TECHNICAL MEMORANDUM
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PRELIMINARY EVALUATION OF HYDROLOGIC DATA COLLECTED FROM THE C-103 BASIN, DADE COUNTY, FLORIDA

by

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INTRODUCTION

Purpose and Scope

The purpose of the study was to compare hydrologic, hydrogeologic, and geochemical conditions during the pre- and post-construction phases of structure S-331 and its effect on Canal 103, which is part of the South Dade Conveyance Canal System. Both geologic and hydrologic data were used to make this determination. This technical memorandum is intended to fulfill the requirements of data gathering and analysis during the pre-pumping period condition within the basin. This period of time is from 7/15/79 to 3/1/83. This memorandum report provides interpretation of the pre-structure data analysis of the C-103 Basin; however, a more in-depth report comparing the pre- versus the post-pumping conditions will be required in the future. This memorandum will serve as a working document when preparing the final report, once an adequate amount of post-pumping data is collected. All of the data gathered during the period of study is presented in this memorandum with the exception of the groundwater level and stage data, which are archived in the Data Management Computer Library.

Location and Extent of Study Area

The location of C-103 and the surrounding area is shown in Figure 1. The most western extent of C-103 is where it merges with L-31N canal approximately one mile north of the Homestead General Aviation Airport. The canal follows a bending southeasterly course of approximately 16 miles to the discharge point at Biscayne Bay. The control structures along C-103 include S-196, S-167, S-179, and S-20F. The study was performed west of S-167 to the L-31N canal. In this western portion the canal drains agricultural lands consisting of nurseries, truck farms, and avocado and mango groves. Portions north of Homestead drain urbanized developed lots. The eastern portion of C-103 is located just south of Homestead Air Base and is commonly referred to as Mowry Canal at the most eastern extent.

