/2 Tee (R)	
						$\Sigma L = 8.0$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
90°LR		$1 \times 14 = 14$	8.1
1/2 Tee (R)		$1 \times 10 = 10$	
1LP-32		$1 \times 8 = 8$	
		$0.14(32) = 0.45$	
		$0.45 \left(\frac{10.25}{10.52} \right)^4 = 0.49$	
$\Sigma k = 0.49$			

Unit - 2

1/2 Tee R - 1

Unit - 3

90 - 1

1/2 Tee B - 1

Form 00184 (6-81)

Dev./Station _____ Unit _____ File No. _____

Subject _____

By JMS Date 5/22/89Sheet No. 59 of 133 Problem No. _____ Checked By _____ Date _____PIPE # 40From Junction 26 @ Elev 765.25 To Junction 27 @ Elev 779.00Pipe Internal Diameter, $d = 10.25$ in. ^{10" SCH 20}Pipe Equivalent Length, $L_e = 107.8$ ft. Σ Minor Loss Coefficient, $k = 2.54$

Reference Drawings

OFD-102A-1.2	
O-435B	O-436D
O-435D	
O-436G	

Actual Pipe Lengths

7.8	13'	5	1.5	5	14'
Tee (A)	45	45	90LR	45	90LR 90LR
1	36	20.5			
45	45	1/2 Tee (R)			$\Sigma L = 107.8$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
Tee (A)		$1 \times 50 = 50$	8.1
45		$5 \times 10 = 50$	
90LR		$4 \times 14 = 56$	
1/2 Tee (R)		$1 \times 10 = 10$	
		$0.14 (166) = 2.32$	
		$K_{205} = 2.32 \left(\frac{10.25}{10.02} \right)^4 = 2.54$	
$\Sigma k = 2.54$			

Unit - 2
 1/2 Tee B - 1
 45 - 1
 90 - 111
 30 - 111
 60 - 1
 1/2 Tee R - 1

Unit - 3
 1/2 Tee R - 11
 90 - 111
 60 - 1
 45 - 1

Dev./Station _____ Unit _____ File No. _____

Subject _____

By JMS Date 5/22/79Sheet No. 60 of 133 Problem No. _____ Checked By _____ Date _____PIPE # 41From Junction 27 @ Elev 779.00 To Junction 29 @ Elev 779.00Pipe Internal Diameter, $d = 10.25$ in.Pipe Equivalent Length, $L_e = 2.5$ ft. Σ Minor Loss Coefficient, $k = 0.4$

Reference Drawings
UFD-162A-1.2
O-436D
O-436E

Actual Pipe Lengths		
$\frac{1}{2}$ Tee (R)	1 LP-11	$\frac{1}{2}$ Tee (K)
$\Sigma L = 2.5$		

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
$\frac{1}{2}$ Tee (R) LP-11		$2 \times 10 = 20$ $1 \times 8 = 8$ $.013(28) = 0.36$ $K_{loss} = .36 \left(\frac{10.25}{12.02} \right)^4 = 0.4$	8.1
$\Sigma k = 0.4$			

Unit-2

 $\frac{1}{2}$ Tee R-11

Unit-3

 $\frac{1}{2}$ Tee R-1

90 - 1111

Encl-1

10x16

Dev./Station _____ Unit _____ File No. _____

Subject _____

By DM Date 5/22/89Sheet No. 41 of 133 Problem No. _____ Checked By _____ Date _____PIPE # 42From Junction 27 @ Elev 779.00 To Junction 29 @ Elev 779.00 $6" \text{ schedule } 10S$ Pipe Internal Diameter, $d = 6.357$ in.Pipe Equivalent Length, $L_e = 6.0$ ft. Σ Minor Loss Coefficient, $k = 11.76$

Reference Drawings

DEF-102A-1.2

O-4360

O-436F

Actual Pipe Lengths

Te (B)	90LR	4" orifice	90LR	90LR	1LP94	90LR (B)
						$\Sigma L = 6$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
1LP94 Te (B) 90LR		$1 \times 8 = 8$ $2 \times 50 = 100$ $4 \times 14 = 56$ $.015 (164) = 2.46$	8.1
4" orifice		$K_{loss} = 2.46 \left(\frac{6.357}{6.065} \right)^4 = 2.97$ $K = \frac{1}{C_v^2 P^4} ; \beta = \frac{4.0}{6.357} = 0.63$ $C = 0.66$ $K = \frac{1}{(.66)^2 (.63)^4} = 14.64$ For $\beta = .63$, permanent pressure loss = $0.60(\Delta P)$ Since $\Delta P \sim K$, $K = .6(14.64)$ $= 8.79$	8.5 8.6 (fully turbulent) 8.6
$\Sigma k = 11.76$			

NOT
Applicable
To Unit-3

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PIPE # 43From Junction 29 @ Elev 779.00 To Junction 30 @ Elev 771.5010" sch. 10 SPipe Internal Diameter, $d = \underline{10.42}$ in.Pipe Equivalent Length, $L_e = \underline{14.0}$ ft. Σ Minor Loss Coefficient, $k = \underline{1.20}$

Reference Drawings

OFO-102A-1.2O-436AO-436F

Actual Pipe Lengths					
<u>1/2 Tee (L)</u>	<u>90LR</u>	<u>90LR</u>	<u>90LR</u>	<u>90LR</u>	<u>10x16 end</u>
					$\Sigma L = 14$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
<u>1/2 Tee (L)</u> <u>90LR</u>		$1 \times 10 = 10$ $4 \times 14 = 54$ $.014 \overline{)64} = 0.9$ $K_{10s} = \left(\frac{10.42}{10.02} \right)^4 \cdot 9 = 1.05$	8.1
<u>10x16 end</u>		0.15	8.2
$\Sigma k = \underline{1.20}$			

Unit - 2

1/2 Tee R - 1
90 - 111
10x16 end - 1

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PIPE # 45From Junction 31 @ Elev 777.33 To Junction 32 @ Elev 779.00Pipe Internal Diameter, $d = \overset{10" \rightarrow \text{ch. } 10"}{10.42}$ in.Pipe Equivalent Length, $L_e = 2.0$ ft. Σ Minor Loss Coefficient, $k = 0.31$

Reference Drawings

OED-132A L2

O-4360

O-436E

Actual Pipe Lengths

<u>16x10 red</u>	<u>90 LR</u>	<u>red</u>
$\Sigma L = 2$		

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
<u>Unit - 2</u> <u>16x10 red - 1</u> <u>90 - 1</u> <u>90 LR</u>		$1 \times 14 = 14$ $.014(14) = 0.2$	<u>8.1</u>
<u>Unit - 3</u> <u>10x16 red - 1</u> <u>90 - 1</u> <u>16x10 red</u>		$K_{10x} = .12 \left(\frac{10.12}{12.24} \right)^4 = 0.23$ <u>108</u>	<u>8.2</u>
$\Sigma k = 0.31$			

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PIPE # 46From Junction 32 @ Elev 779.00 To Junction 33 @ Elev 779.00Pipe Internal Diameter, $d = 8.125$ in.Pipe Equivalent Length, $L_e = 0.1$ ft. Σ Minor Loss Coefficient, $k = 9.28$

Reference Drawings

OFD-102A-1.2O-436D

Actual Pipe Lengths

10x8 red 1LP-12 8x10 end $\Sigma L = 0.1$ CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
1LP-12 Globe	650	$K = 891(8.125)^4 / (650)^2$ $K = 9.19$	
10x8 red		.04	
10x10 end		.05	
$\Sigma k = 9.28$			

Note: $K = 9.19$ is used in the model.

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Unit-2
10x8 red
8x10 end

Unit-3
10x8 red
8x10 end

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PIPE # 47From Junction 33 @ Elev 779.00 To Junction 35 @ Elev 779.00Pipe Internal Diameter, $d = 10.25$ in.Pipe Equivalent Length, $L_e = 2.0$ ft. Σ Minor Loss Coefficient, $k = 0.15$

Reference Drawings

OED-102A-1.2

O-436D

O-436F

Actual Pipe Lengths

2'	1'	
end	42' (all)	
		$\Sigma L = 2$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
<u>Unit - 2</u> <u>1/2 Tee R - 1</u> <u>Unit - 3</u> <u>1/2 Tee R - III</u> <u>90 - 1</u>	<u>1/2 Tee (R)</u>	$1 \times 10 = 10$ $1014(10) = .14$ $K_{20} = .14 \left(\frac{10.25}{10.02} \right)^4 = .15$	8.1
$\Sigma k = 0.15$			

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PIPE # 48From Junction 35 @ Elev 779.00 To Junction 36 @ Elev 824.75Pipe Internal Diameter, $d = 10.25$ in.Pipe Equivalent Length, $L_e = 107.50$ ft. Σ Minor Loss Coefficient, $k = 5.03$

Reference Drawings

DFD-102A-1.2

D-436D

D-437A

Actual Pipe Lengths							
$\frac{1}{2}$ Tee (R)	90LR	90LR	90LR	90LR	90LR	90LR	90LR
48'	7'	1'	30.5'	12'	5'	12'	5'
1 FT-5	90LR	$\frac{1}{2}$ Tee (R)					$\Sigma L = 107.5$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
$\frac{1}{2}$ Tee (R)		$2 \times 10 = 20$	
90LR		$7 \times 14 = 98$	8.1
		$.014 (118) = 1.65$	
		$K_{20} = 1.65 (1.1) = 1.82$	
		$\phi = 2.455$	
		$\beta = \frac{2.455}{10.25} = 0.23$	8.14, 8.15
		$C = 0.71$	8.6 (fully turbulent)
		$K = \frac{1}{C^2 \beta^4} = \frac{1}{(.71)^2 (.23)^4}$	NOTE: Ref 8.14 is for
		$K = 6.99$	Unit 2. Verification on
		for $\beta = .173$	applicability to Unit 1
		parametric pressure	is on reverse side.
		loss = 0.46	
		$K = .46 (6.99) = 3.21$	
1 FT-5			
$\Sigma k = 5.03$			

(see back)

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PIPE # 49From Junction 36 @ Elev 824.75 To Junction 37 @ Elev 816.00Pipe Internal Diameter, $d = 10.25$ in.Pipe Equivalent Length, $L_e = 13.00$ ft. Σ Minor Loss Coefficient, $k = 0.74$

Reference Drawings

OFO-102A-1.2

O-439B

O-439A

Actual Pipe Lengths

$\frac{1}{2}$ Tee (R)	2'	90LR	2.5'	90LR	2.5'	45'	1'	16P-17
								$\Sigma L = 13$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
$\frac{1}{2}$ Tee (R)		$1 \times 10 = 10$	8.1
90LR		$2 \times 14 = 28$	
45		$1 \times 10 = 10$	
		$.014(48) = 0.67$	
		$K_{co} = .67(1.1) = .74$	
$\Sigma k = 0.74$			

Unit - 2

 $\frac{1}{2}$ Tee R - 1
90 - 1

Unit - 3

 $\frac{1}{2}$ Tee R - 1
90 - 1

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PIPE # 50From Junction 37 @ Elev 816.00 To Junction 38 @ Elev 816.00Pipe Internal Diameter, $d = 8.50$ in.Pipe Equivalent Length, $L_e = 9.0$ ft. Σ Minor Loss Coefficient, $k = 0.28$

Reference Drawings

OFD-103A.120-439A0-479 G

Actual Pipe Lengths

<u>FLP-17</u>	<u>9.0</u>	<u>1 1/2" tie-in</u>
$\Sigma L = 9.0$		

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
<u>FLP-17</u>		$= \frac{891(8.50)^4}{(4041)^2}$ $= .28$	<u>See Pipe # 75</u>
$\Sigma k = 0.28$			

Unit-2
90-11
45-1

Unit-3
90-11
45-1

1457

033866

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PIPE # 52From Junction 39 @ Elev 816.00 To Junction 41 @ Elev 792.38Pipe Internal Diameter, $d = 8.75$ in.Pipe Equivalent Length, $L_e = 78.0$ ft. Σ Minor Loss Coefficient, $k = 2.09$

Reference Drawings

<u>OFD-102A-1.2</u>
<u>OFD-102A-1.3</u>
<u>O-4796</u> <u>O-478A(37)</u>
<u>O-479A</u>

Actual Pipe Lengths	
<u>1' LP48</u>	<u>24'</u>
<u>4'</u>	<u>15.5'</u>
<u>90LR</u>	<u>45'</u>
<u>90LR</u>	<u>10'</u>
<u>17'</u>	<u>6.5'</u>
<u>90LR</u>	<u>45'</u>
<u>Tee(B)</u>	<u>45'</u>
<u>10' x 14 end</u>	<u>$\Sigma L = 78$</u>

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
Unit-2			
90-11		$3 \times 14 = 42$	
45-1		$3 \times 10 = 30$	8.1
30-1			
60-1			
1/2 Tee B-1		$1 \times 50 = 50$	
10' x 14 end		$1014 (122) = 1.71$	
		$K_{110} = \left(\frac{8.75}{8.5}\right)^4 1.71 = 1.92$	
Unit-3			
90-11			
45-1		$\beta = \frac{8.75}{11.5} = 0.76$	
30-1		$k = .17$	
60-1			
1/2 Tee B-1			
		$\Sigma k = 2.09$	

1459

038666

2

10' x 14 end

Unit-3

90-11

45-1

30-1

60-1

1/2 Tee B-1

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PIPE # 53From Junction 41 @ Elev 792.38 To Junction 0 @ Elev 811.50Pipe Internal Diameter, $d = 11.50$ in.Pipe Equivalent Length, $L_e = 36.5$ ft. Σ Minor Loss Coefficient, $k = 2.28$

Reference Drawings

OFA-102A-1.3
O-478A
O-479A
O-

Actual Pipe Lengths

$\frac{1}{2}$ Tee (R)	13.5	90°LR	14'	ICF-14	90°LR	9'	EXIT
							$\Sigma L = 36.5$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
$\frac{1}{2}$ Tee (R) 90°LR		$1 \times 10 = 10$ $2 \times 14 = 28$ $.013 (38) = 0.49$ $K_{140} = .49 \left(\frac{11.50}{11.188} \right)^4 = .55$	8.1
EXIT ICF-14		1.0 $1 \times 50 = 50$ $.13 (50) = .65 \left(\frac{11.5}{11.188} \right)^4 = .73$	8.1, 8.9
$\Sigma k = 2.28$			

Unit - 2

 $\frac{1}{2}$ Tee R - 1

90 - 11

Unit -

 $\frac{1}{2}$ Tee R - 1

90 - 11



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PIPE # 57From Junction 44 @ Elev 761.08 To Junction 45 @ Elev 763.00Pipe Internal Diameter, $d = 10.00$ in.Pipe Equivalent Length, $L_e = 0.1$ ft. Σ Minor Loss Coefficient, $k = 0.06$

Reference Drawings

OFD-102A-1.2

0-435R

0-435C

0-435K

Actual Pipe Lengths

<u>14x12 vel</u>	<u>LPI Pump 1B</u>	<u>8x10 vel</u>	$\Sigma L =$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C _v	$k = 891(d)^4 / (C_v)^2$	References								
14x12 vel 8x10 vel		$K = 0.01$ $K = 0.05$									
LPI Pump 1B		<table><tr><th>HEAD (ft)</th><th>FLOW (gpm)</th></tr><tr><td>430</td><td>0</td></tr><tr><td>375</td><td>3000</td></tr><tr><td>285</td><td>4125</td></tr></table>	HEAD (ft)	FLOW (gpm)	430	0	375	3000	285	4125	8.16, 8.17, 8.18
HEAD (ft)	FLOW (gpm)										
430	0										
375	3000										
285	4125										
$\Sigma k = 0.06$											

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Dev./Station _____	Unit _____	File No. _____
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PIPE # 38From Junction 45 @ Elev 763.00 To Junction 46 @ Elev 765.00Pipe Internal Diameter, $d = 10.42$ in.Pipe Equivalent Length, $L_e = 0.5$ ft. Σ Minor Loss Coefficient, $k = 0.23$

Reference Drawings

OFO-102A-1.2

Q-435R

Q-435C

Q-435D

Actual Pipe Lengths

0.5'	90 LR 1" pipe	$\Sigma L = 0.5$
------	---------------	------------------

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4/(C_v)^2$	References
90 LR		$1 \times 14 = 14$ $.014(14) = 0.2$ $K_{loss} = 1.2 \left(\frac{10.42}{1.17} \right)^4 = 0.23$	8.1
$\Sigma k = 0.23$			

Unit-2
90-1

Unit-3

90-1

10.1

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PIPE # 59From Junction 43 @ Elev 767.00 To Junction 46 @ Elev 765.00Pipe Internal Diameter, $d = 1.049$ in.Pipe Equivalent Length, $L_e = 6.3$ ft. Σ Minor Loss Coefficient, $k = 800.14$

Reference Drawings

OED-102A-1.2

O-435B

O-435K

Actual Pipe Lengths

2'	2.3'	2'		
Tee(B) 14x1 red	1/4" orifice	90C	90EL	1x10 red Tee(B)
				$\Sigma L =$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
Tee(B)		See OSC- 3077 Rev. 1	
90EL			
14x1 red			
1x10 red			
1/4" orifice			
$\Sigma k = 50$			

1466
03866

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PIPE # 60

From Junction 46 @ Elev 765.00 To Junction 47 @ Elev 765.25

Pipe Internal Diameter, $d = \underline{10.42}$ in.

Pipe Equivalent Length, $L_E = \underline{18.50}$ ft.

Σ Minor Loss Coefficient, $k = \underline{1.02}$

=Reference Drawings=

OFD-102A-1.2

0-4350

Actual Pipe Lengths

Actual Pipe Lengths

1	2	3	4
1CP-33	1CP-34	90LR	1/2 Tee (R)
(CHK)	(GT)		
$\Sigma L = 18.5$			

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C _v	$k = 891(d)^4/(C_v)^2$	References
1LP-33 1LP-34 90LR 1/2 Tee (R)		$1 \times 30 = 30$ $1 \times 8 = 8$ $1 \times 14 = 14$ $1 \times 10 = 10$ <hr/> $.014 (62) = 0.87$ $.87 (1.17) = 1.02$	8.1
$\Sigma k = 1.02$			

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Unit-2
1/2 Tree 8-1
90-111

Unit -3
 1. Tel P-1
 90-1

Dev./Station _____ Unit _____ File No. _____
 Subject _____
 By AM Date 5/22/89
 Sheet No. 10 of 13 Problem No. _____ Checked By _____ Date _____

PIPE # 61From Junction 47 @ Elev 765.25 To Junction 48 @ Elev 775.50Pipe Internal Diameter, $d = 10.42$ in.Pipe Equivalent Length, $L_e = 70.5$ ft. Σ Minor Loss Coefficient, $k = 2.23$

Reference Drawings

OFO-102A-1.2

O-444

O-436D

O-435B

Actual Pipe Lengths							
16'	31'	7'	3.5'	20'	45'	45'	
Tee (B)	90LR	90LR	90LR				
1'	9.0						
90LR	1/2 Tee (R)						$\Sigma L = 70.50$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
Unit-2 1/2 Tee B-1 90-1 1/2 Tee R-1 45	Tee (B) 1/2 Tee (R) 90LR 45	$1 \times 50 = 50$ $1 \times 10 = 10$ $4 \times 14 = 56$ $2 \times 10 = 20$ $0.14 (131) = 1.90$ $1.90 \left(\frac{10.42}{12.31} \right)^4 = 2.23$	8.1
Unit-3 1/2 Tee B-1 90-MH 30-1 45-11 10-1 1/2 Tee-R-1			
$\Sigma k = 2.23$			

Dev./Station _____	Unit _____	File No. _____
Subject _____		
By <u>1115</u>		Date <u>5/22/89</u>
Sheet No. <u>81</u> of <u>133</u>	Problem No. _____	Checked By _____ Date _____

PIPE # 62From Junction 48 @ Elev 775.50 To Junction 49 @ Elev 777.75Pipe Internal Diameter, $d = 10.42$ in.Pipe Equivalent Length, $L_e = 26.50$ ft. Σ Minor Loss Coefficient, $k = 0.88$

Reference Drawings

OFD-102A-12

Q-444

Q-436 D

Actual Pipe Lengths

$\frac{1}{2}$ Tee (R)	1.0	90LR	1.0	45	23.5	45	1.0	$\frac{1}{2}$ Tee (R)
$\Sigma L = 26.5$								

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
$\frac{1}{2}$ Tee (R)		$2 \times 10 = 20$	8.1
45		$2 \times 10 = 20$	
90LR		$1 \times 14 = 14$	
		$0.14(54) = 0.76$	
		$0.76 \left(\frac{10.42}{12.126} \right)^5 = .88$	
$\Sigma k = 0.88$			

(() unit - 2

$\frac{1}{2}$ Tee R - 1
 90 - 1111
 45 - 11
 30 - 1
 60 - 1

Dev./Station _____ Unit _____ File No. _____
 Subject _____
 By 1mm Date 5/22/89
 Sheet No. 82 of 123 Problem No. _____ Checked By _____ Date _____

PIPE # 63From Junction 49 @ Elev 777.75 To Junction 50 @ Elev 774.25Pipe Internal Diameter, $d = 10.42$ in.Pipe Equivalent Length, $L_e = 3.5$ ft. Σ Minor Loss Coefficient, $k = 0.69$

Reference Drawings

OFA-102A-1.2

O-436F

Actual Pipe Lengths			
$\frac{1}{2}$ Tee (R)	1.0	$\frac{1}{2}$ Tee (R)	1.5
90° Elbow	1.0	90° Elbow	1.5
16P-13 (LT)		16P-13 (RT)	
$\Sigma L = 3.5$			

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
90° Elbow		$1 \times 14 = 14$	
$\frac{1}{2}$ Tee (R)		$2 \times 10 = 20$	
16P-13		$1 \times 8 = 8$	
		$0.14(42) = .59$	
		$.59(1.17) = 0.69$	
$\Sigma k = 0.69$			

Unit-2

 $\frac{1}{2}$ Tee R-1
90-1

Unit-3

 $\frac{1}{2}$ Tee R-1
90-111Exc - 1
1006

Dev./Station _____ Unit _____ File No. _____
 Subject _____
 By JMS Date 5/20/89
 Sheet No. 83 of 133 Problem No. _____ Checked By _____ Date _____

PIPE # 64From Junction 49 @ Elev 777.75 To Junction 50 @ Elev 774.25Pipe Internal Diameter, $d = 6.357$ in.Pipe Equivalent Length, $L_e = 4.5$ ft. Σ Minor Loss Coefficient, $k = 11.40$

Reference Drawings

QED-102A12
Q-436F

Actual Pipe Lengths

Tee (B)	10x6 red	4" orifice	90LR	1CP-95 (6T)
1.0				
Tee (A)	10x6 end			
				$\Sigma L = 4.5$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
Tee (B)		$2 \times 50 = 100$	8.1
90LR		$1 \times 14 = 14$	
1CP-95		$1 \times 8 = 8$	
		$0.15 (122) = 1.83$	
10x6 red		$1.83 \left(\frac{6.357}{6.065} \right)^4 = 2.21$	8.2
6x10 end		0.14	
		0.26	
4" orifice		$K = 8.79$	Pipe # 42
$\Sigma k = 11.40$			

NOT
applicable
to
unit-3

Dev./Station _____ Unit _____ File No. _____

Subject _____

By JMS Date 5/12/79Sheet No. 24 of 133 Problem No. _____ Checked By _____ Date _____PIPE # 65From Junction 50 @ Elev 774.25 To Junction 51 @ Elev 771.50Pipe Internal Diameter, $d = 10.42$ in.Pipe Equivalent Length, $L_e = 7.0$ ft. Σ Minor Loss Coefficient, $k = 0.77$

Reference Drawings

DED-102A-1.2

0-4360

0-436F

Actual Pipe Lengths

<u>3.0</u>	<u>3.5</u>	<u>0.5</u>	
<u>1/2 Tee (R)</u>	<u>90LR</u>	<u>90LR</u>	<u>10 x 16 end</u>
			$\Sigma L = 7$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
<u>1/2 Tee (R)</u> <u>90LR</u>		$1 \times 10 = 10$ $2 \times 14 = 28$ $.014(38) = 0.53$ $K = .53(1.17) = .62$	8.1
<u>10 x 16 end</u>		0.15	8.2
$\Sigma k = 0.77$			

Unit-2

1/2 Tee P-1

90-1

End-1

Form 00184 (6-81)

Dev./Station _____ Unit _____ File No. _____

Subject _____

By AMS Date 5/22/87Sheet No. 86 of 133 Problem No. _____ Checked By _____ Date _____PIPE # 67From Junction 52 @ Elev 777.33 To Junction 53 @ Elev 779.25Pipe Internal Diameter, $d = 10.42$ in.Pipe Equivalent Length, $L_e = 2.5$ ft. Σ Minor Loss Coefficient, $k = 0.48$

Reference Drawings

OSP-102A 12

Q-436F

Actual Pipe Lengths

10	1.5
16x10 red 90LR	1/2 Tee R
$\Sigma L = 2.5$	

CALCULATIONS

Unit - 2 Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
1/2 Tee R-1 90 - 1 45 - 60 - Red - 1 Encl -	1/2 Tee R 90LR	$1 \times 10 = 10$ $1 \times 14 = 14$ $10 \sqrt{4(24)} = 0.34$ $K = .34(1.17) = 0.40$	8.1
Unit - 3 10x16 red - 1 90 - 1	16x10 red	.08	8.2
$\Sigma k = 0.48$			

Dev./Station _____ Unit _____ File No. _____

Subject _____

By JMS Date 5/22/89Sheet No. 87 of 133 Problem No. _____ Checked By _____ Date _____PIPE # 69From Junction 53 @ Elev 779.25 To Junction 54 @ Elev 779.25Pipe Internal Diameter, $d = 10.42$ in.Pipe Equivalent Length, $L_e = 1.7$ ft. Σ Minor Loss Coefficient, $k = 0.39$

Reference Drawings

OFD 102A-1.2

0-4360

0-75F

Actual Pipe Lengths

$112 \frac{1}{2}$ Tee (R)	90° LR	red
		$\Sigma L = 1.7$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
$112 \frac{1}{2}$ Tee (R) 90° LR		$1 \times 10 = 10$ $1 \times 14 = 14$ <hr/> $.014(24) = .34$ $.34(1.17) = 0.39$	8.1
$\Sigma k = 0.39$			

Unit - 2
 $112 \frac{1}{2}$ Tee R - 1
 Exc -
 Red -
 90 - 1

Dev./Station _____ Unit _____ File No. _____
 Subject _____
 By JMS Date 5/22/89
 Sheet No. 88 of 133 Problem No. _____ Checked By _____ Date _____

PIPE # 69From Junction 54 @ Elev 779.25 To Junction 55 @ Elev 779.25Pipe Internal Diameter, $d = 8.125$ in.Pipe Equivalent Length, $L_e = 0.1$ ft. Σ Minor Loss Coefficient, $k =$ _____

Reference Drawings

OFD-102A-1.2

O-436D

O-436F

Actual Pipe Lengths

10x8 end

16P-14

8x10 end

 $\Sigma L = 0$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
16P-114 Globe		$K = 891(8.125)^4 / (650)^2$ $K = 9.19$	
10x8 end 8x10 end		0.04 0.05	
$\Sigma k = 9.28$			

Note: K used in the model is 9.19

1476

03866

Unit-2

Red-1

Enlg-1

Unit-3

Red-1

Enlg-1

Form 00184 (6-81)

Dev./Station _____ Unit _____ File No. _____
Subject _____By 2ms Date 5/22/89
Sheet No. 39 of 133 Problem No. _____ Checked By _____ Date _____PIPE # 70From Junction 55 @ Elev 779.25 To Junction 56 @ Elev 779.25Pipe Internal Diameter, $d = 10.25$ in.Pipe Equivalent Length, $L_e = 10.0$ ft. Σ Minor Loss Coefficient, $k = 0.31$

Reference Drawings

OFD-102A-1.2
0-4360

Actual Pipe Lengths

ent	2.5	45	8.5	1/2 Tee (R)
				to 4516
				$\Sigma L = 10$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
Unit-2 1/2 Tee-1 60-1 45 1/2 Tee (R)		$1 \times 10 = 10$ $1 \times 10 = 10$ $.014(20) = 0.28$ $.28 \frac{10.25}{10.02} = 0.31$	81
Unit-3 1/2 Tee R-111 60-1			
$\Sigma k = 0.31$			

Dev./Station _____ Unit _____ File No. _____
 Subject _____
 By AMS Date 5/22/89
 Sheet No. 90 of 132 Problem No. _____ Checked By _____ Date _____

PIPE # 71From Junction 56 @ Elev 779.25 To Junction 57 @ Elev 779.25Pipe Internal Diameter, $d = 10.25$ in.Pipe Equivalent Length, $L_e = 18.0$ ft. Σ Minor Loss Coefficient, $k = 1.08$

Reference Drawings

DFD-102A-1.2
 0-4350

Actual Pipe Lengths

$\frac{1}{2}$ Tee (R)	14'	4'	Tee (B)
	45		
$\Sigma L = 18$			

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
$\frac{1}{2}$ Tee R-11			
45		$1 \times 10 = 10$	
$\frac{1}{2}$ Tee (R)		$1 \times 10 = 10$	8.1
Tee (B)		$1 \times 50 = 50$	
		$.014 (70) = .98$	
		$.98 (1.10) = 1.08$	
$\Sigma k = 1.08$			

NOT
 Applicable
 TO Unit-3

Form 00184 (6-81)

Dev./Station _____ Unit _____ File No. _____

Subject _____

By JMM Date 5/22/89Sheet No. 91 of 133 Problem No. _____ Checked By _____ Date _____PIPE # 72From Junction 57 @ Elev 779.25 To Junction 70 @ Elev 787.75Pipe Internal Diameter, $d = 10.25$ in.Pipe Equivalent Length, $L_e = 8.0$ ft. Σ Minor Loss Coefficient, $k = 0.15$

Reference Drawings

DEA-1000 2

5-11

Actual Pipe Lengths

 $\frac{1}{2}$ " Tee (R) 8'
2" Tee 2' $\Sigma L = 8$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
$\frac{1}{2}$ " Tee (R)		$1 \times 10 = 10$	8.1
30 - 1		$.014(10) = .14$	
90 - 1		$.14(11) = .15$	
$\Sigma k = 0.15$			

Unit-2

 $\frac{1}{2}$ " Tee R - 1

30 - 1

90 - 1

Unit-3

 $\frac{1}{2}$ " Tee R - 1

30 - 1

90 - 1

Form 00184 (6-81)

Dev./Station _____ Unit _____ File No. _____
 Subject _____
 By SWM Date 5/12/89
 Sheet No. 92 of 133 Problem No. _____ Checked By _____ Date _____

PIPE # 73From Junction 70 @ Elev 787.25 To Junction 58 @ Elev 823.17Pipe Internal Diameter, $d = 10.25$ in.Pipe Equivalent Length, $L_e = 179.3$ ft. Σ Minor Loss Coefficient, $k = 5.54$

Reference Drawings

DEF-102A-112

D-444

D-439A

D-439C

Actual Pipe Lengths

2" tip-in	17'	5'	7.8'	1'	11'	
90LR	90LR	90LR	45	90LR	90LR	
11'	6.5'	2'	18'	9'	7.5'	$\Sigma L = 179.3$
90LR	90LR	90LR	FT-4	45	45	
79.50	4'					

90LR 42LR (R) CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
90LR		$8 \times 14 = 112$	8.1
45		$3 \times 10 = 30$	
42LR (R)		$1 \times 10 = 10$	
		$.014 (152) = 2.13$	
		$K_o = 2.13 \left(\frac{10.25}{10.02} \right)^4 = 2.33$	
		$K = 3.21$	
			Pipe # 48
$\Sigma k = 5.54$			

Unit - 2

1/2 Tee R-11

90-1111

45-11

Unit - 3

1/2 Tee R-1

90-1111

45-11

Form 00184 (6-81)

Dev./Station _____ Unit _____ File No. _____
Subject _____By AW Date 5/22/89Sheet No. 93 of 133 Problem No. _____ Checked By _____ Date _____PIPE # 74From Junction 58 @ Elev 823.17 To Junction 59 @ Elev 816.50Pipe Internal Diameter, $d = 10.25$ in.Pipe Equivalent Length, $L_e = 26.0$ ft. Σ Minor Loss Coefficient, $k = 0.59$

Reference Drawings

OFD-102A-1.2

O-434E

O-434C

Actual Pipe Lengths

$\frac{1}{2}$ Tee (R)	17	90	5	90	4	LP-18	$\Sigma L = 26$
-----------------------	----	----	---	----	---	-------	-----------------

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
$\frac{1}{2}$ Tee (R)		$1 \times 10 = 10$	
90		$2 \times 14 = 28$	
		$.014(38) = .53$	8-1
		$.53(1.1) = .59$	
$\Sigma k = 0.59$			

Unit-2

 $\frac{1}{2}$ Tee R-1

90-1

Unit-3

 $\frac{1}{2}$ Tee R-1

90-1

Subject

By JMS Date 5/22/89

Sheet No. 94 of 133 Problem No. _____ Checked By _____ Date _____

PIPE # 75

From Junction 59 @ Elev 816.50 To Junction 61 @ Elev 811.50

Pipe Internal Diameter, $d = \underline{8.50}$ in.

Pipe Equivalent Length, $L_e = \underline{7.2}$ ft.

Σ Minor Loss Coefficient, $k = \underline{2.8}$

Reference Drawings:

OFD-102A-1.2

0-439C

0-439

Actual Pipe Lengths:

1LP-18

$$2 + 512$$

142 tie-in

$$\Sigma L = 7.2$$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

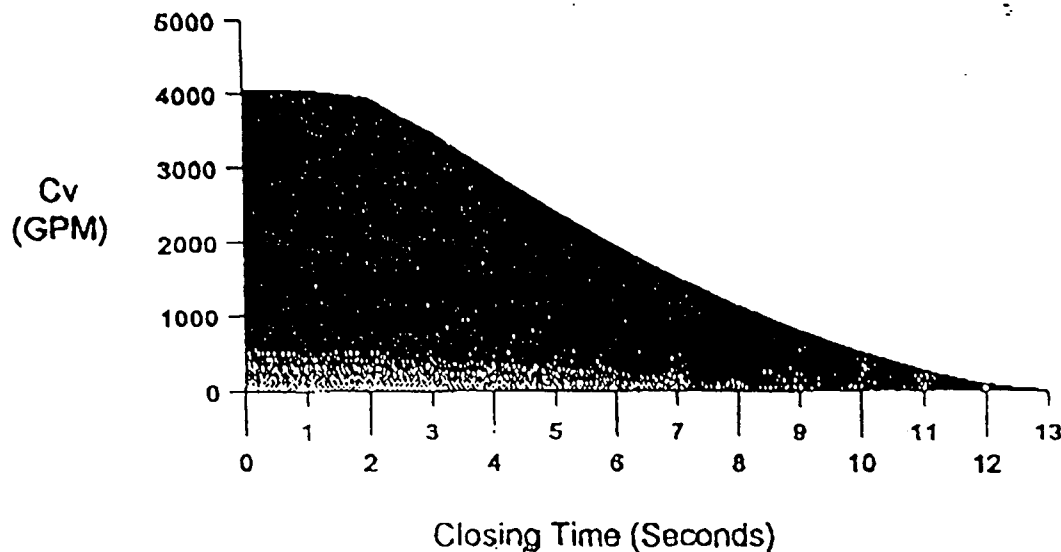
Valve/ Fitting	C _v	k = 891(d) ⁴ / (C _v) ²	References
LR-18		$k = \frac{891 (8.5)^4}{(4041)^2}$ $= .28$	see next Page for C _v curve
		Σ k = <u>.28</u>	

CRANE

CRANE VALVES
NUCLEAR
OPERATIONS

Flow Characteristics

Cv @ time of closing



Closing Time (Sec)	Cv
0.....	4041
1.....	4041
2.....	3947
3.....	3482
4.....	2960
5.....	2448
6.....	1963
7.....	1533
8.....	1143
9.....	802
10.....	514
11.....	275
12.....	97
12.6.....	0
13.....	0

VALVE SIZE: 10" Walworth Gate Valve

FIGURE NO.: 5262PS

ASSEMBLY DWG. NO.: A-9558-M-149(OTC-200)

STEM TRAVEL: 8 7/8"

Prepared by / Date:

Blf 5-16-96

Verified by / Date:

Form 00184 (6-81)

Dev./Station _____ Unit _____ File No. _____

Subject _____

By JMS Date 5/22/89Sheet No. 95 of 133 Problem No. _____ Checked By _____ Date _____PIPE # 76From Junction 61 @ Elev 816.50 To Junction 62 @ Elev 816.50Pipe Internal Diameter, $d = 8.50$ in.Pipe Equivalent Length, $L_e = 0.5$ ft. Σ Minor Loss Coefficient, $k = 0.7$

Reference Drawings

DFD-101A-1.2

0-479D

Actual Pipe Lengths

<u>0.5</u>	<u>1-LP-47</u>
<u>1 1/2</u>	<u>1-LP-47</u>
$\Sigma L = 0.5$	

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
<u>1-LP-47</u>		$1 \times 50 = 50$ $50 (.014) = 0.7$	<u>8.1, 8.9</u>
$\Sigma k = 0.7$			

Unit-2

90-1

Unit-3

90-1

Form 00184 (6-81)

Dev./Station _____ Unit _____ File No. _____
 Subject _____
 By ΔMAS Date 5/22/89
 Sheet No. 96 of 133 Problem No. _____ Checked By _____ Date _____

PIPE # 77From Junction 62 @ Elev 811.50 To Junction 13 @ Elev 790.83Pipe Internal Diameter, $d = 8.75$ in.Pipe Equivalent Length, $L_e = 89.5$ ft. Σ Minor Loss Coefficient, $k = 2.15$

Reference Drawings

DFD-1021-1.2
 D-479-D

Actual Pipe Lengths					
2.5'	24'	6'	45'	2'	5'
90°LR	90°LR	45	90°LR	45	
90°LR	Tee (B)	10x14 end	$\Sigma L = 89.5$		

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	C_v	$k = 891(d)^4 / (C_v)^2$	References
90°LR		$4 \times 14 = 56$	8.1
45		$2 \times 14 = 20$	
Tee (B)		$1 \times 50 = 50$	
		$1014 (126) = 1.76$	
		$1.76 \left(\frac{8.75}{8} \right) = 1.98$	
10x14 end		$\beta = \frac{8.75}{11.5} = 0.76$	
		$K = 1.17$	
$\Sigma k = 2.15$			

Unit - 2

1/2 Tee R - 1
 45 - 11
 90 - 1111
 end C - 1

Unit - 3

1/2 Tee B - 1
 90 - 1111
 45 - 111

Form 00184 (6-81)

Dev./Station _____ Unit _____ File No. _____
 Subject _____
 By JMS Date 5/22/87
 Sheet No. 97 of 133 Problem No. _____ Checked By _____ Date _____

PIPE # 78From Junction 63 @ Elev 790.83 To Junction 0 @ Elev 811.50Pipe Internal Diameter, $d = 11.50$ in.Pipe Equivalent Length, $L_e = 65.0$ ft. Σ Minor Loss Coefficient, $k = 2.63$

Reference Drawings

0FO-102A-1.2
0-4798
5-4798
2-4798A 0700B

Actual Pipe Lengths

$\frac{1}{2}$ Tee R)	1.0	31	5'	6'	1
90° LR	91	90° LR	45	90° LR	
13		ICE-R			
		EXIT			
					$\Sigma L = 15$

CALCULATIONS

Minor Loss Coefficients for Valves, Orifices, and Fittings

Valve/ Fitting	Cv	$k = 891(d)^4 / (C_v)^2$	References
Unit-2 90-1811 45-1 $\frac{1}{2}$ Tee - R	$\frac{1}{2}$ Tee R) 90° LR 45	$1 \times 10 = 10$ $3 \times 14 = 42$ $1 \times 10 = 10$ <hr/> $.0362 = .81$ $K_{loss} = \frac{10 + 42 + 10}{.81} = 0.9$	8.1
Unit-3 $\frac{1}{2}$ Tee R-1 90-1111 45-1	EXIT ICE-12	$1 \times 50 = 50$ $50(.011) = .65$ $.65 \left(\frac{11.5}{11.158} \right)^4 = .73$	8.1, 8.9
$\Sigma k = 2.63$			

Calculation OSC-7248

Attachment 8

Wood's Model Computer Run to Simulate ES Testing Performed January 1997

ESTveri

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG
A SUMMARY OF THE ORIGINAL DATA FOLLOWS
THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000119
THE SPECIFIC GRAVITY OF THIS LIQUID = 1.00

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE	
1	0 1	27.5	10.5	.2	2.19	809.50	
2	1 2	12.3	10.5	.2	.81		
3	2 3	1.0	12.4	.2	.30		
4	3 4	4.5	12.4	.2	.42		
5	4 5	9.4	12.4	.2	.15		
6	5 6	13.6	12.3	.2	.75		
7	6 7	.1	10.3	.2	.30		
LINE 7	IS CLOSED						
8	7 8	120.3	12.4	.2	2.56		
9	8 9	26.3	12.4	.2	1.18		
10	9 10	40.4	12.4	.2	1.03		
11	10 11	.1	10.4	.2	.31		
12	11 12	5.0	12.4	.2	.78		
13	12 13	2.6	13.5	.2	.26		
14	13 14	1.0	13.5	.2	.49		
15	14 15	3.5	13.5	.2	.29		
16	15 16	1.2	13.5	.2	.41		
LINE 16	IS CLOSED						
17	16 18	1.5	13.5	.2	.41		
18	18 19	4.5	13.5	.2	.29		
19	0 79	91.0	13.5	.2	1.54	834.25	
20	79 80	7.3	13.5	.2	.44		
21	80 81	15.1	13.5	.2	.26		
22	81 13	6.2	13.5	.2	3.01		
23	81 19	17.7	13.5	.2	2.30		
24	1 86	5.2	2.6	.2	1.58		
LINE 24	IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33	
26	3 20	9.0	8.3	.2	1.96		
LINE 26	IS CLOSED						
27	20 83	57.0	12.4	.2	1.79		
28	0 83	.1	17.5	.2	1.19	782.50	
29	83 84	27.0	17.5	.2	.89		
30	84 14	7.0	13.5	.2	.99		
LINE 30	IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50	
32	85 18	7.0	13.5	.2	.99		
LINE 32	IS CLOSED						
33	12 21	2.5	13.5	.2	.26		
34	21 22	.1	13.5	.2	.15		
35	22 23	14.8	13.5	.2	.94		
36	23 24	.1	10.0	.2	.06		
LINE 36	PUMP DATA (HEAD-FLOW):		430.0	.0	375.0 3000.0	285.0	4125.0
37	24 25	.5	10.3	.2	.89		
38	21 25	8.3	1.0	.2	50.00		
39	25 26	8.0	10.3	.2	.49		
THERE IS A CHECK VALVE IN LINE NUMBER 39							
40	26 27	17.5	10.3	.2	2.54		
41	27 29	2.5	10.3	.2	.40		
42	27 29	6.0	6.4	.2	11.76		
43	29 30	14.0	10.4	.2	1.20		
44	30 31	.1	15.5	.2	11.55		
45	31 32	2.0	10.4	.2	.31		
46	32 33	.1	8.1	.2	9.19		
LINE 46	IS CLOSED						
47	33 35	2.0	10.3	.2	.15		
48	35 36	14.5	10.3	.2	5.03		
49	36 37	13.0	10.3	.2	.74		
50	37 38	9.0	8.5	.2	.28		
51	38 39	.5	8.5	.2	.70		
52	39 41	78.0	8.8	.2	2.09		
53	41 0	28.6	11.5	.2	2.28	809.50	
54	19 42	1.0	13.5	.2	.29		
55	42 43	9.3	13.5	.2	1.05		
56	43 44	24.5	13.5	.2	1.02		
57	44 45	.1	10.0	.2	.06		
LINE 57	PUMP DATA (HEAD-FLOW):		430.0	.0	375.0 3000.0	285.0	4125.0

58	45	46	.5	10.4	.2	.23			
59	43	46	6.3	1.0	.2	50.00			
60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
LINE 69 IS CLOSED									
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0 .0 410.0 2250.0 298.0 4000.0									
83	67	68	1.0	10.3	.2	.89			
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0 .0 470.0 1500.0 385.0 1800.0									
115	115	116	.3	4.0	.2	.15			
LINE 115 IS CLOSED									
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			

119	119	120	103.3	8.1	.2	6.64	
120	120	121	176.6	8.1	.2	2.30	
121	121	122	.1	8.1	.2	5.37	
122	122	123	14.3	8.1	.2	7.05	
123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148 PUMP DATA (HEAD-FLOW) :			622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
LINE 149 IS CLOSED							
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	2578.00	779.00	45	46	
33	-2578.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	2610.00	779.25	68	69	
55	-2610.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1356.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	581.00	761.25	114	115	
116	-581.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	515.00	761.25	148	149	
141	-515.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

ESTveri

THE RESULTS ARE OBTAINED AFTER 6 TRIALS WITH AN ACCURACY = .00000

ES verification NO RCS & RB Pressure, LPI, RBS, & HPI flow adjusted for instrument uncertainty

LPI "A" 2878 - 300 = 2578 / LPI "B" 2910 - 300 = 2610

RBS "A" 675 -160 = 515 / RBS "B" 741 - 160 = 581

HPI (739 + 717) - 100 = 1356

BWST 35' or 799.25' + 35' = 834.25' (Ref. 8.29)

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE	NOS.	FLOWRATE	HEAD LOSS	PUMP	HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0	1	.00	.00	.00	.00	.00	.00	.00
2	1	2	.00	.00	.00	.00	.00	.00	.00
3	2	3	.00	.00	.00	.00	.00	.00	.00
4	3	4	.00	.00	.00	.00	.00	.00	.00
5	4	5	.00	.00	.00	.00	.00	.00	.00
6	5	6	.00	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED									
8	7	8	.00	.00	.00	.00	.00	.00	.00
9	8	9	.00	.00	.00	.00	.00	.00	.00
10	9	10	.00	.00	.00	.00	.00	.00	.00
11	10	11	.00	.00	.00	.00	.00	.00	.00
12	11	12	.00	.00	.00	.00	.00	.00	.00
13	12	13	-2578.00	-.02	.00	-.13	-5.78	-6.78	
14	13	14	515.00	.00	.00	.01	1.15	.34	
15	14	15	515.00	.00	.00	.01	1.15	.34	
LINE 16 IS CLOSED									
17	16	18	.00	.00	.00	.00	.00	.00	.00
18	18	19	.00	.00	.00	.00	.00	.00	.00
19	0	79	7640.00	4.99	.00	7.01	17.12	54.87	
20	79	80	7640.00	.40	.00	2.01	17.12	54.87	
21	80	81	6284.00	.57	.00	.80	14.08	37.53	
22	81	13	3093.00	.06	.00	2.25	6.93	9.59	
23	81	19	3191.00	.18	.00	1.83	7.15	10.18	
LINE 24 IS CLOSED									
25	86	0	.00	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED									
27	20	83	.00	.00	.00	.00	.00	.00	.00
28	0	83	.00	.00	.00	.00	.00	.00	.00
29	83	84	.00	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED									
31	0	85	.00	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED									
33	12	21	2578.00	.02	.00	.13	5.78	6.78	
34	21	22	2637.10	.00	.00	.08	5.91	7.08	
35	22	23	2637.10	.10	.00	.51	5.91	7.08	
36	23	24	2637.10	.00	392.85	.11	10.77	32.03	
37	24	25	2637.10	.01	.00	1.45	10.25	28.27	
38	21	25	-59.10	-16.95	.00	-373.63	-21.94	-2041.82	
39	25	26	2578.00	.22	.00	.76	10.02	27.07	
40	26	27	2578.00	.47	.00	3.96	10.02	27.07	
41	27	29	2400.39	.06	.00	.54	9.33	23.59	
42	27	29	177.61	.01	.00	.59	1.80	1.90	
43	29	30	2578.00	.35	.00	1.75	9.70	24.91	
44	30	31	2578.00	.00	.00	3.45	4.38	3.40	
45	31	32	2578.00	.05	.00	.45	9.70	24.91	
LINE 46 IS CLOSED									
47	33	35	2578.00	.05	.00	.23	10.02	27.07	
48	35	36	2578.00	.39	.00	7.85	10.02	27.07	
49	36	37	2578.00	.35	.00	1.15	10.02	27.07	
50	37	38	2578.00	.63	.00	.94	14.57	69.93	
51	38	39	2578.00	.03	.00	2.31	14.57	69.93	
52	39	41	2578.00	4.71	.00	6.14	13.75	60.35	
53	41	0	2578.00	.43	.00	2.24	7.96	15.15	
54	19	42	3191.00	.01	.00	.23	7.15	10.18	
55	42	43	2610.00	.06	.00	.56	5.85	6.94	
56	43	44	2669.39	.18	.00	.57	5.98	7.24	
57	44	45	2669.39	.00	391.45	.11	10.90	32.80	
58	45	46	2669.39	.01	.00	.36	10.04	26.63	
59	43	46	-59.39	-12.98	.00	-377.24	-22.04	-2061.03	
60	46	47	2610.00	.47	.00	1.53	9.82	25.51	
61	47	48	2610.00	.26	.00	3.34	9.82	25.51	
62	48	49	2610.00	.26	.00	1.32	9.82	25.51	
63	49	50	2384.02	.08	.00	.86	8.97	21.43	
64	49	50	225.98	.01	.00	.92	2.28	2.96	

65	50	51	2610.00	.18	.00	1.15	9.82	25.51
66	51	52	2610.00	.00	.00	3.53	4.44	3.48
67	52	53	2610.00	.06	.00	.72	9.82	25.51
68	53	54	2610.00	.04	.00	.58	9.82	25.51
LINE 69 IS CLOSED								
70	55	56	2610.00	.28	.00	.50	10.15	27.72
71	56	57	2610.00	.50	.00	1.73	10.15	27.72
72	57	70	2610.00	.22	.00	.24	10.15	27.72
73	70	58	2610.00	2.02	.00	8.86	10.15	27.72
74	58	59	2610.00	.72	.00	.94	10.15	27.72
75	59	61	2610.00	.52	.00	.96	14.76	71.63
76	61	62	2610.00	.04	.00	2.37	14.76	71.63
77	62	63	2610.00	5.53	.00	6.47	13.92	61.81
78	63	0	2610.00	.78	.00	2.65	8.06	15.51
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	581.00	.00	.00	.00	1.30	.42
110	113	114	581.00	.04	.00	.12	2.26	1.62
111	114	101	581.00	.00	.00	.00	3.59	5.11
112	15	109	515.00	.01	.00	.16	2.00	1.30
113	109	110	515.00	.00	.00	.00	3.19	4.07
114	101	115	581.00	.00	606.92	.00	3.59	5.11
LINE 115 IS CLOSED								
116	116	117	581.00	.03	.00	1.89	6.45	21.98
117	117	118	581.00	.02	.00	.10	3.59	5.11
118	118	119	581.00	.17	.00	.10	3.59	5.11
119	119	120	581.00	.53	.00	1.33	3.59	5.11
120	120	121	581.00	.90	.00	.46	3.59	5.11
121	121	122	581.00	.00	.00	1.08	3.59	5.11
122	122	123	581.00	.07	.00	1.41	3.59	5.11
123	123	124	52.39	1.61	.00	135.92	19.45	1614.27
124	124	0	52.39	.16	.00	5.87	19.45	1614.27
125	123	125	528.61	.65	.00	.31	3.11	3.78
126	125	126	275.09	.00	.00	.01	1.62	1.13
127	126	127	192.12	.01	.00	.01	1.13	.59
128	127	128	109.21	.01	.00	.01	1.10	.78
129	128	129	43.68	.02	.00	.00	.98	1.05
130	128	130	65.53	.01	.00	.01	1.48	2.18
131	127	131	82.91	.02	.00	.05	1.87	3.34
132	126	132	82.97	.02	.00	.05	1.87	3.35
133	125	133	253.52	.01	.00	.01	1.49	.97
134	133	134	170.56	.01	.00	.01	1.00	.47
135	134	135	91.82	.01	.00	.00	.93	.57
136	135	136	34.97	.01	.00	.00	.79	.70
137	135	137	56.84	.01	.00	.01	1.28	1.68
138	134	138	78.74	.00	.00	.01	1.77	3.04
139	133	139	82.96	.02	.00	.05	1.87	3.35

140	129	0	43.68	.00	.00	9.12	.98	1.05
141	130	0	65.53	.00	.00	9.12	1.48	2.18
142	131	0	82.91	.00	.00	9.10	1.87	3.34
143	132	0	82.97	.00	.00	9.12	1.87	3.35
144	139	0	82.96	.00	.00	9.11	1.87	3.35
145	138	0	78.74	.00	.00	9.15	1.77	3.04
146	137	0	56.84	.00	.00	9.14	1.28	1.68
147	136	0	34.97	.00	.00	9.14	.79	.70
148	110	140	515.00	.00	611.12	.00	3.19	4.07
LINE 149	IS	CLOSED						
150	141	142	515.00	.02	.00	1.48	5.72	17.48
151	142	143	515.00	.00	.00	.02	3.19	4.07
152	143	144	515.00	.82	.00	.52	3.19	4.07
153	144	145	515.00	.10	.00	.87	3.19	4.07
154	145	146	515.00	.02	.00	.14	3.19	4.07
155	146	147	515.00	.00	.00	.85	3.19	4.07
156	147	148	515.00	.05	.00	1.09	3.19	4.07
157	148	200	52.56	1.62	.00	133.30	19.51	1624.89
158	200	0	52.56	.16	.00	5.91	19.51	1624.89
159	148	149	462.44	.46	.00	.30	2.72	2.95
160	149	150	248.03	.00	.00	.01	1.46	.93
161	150	151	172.85	.01	.00	.00	1.02	.48
162	151	152	97.73	.01	.00	.01	.99	.64
163	152	153	41.33	.02	.00	.00	.93	.95
164	152	154	56.40	.00	.00	.01	1.27	1.66
165	151	155	75.12	.00	.00	.04	1.69	2.79
166	150	156	75.18	.00	.00	.04	1.69	2.79
167	149	157	214.40	.01	.00	.01	1.26	.72
168	157	158	139.22	.00	.00	.00	.82	.33
169	158	159	71.50	.01	.00	.00	.72	.37
170	159	160	26.34	.01	.00	.00	.59	.42
171	159	161	45.15	.01	.00	.00	1.02	1.11
172	158	162	67.73	.01	.00	.01	1.52	2.31
173	157	163	75.18	.00	.00	.04	1.69	2.80
174	153	0	41.33	.00	.00	6.75	.93	.95
175	154	0	56.40	.00	.00	6.76	1.27	1.66
176	155	0	75.12	.00	.00	6.74	1.69	2.79
177	156	0	75.18	.00	.00	6.75	1.69	2.79
178	163	0	75.18	.00	.00	6.76	1.69	2.80
179	162	0	67.73	.00	.00	6.77	1.52	2.31
180	161	0	45.15	.00	.00	6.77	1.02	1.11
181	160	0	26.34	.00	.00	6.77	.59	.42

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.17
2	.00	809.50	798.50	4.77
3	.00	809.50	798.50	4.77
4	.00	809.50	801.50	3.47
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	816.01	812.00	1.74
8	.00	816.01	791.75	10.51
9	.00	816.01	798.42	7.62
10	.00	816.01	767.00	21.23
11	.00	816.01	767.00	21.23
12	.00	816.01	767.00	21.23
13	.00	816.16	767.00	21.30
14	.00	816.15	767.00	21.29
15	.00	816.14	767.00	21.29
16	.00	816.46	767.00	21.43
17	.00	830.48	822.67	3.38
18	.00	816.46	767.00	21.43
19	.00	816.46	767.00	21.43
20	.00	782.50	784.67	-.94
21	.00	815.85	767.00	21.16
22	.00	815.77	767.00	21.13
23	.00	815.16	761.08	23.43
24	.00	1207.90	763.00	192.73
25	.00	1206.43	765.25	191.12
26	.00	1205.45	765.25	190.70
27	.00	1201.02	779.00	182.82
28	.00	828.44	823.33	2.21
29	.00	1200.42	779.00	182.56
30	.00	1198.32	771.50	184.90
31	.00	1194.87	777.33	180.88
32	2578.00	1194.37	779.00	179.94
33	-2578.00	836.97	779.00	25.11
34	.00	828.44	823.33	2.21
35	.00	836.68	779.00	24.99
36	.00	828.44	824.75	1.60
37	.00	826.94	816.00	4.74
38	.00	825.37	816.00	4.06
39	.00	823.02	816.00	3.04
40	.00	828.44	820.00	3.66
41	.00	812.18	792.38	8.58
42	.00	816.22	767.00	21.32
43	.00	815.59	767.00	21.05
44	.00	814.85	761.08	23.29
45	.00	1206.19	763.00	191.99
46	.00	1205.82	765.00	190.96
47	.00	1203.82	765.25	189.99
48	.00	1200.22	775.50	183.99
49	.00	1198.65	777.75	182.34
50	.00	1197.71	774.25	183.45
51	.00	1196.38	771.50	184.06
52	.00	1192.85	777.73	179.83
53	.00	1192.07	779.25	178.83
54	2610.00	1191.44	779.25	178.56
55	-2610.00	844.82	779.25	28.40
56	.00	844.05	779.25	28.07
57	.00	841.82	779.25	27.11
58	.00	830.48	823.17	3.17
59	.00	828.82	816.50	5.34
60	.00	828.44	817.00	4.96
61	.00	827.34	816.50	4.69
62	.00	824.93	816.50	3.65
63	.00	812.93	790.83	9.57
64	.00	1203.82	767.00	189.23
65	.00	1203.82	767.00	189.23
66	.00	1203.82	761.08	191.80
67	.00	1630.68	763.00	375.88
68	.00	1203.82	765.25	189.99
69	.00	1203.82	765.25	189.99
70	.00	841.36	787.25	23.44
71	.00	1203.82	765.25	189.99
72	.00	1203.82	763.25	190.86
73	.00	841.82	763.25	34.04
74	.00	1192.07	762.00	186.31
75	.00	1192.07	762.00	186.31

76	.00	1192.07	762.00	186.31
77	.00	815.77	763.50	22.64
78	.00	1192.07	763.50	185.66
79	.00	822.25	794.25	12.13
80	1356.00	819.83	779.00	17.69
81	.00	818.46	779.00	17.10
82	.00	798.33	796.17	.94
83	.00	782.50	774.50	3.47
84	.00	782.50	767.00	6.71
85	.00	782.50	767.00	6.71
86	.00	798.33	804.50	-2.67
101	.00	816.06	760.10	24.24
109	.00	815.97		
110	.00	815.97	760.10	24.20
113	.00	816.21		
114	.00	816.06		
115	581.00	1422.98	761.25	286.66
116	-581.00	962.25	762.00	86.75
117	.00	960.33	765.25	84.51
118	.00	960.21	765.25	84.46
119	.00	959.94	765.25	84.34
120	.00	958.08	816.50	61.33
121	.00	956.72	812.00	62.69
122	.00	955.64	812.00	62.23
123	.00	954.15	812.00	61.58
124	.00	816.62	810.58	2.61
125	.00	953.20	944.00	3.98
126	.00	953.18	944.00	3.98
127	.00	953.17	944.00	3.97
128	.00	953.15	944.00	3.96
129	.00	953.12	944.00	3.95
130	.00	953.12	944.00	3.95
131	.00	953.10	944.00	3.94
132	.00	953.12	944.00	3.95
133	.00	953.18	944.00	3.98
134	.00	953.17	944.00	3.97
135	.00	953.15	944.00	3.96
136	.00	953.14	944.00	3.96
137	.00	953.14	944.00	3.96
138	.00	953.15	944.00	3.96
139	.00	953.12	944.00	3.95
140	515.00	1427.09	761.25	288.44
141	-515.00	957.56	762.00	84.72
142	.00	956.06	764.09	83.16
143	.00	956.04	765.47	82.55
144	.00	954.69	817.50	59.43
145	.00	953.72	817.50	59.01
146	.00	953.57	812.00	61.33
147	.00	952.72	812.00	60.96
148	.00	951.58	812.00	60.47
149	.00	950.81	944.00	2.95
150	.00	950.80	944.00	2.94
151	.00	950.79	944.00	2.94
152	.00	950.77	944.00	2.93
153	.00	950.75	944.00	2.92
154	.00	950.76	944.00	2.93
155	.00	950.74	944.00	2.92
156	.00	950.75	944.00	2.93
157	.00	950.80	944.00	2.94
158	.00	950.79	944.00	2.94
159	.00	950.78	944.00	2.94
160	.00	950.77	944.00	2.93
161	.00	950.77	944.00	2.93
162	.00	950.77	944.00	2.93
163	.00	950.76	944.00	2.93
200	.00	816.66	810.53	2.63

THE NET SYSTEM DEMAND = 1356.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	7640.00
25	.00
28	.00
31	.00
53	-2578.00
78	-2610.00
108	.00
124	-52.39
140	-43.68
141	-65.53
142	-82.91
143	-82.97
144	-82.96
145	-78.74
146	-56.84
147	-34.97
158	-52.56
174	-41.33
175	-56.40
176	-75.12
177	-75.18
178	-75.18
179	-67.73
180	-45.15
181	-26.34

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 7640.00
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -6284.00

GROUP TEND

Main Alarms Graphics Trends Point List Zoom Print Help

05-JAN-1997 10:47:30

SELECT FUNC. KEY OR TURN-ON CODE PT4 >

P/T A

P/T B

SPDS

POINT TREND FOR TEMGRP02

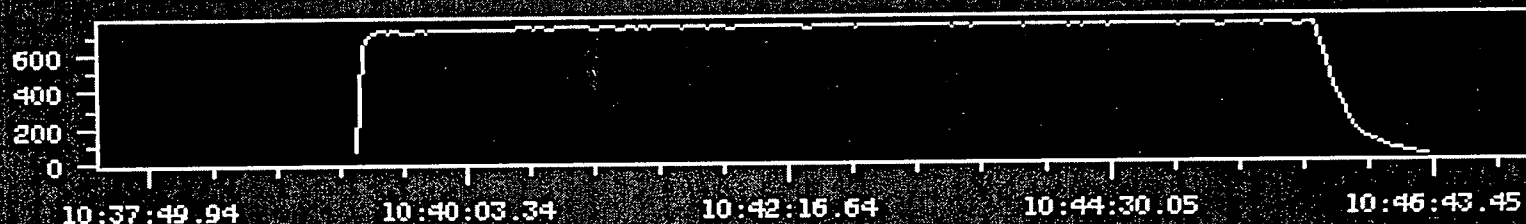
PAGE 1 OF 1

** dynamic group **



6000 45.23

202.72



03A1239

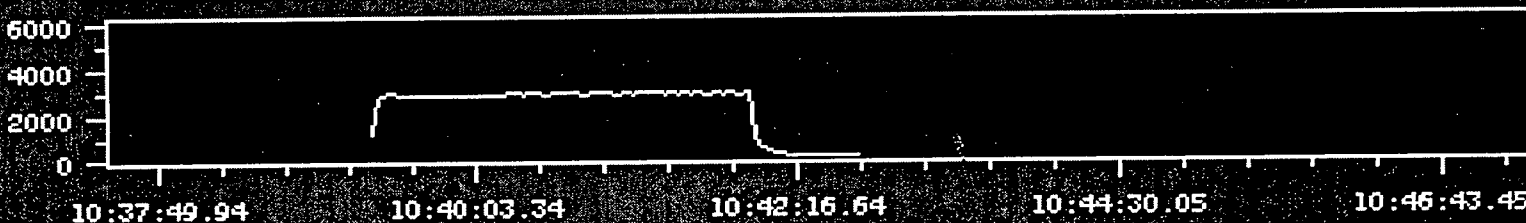
HP LOOP B INJ FLOW

INVL

-9999.00

GPM

186.74



03A1310

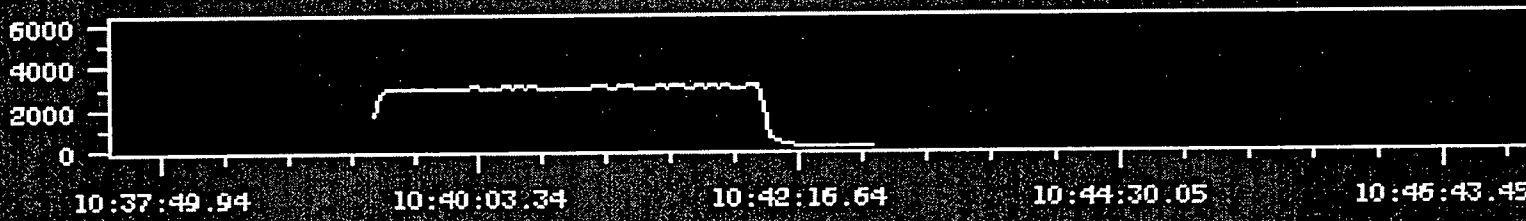
LP LOOP A INJ FLOW

INVL

-9999.0

GPM

-9999.0



03A1311

LP LOOP B INJ FLOW

INVL

-9999.0

GPM

-9999.0

PREV

CANC

F1= CLEAR

F2=

F3= HISTORY

F4=

F5=

F6= LOCAL ARCH

TT028

WK= 007/win=3

SEC LVL= 1

PRIM/BACK

CPU A

CRIT OPS

Ocone 3

OSC-7248
Attachment 8
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GROUP TREND

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SELECT FUNC. KEY OR TURN-ON CODE PT4 >

P/T A

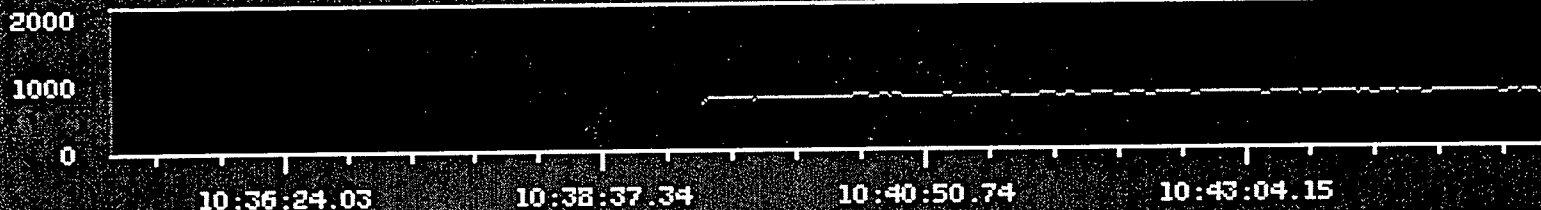
P/T B

SPDS

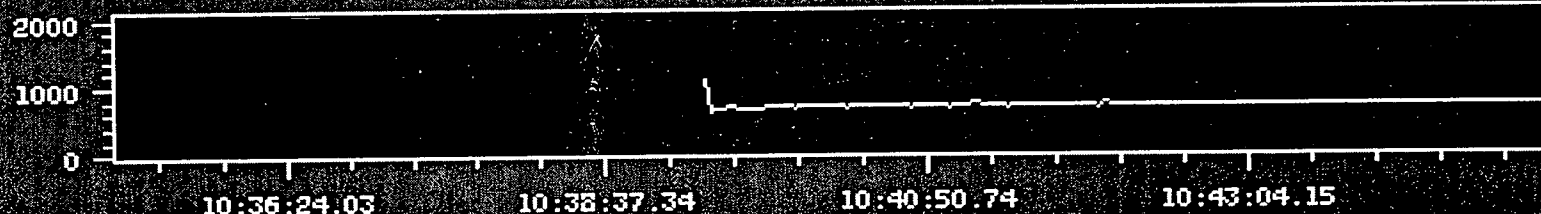
POINT TREND FOR TEMGRP01

PAGE 1 OF 1

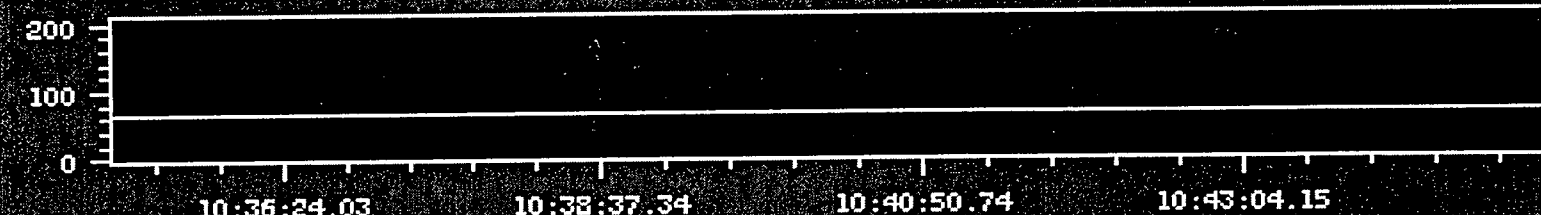
** dynamic group **



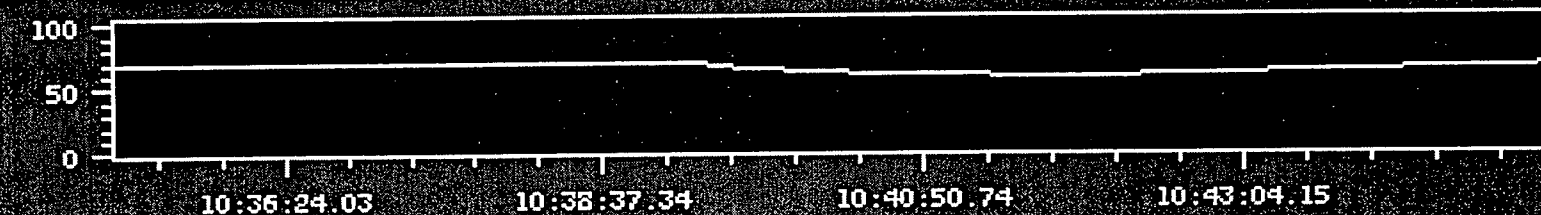
03A0009 BUILDING SPRAY HDR A FLOW LALM 756.6 744.6



03A0010 BUILDING SPRAY HDR B FLOW INHB 689.0 691.3



03A1010 BWST 3 TEMP GOOD 63.6 63.6



03A1042 HP LDST LVL 1 GOOD 64.62 62.18

PREV CANCEL F1= CLEAR F2= F3= HISTORY F4= F5= F6= LOCAL ARCH

TT026 WK=007/win=2 SEC LVL=1 PRIM/BACK CPU A CRIT OPS Ocone 3

OSC-7248
 Attachment 8
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GROUP TREND

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[Zoom](#)
[Print](#)
[Help](#)

05-JAN-1997 10:48:55

PRINT PROCESSING -- print request submitted to PRINTBW

SELECT FUNC. KEY OR TURN-ON CODE PT4

P/T A

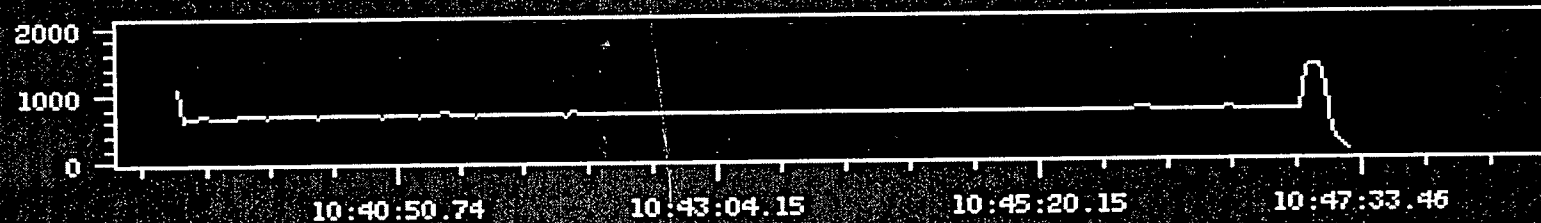
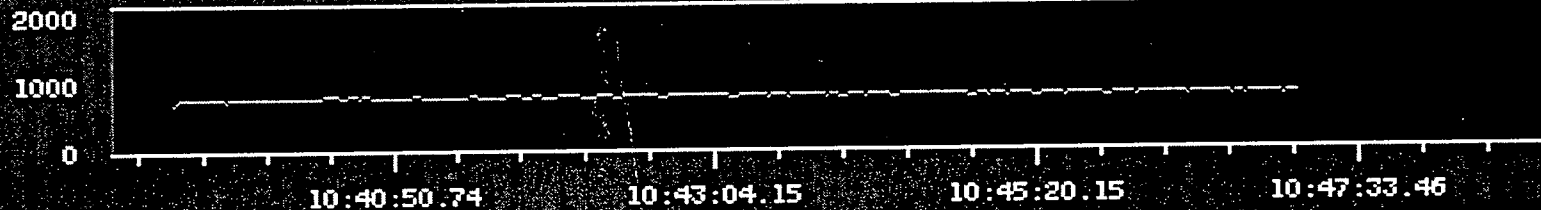
P/T B

SPD

POINT TREND FOR TEMGRP01

PAGE 1 OF 1

*** dynamic group ***



03A0010

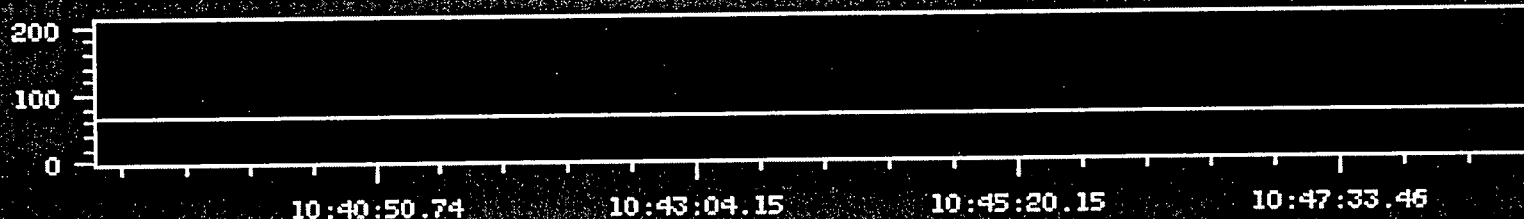
BUILDING SPRAY HDR B FLOW

INWL

-9999.0

GPM

-9999.0



03A1010

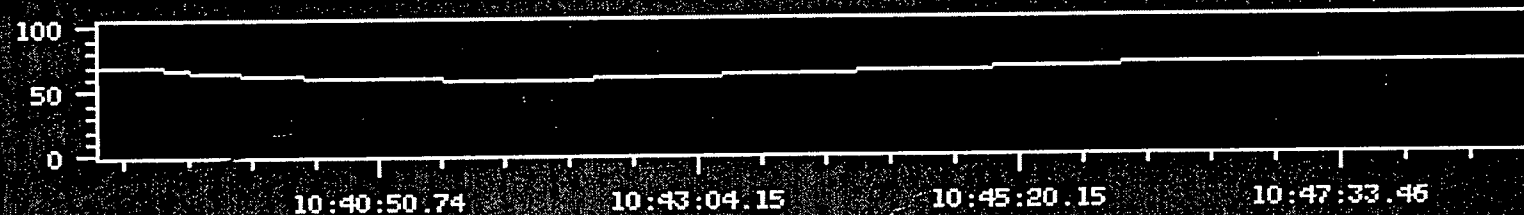
3WST 3 TEMP

GOOD

63.6

DEG F

63.6



03A1042

HP LDST LVL 1

GOOD

67.10

INCHES

67.07

PREV

CANC

F1= CLEAR

F2=

F3= HISTORY

F4=

F5=

F6= LOCAL ARCH

TT026

WK= 007/win=2

SEC LVL= 1

PRIM/BACK

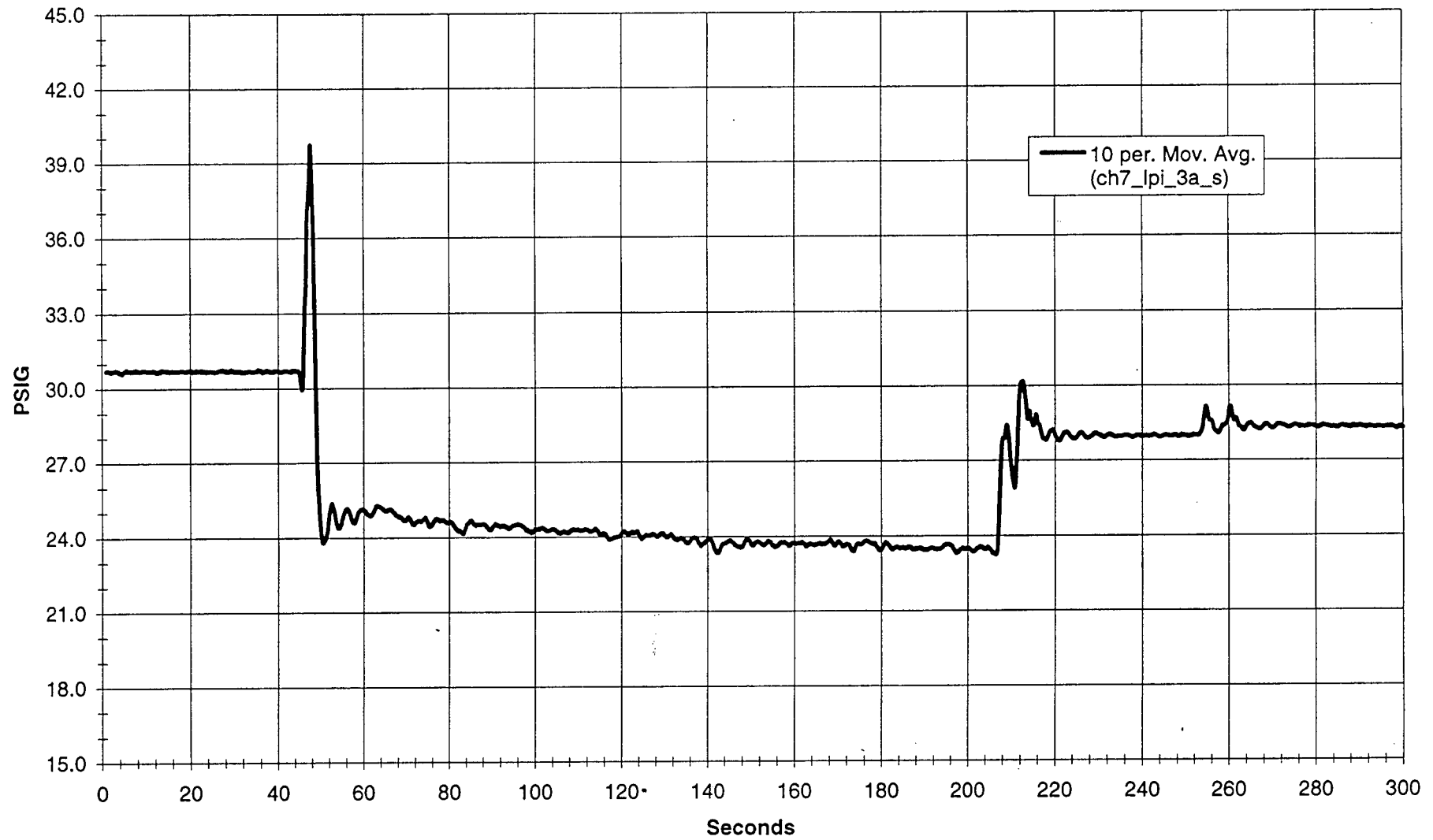
CPU A

CRIT OPS

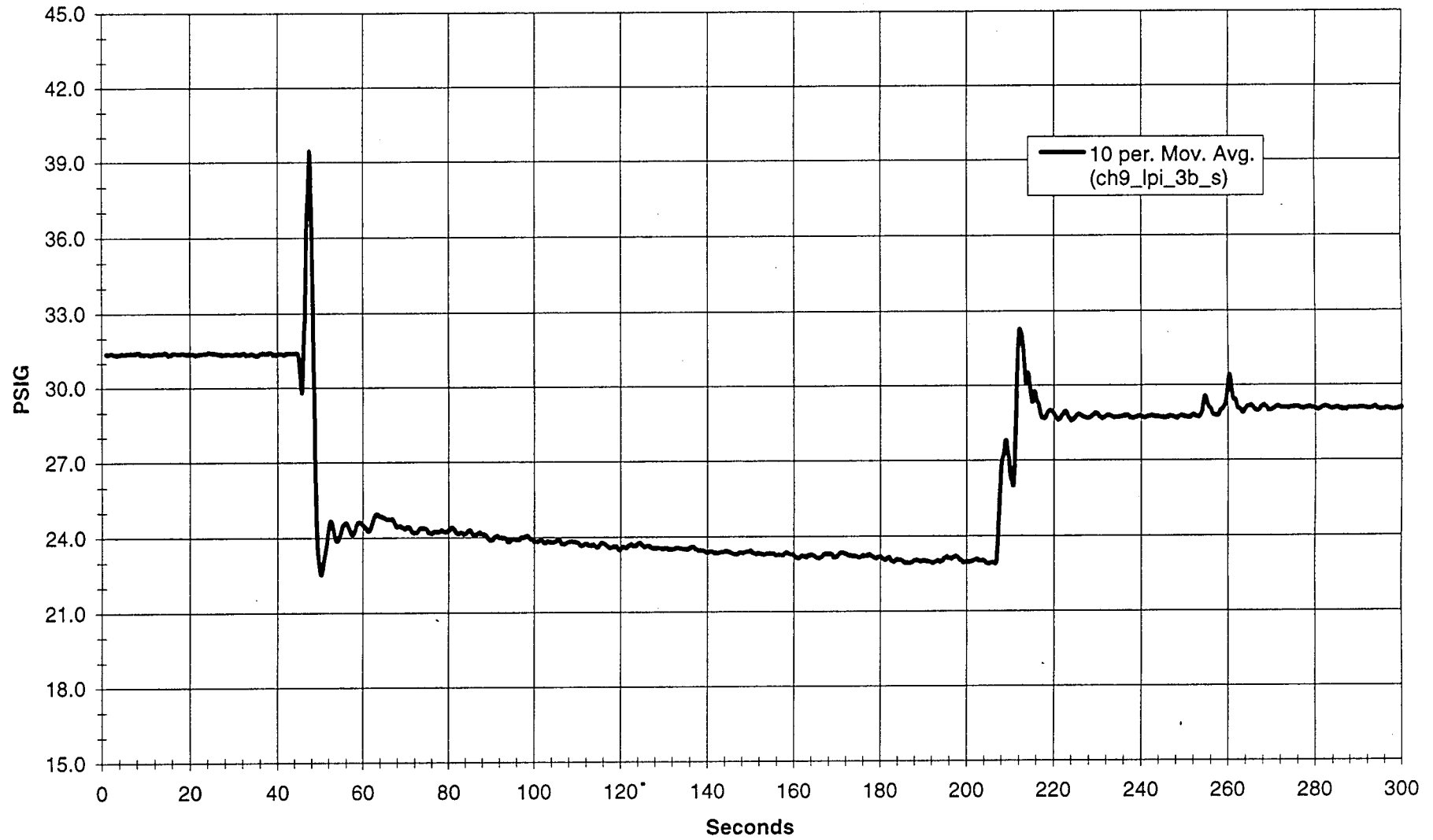
Ocone 3

OSC-7248
Attachment 8
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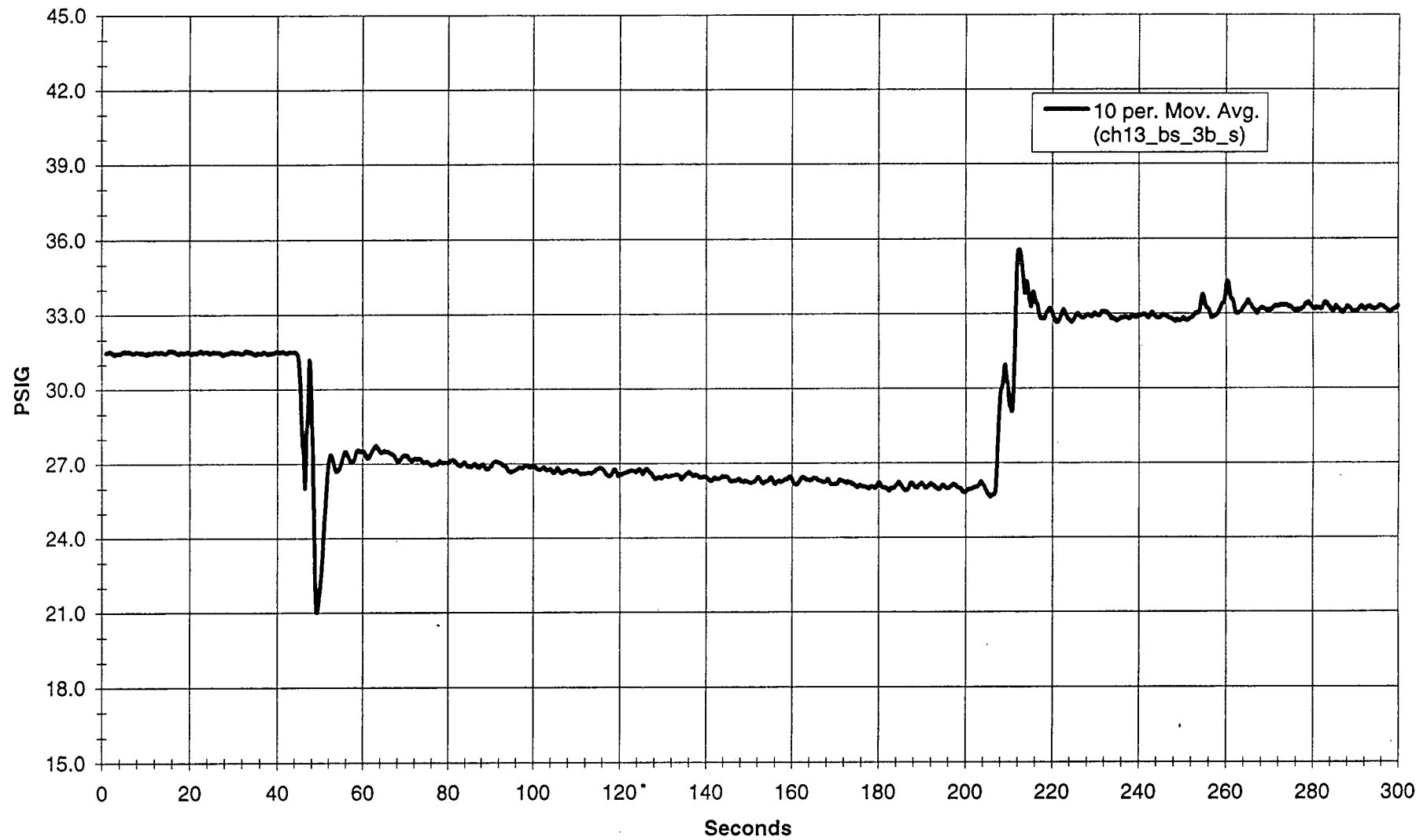
LPI Pump 3A Suction Pressure (Section 12.5)



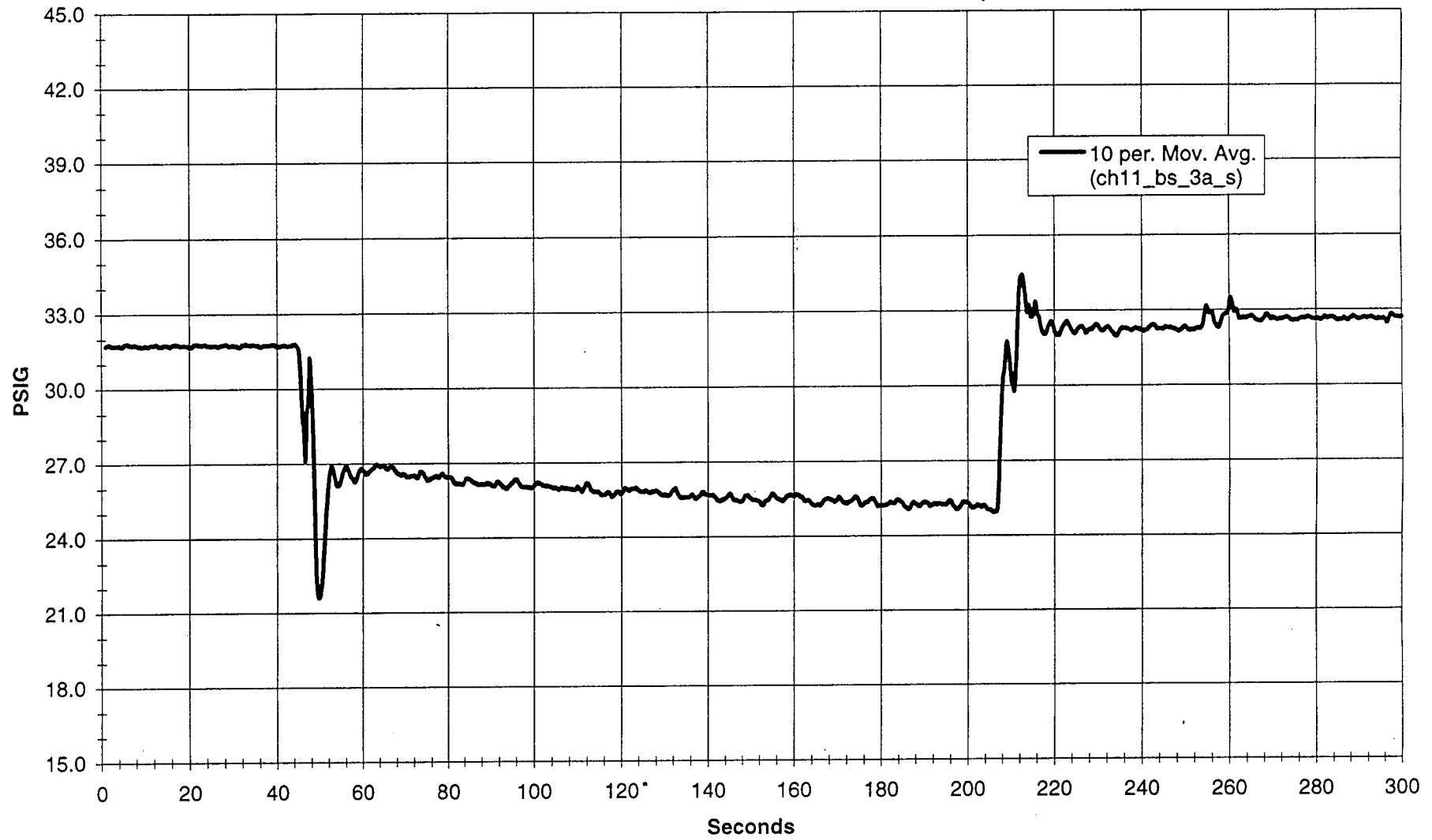
LPI Pump 3B Suction Pressure (Section 12.5)



BS Pump 3B Suction Pressure (Section 12.5)



BS Pump 3A Suction Pressure (Section 12.5)



