

PREPARED BY: Milton Huff DATE: 10/18/79  
Milton Huff

REVIEWED BY: ER France DATE: 10/24/79  
E. R. France

LEAD ANALYSIS ENGINEER APPROVAL: David Saunders  
David Saunders  
DATE: 12/10/79

PART - 1:

Flow Calc. From the F.W. Pump to the  
F.W. Loop Take Off Line (Node 75).

8004150601

AND UNIT 2 CONTAINING THE ...

PROBLEM PARAMETERS

NUMBER OF COMPONENTS		SOLUTION CRITERIA	
NODES.....	42	FRICTION FORMULA.....	HAZEN
ELEMENTS.....	42	MAXIMUM NUMBER OF ITERATIONS.....	10
STORAGE USED.....	1960	FLOW CONVERGENCE-CPM.....	1.00
STORAGE-UNUSED.....	6412	HEAD CONVERGENCE-FEET.....	.100

PUMPING PLANT		FLUID CHARACTERISTICS	
DISCHARGE-PSI		FLUID NAME.....	WATER
HIGH.....	200.	DENSITY-LBS / CUBIC FEET.....	62.4
LOW.....	125.	VISCOSITY-CENTIPOISE.....	.236E-04
VELOCITY-FOOT		TEMPERATURE-DEGREES CELSIUS.....	20.0
HIGH.....	10.0		
LOW.....	0.		

CASE: PUMP ON 2 LINE SYSTEM = ( )  
 COMMENT: WATER SURFACE ELEVATION IS ...  
 PIPE LENGTH TOTAL IS ...  
 NODE ...

$= 75 + 75 + 152 + 145 =$   
 $= NP + HR + SPK1 + SPK2$   
 FW LOOP TAKE  
 OFF PT. SEE  
 NODE NUMBERING  
 DIAGRAM.

NODE NUM.	SPECIFICATION	ELEVATION	COMMENT
38	(374.000)	354.10 FEET	WATER SURFACE
11		367.50 FEET	PUMP DISCHARGE
32		367.50 FEET	
29		367.50 FEET	
26		367.50 FEET	
23		367.50 FEET	
20		367.50 FEET	
17		367.50 FEET	
14		367.50 FEET	
11		367.50 FEET	

$SUCTION HEAD = 354.0' + 20.0' = 374.0'$   
 SEE PUMP CURVE

400-UNIT ... INSTALLATION PROJECT

CASE PUMP ON: FIVE DEWATS = 647 ... AT ... 75

NO.	SPECIFICATION	ELEVATION	COMMENT
1		366.50 FEET	
2		366.50 FEET	
3		366.50 FEET	
4		366.50 FEET	
5		366.50 FEET	
6		366.50 FEET	
7		366.50 FEET	
8		366.50 FEET	
9		366.50 FEET	
10		366.50 FEET	
11		366.50 FEET	
12		366.50 FEET	
13		366.50 FEET	
14		366.50 FEET	
15		366.50 FEET	
16		366.50 FEET	
17		366.50 FEET	
18		366.50 FEET	
19		366.50 FEET	
20		366.50 FEET	
21		366.50 FEET	
22		366.50 FEET	
23		366.50 FEET	
24		361.75 FEET	
25		360.33 FEET	

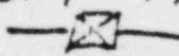
APPENDIX 2 CONTINUUM OF PIPELINE INSTALLATION PROJECT

CASE: PUMP ONE PIPE DEMAND = 447 GPM AT WIDE 75

LINE NO.	SPECIFICATION	ELEVATION	COMMENT
34		350.75 FEET	
37		350.75 FEET	
40		350.75 FEET	
42		350.75 FEET	
75	(-447.000) GPM	349.33 FEET	PIPE DEMAND

↑ ELEMENT INPUT FOLLOWS

NOTE: FLOW IS ONLY LEAVING THE FW LOOP AT WIDE 75

NOTE: THE FOLLOWING T-VALVE ELEMENTS REPRESENT VARIOUS FITTINGS & VALVES. (SEE THE FAAST MANUAL FOR DEFINITIONS OF T-VALVES & THE ASSOCIATED FRICTION FACTOR.) THE SYMBOL USED ON THE ISOMETRIC DRAWINGS TO REPRESENT THE T-VALVE IS THE FOLLOWING:  THIS SYMBOL WILL APPEAR ON THE ISOMETRIC DRAWING JUST BEFORE EACH ELBOW, TEE, ETC.

ANN-UNIT-2 CONTAINMENT FIRE HOSE INSTALLATION PROJECT

CASE PUMP ON: FIRE DEMAND = 447 GPM AT NODE 75

ELEMENT NUMBER		NODES II JJ		PIPE	INPUT			COMMENT
				LENGTH	DIAMETER	FRIC		
				FEET	INCHES	COEF.		
1	34	35		1.000				
HEAD FEET				350.00	350.00	250.00	175.00	0.
FLOOR GPM				1000.0	2000.0	5000.0	4000.0	5000.0

ELEMENT NUMBER		NODES II JJ		PIPE	INPUT			COMMENT
				LENGTH	DIAMETER	FRIC		
				FEET	INCHES	COEF.		
2	35	32		1.000	12.00	110.0		

ELEMENT NUMBER		NODES II JJ		VALVE	VALVE	FRICTION		FACTORS	
				TYPE	DIAMETER	FORWARD	REVERSE		
3	32	24		1	12.000	2.5000		2.5000	

ELEMENT NUMBER		NODES II JJ		PIPE	INPUT			COMMENT
				LENGTH	DIAMETER	FRIC		
				FEET	INCHES	COEF.		
4	24	26		1.000	12.00	110.0		

ELEMENT NUMBER		NODES II JJ		VALVE	VALVE	FRICTION		FACTORS	
				TYPE	DIAMETER	FORWARD	REVERSE		
5	26	23		1	12.000	.44000		.44000	

ELEMENT NUMBER		NODES II JJ		PIPE	INPUT			COMMENT
				LENGTH	DIAMETER	FRIC		
				FEET	INCHES	COEF.		
6	23	20		1.000	12.00	110.0		

ELEMENT NUMBER		NODES II JJ		VALVE	VALVE	FRICTION		FACTORS	
				TYPE	DIAMETER	FORWARD	REVERSE		
7	20	17		1	12.000	.20000		.20000	

ANNOUNCED CONTAINMENT FIRE HOSE INSTALLATION PROJECT

CASE PUMP ONE FIRE DEMAND = 447 GPM AT NODE 75

ELEMENT NUMBER		NODES I J		LENGTH FEET	PIPE DIAMETER INCHES	INPUT FRICTION COEFF.	COMMENT
8	17	14		1.750	12.00	110.0	

ELEMENT NUMBER		NODES I J		T VALVE TYPE	V VALVE DIAMETER	FRICTION FORWARD	FACTORS REVERSE
9	14	11		1	12.000	.60000	.60000

ELEMENT NUMBER		NODES I J		LENGTH FEET	PIPE DIAMETER INCHES	INPUT FRICTION COEFF.	COMMENT
10	11	8		1.000	12.00	110.0	

ELEMENT NUMBER		NODES I J		T VALVE TYPE	V VALVE DIAMETER	FRICTION FORWARD	FACTORS REVERSE
11	8	5		1	12.000	.60000	.60000

ELEMENT NUMBER		NODES I J		LENGTH FEET	PIPE DIAMETER INCHES	INPUT FRICTION COEFF.	COMMENT
12	5	2		2.500	12.00	110.0	

ELEMENT NUMBER		NODES I J		T VALVE TYPE	V VALVE DIAMETER	FRICTION FORWARD	FACTORS REVERSE
13	2	3		1	12.000	.60000	.60000

ELEMENT NUMBER		NODES I J		LENGTH FEET	PIPE DIAMETER INCHES	INPUT FRICTION COEFF.	COMMENT
14	3	5		1.000	12.00	110.0	

ELEMENT NUMBER		NODES I J		T VALVE TYPE	V VALVE DIAMETER	FRICTION FORWARD	FACTORS REVERSE
15	5	4		1	12.000	.60000	.60000

AND UNIT 2 CONFINEMENT FIRE RISK INSTALLATION PROJECT

CASE RING ONE FIRE DEMAND = 447 GPM AT NODE 75

ELEMENT NUMBER		NODES		LENGTH FEET	PIPE DIAMETER INCHES	FRICITION COEFF.	COMMENT
16	9	12		11.52	12.00	110.0	

ELEMENT NUMBER		NODES		TYPE	VALVE DIAMETER	FORWARD FRICTION	REVERSE FACTORS
17	12	15		1	12.000	.60000	.60000

ELEMENT NUMBER		NODES		LENGTH FEET	PIPE DIAMETER INCHES	FRICITION COEFF.	COMMENT
18	15	18		5.000	12.00	110.0	

ELEMENT NUMBER		NODES		TYPE	VALVE DIAMETER	FORWARD FRICTION	REVERSE FACTORS
19	18	21		1	12.000	.60000	.60000

ELEMENT NUMBER		NODES		LENGTH FEET	PIPE DIAMETER INCHES	FRICITION COEFF.	COMMENT
20	21	24		17.17	12.00	110.0	

ELEMENT NUMBER		NODES		TYPE	VALVE DIAMETER	FORWARD FRICTION	REVERSE FACTORS
21	24	27		1	12.000	.60000	.60000

ELEMENT NUMBER		NODES		LENGTH FEET	PIPE DIAMETER INCHES	FRICITION COEFF.	COMMENT
22	27	30		5.000	12.00	110.0	

ELEMENT NUMBER		NODES		TYPE	VALVE DIAMETER	FORWARD FRICTION	REVERSE FACTORS
23	30	33		1	12.000	.60000	.60000

ANNULATED CONTAINMENT FIRE FIGHT INSTALLATION PROJECT

CASE 10000001 FIRE DEPARTMENT BUILDING AT WERT 75

PIPE INPUT . . . . .

ELEMENT NUMBER	NODES	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	COMMENT
24	33 36	14.00	12.00	110.0	

T VALVE INPUT . . . . .

ELEMENT NUMBER	NODES	TVALVE TYPE	VALVE DIAMETER	FRICTION FORWARD	FACTORS REVERSE
25	36 39	1	12.000	.60000	.60000

PIPE INPUT . . . . .

ELEMENT NUMBER	NODES	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	COMMENT
26	39 41	48.00	12.00	110.0	

T VALVE INPUT . . . . .

ELEMENT NUMBER	NODES	TVALVE TYPE	VALVE DIAMETER	FRICTION FORWARD	FACTORS REVERSE
27	41 43	1	12.000	.50000	.50000

PIPE INPUT . . . . .

ELEMENT NUMBER	NODES	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	COMMENT
28	43 45	240.0	12.00	110.0	

T VALVE INPUT . . . . .

ELEMENT NUMBER	NODES	TVALVE TYPE	VALVE DIAMETER	FRICTION FORWARD	FACTORS REVERSE
29	45 47	1	12.000	.20000	.20000

PIPE INPUT . . . . .

ELEMENT NUMBER	NODES	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	COMMENT
30	47 49	4.000	12.00	110.0	

T VALVE INPUT . . . . .

ELEMENT NUMBER	NODES	TVALVE TYPE	VALVE DIAMETER	FRICTION FORWARD	FACTORS REVERSE
31	49 51	1	12.000	.44000	.44000



UNIT-2 CONTAINMENT FIRE PUMP INSTALLATION PROJECT

CASE PUMP ON: FIRE DEMAND = 1.7 MGAL AT NODE 75

PIPE INPUT . . .						COMMENT
ELEMENT NUMBER	NODES II	III	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	
42	51	53	53.00	12.00	110.0	

VALVE INPUT . . .						FACTORS	
ELEMENT NUMBER	NODES II	III	VALVE TYPE	VALVE DIAMETER	FRICTION FORWARD	REVERSE	
43	53	55	1	12.000	.44000	.44000	

PIPE INPUT . . .						COMMENT
ELEMENT NUMBER	NODES II	III	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	
44	55	57	30.00	12.00	110.0	

VALVE INPUT . . .						FACTORS	
ELEMENT NUMBER	NODES II	III	VALVE TYPE	VALVE DIAMETER	FRICTION FORWARD	REVERSE	
45	57	59	1	12.000	.20000	.20000	

PIPE INPUT . . .						COMMENT
ELEMENT NUMBER	NODES II	III	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	
46	59	61	150.0	12.00	110.0	

VALVE INPUT . . .						FACTORS	
ELEMENT NUMBER	NODES II	III	VALVE TYPE	VALVE DIAMETER	FRICTION FORWARD	REVERSE	
47	61	63	1	12.000	.20000	.20000	

PIPE INPUT . . .						COMMENT
ELEMENT NUMBER	NODES II	III	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	
48	63	65	170.0	12.00	110.0	

VALVE INPUT . . .						FACTORS	
ELEMENT NUMBER	NODES II	III	VALVE TYPE	VALVE DIAMETER	FRICTION FORWARD	REVERSE	
49	65	67	1	12.000	.60000	.60000	

SMOKE-INITIATED CONTAINMENT FIRE TEST INSTALLATION PROJECT

CASE: PUMP ONE: FIRE DEMAND = 447 GPM AT 100% 75

PIPER INPUT . . . . .						COMMENT
ELEMENT NUMBER	NODES I J	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.		
40	67 69	300.0	12.00	110.0		

T VALVE INPUT . . . . .						FACTORS REVERSE
ELEMENT NUMBER	NODES I J	TVALVE TYPE	VALVE DIAMETER	FRICTION FORWARD		
41	69 71	1	12.000	.60000		.20000