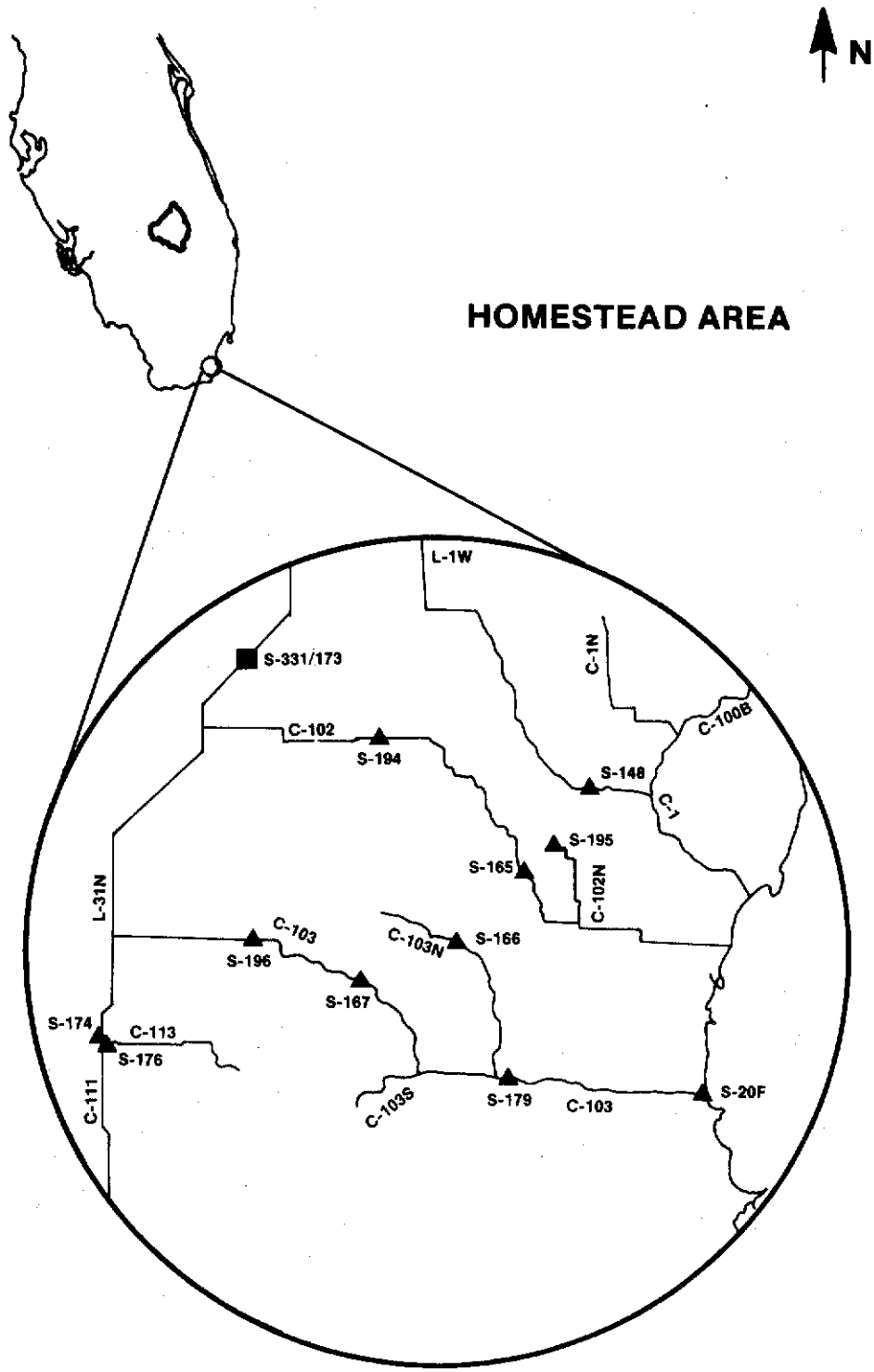


Figure 1 LOCATION OF STUDY AREA

MONITORING NETWORK

Groundwater Stations

A total of 23 wells were drilled at three different areas along C-103 for the project (Figure 2). The most extensive cross section (A) is at station 655+75 of C-103 where 17 wells were drilled. The next cross section (B) to the east is at station 588+00, and consists of four wells. The third and most eastern of the three cross sections (C) is located at station 495+00 and has two wells, both on the south side of C-103.

Cross Section A

An inset of the cross section (A) area is shown in Figure 3. The wells are normal to the canal and are approximately 850 feet west of structure S-196. Six wells (Nos. 1, 2, 3, 4, 5, and 6) were core drilled and are approximately 60 feet deep. A discussion of these cores is presented in a later section and a detailed description of each is presented in Appendix I. Wells 1A, 2A, 3A, 4A, 5A, 6A, 7A, 8A, 9A, and 10A were drilled using rotary air and are approximately 20 feet deep. The shallow wells have 20 feet of 6-inch schedule 40 PVC. The deep wells have 30 feet of 5-inch schedule 40 PVC and an inner casing of 3-inch schedule 40 PVC to a depth of 60 feet. The distance of each well from the top bank of the canal is shown on Figure 3. The shallow and deep well clusters were drilled to evaluate whether a low permeability layer, approximately 30 feet below land surface, confined the lower portion of the aquifer.

Cross Section B

An inset of cross section B area is shown in Figure 4. The wells are normal to the canal and are along the east side of Redland Road. There are two wells north of the canal (11A and 12A) and two wells south of the canal (13A and 14A). All wells were drilled to a depth of 20 feet using rotary air and completed with 20 feet of 6-inch schedule 40 PVC.