1/5/97 10:38:29	ch1_hpl_3a_s	ch2_hpl_3a_d	ch3_hpl_3b_s	ch4_hpl_3b_d	ch5_hpl_3c_s	ch6_hpl_3c_d	ch7_hpl_3a_s	ch8_hpl_3a_d	ch9_hpl_3b_s	ch10_hpl_3b_d	ch11_bs_3a_s	ch12_bs_3a_d	ch13_bs_3b_s	ch14_bs_3b_d	ch15_lds_tank
0.1	26.416	25.391	25.928	25.391	27.637	25.391	30.713	30.908	31.384	30.176	31.812	28.809	31.384	30.029	18.579
0.2	26.904	25.391	25.684	25.391	28.125	25.391	30.713	30.176	31.323	31.641	31.628	30.640	31.384	30.640	18.579
0.3	26.660	30.273	25.684	30.273	27.637	25.391	30.652	30.908	31.689	30.908	31.689	30.640	31.567	29.419	18.579
0.4	26.660	25.391	25.684	25.391	27.637	30.273	30.713	28.711	31.323	30.908	31.689	31.250	31.506	28.809	18.335
0.5	26.660	25.391	25.684	30.273	27.637	25.391	30.713	30.176	31.445	31.641	31.750	30.640	31.506	30.029	18.823
0.6	26.660	30.273	25.928	25.391	27.393	30.273	30.713	31.641	31.323	31.641	31.689	31.860	31.567	29.419	18.091
0.7	26.904	25.391	25.928	25.391	27.637	30.273	30.713	30.908	31.384	30.908	31.689	30.640	31.384	27.588	18.701
0.8	26.904	25.391	26.416	25.391	27.393	30.273	30.835	31.641	31.201	30.908	31.750	32.471	31.384	28.198	18.579
0.9	26.660	25.391	26.172	25.391	27.637	30.273	30.652	30.176	31.262	30.908	31.812	30.029	31.567	29.419	18.579
1.0	26.660	30.273	25.684	25.391	27.637	25.391	30.652	28.711	31.323	31.641	31.750	31.250	31.506	27.588	18.701
1.1	27.393	25.391	26.172	30.273	27.637	25.391	30.713	30.908	31.323	30.908	31.995	28.809	31.384	28.809	18.335
1.2	26.904	25.391	25.928	30.273	27.637	25.391	30.774	28.711	31.506	31.641	31.750	31.250	31.506	28.809	18.823
1.3	26.660	25.391	25.928	25.391	27.881	30.273	30.652	30.908	31.323	31.641	31.750	28.198	31.445	31.860	18.091
1.4	25.928	30.273	26.416	25.391	27.637	25.391	30.591	31.641	31.445	30.908	31.689	31.250	31.628	29.419	18.701
1.5	26.904	30.273	25.439	20.508	27.637	30.273	30.652	30.908	31.323	30.176	31.812	31.250	31.689	28.809	18.701
1.6	26.416	30.273	25.928	25.391	27.881	25.391	30.713	33.105	31.506	31.641	31.873	32.471	31.506	30.029	18.579
1.7	25.684	20.508	25.684	25.391	27.148	25.391	30.652	30.908	31.323	31.641	31.750	30.640	31.506	29.419	18.701
1.8	27.148	25.391	25.684	20.508	27.881	30.273	30.713	28.711	31.262	30.908	31.689	32.471	31.506	27.588	18.335
1.9	26.416	30.273	25.928	25.391	27.881	25.391	30.652	30.908	31.384	30.908	31.628	30.640	31.506	28.809	18.701
2.0	25.928	30.273	25.928	25.391	26.904	30.273	30.652	28.711	31.384	32.373	31.750	30.640	31.506	29.419	18.579
2.1	26.904	25.391	25.684	25.391	29.102	25.391	30.713	30.908	31.384	30.908	31.812	29.419	31.140	28.198	18.579
2.2	26.416	30.273	25.928	25.391	27.637	30.273	30.713	30.908	31.445	30.176	31.445	30.640	31.384	28.809	18.701
2.3	25.928	30.273	25.928	25.391	27.393	30.273	30.713	30.908	31.384	31.641	31.750	29.419	31.506	29.419	18.335
2.4	26.660	25.391	25.684	25.391	28.369	25.391	30.652	30.908	31.323	27.246	31.812	31.250	31.506	30.640	18.579
2.5	26.660	25.391	25.928	30.273	27.637	30.273	30.713	33.105	31.201	30.908	31.750	31.250	31.445	28.809	18.579
2.6	26.416	25.391	26.416	25.391	27.881	30.273	30.774	29.443	31.384	30.908	31.812	31.860	31.445	30.029	18.457
2.7	26.660	20.508	25.684	25.391	27.148	30.273	30.713	30.908	31.201	31.641	31.750	30.640	31.384	29.419	18.945
2.8	26.660	25.391	26.172	30.273	27.637	30.273	30.713	28.711	31.384	30.908	31.689	31.860	31.262	29.419	17.969
2.9	27.148	30.273	25.439	35.156	27.393	25.391	30.713	30.908	31.384	33.105	31.750	30.029	31.445	28.198	18.579
3.0	26.660	30.273	25.928	25.391	27.637	25.391	30.713	30.908	31.323	31.641	31.567	30.029	31.445	28.809	18.579
3.1	26.904	30.273	26.660	20.508	27.637	30.273	30.713	30.176	31.445	31.641	31.750	30.029	31.567	28.809	18.579
3.2	26.416	20.508	25.439	25.391	27.637	30.273	30.713	30.908	31.384	30.908	31.750	30.640	31.506	28.198	18.579
3.3	26.660	30.273	25.928	25.391	27.637	30.273	30.713	30.176	31.384	31.641	31.689	28.809	31.567	26.978	18.335
3.4	26.904	30.273	25.928	25.391	27.881	30.273	30.652	29.443	30.957	31.641	31.812	31.860	31.506	29.419	18.701
3.5	26.416	25.391	25.928	30.273	27.881	30.273	30.652	31.641	31.445	30.908	31.750	31.250	31.445	29.419	18.579
3.6	26.660	25.391	25.928	25.391	27.637	25.391	30.713	30.176	31.262	30.908	31.750	30.640	31.262	28.809	18.579
3.7	26.904	25.391	25.928	25.391	27.881	30.273	30.713	31.641	31.323	31.641	31.812	31.860	31.384	31.860	18.579
3.8	26.416	20.508	25.439	25.391	27.637	30.273	30.591	30.908	31.384	30.908	31.750	30.640	31.445	29.419	18.457
3.9	26.660	30.273	25.684	25.391	27.637	30.273	30.347	30.176	31.506	30.176	31.689	28.809	31.384	29.419	18.579
4.0	26.660	25.391	25.928	25.391	27.881	30.273	30.652	30.908	31.384	30.908	31.750	30.029	31.384	28.809	18.579
4.1	26.660	25.391	25.439	20.508	27.393	25.391	30.713	30.908	31.384	30.176	31.384	31.250	31.445	29.419	18.457
4.2	26.416	30.273	25.928	20.508	28.125	30.273	30.591	30.176	31.445	30.908	31.750	30.029	31.506	29.419	19.067
4.3	26.660	25.391	26.416	20.508	27.148	30.273	30.652	31.641	31.262	31.641	31.689	30.640	31.689	28.198	18.579
4.4	26.660	25.391	25.684	20.508	27.393	30.273	30.713	30.176	31.384	31.641	31.750	30.029	31.689	27.588	18.579
4.5	26.660	25.391	26.172	30.273	28.125	30.273	30.347	32.373	31.384	30.908	31.750	31.250	31.445	28.809	18.579
4.6	26.416	30.273	25.928	25.391	26.416	30.273	30.652	30.908	31.323	30.908	31.567	30.640	31.506	29.419	18.457
4.7	26.660	30.273	25.439	25.391	27.881	30.273	31.079	29.443	31.201	31.641	31.750	31.250	31.567	28.809	18.701
4.8	26.416	30.273	26.660	30.273	27.881	25.391	30.774	30.176	31.445	31.641	31.873	30.640	31.445	29.419	18.335
4.9	25.928	25.391	25.684	25.391	26.904	30.273	30.591	28.711	31.445	30.176	31.812	32.471	31.445	30.640	19.067
5.0	26.660	25.391	25.684	25.391	27.637	30.273	30.774	30.908	31.323	30.908	31.750	29.419	31.506	29.419	18.457
5.1	26.904	20.508	25.928	30.273	27.637	30.273	30.774	30.908	31.445	32.373	31.750	31.250	31.506	28.809	18.579
5.2	26.904	30.273	25.928	20.508	28.369	30.273	30.713	30.908	31.323	30.908	32.239	28.809	31.567	29.419	18.579
5.3	26.416	20.508	25.684	20.508	27.637	30.273	30.652	32.373	31.323	36.035	31.750	31.250	31.506	30.029	18.457
5.4	26.660	35.156	26.172	25.391	27.637	30.273	30.591	30.176	31.384	31.641	31.689	30.029	31.445	28.198	18.823
5.5	27.393	30.273	25.684	25.391	27.393	30.273	30.713	30.176	31.323	31.641	31.750	31.860	31.445	28.198	18.457
5.6	26.416	25.391	25.684	25.391	27.637	30.273	30.774	30.176	31.384	30.908	31.750	30.029	31.506	28.809	19.067
5.7	26.904	20.508	25.928	25.391	27.881	30.273	30.713	28.711	31.445	31.641	31.689	31.860	31.445	29.419	18.579
5.8	27.393	25.391	25.928	25.391	27.393	25.391	30.652	30.908	31.445	30.908	31.812	30.029	31.689	28.198	18.579
5.9	26.172	30.273	25.195	25.391	27.637	25.391	30.713	30.908	31.323	30.908	31.812	31.860	31.567	29.419	18.579
6.0	26.904	35.156	26.416	30.273	27.637	30.273	30.713	30.908	31.384	31.641	31.995	30.640	31.567	29.419	18.457
6.1	27.148	20.508	25.684	25.391	27.881	30.273	30.774	32.373	31.384	31.641	31.689	31.250	31.506	30.029	18.823
6.2	26.416	25.391	25.928	25.391	27.637	30.273	30.652	30.176	31.262	30.908	31.689	29.419	31.445	28.198	18.457
6.3	26.904	30.273	26.172	25.391	27.637	30.273	30.713	30.176	31.384	30.908	31.689	30.640	31.506	29.419	18.945
6.4	27.393	30.273	25.684	25.391	27.637	25.391	30.652	30.908	31.323	31.641	31.750	28.198	31.445	30.029	18.701
6.5	26.416	30.273	26.660	25.391	26.904	30.273	30.591	28.711	31.628	30.908	31.812	30.640	31.384	28.198	18.579
6.6	26.416	25.391	25.928	25.391	27.881	30.273	30.652	31.641	31.323	30.176	31.689	30.640	31.384	26.978	18.701

6.7	26.660	25.391	25.684	30.273	27.148	30.273	30.896	30.908	31.445	30.176	31.689	31.860	31.445	28.809	18.579
6.8	26.660	20.508	25.684	25.391	28.369	30.273	30.774	30.908	31.384	32.373	31.689	30.640	31.384	28.198	18.823
6.9	26.416	30.273	25.684	30.273	27.881	30.273	30.469	31.641	31.384	30.908	31.750	33.081	31.567	28.198	18.701
7.0	26.660	30.273	25.684	25.391	27.148	25.391	30.652	34.570	31.201	31.641	31.873	31.250	31.506	28.809	18.701
7.1	26.660	25.391	25.928	30.273	28.613	25.391	30.957	29.443	31.323	31.641	31.750	31.860	31.445	29.419	18.945
7.2	26.416	30.273	25.928	25.391	27.637	30.273	30.774	30.908	31.384	30.908	31.750	29.419	31.567	29.419	18.579
7.3	26.660	25.391	25.684	30.273	27.637	30.273	30.713	28.711	31.384	30.176	31.873	30.640	31.445	29.419	18.579
7.4	26.904	25.391	26.172	25.391	28.369	30.273	30.652	30.176	31.506	31.641	31.750	29.419	31.445	29.419	18.579
7.5	26.416	30.273	25.928	25.391	27.393	30.273	30.835	30.176	31.384	31.641	31.750	30.640	31.445	30.029	18.823
7.6	26.904	30.273	24.951	30.273	27.637	30.273	30.713	30.908	31.323	30.908	31.873	30.640	31.506	28.809	18.701
7.7	26.660	30.273	26.416	25.391	27.393	25.391	30.652	30.908	31.384	31.641	31.689	31.250	31.506	28.978	18.579
7.8	26.904	25.391	25.439	25.391	27.881	30.273	30.591	30.176	31.812	31.641	31.689	31.250	31.445	29.419	18.701
7.9	26.904	25.391	25.928	25.391	27.393	30.273	30.713	28.711	31.384	30.908	31.567	32.471	31.750	28.198	18.701
8.0	26.660	20.508	25.928	25.391	27.637	25.391	30.713	30.908	31.323	31.641	31.689	31.250	31.445	28.198	18.701
8.1	26.904	25.391	25.928	25.391	27.637	30.273	30.652	30.176	31.323	31.641	31.812	30.029	31.445	28.198	18.701
8.2	26.660	30.273	26.172	20.508	27.637	30.273	30.652	30.908	31.323	29.443	31.689	30.029	31.445	30.029	18.701
8.3	26.904	30.273	25.928	25.391	27.881	30.273	30.713	30.176	31.445	30.908	31.750	30.029	31.445	28.809	18.701
8.4	26.904	25.391	25.684	25.391	27.637	25.391	30.713	30.176	31.384	31.641	31.750	29.419	31.323	29.419	18.579
8.5	26.416	20.508	25.684	25.391	27.637	30.273	30.713	30.908	31.384	31.641	31.689	31.250	31.506	29.419	18.335
8.6	26.660	25.391	25.684	25.391	27.637	30.273	30.713	30.908	31.384	30.908	31.750	31.250	31.384	30.640	18.701
8.7	26.660	25.391	25.928	25.391	28.125	25.391	30.713	30.176	31.079	31.641	31.750	31.250	31.567	29.419	18.701
8.8	26.660	25.391	25.928	25.391	27.393	30.273	30.713	31.641	31.384	31.641	31.689	31.860	31.506	28.198	18.579
8.9	26.416	20.508	25.928	20.508	27.637	30.273	30.652	30.176	31.323	31.641	31.750	31.250	31.445	28.809	18.701
9.0	28.369	25.391	25.439	30.273	29.346	25.391	30.713	33.105	31.384	30.908	31.323	29.419	31.506	28.978	18.457
9.1	26.660	25.391	26.172	30.273	27.393	35.156	30.835	30.176	31.384	30.908	31.750	30.029	31.567	27.588	18.823
9.2	26.416	30.273	25.684	30.273	28.369	20.508	30.713	30.176	31.445	31.641	31.750	30.640	31.506	28.809	17.847
9.3	26.172	25.391	24.707	25.391	26.172	30.273	30.652	30.176	31.384	30.908	31.750	29.419	31.506	29.419	18.579
9.4	26.904	25.391	26.416	25.391	27.393	30.273	30.774	28.711	31.262	31.641	31.750	30.029	31.079	28.198	18.579
9.5	26.416	30.273	25.684	25.391	28.125	25.391	30.713	30.908	31.445	31.641	31.689	30.029	31.323	28.809	18.701
9.6	25.439	30.273	25.928	25.391	26.660	30.273	30.713	31.641	31.201	30.908	31.750	31.250	31.445	30.029	18.579
9.7	27.148	25.391	25.928	25.391	27.881	30.273	30.652	30.176	31.384	30.176	31.812	30.640	31.506	30.029	18.457
9.8	26.416	25.391	25.928	25.391	27.637	25.391	30.713	32.373	31.384	32.373	31.812	31.860	31.506	29.419	18.701
9.9	25.928	25.391	26.416	20.508	27.393	30.273	30.652	30.908	31.323	30.908	31.689	30.640	31.506	29.419	18.213
10.0	26.904	25.391	25.928	25.391	27.637	30.273	30.652	29.443	31.323	30.908	31.689	32.471	31.445	28.809	18.701
10.1	26.416	30.273	25.684	25.391	27.637	25.391	30.774	30.908	31.567	30.908	31.628	29.419	31.262	29.419	18.701
10.2	26.416	30.273	25.928	20.508	27.881	30.273	30.713	28.711	31.384	32.373	31.689	31.250	31.445	28.809	18.579
10.3	26.904	25.391	25.928	30.273	27.637	30.273	30.652	30.908	31.262	30.908	31.689	29.419	31.445	28.198	18.701
10.4	26.904	25.391	25.195	25.391	27.881	30.273	30.652	31.641	31.445	31.641	31.689	31.250	31.567	30.029	18.335
10.5	26.416	25.391	25.928	25.391	27.393	25.391	30.713	30.908	31.201	30.908	31.750	31.250	31.506	28.809	18.701
10.6	26.904	25.391	25.684	25.391	27.393	25.391	30.713	31.641	31.262	30.908	31.506	31.250	31.506	28.198	18.213
10.7	26.904	30.273	25.684	25.391	27.637	30.273	30.713	29.443	31.384	30.176	31.812	30.640	31.567	30.029	18.701
10.8	26.904	25.391	25.928	25.391	27.393	30.273	30.713	28.711	31.323	31.641	31.812	31.860	31.445	30.640	18.579
10.9	26.660	30.273	25.684	25.391	27.637	30.273	30.652	30.908	31.018	31.641	31.995	30.029	31.262	28.809	18.579
11.0	26.660	30.273	24.707	25.391	27.637	30.273	30.713	29.443	31.445	30.176	31.750	31.860	31.384	29.419	18.579
11.1	26.660	25.391	26.416	25.391	27.881	25.391	30.713	28.711	31.445	31.641	31.689	29.419	31.384	29.419	18.335
11.2	26.660	25.391	25.684	25.391	27.393	25.391	30.713	30.176	31.384	31.641	31.689	30.640	31.384	29.419	18.701
11.3	26.660	25.391	25.928	25.391	28.125	25.391	30.713	30.176	31.384	30.908	31.750	30.029	31.506	28.198	18.335
11.4	26.416	25.391	25.928	20.508	27.393	30.273	30.652	30.908	31.384	30.908	31.750	31.860	31.445	28.809	18.579
11.5	26.660	30.273	25.684	25.391	26.660	30.273	30.713	30.908	31.262	31.641	31.689	28.198	31.567	28.809	18.579
11.6	26.416	25.391	26.416	30.273	27.881	25.391	30.896	29.443	31.384	30.908	31.689	31.860	31.689	28.809	18.579
11.7	26.416	25.391	26.172	20.508	27.393	25.391	30.652	31.641	31.323	30.176	31.873	30.640	31.628	28.809	18.701
11.8	26.416	30.273	25.684	25.391	28.613	25.391	30.408	28.711	31.506	30.908	31.750	31.860	31.445	30.029	18.457
11.9	26.416	20.508	25.684	25.391	27.637	30.273	30.713	31.641	31.323	31.641	31.750	30.640	31.445	31.250	18.579
12.0	26.416	30.273	25.928	20.508	27.393	30.273	30.652	30.176	31.445	31.641	31.995	33.081	31.567	28.198	18.701
12.1	26.660	25.391	24.707	25.391	28.613	30.273	30.713	30.176	31.323	30.176	31.750	30.029	31.445	29.419	17.969
12.2	26.660	20.508	25.439	30.273	27.637	30.273	30.774	30.176	31.384	31.641	31.750	30.640	31.384	30.029	18.701
12.3	26.660	30.273	25.928	20.508	27.881	30.273	30.713	30.908	31.323	30.908	31.750	30.029	31.384	29.419	18.335
12.4	26.660	25.391	25.439	25.391	27.881	30.273	30.286	29.443	31.323	30.908	31.689	31.250	31.445	28.809	18.579
12.5	27.148	25.391	25.928	30.273	27.637	25.391	30.652	31.641	31.323	31.641	31.873	30.029	31.506	28.809	18.457
12.6	26.904	25.391	25.928	25.391	27.881	30.273	30.957	29.443	31.323	32.373	31.750	30.640	31.567	29.419	18.457
12.7	26.660	25.391	24.951	25.391	27.637	30.273	30.652	31.641	31.567	30.176	31.628	31.250	31.506	28.809	18.823
12.8	26.660	25.391	26.416	25.391	27.637	25.391	30.652	30.908	31.323	31.641	31.628	30.640	31.445	28.198	18.701
12.9	26.660	25.391	25.928	25.391	27.393	25.391	30.652	30.908	31.506	31.641	31.750	30.640	31.567	28.809	18.701
13.0	26.660	25.391	25.928	25.391	27.881	25.391	30.835	30.176	31.384	30.908	31.812	31.860	31.384	30.640	18.457
13.1	26.172	25.391	25.928	25.391	27.637	30.273	30.774	28.711	31.323	30.176	31.384	30.640	31.567	29.419	18.579
13.2	26.416	25.391	25.684	25.391	27.393	25.391	30.652	30.176	31.201	31.641	31.750	30.029	31.567	30.029	18.579
13.3	26.660	25.391	25.928	25.391	27.881	25.391	30.652	31.641	31.323	30.908	31.812	30.029	31.445	30.029	18.457

13.4	26.904	25.391	26.416	25.391	27.881	25.391	30.713	30.908	31.384	30.176	31.750	30.640	31.567	29.419	18.579
13.5	26.416	30.273	25.684	25.391	27.637	25.391	30.835	32.373	31.323	30.908	31.750	29.419	31.445	28.198	18.823
13.6	26.904	25.391	25.684	30.273	27.393	30.273	30.713	30.176	31.506	31.641	31.873	32.471	31.506	28.809	18.579
13.7	27.637	20.508	26.172	25.391	27.637	40.039	30.652	30.908	31.384	31.641	31.689	30.640	31.506	29.419	18.579
13.8	26.172	25.391	25.195	25.391	27.148	30.273	30.713	30.908	31.384	30.908	31.750	30.640	31.384	28.198	18.579
13.9	26.904	30.273	25.195	25.391	27.881	30.273	30.774	30.176	31.445	31.641	31.567	31.860	31.384	26.367	18.579
14.0	27.393	20.508	26.172	25.391	27.881	30.273	30.713	30.908	31.628	30.908	31.750	31.860	31.445	28.809	18.579
14.1	26.416	25.391	25.439	30.273	27.393	30.273	30.652	30.908	31.384	30.908	31.812	30.029	31.384	30.029	18.457
14.2	26.660	25.391	25.928	25.391	28.125	30.273	30.835	30.176	31.384	30.908	31.812	30.029	31.506	29.419	19.189
14.3	27.393	25.391	25.928	25.391	26.416	25.391	30.713	33.838	31.323	31.641	31.750	31.250	31.445	31.250	18.579
14.4	26.416	30.273	25.195	25.391	27.881	25.391	30.530	30.176	31.323	30.908	31.812	28.809	31.445	30.029	18.579
14.5	26.660	20.508	25.928	30.273	27.637	30.273	30.652	30.176	31.445	30.908	31.750	30.029	31.689	29.419	18.579
14.6	26.904	25.391	25.928	25.391	26.660	35.156	30.896	30.176	31.323	31.641	31.812	30.029	31.506	28.809	18.579
14.7	26.660	25.391	25.928	25.391	27.881	25.391	30.713	28.711	31.323	30.176	31.812	31.860	31.384	29.419	18.701
14.8	26.660	25.391	25.928	25.391	27.393	30.273	30.530	30.908	31.445	30.908	31.689	30.029	31.567	29.419	18.457
14.9	26.660	20.508	25.928	20.508	27.881	30.273	30.652	31.641	30.896	30.908	31.689	31.250	31.445	28.809	19.189
15.0	26.660	25.391	25.928	25.391	27.637	25.391	30.835	30.176	31.384	32.373	31.506	31.250	31.567	27.588	18.457
15.1	26.660	25.391	25.928	25.391	27.393	30.273	30.713	31.641	31.262	30.176	31.689	32.471	31.506	29.419	18.579
15.2	26.660	25.391	25.928	25.391	27.637	25.391	30.591	30.176	31.384	30.908	31.750	30.029	31.995	28.809	18.701
15.3	26.660	25.391	25.684	30.273	27.637	25.391	30.652	30.176	31.384	32.373	31.750	31.250	31.567	28.809	18.457
15.4	26.660	25.391	25.928	30.273	27.881	30.273	30.713	30.908	31.445	31.641	31.750	29.419	31.506	29.419	18.823
15.5	26.904	25.391	25.684	30.273	27.393	30.273	30.713	29.443	31.384	30.176	31.567	30.640	31.445	30.640	18.335
15.6	26.660	25.391	25.195	25.391	27.637	30.273	30.713	28.711	31.384	31.641	31.812	30.640	31.384	29.419	19.067
15.7	26.660	25.391	26.172	25.391	27.637	30.273	30.713	30.908	31.445	30.176	31.750	31.250	31.445	28.809	18.579
15.8	26.660	30.273	25.684	25.391	27.393	25.391	30.713	30.176	31.262	30.908	31.934	30.029	31.445	28.809	18.579
15.9	26.660	25.391	25.684	25.391	27.881	35.156	30.713	31.641	31.445	30.908	31.689	32.471	31.567	29.419	18.823
16.0	26.660	25.391	25.928	30.273	27.881	30.273	30.652	30.908	31.323	32.373	31.689	30.640	31.628	29.419	18.457
16.1	26.660	30.273	25.195	25.391	27.881	25.391	30.713	30.176	31.323	30.176	32.056	31.860	31.628	28.198	18.945
16.2	26.416	25.391	26.172	30.273	27.637	25.391	30.713	31.641	31.384	32.373	31.750	30.640	31.506	29.419	18.579
16.3	26.660	25.391	25.928	25.391	27.881	30.273	30.652	30.176	31.506	31.641	31.750	31.250	31.506	29.419	18.945
16.4	26.416	25.391	25.928	25.391	27.148	30.273	30.652	31.641	31.445	30.908	31.750	28.809	31.628	28.198	18.701
16.5	26.416	25.391	25.928	25.391	27.881	25.391	30.713	30.176	31.384	30.176	31.689	31.250	31.445	29.419	18.579
16.6	26.660	25.391	25.928	30.273	27.881	25.391	30.713	30.176	31.384	30.908	31.750	28.198	31.506	30.029	18.701
16.7	26.416	25.391	25.928	20.508	26.904	25.391	30.713	30.908	31.323	31.641	31.750	31.250	31.262	29.419	18.579
16.8	26.660	25.391	25.684	25.391	28.613	25.391	30.591	30.908	31.323	30.908	31.689	30.640	31.262	28.809	18.701
16.9	27.637	25.391	25.928	25.391	27.637	25.391	30.713	30.176	31.384	30.908	32.056	31.860	31.384	29.419	18.823
17.0	26.660	25.391	25.684	25.391	27.637	25.391	30.774	30.908	31.323	32.373	31.750	30.640	31.506	29.419	18.579
17.1	26.660	25.391	25.928	25.391	28.613	30.273	30.652	29.443	31.262	30.908	31.689	32.471	31.445	28.809	19.556
17.2	26.660	30.273	25.684	20.508	27.393	35.156	30.591	33.105	31.384	30.176	31.812	30.029	31.445	26.978	18.457
17.3	26.904	25.391	25.195	20.508	27.881	30.273	30.713	30.908	31.445	30.908	31.689	30.640	31.506	28.198	18.701
17.4	26.416	25.391	25.928	25.391	27.637	25.391	30.713	29.443	31.323	30.908	31.812	30.029	31.506	28.198	18.701
17.5	25.684	20.508	25.684	25.391	27.637	25.391	30.774	30.176	31.384	30.908	31.689	30.640	31.506	28.809	18.579
17.6	27.148	25.391	25.928	25.391	27.637	30.273	30.713	29.443	31.384	31.641	31.628	29.419	31.384	28.809	18.823
17.7	26.660	25.391	25.928	25.391	27.637	30.273	30.713	30.908	31.323	31.641	31.628	31.250	31.567	30.029	18.579
17.8	26.172	25.391	25.195	25.391	27.881	30.273	30.713	31.641	31.384	30.908	31.750	30.029	31.506	28.809	18.457
17.9	26.904	30.273	26.172	25.391	27.637	30.273	30.713	30.176	31.323	30.176	31.750	31.860	31.445	28.809	18.701
18.0	26.660	30.273	26.172	20.508	27.881	30.273	30.713	32.373	31.689	31.641	31.812	31.250	31.506	29.419	18.579
18.1	25.928	20.508	25.928	25.391	27.637	30.273	30.713	30.176	31.323	30.908	31.750	31.860	31.506	30.029	18.701
18.2	26.904	25.391	25.928	25.391	27.637	25.391	30.591	29.443	31.445	30.908	31.812	30.640	31.384	28.198	18.579
18.3	26.416	30.273	25.684	25.391	27.637	30.273	30.713	29.443	31.445	31.641	31.750	29.419	31.445	28.198	18.701
18.4	25.928	25.391	25.684	30.273	27.881	25.391	30.713	28.711	31.323	32.373	31.689	30.640	31.323	28.809	18.823
18.5	26.904	25.391	26.172	25.391	27.393	25.391	30.713	30.908	31.201	30.908	31.873	30.029	31.445	27.588	17.847
18.6	26.660	25.391	25.928	20.508	27.637	30.273	30.713	31.641	31.323	35.303	31.689	29.419	31.506	28.198	18.579
18.7	26.660	25.391	25.684	25.391	27.881	30.273	30.652	30.908	31.262	31.641	31.689	32.471	31.445	28.809	18.701
18.8	26.660	30.273	25.684	30.273	27.393	30.273	30.591	33.105	31.323	30.908	31.567	31.860	31.506	29.419	18.701
18.9	26.660	30.273	25.928	25.391	28.125	30.273	30.713	30.176	31.567	30.908	31.812	30.640	31.750	29.419	18.701
19.0	26.660	20.508	25.195	25.391	27.393	30.273	30.652	29.443	31.262	31.641	31.750	31.860	31.445	28.809	18.457
19.1	26.416	25.391	26.172	25.391	27.393	25.391	30.713	30.176	31.445	30.176	31.750	30.640	31.506	29.419	18.823
19.2	26.660	25.391	25.439	25.391	28.369	30.273	30.652	29.443	31.445	30.908	31.689	29.419	31.506	31.250	18.091
19.3	26.416	25.391	26.172	25.391	26.904	25.391	30.713	30.908	31.323	30.908	31.750	30.029	31.445	28.809	18.701
19.4	26.660	25.391	25.928	25.391	27.881	25.391	30.713	30.908	31.262	31.641	31.750	30.640	31.506	28.198	18.701
19.5	26.660	25.391	24.951	25.391	27.881	25.391	31.079	30.176	31.323	30.908	31.812	29.419	31.445	29.419	18.579
19.6	26.660	20.508	25.928	25.391	27.148	25.391	30.713	32.373	31.384	30.908	31.689	30.640	31.201	27.588	18.579
19.7	26.660	25.391	26.172	20.508	27.637	25.391	30.408	35.303	31.323	31.641	31.689	30.029	31.384	28.198	18.457
19.8	26.660	25.391	25.684	25.391	27.393	30.273	30.774	29.443	31.506	30.908	31.628	31.250	31.628	29.419	18.823
19.9	26.660	30.273	25.928	30.273	28.369	30.273	30.591	31.641	31.323	30.908	31.323	30.029	31.506	29.419	18.213
20.0	26.660	25.391	25.928	35.156	27.637	25.391	30.713	28.711	31.323	30.908	31.750	31.860	31.445	28.809	18.579

20.1	26.660	25.391	25.684	25.391	27.637	25.391	30.835	31.641	31.445	31.641	31.750	30.640	31.445	28.809	18.701
20.2	26.660	25.391	26.172	25.391	27.393	25.391	30.713	30.908	31.323	31.641	31.750	31.860	31.506	29.419	18.457
20.3	26.660	30.273	25.928	25.391	27.637	25.391	30.347	30.176	31.384	30.908	31.750	30.029	31.201	30.640	18.823
20.4	26.904	30.273	25.439	30.273	27.637	30.273	30.652	30.908	31.323	31.641	31.628	31.860	31.445	28.809	18.335
20.5	26.660	30.273	26.172	30.273	27.637	30.273	30.957	29.443	31.384	31.641	31.812	29.419	31.567	29.419	18.701
20.6	26.660	30.273	26.172	25.391	27.637	30.273	30.713	29.443	31.323	30.176	31.812	31.250	31.445	30.029	18.213
20.7	26.660	25.391	25.195	30.273	27.637	30.273	30.652	31.641	31.323	31.641	31.873	30.640	31.506	28.809	18.457
20.8	26.904	30.273	26.172	25.391	27.637	30.273	30.652	29.443	31.445	32.373	31.750	31.250	31.506	28.198	18.701
20.9	26.660	30.273	25.928	25.391	27.881	30.273	30.774	30.908	31.323	30.176	31.750	30.029	31.506	28.809	18.457
21.0	25.195	25.391	25.928	25.391	27.881	30.273	30.713	30.908	31.445	31.641	31.995	31.860	31.506	29.419	18.579
21.1	26.416	25.391	26.172	25.391	27.637	30.273	30.652	30.176	30.896	31.641	31.750	30.029	31.323	28.198	18.457
21.2	26.660	30.273	25.195	25.391	27.637	30.273	30.652	30.176	31.384	30.908	31.628	32.471	31.445	28.809	18.579
21.3	26.660	30.273	25.684	30.273	27.881	30.273	30.713	30.176	31.262	30.176	31.812	30.640	31.445	29.419	18.579
21.4	26.416	25.391	25.928	25.391	27.148	25.391	30.774	30.176	31.384	31.641	31.689	31.250	31.384	30.640	18.579
21.5	26.904	25.391	25.684	25.391	28.125	25.391	30.591	30.908	31.384	26.514	31.689	29.419	31.445	29.419	18.579
21.6	27.637	25.391	25.928	25.391	27.637	25.391	30.652	30.176	31.506	30.908	31.812	30.640	31.445	28.809	18.579
21.7	26.172	25.391	25.928	25.391	27.148	30.273	30.713	33.105	31.445	30.908	31.812	28.198	31.506	28.809	18.579
21.8	26.660	25.391	25.684	30.273	28.613	30.273	30.774	30.176	31.384	31.641	31.995	31.250	31.812	29.419	18.579
21.9	27.393	25.391	25.928	25.391	27.637	25.391	30.713	30.176	31.323	30.908	31.750	30.640	31.628	27.588	18.457
22.0	26.416	25.391	26.172	25.391	27.393	25.391	30.652	30.908	31.262	33.105	31.628	30.640	31.445	28.809	18.701
22.1	26.660	20.508	25.684	25.391	28.369	30.273	30.774	29.443	31.384	30.908	31.750	30.640	31.567	29.419	18.457
22.2	27.637	25.391	25.684	20.508	27.637	30.273	30.774	30.176	31.262	30.908	31.689	33.081	31.445	28.809	18.579
22.3	26.660	25.391	26.904	25.391	27.881	30.273	30.530	31.641	31.384	30.908	31.750	30.640	31.506	28.809	18.579
22.4	26.904	30.273	25.195	25.391	27.148	30.273	30.713	30.908	31.445	31.641	31.750	31.250	31.567	29.419	18.579
22.5	27.393	25.391	26.172	25.391	27.637	30.273	30.896	32.373	31.384	31.641	31.689	30.029	31.445	30.640	18.579
22.6	26.416	25.391	25.928	25.391	27.637	25.391	30.713	30.176	31.506	30.908	31.812	31.250	31.567	28.809	18.579
22.7	26.660	25.391	25.684	20.508	27.881	30.273	30.469	30.176	31.384	30.908	31.812	29.419	31.506	29.419	18.457
22.8	26.904	15.625	25.928	25.391	27.637	30.273	30.591	30.176	31.384	31.641	31.750	30.640	31.384	30.029	18.701
22.9	26.660	25.391	25.439	25.391	27.393	25.391	30.835	28.711	31.262	30.908	31.873	30.640	31.384	29.419	18.579
23.0	26.660	25.391	25.684	25.391	27.881	30.273	30.774	30.908	31.323	30.176	31.750	31.250	31.445	28.809	18.457
23.1	26.660	20.508	25.928	25.391	27.881	25.391	30.652	31.641	31.323	31.641	31.812	31.250	31.445	28.809	18.579
23.2	26.660	30.273	25.928	25.391	27.881	30.273	30.591	30.908	31.384	30.176	31.750	32.471	31.506	28.809	18.579
23.3	26.660	25.391	25.684	25.391	27.637	30.273	30.713	32.373	31.384	30.908	31.750	31.250	31.689	28.198	18.701
23.4	26.660	20.508	26.416	20.508	27.637	30.273	30.713	30.176	31.384	30.908	31.873	30.029	31.567	28.198	18.457
23.5	26.416	25.391	25.928	25.391	27.393	30.273	30.652	30.176	31.506	31.641	31.750	30.029	31.628	29.419	19.067
23.6	26.660	20.508	25.684	20.508	27.637	25.391	30.652	30.176	31.384	31.641	31.689	30.029	31.506	30.640	18.579
23.7	26.660	25.391	26.172	30.273	28.613	25.391	30.713	29.443	31.323	31.641	31.628	28.809	31.567	29.419	18.457
23.8	26.416	25.391	25.684	25.391	27.393	25.391	30.713	30.176	31.506	31.641	31.812	32.471	31.445	30.029	18.579
23.9	26.660	25.391	25.684	25.391	28.369	30.273	30.652	31.641	31.384	30.908	31.750	31.250	31.445	30.029	18.457
24.0	26.660	30.273	26.904	25.391	26.660	30.273	30.713	30.176	31.384	30.176	31.506	31.250	31.445	28.809	18.701
24.1	26.660	25.391	25.195	25.391	27.637	25.391	30.713	32.373	31.323	31.641	31.750	31.860	31.262	28.809	18.457
24.2	26.660	25.391	25.684	30.273	28.125	30.273	30.713	30.176	31.689	32.373	31.750	31.860	31.445	28.809	18.945
24.3	26.660	30.273	25.684	25.391	26.660	30.273	30.652	30.176	31.323	30.176	31.812	29.419	31.506	29.419	18.579
24.4	26.660	30.273	25.684	25.391	27.881	30.273	30.713	30.908	31.445	36.035	31.812	30.029	31.445	28.198	18.457
24.5	26.904	25.391	25.928	25.391	27.637	30.273	30.774	30.176	31.384	32.373	31.750	30.640	31.445	27.588	18.457
24.6	26.660	25.391	25.684	25.391	26.904	25.391	30.652	30.908	31.384	30.908	31.750	29.419	31.506	28.809	18.579
24.7	26.904	20.508	25.684	30.273	27.637	30.273	30.591	30.908	31.201	30.908	31.689	30.640	31.506	30.029	18.823
24.8	26.904	25.391	25.684	25.391	27.393	30.273	30.652	30.176	31.384	32.373	31.445	30.029	31.567	28.198	18.457
24.9	26.660	25.391	25.928	25.391	28.369	30.273	30.713	30.908	31.384	30.176	31.750	31.860	31.445	31.860	18.945
25.0	26.660	30.273	25.928	25.391	27.393	30.273	30.652	30.176	31.323	30.908	31.750	30.640	31.445	30.029	18.579
25.1	27.881	25.391	27.148	25.391	27.637	25.391	30.652	30.176	31.567	31.641	31.750	31.860	31.506	30.029	18.579
25.2	26.660	30.273	26.172	25.391	27.393	30.273	30.652	30.908	31.384	31.641	31.812	30.640	31.506	28.198	18.701
25.3	26.416	25.391	25.684	25.391	27.637	25.391	30.713	28.711	31.445	30.908	31.689	32.471	31.506	29.419	18.457
25.4	26.172	30.273	26.172	30.273	27.637	30.273	30.652	30.176	31.445	30.908	31.812	29.419	31.628	29.419	18.823
25.5	26.904	30.273	25.684	25.391	27.393	25.391	30.713	30.176	31.445	31.641	31.812	30.640	31.445	28.198	18.579
25.6	26.416	25.391	25.928	20.508	27.881	30.273	30.652	30.176	31.262	30.908	31.750	29.419	31.506	27.588	18.945
25.7	25.439	30.273	26.660	25.391	27.637	30.273	30.652	30.908	31.262	30.908	31.689	30.029	31.384	28.809	18.457
25.8	26.904	30.273	25.439	30.273	28.125	25.391	30.652	29.443	31.323	31.641	31.689	30.640	31.445	28.809	18.579
25.9	26.416	30.273	25.928	25.391	27.393	25.391	30.713	30.176	31.323	32.373	31.506	31.860	31.445	28.809	18.701
26.0	25.928	30.273	25.684	25.391	27.881	25.391	30.713	30.908	31.384	30.908	31.812	31.250	31.445	28.809	18.457
26.1	26.904	25.391	25.928	25.391	27.637	30.273	30.713	30.908	31.445	32.373	31.628	31.860	31.445	29.419	18.823
26.2	26.416	30.273	25.928	25.391	26.416	30.273	30.713	33.105	31.384	32.373	31.812	30.640	31.689	30.029	18.701
26.3	25.928	25.391	25.684	30.273	27.881	20.508	30.774	30.176	31.445	30.908	31.750	31.860	31.506	28.198	18.701
26.4	26.660	25.391	25.684	20.508	27.148	25.391	30.774	29.443	31.262	30.176	31.506	29.419	31.445	30.029	19.556
26.5	26.660	25.391	25.928	30.273	28.613	30.273	30.774	30.176	31.384	30.908	31.812	30.640	31.567	29.419	18.579
26.6	26.172	30.273	25.928	25.391	27.881	30.273	30.713	29.443	31.201	31.641	31.750	28.809	31.445	28.809	18.823
26.7	26.904	30.273	25.928	25.391	27.148	25.391	30.713	30.176	31.384	30.908	31.873	31.250	31.506	27.588	18.457

26.8	26.660	25.391	26.904	25.391	26.613	30.273	30.713	30.908	31.323	30.908	31.812	28.198	31.506	29.419	18.701
26.9	26.904	25.391	25.928	25.391	27.637	30.273	30.774	30.176	31.384	31.641	31.689	31.250	31.079	29.419	18.701
27.0	26.660	25.391	25.684	25.391	27.881	25.391	30.652	32.373	31.445	30.908	31.750	30.640	31.384	29.419	18.579
27.1	26.660	30.273	26.172	25.391	28.125	25.391	30.652	30.176	31.384	30.908	31.750	31.860	31.506	28.809	18.457
27.2	26.660	25.391	25.439	25.391	27.637	30.273	30.652	30.176	31.323	31.641	31.750	30.640	31.506	29.419	18.457
27.3	26.660	25.391	25.928	20.508	27.637	25.391	30.652	30.176	31.018	30.176	31.689	32.471	31.384	29.419	18.701
27.4	26.904	25.391	26.416	25.391	27.393	25.391	31.140	28.711	31.445	30.908	31.689	30.640	31.445	28.809	18.701
27.5	26.660	25.391	25.439	25.391	27.881	25.391	30.713	30.908	31.262	30.908	31.812	30.640	31.384	29.419	18.579
27.6	26.660	25.391	25.928	25.391	27.637	25.391	30.469	32.373	31.384	31.641	31.812	30.029	31.140	30.029	18.823
27.7	26.660	30.273	25.684	25.391	27.637	30.273	30.652	30.176	31.384	30.908	31.750	30.640	31.445	28.809	18.579
27.8	26.660	25.391	25.684	25.391	27.881	25.391	30.591	32.373	31.445	32.373	32.056	29.419	31.567	26.367	18.091
27.9	26.416	25.391	25.928	25.391	27.637	25.391	30.713	30.176	31.384	31.641	31.750	30.640	31.506	28.809	18.701
28.0	26.660	25.391	25.439	25.391	27.881	35.156	30.835	30.176	31.384	30.908	31.750	30.640	31.506	28.809	18.579
28.1	26.172	30.273	25.684	25.391	27.881	30.273	30.713	30.908	31.323	30.176	31.750	30.640	31.628	27.588	18.701
28.2	26.660	25.391	25.928	30.273	27.637	25.391	30.286	30.176	31.262	30.908	31.689	30.029	31.384	29.419	18.701
28.3	26.416	25.391	25.928	20.508	27.637	25.391	30.713	26.514	31.384	32.373	31.812	31.860	31.506	29.419	18.579
28.4	26.416	30.273	25.684	30.273	27.881	30.273	30.957	30.908	31.323	30.908	31.750	30.029	31.384	28.809	18.701
28.5	26.660	25.391	26.416	30.273	27.393	30.273	30.774	30.908	31.323	31.641	31.628	30.029	31.262	28.809	17.969
28.6	26.660	25.391	26.172	25.391	27.637	30.273	30.713	32.373	31.262	31.641	31.567	30.640	31.445	29.419	18.579
28.7	26.660	25.391	25.684	30.273	29.102	25.391	30.652	30.176	31.445	30.908	31.812	30.640	31.445	30.029	18.579
28.8	26.904	25.391	26.172	25.391	27.393	25.391	30.774	29.443	31.445	30.176	31.812	29.419	31.445	29.419	18.701
28.9	26.416	25.391	25.684	30.273	27.881	30.273	30.774	30.176	31.384	31.641	31.567	31.860	31.445	27.588	18.701
29.0	26.660	30.273	25.928	25.391	26.172	25.391	30.652	30.908	31.323	30.176	31.750	31.250	31.506	28.198	18.457
29.1	26.904	25.391	26.416	25.391	27.637	25.391	30.652	31.641	31.262	30.908	31.812	30.029	31.750	28.198	18.823
29.2	26.172	20.508	25.439	25.391	28.125	30.273	30.774	30.908	31.262	31.641	31.750	31.250	31.628	27.588	18.091
29.3	26.416	25.391	25.928	25.391	26.904	30.273	30.774	30.176	31.323	31.641	31.812	31.860	31.506	28.809	18.701
29.4	26.904	25.391	25.928	25.391	27.637	25.391	30.652	31.641	31.262	30.908	31.750	29.419	31.506	30.029	18.579
29.5	27.148	30.273	25.928	25.391	27.393	30.273	30.591	30.908	31.384	31.641	31.750	30.029	31.506	29.419	18.579
29.6	26.660	25.391	25.684	25.391	27.393	30.273	30.713	30.176	31.323	31.641	31.689	31.250	31.384	28.809	18.701
29.7	26.904	30.273	26.172	25.391	27.881	30.273	30.713	30.908	31.445	30.908	31.689	30.029	31.506	30.029	18.213
29.8	27.637	35.156	25.439	35.156	27.393	44.922	30.713	31.384	30.176	31.384	31.750	30.640	31.262	30.640	18.823
29.9	25.928	49.805	25.439	44.922	27.393	44.922	30.652	31.641	31.445	30.908	31.812	30.029	31.506	29.419	18.213
30.0	25.684	44.922	25.195	49.805	26.416	49.805	30.774	30.908	31.384	30.908	31.689	30.640	31.567	27.588	18.579
30.1	25.684	54.688	23.975	54.688	26.172	54.688	30.713	29.443	31.262	30.908	31.750	30.640	31.445	29.419	18.701
30.2	23.975	64.453	23.975	64.453	25.928	69.336	30.469	30.908	31.384	31.641	31.628	31.250	31.445	26.978	18.457
30.3	24.951	74.219	24.951	69.336	26.172	69.336	30.652	28.711	31.201	31.641	31.689	30.640	31.445	28.809	18.701
30.4	26.904	54.688	24.707	64.453	27.148	79.102	30.896	30.176	31.567	30.908	31.812	32.471	31.445	28.198	18.335
30.5	26.416	44.922	25.684	44.922	27.393	74.219	30.774	30.908	31.323	30.908	31.750	30.029	31.506	30.029	18.579
30.6	26.904	44.922	25.439	44.922	27.393	64.453	30.530	30.176	31.384	30.908	31.689	30.640	31.628	28.809	18.335
30.7	27.148	54.688	25.928	44.922	28.125	59.570	30.591	31.641	31.323	30.908	31.750	29.419	31.445	28.809	18.457
30.8	26.660	49.805	26.660	49.805	28.125	59.570	30.835	30.908	31.445	30.908	31.384	30.640	31.506	30.029	18.701
30.9	26.172	54.688	25.928	59.570	27.393	64.453	30.713	30.176	31.140	30.908	31.750	30.640	31.445	30.640	18.457
31.0	26.416	49.805	25.928	54.688	27.881	59.570	30.713	30.176	31.323	32.373	31.628	31.250	31.445	28.809	18.579
31.1	26.660	49.805	26.172	54.688	27.393	64.453	30.591	28.711	31.384	30.908	31.750	30.029	31.445	29.419	18.579
31.2	26.660	44.922	25.684	44.922	26.904	64.453	30.713	30.176	31.262	30.176	31.750	31.860	31.445	29.419	18.335
31.3	26.660	49.805	25.684	49.805	27.881	54.688	30.652	31.641	31.445	30.908	31.567	30.029	31.384	28.198	18.823
31.4	26.660	49.805	26.172	54.688	27.148	64.453	30.652	30.176	31.384	30.908	31.750	33.081	31.323	28.198	17.847
31.5	26.660	49.805	25.684	54.688	28.857	59.570	30.591	32.373	31.323	30.908	31.812	30.640	31.445	28.198	18.701
31.6	26.660	44.922	25.439	49.805	27.637	54.688	30.652	29.443	31.323	30.908	31.812	31.250	31.506	29.419	18.457
31.7	26.660	44.922	25.928	49.805	27.393	59.570	30.652	30.176	31.750	32.373	31.750	29.419	31.445	28.809	18.457
31.8	26.660	49.805	25.928	49.805	28.613	54.688	30.652	30.908	31.323	30.908	31.689	30.640	31.445	28.809	18.579
31.9	26.660	44.922	25.439	49.805	27.393	54.688	30.652	29.443	31.262	31.641	32.178	28.198	31.445	30.029	18.335
32.0	26.660	44.922	26.416	49.805	27.637	54.688	30.713	31.641	31.384	31.641	31.750	31.860	31.628	30.640	18.701
32.1	26.416	49.805	25.684	49.805	27.637	59.570	30.652	31.641	31.323	30.908	31.628	31.250	31.567	28.809	18.579
32.2	26.660	49.805	25.928	44.922	27.393	54.688	30.652	30.176	31.445	30.176	31.689	31.860	31.445	28.809	18.579
32.3	26.660	49.805	25.684	44.922	27.637	54.688	30.713	32.373	31.384	31.641	31.750	31.250	31.384	29.419	18.579
32.4	26.904	44.922	25.928	49.805	27.393	54.688	30.713	32.373	31.323	30.908	31.689	32.471	31.567	28.809	18.457
32.5	26.660	49.805	26.416	44.922	27.637	54.688	30.652	29.443	31.323	30.176	31.812	30.640	31.506	27.588	18.579
32.6	26.416	44.922	25.684	44.922	27.393	54.688	30.591	30.176	31.140	31.641	31.812	30.640	31.384	29.419	18.457
32.7	26.660	40.039	25.928	44.922	27.881	54.688	30.713	29.443	31.323	32.373	31.995	29.419	32.056	28.809	18.335
32.8	26.416	40.039	25.928	44.922	27.881	54.688	30.774	31.641	31.201	30.908	31.750	30.029	31.506	28.809	19.067
32.9	26.416	44.922	25.928	44.922	27.637	54.688	30.652	31.641	31.384	30.908	31.689	29.419	31.445	28.198	18.335
33.0	27.881	44.922	25.928	44.922	27.881	54.688	30.713	30.176	31.384	31.641	31.689	30.640	31.445	29.419	18.457
33.1	26.660	44.922	25.928	49.805	27.881	49.805	30.652	31.641	31.323	30.908	31.689	31.250	31.384	31.250	18.579
33.2	26.416	49.805	25.928	49.805	27.393	54.688	30.713	30.176	31.506	30.908	31.812	31.860	31.445	29.419	18.457
33.3	26.416	44.922	25.684	40.039	27.393	54.688	30.652	30.176	31.323	30.908	31.750	31.250	31.384	28.809	18.701
33.4	26.660	40.039	25.928	44.922	27.637	49.805	30.713	30.176	31.384	31.641	31.689	32.471	31.445	29.419	18.335

33.5	26.416	40.039	25.684	44.922	27.393	49.805	30.652	30.908	31.201	31.641	31.750	30.640	31.628	29.419	19.067
33.6	25.439	40.039	25.439	40.039	28.125	49.805	30.652	30.176	31.445	30.908	31.812	30.029	31.506	27.588	18.579
33.7	26.904	40.039	26.416	40.039	27.637	49.805	30.652	31.641	31.323	31.641	31.750	30.029	31.506	28.809	18.579
33.8	26.660	44.922	25.684	35.156	27.148	49.805	30.713	30.176	31.323	30.908	31.750	30.029	31.567	28.809	18.701
33.9	25.928	40.039	25.928	40.039	28.125	49.805	30.652	30.908	31.323	30.908	31.750	28.809	31.445	28.198	18.335
34.0	27.148	40.039	25.684	44.922	26.416	54.688	30.652	29.443	31.445	32.373	31.812	31.860	31.567	28.198	18.823
34.1	26.416	40.039	25.684	44.922	27.637	49.805	30.652	30.176	31.384	32.373	31.689	31.250	31.506	29.419	18.335
34.2	25.928	40.039	26.660	40.039	27.637	44.922	30.713	30.908	31.323	30.176	31.812	30.640	31.079	30.640	19.067
34.3	27.148	40.039	25.928	40.039	26.904	44.922	30.713	30.908	31.384	30.908	31.934	31.860	31.323	28.809	18.579
34.4	26.660	35.156	26.172	44.922	27.881	44.922	30.713	32.373	31.201	31.641	31.689	31.860	31.445	29.419	18.457
34.5	26.172	40.039	25.684	40.039	27.637	44.922	30.652	30.908	31.323	30.908	31.689	29.419	31.384	29.419	18.579
34.6	26.904	35.156	25.928	40.039	27.881	44.922	30.652	29.443	31.323	30.176	31.628	30.640	31.445	29.419	18.457
34.7	26.660	40.039	25.928	40.039	27.637	44.922	30.713	31.641	31.262	32.373	31.689	30.640	31.384	28.198	18.701
34.8	26.660	35.156	26.172	35.156	27.637	44.922	30.713	27.979	31.018	30.176	31.873	29.419	31.445	28.809	18.457
34.9	26.660	40.039	25.684	40.039	27.637	44.922	30.713	30.176	31.384	30.908	31.689	30.640	31.445	29.419	18.823
35.0	26.660	40.039	25.684	40.039	27.637	44.922	30.713	30.908	31.384	30.908	31.750	30.640	31.506	28.198	18.579
35.1	26.904	40.039	25.928	35.156	27.637	49.805	30.713	30.176	31.323	31.641	31.750	31.250	31.445	27.588	18.335
35.2	26.416	40.039	25.928	35.156	27.393	44.922	30.713	31.641	31.384	31.641	31.750	30.640	31.567	28.809	18.579
35.3	26.416	35.156	24.951	35.156	27.637	44.922	31.201	30.176	31.262	32.373	31.812	31.860	31.506	30.640	18.457
35.4	26.416	40.039	26.660	40.039	27.881	40.039	30.652	29.443	31.323	31.641	31.750	30.029	31.506	28.198	18.701
35.5	26.416	40.039	25.684	40.039	27.393	40.039	30.591	30.176	31.384	30.908	31.689	31.860	31.384	32.471	18.579
35.6	26.660	40.039	26.172	35.156	27.393	44.922	30.652	28.711	31.262	30.176	31.750	29.419	31.445	30.029	18.701
35.7	26.416	35.156	25.684	35.156	27.637	40.039	30.530	30.908	31.567	31.641	31.262	31.250	31.323	30.029	18.701
35.8	26.660	35.156	25.928	35.156	28.125	44.922	30.652	30.908	31.323	31.641	31.689	29.419	31.262	28.198	18.579
35.9	26.660	40.039	26.660	35.156	27.393	44.922	30.896	30.176	31.445	30.908	31.750	31.860	31.445	29.419	18.579
36.0	26.660	30.273	25.928	40.039	28.125	44.922	30.652	32.373	31.384	30.908	31.750	31.250	31.506	28.809	18.701
36.1	26.660	40.039	25.684	40.039	27.148	44.922	30.347	30.908	31.384	31.641	31.689	31.860	31.384	28.809	18.701
36.2	26.904	35.156	25.928	35.156	27.881	40.039	30.652	30.176	31.323	30.908	31.750	30.029	31.506	26.978	18.701
36.3	26.416	35.156	25.684	40.039	27.881	44.922	30.835	30.176	31.323	30.908	31.750	31.860	31.506	28.809	18.579
36.4	26.660	40.039	25.928	35.156	27.148	44.922	30.713	29.443	31.384	31.641	31.812	30.640	31.628	29.419	18.945
36.5	26.904	35.156	25.928	35.156	28.857	40.039	30.713	30.908	31.262	31.641	31.812	31.860	31.628	28.809	18.579
36.6	26.660	35.156	25.928	35.156	27.637	40.039	30.652	31.641	31.628	30.908	31.750	30.640	31.506	29.419	18.701
36.7	26.904	35.156	25.439	35.156	27.637	44.922	30.774	30.908	31.323	31.641	31.689	31.250	31.445	30.029	18.579
36.8	26.416	35.156	26.172	35.156	28.369	40.039	30.774	32.373	31.384	30.908	31.750	30.029	31.506	29.419	18.579
36.9	26.904	40.039	25.684	35.156	27.393	35.156	30.713	33.838	31.384	30.908	31.750	31.250	31.445	28.198	18.579
37.0	26.904	35.156	24.707	35.156	27.881	40.039	30.591	30.176	31.384	30.176	31.689	28.198	31.445	29.419	18.579
37.1	25.195	30.273	26.660	35.156	27.393	40.039	30.713	30.176	31.201	31.641	31.750	31.201	31.445	29.419	18.335
37.2	26.660	35.156	25.439	35.156	27.637	40.039	30.774	30.176	31.262	30.908	31.750	30.029	31.384	28.809	18.579
37.3	26.660	35.156	26.172	35.156	27.637	40.039	30.713	30.176	31.445	30.176	31.567	31.860	31.567	27.588	18.579
37.4	26.416	35.156	25.684	40.039	27.637	40.039	30.652	30.908	31.323	31.641	31.750	30.029	31.445	29.419	18.579
37.5	26.416	30.273	25.439	30.273	27.637	35.156	30.713	29.443	31.567	32.373	31.750	32.471	31.506	29.419	18.701
37.6	26.660	35.156	26.416	35.156	27.637	40.039	30.713	31.641	31.384	30.908	31.934	30.640	31.445	29.419	18.457
37.7	27.393	30.273	26.172	30.273	27.881	40.039	30.652	29.443	31.323	33.105	31.750	31.250	31.445	28.198	18.701
37.8	26.172	30.273	25.439	35.156	27.637	35.156	30.591	30.176	31.323	31.641	31.689	29.419	31.262	30.029	17.847
37.9	26.660	30.273	25.684	30.273	27.637	40.039	30.774	30.908	31.873	30.908	31.689	30.640	31.506	28.809	18.457
38.0	27.637	30.273	25.928	35.156	27.881	40.039	30.713	30.908	31.323	30.176	31.750	30.029	31.445	28.809	18.579
38.1	26.172	30.273	25.195	35.156	27.637	35.156	30.469	30.908	31.323	32.373	31.812	30.640	31.506	29.419	18.579
38.2	26.660	35.156	25.684	30.273	27.393	35.156	30.591	31.641	31.323	30.908	31.689	30.640	31.506	29.419	18.701
38.3	27.393	35.156	26.172	35.156	27.637	40.039	30.835	29.443	31.384	30.908	31.689	31.250	31.445	28.198	18.457
38.4	26.416	30.273	25.439	30.273	27.881	40.039	30.713	31.641	31.384	31.641	31.812	31.250	31.506	27.588	18.701
38.5	26.660	35.156	25.928	30.273	27.148	40.039	30.591	30.176	31.323	31.641	31.750	31.860	31.506	28.809	18.091
38.6	27.393	35.156	25.684	35.156	27.881	35.156	30.652	30.908	31.384	30.908	31.812	31.250	31.262	29.419	18.579
38.7	26.416	35.156	24.707	30.273	27.393	35.156	30.835	30.176	31.384	30.908	31.934	30.640	31.445	28.198	18.701
38.8	26.660	25.391	26.416	35.156	27.637	35.156	30.713	30.908	30.957	31.641	31.750	30.029	31.506	29.419	18.579
38.9	26.660	30.273	25.928	30.273	28.369	40.039	30.652	32.373	31.384	30.908	31.812	30.029	31.506	30.029	18.579
39.0	26.660	30.273	25.684	30.273	26.172	40.039	30.652	31.641	31.323	30.176	31.750	28.198	31.384	29.419	18.335
39.1	26.660	30.273	25.928	30.273	27.393	30.273	30.774	28.711	31.323	31.641	31.689	30.640	31.506	28.809	18.701
39.2	26.660	35.156	25.684	35.156	27.881	35.156	30.774	30.908	31.384	32.373	31.873	30.640	31.445	29.419	18.091
39.3	26.660	30.273	26.416	30.273	26.904	35.156	30.652	29.443	31.384	30.908	31.689	31.250	31.689	30.640	18.579
39.4	26.904	30.273	26.172	30.273	27.637	35.156	30.713	30.908	31.323	30.908	31.628	31.860	31.567	28.809	18.457
39.5	26.904	30.273	25.684	30.273	27.393	35.156	30.713	30.176	31.384	31.641	31.628	31.860	31.506	27.588	18.579
39.6	26.660	30.273	25.684	35.156	28.125	35.156	30.713	30.908	31.384	31.641	31.750	28.809	31.506	29.419	18.579
39.7	26.660	30.273	25.928	30.273	27.637	35.156	30.652	31.641	31.201	30.176	31.812	30.640	31.567	28.198	18.335
39.8	26.660	40.039	25.195	30.273	27.393	35.156	30.652	30.176	31.445	31.641	31.384	31.250	31.567	28.198	18.701
39.9	26.660	30.273	25.439	30.273	27.637	35.156	30.713	29.443	31.262	32.373	31.750	30.029	31.445	29.419	18.091
40.0	26.660	30.273	25.928	30.273	27.637	35.156	30.652	31.641	31.262	30.908	31.812	30.029	31.506	29.419	18.579
40.1	26.660	35.156	25.439	30.273	27.881	35.156	30.591	27.979	31.384	31.641	31.689	30.029	31.506	29.419	18.579

40.2	26.660	30.273	25.684	30.273	27.393	35.156	30.713	30.908	31.506	31.641	31.750	31.250	31.384	29.419	18.457
40.3	26.416	30.273	26.172	30.273	27.393	35.156	30.713	30.908	31.445	30.908	31.812	30.029	31.506	29.419	18.579
40.4	26.660	30.273	24.707	30.273	27.637	30.273	30.652	30.908	31.384	30.176	31.689	31.860	31.384	31.250	18.335
40.5	26.416	30.273	26.172	30.273	27.637	30.273	30.591	32.373	31.445	31.641	31.750	31.250	31.445	28.809	18.457
40.6	26.660	35.156	25.928	30.273	27.637	35.156	30.713	30.908	31.262	27.246	31.506	32.471	31.506	27.588	18.579
40.7	26.660	30.273	25.684	30.273	27.637	35.156	30.713	29.443	31.323	30.176	31.750	30.029	31.506	29.419	18.091
40.8	26.416	30.273	25.928	25.391	27.637	30.273	30.713	31.641	31.445	31.641	31.812	30.640	31.628	26.978	18.701
40.9	26.660	30.273	25.928	25.391	27.393	30.273	30.652	28.711	31.262	32.373	31.750	28.809	31.567	27.588	18.335
41.0	26.660	30.273	26.172	25.391	27.881	30.273	30.713	29.443	31.079	30.908	31.750	30.640	31.567	28.809	18.579
41.1	26.660	30.273	26.172	30.273	26.904	30.273	30.713	30.908	31.384	32.373	31.750	30.640	31.567	30.029	18.457
41.2	27.881	30.273	25.928	30.273	27.637	35.156	30.713	29.443	31.384	31.641	31.750	30.640	31.506	28.198	18.457
41.3	26.904	35.156	25.439	30.273	27.881	35.156	30.713	30.908	31.323	31.641	31.812	31.250	31.445	29.419	18.823
41.4	26.660	25.391	25.928	25.391	26.904	35.156	30.774	30.908	31.445	30.908	31.812	32.471	31.506	30.029	18.457
41.5	26.416	25.391	24.951	25.391	28.857	35.156	30.652	29.443	31.323	30.908	31.750	30.640	31.323	30.640	18.579
41.6	26.904	25.391	25.439	30.273	27.637	35.156	30.713	30.908	31.323	31.641	31.750	31.860	31.323	29.419	18.457
41.7	26.660	30.273	26.172	30.273	27.637	30.273	30.713	30.176	31.445	30.908	31.628	29.419	31.445	29.419	18.457
41.8	25.439	25.391	25.684	30.273	28.369	30.273	30.713	31.641	31.323	30.908	31.689	31.250	31.384	28.809	18.457
41.9	26.904	30.273	25.928	30.273	27.637	30.273	30.652	30.908	31.567	31.641	31.689	29.419	31.506	28.809	18.457
42.0	26.660	25.391	25.928	30.273	27.881	35.156	30.713	29.443	31.384	30.908	31.750	31.250	31.506	27.588	18.457
42.1	25.928	30.273	25.195	30.273	27.148	30.273	30.652	30.908	31.384	30.908	31.689	28.809	31.506	28.809	18.701
42.2	27.148	30.273	26.172	30.273	27.637	35.156	30.652	30.176	31.384	30.908	31.567	31.250	31.567	30.029	18.579
42.3	26.416	30.273	25.684	25.391	27.637	30.273	30.652	30.176	31.323	30.908	31.812	31.250	31.567	28.198	18.457
42.4	25.684	25.391	25.928	25.391	27.637	30.273	30.713	30.176	31.323	30.176	31.750	31.860	31.384	28.809	18.457
42.5	26.904	30.273	25.684	30.273	27.637	30.273	30.652	30.176	31.323	30.908	31.934	30.640	31.506	29.419	18.457
42.6	26.416	25.391	25.928	25.391	27.393	30.273	30.713	30.908	31.323	31.641	31.689	31.860	31.506	30.640	18.579
42.7	25.928	30.273	26.172	25.391	27.881	30.273	30.713	31.641	31.323	30.908	31.689	30.029	31.445	28.809	18.213
42.8	26.660	30.273	26.172	25.391	27.637	35.156	30.652	30.176	31.567	30.908	31.750	30.640	31.506	28.198	19.189
42.9	26.416	35.156	25.928	30.273	27.637	30.273	30.652	30.908	31.323	31.641	31.689	30.029	31.567	29.419	18.457
43.0	26.904	25.391	25.684	25.391	27.637	30.273	30.530	28.711	31.506	30.908	31.689	30.640	31.506	29.419	18.457
43.1	26.660	30.273	25.684	25.391	27.881	30.273	30.713	30.176	31.384	30.176	31.689	30.029	31.445	27.588	18.335
43.2	26.660	35.156	25.439	25.391	27.637	35.156	31.079	30.908	31.323	31.641	31.689	31.250	31.445	28.809	18.457
43.3	26.416	35.156	25.439	25.391	27.637	35.156	30.713	30.908	31.262	31.641	31.873	31.250	31.506	28.809	18.701
43.4	26.660	25.391	25.928	25.391	28.125	30.273	30.652	32.373	31.323	30.908	31.812	31.860	31.384	28.809	18.335
43.5	26.904	30.273	25.684	25.391	27.148	30.273	30.713	30.908	31.384	36.768	31.812	30.640	31.506	28.198	19.067
43.6	26.172	30.273	26.172	30.273	28.369	30.273	30.469	28.711	31.384	32.373	32.056	31.860	31.506	30.029	18.579
43.7	26.660	30.273	25.928	25.391	26.904	30.273	30.713	30.908	31.445	30.908	31.689	30.029	31.567	31.250	18.579
43.8	26.660	30.273	25.439	30.273	27.393	35.156	31.018	28.711	31.323	30.176	31.750	30.029	31.567	28.809	18.457
43.9	26.416	30.273	26.172	30.273	28.369	35.156	30.713	30.908	31.445	31.641	31.689	30.029	31.506	29.419	18.335
44.0	26.660	30.273	25.684	25.391	26.416	35.156	30.408	31.641	31.384	30.908	31.689	30.640	31.445	30.029	18.823
44.1	26.904	25.391	25.684	30.273	27.637	30.273	30.652	31.641	31.628	30.908	31.812	29.419	31.445	29.419	18.213
44.2	26.416	25.391	25.928	25.391	27.881	35.156	30.835	31.641	31.445	30.908	31.750	30.640	31.567	28.198	18.945
44.3	26.660	25.391	25.684	30.273	26.904	30.273	30.713	30.908	31.262	31.641	31.567	31.250	31.445	28.809	18.579
44.4	26.660	30.273	25.928	25.391	27.637	30.273	30.652	29.443	31.323	30.908	31.628	30.640	31.201	28.809	18.457
44.5	26.416	25.391	26.172	30.273	27.393	35.156	30.652	30.908	31.384	30.908	31.750	31.250	31.262	28.809	18.701
44.6	26.660	25.391	25.684	30.273	28.125	30.273	30.713	27.979	31.384	31.641	31.750	31.250	31.445	28.198	18.457
44.7	26.416	30.273	25.439	30.273	27.148	35.156	30.713	31.641	31.323	31.641	31.506	27.588	31.323	28.809	18.823
44.8	26.172	49.805	25.684	44.922	27.393	59.570	30.591	32.373	31.079	32.373	31.506	30.640	31.140	30.640	18.457
44.9	26.172	93.750	24.951	69.336	26.660	79.102	30.347	34.570	30.652	36.035	31.384	31.250	30.774	29.419	18.823
45.0	24.707	93.750	24.219	118.164	25.928	127.930	29.980	38.965	29.858	39.697	30.896	30.029	30.164	29.419	18.579
45.1	23.730	245.117	23.975	245.117	24.463	259.766	29.736	42.627	29.797	44.092	30.286	31.250	29.248	30.029	18.457
45.2	23.242	352.539	22.510	342.773	23.242	420.898	29.492	51.416	29.309	55.078	29.797	31.250	28.882	30.640	18.701
45.3	22.021	445.313	22.754	459.961	23.730	455.078	29.248	63.867	29.309	67.529	29.065	33.081	28.149	30.640	18.457
45.4	23.486	489.258	23.242	406.250	24.219	464.844	29.431	74.121	29.126	79.248	28.516	33.691	27.600	34.302	18.701
45.5	24.707	582.031	22.898	528.320	25.195	680.156	29.858	93.896	29.187	99.756	27.966	38.574	26.990	37.354	18.579
45.6	25.928	684.570	24.707	635.742	25.195	743.164	30.164	118.799	29.370	120.264	27.600	41.016	26.074	38.574	18.457
45.7	25.195	855.469	23.975	816.406	25.439	855.469	31.201	134.180	30.286	138.574	26.807	46.509	25.525	44.067	19.556
45.8	24.951	967.773	23.486	982.422	24.707	972.656	33.887	152.490	32.666	155.420	27.051	52.612	26.196	53.833	18.457
45.9	24.951	1050.781	22.998	1104.492	23.730	1109.375	36.023	162.744	34.802	165.674	28.638	64.209	28.638	61.768	18.457
46.0	23.242	1207.031	22.754	1226.563	24.707	1255.859	37.122	172.998	36.694	177.393	30.408	67.871	29.126	64.819	18.579
46.1	24.463	1333.984	22.998	1329.102	24.707	1353.516	37.000	181.055	35.657	182.520	29.309	78.416	27.844	75.195	18.457
46.2	25.684	1456.055	23.730	1465.820	25.684	1500.000	36.145	185.449	34.131	184.717	27.661	85.571	25.281	80.688	18.701
46.3	24.463	1597.656	23.486	1622.070	25.195	1622.070	34.253	189.844	32.483	189.111	25.037	96.558	22.595	94.116	18.335
46.4	24.463	1690.430	22.754	1714.844	23.730	1739.258	31.934	189.844	31.873	189.111	23.633	122.803	22.534	126.465	18.335
46.5	24.463	1807.617	22.510	1827.148	24.219	1875.977	31.506	194.971	34.070	196.436	24.976	150.268	26.318	154.541	18.457
46.6	22.266	1939.453	21.533	1954.102	22.266	1968.750	38.281	204.492	38.464	203.760	31.323	178.345	30.713	178.955	18.457
46.7	21.533	2090.820	20.688	2105.469	21.777	2134.766	41.028	208.887	41.882	207.422	33.643	199.097	33.032	194.824	18.457
46.8	21.289	2247.070	20.801	2261.719	22.510	2291.016	42.737	208.887	42.676	208.887	32.971	212.524	33.093	207.642	18.335

46.9	21.289	2315.430	19.824	2320.313	21.289	2339.844	41.089	208.887	41.943	210.352	32.727	226.563	33.643	222.290	18.457
47.0	21.045	2310.547	20.068	2305.664	20.801	2315.430	40.234	207.422	40.295	208.154	31.689	232.666	32.422	229.614	18.335
47.1	20.068	2247.070	19.580	2242.188	19.092	2227.539	39.746	207.422	38.831	206.690	30.652	243.042	30.042	236.939	17.603
47.2	19.580	2188.477	18.115	2183.594	19.336	2183.594	38.220	205.957	37.732	204.492	30.042	244.873	29.492	244.873	18.335
47.3	19.092	2110.352	18.848	2100.586	19.092	2100.586	37.305	203.760	37.793	204.492	29.126	254.639	29.980	249.146	18.213
47.4	19.824	2017.578	19.092	2022.461	19.580	2027.344	38.709	205.957	37.549	204.492	29.736	258.301	29.675	253.418	18.213
47.5	20.068	1988.281	19.092	1978.516	19.824	1978.516	39.319	203.027	37.183	202.295	30.591	262.573	29.614	256.470	18.213
47.6	20.068	1900.391	18.848	1895.508	19.336	1880.859	38.892	205.957	36.511	200.830	30.530	263.794	29.919	258.911	17.969
47.7	20.068	1841.797	19.092	1827.148	20.068	1832.031	38.525	203.760	35.779	200.098	30.835	268.677	29.431	260.742	18.335
47.8	20.313	1778.320	18.848	1773.438	20.068	1763.672	37.976	202.295	34.619	197.168	29.736	267.456	28.394	260.742	17.603
47.9	20.313	1709.961	19.336	1709.961	19.824	1709.961	36.450	201.563	33.276	194.238	28.882	266.846	27.966	259.522	18.091
48.0	20.557	1666.016	19.092	1661.133	19.336	1670.898	34.619	197.168	32.117	192.773	27.722	264.404	26.501	260.742	18.213
48.1	20.068	1587.891	18.604	1592.773	18.848	1592.773	33.459	193.506	30.347	189.111	26.257	265.015	24.609	260.132	18.091
48.2	19.580	1558.594	18.359	1563.477	17.871	1563.477	31.750	192.041	28.027	186.914	25.098	261.963	23.084	258.911	18.091
48.3	19.336	1524.414	17.871	1519.531	17.139	1509.766	29.919	187.647	26.807	185.449	24.060	262.573	21.863	258.301	17.847
48.4	18.359	1480.469	16.406	1480.469	18.359	1475.586	28.394	189.111	25.708	183.984	23.450	261.353	20.886	259.522	17.969
48.5	17.871	1451.172	16.650	1451.172	16.162	1451.172	27.478	186.182	24.792	181.055	23.084	261.963	20.581	255.859	17.603
48.6	17.383	1421.875	15.430	1412.109	16.406	1412.109	26.868	184.717	24.060	180.322	22.290	260.132	20.276	257.080	17.969
48.7	17.139	1407.227	15.918	1402.344	14.941	1402.344	26.440	184.717	23.755	179.590	21.741	262.573	20.276	257.690	17.969
48.8	17.139	1377.930	15.674	1377.930	16.162	1373.047	26.257	183.252	23.633	177.393	21.619	259.522	20.581	257.690	17.969
48.9	17.139	1358.398	15.186	1358.398	16.895	1353.516	25.952	181.055	23.633	175.928	21.375	258.911	20.947	256.470	17.969
49.0	17.383	1348.633	16.162	1348.633	15.674	1348.633	25.769	181.055	23.938	176.660	21.497	259.522	21.497	254.028	17.480
49.1	18.115	1319.336	16.406	1329.102	16.895	1333.984	25.647	177.393	23.450	175.928	21.436	258.301	21.619	257.080	17.969
49.2	17.627	1314.453	16.162	1309.570	17.139	1309.570	25.525	178.857	23.389	173.731	21.436	257.690	21.680	257.690	17.480
49.3	17.627	1299.805	16.406	1299.805	16.406	1299.805	25.037	177.393	23.145	174.463	21.741	259.522	21.863	256.470	17.725
49.4	17.871	1285.156	16.406	1294.922	17.139	1285.156	24.487	176.660	22.656	172.266	21.802	260.132	21.924	256.470	17.725
49.5	17.871	1275.391	16.162	1275.391	16.895	1275.391	24.121	175.195	22.412	170.801	21.863	259.522	21.985	257.080	17.725
49.6	17.627	1270.508	16.162	1270.508	17.383	1265.625	23.816	175.928	22.168	170.068	21.741	259.522	21.680	256.470	17.725
49.7	16.895	1250.977	16.406	1260.742	16.895	1260.742	23.572	171.533	22.107	170.068	21.619	260.132	21.741	255.859	17.480
49.8	18.359	1250.977	15.918	1250.977	17.139	1255.859	23.450	173.731	22.107	169.336	21.680	255.859	22.107	257.080	17.603
49.9	17.871	1246.094	16.406	1241.211	17.383	1250.977	23.633	170.801	22.229	169.336	21.802	258.301	22.412	258.301	17.480
50.0	17.383	1241.211	17.139	1241.211	17.383	1246.094	23.755	172.266	22.473	170.068	22.107	258.911	22.900	256.470	17.603
50.1	18.848	1236.328	16.406	1231.445	18.359	1241.211	23.938	172.266	22.900	170.068	22.656	258.911	23.450	255.249	17.603
50.2	18.604	1226.563	17.139	1226.563	17.871	1231.445	23.999	171.533	23.084	169.336	22.778	260.132	24.182	257.690	17.480
50.3	18.359	1221.680	17.139	1226.563	18.359	1226.563	23.999	172.998	23.206	169.336	23.145	261.353	24.121	256.470	17.603
50.4	19.824	1221.680	17.627	1226.563	18.848	1221.680	23.938	170.801	23.267	170.068	23.633	262.573	24.365	257.690	17.358
50.5	19.336	1211.914	17.627	1211.914	18.848	1216.797	23.938	170.068	23.267	170.068	24.060	261.963	24.426	258.911	17.358
50.6	18.848	1207.031	17.139	1211.914	18.848	1216.797	23.877	172.266	23.328	170.068	24.365	263.184	24.731	259.522	17.603
50.7	19.824	1207.031	18.359	1211.914	19.092	1211.914	23.877	170.801	23.206	170.801	24.487	262.573	24.854	260.132	16.748
50.8	19.824	1202.148	18.359	1211.914	19.336	1207.031	23.938	172.998	23.267	172.266	24.548	264.404	25.037	260.132	17.480
50.9	19.824	1207.031	18.604	1207.031	17.627	1207.031	23.633	172.266	23.450	170.801	24.731	261.963	25.403	261.963	17.358
51.0	20.068	1207.031	18.359	1207.031	19.824	1207.031	23.999	170.801	23.450	171.533	25.037	264.404	25.891	263.794	17.358
51.1	20.313	1202.148	18.604	1202.148	19.092	1202.148	24.487	171.533	23.755	172.266	25.525	263.184	26.257	261.963	17.236
51.2	20.557	1202.148	18.604	1202.148	20.801	1207.031	24.609	172.266	23.633	172.266	25.891	265.625	26.501	261.963	17.114
51.3	20.801	1197.266	19.092	1197.266	20.068	1207.031	24.609	172.998	24.304	171.533	26.318	265.625	26.868	264.404	17.358
51.4	21.045	1197.266	19.336	1202.148	19.824	1211.914	24.854	173.731	24.426	173.731	26.501	267.456	27.051	263.184	17.358
51.5	21.045	1197.266	19.336	1197.266	21.777	1202.148	24.731	172.266	24.609	172.998	26.196	266.846	27.295	263.794	17.358
51.6	21.289	1202.148	19.580	1197.266	20.557	1202.148	25.159	174.463	24.609	172.998	26.685	269.898	27.356	264.404	17.114
51.7	21.289	1197.266	20.313	1197.266	20.801	1207.031	25.525	173.731	24.731	173.731	26.807	268.066	27.112	265.015	17.114
51.8	21.045	1197.266	19.092	1197.266	21.533	1197.266	25.403	172.998	24.609	174.463	26.929	268.677	27.234	265.015	17.236
51.9	21.533	1197.266	19.824	1192.383	20.801	1202.148	25.098	173.731	24.609	173.731	26.807	268.066	27.356	266.235	17.114
52.0	21.533	1197.266	19.580	1192.383	21.045	1202.148	25.342	172.266	24.670	173.731	26.685	269.287	27.539	266.846	16.992
52.1	21.533	1192.383	19.824	1197.266	20.801	1202.148	25.525	173.731	24.609	175.195	26.929	268.677	27.356	268.677	17.603
52.2	21.777	1192.383	19.824	1197.266	21.045	1197.266	25.464	175.195	24.792	174.463	27.051	270.508	27.417	267.456	17.114
52.3	21.777	1192.383	19.336	1197.266	21.045	1202.148	25.403	175.195	24.670	174.463	27.051	268.066	27.539	268.066	16.992
52.4	21.533	1192.383	20.068	1197.266	21.289	1202.148	25.342	176.660	24.670	174.463	26.929	271.118	27.417	268.066	17.114
52.5	21.777	1197.266	20.068	1202.148	21.289	1202.148	25.281	175.195	24.487	175.928	26.807	269.898	27.234	268.066	17.114
52.6	21.533	1192.383	20.068	1202.148	20.557	1197.266	25.281	172.998	24.548	175.195	27.112	272.339	27.112	267.456	17.114
52.7	21.777	1197.266	19.824	1197.266	21.289	1197.266	24.915	175.195	24.304	175.195	26.624	271.118	27.112	268.677	16.870
52.8	22.021	1197.266	20.801	1192.383	21.289	1202.148	24.792	172.266	24.060	175.195	26.379	274.170	26.807	269.898	17.480
52.9	21.533	1187.500	19.824	1197.266	21.045	1202.148	24.792	175.195	23.938	175.195	26.318	271.729	26.746	268.677	16.992
53.0	22.021	1197.266	19.824	1197.266	20.801	1202.148	24.731	175.195	23.816	175.195	26.135	272.949	26.746	269.287	16.992
53.1	21.777	1197.266	19.824	1207.031	20.801	1207.031	24.609	175.195	23.816	176.660	26.013	271.729	26.807	271.118	16.992
53.2	20.557	1197.266	19.336	1197.266	20.801	1211.914	24.487	177.393	23.877	176.660	26.135	274.170	26.563	272.339	16.992
53.3	21.533	1197.266	19.824	1202.148	21.045	1207.031	24.487	175.928	23.877	175.195	26.074	272.339	26.685	271.729	17.114

53.6	21.289	1197.266	20.313	1207.031	21.289	1207.031	24.304	175.195	24.060	176.660	25.952	274.780	26.807	271.729	16.870
53.7	22.021	1197.266	19.824	1207.031	19.824	1207.031	24.548	176.660	23.816	175.195	26.074	275.391	26.563	271.729	16.992
53.8	22.510	1202.148	19.824	1207.031	21.045	1207.031	24.426	176.660	23.816	177.393	26.074	277.222	26.685	272.949	16.992
53.9	21.289	1202.148	19.824	1202.148	21.289	1211.914	23.999	176.660	23.938	176.660	26.074	276.001	26.990	274.170	16.748
54.0	21.533	1197.266	19.336	1202.148	20.068	1211.914	24.243	177.393	23.755	177.393	26.135	276.611	26.868	272.949	17.114
54.1	22.266	1202.148	19.824	1202.148	21.289	1207.031	24.548	182.520	23.877	178.125	26.013	277.222	26.624	274.170	16.626
54.2	21.045	1197.266	20.313	1207.031	20.801	1211.914	24.548	177.393	23.999	179.590	26.196	277.832	26.746	275.391	17.358
54.3	21.777	1202.148	19.824	1202.148	20.801	1211.914	24.487	178.125	24.426	177.393	26.440	276.001	26.868	278.442	16.870
54.4	22.266	1202.148	20.068	1211.914	21.045	1207.031	24.609	175.195	24.243	179.590	26.440	277.832	26.990	276.611	16.870
54.5	21.289	1202.148	21.533	1207.031	21.045	1211.914	24.792	178.125	24.487	179.590	26.440	278.442	27.112	276.001	16.992
54.6	21.777	1207.031	20.313	1207.031	21.533	1211.914	24.792	178.857	24.426	178.857	26.563	279.053	26.929	277.222	16.626
54.7	22.266	1207.031	19.824	1211.914	21.045	1216.797	24.854	178.857	24.487	178.857	26.624	279.663	27.173	276.611	17.114
54.8	21.777	1207.031	20.313	1211.914	21.045	1216.797	24.915	178.125	24.304	179.590	26.685	281.494	27.417	276.001	16.748
54.9	22.021	1207.031	19.824	1207.031	21.289	1216.797	24.976	176.660	24.426	179.590	26.685	277.832	27.295	276.611	16.992
55.0	21.777	1207.031	20.313	1207.031	21.289	1216.797	24.976	177.393	24.487	178.857	26.868	280.273	27.356	277.832	16.870
55.1	22.266	1202.148	21.289	1211.914	21.533	1211.914	24.976	180.322	24.548	179.590	26.807	280.273	27.417	277.222	16.626
55.2	22.021	1211.914	19.824	1211.914	21.045	1207.031	25.037	178.857	24.731	180.322	26.868	280.273	27.539	276.611	16.992
55.3	22.021	1207.031	20.557	1211.914	21.289	1211.914	25.159	179.590	24.548	179.590	26.807	280.884	27.356	278.442	16.626
55.4	21.777	1207.031	20.313	1207.031	21.777	1216.797	25.098	178.857	24.609	179.590	26.929	280.884	27.478	280.273	16.992
55.5	21.777	1202.148	20.313	1207.031	21.533	1211.914	25.220	178.857	24.609	180.322	26.929	281.494	27.600	277.832	16.870
55.6	22.266	1211.914	20.313	1207.031	21.045	1216.797	25.159	179.590	24.609	181.055	26.868	280.884	27.600	280.273	16.626
55.7	22.266	1207.031	19.824	1211.914	21.777	1211.914	25.281	179.590	24.487	179.590	26.990	283.325	27.539	279.053	17.236
55.8	22.021	1211.914	20.068	1211.914	21.289	1216.797	25.220	178.857	24.548	180.322	26.990	280.884	27.600	279.053	16.626
55.9	22.021	1211.914	20.313	1211.914	21.045	1221.680	25.098	179.590	24.609	180.322	26.929	282.715	27.478	277.832	16.870
56.0	22.021	1211.914	20.557	1211.914	21.777	1216.797	25.098	179.590	24.426	181.055	26.929	280.884	27.356	278.442	16.626
56.1	22.021	1207.031	20.313	1211.914	20.801	1216.797	25.220	182.520	24.609	178.857	26.685	282.105	27.234	277.832	16.748
56.2	22.266	1211.914	21.777	1211.914	22.510	1216.797	25.037	179.590	24.426	180.322	26.563	280.273	27.112	277.832	16.870
56.3	21.777	1207.031	20.557	1207.031	21.533	1211.914	24.915	178.125	24.304	180.322	26.501	280.884	27.112	276.611	16.504
56.4	21.777	1211.914	20.313	1211.914	21.289	1216.797	24.854	179.590	24.304	180.322	26.196	280.273	27.173	278.442	16.504
56.5	22.021	1211.914	20.313	1211.914	22.021	1216.797	24.915	178.857	24.182	181.055	26.563	282.105	27.173	280.273	16.626
56.6	21.777	1211.914	20.068	1211.914	21.045	1216.797	24.792	179.590	24.243	181.787	26.624	281.494	27.051	279.053	16.626
56.7	22.021	1207.031	20.068	1216.797	21.533	1216.797	24.792	179.590	24.121	180.322	26.501	282.715	27.051	281.494	16.626
56.8	21.777	1207.031	21.045	1211.914	21.533	1216.797	24.731	179.590	24.182	181.055	26.501	281.494	27.356	279.663	16.626
56.9	21.777	1216.797	19.580	1211.914	21.289	1211.914	24.670	181.055	24.121	181.055	26.440	281.494	26.990	279.663	16.626
57.0	21.777	1211.914	20.313	1211.914	21.289	1216.797	24.548	179.590	24.121	180.322	26.501	280.273	26.807	278.442	16.748
57.1	21.777	1202.148	20.313	1207.031	20.557	1216.797	24.548	179.590	24.243	178.857	26.379	282.715	26.990	279.053	15.771
57.2	21.777	1211.914	20.313	1207.031	21.289	1211.914	24.487	179.590	24.060	180.322	26.379	279.053	26.990	279.053	16.626
57.3	23.242	1207.031	20.068	1211.914	21.045	1211.914	24.487	176.660	24.182	180.322	26.318	282.105	26.990	278.442	16.504
57.4	22.021	1207.031	20.068	1207.031	21.289	1211.914	24.609	180.322	23.755	179.590	26.257	279.053	26.990	278.442	16.626
57.5	21.533	1207.031	20.313	1207.031	21.533	1211.914	24.609	180.322	24.304	180.322	26.135	282.715	27.295	279.053	16.504
57.6	21.533	1207.031	20.068	1211.914	21.533	1211.914	24.609	180.322	24.182	180.322	26.196	281.494	27.234	279.053	16.382
57.7	22.266	1197.266	20.313	1207.031	21.533	1216.797	24.670	181.787	24.365	179.590	26.074	283.325	27.478	279.053	16.626
57.8	21.777	1211.914	20.313	1211.914	21.289	1211.914	24.731	179.590	24.365	180.322	26.257	281.494	27.356	279.053	16.016
57.9	20.801	1202.148	20.557	1207.031	21.289	1211.914	24.792	178.857	24.548	180.322	26.318	284.546	27.234	280.273	16.626
58.0	22.266	1207.031	20.801	1211.914	21.289	1211.914	24.976	181.055	24.548	180.322	26.318	281.494	27.356	279.663	16.626
58.1	21.777	1207.031	20.313	1211.914	21.777	1216.797	24.976	178.125	24.487	179.590	26.501	281.494	27.417	278.442	16.504
58.2	21.533	1211.914	20.557	1207.031	21.045	1216.797	24.976	179.590	24.670	181.055	26.563	280.273	27.539	279.053	16.626
58.3	22.510	1207.031	20.313	1211.914	21.533	1211.914	25.098	180.322	24.609	180.322	26.807	280.884	27.783	279.663	16.138
58.4	21.777	1207.031	20.313	1211.914	21.533	1211.914	25.098	179.590	24.670	179.590	26.685	280.273	27.844	277.222	16.626
58.5	21.289	1202.148	21.045	1207.031	21.045	1211.914	25.159	181.787	24.609	179.590	26.563	282.105	27.783	277.832	16.016
58.6	22.510	1202.148	20.068	1207.031	22.021	1216.797	25.159	180.322	24.487	181.055	26.685	282.105	27.539	278.442	16.504
58.7	22.021	1207.031	20.557	1207.031	19.824	1211.914	25.159	178.857	24.548	180.322	26.807	282.715	27.478	279.663	16.504
58.8	21.533	1202.148	20.313	1207.031	21.289	1211.914	24.792	181.055	24.731	179.590	26.746	281.494	27.478	277.222	16.260
58.9	21.777	1207.031	20.557	1211.914	21.777	1211.914	25.159	178.857	24.609	180.322	26.746	282.715	27.417	279.053	16.504
59.0	22.266	1202.148	20.557	1207.031	21.045	1211.914	25.159	181.055	24.548	181.055	26.746	280.884	27.295	279.053	16.138
59.1	22.266	1202.148	20.557	1211.914	21.533	1207.031	25.159	180.322	24.670	180.322	26.807	281.494	27.417	278.442	16.504
59.2	22.266	1207.031	20.068	1207.031	21.289	1211.914	25.159	179.590	24.487	180.322	26.807	280.273	27.478	277.832	16.016
59.3	22.266	1202.148	20.557	1207.031	21.533	1207.031	25.220	179.590	24.609	181.055	26.868	280.884	27.600	278.442	16.260
59.4	21.777	1207.031	20.313	1207.031	21.533	1207.031	24.854	180.322	24.609	179.590	26.990	279.053	27.539	279.053	16.504
59.5	22.021	1197.266	20.313	1207.031	21.045	1207.031	25.220	178.857	24.487	178.857	26.807	280.884	27.478	277.222	16.260
59.6	22.021	1197.266	20.557	1197.266	21.533	1207.031	25.403	180.322	24.548	180.322	26.685	280.273	27.661	274.780	16.260
59.7	21.777	1197.266	20.801	1202.148	21.533	1207.031	25.098	178.857	24.426	177.393	26.624	280.273	27.539	277.222	16.138
59.8	22.266	1197.266	20.313	1202.148	21.533	1211.914	24.976	180.322	24.426	178.857	26.624	280.884	27.478	277.222	16.260
59.9	22.021	1207.031	20.801	1207.031	21.289	1207.031	24.976	178.857	24.365	180.322	26.685	280.884	27.539	276.611	16.260
60.0	21.533	1197.266	20.313	1202.148	21.289	1207.031	25.037	178.857	24.426	180.322	26.501	279.053	27.478	277.222	16.138