PIPER INPUT . . . . .						COMMENT
ELEMENT NUMBER	NODES I J	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.		
42	71 73	4.000	12.00	110.0		

T VALVE INPUT . . . . .						FACTORS REVERSE
ELEMENT NUMBER	NODES I J	TVALVE TYPE	VALVE DIAMETER	FRICTION FORWARD		
43	73 75	1	12.000	.60000		.60000

44	77 79	1	12.000	.60000		.60000
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PIPER INPUT . . . . .						COMMENT
ELEMENT NUMBER	NODES I J	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.		
45	79 77	4.000	12.00	110.0		

T VALVE INPUT . . . . .						FACTORS REVERSE
ELEMENT NUMBER	NODES I J	TVALVE TYPE	VALVE DIAMETER	FRICTION FORWARD		
46	77 79	1	12.000	.20000		.20000

PIPER INPUT . . . . .						COMMENT
ELEMENT NUMBER	NODES I J	LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.		
47	81 81	225.0	12.00	110.0		

AND UNIT-2 CONFINEMENT FIRE HOSE INSTALLATION PROJECT

CASE PUMP ON: FIRE DEMAND = 447 GPM AT NODE 75

ELEMENT NUMBER	NODES		T VALVE		INPUT		FRICTION		FACTORS	
	I	J	TYPE	VALVE	DIAMETER	VALVE	FORWARD	REVERSE		
48	85	83	1		12.000		.60000		.60000	

ELEMENT NUMBER	NODES		PIPE		INPUT		COMMENT
	I	J	LENGTH FEET	DIAMETER INCHES	LENGTH FEET	FRICTION COEF.	
49	87	85	300.0	12.00		110.0	

ELEMENT NUMBER	NODES		T VALVE		INPUT		FRICTION		FACTORS	
	I	J	TYPE	VALVE	DIAMETER	VALVE	FORWARD	REVERSE		
50	84	87	1		12.000		.60000		.60000	

ELEMENT NUMBER	NODES		PIPE		INPUT		COMMENT
	I	J	LENGTH FEET	DIAMETER INCHES	LENGTH FEET	FRICTION COEF.	
51	91	89	25.00	12.00		110.0	

ELEMENT NUMBER	NODES		T VALVE		INPUT		FRICTION		FACTORS	
	I	J	TYPE	VALVE	DIAMETER	VALVE	FORWARD	REVERSE		
52	92	91	1		12.000		.60000		.60000	

ELEMENT NUMBER	NODES		PIPE		INPUT		COMMENT
	I	J	LENGTH FEET	DIAMETER INCHES	LENGTH FEET	FRICTION COEF.	
53	90	92	370.0	12.00		110.0	

ELEMENT NUMBER	NODES		T VALVE		INPUT		FRICTION		FACTORS	
	I	J	TYPE	VALVE	DIAMETER	VALVE	FORWARD	REVERSE		
54	88	90	1		12.000		.50000		.50000	

ELEMENT NUMBER	NODES		PIPE		INPUT		COMMENT
	I	J	LENGTH FEET	DIAMETER INCHES	LENGTH FEET	FRICTION COEF.	
55	86	88	57.00	12.00		110.0	

WATERMETER CONTAINER ... PROJECT

CASE PIPE 001: FIRE METER ...

ELEMENT NUMBER		NODES		T VALVE		VALVE		FRICTION		FACTORS	
		I	J	TYPE	DIAMETER	FORWARD	REVERSE			FORWARD	REVERSE
56		84	85	1	12.000	.50000	.50000			.50000	.50000

ELEMENT NUMBER		NODES		LENGTH	DIAMETER	FRICTION	COMMENT
		I	J	FEET	INCHES	COEF.	
57		82	84	310.0	12.00	110.0	

ELEMENT NUMBER		NODES		T VALVE		VALVE		FRICTION		FACTORS	
		I	J	TYPE	DIAMETER	FORWARD	REVERSE			FORWARD	REVERSE
58		80	82	1	12.000	.60000	.60000			.60000	.60000

ELEMENT NUMBER		NODES		LENGTH	DIAMETER	FRICTION	COMMENT
		I	J	FEET	INCHES	COEF.	
59		78	80	15.00	12.00	110.0	

ELEMENT NUMBER		NODES		T VALVE		VALVE		FRICTION		FACTORS	
		I	J	TYPE	DIAMETER	FORWARD	REVERSE			FORWARD	REVERSE
60		76	78	1	12.000	.60000	.60000			.60000	.60000

ELEMENT NUMBER		NODES		LENGTH	DIAMETER	FRICTION	COMMENT
		I	J	FEET	INCHES	COEF.	
61		74	76	2.000	12.00	110.0	

ELEMENT NUMBER		NODES		T VALVE		VALVE		FRICTION		FACTORS	
		I	J	TYPE	DIAMETER	FORWARD	REVERSE			FORWARD	REVERSE
62		72	74	1	12.000	.20000	.20000			.20000	.20000

ELEMENT NUMBER		NODES		LENGTH	DIAMETER	FRICTION	COMMENT
		I	J	FEET	INCHES	COEF.	
63		70	72	4.000	12.00	110.0	

AND UNIT-2 CONTAINMENT PIPE ROSE INSTALLATION PROJECT

CASE PUMP ONE: FIRE DEMAND = 44.7 GPM AT NODE 75

ELEMENT NUMBER	NODES		VALVE		FRICTION FORWARD	FACTORS	
	II	JJ	TYPE	DIAMETER		FORWARD	REVERSE
64	64	70	1	12.000	.44000		.44000

ELEMENT NUMBER	NODES		LENGTH FEET	PIPE INPUT		COMMENT
	II	JJ		DIAMETER INCHES	FRICTION COEFF.	
65	64	66	4.000	12.00	110.0	

ELEMENT NUMBER	NODES		VALVE		FRICTION FORWARD	FACTORS	
	II	JJ	TYPE	DIAMETER		FORWARD	REVERSE
66	64	66	1	12.000	.20000		.20000

ELEMENT NUMBER	NODES		LENGTH FEET	PIPE INPUT		COMMENT
	II	JJ		DIAMETER INCHES	FRICTION COEFF.	
67	62	64	2.000	12.00	110.0	

ELEMENT NUMBER	NODES		VALVE		FRICTION FORWARD	FACTORS	
	II	JJ	TYPE	DIAMETER		FORWARD	REVERSE
68	60	62	1	12.000	.60000		.60000

ELEMENT NUMBER	NODES		LENGTH FEET	PIPE INPUT		COMMENT
	II	JJ		DIAMETER INCHES	FRICTION COEFF.	
69	58	60	15.00	12.00	110.0	

ELEMENT NUMBER	NODES		VALVE		FRICTION FORWARD	FACTORS	
	II	JJ	TYPE	DIAMETER		FORWARD	REVERSE
70	56	58	1	12.000	.60000		.60000

ELEMENT NUMBER	NODES		LENGTH FEET	PIPE INPUT		COMMENT
	II	JJ		DIAMETER INCHES	FRICTION COEFF.	
71	54	56	154.0	12.00	110.0	

UNIT-2 CONTAINER-FIRE HOSE INSTALLATION PROJECT

CASE PIPE ONE: FIRE DEMAND = 447 GPM AT NODE 75

ELEMENT NUMBER	NODES	T VALVE		INPUT		FRICTION FORWARD	FACTORS REVERSE
		TYPE	VALVE	DIAMETER	VALVE		
72	52 54	1		12.000		.50000	.50000

ELEMENT NUMBER	NODES	PIPE INPUT			COMMENT
		LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	
73	50 49	24.00	12.00	110.0	

ELEMENT NUMBER	NODES	T VALVE		INPUT		FRICTION FORWARD	FACTORS REVERSE
		TYPE	VALVE	DIAMETER	VALVE		
74	48 50	1		12.000		.60000	.60000

ELEMENT NUMBER	NODES	PIPE INPUT			COMMENT
		LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	
75	46 48	30.00	12.00	110.0	

ELEMENT NUMBER	NODES	T VALVE		INPUT		FRICTION FORWARD	FACTORS REVERSE
		TYPE	VALVE	DIAMETER	VALVE		
76	44 46	1		12.000		.60000	.60000

ELEMENT NUMBER	NODES	PIPE INPUT			COMMENT
		LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	
77	42 44	2.500	12.00	110.0	

ELEMENT NUMBER	NODES	T VALVE		INPUT		FRICTION FORWARD	FACTORS REVERSE
		TYPE	VALVE	DIAMETER	VALVE		
78	40 42	1		12.000		.50000	.50000

ELEMENT NUMBER	NODES	PIPE INPUT			COMMENT
		LENGTH FEET	DIAMETER INCHES	FRICTION COEFF.	
79	37 40	4.750	12.00	110.0	

~~AND UNIT 2 CONTAINMENT FIRE HOSE INSTALLATION PROJECT~~

CASE PUMP ON: FIRE DEMAND = 447 GPM AT NODE 75

ELEMENT NUMBER	NODES		T VALVE	INPUT		FRICTION		FACTORS	
	II	JJ	TYPE	VALVE	DIAMETER	FORWARD	REVERSE	FORWARD	REVERSE
40	34	37	1		12.000	.60000		.60000	

ELEMENT NUMBER	NODES		PIPE	INPUT		COMMENT
	II	JJ	LENGTH FEET	DIAMETER INCHES	FRICTION COEF.	
41	31	34	4.810	12.00	110.0	

ELEMENT NUMBER	NODES		T VALVE	INPUT		FRICTION		FACTORS	
	II	JJ	TYPE	VALVE	DIAMETER	FORWARD	REVERSE	FORWARD	REVERSE
42	29	31	1		12.000	.20000		.20000	

ELEMENT NUMBER	NODES		PIPE	INPUT		COMMENT
	II	JJ	LENGTH FEET	DIAMETER INCHES	FRICTION COEF.	
43	25	29	13.170	12.00	110.0	

ELEMENT NUMBER	NODES		T VALVE	INPUT		FRICTION		FACTORS	
	II	JJ	TYPE	VALVE	DIAMETER	FORWARD	REVERSE	FORWARD	REVERSE
44	22	25	1		12.000	.60000		.60000	

ELEMENT NUMBER	NODES		PIPE	INPUT		COMMENT
	II	JJ	LENGTH FEET	DIAMETER INCHES	FRICTION COEF.	
45	19	22	8.250	12.00	110.0	

ELEMENT NUMBER	NODES		T VALVE	INPUT		FRICTION		FACTORS	
	II	JJ	TYPE	VALVE	DIAMETER	FORWARD	REVERSE	FORWARD	REVERSE
46	16	19	1		12.000	.60000		.60000	

ELEMENT NUMBER	NODES		PIPE	INPUT		COMMENT
	II	JJ	LENGTH FEET	DIAMETER INCHES	FRICTION COEF.	
47	13	16	15.00	12.00	110.0	

UNIT-2 CONTAINER ... INSTALLATION PROJECT

CASE PIPE DIA: PIPE DNAM: 4.7 UNIT: INCH: 25

ELEMENT NUMBER	NODES		T VALVE		F VALVE		FRICTION		FACTORS	
	II	JJ	TYPE	DIAMETER	TYPE	DIAMETER	FORWARD	REVERSE	FORWARD	REVERSE
38	10	13	1	12.000	1	12.000	.44000		.44000	

ELEMENT NUMBER	NODES		LENGTH	DIAMETER	FRICTION	COMMENT
	II	JJ	FEET	INCHES	COEF.	
39	7	10	1.000	12.00	110.0	

ELEMENT NUMBER	NODES		T VALVE		F VALVE		FRICTION		FACTORS	
	II	JJ	TYPE	DIAMETER	TYPE	DIAMETER	FORWARD	REVERSE	FORWARD	REVERSE
40	4	7	1	12.000	1	12.000	.20000		.20000	

ELEMENT NUMBER	NODES		LENGTH	DIAMETER	FRICTION	COMMENT
	II	JJ	FEET	INCHES	COEF.	
41	1	4	25.43	12.00	110.0	

ELEMENT NUMBER	NODES		T VALVE		F VALVE		FRICTION		FACTORS	
	II	JJ	TYPE	DIAMETER	TYPE	DIAMETER	FORWARD	REVERSE	FORWARD	REVERSE
42	2	1	1	12.000	1	12.000	.60000		.60000	

SOLVE



AMOUNT OF CONTAINMENT FIRE FIGHTING INSTALLATION PROJECT

PIPELINE PARAMETERS

NUMBER OF COMMENTS		SOLUTION CRITERIA	
NODES.....	42 ✓	FRICTION FORMULA.....	HAGEN
ELEMENTS.....	42 ✓	MAXIMUM NUMBER OF ITERATIONS.....	10
STORAGE USED.....	3048	FLUID CONDUCTIVITY (CGM).....	1.00
STORAGE UNUSED.....	65024	HEAD CONDUCTIVITY (FEET).....	.100

WARNING FLAGS		FLUID CHARACTERISTICS	
PRESSURE-PSI		FLUID NAME.....	WATER
HIGH.....	200. ✓	DENSITY-LBS / CUBIC FEET.....	62.4
LOW.....	125. ✓	VISCOSITY-LBS / SECOND/SQ FEET.....	.236E-04
VELOCITY-FPS		VAPOR PRESSURE-PSI.....	.256
HIGH.....	10.0	TEMPERATURE-DEGREES CELSIUS.....	20.0
LOW.....	0.		