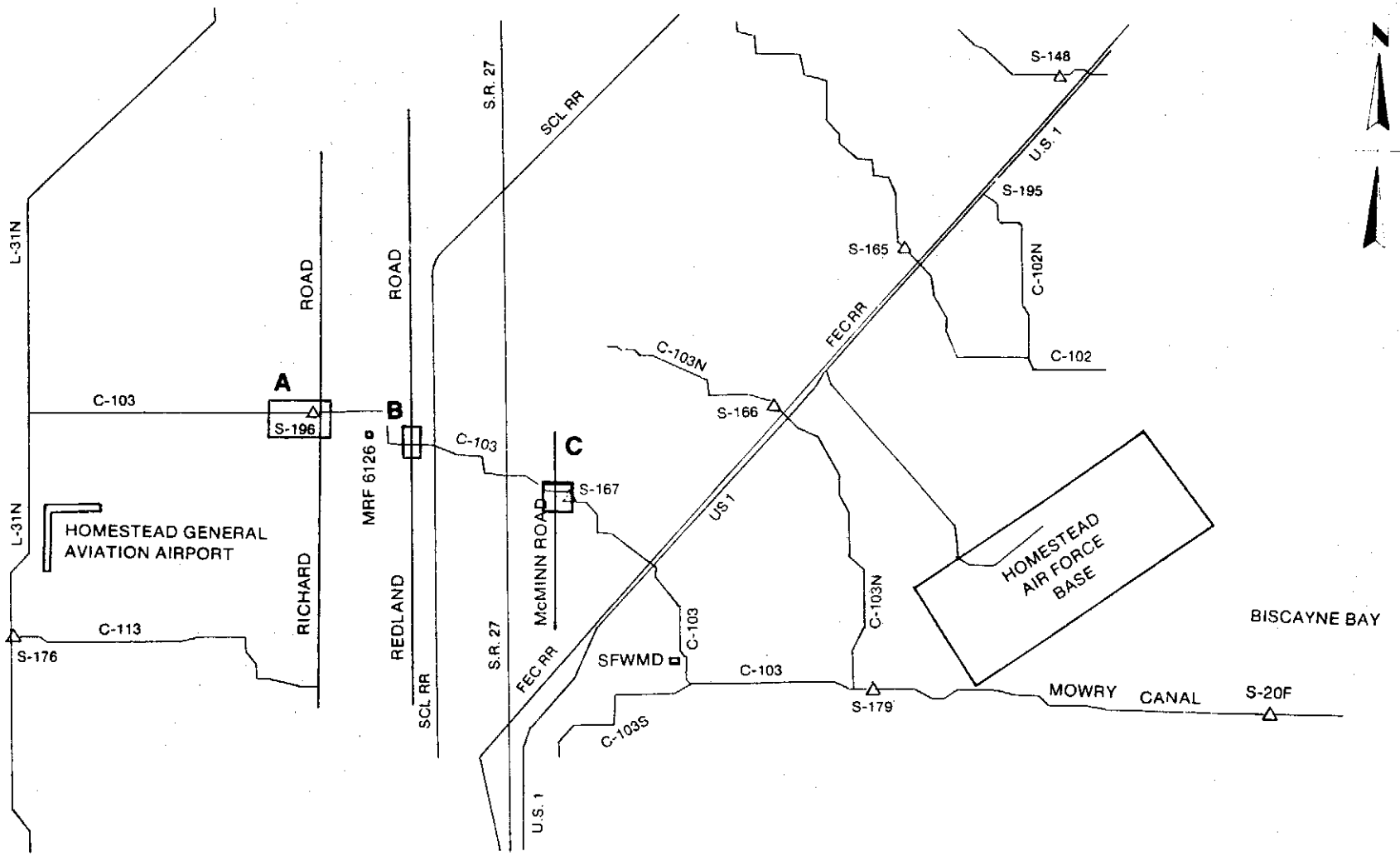


Figure 2 LOCATION OF CROSS SECTIONAL STUDY AREAS

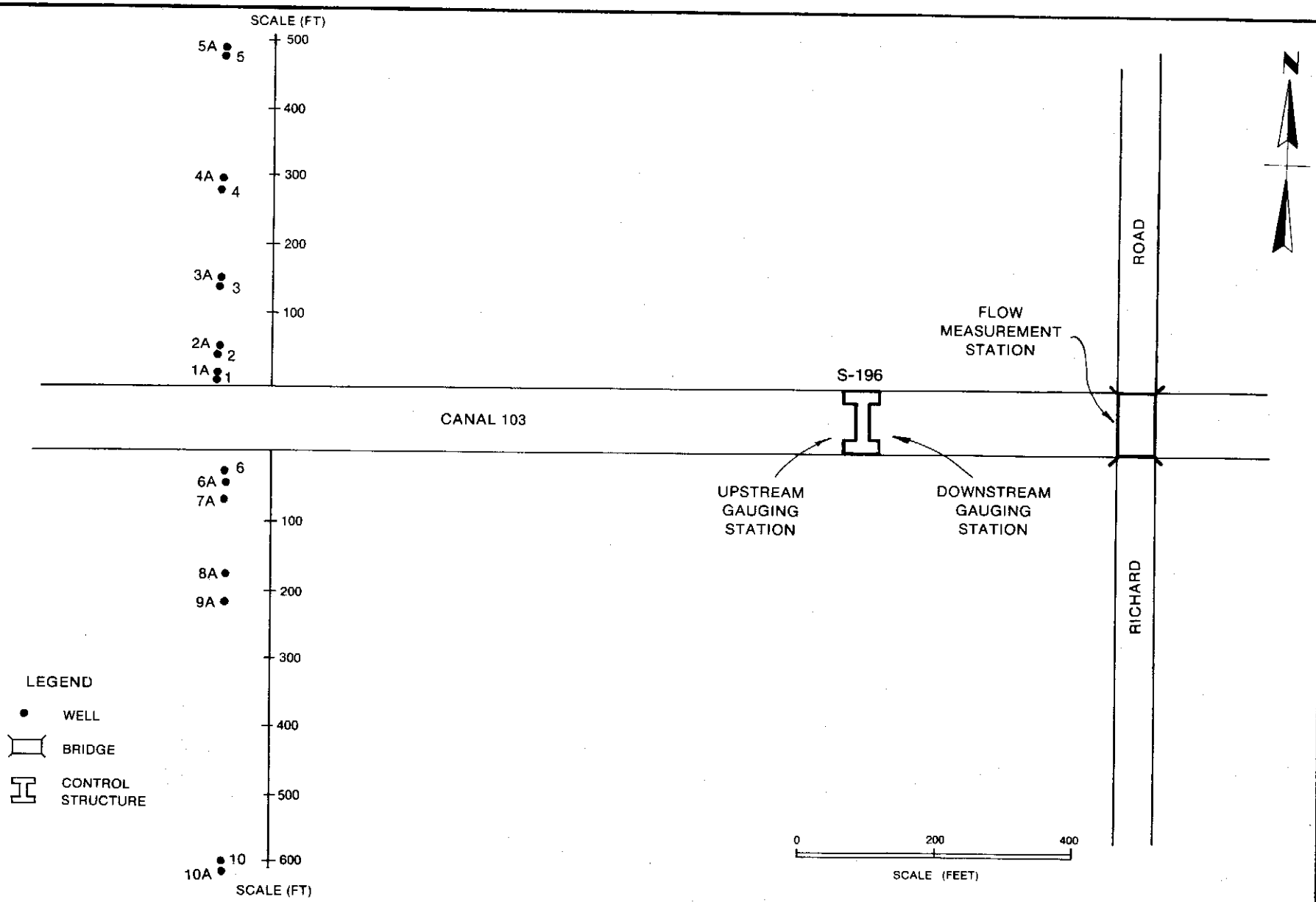


Figure 3 CROSS SECTIONAL AREA, A

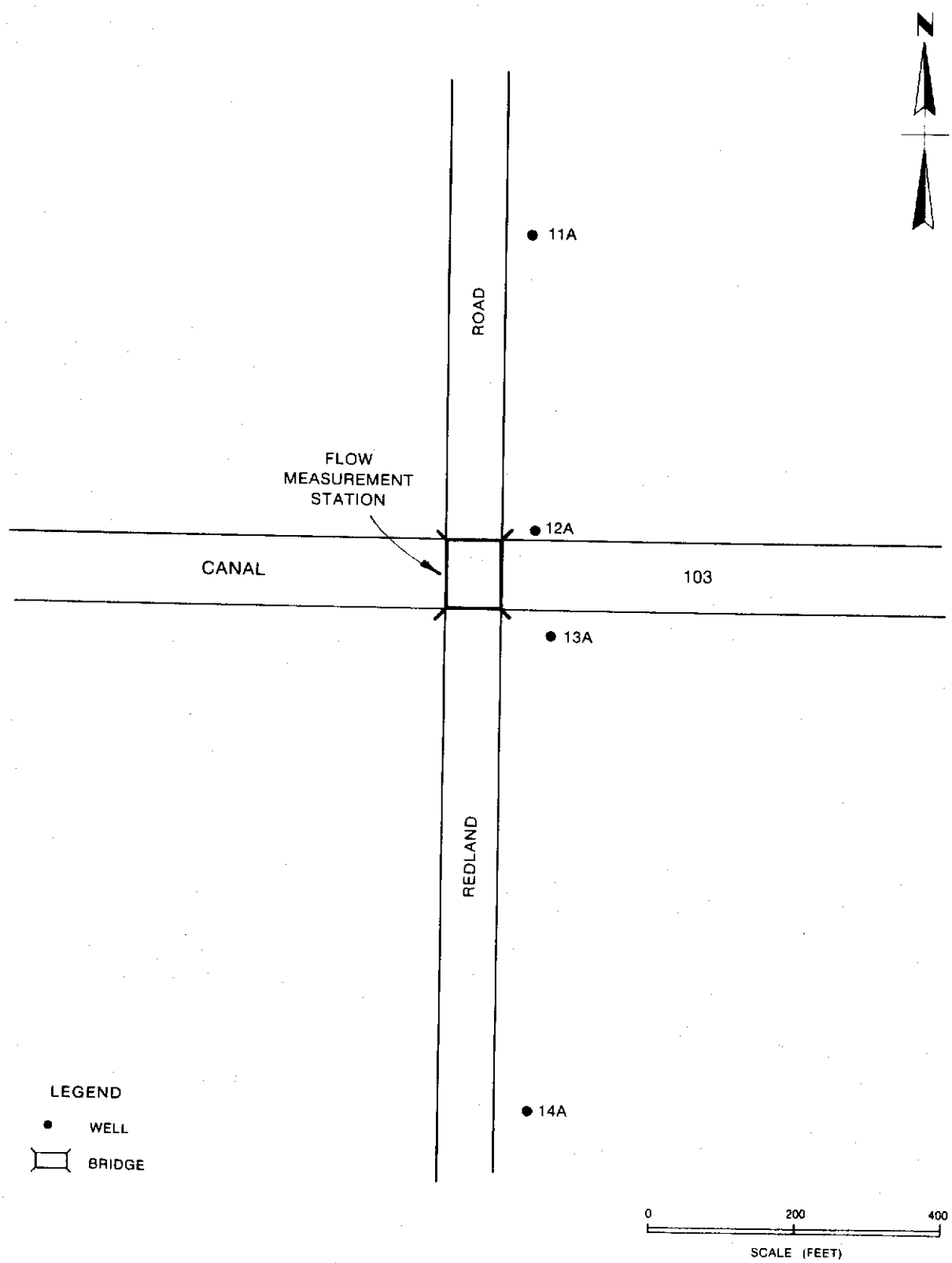


Figure 4 CROSS SECTIONAL AREA, B

Cross Section C

An inset of cross section C area is shown in Figure 5. The wells are normal to the canal and are approximately 700 feet west of S-167. There are two wells (15A and 16A) located in a nursery south of the canal. There are no wells to the north of the canal due to a lack of access. The two wells were drilled to a depth of 20 feet using rotary air and completed with 20 feet of 6-inch schedule 40 PVC.

Canal Stage Gauging Stations

There are two canal stage gauging stations along C-103. They are located at S-196 (Figure 3) and S-167 (Figure 5). S-196 is read from a staff gauge on weekdays. S-167 has a continuous stage recorder. The upstream and downstream stages at S-196 were recorded when all 23 wells were manually measured.

Flow Measurement Stations

Flow measurements were taken at three stations, one near each cross section, and the measurement locations are shown in the inset for each area (Figures 3, 4, and 5).

The flow measurement station for area A was along the west side of the Richmond Road bridge. This station is approximately 1,200 feet east of the wells and 350 feet east and downstream of S-196.

The flow measurement station for area B was along the west side of the Redland Road bridge. This station is approximately 200 feet upstream of the wells at cross section B.

The flow measurement station for area C was along the west side of the McMinn Road bridge. This station is approximately 700 feet west of the wells at cross section C and 1,400 feet upstream of S-167.

Water Quality Stations

Each of the 23 groundwater wells were sampled for water quality. In addition, a sample was taken from the canal near the cross section. Samples were collected at varying time intervals and analyzed for various parameters.