60.3	21.777	1197.266	19.824	1207.031	21.533	1211.914	24.976	178.857	24.426	180.322	26.746	279.663	27.417	277.832	16.260
60.4	22.266	1207.031	20.557	1202.148	21.533	1211.914	24.976	180.322	24.304	180.322	26.685	279.663	27.356	278.442	16.138
60.5	22.021	1207.031	20.557	1202.148	21.533	1207.031	24.976	178.857	24.609	178.125	26.257	281.494	27.112	278.442	16.138
60.6	22.021	1197.266	20.068	1207.031	21.289	1207.031	24.854	181.055	24.121	178.857	26.624	280.273	26.990	277.222	16.382
60.7	22.021	1202.148	20.557	1202.148	21.777	1207.031	24.792	178.857	24.243	179.590	26.685	279.053	27.112	274.170	16.138
60.8	21.777	1202.148	20.557	1202.148	21.045	1207.031	24.854	178.857	24.182	179.590	26.624	279.663	27.051	276.611	16.260
60.9	21.777	1197.266	20.068	1197.266	21.289	1202.148	24.915	179.590	24.243	179.590	26.746	279.663	27.234	276.611	16.016
61.0	22.021	1202.148	20.557	1202.148	21.533	1202.148	24.915	177.393	23.999	179.590	26.746	279.663	27.234	276.001	16.138
61.1	22.021	1197.266	20.557	1202.148	20.801	1207.031	24.792	178.857	24.243	179.590	26.746	279.663	27.234	276.001	16.138
61.2	22.021	1197.266	20.068	1207.031	22.510	1207.031	24.976	179.590	24.304	178.857	26.746	280.884	27.661	277.832	16.138
61.3	22.021	1197.266	20.313	1202.148	21.289	1207.031	25.037	178.857	24.304	180.322	26.685	279.053	27.539	277.222	16.138
61.4	21.045	1197.266	20.801	1202.148	21.045	1207.031	24.731	181.055	24.609	179.590	26.868	280.884	27.356	277.222	16.260
61.5	21.533	1202.148	20.068	1207.031	22.266	1207.031	24.792	178.857	24.487	178.857	26.746	278.442	27.417	277.832	16.138
61.6	22.021	1192.383	20.801	1197.266	21.045	1197.266	25.098	177.393	24.426	180.322	26.685	280.884	27.356	278.442	16.260
61.7	22.021	1192.383	20.313	1192.383	21.533	1207.031	24.976	178.857	24.548	179.590	26.807	279.053	27.417	276.611	16.138
61.8	21.533	1197.266	20.313	1192.383	21.045	1197.266	24.792	176.660	24.792	178.857	26.746	280.884	27.661	276.611	16.016
61.9	22.021	1197.266	21.289	1197.266	21.533	1207.031	25.037	178.857	24.548	177.393	26.868	278.442	27.295	276.001	16.138
62.0	22.998	1187.500	20.068	1192.383	21.777	1192.383	25.342	178.857	24.731	179.590	26.929	280.273	27.478	276.001	15.894
62.1	21.533	1187.500	20.557	1192.383	21.533	1192.383	25.159	178.857	24.854	178.125	26.868	278.442	27.844	274.780	16.626
62.2	22.510	1182.617	20.557	1187.500	21.533	1197.266	25.098	179.590	24.731	177.393	26.807	279.663	27.844	275.391	16.016
62.3	22.754	1187.500	20.557	1182.617	21.289	1197.266	25.159	178.125	25.037	178.125	26.929	277.222	27.844	276.611	16.016
62.4	21.777	1182.617	20.557	1182.617	21.777	1192.383	25.342	176.660	24.976	179.590	26.746	278.442	27.783	275.391	16.016
62.5	22.266	1177.734	21.045	1182.617	22.021	1182.617	25.281	178.125	24.854	178.125	27.112	276.001	27.783	274.170	16.016
62.6	22.754	1177.734	20.313	1177.734	21.533	1182.617	25.220	175.195	25.098	182.520	26.990	277.222	27.356	275.391	16.138
62.7	22.021	1177.734	20.313	1172.852	21.777	1182.617	25.281	173.731	24.792	177.393	27.112	276.001	27.661	275.391	15.771
62.8	22.266	1167.969	20.801	1167.969	21.533	1182.617	25.403	176.660	24.976	176.660	27.112	277.222	27.783	272.949	16.382
62.9	22.510	1172.852	20.068	1167.969	22.021	1172.852	25.342	175.928	24.915	175.195	26.868	275.391	27.783	273.560	16.016
63.0	22.021	1167.969	20.313	1163.086	21.777	1177.734	25.220	175.928	24.976	176.660	26.990	277.832	27.722	272.339	15.894
63.1	22.021	1163.086	21.045	1167.969	21.777	1172.852	25.220	175.928	24.854	175.195	26.929	274.170	27.783	271.729	16.016
63.2	22.266	1163.086	20.313	1167.969	21.533	1172.852	25.281	173.731	24.915	175.195	26.990	275.391	27.661	270.508	16.016
63.3	22.021	1158.203	20.801	1158.203	21.777	1172.852	25.098	175.195	24.915	175.195	26.746	272.949	27.539	271.118	16.016
63.4	21.777	1163.086	20.801	1158.203	21.533	1163.086	25.098	172.998	24.854	175.928	26.685	273.560	27.295	271.118	15.771
63.5	22.021	1158.203	20.313	1163.086	21.533	1163.086	25.281	175.928	24.854	174.463	26.868	271.118	27.417	270.508	16.382
63.6	22.021	1153.320	21.533	1158.203	22.510	1163.086	25.281	174.463	24.609	174.463	26.929	273.560	27.539	269.898	16.016
63.7	22.021	1158.203	20.557	1158.203	20.557	1163.086	25.220	173.731	24.976	174.463	26.929	271.729	27.661	270.508	16.016
63.8	22.266	1153.320	20.313	1153.320	21.777	1163.086	25.159	172.998	24.854	174.463	26.929	272.949	27.295	271.118	15.894
63.9	22.021	1153.320	20.557	1153.320	22.021	1153.320	25.281	174.463	24.854	172.998	26.929	271.729	27.295	268.677	15.894
64.0	22.021	1153.320	20.801	1158.203	21.045	1153.320	25.220	172.998	24.792	173.731	26.990	273.560	27.417	267.456	16.260
64.1	22.266	1153.320	20.557	1153.320	21.777	1153.320	25.037	175.195	24.915	173.731	26.807	271.118	27.661	268.677	15.771
64.2	22.021	1143.555	21.045	1153.320	21.533	1153.320	25.037	172.998	24.792	172.998	26.868	269.898	27.539	267.456	16.382
64.3	22.021	1148.438	20.557	1148.438	22.266	1153.320	25.098	173.731	24.792	172.998	27.112	269.287	27.356	266.846	15.894
64.4	22.021	1143.555	20.313	1148.438	21.533	1148.438	25.159	172.266	24.792	173.731	26.868	269.287	27.417	266.846	15.894
64.5	22.021	1143.555	20.801	1148.438	21.533	1153.320	25.037	172.266	24.731	172.998	26.868	268.066	27.478	267.456	15.894
64.6	22.021	1143.555	20.801	1148.438	21.777	1148.438	25.037	172.266	24.854	171.533	26.868	269.287	27.600	265.625	15.894
64.7	22.266	1143.555	20.068	1148.438	21.777	1148.438	24.976	170.801	24.792	172.998	26.868	269.287	27.661	266.846	16.016
64.8	22.021	1143.555	21.289	1143.555	21.777	1153.320	25.098	170.801	24.792	172.998	27.112	269.287	27.478	266.235	15.771
64.9	22.266	1138.672	20.557	1148.438	21.533	1148.438	25.098	172.998	24.609	172.266	26.868	269.287	27.539	269.287	16.138
65.0	22.266	1138.672	20.801	1143.555	21.777	1148.438	25.098	172.266	24.792	172.266	26.685	270.508	27.600	266.235	16.382
65.1	22.266	1138.672	20.801	1143.555	21.777	1148.438	25.037	174.463	24.670	173.731	26.563	268.066	27.478	265.625	15.771
65.2	22.266	1138.672	20.801	1148.438	21.533	1148.438	24.976	170.801	24.792	172.266	26.685	268.066	27.356	266.235	16.138
65.3	22.266	1138.672	21.289	1138.672	21.533	1148.438	25.098	170.801	24.731	171.533	26.807	268.066	27.417	266.235	15.771
65.4	21.777	1143.555	20.801	1148.438	21.777	1148.438	25.220	171.533	24.609	172.266	26.624	266.846	27.356	265.015	16.016
65.5	22.510	1143.555	20.557	1143.555	22.021	1148.438	25.220	170.801	24.731	169.336	26.746	267.456	27.356	265.625	16.016
65.6	22.510	1138.672	20.313	1143.555	21.777	1153.320	25.159	171.533	24.792	171.533	26.929	271.729	27.661	265.625	15.771
65.7	22.021	1138.672	20.557	1143.555	22.021	1153.320	25.159	172.266	24.670	172.266	26.807	268.677	27.539	264.404	15.894
65.8	21.533	1143.555	20.801	1143.555	21.533	1153.320	25.159	171.533	24.854	172.998	26.990	268.066	27.600	264.404	15.894
65.9	22.266	1143.555	20.801	1148.438	22.021	1158.203	25.220	174.463	24.670	172.266	27.051	269.898	27.539	265.625	15.894
66.0	21.533	1153.320	20.801	1148.438	22.021	1153.320	25.098	170.801	24.731	173.731	26.868	267.456	27.417	267.456	15.894
66.1	21.045	1143.555	20.313	1148.438	21.045	1153.320	25.037	170.801	24.731	172.266	26.868	268.677	27.356	265.625	15.894
66.2	22.510	1148.438	20.801	1148.438	22.998	1158.203	24.915	171.533	24.731	172.266	26.807	266.846	27.295	266.235	15.527
66.3	21.777	1148.438	20.801	1148.438	21.777	1153.320	25.037	170.068	24.670	172.266	26.929	268.066	27.173	266.235	15.771
66.4	21.045	1153.320	19.580	1148.438	21.533	1153.320	25.037	172.266	24.731	172.998	26.868	268.846	27.295	266.235	15.771
66.5	22.266	1148.438	21.045	1153.320	22.510	1158.203	25.220	172.998	24.731	173.731	26.685	268.677	27.417	265.015	15.771
66.6	22.021	1148.438	20.557	1148.438	21.533	1153.320	24.976	171.533	24.670	171.533	26.746	266.235	27.539	266.235	16.016
66.7	21.045	1153.320	20.801	1153.320	21.777	1153.320	24.731	172.998	25.037	172.998	26.868	269.287	27.478	266.235	15.894

67.0	21.777	1153.320	21.533	1153.320	21.533	1163.086	24.976	172.998	24.548	172.266	26.868	269.287	27.356	266.846	15.771
67.1	22.021	1153.320	20.557	1158.203	21.533	1158.203	24.976	170.801	24.487	172.998	26.563	269.898	27.234	267.456	15.039
67.2	21.777	1158.203	20.557	1158.203	21.533	1163.086	24.915	171.533	24.243	172.266	26.685	268.066	27.234	266.846	15.771
67.3	22.021	1158.203	20.557	1163.086	21.289	1163.086	24.426	173.731	24.365	172.998	26.318	269.898	27.112	268.066	15.771
67.4	22.021	1158.203	20.557	1158.203	21.533	1172.852	24.854	172.998	24.365	173.731	26.685	268.677	26.990	268.677	15.771
67.5	22.021	1163.086	20.313	1163.086	21.533	1167.969	25.220	173.731	24.426	174.463	26.685	270.508	27.051	268.066	15.649
67.6	21.777	1163.086	20.557	1163.086	21.533	1172.852	24.854	172.998	24.609	173.731	26.624	269.898	27.051	268.066	15.649
67.7	21.777	1167.969	20.557	1167.969	21.533	1172.852	24.731	172.266	24.365	173.731	26.624	271.729	27.356	268.066	15.771
67.8	22.021	1163.086	20.313	1167.969	21.533	1167.969	24.792	174.463	24.426	174.463	26.501	270.508	27.173	268.677	15.283
67.9	21.533	1167.969	20.801	1167.969	21.289	1167.969	24.976	173.731	24.426	173.731	26.624	272.339	26.990	268.066	15.894
68.0	21.777	1167.969	20.313	1167.969	21.289	1167.969	24.854	175.195	24.792	172.998	26.624	270.508	26.990	268.066	15.649
68.1	22.021	1163.086	19.336	1172.852	21.533	1167.969	24.792	173.731	24.243	174.463	26.685	274.170	26.990	268.677	15.771
68.2	21.777	1163.086	20.801	1167.969	21.289	1172.852	24.670	173.731	24.365	175.195	26.440	271.118	26.990	269.898	15.771
68.3	21.777	1167.969	20.313	1163.086	21.533	1167.969	24.854	174.463	24.487	173.731	26.379	272.949	27.112	269.898	15.405
68.4	21.777	1167.969	20.801	1172.852	20.801	1177.734	24.854	174.463	24.365	175.195	26.746	271.118	27.173	269.898	15.894
68.5	21.777	1167.969	20.313	1172.852	21.289	1177.734	24.731	173.731	24.487	175.928	26.440	273.560	27.417	271.118	15.283
68.6	22.021	1167.969	20.313	1172.852	21.533	1182.617	24.731	174.463	24.548	174.463	26.501	270.508	27.356	269.898	15.771
68.7	21.777	1172.852	20.801	1167.969	20.068	1182.617	24.792	172.998	24.426	175.195	26.440	273.560	27.234	269.898	15.771
68.8	22.021	1167.969	20.557	1172.852	21.289	1182.617	24.731	176.660	24.426	175.928	26.501	272.339	27.356	269.898	15.649
68.9	21.777	1177.734	20.313	1177.734	21.533	1182.617	24.731	174.463	24.304	175.928	26.563	273.560	27.295	270.508	15.771
69.0	22.021	1172.852	20.068	1177.734	20.557	1172.852	24.548	173.731	24.426	175.928	26.624	272.949	27.356	269.287	15.405
69.1	22.021	1177.734	20.557	1177.734	21.533	1177.734	24.670	174.463	24.243	176.660	26.624	274.170	27.417	269.898	15.771
69.2	21.777	1172.852	19.580	1177.734	21.045	1177.734	24.670	172.266	24.365	175.928	26.868	273.560	27.051	270.508	15.161
69.3	21.533	1172.852	20.068	1177.734	21.777	1187.500	24.487	175.195	24.426	176.660	26.563	273.560	27.234	271.729	15.527
69.4	21.777	1172.852	20.313	1177.734	21.289	1182.617	24.609	175.928	24.304	175.195	26.440	273.560	27.478	269.898	15.649
69.5	22.021	1172.852	20.068	1177.734	21.533	1172.852	24.915	175.195	24.365	176.660	26.440	274.170	27.417	271.118	15.405
69.6	22.021	1172.852	20.557	1177.734	21.289	1182.617	24.792	177.393	24.426	175.928	26.440	272.339	27.356	271.729	15.649
69.7	21.045	1177.734	20.313	1177.734	21.045	1187.500	24.548	175.928	24.426	175.928	26.624	274.170	27.478	271.729	15.405
69.8	22.021	1172.852	19.092	1177.734	21.533	1182.617	24.731	175.195	24.121	175.928	26.379	274.170	27.417	271.118	15.527
69.9	22.266	1182.617	20.801	1177.734	21.045	1187.500	24.976	175.195	24.548	177.393	26.318	274.780	27.173	272.339	15.771
70.0	21.533	1172.852	19.824	1182.617	21.045	1187.500	24.976	173.731	24.365	175.928	26.318	274.780	27.234	272.949	15.161
70.1	22.266	1182.617	20.313	1182.617	21.533	1187.500	24.792	175.195	24.426	175.928	26.501	276.001	27.173	271.729	15.649
70.2	22.754	1177.734	20.313	1182.617	21.289	1182.617	24.792	176.660	24.548	177.393	26.563	274.780	27.295	269.898	15.405
70.3	21.533	1177.734	20.068	1182.617	21.289	1187.500	24.854	175.928	24.609	176.660	26.563	274.170	27.356	271.729	15.649
70.4	22.021	1182.617	20.801	1187.500	21.289	1187.500	24.792	178.125	24.426	175.195	26.440	275.391	27.356	271.118	15.527
70.5	22.510	1177.734	20.557	1182.617	21.289	1182.617	24.670	175.195	24.426	176.660	26.624	274.170	27.295	271.729	15.527
70.6	21.289	1177.734	19.824	1182.617	21.045	1187.500	24.548	175.195	24.304	175.928	26.440	274.780	27.234	272.949	15.771
70.7	22.021	1182.617	20.313	1187.500	21.533	1182.617	24.609	175.928	24.121	176.660	26.440	280.273	26.929	273.560	15.527
70.8	22.754	1182.617	20.313	1182.617	20.801	1187.500	24.548	175.195	24.304	177.393	26.563	276.001	26.990	272.949	15.527
70.9	21.533	1177.734	18.848	1182.617	21.533	1187.500	24.426	175.928	24.182	177.393	26.440	274.780	27.051	272.949	15.405
71.0	21.777	1182.617	19.824	1182.617	21.533	1177.734	24.487	177.393	24.243	175.928	26.379	277.222	27.112	273.560	15.283
71.1	21.777	1187.500	20.313	1182.617	20.557	1197.266	24.609	175.195	23.999	176.660	26.440	276.611	27.051	274.780	15.527
71.2	21.533	1182.617	19.580	1187.500	22.266	1192.383	24.548	177.393	24.243	177.393	26.624	276.001	27.051	272.949	15.283
71.3	21.533	1187.500	20.313	1187.500	21.045	1192.383	24.426	182.520	24.243	176.660	26.685	275.391	27.173	271.729	15.649
71.4	22.021	1187.500	20.068	1187.500	21.045	1192.383	24.487	175.195	24.304	175.928	26.501	276.001	27.295	274.170	15.649
71.5	21.533	1182.617	19.336	1192.383	21.777	1192.383	24.609	176.660	24.243	176.660	26.440	275.391	27.295	269.898	15.405
71.6	21.777	1182.617	20.801	1187.500	21.045	1192.383	24.609	175.195	24.182	178.125	26.563	275.391	27.234	273.560	15.405
71.7	21.777	1182.617	20.068	1187.500	21.533	1197.266	24.487	176.660	24.121	177.393	26.563	274.170	27.173	273.560	15.405
71.8	21.533	1182.617	20.068	1187.500	20.801	1192.383	24.670	177.393	24.182	176.660	26.501	276.611	27.234	274.170	15.405
71.9	21.777	1182.617	20.313	1192.383	21.045	1202.148	24.731	175.928	24.121	178.125	26.501	276.001	27.295	272.949	15.527
72.0	22.266	1187.500	20.068	1197.266	21.045	1197.266	24.731	177.393	24.304	177.393	26.379	278.442	27.112	274.170	15.161
72.1	21.533	1187.500	20.557	1187.500	21.289	1187.500	24.609	175.928	24.121	175.928	26.440	276.611	27.051	274.170	16.016
72.2	21.777	1187.500	20.557	1182.617	21.289	1197.266	24.670	177.393	24.182	177.393	26.013	278.442	27.295	276.001	15.405
72.3	21.777	1187.500	20.068	1187.500	20.801	1192.383	24.731	177.393	24.243	178.125	26.440	276.611	27.234	274.170	15.405
72.4	21.777	1187.500	19.824	1192.383	21.289	1197.266	24.609	177.393	24.304	177.393	26.440	277.832	27.112	273.560	15.283
72.5	21.777	1182.617	20.313	1187.500	21.533	1197.266	24.670	177.393	24.304	178.125	26.563	275.391	27.051	273.560	15.405
72.6	21.777	1192.383	19.336	1192.383	21.045	1202.148	24.670	178.125	24.304	178.125	26.501	277.832	27.112	274.780	15.527
72.7	21.533	1187.500	19.824	1187.500	21.289	1202.148	24.609	177.393	24.365	177.393	26.440	276.611	27.173	272.949	15.161
72.8	21.777	1187.500	20.313	1192.383	21.289	1192.383	24.609	176.660	24.243	177.393	26.624	277.832	27.295	274.170	15.894
72.9	21.533	1192.383	19.824	1187.500	21.045	1197.266	24.670	176.660	24.609	178.125	26.746	277.222	27.417	274.170	15.405
73.0	21.533	1187.500	20.068	1192.383	21.045	1197.266	24.731	176.660	24.365	174.463	26.868	278.442	27.173	274.170	15.283
73.1	21.533	1192.383	20.313	1192.383	22.021	1197.266	24.548	178.125	24.426	176.660	26.685	277.222	27.234	273.560	15.405
73.2	21.777	1192.383	19.580	1192.383	21.045	1197.266	24.609	176.660	24.426	178.857	26.624	279.663	27.295	276.001	15.161
73.3	21.045	1187.500	20.557	1192.383	21.533	1192.383	24.609	179.590	24.365	179.590	27.112	277.832	27.112	275.391	15.649
73.4	23.242	1192.383	20.313	1192.383	20.557	1197.266	24.731	176.660	24.243	177.393	26.563	277.832	27.051	274.780	15.161

73.7	21.533	1192.383	20.068	1192.383	20.068	1202.148	24.792	175.928	24.304	178.125	26.440	274.780	26.807	275.391	15.161
73.8	22.021	1192.383	20.313	1192.383	21.533	1197.266	24.854	175.928	24.426	177.393	26.501	278.442	27.051	274.170	15.405
73.9	21.289	1187.500	20.313	1197.266	21.289	1197.266	24.854	178.125	24.365	178.125	26.563	277.832	27.051	274.780	15.283
74.0	20.313	1197.266	20.068	1197.266	20.313	1202.148	24.854	177.393	24.426	178.857	26.501	279.663	27.173	275.391	15.527
74.1	21.777	1187.500	20.068	1192.383	21.533	1202.148	24.731	179.590	24.304	178.125	26.807	278.442	27.112	274.170	15.283
74.2	21.533	1192.383	20.313	1202.148	21.045	1202.148	24.731	176.660	24.731	178.125	26.440	279.663	27.051	274.780	15.649
74.3	21.045	1192.383	20.068	1197.266	21.777	1202.148	24.670	176.660	24.243	178.125	26.318	277.832	27.295	276.611	15.283
74.4	21.777	1187.500	19.580	1192.383	21.289	1202.148	24.915	177.393	24.182	177.393	26.379	278.442	27.051	276.611	15.283
74.5	21.289	1197.266	20.557	1197.266	21.289	1192.383	24.548	175.928	24.304	178.125	26.257	277.222	26.990	276.001	15.283
74.6	21.045	1192.383	20.068	1197.266	21.045	1202.148	24.243	178.125	24.304	178.857	26.318	278.442	26.868	274.780	15.161
74.7	22.021	1187.500	20.313	1192.383	21.289	1202.148	24.548	178.857	24.243	177.393	26.196	277.832	26.929	276.611	15.405
74.8	21.777	1192.383	20.313	1192.383	21.289	1202.148	24.487	177.393	24.304	178.125	26.135	278.442	27.112	276.001	15.405
74.9	21.289	1192.383	19.580	1197.266	20.801	1197.266	24.426	179.590	24.243	178.857	26.318	279.663	27.051	274.780	15.405
75.0	22.021	1187.500	20.801	1192.383	21.045	1202.148	24.487	177.393	24.243	179.590	26.379	277.832	27.478	275.391	16.016
75.1	21.777	1192.383	20.068	1202.148	21.533	1202.148	24.426	177.393	23.938	178.125	26.379	278.442	27.051	275.391	15.283
75.2	21.289	1187.500	20.068	1192.383	21.045	1202.148	23.999	177.393	24.182	178.125	26.501	279.663	26.929	274.780	15.405
75.3	21.777	1192.383	20.068	1197.266	20.801	1197.266	24.426	176.660	24.060	178.857	26.318	278.442	26.868	275.391	15.161
75.4	21.533	1192.383	20.068	1197.266	21.289	1192.383	24.792	176.660	24.182	178.857	26.379	277.222	27.051	275.391	15.283
75.5	21.777	1187.500	20.068	1197.266	21.045	1197.266	24.548	178.125	24.243	177.393	26.379	277.832	26.807	279.053	15.405
75.6	21.533	1192.383	20.313	1197.266	20.068	1192.383	24.487	177.393	24.182	178.125	26.379	277.832	26.868	275.391	15.161
75.7	21.533	1192.383	20.068	1197.266	21.289	1197.266	24.487	178.857	24.243	178.857	26.563	277.222	26.807	276.611	15.161
75.8	21.533	1192.383	20.068	1197.266	20.557	1197.266	24.670	178.125	24.243	178.125	26.440	284.546	26.929	277.222	15.283
75.9	21.777	1187.500	20.068	1197.266	21.533	1197.266	24.670	177.393	24.243	183.984	26.257	279.663	26.990	276.001	15.283
76.0	21.533	1197.266	20.068	1197.266	21.289	1197.266	24.670	178.857	23.999	178.857	26.379	278.442	27.051	275.391	15.283
76.1	21.289	1192.383	19.580	1187.500	20.801	1197.266	24.609	177.393	24.365	178.125	26.501	280.273	27.051	276.001	15.283
76.2	21.533	1197.266	20.313	1192.383	22.021	1197.266	24.731	177.393	24.121	178.125	26.624	278.442	27.051	276.001	15.283
76.3	21.533	1192.383	19.824	1192.383	21.045	1202.148	24.792	178.125	24.243	178.857	26.501	279.053	27.051	275.391	15.283
76.4	21.777	1197.266	20.068	1192.383	21.289	1202.148	24.670	177.393	24.304	177.393	26.440	277.832	27.051	274.170	14.795
76.5	21.533	1192.383	19.824	1197.266	21.777	1202.148	24.854	178.125	24.365	177.393	26.440	278.442	26.746	276.001	15.161
76.6	21.533	1197.266	18.848	1197.266	20.801	1202.148	24.854	176.660	24.304	178.857	26.563	277.222	26.807	277.222	15.161
76.7	21.533	1192.383	20.313	1192.383	21.289	1197.266	24.854	177.393	24.243	179.590	26.501	279.053	26.990	276.001	15.039
76.8	21.533	1192.383	20.313	1202.148	20.801	1197.266	24.731	177.393	24.243	178.857	26.501	276.001	26.990	279.663	15.283
76.9	21.777	1197.266	20.068	1192.383	21.045	1197.266	24.670	178.125	24.121	178.125	26.501	279.053	26.929	277.222	15.161
77.0	21.777	1197.266	20.068	1197.266	21.045	1202.148	24.670	178.857	24.182	178.857	26.501	277.832	27.112	276.001	15.283
77.1	21.777	1192.383	20.068	1192.383	21.045	1202.148	24.670	177.393	24.182	178.125	26.440	280.273	26.990	275.391	14.551
77.2	21.533	1192.383	19.824	1197.266	21.289	1202.148	24.426	177.393	24.182	178.125	26.440	279.053	27.051	276.001	15.161
77.3	21.777	1192.383	20.068	1197.266	20.801	1197.266	24.609	178.125	23.938	178.857	26.379	279.663	27.173	275.391	15.161
77.4	21.533	1197.266	20.068	1202.148	21.289	1202.148	24.915	176.660	24.426	179.590	26.501	278.442	26.990	275.391	15.161
77.5	20.801	1197.266	19.580	1197.266	21.289	1207.031	24.792	178.125	24.365	178.857	26.440	279.663	27.112	274.170	15.161
77.6	21.533	1192.383	20.068	1197.266	21.289	1202.148	24.426	178.857	24.304	179.590	26.379	277.832	27.173	276.611	15.039
77.7	21.777	1192.383	20.313	1197.266	21.289	1197.266	24.670	177.393	24.365	178.857	26.563	279.053	27.234	276.611	15.161
77.8	21.777	1192.383	19.580	1197.266	21.533	1207.031	24.915	180.322	24.304	178.125	26.685	279.053	27.234	276.001	14.673
77.9	21.289	1192.383	20.557	1197.266	21.045	1207.031	24.731	177.393	24.182	177.393	26.746	279.053	27.173	276.001	15.161
78.0	21.777	1197.266	19.824	1197.266	21.289	1202.148	24.609	175.928	24.243	179.590	26.685	277.832	26.929	277.222	15.039
78.1	22.510	1192.383	20.068	1197.266	22.998	1202.148	24.548	177.393	24.243	178.857	26.501	279.053	26.868	277.222	15.161
78.2	21.289	1192.383	20.313	1197.266	20.801	1197.266	24.670	176.660	24.304	177.393	26.563	277.832	26.868	276.001	15.039
78.3	21.777	1187.500	19.336	1192.383	21.533	1197.266	24.731	178.125	24.243	178.125	26.563	281.494	26.807	276.001	14.795
78.4	22.266	1192.383	20.313	1197.266	20.068	1197.266	24.670	179.590	24.304	179.590	26.440	278.442	27.051	276.611	15.161
78.5	21.289	1192.383	20.068	1192.383	20.801	1197.266	24.670	178.125	24.182	178.857	26.563	279.663	27.051	274.780	14.673
78.6	21.533	1192.383	19.824	1192.383	21.533	1197.266	24.670	179.590	24.304	178.125	26.563	277.222	27.173	274.780	15.039
78.7	22.266	1192.383	20.068	1197.266	20.068	1197.266	24.731	177.393	24.243	178.857	26.318	279.053	27.295	276.001	15.161
78.8	21.289	1187.500	20.068	1192.383	21.045	1202.148	24.609	177.393	24.121	178.125	26.563	276.001	27.173	276.001	14.917
78.9	21.533	1192.383	19.824	1197.266	20.801	1197.266	24.548	178.125	24.243	178.125	26.379	278.442	27.112	275.391	15.161
79.0	22.021	1192.383	20.068	1197.266	20.557	1197.266	24.548	175.928	24.060	178.125	26.563	278.442	26.929	276.611	14.795
79.1	21.289	1192.383	20.313	1197.266	21.045	1197.266	24.487	178.125	24.365	178.125	26.379	279.053	27.051	276.611	14.673
79.2	21.533	1192.383	19.580	1192.383	20.557	1197.266	24.487	178.857	24.182	178.125	26.318	278.442	27.051	276.611	14.673
79.3	21.533	1197.266	20.068	1192.383	21.289	1197.266	24.609	177.393	24.243	178.857	26.501	280.884	26.929	275.391	15.039
79.4	21.533	1197.266	20.801	1192.383	20.801	1197.266	24.670	179.590	24.243	178.857	26.440	279.053	26.746	276.001	15.039
79.5	21.533	1187.500	19.336	1192.383	21.045	1202.148	24.548	177.393	24.365	178.125	26.440	279.053	27.112	276.001	14.917
79.6	21.777	1197.266	20.313	1192.383	20.801	1197.266	24.487	176.660	24.182	177.393	26.440	277.832	27.173	275.391	15.161
79.7	21.533	1192.383	19.824	1197.266	20.801	1202.148	24.731	178.125	24.243	179.590	26.379	279.053	27.173	274.170	14.673
79.8	21.777	1192.383	20.068	1197.266	21.289	1202.148	24.854	176.660	24.365	179.590	26.563	277.832	27.173	274.780	15.039
79.9	21.533	1187.500	20.068	1197.266	20.801	1202.148	24.731	172.998	24.365	178.125	26.501	278.442	27.051	276.611	15.161
80.0	21.533	1192.383	19.580	1197.266	21.045	1197.266	24.548	178.125	24.487	178.125	26.318	278.442	27.112	274.780	14.429
80.1	21.533	1192.383	20.068	1197.266	21.045	1202.148	24.609	177.393	24.304	178.857	26.440	279.053	26.929	276.001	15.161

80.4	21.777	1192.383	19.824	1192.383	21.289	1197.266	24.487	177.393	24.792	178.857	26.379	278.442	27.051	275.391	14.917
80.5	21.533	1197.266	21.045	1192.383	20.801	1197.266	24.548	177.393	24.365	177.393	26.440	278.442	27.234	276.611	14.795
80.6	21.289	1197.266	20.068	1197.266	19.580	1197.266	24.487	177.393	24.243	178.857	26.501	277.832	27.234	276.001	15.161
80.7	21.533	1197.266	20.068	1202.148	21.289	1197.266	24.426	179.590	24.365	178.857	26.318	277.832	27.173	275.391	15.039
80.8	21.533	1192.383	20.313	1197.266	20.313	1202.148	24.426	178.857	24.365	179.590	26.074	277.222	27.173	273.560	14.917
80.9	21.289	1197.266	19.824	1192.383	22.021	1197.266	24.426	176.660	24.243	178.125	26.074	283.936	27.051	276.001	14.917
81.0	21.533	1192.383	19.824	1197.266	21.045	1202.148	24.426	178.857	24.243	179.590	26.135	279.663	27.112	276.001	14.917
81.1	21.533	1197.266	21.045	1197.266	20.313	1202.148	24.365	178.125	24.182	178.857	26.196	279.053	27.173	275.391	14.917
81.2	21.289	1202.148	19.336	1197.266	22.021	1202.148	24.304	177.393	24.243	178.857	25.769	280.273	27.051	275.391	14.795
81.3	22.510	1192.383	20.068	1197.266	21.045	1207.031	24.182	178.125	23.938	177.393	26.196	278.442	27.051	277.832	14.917
81.4	21.533	1192.383	20.068	1197.266	21.045	1202.148	24.243	176.660	24.243	178.857	26.318	279.053	27.112	276.001	14.917
81.5	21.289	1197.266	20.068	1202.148	21.533	1197.266	24.243	178.125	24.182	179.590	26.318	277.832	26.990	276.611	14.795
81.6	21.533	1197.266	20.068	1192.383	21.045	1202.148	24.243	176.660	24.182	178.125	26.318	278.442	27.234	277.222	14.795
81.7	21.777	1192.383	19.824	1197.266	21.289	1202.148	24.243	175.928	24.060	178.857	26.379	277.222	26.929	277.222	14.795
81.8	21.533	1192.383	20.068	1197.266	20.557	1197.266	24.304	177.393	24.182	178.857	26.196	278.442	26.807	276.001	14.917
81.9	20.801	1192.383	20.313	1197.266	21.045	1197.266	24.304	174.463	24.182	178.857	26.135	276.611	26.868	274.780	14.917
82.0	22.021	1197.266	20.068	1197.266	21.045	1202.148	24.182	178.125	24.182	178.125	25.830	279.053	26.807	276.001	14.673
82.1	21.289	1192.383	20.068	1197.266	21.289	1202.148	24.182	177.393	24.182	178.857	26.196	278.442	26.990	273.560	15.405
82.2	21.045	1187.500	21.533	1197.266	21.289	1202.148	24.243	177.393	24.060	178.857	26.135	279.663	26.868	275.391	14.795
82.3	21.777	1192.383	20.557	1197.266	20.801	1197.266	24.609	178.125	24.304	178.125	26.196	279.663	27.051	275.391	14.917
82.4	21.289	1187.500	20.068	1197.266	21.289	1202.148	24.121	176.660	24.243	178.857	26.196	279.053	27.051	276.611	14.795
82.5	20.801	1197.266	20.313	1192.383	21.045	1202.148	23.877	176.660	24.243	178.857	26.196	277.832	26.990	276.001	14.795
82.6	21.777	1192.383	19.824	1197.266	21.045	1197.266	24.182	177.393	24.182	178.125	26.257	278.442	26.868	275.391	14.917
82.7	21.533	1197.266	20.068	1197.266	21.045	1197.266	24.121	175.928	24.304	177.393	26.257	277.222	26.868	276.611	14.673
82.8	20.801	1192.383	20.801	1197.266	21.045	1197.266	24.182	177.393	24.121	179.590	26.135	279.663	26.807	278.442	15.283
82.9	21.533	1192.383	19.580	1197.266	21.045	1197.266	24.243	178.857	24.060	178.857	26.074	277.832	26.868	276.001	14.673
83.0	21.289	1192.383	20.068	1192.383	21.289	1197.266	24.182	177.393	24.182	177.393	26.013	280.273	26.990	275.391	14.795
83.1	21.289	1187.500	19.824	1197.266	21.533	1202.148	23.694	180.322	23.999	178.857	25.891	279.053	27.112	275.391	14.795
83.2	21.533	1197.266	20.068	1197.266	20.801	1202.148	24.243	177.393	24.121	179.590	26.196	280.273	27.112	274.780	14.673
83.3	21.289	1197.266	20.068	1197.266	21.533	1197.266	24.609	176.660	24.182	178.857	26.196	277.832	27.173	274.780	15.039
83.4	21.533	1187.500	20.068	1202.148	19.580	1202.148	24.487	178.125	24.243	182.520	26.379	280.884	27.173	276.001	14.551
83.5	21.289	1197.266	20.068	1197.266	20.801	1202.148	24.487	176.660	23.877	179.590	26.501	277.222	27.295	276.611	15.161
83.6	21.289	1197.266	19.824	1202.148	21.533	1202.148	24.548	178.857	24.365	178.857	26.196	277.832	27.112	276.001	14.795
83.7	21.289	1197.266	20.313	1197.266	20.313	1202.148	24.609	178.125	24.243	177.393	26.440	277.832	26.990	275.391	14.673
83.8	21.533	1197.266	20.313	1202.148	20.801	1202.148	24.609	176.660	24.121	178.857	26.440	278.442	26.868	277.222	14.917
83.9	21.289	1197.266	20.068	1197.266	20.801	1197.266	24.426	181.055	24.121	177.393	26.440	279.053	26.746	276.611	15.039
84.0	21.289	1197.266	20.313	1197.266	20.801	1197.266	24.426	181.055	24.121	177.393	26.440	279.053	26.746	276.611	15.039
84.1	21.289	1192.383	19.824	1197.266	21.045	1202.148	24.548	178.125	24.060	178.857	26.318	279.053	26.868	276.001	14.673
84.2	21.533	1197.266	20.068	1197.266	20.801	1207.031	24.609	178.125	24.182	179.590	26.318	279.053	26.868	276.611	15.161
84.3	21.533	1192.383	19.824	1202.148	21.289	1207.031	24.609	177.393	24.243	178.125	26.379	278.442	26.807	276.001	14.917
84.4	21.289	1197.266	20.313	1197.266	20.801	1202.148	24.609	178.125	24.487	178.857	26.257	280.273	26.929	274.780	14.673
84.5	21.777	1197.266	20.557	1202.148	20.801	1207.031	24.609	179.590	24.304	179.590	26.257	279.053	26.990	276.001	14.917
84.6	21.533	1192.383	19.824	1202.148	20.801	1207.031	24.670	178.125	24.426	179.590	26.318	279.663	27.112	276.611	14.551
84.7	21.533	1197.266	20.068	1202.148	21.045	1197.266	24.792	178.857	24.304	178.125	26.501	278.442	26.868	276.001	14.917
84.8	21.777	1192.383	19.824	1197.266	21.045	1202.148	24.731	177.393	24.426	178.857	26.501	279.663	26.868	276.001	14.795
84.9	21.777	1197.266	20.068	1197.266	20.557	1202.148	24.731	178.125	24.243	179.590	26.379	277.222	26.868	276.611	14.673
85.0	21.533	1192.383	20.068	1202.148	21.045	1207.031	24.731	177.393	24.121	178.857	26.563	279.663	26.746	277.832	15.527
85.1	21.533	1197.266	20.068	1202.148	21.045	1207.031	24.487	178.857	24.121	179.590	26.196	279.053	26.807	277.222	14.673
85.2	21.289	1202.148	19.824	1197.266	21.045	1202.148	24.609	178.857	24.060	178.857	26.196	279.053	26.929	275.391	14.795
85.3	21.533	1197.266	19.824	1202.148	20.801	1202.148	24.792	179.590	24.304	178.857	26.257	279.663	26.746	277.222	14.673
85.4	20.068	1197.266	20.068	1197.266	21.045	1207.031	24.548	178.125	24.060	178.857	26.196	280.884	26.868	276.611	14.795
85.5	21.045	1202.148	19.824	1202.148	20.557	1202.148	24.243	179.590	24.121	178.857	26.257	279.663	26.929	275.391	14.917
85.6	21.777	1197.266	19.824	1197.266	21.045	1207.031	24.426	176.660	24.121	178.857	26.196	278.442	26.990	276.611	14.551
85.7	21.533	1197.266	20.313	1202.148	21.045	1207.031	24.609	178.125	24.121	178.857	26.196	280.273	27.051	277.222	14.551
85.8	21.045	1207.031	19.824	1197.266	20.313	1207.031	24.487	178.857	23.938	178.857	26.196	279.053	27.112	276.001	14.795
85.9	21.533	1202.148	20.068	1197.266	22.266	1202.148	24.426	178.857	24.060	179.590	26.379	278.442	26.990	276.611	14.673
86.0	22.266	1202.148	19.824	1207.031	21.045	1207.031	24.487	179.590	24.060	178.857	26.379	285.156	27.173	277.222	14.795
86.1	21.045	1207.031	19.824	1197.266	20.313	1207.031	24.609	178.857	23.999	178.125	26.074	279.663	26.990	279.663	14.795
86.2	21.533	1202.148	20.801	1207.031	21.533	1207.031	24.548	177.393	24.243	179.590	26.135	279.663	26.990	277.222	14.795
86.3	22.266	1202.148	19.336	1202.148	20.557	1207.031	24.487	179.590	24.060	178.125	26.135	280.273	26.807	277.832	14.795
86.4	21.045	1202.148	19.824	1202.148	21.045	1202.148	24.426	177.393	24.121	178.857	26.074	280.884	26.929	278.442	14.307
86.5	21.533	1202.148	19.824	1202.148	21.045	1211.914	24.548	178.857	24.182	178.857	26.196	280.884	26.990	277.832	14.673
86.6	22.266	1202.148	19.824	1197.266	20.801	1207.031	24.548	179.590	24.487	179.590	26.318	280.273	26.929	277.222	14.673
86.7	21.289	1197.266	19.824	1207.031	21.045	1207.031	24.609	179.590	24.121	179.590	26.135	281.494	26.624	277.832	14.673
86.8	21.533	1211.914	20.313	1207.031	20.557	1211.914	24.487	181.055	24.121	180.322	26.135	279.663	26.868	277.832	14.673

87.1	21.289	1202.148	20.068	1207.031	20.801	1216.797	24.426	178.857	24.243	179.590	26.074	280.884	26.929	278.442	14.063
87.2	21.289	1207.031	19.824	1207.031	20.801	1216.797	24.426	177.393	24.182	180.322	26.074	280.273	26.868	280.273	14.551
87.3	21.289	1207.031	19.092	1207.031	20.801	1216.797	24.548	179.590	24.182	181.055	26.135	282.105	26.929	278.442	14.673
87.4	21.289	1207.031	20.557	1207.031	21.045	1211.914	24.609	179.590	24.304	179.590	26.196	280.884	26.685	279.663	14.673
87.5	21.533	1207.031	19.336	1202.148	20.801	1211.914	24.426	178.857	23.816	180.322	26.196	282.715	26.929	279.663	14.673
87.6	21.289	1202.148	20.313	1207.031	20.801	1211.914	24.548	181.055	24.121	181.055	26.318	280.884	26.990	278.442	14.551
87.7	21.289	1207.031	19.824	1202.148	20.557	1211.914	24.670	178.857	24.121	179.590	26.196	282.105	27.051	277.832	14.673
87.8	21.289	1207.031	19.824	1207.031	21.045	1211.914	24.487	178.857	24.121	178.125	26.135	279.663	27.051	278.442	14.185
87.9	21.289	1207.031	20.801	1211.914	20.557	1216.797	24.548	179.590	24.121	180.322	26.135	281.494	26.990	278.442	14.551
88.0	21.045	1211.914	20.068	1211.914	20.801	1207.031	24.487	178.125	24.182	179.590	25.830	280.884	27.051	277.832	14.795
88.1	21.289	1207.031	19.824	1211.914	20.557	1211.914	24.548	179.590	24.121	179.590	26.074	281.494	27.051	277.222	14.429
88.2	21.289	1207.031	19.824	1207.031	20.557	1211.914	24.365	179.590	24.182	180.322	26.074	281.494	26.929	278.442	14.673
88.3	21.289	1207.031	19.824	1211.914	21.289	1211.914	24.487	178.857	24.243	182.520	26.196	282.715	26.929	280.273	14.429
88.4	21.533	1207.031	19.824	1207.031	19.336	1216.797	24.487	180.322	23.938	180.322	26.379	282.105	26.868	279.053	14.673
88.5	21.289	1207.031	20.313	1211.914	21.045	1216.797	24.365	182.520	24.060	181.055	26.135	283.936	26.685	282.105	14.185
88.6	21.533	1211.914	19.824	1216.797	21.289	1216.797	24.304	178.857	24.060	180.322	26.257	281.494	26.624	280.884	14.551
88.7	21.289	1211.914	19.580	1211.914	19.824	1221.680	24.365	180.322	23.999	179.590	26.196	282.105	26.685	279.053	14.551
88.8	21.289	1207.031	20.313	1211.914	20.801	1216.797	24.426	178.857	23.877	179.590	26.257	280.273	26.624	277.832	14.551
88.9	21.289	1207.031	20.068	1207.031	20.557	1221.680	24.304	178.125	24.060	180.322	26.135	282.105	26.990	279.663	14.551
89.0	21.289	1211.914	18.848	1211.914	21.289	1216.797	24.243	179.590	23.938	181.055	26.074	279.053	26.807	279.663	14.185
89.1	21.289	1211.914	20.557	1211.914	20.801	1211.914	24.304	178.857	23.877	180.322	26.440	282.715	26.685	279.053	14.673
89.2	23.242	1216.797	19.580	1211.914	20.557	1216.797	24.243	181.055	23.999	180.322	26.013	282.105	26.929	278.442	14.185
89.3	21.289	1207.031	20.068	1216.797	20.801	1216.797	24.243	178.125	23.816	181.787	26.074	283.325	26.929	279.053	14.551
89.4	21.045	1207.031	19.824	1216.797	20.557	1216.797	24.243	178.857	23.877	180.322	26.135	282.105	26.807	279.663	14.551
89.5	21.289	1211.914	20.068	1211.914	21.045	1216.797	24.304	179.590	23.938	179.590	26.196	284.546	26.746	279.663	14.429
89.6	21.533	1211.914	20.557	1216.797	20.557	1216.797	24.304	179.590	23.938	180.322	26.135	282.105	26.685	279.663	14.551
89.7	21.045	1211.914	20.313	1216.797	20.557	1216.797	24.365	180.322	23.633	181.055	26.196	282.105	26.868	280.273	14.307
89.8	20.068	1211.914	19.580	1211.914	20.557	1211.914	24.426	180.322	23.999	180.322	26.135	280.884	26.929	279.663	14.551
89.9	21.533	1207.031	19.580	1216.797	20.557	1216.797	24.365	178.857	23.999	181.055	26.318	282.105	27.112	278.442	14.551
90.0	21.045	1207.031	19.824	1207.031	20.801	1216.797	24.487	180.322	23.877	181.055	25.952	280.884	26.990	279.663	14.185
90.1	20.557	1216.797	18.604	1211.914	20.801	1216.797	24.487	178.857	23.877	180.322	25.952	282.715	26.929	280.273	14.551
90.2	21.777	1207.031	19.580	1216.797	20.801	1216.797	24.976	181.055	23.938	179.590	25.952	283.325	26.929	279.053	14.307
90.3	21.045	1216.797	20.313	1216.797	20.801	1216.797	24.426	181.055	23.938	180.322	26.013	282.715	27.051	279.053	14.429
90.4	20.557	1211.914	19.580	1216.797	21.045	1221.680	24.365	180.322	23.938	181.055	26.074	283.936	27.051	279.663	14.307
90.5	21.289	1216.797	20.068	1216.797	20.557	1221.680	24.487	181.787	23.999	180.322	26.074	284.546	27.112	280.273	14.307
90.6	21.045	1211.914	20.068	1216.797	20.801	1221.680	24.426	181.055	24.365	181.055	26.074	282.715	27.173	280.273	14.673
90.7	20.557	1216.797	19.092	1216.797	21.045	1221.680	24.548	179.590	24.060	181.787	26.135	282.105	27.051	280.273	14.429
90.8	21.289	1221.680	20.557	1216.797	20.068	1226.563	24.670	180.322	24.121	181.055	26.196	282.105	27.173	281.494	14.429
90.9	21.289	1216.797	20.068	1216.797	22.021	1221.680	24.548	178.125	24.060	185.449	26.257	282.105	27.234	280.884	14.307
91.0	21.289	1216.797	19.580	1221.680	20.557	1226.563	24.182	180.322	23.999	181.787	26.135	282.105	27.051	280.884	14.429
91.1	21.289	1216.797	19.824	1221.680	20.313	1226.563	24.426	181.055	23.938	181.055	26.257	287.598	27.112	280.273	14.429
91.2	21.289	1216.797	19.824	1226.563	21.533	1221.680	24.670	180.322	23.999	179.590	26.379	283.936	26.990	280.884	14.307
91.3	21.045	1216.797	20.068	1216.797	20.801	1226.563	24.426	181.787	23.938	181.055	26.318	283.325	26.990	280.273	14.551
91.4	21.289	1216.797	20.068	1221.680	20.801	1226.563	24.365	180.322	23.938	180.322	26.257	283.936	27.051	278.442	14.429
91.5	21.289	1216.797	19.824	1221.680	20.313	1226.563	24.304	179.590	24.243	180.322	26.440	283.325	27.112	279.663	14.429
91.6	21.045	1211.914	19.824	1221.680	20.801	1231.445	24.548	181.055	23.938	181.055	26.135	283.325	26.990	280.884	14.307
91.7	21.289	1221.680	20.068	1221.680	20.801	1226.563	24.487	178.125	23.999	181.055	26.135	282.105	27.112	279.663	14.307
91.8	21.289	1216.797	19.580	1221.680	20.801	1231.445	24.426	181.055	23.999	180.322	25.952	283.936	27.051	280.884	14.307
91.9	21.289	1221.680	19.336	1216.797	21.045	1236.328	24.365	181.055	23.938	181.787	26.135	282.105	27.051	280.884	14.307
92.0	21.045	1226.563	20.068	1226.563	20.313	1231.445	24.487	181.055	23.877	181.787	26.196	283.325	26.929	280.884	14.307
92.1	21.289	1221.680	19.580	1221.680	20.801	1226.563	24.548	182.520	23.999	181.055	26.074	281.494	26.990	280.884	14.795
92.2	21.045	1216.797	19.824	1221.680	21.045	1231.445	24.426	180.322	23.999	181.055	26.074	284.546	27.051	281.494	14.307
92.3	21.045	1226.563	19.824	1221.680	20.557	1226.563	24.426	179.590	23.938	181.787	26.135	282.105	27.051	282.105	14.551
92.4	21.289	1216.797	19.336	1226.563	20.801	1231.445	24.487	181.055	24.121	182.520	26.074	285.156	26.929	280.884	14.307
92.5	21.045	1221.680	20.313	1221.680	20.801	1226.563	24.548	180.322	23.877	181.055	26.135	283.325	27.173	278.442	14.429
92.6	21.045	1226.563	20.068	1221.680	20.557	1231.445	24.426	178.857	23.938	182.520	25.952	283.936	26.807	280.884	14.429
92.7	20.801	1216.797	19.824	1221.680	20.557	1226.563	24.304	181.055	24.060	181.787	25.952	283.325	26.868	281.494	14.307
92.8	21.045	1221.680	19.824	1221.680	21.045	1226.563	24.548	181.055	24.182	181.787	26.013	283.936	26.807	280.273	14.795
92.9	21.045	1216.797	19.824	1216.797	20.557	1231.445	24.426	182.520	23.816	180.322	25.708	283.936	26.746	281.494	14.307
93.0	20.068	1211.914	19.580	1231.445	21.045	1231.445	24.182	181.055	23.999	181.787	26.074	285.156	26.990	281.494	14.307
93.1	20.801	1221.680	20.068	1221.680	20.068	1226.563	24.365	181.787	23.938	182.520	26.074	283.936	26.990	281.494	14.307
93.2	21.289	1216.797	20.068	1226.563	20.313	1231.445	24.609	180.322	23.877	181.787	26.013	285.156	26.868	280.884	14.307
93.3	21.045	1216.797	19.580	1221.680	21.289	1226.563	24.487	180.322	23.938	181.787	26.074	283.936	27.112	282.715	14.551
93.4	20.801	1221.680	19.824	1226.563	19.580	1231.445	24.243	182.520	23.816	182.520	25.891	285.156	26.807	283.325	14.185
93.5	21.533	1221.680	19.824	1231.445	20.801	1226.563	24.243	181.787	23.816	181.787	25.952	283.325	26.746	281.494	14.917

93.8	21.289	1221.680	19.580	1221.680	20.557	1226.563	24.304	181.055	23.816	180.322	25.952	285.156	26.685	277.832	14.307
93.9	21.777	1216.797	19.824	1221.680	20.557	1231.445	24.304	181.055	23.755	181.055	26.074	283.936	26.746	281.494	14.185
94.0	20.801	1221.680	19.824	1221.680	21.045	1226.563	24.426	181.055	23.877	182.520	26.501	285.767	26.501	281.494	14.673
94.1	21.289	1216.797	19.092	1226.563	20.557	1226.563	24.548	181.055	23.938	182.520	26.135	282.105	26.563	282.715	14.063
94.2	21.777	1216.797	20.068	1221.680	20.801	1226.563	24.609	181.787	23.999	181.055	26.135	284.546	26.685	282.105	14.795
94.3	21.045	1221.680	20.068	1226.563	20.801	1221.680	24.487	181.055	23.999	182.520	26.196	283.936	26.746	281.494	14.429
94.4	21.289	1221.680	20.068	1221.680	20.557	1226.563	24.487	179.590	23.999	182.520	26.074	285.156	26.746	282.105	14.185
94.5	21.777	1211.914	19.824	1221.680	20.801	1221.680	24.426	181.055	23.999	181.787	26.074	284.546	26.746	283.325	14.429
94.6	21.045	1221.680	19.824	1216.797	20.313	1221.680	24.487	177.393	23.816	180.322	26.196	284.546	26.685	281.494	14.185
94.7	21.045	1216.797	19.824	1216.797	20.557	1221.680	24.426	180.322	23.999	181.055	26.196	283.325	26.563	281.494	14.551
94.8	21.289	1216.797	20.068	1216.797	20.801	1221.680	24.426	181.055	23.755	182.520	26.440	283.936	26.563	281.494	14.307
94.9	21.045	1211.914	20.068	1221.680	20.801	1221.680	24.426	181.787	23.877	180.322	26.135	282.715	26.685	279.663	14.429
95.0	21.289	1211.914	19.580	1216.797	20.557	1226.563	24.426	181.787	23.938	181.055	26.196	283.325	26.746	279.663	14.795
95.1	21.045	1211.914	19.824	1216.797	20.801	1221.680	24.548	181.055	23.999	181.787	26.379	281.494	26.685	280.273	14.185
95.2	21.045	1211.914	20.801	1216.797	20.801	1226.563	24.670	179.590	23.999	180.322	26.440	283.325	26.807	280.273	14.429
95.3	21.045	1211.914	19.336	1216.797	19.580	1221.680	24.548	181.055	23.938	179.590	26.501	282.715	26.807	280.273	14.307
95.4	21.289	1216.797	20.068	1211.914	20.801	1216.797	24.426	179.590	23.938	181.787	26.379	283.325	26.807	279.663	14.307
95.5	21.289	1211.914	19.824	1216.797	20.313	1216.797	24.548	181.787	23.877	179.590	26.318	283.325	26.685	280.273	14.429
95.6	21.045	1207.031	19.824	1211.914	21.533	1221.680	24.548	180.322	23.877	180.322	26.318	285.156	26.746	282.105	14.185
95.7	21.289	1216.797	19.824	1211.914	20.801	1216.797	24.487	180.322	23.938	181.055	26.196	282.715	26.685	280.273	14.307
95.8	21.045	1211.914	19.336	1211.914	20.313	1216.797	24.487	181.787	23.877	181.787	26.318	282.715	26.746	279.053	14.307
95.9	21.533	1211.914	19.824	1211.914	21.777	1216.797	24.548	181.055	23.694	180.322	26.318	282.715	26.685	279.663	14.429
96.0	21.289	1211.914	19.824	1211.914	20.313	1216.797	24.548	178.857	23.877	181.055	26.257	280.884	26.807	279.663	14.307
96.1	21.045	1211.914	19.824	1211.914	20.801	1216.797	24.426	180.322	23.999	181.055	26.257	281.494	26.807	278.442	14.307
96.2	21.289	1211.914	19.580	1211.914	21.289	1216.797	24.426	177.393	23.938	181.055	26.074	283.325	27.051	280.273	14.429
96.3	21.045	1211.914	21.289	1211.914	20.313	1216.797	24.487	180.322	23.877	179.590	26.013	282.715	26.990	279.663	14.185
96.4	21.045	1211.914	20.068	1211.914	20.801	1216.797	24.426	180.322	23.938	180.322	26.318	282.105	26.807	279.053	14.063
96.5	21.289	1207.031	19.580	1207.031	20.313	1211.914	24.487	179.590	23.999	181.055	25.952	283.936	26.807	279.663	14.307
96.6	21.289	1211.914	20.068	1211.914	20.801	1216.797	24.487	180.322	23.999	180.322	26.013	282.715	26.990	280.273	14.307
96.7	21.045	1207.031	19.580	1211.914	20.557	1211.914	24.487	179.590	23.999	180.322	25.952	283.325	26.807	280.884	14.429
96.8	22.754	1207.031	20.068	1207.031	20.801	1211.914	24.426	178.857	24.243	181.787	26.013	282.105	26.807	279.663	14.307
96.9	21.289	1202.148	20.557	1202.148	21.045	1211.914	24.426	180.322	23.938	180.322	26.135	281.494	26.685	277.832	14.185
97.0	21.045	1202.148	19.580	1207.031	20.557	1211.914	24.304	178.125	24.060	180.322	25.952	280.273	26.807	279.663	14.307
97.1	21.045	1207.031	20.068	1207.031	20.801	1211.914	24.365	178.857	24.060	181.055	26.013	280.884	26.868	279.053	13.452
97.2	21.289	1202.148	19.824	1211.914	20.801	1211.914	24.365	179.590	23.877	179.590	26.074	279.053	26.868	277.222	14.307
97.3	20.801	1207.031	19.580	1207.031	20.557	1211.914	24.365	179.590	23.877	180.322	26.013	281.494	26.746	277.832	14.307
97.4	19.824	1207.031	19.824	1207.031	20.801	1211.914	24.304	180.322	23.877	180.322	26.135	280.884	26.868	278.442	14.185
97.5	21.289	1197.266	19.580	1202.148	20.801	1211.914	24.365	179.590	23.938	181.055	26.074	282.105	26.807	277.222	14.307
97.6	21.045	1202.148	19.580	1202.148	20.801	1216.797	24.243	178.857	23.999	179.590	26.013	280.273	26.868	277.832	14.063
97.7	20.557	1207.031	19.824	1207.031	20.557	1211.914	24.182	179.590	24.304	178.857	26.074	282.105	27.112	279.053	14.429
97.8	21.289	1202.148	19.824	1211.914	22.021	1211.914	24.121	179.590	24.060	179.590	25.708	280.273	26.990	280.884	13.940
97.9	21.045	1207.031	19.824	1207.031	20.313	1216.797	24.121	180.322	24.243	179.590	26.074	281.494	27.051	278.442	14.185
98.0	20.557	1207.031	20.313	1202.148	21.045	1216.797	24.304	179.590	24.243	179.590	26.196	279.053	26.990	278.442	14.185
98.1	21.533	1197.266	20.313	1202.148	19.336	1211.914	24.731	178.857	24.060	179.590	26.135	282.105	27.051	279.053	14.185
98.2	21.289	1202.148	19.580	1207.031	20.801	1211.914	24.243	179.590	23.938	181.055	26.074	279.053	26.929	279.053	14.307
98.3	21.045	1202.148	20.313	1211.914	21.045	1216.797	24.182	178.857	23.938	179.590	25.952	281.494	26.746	277.832	14.063
98.4	21.289	1202.148	19.580	1211.914	19.580	1216.797	24.182	178.857	23.877	186.182	25.891	280.884	26.746	277.832	14.307
98.5	21.045	1197.266	19.824	1207.031	20.801	1216.797	23.999	179.590	23.877	180.322	25.952	282.715	26.868	278.442	13.940
98.6	21.289	1207.031	20.313	1211.914	20.557	1211.914	24.182	178.857	23.999	179.590	26.135	280.884	26.868	277.222	14.185
98.7	21.289	1202.148	19.336	1207.031	20.557	1211.914	24.426	181.055	23.877	179.590	26.013	283.325	26.807	276.611	14.185
98.8	21.289	1207.031	19.824	1207.031	20.801	1211.914	24.182	179.590	23.938	180.322	26.013	280.884	26.868	278.442	14.063
98.9	21.045	1202.148	19.580	1207.031	20.313	1207.031	23.816	178.125	23.938	179.590	25.952	281.494	26.807	280.273	14.185
99.0	21.289	1207.031	19.580	1211.914	20.801	1211.914	24.121	179.590	24.304	179.590	26.013	279.663	26.929	277.832	13.818
99.1	21.289	1202.148	19.824	1207.031	20.557	1207.031	24.426	177.393	23.816	180.322	25.952	281.494	26.990	283.325	14.307
99.2	21.045	1202.148	19.824	1207.031	20.801	1211.914	24.365	179.590	23.694	180.322	25.952	280.273	26.807	279.053	13.696
99.3	21.045	1207.031	19.580	1207.031	20.557	1211.914	24.304	179.590	23.938	179.590	25.952	281.494	26.929	279.053	14.063
99.4	21.289	1202.148	19.580	1211.914	20.313	1211.914	24.182	179.590	23.877	178.857	25.952	281.494	26.868	277.832	14.185
99.5	21.045	1207.031	20.068	1211.914	20.801	1211.914	24.365	180.322	23.877	179.590	26.135	282.105	26.807	278.442	14.063
99.6	20.801	1207.031	19.336	1211.914	20.313	1216.797	24.365	179.590	23.938	180.322	26.135	280.273	26.807	278.442	14.307
99.7	20.801	1202.148	19.092	1211.914	20.801	1216.797	24.304	178.125	23.816	179.590	26.318	282.715	26.807	278.442	14.063
99.8	20.801	1211.914	20.313	1207.031	20.557	1216.797	24.182	179.590	23.877	179.590	26.074	280.273	27.356	276.001	14.063
99.9	20.801	1207.031	19.580	1211.914	20.557	1216.797	24.365	176.660	23.572	180.322	26.074	280.884	26.868	278.442	14.185
100.0	21.045	1197.266	19.824	1207.031	20.557	1216.797	24.426	179.590	23.938	179.590	26.196	280.273	26.929	279.663	13.940
100.1	21.045	1211.914	19.824	1211.914	20.801	1216.797	24.365	179.590	23.755	180.322	26.196	281.494	26.929	278.442	14.063
100.2	21.289	1207.031	19.580	1207.031	20.313	1211.914	24.243	179.590	23.877	180.322	26.318	279.663	26.685	280.273	14.063

100.5	21.045	1207.031	19.580	1216.797	20.068	1216.797	24.304	178.125	23.877	180.322	26.257	282.105	26.685	277.832	14.063
100.6	19.824	1207.031	19.336	1216.797	21.533	1211.914	24.304	180.322	23.877	180.322	26.074	283.325	26.868	279.053	14.307
100.7	20.801	1207.031	19.824	1216.797	20.313	1216.797	24.487	178.125	23.877	179.590	26.135	282.715	26.929	279.053	13.818
100.8	21.289	1207.031	19.336	1211.914	20.557	1211.914	24.426	179.590	23.755	181.055	26.379	279.663	26.746	278.442	14.185
100.9	21.289	1207.031	19.824	1216.797	21.533	1216.797	24.121	179.590	23.999	181.055	26.135	280.884	26.868	277.832	13.940
101.0	21.045	1211.914	19.580	1211.914	20.557	1216.797	24.365	180.322	23.816	181.055	26.196	282.105	26.746	279.663	14.063
101.1	21.289	1207.031	19.336	1211.914	20.801	1216.797	24.609	181.055	23.877	179.590	26.135	281.494	26.746	279.053	14.063
101.2	22.021	1207.031	19.824	1211.914	20.557	1216.797	24.365	184.717	23.938	181.055	25.952	282.105	26.868	279.053	13.940
101.3	20.801	1211.914	19.580	1216.797	20.313	1216.797	24.182	178.857	23.877	180.322	26.318	282.105	26.501	279.053	14.063
101.4	21.289	1207.031	18.359	1216.797	20.801	1216.797	24.304	180.322	23.938	180.322	26.074	282.105	26.501	280.884	14.063
101.5	21.777	1207.031	20.313	1216.797	20.068	1216.797	24.487	178.857	23.877	180.322	26.074	281.494	26.868	279.663	14.185
101.6	20.801	1216.797	19.336	1216.797	20.557	1216.797	24.426	179.590	23.816	181.055	26.074	282.715	26.868	279.053	13.940
101.7	21.045	1207.031	19.580	1216.797	20.313	1216.797	24.304	180.322	23.755	181.055	26.196	282.105	26.868	279.053	13.940
101.8	21.777	1211.914	19.580	1216.797	20.557	1221.680	24.243	179.590	23.877	180.322	26.196	283.936	26.990	279.663	14.063
101.9	21.045	1216.797	19.580	1216.797	20.557	1226.563	24.304	180.322	23.694	181.055	25.708	281.494	26.929	277.832	14.063
102.0	20.801	1216.797	19.824	1221.680	20.313	1216.797	24.304	179.590	23.755	180.322	26.013	282.715	26.868	279.053	13.940
102.1	21.289	1211.914	19.824	1216.797	20.801	1221.680	24.243	179.590	23.511	180.322	26.135	280.884	26.868	279.053	14.551
102.2	21.045	1211.914	19.580	1221.680	20.801	1221.680	24.182	180.322	23.755	181.787	26.135	282.105	26.746	280.884	14.063
102.3	21.045	1211.914	19.580	1216.797	20.557	1221.680	24.243	179.590	23.877	181.787	26.135	281.494	26.807	279.053	14.063
102.4	20.801	1216.797	19.824	1216.797	20.313	1216.797	24.243	180.322	23.816	180.322	26.196	283.325	26.807	280.273	13.940
102.5	20.801	1211.914	19.092	1216.797	20.801	1221.680	24.182	181.055	23.816	180.322	26.074	281.494	26.868	280.273	14.063
102.6	21.045	1211.914	19.092	1216.797	20.313	1216.797	24.243	179.590	23.938	181.787	26.013	283.936	26.746	280.273	14.063
102.7	21.289	1207.031	19.824	1216.797	20.801	1221.680	24.243	180.322	23.816	181.055	25.952	282.715	26.685	279.053	13.940
102.8	21.289	1216.797	19.336	1216.797	20.313	1226.563	24.304	179.590	23.877	179.590	26.074	283.936	26.563	280.273	14.429
102.9	21.045	1216.797	19.824	1216.797	20.313	1221.680	24.243	180.322	23.816	181.055	26.135	282.105	26.685	280.884	14.185
103.0	21.289	1216.797	19.824	1216.797	21.045	1221.680	24.304	181.055	23.999	177.393	26.074	283.325	26.685	279.663	14.063
103.1	21.289	1221.680	19.092	1216.797	19.580	1221.680	24.365	180.322	23.755	181.055	26.013	281.494	26.746	277.222	13.940
103.2	21.045	1211.914	20.068	1216.797	20.801	1221.680	24.304	182.520	23.816	180.322	26.013	282.715	26.807	279.053	14.063
103.3	21.045	1211.914	19.580	1216.797	20.557	1221.680	24.243	180.322	23.755	181.787	26.074	280.273	26.807	279.053	14.185
103.4	21.045	1211.914	19.580	1216.797	19.580	1221.680	24.304	179.590	23.755	180.322	26.135	282.715	26.807	279.053	13.818
103.5	21.045	1216.797	19.580	1226.563	20.557	1216.797	24.365	180.322	23.633	183.252	26.135	282.105	26.929	280.273	14.429
103.6	21.045	1211.914	19.580	1216.797	20.313	1216.797	24.243	178.857	23.755	181.787	25.891	283.325	26.807	280.884	13.940
103.7	21.045	1221.680	19.336	1216.797	21.045	1221.680	24.304	181.055	23.877	180.322	25.952	282.715	26.807	280.273	13.940
103.8	21.289	1216.797	19.824	1216.797	20.313	1221.680	24.365	180.322	23.755	180.322	25.830	285.767	26.746	280.273	14.063
103.9	21.045	1211.914	19.824	1221.680	20.313	1221.680	24.304	181.055	24.060	181.055	26.013	282.715	26.807	280.884	13.940
104.0	20.801	1216.797	19.336	1221.680	20.313	1226.563	24.304	181.055	23.816	181.787	26.013	283.325	26.685	280.884	14.307
104.1	21.289	1216.797	19.824	1221.680	20.313	1221.680	24.304	180.322	23.816	180.322	26.074	282.105	26.746	279.663	13.818
104.2	21.045	1216.797	19.824	1216.797	20.557	1226.563	24.304	178.857	23.816	181.055	26.013	283.325	26.440	277.832	14.307
104.3	21.045	1211.914	18.848	1221.680	20.313	1226.563	24.243	181.787	23.755	181.055	25.830	281.494	26.379	280.884	13.940
104.4	20.801	1221.680	19.824	1216.797	20.313	1226.563	24.304	177.393	23.633	181.055	26.013	282.715	26.624	280.273	13.940
104.5	21.045	1216.797	19.336	1221.680	20.557	1226.563	24.304	180.322	23.694	179.590	26.013	282.715	26.563	279.663	14.063
104.6	20.557	1216.797	19.580	1221.680	20.557	1226.563	24.243	180.322	23.877	181.055	26.196	284.546	26.624	280.273	13.818
104.7	20.068	1216.797	19.580	1216.797	20.313	1226.563	24.121	180.322	23.816	179.590	26.013	283.325	26.685	282.105	14.185
104.8	21.289	1211.914	19.092	1221.680	20.801	1226.563	24.182	181.787	23.999	181.055	25.891	285.156	26.746	280.273	13.818
104.9	20.801	1211.914	19.580	1221.680	20.557	1221.680	24.182	181.055	23.999	181.055	26.013	283.936	26.685	281.494	14.185
105.0	20.313	1216.797	19.824	1221.680	19.580	1221.680	24.243	179.590	23.938	181.787	25.952	283.325	26.868	281.494	14.185
105.1	21.289	1216.797	19.580	1221.680	20.801	1221.680	24.182	180.322	23.816	181.787	25.891	283.936	26.807	282.715	13.940
105.2	21.045	1216.797	19.580	1221.680	20.068	1221.680	24.060	179.590	24.243	181.787	25.830	282.715	26.868	280.884	14.185
105.3	20.557	1221.680	19.824	1221.680	21.045	1226.563	24.060	178.125	23.877	181.787	25.708	282.105	26.990	280.273	13.818
105.4	21.289	1221.680	19.580	1226.563	20.313	1226.563	24.121	181.055	23.755	181.055	25.891	283.936	26.929	280.884	14.185
105.5	21.045	1216.797	19.336	1226.563	19.824	1226.563	24.182	181.055	23.877	180.322	25.952	285.156	26.868	277.222	14.185
105.6	20.557	1221.680	20.068	1221.680	21.533	1226.563	24.182	180.322	23.877	181.787	26.013	284.546	26.868	280.273	13.940
105.7	21.289	1221.680	19.336	1226.563	20.313	1231.445	24.121	180.322	23.877	182.520	26.318	285.767	26.624	280.884	14.551
105.8	21.045	1216.797	19.336	1226.563	20.557	1226.563	24.121	180.322	23.877	181.055	26.013	285.767	26.501	282.715	13.818
105.9	21.289	1226.563	20.313	1226.563	21.045	1226.563	24.243	181.055	23.694	181.787	25.952	281.494	26.501	281.494	14.063
106.0	20.801	1226.563	19.092	1221.680	20.313	1226.563	24.548	179.590	23.694	182.520	26.074	283.936	26.563	280.884	14.063
106.1	21.045	1216.797	19.824	1221.680	20.801	1226.563	24.121	182.520	23.899	181.787	25.891	283.936	26.501	282.715	13.940
106.2	20.801	1216.797	19.580	1226.563	20.068	1226.563	24.121	181.055	23.755	181.787	26.074	283.325	26.563	280.884	14.307
106.3	21.045	1221.680	19.580	1226.563	20.313	1231.445	24.243	181.055	23.633	181.055	25.952	283.936	26.563	280.884	13.818
106.4	20.801	1226.563	19.580	1226.563	20.313	1231.445	23.999	181.055	23.816	182.520	25.830	283.936	26.929	282.105	13.940
106.5	20.801	1221.680	19.336	1226.563	20.557	1231.445	24.243	181.787	23.755	181.055	25.830	285.156	26.685	281.494	13.940
106.6	21.045	1231.445	19.336	1231.445	20.557	1236.328	24.426	180.322	23.816	181.787	26.013	284.546	26.624	281.494	13.940
106.7	20.801	1226.563	19.580	1226.563	20.313	1236.328	24.304	182.520	23.877	181.787	25.952	286.377	26.685	280.884	14.063
106.8	20.801	1221.680	19.824	1231.445	20.557	1236.328	23.816	181.055	23.755	181.055	26.013	284.546	26.563	281.494	13.940
106.9	20.801	1226.563	19.580	1231.445	20.313	1236.328	24.182	181.787	23.755	181					

107.2	20.801	1221.680	19.336	1231.445	20.557	1231.445	24.060	181.787	23.694	181.055	25.952	282.715	26.685	283.325	14.063
107.3	20.801	1226.563	19.580	1231.445	20.068	1236.328	24.060	179.590	23.755	182.520	26.013	285.156	26.563	283.936	13.940
107.4	20.801	1221.680	19.336	1231.445	20.313	1231.445	24.243	181.787	23.816	183.252	25.952	285.767	26.624	282.715	13.940
107.5	21.045	1221.680	19.336	1231.445	21.289	1236.328	24.243	182.520	23.938	181.787	25.769	286.377	26.746	282.105	13.818
107.6	20.801	1226.563	20.068	1226.563	20.068	1241.211	24.182	182.520	23.877	186.182	25.769	285.767	26.807	282.715	13.940
107.7	21.045	1226.563	19.092	1226.563	20.801	1231.445	24.182	184.717	23.877	183.252	25.891	286.377	26.746	282.105	13.940
107.8	21.045	1226.563	19.824	1231.445	19.092	1236.328	24.243	182.520	23.877	182.520	26.013	285.767	26.685	281.494	13.452
107.9	19.824	1226.563	19.336	1231.445	20.068	1236.328	24.365	180.322	23.694	181.787	26.074	287.598	26.868	282.105	13.940
108.0	20.801	1226.563	19.580	1236.328	20.557	1236.328	24.304	182.520	23.816	182.520	26.074	285.156	26.868	282.715	13.818
108.1	21.045	1226.563	19.336	1231.445	19.336	1241.211	24.304	180.322	23.877	181.787	25.952	285.767	26.685	282.105	13.940
108.2	21.289	1236.328	19.580	1236.328	20.801	1236.328	24.304	182.520	23.755	182.520	25.891	284.546	26.685	282.715	13.940
108.3	20.801	1226.563	19.824	1231.445	20.313	1241.211	24.365	181.787	23.633	183.252	25.891	285.767	26.746	283.936	13.696
108.4	21.289	1226.563	19.336	1236.328	20.313	1241.211	24.243	182.520	23.938	183.252	25.891	283.325	26.624	284.546	13.940
108.5	21.777	1236.328	19.824	1236.328	20.313	1236.328	24.243	183.984	23.999	181.787	25.952	286.987	26.807	282.715	13.452
108.6	20.313	1226.563	19.580	1226.563	20.068	1231.445	24.365	182.520	23.877	182.520	25.891	285.156	26.563	282.105	13.940
108.7	21.045	1221.680	18.848	1236.328	20.801	1231.445	24.304	182.520	23.877	183.252	25.464	286.987	26.563	283.325	13.940
108.8	21.533	1236.328	20.068	1236.328	20.313	1231.445	23.999	182.520	23.816	182.520	26.074	285.156	26.807	282.715	13.818
108.9	20.801	1236.328	19.580	1236.328	20.313	1236.328	24.243	179.590	23.694	182.520	25.952	286.987	26.746	281.494	14.063
109.0	21.045	1231.445	19.824	1236.328	20.068	1236.328	24.548	183.252	23.755	182.520	26.074	285.156	26.563	282.715	13.574
109.1	21.533	1231.445	19.580	1231.445	20.068	1241.211	24.365	183.252	23.694	183.984	26.013	285.767	26.624	283.325	14.063
109.2	20.557	1231.445	19.580	1236.328	20.801	1241.211	24.121	182.520	23.938	182.520	25.830	285.156	26.746	282.105	13.452
109.3	20.801	1231.445	20.068	1236.328	20.068	1241.211	24.243	182.520	23.755	183.984	26.013	286.377	26.624	283.325	13.818
109.4	20.801	1236.328	19.580	1231.445	20.068	1241.211	24.304	186.914	23.816	183.252	26.013	285.767	26.746	283.325	13.818
109.5	20.557	1231.445	19.580	1236.328	20.313	1241.211	24.365	181.055	23.755	182.520	26.074	286.377	26.685	286.377	13.818
109.6	20.557	1231.445	19.336	1236.328	20.557	1236.328	24.243	183.252	23.877	181.787	25.952	286.987	26.746	283.325	13.940
109.7	20.801	1231.445	19.580	1236.328	20.313	1241.211	24.243	180.322	23.755	183.252	25.952	285.767	26.746	283.936	13.574
109.8	20.801	1226.563	19.092	1236.328	20.801	1236.328	24.304	182.520	23.755	183.252	26.440	286.987	26.807	283.936	13.940
109.9	20.801	1231.445	19.580	1231.445	19.824	1246.094	24.365	182.520	23.755	182.520	26.074	288.208	26.807	283.936	13.696
110.0	21.045	1231.445	19.580	1231.445	20.313	1241.211	24.304	182.520	23.633	183.252	25.891	286.987	26.746	282.715	13.818
110.1	20.801	1231.445	19.336	1231.445	20.557	1236.328	24.182	182.520	23.877	183.252	25.830	285.767	26.563	283.325	13.818
110.2	20.801	1226.563	19.580	1231.445	19.580	1231.445	24.121	181.787	23.633	182.520	25.708	286.377	26.501	283.325	13.818
110.3	20.801	1226.563	19.580	1226.563	21.289	1236.328	24.182	181.055	23.633	182.520	25.647	285.156	26.440	282.715	13.818
110.4	20.801	1226.563	18.604	1231.445	20.557	1236.328	24.304	183.252	23.572	183.252	25.830	285.156	26.440	282.105	13.574
110.5	20.801	1226.563	20.068	1231.445	20.068	1236.328	24.243	181.787	23.694	182.520	25.830	291.260	26.563	283.325	13.696
110.6	21.045	1221.680	19.336	1231.445	21.045	1236.328	24.304	182.520	23.511	181.787	26.013	286.377	26.563	284.546	13.940
110.7	20.801	1226.563	19.824	1231.445	20.068	1236.328	24.304	182.520	23.633	182.520	25.891	285.767	26.685	283.325	13.086
110.8	21.045	1226.563	19.580	1236.328	20.557	1241.211	24.243	181.055	23.694	183.252	25.708	286.987	26.685	283.325	13.818
110.9	20.801	1231.445	19.580	1231.445	20.068	1231.445	24.304	182.520	23.633	182.520	25.952	286.377	26.563	284.546	13.696
111.0	20.801	1226.563	20.068	1236.328	20.068	1236.328	24.365	182.520	23.816	181.787	26.074	286.377	26.624	283.325	13.818
111.1	21.045	1221.680	19.824	1226.563	20.313	1241.211	24.304	182.520	23.755	183.252	26.074	285.767	26.563	282.715	13.818
111.2	20.801	1231.445	19.580	1231.445	20.068	1231.445	24.182	181.787	23.694	182.520	26.074	286.987	26.563	282.715	13.696
111.3	20.801	1226.563	19.580	1231.445	20.313	1236.328	24.304	181.787	23.694	182.520	26.074	284.546	26.685	283.325	13.940
111.4	22.510	1226.563	19.580	1231.445	20.313	1231.445	24.426	184.717	23.999	183.252	26.135	286.377	26.624	282.715	13.940
111.5	21.045	1226.563	19.580	1231.445	20.801	1236.328	24.304	182.520	23.755	183.984	26.196	283.325	26.379	280.273	13.696
111.6	20.557	1226.563	18.848	1226.563	20.313	1231.445	24.365	181.787	23.633	182.520	26.196	286.377	26.440	283.325	13.696
111.7	20.313	1221.680	19.824	1231.445	20.068	1241.211	24.243	182.520	23.633	183.252	26.318	284.546	26.685	284.546	13.696
111.8	21.289	1231.445	19.336	1231.445	20.313	1241.211	24.243	180.322	23.694	183.252	26.257	286.377	26.624	283.325	13.696
111.9	20.557	1231.445	19.580	1226.563	20.557	1236.328	24.243	181.787	23.694	182.520	26.257	286.377	26.685	288.818	13.818
112.0	19.824	1231.445	19.336	1236.328	20.068	1236.328	24.304	182.520	23.755	181.787	26.074	286.987	26.624	284.546	13.696
112.1	21.289	1226.563	18.848	1231.445	20.313	1236.328	24.243	182.520	23.755	183.252	26.074	285.156	26.746	282.715	14.063
112.2	20.557	1226.563	19.824	1231.445	21.045	1236.328	24.182	183.984	23.816	179.590	26.074	286.377	26.501	282.715	13.818
112.3	20.313	1231.445	19.580	1231.445	20.068	1236.328	24.243	182.520	23.328	181.787	26.013	284.546	26.685	283.325	13.696
112.4	21.289	1231.445	19.580	1231.445	20.801	1236.328	24.304	181.055	23.755	182.520	25.891	286.377	26.624	283.936	13.696
112.5	20.557	1226.563	19.580	1231.445	19.580	1236.328	24.182	182.520	23.572	183.252	25.830	284.546	26.440	283.325	13.696
112.6	20.313	1226.563	19.580	1231.445	20.068	1236.328	24.121	178.857	23.633	182.520	25.891	286.377	26.624	281.494	13.696
112.7	20.801	1231.445	19.580	1226.563	20.801	1236.328	24.121	181.787	23.694	184.717	25.891	285.156	26.685	282.715	13.574
112.8	20.801	1231.445	19.580	1231.445	19.580	1236.328	24.243	182.520	23.816	183.252	25.647	287.598	26.685	283.936	14.185
112.9	21.045	1231.445	19.336	1231.445	20.313	1236.328	24.243	182.520	23.694	182.520	25.891	285.156	26.746	282.715	13.696
113.0	20.801	1221.680	19.336	1231.445	20.313	1236.328	24.304	182.520	23.694	182.520	25.830	289.429	26.563	283.325	13.696
113.1	20.801	1226.563	19.580	1231.445	19.824	1236.328	24.304	181.787	23.755	183.252	25.891	285.767	26.563	283.325	13.696
113.2	20.801	1221.680	20.557	1231.445	20.313	1236.328	24.365	180.322	23.572	183.252	26.013	285.767	26.563	283.325	13.696
113.3	20.801	1231.445	19.092	1226.563	20.068	1236.328	24.304	182.520	23.755	181.787	25.891	283.936	26.563	282.105	13.696
113.4	21.045	1226.563	19.580	1226.563	20.557	1236.328	24.304	180.322	23.694	182.520	25.830	285.156	26.440	283.325	13.574
113.5	20.557	1226.563	19.336	1226.563	20.313	1236.328	24.243	181.055	23.633	183.252	25.830	283.325	26.685	283.325	14.307
113.6	20.801	1231.445	19.580	1231.445	20.313	1236.328	24.304	181.787	23.694	181.787					

113.9	20.801	1226.563	19.092	1231.445	20.557	1231.445	24.731	181.787	23.511	181.055	25.830	286.377	26.685	283.325	13.696
114.0	20.557	1231.445	19.580	1231.445	20.068	1236.328	24.243	181.055	23.633	181.787	25.830	287.598	26.746	282.715	13.818
114.1	20.557	1226.563	19.824	1236.328	20.313	1231.445	24.121	181.787	23.389	181.787	25.769	285.767	26.624	283.325	13.452
114.2	20.557	1221.680	19.580	1231.445	20.068	1231.445	24.121	181.055	23.511	183.252	25.891	284.546	26.685	283.936	14.185
114.3	20.557	1226.563	19.824	1231.445	20.313	1231.445	23.938	183.252	23.694	182.520	25.952	284.546	26.624	283.936	13.696
114.4	20.801	1226.563	20.068	1231.445	20.313	1236.328	24.182	181.787	23.572	182.520	25.891	284.546	26.807	282.105	13.696
114.5	20.801	1226.563	19.336	1236.328	20.557	1226.563	24.365	181.055	23.450	182.520	25.769	282.715	26.990	283.936	13.696
114.6	20.557	1226.563	19.336	1226.563	20.068	1231.445	24.121	181.787	23.816	181.787	25.647	285.767	26.868	283.325	13.696
114.7	21.045	1221.680	19.092	1231.445	19.092	1231.445	23.694	183.252	23.755	181.787	25.525	285.767	26.807	282.105	13.940
114.8	20.801	1226.563	19.336	1231.445	20.557	1231.445	24.060	181.055	23.755	182.520	25.891	286.377	26.868	281.494	13.452
114.9	19.824	1231.445	20.068	1231.445	19.824	1241.211	24.243	183.252	23.816	183.252	25.647	286.987	26.807	282.715	14.063
115.0	20.801	1221.680	18.848	1231.445	21.289	1231.445	24.121	181.055	23.755	181.787	25.708	287.598	26.685	283.325	13.696
115.1	21.045	1231.445	19.336	1231.445	20.557	1236.328	24.060	183.252	23.755	182.520	25.708	282.105	26.746	282.105	13.574
115.2	21.045	1226.563	19.336	1226.563	19.824	1236.328	23.999	181.787	23.755	183.252	25.525	285.156	26.929	282.715	13.818
115.3	20.557	1226.563	19.092	1226.563	21.289	1236.328	24.243	181.787	23.755	182.520	25.708	285.767	26.807	283.936	13.574
115.4	20.801	1231.445	19.336	1231.445	20.068	1231.445	24.304	182.520	23.938	181.787	25.769	284.546	26.868	282.715	14.063
115.5	21.777	1226.563	19.824	1231.445	20.557	1236.328	24.243	179.590	23.694	183.252	25.769	285.767	26.746	283.325	13.574
115.6	20.313	1231.445	19.336	1231.445	20.313	1236.328	24.060	181.055	23.816	183.984	25.708	284.546	26.807	283.325	13.818
115.7	21.045	1226.563	19.336	1231.445	20.313	1241.211	24.121	183.252	23.694	182.520	25.647	286.377	26.746	283.936	14.429
115.8	21.533	1231.445	19.824	1226.563	20.557	1241.211	24.121	182.520	23.694	181.787	25.708	285.767	26.807	282.715	13.574
115.9	20.557	1226.563	19.336	1231.445	20.068	1236.328	24.182	183.984	23.694	183.252	25.769	286.987	26.746	280.884	13.818
116.0	20.557	1226.563	18.359	1236.328	20.313	1236.328	23.999	181.787	23.694	182.520	25.708	285.156	26.624	282.105	13.574
116.1	21.045	1231.445	19.824	1241.211	20.068	1241.211	24.060	181.787	23.694	181.787	25.647	287.598	26.746	282.715	13.818
116.2	20.801	1231.445	19.336	1241.211	20.557	1236.328	24.060	181.787	23.572	182.520	25.708	284.546	26.624	282.105	13.940
116.3	20.801	1231.445	19.580	1231.445	20.313	1236.328	23.999	180.322	23.816	182.520	25.830	285.767	26.563	283.325	13.574
116.4	20.313	1231.445	19.580	1231.445	20.068	1231.445	23.877	181.787	23.572	181.787	25.830	283.936	26.624	283.936	13.696
116.5	20.557	1231.445	19.580	1231.445	20.313	1236.328	23.999	181.787	23.816	182.520	25.830	285.767	26.624	283.325	13.452
116.6	20.557	1231.445	19.824	1236.328	20.313	1236.328	23.938	181.055	23.633	183.252	26.135	286.987	26.501	283.325	13.818
116.7	20.801	1231.445	19.824	1231.445	20.068	1236.328	23.755	183.984	23.572	182.520	25.891	286.987	26.501	283.325	13.696
116.8	20.801	1231.445	19.336	1226.563	20.068	1236.328	23.816	180.322	23.511	189.111	25.830	285.767	26.501	283.936	13.696
116.9	20.801	1231.445	19.580	1236.328	20.068	1236.328	23.999	181.055	23.572	183.252	25.586	286.987	26.379	282.715	13.818
117.0	20.801	1236.328	19.580	1231.445	20.068	1241.211	23.816	181.787	23.511	182.520	25.647	285.156	26.501	280.273	13.574
117.1	20.557	1231.445	18.115	1231.445	20.557	1241.211	23.755	179.590	23.511	181.787	25.708	286.987	26.501	283.325	13.452
117.2	20.801	1226.563	19.336	1241.211	20.068	1236.328	23.938	182.520	23.694	183.252	25.586	285.767	26.501	283.325	13.574
117.3	21.045	1231.445	19.824	1236.328	19.824	1236.328	24.121	181.787	23.450	182.520	25.525	286.987	26.501	282.715	13.696
117.4	20.801	1231.445	19.092	1236.328	20.801	1236.328	23.938	181.787	23.511	182.520	25.464	285.156	26.440	283.325	13.818
117.5	20.801	1236.328	19.824	1231.445	19.092	1236.328	23.999	182.520	23.572	183.252	25.647	287.598	26.563	284.546	13.696
117.6	20.801	1231.445	19.092	1236.328	20.313	1241.211	23.938	185.449	23.938	183.252	25.769	283.325	26.501	283.325	13.696
117.7	20.557	1231.445	18.848	1236.328	20.313	1241.211	23.999	180.322	23.572	183.252	25.525	286.987	26.624	283.936	13.696
117.8	20.801	1221.680	19.824	1231.445	19.580	1241.211	23.938	182.520	23.572	182.520	25.769	285.767	26.563	284.546	12.964
117.9	20.801	1236.328	19.336	1236.328	20.313	1241.211	23.938	181.055	23.511	183.252	25.830	286.987	26.501	285.156	13.696
118.0	20.801	1231.445	19.336	1236.328	20.068	1241.211	23.999	182.520	23.511	183.252	25.708	285.156	26.624	282.715	13.696
118.1	21.045	1231.445	19.580	1236.328	20.557	1241.211	23.999	182.520	23.633	182.520	25.708	288.208	26.929	282.105	13.696
118.2	20.557	1231.445	19.092	1236.328	20.068	1236.328	23.999	182.520	23.633	183.252	25.769	285.767	26.868	283.325	13.696
118.3	20.313	1231.445	19.580	1236.328	20.068	1241.211	23.999	182.520	23.694	184.717	25.708	286.377	26.868	279.663	13.574
118.4	20.801	1231.445	19.580	1241.211	20.068	1241.211	23.999	181.787	23.694	182.520	25.769	285.767	26.929	282.715	13.696
118.5	20.801	1231.445	19.580	1236.328	20.068	1241.211	23.999	181.787	23.267	183.252	25.708	286.987	26.807	282.715	13.086
118.6	20.557	1231.445	19.336	1231.445	20.068	1241.211	23.938	183.252	23.755	183.984	25.952	285.767	26.868	283.325	13.696
118.7	19.336	1226.563	19.580	1231.445	19.824	1241.211	23.999	181.787	23.694	183.252	26.135	286.377	26.746	283.325	13.696
118.8	20.801	1231.445	19.580	1231.445	20.313	1241.211	24.060	182.520	23.633	181.787	25.952	286.987	26.318	282.715	13.574
118.9	20.313	1231.445	19.092	1231.445	20.313	1236.328	24.121	182.520	23.694	183.252	25.830	286.377	26.624	283.936	13.696
119.0	20.068	1236.328	19.580	1241.211	20.068	1231.445	23.999	182.520	23.633	182.520	25.708	286.377	26.563	285.767	13.452
119.1	21.045	1226.563	19.092	1231.445	20.313	1241.211	23.938	183.252	23.450	182.520	25.708	287.598	26.501	282.715	13.818
119.2	20.557	1226.563	19.580	1236.328	20.313	1236.328	24.060	182.520	23.389	183.252	25.769	286.377	26.563	283.325	13.086
119.3	19.824	1231.445	19.336	1231.445	20.068	1241.211	24.060	181.055	23.450	183.252	25.708	286.987	26.501	283.325	13.574
119.4	20.801	1231.445	18.604	1236.328	18.848	1236.328	23.999	183.984	23.145	182.520	25.708	285.767	26.379	283.325	13.574
119.5	20.557	1231.445	19.824	1236.328	20.557	1236.328	24.060	182.520	23.450	183.252	25.769	285.767	26.135	283.325	13.574
119.6	20.801	1231.445	19.580	1236.328	19.580	1241.211	24.060	185.449	23.389	183.252	25.464	285.767	26.563	283.936	13.696
119.7	20.801	1231.445	19.580	1231.445	20.801	1236.328	24.182	181.787	23.511	182.520	25.830	290.039	26.685	283.936	13.330
119.8	20.557	1231.445	19.092	1231.445	20.313	1236.328	24.243	181.055	23.694	182.520	25.769	286.377	26.624	283.936	13.818
119.9	20.801	1231.445	20.801	1236.328	19.580	1236.328	24.304	182.520	23.816	183.984	25.891	286.377	26.685	282.715	13.208
120.0	20.801	1226.563	19.336	1236.328	21.045	1236.328	24.365	181.055	23.755	183.984	25.952	286.987	26.685	284.546	13.574
120.1	20.801	1236.328	19.336	1231.445	20.313	1236.328	24.243	181.787	23.633	182.520	25.891	286.987	26.501	285.767	13.696
120.2	20.801	1231.445	19.824	1236.328	20.313	1236.328	24.243	181.787	23.694	182.520	25.891	287.598	26.624	283.936	13.452
120.3	20.801	1231.445	19.580	1226.563	20.313	1241.211	24.243	181.787	23.511	183.98					

120.6	20.801	1226.563	18.848	1236.328	20.068	1241.211	24.121	180.322	23.572	183.252	25.952	286.377	26.563	282.105	13.452
120.7	20.801	1226.563	19.580	1231.445	20.313	1241.211	24.121	181.787	23.328	182.520	26.379	284.546	26.563	283.325	13.452
120.8	20.313	1226.563	19.580	1236.328	19.824	1236.328	24.060	179.590	23.694	183.252	25.891	286.377	26.807	283.325	13.574
120.9	20.801	1231.445	19.824	1236.328	20.068	1236.328	24.121	182.520	23.633	182.520	25.891	285.767	26.685	282.105	13.452
121.0	20.801	1226.563	19.336	1231.445	20.313	1236.328	24.121	183.252	23.694	183.252	25.769	286.987	26.807	282.715	13.452
121.1	20.801	1226.563	19.824	1231.445	20.068	1236.328	24.060	181.787	23.572	182.520	25.769	286.377	26.746	283.325	13.452
121.2	20.801	1226.563	19.092	1226.563	20.313	1236.328	24.182	183.252	23.511	182.520	25.708	286.987	26.440	283.936	13.330
121.3	20.557	1236.328	19.336	1236.328	20.068	1231.445	24.121	182.520	23.511	182.520	25.769	285.767	26.563	282.715	13.696
121.4	20.801	1221.680	19.580	1231.445	20.068	1231.445	23.999	181.787	23.572	181.787	25.830	285.156	26.624	282.105	12.842
121.5	20.801	1226.563	19.336	1231.445	20.068	1231.445	23.938	182.520	23.633	181.787	26.196	283.325	26.624	283.325	13.452
121.6	19.336	1231.445	18.848	1226.563	20.068	1236.328	24.121	180.322	23.877	183.252	25.830	285.767	26.624	282.715	13.452
121.7	20.557	1226.563	19.824	1231.445	19.824	1236.328	24.182	180.322	23.694	183.252	25.891	282.715	26.685	281.494	13.452
121.8	21.045	1226.563	19.092	1231.445	20.557	1231.445	24.670	182.520	23.816	181.787	25.952	285.767	26.868	282.105	13.452
121.9	20.801	1226.563	19.824	1226.563	20.068	1236.328	24.121	182.520	23.755	182.520	25.952	285.156	26.868	283.325	13.452
122.0	20.557	1221.680	19.580	1221.680	19.824	1236.328	24.060	182.520	23.633	183.252	26.074	287.598	26.685	282.105	13.574
122.1	21.045	1226.563	19.092	1226.563	20.557	1231.445	24.243	181.055	23.694	182.520	25.952	285.156	26.624	282.105	13.452
122.2	21.533	1226.563	20.068	1226.563	18.848	1231.445	24.060	181.055	23.694	181.787	25.891	288.818	26.746	282.715	13.574
122.3	20.313	1221.680	19.580	1231.445	20.313	1231.445	24.121	183.252	23.572	182.520	25.830	285.156	26.624	284.546	13.574
122.4	20.801	1226.563	19.336	1226.563	20.557	1236.328	24.304	181.055	23.633	183.984	25.891	285.156	26.624	282.105	13.452
122.5	21.533	1226.563	19.336	1226.563	19.580	1231.445	24.182	182.520	23.816	181.787	26.013	283.936	26.868	281.494	13.452
122.6	20.557	1226.563	19.336	1221.680	20.068	1226.563	23.694	181.787	23.511	182.520	25.952	285.156	26.685	282.715	13.452
122.7	20.801	1221.680	18.115	1226.563	19.824	1231.445	24.060	182.520	23.694	181.787	25.891	283.936	26.746	282.715	13.330
122.8	21.289	1221.680	19.092	1226.563	20.801	1226.563	24.487	181.787	23.572	181.787	26.074	285.156	26.685	281.494	13.818
122.9	20.801	1226.563	19.336	1231.445	20.068	1226.563	24.243	182.520	23.572	181.055	25.891	285.156	26.685	282.715	13.452
123.0	20.557	1221.680	19.092	1226.563	20.068	1231.445	24.243	181.055	23.511	182.520	25.952	286.377	26.746	283.325	13.330
123.1	20.801	1226.563	19.824	1221.680	20.068	1236.328	24.182	181.787	23.694	178.857	26.196	285.767	26.685	282.105	13.452
123.2	20.801	1221.680	19.824	1226.563	20.313	1231.445	24.365	181.055	23.694	181.055	26.013	286.987	26.624	281.494	13.452
123.3	20.801	1226.563	18.848	1226.563	20.313	1236.328	24.304	183.252	23.694	182.520	25.952	285.156	26.624	283.325	13.452
123.4	20.801	1221.680	20.068	1231.445	19.824	1236.328	24.182	181.055	23.877	183.252	25.830	284.546	26.685	285.156	13.452
123.5	20.557	1221.680	19.580	1226.563	20.068	1236.328	24.060	181.055	23.633	182.520	25.830	283.936	26.624	282.105	13.818
123.6	20.557	1226.563	19.580	1226.563	20.313	1231.445	24.121	181.055	23.633	183.252	25.891	283.936	26.501	282.105	13.452
123.7	20.557	1221.680	19.336	1226.563	20.068	1231.445	24.121	179.590	23.633	182.520	25.708	282.715	26.563	283.936	13.452
123.8	20.557	1221.680	19.336	1221.680	20.068	1236.328	23.877	181.787	24.121	182.520	25.708	287.598	26.807	282.105	13.330
123.9	20.801	1221.680	19.336	1231.445	20.313	1226.563	23.877	181.787	23.755	181.787	25.830	285.156	26.807	281.494	13.452
124.0	20.801	1226.563	19.336	1221.680	20.313	1231.445	23.999	181.055	23.694	181.787	25.891	285.767	26.929	282.105	13.452
124.1	20.557	1216.797	19.336	1221.680	19.336	1226.563	23.938	183.252	23.755	183.252	26.013	286.377	26.868	281.494	13.330
124.2	20.557	1221.680	19.580	1226.563	20.557	1236.328	23.877	181.787	23.755	181.787	25.891	285.767	26.868	281.494	13.940
124.3	20.801	1221.680	19.580	1226.563	19.580	1236.328	23.938	181.055	23.877	182.520	25.769	284.546	26.929	280.884	13.330
124.4	20.557	1221.680	19.580	1226.563	20.801	1231.445	24.060	181.787	23.816	181.787	25.952	283.936	26.807	282.715	13.574
124.5	20.801	1221.680	18.604	1226.563	20.313	1231.445	24.060	180.322	23.633	181.787	25.464	285.767	26.563	283.936	13.330
124.6	20.557	1226.563	19.580	1231.445	19.580	1236.328	23.755	181.787	23.694	181.055	25.891	284.546	26.685	282.105	13.330
124.7	20.557	1231.445	19.092	1226.563	21.045	1236.328	23.877	182.520	23.328	182.520	25.830	285.767	26.379	282.105	13.696
124.8	22.266	1221.680	19.336	1231.445	20.068	1236.328	24.182	181.787	23.633	181.787	25.830	283.936	26.440	283.936	13.208
124.9	20.801	1236.328	19.336	1231.445	20.068	1236.328	24.121	183.984	23.572	181.787	25.769	286.377	26.501	282.105	13.818
125.0	20.313	1221.680	18.604	1226.563	20.801	1236.328	23.877	181.055	23.633	183.252	25.769	284.546	26.501	281.494	13.330
125.1	20.557	1221.680	19.092	1226.563	19.824	1236.328	24.121	181.055	23.633	183.252	25.830	286.377	26.440	282.715	13.330
125.2	20.801	1231.445	19.580	1231.445	20.313	1236.328	24.182	182.520	23.633	182.520	25.952	285.156	26.624	282.715	13.574
125.3	20.557	1226.563	19.336	1231.445	19.824	1236.328	24.121	180.322	23.694	182.520	26.074	285.156	26.624	282.715	13.330
125.4	19.824	1226.563	19.092	1221.680	20.313	1236.328	24.060	181.787	23.633	182.520	25.891	283.325	26.929	281.494	13.696
125.5	20.801	1231.445	20.801	1231.445	19.824	1236.328	24.060	182.520	23.694	183.252	25.891	285.767	26.990	282.105	13.208
125.6	20.557	1231.445	19.580	1241.211	20.068	1231.445	24.121	181.787	23.389	181.787	25.891	283.936	26.807	284.546	13.940
125.7	19.824	1231.445	18.848	1236.328	20.068	1236.328	23.999	183.252	23.694	182.520	25.769	286.377	26.807	282.715	13.330
125.8	20.801	1226.563	19.580	1236.328	20.068	1236.328	23.938	186.914	23.511	183.252	25.708	284.546	26.746	288.818	13.452
125.9	20.557	1231.445	19.092	1226.563	20.313	1236.328	23.999	180.322	23.694	182.520	25.647	286.987	26.868	282.715	13.574
126.0	19.824	1226.563	19.336	1236.328	20.068	1241.211	24.060	182.520	23.633	183.252	25.708	285.767	26.868	283.936	13.208
126.1	20.801	1226.563	19.824	1231.445	20.068	1241.211	24.121	181.055	23.755	183.252	25.586	286.987	26.379	282.715	13.696
126.2	20.557	1236.328	18.848	1231.445	20.313	1236.328	24.060	183.252	23.755	182.520	25.830	285.156	26.685	283.325	13.330
126.3	20.801	1231.445	19.580	1231.445	20.313	1236.328	24.121	182.520	23.694	182.520	25.891	288.208	26.807	283.325	13.574
126.4	20.557	1231.445	19.336	1231.445	20.068	1241.211	24.060	181.787	23.633	183.984	26.074	285.156	26.685	282.105	13.940
126.5	20.557	1231.445	19.092	1236.328	20.313	1236.328	24.060	182.520	23.572	181.787	25.830	286.377	26.685	281.494	13.330
126.6	20.313	1231.445	19.336	1231.445	19.824	1241.211	24.060	181.787	23.572	182.520	25.708	285.156	26.746	282.715	13.574
126.7	20.557	1231.445	19.580	1231.445	19.824	1236.328	24.121	181.055	23.450	183.252	25.769	286.377	26.624	283.936	13.208
126.8	20.557	1231.445	19.092	1241.211	20.557	1236.328	24.121	183.984	23.572	183.984	25.769	284.546	26.257	283.325	13.452
126.9	20.557	1231.445	19.336	1231.445	18.604	1241.211	24.121	181.787	23.287	183.252	25.830	286.987	26.563	285.156	13.574
127.0	20.801	1231.445	19.580	1231.445	20.068	1236.328	24.060	182.520	23.633	183.252					

5-JAN-1997	40:00.7 O3A0009	726
5-JAN-1997	40:01.7 O3A0009	733.5
5-JAN-1997	40:02.7 O3A0009	744.1
5-JAN-1997	40:03.7 O3A0009	742.5
5-JAN-1997	40:04.7 O3A0009	748.8
5-JAN-1997	40:05.7 O3A0009	731.4
5-JAN-1997	40:06.7 O3A0009	733
5-JAN-1997	40:07.7 O3A0009	745.7
5-JAN-1997	40:08.7 O3A0009	730.9
5-JAN-1997	40:09.7 O3A0009	751.4
5-JAN-1997	40:10.7 O3A0009	727.6
5-JAN-1997	40:11.7 O3A0009	741
5-JAN-1997	40:12.7 O3A0009	739.2
5-JAN-1997	40:13.7 O3A0009	738.8
5-JAN-1997	40:14.7 O3A0009	735.1
5-JAN-1997	40:16.7 O3A0009	736.7
5-JAN-1997	40:17.7 O3A0009	733
5-JAN-1997	40:18.7 O3A0009	737.2
5-JAN-1997	40:19.7 O3A0009	724.9
5-JAN-1997	40:20.7 O3A0009	743.1
5-JAN-1997	40:21.7 O3A0009	757.1
5-JAN-1997	40:22.7 O3A0009	744.6
5-JAN-1997	40:23.7 O3A0009	754.5
5-JAN-1997	40:24.7 O3A0009	740.4
5-JAN-1997	40:25.7 O3A0009	732.5
5-JAN-1997	40:26.7 O3A0009	754
5-JAN-1997	40:27.7 O3A0009	749.3
5-JAN-1997	40:28.7 O3A0009	734.1
5-JAN-1997	40:29.7 O3A0009	728.2
5-JAN-1997	40:30.7 O3A0009	747.3
5-JAN-1997	40:31.7 O3A0009	742
5-JAN-1997	40:33.7 O3A0009	736.6
5-JAN-1997	40:34.7 O3A0009	758.7
5-JAN-1997	40:35.7 O3A0009	752.5
5-JAN-1997	40:36.7 O3A0009	730.3
5-JAN-1997	40:37.7 O3A0009	743.6
5-JAN-1997	40:38.7 O3A0009	754.5
5-JAN-1997	40:39.7 O3A0009	770.9
5-JAN-1997	40:40.7 O3A0009	745.7
5-JAN-1997	40:41.7 O3A0009	746.2
5-JAN-1997	40:42.7 O3A0009	744.6
5-JAN-1997	40:43.7 O3A0009	730.9
5-JAN-1997	40:44.7 O3A0009	743.6
5-JAN-1997	40:45.7 O3A0009	729.2
5-JAN-1997	40:46.7 O3A0009	751.4
5-JAN-1997	40:47.7 O3A0009	734.1
5-JAN-1997	40:48.7 O3A0009	739.4
5-JAN-1997	40:49.7 O3A0009	745.2
5-JAN-1997	40:51.7 O3A0009	747.3
5-JAN-1997	40:52.7 O3A0009	739.9
5-JAN-1997	40:53.7 O3A0009	745.7
5-JAN-1997	40:54.7 O3A0009	720.1
5-JAN-1997	40:55.7 O3A0009	739.9
5-JAN-1997	40:56.7 O3A0009	746.2
5-JAN-1997	40:57.7 O3A0009	746.7
5-JAN-1997	40:58.7 O3A0009	746.2
5-JAN-1997	40:59.7 O3A0009	741.5

B53A Pump Flow

741.3825 ← 1 minute average

5-JAN-1997	40:00.7 O3A0010	684.4
5-JAN-1997	40:01.7 O3A0010	670
5-JAN-1997	40:02.7 O3A0010	673.5
5-JAN-1997	40:03.7 O3A0010	685
5-JAN-1997	40:04.7 O3A0010	675.2
5-JAN-1997	40:05.7 O3A0010	698
5-JAN-1997	40:06.7 O3A0010	675.8
5-JAN-1997	40:07.7 O3A0010	672.9
5-JAN-1997	40:08.7 O3A0010	674.7
5-JAN-1997	40:09.7 O3A0010	672.9
5-JAN-1997	40:10.7 O3A0010	671.2
5-JAN-1997	40:11.7 O3A0010	663
5-JAN-1997	40:12.7 O3A0010	669.9
5-JAN-1997	40:13.7 O3A0010	657.1
5-JAN-1997	40:14.7 O3A0010	675.2
5-JAN-1997	40:15.7 O3A0010	671.2
5-JAN-1997	40:16.7 O3A0010	661.2
5-JAN-1997	40:17.7 O3A0010	665.9
5-JAN-1997	40:18.7 O3A0010	684.4
5-JAN-1997	40:19.7 O3A0010	668.3
5-JAN-1997	40:20.7 O3A0010	675.8
5-JAN-1997	40:21.7 O3A0010	669.4
5-JAN-1997	40:22.7 O3A0010	671.2
5-JAN-1997	40:23.7 O3A0010	667.7
5-JAN-1997	40:25.7 O3A0010	675.2
5-JAN-1997	40:26.7 O3A0010	670
5-JAN-1997	40:27.7 O3A0010	676.4
5-JAN-1997	40:28.7 O3A0010	674.1
5-JAN-1997	40:29.7 O3A0010	693.5
5-JAN-1997	40:30.7 O3A0010	676.4
5-JAN-1997	40:31.7 O3A0010	669.4
5-JAN-1997	40:32.7 O3A0010	672.3
5-JAN-1997	40:33.7 O3A0010	664.6
5-JAN-1997	40:34.7 O3A0010	681
5-JAN-1997	40:35.7 O3A0010	680.4
5-JAN-1997	40:36.7 O3A0010	676.4
5-JAN-1997	40:37.7 O3A0010	665.9
5-JAN-1997	40:38.7 O3A0010	672.9
5-JAN-1997	40:40.7 O3A0010	664.7
5-JAN-1997	40:41.7 O3A0010	675.8
5-JAN-1997	40:42.7 O3A0010	677
5-JAN-1997	40:43.7 O3A0010	681.6
5-JAN-1997	40:44.7 O3A0010	663
5-JAN-1997	40:45.7 O3A0010	679.9
5-JAN-1997	40:46.7 O3A0010	678.7
5-JAN-1997	40:47.7 O3A0010	685.6
5-JAN-1997	40:48.7 O3A0010	675.8
5-JAN-1997	40:49.7 O3A0010	673.5
5-JAN-1997	40:50.7 O3A0010	677
5-JAN-1997	40:51.7 O3A0010	683.3
5-JAN-1997	40:52.7 O3A0010	685
5-JAN-1997	40:53.7 O3A0010	675.2
5-JAN-1997	40:54.7 O3A0010	683.3
5-JAN-1997	40:55.7 O3A0010	674.1
5-JAN-1997	40:56.7 O3A0010	677
5-JAN-1997	40:57.7 O3A0010	686.7
5-JAN-1997	40:58.7 O3A0010	687.3
5-JAN-1997	40:59.7 O3A0010	686.7

BS 3B Pump Flowrate

675.4069

← 1 minute ave.