CASE PUMP ON: FIRE DEMAND = 447 GPM AT NODE 75

4 ITERATIONS, CONVERGED TO .0144E-02 GPM AND .6670E-04 FEET

ELEMENT NUMBER	NODES		PIPE		DIAMETER INCHES	VELOCITY FPS
	II	JJ	FLOW GPM	HEAD CHANGE FEET		
2	75	72	447.00	-2.3370E-03	12.000	1.2680
4	24	26	447.00	-7.7740E-04	12.000	1.2680
6	23	21	447.00	-7.7740E-04	12.000	1.2680
8	17	14	447.00	-1.3110E-03	12.000	1.2680
10	11	8	447.00	-7.7740E-04	12.000	1.2680
12	5	2	447.00	-1.3110E-03	12.000	1.2680
14	3	6	248.29	-2.6217E-04	12.000	.70435
16	4	12	248.29	-3.0159E-03	12.000	.70435
18	15	18	248.29	-1.3108E-03	12.000	.70435
20	21	24	248.29	-4.5015E-03	12.000	.70435
22	27	30	248.29	-2.0477E-03	12.000	.70435
24	33	36	248.29	-4.7191E-03	12.000	.70435

AND ... CONTAINMENT ... INSTALLATION PROJECT

CASE ... DEMAND = ...

ITERATIONS ...

ELEMENT NUMBER	NODES I J	FLOW GPM	HEAD CHANGE FEET	DIAMETER INCHES	VELOCITY FPS
26	44 41	248.29	-1.75275E-01	12.000	.70435
28	43 45	248.29	-8.24215E-02	12.000	.70435
30	47 49	248.29	-1.16464E-01	12.000	.70435
32	51 53	248.29	-1.75275E-02	12.000	.70435
34	55 57	248.29	-7.88520E-04	12.000	.70435
36	59 61	248.29	-4.13477E-02	12.000	.70435
38	63 65	248.29	-4.43605E-02	12.000	.70435
40	67 69	248.29	-7.46520E-02	12.000	.70435
42	71 73	248.29	-1.04464E-01	12.000	.70435
45	74 77	198.71	-6.94408E-04	12.000	.56370
47	43 81	198.71	-3.40695E-02	12.000	.56370
49	47 85	198.71	-5.26873E-02	12.000	.56370
51	41 89	198.71	-4.51423E-01	12.000	.56370
53	49 92	198.71	-8.42413E-02	12.000	.56370
55	45 98	198.71	-4.51687E-01	12.000	.56370
57	42 94	198.71	-5.33233E-02	12.000	.56370
59	74 99	198.71	-7.88520E-01	12.000	.56370
61	74 75	198.71	-3.47249E-04	12.000	.56370
63	70 72	198.71	-8.94408E-04	12.000	.56370
65	88 88	198.71	-8.94408E-04	12.000	.56370
67	82 84	198.71	-3.47249E-04	12.000	.56370

UNIT-2 CONTAINMENT FIRE HOSE INSTALLATION PROJECT

CASE PUMP OUT FIRE DEMAND = 447 GPM AT NODE 75

ITERATIONS, CONVERGED TO  $-1.44E-02$  GPM AND  $.6630E-04$  FEET

ELEMENT NUMBER	NODES		PIPE INPUT		DIAMETER INCHES	VELOCITY FPS
	II	JJ	FLOW GPM	HEAD CHANGE FEET		
69	58	60	198.71	$-2.59437E-01$	12.000	.56370
71	54	56	198.71	$-2.67382E-02$	12.000	.56370
73	50	42	198.71	$-4.15598E-13$	12.000	.56370
75	46	48	198.71	$-5.20873E-03$	12.000	.56370
77	42	44	198.71	$-4.14018E-04$	12.000	.56370
79	37	40	198.71	$-5.2716E-04$	12.000	.56370
81	31	34	198.71	$-1.55574E-03$	12.000	.56370
83	25	28	198.71	$-5.30344E-04$	12.000	.56370
85	19	22	198.71	$-1.13240E-03$	12.000	.56370
87	13	16	198.71	$-3.12524E-03$	12.000	.56370
89	7	10	198.71	$-1.73620E-04$	12.000	.56370
91	1	4	198.71	$-4.43472E-03$	12.000	.56370

AMPLITUDE CONTINUED WITH THE INSULATION PROJECT

CASE DUMP (01) FIVE DEMAND = 447 GPM AT 100% DS

4 ITERATIONS, CONVERGED TO .414E+02 GPM AND .6630E-04 FEET

ELEMENT NUMBER	NODES		AMPLITUDE FACTOR	DUMP FLOW GPM	HEAD CHANGE FEET
	II	IJ			
1	34	35	1.000	447.00	376.06

CASE: 010001 PIPE DEMAND = 0.070000 AT NODE 75

4. HEAD LOSS: CONVERSION TO HEAD LOSS

TABLE 1: ELEMENT TYPES, VALVE, FRICTION FACTORS  
 ELEMENT NO. TYPE FRICTION FACTOR  
 HEAD CHANGE FEET

1	20	2.5000	2.5000	4.7.00	-6.24706E-02
2	20	2.0000	2.0000	4.7.00	-1.09944E-02
3	20	2.0000	2.0000	4.7.00	-4.93765E-03
4	14	4.0000	4.0000	4.7.00	-1.49930E-02
5	14	4.0000	4.0000	4.7.00	-1.49930E-02
6	2	4.0000	4.0000	4.7.00	-4.45899E-03
7	2	4.0000	4.0000	4.7.00	-4.45899E-03
8	12	4.0000	4.0000	4.7.00	-4.45899E-03
9	12	4.0000	4.0000	4.7.00	-4.45899E-03
10	18	4.0000	4.0000	4.7.00	-4.45899E-03
11	18	4.0000	4.0000	4.7.00	-4.45899E-03
12	27	4.0000	4.0000	4.7.00	-4.45899E-03
13	27	4.0000	4.0000	4.7.00	-4.45899E-03
14	34	4.0000	4.0000	4.7.00	-4.45899E-03
15	34	4.0000	4.0000	4.7.00	-4.45899E-03
16	41	4.0000	4.0000	4.7.00	-3.34232E-03
17	41	4.0000	4.0000	4.7.00	-3.34232E-03
18	48	4.0000	4.0000	4.7.00	-1.54196E-03
19	48	4.0000	4.0000	4.7.00	-1.54196E-03
20	51	4.0000	4.0000	4.7.00	-3.34232E-03
21	51	4.0000	4.0000	4.7.00	-3.34232E-03
22	57	4.0000	4.0000	4.7.00	-1.54196E-03
23	57	4.0000	4.0000	4.7.00	-1.54196E-03
24	63	2.0000	2.0000	4.7.00	-1.54196E-03
25	63	2.0000	2.0000	4.7.00	-1.54196E-03
26	65	4.0000	4.0000	4.7.00	-4.45899E-03
27	65	4.0000	4.0000	4.7.00	-4.45899E-03
28	71	4.0000	4.0000	4.7.00	-1.54196E-03
29	71	4.0000	4.0000	4.7.00	-1.54196E-03
30	75	4.0000	4.0000	4.7.00	-4.45899E-03

AND UNIT-2 CONTAINMENT-FIRE WISE INSTALLATION PROJECT

CASE PUMP ONE FIRE DEMAND = 447 GPM AT LOUPE 75

4 ITERATIONS, CONVERGED TO  $-1.44E-02$  GPM AND  $.5530E-04$  FEET

ELEMENT NUMBER	NODES		T VALVE TYPE	FRICTION FACTORS		FLOW GPM	HEAD CHANGE FEET
	II	III		FORWARD	REVERSE		
44	77	75	1	.50000	.50000	148.71	-2.96242E-03
46	81	79	1	.20000	.20000	148.71	-4.87608E-04
48	85	83	1	.50000	.50000	148.71	-2.96242E-03
50	89	87	1	.50000	.50000	148.71	-2.96242E-03
52	92	91	1	.50000	.50000	148.71	-2.96242E-03
54	94	90	1	.50000	.50000	148.71	-2.46902E-03
56	94	96	1	.50000	.50000	148.71	-2.46902E-03
58	80	82	1	.50000	.50000	148.71	-2.96242E-03
60	76	78	1	.50000	.50000	148.71	-2.96242E-03
62	72	74	1	.20000	.20000	148.71	-4.87608E-04
64	68	70	1	.44000	.44000	148.71	-2.17274E-03
66	64	66	1	.20000	.20000	148.71	-4.47608E-04
68	60	62	1	.50000	.50000	148.71	-2.96242E-03
70	56	58	1	.50000	.50000	148.71	-2.96242E-03
72	52	54	1	.50000	.50000	148.71	-2.46902E-03
74	48	50	1	.50000	.50000	148.71	-2.96242E-03
76	44	46	1	.50000	.50000	148.71	-2.96242E-03
78	40	42	1	.50000	.50000	148.71	-2.46902E-03
80	36	38	1	.50000	.50000	148.71	-2.96242E-03
82	32	34	1	.20000	.20000	148.71	-4.87608E-04
84	28	30	1	.50000	.50000	148.71	-2.96242E-03

AND UNIT-2 CONTAINMENT FIRE PUMP INSTALLATION PROJECT

CASE PUMP ONE FIRE DEMAND = 447 GPM AT NODE 75

4 ITERATIONS, CONVERGED TO  $1.149E-02$  GPM AND  $6.630E-04$  FEET

ELEMENT NUMBER	NODES I J	VALVE TYPE	FRICTION FACTORS		FLOW GPM	HEAD CHANGE FEET
			FORWARD	REVERSE		
18	18 19	1	.60000	.60000	144.71	-0.96282E-03
19	19 13	1	.44000	.44000	144.71	-2.17274E-03
20	4 7	1	.20000	.20000	144.71	-5.87408E-04
22	2 1	1	.60000	.60000	144.71	-2.95242E-03

AND UNIT-2 CONTINGENT FIRE LINE INSTALLATION PROJECT

CASE PUMP (ONE FIRE PUMP) = 447 GPM AT NODE 75

4 ITERATIONS, CONVERGED TO .416E+02 GPM AND .6530E+04 FEET

NODE	FLOW GPM	NODE & L ELEVATION FEET	OUTPUT HEAD FEET	PRESSURE PSI
1	0.	366.50	747.76	166.08
2	0.	366.50	747.76	166.08
3	0.	366.50	747.76	166.08
4	0.	366.50	747.76	166.08
5	0.	366.50	747.76	166.08
6	0.	366.50	747.76	166.08
7	0.	366.50	747.76	166.08
8	0.	366.50	747.76	166.08
9	0.	366.50	747.76	166.08
10	0.	366.50	747.76	166.08
11	0.	367.50	747.76	165.65
12	0.	366.50	747.76	166.07
13	0.	366.50	747.76	166.07
14	0.	367.50	747.76	165.66
15	0.	366.50	747.76	166.07
16	0.	366.50	747.76	166.07
17	0.	367.50	747.76	165.66
18	0.	366.50	747.76	166.07
19	0.	366.50	747.76	166.07
20	0.	367.50	747.76	165.66
21	0.	366.50	747.76	166.07



... CONTINUATION OF ...

CASE ... DEMAND = 4.7 ...

4 ITERATIONS, CONVERGED TO ...

NODE	FLOW GPM	ELEVATION FEET	... FEET	PRESSURE PSI
22	0.	366.50	744.73	166.07
23	0.	367.50	744.78	165.06
24	0.	349.73	744.72	173.51
25	0.	366.50	744.72	166.07
26	0.	367.50	744.79	165.67
27	0.	349.73	744.71	173.50
28	0.	361.75	744.72	168.13
29	0.	367.50	750.00	165.67
30	0.	349.73	744.71	173.50
31	0.	360.73	744.72	168.74
32	0.	367.50	750.00	165.70
33	0.	349.73	744.71	173.50
34	0.	350.75	744.72	172.89
35	0.	367.50	750.00	165.70
36	0.	349.73	744.70	173.50
37	0.	350.75	744.72	172.89
HEAD	447.00	354.00	374.00	4.6025
38	0.	349.73	744.90	173.50
39	0.	350.75	744.72	172.89
41	0.	349.73	744.88	173.49
42	0.	350.75	744.71	172.89

Handwritten signature or initials.

AMMUNITION CONTAINMENT FIRE HOLE INSTALLATION PROJECT

CASE PIPE ONE: FIRE DEMAND = 427 GPM AT NODE 74

4 ITERATION: CONVERGENCE TO 1.44E+04 GPM 1.5610E+04 FEET

NODE	FLOW GPM	HEAD FEET	LOSS FEET	PRESSURE PSI
43	0.	349.73	744.70	173.49
44	0.	349.73	744.71	173.50
45	0.	349.73	744.71	173.46
46	0.	349.73	744.71	173.50
47	0.	349.73	744.71	173.46
48	0.	349.73	744.70	173.50
49	0.	349.73	744.71	173.46
50	0.	349.73	744.70	173.50
51	0.	349.73	744.71	173.46
52	0.	349.73	744.70	173.50
53	0.	349.73	744.74	173.45
54	0.	349.73	744.74	173.49
55	0.	349.73	744.74	173.45
56	0.	349.73	744.77	173.44
57	0.	349.73	744.78	173.45
58	0.	349.73	744.78	173.48
59	0.	349.73	744.78	173.45
60	0.	349.73	744.76	173.48
61	0.	349.73	744.74	173.47
62	0.	349.73	744.76	173.48
63	0.	349.73	744.74	173.47

ANSI-NFPA-2 CONTAINMENT FIRE HOSE INSTALLATION PROJECT

CASE PUMP ON: FIRE DEMAND = 447 GPM AT NODE 75

4 ITERATIONS, CONVERGED TO 447.00 GPM AND 173.37 PSIG

NODE	FLOW GPM	ELEVATION FEET	HEAD FEET	PRESSURE PSI
54	0.	349.33	744.05	173.48
55	0.	349.33	744.04	173.41
56	0.	349.33	744.05	173.48
57	0.	349.33	744.05	173.41
58	0.	349.33	744.06	173.48
60	0.	349.33	744.01	173.37
70	0.	349.33	744.05	173.48
71	0.	349.33	744.01	173.37
72	0.	349.33	744.05	173.48
73	0.	349.33	744.01	173.37
74	0.	349.33	744.05	173.48
75	447.00	349.33	744.00	173.37
76	0.	349.33	744.05	173.48
77	0.	349.33	744.01	173.37
78	0.	349.33	744.05	173.48
79	0.	349.33	744.01	173.37
80	0.	349.33	744.05	173.47
81	0.	349.33	744.01	173.37
82	0.	349.33	744.05	173.47
83	0.	349.33	744.05	173.34
84	0.	349.33	744.05	173.45

**RESULTS** *Z*

NOTE: AT THE  
 REQUIRED FLOW  
 OF 447 GPM THE  
 PRESSURE AT THE  
 F.W. LOOP TAKE  
 OFF POINT IS  
173.37 PSI.