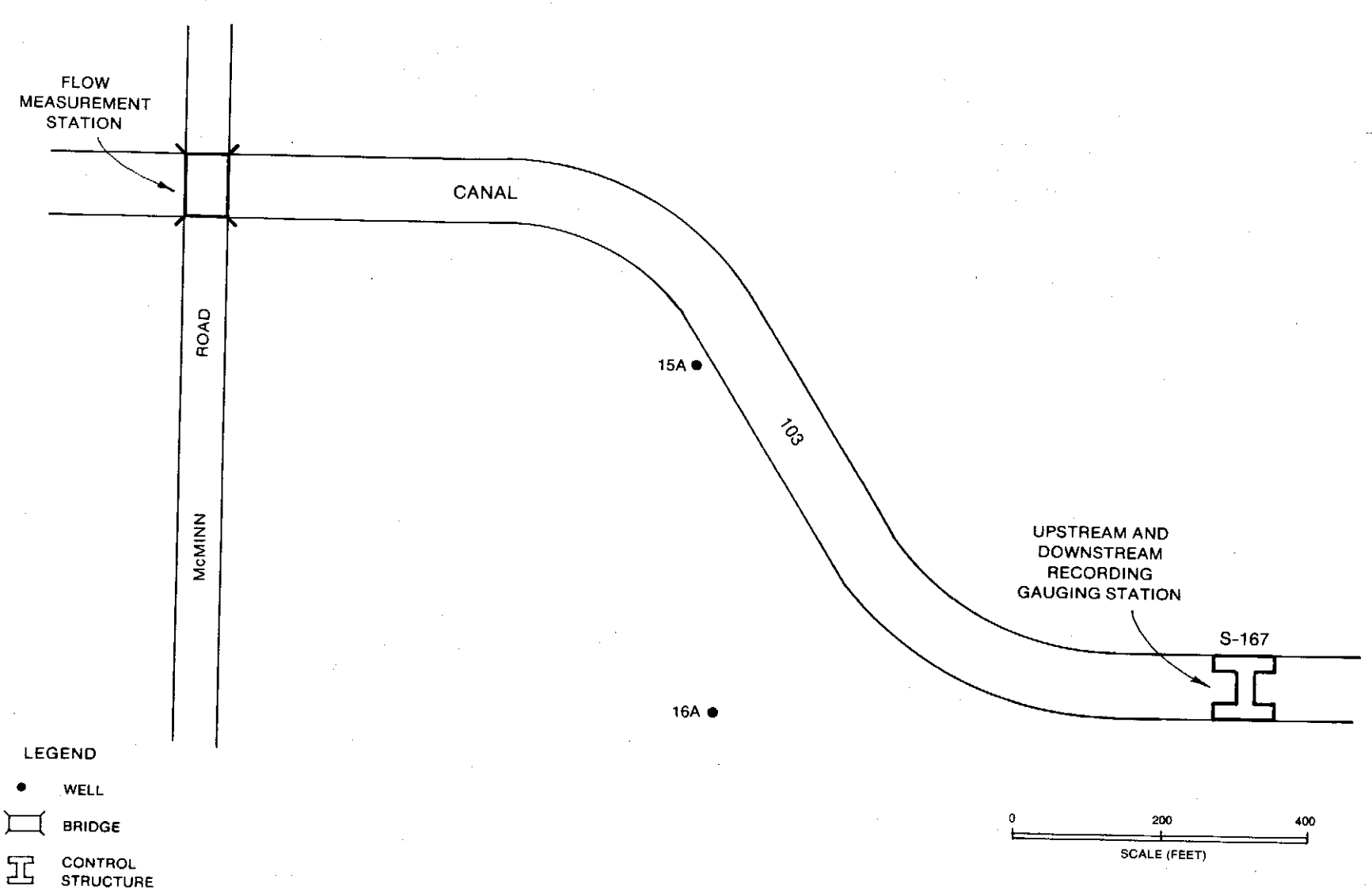


Figure 5 CROSS SECTIONAL AREA, C

GEOLOGY

A description of the general geologic and hydrogeologic characteristics in the C-103 and Homestead area is shown in Figure 6. A detailed description of each core is presented in Appendix I. The three formations present in the area, which are encountered to a depth of 60 feet, are the Fort Thompson formation, the Key Largo Limestone, and the Miami Oolite.

The Fort Thompson formation consists of alternating marine and fresh water limestones and marl beds, including between one to three fresh-water mudstones marked by the presence of the fresh water gastropod Helisoma sp. The upper portion of the Fort Thompson contains large numbers of the pelycypod Chione cancellata and is readily identifiable as the Coffee Mill Hammock member described by Schroeder et al., (1958). Groundwater percolation has caused solution cavities and channels to form in both the marine and fresh water beds. Sand and material from overlying beds have subsequently been deposited in some of these channels. These solution channels range in diameter from 0.5 to 2.5 cm. A bed of sandy limestone is present beneath the deepest fresh water mudstone bed. This sandy limestone bed is the lowest bed of the Fort Thompson formation and marks the contact between the Fort Thompson formation and the underlying Tamiami formation (Schroeder et al., 1958).

The Key Largo limestone was not present at Site A but is most likely to be present in the area as stringers interfingered with the Fort Thompson formation. The Key Largo limestone is a coralline limestone consisting of white to tan coral, fine grained crystalline limestone and generally grayish white sandy limestone reef deposits. The formation contains fine to medium grained cemented calcareous sand and other reef detritus and is generally well cemented. Vug content varies from abundant in certain zones to none in others. Fossil content includes the presence of Chione sp. and other mollusks.