5-JAN-1997	40:00.0 O3A1310	2874.5
5-JAN-1997	40:00.1 O3A1310	2858.5
5-JAN-1997	40:00.2 O3A1310	2847.4
5-JAN-1997	40:00.3 O3A1310	2849.9
5-JAN-1997	40:00.4 O3A1310	2843.7
5-JAN-1997	40:00.5 O3A1310	2816.4
5-JAN-1997	40:00.6 O3A1310	2791.3
5-JAN-1997	40:00.7 O3A1310	2823.9
5-JAN-1997	40:00.8 O3A1310	2832.6
5-JAN-1997	40:00.9 O3A1310	2840
5-JAN-1997	40:01.0 O3A1310	2852.4
5-JAN-1997	40:01.1 O3A1310	2843.7
5-JAN-1997	40:01.2 O3A1310	2841.3
5-JAN-1997	40:01.3 O3A1310	2842.5
5-JAN-1997	40:01.4 O3A1310	2857.3
5-JAN-1997	40:01.5 O3A1310	2878.2
5-JAN-1997	40:01.6 O3A1310	2892.8
5-JAN-1997	40:01.7 O3A1310	2848.7
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5-JAN-1997	40:36.5 O3A1310	2858.5
5-JAN-1997	40:36.6 O3A1310	2851.1
5-JAN-1997	40:36.7 O3A1310	2832.6
5-JAN-1997	40:36.8 O3A1310	2873.3
5-JAN-1997	40:36.9 O3A1310	2912.2
5-JAN-1997	40:37.0 O3A1310	2895.2
5-JAN-1997	40:37.1 O3A1310	2912.2
5-JAN-1997	40:37.2 O3A1310	2886.7
5-JAN-1997	40:37.3 O3A1310	2859.8
5-JAN-1997	40:37.4 O3A1310	2880.6
5-JAN-1997	40:37.5 O3A1310	2898.9
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5-JAN-1997	40:37.8 O3A1310	2942.3
5-JAN-1997	40:37.9 O3A1310	2886.7
5-JAN-1997	40:38.0 O3A1310	2885.5
5-JAN-1997	40:38.1 O3A1310	2881.8
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5-JAN-1997	40:38.3 O3A1310	2870.5
5-JAN-1997	40:38.4 O3A1310	2877.8
5-JAN-1997	40:38.5 O3A1310	2883.9
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5-JAN-1997	40:38.7 O3A1310	2941.9
5-JAN-1997	40:38.8 O3A1310	2898.5
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5-JAN-1997	40:39.0 O3A1310	2872.9
5-JAN-1997	40:39.1 O3A1310	2860.6
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5-JAN-1997	40:39.3 O3A1310	2851.1
5-JAN-1997	40:39.4 O3A1310	2901.3
5-JAN-1997	40:39.5 O3A1310	2894
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5-JAN-1997	40:39.7 O3A1310	2912.2
5-JAN-1997	40:39.8 O3A1310	2908.6
5-JAN-1997	40:39.9 O3A1310	2875.7
5-JAN-1997	40:40.0 O3A1310	2862.2
5-JAN-1997	40:40.1 O3A1310	2887.9
5-JAN-1997	40:40.2 O3A1310	2894
5-JAN-1997	40:40.3 O3A1310	2843.7
5-JAN-1997	40:40.4 O3A1310	2847.4
5-JAN-1997	40:40.5 O3A1310	2857.3
5-JAN-1997	40:40.6 O3A1310	2915.8
5-JAN-1997	40:40.7 O3A1310	2848.7
5-JAN-1997	40:40.8 O3A1310	2808.9
5-JAN-1997	40:40.9 O3A1310	2807.6
5-JAN-1997	40:41.0 O3A1310	2851.1
5-JAN-1997	40:41.1 O3A1310	2858.5
5-JAN-1997	40:41.2 O3A1310	2907.4
5-JAN-1997	40:41.3 O3A1310	2931.5

5-JAN-1997	40:41.4 O3A1310	2925.5
5-JAN-1997	40:41.5 O3A1310	2897.7
5-JAN-1997	40:41.6 O3A1310	2881.8
5-JAN-1997	40:41.7 O3A1310	2889.2
5-JAN-1997	40:41.8 O3A1310	2886.7
5-JAN-1997	40:41.9 O3A1310	2902.5
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5-JAN-1997	40:42.1 O3A1310	2897.7
5-JAN-1997	40:42.2 O3A1310	2904.9
5-JAN-1997	40:42.3 O3A1310	2936.3
5-JAN-1997	40:42.4 O3A1310	2955.4
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5-JAN-1997	40:42.6 O3A1310	2904.9
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5-JAN-1997	40:42.8 O3A1310	2875.7
5-JAN-1997	40:42.9 O3A1310	2876.9
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5-JAN-1997	40:43.1 O3A1310	2876.9
5-JAN-1997	40:43.2 O3A1310	2885.5
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5-JAN-1997	40:43.4 O3A1310	2929.1
5-JAN-1997	40:43.5 O3A1310	2902.5
5-JAN-1997	40:43.6 O3A1310	2885.5
5-JAN-1997	40:43.7 O3A1310	2897.7
5-JAN-1997	40:43.8 O3A1310	2926.7
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5-JAN-1997	40:44.1 O3A1310	2872.1
5-JAN-1997	40:44.2 O3A1310	2874.5
5-JAN-1997	40:44.3 O3A1310	2870.8
5-JAN-1997	40:44.4 O3A1310	2885.5
5-JAN-1997	40:44.5 O3A1310	2879.4
5-JAN-1997	40:44.6 O3A1310	2869.6
5-JAN-1997	40:44.7 O3A1310	2868.4
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5-JAN-1997	40:45.3 O3A1310	2817.6
5-JAN-1997	40:45.4 O3A1310	2848.7
5-JAN-1997	40:45.5 O3A1310	2878.2
5-JAN-1997	40:45.6 O3A1310	2876.9
5-JAN-1997	40:45.7 O3A1310	2870.8
5-JAN-1997	40:45.8 O3A1310	2901.3
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5-JAN-1997	40:46.0 O3A1310	2884.3
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5-JAN-1997	40:46.2 O3A1310	2884.3
5-JAN-1997	40:46.3 O3A1310	2892.8
5-JAN-1997	40:46.4 O3A1310	2872.1
5-JAN-1997	40:46.5 O3A1310	2884.3
5-JAN-1997	40:46.6 O3A1310	2876.9
5-JAN-1997	40:46.7 O3A1310	2902.5
5-JAN-1997	40:46.8 O3A1310	2897.7
5-JAN-1997	40:46.9 O3A1310	2913.4
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5-JAN-1997	40:47.2 O3A1310	2939.9

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5-JAN-1997	40:47.6 O3A1310	2856.1
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5-JAN-1997	40:47.8 O3A1310	2867.1
5-JAN-1997	40:48.0 O3A1310	2883.1
5-JAN-1997	40:48.1 O3A1310	2874.5
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5-JAN-1997	40:48.3 O3A1310	2841.3
5-JAN-1997	40:48.4 O3A1310	2847.4
5-JAN-1997	40:48.5 O3A1310	2845
5-JAN-1997	40:48.6 O3A1310	2859.8
5-JAN-1997	40:48.8 O3A1310	2852.4
5-JAN-1997	40:48.9 O3A1310	2865.9
5-JAN-1997	40:49.0 O3A1310	2873.3
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5-JAN-1997	40:49.5 O3A1310	2856.1
5-JAN-1997	40:49.7 O3A1310	2854.8
5-JAN-1997	40:49.8 O3A1310	2843.7
5-JAN-1997	40:49.9 O3A1310	2847.4
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5-JAN-1997	40:50.3 O3A1310	2868.4
5-JAN-1997	40:50.4 O3A1310	2858.5
5-JAN-1997	40:50.5 O3A1310	2862.2
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5-JAN-1997	40:50.8 O3A1310	2841.3
5-JAN-1997	40:50.9 O3A1310	2867.1
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5-JAN-1997	40:51.1 O3A1310	2864.7
5-JAN-1997	40:51.2 O3A1310	2862.2
5-JAN-1997	40:51.3 O3A1310	2853.6
5-JAN-1997	40:51.4 O3A1310	2874.5
5-JAN-1997	40:51.5 O3A1310	2878.2
5-JAN-1997	40:51.6 O3A1310	2867.1
5-JAN-1997	40:51.8 O3A1310	2873.3
5-JAN-1997	40:51.9 O3A1310	2938.7
5-JAN-1997	40:52.0 O3A1310	2961.3
5-JAN-1997	40:52.1 O3A1310	2925.5
5-JAN-1997	40:52.2 O3A1310	2889.2
5-JAN-1997	40:52.3 O3A1310	2885.5
5-JAN-1997	40:52.4 O3A1310	2874.5
5-JAN-1997	40:52.5 O3A1310	2837.5
5-JAN-1997	40:52.6 O3A1310	2826.4
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5-JAN-1997	40:52.8 O3A1310	2926.7
5-JAN-1997	40:52.9 O3A1310	2931.5
5-JAN-1997	40:53.0 O3A1310	2918.2
5-JAN-1997	40:53.1 O3A1310	2913.4
5-JAN-1997	40:53.2 O3A1310	2895.2
5-JAN-1997	40:53.3 O3A1310	2890.4
5-JAN-1997	40:53.4 O3A1310	2887.9

5-JAN-1997	40:53.5 O3A1310	2897.7
5-JAN-1997	40:53.6 O3A1310	2896.5
5-JAN-1997	40:53.7 O3A1310	2875.7
5-JAN-1997	40:53.8 O3A1310	2863.5
5-JAN-1997	40:53.9 O3A1310	2884.3
5-JAN-1997	40:54.0 O3A1310	2878.2
5-JAN-1997	40:54.1 O3A1310	2912.2
5-JAN-1997	40:54.2 O3A1310	2906.2
5-JAN-1997	40:54.3 O3A1310	2901.3
5-JAN-1997	40:54.4 O3A1310	2907.4
5-JAN-1997	40:54.5 O3A1310	2884.3
5-JAN-1997	40:54.6 O3A1310	2862.2
5-JAN-1997	40:54.8 O3A1310	2875.7
5-JAN-1997	40:54.9 O3A1310	2874.5
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5-JAN-1997	40:55.2 O3A1310	2902.5
5-JAN-1997	40:55.3 O3A1310	2919.4
5-JAN-1997	40:55.4 O3A1310	2924.3
5-JAN-1997	40:55.5 O3A1310	2912.2
5-JAN-1997	40:55.6 O3A1310	2913.4
5-JAN-1997	40:55.7 O3A1310	2901.3
5-JAN-1997	40:55.8 O3A1310	2869.6
5-JAN-1997	40:55.9 O3A1310	2873.3
5-JAN-1997	40:56.0 O3A1310	2876.9
5-JAN-1997	40:56.1 O3A1310	2898.9
5-JAN-1997	40:56.2 O3A1310	2879.4
5-JAN-1997	40:56.3 O3A1310	2881.8
5-JAN-1997	40:56.4 O3A1310	2883.1
5-JAN-1997	40:56.5 O3A1310	2891.6
5-JAN-1997	40:56.6 O3A1310	2902.5
5-JAN-1997	40:56.7 O3A1310	2915.8
5-JAN-1997	40:56.8 O3A1310	2930.3
5-JAN-1997	40:56.9 O3A1310	2932.7
5-JAN-1997	40:57.0 O3A1310	2949.4
5-JAN-1997	40:57.1 O3A1310	2973.2
5-JAN-1997	40:57.2 O3A1310	2942.3
5-JAN-1997	40:57.3 O3A1310	2929.1
5-JAN-1997	40:57.4 O3A1310	2943.4
5-JAN-1997	40:57.5 O3A1310	2938.7
5-JAN-1997	40:57.6 O3A1310	2900.1
5-JAN-1997	40:57.7 O3A1310	2904.9
5-JAN-1997	40:57.9 O3A1310	2908.6
5-JAN-1997	40:58.0 O3A1310	2900.1
5-JAN-1997	40:58.1 O3A1310	2896.5
5-JAN-1997	40:58.3 O3A1310	2886.7
5-JAN-1997	40:58.4 O3A1310	2902.5
5-JAN-1997	40:58.5 O3A1310	2917
5-JAN-1997	40:58.6 O3A1310	2919.4
5-JAN-1997	40:58.7 O3A1310	2923.1
5-JAN-1997	40:58.8 O3A1310	2909.8
5-JAN-1997	40:58.9 O3A1310	2921.9
5-JAN-1997	40:59.0 O3A1310	2896.5
5-JAN-1997	40:59.1 O3A1310	2889.2
5-JAN-1997	40:59.2 O3A1310	2900.1
5-JAN-1997	40:59.3 O3A1310	2897.7
5-JAN-1997	40:59.4 O3A1310	2904.9
5-JAN-1997	40:59.5 O3A1310	2892.8

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5-JAN-1997 40:59.7 O3A1310
5-JAN-1997 40:59.8 O3A1310
5-JAN-1997 40:59.9 O3A1310

2887.9
2906.2
2912.2 2877.577

← 1 minute average

5-JAN-1997	40:00.0 O3A1311	2858.5
5-JAN-1997	40:00.1 O3A1311	2875.7
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5-JAN-1997	40:00.3 O3A1311	2884.3
5-JAN-1997	40:00.4 O3A1311	2895.2
5-JAN-1997	40:00.5 O3A1311	2869.6
5-JAN-1997	40:00.6 O3A1311	2880.6
5-JAN-1997	40:00.7 O3A1311	2908.6
5-JAN-1997	40:00.8 O3A1311	2932.7
5-JAN-1997	40:00.9 O3A1311	2915.8
5-JAN-1997	40:01.0 O3A1311	2886.7
5-JAN-1997	40:01.1 O3A1311	2918.2
5-JAN-1997	40:01.2 O3A1311	2920.6
5-JAN-1997	40:01.3 O3A1311	2907.4
5-JAN-1997	40:01.4 O3A1311	2895.2
5-JAN-1997	40:01.5 O3A1311	2889.2
5-JAN-1997	40:01.6 O3A1311	2902.5
5-JAN-1997	40:01.7 O3A1311	2894
5-JAN-1997	40:01.8 O3A1311	2890.4
5-JAN-1997	40:01.9 O3A1311	2883.1
5-JAN-1997	40:02.0 O3A1311	2902.5
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5-JAN-1997	40:02.2 O3A1311	2869.6
5-JAN-1997	40:02.3 O3A1311	2883.1
5-JAN-1997	40:02.4 O3A1311	2894
5-JAN-1997	40:02.5 O3A1311	2887.9
5-JAN-1997	40:02.6 O3A1311	2886.7
5-JAN-1997	40:02.7 O3A1311	2867.1
5-JAN-1997	40:02.8 O3A1311	2865.9
5-JAN-1997	40:02.9 O3A1311	2864.7
5-JAN-1997	40:03.0 O3A1311	2879.4
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5-JAN-1997	40:03.2 O3A1311	2911
5-JAN-1997	40:03.3 O3A1311	2933.9
5-JAN-1997	40:03.4 O3A1311	2912.2
5-JAN-1997	40:03.5 O3A1311	2908.6
5-JAN-1997	40:03.7 O3A1311	2880.6
5-JAN-1997	40:03.8 O3A1311	2876.9
5-JAN-1997	40:03.9 O3A1311	2901.3
5-JAN-1997	40:04.0 O3A1311	2911
5-JAN-1997	40:04.1 O3A1311	2909.8
5-JAN-1997	40:04.2 O3A1311	2915.8
5-JAN-1997	40:04.3 O3A1311	2902.5
5-JAN-1997	40:04.4 O3A1311	2885.5
5-JAN-1997	40:04.5 O3A1311	2894
5-JAN-1997	40:04.7 O3A1311	2885.5
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5-JAN-1997	40:04.9 O3A1311	2908.6
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5-JAN-1997	40:05.6 O3A1311	2895.2
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5-JAN-1997	40:05.8 O3A1311	2944.6
5-JAN-1997	40:05.9 O3A1311	2918.2
5-JAN-1997	40:06.0 O3A1311	2912.2
5-JAN-1997	40:06.1 O3A1311	2915.8

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5-JAN-1997	40:06.4 O3A1311	2897.7
5-JAN-1997	40:06.5 O3A1311	2906.2
5-JAN-1997	40:06.6 O3A1311	2897.7
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5-JAN-1997	40:06.8 O3A1311	2914.6
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5-JAN-1997	40:07.1 O3A1311	2925.5
5-JAN-1997	40:07.2 O3A1311	2900.1
5-JAN-1997	40:07.3 O3A1311	2903.7
5-JAN-1997	40:07.4 O3A1311	2915.8
5-JAN-1997	40:07.5 O3A1311	2933.9
5-JAN-1997	40:07.6 O3A1311	2917
5-JAN-1997	40:07.7 O3A1311	2874.5
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5-JAN-1997	40:07.9 O3A1311	2852.4
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5-JAN-1997	40:08.3 O3A1311	2920.3
5-JAN-1997	40:08.4 O3A1311	2894.9
5-JAN-1997	40:08.5 O3A1311	2870.5
5-JAN-1997	40:08.6 O3A1311	2868
5-JAN-1997	40:08.7 O3A1311	2875.3
5-JAN-1997	40:08.8 O3A1311	2880.2
5-JAN-1997	40:08.9 O3A1311	2911.8
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5-JAN-1997	40:09.1 O3A1311	2905.8
5-JAN-1997	40:09.2 O3A1311	2878.2
5-JAN-1997	40:09.3 O3A1311	2901.3
5-JAN-1997	40:09.4 O3A1311	2918.2
5-JAN-1997	40:09.5 O3A1311	2939.9
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5-JAN-1997	40:09.9 O3A1311	2880.6
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5-JAN-1997	40:10.2 O3A1311	2880.6
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5-JAN-1997	40:10.4 O3A1311	2904.9
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5-JAN-1997	40:10.6 O3A1311	2915.8
5-JAN-1997	40:10.7 O3A1311	2925.5
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5-JAN-1997	40:10.9 O3A1311	2955.4
5-JAN-1997	40:11.0 O3A1311	2939.9
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5-JAN-1997	40:11.2 O3A1311	2896.1
5-JAN-1997	40:11.3 O3A1311	2848.3
5-JAN-1997	40:11.4 O3A1311	2817.3
5-JAN-1997	40:11.5 O3A1311	2826
5-JAN-1997	40:11.6 O3A1311	2858.2
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2918.2
2931.5 2909.826

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5-JAN-1997	40:04.3 O3A1239	711.99
5-JAN-1997	40:04.4 O3A1239	714.61
5-JAN-1997	40:04.5 O3A1239	714.45
5-JAN-1997	40:04.6 O3A1239	713.84
5-JAN-1997	40:04.7 O3A1239	716.38
5-JAN-1997	40:04.9 O3A1239	713.99
5-JAN-1997	40:05.0 O3A1239	712.07
5-JAN-1997	40:05.1 O3A1239	712.22
5-JAN-1997	40:05.2 O3A1239	715.22
5-JAN-1997	40:05.3 O3A1239	714.3
5-JAN-1997	40:05.4 O3A1239	713.38
5-JAN-1997	40:05.5 O3A1239	714.3
5-JAN-1997	40:05.6 O3A1239	713.15
5-JAN-1997	40:05.7 O3A1239	710.75
5-JAN-1997	40:05.8 O3A1239	713.99

HPI 3B flow

5-JAN-1997	40:05.9 O3A1239	714.76
5-JAN-1997	40:06.0 O3A1239	717.07
5-JAN-1997	40:06.1 O3A1239	715.76
5-JAN-1997	40:06.2 O3A1239	713.61
5-JAN-1997	40:06.3 O3A1239	713.76
5-JAN-1997	40:06.4 O3A1239	709.9
5-JAN-1997	40:06.5 O3A1239	715.07
5-JAN-1997	40:06.6 O3A1239	714.45
5-JAN-1997	40:06.8 O3A1239	713.53
5-JAN-1997	40:06.9 O3A1239	712.61
5-JAN-1997	40:07.0 O3A1239	712.22
5-JAN-1997	40:07.1 O3A1239	711.68
5-JAN-1997	40:07.2 O3A1239	711.99
5-JAN-1997	40:07.3 O3A1239	711.14
5-JAN-1997	40:07.4 O3A1239	712.45
5-JAN-1997	40:07.5 O3A1239	713.99
5-JAN-1997	40:07.6 O3A1239	709.51
5-JAN-1997	40:07.7 O3A1239	707.65
5-JAN-1997	40:07.8 O3A1239	709.9
5-JAN-1997	40:07.9 O3A1239	710.91
5-JAN-1997	40:08.0 O3A1239	713.15
5-JAN-1997	40:08.1 O3A1239	713.99
5-JAN-1997	40:08.2 O3A1239	715.4
5-JAN-1997	40:08.3 O3A1239	714.94
5-JAN-1997	40:08.4 O3A1239	712.55
5-JAN-1997	40:08.5 O3A1239	714.17
5-JAN-1997	40:08.6 O3A1239	712.93
5-JAN-1997	40:08.7 O3A1239	710.77
5-JAN-1997	40:08.8 O3A1239	711.62
5-JAN-1997	40:08.9 O3A1239	712.47
5-JAN-1997	40:09.0 O3A1239	712.16
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5-JAN-1997	40:09.2 O3A1239	711.83
5-JAN-1997	40:09.3 O3A1239	709.44
5-JAN-1997	40:09.4 O3A1239	708.58
5-JAN-1997	40:09.5 O3A1239	707.42
5-JAN-1997	40:09.6 O3A1239	708.97
5-JAN-1997	40:09.7 O3A1239	713.45
5-JAN-1997	40:09.8 O3A1239	713.76
5-JAN-1997	40:09.9 O3A1239	714.07
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5-JAN-1997	40:10.2 O3A1239	710.98
5-JAN-1997	40:10.3 O3A1239	709.05
5-JAN-1997	40:10.4 O3A1239	710.52
5-JAN-1997	40:10.5 O3A1239	713.84
5-JAN-1997	40:10.6 O3A1239	714.53
5-JAN-1997	40:10.7 O3A1239	712.91
5-JAN-1997	40:10.8 O3A1239	712.07
5-JAN-1997	40:10.9 O3A1239	711.37
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5-JAN-1997	40:11.1 O3A1239	711.06
5-JAN-1997	40:11.2 O3A1239	709.15
5-JAN-1997	40:11.3 O3A1239	710.93
5-JAN-1997	40:11.4 O3A1239	712.39
5-JAN-1997	40:11.6 O3A1239	708.06
5-JAN-1997	40:11.7 O3A1239	707.67
5-JAN-1997	40:11.8 O3A1239	707.83

5-JAN-1997	40:11.9 O3A1239	710
5-JAN-1997	40:12.0 O3A1239	711.78
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5-JAN-1997	40:12.2 O3A1239	714.15
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5-JAN-1997	40:12.5 O3A1239	713.22
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5-JAN-1997	40:12.7 O3A1239	712.91
5-JAN-1997	40:12.8 O3A1239	714.84
5-JAN-1997	40:12.9 O3A1239	715.92
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5-JAN-1997	40:13.2 O3A1239	713.45
5-JAN-1997	40:13.3 O3A1239	707.42
5-JAN-1997	40:13.4 O3A1239	708.35
5-JAN-1997	40:13.5 O3A1239	705.78
5-JAN-1997	40:13.6 O3A1239	705.32
5-JAN-1997	40:13.7 O3A1239	711.06
5-JAN-1997	40:13.8 O3A1239	713.68
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5-JAN-1997	40:14.2 O3A1239	709.75
5-JAN-1997	40:14.3 O3A1239	711.83
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5-JAN-1997	40:14.5 O3A1239	717.07
5-JAN-1997	40:14.7 O3A1239	714.38
5-JAN-1997	40:14.8 O3A1239	716.76
5-JAN-1997	40:14.9 O3A1239	715.53
5-JAN-1997	40:15.0 O3A1239	717.53
5-JAN-1997	40:15.1 O3A1239	717.68
5-JAN-1997	40:15.2 O3A1239	712.84
5-JAN-1997	40:15.3 O3A1239	710.29
5-JAN-1997	40:15.4 O3A1239	713.99
5-JAN-1997	40:15.5 O3A1239	715.15
5-JAN-1997	40:15.6 O3A1239	714.99
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5-JAN-1997	40:15.9 O3A1239	715.84
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5-JAN-1997	40:16.4 O3A1239	712.3
5-JAN-1997	40:16.5 O3A1239	713.15
5-JAN-1997	40:16.6 O3A1239	715.99
5-JAN-1997	40:16.7 O3A1239	716.91
5-JAN-1997	40:16.8 O3A1239	714.22
5-JAN-1997	40:16.9 O3A1239	716.45
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5-JAN-1997	40:17.1 O3A1239	711.68
5-JAN-1997	40:17.2 O3A1239	710.44
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5-JAN-1997	40:17.4 O3A1239	713.22
5-JAN-1997	40:17.5 O3A1239	715.15
5-JAN-1997	40:17.6 O3A1239	716.22
5-JAN-1997	40:17.7 O3A1239	715.61

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5-JAN-1997	40:17.9 O3A1239	712.14
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5-JAN-1997	40:18.6 O3A1239	710.83
5-JAN-1997	40:18.7 O3A1239	712.53
5-JAN-1997	40:18.8 O3A1239	711.91
5-JAN-1997	40:18.9 O3A1239	716.3
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5-JAN-1997	40:19.2 O3A1239	712.3
5-JAN-1997	40:19.3 O3A1239	715.45
5-JAN-1997	40:19.4 O3A1239	717.3
5-JAN-1997	40:19.5 O3A1239	718.45
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5-JAN-1997	40:19.7 O3A1239	720.05
5-JAN-1997	40:19.8 O3A1239	718.6
5-JAN-1997	40:19.9 O3A1239	717.6
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5-JAN-1997	40:20.1 O3A1239	716.22
5-JAN-1997	40:20.2 O3A1239	716.61
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5-JAN-1997	40:20.4 O3A1239	720.51
5-JAN-1997	40:20.5 O3A1239	719.59
5-JAN-1997	40:20.6 O3A1239	720.89
5-JAN-1997	40:20.7 O3A1239	718.29
5-JAN-1997	40:20.8 O3A1239	717.83
5-JAN-1997	40:20.9 O3A1239	715.92
5-JAN-1997	40:21.0 O3A1239	719.59
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5-JAN-1997	40:21.3 O3A1239	716.91
5-JAN-1997	40:21.4 O3A1239	720.43
5-JAN-1997	40:21.5 O3A1239	717.22
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5-JAN-1997	40:21.7 O3A1239	722.34
5-JAN-1997	40:21.8 O3A1239	721.27
5-JAN-1997	40:21.9 O3A1239	718.37
5-JAN-1997	40:22.0 O3A1239	715.99
5-JAN-1997	40:22.1 O3A1239	716.38
5-JAN-1997	40:22.2 O3A1239	718.75
5-JAN-1997	40:22.3 O3A1239	719.52
5-JAN-1997	40:22.4 O3A1239	720.43
5-JAN-1997	40:22.5 O3A1239	722.34
5-JAN-1997	40:22.6 O3A1239	720.58
5-JAN-1997	40:22.7 O3A1239	717.07
5-JAN-1997	40:22.8 O3A1239	713.07
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5-JAN-1997	40:23.3 O3A1239	717.91
5-JAN-1997	40:23.4 O3A1239	719.67
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5-JAN-1997	40:23.7 O3A1239	715.84
5-JAN-1997	40:23.8 O3A1239	716.91
5-JAN-1997	40:23.9 O3A1239	717.14
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5-JAN-1997	40:24.1 O3A1239	716.91
5-JAN-1997	40:24.2 O3A1239	715.07
5-JAN-1997	40:24.3 O3A1239	712.3
5-JAN-1997	40:24.4 O3A1239	714.69
5-JAN-1997	40:24.5 O3A1239	716.15
5-JAN-1997	40:24.6 O3A1239	715.69
5-JAN-1997	40:24.7 O3A1239	717.07
5-JAN-1997	40:24.8 O3A1239	717.45
5-JAN-1997	40:24.9 O3A1239	714.61
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5-JAN-1997	40:25.1 O3A1239	715.99
5-JAN-1997	40:25.2 O3A1239	713.99
5-JAN-1997	40:25.3 O3A1239	717.45
5-JAN-1997	40:25.4 O3A1239	717.53
5-JAN-1997	40:25.5 O3A1239	716.07
5-JAN-1997	40:25.6 O3A1239	716.53
5-JAN-1997	40:25.7 O3A1239	717.22
5-JAN-1997	40:25.8 O3A1239	714.76
5-JAN-1997	40:25.9 O3A1239	716.45
5-JAN-1997	40:26.0 O3A1239	716.99
5-JAN-1997	40:26.1 O3A1239	715.15
5-JAN-1997	40:26.2 O3A1239	719.06
5-JAN-1997	40:26.3 O3A1239	721.35
5-JAN-1997	40:26.4 O3A1239	719.36
5-JAN-1997	40:26.5 O3A1239	717.37
5-JAN-1997	40:26.6 O3A1239	716.99
5-JAN-1997	40:26.7 O3A1239	716.53
5-JAN-1997	40:26.8 O3A1239	715.61
5-JAN-1997	40:26.9 O3A1239	715.92
5-JAN-1997	40:27.0 O3A1239	715.07
5-JAN-1997	40:27.1 O3A1239	715.69
5-JAN-1997	40:27.2 O3A1239	716.76
5-JAN-1997	40:27.3 O3A1239	719.29
5-JAN-1997	40:27.4 O3A1239	720.51
5-JAN-1997	40:27.5 O3A1239	722.34
5-JAN-1997	40:27.6 O3A1239	719.82
5-JAN-1997	40:27.7 O3A1239	721.5
5-JAN-1997	40:27.8 O3A1239	714.69
5-JAN-1997	40:27.9 O3A1239	715.53
5-JAN-1997	40:28.0 O3A1239	719.52
5-JAN-1997	40:28.1 O3A1239	721.88
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5-JAN-1997	40:28.3 O3A1239	720.74
5-JAN-1997	40:28.4 O3A1239	721.35
5-JAN-1997	40:28.5 O3A1239	716.3
5-JAN-1997	40:28.6 O3A1239	718.29
5-JAN-1997	40:28.7 O3A1239	715.07
5-JAN-1997	40:28.8 O3A1239	718.6
5-JAN-1997	40:28.9 O3A1239	722.03
5-JAN-1997	40:29.0 O3A1239	722.26
5-JAN-1997	40:29.1 O3A1239	719.67
5-JAN-1997	40:29.2 O3A1239	719.29
5-JAN-1997	40:29.3 O3A1239	720.13

5-JAN-1997	40:29.4 O3A1239	717.14
5-JAN-1997	40:29.5 O3A1239	716.3
5-JAN-1997	40:29.6 O3A1239	715.22
5-JAN-1997	40:29.7 O3A1239	709.44
5-JAN-1997	40:29.8 O3A1239	713.92
5-JAN-1997	40:29.9 O3A1239	716.99
5-JAN-1997	40:30.0 O3A1239	719.13
5-JAN-1997	40:30.1 O3A1239	722.64
5-JAN-1997	40:30.2 O3A1239	720.89
5-JAN-1997	40:30.3 O3A1239	720.97
5-JAN-1997	40:30.4 O3A1239	718.29
5-JAN-1997	40:30.6 O3A1239	719.21
5-JAN-1997	40:30.7 O3A1239	721.04
5-JAN-1997	40:30.8 O3A1239	721.8
5-JAN-1997	40:30.9 O3A1239	721.88
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5-JAN-1997	40:31.1 O3A1239	721.96
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5-JAN-1997	40:31.3 O3A1239	720.58
5-JAN-1997	40:31.4 O3A1239	719.75
5-JAN-1997	40:31.5 O3A1239	719.44
5-JAN-1997	40:31.6 O3A1239	717.99
5-JAN-1997	40:31.7 O3A1239	719.67
5-JAN-1997	40:31.8 O3A1239	720.36
5-JAN-1997	40:31.9 O3A1239	720.51
5-JAN-1997	40:32.1 O3A1239	720.81
5-JAN-1997	40:32.2 O3A1239	717.76
5-JAN-1997	40:32.3 O3A1239	718.06
5-JAN-1997	40:32.4 O3A1239	717.68
5-JAN-1997	40:32.5 O3A1239	712.61
5-JAN-1997	40:32.6 O3A1239	710.98
5-JAN-1997	40:32.7 O3A1239	715.38
5-JAN-1997	40:32.8 O3A1239	720.28
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5-JAN-1997	40:33.1 O3A1239	720.13
5-JAN-1997	40:33.2 O3A1239	716.45
5-JAN-1997	40:33.3 O3A1239	717.37
5-JAN-1997	40:33.4 O3A1239	719.29
5-JAN-1997	40:33.5 O3A1239	720.28
5-JAN-1997	40:33.6 O3A1239	719.44
5-JAN-1997	40:33.7 O3A1239	713.76
5-JAN-1997	40:33.8 O3A1239	716.38
5-JAN-1997	40:33.9 O3A1239	719.67
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5-JAN-1997	40:34.2 O3A1239	711.52
5-JAN-1997	40:34.3 O3A1239	710.05
5-JAN-1997	40:34.4 O3A1239	712.45
5-JAN-1997	40:34.5 O3A1239	717.45
5-JAN-1997	40:34.6 O3A1239	714.76
5-JAN-1997	40:34.7 O3A1239	712.99
5-JAN-1997	40:34.8 O3A1239	714.22
5-JAN-1997	40:34.9 O3A1239	716.61
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5-JAN-1997	40:35.1 O3A1239	715.76
5-JAN-1997	40:35.2 O3A1239	715.99
5-JAN-1997	40:35.3 O3A1239	719.36

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5-JAN-1997	40:35.5 O3A1239	712.37
5-JAN-1997	40:35.6 O3A1239	712.76
5-JAN-1997	40:35.7 O3A1239	714.07
5-JAN-1997	40:35.8 O3A1239	713.38
5-JAN-1997	40:35.9 O3A1239	708.97
5-JAN-1997	40:36.0 O3A1239	712.37
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5-JAN-1997	40:36.2 O3A1239	715.07
5-JAN-1997	40:36.3 O3A1239	713.68
5-JAN-1997	40:36.4 O3A1239	717.3
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5-JAN-1997	40:36.7 O3A1239	718.45
5-JAN-1997	40:36.8 O3A1239	716.53
5-JAN-1997	40:36.9 O3A1239	715.99
5-JAN-1997	40:37.0 O3A1239	711.29
5-JAN-1997	40:37.1 O3A1239	709.2
5-JAN-1997	40:37.2 O3A1239	711.29
5-JAN-1997	40:37.3 O3A1239	716.68
5-JAN-1997	40:37.4 O3A1239	711.83
5-JAN-1997	40:37.5 O3A1239	715.99
5-JAN-1997	40:37.6 O3A1239	718.06
5-JAN-1997	40:37.8 O3A1239	719.59
5-JAN-1997	40:37.9 O3A1239	717.76
5-JAN-1997	40:38.0 O3A1239	711.22
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5-JAN-1997	40:38.3 O3A1239	715.24
5-JAN-1997	40:38.4 O3A1239	718.08
5-JAN-1997	40:38.5 O3A1239	719.61
5-JAN-1997	40:38.6 O3A1239	721.59
5-JAN-1997	40:38.7 O3A1239	722.43
5-JAN-1997	40:38.8 O3A1239	723.88
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5-JAN-1997	40:39.3 O3A1239	717.14
5-JAN-1997	40:39.4 O3A1239	713.3
5-JAN-1997	40:39.5 O3A1239	711.29
5-JAN-1997	40:39.6 O3A1239	714.07
5-JAN-1997	40:39.7 O3A1239	717.6
5-JAN-1997	40:39.8 O3A1239	719.97
5-JAN-1997	40:39.9 O3A1239	718.9
5-JAN-1997	40:40.0 O3A1239	719.52
5-JAN-1997	40:40.1 O3A1239	720.74
5-JAN-1997	40:40.2 O3A1239	717.99
5-JAN-1997	40:40.3 O3A1239	714.92
5-JAN-1997	40:40.4 O3A1239	717.07
5-JAN-1997	40:40.5 O3A1239	720.28
5-JAN-1997	40:40.6 O3A1239	717.91
5-JAN-1997	40:40.7 O3A1239	717.68
5-JAN-1997	40:40.8 O3A1239	718.9
5-JAN-1997	40:40.9 O3A1239	718.6
5-JAN-1997	40:41.0 O3A1239	717.76
5-JAN-1997	40:41.1 O3A1239	720.66
5-JAN-1997	40:41.2 O3A1239	718.75

5-JAN-1997	40:41.3 O3A1239	718.45
5-JAN-1997	40:41.4 O3A1239	719.97
5-JAN-1997	40:41.5 O3A1239	721.65
5-JAN-1997	40:41.6 O3A1239	720.28
5-JAN-1997	40:41.7 O3A1239	715.22
5-JAN-1997	40:41.8 O3A1239	716.3
5-JAN-1997	40:41.9 O3A1239	717.22
5-JAN-1997	40:42.0 O3A1239	714.69
5-JAN-1997	40:42.1 O3A1239	717.45
5-JAN-1997	40:42.2 O3A1239	718.83
5-JAN-1997	40:42.3 O3A1239	721.65
5-JAN-1997	40:42.4 O3A1239	722.79
5-JAN-1997	40:42.5 O3A1239	723.4
5-JAN-1997	40:42.6 O3A1239	722.64
5-JAN-1997	40:42.8 O3A1239	722.57
5-JAN-1997	40:42.9 O3A1239	719.21
5-JAN-1997	40:43.0 O3A1239	715.38
5-JAN-1997	40:43.1 O3A1239	718.98
5-JAN-1997	40:43.2 O3A1239	719.82
5-JAN-1997	40:43.3 O3A1239	719.36
5-JAN-1997	40:43.4 O3A1239	719.52
5-JAN-1997	40:43.5 O3A1239	720.05
5-JAN-1997	40:43.6 O3A1239	721.73
5-JAN-1997	40:43.7 O3A1239	720.58
5-JAN-1997	40:43.8 O3A1239	721.96
5-JAN-1997	40:43.9 O3A1239	724.01
5-JAN-1997	40:44.0 O3A1239	722.49
5-JAN-1997	40:44.1 O3A1239	720.2
5-JAN-1997	40:44.2 O3A1239	718.29
5-JAN-1997	40:44.3 O3A1239	718.98
5-JAN-1997	40:44.4 O3A1239	720.58
5-JAN-1997	40:44.5 O3A1239	717.99
5-JAN-1997	40:44.6 O3A1239	720.66
5-JAN-1997	40:44.7 O3A1239	720.81
5-JAN-1997	40:44.8 O3A1239	718.06
5-JAN-1997	40:44.9 O3A1239	715.92
5-JAN-1997	40:45.0 O3A1239	716.07
5-JAN-1997	40:45.1 O3A1239	716.53
5-JAN-1997	40:45.2 O3A1239	716.68
5-JAN-1997	40:45.3 O3A1239	717.07
5-JAN-1997	40:45.4 O3A1239	718.45
5-JAN-1997	40:45.5 O3A1239	718.98
5-JAN-1997	40:45.6 O3A1239	717.83
5-JAN-1997	40:45.7 O3A1239	717.14
5-JAN-1997	40:45.8 O3A1239	717.37
5-JAN-1997	40:45.9 O3A1239	720.36
5-JAN-1997	40:46.0 O3A1239	720.28
5-JAN-1997	40:46.1 O3A1239	719.67
5-JAN-1997	40:46.2 O3A1239	720.51
5-JAN-1997	40:46.3 O3A1239	719.9
5-JAN-1997	40:46.4 O3A1239	721.73
5-JAN-1997	40:46.5 O3A1239	722.64
5-JAN-1997	40:46.6 O3A1239	721.35
5-JAN-1997	40:46.7 O3A1239	721.5
5-JAN-1997	40:46.8 O3A1239	720.74
5-JAN-1997	40:46.9 O3A1239	720.97
5-JAN-1997	40:47.0 O3A1239	720.74
5-JAN-1997	40:47.1 O3A1239	719.06

5-JAN-1997	40:47.2 O3A1239	716.61
5-JAN-1997	40:47.3 O3A1239	717.99
5-JAN-1997	40:47.4 O3A1239	717.3
5-JAN-1997	40:47.5 O3A1239	716.68
5-JAN-1997	40:47.6 O3A1239	717.91
5-JAN-1997	40:47.7 O3A1239	720.05
5-JAN-1997	40:47.8 O3A1239	721.12
5-JAN-1997	40:47.9 O3A1239	718.98
5-JAN-1997	40:48.0 O3A1239	718.06
5-JAN-1997	40:48.1 O3A1239	717.68
5-JAN-1997	40:48.2 O3A1239	715.84
5-JAN-1997	40:48.4 O3A1239	717.99
5-JAN-1997	40:48.5 O3A1239	719.21
5-JAN-1997	40:48.7 O3A1239	717.3
5-JAN-1997	40:48.8 O3A1239	718.75
5-JAN-1997	40:48.9 O3A1239	718.37
5-JAN-1997	40:49.0 O3A1239	717.45
5-JAN-1997	40:49.1 O3A1239	716.45
5-JAN-1997	40:49.2 O3A1239	721.58
5-JAN-1997	40:49.3 O3A1239	714.61
5-JAN-1997	40:49.4 O3A1239	712.53
5-JAN-1997	40:49.5 O3A1239	711.6
5-JAN-1997	40:49.6 O3A1239	715.15
5-JAN-1997	40:49.7 O3A1239	718.37
5-JAN-1997	40:49.8 O3A1239	719.13
5-JAN-1997	40:49.9 O3A1239	714.92
5-JAN-1997	40:50.1 O3A1239	717.22
5-JAN-1997	40:50.2 O3A1239	716.91
5-JAN-1997	40:50.3 O3A1239	718.9
5-JAN-1997	40:50.4 O3A1239	721.35
5-JAN-1997	40:50.5 O3A1239	717.07
5-JAN-1997	40:50.6 O3A1239	717.45
5-JAN-1997	40:50.7 O3A1239	718.75
5-JAN-1997	40:50.8 O3A1239	718.52
5-JAN-1997	40:50.9 O3A1239	715.84
5-JAN-1997	40:51.0 O3A1239	716.22
5-JAN-1997	40:51.1 O3A1239	716.61
5-JAN-1997	40:51.2 O3A1239	720.89
5-JAN-1997	40:51.3 O3A1239	721.88
5-JAN-1997	40:51.4 O3A1239	719.52
5-JAN-1997	40:51.5 O3A1239	719.13
5-JAN-1997	40:51.6 O3A1239	718.98
5-JAN-1997	40:51.8 O3A1239	717.45
5-JAN-1997	40:51.9 O3A1239	717.99
5-JAN-1997	40:52.0 O3A1239	719.59
5-JAN-1997	40:52.1 O3A1239	721.8
5-JAN-1997	40:52.2 O3A1239	721.12
5-JAN-1997	40:52.3 O3A1239	721.5
5-JAN-1997	40:52.4 O3A1239	719.59
5-JAN-1997	40:52.5 O3A1239	721.35
5-JAN-1997	40:52.6 O3A1239	717.14
5-JAN-1997	40:52.7 O3A1239	718.9
5-JAN-1997	40:52.8 O3A1239	715.22
5-JAN-1997	40:52.9 O3A1239	718.6
5-JAN-1997	40:53.0 O3A1239	717.68
5-JAN-1997	40:53.1 O3A1239	721.2
5-JAN-1997	40:53.2 O3A1239	723.25
5-JAN-1997	40:53.3 O3A1239	723.86

5-JAN-1997	40:53.4 O3A1239	724.69
5-JAN-1997	40:53.5 O3A1239	721.5
5-JAN-1997	40:53.6 O3A1239	724.16
5-JAN-1997	40:53.7 O3A1239	723.48
5-JAN-1997	40:53.8 O3A1239	717.6
5-JAN-1997	40:53.9 O3A1239	713.45
5-JAN-1997	40:54.0 O3A1239	719.75
5-JAN-1997	40:54.1 O3A1239	722.26
5-JAN-1997	40:54.2 O3A1239	717.99
5-JAN-1997	40:54.3 O3A1239	714.69
5-JAN-1997	40:54.4 O3A1239	718.6
5-JAN-1997	40:54.6 O3A1239	719.06
5-JAN-1997	40:54.7 O3A1239	721.04
5-JAN-1997	40:54.9 O3A1239	720.89
5-JAN-1997	40:55.0 O3A1239	723.48
5-JAN-1997	40:55.1 O3A1239	719.06
5-JAN-1997	40:55.2 O3A1239	723.71
5-JAN-1997	40:55.3 O3A1239	724.47
5-JAN-1997	40:55.4 O3A1239	721.12
5-JAN-1997	40:55.5 O3A1239	717.14
5-JAN-1997	40:55.6 O3A1239	718.6
5-JAN-1997	40:55.7 O3A1239	724.77
5-JAN-1997	40:55.8 O3A1239	725.38
5-JAN-1997	40:55.9 O3A1239	724.54
5-JAN-1997	40:56.0 O3A1239	728.33
5-JAN-1997	40:56.1 O3A1239	723.63
5-JAN-1997	40:56.2 O3A1239	718.6
5-JAN-1997	40:56.3 O3A1239	722.26
5-JAN-1997	40:56.4 O3A1239	724.16
5-JAN-1997	40:56.5 O3A1239	718.45
5-JAN-1997	40:56.6 O3A1239	711.6
5-JAN-1997	40:56.7 O3A1239	713.84
5-JAN-1997	40:56.8 O3A1239	718.37
5-JAN-1997	40:56.9 O3A1239	722.11
5-JAN-1997	40:57.0 O3A1239	722.19
5-JAN-1997	40:57.1 O3A1239	725.53
5-JAN-1997	40:57.2 O3A1239	721.5
5-JAN-1997	40:57.3 O3A1239	721.8
5-JAN-1997	40:57.4 O3A1239	719.59
5-JAN-1997	40:57.5 O3A1239	723.4
5-JAN-1997	40:57.6 O3A1239	724.92
5-JAN-1997	40:57.7 O3A1239	726.66
5-JAN-1997	40:57.8 O3A1239	726.59
5-JAN-1997	40:57.9 O3A1239	721.8
5-JAN-1997	40:58.0 O3A1239	724.84
5-JAN-1997	40:58.1 O3A1239	725.3
5-JAN-1997	40:58.2 O3A1239	725.91
5-JAN-1997	40:58.3 O3A1239	726.74
5-JAN-1997	40:58.4 O3A1239	723.4
5-JAN-1997	40:58.5 O3A1239	723.63
5-JAN-1997	40:58.6 O3A1239	721.73
5-JAN-1997	40:58.7 O3A1239	720.51
5-JAN-1997	40:58.8 O3A1239	723.93
5-JAN-1997	40:58.9 O3A1239	724.77
5-JAN-1997	40:59.0 O3A1239	726.66
5-JAN-1997	40:59.1 O3A1239	723.48
5-JAN-1997	40:59.2 O3A1239	721.73
5-JAN-1997	40:59.3 O3A1239	718.67

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5-JAN-1997	40:59.4 O3A1239	718.22	
5-JAN-1997	40:59.5 O3A1239	719.59	
5-JAN-1997	40:59.6 O3A1239	725.3	
5-JAN-1997	40:59.7 O3A1239	723.86	
5-JAN-1997	40:59.8 O3A1239	721.12	
5-JAN-1997	40:59.9 O3A1239	714.07	716.738 ← 1 min. ave.

Calculation OSC-7248

Attachment 9

Wood's Model Computer Run to Simulate Initial Flowrates Starting a Time $t=0$ sec

58	45	46	.5	10.4	.2	.23			
59	43	46	6.3	1.0	.2	50.00			
60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0 .0 410.0 2250.0 298.0 4000.0									
83	67	68	1.0	10.3	.2	.89			
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0 .0 470.0 1500.0 385.0 1800.0									
115	115	116	.3	4.0	.2	.15			
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			

119	119	120	103.3	8.1	.2	6.64	
120	120	121	176.6	8.1	.2	2.30	
121	121	122	.1	8.1	.2	5.37	
122	122	123	14.3	8.1	.2	7.05	
123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148 PUMP DATA (HEAD-FLOW) :			622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	

74	.00	762.00	93	94	
75	.00	762.00	94	95	
76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1600.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
 THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000
 NO RCS or Rx Bldg. pressure
 BWST 797.25 + 46 = 843.25 / 50 F / LPI,HPI,RBS NOT Throttled
 Unit-2 BWST @ 100 F

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-4376.33	-.05	.00	-.39	-9.81	-18.07
14	13 14	1861.09	.00	.00	.13	4.17	3.48
15	14 15	1861.09	.01	.00	.08	4.17	3.48
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	13974.19	16.05	.00	23.45	31.32	176.32
20	79 80	13974.19	1.29	.00	6.73	31.32	176.32
21	80 81	12374.19	2.09	.00	3.10	27.73	138.68
22	81 13	6237.42	.22	.00	9.13	13.98	36.07
23	81 19	6136.77	.62	.00	6.76	13.75	34.94
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED							
31	0 85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED							
33	12 21	4376.33	.05	.00	.39	9.81	18.07
34	21 22	4423.31	.00	.00	.23	9.91	18.45
35	22 23	4423.31	.27	.00	1.43	9.91	18.45
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE							
36	23 24	4423.31	.01	253.08	.30	18.07	85.47
37	24 25	4423.31	.04	.00	4.09	17.20	75.31
38	21 25	-46.98	-10.59	.00	-236.12	-17.44	-1275.52
39	25 26	4376.33	.59	.00	2.20	17.01	73.75
40	26 27	4376.33	1.29	.00	11.42	17.01	73.75
41	27 29	4075.26	.16	.00	1.56	15.84	64.13
42	27 29	301.07	.03	.00	1.69	3.04	4.75
43	29 30	4376.33	.95	.00	5.05	16.46	67.78
44	30 31	4376.33	.00	.00	9.93	7.44	8.96
45	31 32	4376.33	.14	.00	1.30	16.46	67.78
46	32 33	4376.33	.02	.00	104.62	27.08	243.38
47	33 35	4376.33	.15	.00	.67	17.01	73.75
48	35 36	4376.33	1.07	.00	22.61	17.01	73.75
49	36 37	4376.33	.96	.00	3.33	17.01	73.75
50	37 38	4376.33	1.74	.00	2.71	24.74	192.92
51	38 39	4376.33	.10	.00	6.65	24.74	192.92
52	39 41	4376.33	12.96	.00	17.69	23.35	166.18
53	41 0	4376.33	1.17	.00	6.47	13.52	40.92
54	19 42	6136.77	.03	.00	.85	13.75	34.94
55	42 43	4275.21	.16	.00	1.50	9.58	17.27
56	43 44	4323.75	.43	.00	1.49	9.69	17.65
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE							
57	44 45	4323.75	.01	263.73	.29	17.66	81.73
58	45 46	4323.75	.03	.00	.94	16.27	66.20
59	43 46	-48.53	-8.56	.00	-251.97	-18.02	-1359.41
60	46 47	4275.21	1.20	.00	4.10	16.08	64.75
61	47 48	4275.21	.65	.00	8.96	16.08	64.75
62	48 49	4275.21	.65	.00	3.53	16.08	64.75
63	49 50	3905.55	.19	.00	2.31	14.69	54.23
64	49 50	369.66	.03	.00	2.47	3.74	7.00
65	50 51	4275.21	.45	.00	3.09	16.08	64.75
66	51 52	4275.21	.00	.00	9.47	7.27	8.57

67	52	53	4275.21	.16	.00	1.93	16.08	64.75
68	53	54	4275.21	.11	.00	1.57	16.08	64.75
69	54	55	4275.21	.02	.00	99.84	26.45	232.41
70	55	56	4275.21	.70	.00	1.33	16.62	70.44
71	56	57	4275.21	1.27	.00	4.63	16.62	70.44
72	57	70	4275.21	.56	.00	.64	16.62	70.44
73	70	58	4275.21	5.14	.00	23.76	16.62	70.44
74	58	59	4275.21	1.83	.00	2.53	16.62	70.44
75	59	61	4275.21	1.33	.00	2.59	24.17	184.23
76	61	62	4275.21	.09	.00	6.35	24.17	184.23
77	62	63	4275.21	14.20	.00	17.37	22.81	158.71
78	63	0	4275.21	1.96	.00	7.12	13.20	39.10
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
-89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1861.55	.01	.00	.04	4.17	3.48
110	113	114	1861.55	.31	.00	1.24	7.24	13.95
111	114	101	1861.55	.00	.00	.00	11.52	45.48
112	15	109	1861.09	.14	.00	2.10	7.24	13.94
113	109	110	1861.09	.00	.00	.00	11.52	45.46
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1861.55	.00	365.26	.00	11.52	45.48
115	115	116	1861.55	.47	.00	5.06	46.91	1692.61
116	116	117	1861.55	.27	.00	19.39	20.67	203.65
117	117	118	1861.55	.17	.00	1.05	11.52	45.48
118	118	119	1861.55	1.51	.00	.98	11.52	45.48
119	119	120	1861.55	4.70	.00	13.68	11.52	45.48
120	120	121	1861.55	8.03	.00	4.73	11.52	45.48
121	121	122	1861.55	.00	.00	11.07	11.52	45.48
122	122	123	1861.55	.65	.00	14.52	11.52	45.48
123	123	124	69.01	2.72	.00	235.87	25.62	2715.37
124	124	0	69.01	.27	.00	10.19	25.62	2715.37
125	123	125	1792.54	6.37	.00	3.58	10.55	37.23
126	125	126	932.87	.04	.00	.13	5.49	10.53
127	126	127	651.55	.07	.00	.06	3.84	5.30
128	127	128	370.40	.11	.00	.09	3.74	7.03
129	128	129	148.15	.19	.00	.05	3.33	9.20
130	128	130	222.25	.12	.00	.10	5.00	19.90
131	127	131	281.15	.16	.00	.53	6.33	31.23
132	126	132	281.32	.16	.00	.53	6.33	31.27
133	125	133	859.67	.07	.00	.11	5.06	9.00
134	133	134	578.36	.06	.00	.08	3.41	4.23
135	134	135	311.37	.09	.00	.04	3.15	5.06
136	135	136	118.61	.11	.00	.03	2.67	6.05
137	135	137	192.76	.05	.00	.07	4.34	15.16
138	134	138	266.99	.04	.00	.14	6.01	28.28

139	133	139	281.31	.16	.00	.53	6.33	31.27
140	129	0	148.15	.00	.00	104.93	3.33	9.20
141	130	0	222.25	.00	.00	104.95	5.00	19.90
142	131	0	281.15	.00	.00	104.67	6.33	31.23
143	132	0	281.32	.00	.00	104.80	6.33	31.27
144	139	0	281.31	.00	.00	104.80	6.33	31.27
145	138	0	266.99	.00	.00	105.17	6.01	28.28
146	137	0	192.76	.00	.00	105.11	4.34	15.16
147	136	0	118.61	.00	.00	105.08	2.67	6.05
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1861.09	.00	359.64	.00	11.52	45.46
149	140	141	1861.09	.47	.00	5.05	46.90	1691.78
150	141	142	1861.09	.27	.00	19.38	20.67	203.55
151	142	143	1861.09	.00	.00	.25	11.52	45.46
152	143	144	1861.09	9.17	.00	6.80	11.52	45.46
153	144	145	1861.09	1.13	.00	11.36	11.52	45.46
154	145	146	1861.09	.18	.00	1.84	11.52	45.46
155	146	147	1861.09	.00	.00	11.06	11.52	45.46
156	147	148	1861.09	.58	.00	14.21	11.52	45.46
157	148	200	69.44	2.75	.00	232.65	25.78	2749.11
158	200	0	69.44	.27	.00	10.32	25.78	2749.11
159	148	149	1791.65	5.84	.00	4.57	10.55	37.20
160	149	150	960.96	.05	.00	.14	5.66	11.15
161	150	151	669.75	.07	.00	.07	3.94	5.59
162	151	152	378.74	.11	.00	.09	3.83	7.33
163	152	153	160.19	.19	.00	.06	3.61	10.67
164	152	154	218.55	.05	.00	.10	4.92	19.27
165	151	155	291.01	.05	.00	.57	6.55	33.37
166	150	156	291.21	.05	.00	.57	6.55	33.42
167	149	157	830.68	.07	.00	.10	4.89	8.43
168	157	158	539.45	.05	.00	.07	3.18	3.71
169	158	159	277.04	.07	.00	.03	2.80	4.06
170	159	160	102.08	.09	.00	.02	2.30	4.57
171	159	161	174.96	.09	.00	.06	3.94	12.61
172	158	162	262.41	.14	.00	.14	5.91	27.35
173	157	163	291.24	.05	.00	.57	6.56	33.42
174	153	0	160.19	.00	.00	101.38	3.61	10.67
175	154	0	218.55	.00	.00	101.48	4.92	19.27
176	155	0	291.01	.00	.00	101.21	6.55	33.37
177	156	0	291.21	.00	.00	101.35	6.55	33.42
178	163	0	291.24	.00	.00	101.37	6.56	33.42
179	162	0	262.41	.00	.00	101.60	5.91	27.35
180	161	0	174.96	.00	.00	101.62	3.94	12.61
181	160	0	102.08	.00	.00	101.66	2.30	4.57

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	780.73	812.00	-13.47
8	.00	780.73	791.75	-4.74
9	.00	780.73	798.42	-7.62
10	.00	780.73	767.00	5.92
11	.00	780.73	767.00	5.92
12	.00	780.73	767.00	5.92
13	.00	781.17	767.00	6.10
14	.00	781.03	767.00	6.04
15	.00	780.94	767.00	6.01
16	.00	783.15	767.00	6.96
17	.00	864.86	822.67	18.17
18	.00	783.15	767.00	6.96
19	.00	783.15	767.00	6.96
20	.00	782.50	784.67	-.93
21	.00	780.30	767.00	5.73
22	.00	780.07	767.00	5.63
23	.00	778.36	761.08	7.44
24	.00	1031.13	763.00	115.49
25	.00	1027.00	765.25	112.75
26	.00	1024.21	765.25	111.54
27	.00	1011.50	779.00	100.15
28	.00	863.27	823.33	17.20
29	.00	1009.78	779.00	99.41
30	.00	1003.79	771.50	100.05
31	.00	993.86	777.33	93.27
32	.00	992.42	779.00	91.93
33	.00	887.77	779.00	46.85
34	.00	863.27	823.33	17.20
35	.00	886.95	779.00	46.50
36	.00	863.27	824.75	16.59
37	.00	858.98	816.00	18.51
38	.00	854.54	816.00	16.60
39	.00	847.79	816.00	13.69
40	.00	863.27	820.00	18.64
41	.00	817.14	792.38	10.66
42	.00	782.27	767.00	6.58
43	.00	780.61	767.00	5.86
44	.00	778.69	761.08	7.59
45	.00	1042.12	763.00	120.23
46	.00	1041.15	765.00	118.95
47	.00	1035.85	765.25	116.56
48	.00	1026.25	775.50	108.01
49	.00	1022.07	777.75	105.24
50	.00	1019.56	774.25	105.66
51	.00	1016.02	771.50	105.32
52	.00	1006.54	777.73	98.56
53	.00	1004.45	779.25	97.00
54	.00	1002.78	779.25	96.28
55	.00	902.91	779.25	53.26
56	.00	900.87	779.25	52.39
57	.00	894.97	779.25	49.85
58	.00	864.86	823.17	17.96
59	.00	860.50	816.50	18.95
60	.00	863.27	817.00	19.93
61	.00	856.59	816.50	17.27
62	.00	850.15	816.50	14.49
63	.00	818.58	790.83	11.95
64	.00	1035.85	767.00	115.80
65	.00	1035.85	767.00	115.80
66	.00	1035.85	761.08	118.35
67	.00	1462.72	763.00	301.39
68	.00	1035.85	765.25	116.56
69	.00	1035.85	765.25	116.56
70	.00	893.77	787.25	45.88
71	.00	1035.85	765.25	116.56
72	.00	1035.85	763.25	117.42
73	.00	894.97	763.25	56.74

74	.00	1004.45	762.00	104.43
75	.00	1004.45	762.00	104.43
76	.00	1004.45	762.00	104.43
77	.00	780.07	763.50	7.14
78	.00	1004.45	763.50	103.79
79	.00	803.75	794.25	4.09
80	1600.00	795.73	779.00	7.20
81	.00	790.53	779.00	4.97
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	780.66	760.10	8.86
109	.00	778.71		
110	.00	778.70	760.10	8.01
113	.00	782.22		
114	.00	780.67		
115	.00	1145.91	761.25	165.69
116	.00	1140.38	762.00	162.98
117	.00	1120.73	765.25	153.12
118	.00	1119.50	765.25	152.59
119	.00	1117.01	765.25	151.51
120	.00	1098.63	816.50	121.52
121	.00	1085.87	812.00	117.97
122	.00	1074.80	812.00	113.20
123	.00	1059.63	812.00	106.66
124	.00	821.04	810.58	4.51
125	.00	1049.67	944.00	45.51
126	.00	1049.49	944.00	45.44
127	.00	1049.36	944.00	45.38
128	.00	1049.17	944.00	45.30
129	.00	1048.93	944.00	45.20
130	.00	1048.95	944.00	45.20
131	.00	1048.68	944.00	45.09
132	.00	1048.81	944.00	45.14
133	.00	1049.49	944.00	45.44
134	.00	1049.36	944.00	45.38
135	.00	1049.23	944.00	45.32
136	.00	1049.08	944.00	45.26
137	.00	1049.11	944.00	45.27
138	.00	1049.18	944.00	45.30
139	.00	1048.80	944.00	45.14
140	.00	1138.34	761.25	162.42
141	.00	1132.81	762.00	159.72
142	.00	1113.16	764.09	150.36
143	.00	1112.91	765.47	149.65
144	.00	1096.94	817.50	120.36
145	.00	1084.45	817.50	114.98
146	.00	1082.42	812.00	116.48
147	.00	1071.36	812.00	111.72
148	.00	1056.58	812.00	105.35
149	.00	1046.16	944.00	44.01
150	.00	1045.97	944.00	43.92
151	.00	1045.83	944.00	43.86
152	.00	1045.63	944.00	43.77
153	.00	1045.38	944.00	43.67
154	.00	1045.48	944.00	43.71
155	.00	1045.22	944.00	43.60
156	.00	1045.35	944.00	43.66
157	.00	1045.99	944.00	43.93
158	.00	1045.88	944.00	43.88
159	.00	1045.77	944.00	43.84
160	.00	1045.66	944.00	43.79
161	.00	1045.63	944.00	43.77
162	.00	1045.60	944.00	43.76
163	.00	1045.37	944.00	43.67
200	.00	821.18	810.58	4.56

THE NET SYSTEM DEMAND = 1600.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13974.19
25	.00
28	.00
31	.00
53	-4376.33
78	-4275.21
108	.00
124	-69.01
140	-148.15
141	-222.25
142	-281.15
143	-281.32
144	-281.31
145	-266.99
146	-192.76
147	-118.61
158	-69.44
174	-160.19
175	-218.55
176	-291.01
177	-291.21
178	-291.24
179	-262.41
180	-174.96
181	-102.08

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13974.19
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12374.19

Calculation OSC-7248

Attachment 10

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=60$ sec

T1797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	841.41
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW):					425.0	.0	410.0	2250.0	298.0 4000.0
83	67	68	1.0	10.3	.2	.89			
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW):					622.0	.0	470.0	1500.0	385.0 1800.0
115	115	116	.3	4.0	.2	.15			
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148 PUMP DATA (HEAD-FLOW):					622.0	.0	468.0 1500.0 380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1600.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

T1797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 841.41'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE	NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0	1	.00	.00	.00	.00	.00	.00
2	1	2	.00	.00	.00	.00	.00	.00
3	2	3	.00	.00	.00	.00	.00	.00
4	3	4	.00	.00	.00	.00	.00	.00
5	4	5	.00	.00	.00	.00	.00	.00
6	5	6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED								
8	7	8	.00	.00	.00	.00	.00	.00
9	8	9	.00	.00	.00	.00	.00	.00
10	9	10	.00	.00	.00	.00	.00	.00
11	10	11	.00	.00	.00	.00	.00	.00
12	11	12	.00	.00	.00	.00	.00	.00
13	12	13	-4368.44	-.05	.00	-.39	-9.79	-18.01
14	13	14	1858.08	.00	.00	.13	4.16	3.47
15	14	15	1858.08	.01	.00	.08	4.16	3.47
LINE 16 IS CLOSED								
17	16	18	.00	.00	.00	.00	.00	.00
18	18	19	.00	.00	.00	.00	.00	.00
19	0	79	13952.62	16.00	.00	23.38	31.27	175.79
20	79	80	13952.62	1.29	.00	6.71	31.27	175.79
21	80	81	12352.62	2.09	.00	3.09	27.69	138.20
22	81	13	6226.52	.22	.00	9.10	13.96	35.95
23	81	19	6126.10	.62	.00	6.73	13.73	34.82
LINE 24 IS CLOSED								
25	86	0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED								
27	20	83	.00	.00	.00	.00	.00	.00
28	0	83	.00	.00	.00	.00	.00	.00
29	83	84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED								
31	0	85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED								
33	12	21	4368.44	.05	.00	.39	9.79	18.01
34	21	22	4415.50	.00	.00	.23	9.90	18.39
35	22	23	4415.50	.27	.00	1.43	9.90	18.39
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE								
36	23	24	4415.50	.01	253.91	.30	18.04	85.17
37	24	25	4415.50	.04	.00	4.07	17.17	75.05
38	21	25	-47.06	-10.62	.00	-236.94	-17.47	-1279.87
39	25	26	4368.44	.59	.00	2.19	16.98	73.48
40	26	27	4368.44	1.29	.00	11.38	16.98	73.48
41	27	29	4067.91	.16	.00	1.55	15.82	63.90
42	27	29	300.53	.03	.00	1.68	3.04	4.73
43	29	30	4368.44	.95	.00	5.03	16.43	67.54
44	30	31	4368.44	.00	.00	9.89	7.43	8.93
45	31	32	4368.44	.14	.00	1.30	16.43	67.54
46	32	33	4368.44	.02	.00	104.25	27.03	242.52
47	33	35	4368.44	.15	.00	.67	16.98	73.48
48	35	36	4368.44	1.07	.00	22.53	16.98	73.48
49	36	37	4368.44	.96	.00	3.31	16.98	73.48
50	37	38	4368.44	1.73	.00	2.70	24.70	192.23
51	38	39	4368.44	.10	.00	6.63	24.70	192.23
52	39	41	4368.44	12.92	.00	17.63	23.31	165.59
53	41	0	4368.44	1.17	.00	6.44	13.49	40.78
54	19	42	6126.10	.03	.00	.85	13.73	34.82
55	42	43	4267.59	.16	.00	1.49	9.56	17.21
56	43	44	4316.20	.43	.00	1.48	9.67	17.59
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE								
57	44	45	4316.20	.01	264.54	.29	17.63	81.45
58	45	46	4316.20	.03	.00	.94	16.24	65.97
59	43	46	-48.61	-8.59	.00	-252.76	-18.04	-1363.60
60	46	47	4267.59	1.19	.00	4.08	16.05	64.52
61	47	48	4267.59	.65	.00	8.92	16.05	64.52
62	48	49	4267.59	.65	.00	3.52	16.05	64.52
63	49	50	3898.59	.19	.00	2.30	14.67	54.05
64	49	50	369.00	.03	.00	2.46	3.73	6.98
65	50	51	4267.59	.45	.00	3.08	16.05	64.52
66	51	52	4267.59	.00	.00	9.44	7.26	8.54
67	52	53	4267.59	.16	.00	1.92	16.05	64.52

68	53	54	4267.59	.11	.00	1.56	16.05	64.52
69	54	55	4267.59	.02	.00	99.49	26.41	231.60
70	55	56	4267.59	.70	.00	1.33	16.59	70.19
71	56	57	4267.59	1.26	.00	4.62	16.59	70.19
72	57	70	4267.59	.56	.00	.64	16.59	70.19
73	70	58	4267.59	5.12	.00	23.68	16.59	70.19
74	58	59	4267.59	1.83	.00	2.52	16.59	70.19
75	59	61	4267.59	1.32	.00	2.58	24.13	183.58
76	61	62	4267.59	.09	.00	6.33	24.13	183.58
77	62	63	4267.59	14.15	.00	17.30	22.77	158.15
78	63	0	4267.59	1.95	.00	7.09	13.18	38.96
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1858.51	.01	.00	.04	4.17	3.47
110	113	114	1858.51	.31	.00	1.24	7.23	13.91
111	114	101	1858.51	.00	.00	.00	11.50	45.34
112	15	109	1858.08	.14	.00	2.09	7.22	13.90
113	109	110	1858.08	.00	.00	.00	11.50	45.32
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1858.51	.00	366.23	.00	11.50	45.34
115	115	116	1858.51	.47	.00	5.04	46.84	1687.13
116	116	117	1858.51	.27	.00	19.32	20.64	202.99
117	117	118	1858.51	.17	.00	1.05	11.50	45.34
118	118	119	1858.51	1.51	.00	.98	11.50	45.34
119	119	120	1858.51	4.68	.00	13.63	11.50	45.34
120	120	121	1858.51	8.01	.00	4.71	11.50	45.34
121	121	122	1858.51	.00	.00	11.03	11.50	45.34
122	122	123	1858.51	.65	.00	14.47	11.50	45.34
123	123	124	68.96	2.71	.00	235.50	25.60	2711.24
124	124	0	68.96	.27	.00	10.17	25.60	2711.24
125	123	125	1789.55	6.35	.00	3.57	10.54	37.11
126	125	126	931.31	.04	.00	.13	5.48	10.50
127	126	127	650.46	.07	.00	.06	3.83	5.29
128	127	128	369.78	.11	.00	.09	3.74	7.01
129	128	129	147.91	.19	.00	.05	3.33	9.17
130	128	130	221.88	.12	.00	.10	4.99	19.83
131	127	131	280.68	.16	.00	.53	6.32	31.13
132	126	132	280.85	.16	.00	.53	6.32	31.17
133	125	133	858.24	.07	.00	.11	5.05	8.98
134	133	134	577.39	.06	.00	.08	3.40	4.22
135	134	135	310.85	.09	.00	.04	3.14	5.04
136	135	136	118.41	.11	.00	.03	2.67	6.03
137	135	137	192.44	.05	.00	.07	4.33	15.11
138	134	138	266.54	.04	.00	.14	6.00	28.19
139	133	139	280.84	.16	.00	.53	6.32	31.17
140	129	0	147.91	.00	.00	104.58	3.33	9.17
141	130	0	221.88	.00	.00	104.60	4.99	19.83

142	131	0	280.68	.00	.00	104.32	6.32	31.13
143	132	0	280.85	.00	.00	104.45	6.32	31.17
144	139	0	280.84	.00	.00	104.45	6.32	31.17
145	138	0	266.54	.00	.00	104.82	6.00	28.19
146	137	0	192.44	.00	.00	104.76	4.33	15.11
147	136	0	118.41	.00	.00	104.73	2.67	6.03
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1858.08	.00	360.64	.00	11.50	45.32
149	140	141	1858.08	.47	.00	5.04	46.83	1686.36
150	141	142	1858.08	.27	.00	19.31	20.63	202.90
151	142	143	1858.08	.00	.00	.25	11.50	45.32
152	143	144	1858.08	9.14	.00	6.78	11.50	45.32
153	144	145	1858.08	1.12	.00	11.33	11.50	45.32
154	145	146	1858.08	.18	.00	1.84	11.50	45.32
155	146	147	1858.08	.00	.00	11.02	11.50	45.32
156	147	148	1858.08	.58	.00	14.16	11.50	45.32
157	148	200	69.39	2.75	.00	232.30	25.76	2745.03
158	200	0	69.39	.27	.00	10.30	25.76	2745.03
159	148	149	1788.69	5.82	.00	4.56	10.53	37.08
160	149	150	959.38	.05	.00	.14	5.65	11.11
161	150	151	668.65	.07	.00	.07	3.94	5.57
162	151	152	378.11	.11	.00	.09	3.82	7.31
163	152	153	159.92	.19	.00	.06	3.60	10.63
164	152	154	218.19	.05	.00	.10	4.91	19.21
165	151	155	290.53	.05	.00	.56	6.54	33.27
166	150	156	290.73	.05	.00	.57	6.54	33.31
167	149	157	829.31	.07	.00	.10	4.88	8.41
168	157	158	538.55	.05	.00	.07	3.17	3.70
169	158	159	276.58	.07	.00	.03	2.80	4.04
170	159	160	101.91	.09	.00	.02	2.29	4.55
171	159	161	174.67	.09	.00	.06	3.93	12.57
172	158	162	261.97	.14	.00	.14	5.90	27.27
173	157	163	290.76	.05	.00	.57	6.54	33.32
174	153	0	159.92	.00	.00	101.05	3.60	10.63
175	154	0	218.19	.00	.00	101.15	4.91	19.21
176	155	0	290.53	.00	.00	100.88	6.54	33.27
177	156	0	290.73	.00	.00	101.02	6.54	33.31
178	163	0	290.76	.00	.00	101.04	6.54	33.32
179	162	0	261.97	.00	.00	101.26	5.90	27.27
180	161	0	174.67	.00	.00	101.29	3.93	12.57
181	160	0	101.91	.00	.00	101.32	2.29	4.55

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	779.09	812.00	-14.17
8	.00	779.09	791.75	-5.45
9	.00	779.09	798.42	-8.33
10	.00	779.09	767.00	5.21
11	.00	779.09	767.00	5.21
12	.00	779.09	767.00	5.21
13	.00	779.53	767.00	5.40
14	.00	779.39	767.00	5.34
15	.00	779.30	767.00	5.30
16	.00	781.50	767.00	6.25
17	.00	864.67	822.67	18.09
18	.00	781.50	767.00	6.25
19	.00	781.50	767.00	6.25
20	.00	782.50	784.67	-.93
21	.00	778.66	767.00	5.02
22	.00	778.43	767.00	4.92
23	.00	776.73	761.08	6.74
24	.00	1030.33	763.00	115.15
25	.00	1026.22	765.25	112.41
26	.00	1023.44	765.25	111.21
27	.00	1010.78	779.00	99.83
28	.00	863.08	823.33	17.12
29	.00	1009.06	779.00	99.10
30	.00	1003.09	771.50	99.75
31	.00	993.19	777.33	92.98
32	.00	991.76	779.00	91.64
33	.00	887.49	779.00	46.73
34	.00	863.08	823.33	17.12
35	.00	886.67	779.00	46.38
36	.00	863.08	824.75	16.51
37	.00	858.81	816.00	18.44
38	.00	854.38	816.00	16.53
39	.00	847.65	816.00	13.63
40	.00	863.08	820.00	18.55
41	.00	817.11	792.38	10.65
42	.00	780.62	767.00	5.87
43	.00	778.97	767.00	5.16
44	.00	777.06	761.08	6.88
45	.00	1041.30	763.00	119.87
46	.00	1040.32	765.00	118.59
47	.00	1035.05	765.25	116.21
48	.00	1025.48	775.50	107.67
49	.00	1021.31	777.75	104.91
50	.00	1018.82	774.25	105.34
51	.00	1015.28	771.50	105.01
52	.00	1005.84	777.73	98.26
53	.00	1003.76	779.25	96.70
54	.00	1002.09	779.25	95.98
55	.00	902.58	779.25	53.12
56	.00	900.55	779.25	52.25
57	.00	894.67	779.25	49.72
58	.00	864.67	823.17	17.87
59	.00	860.32	816.50	18.87
60	.00	863.08	817.00	19.85
61	.00	856.42	816.50	17.20
62	.00	850.00	816.50	14.43
63	.00	818.55	790.83	11.94
64	.00	1035.05	767.00	115.46
65	.00	1035.05	767.00	115.46
66	.00	1035.05	761.08	118.01
67	.00	1461.91	763.00	301.05
68	.00	1035.05	765.25	116.21
69	.00	1035.05	765.25	116.21
70	.00	893.47	787.25	45.75
71	.00	1035.05	765.25	116.21
72	.00	1035.05	763.25	117.07
73	.00	894.67	763.25	56.61
74	.00	1003.76	762.00	104.13
75	.00	1003.76	762.00	104.13

76	.00	1003.76	762.00	104.13
77	.00	778.43	763.50	6.43
78	.00	1003.76	763.50	103.49
79	.00	802.03	794.25	3.35
80	1600.00	794.03	779.00	6.47
81	.00	788.85	779.00	4.24
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	779.02	760.10	8.15
109	.00	777.07		
110	.00	777.07	760.10	7.31
113	.00	780.57		
114	.00	779.03		
115	.00	1145.25	761.25	165.40
116	.00	1139.74	762.00	162.70
117	.00	1120.15	765.25	152.87
118	.00	1118.93	765.25	152.34
119	.00	1116.44	765.25	151.27
120	.00	1098.12	816.50	121.30
121	.00	1085.40	812.00	117.76
122	.00	1074.36	812.00	113.01
123	.00	1059.24	812.00	106.49
124	.00	821.03	810.58	4.50
125	.00	1049.32	944.00	45.36
126	.00	1049.14	944.00	45.29
127	.00	1049.01	944.00	45.23
128	.00	1048.82	944.00	45.15
129	.00	1048.58	944.00	45.05
130	.00	1048.60	944.00	45.05
131	.00	1048.33	944.00	44.94
132	.00	1048.46	944.00	44.99
133	.00	1049.13	944.00	45.29
134	.00	1049.00	944.00	45.23
135	.00	1048.88	944.00	45.17
136	.00	1048.73	944.00	45.11
137	.00	1048.76	944.00	45.12
138	.00	1048.83	944.00	45.15
139	.00	1048.45	944.00	44.99
140	.00	1137.70	761.25	162.15
141	.00	1132.19	762.00	159.45
142	.00	1112.61	764.09	150.12
143	.00	1112.36	765.47	149.42
144	.00	1096.44	817.50	120.15
145	.00	1083.99	817.50	114.79
146	.00	1081.97	812.00	116.29
147	.00	1070.95	812.00	111.54
148	.00	1056.21	812.00	105.19
149	.00	1045.83	944.00	43.86
150	.00	1045.64	944.00	43.78
151	.00	1045.50	944.00	43.72
152	.00	1045.29	944.00	43.63
153	.00	1045.05	944.00	43.52
154	.00	1045.15	944.00	43.57
155	.00	1044.88	944.00	43.45
156	.00	1045.02	944.00	43.51
157	.00	1045.66	944.00	43.79
158	.00	1045.54	944.00	43.74
159	.00	1045.44	944.00	43.69
160	.00	1045.32	944.00	43.64
161	.00	1045.29	944.00	43.63
162	.00	1045.26	944.00	43.62
163	.00	1045.04	944.00	43.52
200	.00	821.16	810.58	4.56

THE NET SYSTEM DEMAND = 1600.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13952.62
25	.00
28	.00
31	.00
53	-4368.44
78	-4267.59
108	.00
124	-68.96
140	-147.91
141	-221.88
142	-280.68
143	-280.85
144	-280.84
145	-266.54
146	-192.44
147	-118.41
158	-69.39
174	-159.92
175	-218.19
176	-290.53
177	-290.73
178	-290.76
179	-261.97
180	-174.67
181	-101.91

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13952.62
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12352.62

Calculation OSC-7248

Attachment 11

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=120$ sec

T2797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	839.58
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

60	46	47	18.5	10.4	.2	1.02		
THERE IS A CHECK VALVE IN LINE NUMBER 60								
61	47	48	10.0	10.4	.2	2.23		
62	48	49	10.0	10.4	.2	.88		
63	49	50	3.5	10.4	.2	.69		
64	49	50	4.5	6.4	.2	11.40		
65	50	51	7.0	10.4	.2	.77		
66	51	52	.1	15.5	.2	11.55		
67	52	53	2.5	10.4	.2	.48		
68	53	54	1.7	10.4	.2	.39		
69	54	55	.1	8.1	.2	9.19		
70	55	56	10.0	10.3	.2	.31		
71	56	57	18.0	10.3	.2	1.08		
72	57	70	8.0	10.3	.2	.15		
73	70	58	73.0	10.3	.2	5.54		
74	58	59	26.0	10.3	.2	.59		
75	59	61	7.2	8.5	.2	.28		
76	61	62	.5	8.5	.2	.70		
77	62	63	89.5	8.8	.2	2.15		
78	63	0	50.1	11.5	.2	2.63	809.50	
79	16	64	5.2	13.5	.2	.73		
LINE 79 IS CLOSED								
80	64	65	3.8	13.5	.2	.55		
81	65	66	13.5	13.5	.2	.96		
82	66	67	.1	10.0	.2	.06		
LINE 82 PUMP DATA (HEAD-FLOW): 425.0 .0 410.0 2250.0 298.0 4000.0								
83	67	68	1.0	10.3	.2	.89		
LINE 83 IS CLOSED								
84	64	68	8.5	1.0	.2	50.00		
85	68	69	15.5	10.3	.2	1.41		
86	69	47	3.0	10.3	.2	.43		
87	69	71	10.0	10.3	.2	.31		
88	26	71	6.1	10.3	.2	.65		
LINE 88 IS CLOSED								
89	71	72	29.5	8.1	.2	7.20		
90	72	73	8.6	6.4	.2	.12		
LINE 90 IS CLOSED								
91	73	57	20.5	8.1	.2	.83		
92	9	48	15.0	8.3	.2	2.89		
LINE 92 IS CLOSED								
93	53	74	49.5	8.3	.2	3.13		
94	74	75	3.6	6.4	.2	.12		
95	75	76	12.0	8.3	.2	.40		
96	76	77	5.0	8.3	.2	1.06		
LINE 96 IS CLOSED								
97	77	22	1.5	8.1	.2	.97		
98	76	78	20.5	8.3	.2	.63		
99	78	65	1.5	8.1	.2	.87		
LINE 99 IS CLOSED								
100	36	28	1.5	3.1	.2	1.63		
101	28	34	17.5	3.3	.2	.55		
102	34	40	132.5	3.3	.2	2.34		
103	40	60	4.0	3.3	.2	2.07		
104	58	17	.5	8.1	.2	.19		
105	17	60	3.0	8.1	.2	.42		
LINE 105 IS CLOSED								
106	40	17	.5	3.3	.2	3.72		
LINE 106 IS CLOSED								
107	60	82	22.2	8.3	.2	.80		
LINE 107 IS CLOSED								
108	82	0	23.2	8.3	.2	2.13	798.33	
109	42	113	3.1	13.5	.2	.13		
110	113	114	22.1	10.3	.2	1.53		
111	114	101	.1	8.1	.2	.00		
112	15	109	10.1	10.3	.2	2.58		
113	109	110	.1	8.1	.2	.00		
114	101	115	.1	8.1	.2	.00		
LINE 114 PUMP DATA (HEAD-FLOW): 622.0 .0 470.0 1500.0 385.0 1800.0								
115	115	116	.3	4.0	.2	.15		
116	116	117	1.3	6.1	.2	2.92		
117	117	118	3.7	8.1	.2	.51		
118	118	119	33.3	8.1	.2	.48		
119	119	120	103.3	8.1	.2	6.64		
120	120	121	176.6	8.1	.2	2.30		
121	121	122	.1	8.1	.2	5.37		
122	122	123	14.3	8.1	.2	7.05		