WATER SUPPLY SYSTEMS - [unclear] [unclear] [unclear] PROJECT

CASE: [unclear] [unclear] [unclear] = [unclear] [unclear] [unclear]

ITERATIONS, CONVERGED TO [unclear] [unclear] [unclear] [unclear] [unclear] FEET

NODE	FLOW GPM	ELEVATION FEET	HEAD FEET	PRESSURE PSI
45	0.	349.33	749.65	173.39
46	0.	349.33	749.79	173.45
47	0.	349.33	749.70	173.41
48	0.	349.33	749.75	173.44
49	0.	349.33	749.70	173.41
50	0.	349.33	749.75	173.44
51	0.	349.33	749.71	173.41
52	0.	349.33	749.71	173.41

C  
C  
END

END OF PART-008

PREPARED BY: Milton Huff DATE: 11/6/79  
Milton Huff

REVIEWED BY: E R France DATE: 12/10/79  
E. R. France

LEAD ANALYSIS ENGINEER APPROVAL: David Saunders  
David Saunders

DATE: 1/17/80

PART - 2:

Flow Calc. From the F.W. Loop Take Off Line (Node 1)  
to the 2-Highest Elevation Hose Reels (Nodes 236, &  
239) (Hose Reel #'s 44 & 43 Respectively.)

NOTE: Node 75 in Part 1 of this Calc. has been Renamed  
Node 1 in Part 2 for Ease in Writing up the input.

REASON: See FAAST Manual Appendix D-1 (Node Numbering).



INPUT DATA

NUMBER OF NODES..... 219  
 ELEMENTS..... 204  
 STORAGE (INCH)..... 1000  
 STORAGE (INCHES)..... 1000

FLOW (GPM)..... 1.00  
 FLOW (GPM)..... 1.00  
 FLOW (GPM)..... 1.00

SPRING DATA

PRESSURE-PSI  
 HIGH..... 200.  
 LOW..... 75.0  
 VELOCITY-FPS  
 HIGH..... 10.0  
 LOW..... 0.0

FLUID CHARACTERISTICS

FLUID..... WATER  
 DENSITY-LBS / CU. FT..... 62.4  
 VISCOSITY-LBS / SEC. INCHES SQ. FEET..... .236E-04  
 VAPOR PRESSURE-PSI..... .256  
 TEMPERATURE-DEGREES CELSIUS..... 20.0

CASE SYSTEM DEMANDS: 2-HOSE REELS, 2-SPRINKLERS

COMMENT

- C ELEMENT 103 (NODES 104-105) REPRESENTS THE SPRINKLERS
- C NODE 239 REPRESENTS HOSE REEL 2000
- C NODE 236 REPRESENTS HOSE REEL 2000
- C NODE 1 HAS A CONSTANT PRESSURE OF 173.37 PSI ← FROM PART-1
- C NODE 1: THE PRESSURE OF 173.37 PSI WAS CALCULATED IN PART-1 OF
- C OF THIS ANALYSIS BY IMPOSING A FLOW OF 0.47 GPM.
- C NODES 236-239 ARE PART-1 NODES.
- C
- C
- C
- C
- C
- C

PIPE SPECIFICATION

SIZE

1	173.370	PSI	700.00 FEET	INLET PRESSURE
2			600.00 FEET	
3			500.00 FEET	
4			400.00 FEET	
5			300.00 FEET	
6			200.00 FEET	
7			100.00 FEET	
8			0.00 FEET	

CASE SYSTEM DEMANDS: 2-052, 2-055, 2-058, 2-061, 2-064, 2-067, 2-070, 2-073, 2-076, 2-079, 2-082, 2-085, 2-088, 2-091, 2-094, 2-097, 2-100, 2-103, 2-106, 2-109, 2-112, 2-115, 2-118, 2-121, 2-124, 2-127, 2-130, 2-133, 2-136, 2-139, 2-142, 2-145, 2-148, 2-151, 2-154, 2-157, 2-160, 2-163, 2-166, 2-169, 2-172, 2-175, 2-178, 2-181, 2-184, 2-187, 2-190, 2-193, 2-196, 2-199, 2-202, 2-205, 2-208, 2-211, 2-214, 2-217, 2-220, 2-223, 2-226, 2-229, 2-232, 2-235, 2-238, 2-241, 2-244, 2-247, 2-250, 2-253, 2-256, 2-259, 2-262, 2-265, 2-268, 2-271, 2-274, 2-277, 2-280, 2-283, 2-286, 2-289, 2-292, 2-295, 2-298, 2-301, 2-304, 2-307, 2-310, 2-313, 2-316, 2-319, 2-322, 2-325, 2-328, 2-331, 2-334, 2-337, 2-340, 2-343, 2-346, 2-349, 2-352, 2-355, 2-358, 2-361, 2-364, 2-367, 2-370, 2-373, 2-376, 2-379, 2-382, 2-385, 2-388, 2-391, 2-394, 2-397, 2-400, 2-403, 2-406, 2-409, 2-412, 2-415, 2-418, 2-421, 2-424, 2-427, 2-430, 2-433, 2-436, 2-439, 2-442, 2-445, 2-448, 2-451, 2-454, 2-457, 2-460, 2-463, 2-466, 2-469, 2-472, 2-475, 2-478, 2-481, 2-484, 2-487, 2-490, 2-493, 2-496, 2-499, 2-502, 2-505, 2-508, 2-511, 2-514, 2-517, 2-520, 2-523, 2-526, 2-529, 2-532, 2-535, 2-538, 2-541, 2-544, 2-547, 2-550, 2-553, 2-556, 2-559, 2-562, 2-565, 2-568, 2-571, 2-574, 2-577, 2-580, 2-583, 2-586, 2-589, 2-592, 2-595, 2-598, 2-601, 2-604, 2-607, 2-610, 2-613, 2-616, 2-619, 2-622, 2-625, 2-628, 2-631, 2-634, 2-637, 2-640, 2-643, 2-646, 2-649, 2-652, 2-655, 2-658, 2-661, 2-664, 2-667, 2-670, 2-673, 2-676, 2-679, 2-682, 2-685, 2-688, 2-691, 2-694, 2-697, 2-700, 2-703, 2-706, 2-709, 2-712, 2-715, 2-718, 2-721, 2-724, 2-727, 2-730, 2-733, 2-736, 2-739, 2-742, 2-745, 2-748, 2-751, 2-754, 2-757, 2-760, 2-763, 2-766, 2-769, 2-772, 2-775, 2-778, 2-781, 2-784, 2-787, 2-790, 2-793, 2-796, 2-799, 2-802, 2-805, 2-808, 2-811, 2-814, 2-817, 2-820, 2-823, 2-826, 2-829, 2-832, 2-835, 2-838, 2-841, 2-844, 2-847, 2-850, 2-853, 2-856, 2-859, 2-862, 2-865, 2-868, 2-871, 2-874, 2-877, 2-880, 2-883, 2-886, 2-889, 2-892, 2-895, 2-898, 2-901, 2-904, 2-907, 2-910, 2-913, 2-916, 2-919, 2-922, 2-925, 2-928, 2-931, 2-934, 2-937, 2-940, 2-943, 2-946, 2-949, 2-952, 2-955, 2-958, 2-961, 2-964, 2-967, 2-970, 2-973, 2-976, 2-979, 2-982, 2-985, 2-988, 2-991, 2-994, 2-997, 2-1000

NO. SPECIFICITY

ELEVATION

9	304.00 FEET
10	304.00 FEET
11	304.00 FEET
12	304.00 FEET
13	304.00 FEET
14	304.00 FEET
15	304.00 FEET
16	304.00 FEET
17	304.00 FEET
18	337.00 FEET
19	337.00 FEET
20	337.00 FEET
21	337.00 FEET
22	337.00 FEET
23	337.00 FEET
24	337.00 FEET
25	337.00 FEET
26	337.00 FEET
27	337.00 FEET
28	337.00 FEET
29	337.00 FEET
30	337.00 FEET
31	337.00 FEET
32	337.00 FEET
33	337.00 FEET
34	337.00 FEET
35	337.00 FEET
36	337.00 FEET
37	337.00 FEET
38	337.00 FEET
39	337.00 FEET
40	337.00 FEET
41	337.00 FEET
42	337.00 FEET
43	337.00 FEET
44	337.00 FEET
45	337.00 FEET
46	337.00 FEET
47	337.00 FEET
48	337.00 FEET
49	337.00 FEET
50	337.00 FEET
51	337.00 FEET
52	337.00 FEET
53	337.00 FEET
54	337.00 FEET
55	337.00 FEET
56	337.00 FEET
57	337.00 FEET
58	337.00 FEET
59	337.00 FEET
60	337.00 FEET
61	337.00 FEET
62	337.00 FEET
63	337.00 FEET
64	337.00 FEET
65	337.00 FEET
66	337.00 FEET
67	337.00 FEET
68	337.00 FEET
69	337.00 FEET
70	337.00 FEET
71	337.00 FEET
72	337.00 FEET
73	337.00 FEET
74	337.00 FEET
75	337.00 FEET
76	337.00 FEET
77	337.00 FEET
78	337.00 FEET
79	337.00 FEET
80	337.00 FEET
81	337.00 FEET
82	337.00 FEET
83	337.00 FEET
84	337.00 FEET
85	337.00 FEET
86	337.00 FEET
87	337.00 FEET
88	337.00 FEET
89	337.00 FEET
90	337.00 FEET
91	337.00 FEET
92	337.00 FEET
93	337.00 FEET
94	337.00 FEET
95	337.00 FEET
96	337.00 FEET
97	337.00 FEET
98	337.00 FEET
99	337.00 FEET
100	337.00 FEET



CASE

SYSTEM DEMANDS: ZONING, WELLS, RESOURCES

LINE NO.	SPECIFICATION	START	END
30		350.50	FEET
31		350.50	FEET
32		350.50	FEET
33		350.50	FEET
34		350.50	FEET
35		350.50	FEET
36		350.50	FEET
37		350.50	FEET
38		350.50	FEET
39		350.50	FEET
40		350.50	FEET
41		350.50	FEET
42		350.50	FEET
43		350.50	FEET
44		350.50	FEET
45		350.50	FEET
46		350.50	FEET
47		350.50	FEET
48		350.50	FEET
49		350.50	FEET
50		350.50	FEET

CASE SYSTEMS

NAME SPECIFICATIONS

51	365.25 FEET
52	365.25 FEET
53	365.25 FEET
54	365.25 FEET
55	365.25 FEET
56	365.25 FEET
57	375.92 FEET
58	375.92 FEET
59	375.92 FEET
60	375.92 FEET
61	375.92 FEET
62	375.92 FEET
63	375.92 FEET
64	375.92 FEET
65	375.92 FEET
66	375.92 FEET
67	375.92 FEET
68	375.92 FEET
69	375.92 FEET
70	375.92 FEET
71	375.92 FEET

UNCLASSIFIED CONFIDENTIAL SECURITY INFORMATION

CASE SYSTEM OF RECORDS

NO. OF SPECIFICITY	...
72	...
73	...
74	...
75	...
76	...
77	...
78	370.00 FEET
79	370.00 FEET
80	370.00 FEET
81	370.00 FEET
82	370.00 FEET
83	370.00 FEET
84	370.00 FEET
85	370.00 FEET
86	370.00 FEET
87	370.00 FEET
88	370.00 FEET
89	370.00 FEET
90	370.00 FEET
91	370.00 FEET
92	370.00 FEET
93	370.00 FEET
94	370.00 FEET
95	370.00 FEET
96	370.00 FEET
97	370.00 FEET
98	370.00 FEET
99	370.00 FEET
00	370.00 FEET

ANNUAL CAPITAL BUDGETING AND INVESTMENT PROJECT - PART 2

CASE SYSTEM OF INVESTMENT: PIPING

NUMBER SPECIFICATION      AMOUNT      PERCENT

88		373,000	8.8%
89		374,000	8.8%
90		375,000	8.8%
91		376,000	8.9%
92		377,000	8.9%
93		378,000	8.9%
94		379,000	8.9%
95		380,000	9.0%
96		381,000	9.0%
97		382,000	9.0%
98		383,000	9.0%
99		384,000	9.1%
100		385,000	9.1%
101		386,000	9.1%
102		387,000	9.1%
103		388,000	9.2%
104		389,000	9.2%
105		390,000	9.2%
106		391,000	9.2%
107		392,000	9.3%
108		393,000	9.3%
109		394,000	9.3%
110		395,000	9.3%
111		396,000	9.4%
112		397,000	9.4%
113		398,000	9.4%

APPROXIMATE QUANTITIES FOR PIPE INSTALLATION PROJECT PART-2

CASE SYSTEM OF APPROXIMATE 2-1/2" DIA. 10-SPRINKLERS

LINE NO.	SPECIFICATION	ELEVATION	COMMENT
114		342.50 FEET	
115		342.50 FEET	
116		341.17 FEET	
117		341.17 FEET	
118		341.17 FEET	
119		341.17 FEET	
120		341.17 FEET	
121		341.17 FEET	
122		341.17 FEET	
123		341.17 FEET	
124		341.17 FEET	
125		341.17 FEET	
126		341.17 FEET	
127		339.50 FEET	
128		339.50 FEET	
129		339.50 FEET	
130		341.17 FEET	
131		341.17 FEET	
132		341.17 FEET	
133		341.17 FEET	
134		341.17 FEET	

CASE SYSTEM OF MASS: ...