Series	Formation	Geologic Characteristics	Aquifer Characteristics	Thickness in Homestead Area (feet)
PLEISTOCENE	Miami Oolite	Limestone, white to yellowish-orange; oolitic. Contains up to 40% sand, stratified. Perforated with solution channels.	Fair to very highly permeable, especially in areas of solution channels and vugs	10-25
	Key Largo Limestone	Coralline limestone, white to tan coral, fine grained crystalline limestone and grayish white sandy limestone reef deposit. Fine to medium grained calcareous sand, vuggy.	Not present at Site A. Highly permeable where present.	0-15
	Fort Thompson Formation	Alternating marine and fresh water limestone, and sandstone.	Varying permeability. High where solution channels are open, but low where fresh water mudstones are deposited in the cavities, and near the lower contact with the Tamiami Formation	20-100

Figure 6 General Geologic and Hydrogeologic Characteristics of the Homestead Area.

The Miami Oolite found at Site A is a white to yellowish-orange massive oolitic limestone containing varying amounts of quartz sand (up to approximately 40 percent). Most of the sand tends to be concentrated in solution channels which range in size from about 1 to 4 cm and average approximately 1.5 cm in diameter. The formation is stratified and cross bedded.

HYDROGEOLOGY

A hydrogeologic cross section derived from the core samples collected at Site A is shown in Figure 7. The cross section shows the highly permeable Miami Oolite which ranges in thickness from 3 to 9 feet at the surface. Underlying the Miami Oolite is the Fort Thompson formation. The variation in permeability occurs where there are interfingerings of fresh water mudstones. The lenses are predominant at depths of approximately 35-40, 45-48, and 50-55 feet below land surface, with thickness averaging 2-5 feet.

At Site A the Miami Oolite is highly permeable. The Fort Thompson formation, though similar in structure, appears less pervious than the Miami Oolite and Key Largo Limestone (where present). The solution channels and vugs present in all three formations are responsible for virtually all of the water flow through the individual formations. Secondary solution along formational contacts is also a contributor to water flow through the aquifer. The lower permeability of the Fort Thompson formation is due to the fact that it has smaller, less numerous channels and vugs than the other formations; in addition, some of the channels in the Fort Thompson formation are partially filled in by sediment. Both of these factors tend to lower the mass permeability of the rock.

The results of the laboratory permeability test are shown in Tables 1 through 6. The data indicate that the Miami Oolite has a higher permeability