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA	(HEAD-FLOW) :	622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1600.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

T2797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 839.58'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-4360.58	-.05	.00	-.39	-9.77	-17.95
14	13 14	1855.09	.00	.00	.13	4.16	3.46
15	14 15	1855.09	.01	.00	.08	4.16	3.46
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	13931.16	15.95	.00	23.31	31.22	175.25
20	79 80	13931.16	1.28	.00	6.69	31.22	175.25
21	80 81	12331.16	2.08	.00	3.08	27.64	137.73
22	81 13	6215.68	.22	.00	9.07	13.93	35.83
23	81 19	6115.48	.61	.00	6.71	13.71	34.71
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED							
31	0 85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED							
33	12 21	4360.58	.04	.00	.39	9.77	17.95
34	21 22	4407.73	.00	.00	.23	9.88	18.32
35	22 23	4407.73	.27	.00	1.42	9.88	18.32
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE							
36	23 24	4407.73	.01	254.75	.30	18.00	84.88
37	24 25	4407.73	.04	.00	4.06	17.14	74.79
38	21 25	-47.15	-10.66	.00	-237.76	-17.50	-1284.20
39	25 26	4360.58	.59	.00	2.19	16.95	73.23
40	26 27	4360.58	1.28	.00	11.33	16.95	73.23
41	27 29	4060.60	.16	.00	1.55	15.79	63.67
42	27 29	299.99	.03	.00	1.68	3.03	4.71
43	29 30	4360.58	.94	.00	5.01	16.40	67.31
44	30 31	4360.58	.00	.00	9.86	7.41	8.90
45	31 32	4360.58	.13	.00	1.30	16.40	67.31
46	32 33	4360.58	.02	.00	103.87	26.98	241.66
47	33 35	4360.58	.15	.00	.67	16.95	73.23
48	35 36	4360.58	1.06	.00	22.45	16.95	73.23
49	36 37	4360.58	.95	.00	3.30	16.95	73.23
50	37 38	4360.58	1.72	.00	2.69	24.65	191.55
51	38 39	4360.58	.10	.00	6.61	24.65	191.55
52	39 41	4360.58	12.87	.00	17.56	23.26	165.01
53	41 0	4360.58	1.16	.00	6.42	13.47	40.64
54	19 42	6115.48	.03	.00	.85	13.71	34.71
55	42 43	4260.00	.16	.00	1.49	9.55	17.15
56	43 44	4308.69	.43	.00	1.48	9.66	17.53
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE							
57	44 45	4308.69	.01	265.34	.29	17.60	81.13
58	45 46	4308.69	.03	.00	.94	16.21	65.74
59	43 46	-48.69	-8.62	.00	-253.55	-18.07	-1367.77
60	46 47	4260.00	1.19	.00	4.07	16.03	64.30
61	47 48	4260.00	.64	.00	8.89	16.03	64.30
62	48 49	4260.00	.64	.00	3.51	16.03	64.30
63	49 50	3891.66	.19	.00	2.30	14.64	53.86
64	49 50	368.35	.03	.00	2.45	3.72	6.95
65	50 51	4260.00	.45	.00	3.07	16.03	64.30
66	51 52	4260.00	.00	.00	9.41	7.24	8.51
67	52 53	4260.00	.16	.00	1.91	16.03	64.30

68	53	54	4260.00	.11	.00	1.56	16.03	64.30
69	54	55	4260.00	.02	.00	99.14	26.36	230.78
70	55	56	4260.00	.70	.00	1.32	16.56	69.95
71	56	57	4260.00	1.26	.00	4.60	16.56	69.95
72	57	70	4260.00	.56	.00	.64	16.56	69.95
73	70	58	4260.00	5.10	.00	23.60	16.56	69.95
74	58	59	4260.00	1.82	.00	2.51	16.56	69.95
75	59	61	4260.00	1.32	.00	2.57	24.08	182.94
76	61	62	4260.00	.09	.00	6.30	24.08	182.94
77	62	63	4260.00	14.10	.00	17.24	22.73	157.60
78	63	0	4260.00	1.94	.00	7.07	13.16	38.83
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1855.48	.01	.00	.03	4.16	3.46
110	113	114	1855.48	.31	.00	1.24	7.21	13.86
111	114	101	1855.48	.00	.00	.00	11.48	45.19
112	15	109	1855.09	.14	.00	2.08	7.21	13.86
113	109	110	1855.09	.00	.00	.00	11.48	45.17
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1855.48	.00	367.20	.00	11.48	45.19
115	115	116	1855.48	.47	.00	5.02	46.76	1681.68
116	116	117	1855.48	.27	.00	19.26	20.60	202.34
117	117	118	1855.48	.17	.00	1.05	11.48	45.19
118	118	119	1855.48	1.50	.00	.97	11.48	45.19
119	119	120	1855.48	4.67	.00	13.59	11.48	45.19
120	120	121	1855.48	7.98	.00	4.70	11.48	45.19
121	121	122	1855.48	.00	.00	11.00	11.48	45.19
122	122	123	1855.48	.65	.00	14.43	11.48	45.19
123	123	124	68.90	2.71	.00	235.14	25.58	2707.14
124	124	0	68.90	.27	.00	10.16	25.58	2707.14
125	123	125	1786.58	6.33	.00	3.56	10.52	36.99
126	125	126	929.76	.04	.00	.13	5.47	10.46
127	126	127	649.38	.07	.00	.06	3.82	5.27
128	127	128	369.17	.11	.00	.09	3.73	6.98
129	128	129	147.66	.19	.00	.05	3.32	9.14
130	128	130	221.51	.12	.00	.10	4.99	19.77
131	127	131	280.21	.16	.00	.52	6.31	31.03
132	126	132	280.39	.16	.00	.53	6.31	31.07
133	125	133	856.81	.07	.00	.11	5.04	8.95
134	133	134	576.43	.06	.00	.08	3.39	4.20
135	134	135	310.34	.09	.00	.04	3.14	5.03
136	135	136	118.22	.11	.00	.03	2.66	6.01
137	135	137	192.12	.05	.00	.07	4.32	15.07
138	134	138	266.10	.04	.00	.14	5.99	28.10
139	133	139	280.38	.16	.00	.53	6.31	31.07
140	129	0	147.66	.00	.00	104.23	3.32	9.14
141	130	0	221.51	.00	.00	104.25	4.99	19.77

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA (HEAD-FLOW) :		622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

60	46	47	18.5	10.4	.2	1.02		
THERE IS A CHECK VALVE IN LINE NUMBER 60								
61	47	48	10.0	10.4	.2	2.23		
62	48	49	10.0	10.4	.2	.88		
63	49	50	3.5	10.4	.2	.69		
64	49	50	4.5	6.4	.2	11.40		
65	50	51	7.0	10.4	.2	.77		
66	51	52	.1	15.5	.2	11.55		
67	52	53	2.5	10.4	.2	.48		
68	53	54	1.7	10.4	.2	.39		
69	54	55	.1	8.1	.2	9.19		
70	55	56	10.0	10.3	.2	.31		
71	56	57	18.0	10.3	.2	1.08		
72	57	70	8.0	10.3	.2	.15		
73	70	58	73.0	10.3	.2	5.54		
74	58	59	26.0	10.3	.2	.59		
75	59	61	7.2	8.5	.2	.28		
76	61	62	.5	8.5	.2	.70		
77	62	63	89.5	8.8	.2	2.15		
78	63	0	50.1	11.5	.2	2.63	809.50	
79	16	64	5.2	13.5	.2	.73		
LINE 79 IS CLOSED								
80	64	65	3.8	13.5	.2	.55		
81	65	66	13.5	13.5	.2	.96		
82	66	67	.1	10.0	.2	.06		
LINE 82 PUMP DATA (HEAD-FLOW): 425.0 .0 410.0 2250.0 298.0 4000.0								
83	67	68	1.0	10.3	.2	.89		
LINE 83 IS CLOSED								
84	64	68	8.5	1.0	.2	50.00		
85	68	69	15.5	10.3	.2	1.41		
86	69	47	3.0	10.3	.2	.43		
87	69	71	10.0	10.3	.2	.31		
88	26	71	6.1	10.3	.2	.65		
LINE 88 IS CLOSED								
89	71	72	29.5	8.1	.2	7.20		
90	72	73	8.6	6.4	.2	.12		
LINE 90 IS CLOSED								
91	73	57	20.5	8.1	.2	.83		
92	9	48	15.0	8.3	.2	2.89		
LINE 92 IS CLOSED								
93	53	74	49.5	8.3	.2	3.13		
94	74	75	3.6	6.4	.2	.12		
95	75	76	12.0	8.3	.2	.40		
96	76	77	5.0	8.3	.2	1.06		
LINE 96 IS CLOSED								
97	77	22	1.5	8.1	.2	.97		
98	76	78	20.5	8.3	.2	.63		
99	78	65	1.5	8.1	.2	.87		
LINE 99 IS CLOSED								
100	36	28	1.5	3.1	.2	1.63		
101	28	34	17.5	3.3	.2	.55		
102	34	40	132.5	3.3	.2	2.34		
103	40	60	4.0	3.3	.2	2.07		
104	58	17	.5	8.1	.2	.19		
105	17	60	3.0	8.1	.2	.42		
LINE 105 IS CLOSED								
106	40	17	.5	3.3	.2	3.72		
LINE 106 IS CLOSED								
107	60	82	22.2	8.3	.2	.80		
LINE 107 IS CLOSED								
108	82	0	23.2	8.3	.2	2.13	798.33	
109	42	113	3.1	13.5	.2	.13		
110	113	114	22.1	10.3	.2	1.53		
111	114	101	.1	8.1	.2	.00		
112	15	109	10.1	10.3	.2	2.58		
113	109	110	.1	8.1	.2	.00		
114	101	115	.1	8.1	.2	.00		
LINE 114 PUMP DATA (HEAD-FLOW): 622.0 .0 470.0 1500.0 385.0 1800.0								
115	115	116	.3	4.0	.2	.15		
116	116	117	1.3	6.1	.2	2.92		
117	117	118	3.7	8.1	.2	.51		
118	118	119	33.3	8.1	.2	.48		
119	119	120	103.3	8.1	.2	6.64		
120	120	121	176.6	8.1	.2	2.30		
121	121	122	.1	8.1	.2	5.37		
122	122	123	14.3	8.1	.2	7.05		

T7797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	830.46
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

Calculation OSC-7248

Attachment 16

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=420$ sec

THE NET SYSTEM DEMAND = 1600.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13845.35
25	.00
28	.00
31	.00
53	-4329.18
78	-4229.67
108	.00
124	-68.69
140	-146.68
141	-220.03
142	-278.34
143	-278.52
144	-278.51
145	-264.33
146	-190.84
147	-117.43
158	-69.13
174	-158.61
175	-216.40
176	-288.15
177	-288.34
178	-288.37
179	-259.82
180	-173.24
181	-101.07

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13845.35
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12245.34

76	.00	1000.33	762.00	102.66
77	.00	770.29	763.50	2.93
78	.00	1000.33	763.50	102.01
79	.00	793.50	794.25	-.32
80	1600.00	785.62	779.00	2.85
81	.00	780.53	779.00	.66
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	770.87	760.10	4.64
109	.00	768.95		
110	.00	768.95	760.10	3.81
113	.00	772.40		
114	.00	770.88		
115	.00	1141.95	761.25	163.98
116	.00	1136.53	762.00	161.32
117	.00	1117.26	765.25	151.62
118	.00	1116.06	765.25	151.10
119	.00	1113.61	765.25	150.05
120	.00	1095.59	816.50	120.21
121	.00	1083.07	812.00	116.76
122	.00	1072.21	812.00	112.08
123	.00	1057.33	812.00	105.67
124	.00	820.95	810.58	4.47
125	.00	1047.57	944.00	44.61
126	.00	1047.40	944.00	44.54
127	.00	1047.27	944.00	44.48
128	.00	1047.08	944.00	44.40
129	.00	1046.85	944.00	44.30
130	.00	1046.87	944.00	44.31
131	.00	1046.60	944.00	44.19
132	.00	1046.73	944.00	44.25
133	.00	1047.39	944.00	44.54
134	.00	1047.27	944.00	44.48
135	.00	1047.14	944.00	44.43
136	.00	1047.00	944.00	44.37
137	.00	1047.02	944.00	44.38
138	.00	1047.09	944.00	44.40
139	.00	1046.72	944.00	44.25
140	.00	1134.57	761.25	160.80
141	.00	1129.15	762.00	158.14
142	.00	1109.88	764.09	148.94
143	.00	1109.63	765.47	148.24
144	.00	1093.96	817.50	119.08
145	.00	1081.71	817.50	113.80
146	.00	1079.73	812.00	115.32
147	.00	1068.88	812.00	110.65
148	.00	1054.37	812.00	104.40
149	.00	1044.16	944.00	43.14
150	.00	1043.97	944.00	43.06
151	.00	1043.84	944.00	43.00
152	.00	1043.64	944.00	42.92
153	.00	1043.39	944.00	42.81
154	.00	1043.49	944.00	42.86
155	.00	1043.23	944.00	42.74
156	.00	1043.37	944.00	42.80
157	.00	1043.99	944.00	43.07
158	.00	1043.88	944.00	43.02
159	.00	1043.78	944.00	42.98
160	.00	1043.66	944.00	42.93
161	.00	1043.63	944.00	42.92
162	.00	1043.61	944.00	42.90
163	.00	1043.39	944.00	42.81
200	.00	821.08	810.53	4.52

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	770.94	812.00	-17.68
8	.00	770.94	791.75	-8.96
9	.00	770.94	798.42	-11.84
10	.00	770.94	767.00	1.70
11	.00	770.94	767.00	1.70
12	.00	770.94	767.00	1.70
13	.00	771.37	767.00	1.88
14	.00	771.24	767.00	1.82
15	.00	771.15	767.00	1.79
16	.00	773.31	767.00	2.72
17	.00	863.70	822.67	17.67
18	.00	773.31	767.00	2.72
19	.00	773.31	767.00	2.72
20	.00	782.50	784.67	-.93
21	.00	770.52	767.00	1.52
22	.00	770.29	767.00	1.42
23	.00	768.62	761.08	3.25
24	.00	1026.39	763.00	113.45
25	.00	1022.35	765.25	110.74
26	.00	1019.62	765.25	109.56
27	.00	1007.18	779.00	98.29
28	.00	862.12	823.33	16.71
29	.00	1005.50	779.00	97.56
30	.00	999.63	771.50	98.26
31	.00	989.91	777.33	91.57
32	.00	988.50	779.00	90.24
33	.00	886.10	779.00	46.13
34	.00	862.12	823.33	16.71
35	.00	885.29	779.00	45.78
36	.00	862.12	824.75	16.10
37	.00	857.93	816.00	18.06
38	.00	853.58	816.00	16.19
39	.00	846.97	816.00	13.34
40	.00	862.12	820.00	18.14
41	.00	816.97	792.38	10.59
42	.00	772.44	767.00	2.34
43	.00	770.82	767.00	1.65
44	.00	768.94	761.08	3.39
45	.00	1037.21	763.00	118.11
46	.00	1036.25	765.00	116.84
47	.00	1031.07	765.25	114.50
48	.00	1021.67	775.50	106.03
49	.00	1017.57	777.75	103.30
50	.00	1015.12	774.25	103.75
51	.00	1011.65	771.50	103.44
52	.00	1002.38	777.73	96.76
53	.00	1000.33	779.25	95.23
54	.00	998.69	779.25	94.52
55	.00	900.94	779.25	52.42
56	.00	898.95	779.25	51.56
57	.00	893.17	779.25	49.07
58	.00	863.70	823.17	17.46
59	.00	859.43	816.50	18.49
60	.00	862.12	817.00	19.44
61	.00	855.60	816.50	16.84
62	.00	849.29	816.50	14.12
63	.00	818.39	790.83	11.87
64	.00	1031.07	767.00	113.74
65	.00	1031.07	767.00	113.74
66	.00	1031.07	761.08	116.29
67	.00	1457.93	763.00	299.33
68	.00	1031.07	765.25	114.50
69	.00	1031.07	765.25	114.50
70	.00	891.99	787.25	45.12
71	.00	1031.07	765.25	114.50
72	.00	1031.07	763.25	115.36
73	.00	893.17	763.25	55.96
74	.00	1000.33	762.00	102.66
75	.00	1000.33	762.00	102.66

142	131	0	278.34	.00	.00	102.60	6.27	30.63
143	132	0	278.52	.00	.00	102.73	6.27	30.67
144	139	0	278.51	.00	.00	102.72	6.27	30.67
145	138	0	264.33	.00	.00	103.09	5.95	27.74
146	137	0	190.84	.00	.00	103.02	4.30	14.88
147	136	0	117.43	.00	.00	103.00	2.64	5.94
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1843.13	.00	365.62	.00	11.40	44.61
149	140	141	1843.13	.46	.00	4.96	46.45	1659.57
150	141	142	1843.13	.26	.00	19.00	20.47	199.70
151	142	143	1843.13	.00	.00	.24	11.40	44.61
152	143	144	1843.13	9.00	.00	6.67	11.40	44.61
153	144	145	1843.13	1.10	.00	11.15	11.40	44.61
154	145	146	1843.13	.17	.00	1.81	11.40	44.61
155	146	147	1843.13	.00	.00	10.84	11.40	44.61
156	147	148	1843.13	.57	.00	13.93	11.40	44.61
157	148	200	69.13	2.72	.00	230.57	25.66	2724.87
158	200	0	69.13	.27	.00	10.22	25.66	2724.87
159	148	149	1774.00	5.73	.00	4.48	10.45	36.49
160	149	150	951.50	.05	.00	.14	5.60	10.94
161	150	151	663.15	.07	.00	.07	3.90	5.49
162	151	152	375.01	.11	.00	.09	3.79	7.19
163	152	153	158.61	.19	.00	.06	3.57	10.47
164	152	154	216.40	.05	.00	.09	4.87	18.91
165	151	155	288.15	.05	.00	.56	6.49	32.74
166	150	156	288.34	.05	.00	.56	6.49	32.79
167	149	157	822.50	.07	.00	.10	4.84	8.27
168	157	158	534.13	.05	.00	.06	3.15	3.64
169	158	159	274.31	.07	.00	.03	2.77	3.98
170	159	160	101.07	.09	.00	.02	2.27	4.48
171	159	161	173.24	.09	.00	.06	3.90	12.38
172	158	162	259.82	.14	.00	.14	5.85	26.84
173	157	163	288.37	.05	.00	.56	6.49	32.79
174	153	0	158.61	.00	.00	99.39	3.57	10.47
175	154	0	216.40	.00	.00	99.49	4.87	18.91
176	155	0	288.15	.00	.00	99.23	6.49	32.74
177	156	0	288.34	.00	.00	99.36	6.49	32.79
178	163	0	288.37	.00	.00	99.38	6.49	32.79
179	162	0	259.82	.00	.00	99.61	5.85	26.84
180	161	0	173.24	.00	.00	99.63	3.90	12.38
181	160	0	101.07	.00	.00	99.66	2.27	4.48

68	53	54	4229.67	.11	.00	1.53	15.91	63.40
69	54	55	4229.67	.02	.00	97.73	26.17	227.55
70	55	56	4229.67	.69	.00	1.30	16.44	68.98
71	56	57	4229.67	1.24	.00	4.53	16.44	68.98
72	57	70	4229.67	.55	.00	.63	16.44	68.98
73	70	58	4229.67	5.03	.00	23.26	16.44	68.98
74	58	59	4229.67	1.79	.00	2.48	16.44	68.98
75	59	61	4229.67	1.30	.00	2.53	23.91	180.38
76	61	62	4229.67	.09	.00	6.21	23.91	180.38
77	62	63	4229.67	13.91	.00	17.00	22.57	155.39
78	63	0	4229.67	1.92	.00	6.97	13.06	38.29
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1843.37	.01	.00	.03	4.13	3.41
110	113	114	1843.37	.30	.00	1.22	7.17	13.69
111	114	101	1843.37	.00	.00	.00	11.41	44.62
112	15	109	1843.13	.14	.00	2.06	7.17	13.68
113	109	110	1843.13	.00	.00	.00	11.40	44.61
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1843.37	.00	371.09	.00	11.41	44.62
115	115	116	1843.37	.46	.00	4.96	46.45	1659.99
116	116	117	1843.37	.26	.00	19.01	20.47	199.75
117	117	118	1843.37	.17	.00	1.03	11.41	44.62
118	118	119	1843.37	1.49	.00	.96	11.41	44.62
119	119	120	1843.37	4.61	.00	13.41	11.41	44.62
120	120	121	1843.37	7.88	.00	4.64	11.41	44.62
121	121	122	1843.37	.00	.00	10.85	11.41	44.62
122	122	123	1843.37	.64	.00	14.24	11.41	44.62
123	123	124	68.69	2.69	.00	233.70	25.50	2690.75
124	124	0	68.69	.27	.00	10.09	25.50	2690.75
125	123	125	1774.68	6.25	.00	3.51	10.45	36.51
126	125	126	923.57	.04	.00	.13	5.44	19.33
127	126	127	645.05	.07	.00	.06	3.80	5.20
128	127	128	366.71	.11	.00	.08	3.71	6.89
129	128	129	146.68	.18	.00	.05	3.30	9.03
130	128	130	220.03	.12	.00	.10	4.95	19.52
131	127	131	278.34	.15	.00	.52	6.27	30.63
132	126	132	278.52	.15	.00	.52	6.27	30.67
133	125	133	851.10	.07	.00	.11	5.01	8.83
134	133	134	572.59	.05	.00	.07	3.37	4.15
135	134	135	308.27	.09	.00	.04	3.12	4.96
136	135	136	117.43	.11	.00	.03	2.64	5.94
137	135	137	190.84	.04	.00	.07	4.30	14.88
138	134	138	264.33	.03	.00	.14	5.95	27.74
139	133	139	278.51	.15	.00	.52	6.27	30.67
140	129	0	146.68	.00	.00	102.85	3.30	9.03
141	130	0	220.03	.00	.00	102.86	4.95	19.52

T6797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 832.28'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-4329.18	-.05	.00	-.38	-9.70	-17.69
14	13 14	1843.13	.00	.00	.13	4.13	3.41
15	14 15	1843.13	.01	.00	.08	4.13	3.41
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	13845.35	15.75	.00	23.02	31.03	173.13
20	79 80	13845.35	1.27	.00	6.61	31.03	173.13
21	80 81	12245.35	2.05	.00	3.04	27.45	135.84
22	81 13	6172.31	.22	.00	8.94	13.83	35.34
23	81 19	6073.04	.60	.00	6.62	13.61	34.24
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED							
31	0 85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED							
33	12 21	4329.18	.04	.00	.38	9.70	17.69
34	21 22	4376.65	.00	.00	.22	9.81	18.07
35	22 23	4376.65	.27	.00	1.40	9.81	18.07
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE							
36	23 24	4376.65	.01	258.07	.30	17.88	83.71
37	24 25	4376.65	.04	.00	4.00	17.02	73.76
38	21 25	-47.47	-10.80	.00	-241.03	-17.62	-1301.51
39	25 26	4329.18	.58	.00	2.16	16.83	72.19
40	26 27	4329.18	1.26	.00	11.17	16.83	72.19
41	27 29	4031.35	.16	.00	1.53	15.67	62.78
42	27 29	297.83	.03	.00	1.65	3.01	4.65
43	29 30	4329.18	.93	.00	4.94	16.29	66.36
44	30 31	4329.18	.00	.00	9.72	7.36	8.78
45	31 32	4329.18	.13	.00	1.28	16.29	66.36
46	32 33	4329.18	.02	.00	102.38	26.79	238.24
47	33 35	4329.18	.14	.00	.66	16.83	72.19
48	35 36	4329.18	1.05	.00	22.12	16.83	72.19
49	36 37	4329.18	.94	.00	3.25	16.83	72.19
50	37 38	4329.18	1.70	.00	2.65	24.48	188.84
51	38 39	4329.18	.09	.00	6.51	24.48	188.84
52	39 41	4329.18	12.69	.00	17.31	23.10	162.68
53	41 0	4329.18	1.15	.00	6.33	13.37	40.07
54	19 42	6073.04	.03	.00	.83	13.61	34.24
55	42 43	4229.67	.16	.00	1.47	9.48	16.91
56	43 44	4278.66	.42	.00	1.46	9.59	17.30
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE							
57	44 45	4278.66	.01	203.56	.28	17.48	80.07
58	45 46	4278.66	.03	.00	.93	16.10	64.85
59	43 46	-48.99	-8.72	.00	-256.71	-18.18	-1384.44
60	46 47	4229.67	1.17	.00	4.01	15.91	63.40
61	47 48	4229.67	.63	.00	8.77	15.91	63.40
62	48 49	4229.67	.63	.00	3.46	15.91	63.40
63	49 50	3863.94	.19	.00	2.26	14.54	53.11
64	49 50	365.72	.03	.00	2.42	3.70	6.86
65	50 51	4229.67	.44	.00	3.03	15.91	63.40
66	51 52	4229.67	.00	.00	9.27	7.19	8.39
67	52 53	4229.67	.16	.00	1.89	15.91	63.40

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1600.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA (HEAD-FLOW):		622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW):					425.0	.0	410.0	2250.0	298.0 4000.0
83	67	68	1.0	10.3	.2	.89			
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW):					622.0	.0	470.0	1500.0	385.0 1800.0
115	115	116	.3	4.0	.2	.15			
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

T6797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	832.28
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

Calculation OSC-7248

Attachment 15

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=360$ sec

THE NET SYSTEM DEMAND = 1600.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13866.77
25	.00
28	.00
31	.00
53	-4337.02
78	-4237.24
108	.00
124	-68.75
140	-146.92
141	-220.40
142	-278.81
143	-278.98
144	-278.98
145	-264.77
146	-191.16
147	-117.62
158	-69.18
174	-158.87
175	-216.76
176	-288.62
177	-288.82
178	-288.85
179	-260.25
180	-173.52
181	-101.24

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13866.77
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12266.77

76	.00	1001.01	762.00	102.95
77	.00	771.92	763.50	3.62
78	.00	1001.01	763.50	102.31
79	.00	795.20	794.25	.41
80	1600.00	787.30	779.00	3.58
81	.00	782.19	779.00	1.37
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	772.50	760.10	5.34
109	.00	770.57		
110	.00	770.57	760.10	4.51
113	.00	774.03		
114	.00	772.50		
115	.00	1142.61	761.25	164.26
116	.00	1137.17	762.00	161.60
117	.00	1117.83	765.25	151.87
118	.00	1116.63	765.25	151.35
119	.00	1114.17	765.25	150.29
120	.00	1096.09	816.50	120.43
121	.00	1083.54	812.00	116.96
122	.00	1072.64	812.00	112.27
123	.00	1057.71	812.00	105.84
124	.00	820.96	810.58	4.47
125	.00	1047.92	944.00	44.76
126	.00	1047.75	944.00	44.69
127	.00	1047.62	944.00	44.63
128	.00	1047.43	944.00	44.55
129	.00	1047.19	944.00	44.45
130	.00	1047.21	944.00	44.46
131	.00	1046.94	944.00	44.34
132	.00	1047.07	944.00	44.40
133	.00	1047.74	944.00	44.68
134	.00	1047.61	944.00	44.63
135	.00	1047.49	944.00	44.58
136	.00	1047.35	944.00	44.51
137	.00	1047.37	944.00	44.52
138	.00	1047.44	944.00	44.55
139	.00	1047.07	944.00	44.39
140	.00	1135.19	761.25	161.07
141	.00	1129.75	762.00	158.40
142	.00	1110.42	764.09	149.18
143	.00	1110.17	765.47	148.48
144	.00	1094.45	817.50	119.29
145	.00	1082.16	817.50	114.00
146	.00	1080.17	812.00	115.51
147	.00	1069.29	812.00	110.82
148	.00	1054.74	812.00	104.56
149	.00	1044.49	944.00	43.29
150	.00	1044.30	944.00	43.20
151	.00	1044.17	944.00	43.15
152	.00	1043.97	944.00	43.06
153	.00	1043.72	944.00	42.95
154	.00	1043.82	944.00	43.00
155	.00	1043.56	944.00	42.88
156	.00	1043.70	944.00	42.94
157	.00	1044.32	944.00	43.21
158	.00	1044.21	944.00	43.16
159	.00	1044.11	944.00	43.12
160	.00	1043.99	944.00	43.07
161	.00	1043.96	944.00	43.06
162	.00	1043.94	944.00	43.05
163	.00	1043.72	944.00	42.95
200	.00	821.10	810.58	4.53

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	772.57	812.00	-16.98
8	.00	772.57	791.75	-8.26
9	.00	772.57	798.42	-11.14
10	.00	772.57	767.00	2.40
11	.00	772.57	767.00	2.40
12	.00	772.57	767.00	2.40
13	.00	773.00	767.00	2.58
14	.00	772.86	767.00	2.52
15	.00	772.77	767.00	2.49
16	.00	774.94	767.00	3.42
17	.00	863.89	822.67	17.75
18	.00	774.94	767.00	3.42
19	.00	774.94	767.00	3.42
20	.00	782.50	784.67	-.93
21	.00	772.14	767.00	2.21
22	.00	771.92	767.00	2.12
23	.00	770.24	761.08	3.94
24	.00	1027.17	763.00	113.79
25	.00	1023.12	765.25	111.07
26	.00	1020.38	765.25	109.89
27	.00	1007.90	779.00	98.59
28	.00	862.31	823.33	16.79
29	.00	1006.21	779.00	97.87
30	.00	1000.32	771.50	98.56
31	.00	990.56	777.33	91.85
32	.00	989.15	779.00	90.52
33	.00	886.37	779.00	46.25
34	.00	862.31	823.33	16.79
35	.00	885.57	779.00	45.90
36	.00	862.31	824.75	16.18
37	.00	858.10	816.00	18.14
38	.00	853.74	816.00	16.25
39	.00	847.11	816.00	13.40
40	.00	862.31	820.00	18.23
41	.00	817.00	792.38	10.61
42	.00	774.07	767.00	3.05
43	.00	772.45	767.00	2.35
44	.00	770.56	761.08	4.08
45	.00	1038.02	763.00	118.46
46	.00	1037.06	765.00	117.19
47	.00	1031.86	765.25	114.84
48	.00	1022.42	775.50	106.36
49	.00	1018.32	777.75	103.62
50	.00	1015.86	774.25	104.07
51	.00	1012.37	771.50	103.75
52	.00	1003.07	777.73	97.06
53	.00	1001.01	779.25	95.52
54	.00	999.37	779.25	94.81
55	.00	901.27	779.25	52.56
56	.00	899.27	779.25	51.70
57	.00	893.47	779.25	49.20
58	.00	863.89	823.17	17.54
59	.00	859.60	816.50	18.57
60	.00	862.31	817.00	19.52
61	.00	855.76	816.50	16.91
62	.00	849.43	816.50	14.19
63	.00	818.42	790.83	11.88
64	.00	1031.86	767.00	114.08
65	.00	1031.86	767.00	114.06
66	.00	1031.86	761.08	116.63
67	.00	1458.72	763.00	299.67
68	.00	1031.86	765.25	114.84
69	.00	1031.86	765.25	114.84
70	.00	892.28	787.25	45.24
71	.00	1031.86	765.25	114.84
72	.00	1031.86	763.25	115.70
73	.00	893.47	763.25	56.09
74	.00	1001.01	762.00	102.95
75	.00	1001.01	762.00	102.95

142	131	0	278.81	.00	.00	102.94	6.28	30.73
143	132	0	278.98	.00	.00	103.07	6.28	30.77
144	139	0	278.98	.00	.00	103.06	6.28	30.77
145	138	0	264.77	.00	.00	103.43	5.96	27.83
146	137	0	191.16	.00	.00	103.37	4.30	14.92
147	136	0	117.62	.00	.00	103.34	2.65	5.96
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1846.12	.00	364.63	.00	11.42	44.75
149	140	141	1846.12	.47	.00	4.97	46.52	1664.90
150	141	142	1846.12	.26	.00	19.07	20.50	200.34
151	142	143	1846.12	.00	.00	.24	11.42	44.75
152	143	144	1846.12	9.03	.00	6.69	11.42	44.75
153	144	145	1846.12	1.11	.00	11.18	11.42	44.75
154	145	146	1846.12	.18	.00	1.82	11.42	44.75
155	146	147	1846.12	.00	.00	10.88	11.42	44.75
156	147	148	1846.12	.57	.00	13.98	11.42	44.75
157	148	200	69.18	2.73	.00	230.91	25.68	2728.88
158	200	0	69.18	.27	.00	10.24	25.68	2728.88
159	148	149	1776.93	5.75	.00	4.50	10.46	36.60
160	149	150	953.07	.05	.00	.14	5.61	10.97
161	150	151	664.25	.07	.00	.07	3.91	5.50
162	151	152	375.63	.11	.00	.09	3.80	7.22
163	152	153	158.87	.19	.00	.06	3.58	10.50
164	152	154	216.76	.05	.00	.09	4.88	18.97
165	151	155	288.62	.05	.00	.56	6.50	32.85
166	150	156	288.82	.05	.00	.56	6.50	32.89
167	149	157	823.86	.07	.00	.10	4.85	8.30
168	157	158	535.01	.05	.00	.06	3.15	3.65
169	158	159	274.76	.07	.00	.03	2.78	3.99
170	159	160	101.24	.09	.00	.02	2.28	4.50
171	159	161	173.52	.09	.00	.06	3.91	12.41
172	158	162	260.25	.14	.00	.14	5.86	26.92
173	157	163	288.85	.05	.00	.56	6.50	32.90
174	153	0	158.87	.00	.00	99.72	3.58	10.50
175	154	0	216.76	.00	.00	99.82	4.88	18.97
176	155	0	288.62	.00	.00	99.56	6.50	32.85
177	156	0	288.82	.00	.00	99.69	6.50	32.89
178	163	0	288.85	.00	.00	99.71	6.50	32.90
179	162	0	260.25	.00	.00	99.93	5.86	26.92
180	161	0	173.52	.00	.00	99.96	3.91	12.41
181	160	0	101.24	.00	.00	99.99	2.28	4.50

68	53	54	4237.24	.11	.00	1.54	15.94	63.62
69	54	55	4237.24	.02	.00	98.08	26.22	228.36
70	55	56	4237.24	.69	.00	1.31	16.47	69.22
71	56	57	4237.24	1.25	.00	4.55	16.47	69.22
72	57	70	4237.24	.55	.00	.63	16.47	69.22
73	70	58	4237.24	5.05	.00	23.34	16.47	69.22
74	58	59	4237.24	1.80	.00	2.49	16.47	69.22
75	59	61	4237.24	1.30	.00	2.54	23.96	181.02
76	61	62	4237.24	.09	.00	6.24	23.96	181.02
77	62	63	4237.24	13.96	.00	17.06	22.61	155.94
78	63	0	4237.24	1.92	.00	6.99	13.09	38.42
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1846.39	.01	.00	.03	4.14	3.43
110	113	114	1846.39	.30	.00	1.22	7.18	13.73
111	114	101	1846.39	.00	.00	.00	11.42	44.76
112	15	109	1846.12	.14	.00	2.06	7.18	13.73
113	109	110	1846.12	.00	.00	.00	11.42	44.75
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1846.39	.00	370.12	.00	11.42	44.76
115	115	116	1846.39	.47	.00	4.98	46.53	1665.39
116	116	117	1846.39	.26	.00	19.07	20.50	200.40
117	117	118	1846.39	.17	.00	1.04	11.42	44.76
118	118	119	1846.39	1.49	.00	.96	11.42	44.76
119	119	120	1846.39	4.62	.00	13.46	11.42	44.76
120	120	121	1846.39	7.90	.00	4.65	11.42	44.76
121	121	122	1846.39	.00	.00	10.89	11.42	44.76
122	122	123	1846.39	.64	.00	14.29	11.42	44.76
123	123	124	68.75	2.69	.00	234.06	25.52	2694.84
124	124	0	68.75	.27	.00	10.11	25.52	2694.84
125	123	125	1777.65	6.27	.00	3.52	10.47	36.63
126	125	126	925.12	.04	.00	.13	5.45	10.36
127	126	127	646.13	.07	.00	.06	3.80	5.22
128	127	128	367.32	.11	.00	.08	3.71	6.92
129	128	129	146.92	.18	.00	.05	3.31	9.06
130	128	130	220.40	.12	.00	.10	4.96	19.58
131	127	131	278.81	.15	.00	.52	6.28	30.73
132	126	132	278.98	.15	.00	.52	6.28	30.77
133	125	133	852.53	.07	.00	.11	5.02	8.86
134	133	134	573.55	.05	.00	.07	3.38	4.16
135	134	135	308.78	.09	.00	.04	3.12	4.98
136	135	136	117.62	.11	.00	.03	2.65	5.96
137	135	137	191.16	.04	.00	.07	4.30	14.92
138	134	138	264.77	.03	.00	.14	5.96	27.83
139	133	139	278.98	.15	.00	.52	6.28	30.77
140	129	0	146.92	.00	.00	103.19	3.31	9.06
141	130	0	220.40	.00	.00	103.21	4.96	19.58

T5797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 834.10'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-4337.02	-.05	.00	-.38	-9.72	-17.76
14	13 14	1846.12	.00	.00	.13	4.14	3.42
15	14 15	1846.12	.01	.00	.08	4.14	3.42
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	13866.77	15.80	.00	23.10	31.08	173.66
20	79 80	13866.77	1.27	.00	6.63	31.08	173.66
21	80 81	12266.77	2.06	.00	3.05	27.49	136.31
22	81 13	6183.14	.22	.00	8.98	13.86	35.46
23	81 19	6083.63	.61	.00	6.64	13.64	34.35
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED							
31	0 85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED							
33	12 21	4337.02	.04	.00	.38	9.72	17.76
34	21 22	4384.41	.00	.00	.22	9.83	18.14
35	22 23	4384.41	.27	.00	1.41	9.83	18.14
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE							
36	23 24	4384.41	.01	257.24	.30	17.91	84.00
37	24 25	4384.41	.04	.00	4.02	17.05	74.01
38	21 25	-47.39	-10.77	.00	-240.21	-17.59	-1297.19
39	25 26	4337.02	.58	.00	2.16	16.86	72.45
40	26 27	4337.02	1.27	.00	11.21	16.86	72.45
41	27 29	4038.65	.16	.00	1.53	15.70	63.00
42	27 29	298.37	.03	.00	1.66	3.02	4.67
43	29 30	4337.02	.93	.00	4.96	16.32	66.60
44	30 31	4337.02	.00	.00	9.75	7.37	8.81
45	31 32	4337.02	.13	.00	1.28	16.32	66.60
46	32 33	4337.02	.02	.00	102.75	26.84	239.09
47	33 35	4337.02	.14	.00	.66	16.86	72.45
48	35 36	4337.02	1.05	.00	22.20	16.86	72.45
49	36 37	4337.02	.94	.00	3.27	16.86	72.45
50	37 38	4337.02	1.71	.00	2.66	24.52	189.52
51	38 39	4337.02	.09	.00	6.53	24.52	189.52
52	39 41	4337.02	12.73	.00	17.37	23.14	163.26
53	41 0	4337.02	1.15	.00	6.35	13.40	40.21
54	19 42	6083.63	.03	.00	.84	13.64	34.35
55	42 43	4237.24	.16	.00	1.47	9.50	16.97
56	43 44	4286.15	.43	.00	1.46	9.61	17.35
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE							
57	44 45	4286.15	.01	267.76	.29	17.51	80.35
58	45 46	4286.15	.03	.00	.93	16.12	65.07
59	43 46	-48.91	-8.70	.00	-255.92	-18.16	-1380.28
60	46 47	4237.24	1.18	.00	4.02	15.94	63.62
61	47 48	4237.24	.64	.00	8.80	15.94	63.62
62	48 49	4237.24	.64	.00	3.47	15.94	63.62
63	49 50	3870.86	.19	.00	2.27	14.56	53.30
64	49 50	366.38	.03	.00	2.43	3.70	6.88
65	50 51	4237.24	.45	.00	3.04	15.94	63.62
66	51 52	4237.24	.00	.00	9.31	7.20	8.42
67	52 53	4237.24	.16	.00	1.89	15.94	63.62

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1600.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148 PUMP DATA (HEAD-FLOW):					.0	468.0 1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0									
83	67	68	1.0	10.3	.2	.89	410.0	2250.0	298.0 4000.0
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0									
115	115	116	.3	4.0	.2	.15	470.0	1500.0	385.0 1800.0
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

T5797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	834.10
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

Calculation OSC-7248

Attachment 14

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=300$ sec

THE NET SYSTEM DEMAND = 1600.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13888.29
25	.00
28	.00
31	.00
53	-4344.90
78	-4244.85
108	.00
124	-68.80
140	-147.17
141	-220.77
142	-279.28
143	-279.45
144	-279.44
145	-265.21
146	-191.48
147	-117.82
158	-69.24
174	-159.14
175	-217.11
176	-289.10
177	-289.30
178	-289.33
179	-260.68
180	-173.81
181	-101.41

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13888.29
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12288.29

76	.00	1001.70	762.00	103.25
77	.00	773.55	763.50	4.33
78	.00	1001.70	763.50	102.60
79	.00	796.91	794.25	1.15
80	1600.00	788.99	779.00	4.30
81	.00	783.86	779.00	2.09
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	774.13	760.10	6.04
109	.00	772.20		
110	.00	772.19	760.10	5.21
113	.00	775.67		
114	.00	774.13		
115	.00	1143.27	761.25	164.55
116	.00	1137.81	762.00	161.87
117	.00	1118.41	765.25	152.12
118	.00	1117.20	765.25	151.60
119	.00	1114.74	765.25	150.54
120	.00	1096.60	816.50	120.65
121	.00	1084.00	812.00	117.16
122	.00	1073.07	812.00	112.45
123	.00	1058.10	812.00	106.00
124	.00	820.98	810.58	4.48
125	.00	1048.27	944.00	44.91
126	.00	1048.10	944.00	44.84
127	.00	1047.97	944.00	44.78
128	.00	1047.77	944.00	44.70
129	.00	1047.54	944.00	44.60
130	.00	1047.56	944.00	44.61
131	.00	1047.29	944.00	44.49
132	.00	1047.42	944.00	44.55
133	.00	1048.09	944.00	44.83
134	.00	1047.96	944.00	44.78
135	.00	1047.83	944.00	44.72
136	.00	1047.69	944.00	44.66
137	.00	1047.71	944.00	44.67
138	.00	1047.78	944.00	44.70
139	.00	1047.41	944.00	44.54
140	.00	1135.82	761.25	161.34
141	.00	1130.36	762.00	158.67
142	.00	1110.97	764.09	149.41
143	.00	1110.72	765.47	148.71
144	.00	1094.95	817.50	119.51
145	.00	1082.62	817.50	114.20
146	.00	1080.62	812.00	115.70
147	.00	1069.70	812.00	111.00
148	.00	1055.10	812.00	104.71
149	.00	1044.83	944.00	43.43
150	.00	1044.64	944.00	43.35
151	.00	1044.50	944.00	43.29
152	.00	1044.30	944.00	43.20
153	.00	1044.05	944.00	43.10
154	.00	1044.16	944.00	43.14
155	.00	1043.89	944.00	43.03
156	.00	1044.03	944.00	43.09
157	.00	1044.66	944.00	43.36
158	.00	1044.54	944.00	43.31
159	.00	1044.44	944.00	43.26
160	.00	1044.33	944.00	43.21
161	.00	1044.30	944.00	43.20
162	.00	1044.27	944.00	43.19
163	.00	1044.05	944.00	43.09
200	.00	821.11	810.58	4.54

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	774.20	812.00	-16.28
8	.00	774.20	791.75	-7.56
9	.00	774.20	798.42	-10.43
10	.00	774.20	767.00	3.10
11	.00	774.20	767.00	3.10
12	.00	774.20	767.00	3.10
13	.00	774.63	767.00	3.29
14	.00	774.50	767.00	3.23
15	.00	774.41	767.00	3.19
16	.00	776.59	767.00	4.13
17	.00	864.08	822.67	17.84
18	.00	776.59	767.00	4.13
19	.00	776.59	767.00	4.13
20	.00	782.50	784.67	-.93
21	.00	773.77	767.00	2.92
22	.00	773.55	767.00	2.82
23	.00	771.86	761.08	4.64
24	.00	1027.96	763.00	114.13
25	.00	1023.90	765.25	111.41
26	.00	1021.14	765.25	110.22
27	.00	1008.62	779.00	98.90
28	.00	862.50	823.33	16.87
29	.00	1006.92	779.00	98.17
30	.00	1001.01	771.50	98.86
31	.00	991.22	777.33	92.13
32	.00	989.80	779.00	90.80
33	.00	886.65	779.00	46.37
34	.00	862.50	823.33	16.87
35	.00	885.84	779.00	46.02
36	.00	862.50	824.75	16.26
37	.00	858.28	816.00	18.21
38	.00	853.90	816.00	16.32
39	.00	847.24	816.00	13.46
40	.00	862.50	820.00	18.31
41	.00	817.03	792.38	10.62
42	.00	775.71	767.00	3.75
43	.00	774.08	767.00	3.05
44	.00	772.19	761.08	4.78
45	.00	1038.84	763.00	118.81
46	.00	1037.88	765.00	117.54
47	.00	1032.66	765.25	115.18
48	.00	1023.19	775.50	106.69
49	.00	1019.06	777.75	103.94
50	.00	1016.60	774.25	104.39
51	.00	1013.10	771.50	104.07
52	.00	1003.76	777.73	97.36
53	.00	1001.70	779.25	95.82
54	.00	1000.05	779.25	95.10
55	.00	901.59	779.25	52.70
56	.00	899.59	779.25	51.83
57	.00	893.77	779.25	49.33
58	.00	864.08	823.17	17.62
59	.00	859.78	816.50	18.64
60	.00	862.50	817.00	19.60
61	.00	855.93	816.50	16.98
62	.00	849.58	816.50	14.25
63	.00	818.45	790.83	11.90
64	.00	1032.66	767.00	114.43
65	.00	1032.66	767.00	114.43
66	.00	1032.66	761.08	116.98
67	.00	1459.52	763.00	300.02
68	.00	1032.66	765.25	115.18
69	.00	1032.66	765.25	115.18
70	.00	892.58	787.25	45.37
71	.00	1032.66	765.25	115.18
72	.00	1032.66	763.25	116.04
73	.00	893.77	763.25	56.22
74	.00	1001.70	762.00	103.25
75	.00	1001.70	762.00	103.25

142	131	0	279.28	.00	.00	103.29	6.29	30.83
143	132	0	279.45	.00	.00	103.42	6.29	30.87
144	139	0	279.44	.00	.00	103.41	6.29	30.87
145	138	0	265.21	.00	.00	103.78	5.97	27.92
146	137	0	191.48	.00	.00	103.71	4.31	14.97
147	136	0	117.82	.00	.00	103.69	2.65	5.97
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1849.12	.00	363.63	.00	11.44	44.89
149	140	141	1849.12	.47	.00	4.99	46.60	1670.27
150	141	142	1849.12	.27	.00	19.13	20.53	200.98
151	142	143	1849.12	.00	.00	.24	11.44	44.89
152	143	144	1849.12	9.05	.00	6.72	11.44	44.89
153	144	145	1849.12	1.11	.00	11.22	11.44	44.89
154	145	146	1849.12	.18	.00	1.82	11.44	44.89
155	146	147	1849.12	.00	.00	10.91	11.44	44.89
156	147	148	1849.12	.57	.00	14.02	11.44	44.89
157	148	200	69.24	2.73	.00	231.26	25.70	2732.89
158	200	0	69.24	.27	.00	10.26	25.70	2732.89
159	148	149	1779.88	5.77	.00	4.51	10.48	36.72
160	149	150	954.65	.05	.00	.14	5.62	11.01
161	150	151	665.35	.07	.00	.07	3.92	5.52
162	151	152	376.25	.11	.00	.09	3.80	7.24
163	152	153	159.14	.19	.00	.06	3.58	10.53
164	152	154	217.11	.05	.00	.09	4.89	19.03
165	151	155	289.10	.05	.00	.56	6.51	32.95
166	150	156	289.30	.05	.00	.56	6.51	33.00
167	149	157	825.23	.07	.00	.10	4.86	8.33
168	157	158	535.90	.05	.00	.06	3.16	3.66
169	158	159	275.22	.07	.00	.03	2.78	4.01
170	159	160	101.41	.09	.00	.02	2.28	4.51
171	159	161	173.81	.09	.00	.06	3.91	12.45
172	158	162	260.68	.14	.00	.14	5.87	27.01
173	157	163	289.33	.05	.00	.56	6.51	33.00
174	153	0	159.14	.00	.00	100.05	3.58	10.53
175	154	0	217.11	.00	.00	100.15	4.89	19.03
176	155	0	289.10	.00	.00	99.89	6.51	32.95
177	156	0	289.30	.00	.00	100.02	6.51	33.00
178	163	0	289.33	.00	.00	100.04	6.51	33.00
179	162	0	260.68	.00	.00	100.27	5.87	27.01
180	161	0	173.81	.00	.00	100.29	3.91	12.45
181	160	0	101.41	.00	.00	100.33	2.28	4.51

68	53	54	4244.85	.11	.00	1.54	15.97	63.85
69	54	55	4244.85	.02	.00	98.43	26.27	229.17
70	55	56	4244.85	.69	.00	1.31	16.50	69.46
71	56	57	4244.85	1.25	.00	4.57	16.50	69.46
72	57	70	4244.85	.56	.00	.63	16.50	69.46
73	70	58	4244.85	5.07	.00	23.43	16.50	69.46
74	58	59	4244.85	1.81	.00	2.49	16.50	69.46
75	59	61	4244.85	1.31	.00	2.55	24.00	181.66
76	61	62	4244.85	.09	.00	6.26	24.00	181.66
77	62	63	4244.85	14.01	.00	17.12	22.65	156.49
78	63	0	4244.85	1.93	.00	7.02	13.11	38.56
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1849.43	.01	.00	.03	4.15	3.44
110	113	114	1849.43	.30	.00	1.23	7.19	13.77
111	114	101	1849.43	.00	.00	.00	11.44	44.90
112	15	109	1849.12	.14	.00	2.07	7.19	13.77
113	109	110	1849.12	.00	.00	.00	11.44	44.89
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1849.43	.00	369.14	.00	11.44	44.90
115	115	116	1849.43	.47	.00	4.99	46.61	1670.83
116	116	117	1849.43	.27	.00	19.13	20.54	201.05
117	117	118	1849.43	.17	.00	1.04	11.44	44.90
118	118	119	1849.43	1.50	.00	.97	11.44	44.90
119	119	120	1849.43	4.64	.00	13.50	11.44	44.90
120	120	121	1849.43	7.93	.00	4.67	11.44	44.90
121	121	122	1849.43	.00	.00	10.93	11.44	44.90
122	122	123	1849.43	.64	.00	14.33	11.44	44.90
123	123	124	68.80	2.70	.00	234.42	25.54	2698.94
124	124	0	68.80	.27	.00	10.13	25.54	2698.94
125	123	125	1780.63	6.29	.00	3.54	10.48	36.75
126	125	126	926.67	.04	.00	.13	5.46	10.40
127	126	127	647.22	.07	.00	.06	3.81	5.24
128	127	128	367.94	.11	.00	.08	3.72	6.94
129	128	129	147.17	.18	.00	.05	3.31	9.09
130	128	130	220.77	.12	.00	.10	4.97	19.64
131	127	131	279.28	.15	.00	.52	6.29	30.83
132	126	132	279.45	.15	.00	.52	6.29	30.87
133	125	133	853.96	.07	.00	.11	5.03	8.89
134	133	134	574.51	.05	.00	.07	3.38	4.18
135	134	135	309.30	.09	.00	.04	3.13	4.99
136	135	136	117.82	.11	.00	.03	2.65	5.97
137	135	137	191.48	.04	.00	.07	4.31	14.97
138	134	138	265.21	.03	.00	.14	5.97	27.92
139	133	139	279.44	.15	.00	.52	6.29	30.87
140	129	0	147.17	.00	.00	103.54	3.31	9.09
141	130	0	220.77	.00	.00	103.56	4.97	19.64

T4797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 835.93'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-4344.90	-.05	.00	-.38	-9.74	-17.82
14	13 14	1849.12	.00	.00	.13	4.14	3.44
15	14 15	1849.12	.01	.00	.08	4.14	3.44
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	13888.29	15.85	.00	23.17	31.13	174.19
20	79 80	13888.29	1.28	.00	6.65	31.13	174.19
21	80 81	12288.29	2.07	.00	3.06	27.54	136.78
22	81 13	6194.01	.22	.00	9.01	13.88	35.58
23	81 19	6094.28	.61	.00	6.66	13.66	34.47
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED							
31	0 85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED							
33	12 21	4344.90	.04	.00	.38	9.74	17.82
34	21 22	4392.20	.00	.00	.23	9.84	18.20
35	22 23	4392.20	.27	.00	1.41	9.84	18.20
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE							
36	23 24	4392.20	.01	256.41	.30	17.94	84.29
37	24 25	4392.20	.04	.00	4.03	17.08	74.27
38	21 25	-47.31	-10.73	.00	-239.39	-17.56	-1292.84
39	25 26	4344.90	.58	.00	2.17	16.89	72.71
40	26 27	4344.90	1.27	.00	11.25	16.89	72.71
41	27 29	4045.99	.16	.00	1.54	15.73	63.23
42	27 29	298.91	.03	.00	1.67	3.02	4.68
43	29 30	4344.90	.94	.00	4.98	16.35	66.83
44	30 31	4344.90	.00	.00	9.79	7.39	8.84
45	31 32	4344.90	.13	.00	1.29	16.35	66.83
46	32 33	4344.90	.02	.00	103.13	26.88	239.95
47	33 35	4344.90	.15	.00	.66	16.89	72.71
48	35 36	4344.90	1.05	.00	22.29	16.89	72.71
49	36 37	4344.90	.95	.00	3.28	16.89	72.71
50	37 38	4344.90	1.71	.00	2.67	24.56	190.20
51	38 39	4344.90	.10	.00	6.56	24.56	190.20
52	39 41	4344.90	12.78	.00	17.44	23.18	163.84
53	41 0	4344.90	1.15	.00	6.38	13.42	40.35
54	19 42	6094.28	.03	.00	.84	13.66	34.47
55	42 43	4244.85	.16	.00	1.48	9.51	17.03
56	43 44	4293.69	.43	.00	1.47	9.62	17.41
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE							
57	44 45	4293.69	.01	266.95	.29	17.54	80.62
58	45 46	4293.69	.03	.00	.93	16.15	65.30
59	43 46	-48.84	-8.67	.00	-255.13	-18.13	-1376.09
60	46 47	4244.85	1.18	.00	4.04	15.97	63.85
61	47 48	4244.85	.64	.00	8.83	15.97	63.85
62	48 49	4244.85	.64	.00	3.48	15.97	63.85
63	49 50	3877.81	.19	.00	2.28	14.59	53.48
64	49 50	367.04	.03	.00	2.44	3.71	6.91
65	50 51	4244.85	.45	.00	3.05	15.97	63.85
66	51 52	4244.85	.00	.00	9.34	7.22	8.45
67	52 53	4244.85	.16	.00	1.90	15.97	63.85

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1600.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

JUNCTION	NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
	1	.00	804.50	1	2	24
	2	.00	798.50	2	3	
	3	.00	798.50	3	4	26
	4	.00	801.50	4	5	
	5	.00	812.00	5	6	
	6	.00	812.00	6	7	
	7	.00	812.00	7	8	
	8	.00	791.75	8	9	
	9	.00	798.42	9	10	92
	10	.00	767.00	10	11	
	11	.00	767.00	11	12	
	12	.00	767.00	12	13	33
	13	.00	767.00	13	14	22
	14	.00	767.00	14	15	30
	15	.00	767.00	15	16	112
	16	.00	767.00	16	17	79
	17	.00	822.67	104	105	106
	18	.00	767.00	17	18	32
	19	.00	767.00	18	23	54
	20	.00	784.67	26	27	
	21	.00	767.00	33	34	38
	22	.00	767.00	34	35	97
	23	.00	761.08	35	36	
	24	.00	763.00	36	37	
	25	.00	765.25	37	38	39
	26	.00	765.25	39	40	88
	27	.00	779.00	40	41	42
	28	.00	823.33	100	101	
	29	.00	779.00	41	42	43
	30	.00	771.50	43	44	
	31	.00	777.33	44	45	
	32	.00	779.00	45	46	
	33	.00	779.00	46	47	
	34	.00	823.33	101	102	
	35	.00	779.00	47	48	
	36	.00	824.75	48	49	100
	37	.00	816.00	49	50	
	38	.00	816.00	50	51	
	39	.00	816.00	51	52	
	40	.00	820.00	102	103	106
	41	.00	792.38	52	53	
	42	.00	767.00	54	55	109
	43	.00	767.00	55	56	59
	44	.00	761.08	56	57	
	45	.00	763.00	57	58	
	46	.00	765.00	58	59	60
	47	.00	765.25	60	61	86
	48	.00	775.50	61	62	92
	49	.00	777.75	62	63	64
	50	.00	774.25	63	64	65
	51	.00	771.50	65	66	
	52	.00	777.73	66	67	
	53	.00	779.25	67	68	93
	54	.00	779.25	68	69	
	55	.00	779.25	69	70	
	56	.00	779.25	70	71	
	57	.00	779.25	71	72	91
	58	.00	823.17	73	74	104
	59	.00	816.50	74	75	
	60	.00	817.00	103	105	107
	61	.00	816.50	75	76	
	62	.00	816.50	76	77	
	63	.00	790.83	77	78	
	64	.00	767.00	79	80	84
	65	.00	767.00	80	81	99
	66	.00	761.08	81	82	
	67	.00	763.00	82	83	
	68	.00	765.25	83	84	85
	69	.00	765.25	85	86	87
	70	.00	787.25	72	73	
	71	.00	765.25	87	88	89
	72	.00	763.25	89	90	
	73	.00	763.25	90	91	
	74	.00	762.00	93	94	
	75	.00	762.00	94	95	

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148 PUMP DATA (HEAD-FLOW):						622.0	
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0									
83	67	68	1.0	10.3	.2	.89	410.0	2250.0	298.0 4000.0
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0									
115	115	116	.3	4.0	.2	.15	470.0	1500.0	385.0 1800.0
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

T4797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	835.93
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

Calculation OSC-7248

Attachment 13

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=240$ sec

THE NET SYSTEM DEMAND = 1600.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13909.68
25	.00
28	.00
31	.00
53	-4352.72
78	-4252.41
108	.00
124	-68.85
140	-147.41
141	-221.14
142	-279.74
143	-279.92
144	-279.91
145	-265.65
146	-191.80
147	-118.02
158	-69.29
174	-159.40
175	-217.47
176	-289.58
177	-289.77
178	-289.80
179	-261.11
180	-174.10
181	-101.57

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13909.68
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12309.68

76	.00	1002.38	762.00	103.54
77	.00	775.17	763.50	5.03
78	.00	1002.38	763.50	102.90
79	.00	798.61	794.25	1.88
80	1600.00	790.66	779.00	5.02
81	.00	785.52	779.00	2.81
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	775.75	760.10	6.74
109	.00	773.82		
110	.00	773.81	760.10	5.91
113	.00	777.30		
114	.00	775.76		
115	.00	1143.93	761.25	164.83
116	.00	1138.45	762.00	162.15
117	.00	1118.98	765.25	152.36
118	.00	1117.77	765.25	151.84
119	.00	1115.30	765.25	150.78
120	.00	1097.10	816.50	120.86
121	.00	1084.46	812.00	117.36
122	.00	1073.50	812.00	112.64
123	.00	1058.47	812.00	106.16
124	.00	820.99	810.58	4.49
125	.00	1048.61	944.00	45.06
126	.00	1048.44	944.00	44.99
127	.00	1048.31	944.00	44.93
128	.00	1048.12	944.00	44.85
129	.00	1047.89	944.00	44.75
130	.00	1047.90	944.00	44.75
131	.00	1047.63	944.00	44.64
132	.00	1047.76	944.00	44.69
133	.00	1048.44	944.00	44.98
134	.00	1048.31	944.00	44.93
135	.00	1048.18	944.00	44.87
136	.00	1048.04	944.00	44.81
137	.00	1048.06	944.00	44.82
138	.00	1048.13	944.00	44.85
139	.00	1047.76	944.00	44.69
140	.00	1136.44	761.25	161.61
141	.00	1130.97	762.00	158.93
142	.00	1111.51	764.09	149.65
143	.00	1111.26	765.47	148.94
144	.00	1095.44	817.50	119.72
145	.00	1083.07	817.50	114.39
146	.00	1081.07	812.00	115.90
147	.00	1070.11	812.00	111.18
148	.00	1055.47	812.00	104.87
149	.00	1045.16	944.00	43.57
150	.00	1044.97	944.00	43.49
151	.00	1044.83	944.00	43.43
152	.00	1044.63	944.00	43.34
153	.00	1044.38	944.00	43.24
154	.00	1044.49	944.00	43.28
155	.00	1044.22	944.00	43.17
156	.00	1044.36	944.00	43.23
157	.00	1044.99	944.00	43.50
158	.00	1044.87	944.00	43.45
159	.00	1044.77	944.00	43.41
160	.00	1044.66	944.00	43.36
161	.00	1044.63	944.00	43.34
162	.00	1044.60	944.00	43.33
163	.00	1044.38	944.00	43.24
200	.00	821.13	310.58	4.54

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	775.83	812.00	-15.58
8	.00	775.83	791.75	-6.86
9	.00	775.83	798.42	-9.73
10	.00	775.83	767.00	3.80
11	.00	775.83	767.00	3.80
12	.00	775.83	767.00	3.80
13	.00	776.26	767.00	3.99
14	.00	776.12	767.00	3.93
15	.00	776.03	767.00	3.89
16	.00	778.22	767.00	4.83
17	.00	864.28	822.67	17.92
18	.00	778.22	767.00	4.83
19	.00	778.22	767.00	4.83
20	.00	782.50	784.67	-.93
21	.00	775.40	767.00	3.62
22	.00	775.17	767.00	3.52
23	.00	773.48	761.08	5.34
24	.00	1028.75	763.00	114.47
25	.00	1024.67	765.25	111.74
26	.00	1021.91	765.25	110.55
27	.00	1009.33	779.00	99.21
28	.00	862.69	823.33	16.96
29	.00	1007.63	779.00	98.48
30	.00	1001.70	771.50	99.15
31	.00	991.88	777.33	92.41
32	.00	990.45	779.00	91.08
33	.00	886.93	779.00	46.49
34	.00	862.69	823.33	16.96
35	.00	886.12	779.00	46.14
36	.00	862.69	824.75	16.34
37	.00	858.45	816.00	18.29
38	.00	854.06	816.00	16.39
39	.00	847.38	816.00	13.52
40	.00	862.69	820.00	18.39
41	.00	817.06	792.38	10.63
42	.00	777.34	767.00	4.45
43	.00	775.70	767.00	3.75
44	.00	773.80	761.08	5.48
45	.00	1039.66	763.00	119.16
46	.00	1038.69	765.00	117.89
47	.00	1033.45	765.25	115.52
48	.00	1023.95	775.50	107.01
49	.00	1019.81	777.75	104.26
50	.00	1017.33	774.25	104.70
51	.00	1013.83	771.50	104.38
52	.00	1004.45	777.73	97.66
53	.00	1002.38	779.25	96.11
54	.00	1000.73	779.25	95.40
55	.00	901.92	779.25	52.84
56	.00	899.91	779.25	51.97
57	.00	894.07	779.25	49.46
58	.00	864.28	823.17	17.71
59	.00	859.96	816.50	18.72
60	.00	862.69	817.00	19.68
61	.00	856.09	816.50	17.05
62	.00	849.72	816.50	14.31
63	.00	818.48	790.83	11.91
64	.00	1033.45	767.00	114.77
65	.00	1033.45	767.00	114.77
66	.00	1033.45	761.08	117.32
67	.00	1460.32	763.00	300.36
68	.00	1033.45	765.25	115.52
69	.00	1033.45	765.25	115.52
70	.00	892.88	787.25	45.50
71	.00	1033.45	765.25	115.52
72	.00	1033.45	763.25	116.38
73	.00	894.07	763.25	56.35
74	.00	1002.38	762.00	103.54
75	.00	1002.38	762.00	103.54

142	131	0	279.74	.00	.00	103.63	6.30	30.93
143	132	0	279.92	.00	.00	103.76	6.30	30.97
144	139	0	279.91	.00	.00	103.75	6.30	30.97
145	138	0	265.65	.00	.00	104.13	5.98	28.01
146	137	0	191.80	.00	.00	104.06	4.32	15.02
147	136	0	118.02	.00	.00	104.04	2.66	5.99
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1852.10	.00	362.64	.00	11.46	45.03
149	140	141	1852.10	.47	.00	5.01	46.67	1675.61
150	141	142	1852.10	.27	.00	19.19	20.57	201.62
151	142	143	1852.10	.00	.00	.24	11.46	45.03
152	143	144	1852.10	9.08	.00	6.74	11.46	45.03
153	144	145	1852.10	1.11	.00	11.26	11.46	45.03
154	145	146	1852.10	.18	.00	1.83	11.46	45.03
155	146	147	1852.10	.00	.00	10.95	11.46	45.03
156	147	148	1852.10	.58	.00	14.07	11.46	45.03
157	148	200	69.29	2.74	.00	231.60	25.72	2736.92
158	200	0	69.29	.27	.00	10.27	25.72	2736.92
159	148	149	1782.81	5.78	.00	4.53	10.50	36.84
160	149	150	956.22	.05	.00	.14	5.63	11.04
161	150	151	666.45	.07	.00	.07	3.92	5.54
162	151	152	376.87	.11	.00	.09	3.81	7.26
163	152	153	159.40	.19	.00	.06	3.59	10.57
164	152	154	217.47	.05	.00	.09	4.89	19.09
165	151	155	289.58	.05	.00	.56	6.52	33.06
166	150	156	289.77	.05	.00	.56	6.52	33.10
167	149	157	826.59	.07	.00	.10	4.87	8.35
168	157	158	536.78	.05	.00	.07	3.16	3.67
169	158	159	275.67	.07	.00	.03	2.79	4.02
170	159	160	101.57	.09	.00	.02	2.29	4.52
171	159	161	174.10	.09	.00	.06	3.92	12.49
172	158	162	261.11	.14	.00	.14	5.88	27.09
173	157	163	289.80	.05	.00	.56	6.52	33.11
174	153	0	159.40	.00	.00	100.38	3.59	10.57
175	154	0	217.47	.00	.00	100.48	4.89	19.09
176	155	0	289.58	.00	.00	100.22	6.52	33.06
177	156	0	289.77	.00	.00	100.35	6.52	33.10
178	163	0	289.80	.00	.00	100.37	6.52	33.11
179	162	0	261.11	.00	.00	100.60	5.88	27.09
180	161	0	174.10	.00	.00	100.62	3.92	12.49
181	160	0	101.57	.00	.00	100.66	2.29	4.52

68	53	54	4252.41	.11	.00	1.55	16.00	64.07
69	54	55	4252.41	.02	.00	98.78	26.31	229.97
70	55	56	4252.41	.70	.00	1.32	16.53	69.70
71	56	57	4252.41	1.25	.00	4.58	16.53	69.70
72	57	70	4252.41	.56	.00	.64	16.53	69.70
73	70	58	4252.41	5.09	.00	23.51	16.53	69.70
74	58	59	4252.41	1.81	.00	2.50	16.53	69.70
75	59	61	4252.41	1.31	.00	2.56	24.04	182.30
76	61	62	4252.41	.09	.00	6.28	24.04	182.30
77	62	63	4252.41	14.06	.00	17.18	22.69	157.04
78	63	0	4252.41	1.94	.00	7.04	13.13	38.69
LINE 79	IS	CLOSED						
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82	IS	OPERATING OUT OF RANGE						
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83	IS	CLOSED						
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88	IS	CLOSED						
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90	IS	CLOSED						
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92	IS	CLOSED						
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96	IS	CLOSED						
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99	IS	CLOSED						
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105	IS	CLOSED						
LINE 106	IS	CLOSED						
LINE 107	IS	CLOSED						
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1852.45	.01	.00	.03	4.15	3.45
110	113	114	1852.45	.31	.00	1.23	7.20	13.82
111	114	101	1852.45	.00	.00	.00	11.46	45.05
112	15	109	1852.10	.14	.00	2.08	7.20	13.81
113	109	110	1852.10	.00	.00	.00	11.46	45.03
THE PUMP IN LINE 114	IS	OPERATING OUT OF RANGE						
114	101	115	1852.45	.00	368.18	.00	11.46	45.05
115	115	116	1852.45	.47	.00	5.01	46.68	1676.24
116	116	117	1852.45	.27	.00	19.20	20.57	201.69
117	117	118	1852.45	.17	.00	1.04	11.46	45.05
118	118	119	1852.45	1.50	.00	.97	11.46	45.05
119	119	120	1852.45	4.65	.00	13.54	11.46	45.05
120	120	121	1852.45	7.96	.00	4.68	11.46	45.05
121	121	122	1852.45	.00	.00	10.96	11.46	45.05
122	122	123	1852.45	.64	.00	14.38	11.46	45.05
123	123	124	68.85	2.70	.00	234.78	25.56	2702.99
124	124	0	68.85	.27	.00	10.14	25.56	2702.99
125	123	125	1783.60	6.31	.00	3.55	10.50	36.87
126	125	126	928.21	.04	.00	.13	5.47	10.43
127	126	127	648.30	.07	.00	.06	3.82	5.25
128	127	128	368.55	.11	.00	.09	3.73	6.96
129	128	129	147.41	.18	.00	.05	3.32	9.11
130	128	130	221.14	.12	.00	.10	4.98	19.71
131	127	131	279.74	.15	.00	.52	6.30	30.93
132	126	132	279.92	.15	.00	.52	6.30	30.97
133	125	133	855.38	.07	.00	.11	5.04	8.92
134	133	134	575.47	.05	.00	.07	3.39	4.19
135	134	135	309.82	.09	.00	.04	3.13	5.01
136	135	136	118.02	.11	.00	.03	2.66	5.99
137	135	137	191.80	.05	.00	.07	4.32	15.02
138	134	138	265.65	.04	.00	.14	5.98	28.01
139	133	139	279.91	.15	.00	.52	6.30	30.97
140	129	0	147.41	.00	.00	103.89	3.32	9.11
141	130	0	221.14	.00	.00	103.90	4.98	19.71

T3797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 837.75'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS PUMP	HEAD MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00
LINE 7 IS CLOSED						
8	7 8	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00
13	12 13	-4352.72	-.05	.00	-9.76	-17.88
14	13 14	1852.10	.00	.00	4.15	3.45
15	14 15	1852.10	.01	.00	4.15	3.45
LINE 16 IS CLOSED						
17	16 18	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00
19	0 79	13909.68	15.90	.00	31.18	174.72
20	79 80	13909.68	1.28	.00	31.18	174.72
21	80 81	12309.68	2.07	.00	27.59	137.26
22	81 13	6204.82	.22	.00	13.91	35.71
23	81 19	6104.86	.61	.00	13.68	34.59
LINE 24 IS CLOSED						
25	86 0	.00	.00	.00	.00	.00
LINE 26 IS CLOSED						
27	20 83	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00
LINE 30 IS CLOSED						
31	0 85	.00	.00	.00	.00	.00
LINE 32 IS CLOSED						
33	12 21	4352.72	.04	.00	9.76	17.88
34	21 22	4399.95	.00	.00	9.86	18.26
35	22 23	4399.95	.27	.00	9.86	18.26
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE						
36	23 24	4399.95	.01	255.58	17.97	84.59
37	24 25	4399.95	.04	.00	17.11	74.53
38	21 25	-47.23	-10.69	.00	-17.53	-1288.53
39	25 26	4352.72	.58	.00	16.92	72.97
40	26 27	4352.72	1.28	.00	16.92	72.97
41	27 29	4053.28	.16	.00	15.76	63.45
42	27 29	299.45	.03	.00	3.03	4.70
43	29 30	4352.72	.94	.00	16.38	67.07
44	30 31	4352.72	.00	.00	7.40	8.87
45	31 32	4352.72	.13	.00	16.38	67.07
46	32 33	4352.72	.02	.00	26.93	240.80
47	33 35	4352.72	.15	.00	16.92	72.97
48	35 36	4352.72	1.06	.00	16.92	72.97
49	36 37	4352.72	.95	.00	16.92	72.97
50	37 38	4352.72	1.72	.00	24.61	190.87
51	38 39	4352.72	.10	.00	24.61	190.87
52	39 41	4352.72	12.83	.00	23.22	164.42
53	41 0	4352.72	1.16	.00	13.44	40.49
54	19 42	6104.86	.03	.00	13.68	34.59
55	42 43	4252.41	.16	.00	9.53	17.09
56	43 44	4301.17	.43	.00	9.64	17.47
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE						
57	44 45	4301.17	.01	266.15	17.57	80.90
58	45 46	4301.17	.03	.00	16.18	65.52
59	43 46	-48.76	-8.64	.00	-18.10	-1371.94
60	46 47	4252.41	1.19	.00	16.00	64.07
61	47 48	4252.41	.64	.00	16.00	64.07
62	48 49	4252.41	.64	.00	16.00	64.07
63	49 50	3884.72	.19	.00	14.61	53.67
64	49 50	367.69	.03	.00	3.72	6.93
65	50 51	4252.41	.45	.00	16.00	64.07
66	51 52	4252.41	.00	.00	7.23	8.48
67	52 53	4252.41	.16	.00	16.00	64.07

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1600.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA (HEAD-FLOW) :		622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0 .0 410.0 2250.0 298.0 4000.0									
83	67	68	1.0	10.3	.2	.89			
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0 .0 470.0 1500.0 385.0 1800.0									
115	115	116	.3	4.0	.2	.15			
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

T3797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	837.75
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

Calculation OSC-7248

Attachment 12

Wood's Model Computer Run to Simulate Initial Flowrates Starting a Time $t=180$ sec

THE NET SYSTEM DEMAND = 1600.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13931.16
25	.00
28	.00
31	.00
53	-4360.58
78	-4260.00
108	.00
124	-68.90
140	-147.66
141	-221.51
142	-280.21
143	-280.39
144	-280.38
145	-266.10
146	-192.12
147	-118.22
158	-69.34
174	-159.66
175	-217.83
176	-290.06
177	-290.25
178	-290.28
179	-261.54
180	-174.39
181	-101.74

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13931.16
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12331.16

76	.00	1003.07	762.00	103.84
77	.00	776.80	763.50	5.73
78	.00	1003.07	763.50	103.19
79	.00	800.32	794.25	2.62
80	1600.00	792.35	779.00	5.75
81	.00	787.18	779.00	3.52
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	777.39	760.10	7.45
109	.00	775.44		
110	.00	775.44	760.10	6.61
113	.00	778.94		
114	.00	777.39		
115	.00	1144.59	761.25	165.12
116	.00	1139.09	762.00	162.43
117	.00	1119.57	765.25	152.62
118	.00	1118.35	765.25	152.09
119	.00	1115.87	765.25	151.02
120	.00	1097.61	816.50	121.09
121	.00	1084.94	812.00	117.56
122	.00	1073.93	812.00	112.82
123	.00	1058.86	812.00	106.33
124	.00	821.01	810.58	4.49
125	.00	1048.97	944.00	45.21
126	.00	1048.79	944.00	45.14
127	.00	1048.66	944.00	45.08
128	.00	1048.47	944.00	45.00
129	.00	1048.23	944.00	44.90
130	.00	1048.25	944.00	44.90
131	.00	1047.98	944.00	44.79
132	.00	1048.11	944.00	44.84
133	.00	1048.79	944.00	45.13
134	.00	1048.65	944.00	45.08
135	.00	1048.53	944.00	45.02
136	.00	1048.39	944.00	44.96
137	.00	1048.41	944.00	44.97
138	.00	1048.48	944.00	45.00
139	.00	1048.10	944.00	44.84
140	.00	1137.07	761.25	161.88
141	.00	1131.58	762.00	159.19
142	.00	1112.06	764.09	149.88
143	.00	1111.81	765.47	149.18
144	.00	1095.94	817.50	119.93
145	.00	1083.53	817.50	114.59
146	.00	1081.52	812.00	116.09
147	.00	1070.53	812.00	111.36
148	.00	1055.84	812.00	105.03
149	.00	1045.49	944.00	43.72
150	.00	1045.30	944.00	43.63
151	.00	1045.16	944.00	43.57
152	.00	1044.96	944.00	43.49
153	.00	1044.72	944.00	43.38
154	.00	1044.82	944.00	43.43
155	.00	1044.55	944.00	43.31
156	.00	1044.69	944.00	43.37
157	.00	1045.32	944.00	43.64
158	.00	1045.21	944.00	43.59
159	.00	1045.11	944.00	43.55
160	.00	1044.99	944.00	43.50
161	.00	1044.96	944.00	43.49
162	.00	1044.93	944.00	43.47
163	.00	1044.71	944.00	43.38
200	.00	821.14	810.58	4.55

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	777.46	812.00	-14.88
8	.00	777.46	791.75	-6.16
9	.00	777.46	798.42	-9.03
10	.00	777.46	767.00	4.51
11	.00	777.46	767.00	4.51
12	.00	777.46	767.00	4.51
13	.00	777.89	767.00	4.69
14	.00	777.76	767.00	4.63
15	.00	777.67	767.00	4.59
16	.00	779.86	767.00	5.54
17	.00	864.47	822.67	18.01
18	.00	779.86	767.00	5.54
19	.00	779.86	767.00	5.54
20	.00	782.50	784.67	-.93
21	.00	777.03	767.00	4.32
22	.00	776.80	767.00	4.22
23	.00	775.10	761.08	6.04
24	.00	1029.54	763.00	114.81
25	.00	1025.44	765.25	112.07
26	.00	1022.67	765.25	110.88
27	.00	1010.06	779.00	99.52
28	.00	862.88	823.33	17.04
29	.00	1008.35	779.00	98.79
30	.00	1002.39	771.50	99.45
31	.00	992.53	777.33	92.70
32	.00	991.10	779.00	91.36
33	.00	887.21	779.00	46.61
34	.00	862.88	823.33	17.04
35	.00	886.39	779.00	46.26
36	.00	862.88	824.75	16.43
37	.00	858.63	816.00	18.36
38	.00	854.22	816.00	16.46
39	.00	847.52	816.00	13.57
40	.00	862.88	820.00	18.47
41	.00	817.08	792.38	10.64
42	.00	778.98	767.00	5.16
43	.00	777.34	767.00	4.45
44	.00	775.43	761.08	6.18
45	.00	1040.48	763.00	119.52
46	.00	1039.51	765.00	118.24
47	.00	1034.25	765.25	115.87
48	.00	1024.71	775.50	107.34
49	.00	1020.56	777.75	104.59
50	.00	1018.08	774.25	105.02
51	.00	1014.56	771.50	104.69
52	.00	1005.15	777.73	97.96
53	.00	1003.07	779.25	96.41
54	.00	1001.41	779.25	95.69
55	.00	902.25	779.25	52.98
56	.00	900.23	779.25	52.11
57	.00	894.37	779.25	49.59
58	.00	864.47	823.17	17.79
59	.00	860.14	816.50	18.80
60	.00	862.88	817.00	19.76
61	.00	856.26	816.50	17.12
62	.00	849.86	816.50	14.37
63	.00	818.51	790.83	11.92
64	.00	1034.25	767.00	115.11
65	.00	1034.25	767.00	115.11
66	.00	1034.25	761.08	117.66
67	.00	1461.11	763.00	300.70
68	.00	1034.25	765.25	115.87
69	.00	1034.25	765.25	115.87
70	.00	893.17	787.25	45.62
71	.00	1034.25	765.25	115.87
72	.00	1034.25	763.25	116.73
73	.00	894.37	763.25	56.48
74	.00	1003.07	762.00	103.84
75	.00	1003.07	762.00	103.84

142	131	0	280.21	.00	.00	103.98	6.31	31.03
143	132	0	280.39	.00	.00	104.11	6.31	31.07
144	139	0	280.38	.00	.00	104.10	6.31	31.07
145	138	0	266.10	.00	.00	104.47	5.99	28.10
146	137	0	192.12	.00	.00	104.41	4.32	15.07
147	136	0	118.22	.00	.00	104.39	2.66	6.01
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1855.09	.00	361.64	.00	11.48	45.17
149	140	141	1855.09	.47	.00	5.02	46.75	1680.98
150	141	142	1855.09	.27	.00	19.25	20.60	202.26
151	142	143	1855.09	.00	.00	.25	11.48	45.17
152	143	144	1855.09	9.11	.00	6.76	11.48	45.17
153	144	145	1855.09	1.12	.00	11.29	11.48	45.17
154	145	146	1855.09	.18	.00	1.83	11.48	45.17
155	146	147	1855.09	.00	.00	10.98	11.48	45.17
156	147	148	1855.09	.58	.00	14.11	11.48	45.17
157	148	200	69.34	2.74	.00	231.95	25.74	2740.97
158	200	0	69.34	.27	.00	10.29	25.74	2740.97
159	148	149	1785.75	5.80	.00	4.54	10.51	36.96
160	149	150	957.80	.05	.00	.14	5.64	11.08
161	150	151	667.55	.07	.00	.07	3.93	5.55
162	151	152	377.49	.11	.00	.09	3.82	7.29
163	152	153	159.66	.19	.00	.06	3.59	10.60
164	152	154	217.83	.05	.00	.10	4.90	19.15
165	151	155	290.06	.05	.00	.56	6.53	33.16
166	150	156	290.25	.05	.00	.56	6.53	33.21
167	149	157	827.95	.07	.00	.10	4.88	8.38
168	157	158	537.67	.05	.00	.07	3.17	3.68
169	158	159	276.13	.07	.00	.03	2.79	4.03
170	159	160	101.74	.09	.00	.02	2.29	4.54
171	159	161	174.39	.09	.00	.06	3.93	12.53
172	158	162	261.54	.14	.00	.14	5.89	27.18
173	157	163	290.28	.05	.00	.56	6.53	33.21
174	153	0	159.66	.00	.00	100.71	3.59	10.60
175	154	0	217.83	.00	.00	100.82	4.90	19.15
176	155	0	290.06	.00	.00	100.55	6.53	33.16
177	156	0	290.25	.00	.00	100.69	6.53	33.21
178	163	0	290.28	.00	.00	100.71	6.53	33.21
179	162	0	261.54	.00	.00	100.93	5.89	27.18
180	161	0	174.39	.00	.00	100.96	3.93	12.53
181	160	0	101.74	.00	.00	100.99	2.29	4.54

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1600.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

T7797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 830.46'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS PUMP	HEAD MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00
LINE 7 IS CLOSED						
8	7 8	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00
13	12 13	-4321.33	-.05	.00	-9.69	-17.63
14	13 14	1840.15	.00	.00	4.12	3.40
15	14 15	1840.15	.01	.00	4.12	3.40
LINE 16 IS CLOSED						
17	16 18	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00
19	0 79	13823.90	15.71	.00	30.98	172.60
20	79 80	13823.90	1.27	.00	30.98	172.60
21	80 81	12223.90	2.04	.00	27.40	135.37
22	81 13	6161.47	.22	.00	13.81	35.22
23	81 19	6062.43	.60	.00	13.59	34.12
LINE 24 IS CLOSED						
25	86 0	.00	.00	.00	.00	.00
LINE 26 IS CLOSED						
27	20 83	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00
LINE 30 IS CLOSED						
31	0 85	.00	.00	.00	.00	.00
LINE 32 IS CLOSED						
33	12 21	4321.33	.04	.00	9.69	17.63
34	21 22	4368.88	.00	.00	9.79	18.01
35	22 23	4368.88	.27	.00	9.79	18.01
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE						
36	23 24	4368.88	.01	258.90	.30	83.42
37	24 25	4368.88	.04	.00	3.99	73.50
38	21 25	-47.55	-10.84	.00	-241.85	-17.65
39	25 26	4321.33	.58	.00	2.15	16.80
40	26 27	4321.33	1.26	.00	11.13	16.80
41	27 29	4024.04	.16	.00	1.52	15.65
42	27 29	297.29	.03	.00	1.65	3.00
43	29 30	4321.33	.93	.00	4.92	16.26
44	30 31	4321.33	.00	.00	9.68	7.35
45	31 32	4321.33	.13	.00	1.27	16.26
46	32 33	4321.33	.02	.00	102.01	26.74
47	33 35	4321.33	.14	.00	.66	16.80
48	35 36	4321.33	1.04	.00	22.04	16.80
49	36 37	4321.33	.94	.00	3.24	16.80
50	37 38	4321.33	1.69	.00	2.64	24.43
51	38 39	4321.33	.09	.00	6.49	24.43
52	39 41	4321.33	12.64	.00	17.25	23.05
53	41 0	4321.33	1.14	.00	6.31	13.35
54	19 42	6062.43	.03	.00	.83	13.59
55	42 43	4222.09	.16	.00	1.46	9.46
56	43 44	4271.15	.42	.00	1.45	9.57
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE						
57	44 45	4271.15	.01	269.30	.28	17.45
58	45 46	4271.15	.03	.00	.92	16.07
59	43 46	-49.06	-8.75	.00	-257.49	-18.21
60	46 47	4222.09	1.17	.00	4.00	15.88
61	47 48	4222.09	.63	.00	8.74	15.88
62	48 49	4222.09	.63	.00	3.45	15.88
63	49 50	3857.02	.19	.00	2.26	14.51
64	49 50	365.07	.03	.00	2.41	3.69
65	50 51	4222.09	.44	.00	3.02	15.88
66	51 52	4222.09	.00	.00	9.24	7.18
67	52 53	4222.09	.16	.00	1.88	15.88

68	53	54	4222.09	.11	.00	1.53	15.88	63.18
69	54	55	4222.09	.02	.00	97.38	26.12	226.75
70	55	56	4222.09	.69	.00	1.30	16.42	68.73
71	56	57	4222.09	1.24	.00	4.52	16.42	68.73
72	57	70	4222.09	.55	.00	.63	16.42	68.73
73	70	58	4222.09	5.02	.00	23.18	16.42	68.73
74	58	59	4222.09	1.79	.00	2.47	16.42	68.73
75	59	61	4222.09	1.29	.00	2.52	23.87	179.75
76	61	62	4222.09	.09	.00	6.19	23.87	179.75
77	62	63	4222.09	13.86	.00	16.94	22.53	154.85
78	63	0	4222.09	1.91	.00	6.94	13.04	38.15
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1840.34	.01	.00	.03	4.12	3.40
110	113	114	1840.34	.30	.00	1.22	7.16	13.64
111	114	101	1840.34	.00	.00	.00	11.39	44.48
112	15	109	1840.15	.14	.00	2.05	7.15	13.64
113	109	110	1840.15	.00	.00	.00	11.39	44.47
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1840.34	.00	372.06	.00	11.39	44.48
115	115	116	1840.34	.46	.00	4.94	46.38	1654.59
116	116	117	1840.34	.26	.00	18.95	20.44	199.11
117	117	118	1840.34	.17	.00	1.03	11.39	44.48
118	118	119	1840.34	1.48	.00	.96	11.39	44.48
119	119	120	1840.34	4.59	.00	13.37	11.39	44.48
120	120	121	1840.34	7.85	.00	4.62	11.39	44.48
121	121	122	1840.34	.00	.00	10.82	11.39	44.48
122	122	123	1840.34	.64	.00	14.19	11.39	44.48
123	123	124	68.64	2.69	.00	233.34	25.48	2686.68
124	124	0	68.64	.27	.00	10.08	25.48	2686.68
125	123	125	1771.70	6.23	.00	3.50	10.43	36.39
126	125	126	922.03	.04	.00	.13	5.43	10.30
127	126	127	643.97	.07	.00	.06	3.79	5.19
128	127	128	366.10	.11	.00	.08	3.70	6.87
129	128	129	146.43	.18	.00	.05	3.30	9.00
130	128	130	219.66	.12	.00	.10	4.94	19.46
131	127	131	277.88	.15	.00	.52	6.25	30.54
132	126	132	278.05	.15	.00	.52	6.26	30.57
133	125	133	849.68	.07	.00	.11	5.00	8.80
134	133	134	571.63	.05	.00	.07	3.37	4.14
135	134	135	307.75	.09	.00	.04	3.11	4.95
136	135	136	117.23	.11	.00	.03	2.64	5.92
137	135	137	190.52	.04	.00	.07	4.29	14.83
138	134	138	263.88	.03	.00	.14	5.94	27.65
139	133	139	278.04	.15	.00	.52	6.26	30.57
140	129	0	146.43	.00	.00	102.50	3.30	9.00
141	130	0	219.66	.00	.00	102.52	4.94	19.46

142	131	0	277.88	.00	.00	102.25	6.25	30.54
143	132	0	278.05	.00	.00	102.38	6.26	30.57
144	139	0	278.04	.00	.00	102.38	6.26	30.57
145	138	0	263.88	.00	.00	102.74	5.94	27.65
146	137	0	190.52	.00	.00	102.68	4.29	14.83
147	136	0	117.23	.00	.00	102.65	2.64	5.92
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1840.15	.00	366.62	.00	11.39	44.47
149	140	141	1840.15	.46	.00	4.94	46.37	1654.24
150	141	142	1840.15	.26	.00	18.94	20.43	199.07
151	142	143	1840.15	.00	.00	.24	11.39	44.47
152	143	144	1840.15	8.97	.00	6.65	11.39	44.47
153	144	145	1840.15	1.10	.00	11.11	11.39	44.47
154	145	146	1840.15	.17	.00	1.80	11.39	44.47
155	146	147	1840.15	.00	.00	10.81	11.39	44.47
156	147	148	1840.15	.57	.00	13.89	11.39	44.47
157	148	200	69.08	2.72	.00	230.22	25.64	2720.84
158	200	0	69.08	.27	.00	10.21	25.64	2720.84
159	148	149	1771.07	5.71	.00	4.47	10.43	36.37
160	149	150	949.92	.05	.00	.14	5.59	10.90
161	150	151	662.06	.07	.00	.07	3.90	5.47
162	151	152	374.39	.11	.00	.09	3.78	7.17
163	152	153	158.35	.19	.00	.06	3.56	10.44
164	152	154	216.04	.05	.00	.09	4.86	18.85
165	151	155	287.67	.05	.00	.55	6.47	32.64
166	150	156	287.87	.05	.00	.55	6.48	32.68
167	149	157	821.14	.07	.00	.10	4.83	8.25
168	157	158	533.25	.05	.00	.06	3.14	3.63
169	158	159	273.86	.07	.00	.03	2.77	3.97
170	159	160	100.90	.09	.00	.02	2.27	4.47
171	159	161	172.95	.08	.00	.06	3.89	12.34
172	158	162	259.39	.14	.00	.13	5.84	26.75
173	157	163	287.89	.05	.00	.55	6.48	32.69
174	153	0	158.35	.00	.00	99.06	3.56	10.44
175	154	0	216.04	.00	.00	99.17	4.86	18.85
176	155	0	287.67	.00	.00	98.90	6.47	32.64
177	156	0	287.87	.00	.00	99.04	6.48	32.68
178	163	0	287.89	.00	.00	99.06	6.48	32.69
179	162	0	259.39	.00	.00	99.28	5.84	26.75
180	161	0	172.95	.00	.00	99.30	3.89	12.34
181	160	0	100.90	.00	.00	99.34	2.27	4.47