NO. SPECIFICATED ... COMMENT

135	341.17 FEET
136	341.17 FEET
137	342.00 FEET
138	341.17 FEET
139	344.33 FEET
140	341.17 FEET
141	344.33 FEET
142	341.17 FEET
143	344.33 FEET
144	341.17 FEET
145	344.33 FEET
146	341.17 FEET
147	355.00 FEET
148	341.17 FEET
149	355.00 FEET
150	341.17 FEET
151	355.00 FEET
152	341.17 FEET
153	355.00 FEET
154	341.17 FEET
155	355.00 FEET

CASE SYSTEM OF ANALYSIS

CASE	SYSTEM OF ANALYSIS	...
154	SPECIFICITY	...
155		361.17 EFFI
156		387.50 EFFI
157		361.17 EFFI
158		361.17 EFFI
159		361.17 EFFI
160		361.17 EFFI
161		361.17 EFFI
162		361.17 EFFI
163		361.17 EFFI
164		361.17 EFFI
165		361.17 EFFI
166		361.17 EFFI
167		361.17 EFFI
168		361.17 EFFI
169		361.17 EFFI
170		361.17 EFFI
171		361.17 EFFI
172		361.17 EFFI
173		361.17 EFFI
174		361.17 EFFI
175		361.17 EFFI
176		361.17 EFFI

AND/OR THE QUALITY OF THE PRODUCT PART-2

CASE SYSTEM OF ANGES: 2-4-05-0000-0000-0000

NAME	SPECIFICATION	PRICE
177		384.50 FFBI
178		384.50 FFBI
179		384.50 FFBI
180		384.50 FFBI
181		384.50 FFBI
182		384.50 FFBI
183		384.50 FFBI
184		384.50 FFBI
185		384.50 FFBI
186		384.50 FFBI
187		384.50 FFBI
188		384.50 FFBI
189		411.67 FFBI
190		411.67 FFBI
191		411.67 FFBI
192		411.67 FFBI
193		411.67 FFBI
194		411.67 FFBI
195		411.67 FFBI
196		411.67 FFBI
197		411.67 FFBI



AMERICAN CONTAINER CORP. WIRE INSTALLATION PROJECT - PART 2

CASE SYSTEMS: WIRE SCHEDULE

NO. & WIRE	SPECIFICATION	LENGTH	UNIT
190		344.50	FEET
191		411.67	FEET
192		344.50	FEET
193		411.67	FEET
194		344.50	FEET
195		411.67	FEET
196		344.50	FEET
197		411.67	FEET
198		344.50	FEET
199		411.67	FEET
200		344.50	FEET
201		411.67	FEET
202		344.50	FEET
203		411.67	FEET
204		344.50	FEET
205		411.67	FEET
206		344.50	FEET
207		411.67	FEET
208		344.50	FEET
209		411.67	FEET
210		344.50	FEET
211		411.67	FEET
212		344.50	FEET
213		411.67	FEET
214		344.50	FEET
215		411.67	FEET
216		344.50	FEET
217		411.67	FEET
218		344.50	FEET

CASE SYSTEM DEMANDS: 20-150 FEET, 20-100 FEET

LINE	SPECIFICATION	ELEVATION	COMMENT
219		421.00 FEET	
220		417.00 FEET	
221		421.00 FEET	
222		414.00 FEET	
223		421.00 FEET	
224		427.00 FEET	
225		421.00 FEET	
226		424.00 FEET	
227		421.00 FEET	
228		427.00 FEET	
229		420.50 FEET	
230		423.00 FEET	
231		420.50 FEET	
232		422.75 FEET	
233		420.50 FEET	
234		422.75 FEET	
235		420.50 FEET	
236		422.75 FEET	
237		431.50 FEET	
238		421.50 FEET	
239		431.50 FEET	

PROJECT

UNIT 2: (1988-1991)

14 1974 17:30

1. 1. 1988

1988 40

4. 1. 1988 (1988-1991) - 1. 1. 1988 (1988-1991) - 1. 1. 1988 (1988-1991)

CASE

SYSTEM OF ACCOUNTS FOR THE YEAR 1988

Ch

FINANCIAL STATEMENT FOR 1988

INVESTIGATION PROJECT PART-2

CASE SYSTEM [unclear] [unclear] [unclear] [unclear] [unclear] [unclear]  
 COMMENT [unclear] [unclear] [unclear]

EMOTION COEFFICIENT [unclear] [unclear] [unclear]

FLIGHT NUMBER	FLIGHT NUMBER	FLIGHT NUMBER	FLIGHT NUMBER	FLIGHT NUMBER	FLIGHT NUMBER	COMMENT
1	1	2	100.0	10.00	120.0	
3	3	4	8.000	10.00	120.0	
5	5	6	8.170	10.00	120.0	
7	7	8	8.500	10.00	120.0	
9	9	10	22.00	10.00	120.0	
11	11	12	21.50	10.00	120.0	
13	13	14	15.50	10.00	120.0	
15	15	16	7.000	10.00	120.0	
17	17	18	7.000	10.00	120.0	
19	19	20	7.100	11.00	120.0	
21	21	22	1.000	10.00	120.0	
23	23	24	8.000	8.000	120.0	
25	25	26	8.000	8.000	120.0	
27	27	28	17.00	8.000	120.0	
29	29	30	8.000	8.000	120.0	
31	31	32	8.000	8.000	120.0	
33	33	34	8.000	8.000	120.0	
35	35	36	4.170	8.000	120.0	
37	37	38	8.500	8.000	120.0	
39	39	40	8.500	8.000	120.0	
41	41	42	23.00	8.000	120.0	

UNIVERSITY OF CALIFORNIA - RIVERSIDE INSTALLATION PROJECT PART 2

CASE SYSTEM DEMANDS: 2-1980 - FLS. 2-1980 RIFES

ELEMENT NUMBER	NO. OF	LENGTH	PIPE	PER	PER	COMMENT
II	III	FEET	INCHES	INCHES	INCHES	
43	43	64	1.250	4.000	120.0	
44	44	65	2.167	4.000	120.0	
45	45	66	2.000	4.000	120.0	
46	46	67	1.250	4.000	120.0	
47	47	68	2.167	4.000	120.0	
48	48	69	1.000	4.000	120.0	
49	49	70	10.67	4.000	120.0	
50	50	71	2.170	4.000	120.0	
51	51	72	10.67	4.000	120.0	
52	52	73	2.330	4.000	120.0	
53	53	74	1.000	4.000	120.0	REMOVED 4X3 RFD
54	54	75	2.170	4.000	120.0	
55	55	76	3.400	4.000	120.0	
56	56	77	2.000	4.000	120.0	
57	57	78	1.000	4.000	120.0	
58	58	79	3.400	4.000	120.0	
59	59	80	2.167	4.000	120.0	
60	60	81	2.500	4.000	120.0	
61	61	82	2.500	4.000	120.0	
62	62	83	1.000	4.000	120.0	
63	63	84	2.000	4.000	120.0	

ANALOG TELEPHONE SYSTEM INSTALLATION PROJECT PART-2

CASE SYSTEM DEMANDS: 2-ROSE 2-ELLS 2-SPRINGERS

ELEMENT NUMBER	FROM	TO	LENGTH FEET	DIAMETER INCHES	EXTRACTION CURF.	COMMENT
85	85	86	2.230	3.000	120.0	
87	87	88	2.400	3.000	120.0	
89	89	90	2.000	3.000	120.0	
91	91	92	2.200	3.000	120.0	
93	93	94	4.500	3.000	120.0	
95	95	96	1.250	3.000	120.0	
97	97	98	2.300	3.000	120.0	
99	99	100	2.300	3.000	120.0	
101	101	102	2.300	3.000	120.0	
102	102	103	30.00	3.000	120.0	
105	105	106	2.200	3.000	120.0	
107	107	108	5.800	4.000	120.0	
109	109	110	4.300	4.000	120.0	
111	111	112	14.00	4.000	120.0	
113	113	114	4.500	4.000	120.0	
115	115	116	4.300	4.000	120.0	
117	117	118	1.250	4.000	120.0	
119	119	120	3.500	4.000	120.0	
121	121	122	17.50	4.000	120.0	
123	123	124	6.500	4.000	120.0	
125	125	126	2.300	4.000	120.0	

CASE SYSTEM: [illegible]

ELEMENT NUMBER	ADJ	ST	START	END	AMOUNT	COMMENT
127	127	128	2,500	3,000	120.0	
129	129	130	2,700	3,000	121.0	
131	131	132	4,170	4,000	120.0	
133	133	134	2,900	4,000	120.0	
135	135	136	1,000	4,000	120.0	
137	137	138	3,100	3,000	120.0	
139	141	143	5,020	3,000	120.0	
141	145	147	10,170	3,000	120.0	
143	151	153	4,670	3,000	120.0	
145	155	157	3,000	3,000	120.0	
147	159	161	1,330	3,000	120.0	
149	163	165	1,500	3,000	120.0	
151	167	169	1,100	3,000	120.0	
153	171	173	23,800	3,000	120.0	
155	175	177	3,000	3,000	120.0	
157	179	181	1,000	3,000	120.0	
159	183	185	9,800	3,000	120.0	
161	187	189	27,000	3,000	120.0	
163	191	193	3,000	3,000	120.0	
165	195	197	6,700	3,000	120.0	
167	199	201	28,500	3,000	120.0	

AND... (partially illegible)

CASE SYSTEM COMMENTS: 2-10-74 3-1-74 3-1-74 3-1-74

ELEMENT NUMBER	INDEX	LENGTH FEET	11/17/74	3/1/74	3/1/74	3/1/74	ELEMENT
170	203	205	4,000	3,000	120.0		
172	207	209	1,330	3,000	120.0		
174	211	213	4,000	3,000	120.0		
176	215	217	2,400	3,000	120.0		
178	219	221	3,300	3,000	120.0		
180	223	225	25,000	3,000	120.0		
182	227	229	5,500	3,000	120.0		
184	231	233	4,000	3,000	120.0		
186	235	237	4,000	3,000	120.0		
188	138	140	19.33	3,000	120.0		
192	142	144	22.33	3,000	120.0		
194	146	148	19.75	3,000	120.0		
196	150	152	1,000	3,000	120.0		
198	154	156	3,750	3,000	120.0		
200	158	160	3,000	3,000	120.0		
212	152	164	13.41	3,000	120.0		
214	166	168	10.50	3,000	120.0		
216	170	172	17.50	3,000	120.0		
218	174	176	5,000	3,000	120.0		
219	178	180	11.00	3,000	120.0		
217	182	184	11.50	3,000	120.0		



CASE SYSTEM OPERATIONS: 2-1-79 2-1-79 2-1-79

FILE #	NODES	LENGTH	START	END	COMMENT
NUMBER	II	III	IIII	IIIIII	IIIIIIII
214	186	188	13.00	3.000	120.0
215	190	192	21.00	3.000	120.0
216	194	196	25.00	3.000	120.0
221	198	200	3.300	3.000	120.0
222	202	204	3.300	3.000	120.0
224	206	208	5.700	3.000	120.0
225	210	212	22.00	3.000	120.0
226	214	216	17.00	3.000	120.0
230	218	220	30.00	3.000	120.0
232	222	224	14.50	3.000	120.0
234	226	228	4.000	3.000	120.0
236	230	232	4.700	3.000	120.0

COMMENT: TWELVE ELEMENTS

ELEMENT	NODES	T VALUE	V F	INPUT	FUNCTION	FACTORS
NUMBER	II	III	IIII	IIIIII	IIIIIIII	IIIIIIII
					FORWARD	REVERSE
2	2	3	1	11.000	.60000	.60000
4	4	5	1	10.000	.60000	.60000
6	6	7	1	10.000	.60000	.60000
8	8	9	1	11.000	.60000	.60000
10	10	11	1	10.000	.60000	.60000
12	12	13	1	11.000	.60000	.60000
14	14	15	1	11.000	.60000	.60000

PRINT REPORT

DATE

17:38

PAGE

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CASE SYSTEM REPORT PRINT REPORTS

TOTAL

DATE	TIME	TYPE	DICTIONARY	REVERSE
15	14	17	10000	60000
16	14	14	10000	60000
17	20	21	10000	60000
18	22	22	10000	13300
19	24	24	10000	60000
20	25	25	10000	60000
21	27	27	10000	60000
22	28	28	10000	60000
23	30	31	10000	60000
24	32	32	10000	60000
25	34	34	10000	60000
26	36	36	10000	60000
27	37	37	10000	60000
28	38	38	10000	60000
29	40	41	10000	60000
30	42	43	10000	60000
31	44	45	10000	60000
32	46	47	10000	11500
33	47	48	10000	60000
34	49	50	10000	60000
35	51	52	10000	60000
36	52	53	10000	60000
37	54	55	10000	60000