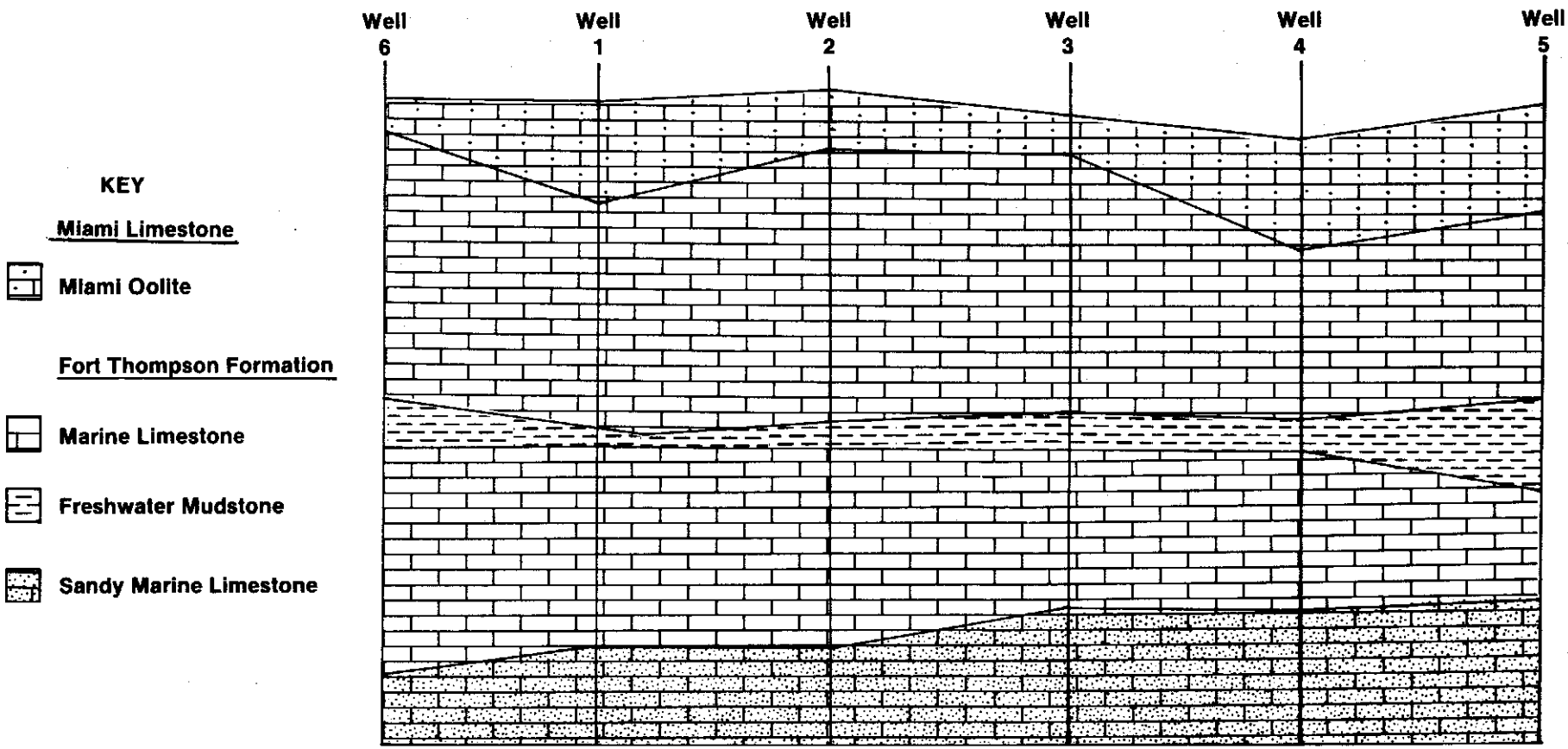


Figure 7 Generalized Geologic Cross Section at Site A

TABLE 1. PERMEABILITY OF WELL 1

SAMPLE	WELL	DEPTH	q(ml/sec)	L(cm)	t(sec)	h(cm)	Q(ml)	K(cm/sec)
1	1	20.5'	2.21	11.43	452	30.0	1,000	.042
2	1	17.0'	9.26	14.48	108	31.0	1,000	.213
2	1	17.0'	5.92	14.48	169	10.7	1,000	.395
3	1	19.5'	.09	9.53	1103	24.1	100	.0018
4	1	22.5'	1.57	14.00	319	24.1	500	.045
5	1	42.0'	2.30	12.70	435	24.9	1,000	.058
6	1	53.5'	0.14	15.24	700	24.5	100	.0044
7	1	45.5'	3.72	13.2	265	24.4	985	.099
8	1	54.5'	.32	14.5	273	24.2	87	.0094
9	1	40.0'	.24	10.7	440	24.4	107	.0053
10	1	32.5'	.43	12.0	355	25.2	152	.010
11	1	25.5'	.15	10.0	588	23.4	90	.0032
12	1	28.0'	1.70	14.5	317	22.3	540	.055
13	1	41.5'	2.24	12.0	432	29.7	967	.045
14	1	55.3'	1.12	10.5	590	28.7	660	.020
15	1	57.0'	0.20	14.5	729	28.5	143	.0049
16	1	58.8'	7.59	6.5	130	29.0	987	.084
17	1	59.1'	9.22	4.0	108	28.4	996	.064

q = quantity of water discharged in milliliters per second (ml/sec)
L = length of sample in centimeters (cm)
t = total time for discharge in seconds (sec)
h = vertical distance between funnel overflow and chamber overflow ports in centimeters (cm)
Q = discharge in milliliters (ml)
K = coefficient of permeability in centimeters per second (cm/sec)

TABLE 2. PERMEABILITY OF WELL 2

SAMPLE	WELL	DEPTH	q(ml/sec)	L(cm)	t(sec)	h(cm)	Q(ml)	K(cm/sec)
1	2	12.0'	6.04	12.0	154	25.7	930	.139
2	2	14.5'	7.41	8.5	133	25.7	985	.121
3	2	20.7'	.081	12.0	984	31.5	80	.002
4	2	26.5'	.30	12.0	543	24.7	162	.007
5	2	30.5'	2.10	9.0	389	25.0	817	.037
6	2	33.0'	2.96	11.5	334	25.2	988	.066
8	2	37.5'	1.00	4.5	297	29.0	297	.008
9	2	38.5'	8.36	14.0	118	25.0	987	.231
10	2	43.0'	2.54	10.0	385	25.0	978	.05
11	2	44.5'	.20	8.7	460	24.0	925	.004
12	2	46.0'	4.29	13.2	220	25.0	943	.112
13	2	49.5'	1.42	9.0	560	25.0	793	.025
14	2	50.5'	2.32	11.5	261	28.5	605	.046
15	2	53.0'	.24	12.0	333	28.5	78.5	.005
16	2	55.5'	.31	10.0	1375	28.3	432	.005
17	2	58.5'	.59	11.0	604	28.3	354	.011
18	2	59.5'	5.72	8.0	172	18.4	983	.123