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	769.32	812.00	-18.38
8	.00	769.32	791.75	-9.66
9	.00	769.32	798.42	-12.53
10	.00	769.32	767.00	1.00
11	.00	769.32	767.00	1.00
12	.00	769.32	767.00	1.00
13	.00	769.74	767.00	1.18
14	.00	769.61	767.00	1.12
15	.00	769.52	767.00	1.09
16	.00	771.68	767.00	2.02
17	.00	863.50	822.67	17.59
18	.00	771.68	767.00	2.02
19	.00	771.68	767.00	2.02
20	.00	782.50	784.67	-.93
21	.00	768.90	767.00	.82
22	.00	768.67	767.00	.72
23	.00	767.00	761.08	2.55
24	.00	1025.60	763.00	113.11
25	.00	1021.58	765.25	110.41
26	.00	1018.86	765.25	109.24
27	.00	1006.47	779.00	97.98
28	.00	861.93	823.33	16.63
29	.00	1004.79	779.00	97.26
30	.00	998.94	771.50	97.97
31	.00	989.26	777.33	91.28
32	.00	987.85	779.00	89.96
33	.00	885.82	779.00	46.01
34	.00	861.93	823.33	16.63
35	.00	885.02	779.00	45.67
36	.00	861.93	824.75	16.02
37	.00	857.75	816.00	17.98
38	.00	853.42	816.00	16.12
39	.00	846.84	816.00	13.28
40	.00	861.93	820.00	18.06
41	.00	816.95	792.38	10.58
42	.00	770.81	767.00	1.64
43	.00	769.20	767.00	.95
44	.00	767.32	761.08	2.69
45	.00	1036.39	763.00	117.76
46	.00	1035.44	765.00	116.49
47	.00	1030.27	765.25	114.15
48	.00	1020.91	775.50	105.71
49	.00	1016.83	777.75	102.98
50	.00	1014.39	774.25	103.44
51	.00	1010.93	771.50	103.13
52	.00	1001.69	777.73	96.47
53	.00	999.65	779.25	94.93
54	.00	998.01	779.25	94.23
55	.00	900.61	779.25	52.28
56	.00	898.63	779.25	51.42
57	.00	892.87	779.25	48.94
58	.00	863.50	823.17	17.37
59	.00	859.25	816.50	18.41
60	.00	861.93	817.00	19.35
61	.00	855.43	816.50	16.77
62	.00	849.15	816.50	14.06
63	.00	818.35	790.83	11.86
64	.00	1030.27	767.00	113.40
65	.00	1030.27	767.00	113.40
66	.00	1030.27	761.08	115.95
67	.00	1457.14	763.00	298.99
68	.00	1030.27	765.25	114.15
69	.00	1030.27	765.25	114.15
70	.00	891.70	787.25	44.99
71	.00	1030.27	765.25	114.15
72	.00	1030.27	763.25	115.02
73	.00	892.87	763.25	55.83
74	.00	999.65	762.00	102.36
75	.00	999.65	762.00	102.36

76	.00	999.65	762.00	102.36
77	.00	768.67	763.50	2.23
78	.00	999.65	763.50	101.72
79	.00	791.80	794.25	-1.05
80	1600.00	783.95	779.00	2.13
81	.00	778.87	779.00	-.05
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	769.25	760.10	3.94
109	.00	767.33		
110	.00	767.33	760.10	3.11
113	.00	770.77		
114	.00	769.25		
115	.00	1141.30	761.25	163.70
116	.00	1135.89	762.00	161.05
117	.00	1116.68	765.25	151.37
118	.00	1115.49	765.25	150.86
119	.00	1113.05	765.25	149.81
120	.00	1095.08	816.50	120.00
121	.00	1082.61	812.00	116.56
122	.00	1071.78	812.00	111.90
123	.00	1056.96	812.00	105.51
124	.00	820.93	810.58	4.46
125	.00	1047.22	944.00	44.46
126	.00	1047.05	944.00	44.39
127	.00	1046.93	944.00	44.33
128	.00	1046.74	944.00	44.25
129	.00	1046.51	944.00	44.15
130	.00	1046.52	944.00	44.16
131	.00	1046.26	944.00	44.05
132	.00	1046.38	944.00	44.10
133	.00	1047.05	944.00	44.39
134	.00	1046.92	944.00	44.33
135	.00	1046.80	944.00	44.28
136	.00	1046.66	944.00	44.22
137	.00	1046.68	944.00	44.23
138	.00	1046.75	944.00	44.26
139	.00	1046.38	944.00	44.10
140	.00	1133.94	761.25	160.53
141	.00	1128.54	762.00	157.88
142	.00	1109.33	764.09	148.71
143	.00	1109.09	765.47	148.01
144	.00	1093.47	817.50	118.87
145	.00	1081.26	817.50	113.61
146	.00	1079.28	812.00	115.13
147	.00	1068.47	812.00	110.47
148	.00	1054.01	812.00	104.24
149	.00	1043.83	944.00	43.00
150	.00	1043.64	944.00	42.92
151	.00	1043.51	944.00	42.86
152	.00	1043.31	944.00	42.77
153	.00	1043.07	944.00	42.67
154	.00	1043.17	944.00	42.71
155	.00	1042.90	944.00	42.60
156	.00	1043.04	944.00	42.66
157	.00	1043.66	944.00	42.93
158	.00	1043.55	944.00	42.88
159	.00	1043.45	944.00	42.84
160	.00	1043.34	944.00	42.79
161	.00	1043.30	944.00	42.77
162	.00	1043.28	944.00	42.76
163	.00	1043.06	944.00	42.67
200	.00	821.06	810.58	4.52

THE NET SYSTEM DEMAND = 1600.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13823.90
25	.00
28	.00
31	.00
53	-4321.33
78	-4222.09
108	.00
124	-68.64
140	-146.43
141	-219.66
142	-277.88
143	-278.05
144	-278.04
145	-263.88
146	-190.52
147	-117.23
158	-69.08
174	-158.35
175	-216.04
176	-287.67
177	-287.87
178	-287.89
179	-259.39
180	-172.95
181	-100.90

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13823.90
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12223.90

Calculation OSC-7248

Attachment 17

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=480$ sec

T8797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073
THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE	NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0	1	27.5	10.5	.2	2.19	809.50
2	1	2	12.3	10.5	.2	.81	
3	2	3	1.0	12.4	.2	.30	
4	3	4	4.5	12.4	.2	.42	
5	4	5	9.4	12.4	.2	.15	
6	5	6	13.6	12.3	.2	.75	
7	6	7	.1	10.3	.2	.30	
LINE 7 IS CLOSED							
8	7	8	120.3	12.4	.2	2.56	
9	8	9	26.3	12.4	.2	1.18	
10	9	10	40.4	12.4	.2	1.03	
11	10	11	.1	10.4	.2	.31	
12	11	12	5.0	12.4	.2	.78	
13	12	13	2.6	13.5	.2	.26	
14	13	14	1.0	13.5	.2	.49	
15	14	15	3.5	13.5	.2	.29	
16	15	16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED							
17	16	18	1.5	13.5	.2	.41	
18	18	19	4.5	13.5	.2	.29	
19	0	79	91.0	13.5	.2	1.54	828.65
20	79	80	7.3	13.5	.2	.44	
21	80	81	15.1	13.5	.2	.26	
22	81	13	6.2	13.5	.2	3.01	
23	81	19	17.7	13.5	.2	2.30	
24	1	86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED							
25	86	0	10.2	3.3	.2	1.78	798.33
26	3	20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED							
27	20	83	57.0	12.4	.2	1.79	
28	0	83	.1	17.5	.2	1.19	782.50
29	83	84	27.0	17.5	.2	.89	
30	84	14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED							
31	0	85	53.5	17.5	.2	.90	782.50
32	85	18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED							
33	12	21	2.5	13.5	.2	.26	
34	21	22	.1	13.5	.2	.15	
35	22	23	14.8	13.5	.2	.94	
36	23	24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0							
37	24	25	.5	10.3	.2	.89	
38	21	25	8.3	1.0	.2	50.00	
39	25	26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39							
40	26	27	17.5	10.3	.2	2.54	
41	27	29	2.5	10.3	.2	.40	
42	27	29	6.0	6.4	.2	11.76	
43	29	30	14.0	10.4	.2	1.20	
44	30	31	.1	15.5	.2	11.55	
45	31	32	2.0	10.4	.2	.31	
46	32	33	.1	8.1	.2	9.19	
47	33	35	2.0	10.3	.2	.15	
48	35	36	14.5	10.3	.2	5.03	
49	36	37	13.0	10.3	.2	.74	
50	37	38	9.0	8.5	.2	.28	
51	38	39	.5	8.5	.2	.70	
52	39	41	78.0	8.8	.2	2.09	
53	41	0	28.6	11.5	.2	2.28	809.50
54	19	42	1.0	13.5	.2	.29	
55	42	43	9.3	13.5	.2	1.05	
56	43	44	24.5	13.5	.2	1.02	
57	44	45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0							
58	45	46	.5	10.4	.2	.23	
59	43	46	6.3	1.0	.2	50.00	

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0									
83	67	68	1.0	10.3	.2	.89	410.0	2250.0	298.0 4000.0
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0									
115	115	116	.3	4.0	.2	.15	470.0	1500.0	385.0 1800.0
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA (HEAD-FLOW):		622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1600.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

T8797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 828.65'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS PUMP	HEAD MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00
LINE 7 IS CLOSED						
8	7 8	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00
13	12 13	-4313.51	-.05	-.38	-9.67	-17.57
14	13 14	1837.17	.00	.13	4.12	3.39
15	14 15	1837.17	.01	.08	4.12	3.39
LINE 16 IS CLOSED						
17	16 18	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00
19	0 79	13802.56	15.66	.00	22.88	30.94 172.07
20	79 80	13802.56	1.26	.00	6.57	30.94 172.07
21	80 81	12202.56	2.04	.00	3.02	27.35 134.91
22	81 13	6150.69	.22	.00	8.88	13.79 35.10
23	81 19	6051.87	.60	.00	6.57	13.56 34.00
LINE 24 IS CLOSED						
25	86 0	.00	.00	.00	.00	.00
LINE 26 IS CLOSED						
27	20 83	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00
LINE 30 IS CLOSED						
31	0 85	.00	.00	.00	.00	.00
LINE 32 IS CLOSED						
33	12 21	4313.51	.04	.00	.38	9.67 17.57
34	21 22	4361.14	.00	.00	.22	9.77 17.95
35	22 23	4361.14	.27	.00	1.39	9.77 17.95
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE						
36	23 24	4361.14	.01	259.73	.30	17.81 83.13
37	24 25	4361.14	.04	.00	3.97	16.96 73.24
38	21 25	-47.63	-10.87	.00	-242.66	-17.68 -1310.14
39	25 26	4313.51	.57	.00	2.14	16.77 71.68
40	26 27	4313.51	1.26	.00	11.09	16.77 71.68
41	27 29	4016.76	.16	.00	1.51	15.62 62.33
42	27 29	296.75	.03	.00	1.64	3.00 4.62
43	29 30	4313.51	.92	.00	4.91	16.23 65.89
44	30 31	4313.51	.00	.00	9.65	7.33 8.72
45	31 32	4313.51	.13	.00	1.27	16.23 65.89
46	32 33	4313.51	.02	.00	101.64	26.69 236.54
47	33 35	4313.51	.14	.00	.66	16.77 71.68
48	35 36	4313.51	1.04	.00	21.96	16.77 71.68
49	36 37	4313.51	.93	.00	3.23	16.77 71.68
50	37 38	4313.51	1.69	.00	2.63	24.39 187.50
51	38 39	4313.51	.09	.00	6.46	24.39 187.50
52	39 41	4313.51	12.60	.00	17.19	23.01 161.52
53	41 0	4313.51	1.14	.00	6.28	13.32 39.78
54	19 42	6051.87	.03	.00	.83	13.56 34.00
55	42 43	4214.54	.16	.00	1.45	9.45 16.80
56	43 44	4263.68	.42	.00	1.45	9.56 17.18
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE						
57	44 45	4263.68	.01	270.16	.28	17.42 79.52
58	45 46	4263.68	.03	.00	.92	16.04 64.41
59	43 46	-49.14	-8.77	.00	-258.28	-18.24 -1392.75
60	46 47	4214.54	1.16	.00	3.98	15.86 62.96
61	47 48	4214.54	.63	.00	8.70	15.86 62.96
62	48 49	4214.54	.63	.00	3.43	15.86 62.96
63	49 50	3850.12	.18	.00	2.25	14.48 52.74
64	49 50	364.42	.03	.00	2.40	3.68 6.81
65	50 51	4214.54	.44	.00	3.01	15.86 62.96
66	51 52	4214.54	.00	.00	9.21	7.17 8.34
67	52 53	4214.54	.16	.00	1.87	15.86 62.96

68	53	54	4214.54	.11	.00	1.52	15.86	62.96
69	54	55	4214.54	.02	.00	97.03	26.08	225.95
70	55	56	4214.54	.68	.00	1.29	16.39	68.49
71	56	57	4214.54	1.23	.00	4.50	16.39	68.49
72	57	70	4214.54	.55	.00	.63	16.39	68.49
73	70	58	4214.54	5.00	.00	23.09	16.39	68.49
74	58	59	4214.54	1.78	.00	2.46	16.39	68.49
75	59	61	4214.54	1.29	.00	2.51	23.83	179.11
76	61	62	4214.54	.09	.00	6.17	23.83	179.11
77	62	63	4214.54	13.81	.00	16.88	22.49	154.30
78	63	0	4214.54	1.90	.00	6.92	13.02	38.02
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	59	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1837.33	.01	.00	.03	4.12	3.39
110	113	114	1837.33	.30	.00	1.21	7.14	13.60
111	114	101	1837.33	.00	.00	.00	11.37	44.33
112	15	109	1837.17	.14	.00	2.04	7.14	13.60
113	109	110	1837.17	.00	.00	.00	11.37	44.33
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1837.33	.00	373.02	.00	11.37	44.33
115	115	116	1837.33	.46	.00	4.93	46.30	1649.23
116	116	117	1837.33	.26	.00	18.89	20.40	198.47
117	117	118	1837.33	.17	.00	1.03	11.37	44.33
118	118	119	1837.33	1.48	.00	.96	11.37	44.33
119	119	120	1837.33	4.58	.00	13.32	11.37	44.33
120	120	121	1837.33	7.83	.00	4.61	11.37	44.33
121	121	122	1837.33	.00	.00	10.78	11.37	44.33
122	122	123	1837.33	.63	.00	14.15	11.37	44.33
123	123	124	68.59	2.68	.00	232.98	25.46	2682.67
124	124	0	68.59	.27	.00	10.06	25.46	2682.67
125	123	125	1768.75	6.21	.00	3.49	10.41	36.28
126	125	126	920.49	.04	.00	.13	5.42	10.26
127	126	127	642.90	.07	.00	.06	3.79	5.17
128	127	128	365.48	.11	.00	.08	3.69	6.85
129	128	129	146.19	.18	.00	.05	3.29	8.97
130	128	130	219.30	.12	.00	.10	4.94	19.39
131	127	131	277.41	.15	.00	.51	6.24	30.44
132	126	132	277.59	.15	.00	.52	6.25	30.47
133	125	133	848.26	.07	.00	.11	4.99	8.78
134	133	134	570.68	.05	.00	.07	3.36	4.12
135	134	135	307.24	.09	.00	.04	3.11	4.93
136	135	136	117.04	.11	.00	.03	2.63	5.90
137	135	137	190.20	.04	.00	.07	4.28	14.78
138	134	138	263.44	.03	.00	.14	5.93	27.56
139	133	139	277.58	.15	.00	.52	6.25	30.47
140	129	0	146.19	.00	.00	102.16	3.29	8.97
141	130	0	219.30	.00	.00	102.18	4.94	19.39

142	131	0	277.41	.00	.00	101.91	6.24	30.44
143	132	0	277.59	.00	.00	102.04	6.25	30.47
144	139	0	277.58	.00	.00	102.03	6.25	30.47
145	138	0	263.44	.00	.00	102.40	5.93	27.56
146	137	0	190.20	.00	.00	102.33	4.28	14.78
147	136	0	117.04	.00	.00	102.31	2.63	5.90
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1837.17	.00	367.61	.00	11.37	44.33
149	140	141	1837.17	.46	.00	4.93	46.30	1648.95
150	141	142	1837.17	.26	.00	18.88	20.40	198.43
151	142	143	1837.17	.00	.00	.24	11.37	44.33
152	143	144	1837.17	8.94	.00	6.63	11.37	44.33
153	144	145	1837.17	1.10	.00	11.07	11.37	44.33
154	145	146	1837.17	.17	.00	1.80	11.37	44.33
155	146	147	1837.17	.00	.00	10.77	11.37	44.33
156	147	148	1837.17	.57	.00	13.84	11.37	44.33
157	148	200	69.03	2.72	.00	229.88	25.62	2716.85
158	200	0	69.03	.27	.00	10.19	25.62	2716.85
159	148	149	1768.14	5.69	.00	4.45	10.41	36.25
160	149	150	948.36	.05	.00	.14	5.58	10.87
161	150	151	660.96	.07	.00	.07	3.89	5.45
162	151	152	373.77	.11	.00	.09	3.78	7.15
163	152	153	158.09	.19	.00	.06	3.56	10.40
164	152	154	215.68	.05	.00	.09	4.85	18.79
165	151	155	287.19	.05	.00	.55	6.46	32.54
166	150	156	287.39	.05	.00	.55	6.47	32.58
167	149	157	819.79	.07	.00	.10	4.83	8.22
168	157	158	532.37	.05	.00	.06	3.13	3.62
169	158	159	273.41	.07	.00	.03	2.76	3.96
170	159	160	100.74	.09	.00	.02	2.27	4.45
171	159	161	172.67	.08	.00	.06	3.89	12.30
172	158	162	258.96	.14	.00	.13	5.83	26.67
173	157	163	287.42	.05	.00	.55	6.47	32.58
174	153	0	158.09	.00	.00	98.74	3.56	10.40
175	154	0	215.68	.00	.00	98.84	4.85	18.79
176	155	0	287.19	.00	.00	98.58	6.46	32.54
177	156	0	287.39	.00	.00	98.71	6.47	32.58
178	163	0	287.42	.00	.00	98.73	6.47	32.58
179	162	0	258.96	.00	.00	98.95	5.83	26.67
180	161	0	172.67	.00	.00	98.98	3.89	12.30
181	160	0	100.74	.00	.00	99.01	2.27	4.45

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	767.70	812.00	-19.08
8	.00	767.70	791.75	-10.36
9	.00	767.70	798.42	-13.23
10	.00	767.70	767.00	.30
11	.00	767.70	767.00	.30
12	.00	767.70	767.00	.30
13	.00	768.13	767.00	.48
14	.00	767.99	767.00	.43
15	.00	767.90	767.00	.39
16	.00	770.05	767.00	1.32
17	.00	863.31	822.67	17.51
18	.00	770.05	767.00	1.32
19	.00	770.05	767.00	1.32
20	.00	782.50	784.67	-.93
21	.00	767.28	767.00	.12
22	.00	767.06	767.00	.02
23	.00	765.40	761.08	1.86
24	.00	1024.82	763.00	112.78
25	.00	1020.82	765.25	110.08
26	.00	1018.10	765.25	108.91
27	.00	1005.76	779.00	97.67
28	.00	861.74	823.33	16.55
29	.00	1004.09	779.00	96.95
30	.00	998.26	771.50	97.67
31	.00	988.61	777.33	91.01
32	.00	987.21	779.00	89.68
33	.00	885.55	779.00	45.89
34	.00	861.74	823.33	16.55
35	.00	884.75	779.00	45.55
36	.00	861.74	824.75	15.93
37	.00	857.58	816.00	17.91
38	.00	853.26	816.00	16.05
39	.00	846.70	816.00	13.23
40	.00	861.74	820.00	17.98
41	.00	816.92	792.38	10.57
42	.00	769.19	767.00	.94
43	.00	767.58	767.00	.25
44	.00	765.71	761.08	2.00
45	.00	1035.58	763.00	117.41
46	.00	1034.63	765.00	116.14
47	.00	1029.49	765.25	113.82
48	.00	1020.15	775.50	105.38
49	.00	1016.09	777.75	102.66
50	.00	1013.66	774.25	103.12
51	.00	1010.21	771.50	102.82
52	.00	1001.00	777.73	96.17
53	.00	998.97	779.25	94.64
54	.00	997.34	779.25	93.94
55	.00	900.29	779.25	52.14
56	.00	898.31	779.25	51.28
57	.00	892.58	779.25	48.81
58	.00	863.31	823.17	17.29
59	.00	859.07	816.50	18.34
60	.00	861.74	817.00	19.27
61	.00	855.27	816.50	16.70
62	.00	849.01	816.50	14.00
63	.00	818.32	790.83	11.84
64	.00	1029.49	767.00	113.06
65	.00	1029.49	767.00	113.06
66	.00	1029.49	761.08	115.61
67	.00	1456.35	763.00	298.65
68	.00	1029.49	765.25	113.82
69	.00	1029.49	765.25	113.82
70	.00	891.40	787.25	44.86
71	.00	1029.49	765.25	113.82
72	.00	1029.49	763.25	114.68
73	.00	892.58	763.25	55.71
74	.00	998.97	762.00	102.07
75	.00	998.97	762.00	102.07

76	.00	998.97	762.00	102.07
77	.00	767.06	763.50	1.53
78	.00	998.97	763.50	101.43
79	.00	790.11	794.25	-1.78
80	1600.00	782.28	779.00	1.41
81	.00	777.22	779.00	-.76
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	767.63	760.10	3.24
109	.00	765.72		
110	.00	765.72	760.10	2.42
113	.00	769.15		
114	.00	767.63		
115	.00	1140.65	761.25	163.42
116	.00	1135.26	762.00	160.78
117	.00	1116.11	765.25	151.13
118	.00	1114.92	765.25	150.62
119	.00	1112.49	765.25	149.57
120	.00	1094.59	816.50	119.78
121	.00	1082.15	812.00	116.36
122	.00	1071.36	812.00	111.72
123	.00	1056.58	812.00	105.35
124	.00	820.92	810.58	4.45
125	.00	1046.88	944.00	44.31
126	.00	1046.71	944.00	44.24
127	.00	1046.58	944.00	44.19
128	.00	1046.39	944.00	44.10
129	.00	1046.16	944.00	44.01
130	.00	1046.18	944.00	44.01
131	.00	1045.92	944.00	43.90
132	.00	1046.04	944.00	43.95
133	.00	1046.70	944.00	44.24
134	.00	1046.58	944.00	44.18
135	.00	1046.45	944.00	44.13
136	.00	1046.31	944.00	44.07
137	.00	1046.34	944.00	44.08
138	.00	1046.40	944.00	44.11
139	.00	1046.04	944.00	43.95
140	.00	1133.33	761.25	160.27
141	.00	1127.94	762.00	157.62
142	.00	1108.79	764.09	148.48
143	.00	1108.55	765.47	147.78
144	.00	1092.98	817.50	118.66
145	.00	1080.81	817.50	113.41
146	.00	1078.84	812.00	114.93
147	.00	1068.06	812.00	110.29
148	.00	1053.65	812.00	104.09
149	.00	1043.50	944.00	42.86
150	.00	1043.31	944.00	42.78
151	.00	1043.18	944.00	42.72
152	.00	1042.98	944.00	42.63
153	.00	1042.74	944.00	42.53
154	.00	1042.84	944.00	42.57
155	.00	1042.58	944.00	42.46
156	.00	1042.71	944.00	42.52
157	.00	1043.33	944.00	42.79
158	.00	1043.22	944.00	42.74
159	.00	1043.12	944.00	42.70
160	.00	1043.01	944.00	42.65
161	.00	1042.98	944.00	42.63
162	.00	1042.95	944.00	42.62
163	.00	1042.73	944.00	42.53
200	.00	821.05	810.58	4.51

THE NET SYSTEM DEMAND = 1600.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13802.56
25	.00
28	.00
31	.00
53	-4313.51
78	-4214.54
108	.00
124	-68.59
140	-146.19
141	-219.30
142	-277.41
143	-277.59
144	-277.58
145	-263.44
146	-190.20
147	-117.04
158	-69.03
174	-158.09
175	-215.68
176	-287.19
177	-287.39
178	-287.42
179	-258.96
180	-172.67
181	-100.74

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13802.56
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12202.56

Calculation OSC-7248

Attachment 18

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=540$ sec

T9797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073
THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE	NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0	1	27.5	10.5	.2	2.19	809.50
2	1	2	12.3	10.5	.2	.81	
3	2	3	1.0	12.4	.2	.30	
4	3	4	4.5	12.4	.2	.42	
5	4	5	9.4	12.4	.2	.15	
6	5	6	13.6	12.3	.2	.75	
7	6	7	.1	10.3	.2	.30	
LINE 7 IS CLOSED							
8	7	8	120.3	12.4	.2	2.56	
9	8	9	26.3	12.4	.2	1.18	
10	9	10	40.4	12.4	.2	1.03	
11	10	11	.1	10.4	.2	.31	
12	11	12	5.0	12.4	.2	.78	
13	12	13	2.6	13.5	.2	.26	
14	13	14	1.0	13.5	.2	.49	
15	14	15	3.5	13.5	.2	.29	
16	15	16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED							
17	16	18	1.5	13.5	.2	.41	
18	18	19	4.5	13.5	.2	.29	
19	0	79	91.0	13.5	.2	1.54	826.83
20	79	80	7.3	13.5	.2	.44	
21	80	81	15.1	13.5	.2	.26	
22	81	13	6.2	13.5	.2	3.01	
23	81	19	17.7	13.5	.2	2.30	
24	1	86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED							
25	86	0	10.2	3.3	.2	1.78	798.33
26	3	20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED							
27	20	83	57.0	12.4	.2	1.79	
28	0	83	.1	17.5	.2	1.19	782.50
29	83	84	27.0	17.5	.2	.89	
30	84	14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED							
31	0	85	53.5	17.5	.2	.90	782.50
32	85	18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED							
33	12	21	2.5	13.5	.2	.26	
34	21	22	.1	13.5	.2	.15	
35	22	23	14.8	13.5	.2	.94	
36	23	24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0							
37	24	25	.5	10.3	.2	.89	
38	21	25	8.3	1.0	.2	50.00	
39	25	26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39							
40	26	27	17.5	10.3	.2	2.54	
41	27	29	2.5	10.3	.2	.40	
42	27	29	6.0	6.4	.2	11.76	
43	29	30	14.0	10.4	.2	1.20	
44	30	31	.1	15.5	.2	11.55	
45	31	32	2.0	10.4	.2	.31	
46	32	33	.1	8.1	.2	9.19	
47	33	35	2.0	10.3	.2	.15	
48	35	36	14.5	10.3	.2	5.03	
49	36	37	13.0	10.3	.2	.74	
50	37	38	9.0	8.5	.2	.28	
51	38	39	.5	8.5	.2	.70	
52	39	41	78.0	8.8	.2	2.09	
53	41	0	28.6	11.5	.2	2.28	809.50
54	19	42	1.0	13.5	.2	.29	
55	42	43	9.3	13.5	.2	1.05	
56	43	44	24.5	13.5	.2	1.02	
57	44	45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0							
58	45	46	.5	10.4	.2	.23	
59	43	46	6.3	1.0	.2	50.00	

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0									
83	67	68	1.0	10.3	.2	.89	410.0	2250.0	298.0 4000.0
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0									
115	115	116	.3	4.0	.2	.15	470.0	1500.0	385.0 1800.0
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA	(HEAD-FLOW) :	622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1600.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

T9797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 826.83'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-4305.65	-.05	.00	-.38	-9.65	-17.51
14	13 14	1834.18	.00	.00	.13	4.11	3.38
15	14 15	1834.18	.01	.00	.08	4.11	3.38
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	13781.08	15.61	.00	22.81	30.89	171.54
20	79 80	13781.08	1.26	.00	6.55	30.89	171.54
21	80 81	12181.08	2.03	.00	3.01	27.30	134.44
22	81 13	6139.83	.22	.00	8.85	13.76	34.98
23	81 19	6041.25	.60	.00	6.55	13.54	33.89
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED							
31	0 85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED							
33	12 21	4305.65	.04	.00	.38	9.65	17.51
34	21 22	4353.36	.00	.00	.22	9.76	17.89
35	22 23	4353.36	.26	.00	1.39	9.76	17.89
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE							
36	23 24	4353.36	.01	260.56	.29	17.78	82.84
37	24 25	4353.36	.04	.00	3.96	16.93	72.99
38	21 25	-47.71	-10.91	.00	-243.48	-17.71	-1314.47
39	25 26	4305.65	.57	.00	2.13	16.74	71.43
40	26 27	4305.65	1.25	.00	11.05	16.74	71.43
41	27 29	4009.44	.16	.00	1.51	15.59	62.11
42	27 29	296.21	.03	.00	1.64	2.99	4.60
43	29 30	4305.65	.92	.00	4.89	16.20	65.65
44	30 31	4305.65	.00	.00	9.61	7.32	8.69
45	31 32	4305.65	.13	.00	1.26	16.20	65.65
46	32 33	4305.65	.02	.00	101.27	26.64	235.69
47	33 35	4305.65	.14	.00	.65	16.74	71.43
48	35 36	4305.65	1.04	.00	21.88	16.74	71.43
49	36 37	4305.65	.93	.00	3.22	16.74	71.43
50	37 38	4305.65	1.68	.00	2.62	24.34	186.83
51	38 39	4305.65	.09	.00	6.44	24.34	186.83
52	39 41	4305.65	12.55	.00	17.12	22.97	160.94
53	41 0	4305.65	1.13	.00	6.26	13.30	39.64
54	19 42	6041.25	.03	.00	.83	13.54	33.89
55	42 43	4206.94	.16	.00	1.45	9.43	16.74
56	43 44	4256.15	.42	.00	1.44	9.54	17.12
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE							
57	44 45	4256.15	.01	270.97	.28	17.39	79.25
58	45 46	4256.15	.03	.00	.92	16.01	64.18
59	43 46	-49.21	-8.80	.00	-259.07	-18.27	-1396.93
60	46 47	4206.94	1.16	.00	3.97	15.83	62.74
61	47 48	4206.94	.63	.00	8.67	15.83	62.74
62	48 49	4206.94	.63	.00	3.42	15.83	62.74
63	49 50	3843.18	.18	.00	2.24	14.46	52.55
64	49 50	363.76	.03	.00	2.39	3.68	6.79
65	50 51	4206.94	.44	.00	2.99	15.83	62.74
66	51 52	4206.94	.00	.00	9.17	7.15	8.31
67	52 53	4206.94	.16	.00	1.87	15.83	62.74

68	53	54	4206.94	.11	.00	1.52	15.83	62.74
69	54	55	4206.94	.02	.00	96.68	26.03	225.15
70	55	56	4206.94	.68	.00	1.29	16.36	68.25
71	56	57	4206.94	1.23	.00	4.49	16.36	68.25
72	57	70	4206.94	.55	.00	.62	16.36	68.25
73	70	58	4206.94	4.98	.00	23.01	16.36	68.25
74	58	59	4206.94	1.77	.00	2.45	16.36	68.25
75	59	61	4206.94	1.29	.00	2.50	23.78	178.48
76	61	62	4206.94	.09	.00	6.15	23.78	178.48
77	62	63	4206.94	13.76	.00	16.82	22.44	153.75
78	63	0	4206.94	1.90	.00	6.89	12.99	37.89
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
-91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1834.30	.01	.00	.03	4.11	3.38
110	113	114	1834.30	.30	.00	1.21	7.13	13.56
111	114	101	1834.30	.00	.00	.00	11.35	44.19
112	15	109	1834.18	.14	.00	2.04	7.13	13.56
113	109	110	1834.18	.00	.00	.00	11.35	44.19
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1834.30	.00	374.00	.00	11.35	44.19
115	115	116	1834.30	.46	.00	4.91	46.23	1643.85
116	116	117	1834.30	.26	.00	18.82	20.37	197.83
117	117	118	1834.30	.16	.00	1.02	11.35	44.19
118	118	119	1834.30	1.47	.00	.95	11.35	44.19
119	119	120	1834.30	4.56	.00	13.28	11.35	44.19
120	120	121	1834.30	7.80	.00	4.59	11.35	44.19
121	121	122	1834.30	.00	.00	10.75	11.35	44.19
122	122	123	1834.30	.63	.00	14.10	11.35	44.19
123	123	124	68.53	2.68	.00	232.62	25.44	2678.59
124	124	0	68.53	.27	.00	10.05	25.44	2678.59
125	123	125	1765.77	6.19	.00	3.48	10.40	36.16
126	125	126	918.94	.04	.00	.13	5.41	10.23
127	126	127	641.82	.07	.00	.06	3.78	5.15
128	127	128	364.87	.11	.00	.08	3.69	6.83
129	128	129	145.94	.18	.00	.05	3.28	8.94
130	128	130	218.93	.12	.00	.10	4.93	19.33
131	127	131	276.95	.15	.00	.51	6.23	30.34
132	126	132	277.12	.15	.00	.51	6.24	30.38
133	125	133	846.83	.07	.00	.11	4.99	8.75
134	133	134	569.72	.05	.00	.07	3.35	4.11
135	134	135	306.72	.09	.00	.04	3.10	4.92
136	135	136	116.84	.11	.00	.03	2.63	5.88
137	135	137	189.88	.04	.00	.07	4.27	14.73
138	134	138	263.00	.03	.00	.14	5.92	27.47
139	133	139	277.11	.15	.00	.51	6.24	30.37
140	129	0	145.94	.00	.00	101.82	3.28	8.94
141	130	0	218.93	.00	.00	101.83	4.93	19.33

142	131	0	276.95	.00	.00	101.57	6.23	30.34
143	132	0	277.12	.00	.00	101.70	6.24	30.38
144	139	0	277.11	.00	.00	101.69	6.24	30.37
145	138	0	263.00	.00	.00	102.06	5.92	27.47
146	137	0	189.88	.00	.00	101.99	4.27	14.73
147	136	0	116.84	.00	.00	101.97	2.63	5.88
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1834.18	.00	368.61	.00	11.35	44.19
149	140	141	1834.18	.46	.00	4.91	46.22	1643.63
150	141	142	1834.18	.26	.00	18.82	20.37	197.80
151	142	143	1834.18	.00	.00	.24	11.35	44.19
152	143	144	1834.18	8.91	.00	6.61	11.35	44.19
153	144	145	1834.18	1.09	.00	11.04	11.35	44.19
154	145	146	1834.18	.17	.00	1.79	11.35	44.19
155	146	147	1834.18	.00	.00	10.74	11.35	44.19
156	147	148	1834.18	.57	.00	13.80	11.35	44.19
157	148	200	68.98	2.71	.00	229.54	25.60	2712.86
158	200	0	68.98	.27	.00	10.18	25.60	2712.86
159	148	149	1765.21	5.67	.00	4.44	10.39	36.13
160	149	150	946.78	.05	.00	.14	5.57	10.83
161	150	151	659.87	.07	.00	.07	3.89	5.43
162	151	152	373.15	.11	.00	.09	3.77	7.13
163	152	153	157.82	.18	.00	.06	3.55	10.37
164	152	154	215.32	.05	.00	.09	4.85	18.73
165	151	155	286.72	.05	.00	.55	6.45	32.43
166	150	156	286.91	.05	.00	.55	6.46	32.47
167	149	157	818.43	.07	.00	.10	4.82	8.20
168	157	158	531.48	.05	.00	.06	3.13	3.60
169	158	159	272.95	.07	.00	.03	2.76	3.94
170	159	160	100.57	.09	.00	.02	2.26	4.44
171	159	161	172.38	.08	.00	.06	3.88	12.26
172	158	162	258.53	.14	.00	.13	5.82	26.58
173	157	163	286.94	.05	.00	.55	6.46	32.48
174	153	0	157.82	.00	.00	98.41	3.55	10.37
175	154	0	215.32	.00	.00	98.51	4.85	18.73
176	155	0	286.72	.00	.00	98.25	6.45	32.43
177	156	0	286.91	.00	.00	98.38	6.46	32.47
178	163	0	286.94	.00	.00	98.40	6.46	32.48
179	162	0	258.53	.00	.00	98.62	5.82	26.58
180	161	0	172.38	.00	.00	98.65	3.88	12.26
181	160	0	100.57	.00	.00	98.68	2.26	4.44

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	766.08	812.00	-19.78
8	.00	766.08	791.75	-11.06
9	.00	766.08	798.42	-13.93
10	.00	766.08	767.00	-.40
11	.00	766.08	767.00	-.40
12	.00	766.08	767.00	-.40
13	.00	766.50	767.00	-.22
14	.00	766.37	767.00	-.27
15	.00	766.28	767.00	-.31
16	.00	768.42	767.00	.61
17	.00	863.12	822.67	17.42
18	.00	768.42	767.00	.61
19	.00	768.42	767.00	.61
20	.00	782.50	784.67	-.93
21	.00	765.66	767.00	-.58
22	.00	765.43	767.00	-.67
23	.00	763.78	761.08	1.16
24	.00	1024.04	763.00	112.44
25	.00	1020.05	765.25	109.75
26	.00	1017.34	765.25	108.59
27	.00	1005.04	779.00	97.36
28	.00	861.55	823.33	16.46
29	.00	1003.38	779.00	96.65
30	.00	997.57	771.50	97.38
31	.00	987.96	777.33	90.72
32	.00	986.56	779.00	89.41
33	.00	885.27	779.00	45.77
34	.00	861.55	823.33	16.46
35	.00	884.47	779.00	45.43
36	.00	861.55	824.75	15.85
37	.00	857.41	816.00	17.84
38	.00	853.10	816.00	15.98
39	.00	846.57	816.00	13.17
40	.00	861.55	820.00	17.90
41	.00	816.89	792.38	10.56
42	.00	767.56	767.00	.24
43	.00	765.96	767.00	-.45
44	.00	764.10	761.08	1.30
45	.00	1034.77	763.00	117.06
46	.00	1033.82	765.00	115.79
47	.00	1028.70	765.25	113.48
48	.00	1019.40	775.50	105.05
49	.00	1015.35	777.75	102.34
50	.00	1012.92	774.25	102.80
51	.00	1009.49	771.50	102.51
52	.00	1000.31	777.73	95.87
53	.00	998.29	779.25	94.35
54	.00	996.67	779.25	93.65
55	.00	899.96	779.25	52.00
56	.00	897.99	779.25	51.15
57	.00	892.28	779.25	48.69
58	.00	863.12	823.17	17.21
59	.00	858.89	816.50	18.26
60	.00	861.55	817.00	19.19
61	.00	855.11	816.50	16.63
62	.00	848.87	816.50	13.94
63	.00	818.29	790.83	11.83
64	.00	1028.70	767.00	112.72
65	.00	1028.70	767.00	112.72
66	.00	1028.70	761.08	115.27
67	.00	1455.56	763.00	298.31
68	.00	1028.70	765.25	113.48
69	.00	1028.70	765.25	113.48
70	.00	891.11	787.25	44.74
71	.00	1028.70	765.25	113.48
72	.00	1028.70	763.25	114.34
73	.00	892.28	763.25	55.58
74	.00	998.29	762.00	101.78
75	.00	998.29	762.00	101.78

76	.00	998.29	762.00	101.78
77	.00	765.43	763.50	.83
78	.00	998.29	763.50	101.13
79	.00	788.41	794.25	-2.52
80	1600.00	780.60	779.00	.69
81	.00	775.57	779.00	-1.48
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	766.00	760.10	2.54
109	.00	764.11		
110	.00	764.10	760.10	1.72
113	.00	767.52		
114	.00	766.01		
115	.00	1140.00	761.25	163.14
116	.00	1134.62	762.00	160.50
117	.00	1115.54	765.25	150.88
118	.00	1114.35	765.25	150.37
119	.00	1111.93	765.25	149.33
120	.00	1094.08	816.50	119.56
121	.00	1081.69	812.00	116.16
122	.00	1070.93	812.00	111.53
123	.00	1056.20	812.00	105.19
124	.00	820.90	810.58	4.44
125	.00	1046.53	944.00	44.17
126	.00	1046.36	944.00	44.09
127	.00	1046.24	944.00	44.04
128	.00	1046.05	944.00	43.96
129	.00	1045.82	944.00	43.86
130	.00	1045.84	944.00	43.86
131	.00	1045.57	944.00	43.75
132	.00	1045.70	944.00	43.81
133	.00	1046.36	944.00	44.09
134	.00	1046.23	944.00	44.03
135	.00	1046.11	944.00	43.98
136	.00	1045.97	944.00	43.92
137	.00	1045.99	944.00	43.93
138	.00	1046.06	944.00	43.96
139	.00	1045.69	944.00	43.80
140	.00	1132.70	761.25	160.00
141	.00	1127.33	762.00	157.36
142	.00	1108.25	764.09	148.24
143	.00	1108.01	765.47	147.54
144	.00	1092.49	817.50	118.45
145	.00	1080.36	817.50	113.22
146	.00	1078.39	812.00	114.74
147	.00	1067.65	812.00	110.12
148	.00	1053.28	812.00	103.93
149	.00	1043.17	944.00	42.72
150	.00	1042.98	944.00	42.64
151	.00	1042.85	944.00	42.58
152	.00	1042.65	944.00	42.49
153	.00	1042.41	944.00	42.39
154	.00	1042.51	944.00	42.43
155	.00	1042.25	944.00	42.32
156	.00	1042.39	944.00	42.38
157	.00	1043.00	944.00	42.64
158	.00	1042.89	944.00	42.60
159	.00	1042.79	944.00	42.55
160	.00	1042.68	944.00	42.50
161	.00	1042.65	944.00	42.49
162	.00	1042.62	944.00	42.48
163	.00	1042.40	944.00	42.39
200	.00	821.03	810.58	4.50

THE NET SYSTEM DEMAND = 1600.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13781.08
25	.00
28	.00
31	.00
53	-4305.65
78	-4206.94
108	.00
124	-68.53
140	-145.94
141	-218.93
142	-276.95
143	-277.12
144	-277.11
145	-263.00
146	-189.88
147	-116.84
158	-68.98
174	-157.82
175	-215.32
176	-286.72
177	-286.91
178	-286.94
179	-258.53
180	-172.38
181	-100.57

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13781.08
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12181.08

Calculation OSC-7248

Attachment 19

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=600$ sec

T10797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	825.02
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0 .0 410.0 2250.0 298.0 4000.0									
83	67	68	1.0	10.3	.2	.89			
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0 .0 470.0 1500.0 385.0 1800.0									
115	115	116	.3	4.0	.2	.15			
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA	(HEAD-FLOW) :	622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1500.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

T10797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 825.02'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-4300.70	-.05	.00	-.38	-9.64	-17.47
14	13 14	1832.30	.00	.00	.13	4.11	3.38
15	14 15	1832.30	.01	.00	.08	4.11	3.38
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	13667.55	15.36	.00	22.44	30.63	168.76
20	79 80	13667.55	1.24	.00	6.44	30.63	168.76
21	80 81	12167.55	2.03	.00	3.00	27.27	134.15
22	81 13	6133.00	.22	.00	8.83	13.75	34.90
23	81 19	6034.55	.60	.00	6.53	13.53	33.81
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED							
31	0 85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED							
33	12 21	4300.70	.04	.00	.38	9.64	17.47
34	21 22	4348.46	.00	.00	.22	9.75	17.85
35	22 23	4348.46	.26	.00	1.39	9.75	17.85
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE							
36	23 24	4348.46	.01	261.09	.29	17.76	82.65
37	24 25	4348.46	.04	.00	3.95	16.91	72.83
38	21 25	-47.76	-10.93	.00	-243.99	-17.73	-1317.20
39	25 26	4300.70	.57	.00	2.13	16.72	71.27
40	26 27	4300.70	1.25	.00	11.03	16.72	71.27
41	27 29	4004.83	.15	.00	1.51	15.57	61.97
42	27 29	295.87	.03	.00	1.63	2.99	4.59
43	29 30	4300.70	.92	.00	4.88	16.18	65.51
44	30 31	4300.70	.00	.00	9.59	7.31	8.67
45	31 32	4300.70	.13	.00	1.26	16.18	65.51
46	32 33	4300.70	.02	.00	101.04	26.61	235.15
47	33 35	4300.70	.14	.00	.65	16.72	71.27
48	35 36	4300.70	1.03	.00	21.83	16.72	71.27
49	36 37	4300.70	.93	.00	3.21	16.72	71.27
50	37 38	4300.70	1.68	.00	2.62	24.31	186.40
51	38 39	4300.70	.09	.00	6.43	24.31	186.40
52	39 41	4300.70	12.52	.00	17.08	22.94	160.57
53	41 0	4300.70	1.13	.00	6.25	13.28	39.55
54	19 42	6034.55	.03	.00	.82	13.53	33.81
55	42 43	4202.16	.16	.00	1.45	9.42	16.70
56	43 44	4251.42	.42	.00	1.44	9.53	17.08
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE							
57	44 45	4251.42	.01	271.47	.28	17.37	79.07
58	45 46	4251.42	.03	.00	.91	15.99	64.04
59	43 46	-49.26	-8.82	.00	-259.56	-18.29	-1399.55
60	46 47	4202.16	1.16	.00	3.96	15.81	62.60
61	47 48	4202.16	.63	.00	8.65	15.81	62.60
62	48 49	4202.16	.63	.00	3.41	15.81	62.60
63	49 50	3838.81	.18	.00	2.23	14.44	52.44
64	49 50	363.35	.03	.00	2.39	3.67	6.78
65	50 51	4202.16	.44	.00	2.99	15.81	62.60
66	51 52	4202.16	.00	.00	9.15	7.14	8.29
67	52 53	4202.16	.16	.00	1.86	15.81	62.60

68	53	54	4202.16	.11	.00	1.51	15.81	62.60
69	54	55	4202.16	.02	.00	96.46	26.00	224.64
70	55	56	4202.16	.68	.00	1.28	16.34	68.10
71	56	57	4202.16	1.23	.00	4.48	16.34	68.10
72	57	70	4202.16	.54	.00	.62	16.34	68.10
73	70	58	4202.16	4.97	.00	22.96	16.34	68.10
74	58	59	4202.16	1.77	.00	2.45	16.34	68.10
75	59	61	4202.16	1.28	.00	2.50	23.76	178.08
76	61	62	4202.16	.09	.00	6.13	23.76	178.08
77	62	63	4202.16	13.73	.00	16.78	22.42	153.41
78	63	0	4202.16	1.89	.00	6.88	12.98	37.80
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1832.40	.01	.00	.03	4.11	3.38
110	113	114	1832.40	.30	.00	1.21	7.12	13.53
111	114	101	1832.40	.00	.00	.00	11.34	44.10
112	15	109	1832.30	.14	.00	2.03	7.12	13.53
113	109	110	1832.30	.00	.00	.00	11.34	44.10
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1832.40	.00	374.61	.00	11.34	44.10
115	115	116	1832.40	.46	.00	4.90	46.18	1640.46
116	116	117	1832.40	.26	.00	18.78	20.35	197.42
117	117	118	1832.40	.16	.00	1.02	11.34	44.10
118	118	119	1832.40	1.47	.00	.95	11.34	44.10
119	119	120	1832.40	4.56	.00	13.25	11.34	44.10
120	120	121	1832.40	7.79	.00	4.58	11.34	44.10
121	121	122	1832.40	.00	.00	10.73	11.34	44.10
122	122	123	1832.40	.63	.00	14.07	11.34	44.10
123	123	124	68.50	2.68	.00	232.40	25.43	2676.05
124	124	0	68.50	.27	.00	10.04	25.43	2676.05
125	123	125	1763.90	6.18	.00	3.47	10.39	36.08
126	125	126	917.96	.04	.00	.13	5.41	10.21
127	126	127	641.14	.07	.00	.06	3.78	5.14
128	127	128	364.48	.10	.00	.08	3.68	6.82
129	128	129	145.79	.18	.00	.05	3.28	8.92
130	128	130	218.70	.12	.00	.10	4.92	19.29
131	127	131	276.65	.15	.00	.51	6.23	30.28
132	126	132	276.83	.15	.00	.51	6.23	30.31
133	125	133	845.93	.07	.00	.11	4.98	8.73
134	133	134	569.11	.05	.00	.07	3.35	4.10
135	134	135	306.39	.09	.00	.04	3.10	4.91
136	135	136	116.71	.11	.00	.03	2.63	5.87
137	135	137	189.68	.04	.00	.07	4.27	14.70
138	134	138	262.72	.03	.00	.14	5.91	27.42
139	133	139	276.82	.15	.00	.51	6.23	30.31
140	129	0	145.79	.00	.00	101.60	3.28	8.92
141	130	0	218.70	.00	.00	101.62	4.92	19.29

142	131	0	276.65	.00	.00	101.35	6.23	30.28
143	132	0	276.83	.00	.00	101.48	6.23	30.31
144	139	0	276.82	.00	.00	101.47	6.23	30.31
145	138	0	262.72	.00	.00	101.84	5.91	27.42
146	137	0	189.68	.00	.00	101.77	4.27	14.70
147	136	0	116.71	.00	.00	101.75	2.63	5.87
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1832.30	.00	369.23	.00	11.34	44.10
149	140	141	1832.30	.46	.00	4.90	46.18	1640.29
150	141	142	1832.30	.26	.00	18.78	20.35	197.40
151	142	143	1832.30	.00	.00	.24	11.34	44.10
152	143	144	1832.30	8.89	.00	6.59	11.34	44.10
153	144	145	1832.30	1.09	.00	11.02	11.34	44.10
154	145	146	1832.30	.17	.00	1.79	11.34	44.10
155	146	147	1832.30	.00	.00	10.72	11.34	44.10
156	147	148	1832.30	.56	.00	13.77	11.34	44.10
157	148	200	68.95	2.71	.00	229.32	25.59	2710.33
158	200	0	68.95	.27	.00	10.17	25.59	2710.33
159	148	149	1763.35	5.66	.00	4.43	10.38	36.06
160	149	150	945.79	.05	.00	.13	5.57	10.81
161	150	151	659.17	.07	.00	.07	3.88	5.42
162	151	152	372.76	.11	.00	.09	3.77	7.11
163	152	153	157.66	.18	.00	.06	3.55	10.35
164	152	154	215.10	.05	.00	.09	4.84	18.69
165	151	155	286.42	.05	.00	.55	6.45	32.37
166	150	156	286.61	.05	.00	.55	6.45	32.41
167	149	157	817.57	.07	.00	.10	4.81	8.18
168	157	158	530.93	.05	.00	.06	3.13	3.60
169	158	159	272.66	.07	.00	.03	2.76	3.94
170	159	160	100.47	.09	.00	.02	2.26	4.43
171	159	161	172.20	.08	.00	.06	3.88	12.23
172	158	162	258.26	.14	.00	.13	5.81	26.53
173	157	163	286.64	.05	.00	.55	6.45	32.42
174	153	0	157.66	.00	.00	98.20	3.55	10.35
175	154	0	215.10	.00	.00	98.30	4.84	18.69
176	155	0	286.42	.00	.00	98.04	6.45	32.37
177	156	0	286.61	.00	.00	98.18	6.45	32.41
178	163	0	286.64	.00	.00	98.20	6.45	32.42
179	162	0	258.26	.00	.00	98.41	5.81	26.53
180	161	0	172.20	.00	.00	98.44	3.88	12.23
181	160	0	100.47	.00	.00	98.47	2.26	4.43

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	765.05	812.00	-20.22
8	.00	765.05	791.75	-11.50
9	.00	765.05	798.42	-14.37
10	.00	765.05	767.00	-.84
11	.00	765.05	767.00	-.84
12	.00	765.05	767.00	-.84
13	.00	765.48	767.00	-.66
14	.00	765.34	767.00	-.71
15	.00	765.26	767.00	-.75
16	.00	767.39	767.00	.17
17	.00	863.00	822.67	17.37
18	.00	767.39	767.00	.17
19	.00	767.39	767.00	.17
20	.00	782.50	784.67	-.93
21	.00	764.64	767.00	-1.02
22	.00	764.41	767.00	-1.11
23	.00	762.76	761.08	.72
24	.00	1023.55	763.00	112.23
25	.00	1019.56	765.25	109.54
26	.00	1016.87	765.25	108.38
27	.00	1004.59	779.00	97.17
28	.00	861.44	823.33	16.41
29	.00	1002.93	779.00	96.46
30	.00	997.14	771.50	97.19
31	.00	987.55	777.33	90.55
32	.00	986.16	779.00	89.23
33	.00	885.10	779.00	45.70
34	.00	861.44	823.33	16.41
35	.00	884.30	779.00	45.36
36	.00	861.44	824.75	15.80
37	.00	857.30	816.00	17.79
38	.00	853.00	816.00	15.94
39	.00	846.48	816.00	13.13
40	.00	861.44	820.00	17.85
41	.00	816.88	792.38	10.55
42	.00	766.53	767.00	-.20
43	.00	764.93	767.00	-.89
44	.00	763.08	761.08	.86
45	.00	1034.26	763.00	116.84
46	.00	1033.32	765.00	115.57
47	.00	1028.20	765.25	113.26
48	.00	1018.92	775.50	104.85
49	.00	1014.88	777.75	102.14
50	.00	1012.46	774.25	102.61
51	.00	1009.04	771.50	102.31
52	.00	999.88	777.73	95.69
53	.00	997.86	779.25	94.16
54	.00	996.24	779.25	93.47
55	.00	899.76	779.25	51.91
56	.00	897.79	779.25	51.06
57	.00	892.09	779.25	48.60
58	.00	863.00	823.17	17.16
59	.00	858.78	816.50	18.21
60	.00	861.44	817.00	19.14
61	.00	855.00	816.50	16.58
62	.00	848.78	816.50	13.90
63	.00	818.27	790.83	11.82
64	.00	1028.20	767.00	112.51
65	.00	1028.20	767.00	112.51
66	.00	1028.20	761.08	115.06
67	.00	1455.07	763.00	298.10
68	.00	1028.20	765.25	113.26
69	.00	1028.20	765.25	113.26
70	.00	890.93	787.25	44.66
71	.00	1028.20	765.25	113.26
72	.00	1028.20	763.25	114.12
73	.00	892.09	763.25	55.50
74	.00	997.86	762.00	101.59
75	.00	997.86	762.00	101.59

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	3300.00	779.00	45	46	
33	-3300.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	3300.00	779.25	68	69	
55	-3300.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

120	120	121	176.6	8.1	.2	2.30		
121	121	122	.1	8.1	.2	5.37		
122	122	123	14.3	8.1	.2	7.05		
123	123	124	1.0	1.0	.2	23.15		
124	124	0	.1	1.0	.2	1.00	810.58	
125	123	125	171.2	8.3	.2	2.07		
126	125	126	4.1	8.3	.2	.28		
127	126	127	12.8	8.3	.2	.28		
128	127	128	15.4	6.4	.2	.40		
129	128	129	20.3	4.3	.2	.28		
130	128	130	6.0	4.3	.2	.25		
131	127	131	5.0	4.3	.2	.85		
132	126	132	5.0	4.3	.2	.85		
133	125	133	7.7	8.3	.2	.28		
134	133	134	13.1	8.3	.2	.42		
135	134	135	17.5	6.4	.2	.25		
136	135	136	18.5	4.3	.2	.28		
137	135	137	3.0	4.3	.2	.25		
138	134	138	1.3	4.3	.2	.25		
139	133	139	5.0	4.3	.2	.85		
140	129	0	.1	4.3	.2	607.75	944.00	
141	130	0	.1	4.3	.2	270.11	944.00	
142	131	0	.1	4.3	.2	168.35	944.00	
143	132	0	.1	4.3	.2	168.35	944.00	
144	139	0	.1	4.3	.2	168.35	944.00	
145	138	0	.1	4.3	.2	187.58	944.00	
146	137	0	.1	4.3	.2	359.62	944.00	
147	136	0	.1	4.3	.2	949.61	944.00	
148	110	140	.1	8.1	.2	.00		
LINE 148	PUMP DATA	(HEAD-FLOW) :	622.0		.0	468.0 1500.0	380.0 1800.0	
149	140	141	.3	4.0	.2	.15		
150	141	142	1.3	6.1	.2	2.92		
151	142	143	.1	8.1	.2	.12		
152	143	144	201.7	8.1	.2	3.30		
153	144	145	24.8	8.1	.2	5.52		
154	145	146	3.9	8.1	.2	.90		
155	146	147	.1	8.1	.2	5.37		
156	147	148	12.8	8.1	.2	6.90		
157	148	200	1.0	1.0	.2	22.55		
158	200	0	.1	1.0	.2	1.00	810.58	
159	148	149	157.0	8.3	.2	2.65		
160	149	150	4.8	8.3	.2	.28		
161	150	151	12.8	8.3	.2	.28		
162	151	152	15.6	6.4	.2	.40		
163	152	153	17.8	4.3	.2	.28		
164	152	154	2.5	4.3	.2	.25		
165	151	155	1.5	4.3	.2	.85		
166	150	156	1.5	4.3	.2	.85		
167	149	157	8.1	8.3	.2	.28		
168	157	158	13.1	8.3	.2	.42		
169	158	159	18.0	6.4	.2	.25		
170	159	160	20.3	4.3	.2	.28		
171	159	161	6.9	4.3	.2	.25		
172	158	162	5.1	4.3	.2	.25		
173	157	163	1.5	4.3	.2	.85		
174	153	0	.1	4.3	.2	502.27	944.00	
175	154	0	.1	4.3	.2	270.11	944.00	
176	155	0	.1	4.3	.2	151.94	944.00	
177	156	0	.1	4.3	.2	151.94	944.00	
178	163	0	.1	4.3	.2	151.94	944.00	
179	162	0	.1	4.3	.2	187.58	944.00	
180	161	0	.1	4.3	.2	422.05	944.00	
181	160	0	.1	4.3	.2	1240.31	944.00	

58	45	46	.5	10.4	.2	.23		
59	43	46	6.3	1.0	.2	50.00		
60	46	47	18.5	10.4	.2	1.02		
THERE IS A CHECK VALVE IN LINE NUMBER 60								
61	47	48	10.0	10.4	.2	2.23		
62	48	49	10.0	10.4	.2	.88		
63	49	50	3.5	10.4	.2	.69		
64	49	50	4.5	6.4	.2	11.40		
65	50	51	7.0	10.4	.2	.77		
66	51	52	.1	15.5	.2	11.55		
67	52	53	2.5	10.4	.2	.48		
68	53	54	1.7	10.4	.2	.39		
69	54	55	.1	8.1	.2	9.19		
LINE 69 IS CLOSED								
70	55	56	10.0	10.3	.2	.31		
71	56	57	18.0	10.3	.2	1.08		
72	57	70	8.0	10.3	.2	.15		
73	70	58	73.0	10.3	.2	5.54		
74	58	59	26.0	10.3	.2	.59		
75	59	61	7.2	8.5	.2	.28		
76	61	62	.5	8.5	.2	.70		
77	62	63	89.5	8.8	.2	2.15		
78	63	0	50.1	11.5	.2	2.63	809.50	
79	16	64	5.2	13.5	.2	.73		
LINE 79 IS CLOSED								
80	64	65	3.8	13.5	.2	.55		
81	65	66	13.5	13.5	.2	.96		
82	66	67	.1	10.0	.2	.06		
LINE 82 PUMP DATA (HEAD-FLOW): 425.0 .0 410.0 2250.0 298.0 4000.0								
83	67	68	1.0	10.3	.2	.89		
LINE 83 IS CLOSED								
84	64	68	8.5	1.0	.2	50.00		
85	68	69	15.5	10.3	.2	1.41		
86	69	47	3.0	10.3	.2	.43		
87	69	71	10.0	10.3	.2	.31		
88	26	71	6.1	10.3	.2	.65		
LINE 88 IS CLOSED								
89	71	72	29.5	8.1	.2	7.20		
90	72	73	8.6	6.4	.2	.12		
LINE 90 IS CLOSED								
91	73	57	20.5	8.1	.2	.83		
92	9	48	15.0	8.3	.2	2.89		
LINE 92 IS CLOSED								
93	53	74	49.5	8.3	.2	3.13		
94	74	75	3.6	6.4	.2	.12		
95	75	76	12.0	8.3	.2	.40		
96	76	77	5.0	8.3	.2	1.06		
LINE 96 IS CLOSED								
97	77	22	1.5	8.1	.2	.97		
98	76	78	20.5	8.3	.2	.63		
99	78	65	1.5	8.1	.2	.87		
LINE 99 IS CLOSED								
100	36	28	1.5	3.1	.2	1.63		
101	28	34	17.5	3.3	.2	.55		
102	34	40	132.5	3.3	.2	2.34		
103	40	60	4.0	3.3	.2	2.07		
104	58	17	.5	8.1	.2	.19		
105	17	60	3.0	8.1	.2	.42		
LINE 105 IS CLOSED								
106	40	17	.5	3.3	.2	3.72		
LINE 106 IS CLOSED								
107	60	82	22.2	8.3	.2	.80		
LINE 107 IS CLOSED								
108	82	0	23.2	8.3	.2	2.13	798.33	
109	42	113	3.1	13.5	.2	.13		
110	113	114	22.1	10.3	.2	1.53		
111	114	101	.1	8.1	.2	.00		
112	15	109	10.1	10.3	.2	2.58		
113	109	110	.1	8.1	.2	.00		
114	101	115	.1	8.1	.2	.00		
LINE 114 PUMP DATA (HEAD-FLOW): 622.0 .0 470.0 1500.0 385.0 1800.0								
115	115	116	.3	4.0	.2	.15		
116	116	117	1.3	6.1	.2	2.92		
117	117	118	3.7	8.1	.2	.51		
118	118	119	33.3	8.1	.2	.48		
119	119	120	103.3	8.1	.2	6.64		

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE	
1	0 1	27.5	10.5	.2	2.19	809.50	
2	1 2	12.3	10.5	.2	.81		
3	2 3	1.0	12.4	.2	.30		
4	3 4	4.5	12.4	.2	.42		
5	4 5	9.4	12.4	.2	.15		
6	5 6	13.6	12.3	.2	.75		
7	6 7	.1	10.3	.2	.30		
LINE 7	IS CLOSED						
8	7 8	120.3	12.4	.2	2.56		
9	8 9	26.3	12.4	.2	1.18		
10	9 10	40.4	12.4	.2	1.03		
11	10 11	.1	10.4	.2	.31		
12	11 12	5.0	12.4	.2	.78		
13	12 13	2.6	13.5	.2	.26		
14	13 14	1.0	13.5	.2	.49		
15	14 15	3.5	13.5	.2	.29		
16	15 16	1.2	13.5	.2	.41		
LINE 16	IS CLOSED						
17	16 18	1.5	13.5	.2	.41		
18	18 19	4.5	13.5	.2	.29		
19	0 79	91.0	13.5	.2	1.54	819.65	
20	79 80	7.3	13.5	.2	.44		
21	80 81	15.1	13.5	.2	.26		
22	81 13	6.2	13.5	.2	3.01		
23	81 19	17.7	13.5	.2	2.30		
24	1 86	5.2	2.6	.2	1.58		
LINE 24	IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33	
26	3 20	9.0	8.3	.2	1.96		
LINE 26	IS CLOSED						
27	20 83	57.0	12.4	.2	1.79		
28	0 83	.1	17.5	.2	1.19	782.50	
29	83 84	27.0	17.5	.2	.89		
30	84 14	7.0	13.5	.2	.99		
LINE 30	IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50	
32	85 18	7.0	13.5	.2	.99		
LINE 32	IS CLOSED						
33	12 21	2.5	13.5	.2	.26		
34	21 22	.1	13.5	.2	.15		
35	22 23	14.8	13.5	.2	.94		
36	23 24	.1	10.0	.2	.06		
LINE 36	PUMP DATA (HEAD-FLOW):			430.0	.0	375.0 3000.0	285.0 4125.0
37	24 25	.5	10.3	.2	.89		
38	21 25	8.3	1.0	.2	50.00		
39	25 26	8.0	10.3	.2	.49		
THERE IS A CHECK VALVE IN LINE NUMBER 39							
40	26 27	17.5	10.3	.2	2.54		
41	27 29	2.5	10.3	.2	.40		
42	27 29	6.0	6.4	.2	11.76		
43	29 30	14.0	10.4	.2	1.20		
44	30 31	.1	15.5	.2	11.55		
45	31 32	2.0	10.4	.2	.31		
46	32 33	.1	8.1	.2	9.19		
LINE 46	IS CLOSED						
47	33 35	2.0	10.3	.2	.15		
48	35 36	14.5	10.3	.2	5.03		
49	36 37	13.0	10.3	.2	.74		
50	37 38	9.0	8.5	.2	.28		
51	38 39	.5	8.5	.2	.70		
52	39 41	78.0	8.8	.2	2.09		
53	41 0	28.6	11.5	.2	2.28	809.50	
54	19 42	1.0	13.5	.2	.29		
55	42 43	9.3	13.5	.2	1.05		
56	43 44	24.5	13.5	.2	1.02		
57	44 45	.1	10.0	.2	.06		
LINE 57	PUMP DATA (HEAD-FLOW):			430.0	.0	375.0 3000.0	285.0 4125.0

Calculation OSC-7248

Attachment 25

Wood's Model Computer Run to Simulate Flowrates if LPI Pumps are throttled at $t=780$ sec (13 min)

THE NET SYSTEM DEMAND = 1500.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13561.63
25	.00
28	.00
31	.00
53	-4261.91
78	-4164.69
108	.00
124	-68.24
140	-144.57
141	-216.88
142	-274.35
143	-274.52
144	-274.52
145	-260.53
146	-188.11
147	-115.74
158	-68.69
174	-156.36
175	-213.33
176	-284.06
177	-284.26
178	-284.29
179	-256.14
180	-170.78
181	-99.64

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13561.63
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12061.63

76	.00	994.53	762.00	100.16
77	.00	756.43	763.50	-3.04
78	.00	994.53	763.50	99.51
79	.00	778.87	794.25	-6.63
80	1500.00	771.31	779.00	-3.31
81	.00	766.37	779.00	-5.44
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	756.99	760.10	-1.34
109	.00	755.13		
110	.00	755.12	760.10	-2.14
113	.00	758.47		
114	.00	756.99		
115	.00	1136.38	761.25	161.58
116	.00	1131.11	762.00	158.99
117	.00	1112.37	765.25	149.52
118	.00	1111.21	765.25	149.01
119	.00	1108.83	765.25	147.99
120	.00	1091.30	816.50	118.37
121	.00	1079.13	812.00	115.06
122	.00	1068.57	812.00	110.52
123	.00	1054.11	812.00	104.29
124	.00	820.81	810.58	4.41
125	.00	1044.62	944.00	43.34
126	.00	1044.46	944.00	43.27
127	.00	1044.33	944.00	43.22
128	.00	1044.15	944.00	43.14
129	.00	1043.92	944.00	43.04
130	.00	1043.94	944.00	43.05
131	.00	1043.68	944.00	42.93
132	.00	1043.80	944.00	42.99
133	.00	1044.45	944.00	43.27
134	.00	1044.33	944.00	43.21
135	.00	1044.21	944.00	43.16
136	.00	1044.07	944.00	43.10
137	.00	1044.09	944.00	43.11
138	.00	1044.16	944.00	43.14
139	.00	1043.80	944.00	42.99
140	.00	1129.27	761.25	158.52
141	.00	1123.99	762.00	155.92
142	.00	1105.25	764.09	146.95
143	.00	1105.01	765.47	146.25
144	.00	1089.77	817.50	117.27
145	.00	1077.85	817.50	112.14
146	.00	1075.92	812.00	113.68
147	.00	1065.37	812.00	109.14
148	.00	1051.27	812.00	103.06
149	.00	1041.34	944.00	41.93
150	.00	1041.16	944.00	41.85
151	.00	1041.03	944.00	41.79
152	.00	1040.83	944.00	41.71
153	.00	1040.60	944.00	41.61
154	.00	1040.70	944.00	41.65
155	.00	1040.44	944.00	41.54
156	.00	1040.57	944.00	41.60
157	.00	1041.18	944.00	41.86
158	.00	1041.07	944.00	41.81
159	.00	1040.97	944.00	41.77
160	.00	1040.86	944.00	41.72
161	.00	1040.83	944.00	41.71
162	.00	1040.81	944.00	41.70
163	.00	1040.59	944.00	41.61
200	.00	820.95	810.58	4.47

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	757.07	812.00	-23.66
8	.00	757.07	791.75	-14.94
9	.00	757.07	798.42	-17.81
10	.00	757.07	767.00	-4.28
11	.00	757.07	767.00	-4.28
12	.00	757.07	767.00	-4.28
13	.00	757.48	767.00	-4.10
14	.00	757.35	767.00	-4.16
15	.00	757.26	767.00	-4.19
16	.00	759.36	767.00	-3.29
17	.00	862.05	822.67	16.96
18	.00	759.36	767.00	-3.29
19	.00	759.36	767.00	-3.29
20	.00	782.50	784.67	-.93
21	.00	756.65	767.00	-4.46
22	.00	756.43	767.00	-4.55
23	.00	754.81	761.08	-2.70
24	.00	1019.71	763.00	110.58
25	.00	1015.80	765.25	107.92
26	.00	1013.15	765.25	106.78
27	.00	1001.10	779.00	95.66
28	.00	860.51	823.33	16.01
29	.00	999.46	779.00	94.96
30	.00	993.77	771.50	95.74
31	.00	984.36	777.33	89.17
32	.00	982.99	779.00	87.87
33	.00	883.74	779.00	45.12
34	.00	860.51	823.33	16.01
35	.00	882.96	779.00	44.78
36	.00	860.51	824.75	15.40
37	.00	856.44	816.00	17.42
38	.00	852.23	816.00	15.60
39	.00	845.82	816.00	12.85
40	.00	860.51	820.00	17.45
41	.00	816.74	792.38	10.49
42	.00	758.52	767.00	-3.65
43	.00	756.95	767.00	-4.33
44	.00	755.12	761.08	-2.57
45	.00	1030.28	763.00	115.13
46	.00	1029.35	765.00	113.86
47	.00	1024.33	765.25	111.59
48	.00	1015.21	775.50	103.25
49	.00	1011.24	777.75	100.57
50	.00	1008.87	774.25	101.06
51	.00	1005.50	771.50	100.79
52	.00	996.51	777.73	94.24
53	.00	994.53	779.25	92.73
54	.00	992.94	779.25	92.04
55	.00	898.17	779.25	51.22
56	.00	896.23	779.25	50.39
57	.00	890.63	779.25	47.98
58	.00	862.05	823.17	16.75
59	.00	857.91	816.50	17.84
60	.00	860.51	817.00	18.74
61	.00	854.20	816.50	16.24
62	.00	848.09	816.50	13.61
63	.00	818.12	790.83	11.75
64	.00	1024.33	767.00	110.84
65	.00	1024.33	767.00	110.84
66	.00	1024.33	761.08	113.39
67	.00	1451.19	763.00	296.43
68	.00	1024.33	765.25	111.59
69	.00	1024.33	765.25	111.59
70	.00	889.49	787.25	44.04
71	.00	1024.33	765.25	111.59
72	.00	1024.33	763.25	112.45
73	.00	890.63	763.25	54.87
74	.00	994.53	762.00	100.16
75	.00	994.53	762.00	100.16

142	131	0	274.35	.00	.00	99.68	6.18	29.80
143	132	0	274.52	.00	.00	99.80	6.18	29.83
144	139	0	274.52	.00	.00	99.79	6.18	29.83
145	138	0	260.53	.00	.00	100.15	5.86	26.98
146	137	0	188.11	.00	.00	100.09	4.23	14.47
147	136	0	115.74	.00	.00	100.07	2.61	5.78
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1817.56	.00	374.15	.00	11.25	43.41
149	140	141	1817.56	.45	.00	4.82	45.80	1614.24
150	141	142	1817.56	.26	.00	18.48	20.18	194.29
151	142	143	1817.56	.00	.00	.24	11.25	43.41
152	143	144	1817.56	8.76	.00	6.49	11.25	43.41
153	144	145	1817.56	1.07	.00	10.84	11.25	43.41
154	145	146	1817.56	.17	.00	1.76	11.25	43.41
155	146	147	1817.56	.00	.00	10.54	11.25	43.41
156	147	148	1817.56	.56	.00	13.55	11.25	43.41
157	148	200	68.69	2.69	.00	227.63	25.50	2690.67
158	200	0	68.69	.27	.00	10.09	25.50	2690.67
159	148	149	1748.87	5.57	.00	4.36	10.30	35.49
160	149	150	938.02	.05	.00	.13	5.52	10.64
161	150	151	653.76	.07	.00	.06	3.85	5.34
162	151	152	369.70	.11	.00	.09	3.74	7.00
163	152	153	156.36	.18	.00	.05	3.52	10.19
164	152	154	213.33	.05	.00	.09	4.80	18.40
165	151	155	284.06	.05	.00	.54	6.39	31.86
166	150	156	284.26	.05	.00	.54	6.40	31.90
167	149	157	810.85	.07	.00	.10	4.77	8.05
168	157	158	526.57	.05	.00	.06	3.10	3.54
169	158	159	270.42	.07	.00	.03	2.73	3.88
170	159	160	99.64	.09	.00	.02	2.24	4.36
171	159	161	170.78	.08	.00	.06	3.84	12.04
172	158	162	256.14	.13	.00	.13	5.77	26.11
173	157	163	284.29	.05	.00	.54	6.40	31.90
174	153	0	156.36	.00	.00	96.60	3.52	10.19
175	154	0	213.33	.00	.00	96.69	4.80	18.40
176	155	0	284.06	.00	.00	96.44	6.39	31.86
177	156	0	284.26	.00	.00	96.57	6.40	31.90
178	163	0	284.29	.00	.00	96.59	6.40	31.90
179	162	0	256.14	.00	.00	96.80	5.77	26.11
180	161	0	170.78	.00	.00	96.83	3.84	12.04
181	160	0	99.64	.00	.00	96.86	2.24	4.36

68	53	54	4164.69	.10	.00	1.49	15.67	61.51
69	54	55	4164.69	.02	.00	94.75	25.77	220.71
70	55	56	4164.69	.67	.00	1.26	16.19	66.91
71	56	57	4164.69	1.20	.00	4.40	16.19	66.91
72	57	70	4164.69	.54	.00	.61	16.19	66.91
73	70	58	4164.69	4.88	.00	22.55	16.19	66.91
74	58	59	4164.69	1.74	.00	2.40	16.19	66.91
75	59	61	4164.69	1.26	.00	2.45	23.55	174.96
76	61	62	4164.69	.09	.00	6.03	23.55	174.96
77	62	63	4164.69	13.49	.00	16.48	22.22	150.73
78	63	0	4164.69	1.86	.00	6.76	12.86	37.15
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
-91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1817.47	.01	.00	.03	4.07	3.32
110	113	114	1817.47	.29	.00	1.19	7.07	13.32
111	114	101	1817.47	.00	.00	.00	11.25	43.40
112	15	109	1817.56	.13	.00	2.00	7.07	13.32
113	109	110	1817.56	.00	.00	.00	11.25	43.41
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1817.47	.00	379.40	.00	11.25	43.40
115	115	116	1817.47	.45	.00	4.82	45.80	1614.07
116	116	117	1817.47	.26	.00	18.48	20.18	194.27
117	117	118	1817.47	.16	.00	1.01	11.25	43.40
118	118	119	1817.47	1.45	.00	.93	11.25	43.40
119	119	120	1817.47	4.48	.00	13.04	11.25	43.40
120	120	121	1817.47	7.67	.00	4.51	11.25	43.40
121	121	122	1817.47	.00	.00	10.55	11.25	43.40
122	122	123	1817.47	.62	.00	13.84	11.25	43.40
123	123	124	68.24	2.66	.00	230.64	25.33	2656.13
124	124	0	68.24	.27	.00	9.96	25.33	2656.13
125	123	125	1749.23	6.08	.00	3.41	10.30	35.50
126	125	126	910.33	.04	.00	.12	5.36	10.05
127	126	127	635.80	.06	.00	.06	3.74	5.06
128	127	128	361.45	.10	.00	.08	3.65	6.71
129	128	129	144.57	.18	.00	.05	3.25	8.78
130	128	130	216.88	.11	.00	.09	4.88	18.99
131	127	131	274.35	.15	.00	.50	6.18	29.80
132	126	132	274.52	.15	.00	.50	6.18	29.83
133	125	133	838.90	.07	.00	.11	4.94	8.59
134	133	134	564.38	.05	.00	.07	3.32	4.04
135	134	135	303.85	.08	.00	.04	3.07	4.83
136	135	136	115.74	.11	.00	.03	2.61	5.78
137	135	137	188.11	.04	.00	.07	4.23	14.47
138	134	138	260.53	.03	.00	.14	5.86	26.98
139	133	139	274.52	.15	.00	.50	6.18	29.83
140	129	0	144.57	.00	.00	99.92	3.25	8.78
141	130	0	216.88	.00	.00	99.93	4.88	18.99

T15797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 816.08'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-4261.91	-.04	.00	-.37	-9.55	-17.16
14	13 14	1817.56	.00	.00	.13	4.07	3.32
15	14 15	1817.56	.01	.00	.07	4.07	3.32
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	13561.63	15.12	.00	22.09	30.40	166.19
20	79 80	13561.63	1.22	.00	6.34	30.40	166.19
21	80 81	12061.63	1.99	.00	2.95	27.03	131.85
22	81 13	6079.47	.21	.00	8.68	13.63	34.31
23	81 19	5982.16	.59	.00	6.42	13.41	33.24
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED							
31	0 85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED							
33	12 21	4261.91	.04	.00	.37	9.55	17.16
34	21 22	4310.06	.00	.00	.22	9.66	17.54
35	22 23	4310.06	.26	.00	1.36	9.66	17.54
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE							
36	23 24	4310.06	.01	265.20	.29	17.61	81.23
37	24 25	4310.06	.04	.00	3.88	16.76	71.57
38	21 25	-48.15	-11.11	.00	-248.03	-17.87	-1338.57
39	25 26	4261.91	.56	.00	2.09	16.57	70.01
40	26 27	4261.91	1.23	.00	10.83	16.57	70.01
41	27 29	3968.71	.15	.00	1.48	15.43	60.88
42	27 29	293.20	.03	.00	1.60	2.96	4.51
43	29 30	4261.91	.90	.00	4.79	16.03	64.35
44	30 31	4261.91	.00	.00	9.42	7.25	8.52
45	31 32	4261.91	.13	.00	1.24	16.03	64.35
46	32 33	4261.91	.02	.00	99.22	26.37	230.99
47	33 35	4261.91	.14	.00	.64	16.57	70.01
48	35 36	4261.91	1.02	.00	21.44	16.57	70.01
49	36 37	4261.91	.91	.00	3.15	16.57	70.01
50	37 38	4261.91	1.65	.00	2.57	24.10	183.10
51	38 39	4261.91	.09	.00	6.31	24.10	183.10
52	39 41	4261.91	12.30	.00	16.78	22.74	157.74
53	41 0	4261.91	1.11	.00	6.13	13.16	38.86
54	19 42	5982.16	.03	.00	.81	13.41	33.24
55	42 43	4164.69	.15	.00	1.42	9.33	16.41
56	43 44	4214.31	.41	.00	1.41	9.45	16.79
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE							
57	44 45	4214.31	.01	275.44	.28	17.21	77.72
58	45 46	4214.31	.03	.00	.90	15.85	62.95
59	43 46	-49.63	-8.95	.00	-263.46	-18.42	-1420.14
60	46 47	4164.69	1.14	.00	3.89	15.67	61.51
61	47 48	4164.69	.62	.00	8.50	15.67	61.51
62	48 49	4164.69	.62	.00	3.35	15.67	61.51
63	49 50	3804.58	.18	.00	2.19	14.31	51.52
64	49 50	360.11	.03	.00	2.35	3.64	6.66
65	50 51	4164.69	.43	.00	2.93	15.67	61.51
66	51 52	4164.69	.00	.00	8.99	7.08	8.15
67	52 53	4164.69	.15	.00	1.83	15.67	61.51

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1500.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

JUNCTION	NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
	1	.00	804.50	1	2	24
	2	.00	798.50	2	3	
	3	.00	798.50	3	4	26
	4	.00	801.50	4	5	
	5	.00	812.00	5	6	
	6	.00	812.00	6	7	
	7	.00	812.00	7	8	
	8	.00	791.75	8	9	
	9	.00	798.42	9	10	92
	10	.00	767.00	10	11	
	11	.00	767.00	11	12	
	12	.00	767.00	12	13	33
	13	.00	767.00	13	14	22
	14	.00	767.00	14	15	30
	15	.00	767.00	15	16	112
	16	.00	767.00	16	17	79
	17	.00	822.67	104	105	106
	18	.00	767.00	17	18	32
	19	.00	767.00	18	23	54
	20	.00	784.67	26	27	
	21	.00	767.00	33	34	38
	22	.00	767.00	34	35	97
	23	.00	761.08	35	36	
	24	.00	763.00	36	37	
	25	.00	765.25	37	38	39
	26	.00	765.25	39	40	88
	27	.00	779.00	40	41	42
	28	.00	823.33	100	101	
	29	.00	779.00	41	42	43
	30	.00	771.50	43	44	
	31	.00	777.33	44	45	
	32	.00	779.00	45	46	
	33	.00	779.00	46	47	
	34	.00	823.33	101	102	
	35	.00	779.00	47	48	
	36	.00	824.75	48	49	100
	37	.00	816.00	49	50	
	38	.00	816.00	50	51	
	39	.00	816.00	51	52	
	40	.00	820.00	102	103	106
	41	.00	792.38	52	53	
	42	.00	767.00	54	55	109
	43	.00	767.00	55	56	59
	44	.00	761.08	56	57	
	45	.00	763.00	57	58	
	46	.00	765.00	58	59	60
	47	.00	765.25	60	61	86
	48	.00	775.50	61	62	92
	49	.00	777.75	62	63	64
	50	.00	774.25	63	64	65
	51	.00	771.50	65	66	
	52	.00	777.73	66	67	
	53	.00	779.25	67	68	93
	54	.00	779.25	68	69	
	55	.00	779.25	69	70	
	56	.00	779.25	70	71	
	57	.00	779.25	71	72	91
	58	.00	823.17	73	74	104
	59	.00	816.50	74	75	
	60	.00	817.00	103	105	107
	61	.00	816.50	75	76	
	62	.00	816.50	76	77	
	63	.00	790.83	77	78	
	64	.00	767.00	79	80	84
	65	.00	767.00	80	81	99
	66	.00	761.08	81	82	
	67	.00	763.00	82	83	
	68	.00	765.25	83	84	85
	69	.00	765.25	85	86	87
	70	.00	787.25	72	73	
	71	.00	765.25	87	88	89
	72	.00	763.25	89	90	
	73	.00	763.25	90	91	
	74	.00	762.00	93	94	
	75	.00	762.00	94	95	

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA (HEAD-FLOW) :		622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0 .0 410.0 2250.0 298.0 4000.0									
83	67	68	1.0	10.3	.2	.89			
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0 .0 470.0 1500.0 385.0 1800.0									
115	115	116	.3	4.0	.2	.15			
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

T15797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073
THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	816.08
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

Calculation OSC-7248

Attachment 24

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=900$ sec

THE NET SYSTEM DEMAND = 1500.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13582.75
25	.00
28	.00
31	.00
53	-4269.65
78	-4172.16
108	.00
124	-68.29
140	-144.82
141	-217.24
142	-274.81
143	-274.98
144	-274.98
145	-260.97
146	-188.42
147	-115.94
158	-68.74
174	-156.62
175	-213.68
176	-284.53
177	-284.73
178	-284.76
179	-256.56
180	-171.07
181	-99.80

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13582.75
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12082.75

76	.00	995.19	762.00	100.44
77	.00	758.02	763.50	-2.36
78	.00	995.19	763.50	99.80
79	.00	780.53	794.25	-5.91
80	1500.00	772.95	779.00	-2.61
81	.00	767.99	779.00	-4.74
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	758.58	760.10	-.65
109	.00	756.71		
110	.00	756.71	760.10	-1.46
113	.00	760.07		
114	.00	758.59		
115	.00	1137.02	761.25	161.86
116	.00	1131.73	762.00	159.25
117	.00	1112.93	765.25	149.76
118	.00	1111.76	765.25	149.25
119	.00	1109.37	765.25	148.23
120	.00	1091.79	816.50	118.58
121	.00	1079.58	812.00	115.26
122	.00	1068.99	812.00	110.69
123	.00	1054.48	812.00	104.44
124	.00	820.83	810.58	4.41
125	.00	1044.96	944.00	43.49
126	.00	1044.79	944.00	43.41
127	.00	1044.67	944.00	43.36
128	.00	1044.48	944.00	43.28
129	.00	1044.26	944.00	43.18
130	.00	1044.27	944.00	43.19
131	.00	1044.01	944.00	43.08
132	.00	1044.14	944.00	43.13
133	.00	1044.79	944.00	43.41
134	.00	1044.66	944.00	43.36
135	.00	1044.54	944.00	43.31
136	.00	1044.40	944.00	43.25
137	.00	1044.42	944.00	43.26
138	.00	1044.49	944.00	43.28
139	.00	1044.13	944.00	43.13
140	.00	1129.87	761.25	158.78
141	.00	1124.58	762.00	156.18
142	.00	1105.78	764.09	147.18
143	.00	1105.54	765.47	146.48
144	.00	1090.25	817.50	117.48
145	.00	1078.30	817.50	112.33
146	.00	1076.36	812.00	113.87
147	.00	1065.78	812.00	109.31
148	.00	1051.63	812.00	103.22
149	.00	1041.67	944.00	42.07
150	.00	1041.48	944.00	41.99
151	.00	1041.35	944.00	41.93
152	.00	1041.15	944.00	41.85
153	.00	1040.92	944.00	41.75
154	.00	1041.02	944.00	41.79
155	.00	1040.76	944.00	41.68
156	.00	1040.89	944.00	41.73
157	.00	1041.50	944.00	42.00
158	.00	1041.39	944.00	41.95
159	.00	1041.29	944.00	41.91
160	.00	1041.18	944.00	41.86
161	.00	1041.15	944.00	41.85
162	.00	1041.13	944.00	41.84
163	.00	1040.91	944.00	41.74
200	.00	820.96	810.58	4.47

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	758.66	812.00	-22.98
8	.00	758.66	791.75	-14.25
9	.00	758.66	798.42	-17.13
10	.00	758.66	767.00	-3.59
11	.00	758.66	767.00	-3.59
12	.00	758.66	767.00	-3.59
13	.00	759.07	767.00	-3.42
14	.00	758.94	767.00	-3.47
15	.00	758.85	767.00	-3.51
16	.00	760.96	767.00	-2.60
17	.00	862.24	822.67	17.04
18	.00	760.96	767.00	-2.60
19	.00	760.96	767.00	-2.60
20	.00	782.50	784.67	-.93
21	.00	758.24	767.00	-3.77
22	.00	758.02	767.00	-3.87
23	.00	756.40	761.08	-2.02
24	.00	1020.48	763.00	110.90
25	.00	1016.55	765.25	108.24
26	.00	1013.89	765.25	107.10
27	.00	1001.79	779.00	95.96
28	.00	860.69	823.33	16.09
29	.00	1000.15	779.00	95.26
30	.00	994.44	771.50	96.03
31	.00	984.99	777.33	89.45
32	.00	983.62	779.00	88.14
33	.00	884.01	779.00	45.23
34	.00	860.69	823.33	16.09
35	.00	883.23	779.00	44.90
36	.00	860.69	824.75	15.48
37	.00	856.61	816.00	17.49
38	.00	852.38	816.00	15.67
39	.00	845.96	816.00	12.90
40	.00	860.69	820.00	17.53
41	.00	816.77	792.38	10.51
42	.00	760.11	767.00	-2.97
43	.00	758.54	767.00	-3.65
44	.00	756.71	761.08	-1.88
45	.00	1031.07	763.00	115.47
46	.00	1030.14	765.00	114.20
47	.00	1025.10	765.25	111.92
48	.00	1015.95	775.50	103.57
49	.00	1011.97	777.75	100.88
50	.00	1009.58	774.25	101.37
51	.00	1006.20	771.50	101.10
52	.00	997.18	777.73	94.52
53	.00	995.19	779.25	93.01
54	.00	993.59	779.25	92.32
55	.00	898.48	779.25	51.36
56	.00	896.54	779.25	50.52
57	.00	890.92	779.25	48.10
58	.00	862.24	823.17	16.83
59	.00	858.09	816.50	17.91
60	.00	860.69	817.00	18.82
61	.00	854.36	816.50	16.31
62	.00	848.22	816.50	13.66
63	.00	818.15	790.83	11.77
64	.00	1025.10	767.00	111.17
65	.00	1025.10	767.00	111.17
66	.00	1025.10	761.08	113.72
67	.00	1451.96	763.00	296.76
68	.00	1025.10	765.25	111.92
69	.00	1025.10	765.25	111.92
70	.00	889.77	787.25	44.16
71	.00	1025.10	765.25	111.92
72	.00	1025.10	763.25	112.79
73	.00	890.92	763.25	54.99
74	.00	995.19	762.00	100.44
75	.00	995.19	762.00	100.44

142	131	0	274.81	.00	.00	100.01	6.19	29.89
143	132	0	274.98	.00	.00	100.13	6.19	29.93
144	139	0	274.98	.00	.00	100.13	6.19	29.93
145	138	0	260.97	.00	.00	100.49	5.87	27.07
146	137	0	188.42	.00	.00	100.42	4.24	14.52
147	136	0	115.94	.00	.00	100.40	2.61	5.80
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1820.50	.00	373.17	.00	11.26	43.55
149	140	141	1820.50	.45	.00	4.84	45.88	1619.42
150	141	142	1820.50	.26	.00	18.54	20.22	194.91
151	142	143	1820.50	.00	.00	.24	11.26	43.55
152	143	144	1820.50	8.78	.00	6.51	11.26	43.55
153	144	145	1820.50	1.08	.00	10.87	11.26	43.55
154	145	146	1820.50	.17	.00	1.77	11.26	43.55
155	146	147	1820.50	.00	.00	10.58	11.26	43.55
156	147	148	1820.50	.56	.00	13.59	11.26	43.55
157	148	200	68.74	2.69	.00	227.97	25.52	2694.60
158	200	0	68.74	.27	.00	10.11	25.52	2694.60
159	148	149	1751.76	5.59	.00	4.37	10.31	35.60
160	149	150	939.57	.05	.00	.13	5.53	10.68
161	150	151	654.84	.07	.00	.06	3.86	5.36
162	151	152	370.31	.11	.00	.09	3.74	7.02
163	152	153	156.62	.18	.00	.05	3.53	10.22
164	152	154	213.68	.05	.00	.09	4.81	18.46
165	151	155	284.53	.05	.00	.54	6.40	31.96
166	150	156	284.73	.05	.00	.54	6.41	32.00
167	149	157	812.19	.07	.00	.10	4.78	8.08
168	157	158	527.44	.05	.00	.06	3.11	3.55
169	158	159	270.87	.07	.00	.03	2.74	3.89
170	159	160	99.80	.09	.00	.02	2.25	4.38
171	159	161	171.07	.08	.00	.06	3.85	12.08
172	158	162	256.56	.13	.00	.13	5.77	26.20
173	157	163	284.76	.05	.00	.54	6.41	32.01
174	153	0	156.62	.00	.00	96.92	3.53	10.22
175	154	0	213.68	.00	.00	97.01	4.81	18.46
176	155	0	284.53	.00	.00	96.76	6.40	31.96
177	156	0	284.73	.00	.00	96.89	6.41	32.00
178	163	0	284.76	.00	.00	96.91	6.41	32.01
179	162	0	256.56	.00	.00	97.12	5.77	26.20
180	161	0	171.07	.00	.00	97.15	3.85	12.08
181	160	0	99.80	.00	.00	97.18	2.25	4.38

68	53	54	4172.16	.10	.00	1.49	15.70	61.72
69	54	55	4172.16	.02	.00	95.09	25.82	221.49
70	55	56	4172.16	.67	.00	1.27	16.22	67.15
71	56	57	4172.16	1.21	.00	4.41	16.22	67.15
72	57	70	4172.16	.54	.00	.61	16.22	67.15
73	70	58	4172.16	4.90	.00	22.63	16.22	67.15
74	58	59	4172.16	1.75	.00	2.41	16.22	67.15
75	59	61	4172.16	1.26	.00	2.46	23.59	175.58
76	61	62	4172.16	.09	.00	6.05	23.59	175.58
77	62	63	4172.16	13.54	.00	16.54	22.26	151.26
78	63	0	4172.16	1.87	.00	6.78	12.89	37.28
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1820.44	.01	.00	.03	4.08	3.33
110	113	114	1820.44	.30	.00	1.19	7.08	13.36
111	114	101	1820.44	.00	.00	.00	11.26	43.54
112	15	109	1820.50	.13	.00	2.01	7.08	13.36
113	109	110	1820.50	.00	.00	.00	11.26	43.55
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1820.44	.00	378.44	.00	11.26	43.54
115	115	116	1820.44	.45	.00	4.84	45.88	1619.32
116	116	117	1820.44	.26	.00	18.54	20.22	194.90
117	117	118	1820.44	.16	.00	1.01	11.26	43.54
118	118	119	1820.44	1.45	.00	.94	11.26	43.54
119	119	120	1820.44	4.50	.00	13.08	11.26	43.54
120	120	121	1820.44	7.69	.00	4.52	11.26	43.54
121	121	122	1820.44	.00	.00	10.59	11.26	43.54
122	122	123	1820.44	.62	.00	13.89	11.26	43.54
123	123	124	68.29	2.66	.00	230.99	25.35	2660.09
124	124	0	68.29	.27	.00	9.98	25.35	2660.09
125	123	125	1752.15	6.10	.00	3.42	10.32	35.62
126	125	126	911.85	.04	.00	.13	5.37	10.08
127	126	127	636.87	.07	.00	.06	3.75	5.08
128	127	128	362.05	.10	.00	.08	3.66	6.73
129	128	129	144.82	.18	.00	.05	3.26	8.81
130	128	130	217.24	.11	.00	.09	4.89	19.05
131	127	131	274.81	.15	.00	.50	6.19	22.39
132	126	132	274.98	.15	.00	.51	6.19	29.93
133	125	133	840.30	.07	.00	.11	4.95	8.62
134	133	134	565.33	.05	.00	.07	3.33	4.05
135	134	135	304.35	.08	.00	.04	3.08	4.84
136	135	136	115.94	.11	.00	.03	2.61	5.80
137	135	137	188.42	.04	.00	.07	4.24	14.52
138	134	138	260.97	.03	.00	.14	5.87	27.07
139	133	139	274.98	.15	.00	.51	6.19	29.93
140	129	0	144.82	.00	.00	100.25	3.26	8.81
141	130	0	217.24	.00	.00	100.27	4.89	19.05