EAST OF THE RIVER  
 PROJECT # 17-12  
 3/27/54  
 SUBJECT # 17-12

CESI

PROJECT # 17-12  
 3/27/54  
 SUBJECT # 17-12

57	57	40000	1	40000	40000
58	58	40000	1	40000	40000
59	59	40000	1	40000	40000
60	60	40000	1	40000	40000
61	61	40000	1	40000	40000
62	62	40000	1	40000	40000
63	63	40000	1	40000	40000
64	64	40000	1	40000	40000
65	65	40000	1	40000	40000
66	66	40000	1	40000	40000
67	67	40000	1	40000	40000
68	68	40000	1	40000	40000
69	69	40000	1	40000	40000
70	70	40000	1	40000	40000
71	71	40000	1	40000	40000
72	72	40000	1	40000	40000
73	73	40000	1	40000	40000
74	74	40000	1	40000	40000
75	75	40000	1	40000	40000
76	76	40000	1	40000	40000
77	77	40000	1	40000	40000
78	78	40000	1	40000	40000
79	79	40000	1	40000	40000
80	80	40000	1	40000	40000
81	81	40000	1	40000	40000
82	82	40000	1	40000	40000
83	83	40000	1	40000	40000
84	84	40000	1	40000	40000
85	85	40000	1	40000	40000
86	86	40000	1	40000	40000
87	87	40000	1	40000	40000
88	88	40000	1	40000	40000
89	89	40000	1	40000	40000
90	90	40000	1	40000	40000
91	91	40000	1	40000	40000
92	92	40000	1	40000	40000
93	93	40000	1	40000	40000
94	94	40000	1	40000	40000
95	95	40000	1	40000	40000
96	96	40000	1	40000	40000
97	97	40000	1	40000	40000
98	98	40000	1	40000	40000
99	99	40000	1	40000	40000
100	100	40000	1	40000	40000

1 40000 40000



APPENDIX 2 CONTINUATION OF THE PIPE INSTALLATION PROJECT PART 2

CASE SYSTEM: 2000 2000 2000 2000 2000 2000

ELEMENT NUMBER	II	II	1	1	1	FACTORS
NUMBER	II	II	1	1	1	REVERSE
143	164	161	1	1	1	.60000
144	163	158	1	1	1	.60000
147	157	154	1	1	1	.60000
149	161	150	1	1	1	.60000
151	165	167	1	1	1	.60000
154	168	171	1	1	1	.60000
155	173	175	1	1	1	.44000
157	177	179	1	1	1	.60000
158	161	163	1	1	1	.60000
161	185	187	1	1	1	.60000
163	189	191	1	1	1	.60000
165	193	195	1	1	1	.60000
167	197	199	1	1	1	.60000
169	201	203	1	1	1	.60000
171	205	207	1	1	1	.60000
173	209	211	1	1	1	.60000
175	213	215	1	1	1	.60000
177	217	219	1	1	1	.60000
179	221	223	1	1	1	.60000
181	225	227	1	1	1	.60000
183	229	231	1	1	1	.60000

INSTALLATION PROJECT PART 2

CASE SYSTEM ANALYSIS: ZEROISE REFLECTORS

ELEMENT NUMBER	NODES		TYPE	MAY. 1974	FACTORS	
	I	J			FORWARD	REVERSE
145	237	238	1	3.0000	.60000	.60000
147	247	238	1	1.5000	5.0000	5.0000
149	136	138	1	3.0000	.44000	.44000
141	140	142	1	3.0000	.45000	.45000
143	144	146	1	3.0000	.60000	.60000
145	148	150	1	3.0000	.60000	.60000
147	152	154	1	3.0000	.60000	.60000
149	156	158	1	3.0000	.60000	.60000
<del>201</del>	<del>160</del>	<del>162</del>	1	3.0000	.60000	.60000
203	164	166	1	3.0000	.60000	.60000
205	168	170	1	3.0000	.60000	.60000
207	172	174	1	3.0000	.44000	.44000
209	176	178	1	3.0000	.60000	.60000
211	180	182	1	3.0000	.60000	.60000
213	184	186	1	3.0000	.60000	.60000
215	188	190	1	3.0000	.60000	.60000
217	192	194	1	3.0000	.60000	.60000
219	196	198	1	3.0000	.60000	.60000
221	200	202	1	3.0000	.60000	.60000
223	204	206	1	3.0000	.60000	.60000
225	208	210	1	3.0000	.60000	.60000

CASE SYSTEM DEMONSTRATION: HOSE REEL, SPRINKLER

ELEMENT NUMBER	NODES	TYPE	FRIC	FLOW	HEIGHT	REVERSE
227	212 214	1	3.0000	.44000	.44000	
227	215 216	1	3.0000	.44000	.44000	
227	223 222	1	3.0000	.44000	.44000	
227	224 226	1	3.0000	.44000	.44000	
227	224 219	1	3.0000	.44000	.44000	
227	232 214	1	1.5000	5.0000	5.0000	

COMMENT: SPRINKLER ELEMENT FOLLOWS

ELEMENT NUMBER	NODES	TYPE	FRIC	FLOW	HEIGHT	REVERSE	NOTES
103	103 105	1	3.0000	145.000	152.000		BOTH SPRINKLERS (103) ARE MODELED TOGETHER
184	212 214	1	1.5000	75.000	75.000		MODEL OF SPRINKLERS
232	214 214	1	1.5000	75.000	75.000		MODEL OF HR 2-43
232	214 214	1	1.5000	75.000	75.000		MODEL OF HR 2-44

SOLVE

NOTE: SPRINKLER CARDS WERE USED TO MODEL THE HOSE REELS (SEE FAAST MANUAL P. 4-12, SPRINKLER RECORD) BECAUSE THE SPRINKLER ELEMENT DEFINES ITS DISCHARGE TO HAVE ZERO GAUGE PRESSURE. ALSO, THE K FACTOR FOR THE SPRINKLER RECORD IS CALCULATED TO REPRESENT THE ACTUAL ELEMENT. THE FRICTION VALUE (K) IS DEFINED AS FOLLOWS:

$$K = \frac{\text{FLOW}}{(\text{PRESS})^{1/2}} = \frac{\text{GPM}}{\sqrt{\text{PRESS}}}$$

CALCULATE (K) FOR THE ABOVE SPRINKLER ELEMENTS:

(A) ELEMENT 103:  $K = \frac{(145 + 152) \text{ GPM}}{(21.49 \text{ PSI})^{1/2}} = \underline{\underline{64.07}}$

(B) ELEMENT 184:  $K = \frac{75}{(75)^{1/2}} = \underline{\underline{8.66}}$

(C) ELEMENT 232:  $K = \frac{75}{(75)^{1/2}} = \underline{\underline{8.66}}$

NUMBER OF NODES: 24  
 NUMBER OF ELEMENTS: 23  
 NODES: 24  
 ELEMENTS: 23  
 STORAGE USED: 1.00  
 STORAGE AVAILABLE: 1.00

LOADING CASE: 1  
 FLUID CHARACTERISTICS: WATER  
 DENSITY: 62.4  
 VISCOSITY: 2.14E-04  
 TEMPERATURE: 20.0

CASE SYSTEM DEMANDS: 2-BORE WELLS, 2-SPRINGERS

SITUATION: CONVERGENCE: 1.11E-02  
 AMT: .5549E+01 FEET

ELEMENT NUMBER	NODES	FLOW RATE	HEAD CHANGE FEET	DIAMETER INCHES	VELOCITY FPS
1	1 - 2	581.22	-1.25E-17	10.000	2.2425
3	3 - 4	581.22	-1.5567E-02	10.000	2.2425
5	5 - 6	581.22	-1.5127E-02	10.000	2.2425
7	7 - 8	581.22	-1.5783E-02	10.000	2.2425
9	9 - 10	581.22	-7.1454E-02	10.000	2.2425
11	11 - 12	581.22	-5.2711E-02	10.000	2.2425
13	13 - 14	581.22	-1.5101E-02	10.000	2.2425
15	15 - 16	581.22	-9.7332E-03	10.000	2.2425
17	17 - 18	581.22	-1.7182E-02	10.000	2.2425
19	19 - 20	581.22	-7.3551E-03	10.000	2.2425
21	21 - 22	581.22	-2.4517E-01	10.000	2.2425
23	23 - 24	581.22	-1.14827	6.0000	6.3683



CASE SYSTEMS: ...

5 ...

FILE NO	DATE	TIME	...	...	...	...	...
25	25	...	...	...	...	...	...
27	27	...	...	...	...	...	...
29	29	...	...	...	...	...	...
31	31	...	...	...	...	...	...
33	33	...	...	...	...	...	...
35	35	...	...	...	...	...	...
37	37	...	...	...	...	...	...
39	39	...	...	...	...	...	...
41	41	...	...	...	...	...	...
43	43	...	...	...	...	...	...
45	45	...	...	...	...	...	...
47	47	...	...	...	...	...	...
49	49	...	...	...	...	...	...
51	51	...	...	...	...	...	...
53	53	...	...	...	...	...	...
55	55	...	...	...	...	...	...
57	57	...	...	...	...	...	...
59	59	...	...	...	...	...	...
61	61	...	...	...	...	...	...
63	63	...	...	...	...	...	...
65	65	...	...	...	...	...	...
67	67	...	...	...	...	...	...
69	69	...	...	...	...	...	...
71	71	...	...	...	...	...	...
73	73	...	...	...	...	...	...
75	75	...	...	...	...	...	...
77	77	...	...	...	...	...	...
79	79	...	...	...	...	...	...
81	81	...	...	...	...	...	...
83	83	...	...	...	...	...	...
85	85	...	...	...	...	...	...
87	87	...	...	...	...	...	...
89	89	...	...	...	...	...	...
91	91	...	...	...	...	...	...
93	93	...	...	...	...	...	...
95	95	...	...	...	...	...	...
97	97	...	...	...	...	...	...
99	99	...	...	...	...	...	...

ALPHALITE-2 OBSERVATION OF THE ... PROJECT PART-2

CASE SYSTEM ...

ITERATION ... FEET

ELEMENT NUMBER	NODES	...	...	...	...	VELOCITY FPS	...
67	67	68	561.22	-0.11220	0.0000	14.329	HIGH
68	68	69	561.22	-0.11220	0.0000	14.329	HIGH
71	71	72	561.22	-0.11220	0.0000	14.329	HIGH
73	73	74	561.22	-0.11220	0.0000	14.329	HIGH
75	75	76	561.22	-0.11220	0.0000	14.329	HIGH
77	77	78	561.22	-0.11220	0.0000	14.329	HIGH
79	79	80	561.22	-0.11220	0.0000	14.329	HIGH
81	81	82	561.22	-0.11220	0.0000	14.329	HIGH
83	83	84	561.22	-0.11220	0.0000	14.329	HIGH
85	85	86	561.22	-0.11220	0.0000	25.473	HIGH
87	87	88	561.22	-0.11220	0.0000	25.473	HIGH
89	89	90	561.22	-0.11220	0.0000	25.473	HIGH
91	91	92	561.22	-0.11220	0.0000	25.473	HIGH
93	93	94	561.22	-0.11220	0.0000	25.473	HIGH
95	95	96	561.22	-0.11220	0.0000	25.473	HIGH
97	97	98	561.22	-0.11220	0.0000	25.473	HIGH
99	99	100	561.22	-0.11220	0.0000	25.473	HIGH
101	101	102	561.22	-0.26757	0.0000	25.473	HIGH
102	102	103	409.23	-145.35	0.0000	18.606	HIGH
105	105	106	151.29	-0.21521	0.0000	3.4625	
107	107	108	151.29	-0.10494	0.0000	3.4625	

ANALYSIS: Conductor and Cable Installation PROJECT PART-2

CASE: SYSTEM OF WIRE: 2-4000A, 2-4000B, 2-4000C, 2-4000D, 2-4000E, 2-4000F, 2-4000G, 2-4000H, 2-4000I, 2-4000J, 2-4000K, 2-4000L, 2-4000M, 2-4000N, 2-4000O, 2-4000P, 2-4000Q, 2-4000R, 2-4000S, 2-4000T, 2-4000U, 2-4000V, 2-4000W, 2-4000X, 2-4000Y, 2-4000Z

ITERATION: 1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 21.0, 22.0, 23.0, 24.0, 25.0, 26.0, 27.0, 28.0, 29.0, 30.0, 31.0, 32.0, 33.0, 34.0, 35.0, 36.0, 37.0, 38.0, 39.0, 40.0, 41.0, 42.0, 43.0, 44.0, 45.0, 46.0, 47.0, 48.0, 49.0, 50.0, 51.0, 52.0, 53.0, 54.0, 55.0, 56.0, 57.0, 58.0, 59.0, 60.0, 61.0, 62.0, 63.0, 64.0, 65.0, 66.0, 67.0, 68.0, 69.0, 70.0, 71.0, 72.0, 73.0, 74.0, 75.0, 76.0, 77.0, 78.0, 79.0, 80.0, 81.0, 82.0, 83.0, 84.0, 85.0, 86.0, 87.0, 88.0, 89.0, 90.0, 91.0, 92.0, 93.0, 94.0, 95.0, 96.0, 97.0, 98.0, 99.0, 100.0