T14797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 817.86'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-4269.65	-.04	.00	-.37	-9.57	-17.22
14	13 14	1820.50	.00	.00	.13	4.08	3.33
15	14 15	1820.50	.01	.00	.07	4.08	3.33
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	13582.75	15.17	.00	22.16	30.44	166.70
20	79 80	13582.75	1.22	.00	6.36	30.44	166.70
21	80 81	12082.75	2.00	.00	2.96	27.08	132.31
22	81 13	6090.15	.21	.00	8.71	13.65	34.43
23	81 19	5992.61	.59	.00	6.44	13.43	33.36
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED							
31	0 85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED							
33	12 21	4269.65	.04	.00	.37	9.57	17.22
34	21 22	4317.72	.00	.00	.22	9.68	17.60
35	22 23	4317.72	.26	.00	1.37	9.68	17.60
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE							
36	23 24	4317.72	.01	264.38	.29	17.64	81.51
37	24 25	4317.72	.04	.00	3.89	16.79	71.82
38	21 25	-48.08	-11.07	.00	-247.23	-17.85	-1334.31
39	25 26	4269.65	.56	.00	2.10	16.60	70.26
40	26 27	4269.65	1.23	.00	10.87	16.60	70.26
41	27 29	3975.91	.15	.00	1.48	15.46	61.10
42	27 29	293.74	.03	.00	1.61	2.97	4.53
43	29 30	4269.65	.90	.00	4.81	16.06	64.58
44	30 31	4269.65	.00	.00	9.45	7.26	8.55
45	31 32	4269.65	.13	.00	1.24	16.06	64.58
46	32 33	4269.65	.02	.00	99.58	26.42	231.82
47	33 35	4269.65	.14	.00	.64	16.60	70.26
48	35 36	4269.65	1.02	.00	21.52	16.60	70.26
49	36 37	4269.65	.91	.00	3.17	16.60	70.26
50	37 38	4269.65	1.65	.00	2.58	24.14	183.76
51	38 39	4269.65	.09	.00	6.33	24.14	183.76
52	39 41	4269.65	12.35	.00	16.84	22.78	158.30
53	41 0	4269.65	1.11	.00	6.16	13.19	39.00
54	19 42	5992.61	.03	.00	.81	13.43	33.36
55	42 43	4172.16	.15	.00	1.43	9.35	16.47
56	43 44	4221.72	.41	.00	1.42	9.46	16.85
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE							
57	44 45	4221.72	.01	274.65	.28	17.24	77.99
58	45 46	4221.72	.03	.00	.90	15.88	63.17
59	43 46	-49.56	-8.92	.00	-262.68	-18.39	-1416.04
60	46 47	4172.16	1.14	.00	3.90	15.70	61.72
61	47 48	4172.16	.62	.00	8.53	15.70	61.72
62	48 49	4172.16	.62	.00	3.37	15.70	61.72
63	49 50	3811.40	.18	.00	2.20	14.34	51.71
64	49 50	360.76	.03	.00	2.35	3.65	6.68
65	50 51	4172.16	.43	.00	2.95	15.70	61.72
66	51 52	4172.16	.00	.00	9.02	7.09	8.17
67	52 53	4172.16	.15	.00	1.84	15.70	61.72

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1500.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA	(HEAD-FLOW):	622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0									
83	67	68	1.0	10.3	.2	.89	410.0	2250.0	298.0 4000.0
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0									
115	115	116	.3	4.0	.2	.15	470.0	1500.0	385.0 1800.0
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

T14797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	817.86
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

Calculation OSC-7248

Attachment 23

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=840$ sec

THE NET SYSTEM DEMAND = 1500.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13603.98
25	.00
28	.00
31	.00
53	-4277.42
78	-4179.67
108	.00
124	-68.35
140	-145.06
141	-217.60
142	-275.27
143	-275.44
144	-275.44
145	-261.41
146	-188.73
147	-116.13
158	-68.79
174	-156.88
175	-214.04
176	-285.00
177	-285.20
178	-285.23
179	-256.99
180	-171.35
181	-99.97

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13603.98
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12103.98

76	.00	995.86	762.00	100.73
77	.00	759.62	763.50	-1.67
78	.00	995.86	763.50	100.08
79	.00	782.21	794.25	-5.19
80	1500.00	774.60	779.00	-1.90
81	.00	769.62	779.00	-4.04
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	760.18	760.10	.03
109	.00	758.31		
110	.00	758.30	760.10	-.77
113	.00	761.68		
114	.00	760.19		
115	.00	1137.66	761.25	162.13
116	.00	1132.35	762.00	159.52
117	.00	1113.49	765.25	150.00
118	.00	1112.32	765.25	149.49
119	.00	1109.92	765.25	148.46
120	.00	1092.29	816.50	118.79
121	.00	1080.03	812.00	115.45
122	.00	1069.41	812.00	110.87
123	.00	1054.85	812.00	104.60
124	.00	820.84	810.58	4.42
125	.00	1045.30	944.00	43.63
126	.00	1045.13	944.00	43.56
127	.00	1045.00	944.00	43.51
128	.00	1044.82	944.00	43.43
129	.00	1044.59	944.00	43.33
130	.00	1044.61	944.00	43.34
131	.00	1044.35	944.00	43.22
132	.00	1044.47	944.00	43.28
133	.00	1045.12	944.00	43.56
134	.00	1045.00	944.00	43.50
135	.00	1044.88	944.00	43.45
136	.00	1044.74	944.00	43.39
137	.00	1044.76	944.00	43.40
138	.00	1044.83	944.00	43.43
139	.00	1044.47	944.00	43.27
140	.00	1130.48	761.25	159.04
141	.00	1125.17	762.00	156.43
142	.00	1106.31	764.09	147.41
143	.00	1106.07	765.47	146.71
144	.00	1090.73	817.50	117.69
145	.00	1078.74	817.50	112.52
146	.00	1076.80	812.00	114.06
147	.00	1066.18	812.00	109.48
148	.00	1051.98	812.00	103.37
149	.00	1041.99	944.00	42.21
150	.00	1041.81	944.00	42.13
151	.00	1041.67	944.00	42.07
152	.00	1041.48	944.00	41.99
153	.00	1041.24	944.00	41.88
154	.00	1041.34	944.00	41.93
155	.00	1041.08	944.00	41.82
156	.00	1041.21	944.00	41.87
157	.00	1041.82	944.00	42.14
158	.00	1041.71	944.00	42.09
159	.00	1041.62	944.00	42.05
160	.00	1041.50	944.00	42.00
161	.00	1041.47	944.00	41.98
162	.00	1041.45	944.00	41.97
163	.00	1041.23	944.00	41.88
200	.00	820.98	810.58	4.48

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	760.26	812.00	-22.29
8	.00	760.26	791.75	-13.57
9	.00	760.26	798.42	-16.44
10	.00	760.26	767.00	-2.90
11	.00	760.26	767.00	-2.90
12	.00	760.26	767.00	-2.90
13	.00	760.67	767.00	-2.73
14	.00	760.54	767.00	-2.78
15	.00	760.45	767.00	-2.82
16	.00	762.57	767.00	-1.91
17	.00	862.43	822.67	17.13
18	.00	762.57	767.00	-1.91
19	.00	762.57	767.00	-1.91
20	.00	782.50	784.67	-.93
21	.00	759.84	767.00	-3.08
22	.00	759.62	767.00	-3.18
23	.00	757.99	761.08	-1.33
24	.00	1021.24	763.00	111.23
25	.00	1017.30	765.25	108.57
26	.00	1014.63	765.25	107.42
27	.00	1002.49	779.00	96.26
28	.00	860.88	823.33	16.17
29	.00	1000.85	779.00	95.56
30	.00	995.12	771.50	96.32
31	.00	985.63	777.33	89.72
32	.00	984.25	779.00	88.41
33	.00	884.28	779.00	45.35
34	.00	860.88	823.33	16.17
35	.00	883.50	779.00	45.01
36	.00	860.88	824.75	15.56
37	.00	856.78	816.00	17.57
38	.00	852.54	816.00	15.74
39	.00	846.09	816.00	12.96
40	.00	860.88	820.00	17.61
41	.00	816.80	792.38	10.52
42	.00	761.72	767.00	-2.27
43	.00	760.14	767.00	-2.96
44	.00	758.30	761.08	-1.20
45	.00	1031.87	763.00	115.81
46	.00	1030.93	765.00	114.55
47	.00	1025.87	765.25	112.26
48	.00	1016.69	775.50	103.89
49	.00	1012.69	777.75	101.20
50	.00	1010.30	774.25	101.68
51	.00	1006.91	771.50	101.40
52	.00	997.85	777.73	94.82
53	.00	995.86	779.25	93.30
54	.00	994.25	779.25	92.61
55	.00	898.80	779.25	51.49
56	.00	896.86	779.25	50.66
57	.00	891.22	779.25	48.23
58	.00	862.43	823.17	16.91
59	.00	858.26	816.50	17.99
60	.00	860.88	817.00	18.90
61	.00	854.52	816.50	16.38
62	.00	848.36	816.50	13.72
63	.00	818.18	790.83	11.78
64	.00	1025.87	767.00	111.50
65	.00	1025.67	767.00	111.50
66	.00	1025.87	761.08	114.05
67	.00	1452.74	763.00	297.09
68	.00	1025.87	765.25	112.26
69	.00	1025.87	765.25	112.26
70	.00	890.06	787.25	44.28
71	.00	1025.87	765.25	112.26
72	.00	1025.87	763.25	113.12
73	.00	891.22	763.25	55.12
74	.00	995.86	762.00	100.73
75	.00	995.86	762.00	100.73

142	131	0	275.27	.00	.00	100.34	6.20	29.99
143	132	0	275.44	.00	.00	100.47	6.20	30.02
144	139	0	275.44	.00	.00	100.46	6.20	30.02
145	138	0	261.41	.00	.00	100.83	5.88	27.15
146	137	0	188.73	.00	.00	100.76	4.25	14.57
147	136	0	116.13	.00	.00	100.74	2.61	5.81
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1823.45	.00	372.18	.00	11.28	43.68
149	140	141	1823.45	.45	.00	4.85	45.95	1624.63
150	141	142	1823.45	.26	.00	18.60	20.25	195.53
151	142	143	1823.45	.00	.00	.24	11.28	43.68
152	143	144	1823.45	8.81	.00	6.53	11.28	43.68
153	144	145	1823.45	1.08	.00	10.91	11.28	43.68
154	145	146	1823.45	.17	.00	1.77	11.28	43.68
155	146	147	1823.45	.00	.00	10.61	11.28	43.68
156	147	148	1823.45	.56	.00	13.64	11.28	43.68
157	148	200	68.79	2.70	.00	228.31	25.54	2698.53
158	200	0	68.79	.27	.00	10.12	25.54	2698.53
159	148	149	1754.66	5.61	.00	4.39	10.33	35.72
160	149	150	941.12	.05	.00	.13	5.54	10.71
161	150	151	655.92	.07	.00	.06	3.86	5.37
162	151	152	370.92	.11	.00	.09	3.75	7.05
163	152	153	156.88	.18	.00	.05	3.53	10.25
164	152	154	214.04	.05	.00	.09	4.82	18.51
165	151	155	285.00	.05	.00	.54	6.41	32.06
166	150	156	285.20	.05	.00	.54	6.42	32.10
167	149	157	813.54	.07	.00	.10	4.79	8.10
168	157	158	528.31	.05	.00	.06	3.11	3.56
169	158	159	271.32	.07	.00	.03	2.74	3.90
170	159	160	99.97	.09	.00	.02	2.25	4.39
171	159	161	171.35	.08	.00	.06	3.86	12.12
172	158	162	256.99	.13	.00	.13	5.78	26.28
173	157	163	285.23	.05	.00	.54	6.42	32.11
174	153	0	156.88	.00	.00	97.24	3.53	10.25
175	154	0	214.04	.00	.00	97.34	4.82	18.51
176	155	0	285.00	.00	.00	97.08	6.41	32.06
177	156	0	285.20	.00	.00	97.21	6.42	32.10
178	163	0	285.23	.00	.00	97.23	6.42	32.11
179	162	0	256.99	.00	.00	97.45	5.78	26.28
180	161	0	171.35	.00	.00	97.47	3.86	12.12
181	160	0	99.97	.00	.00	97.50	2.25	4.39

68	53	54	4179.67	.11	.00	1.50	15.72	61.94
69	54	55	4179.67	.02	.00	95.43	25.86	222.28
70	55	56	4179.67	.67	.00	1.27	16.25	67.39
71	56	57	4179.67	1.21	.00	4.43	16.25	67.39
72	57	70	4179.67	.54	.00	.61	16.25	67.39
73	70	58	4179.67	4.92	.00	22.71	16.25	67.39
74	58	59	4179.67	1.75	.00	2.42	16.25	67.39
75	59	61	4179.67	1.27	.00	2.47	23.63	176.21
76	61	62	4179.67	.09	.00	6.07	23.63	176.21
77	62	63	4179.67	13.59	.00	16.60	22.30	151.80
78	63	0	4179.67	1.87	.00	6.81	12.91	37.41
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1823.44	.01	.00	.03	4.09	3.34
110	113	114	1823.44	.30	.00	1.19	7.09	13.40
111	114	101	1823.44	.00	.00	.00	11.28	43.68
112	15	109	1823.45	.14	.00	2.01	7.09	13.40
113	109	110	1823.45	.00	.00	.00	11.28	43.68
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1823.44	.00	377.48	.00	11.28	43.68
115	115	116	1823.44	.45	.00	4.85	45.95	1624.60
116	116	117	1823.44	.26	.00	18.60	20.25	195.53
117	117	118	1823.44	.16	.00	1.01	11.28	43.68
118	118	119	1823.44	1.45	.00	.94	11.28	43.68
119	119	120	1823.44	4.51	.00	13.12	11.28	43.68
120	120	121	1823.44	7.71	.00	4.54	11.28	43.68
121	121	122	1823.44	.00	.00	10.62	11.28	43.68
122	122	123	1823.44	.62	.00	13.93	11.28	43.68
123	123	124	68.35	2.66	.00	231.34	25.37	2664.07
124	124	0	68.35	.27	.00	9.99	25.37	2664.07
125	123	125	1755.09	6.12	.00	3.44	10.33	35.73
126	125	126	913.38	.04	.00	.13	5.38	10.11
127	126	127	637.93	.07	.00	.06	3.76	5.10
128	127	128	362.66	.10	.00	.08	3.67	6.75
129	128	129	145.06	.18	.00	.05	3.27	8.84
130	128	130	217.60	.11	.00	.09	4.90	19.11
131	127	131	275.27	.15	.00	.51	6.20	29.99
132	126	132	275.44	.15	.00	.51	6.20	30.02
133	125	133	841.71	.07	.00	.11	4.96	8.65
134	133	134	566.27	.05	.00	.07	3.33	4.06
135	134	135	304.87	.09	.00	.04	3.08	4.86
136	135	136	116.13	.11	.00	.03	2.61	5.81
137	135	137	188.73	.04	.00	.07	4.25	14.57
138	134	138	261.41	.03	.00	.14	5.88	27.15
139	133	139	275.44	.15	.00	.51	6.20	30.02
140	129	0	145.06	.00	.00	100.59	3.27	8.84
141	130	0	217.60	.00	.00	100.61	4.90	19.11

T13797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 819.65'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP	HEAD MINOR	LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED								
8	7 8	.00	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00	.00
13	12 13	-4277.42	-.04	.00	-.37	-9.59	-17.29	
14	13 14	1823.45	.00	.00	.13	4.09	3.34	
15	14 15	1823.45	.01	.00	.08	4.09	3.34	
LINE 16 IS CLOSED								
17	16 18	.00	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00	.00
19	0 79	13603.98	15.22	.00	22.23	30.49	167.21	
20	79 80	13603.98	1.23	.00	6.38	30.49	167.21	
21	80 81	12103.98	2.00	.00	2.97	27.13	132.77	
22	81 13	6100.87	.21	.00	8.74	13.67	34.54	
23	81 19	6003.11	.59	.00	6.46	13.45	33.47	
LINE 24 IS CLOSED								
25	86 0	.00	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED								
27	20 83	.00	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED								
31	0 85	.00	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED								
33	12 21	4277.42	.04	.00	.37	9.59	17.29	
34	21 22	4325.42	.00	.00	.22	9.69	17.66	
35	22 23	4325.42	.26	.00	1.37	9.69	17.66	
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE								
36	23 24	4325.42	.01	263.55	.29	17.67	81.80	
37	24 25	4325.42	.04	.00	3.91	16.82	72.07	
38	21 25	-48.00	-11.04	.00	-246.42	-17.82	-1330.03	
39	25 26	4277.42	.56	.00	2.10	16.63	70.51	
40	26 27	4277.42	1.23	.00	10.91	16.63	70.51	
41	27 29	3983.15	.15	.00	1.49	15.49	61.32	
42	27 29	294.27	.03	.00	1.62	2.97	4.55	
43	29 30	4277.42	.91	.00	4.82	16.09	64.81	
44	30 31	4277.42	.00	.00	9.48	7.27	8.58	
45	31 32	4277.42	.13	.00	1.25	16.09	64.81	
46	32 33	4277.42	.02	.00	99.95	26.47	232.65	
47	33 35	4277.42	.14	.00	.64	16.63	70.51	
48	35 36	4277.42	1.02	.00	21.60	16.63	70.51	
49	36 37	4277.42	.92	.00	3.18	16.63	70.51	
50	37 38	4277.42	1.66	.00	2.59	24.18	184.42	
51	38 39	4277.42	.09	.00	6.36	24.18	184.42	
52	39 41	4277.42	12.39	.00	16.90	22.82	158.87	
53	41 0	4277.42	1.12	.00	6.18	13.21	39.14	
54	19 42	6003.11	.03	.00	.82	13.45	33.47	
55	42 43	4179.67	.15	.00	1.43	9.37	16.53	
56	43 44	4229.15	.41	.00	1.42	9.48	16.91	
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE								
57	44 45	4229.15	.01	273.86	.28	17.27	78.26	
58	45 46	4229.15	.03	.00	.90	15.91	63.39	
59	43 46	-49.48	-8.90	.00	-261.90	-18.37	-1411.91	
60	46 47	4179.67	1.15	.00	3.92	15.72	61.94	
61	47 48	4179.67	.62	.00	8.56	15.72	61.94	
62	48 49	4179.67	.62	.00	3.38	15.72	61.94	
63	49 50	3818.27	.18	.00	2.21	14.36	51.89	
64	49 50	361.41	.03	.00	2.36	3.65	6.71	
65	50 51	4179.67	.43	.00	2.96	15.72	61.94	
66	51 52	4179.67	.00	.00	9.06	7.11	8.20	
67	52 53	4179.67	.15	.00	1.84	15.72	61.94	

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1500.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA (HEAD-FLOW) :		622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0									
83	67	68	1.0	10.3	.2	.89	410.0	2250.0	298.0 4000.0
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0									
115	115	116	.3	4.0	.2	.15	470.0	1500.0	385.0 1800.0
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

T13797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	819.65
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

Calculation OSC-7248

Attachment 22

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=780$ sec

THE NET SYSTEM DEMAND = 1500.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13625.19
25	.00
28	.00
31	.00
53	-4285.19
78	-4187.17
108	.00
124	-68.40
140	-145.30
141	-217.97
142	-275.73
143	-275.91
144	-275.90
145	-261.85
146	-189.05
147	-116.33
158	-68.84
174	-157.14
175	-214.39
176	-285.48
177	-285.67
178	-285.70
179	-257.41
180	-171.63
181	-100.14

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13625.19
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12125.19

76	.00	996.53	762.00	101.02
77	.00	761.22	763.50	-.98
78	.00	996.53	763.50	100.37
79	.00	783.88	794.25	-4.47
80	1500.00	776.25	779.00	-1.18
81	.00	771.26	779.00	-3.34
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	761.78	760.10	.72
109	.00	759.90		
110	.00	759.90	760.10	-.09
113	.00	763.28		
114	.00	761.79		
115	.00	1138.30	761.25	162.41
116	.00	1132.98	762.00	159.79
117	.00	1114.05	765.25	150.24
118	.00	1112.88	765.25	149.73
119	.00	1110.47	765.25	148.70
120	.00	1092.78	816.50	119.00
121	.00	1080.49	812.00	115.65
122	.00	1069.83	812.00	111.05
123	.00	1055.22	812.00	104.76
124	.00	820.86	810.58	4.43
125	.00	1045.64	944.00	43.78
126	.00	1045.47	944.00	43.71
127	.00	1045.34	944.00	43.65
128	.00	1045.16	944.00	43.57
129	.00	1044.93	944.00	43.47
130	.00	1044.95	944.00	43.48
131	.00	1044.68	944.00	43.37
132	.00	1044.81	944.00	43.42
133	.00	1045.46	944.00	43.70
134	.00	1045.34	944.00	43.65
135	.00	1045.22	944.00	43.60
136	.00	1045.08	944.00	43.54
137	.00	1045.10	944.00	43.55
138	.00	1045.17	944.00	43.58
139	.00	1044.80	944.00	43.42
140	.00	1131.09	761.25	159.30
141	.00	1125.77	762.00	156.69
142	.00	1106.85	764.09	147.64
143	.00	1106.60	765.47	146.94
144	.00	1091.21	817.50	117.90
145	.00	1079.18	817.50	112.72
146	.00	1077.23	812.00	114.25
147	.00	1066.58	812.00	109.66
148	.00	1052.34	812.00	103.52
149	.00	1042.31	944.00	42.35
150	.00	1042.13	944.00	42.27
151	.00	1042.00	944.00	42.21
152	.00	1041.80	944.00	42.13
153	.00	1041.56	944.00	42.02
154	.00	1041.66	944.00	42.07
155	.00	1041.40	944.00	41.95
156	.00	1041.54	944.00	42.01
157	.00	1042.15	944.00	42.28
158	.00	1042.04	944.00	42.23
159	.00	1041.94	944.00	42.19
160	.00	1041.83	944.00	42.14
161	.00	1041.80	944.00	42.12
162	.00	1041.77	944.00	42.11
163	.00	1041.55	944.00	42.02
200	.00	820.99	810.58	4.49

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	761.86	812.00	-21.60
8	.00	761.86	791.75	-12.88
9	.00	761.86	798.42	-15.75
10	.00	761.86	767.00	-2.22
11	.00	761.86	767.00	-2.22
12	.00	761.86	767.00	-2.22
13	.00	762.27	767.00	-2.04
14	.00	762.14	767.00	-2.09
15	.00	762.06	767.00	-2.13
16	.00	764.18	767.00	-1.22
17	.00	862.62	822.67	17.21
18	.00	764.18	767.00	-1.22
19	.00	764.18	767.00	-1.22
20	.00	782.50	784.67	-.93
21	.00	761.44	767.00	-2.39
22	.00	761.22	767.00	-2.49
23	.00	759.58	761.08	-.65
24	.00	1022.01	763.00	111.56
25	.00	1018.05	765.25	108.89
26	.00	1015.38	765.25	107.74
27	.00	1003.19	779.00	96.57
28	.00	861.06	823.33	16.25
29	.00	1001.54	779.00	95.86
30	.00	995.79	771.50	96.61
31	.00	986.27	777.33	90.00
32	.00	984.89	779.00	88.68
33	.00	884.55	779.00	45.47
34	.00	861.06	823.33	16.25
35	.00	883.77	779.00	45.13
36	.00	861.06	824.75	15.64
37	.00	856.95	816.00	17.64
38	.00	852.69	816.00	15.80
39	.00	846.22	816.00	13.02
40	.00	861.06	820.00	17.69
41	.00	816.82	792.38	10.53
42	.00	763.33	767.00	-1.58
43	.00	761.74	767.00	-2.27
44	.00	759.89	761.08	-.51
45	.00	1032.67	763.00	116.15
46	.00	1031.73	765.00	114.89
47	.00	1026.65	765.25	112.59
48	.00	1017.43	775.50	104.21
49	.00	1013.42	777.75	101.51
50	.00	1011.02	774.25	101.99
51	.00	1007.62	771.50	101.70
52	.00	998.53	777.73	95.11
53	.00	996.53	779.25	93.59
54	.00	994.92	779.25	92.90
55	.00	899.12	779.25	51.63
56	.00	897.17	779.25	50.79
57	.00	891.51	779.25	48.35
58	.00	862.62	823.17	16.99
59	.00	858.43	816.50	18.06
60	.00	861.06	817.00	18.98
61	.00	854.68	816.50	16.45
62	.00	848.50	816.50	13.78
63	.00	818.21	790.83	11.79
64	.00	1026.65	767.00	111.84
65	.00	1026.65	767.00	111.84
66	.00	1026.65	761.08	114.39
67	.00	1453.51	763.00	297.43
68	.00	1026.65	765.25	112.59
69	.00	1026.65	765.25	112.59
70	.00	890.35	787.25	44.41
71	.00	1026.65	765.25	112.59
72	.00	1026.65	763.25	113.45
73	.00	891.51	763.25	55.24
74	.00	996.53	762.00	101.02
75	.00	996.53	762.00	101.02

142	131	0	275.73	.00	.00	100.68	6.21	30.08
143	132	0	275.91	.00	.00	100.81	6.21	30.12
144	139	0	275.90	.00	.00	100.80	6.21	30.12
145	138	0	261.85	.00	.00	101.16	5.89	27.24
146	137	0	189.05	.00	.00	101.10	4.26	14.61
147	136	0	116.33	.00	.00	101.08	2.62	5.83
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1826.41	.00	371.20	.00	11.30	43.82
149	140	141	1826.41	.46	.00	4.87	46.03	1629.84
150	141	142	1826.41	.26	.00	18.66	20.28	196.15
151	142	143	1826.41	.00	.00	.24	11.30	43.82
152	143	144	1826.41	8.84	.00	6.55	11.30	43.82
153	144	145	1826.41	1.09	.00	10.95	11.30	43.82
154	145	146	1826.41	.17	.00	1.78	11.30	43.82
155	146	147	1826.41	.00	.00	10.65	11.30	43.82
156	147	148	1826.41	.56	.00	13.68	11.30	43.82
157	148	200	68.84	2.70	.00	228.64	25.55	2702.45
158	200	0	68.84	.27	.00	10.14	25.55	2702.45
159	148	149	1757.56	5.63	.00	4.40	10.35	35.83
160	149	150	942.68	.05	.00	.13	5.55	10.75
161	150	151	657.01	.07	.00	.07	3.87	5.39
162	151	152	371.53	.11	.00	.09	3.76	7.07
163	152	153	157.14	.18	.00	.05	3.54	10.29
164	152	154	214.39	.05	.00	.09	4.83	18.57
165	151	155	285.48	.05	.00	.54	6.43	32.16
166	150	156	285.67	.05	.00	.55	6.43	32.20
167	149	157	814.88	.07	.00	.10	4.80	8.13
168	157	158	529.18	.05	.00	.06	3.12	3.57
169	158	159	271.77	.07	.00	.03	2.75	3.91
170	159	160	100.14	.09	.00	.02	2.25	4.41
171	159	161	171.63	.08	.00	.06	3.86	12.16
172	158	162	257.41	.14	.00	.13	5.79	26.36
173	157	163	285.70	.05	.00	.55	6.43	32.21
174	153	0	157.14	.00	.00	97.56	3.54	10.29
175	154	0	214.39	.00	.00	97.66	4.83	18.57
176	155	0	285.48	.00	.00	97.40	6.43	32.16
177	156	0	285.67	.00	.00	97.53	6.43	32.20
178	163	0	285.70	.00	.00	97.55	6.43	32.21
179	162	0	257.41	.00	.00	97.77	5.79	26.36
180	161	0	171.63	.00	.00	97.79	3.86	12.16
181	160	0	100.14	.00	.00	97.83	2.25	4.41

68	53	54	4187.17	.11	.00	1.50	15.75	62.16
69	54	55	4187.17	.02	.00	95.77	25.91	223.07
70	55	56	4187.17	.68	.00	1.28	16.28	67.62
71	56	57	4187.17	1.22	.00	4.44	16.28	67.62
72	57	70	4187.17	.54	.00	.62	16.28	67.62
73	70	58	4187.17	4.93	.00	22.80	16.28	67.62
74	58	59	4187.17	1.76	.00	2.43	16.28	67.62
75	59	61	4187.17	1.27	.00	2.48	23.67	176.83
76	61	62	4187.17	.09	.00	6.09	23.67	176.83
77	62	63	4187.17	13.63	.00	16.66	22.34	152.34
78	63	0	4187.17	1.88	.00	6.83	12.93	37.54
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1826.43	.01	.00	.03	4.09	3.36
110	113	114	1826.43	.30	.00	1.20	7.10	13.45
111	114	101	1826.43	.00	.00	.00	11.30	43.82
112	15	109	1826.41	.14	.00	2.02	7.10	13.45
113	109	110	1826.41	.00	.00	.00	11.30	43.82
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1826.43	.00	376.52	.00	11.30	43.82
115	115	116	1826.43	.46	.00	4.87	46.03	1629.88
116	116	117	1826.43	.26	.00	18.66	20.28	196.16
117	117	118	1826.43	.16	.00	1.02	11.30	43.82
118	118	119	1826.43	1.46	.00	.94	11.30	43.82
119	119	120	1826.43	4.53	.00	13.17	11.30	43.82
120	120	121	1826.43	7.74	.00	4.55	11.30	43.82
121	121	122	1826.43	.00	.00	10.66	11.30	43.82
122	122	123	1826.43	.63	.00	13.98	11.30	43.82
123	123	124	68.40	2.67	.00	231.70	25.39	2668.06
124	124	0	68.40	.27	.00	10.01	25.39	2668.06
125	123	125	1758.03	6.14	.00	3.45	10.35	35.85
126	125	126	914.91	.04	.00	.13	5.39	10.15
127	126	127	639.00	.07	.00	.06	3.76	5.11
128	127	128	363.27	.10	.00	.08	3.67	6.77
129	128	129	145.30	.18	.00	.05	3.27	8.87
130	128	130	217.97	.12	.00	.10	4.91	19.17
131	127	131	275.73	.15	.00	.51	6.21	30.08
132	126	132	275.91	.15	.00	.51	6.21	30.12
133	125	133	843.12	.07	.00	.11	4.96	8.67
134	133	134	567.22	.05	.00	.07	3.34	4.08
135	134	135	305.38	.09	.00	.04	3.09	4.87
136	135	136	116.33	.11	.00	.03	2.62	5.83
137	135	137	189.05	.04	.00	.07	4.26	14.61
138	134	138	261.85	.03	.00	.14	5.89	27.24
139	133	139	275.90	.15	.00	.51	6.21	30.12
140	129	0	145.30	.00	.00	100.93	3.27	8.87
141	130	0	217.97	.00	.00	100.94	4.91	19.17

T12797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 821.44'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE	NOS.	FLOWRATE	HEAD LOSS	PUMP	HEAD	MINOR	LOSS	VELOCITY	HL/1000
1	0	1	.00	.00	.00	.00	.00	.00	.00	.00
2	1	2	.00	.00	.00	.00	.00	.00	.00	.00
3	2	3	.00	.00	.00	.00	.00	.00	.00	.00
4	3	4	.00	.00	.00	.00	.00	.00	.00	.00
5	4	5	.00	.00	.00	.00	.00	.00	.00	.00
6	5	6	.00	.00	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED										
8	7	8	.00	.00	.00	.00	.00	.00	.00	.00
9	8	9	.00	.00	.00	.00	.00	.00	.00	.00
10	9	10	.00	.00	.00	.00	.00	.00	.00	.00
11	10	11	.00	.00	.00	.00	.00	.00	.00	.00
12	11	12	.00	.00	.00	.00	.00	.00	.00	.00
13	12	13	-4285.19	-.05	.00	-.37	-9.60	-17.35		
14	13	14	1826.41	.00	.00	.13	4.09	3.36		
15	14	15	1826.41	.01	.00	.08	4.09	3.36		
LINE 16 IS CLOSED										
17	16	18	.00	.00	.00	.00	.00	.00	.00	.00
18	18	19	.00	.00	.00	.00	.00	.00	.00	.00
19	0	79	13625.19	15.26	.00	22.30	30.54	167.73		
20	79	80	13625.19	1.23	.00	6.40	30.54	167.73		
21	80	81	12125.19	2.01	.00	2.98	27.18	133.22		
22	81	13	6111.59	.22	.00	8.77	13.70	34.66		
23	81	19	6013.60	.59	.00	6.49	13.48	33.58		
LINE 24 IS CLOSED										
25	86	0	.00	.00	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED										
27	20	83	.00	.00	.00	.00	.00	.00	.00	.00
28	0	83	.00	.00	.00	.00	.00	.00	.00	.00
29	83	84	.00	.00	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED										
31	0	85	.00	.00	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED										
33	12	21	4285.19	.04	.00	.37	9.60	17.35		
34	21	22	4333.10	.00	.00	.22	9.71	17.73		
35	22	23	4333.10	.26	.00	1.38	9.71	17.73		
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE										
36	23	24	4333.10	.01	262.73	.29	17.70	82.08		
37	24	25	4333.10	.04	.00	3.92	16.85	72.32		
38	21	25	-47.92	-11.00	.00	-245.61	-17.79	-1325.75		
39	25	26	4285.19	.57	.00	2.11	16.66	70.76		
40	26	27	4285.19	1.24	.00	10.95	16.66	70.76		
41	27	29	3990.38	.15	.00	1.49	15.51	61.53		
42	27	29	294.80	.03	.00	1.62	2.98	4.56		
43	29	30	4285.19	.91	.00	4.84	16.12	65.04		
44	30	31	4285.19	.00	.00	9.52	7.29	8.61		
45	31	32	4285.19	.13	.00	1.25	16.12	65.04		
46	32	33	4285.19	.02	.00	100.31	26.51	233.48		
47	33	35	4285.19	.14	.00	.65	16.66	70.76		
48	35	36	4285.19	1.03	.00	21.68	16.66	70.76		
49	36	37	4285.19	.92	.00	3.19	16.66	70.76		
50	37	38	4285.19	1.67	.00	2.60	24.23	185.08		
51	38	39	4285.19	.09	.00	6.38	24.23	185.08		
52	39	41	4285.19	12.44	.00	16.96	22.86	159.44		
53	41	0	4285.19	1.12	.00	6.20	13.24	39.28		
54	19	42	6013.60	.03	.00	.82	13.48	33.58		
55	42	43	4187.17	.15	.00	1.44	9.38	16.58		
56	43	44	4236.58	.42	.00	1.43	9.50	16.97		
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE										
57	44	45	4236.58	.01	273.06	.28	17.31	78.53		
58	45	46	4236.58	.03	.00	.91	15.94	63.61		
59	43	46	-49.41	-8.87	.00	-261.12	-18.34	-1407.79		
60	46	47	4187.17	1.15	.00	3.93	15.75	62.16		
61	47	48	4187.17	.62	.00	8.59	15.75	62.16		
62	48	49	4187.17	.62	.00	3.39	15.75	62.16		
63	49	50	3825.12	.18	.00	2.22	14.39	52.07		
64	49	50	362.05	.03	.00	2.37	3.66	6.73		
65	50	51	4187.17	.44	.00	2.97	15.75	62.16		
66	51	52	4187.17	.00	.00	9.09	7.12	8.23		
67	52	53	4187.17	.16	.00	1.85	15.75	62.16		

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1500.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA	(HEAD-FLOW) :	622.0	.0	468.0	1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0									
83	67	68	1.0	10.3	.2	.89	410.0	2250.0	298.0 4000.0
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0									
115	115	116	.3	4.0	.2	.15	470.0	1500.0	385.0 1800.0
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			
122	122	123	14.3	8.1	.2	7.05			

T12797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	821.44
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

Calculation OSC-7248

Attachment 21

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=720$ sec

THE NET SYSTEM DEMAND = 1500.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13646.38
25	.00
28	.00
31	.00
53	-4292.95
78	-4194.67
108	.00
124	-68.45
140	-145.54
141	-218.33
142	-276.19
143	-276.37
144	-276.36
145	-262.28
146	-189.36
147	-116.52
158	-68.89
174	-157.40
175	-214.75
176	-285.95
177	-286.14
178	-286.17
179	-257.84
180	-171.92
181	-100.30

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13646.38
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12146.38

76	.00	997.19	762.00	101.31
77	.00	762.82	763.50	-.29
78	.00	997.19	763.50	100.66
79	.00	785.55	794.25	-3.75
80	1500.00	777.90	779.00	-.47
81	.00	772.89	779.00	-2.63
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	763.38	760.10	1.41
109	.00	761.49		
110	.00	761.49	760.10	.60
113	.00	764.89		
114	.00	763.39		
115	.00	1138.94	761.25	162.68
116	.00	1133.60	762.00	160.06
117	.00	1114.62	765.25	150.48
118	.00	1113.44	765.25	149.98
119	.00	1111.02	765.25	148.94
120	.00	1093.27	816.50	119.22
121	.00	1080.94	812.00	115.84
122	.00	1070.25	812.00	111.24
123	.00	1055.59	812.00	104.92
124	.00	820.87	810.58	4.43
125	.00	1045.98	944.00	43.93
126	.00	1045.81	944.00	43.85
127	.00	1045.68	944.00	43.80
128	.00	1045.49	944.00	43.72
129	.00	1045.27	944.00	43.62
130	.00	1045.28	944.00	43.63
131	.00	1045.02	944.00	43.51
132	.00	1045.15	944.00	43.57
133	.00	1045.80	944.00	43.85
134	.00	1045.68	944.00	43.80
135	.00	1045.55	944.00	43.74
136	.00	1045.41	944.00	43.68
137	.00	1045.44	944.00	43.69
138	.00	1045.50	944.00	43.72
139	.00	1045.14	944.00	43.56
140	.00	1131.70	761.25	159.57
141	.00	1126.36	762.00	156.94
142	.00	1107.38	764.09	147.87
143	.00	1107.13	765.47	147.17
144	.00	1091.69	817.50	118.10
145	.00	1079.63	817.50	112.91
146	.00	1077.67	812.00	114.43
147	.00	1066.98	812.00	109.83
148	.00	1052.70	812.00	103.68
149	.00	1042.64	944.00	42.49
150	.00	1042.45	944.00	42.41
151	.00	1042.32	944.00	42.35
152	.00	1042.12	944.00	42.26
153	.00	1041.88	944.00	42.16
154	.00	1041.98	944.00	42.20
155	.00	1041.72	944.00	42.09
156	.00	1041.86	944.00	42.15
157	.00	1042.47	944.00	42.42
158	.00	1042.36	944.00	42.37
159	.00	1042.26	944.00	42.32
160	.00	1042.15	944.00	42.28
161	.00	1042.12	944.00	42.26
162	.00	1042.09	944.00	42.25
163	.00	1041.88	944.00	42.16
200	.00	821.01	810.58	4.49

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	763.46	812.00	-20.91
8	.00	763.46	791.75	-12.19
9	.00	763.46	798.42	-15.06
10	.00	763.46	767.00	-1.53
11	.00	763.46	767.00	-1.53
12	.00	763.46	767.00	-1.53
13	.00	763.87	767.00	-1.35
14	.00	763.74	767.00	-1.40
15	.00	763.66	767.00	-1.44
16	.00	765.78	767.00	-.52
17	.00	862.81	822.67	17.29
18	.00	765.78	767.00	-.52
19	.00	765.78	767.00	-.52
20	.00	782.50	784.67	-.93
21	.00	763.04	767.00	-1.71
22	.00	762.82	767.00	-1.80
23	.00	761.17	761.08	.04
24	.00	1022.78	763.00	111.90
25	.00	1018.81	765.25	109.22
26	.00	1016.12	765.25	108.06
27	.00	1003.89	779.00	96.87
28	.00	861.25	823.33	16.33
29	.00	1002.24	779.00	96.16
30	.00	996.46	771.50	96.90
31	.00	986.91	777.33	90.27
32	.00	985.52	779.00	88.96
33	.00	884.83	779.00	45.58
34	.00	861.25	823.33	16.33
35	.00	884.03	779.00	45.24
36	.00	861.25	824.75	15.72
37	.00	857.13	816.00	17.71
38	.00	852.85	816.00	15.87
39	.00	846.35	816.00	13.07
40	.00	861.25	820.00	17.77
41	.00	816.85	792.38	10.54
42	.00	764.93	767.00	-.89
43	.00	763.33	767.00	-1.58
44	.00	761.48	761.08	.17
45	.00	1033.46	763.00	116.50
46	.00	1032.52	765.00	115.23
47	.00	1027.42	765.25	112.93
48	.00	1018.18	775.50	104.53
49	.00	1014.15	777.75	101.83
50	.00	1011.74	774.25	102.30
51	.00	1008.33	771.50	102.01
52	.00	999.21	777.73	95.40
53	.00	997.19	779.25	93.88
54	.00	995.58	779.25	93.18
55	.00	899.44	779.25	51.77
56	.00	897.48	779.25	50.93
57	.00	891.80	779.25	48.48
58	.00	862.81	823.17	17.07
59	.00	858.61	816.50	18.14
60	.00	861.25	817.00	19.06
61	.00	854.84	816.50	16.52
62	.00	848.64	816.50	13.84
63	.00	818.24	790.83	11.81
64	.00	1027.42	767.00	112.17
65	.00	1027.42	767.00	112.17
66	.00	1027.42	761.08	114.72
67	.00	1454.29	763.00	297.76
68	.00	1027.42	765.25	112.93
69	.00	1027.42	765.25	112.93
70	.00	890.64	787.25	44.53
71	.00	1027.42	765.25	112.93
72	.00	1027.42	763.25	113.79
73	.00	891.80	763.25	55.37
74	.00	997.19	762.00	101.31
75	.00	997.19	762.00	101.31

142	131	0	276.19	.00	.00	101.02	6.22	30.18
143	132	0	276.37	.00	.00	101.14	6.22	30.22
144	139	0	276.36	.00	.00	101.14	6.22	30.22
145	138	0	262.28	.00	.00	101.50	5.90	27.33
146	137	0	189.36	.00	.00	101.43	4.26	14.66
147	136	0	116.52	.00	.00	101.41	2.62	5.85
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1829.35	.00	370.22	.00	11.32	43.96
149	140	141	1829.35	.46	.00	4.88	46.10	1635.06
150	141	142	1829.35	.26	.00	18.72	20.31	196.78
151	142	143	1829.35	.00	.00	.24	11.32	43.96
152	143	144	1829.35	8.87	.00	6.57	11.32	43.96
153	144	145	1829.35	1.09	.00	10.98	11.32	43.96
154	145	146	1829.35	.17	.00	1.78	11.32	43.96
155	146	147	1829.35	.00	.00	10.68	11.32	43.96
156	147	148	1829.35	.56	.00	13.73	11.32	43.96
157	148	200	68.89	2.71	.00	228.98	25.57	2706.38
158	200	0	68.89	.27	.00	10.15	25.57	2706.38
159	148	149	1760.46	5.64	.00	4.41	10.37	35.95
160	149	150	944.23	.05	.00	.13	5.56	10.78
161	150	151	658.09	.07	.00	.07	3.87	5.41
162	151	152	372.15	.11	.00	.09	3.76	7.09
163	152	153	157.40	.18	.00	.06	3.54	10.32
164	152	154	214.75	.05	.00	.09	4.83	18.63
165	151	155	285.95	.05	.00	.55	6.44	32.26
166	150	156	286.14	.05	.00	.55	6.44	32.31
167	149	157	816.22	.07	.00	.10	4.81	8.15
168	157	158	530.05	.05	.00	.06	3.12	3.59
169	158	159	272.22	.07	.00	.03	2.75	3.92
170	159	160	100.30	.09	.00	.02	2.26	4.42
171	159	161	171.92	.08	.00	.06	3.87	12.20
172	158	162	257.84	.14	.00	.13	5.80	26.45
173	157	163	286.17	.05	.00	.55	6.44	32.31
174	153	0	157.40	.00	.00	97.88	3.54	10.32
175	154	0	214.75	.00	.00	97.98	4.83	18.63
176	155	0	285.95	.00	.00	97.72	6.44	32.26
177	156	0	286.14	.00	.00	97.85	6.44	32.31
178	163	0	286.17	.00	.00	97.87	6.44	32.31
179	162	0	257.84	.00	.00	98.09	5.80	26.45
180	161	0	171.92	.00	.00	98.12	3.87	12.20
181	160	0	100.30	.00	.00	98.15	2.26	4.42

68	53	54	4194.67	.11	.00	1.51	15.78	62.38
69	54	55	4194.67	.02	.00	96.12	25.95	223.86
70	55	56	4194.67	.68	.00	1.28	16.31	67.86
71	56	57	4194.67	1.22	.00	4.46	16.31	67.86
72	57	70	4194.67	.54	.00	.62	16.31	67.86
73	70	58	4194.67	4.95	.00	22.88	16.31	67.86
74	58	59	4194.67	1.76	.00	2.44	16.31	67.86
75	59	61	4194.67	1.28	.00	2.49	23.71	177.45
76	61	62	4194.67	.09	.00	6.11	23.71	177.45
77	62	63	4194.67	13.68	.00	16.72	22.38	152.87
78	63	0	4194.67	1.89	.00	6.85	12.96	37.67
LINE 79 IS CLOSED								
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83 IS CLOSED								
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88 IS CLOSED								
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90 IS CLOSED								
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92 IS CLOSED								
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96 IS CLOSED								
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99 IS CLOSED								
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105 IS CLOSED								
LINE 106 IS CLOSED								
LINE 107 IS CLOSED								
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1829.41	.01	.00	.03	4.10	3.37
110	113	114	1829.41	.30	.00	1.20	7.11	13.49
111	114	101	1829.41	.00	.00	.00	11.32	43.96
112	15	109	1829.35	.14	.00	2.03	7.11	13.49
113	109	110	1829.35	.00	.00	.00	11.32	43.96
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE								
114	101	115	1829.41	.00	375.57	.00	11.32	43.96
115	115	116	1829.41	.46	.00	4.88	46.10	1635.17
116	116	117	1829.41	.26	.00	18.72	20.31	196.79
117	117	118	1829.41	.16	.00	1.02	11.32	43.96
118	118	119	1829.41	1.46	.00	.95	11.32	43.96
119	119	120	1829.41	4.54	.00	13.21	11.32	43.96
120	120	121	1829.41	7.76	.00	4.57	11.32	43.96
121	121	122	1829.41	.00	.00	10.69	11.32	43.96
122	122	123	1829.41	.63	.00	14.03	11.32	43.96
123	123	124	68.45	2.67	.00	232.05	25.41	2672.05
124	124	0	68.45	.27	.00	10.02	25.41	2672.05
125	123	125	1760.96	6.16	.00	3.46	10.37	35.97
126	125	126	916.44	.04	.00	.13	5.40	10.18
127	126	127	640.07	.07	.00	.06	3.77	5.13
128	127	128	363.88	.10	.00	.08	3.68	6.79
129	128	129	145.54	.18	.00	.05	3.28	8.90
130	128	130	218.33	.12	.00	.10	4.91	19.23
131	127	131	276.19	.15	.00	.51	6.22	30.18
132	126	132	276.37	.15	.00	.51	6.22	30.22
133	125	133	844.53	.07	.00	.11	4.97	8.70
134	133	134	568.17	.05	.00	.07	3.35	4.09
135	134	135	305.88	.09	.00	.04	3.09	4.89
136	135	136	116.52	.11	.00	.03	2.62	5.85
137	135	137	189.36	.04	.00	.07	4.26	14.66
138	134	138	262.28	.03	.00	.14	5.90	27.33
139	133	139	276.36	.15	.00	.51	6.22	30.22
140	129	0	145.54	.00	.00	101.27	3.28	8.90
141	130	0	218.33	.00	.00	101.28	4.91	19.23

T11797r2

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000

NO RCS or Rx Bldg. pressure

BWST 823.23'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-4292.95	-.05	.00	-.37	-9.62	-17.41
14	13 14	1829.35	.00	.00	.13	4.10	3.37
15	14 15	1829.35	.01	.00	.08	4.10	3.37
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	13646.38	15.31	.00	22.37	30.59	168.24
20	79 80	13646.38	1.23	.00	6.42	30.59	168.24
21	80 81	12146.38	2.02	.00	2.99	27.22	133.68
22	81 13	6122.30	.22	.00	8.80	13.72	34.78
23	81 19	6024.08	.60	.00	6.51	13.50	33.70
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED							
31	0 85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED							
33	12 21	4292.95	.04	.00	.37	9.62	17.41
34	21 22	4340.78	.00	.00	.22	9.73	17.79
35	22 23	4340.78	.26	.00	1.38	9.73	17.79
THE PUMP IN LINE 36 IS OPERATING OUT OF RANGE							
36	23 24	4340.78	.01	261.91	.29	17.73	82.37
37	24 25	4340.78	.04	.00	3.94	16.88	72.57
38	21 25	-47.84	-10.97	.00	-244.80	-17.76	-1321.47
39	25 26	4292.95	.57	.00	2.12	16.69	71.01
40	26 27	4292.95	1.24	.00	10.99	16.69	71.01
41	27 29	3997.61	.15	.00	1.50	15.54	61.75
42	27 29	295.34	.03	.00	1.63	2.99	4.58
43	29 30	4292.95	.91	.00	4.86	16.15	65.27
44	30 31	4292.95	.00	.00	9.55	7.30	8.64
45	31 32	4292.95	.13	.00	1.26	16.15	65.27
46	32 33	4292.95	.02	.00	100.67	26.56	234.32
47	33 35	4292.95	.14	.00	.65	16.69	71.01
48	35 36	4292.95	1.03	.00	21.76	16.69	71.01
49	36 37	4292.95	.92	.00	3.20	16.69	71.01
50	37 38	4292.95	1.67	.00	2.61	24.27	185.74
51	38 39	4292.95	.09	.00	6.40	24.27	185.74
52	39 41	4292.95	12.48	.00	17.02	22.90	160.01
53	41 0	4292.95	1.13	.00	6.22	13.26	39.41
54	19 42	6024.08	.03	.00	.82	13.50	33.70
55	42 43	4194.67	.15	.00	1.44	9.40	16.64
56	43 44	4244.00	.42	.00	1.43	9.51	17.02
THE PUMP IN LINE 57 IS OPERATING OUT OF RANGE							
57	44 45	4244.00	.01	272.27	.28	17.34	78.80
58	45 46	4244.00	.03	.00	.91	15.97	63.82
59	43 46	-49.33	-8.84	.00	-260.34	-18.31	-1403.67
60	46 47	4194.67	1.15	.00	3.94	15.78	62.38
61	47 48	4194.67	.62	.00	8.62	15.78	62.38
62	48 49	4194.67	.62	.00	3.40	15.78	62.38
63	49 50	3831.97	.18	.00	2.23	14.42	52.25
64	49 50	362.70	.03	.00	2.38	3.67	6.75
65	50 51	4194.67	.44	.00	2.98	15.78	62.38
66	51 52	4194.67	.00	.00	9.12	7.13	8.26
67	52 53	4194.67	.16	.00	1.86	15.78	62.38

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1500.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	.00	779.00	45	46	
33	.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	.00	779.25	68	69	
55	.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148	PUMP DATA (HEAD-FLOW):		622.0		.0	468.0 1500.0	380.0 1800.0
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

60	46	47	18.5	10.4	.2	1.02		
THERE IS A CHECK VALVE IN LINE NUMBER 60								
61	47	48	10.0	10.4	.2	2.23		
62	48	49	10.0	10.4	.2	.88		
63	49	50	3.5	10.4	.2	.69		
64	49	50	4.5	6.4	.2	11.40		
65	50	51	7.0	10.4	.2	.77		
66	51	52	.1	15.5	.2	11.55		
67	52	53	2.5	10.4	.2	.48		
68	53	54	1.7	10.4	.2	.39		
69	54	55	.1	8.1	.2	9.19		
70	55	56	10.0	10.3	.2	.31		
71	56	57	18.0	10.3	.2	1.08		
72	57	70	8.0	10.3	.2	.15		
73	70	58	73.0	10.3	.2	5.54		
74	58	59	26.0	10.3	.2	.59		
75	59	61	7.2	8.5	.2	.28		
76	61	62	.5	8.5	.2	.70		
77	62	63	89.5	8.8	.2	2.15		
78	63	0	50.1	11.5	.2	2.63	809.50	
79	16	64	5.2	13.5	.2	.73		
LINE 79 IS CLOSED								
80	64	65	3.8	13.5	.2	.55		
81	65	66	13.5	13.5	.2	.96		
82	66	67	.1	10.0	.2	.06		
LINE 82 PUMP DATA (HEAD-FLOW): 425.0 .0 410.0 2250.0 298.0 4000.0								
83	67	68	1.0	10.3	.2	.89		
LINE 83 IS CLOSED								
84	64	68	8.5	1.0	.2	50.00		
85	68	69	15.5	10.3	.2	1.41		
86	69	47	3.0	10.3	.2	.43		
87	69	71	10.0	10.3	.2	.31		
88	26	71	6.1	10.3	.2	.65		
LINE 88 IS CLOSED								
89	71	72	29.5	8.1	.2	7.20		
90	72	73	8.6	6.4	.2	.12		
LINE 90 IS CLOSED								
91	73	57	20.5	8.1	.2	.83		
92	9	48	15.0	8.3	.2	2.89		
LINE 92 IS CLOSED								
93	53	74	49.5	8.3	.2	3.13		
94	74	75	3.6	6.4	.2	.12		
95	75	76	12.0	8.3	.2	.40		
96	76	77	5.0	8.3	.2	1.06		
LINE 96 IS CLOSED								
97	77	22	1.5	8.1	.2	.97		
98	76	78	20.5	8.3	.2	.63		
99	78	65	1.5	8.1	.2	.87		
LINE 99 IS CLOSED								
100	36	28	1.5	3.1	.2	1.63		
101	28	34	17.5	3.3	.2	.55		
102	34	40	132.5	3.3	.2	2.34		
103	40	60	4.0	3.3	.2	2.07		
104	58	17	.5	8.1	.2	.19		
105	17	60	3.0	8.1	.2	.42		
LINE 105 IS CLOSED								
106	40	17	.5	3.3	.2	3.72		
LINE 106 IS CLOSED								
107	60	82	22.2	8.3	.2	.80		
LINE 107 IS CLOSED								
108	82	0	23.2	8.3	.2	2.13	798.33	
109	42	113	3.1	13.5	.2	.13		
110	113	114	22.1	10.3	.2	1.53		
111	114	101	.1	8.1	.2	.00		
112	15	109	10.1	10.3	.2	2.58		
113	109	110	.1	8.1	.2	.00		
114	101	115	.1	8.1	.2	.00		
LINE 114 PUMP DATA (HEAD-FLOW): 622.0 .0 470.0 1500.0 385.0 1800.0								
115	115	116	.3	4.0	.2	.15		
116	116	117	1.3	6.1	.2	2.92		
117	117	118	3.7	8.1	.2	.51		
118	118	119	33.3	8.1	.2	.48		
119	119	120	103.3	8.1	.2	6.64		
120	120	121	176.6	8.1	.2	2.30		
121	121	122	.1	8.1	.2	5.37		
122	122	123	14.3	8.1	.2	7.05		

T11797r2

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073
THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	823.23
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	782.50
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
LINE 30 IS CLOSED						
31	0 85	53.5	17.5	.2	.90	782.50
32	85 18	7.0	13.5	.2	.99	
LINE 32 IS CLOSED						
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

Calculation OSC-7248

Attachment 20

Wood's Model Computer Run to Simulate Flowrates Starting a Time $t=660$ sec

THE NET SYSTEM DEMAND = 1500.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	13667.55
25	.00
28	.00
31	.00
53	-4300.70
78	-4202.16
108	.00
124	-68.50
140	-145.79
141	-218.70
142	-276.65
143	-276.83
144	-276.82
145	-262.72
146	-189.68
147	-116.71
158	-68.95
174	-157.66
175	-215.10
176	-286.42
177	-286.61
178	-286.64
179	-258.26
180	-172.20
181	-100.47

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 13667.55
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -12167.55

76	.00	997.86	762.00	101.59
77	.00	764.41	763.50	.39
78	.00	997.86	763.50	100.95
79	.00	787.23	794.25	-3.03
80	1500.00	779.55	779.00	.24
81	.00	774.52	779.00	-1.93
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	764.98	760.10	2.10
109	.00	763.09		
110	.00	763.08	760.10	1.28
113	.00	766.49		
114	.00	764.99		
115	.00	1139.58	761.25	162.96
116	.00	1134.22	762.00	160.33
117	.00	1115.18	765.25	150.73
118	.00	1113.99	765.25	150.22
119	.00	1111.58	765.25	149.17
120	.00	1093.77	816.50	119.43
121	.00	1081.40	812.00	116.04
122	.00	1070.67	812.00	111.42
123	.00	1055.97	812.00	105.08
124	.00	820.89	810.58	4.44
125	.00	1046.32	944.00	44.07
126	.00	1046.15	944.00	44.00
127	.00	1046.02	944.00	43.94
128	.00	1045.83	944.00	43.86
129	.00	1045.60	944.00	43.76
130	.00	1045.62	944.00	43.77
131	.00	1045.36	944.00	43.66
132	.00	1045.48	944.00	43.71
133	.00	1046.14	944.00	44.00
134	.00	1046.01	944.00	43.94
135	.00	1045.89	944.00	43.89
136	.00	1045.75	944.00	43.83
137	.00	1045.77	944.00	43.84
138	.00	1045.84	944.00	43.87
139	.00	1045.48	944.00	43.71
140	.00	1132.31	761.25	159.83
141	.00	1126.95	762.00	157.20
142	.00	1107.91	764.09	148.10
143	.00	1107.67	765.47	147.40
144	.00	1092.18	817.50	118.31
145	.00	1080.07	817.50	113.10
146	.00	1078.11	812.00	114.62
147	.00	1067.39	812.00	110.00
148	.00	1053.05	812.00	103.83
149	.00	1042.96	944.00	42.63
150	.00	1042.78	944.00	42.55
151	.00	1042.64	944.00	42.49
152	.00	1042.44	944.00	42.40
153	.00	1042.20	944.00	42.30
154	.00	1042.30	944.00	42.34
155	.00	1042.05	944.00	42.23
156	.00	1042.18	944.00	42.29
157	.00	1042.80	944.00	42.55
158	.00	1042.69	944.00	42.51
159	.00	1042.58	944.00	42.46
160	.00	1042.47	944.00	42.42
161	.00	1042.44	944.00	42.40
162	.00	1042.42	944.00	42.39
163	.00	1042.20	944.00	42.30
200	.00	821.02	810.58	4.50

74	.00	762.00	93	94	
75	.00	762.00	94	95	
76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	1680.00	812.00	120	121	
122	-1680.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	1680.00	812.00	154	155	
147	-1680.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

JUNCTION	NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
	1	.00	804.50	1	2	24
	2	.00	798.50	2	3	
	3	.00	798.50	3	4	26
	4	.00	801.50	4	5	
	5	.00	812.00	5	6	
	6	.00	812.00	6	7	
	7	.00	812.00	7	8	
	8	.00	791.75	8	9	
	9	.00	798.42	9	10	92
	10	.00	767.00	10	11	
	11	.00	767.00	11	12	
	12	.00	767.00	12	13	33
	13	.00	767.00	13	14	22
	14	.00	767.00	14	15	30
	15	.00	767.00	15	16	112
	16	.00	767.00	16	17	79
	17	.00	822.67	104	105	106
	18	.00	767.00	17	18	32
	19	.00	767.00	18	23	54
	20	.00	784.67	26	27	
	21	.00	767.00	33	34	38
	22	.00	767.00	34	35	97
	23	.00	761.08	35	36	
	24	.00	763.00	36	37	
	25	.00	765.25	37	38	39
	26	.00	765.25	39	40	88
	27	.00	779.00	40	41	42
	28	.00	823.33	100	101	
	29	.00	779.00	41	42	43
	30	.00	771.50	43	44	
	31	.00	777.33	44	45	
	32	3300.00	779.00	45	46	
	33	-3300.00	779.00	46	47	
	34	.00	823.33	101	102	
	35	.00	779.00	47	48	
	36	.00	824.75	48	49	100
	37	.00	816.00	49	50	
	38	.00	816.00	50	51	
	39	.00	816.00	51	52	
	40	.00	820.00	102	103	106
	41	.00	792.38	52	53	
	42	.00	767.00	54	55	109
	43	.00	767.00	55	56	59
	44	.00	761.08	56	57	
	45	.00	763.00	57	58	
	46	.00	765.00	58	59	60
	47	.00	765.25	60	61	86
	48	.00	775.50	61	62	92
	49	.00	777.75	62	63	64
	50	.00	774.25	63	64	65
	51	.00	771.50	65	66	
	52	.00	777.73	66	67	
	53	.00	779.25	67	68	93
	54	3300.00	779.25	68	69	
	55	-3300.00	779.25	69	70	
	56	.00	779.25	70	71	
	57	.00	779.25	71	72	91
	58	.00	823.17	73	74	104
	59	.00	816.50	74	75	
	60	.00	817.00	103	105	107
	61	.00	816.50	75	76	
	62	.00	816.50	76	77	
	63	.00	790.83	77	78	
	64	.00	767.00	79	80	84
	65	.00	767.00	80	81	99
	66	.00	761.08	81	82	
	67	.00	763.00	82	83	
	68	.00	765.25	83	84	85
	69	.00	765.25	85	86	87
	70	.00	787.25	72	73	
	71	.00	765.25	87	88	89
	72	.00	763.25	89	90	
	73	.00	763.25	90	91	

119	119	120	103.3	8.1	.2	6.64	
120	120	121	176.6	8.1	.2	2.30	
121	121	122	.1	8.1	.2	5.37	
LINE 121 IS CLOSED							
122	122	123	14.3	8.1	.2	7.05	
123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148 PUMP DATA (HEAD-FLOW) :							
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
LINE 155 IS CLOSED							
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

59	43	46	6.3	1.0	.2	50.00			
60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
LINE 69 IS CLOSED									
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW): 425.0 .0 410.0 2250.0 298.0 4000.0									
83	67	68	1.0	10.3	.2	.89			
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW): 622.0 .0 470.0 1500.0 385.0 1800.0									
115	115	116	.3	4.0	.2	.15			
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			

Tbwst6 / NO HPI / (RBES) LP-19 & LP-20 Open

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073
THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	803.56
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	781.15
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
31	0 85	53.5	17.5	.2	.90	781.15
32	85 18	7.0	13.5	.2	.99	
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
LINE 46 IS CLOSED						
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	

Calculation OSC-7248

Attachment 28

Wood's Model Computer Run to Simulate Conditions at Initiation of Swapover with HPI Pumps Secured

OSC-7245
Attachment 27
page 16 of 16

INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #3 AT 2001 GPM PAGE 1

DATE 11 /13 /98 13 :23

POINT #	1	2	3	4	5	6
DISCHG (FT)	301.2	279.6	264.5	255.7	247.7	166.2
SUCTION (FT)	58.0	44.2	40.3	32.7	21.7	16.6
DIFF. VEL. HD.	36.9	36.9	37.5	37.5	36.2	35.6
T.D.H. (FT)	280.1	272.4	261.7	260.5	262.2	185.1
RPM	3571.	3571.	3571.	3571.	3571.	3571.
BARO. (FT.)	34.0	34.0	34.0	34.0	34.0	34.0
H2O TEMP. (F)	81.0	81.0	81.0	81.0	81.0	81.0
V.P. (FT.)	1.2	1.2	1.2	1.2	1.2	1.2
NPSH (FT)	93.3	79.5	75.7	68.0	56.9	51.8

4mDATA STEPPED TO SPEED OF 3560 RPM.

STEPPED FLOW OF 1995 GPM.

STEP TDH	278.3	270.7	260.1	258.9	260.6	184.0
STEP RPM	3560.	3560.	3560.	3560.	3560.	3560.
STEP NPSH	92.7	79.0	75.2	67.6	56.6	51.5

-390 = 269.9

ORDER #-ITEM	CUSTOMER	CUST. ORDER	CUST. TAG/ITM
703-00009.02	BABCOCK & WILCOX		

PUMP TYPE	SERIAL NO.	IMPELLER	IMPELLER DIA	CUST. RPM
4X11A	####		0.00	3560.

4mGUARANTEED CONDITIONS:

GUAR. GPM	GUAR. TDH	GUAR. EFF.	GUAR. NPSHR	GUAR. MCSF
1500.0	450.0	75.0	0.0	0.

4mCUSTOMER CONDITIONS:

CUST. SERVICE	CUST. TEMP.	C. VISC. (SSU)	CUST. SP. GR.	CUST. NPSHA
		0.0	0.00	0.0

APPROVALS:

TEST ENGR. *PR*

ENGR'G. DEPT. *PJ. Kestice 11/14/98*

-390 NPSHR 74 SL

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INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #2 AT 1902 GPM PAGE 1

DATE 11 /13 /98 13 :23

POINT #	1	2	3	4	5	6	7	8
DISCHG (FT)	326.1	308.9	309.5	303.8	299.6	300.5	278.6	221.1
SUCTION (FT)	31.8	20.2	17.0	16.9	16.3	13.4	8.1	4.2
DIFF. VEL. HD.	33.4	33.4	32.9	33.3	33.4	33.0	32.7	31.9
T.D.H. (FT)	327.7	322.0	325.4	320.1	316.7	320.0	303.1	248.8
RPM	3571.	3571.	3571.	3571.	3571.	3571.	3571.	3571.
BARO. (FT.)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
H2O TEMP. (F)	81.0	81.0	81.0	81.0	81.0	81.0	81.0	81.0
V.P. (FT.)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
NPSH (FT)	66.9	55.3	52.0	52.0	51.3	48.5	43.1	39.1

4mDATA STEPPED TO SPEED OF 3560 RPM.

STEPPED FLOW OF 1896 GPM.

STEP TDH	325.7	320.1	323.4	318.1	314.8	318.0	301.3	247.3
STEP RPM	3560.	3560.	3560.	3560.	3560.	3560.	3560.	3560.
STEP NPSH	66.4	54.9	51.7	51.6	51.0	48.2	42.8	38.9

-3% = 315.9

↑

ORDER #--ITEM. CUSTOMER CUST. ORDER CUST. TAG/ITH
703-00009.02 BABCOCK & WILCOX

PUMP TYPE SERIAL NO. IMPELLER IMPELLER DIA CUST. RPM
4X11A ##### 0.00 3560.

4mGUARANTEED CONDITIONS:

GUAR. GPM GUAR. TDH GUAR. EFF. GUAR. NPSHR GUAR. MCSF
1500.0 450.0 75.0 0.0 0.

4mCUSTOMER CONDITIONS:

CUST. SERVICE CUST. TEMP. C. VISC. (SSU) CUST. SP. GR. CUST. NPSHA
0.0 0.00 0.0

APPROVALS:

TEST ENGR. *PR*

ENGR'G. DEPT. *Paul J. Kefjic* 11/14/98

-3% NPSHR 48.5 ?
(61)

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INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #4 AT 1859 GPM

PAGE 1

DATE 11 /13 /98 13 :23

POINT #	1	2	3	4	5
DISCHG (FT)	340.6	317.0	307.8	303.7	214.2
SUCTION (FT)	26.9	10.1	7.5	5.5	2.8
DIFF. VEL. HD.	31.9	31.8	31.8	31.4	31.6
T.D.H. (FT)	345.6	338.7	332.1	329.5	242.9
RPM	3571.	3571.	3571.	3571.	3571.
BARO. (FT.)	34.0	34.0	34.0	34.0	34.0
H2O TEMP. (F)	81.0	81.0	81.0	81.0	81.0
V.P. (FT.)	1.2	1.2	1.2	1.2	1.2
NPSH (FT)	61.9	45.0	42.4	40.4	37.7

4mDATA STEPPED TO SPEED OF 3560 RPM.

STEPPED FLOW OF 1854 GPM.

STEP TDH	343.5	336.6	330.0	327.5	241.5
STEP RPM	3560.	3560.	3560.	3560.	3560.
STEP NPSH	61.5	44.7	42.2	40.2	37.5

-39% = 333.2

=====

ORDER #-ITEM	CUSTOMER	CUST. ORDER	CUST. TAG/ITM
703-00009.02	BABCOCK & WILCOX		

=====

PUMP TYPE	SERIAL NO.	IMPELLER	IMPELLER DIA	CUST. RPM
4X11A	####		0.00	3560.

=====

4mGUARANTEED CONDITIONS:

GUAR. GPM	GUAR. TDH	GUAR. EFF.	GUAR. NPSHR	GUAR. MCSF
1500.0	450.0	75.0	0.0	0.

=====

4mCUSTOMER CONDITIONS:

CUST. SERVICE	CUST. TEMP.	C. VISC. (SSU)	CUST. SP. GR.	CUST. NPSHA
		0.0	0.00	0.0

=====

APPROVALS:

TEST ENGR. *RF*

ENGR'G. DEPT. *PQK*

11/14/98

NPSH2.
-39% = 42.5

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INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #1 AT 1806 GPM PAGE 1

DATE 11 /13 /98 9 :43

POINT #	1	2	3	4	5	6	7
DISCHG (FT)	373.2	349.1	345.8	344.8	328.4	279.3	139.0
SUCTION (FT)	32.5	10.6	2.8	1.7	-1.2	-1.6	-2.0
DIFF. VEL. HD.	30.1	30.0	29.2	29.3	29.2	29.5	30.5
T.D.H. (FT)	370.8	368.5	372.3	372.4	350.8	310.5	171.7
RPM	3571.	3571.	3571.	3571.	3571.	3571.	3571.
BARO. (FT.)	34.0	34.0	34.0	34.0	34.0	34.0	34.0
H2O TEMP. (F)	75.0	75.0	75.0	75.0	75.0	75.0	75.0
V.P. (FT.)	1.0	1.0	1.0	1.0	1.0	1.0	1.0
NPSH (FT)	67.5	45.6	37.7	36.7	33.7	33.2	32.9

4mDATA STEPPED TO SPEED OF 3560 RPM.

STEPPED FLOW OF 1800 GPM.

STEP TDH	368.5	366.2	370.0	370.1	348.7	308.6	170.6
STEP RPM	3560.	3560.	3560.	3560.	3560.	3560.	3560.
STEP NPSH	67.1	45.3	37.5	36.4	33.5	33.0	32.7

-39% = 357.4

ORDER #-ITEM
703-00009.02

CUSTOMER
BARCOCK & WILCOX

CUST. ORDER

CUST. TAG/ITM

PUMP TYPE
4X11A

SERIAL NO.
####

IMPELLER

IMPELLER DIA
0.00

CUST. RPM
3560.

4mGUARANTEED CONDITIONS:

GUAR. GPM
1500.0

GUAR. TDH
450.0

GUAR. EFF.
75.0

GUAR. NPSHR
0.0

GUAR. MCSF
0.

4mCUSTOMER CONDITIONS:

CUST. SERVICE

CUST. TEMP.

C. VISC. (SSU)
0.0

CUST. SP. GR.
0.00

CUST. NPSHA
0.0

APPROVALS:

TEST ENGR.

PREAD

ENGR'G. DEPT.

P. Kestric 11/14/98

-39% NPSHR - 33.8

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INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #2 AT 1599 GPM

PAGE 2

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POINT # 9
DISCHG (FT) 291.2
SUCTION (FT) -11.9
DIFF. VEL. HD. 21.6
T.D.H. (FT) 324.8
RPM 3571.
BARO. (FT.) 34.0
H2O TEMP. (F) 78.0
V.P. (FT.) 1.1
NPSH (FT) 22.3

4mDATA STEPPED TO SPEED OF 3560 RPM.

STEPPED FLOW OF 1594 GPM.

STEP TDH 322.8
STEP RPM 3560.
STEP NPSH 22.2

=====

ORDER # - ITEM	CUSTOMER	CUST. ORDER	CUST. TAG/ITM
703-00009.02	BABCOCK & WILCOX		

=====

PUMP TYPE	SERIAL NO.	IMPELLER	IMPELLER DIA	CUST. RPM
4X11A	####		0.00	3560.

=====

4mGUARANTEED CONDITIONS:

GUAR. GPM	GUAR. TDH	GUAR. EFF.	GUAR. NPSHR	GUAR. MCSF
1500.0	450.0	75.0	0.0	0.

=====

4mCUSTOMER CONDITIONS:

CUST. SERVICE	CUST. TEMP.	C. VISC. (SSU)	CUST. SP. GR.	CUST. NPSHA
		0.0	0.00	0.0

=====

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INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #2 AT 1599 GPM

PAGE 1

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POINT #	1	2	3	4	5	6	7	8
DISCHG (FT)	427.6	411.1	409.4	397.8	397.3	393.6	386.5	372.1
SUCTION (FT)	16.4	-0.4	-3.3	-5.0	-5.6	-8.1	-9.8	-11.3
DIFF. VEL. HD.	23.6	23.4	23.3	24.1	24.2	23.9	23.4	22.1
T.D.H. (FT)	434.8	435.1	436.2	427.0	427.2	425.8	419.9	405.6
RPM	3571.	3571.	3571.	3571.	3571.	3571.	3571.	3571.
BARO. (FT.)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
H2O TEMP. (F)	78.0	78.0	78.0	78.0	78.0	78.0	78.0	78.0
V.P. (FT.)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
NPSH (FT)	50.9	33.9	31.0	29.4	28.8	26.3	24.5	23.0

4mDATA STEPPED TO SPEED OF 3560 RPM.

STEPPED FLOW OF 1594 GPM.

STEP TDH	432.2	432.5	433.5	424.4	424.6	423.2	417.3	403.1
STEP RPM	3560.	3560.	3560.	3560.	3560.	3560.	3560.	3560.
STEP NPSH	50.6	33.7	30.8	29.2	28.6	26.1	24.4	22.8
	-3% = 419.2				x	x	x	x

ORDER #-ITEM
703-00009.02CUSTOMER
BARCOCK & WILCOX

CUST. ORDER , CUST. TAG/ITM

PUMP TYPE
4X11ASERIAL NO.
####

IMPELLER

IMPELLER DIA
0.00CUST. RPM
3560.

4mGUARANTEED CONDITIONS:

GUAR. GPM
1500.0GUAR. TDH
450.0GUAR. EFF.
75.0GUAR. NPSHR
0.0GUAR. MCSF
0.

4mCUSTOMER CONDITIONS:

CUST. SERVICE

CUST. TEMP.

C. VISC. (SSU)
0.0CUST. SP. GR.
0.00CUST. NPSHA
0.0

APPROVALS:

TEST ENGR. *PR*ENGR'G. DEPT. *D. Koptre*

11/14/98

-3% NPSHR = 25'

(C. VISC.)

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INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #3 AT 1417 GPM PAGE 1

DATE 11 /13 /98 9 :43

POINT #	1	2	3	4	5	6	7
DISCHG (FT)	477.1	465.3	448.0	443.5	439.7	427.0	297.9
SUCTION (FT)	13.6	-0.2	-9.9	-12.0	-13.1	-14.1	-15.1
DIFF. VEL. HD.	18.5	18.0	18.7	18.8	18.5	17.8	16.5
T.D.H. (FT)	482.0	483.6	476.7	474.4	471.4	459.0	329.7
RPM	3571.	3571.	3571.	3571.	3571.	3571.	3571.
BARO. (FT.)	34.0	34.0	34.0	34.0	34.0	34.0	34.0
H2O TEMP. (F)	78.0	78.0	78.0	78.0	78.0	78.0	78.0
V.P. (FT.)	1.1	1.1	1.1	1.1	1.1	1.1	1.1
NPSH (FT)	47.8	33.8	24.2	22.1	20.9	19.9	18.8

4mDATA STEPPED TO SPEED OF 3560 RPM. STEPPED FLOW OF 1413 GPM.

STEP TDH	479.0	480.6	473.8	471.5	468.5	456.2	327.6
STEP RPM	3560.	3560.	3560.	3560.	3560.	3560.	3560.
STEP NPSH	47.5	33.6	24.0	21.9	20.8	19.8	18.7

-3% = 464.6

=====

ORDER # - ITEM	CUSTOMER	CUST. ORDER	CUST. TAG/ITM
703-00009.02	BABCOCK & WILCOX		

=====

PUMP TYPE	SERIAL NO.	IMPELLER	IMPELLER DIA	CUST. RPM
4X11A	####		0.00	3560.

=====

4mGUARANTEED CONDITIONS:

GUAR. GPM	GUAR. TDH	GUAR. EFF.	GUAR. NPSHR	GUAR. MCSF
1500.0	450.0	75.0	0.0	0.

=====

4mCUSTOMER CONDITIONS:

CUST. SERVICE	CUST. TEMP.	C. VISC. (SSU)	CUST. SP. GR.	CUST. NPSHA
		0.0	0.00	0.0

=====

APPROVALS:

TEST ENGR. *PR*

ENGR'G. DEPT. *P. Kestner* 11/14/98

-3% NPSHR 20.5

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INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #4 AT 1206 GPM PAGE 1

DATE 11 /13 /98 9 :43

POINT #	1	2	3	4	5	6	7	8
DISCHG (FT)	521.6	501.6	493.6	487.2	483.3	478.5	466.7	341.2
SUCTION (FT)	10.6	-5.2	-12.9	-15.7	-16.3	-17.1	-17.7	-18.3
DIFF. VEL. HD.	13.4	13.8	13.6	13.5	13.3	13.2	12.8	12.0
T.D.H. (FT)	524.4	520.6	520.2	516.4	513.0	508.9	497.3	371.5
RPM	3571.	3571.	3571.	3571.	3571.	3571.	3571.	3571.
BARO. (FT.)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
H2O TEMP. (F)	78.0	78.0	78.0	78.0	78.0	78.0	78.0	78.0
V.P. (FT.)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
NPSH (FT)	44.4	28.5	20.8	18.0	17.3	16.5	15.9	15.3

4mDATA STEPPED TO SPEED OF 3560 RPM.

STEPPED FLOW OF 1202 GPM.

STEP TDH	521.2	517.4	517.0	513.2	509.8	505.8	494.3	369.2
STEP RPM	3560.	3560.	3560.	3560.	3560.	3560.	3560.	3560.
STEP NPSH	44.1	28.4	20.7	17.9	17.2	16.4	15.9	15.2

-3% = 505.6

ORDER #-ITEM	CUSTOMER	CUST. ORDER	CUST. TAG/ITH
703-00009.02	BABCOCK & WILCOX		

PUMP TYPE	SERIAL NO.	IMPELLER	IMPELLER DIA	CUST. RPM
4X11A	####		0.00	3560.

4mGUARANTEED CONDITIONS:

GUAR. GPM	GUAR. TDH	GUAR. EFF.	GUAR. NPSHR	GUAR. MCSF
1500.0	450.0	75.0	0.0	0.

4mCUSTOMER CONDITIONS:

CUST. SERVICE	CUST. TEMP.	C. VISC. (SSU)	CUST. SP. GR.	CUST. NPSHA
		0.0	0.00	0.0

APPROVALS:

TEST ENGR. *PR*

ENGR'G. DEPT. *M. K. [Signature]* 11/14/98

-3% NPSHR 16.6

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INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #5 AT 1000 GPM PAGE 2

DATE 11 /13 /98 9 :43

POINT # 9
DISCHG (FT) 459.3
SUCTION (FT) -20.3
DIFF.VEL.HD. 9.3
T.D.H. (FT) 489.0
RPM 3571.
BARO. (FT.) 34.0
H2O TEMP. (F) 78.0
V.P. (FT.) 1.1
NPSH (FT) 13.0

4mDATA STEPPED TO SPEED OF 3560 RPM.

STEPPED FLOW OF 1005 GPM.

STEP TDH 486.0
STEP RPM 3560.
STEP NPSH 13.0

=====

ORDER #-ITEM	CUSTOMER	CUST. ORDER	CUST.TAG/ITM
703-00009.02	BABCOCK & WILCOX		

PUMP TYPE	SERIAL NO.	IMPELLER	IMPELLER DIA	CUST. RPM
4X11A	####		0.00	3560.

=====

4mGUARANTEED CONDITIONS:

GUAR. GPM	GUAR. TDH	GUAR. EFF.	GUAR. NPSHR	GUAR. MCSF
1500.0	450.0	75.0	0.0	0.

=====

4mCUSTOMER CONDITIONS:

CUST.SERVICE	CUST. TEMP.	C.VISC.(SSU)	CUST. SP.GR.	CUST. NPSHA
		0.0	0.00	0.0

=====

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INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #5 AT 1000 GPM PAGE 1

DATE 11 /13 /98 9 :43

POINT #	1	2	3	4	5	6	7	8
DISCHG (FT)	563.9	539.0	531.6	528.4	528.7	528.4	515.8	504.2
SUCTION (FT)	13.2	-7.4	-14.4	-16.8	-17.9	-18.7	-19.0	-20.0
DIFF. VEL. HD.	9.4	9.8	9.6	9.6	9.4	9.1	9.7	9.2
T.D.H. (FT)	560.0	556.3	555.7	554.8	556.0	556.4	544.6	533.6
RPM	3571.	3571.	3571.	3571.	3571.	3571.	3571.	3571.
BARO. (FT.)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
H2O TEMP. (F)	78.0	78.0	78.0	78.0	78.0	78.0	78.0	78.0
V.P. (FT.)	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
NPSH (FT)	46.7	26.0	19.0	16.6	15.5	14.7	14.4	13.3

4mDATA STEPPED TO SPEED OF 3560 RPM.

STEPPED FLOW OF 1005 GPM.

STEP TDH	556.5	552.8	552.3	551.4	552.6	552.9	541.2	530.3
STEP RPM	3560.	3560.	3560.	3560.	3560.	3560.	3560.	3560.
STEP NPSH	46.4	25.9	18.9	16.5	15.4	14.6	14.3	13.3

-3% = 539.9

ORDER # - ITEM CUSTOMER
703-00009.02 BABCOCK & WILCOX

CUST. ORDER CUST. TAG/ITM

PUMP TYPE SERIAL NO. IMPELLER IMPELLER DIA CUST. RPM
4X11A ##### 0.00 3560.

4mGUARANTEED CONDITIONS:

GUAR. GPM GUAR. TDH GUAR. EFF. GUAR. NPSHR GUAR. MCSF
1500.0 450.0 75.0 0.0 0.

4mCUSTOMER CONDITIONS:

CUST. SERVICE CUST. TEMP. C. VISC. (SSU) CUST. SP. GR. CUST. NPSHA
0.0 0.00 0.0

APPROVALS:
TEST ENGR. *PR*

ENGR'G. DEPT. *M. Kestire* 11/14/98

-3% NPSHR = 13.7

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INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #1 AT 790 GPM

PAGE 2

DATE 11 /13 /98 13 :23

POINT # 9
DISCHG (FT) 427.1
SUCTION (FT) -22.2
DIFF.VEL.HD. 5.8
T.D.H. (FT) 455.1
RPM 3571.
BARO. (FT.) 34.0
H2O TEMP. (F) 81.0
V.P. (FT.) 1.2
NPSH (FT) 10.8

4mDATA STEPPED TO SPEED OF 3560 RPM.

STEPPED FLOW OF 788 GPM.

STEP TDH 452.3
STEP RPM 3560.
STEP NPSH 10.8

=====

ORDER #-ITEM	CUSTOMER	CUST. ORDER	CUST.TAG/ITM
703-00009.02	BABCOCK & WILCOX		

=====

PUMP TYPE	SERIAL NO.	IMPELLER	IMPELLER DIA	CUST. RPM
4X11A	####		0.00	3560.

=====

4mGUARANTEED CONDITIONS:

GUAR. GPM	GUAR. TDH	GUAR. EFF.	GUAR. NPSHR	GUAR. MCSF
1500.0	450.0	75.0	0.0	0.

=====

4mCUSTOMER CONDITIONS:

CUST.SERVICE	CUST. TEMP.	C.VISC.(SSU)	CUST. SP.GR.	CUST. NPSHA
		0.0	0.00	0.0

=====

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INGERSOLL-RAND COMPANY - ENGINEERED PUMP DIVISION

STEPPED NPSH TEST RECORD - BREAK #1 AT 790 GPM

PAGE 1

DATE 11 /13 /98 13 :23

POINT #	1	2	3	4	5	6	7	8
DISCHG (FT)	594.2	571.4	564.2	560.7	557.9	557.6	554.3	547.2
SUCTION (FT)	10.2	-8.9	-15.5	-17.9	-19.4	-20.2	-21.2	-21.8
DIFF. VEL. HD.	5.8	6.2	6.1	6.0	6.0	5.8	5.7	5.6
T.D.H. (FT)	589.8	586.6	585.8	584.7	583.4	583.6	581.3	574.7
RPM	3571.	3571.	3571.	3571.	3571.	3571.	3571.	3571.
BARO. (FT.)	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
H2O TEMP. (F)	81.0	81.0	81.0	81.0	81.0	81.0	81.0	81.0
V.P. (FT.)	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
NPSH (FT)	43.3	24.2	17.6	15.1	13.7	12.8	11.8	11.2

4mDATA STEPPED TO SPEED OF 3560 RPM.

STEPPED FLOW OF 788 GPM.

STEP TDH	586.1	583.0	582.2	581.1	579.8	580.1	577.7	571.2
STEP RPM	3560.	3560.	3560.	3560.	3560.	3560.	3560.	3560.
STEP NPSH	43.1	24.0	17.5	15.0	13.6	12.8	11.8	11.1

-3% = 569.5

ORDER # - ITEM CUSTOMER CUST. ORDER CUST. TAG/ITM
703-00009.02 BARCOCK & WILCOX

PUMP TYPE SERIAL NO. IMPELLER IMPELLER DIA CUST. RPM
4X11A ##### 0.00 3560.

4mGUARANTEED CONDITIONS:

GUAR. GPM GUAR. TDH GUAR. EFF. GUAR. NPSHR GUAR. MCSF
1500.0 450.0 75.0 0.0 0.

4mCUSTOMER CONDITIONS:

CUST. SERVICE CUST. TEMP. C. VISC. (SSU) CUST. SP. GR. CUST. NPSHA
 0.0 0.00 0.0

APPROVALS:

TEST ENGR. *BR*

ENGR'G. DEPT. *Paul J. Vojtisek* 11/14/98

39% NPSHR = 11 ft.

[illegible]

CUSTOMER **Duke Energy**
 PROPOSAL NO. **703-00009ITEM02**
 SPECIAL NOTES

DESIGN CONDITIONS
 GPM **1500** EFF
 T.H. (FT.) **450** BHP
 RPM **3560** DRIVER HP

IR Ingersoll-Rand

DRAWN BY **AE**

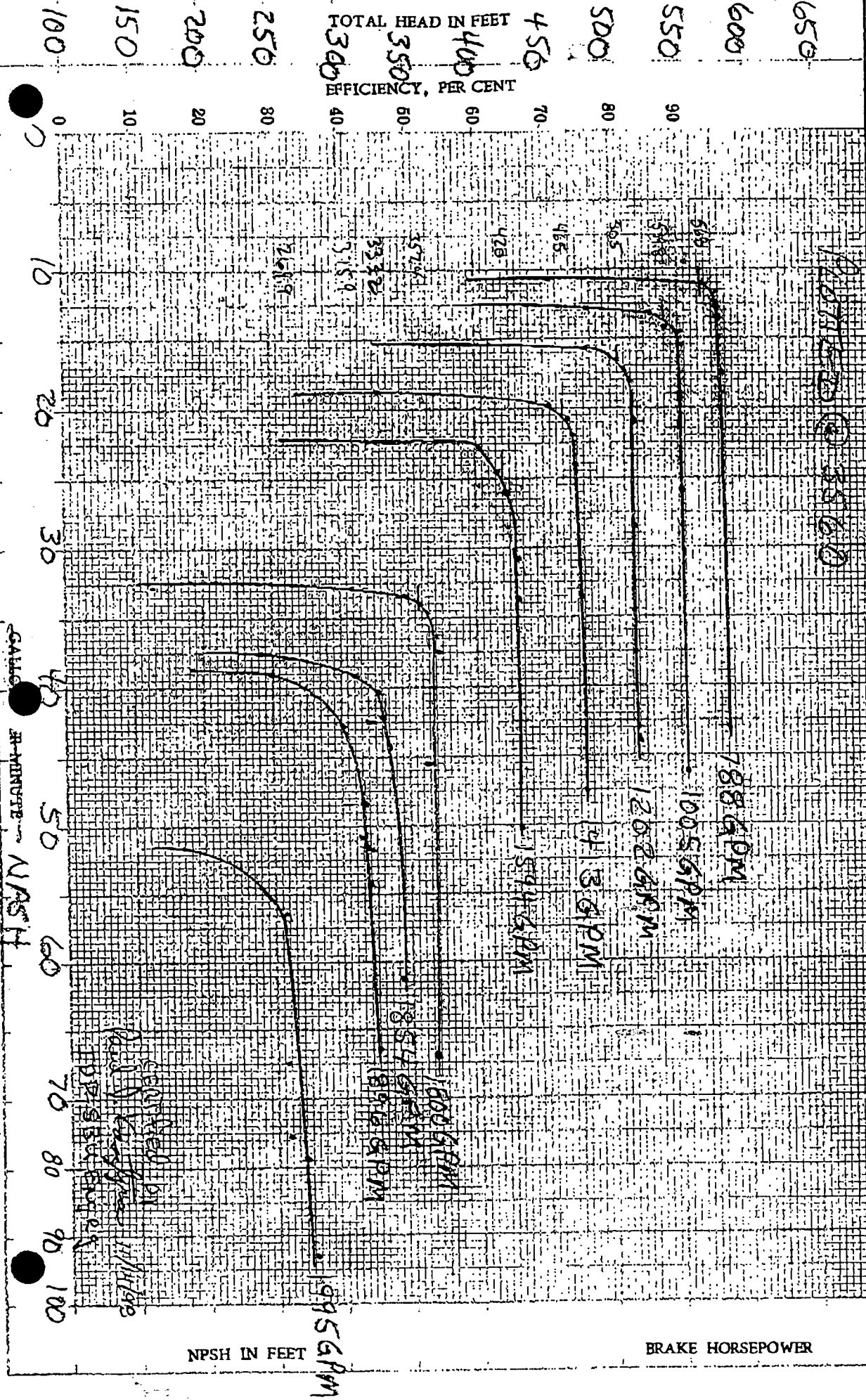
DATE **11/13/98**

CURVE **N-1468**

PUMP **4X11A3A**

Curves are approximate. Pump is guaranteed for one set of conditions. Capacity, head and efficiency guarantees are based on pump test and when handling clean, cold, fresh water at a temperature of not over 85 degrees and not over 15' suction lift.

TOTAL HEAD IN FEET
 EFFICIENCY, PER CENT



NPSH IN FEET

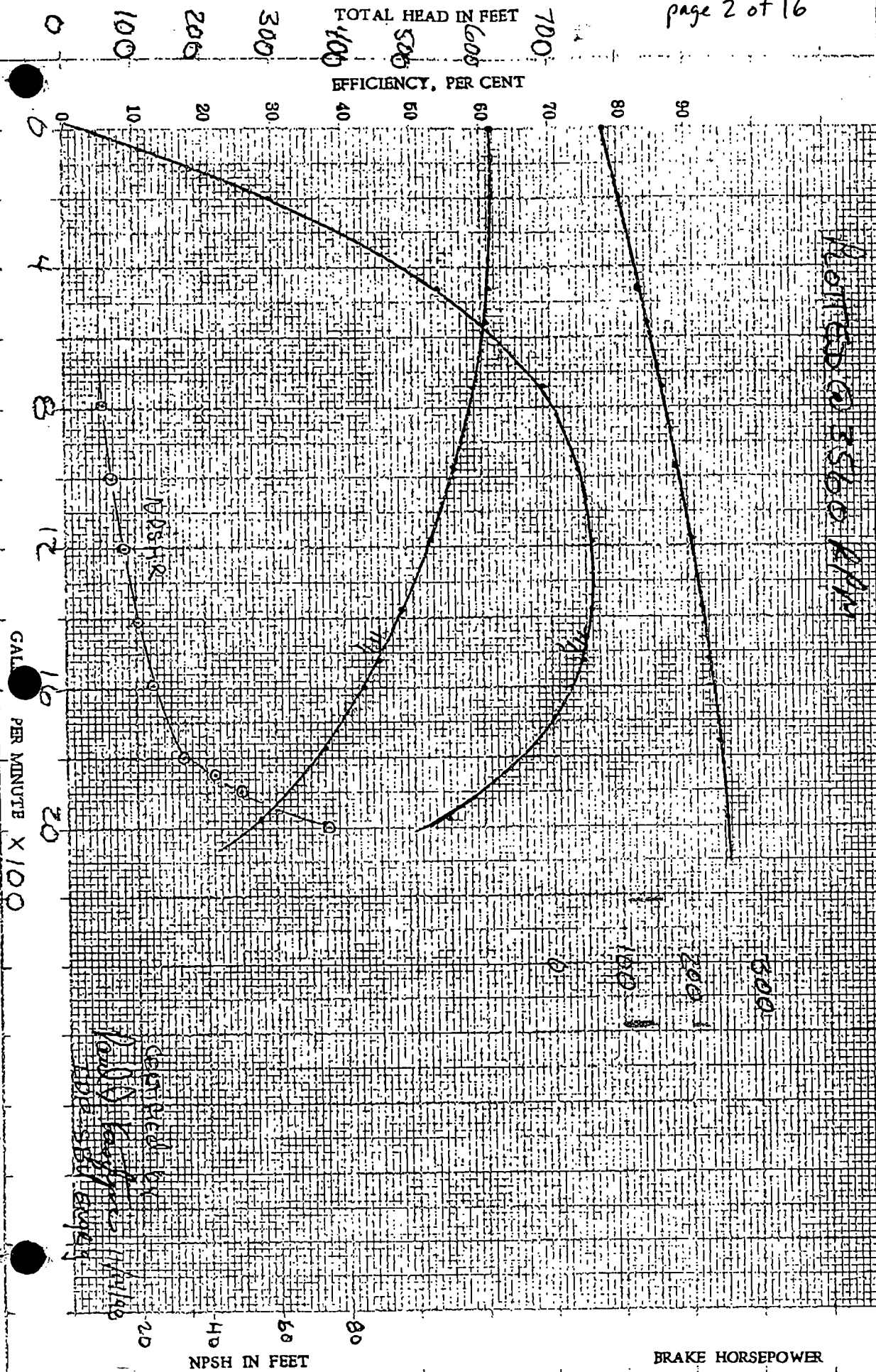
BRAKE HORSEPOWER

CUSTOMER **BABCOCK & WILCOX**
PROPOSAL NO. **703-00009** ITEM **02**
SPECIAL NOTES

DESIGN CONDITIONS
GPM **1500** EFF **75** SC.
T.H. (FT.) **450** BHP
RPM **3560** DRIVER HP

IR Ingersoll-Rand
DRAWN BY **PK**
DATE **11/13/98**

CURVE **N-1467**
PUMP **4x11A3A**
Curves are approximate. Pump is guaranteed for one year of conditions. Capacity, head and efficiency guaranteed only when tested with clean, cold, fresh water at a temperature of not over 88 degrees and not over 15' suction lift.



INGERSOLL-DRESSER PUMP COMPANY
ENGINEERING DEPARTMENT
942 MEMORIAL PARKWAY
PHILLIPSBURG, NJ 08865

DATE: 11/14/92 OSC-7248
Atch. 2

NO. OF PAGES: 4 page 1 of
(including cover page)

TO: Tracy Saville

COMPANY: Duke

FAX: 964-885-3411

PHONE: _____

FROM: Kaszejna

FAX: 7322 908-959
PHONE: 7437

Tracy,

Attd following

- A) performance curve and NPSH N-1467
- B) NPSH Test breaks N-1468
- C) Data from breakdown test
(1 hr plus) times shown

Call if you need anything else

Calculation OSC-7248

Attachment 27

Data from November 1998 Pump Testing at Ingersoll-Dresser Factory in Phillipsburg, NJ

THE NET SYSTEM DEMAND = 1500.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	11420.00
25	.00
53	-3300.00
78	-3300.00
108	.00
124	-65.58
140	-131.78
141	-197.68
142	-250.07
143	-250.23
144	-250.22
145	-237.48
146	-171.46
147	-105.50
158	-66.05
174	-142.51
175	-194.43
176	-258.90
177	-259.08
178	-259.10
179	-233.45
180	-155.65
181	-90.81

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 11420.00
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -9920.00

76	.00	1090.81	762.00	141.63
77	.00	761.86	763.50	-.70
78	.00	1090.81	763.50	140.98
79	.00	777.12	794.25	-7.38
80	1500.00	771.76	779.00	-3.12
81	.00	768.41	779.00	-4.56
82	.00	798.33	796.17	.93
83	.00	762.38	774.50	-5.22
84	.00	762.38	767.00	-1.99
85	.00	763.59	767.00	-1.47
86	.00	798.33	804.50	-2.66
101	.00	761.73	760.10	.70
109	.00	760.53		
110	.00	760.53	760.10	.18
113	.00	762.97		
114	.00	761.74		
115	.00	1189.16	761.25	184.31
116	.00	1184.76	762.00	182.10
117	.00	1169.13	765.25	173.96
118	.00	1168.15	765.25	173.54
119	.00	1166.16	765.25	172.69
120	.00	1151.53	816.50	144.31
121	1660.00	1141.34	812.00	141.86
122	-1660.00	1047.58	812.00	101.47
123	.00	1035.51	812.00	96.27
124	.00	820.03	810.58	4.07
125	.00	1027.60	944.00	36.01
126	.00	1027.46	944.00	35.95
127	.00	1027.36	944.00	35.91
128	.00	1027.20	944.00	35.84
129	.00	1027.02	944.00	35.76
130	.00	1027.03	944.00	35.76
131	.00	1026.82	944.00	35.67
132	.00	1026.92	944.00	35.72
133	.00	1027.46	944.00	35.95
134	.00	1027.35	944.00	35.90
135	.00	1027.25	944.00	35.86
136	.00	1027.14	944.00	35.81
137	.00	1027.16	944.00	35.82
138	.00	1027.21	944.00	35.84
139	.00	1026.91	944.00	35.71
140	.00	1184.53	761.25	182.32
141	.00	1180.14	762.00	180.10
142	.00	1164.51	764.09	172.47
143	.00	1164.31	765.47	171.79
144	.00	1151.55	817.50	143.89
145	.00	1141.61	817.50	139.61
146	1660.00	1140.00	812.00	141.28
147	-1660.00	1044.90	812.00	100.32
148	.00	1033.14	812.00	95.25
149	.00	1024.86	944.00	34.83
150	.00	1024.71	944.00	34.76
151	.00	1024.60	944.00	34.72
152	.00	1024.44	944.00	34.65
153	.00	1024.24	944.00	34.56
154	.00	1024.32	944.00	34.60
155	.00	1024.11	944.00	34.51
156	.00	1024.22	944.00	34.55
157	.00	1024.73	944.00	34.77
158	.00	1024.64	944.00	34.73
159	.00	1024.55	944.00	34.70
160	.00	1024.46	944.00	34.66
161	.00	1024.43	944.00	34.65
162	.00	1024.41	944.00	34.64
163	.00	1024.24	944.00	34.56
200	.00	820.17	810.58	4.13

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	762.24	812.00	-21.43
8	.00	762.24	791.75	-12.71
9	.00	762.24	798.42	-15.58
10	.00	762.24	767.00	-2.05
11	.00	762.24	767.00	-2.05
12	.00	762.24	767.00	-2.05
13	.00	762.49	767.00	-1.94
14	.00	762.38	767.00	-1.99
15	.00	762.31	767.00	-2.02
16	.00	763.59	767.00	-1.47
17	.00	842.60	822.67	8.58
18	.00	763.59	767.00	-1.47
19	.00	763.59	767.00	-1.47
20	.00	762.38	784.67	-9.60
21	.00	762.00	767.00	-2.15
22	.00	761.86	767.00	-2.21
23	.00	760.88	761.08	-.09
24	.00	1113.33	763.00	150.90
25	.00	1110.96	765.25	148.91
26	.00	1109.36	765.25	148.22
27	.00	1102.13	779.00	139.18
28	.00	840.17	823.33	7.25
29	.00	1101.15	779.00	138.76
30	.00	1097.73	771.50	140.52
31	.00	1092.09	777.33	135.58
32	3300.00	1091.27	779.00	134.50
33	-3300.00	854.11	779.00	32.35
34	.00	840.17	823.33	7.25
35	.00	853.64	779.00	32.15
36	.00	840.17	824.75	6.64
37	.00	837.73	816.00	9.36
38	.00	835.19	816.00	8.27
39	.00	831.35	816.00	6.61
40	.00	840.17	820.00	8.69
41	.00	813.85	792.38	9.25
42	.00	763.01	767.00	-1.72
43	.00	762.02	767.00	-2.14
44	.00	760.86	761.08	-.09
45	.00	1113.28	763.00	150.88
46	.00	1112.69	765.00	149.76
47	.00	1109.53	765.25	148.29
48	.00	1103.80	775.50	141.41
49	.00	1101.31	777.75	139.37
50	.00	1099.82	774.25	140.23
51	.00	1097.70	771.50	140.50
52	.00	1092.05	777.73	135.39
53	.00	1090.81	779.25	134.20
54	3300.00	1089.81	779.25	133.77
55	-3300.00	865.31	779.25	37.07
56	.00	864.10	779.25	36.55
57	.00	860.57	779.25	35.03
58	.00	842.60	823.17	8.37
59	.00	839.98	816.50	10.12
60	.00	840.17	817.00	9.98
61	.00	837.65	816.50	9.11
62	.00	833.81	816.50	7.46
63	.00	814.92	790.83	10.38
64	.00	1109.53	767.00	147.54
65	.00	1109.53	767.00	147.54
66	.00	1109.53	761.08	150.09
67	.00	1536.40	763.00	333.13
68	.00	1109.53	765.25	148.29
69	.00	1109.53	765.25	148.29
70	.00	859.85	787.25	31.27
71	.00	1109.53	765.25	148.29
72	.00	1109.53	763.25	149.15
73	.00	860.57	763.25	41.92
74	.00	1090.81	762.00	141.63
75	.00	1090.81	762.00	141.63

144	139	0	250.22	.00	.00	82.91	5.63	24.97
145	138	0	237.48	.00	.00	83.21	5.35	22.59
146	137	0	171.46	.00	.00	83.16	3.86	12.13
147	136	0	105.50	.00	.00	83.14	2.37	4.86
148	110	140	1660.00	.00	424.01	.00	10.27	36.38
149	140	141	1660.00	.38	.00	4.02	41.83	1348.75
150	141	142	1660.00	.21	.00	15.42	18.43	162.58
151	142	143	1660.00	.00	.00	.20	10.27	36.38
152	143	144	1660.00	7.34	.00	5.41	10.27	36.38
153	144	145	1660.00	.90	.00	9.04	10.27	36.38
154	145	146	1660.00	.14	.00	1.47	10.27	36.38
LINE	155	IS	CLOSED					
156	147	148	1660.00	.47	.00	11.30	10.27	36.38
157	148	200	66.05	2.49	.00	210.48	24.52	2490.87
158	200	0	66.05	.25	.00	9.33	24.52	2490.87
159	148	149	1593.95	4.65	.00	3.62	9.39	29.63
160	149	150	854.92	.04	.00	.11	5.03	8.91
161	150	151	595.85	.06	.00	.05	3.51	4.48
162	151	152	336.94	.09	.00	.07	3.41	5.87
163	152	153	142.51	.15	.00	.05	3.21	8.55
164	152	154	194.43	.04	.00	.08	4.38	15.41
165	151	155	258.90	.04	.00	.45	5.83	26.66
166	150	156	259.08	.04	.00	.45	5.83	26.69
167	149	157	739.02	.05	.00	.08	4.35	6.74
168	157	158	479.92	.04	.00	.05	2.83	2.97
169	158	159	246.47	.06	.00	.02	2.49	3.26
170	159	160	90.81	.07	.00	.02	2.04	3.67
171	159	161	155.65	.07	.00	.05	3.50	10.10
172	158	162	233.45	.11	.00	.11	5.25	21.86
173	157	163	259.10	.04	.00	.45	5.83	26.70
174	153	0	142.51	.00	.00	80.24	3.21	8.55
175	154	0	194.43	.00	.00	80.32	4.38	15.41
176	155	0	258.90	.00	.00	80.11	5.83	26.66
177	156	0	259.08	.00	.00	80.22	5.83	26.69
178	163	0	259.10	.00	.00	80.23	5.83	26.70
179	162	0	233.45	.00	.00	80.41	5.25	21.86
180	161	0	155.65	.00	.00	80.43	3.50	10.10
181	160	0	90.81	.00	.00	80.46	2.04	3.67

LINE	69	IS	CLOSED					
70	55	56	3300.00	.42	.00	.79	12.83	42.43
71	56	57	3300.00	.76	.00	2.76	12.83	42.43
72	57	70	3300.00	.34	.00	.38	12.83	42.43
73	70	58	3300.00	3.10	.00	14.16	12.83	42.43
74	58	59	3300.00	1.10	.00	1.51	12.83	42.43
75	59	61	3300.00	.80	.00	1.54	18.66	110.69
76	61	62	3300.00	.06	.00	3.78	18.66	110.69
77	62	63	3300.00	8.54	.00	10.35	17.61	95.39
78	63	0	3300.00	1.18	.00	4.24	10.19	23.60
LINE	79	IS	CLOSED					
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE								
82	66	67	.00	.00	425.00	.00	.00	.00
LINE	83	IS	CLOSED					
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE	88	IS	CLOSED					
89	71	72	.00	.00	.00	.00	.00	.00
LINE	90	IS	CLOSED					
91	73	57	.00	.00	.00	.00	.00	.00
LINE	92	IS	CLOSED					
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE	96	IS	CLOSED					
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE	99	IS	CLOSED					
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE	105	IS	CLOSED					
LINE	106	IS	CLOSED					
LINE	107	IS	CLOSED					
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1660.00	.01	.00	.03	3.72	2.80
110	113	114	1660.00	.25	.00	.99	6.45	11.18
111	114	101	1660.00	.00	.00	.00	10.27	36.38
112	15	109	1660.00	.11	.00	1.67	6.45	11.18
113	109	110	1660.00	.00	.00	.00	10.27	36.38
114	101	115	1660.00	.00	427.43	.00	10.27	36.38
115	115	116	1660.00	.38	.00	4.02	41.83	1348.75
116	116	117	1660.00	.21	.00	15.42	18.43	162.58
117	117	118	1660.00	.14	.00	.84	10.27	36.38
118	118	119	1660.00	1.21	.00	.78	10.27	36.38
119	119	120	1660.00	3.76	.00	10.88	10.27	36.38
120	120	121	1660.00	6.43	.00	3.76	10.27	36.38
LINE	121	IS	CLOSED					
122	122	123	1660.00	.52	.00	11.55	10.27	36.38
123	123	124	65.58	2.46	.00	213.03	24.34	2456.21
124	124	0	65.58	.25	.00	9.20	24.34	2456.21
125	123	125	1594.42	5.08	.00	2.84	9.39	29.65
126	125	126	829.76	.03	.00	.10	4.89	8.41
127	126	127	579.53	.05	.00	.05	3.41	4.25
128	127	128	329.46	.09	.00	.07	3.33	5.63
129	128	129	131.78	.15	.00	.04	2.97	7.38
130	128	130	197.68	.10	.00	.08	4.45	15.91
131	127	131	250.07	.12	.00	.42	5.63	24.94
132	126	132	250.23	.12	.00	.42	5.63	24.97
133	125	133	764.66	.06	.00	.09	4.50	7.20
134	133	134	514.43	.04	.00	.06	3.03	3.39
135	134	135	276.96	.07	.00	.03	2.80	4.05
136	135	136	105.50	.09	.00	.02	2.37	4.86
137	135	137	171.46	.04	.00	.06	3.86	12.13
138	134	138	237.48	.03	.00	.11	5.35	22.59
139	133	139	250.22	.12	.00	.42	5.63	24.97
140	129	0	131.78	.00	.00	83.01	2.97	7.38
141	130	0	197.68	.00	.00	83.03	4.45	15.91
142	131	0	250.07	.00	.00	82.81	5.63	24.94
143	132	0	250.23	.00	.00	82.92	5.63	24.97

Tbwst6r0 / LPI 3300 gpm / RBS 1660 gpm / HPI 1500 / LP-19 & 20 CLOSE

THE RESULTS ARE OBTAINED AFTER 6 TRIALS WITH AN ACCURACY = .00000

NO RCS & RB pressure, LPI 3300, RBS 1660, HPI 1500, LP-19 & LP-20 close

BWST 6' or 799.25' + 6 -20.2/12 = 803.56'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-3300.00	-.03	.00	-.22	-7.40	-10.45
14	13 14	1660.00	.00	.00	.11	3.72	2.80
15	14 15	1660.00	.01	.00	.06	3.72	2.80
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	11420.00	10.77	.00	15.66	25.60	118.37
20	79 80	11420.00	.87	.00	4.50	25.60	118.37
21	80 81	9920.00	1.35	.00	2.00	22.23	89.69
22	81 13	4960.00	.14	.00	5.78	11.12	23.06
23	81 19	4960.00	.41	.00	4.41	11.12	23.06
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
LINE 28 IS CLOSED							
29	83 84	.00	.00	.00	.00	.00	.00
30	84 14	.00	.00	.00	.00	.00	.00
LINE 31 IS CLOSED							
32	85 18	.00	.00	.00	.00	.00	.00
33	12 21	3300.00	.03	.00	.22	7.40	10.45
34	21 22	3355.89	.00	.00	.13	7.52	10.80
35	22 23	3355.89	.16	.00	.83	7.52	10.80
36	23 24	3355.89	.00	352.63	.18	13.71	49.75
37	24 25	3355.89	.02	.00	2.35	13.05	43.85
38	21 25	-55.89	-14.88	.00	-334.08	-20.74	-1792.93
39	25 26	3300.00	.34	.00	1.25	12.83	42.43
40	26 27	3300.00	.74	.00	6.49	12.83	42.43
41	27 29	3072.91	.09	.00	.89	11.95	36.92
42	27 29	227.09	.02	.00	.96	2.30	2.79
43	29 30	3300.00	.55	.00	2.87	12.41	39.01
44	30 31	3300.00	.00	.00	5.65	5.61	5.20
45	31 32	3300.00	.08	.00	.74	12.41	39.01
LINE 46 IS CLOSED							
47	33 35	3300.00	.08	.00	.38	12.83	42.43
48	35 36	3300.00	.62	.00	12.86	12.83	42.43
49	36 37	3300.00	.55	.00	1.89	12.83	42.43
50	37 38	3300.00	1.00	.00	1.54	18.66	110.69
51	38 39	3300.00	.06	.00	3.78	18.66	110.69
52	39 41	3300.00	7.44	.00	10.06	17.61	95.39
53	41 0	3300.00	.67	.00	3.68	10.19	23.60
54	19 42	4960.00	.02	.00	.56	11.12	23.06
55	42 43	3300.00	.10	.00	.89	7.40	10.45
56	43 44	3356.31	.26	.00	.90	7.52	10.80
57	44 45	3356.31	.00	352.60	.18	13.71	49.76
58	45 46	3356.31	.02	.00	.57	12.63	40.33
59	43 46	-56.31	-11.47	.00	-339.21	-20.90	-1819.96
60	46 47	3300.00	.72	.00	2.44	12.41	39.01
61	47 48	3300.00	.39	.00	5.34	12.41	39.01
62	48 49	3300.00	.39	.00	2.11	12.41	39.01
63	49 50	3014.59	.11	.00	1.38	11.34	32.70
64	49 50	285.41	.02	.00	1.47	2.88	4.29
65	50 51	3300.00	.27	.00	1.84	12.41	39.01
66	51 52	3300.00	.00	.00	5.65	5.61	5.20
67	52 53	3300.00	.10	.00	1.15	12.41	39.01
68	53 54	3300.00	.07	.00	.93	12.41	39.01

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1500.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	1660.00	812.00	120	121	
122	-1660.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	1660.00	812.00	154	155	
147	-1660.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	3300.00	779.00	45	46	
33	-3300.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	3300.00	779.25	68	69	
55	-3300.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

120	120	121	176.6	8.1	.2	2.30	
121	121	122	.1	8.1	.2	5.37	
LINE 121 IS CLOSED							
122	122	123	14.3	8.1	.2	7.05	
123	123	124	1.0	1.0	.2	23.15	
124	124	0	.1	1.0	.2	1.00	810.58
125	123	125	171.2	8.3	.2	2.07	
126	125	126	4.1	8.3	.2	.28	
127	126	127	12.8	8.3	.2	.28	
128	127	128	15.4	6.4	.2	.40	
129	128	129	20.3	4.3	.2	.28	
130	128	130	6.0	4.3	.2	.25	
131	127	131	5.0	4.3	.2	.85	
132	126	132	5.0	4.3	.2	.85	
133	125	133	7.7	8.3	.2	.28	
134	133	134	13.1	8.3	.2	.42	
135	134	135	17.5	6.4	.2	.25	
136	135	136	18.5	4.3	.2	.28	
137	135	137	3.0	4.3	.2	.25	
138	134	138	1.3	4.3	.2	.25	
139	133	139	5.0	4.3	.2	.85	
140	129	0	.1	4.3	.2	607.75	944.00
141	130	0	.1	4.3	.2	270.11	944.00
142	131	0	.1	4.3	.2	168.35	944.00
143	132	0	.1	4.3	.2	168.35	944.00
144	139	0	.1	4.3	.2	168.35	944.00
145	138	0	.1	4.3	.2	187.58	944.00
146	137	0	.1	4.3	.2	359.62	944.00
147	136	0	.1	4.3	.2	949.61	944.00
148	110	140	.1	8.1	.2	.00	
LINE 148 PUMP DATA (HEAD-FLOW):							
149	140	141	.3	4.0	.2	.15	
150	141	142	1.3	6.1	.2	2.92	
151	142	143	.1	8.1	.2	.12	
152	143	144	201.7	8.1	.2	3.30	
153	144	145	24.8	8.1	.2	5.52	
154	145	146	3.9	8.1	.2	.90	
155	146	147	.1	8.1	.2	5.37	
LINE 155 IS CLOSED							
156	147	148	12.8	8.1	.2	6.90	
157	148	200	1.0	1.0	.2	22.55	
158	200	0	.1	1.0	.2	1.00	810.58
159	148	149	157.0	8.3	.2	2.65	
160	149	150	4.8	8.3	.2	.28	
161	150	151	12.8	8.3	.2	.28	
162	151	152	15.6	6.4	.2	.40	
163	152	153	17.8	4.3	.2	.28	
164	152	154	2.5	4.3	.2	.25	
165	151	155	1.5	4.3	.2	.85	
166	150	156	1.5	4.3	.2	.85	
167	149	157	8.1	8.3	.2	.28	
168	157	158	13.1	8.3	.2	.42	
169	158	159	18.0	6.4	.2	.25	
170	159	160	20.3	4.3	.2	.28	
171	159	161	6.9	4.3	.2	.25	
172	158	162	5.1	4.3	.2	.25	
173	157	163	1.5	4.3	.2	.85	
174	153	0	.1	4.3	.2	502.27	944.00
175	154	0	.1	4.3	.2	270.11	944.00
176	155	0	.1	4.3	.2	151.94	944.00
177	156	0	.1	4.3	.2	151.94	944.00
178	163	0	.1	4.3	.2	151.94	944.00
179	162	0	.1	4.3	.2	187.58	944.00
180	161	0	.1	4.3	.2	422.05	944.00
181	160	0	.1	4.3	.2	1240.31	944.00

58	45	46	.5	10.4	.2	.23			
59	43	46	6.3	1.0	.2	50.00			
60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
LINE 69 IS CLOSED									
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW):					425.0	.0	410.0	2250.0	298.0 4000.0
83	67	68	1.0	10.3	.2	.89			
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW):					622.0	.0	470.0	1500.0	385.0 1800.0
115	115	116	.3	4.0	.2	.15			
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			

THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE			
1	0 1	27.5	10.5	.2	2.19	809.50			
2	1 2	12.3	10.5	.2	.81				
3	2 3	1.0	12.4	.2	.30				
4	3 4	4.5	12.4	.2	.42				
5	4 5	9.4	12.4	.2	.15				
6	5 6	13.6	12.3	.2	.75				
7	6 7	.1	10.3	.2	.30				
LINE 7 IS CLOSED									
8	7 8	120.3	12.4	.2	2.56				
9	8 9	26.3	12.4	.2	1.18				
10	9 10	40.4	12.4	.2	1.03				
11	10 11	.1	10.4	.2	.31				
12	11 12	5.0	12.4	.2	.78				
13	12 13	2.6	13.5	.2	.26				
14	13 14	1.0	13.5	.2	.49				
15	14 15	3.5	13.5	.2	.29				
16	15 16	1.2	13.5	.2	.41				
LINE 16 IS CLOSED									
17	16 18	1.5	13.5	.2	.41				
18	18 19	4.5	13.5	.2	.29				
19	0 79	91.0	13.5	.2	1.54	803.56			
20	79 80	7.3	13.5	.2	.44				
21	80 81	15.1	13.5	.2	.26				
22	81 13	6.2	13.5	.2	3.01				
23	81 19	17.7	13.5	.2	2.30				
24	1 86	5.2	2.6	.2	1.58				
LINE 24 IS CLOSED									
25	86 0	10.2	3.3	.2	1.78	798.33			
26	3 20	9.0	8.3	.2	1.96				
LINE 26 IS CLOSED									
27	20 83	57.0	12.4	.2	1.79				
28	0 83	.1	17.5	.2	1.19	781.15			
LINE 28 IS CLOSED									
29	83 84	27.0	17.5	.2	.89				
30	84 14	7.0	13.5	.2	.99				
31	0 85	53.5	17.5	.2	.90	781.15			
LINE 31 IS CLOSED									
32	85 18	7.0	13.5	.2	.99				
33	12 21	2.5	13.5	.2	.26				
34	21 22	.1	13.5	.2	.15				
35	22 23	14.8	13.5	.2	.94				
36	23 24	.1	10.0	.2	.06				
LINE 36 PUMP DATA (HEAD-FLOW):				430.0	.0	375.0	3000.0	285.0	4125.0
37	24 25	.5	10.3	.2	.89				
38	21 25	8.3	1.0	.2	50.00				
39	25 26	8.0	10.3	.2	.49				
THERE IS A CHECK VALVE IN LINE NUMBER 39									
40	26 27	17.5	10.3	.2	2.54				
41	27 29	2.5	10.3	.2	.40				
42	27 29	6.0	6.4	.2	11.76				
43	29 30	14.0	10.4	.2	1.20				
44	30 31	.1	15.5	.2	11.55				
45	31 32	2.0	10.4	.2	.31				
46	32 33	.1	8.1	.2	9.19				
LINE 46 IS CLOSED									
47	33 35	2.0	10.3	.2	.15				
48	35 36	14.5	10.3	.2	5.03				
49	36 37	13.0	10.3	.2	.74				
50	37 38	9.0	8.5	.2	.28				
51	38 39	.5	8.5	.2	.70				
52	39 41	78.0	8.8	.2	2.09				
53	41 0	28.6	11.5	.2	2.28	809.50			
54	19 42	1.0	13.5	.2	.29				
55	42 43	9.3	13.5	.2	1.05				
56	43 44	24.5	13.5	.2	1.02				
57	44 45	.1	10.0	.2	.06				
LINE 57 PUMP DATA (HEAD-FLOW):				430.0	.0	375.0	3000.0	285.0	4125.0

Calculation OSC-7248

Attachment 26

Wood's Model Computer Run to Simulate Conditions at Swapover to the RB Emergency Sump

THE NET SYSTEM DEMAND = 1500.00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	11801.55
25	.00
28	.00
31	.00
53	-3300.00
78	-3300.00
108	.00
124	-68.82
140	-147.25
141	-220.90
142	-279.44
143	-279.61
144	-279.60
145	-265.36
146	-191.59
147	-117.89
158	-69.27
174	-159.31
175	-217.35
176	-289.42
177	-289.61
178	-289.64
179	-260.97
180	-174.00
181	-101.52

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 11801.55
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -10301.55

76	.00	1104.07	762.00	147.34
77	.00	775.08	763.50	4.99
78	.00	1104.07	763.50	146.69
79	.00	791.43	794.25	-1.22
80	1500.00	785.70	779.00	2.89
81	.00	782.09	779.00	1.33
82	.00	798.33	796.17	.93
83	.00	782.50	774.50	3.45
84	.00	782.50	767.00	6.68
85	.00	782.50	767.00	6.68
86	.00	798.33	804.50	-2.66
101	.00	774.68	760.10	6.28
109	.00	773.27		
110	.00	773.27	760.10	5.67
113	.00	776.22		
114	.00	774.69		
115	.00	1143.49	761.25	164.65
116	.00	1138.03	762.00	161.97
117	.00	1118.61	765.25	152.20
118	.00	1117.40	765.25	151.68
119	.00	1114.93	765.25	150.62
120	.00	1096.77	816.50	120.72
121	.00	1084.16	812.00	117.23
122	.00	1073.22	812.00	112.51
123	.00	1058.22	812.00	106.06
124	.00	820.98	810.58	4.48
125	.00	1048.38	944.00	44.96
126	.00	1048.21	944.00	44.89
127	.00	1048.08	944.00	44.83
128	.00	1047.89	944.00	44.75
129	.00	1047.66	944.00	44.65
130	.00	1047.68	944.00	44.66
131	.00	1047.41	944.00	44.54
132	.00	1047.54	944.00	44.60
133	.00	1048.21	944.00	44.89
134	.00	1048.08	944.00	44.83
135	.00	1047.95	944.00	44.78
136	.00	1047.81	944.00	44.71
137	.00	1047.83	944.00	44.72
138	.00	1047.90	944.00	44.75
139	.00	1047.53	944.00	44.59
140	.00	1136.23	761.25	161.52
141	.00	1130.76	762.00	158.84
142	.00	1111.33	764.09	149.57
143	.00	1111.08	765.47	148.87
144	.00	1095.28	817.50	119.65
145	.00	1082.92	817.50	114.33
146	.00	1080.92	812.00	115.83
147	.00	1069.98	812.00	111.12
148	.00	1055.35	812.00	104.82
149	.00	1045.05	944.00	43.52
150	.00	1044.86	944.00	43.44
151	.00	1044.72	944.00	43.38
152	.00	1044.52	944.00	43.30
153	.00	1044.27	944.00	43.19
154	.00	1044.37	944.00	43.23
155	.00	1044.11	944.00	43.12
156	.00	1044.25	944.00	43.18
157	.00	1044.88	944.00	43.45
158	.00	1044.76	944.00	43.40
159	.00	1044.66	944.00	43.36
160	.00	1044.55	944.00	43.31
161	.00	1044.51	944.00	43.29
162	.00	1044.49	944.00	43.28
163	.00	1044.27	944.00	43.19
200	.00	821.12	810.58	4.54

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	775.46	812.00	-15.74
8	.00	775.46	791.75	-7.02
9	.00	775.46	798.42	-9.89
10	.00	775.46	767.00	3.64
11	.00	775.46	767.00	3.64
12	.00	775.46	767.00	3.64
13	.00	775.71	767.00	3.75
14	.00	775.57	767.00	3.69
15	.00	775.48	767.00	3.65
16	.00	776.89	767.00	4.26
17	.00	842.60	822.67	8.58
18	.00	776.89	767.00	4.26
19	.00	776.89	767.00	4.26
20	.00	782.50	784.67	-.93
21	.00	775.21	767.00	3.54
22	.00	775.08	767.00	3.48
23	.00	774.09	761.08	5.61
24	.00	1126.55	763.00	156.59
25	.00	1124.17	765.25	154.60
26	.00	1122.58	765.25	153.91
27	.00	1115.34	779.00	144.88
28	.00	840.17	823.33	7.25
29	.00	1114.37	779.00	144.45
30	.00	1110.95	771.50	146.21
31	.00	1105.30	777.33	141.27
32	3300.00	1104.48	779.00	140.20
33	-3300.00	854.11	779.00	32.35
34	.00	840.17	823.33	7.25
35	.00	853.64	779.00	32.15
36	.00	840.17	824.75	6.64
37	.00	837.73	816.00	9.36
38	.00	835.19	816.00	8.27
39	.00	831.35	816.00	6.61
40	.00	840.17	820.00	8.69
41	.00	813.85	792.38	9.25
42	.00	776.27	767.00	3.99
43	.00	775.28	767.00	3.57
44	.00	774.12	761.08	5.62
45	.00	1126.54	763.00	156.59
46	.00	1125.95	765.00	155.47
47	.00	1122.79	765.25	154.00
48	.00	1117.06	775.50	147.12
49	.00	1114.57	777.75	145.08
50	.00	1113.07	774.25	145.94
51	.00	1110.96	771.50	146.22
52	.00	1105.31	777.73	141.10
53	.00	1104.07	779.25	139.91
54	3300.00	1103.07	779.25	139.48
55	-3300.00	865.31	779.25	37.07
56	.00	864.10	779.25	36.55
57	.00	860.57	779.25	35.03
58	.00	842.60	823.17	8.37
59	.00	839.98	816.50	10.12
60	.00	840.17	817.00	9.98
61	.00	837.65	816.50	9.11
62	.00	833.81	816.50	7.46
63	.00	814.92	790.83	10.38
64	.00	1122.79	767.00	153.25
65	.00	1122.79	767.00	153.25
66	.00	1122.79	761.08	155.80
67	.00	1549.65	763.00	338.84
68	.00	1122.79	765.25	154.00
69	.00	1122.79	765.25	154.00
70	.00	859.85	787.25	31.27
71	.00	1122.79	765.25	154.00
72	.00	1122.79	763.25	154.86
73	.00	860.57	763.25	41.92
74	.00	1104.07	762.00	147.34
75	.00	1104.07	762.00	147.34

143	132	0	279.61	.00	.00	103.53	6.29	30.90
144	139	0	279.60	.00	.00	103.53	6.29	30.90
145	138	0	265.36	.00	.00	103.90	5.97	27.95
146	137	0	191.59	.00	.00	103.83	4.31	14.99
147	136	0	117.89	.00	.00	103.81	2.65	5.98
THE PUMP IN LINE 148 IS OPERATING OUT OF RANGE								
148	110	140	1851.09	.00	362.97	.00	11.45	44.98
149	140	141	1851.09	.47	.00	5.00	46.65	1673.80
150	141	142	1851.09	.27	.00	19.17	20.56	201.40
151	142	143	1851.09	.00	.00	.24	11.45	44.98
152	143	144	1851.09	9.07	.00	6.73	11.45	44.98
153	144	145	1851.09	1.11	.00	11.24	11.45	44.98
154	145	146	1851.09	.18	.00	1.82	11.45	44.98
155	146	147	1851.09	.00	.00	10.94	11.45	44.98
156	147	148	1851.09	.58	.00	14.05	11.45	44.98
157	148	200	69.27	2.74	.00	231.49	25.71	2735.57
158	200	0	69.27	.27	.00	10.27	25.71	2735.57
159	148	149	1781.82	5.78	.00	4.52	10.49	36.80
160	149	150	955.69	.05	.00	.14	5.63	11.03
161	150	151	666.08	.07	.00	.07	3.92	5.53
162	151	152	376.66	.11	.00	.09	3.81	7.25
163	152	153	159.31	.19	.00	.06	3.59	10.56
164	152	154	217.35	.05	.00	.09	4.89	19.07
165	151	155	289.42	.05	.00	.56	6.51	33.02
166	150	156	289.61	.05	.00	.56	6.52	33.07
167	149	157	826.13	.07	.00	.10	4.86	8.34
168	157	158	536.49	.05	.00	.07	3.16	3.67
169	158	159	275.52	.07	.00	.03	2.78	4.01
170	159	160	101.52	.09	.00	.02	2.28	4.52
171	159	161	174.00	.09	.00	.06	3.92	12.48
172	158	162	260.97	.14	.00	.14	5.87	27.07
173	157	163	289.64	.05	.00	.56	6.52	33.07
174	153	0	159.31	.00	.00	100.27	3.59	10.56
175	154	0	217.35	.00	.00	100.37	4.89	19.07
176	155	0	289.42	.00	.00	100.11	6.51	33.02
177	156	0	289.61	.00	.00	100.24	6.52	33.07
178	163	0	289.64	.00	.00	100.26	6.52	33.07
179	162	0	260.97	.00	.00	100.49	5.87	27.07
180	161	0	174.00	.00	.00	100.51	3.92	12.48
181	160	0	101.52	.00	.00	100.55	2.28	4.52

LINE	69	IS	CLOSED						
70	55	56	3300.00	.42	.00	.79	12.83	42.43	
71	56	57	3300.00	.76	.00	2.76	12.83	42.43	
72	57	70	3300.00	.34	.00	.38	12.83	42.43	
73	70	58	3300.00	3.10	.00	14.16	12.83	42.43	
74	58	59	3300.00	1.10	.00	1.51	12.83	42.43	
75	59	61	3300.00	.80	.00	1.54	18.66	110.69	
76	61	62	3300.00	.06	.00	3.78	18.66	110.69	
77	62	63	3300.00	8.54	.00	10.35	17.61	95.39	
78	63	0	3300.00	1.18	.00	4.24	10.19	23.60	
LINE	79	IS	CLOSED						
80	64	65	.00	.00	.00	.00	.00	.00	
81	65	66	.00	.00	.00	.00	.00	.00	
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE									
82	66	67	.00	.00	425.00	.00	.00	.00	
LINE	83	IS	CLOSED						
84	64	68	.00	.00	.00	.00	.00	.00	
85	68	69	.00	.00	.00	.00	.00	.00	
86	69	47	.00	.00	.00	.00	.00	.00	
87	69	71	.00	.00	.00	.00	.00	.00	
LINE	88	IS	CLOSED						
89	71	72	.00	.00	.00	.00	.00	.00	
LINE	90	IS	CLOSED						
91	73	57	.00	.00	.00	.00	.00	.00	
LINE	92	IS	CLOSED						
93	53	74	.00	.00	.00	.00	.00	.00	
94	74	75	.00	.00	.00	.00	.00	.00	
95	75	76	.00	.00	.00	.00	.00	.00	
LINE	96	IS	CLOSED						
97	77	22	.00	.00	.00	.00	.00	.00	
98	76	78	.00	.00	.00	.00	.00	.00	
LINE	99	IS	CLOSED						
100	36	28	.00	.00	.00	.00	.00	.00	
101	28	34	.00	.00	.00	.00	.00	.00	
102	34	40	.00	.00	.00	.00	.00	.00	
103	40	60	.00	.00	.00	.00	.00	.00	
104	58	17	.00	.00	.00	.00	.00	.00	
LINE	105	IS	CLOSED						
LINE	106	IS	CLOSED						
LINE	107	IS	CLOSED						
108	82	0	.00	.00	.00	.00	.00	.00	
109	42	113	1850.46	.01	.00	.03	4.15	3.44	
110	113	114	1850.46	.31	.00	1.23	7.19	13.79	
111	114	101	1850.46	.00	.00	.00	11.45	44.95	
112	15	109	1851.09	.14	.00	2.07	7.20	13.80	
113	109	110	1851.09	.00	.00	.00	11.45	44.98	
THE PUMP IN LINE 114 IS OPERATING OUT OF RANGE									
114	101	115	1850.46	.00	368.81	.00	11.45	44.95	
115	115	116	1850.46	.47	.00	5.00	46.63	1672.67	
116	116	117	1850.46	.27	.00	19.16	20.55	201.27	
117	117	118	1850.46	.17	.00	1.04	11.45	44.95	
118	118	119	1850.46	1.50	.00	.97	11.45	44.95	
119	119	120	1850.46	4.64	.00	13.52	11.45	44.95	
120	120	121	1850.46	7.94	.00	4.67	11.45	44.95	
121	121	122	1850.46	.00	.00	10.94	11.45	44.95	
122	122	123	1850.46	.64	.00	14.35	11.45	44.95	
123	123	124	68.82	2.70	.00	234.54	25.54	2700.32	
124	124	0	68.82	.27	.00	10.13	25.54	2700.32	
125	123	125	1781.64	6.30	.00	3.54	10.49	36.79	
126	125	126	927.20	.04	.00	.13	5.46	10.41	
127	126	127	647.59	.07	.00	.06	3.81	5.24	
128	127	128	368.15	.11	.00	.08	3.72	6.95	
129	128	129	147.25	.18	.00	.05	3.31	9.10	
130	128	130	220.90	.12	.00	.10	4.97	19.67	
131	127	131	279.44	.15	.00	.52	6.29	30.87	
132	126	132	279.61	.15	.00	.52	6.29	30.90	
133	125	133	854.44	.07	.00	.11	5.03	8.90	
134	133	134	574.84	.05	.00	.07	3.38	4.18	
135	134	135	309.48	.09	.00	.04	3.13	5.00	
136	135	136	117.89	.11	.00	.03	2.65	5.98	
137	135	137	191.59	.04	.00	.07	4.31	14.99	
138	134	138	265.36	.03	.00	.14	5.97	27.95	
139	133	139	279.60	.15	.00	.52	6.29	30.90	
140	129	0	147.25	.00	.00	103.66	3.31	9.10	
141	130	0	220.90	.00	.00	103.67	4.97	19.67	
142	131	0	279.44	.00	.00	103.40	6.29	30.87	

T13LPit

THE RESULTS ARE OBTAINED AFTER 7 TRIALS WITH AN ACCURACY = .00000
NO RCS & Bldg. Press., LPI throttled to 3300 gpm, RBS Not throttled, HPI=1500
BWST 819.65'
Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-3300.00	-.03	.00	-.22	-7.40	-10.45
14	13 14	1851.09	.00	.00	.13	4.15	3.44
15	14 15	1851.09	.01	.00	.08	4.15	3.44
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	.00	.00	.00	.00	.00	.00
19	0 79	11801.55	11.49	.00	16.73	26.45	126.30
20	79 80	11801.55	.93	.00	4.80	26.45	126.30
21	80 81	10301.55	1.46	.00	2.15	23.09	96.61
22	81 13	5151.09	.15	.00	6.23	11.54	24.82
23	81 19	5150.46	.44	.00	4.76	11.54	24.82
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	.00	.00	.00	.00	.00	.00
29	83 84	.00	.00	.00	.00	.00	.00
LINE 30 IS CLOSED							
31	0 85	.00	.00	.00	.00	.00	.00
LINE 32 IS CLOSED							
33	12 21	3300.00	.03	.00	.22	7.40	10.45
34	21 22	3355.89	.00	.00	.13	7.52	10.80
35	22 23	3355.89	.16	.00	.83	7.52	10.80
36	23 24	3355.89	.00	352.63	.18	13.71	49.75
37	24 25	3355.89	.02	.00	2.35	13.05	43.85
38	21 25	-55.89	-14.88	.00	-334.08	-20.74	-1792.93
39	25 26	3300.00	.34	.00	1.25	12.83	42.43
40	26 27	3300.00	.74	.00	6.49	12.83	42.43
41	27 29	3072.91	.09	.00	.89	11.95	36.92
42	27 29	227.09	.02	.00	.96	2.30	2.79
43	29 30	3300.00	.55	.00	2.87	12.41	39.01
44	30 31	3300.00	.00	.00	5.65	5.61	5.20
45	31 32	3300.00	.08	.00	.74	12.41	39.01
LINE 46 IS CLOSED							
47	33 35	3300.00	.08	.00	.38	12.83	42.43
48	35 36	3300.00	.62	.00	12.86	12.83	42.43
49	36 37	3300.00	.55	.00	1.89	12.83	42.43
50	37 38	3300.00	1.00	.00	1.54	18.66	110.69
51	38 39	3300.00	.06	.00	3.78	18.66	110.69
52	39 41	3300.00	7.44	.00	10.06	17.61	95.39
53	41 0	3300.00	.67	.00	3.68	10.19	23.60
54	19 42	5150.46	.02	.00	.60	11.54	24.82
55	42 43	3300.00	.10	.00	.89	7.40	10.45
56	43 44	3356.31	.26	.00	.90	7.52	10.80
57	44 45	3356.31	.00	352.60	.18	13.71	49.76
58	45 46	3356.31	.02	.00	.57	12.63	40.33
59	43 46	-56.31	-11.47	.00	-339.20	-20.90	-1819.96
60	46 47	3300.00	.72	.00	2.44	12.41	39.01
61	47 48	3300.00	.39	.00	5.34	12.41	39.01
62	48 49	3300.00	.39	.00	2.11	12.41	39.01
63	49 50	3014.59	.11	.00	1.38	11.34	32.70
64	49 50	285.41	.02	.00	1.47	2.88	4.29
65	50 51	3300.00	.27	.00	1.84	12.41	39.01
66	51 52	3300.00	.00	.00	5.65	5.61	5.20
67	52 53	3300.00	.10	.00	1.15	12.41	39.01
68	53 54	3300.00	.07	.00	.93	12.41	39.01

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	1500.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	.00	812.00	120	121	
122	.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	.00	812.00	154	155	
147	.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

Tbwst6 / NO HPI / (RBES) LP-19 & LP-20 Open

THE RESULTS ARE OBTAINED AFTER 6 TRIALS WITH AN ACCURACY = .00000

NO RCS & RB pressure, LPI 3300 ea., RBS 1680 ea., HPI = 0

Note: Model use RBS flow = 1680 or 1500 + 180 uncertainty, this is conservative flow.

Calculated uncertainty = 160 gpm at 1000 & 1500 gpm (Ref. OSC-4084 Rev. 4)

BWST 6' or 799.25' + 6 -20.2/12 = 803.56'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-3300.00	-.03	.00	-.22	-7.40	-10.45
14	13 14	623.62	.00	.00	.01	1.40	.44
15	14 15	1680.00	.01	.00	.06	3.77	2.86
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	680.70	.00	.00	.01	1.53	.52
19	0 79	8222.92	5.64	.00	8.12	18.43	62.01
20	79 80	8222.92	.45	.00	2.33	18.43	62.01
21	80 81	8222.92	.94	.00	1.37	18.43	62.01
22	81 13	3923.62	.09	.00	3.61	8.79	14.62
23	81 19	4299.30	.31	.00	3.32	9.64	17.46
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	1056.38	.00	.00	.04	1.41	.33
29	83 84	1056.38	.01	.00	.03	1.41	.33
30	84 14	1056.38	.01	.00	.09	2.37	1.19
31	0 85	680.70	.01	.00	.01	.91	.15
32	85 18	680.70	.00	.00	.04	1.53	.52
33	12 21	3300.00	.03	.00	.22	7.40	10.45
34	21 22	3355.89	.00	.00	.13	7.52	10.80
35	22 23	3355.89	.16	.00	.83	7.52	10.80
36	23 24	3355.89	.00	352.63	.18	13.71	49.75
37	24 25	3355.89	.02	.00	2.35	13.05	43.85
38	21 25	-55.89	-14.88	.00	-334.08	-20.74	-1792.93
39	25 26	3300.00	.24	.00	1.25	12.83	42.43
40	26 27	3300.00	.74	.00	6.49	12.83	42.43
41	27 29	3072.91	.09	.00	.89	11.95	36.92
42	27 29	227.09	.02	.00	.96	2.30	2.79
43	29 30	3300.00	.55	.00	2.87	12.41	39.01
44	30 31	3300.00	.00	.00	5.65	5.61	5.20
45	31 32	3300.00	.08	.00	.74	12.41	39.01
LINE 46 IS CLOSED							
47	33 35	3300.00	.08	.00	.38	12.83	42.43
48	35 36	3300.00	.62	.00	12.86	12.83	42.43
49	36 37	3300.00	.55	.00	1.89	12.83	42.43
50	37 38	3300.00	1.00	.00	1.54	18.66	110.69
51	38 39	3300.00	.06	.00	3.78	18.66	110.69
52	39 41	3300.00	7.44	.00	10.06	17.61	95.39
53	41 0	3300.00	.67	.00	3.68	10.19	23.60
54	19 42	4980.00	.02	.00	.56	11.16	23.24
55	42 43	3300.00	.10	.00	.89	7.40	10.45
56	43 44	3356.31	.26	.00	.90	7.52	10.80
57	44 45	3356.31	.00	352.60	.18	13.71	49.76
58	45 46	3356.31	.02	.00	.57	12.63	40.33
59	43 46	-56.31	-11.47	.00	-339.21	-20.90	-1819.96
60	46 47	3300.00	.72	.00	2.44	12.41	39.01
61	47 48	3300.00	.39	.00	5.34	12.41	39.01
62	48 49	3300.00	.39	.00	2.11	12.41	39.01
63	49 50	3014.59	.11	.00	1.38	11.34	32.70
64	49 50	285.41	.02	.00	1.47	2.88	4.29
65	50 51	3300.00	.27	.00	1.84	12.41	39.01

66	51	52	3300.00	.00	.00	5.65	5.61	5.20
67	52	53	3300.00	.10	.00	1.15	12.41	39.01
68	53	54	3300.00	.07	.00	.93	12.41	39.01
LINE 69	IS	CLOSED						
70	55	56	3300.00	.42	.00	.79	12.83	42.43
71	56	57	3300.00	.76	.00	2.76	12.83	42.43
72	57	70	3300.00	.34	.00	.38	12.83	42.43
73	70	58	3300.00	3.10	.00	14.16	12.83	42.43
74	58	59	3300.00	1.10	.00	1.51	12.83	42.43
75	59	61	3300.00	.80	.00	1.54	18.66	110.69
76	61	62	3300.00	.06	.00	3.78	18.66	110.69
77	62	63	3300.00	8.54	.00	10.35	17.61	95.39
78	63	0	3300.00	1.18	.00	4.24	10.19	23.60
LINE 79	IS	CLOSED						
80	64	65	.00	.00	.00	.00	.00	.00
81	65	66	.00	.00	.00	.00	.00	.00
THE PUMP	IN	LINE 82	IS	OPERATING	OUT OF	RANGE		
82	66	67	.00	.00	425.00	.00	.00	.00
LINE 83	IS	CLOSED						
84	64	68	.00	.00	.00	.00	.00	.00
85	68	69	.00	.00	.00	.00	.00	.00
86	69	47	.00	.00	.00	.00	.00	.00
87	69	71	.00	.00	.00	.00	.00	.00
LINE 88	IS	CLOSED						
89	71	72	.00	.00	.00	.00	.00	.00
LINE 90	IS	CLOSED						
91	73	57	.00	.00	.00	.00	.00	.00
LINE 92	IS	CLOSED						
93	53	74	.00	.00	.00	.00	.00	.00
94	74	75	.00	.00	.00	.00	.00	.00
95	75	76	.00	.00	.00	.00	.00	.00
LINE 96	IS	CLOSED						
97	77	22	.00	.00	.00	.00	.00	.00
98	76	78	.00	.00	.00	.00	.00	.00
LINE 99	IS	CLOSED						
100	36	28	.00	.00	.00	.00	.00	.00
101	28	34	.00	.00	.00	.00	.00	.00
102	34	40	.00	.00	.00	.00	.00	.00
103	40	60	.00	.00	.00	.00	.00	.00
104	58	17	.00	.00	.00	.00	.00	.00
LINE 105	IS	CLOSED						
LINE 106	IS	CLOSED						
LINE 107	IS	CLOSED						
108	82	0	.00	.00	.00	.00	.00	.00
109	42	113	1680.00	.01	.00	.03	3.77	2.86
110	113	114	1680.00	.25	.00	1.01	6.53	11.44
111	114	101	1680.00	.00	.00	.00	10.40	37.24
112	15	109	1680.00	.12	.00	1.71	6.53	11.44
113	109	110	1680.00	.00	.00	.00	10.40	37.24
114	101	115	1680.00	.00	421.67	.00	10.40	37.24
115	115	116	1680.00	.39	.00	4.12	42.34	1381.13
116	116	117	1680.00	.22	.00	15.79	18.66	166.45
117	117	118	1680.00	.14	.00	.86	10.40	37.24
118	118	119	1680.00	1.24	.00	.80	10.40	37.24
119	119	120	1680.00	3.85	.00	11.14	10.40	37.24
120	120	121	1680.00	6.58	.00	3.85	10.40	37.24
LINE 121	IS	CLOSED						
122	122	123	1680.00	.53	.00	11.83	10.40	37.24
123	123	124	65.91	2.48	.00	215.17	24.47	2480.60
124	124	0	65.91	.25	.00	9.29	24.47	2480.60
125	123	125	1614.09	5.20	.00	2.91	9.50	30.36
126	125	126	840.00	.04	.00	.11	4.95	8.61
127	126	127	586.68	.06	.00	.05	3.45	4.35
128	127	128	333.52	.09	.00	.07	3.37	5.76
129	128	129	133.40	.15	.00	.04	3.00	7.55
130	128	130	200.12	.10	.00	.08	4.50	16.29
131	127	131	253.16	.13	.00	.43	5.70	25.53
132	126	132	253.32	.13	.00	.43	5.70	25.56
133	125	133	774.09	.06	.00	.09	4.56	7.37
134	133	134	520.78	.05	.00	.06	3.07	3.47
135	134	135	280.37	.07	.00	.03	2.83	4.15
136	135	136	106.80	.09	.00	.03	2.40	4.97
137	135	137	173.57	.04	.00	.06	3.91	12.42
138	134	138	240.41	.03	.00	.12	5.41	23.12

139	133	139	253.31	.13	.00	.43	5.70	25.56
140	129	0	133.40	.00	.00	85.08	3.00	7.55
141	130	0	200.12	.00	.00	85.09	4.50	16.29
142	131	0	253.16	.00	.00	84.87	5.70	25.53
143	132	0	253.32	.00	.00	84.98	5.70	25.56
144	139	0	253.31	.00	.00	84.97	5.70	25.56
145	138	0	240.41	.00	.00	85.28	5.41	23.12
146	137	0	173.57	.00	.00	85.22	3.91	12.42
147	136	0	106.80	.00	.00	85.20	2.40	4.97
148	110	140	1680.00	.00	418.04	.00	10.40	37.24
149	140	141	1680.00	.39	.00	4.12	42.34	1381.13
150	141	142	1680.00	.22	.00	15.79	18.66	166.45
151	142	143	1680.00	.00	.00	.20	10.40	37.24
152	143	144	1680.00	7.51	.00	5.54	10.40	37.24
153	144	145	1680.00	.92	.00	9.26	10.40	37.24
154	145	146	1680.00	.15	.00	1.50	10.40	37.24
LINE 155 IS CLOSED								
156	147	148	1680.00	.48	.00	11.58	10.40	37.24
157	148	200	66.38	2.52	.00	212.57	24.64	2515.23
158	200	0	66.38	.25	.00	9.43	24.64	2515.23
159	148	149	1613.62	4.77	.00	3.71	9.50	30.35
160	149	150	865.48	.04	.00	.11	5.10	9.12
161	150	151	603.20	.06	.00	.05	3.55	4.58
162	151	152	341.10	.09	.00	.07	3.45	6.01
163	152	153	144.27	.16	.00	.05	3.25	8.75
164	152	154	196.83	.04	.00	.08	4.43	15.78
165	151	155	262.10	.04	.00	.46	5.90	27.29
166	150	156	262.28	.04	.00	.46	5.90	27.33
167	149	157	748.14	.06	.00	.08	4.41	6.90
168	157	158	485.84	.04	.00	.05	2.86	3.04
169	158	159	249.51	.06	.00	.02	2.52	3.33
170	159	160	91.93	.08	.00	.02	2.07	3.76
171	159	161	157.58	.07	.00	.05	3.55	10.34
172	158	162	236.33	.11	.00	.11	5.32	22.38
173	157	163	262.30	.04	.00	.46	5.90	27.33
174	153	0	144.27	.00	.00	82.23	3.25	8.75
175	154	0	196.83	.00	.00	82.32	4.43	15.78
176	155	0	262.10	.00	.00	82.10	5.90	27.29
177	156	0	262.28	.00	.00	82.21	5.90	27.33
178	163	0	262.30	.00	.00	82.23	5.90	27.33
179	162	0	236.33	.00	.00	82.41	5.32	22.38
180	161	0	157.58	.00	.00	82.43	3.55	10.34
181	160	0	91.93	.00	.00	82.46	2.07	3.76

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	780.75	812.00	-13.46
8	.00	780.75	791.75	-4.74
9	.00	780.75	798.42	-7.61
10	.00	780.75	767.00	5.92
11	.00	780.75	767.00	5.92
12	.00	780.75	767.00	5.92
13	.00	781.00	767.00	6.03
14	.00	780.98	767.00	6.02
15	.00	780.91	767.00	5.99
16	.00	781.09	767.00	6.07
17	.00	842.60	822.67	8.58
18	.00	781.09	767.00	6.07
19	.00	781.08	767.00	6.06
20	.00	781.11	784.67	-1.53
21	.00	780.50	767.00	5.82
22	.00	780.37	767.00	5.76
23	.00	779.38	761.08	7.88
24	.00	1131.84	763.00	158.87
25	.00	1129.46	765.25	156.88
26	.00	1127.87	765.25	156.19
27	.00	1120.64	779.00	147.15
28	.00	840.17	823.33	7.25
29	.00	1119.66	779.00	146.73
30	.00	1116.24	771.50	148.49
31	.00	1110.59	777.33	143.55
32	3300.00	1109.77	779.00	142.47
33	-3300.00	854.11	779.00	32.35
34	.00	840.17	823.33	7.25
35	.00	853.64	779.00	32.15
36	.00	840.17	824.75	6.64
37	.00	837.73	816.00	9.36
38	.00	835.19	816.00	8.27
39	.00	831.35	816.00	6.61
40	.00	840.17	820.00	8.69
41	.00	813.85	792.38	9.25
42	.00	780.49	767.00	5.81
43	.00	779.51	767.00	5.39
44	.00	778.34	761.08	7.44
45	.00	1130.77	763.00	158.41
46	.00	1130.18	765.00	157.29
47	.00	1127.01	765.25	155.82
48	.00	1121.29	775.50	148.94
49	.00	1118.79	777.75	146.90
50	.00	1117.30	774.25	147.76
51	.00	1115.18	771.50	148.04
52	.00	1109.54	777.73	142.92
53	.00	1108.29	779.25	141.73
54	3300.00	1107.29	779.25	141.30
55	-3300.00	865.31	779.25	37.07
56	.00	864.10	779.25	36.55
57	.00	860.57	779.25	35.03
58	.00	842.60	823.17	8.37
59	.00	839.98	816.50	10.12
60	.00	840.17	817.00	9.98
61	.00	837.65	816.50	9.11
62	.00	833.81	816.50	7.46
63	.00	814.92	790.83	10.38
64	.00	1127.01	767.00	155.07
65	.00	1127.01	767.00	155.07
66	.00	1127.01	761.08	157.62
67	.00	1553.88	763.00	340.66
68	.00	1127.01	765.25	155.82
69	.00	1127.01	765.25	155.82
70	.00	859.85	787.25	31.27
71	.00	1127.01	765.25	155.82
72	.00	1127.01	763.25	156.68
73	.00	860.57	763.25	41.92

74	.00	1108.29	762.00	149.16
75	.00	1108.29	762.00	149.16
76	.00	1108.29	762.00	149.16
77	.00	780.37	763.50	7.27
78	.00	1108.29	763.50	148.51
79	.00	789.80	794.25	-1.92
80	.00	787.01	779.00	3.45
81	.00	784.70	779.00	2.46
82	.00	798.33	796.17	.93
83	.00	781.11	774.50	2.85
84	.00	781.08	767.00	6.06
85	.00	781.13	767.00	6.09
86	.00	798.33	804.50	-2.66
101	.00	779.19	760.10	8.22
109	.00	779.08		
110	.00	779.08	760.10	8.18
113	.00	780.46		
114	.00	779.19		
115	.00	1200.85	761.25	189.35
116	.00	1196.34	762.00	187.09
117	.00	1180.34	765.25	178.79
118	.00	1179.34	765.25	178.36
119	.00	1177.30	765.25	177.48
120	.00	1162.31	816.50	148.95
121	1680.00	1151.88	812.00	146.40
122	-1680.00	1050.14	812.00	102.58
123	.00	1037.78	812.00	97.25
124	.00	820.13	810.58	4.11
125	.00	1029.68	944.00	36.90
126	.00	1029.54	944.00	36.84
127	.00	1029.43	944.00	36.80
128	.00	1029.27	944.00	36.73
129	.00	1029.08	944.00	36.65
130	.00	1029.09	944.00	36.65
131	.00	1028.87	944.00	36.56
132	.00	1028.98	944.00	36.60
133	.00	1029.53	944.00	36.84
134	.00	1029.42	944.00	36.79
135	.00	1029.32	944.00	36.75
136	.00	1029.20	944.00	36.70
137	.00	1029.22	944.00	36.71
138	.00	1029.28	944.00	36.73
139	.00	1028.97	944.00	36.60
140	.00	1197.12	761.25	187.74
141	.00	1192.62	762.00	185.48
142	.00	1176.61	764.09	177.68
143	.00	1176.40	765.47	177.00
144	.00	1163.35	817.50	148.97
145	.00	1153.16	817.50	144.58
146	1680.00	1151.52	812.00	146.24
147	-1680.00	1047.40	812.00	101.39
148	.00	1035.35	812.00	96.20
149	.00	1026.87	944.00	35.70
150	.00	1026.72	944.00	35.63
151	.00	1026.60	944.00	35.58
152	.00	1026.44	944.00	35.51
153	.00	1026.23	944.00	35.42
154	.00	1026.32	944.00	35.46
155	.00	1026.10	944.00	35.36
156	.00	1026.21	944.00	35.41
157	.00	1026.73	944.00	35.64
158	.00	1026.64	944.00	35.59
159	.00	1026.55	944.00	35.56
160	.00	1026.46	944.00	35.52
161	.00	1026.43	944.00	35.51
162	.00	1026.41	944.00	35.50
163	.00	1026.23	944.00	35.42
200	.00	820.26	810.58	4.17

THE NET SYSTEM DEMAND = .00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	8222.92
25	.00
28	1056.38
31	680.70
53	-3300.00
78	-3300.00
108	.00
124	-65.91
140	-133.40
141	-200.12
142	-253.16
143	-253.32
144	-253.31
145	-240.41
146	-173.57
147	-106.80
158	-66.38
174	-144.27
175	-196.83
176	-262.10
177	-262.28
178	-262.30
179	-236.33
180	-157.58
181	-91.93

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 9960.00
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -9960.00

Calculation OSC-7248

Attachment 29

Wood's Model Computer Run to Simulate Conditions at End of Swapover with 2' Indicated BWST level

Tbwst2 NO RCS & RB pressure / LPI 3300 / RBS 1660 / HPI = 0

FLOWRATE IS EXPRESSED IN GPM AND PRESSURE IN PSIG

A SUMMARY OF THE ORIGINAL DATA FOLLOWS

THE DARCY WEISBACH HEAD LOSS EQUATION IS USED, THE KINEMATIC VIS. = .0000073
THE SPECIFIC GRAVITY OF THIS LIQUID = .99

PIPE NO.	NODE NOS.	LENGTH (FEET)	DIAMETER (INCHES)	ROUGHNESS	MINOR LOSS K	FIXED GRADE
1	0 1	27.5	10.5	.2	2.19	809.50
2	1 2	12.3	10.5	.2	.81	
3	2 3	1.0	12.4	.2	.30	
4	3 4	4.5	12.4	.2	.42	
5	4 5	9.4	12.4	.2	.15	
6	5 6	13.6	12.3	.2	.75	
7	6 7	.1	10.3	.2	.30	
LINE 7 IS CLOSED						
8	7 8	120.3	12.4	.2	2.56	
9	8 9	26.3	12.4	.2	1.18	
10	9 10	40.4	12.4	.2	1.03	
11	10 11	.1	10.4	.2	.31	
12	11 12	5.0	12.4	.2	.78	
13	12 13	2.6	13.5	.2	.26	
14	13 14	1.0	13.5	.2	.49	
15	14 15	3.5	13.5	.2	.29	
16	15 16	1.2	13.5	.2	.41	
LINE 16 IS CLOSED						
17	16 18	1.5	13.5	.2	.41	
18	18 19	4.5	13.5	.2	.29	
19	0 79	91.0	13.5	.2	1.54	799.56
20	79 80	7.3	13.5	.2	.44	
21	80 81	15.1	13.5	.2	.26	
22	81 13	6.2	13.5	.2	3.01	
23	81 19	17.7	13.5	.2	2.30	
24	1 86	5.2	2.6	.2	1.58	
LINE 24 IS CLOSED						
25	86 0	10.2	3.3	.2	1.78	798.33
26	3 20	9.0	8.3	.2	1.96	
LINE 26 IS CLOSED						
27	20 83	57.0	12.4	.2	1.79	
28	0 83	.1	17.5	.2	1.19	781.15
29	83 84	27.0	17.5	.2	.89	
30	84 14	7.0	13.5	.2	.99	
31	0 85	53.5	17.5	.2	.90	781.15
32	85 18	7.0	13.5	.2	.99	
33	12 21	2.5	13.5	.2	.26	
34	21 22	.1	13.5	.2	.15	
35	22 23	14.8	13.5	.2	.94	
36	23 24	.1	10.0	.2	.06	
LINE 36 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
37	24 25	.5	10.3	.2	.89	
38	21 25	8.3	1.0	.2	50.00	
39	25 26	8.0	10.3	.2	.49	
THERE IS A CHECK VALVE IN LINE NUMBER 39						
40	26 27	17.5	10.3	.2	2.54	
41	27 29	2.5	10.3	.2	.40	
42	27 29	6.0	6.4	.2	11.76	
43	29 30	14.0	10.4	.2	1.20	
44	30 31	.1	15.5	.2	11.55	
45	31 32	2.0	10.4	.2	.31	
46	32 33	.1	8.1	.2	9.19	
LINE 46 IS CLOSED						
47	33 35	2.0	10.3	.2	.15	
48	35 36	14.5	10.3	.2	5.03	
49	36 37	13.0	10.3	.2	.74	
50	37 38	9.0	8.5	.2	.28	
51	38 39	.5	8.5	.2	.70	
52	39 41	78.0	8.8	.2	2.09	
53	41 0	28.6	11.5	.2	2.28	809.50
54	19 42	1.0	13.5	.2	.29	
55	42 43	9.3	13.5	.2	1.05	
56	43 44	24.5	13.5	.2	1.02	
57	44 45	.1	10.0	.2	.06	
LINE 57 PUMP DATA (HEAD-FLOW): 430.0 .0 375.0 3000.0 285.0 4125.0						
58	45 46	.5	10.4	.2	.23	
59	43 46	6.3	1.0	.2	50.00	

60	46	47	18.5	10.4	.2	1.02			
THERE IS A CHECK VALVE IN LINE NUMBER 60									
61	47	48	10.0	10.4	.2	2.23			
62	48	49	10.0	10.4	.2	.88			
63	49	50	3.5	10.4	.2	.69			
64	49	50	4.5	6.4	.2	11.40			
65	50	51	7.0	10.4	.2	.77			
66	51	52	.1	15.5	.2	11.55			
67	52	53	2.5	10.4	.2	.48			
68	53	54	1.7	10.4	.2	.39			
69	54	55	.1	8.1	.2	9.19			
LINE 69 IS CLOSED									
70	55	56	10.0	10.3	.2	.31			
71	56	57	18.0	10.3	.2	1.08			
72	57	70	8.0	10.3	.2	.15			
73	70	58	73.0	10.3	.2	5.54			
74	58	59	26.0	10.3	.2	.59			
75	59	61	7.2	8.5	.2	.28			
76	61	62	.5	8.5	.2	.70			
77	62	63	89.5	8.8	.2	2.15			
78	63	0	50.1	11.5	.2	2.63	809.50		
79	16	64	5.2	13.5	.2	.73			
LINE 79 IS CLOSED									
80	64	65	3.8	13.5	.2	.55			
81	65	66	13.5	13.5	.2	.96			
82	66	67	.1	10.0	.2	.06			
LINE 82 PUMP DATA (HEAD-FLOW):					425.0	.0	410.0	2250.0	298.0 4000.0
83	67	68	1.0	10.3	.2	.89			
LINE 83 IS CLOSED									
84	64	68	8.5	1.0	.2	50.00			
85	68	69	15.5	10.3	.2	1.41			
86	69	47	3.0	10.3	.2	.43			
87	69	71	10.0	10.3	.2	.31			
88	26	71	6.1	10.3	.2	.65			
LINE 88 IS CLOSED									
89	71	72	29.5	8.1	.2	7.20			
90	72	73	8.6	6.4	.2	.12			
LINE 90 IS CLOSED									
91	73	57	20.5	8.1	.2	.83			
92	9	48	15.0	8.3	.2	2.89			
LINE 92 IS CLOSED									
93	53	74	49.5	8.3	.2	3.13			
94	74	75	3.6	6.4	.2	.12			
95	75	76	12.0	8.3	.2	.40			
96	76	77	5.0	8.3	.2	1.06			
LINE 96 IS CLOSED									
97	77	22	1.5	8.1	.2	.97			
98	76	78	20.5	8.3	.2	.63			
99	78	65	1.5	8.1	.2	.87			
LINE 99 IS CLOSED									
100	36	28	1.5	3.1	.2	1.63			
101	28	34	17.5	3.3	.2	.55			
102	34	40	132.5	3.3	.2	2.34			
103	40	60	4.0	3.3	.2	2.07			
104	58	17	.5	8.1	.2	.19			
105	17	60	3.0	8.1	.2	.42			
LINE 105 IS CLOSED									
106	40	17	.5	3.3	.2	3.72			
LINE 106 IS CLOSED									
107	60	82	22.2	8.3	.2	.80			
LINE 107 IS CLOSED									
108	82	0	23.2	8.3	.2	2.13	798.33		
109	42	113	3.1	13.5	.2	.13			
110	113	114	22.1	10.3	.2	1.53			
111	114	101	.1	8.1	.2	.00			
112	15	109	10.1	10.3	.2	2.58			
113	109	110	.1	8.1	.2	.00			
114	101	115	.1	8.1	.2	.00			
LINE 114 PUMP DATA (HEAD-FLOW):					622.0	.0	470.0	1500.0	385.0 1800.0
115	115	116	.3	4.0	.2	.15			
116	116	117	1.3	6.1	.2	2.92			
117	117	118	3.7	8.1	.2	.51			
118	118	119	33.3	8.1	.2	.48			
119	119	120	103.3	8.1	.2	6.64			
120	120	121	176.6	8.1	.2	2.30			
121	121	122	.1	8.1	.2	5.37			

LINE 121 IS CLOSED									
122	122	123	14.3	8.1	.2	7.05			
123	123	124	1.0	1.0	.2	23.15			
124	124	0	.1	1.0	.2	1.00	810.58		
125	123	125	171.2	8.3	.2	2.07			
126	125	126	4.1	8.3	.2	.28			
127	126	127	12.8	8.3	.2	.28			
128	127	128	15.4	6.4	.2	.40			
129	128	129	20.3	4.3	.2	.28			
130	128	130	6.0	4.3	.2	.25			
131	127	131	5.0	4.3	.2	.85			
132	126	132	5.0	4.3	.2	.85			
133	125	133	7.7	8.3	.2	.28			
134	133	134	13.1	8.3	.2	.42			
135	134	135	17.5	6.4	.2	.25			
136	135	136	18.5	4.3	.2	.28			
137	135	137	3.0	4.3	.2	.25			
138	134	138	1.3	4.3	.2	.25			
139	133	139	5.0	4.3	.2	.85			
140	129	0	.1	4.3	.2	607.75	944.00		
141	130	0	.1	4.3	.2	270.11	944.00		
142	131	0	.1	4.3	.2	168.35	944.00		
143	132	0	.1	4.3	.2	168.35	944.00		
144	139	0	.1	4.3	.2	168.35	944.00		
145	138	0	.1	4.3	.2	187.58	944.00		
146	137	0	.1	4.3	.2	359.62	944.00		
147	136	0	.1	4.3	.2	949.61	944.00		
148	110	140	.1	8.1	.2	.00			
LINE 148 PUMP DATA (HEAD-FLOW):									
149	140	141	.3	4.0	.2	.15			
150	141	142	1.3	6.1	.2	2.92			
151	142	143	.1	8.1	.2	.12			
152	143	144	201.7	8.1	.2	3.30			
153	144	145	24.8	8.1	.2	5.52			
154	145	146	3.9	8.1	.2	.90			
155	146	147	.1	8.1	.2	5.37			
LINE 155 IS CLOSED									
156	147	148	12.8	8.1	.2	6.90			
157	148	200	1.0	1.0	.2	22.55			
158	200	0	.1	1.0	.2	1.00	810.58		
159	148	149	157.0	8.3	.2	2.65			
160	149	150	4.8	8.3	.2	.28			
161	150	151	12.8	8.3	.2	.28			
162	151	152	15.6	6.4	.2	.40			
163	152	153	17.8	4.3	.2	.28			
164	152	154	2.5	4.3	.2	.25			
165	151	155	1.5	4.3	.2	.85			
166	150	156	1.5	4.3	.2	.85			
167	149	157	8.1	8.3	.2	.28			
168	157	158	13.1	8.3	.2	.42			
169	158	159	18.0	6.4	.2	.25			
170	159	160	20.3	4.3	.2	.28			
171	159	161	6.9	4.3	.2	.25			
172	158	162	5.1	4.3	.2	.25			
173	157	163	1.5	4.3	.2	.85			
174	153	0	.1	4.3	.2	502.27	944.00		
175	154	0	.1	4.3	.2	270.11	944.00		
176	155	0	.1	4.3	.2	151.94	944.00		
177	156	0	.1	4.3	.2	151.94	944.00		
178	163	0	.1	4.3	.2	151.94	944.00		
179	162	0	.1	4.3	.2	187.58	944.00		
180	161	0	.1	4.3	.2	422.05	944.00		
181	160	0	.1	4.3	.2	1240.31	944.00		

JUNCTION NUMBER	DEMAND	ELEVATION	CONNECTING PIPES		
1	.00	804.50	1	2	24
2	.00	798.50	2	3	
3	.00	798.50	3	4	26
4	.00	801.50	4	5	
5	.00	812.00	5	6	
6	.00	812.00	6	7	
7	.00	812.00	7	8	
8	.00	791.75	8	9	
9	.00	798.42	9	10	92
10	.00	767.00	10	11	
11	.00	767.00	11	12	
12	.00	767.00	12	13	33
13	.00	767.00	13	14	22
14	.00	767.00	14	15	30
15	.00	767.00	15	16	112
16	.00	767.00	16	17	79
17	.00	822.67	104	105	106
18	.00	767.00	17	18	32
19	.00	767.00	18	23	54
20	.00	784.67	26	27	
21	.00	767.00	33	34	38
22	.00	767.00	34	35	97
23	.00	761.08	35	36	
24	.00	763.00	36	37	
25	.00	765.25	37	38	39
26	.00	765.25	39	40	88
27	.00	779.00	40	41	42
28	.00	823.33	100	101	
29	.00	779.00	41	42	43
30	.00	771.50	43	44	
31	.00	777.33	44	45	
32	3300.00	779.00	45	46	
33	-3300.00	779.00	46	47	
34	.00	823.33	101	102	
35	.00	779.00	47	48	
36	.00	824.75	48	49	100
37	.00	816.00	49	50	
38	.00	816.00	50	51	
39	.00	816.00	51	52	
40	.00	820.00	102	103	106
41	.00	792.38	52	53	
42	.00	767.00	54	55	109
43	.00	767.00	55	56	59
44	.00	761.08	56	57	
45	.00	763.00	57	58	
46	.00	765.00	58	59	60
47	.00	765.25	60	61	86
48	.00	775.50	61	62	92
49	.00	777.75	62	63	64
50	.00	774.25	63	64	65
51	.00	771.50	65	66	
52	.00	777.73	66	67	
53	.00	779.25	67	68	93
54	3300.00	779.25	68	69	
55	-3300.00	779.25	69	70	
56	.00	779.25	70	71	
57	.00	779.25	71	72	91
58	.00	823.17	73	74	104
59	.00	816.50	74	75	
60	.00	817.00	103	105	107
61	.00	816.50	75	76	
62	.00	816.50	76	77	
63	.00	790.83	77	78	
64	.00	767.00	79	80	84
65	.00	767.00	80	81	99
66	.00	761.08	81	82	
67	.00	763.00	82	83	
68	.00	765.25	83	84	85
69	.00	765.25	85	86	87
70	.00	787.25	72	73	
71	.00	765.25	87	88	89
72	.00	763.25	89	90	
73	.00	763.25	90	91	
74	.00	762.00	93	94	
75	.00	762.00	94	95	

76	.00	762.00	95	96	98
77	.00	763.50	96	97	
78	.00	763.50	98	99	
79	.00	794.25	19	20	
80	.00	779.00	20	21	
81	.00	779.00	21	22	23
82	.00	796.17	107	108	
83	.00	774.50	27	28	29
84	.00	767.00	29	30	
85	.00	767.00	31	32	
86	.00	804.50	24	25	
101	.00	760.10	111	114	
109	.00	.00	112	113	
110	.00	760.10	113	148	
113	.00	.00	109	110	
114	.00	.00	110	111	
115	.00	761.25	114	115	
116	.00	762.00	115	116	
117	.00	765.25	116	117	
118	.00	765.25	117	118	
119	.00	765.25	118	119	
120	.00	816.50	119	120	
121	1660.00	812.00	120	121	
122	-1660.00	812.00	121	122	
123	.00	812.00	122	123	125
124	.00	810.58	123	124	
125	.00	944.00	125	126	133
126	.00	944.00	126	127	132
127	.00	944.00	127	128	131
128	.00	944.00	128	129	130
129	.00	944.00	129	140	
130	.00	944.00	130	141	
131	.00	944.00	131	142	
132	.00	944.00	132	143	
133	.00	944.00	133	134	139
134	.00	944.00	134	135	138
135	.00	944.00	135	136	137
136	.00	944.00	136	147	
137	.00	944.00	137	146	
138	.00	944.00	138	145	
139	.00	944.00	139	144	
140	.00	761.25	148	149	
141	.00	762.00	149	150	
142	.00	764.09	150	151	
143	.00	765.47	151	152	
144	.00	817.50	152	153	
145	.00	817.50	153	154	
146	1660.00	812.00	154	155	
147	-1660.00	812.00	155	156	
148	.00	812.00	156	157	159
149	.00	944.00	159	160	167
150	.00	944.00	160	161	166
151	.00	944.00	161	162	165
152	.00	944.00	162	163	164
153	.00	944.00	163	174	
154	.00	944.00	164	175	
155	.00	944.00	165	176	
156	.00	944.00	166	177	
157	.00	944.00	167	168	173
158	.00	944.00	168	169	172
159	.00	944.00	169	170	171
160	.00	944.00	170	181	
161	.00	944.00	171	180	
162	.00	944.00	172	179	
163	.00	944.00	173	178	
200	.00	810.58	157	158	

OUTPUT SELECTION: ALL RESULTS ARE OUTPUT EACH PERIOD
THIS SYSTEM HAS 181 PIPES WITH 141 JUNCTIONS , 15 LOOPS AND 26 FGNS

Tbwst2 NO RCS & RB pressure / LPI 3300 / RBS 1660 / HPI = 0

THE RESULTS ARE OBTAINED AFTER 6 TRIALS WITH AN ACCURACY = .00000

NO RCS & RB pressure, LPI 3300 ea., RBS 1660 ea., HPI = 0

BWST 2' or 799.25' + 2' - 20.2/12 = 799.56'

Model adjusted/ most restrictive on the suction & Least restrictive on Disch.

PIPE NO.	NODE NOS.	FLOWRATE	HEAD LOSS	PUMP HEAD	MINOR LOSS	VELOCITY	HL/1000
1	0 1	.00	.00	.00	.00	.00	.00
2	1 2	.00	.00	.00	.00	.00	.00
3	2 3	.00	.00	.00	.00	.00	.00
4	3 4	.00	.00	.00	.00	.00	.00
5	4 5	.00	.00	.00	.00	.00	.00
6	5 6	.00	.00	.00	.00	.00	.00
LINE 7 IS CLOSED							
8	7 8	.00	.00	.00	.00	.00	.00
9	8 9	.00	.00	.00	.00	.00	.00
10	9 10	.00	.00	.00	.00	.00	.00
11	10 11	.00	.00	.00	.00	.00	.00
12	11 12	.00	.00	.00	.00	.00	.00
13	12 13	-3300.00	-.03	.00	-.22	-7.40	-10.45
14	13 14	280.31	.00	.00	.00	.63	.10
15	14 15	1660.00	.01	.00	.06	3.72	2.80
LINE 16 IS CLOSED							
17	16 18	.00	.00	.00	.00	.00	.00
18	18 19	1064.62	.01	.00	.03	2.39	1.21
19	0 79	7475.69	4.68	.00	6.71	16.76	51.44
20	79 80	7475.69	.38	.00	1.93	16.76	51.44
21	80 81	7475.69	.78	.00	1.13	16.76	51.44
22	81 13	3580.31	.08	.00	3.01	8.02	12.24
23	81 19	3895.38	.25	.00	2.72	8.73	14.41
LINE 24 IS CLOSED							
25	86 0	.00	.00	.00	.00	.00	.00
LINE 26 IS CLOSED							
27	20 83	.00	.00	.00	.00	.00	.00
28	0 83	1379.69	.00	.00	.06	1.84	.54
29	83 84	1379.69	.01	.00	.05	1.84	.54
30	84 14	1379.69	.01	.00	.15	3.09	1.97
31	0 85	1064.62	.02	.00	.03	1.42	.33
32	85 18	1064.62	.01	.00	.09	2.39	1.21
33	12 21	3300.00	.03	.00	.22	7.40	10.45
34	21 22	3355.89	.00	.00	.13	7.52	10.80
35	22 23	3355.89	.16	.00	.83	7.52	10.80
36	23 24	3355.89	.00	352.63	.18	13.71	49.75
37	24 25	3355.89	.02	.00	2.35	13.05	43.85
38	21 25	-55.89	-14.88	.00	-334.08	-20.74	-1792.93
39	25 26	3300.00	.34	.00	1.25	12.83	42.43
40	26 27	3300.00	.74	.00	6.49	12.83	42.43
41	27 29	3072.91	.09	.00	.89	11.95	36.92
42	27 29	227.09	.02	.00	.96	2.30	2.79
43	29 30	3300.00	.55	.00	2.87	12.41	39.01
44	30 31	3300.00	.00	.00	5.65	5.61	5.20
45	31 32	3300.00	.08	.00	.74	12.41	39.01
LINE 46 IS CLOSED							
47	33 35	3300.00	.08	.00	.38	12.83	42.43
48	35 36	3300.00	.62	.00	12.86	12.83	42.43
49	36 37	3300.00	.55	.00	1.89	12.83	42.43
50	37 38	3300.00	1.00	.00	1.54	18.66	110.69
51	38 39	3300.00	.06	.00	3.78	18.66	110.69
52	39 41	3300.00	7.44	.00	10.06	17.61	95.39
53	41 0	3300.00	.67	.00	3.68	10.19	23.60
54	19 42	4960.00	.02	.00	.56	11.12	23.06
55	42 43	3300.00	.10	.00	.89	7.40	10.45
56	43 44	3356.31	.26	.00	.90	7.52	10.80
57	44 45	3356.31	.00	352.60	.18	13.71	49.76
58	45 46	3356.31	.02	.00	.57	12.63	40.33
59	43 46	-56.31	-11.47	.00	-339.21	-20.90	-1819.96
60	46 47	3300.00	.72	.00	2.44	12.41	39.01
61	47 48	3300.00	.39	.00	5.34	12.41	39.01
62	48 49	3300.00	.39	.00	2.11	12.41	39.01
63	49 50	3014.59	.11	.00	1.38	11.34	32.70
64	49 50	285.41	.02	.00	1.47	2.88	4.29
65	50 51	3300.00	.27	.00	1.84	12.41	39.01
66	51 52	3300.00	.00	.00	5.65	5.61	5.20
67	52 53	3300.00	.10	.00	1.15	12.41	39.01
68	53 54	3300.00	.07	.00	.93	12.41	39.01

LINE 69	IS	CLOSED							
70	55	56	3300.00	.42	.00	.79	12.83	42.43	
71	56	57	3300.00	.76	.00	2.76	12.83	42.43	
72	57	70	3300.00	.34	.00	.38	12.83	42.43	
73	70	58	3300.00	3.10	.00	14.16	12.83	42.43	
74	58	59	3300.00	1.10	.00	1.51	12.83	42.43	
75	59	61	3300.00	.80	.00	1.54	18.66	110.69	
76	61	62	3300.00	.06	.00	3.78	18.66	110.69	
77	62	63	3300.00	8.54	.00	10.35	17.61	95.39	
78	63	0	3300.00	1.18	.00	4.24	10.19	23.60	
LINE 79	IS	CLOSED							
80	64	65	.00	.00	.00	.00	.00	.00	
81	65	66	.00	.00	.00	.00	.00	.00	
THE PUMP IN LINE 82 IS OPERATING OUT OF RANGE									
82	66	67	.00	.00	425.00	.00	.00	.00	
LINE 83	IS	CLOSED							
84	64	68	.00	.00	.00	.00	.00	.00	
85	68	69	.00	.00	.00	.00	.00	.00	
86	69	47	.00	.00	.00	.00	.00	.00	
87	69	71	.00	.00	.00	.00	.00	.00	
LINE 88	IS	CLOSED							
89	71	72	.00	.00	.00	.00	.00	.00	
LINE 90	IS	CLOSED							
91	73	57	.00	.00	.00	.00	.00	.00	
LINE 92	IS	CLOSED							
93	53	74	.00	.00	.00	.00	.00	.00	
94	74	75	.00	.00	.00	.00	.00	.00	
95	75	76	.00	.00	.00	.00	.00	.00	
LINE 96	IS	CLOSED							
97	77	22	.00	.00	.00	.00	.00	.00	
98	76	78	.00	.00	.00	.00	.00	.00	
LINE 99	IS	CLOSED							
100	36	28	.00	.00	.00	.00	.00	.00	
101	28	34	.00	.00	.00	.00	.00	.00	
102	34	40	.00	.00	.00	.00	.00	.00	
103	40	60	.00	.00	.00	.00	.00	.00	
104	58	17	.00	.00	.00	.00	.00	.00	
LINE 105	IS	CLOSED							
LINE 106	IS	CLOSED							
LINE 107	IS	CLOSED							
108	82	0	.00	.00	.00	.00	.00	.00	
109	42	113	1660.00	.01	.00	.03	3.72	2.80	
110	113	114	1660.00	.25	.00	.99	6.45	11.18	
111	114	101	1660.00	.00	.00	.00	10.27	36.38	
112	15	109	1660.00	.11	.00	1.67	6.45	11.18	
113	109	110	1660.00	.00	.00	.00	10.27	36.38	
114	101	115	1660.00	.00	427.43	.00	10.27	36.38	
115	115	116	1660.00	.38	.00	4.02	41.83	1348.75	
116	116	117	1660.00	.21	.00	15.42	18.43	162.58	
117	117	118	1660.00	.14	.00	.84	10.27	36.38	
118	118	119	1660.00	1.21	.00	.78	10.27	36.38	
119	119	120	1660.00	3.76	.00	10.88	10.27	36.38	
120	120	121	1660.00	6.43	.00	3.76	10.27	36.38	
LINE 121	IS	CLOSED							
122	122	123	1660.00	.52	.00	11.55	10.27	36.38	
123	123	124	65.58	2.46	.00	213.02	24.34	2456.21	
124	124	0	65.58	.25	.00	9.20	24.34	2456.21	
125	123	125	1594.42	5.08	.00	2.84	9.39	29.65	
126	125	126	829.76	.03	.00	.10	4.89	8.41	
127	126	127	579.53	.05	.00	.05	3.41	4.25	
128	127	128	329.46	.09	.00	.07	3.33	5.63	
129	128	129	131.78	.15	.00	.04	2.97	7.38	
130	128	130	197.68	.10	.00	.08	4.45	15.91	
131	127	131	250.07	.12	.00	.42	5.63	24.94	
132	126	132	250.23	.12	.00	.42	5.63	24.97	
133	125	133	764.66	.06	.00	.09	4.50	7.20	
134	133	134	514.43	.04	.00	.06	3.03	3.39	
135	134	135	276.96	.07	.00	.03	2.80	4.05	
136	135	136	105.50	.09	.00	.02	2.37	4.86	
137	135	137	171.46	.04	.00	.06	3.86	12.13	
138	134	138	237.48	.03	.00	.11	5.35	22.59	
139	133	139	250.22	.12	.00	.42	5.63	24.97	
140	129	0	131.78	.00	.00	83.01	2.97	7.38	
141	130	0	197.68	.00	.00	83.03	4.45	15.91	
142	131	0	250.07	.00	.00	82.81	5.63	24.94	
143	132	0	250.23	.00	.00	82.92	5.63	24.97	

144	139	0	250.22	.00	.00	82.91	5.63	24.97
145	138	0	237.48	.00	.00	83.21	5.35	22.59
146	137	0	171.46	.00	.00	83.16	3.86	12.13
147	136	0	105.50	.00	.00	83.14	2.37	4.86
148	110	140	1660.00	.00	424.01	.00	10.27	36.38
149	140	141	1660.00	.38	.00	4.02	41.83	1348.75
150	141	142	1660.00	.21	.00	15.42	18.43	162.58
151	142	143	1660.00	.00	.00	.20	10.27	36.38
152	143	144	1660.00	7.34	.00	5.41	10.27	36.38
153	144	145	1660.00	.90	.00	9.04	10.27	36.38
154	145	146	1660.00	.14	.00	1.47	10.27	36.38
LINE 155 IS CLOSED								
156	147	148	1660.00	.47	.00	11.30	10.27	36.38
157	148	200	66.05	2.49	.00	210.48	24.52	2490.88
158	200	0	66.05	.25	.00	9.33	24.52	2490.88
159	148	149	1593.95	4.65	.00	3.62	9.39	29.63
160	149	150	854.92	.04	.00	.11	5.03	8.91
161	150	151	595.85	.06	.00	.05	3.51	4.48
162	151	152	336.94	.09	.00	.07	3.41	5.87
163	152	153	142.51	.15	.00	.05	3.21	8.55
164	152	154	194.43	.04	.00	.08	4.38	15.41
165	151	155	258.90	.04	.00	.45	5.83	26.66
166	150	156	259.08	.04	.00	.45	5.83	26.69
167	149	157	739.02	.05	.00	.08	4.35	6.74
168	157	158	479.92	.04	.00	.05	2.83	2.97
169	158	159	246.47	.06	.00	.02	2.49	3.26
170	159	160	90.81	.07	.00	.02	2.04	3.67
171	159	161	155.65	.07	.00	.05	3.50	10.10
172	158	162	233.45	.11	.00	.11	5.25	21.86
173	157	163	259.10	.04	.00	.45	5.83	26.70
174	153	0	142.51	.00	.00	80.24	3.21	8.55
175	154	0	194.43	.00	.00	80.32	4.38	15.41
176	155	0	258.90	.00	.00	80.11	5.83	26.66
177	156	0	259.08	.00	.00	80.22	5.83	26.69
178	163	0	259.10	.00	.00	80.23	5.83	26.70
179	162	0	233.45	.00	.00	80.41	5.25	21.86
180	161	0	155.65	.00	.00	80.43	3.50	10.10
181	160	0	90.81	.00	.00	80.46	2.04	3.67

JUNCTION NUMBER	DEMAND	GRADE LINE	ELEVATION	PRESSURE
1	.00	809.50	804.50	2.15
2	.00	809.50	798.50	4.74
3	.00	809.50	798.50	4.74
4	.00	809.50	801.50	3.45
5	.00	809.50	812.00	-1.08
6	.00	809.50	812.00	-1.08
7	.00	780.62	812.00	-13.52
8	.00	780.62	791.75	-4.79
9	.00	780.62	798.42	-7.67
10	.00	780.62	767.00	5.87
11	.00	780.62	767.00	5.87
12	.00	780.62	767.00	5.87
13	.00	780.87	767.00	5.97
14	.00	780.87	767.00	5.97
15	.00	780.79	767.00	5.94
16	.00	781.01	767.00	6.03
17	.00	842.60	822.67	8.58
18	.00	781.01	767.00	6.03
19	.00	780.98	767.00	6.02
20	.00	781.09	784.67	-1.54
21	.00	780.37	767.00	5.76
22	.00	780.24	767.00	5.70
23	.00	779.26	761.08	7.83
24	.00	1131.71	763.00	158.81
25	.00	1129.33	765.25	156.82
26	.00	1127.74	765.25	156.14
27	.00	1120.51	779.00	147.10
28	.00	840.17	823.33	7.25
29	.00	1119.53	779.00	146.68
30	.00	1116.11	771.50	148.43
31	.00	1110.46	777.33	143.49
32	3300.00	1109.64	779.00	142.42
33	-3300.00	854.11	779.00	32.35
34	.00	840.17	823.33	7.25
35	.00	853.64	779.00	32.15
36	.00	840.17	824.75	6.64
37	.00	837.73	816.00	9.36
38	.00	835.19	816.00	8.27
39	.00	831.35	816.00	6.61
40	.00	840.17	820.00	8.69
41	.00	813.85	792.38	9.25
42	.00	780.40	767.00	5.77
43	.00	779.41	767.00	5.34
44	.00	778.25	761.08	7.39
45	.00	1130.67	763.00	158.37
46	.00	1130.08	765.00	157.25
47	.00	1126.92	765.25	155.78
48	.00	1121.19	775.50	148.90
49	.00	1118.69	777.75	146.86
50	.00	1117.20	774.25	147.72
51	.00	1115.09	771.50	147.99
52	.00	1109.44	777.73	142.88
53	.00	1108.19	779.25	141.69
54	3300.00	1107.19	779.25	141.26
55	-3300.00	865.31	779.25	37.07
56	.00	864.10	779.25	36.55
57	.00	860.57	779.25	35.03
58	.00	842.60	823.17	8.37
59	.00	839.98	816.50	10.12
60	.00	840.17	817.00	9.98
61	.00	837.65	816.50	9.11
62	.00	833.81	816.50	7.46
63	.00	814.92	790.83	10.38
64	.00	1126.92	767.00	155.03
65	.00	1126.92	767.00	155.03
66	.00	1126.92	761.08	157.58
67	.00	1553.78	763.00	340.62
68	.00	1126.92	765.25	155.78
69	.00	1126.92	765.25	155.78
70	.00	859.85	787.25	31.27
71	.00	1126.92	765.25	155.78
72	.00	1126.92	763.25	156.64
73	.00	860.57	763.25	41.92
74	.00	1108.19	762.00	149.12
75	.00	1108.19	762.00	149.12

76	.00	1108.19	762.00	149.12
77	.00	780.24	763.50	7.21
78	.00	1108.19	763.50	148.47
79	.00	788.17	794.25	-2.62
80	.00	785.86	779.00	2.96
81	.00	783.95	779.00	2.13
82	.00	798.33	796.17	.93
83	.00	781.09	774.50	2.84
84	.00	781.03	767.00	6.04
85	.00	781.10	767.00	6.08
86	.00	798.33	804.50	-2.66
101	.00	779.12	760.10	8.19
109	.00	779.01		
110	.00	779.01	760.10	8.14
113	.00	780.36		
114	.00	779.12		
115	.00	1206.55	761.25	191.80
116	.00	1202.15	762.00	189.59
117	.00	1186.51	765.25	181.45
118	.00	1185.54	765.25	181.03
119	.00	1183.55	765.25	180.18
120	.00	1168.91	816.50	151.80
121	1660.00	1158.73	812.00	149.35
122	-1660.00	1047.58	812.00	101.47
123	.00	1035.51	812.00	96.27
124	.00	820.03	810.58	4.07
125	.00	1027.60	944.00	36.01
126	.00	1027.46	944.00	35.95
127	.00	1027.36	944.00	35.91
128	.00	1027.20	944.00	35.84
129	.00	1027.02	944.00	35.76
130	.00	1027.03	944.00	35.76
131	.00	1026.82	944.00	35.67
132	.00	1026.92	944.00	35.72
133	.00	1027.46	944.00	35.95
134	.00	1027.35	944.00	35.90
135	.00	1027.25	944.00	35.86
136	.00	1027.14	944.00	35.81
137	.00	1027.16	944.00	35.82
138	.00	1027.21	944.00	35.84
139	.00	1026.91	944.00	35.71
140	.00	1203.02	761.25	190.28
141	.00	1198.62	762.00	188.07
142	.00	1182.99	764.09	180.43
143	.00	1182.79	765.47	179.75
144	.00	1170.04	817.50	151.85
145	.00	1160.09	817.50	147.57
146	1660.00	1158.48	812.00	149.24
147	-1660.00	1044.90	812.00	100.32
148	.00	1033.14	812.00	95.25
149	.00	1024.86	944.00	34.83
150	.00	1024.71	944.00	34.76
151	.00	1024.60	944.00	34.72
152	.00	1024.44	944.00	34.65
153	.00	1024.24	944.00	34.56
154	.00	1024.32	944.00	34.60
155	.00	1024.11	944.00	34.51
156	.00	1024.22	944.00	34.55
157	.00	1024.73	944.00	34.77
158	.00	1024.64	944.00	34.73
159	.00	1024.55	944.00	34.70
160	.00	1024.46	944.00	34.66
161	.00	1024.43	944.00	34.65
162	.00	1024.41	944.00	34.64
163	.00	1024.24	944.00	34.56
200	.00	820.17	810.58	4.13

THE NET SYSTEM DEMAND = .00
SUMMARY OF INFLOWS(+) AND OUTFLOWS(-) FROM FIXED GRADE NODES

PIPE NUMBER	FLOWRATE
1	.00
19	7475.69
25	.00
28	1379.69
31	1064.62
53	-3300.00
78	-3300.00
108	.00
124	-65.58
140	-131.78
141	-197.68
142	-250.07
143	-250.23
144	-250.22
145	-237.48
146	-171.46
147	-105.50
158	-66.05
174	-142.51
175	-194.43
176	-258.90
177	-259.08
178	-259.10
179	-233.45
180	-155.65
181	-90.81

THE NET FLOW INTO THE SYSTEM FROM FIXED GRADE NODES = 9920.00
THE NET FLOW OUT OF THE SYSTEM INTO FIXED GRADE NODES = -9920.00