ELEMENT NUMBER	NO. 1	NO. 2	NO. 3	NO. 4	NO. 5	NO. 6	VELOCITY FPS
109	109	110	151.29	-0.0000	4.0000		3.4625
111	111	112	151.29	-0.0000	4.0000		3.4625
113	113	114	151.29	-0.0000	4.0000		3.4625
115	115	116	151.29	-0.0000	4.0000		3.4625
117	117	118	151.29	-0.0000	4.0000		3.4625
119	119	120	151.29	-0.0000	4.0000		3.4625
121	121	122	151.29	-0.0000	4.0000		3.4625
123	123	124	151.29	-0.0000	4.0000		3.4625
125	125	126	151.29	-0.0000	4.0000		3.4625
127	127	128	151.29	-0.0000	4.0000		3.4625
129	129	130	151.29	-0.0000	4.0000		3.4625
131	131	132	151.29	-0.0000	4.0000		3.4625
133	133	134	151.29	-0.0000	4.0000		3.4625
135	135	136	151.29	-0.0000	4.0000		3.4625
137	137	138	75.612	-0.0000	3.0000		3.4450
139	139	140	75.612	-0.0000	3.0000		3.4450
141	141	142	75.612	-0.0000	3.0000		3.4450
143	143	144	75.612	-0.0000	3.0000		3.4450
145	145	146	75.612	-0.0000	3.0000		3.4450
147	147	148	75.612	-0.0000	3.0000		3.4450
149	149	150	75.612	-0.0000	3.0000		3.4450
151	151	152	75.612	-0.0000	3.0000		3.4450
153	153	154	75.612	-0.0000	3.0000		3.4450
155	155	156	75.612	-0.0000	3.0000		3.4450
157	157	158	75.612	-0.0000	3.0000		3.4450
159	159	160	75.612	-0.0000	3.0000		3.4450
161	161	162	75.612	-0.0000	3.0000		3.4450
163	163	164	75.612	-0.0000	3.0000		3.4450

CASE SYSTEM DESIGN: 2-INCH 2-CELL, 12-CELL, 18-CELL

ITERATION: 1000000 TO 100000000 1.0000000000 1.5649E-01 FEET

ELEMENT NUMBER	INCHES	FEET	FRIC.	HEAD LOSS (FEET)	DISCHARGE (MGDS)	VELOCITY (FPS)
162	167	171	75.412	-2.131E+00	3.0000	3.4456
164	171	173	75.412	-2.300E+00	3.0000	3.4456
166	175	177	75.412	-2.482E+00	3.0000	3.4456
168	179	181	75.412	-2.671E+00	3.0000	3.4456
169	183	185	75.412	-2.867E+00	3.0000	3.4456
162	187	189	75.412	-3.071E+00	3.0000	3.4456
164	191	193	75.412	-3.284E+00	3.0000	3.4456
166	195	197	75.412	-3.507E+00	3.0000	3.4456
168	199	201	75.412	-3.740E+00	3.0000	3.4456
170	203	205	75.412	-3.984E+00	3.0000	3.4456
172	207	209	75.412	-4.239E+00	3.0000	3.4456
174	211	213	75.412	-4.506E+00	3.0000	3.4456
176	215	217	75.412	-4.786E+00	3.0000	3.4456
178	219	221	75.412	-5.079E+00	3.0000	3.4456
180	223	225	75.412	-5.386E+00	3.0000	3.4456
182	227	229	75.412	-5.707E+00	3.0000	3.4456
184	231	233	75.412	-6.043E+00	3.0000	3.4456
186	235	237	75.412	-6.395E+00	3.0000	3.4456
188	239	241	75.374	-6.763E+00	3.0000	3.4211
190	243	245	75.374	-7.148E+00	3.0000	3.4211
192	247	249	75.374	-7.550E+00	3.0000	3.4211
194	251	253	75.374	-7.970E+00	3.0000	3.4211

UNIT 21-192 5121

DATE 1979 17:30

3. 7. 1979

DATE 1979

SYSTEM ANALYSIS

CASE

5 170-172 174 176 178 180 182 184 186 188 190 192 194 196 198 200 202 204 206 210 212 214 216 218 220 222 224 226 230 232

FILE NO	NO OF	NO OF	FILE	NO OF	FILE	VELOCITY
NUMBER	11	12	NO	13	14	MS
170	150	152	75.374	-2.197000E-02	1.00000	3.4211
172	154	156	75.374	-7.410000E-02	1.00000	3.4211
174	158	160	75.374	-0.311400E-02	1.00000	3.4211
176	162	164	75.374	-.25210	1.00000	3.4211
178	166	168	75.374	-.22092	1.00000	3.4211
180	170	172	75.374	-.30940	1.00000	3.4211
182	174	176	75.374	-.11750	1.00000	3.4211
184	178	180	75.374	-.23100	1.00000	3.4211
186	182	184	75.374	-.20100	1.00000	3.4211
188	186	188	75.374	-.21000	1.00000	3.4211
190	190	192	75.374	-.40070	1.00000	3.4211
192	194	196	75.374	-1.051400E-02	1.00000	3.4211
194	198	200	75.374	-7.310000E-02	1.00000	3.4211
196	202	204	75.374	-7.000000E-02	1.00000	3.4211
198	206	208	75.374	-.12260	1.00000	3.4211
200	210	212	75.374	-.40000	1.00000	3.4211
202	214	216	75.374	-.37703	1.00000	3.4211
204	218	220	75.374	-.53110	1.00000	3.4211
206	222	224	75.374	-.40000	1.00000	3.4211
208	226	228	75.374	-.410000E-02	1.00000	3.4211
210	230	232	75.374	-.437000E-02	1.00000	3.4211



PART 2: PIPE SIZES  
 12.00 HOLE

NOV 5, 1974 17:34  
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ASPHALT-2 CONCRETE AIR-SEAL INSTALLATION PROJECT PART-2

CASE SYSTEM (1) CASE (2) PIPE SIZES (3) HOLE

SUBSTRATE (4) CONCRETE (5) DUCT (6) AIR-SEAL (7) CASE (8) HOLE (9) FEET

ELEMENT NUMBER	NO. 11	NO. 12	NO. 13	NO. 14	NO. 15	NO. 16	NO. 17	NO. 18	NO. 19	FEET
45	46	47	1	.50000	.50000	561.22				-1.9144
46	48	49	1	.51150	.51150	561.22				-1.9682
47	47	48	1	.50000	.50000	561.22				-1.9144
48	48	49	1	.50000	.50000	561.22				-1.9144
49	49	50	1	.50000	.50000	561.22				-1.9144
50	50	51	1	.50000	.50000	561.22				-1.9144
51	51	52	1	.50000	.50000	561.22				-1.9144
52	52	53	1	.50000	.50000	561.22				-1.9144
53	53	54	1	.50000	.50000	561.22				-1.9144
54	54	55	1	.50000	.50000	561.22				-1.9144
55	55	56	1	.50000	.50000	561.22				-1.9144
56	56	57	1	.50000	.50000	561.22				-1.9144
57	57	58	1	.50000	.50000	561.22				-1.9144
58	58	59	1	.50000	.50000	561.22				-1.9144
59	59	60	1	.50000	.50000	561.22				-1.9144
60	60	61	1	.50000	.50000	561.22				-1.9144
61	61	62	1	.50000	.50000	561.22				-1.9144
62	62	63	1	.50000	.50000	561.22				-1.9144
63	63	64	1	.50000	.50000	561.22				-1.9144
64	64	65	1	.50000	.50000	561.22				-1.9144
65	65	66	1	.50000	.50000	561.22				-1.9144
66	66	67	1	.50000	.50000	561.22				-1.9144
67	67	68	1	.50000	.50000	561.22				-1.9144
68	68	69	1	.50000	.50000	561.22				-1.9144
69	69	70	1	.50000	.50000	561.22				-1.9144
70	70	71	1	.50000	.50000	561.22				-1.9144
71	71	72	1	.50000	.50000	561.22				-1.9144
72	72	73	1	.50000	.50000	561.22				-1.9144
73	73	74	1	.50000	.50000	561.22				-1.9144
74	74	75	1	.50000	.50000	561.22				-1.9144
75	75	76	1	.50000	.50000	561.22				-1.9144
76	76	77	1	.50000	.50000	561.22				-1.9144
77	77	78	1	.50000	.50000	561.22				-1.9144
78	78	79	1	.50000	.50000	561.22				-1.9144
79	79	80	1	.50000	.50000	561.22				-1.9144
80	80	81	1	.50000	.50000	561.22				-1.9144
81	81	82	1	.50000	.50000	561.22				-1.9144
82	82	83	1	.50000	.50000	561.22				-1.9144
83	83	84	1	.50000	.50000	561.22				-1.9144
84	84	85	1	.50000	.50000	561.22				-1.9144

CASE SYSTEM RECORDS

8 RECORDS

HEAD CHANGE FEET

DATE	TIME	DEPTH (FEET)	TEMP (C)	TEMP (F)	WIND (MPS)	WIND (KTS)	DIR (DEG)	PRES (HPa)	PRES (IN)	REL HUM (%)	SEA STATE	WAVE DIR (DEG)	WAVE PER (S)	WAVE HGT (M)	WAVE HGT (FT)	WAVE PER (S)	WAVE HGT (M)	WAVE HGT (FT)
1974	04	17	17:34	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	17:31	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	17:28	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	17:25	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	17:22	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	17:19	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	17:16	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	17:13	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	17:10	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	17:07	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	17:04	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	17:01	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	16:58	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	16:55	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	16:52	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	16:49	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	16:46	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	16:43	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98
1974	04	17	16:40	17.00	62.60	1.00	180	1013.00	29.91	70	1	180	10	0.30	0.98	10	0.30	0.98



CASE: SYSTEM ANALYSIS - STRESS ANALYSIS - STRESS ANALYSIS

ITERATION: 5, CONVERGENCE: YES, DISPLACEMENT: 0.000000, STRESS: 0.000000, STRAIN: 0.000000, DEFLECTION: 0.000000 FEET

ELEMENT NUMBER	NODE I	NODE J	TYPE	TYPICAL PROPERTIES		STRESS	DEFLECTION
				EXCITATION	REVERSE		
130	130	131	1	.45000	.45000	151.29	-.10433
132	132	133	1	.45000	.45000	151.29	-.10433
134	134	135	1	.45000	.45000	151.29	-.10433
136	136	137	1	.60000	.60000	75.912	-.11070
138	138	141	1	.60000	.60000	75.912	-.11070
140	140	143	1	.60000	.60000	75.912	-.11070
142	142	149	1	.60000	.60000	75.912	-.11070
144	144	151	1	.60000	.60000	75.912	-.11070
146	146	153	1	.60000	.60000	75.912	-.11070
148	148	157	1	.60000	.60000	75.912	-.11070
150	150	159	1	.60000	.60000	75.912	-.11070
152	152	167	1	.60000	.60000	75.912	-.11070
154	154	171	1	.60000	.60000	75.912	-.11070
156	156	173	1	.60000	.60000	75.912	-.11774E-02
158	158	177	1	.60000	.60000	75.912	-.11070
160	160	183	1	.60000	.60000	75.912	-.11070
162	162	187	1	.60000	.60000	75.912	-.11070
164	164	181	1	.60000	.60000	75.912	-.11070
166	166	198	1	.60000	.60000	75.912	-.11070
168	168	147	1	.60000	.60000	75.912	-.11070
169	201	203	1	.60000	.60000	75.912	-.11070

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ELEMENT NUMBER	TYPE	FROM	TO	LENGTH	HEIGHT	AREA	PERIMETER	HEAT CHANGE FEET
171	215	207	1	.50000	.50000	75.912	-.11070	
173	214	211	1	.50000	.50000	75.912	-.11070	
175	213	215	1	.50000	.50000	75.912	-.11070	
177	217	214	1	.50000	.50000	75.912	-.11070	
179	221	223	1	.50000	.50000	75.912	-.11070	
181	225	227	1	.50000	.50000	75.912	-.11070	
183	229	231	1	.50000	.50000	75.912	-.11070	
185	233	235	1	.50000	.50000	75.912	-.11070	
187	237	239	1	.50000	.50000	75.912	-14.760	
189	135	137	1	.50000	.50000	75.374	-5.00300E-02	
191	140	142	1	.50000	.50000	75.374	-5.18488E-02	
193	144	146	1	.50000	.50000	75.374	-.10913	
195	148	150	1	.50000	.50000	75.374	-.10913	
197	152	154	1	.50000	.50000	75.374	-.10913	
199	156	158	1	.50000	.50000	75.374	-.10913	
201	160	162	1	.50000	.50000	75.374	-.10913	
203	164	166	1	.50000	.50000	75.374	-.10913	
205	168	170	1	.50000	.50000	75.374	-.10913	
207	172	174	1	.50000	.50000	75.374	-5.00300E-02	
209	176	178	1	.50000	.50000	75.374	-.10913	
211	180	182	1	.50000	.50000	75.374	-.10913	

APPROXIMATE COORDINATES FOR THE INSTALLATION PROJECT PART-2

CASE SYSTEM: 2-DIMENSIONAL ELASTICITY

5 ITERATIONS OF THE NEWTON-RAPHSON METHOD. MAXIMUM DISPLACEMENT = 1.0000E-01 FEET

ELEMENT NUMBER	NODES		TYPE	MATERIAL PROPERTIES		EQUATION NUMBER	FLOW CURV	HEAD CHANGE FEET
	II	III		EX (K/IN)	NU (K/IN)			
213	194	195	1	.50000E+01	.50000E+01		75.374	-.10913
214	194	199	1	.50000E+01	.50000E+01		75.374	-.10913
217	192	194	1	.50000E+01	.50000E+01		75.374	-.10913
218	194	195	1	.50000E+01	.50000E+01		75.374	-.10913
221	204	202	1	.50000E+01	.50000E+01		75.374	-.10913
223	204	205	1	.50000E+01	.50000E+01		75.374	-.10913
225	204	210	1	.50000E+01	.50000E+01		75.374	-.10913
227	212	214	1	.50000E+01	.50000E+01		75.374	-5.00300E-02
229	216	215	1	.50000E+01	.50000E+01		75.374	-5.00300E-02
231	221	222	1	.50000E+01	.50000E+01		75.374	-5.00300E-02
233	224	225	1	.50000E+01	.50000E+01		75.374	-.10913
235	224	230	1	.50000E+01	.50000E+01		75.374	-.10913
237	232	234	1	.50000E+01	.50000E+01		75.374	-14.551

CONTINUED CALCULATION OF HEAD LOSS INSTALLATION PROJECT PART-2

CASE SYSTEM OF PIPES: 2-DOSE HEAD LOSS: 2-DOSE HEAD LOSS

5 ITERATIONS CONSIDERED TO 41/2 MIN 4.01 50445-01 FEET

ELEMENT NUMBER	NO. OF JOINTS	DIAMETER IN INCHES	LENGTH FEET	ROUGHNESS COEFFICIENT	LOSS FACTOR	HEAD LOSS FEET	HEAD-CHANGE FEET
100-103	105	3.00	504.1	0.01	17.5	619.	-194.5
100-204	23	1.50	504.1	0.01	75.9	-177.	
200-204	23	1.50	504.1	0.01	75.4	-175.	

AND UNIT-2 CONTAINMENT FIRE HOSE INSTALLATION PROJECT PART-2

CASE SYSTEM DEMANDS: 2-HOSE REELS, 2-SPRINKLERS

5 ITERATIONS, CONVERGED TO 2102 GPM AND 173.37 PSI

NODE	FLOW GPM	ELEVATION FEET	HEAD FEET	PRESSURE PSI
0001	561.22	344.73	744.61	173.37
2	0.	344.73	744.30	173.26
3	0.	344.73	744.31	173.24
4	0.	344.00	744.30	175.55
5	0.	344.00	744.25	175.52
6	0.	344.00	744.24	175.52
7	0.	344.00	744.19	175.50
8	0.	344.00	744.17	175.49
9	0.	344.00	744.12	175.47
10	0.	344.00	744.06	175.44
11	0.	344.00	744.00	175.41
12	0.	344.00	744.94	175.39
13	0.	344.00	744.00	175.37
14	0.	344.00	744.46	175.35
15	0.	344.00	744.01	175.33
16	0.	344.00	744.00	175.33
17	0.	344.00	744.75	175.31
18	0.	337.00	744.73	174.33
19	0.	337.00	744.64	174.31
20	0.	337.00	744.67	174.31
21	0.	337.00	744.67	174.29

NOTE: NODE #1 WAS DEFINED IN THIS ANALYSIS TO HAVE 173.37 PSI FROM THE RESULT OF PART-1. THE PROGRAM SOLVED FOR THE FLOW AT NODE 1, RESULTING IN 561.22 GPM. THIS EXTRA FLOW DOES NOT AFFECT THE PRESSURE CALC. BECAUSE THE PUMP CURVE IS A CONSTANT BETWEEN 500 - 1000 GPM.

(SEE PUMP CURVE P. 9 OF 15.)

CASE SYSTEM: [unclear] [unclear] [unclear]

5 ELEVATIONS: [unclear] [unclear] [unclear] [unclear] [unclear] FEET

DATE	FLOW M3/S	ELEVATION FEET	TIME FEET	PRESSURE PSI
22	1.	344.30	747.02	177.45
23	1.	344.30	747.04	177.56
24	1.	344.30	747.35	174.72
25	1.	344.40	747.37	174.56
26	0.	344.30	747.34	174.50
27	0.	344.36	747.40	174.33
28	1.	344.36	747.50	174.09
29	1.	344.30	747.57	173.93
30	0.	344.30	747.58	171.46
31	1.	344.33	747.58	171.29
32	2.	344.30	747.58	171.24
33	1.	344.33	747.58	171.04
34	1.	344.30	747.58	168.85
35	1.	344.30	747.58	168.86
36	1.	344.30	747.58	168.83
37	1.	344.30	747.58	168.47
38	1.	344.30	747.58	164.84
39	0.	344.30	747.58	164.51
40	0.	344.30	747.58	164.39
41	0.	344.30	747.58	164.23
42	0.	344.30	747.58	163.43

APPROXIMATE COSTS OF INSTALLATION OF PROJECT PART-2

CASE SYSTEMS OPERATIONS: 2-15-79

INSTALLATION COSTS OF PROJECT PART-2

NOISE	FREQ	LEVEL	TIME	ADJUSTED
	(Hz)	(dB)	(hr)	(dB)
43	1	352.00	702.11	153.77
44	0	354.00	702.07	153.75
45	0	354.00	701.98	153.52
46	0	354.00	701.87	153.55
47	0	354.00	701.20	153.34
48	0	364.00	712.12	152.56
49	0	364.00	711.74	151.96
50	0	364.00	710.13	151.13
51	0	365.25	710.70	150.48
52	0	365.25	710.25	150.65
53	0	365.25	710.02	150.40
54	0	365.25	710.01	150.50
55	0	365.25	710.00	150.50
56	0	365.25	709.50	150.71
57	0	375.22	710.11	150.11
58	0	375.22	710.00	151.20
59	0	375.22	709.74	151.04
60	0	375.22	722.22	150.25
61	0	375.22	720.57	149.24
62	0	375.22	719.08	149.45
63	0	375.22	716.49	147.58





CASE SYSTEM OPERATIONS: FLOW RATE: 0.001 CFS PER PIPE

ITERATIONS: CONVERGED TO 3177 GPM AND 58.96-01 FEET

NODE	FLOW GPM	ELEVATION FEET	HEAD FEET	PRESSURE PSI	
65	0.	352.00	657.05	141.18	
66	0.	352.00	655.09	140.45	
67	0.	352.00	654.12	139.47	
68	0.	352.00	653.16	138.19	
69	0.	352.00	652.11	136.48	
70	0.	370.00	651.21	130.03	
71	0.	370.00	650.15	127.01	
72	0.	370.00	649.30	127.05	
73	0.	370.00	648.31	124.04	
74	0.	370.00	647.05	122.72	
75	0.	370.00	647.25	120.13	
76	0.	370.00	646.21	119.04	
77	0.	370.00	645.15	117.01	
78	0.	370.00	644.04	115.87	
79	0.	370.00	643.02	114.00	
100	0.	370.00	642.11	115.09	
101	0.	370.00	641.04	114.22	
102	0.	370.00	640.32	114.70	
103	0.	365.00	639.07	109.97	LOW
104	0.	365.50	638.36	115.16	
105	0.	365.00	638.00	0.	LOW



ASSUMED CONTAINMENT LINE GROUND INSTALLATION PROJECT - PART 2

CASE SYSTEM DESIGN: 2-PIECE PIPES, 1-PIECE VALVES

5.116410 S. CONCRETE TO 1.102 0.00 1.00 .5649E+01 FEET

NO. F.	FL. 26 GPM	ELEVATION FEET	HEAD FEET	PRESSURE PSI
127	0.	334.50	631.52	126.53
128	0.	334.50	631.54	126.54
129	0.	334.50	631.67	126.66
130	0.	341.17	631.23	125.72
131	0.	341.17	631.32	125.67
132	0.	341.17	631.17	125.61
133	0.	341.17	631.05	125.56
134	0.	341.17	630.95	125.29
135	0.	341.17	630.34	125.25
136	0.	341.17	630.32	125.24
137	0.	342.00	630.21	124.83
138	0.	341.17	630.24	125.20
139	0.	344.33	630.14	123.74
140	0.	341.17	629.54	125.03
141	0.	344.33	630.03	123.75
142	0.	341.17	629.75	124.99
143	0.	344.33	629.42	123.70
144	0.	341.17	629.24	124.79
145	0.	344.33	629.41	123.65
146	0.	341.17	629.17	124.74
147	0.	355.30	629.59	118.93

CASE SYSTEM DESIGN: 2-10-81

8. ELEVATION: 100.00 FEET

NODE	FLOW GPM	ELEVATION FEET	HEAD FEET	PRESSURE PSI
139	0.	341.17	628.00	124.54
140	0.	355.00	628.00	118.88
150	0.	341.17	628.00	124.60
151	0.	357.50	628.00	118.94
152	0.	341.17	628.00	124.59
153	0.	355.00	628.07	118.79
154	0.	341.17	628.00	124.54
155	0.	355.00	628.00	118.75
156	0.	341.17	628.03	124.51
157	0.	357.50	628.00	117.63
158	0.	341.17	628.00	124.46
159	0.	357.50	628.00	117.59
160	0.	341.17	628.00	124.43
161	0.	357.50	628.00	117.57
162	0.	341.17	628.00	124.38
163	0.	357.50	628.00	117.53
164	0.	353.50	628.07	118.89
165	0.	357.50	628.02	117.51
166	0.	354.50	628.00	118.41
167	0.	357.50	628.00	117.47
168	0.	354.50	628.00	118.31

Approved by [Signature] DATE: [Date] PROJECT PART-2

CASE SYSTEM NUMBER: [Number] NAME: [Name]

ITERATION: [Number] DATE: [Date] TIME: [Time] .500000 FEET

Node	Flow	Pressure	Flow	Pressure
150	0.	357.50	627.50	117.46
170	0.	374.00	627.50	118.26
171	0.	355.00	627.50	117.19
172	0.	354.50	627.50	118.10
173	0.	381.00	627.00	107.01
174	0.	354.50	627.10	118.07
175	0.	382.00	627.00	106.55
176	0.	354.50	627.00	118.02
177	0.	384.50	627.00	105.40
178	0.	354.50	627.00	117.94
179	0.	384.50	627.00	105.35
180	0.	354.50	627.00	117.30
181	0.	384.50	627.00	105.36
182	0.	384.50	627.00	117.43
183	0.	384.50	627.00	105.29
184	0.	343.00	627.00	122.74
185	0.	384.50	627.00	105.20
186	0.	343.00	627.00	122.60
187	0.	384.50	627.00	105.15
188	0.	343.00	627.00	122.57
189	0.	411.57	627.00	93.171

WIRE-SIZES 201-219 (SEE WIRE SIZE INSTALLATION PROJECT PART-2)

CASE SYSTEM DEMANDS: 2-WIRE WIRE SIZE (WIRE) (WIRE)

WIRE-SIZES 201-219 (SEE WIRE SIZE INSTALLATION PROJECT PART-2) 5649E+01 FEET

NO. OF WIRE	WIRE SIZE	WIRE SIZE	WIRE SIZE	WIRE SIZE
191	0.	411.57	625.14	122.53
191	0.	411.57	625.14	43.123
192	0.	411.57	625.14	122.33
193	0.	411.57	625.14	43.096
194	0.	411.57	625.14	122.28
195	0.	411.57	625.14	43.048
196	0.	411.57	625.14	121.63
197	0.	411.57	625.14	43.041
199	0.	411.57	625.21	121.58
199	0.	411.57	625.17	42.943
200	0.	411.57	625.14	121.55
201	0.	411.57	625.17	42.730
202	0.	411.57	625.14	121.50
203	0.	411.57	625.14	42.662
204	0.	411.57	625.14	121.47
205	0.	411.57	625.14	42.617
206	0.	411.57	625.14	121.43
207	0.	411.57	625.14	42.573
208	0.	411.57	625.14	121.37
209	0.	411.57	625.14	42.510
210	0.	411.57	625.14	121.33

CASE SYSTEM DEMANDS 22-0000 FEET 5. 22-0000 FEET

22-0000 FEET 5. 22-0000 FEET 5. 22-0000 FEET 5. 22-0000 FEET 5. 22-0000 FEET 5.

BOOK	FEET	FEET	FEET	PRESSURE PSI
211	0.	417.07	620.00	102.424
212	0.	418.07	620.00	112.41
213	0.	419.07	620.00	122.403
214	0.	420.07	620.00	132.396
215	0.	421.07	620.00	142.389
216	0.	422.00	620.00	152.382
217	0.	423.07	620.00	162.375
218	0.	424.00	620.00	172.368
219	0.	425.00	620.00	182.361
220	0.	426.00	620.00	192.354
221	0.	427.00	620.00	202.347
222	0.	428.00	620.00	212.340
223	0.	429.00	620.00	222.333
224	0.	430.00	620.00	232.326
225	0.	431.00	620.00	242.319
226	0.	432.00	620.00	252.312
227	0.	433.00	620.00	262.305
228	0.	434.00	620.00	272.298
229	0.	435.00	620.00	282.291
230	0.	436.00	620.00	292.284
231	0.	437.00	620.00	302.277
232	0.	438.00	620.00	312.270

ADJUSTED CONTROL POINT ELEVATION PROJECT MARK-2

SYSTEM DESIGN: Z-WISE WELLS (SPLIT) ALER

ELEVATION CONVERGED TO 3100 AND 30.95-01 FEET

MARK	FEET	ELEVATION FEET	MARK	FEET	STATUS
230	.	42.75	42.75	42.75	
232	.	42.50	42.50	42.50	
<b>HR-2-44</b>	234	0.	42.75	42.75	15.150 ✓ = PRESS @ H.R.
	235	.	42.75	42.75	42.75
<b>HR-2-44</b>	236	-75.512	42.75	42.75	0. = DISCHARGE LOW PRESS.
	237	0.	41.50	41.50	41.50 ✓
<b>HR-2-43</b>	238	0.	41.50	41.50	15.460 ✓ = PRESS. @ H.R.
	239	-75.512	41.50	41.50	0. = DISCHARGE LOW PRESS.

C  
 C  
 F.001  
 END OF MARK-2