TABLE 3. PERMEABILITY OF WELL 3

SAMPLE	WELL	DEPTH	q(ml/sec)	L(cm)	t(sec)	h(cm)	Q(ml)	K(cm/sec)
1	3	13.5'	4.89	12.5	200	20.0	978	0.151
2	3	16.0'	.64	11.0	600	29.7	386	0.012
3	3	17.0'		10.0		29.7	no	flow
4	3	21.7'	.25	12.5	710	26.0	180	0.006
5	3	23.5'	.11	9.3	566	31.2	64	0.002
6	3	24.8'	.36	10.0	250	30.2	905	0.006
7	3	27.5'	1.67	9.0	550	30.7	920	0.024
8	3	29.0'	7.80	6.3	124	30.7	967	0.079
9	3	30.5'	5.16	7.3	185	22.0	955	0.084
10	3	33.2'	.72	3.0	137	27.6	98	0.039
11	3	34.1'	3.38	6.5	291	27.5	983	0.039
12	3	38.5'	.44	11.0	226	27.5	100	0.009
13	3	40.1'	.08	13.5	600	28.0	48.2	0.002
14	3	40.9'	7.94	7.5	126	28.7	1,000	0.102
15	3	44.0'	.52	10.5	399	28.0	208	0.010
16	3	45.2'	.71	12.0	139	28.0	99	0.015
17	3	47.0'	.37	12.5	270	27.7	100	0.008
18	3	49.0'	.39	12.0	255	28.0	100	0.008
19	3	49.5'	2.99	7.5	338	28.0	1,010	0.039
20	3	50.5'	6.34	8.5	157	27.7	995	0.096
21	3	52.0'	.34	11.5	289	27.5	98	0.007
22	3	54.0'	5.28	11.0	187	27.5	988	0.104
23	3	56.2'	.12	10.5	653	27.7	80	0.002
24	3	61.0'	.61	9.5	165	27.7	100	0.010

TABLE 4. PERMEABILITY OF WELL 4

SAMPLE	WELL	DEPTH	q(ml/sec)	L(cm)	t(sec)	h(cm)	Q(ml)	K(cm/sec)
1	4	15.5'	5.71	11.0	172	27.5	982	.113
2	4	14.2'	9.95	7.0	99	27.7	985	.124
3	4	23.5'	.24	13.0	320	27.3	80	.0058
4	4	26.0'	.11	15.5	402	27.3	43	.0030
5	4	28.5'	.11	11.5	379	27.5	42.5	.0023
6	4	30.5'	1.67	11.0	346	27.5	578	.033
7	4	34.0'	.98	12.5	336	27.5	328	.022
8	4	38.2'	8.08	14.0	125	28.5	1,010	.196
9	4	40.5'	.36	11.5	393	28.5	142	.0072
10	4	44.0'	.13	11.5	255	27.5	33.5	.0027
11	4	47.0'	.02	10.0	940	32.5	20	.0003
12	4	49.0'	.07	12.5	416	33.0	27.5	.0012
13	4	50.6'	.02	9.0	639	31.5	11.0	.00024
14	4	52.5'	.22	12.2	686	28.2	150	.0047
15	4	56.5'	.10	12.0	1067	28.4	107	.0029
16	4	59.0'	.29	13.5	519	28.4	149	.0067

TABLE 5. PERMEABILITY OF WELL 5

SAMPLE	WELL	DEPTH	q(ml/sec)	L(cm)	t(sec)	h(cm)	Q(ml)	K(cm/sec)
1	5	11.0'	8.66	11.0	115	27.2	996	.173
2	5	15.5'	8.34	13.5	118	27.7	985	.201
3	5	19.5'	7.03	9.5	138	27.7	970	.119
4	5	21.0'	.06	11.2	758	26.8	44	.0012
5	5	24.0'	.14	14.0	822	27.5	112	.0034
6	5	27.0'	1.15	12.0	439	27.5	505	.025
7	5	31.0'	6.22	9.0	156	28.0	970	.099
8	5	40.5'	9.13	8.0	109	28.0	995	.129
9	5	42.5'	.72	10.5	1247	27.0	900	.014
10	5	44.5'	.19	11.3	1120	27.5	210	.0038
11	5	46.5'	.22	5.5	634	27.5	142	.0022
12	5	47.1'	.20	8.5	720	28.5	146	.0030
13	5	49.1'	2.78	4.7	360	27.4	1,000	.024
14	5	51.5'	.80	13.5	500	27.4	410	.020
15	5	54.0'	.25	16.0	904	27.0	222	.0072
16	5	55.0'	.35	12.5	533	27.0	186	.043
17	5	60.0'	3.41	13.2	292	27.0	995	.082

TABLE 6. PERMEABILITY OF WELL 6

SAMPLE	WELL	DEPTH	q(ml/sec)	L(cm)	t(sec)	h(cm)	Q(ml)	K(cm/sec)
1	6	24.5'	0.058	16.5	567	28.5	33	.0017
2	6	17.5'	6.759	13.5	145	16.0	980	.281
3	6	15.0'	5.808	11.0	167	26.3	970	.120
4	6	12.0'	6.368	13.7	155	15.3	987	.281
5	6	25.0'	1.192	10.0	426	26.3	508	.022
6	6	26.3'	0.427	15.0	405	26.6	173	.012
7	6	28.5'	0.847	9.5	386	26.9	327	.015
8	6	29.5'	0.535	14.5	565	26.7	302	.014
9	6	31.5'	3.378	10.0	296	27.0	1,000	.062
10	6	32.3'	0.715	9.5	347	26.8	248	.013
11	6	40.2'	0.236	16.0	337	26.8	795	.0069
12	6	46.0'	0.412	12.3	510	27.0	210	.0092
13	6	48.8'	0.124	14.5	615	26.2	76	.0034
14	6	49.4'	0.213	12.2	401	26.6	855	.0048
15	6	49.7'	0.212	14.5	417	26.8	885	.0057
16	6	50.5'	0.246	13.5	368	26.8	905	.0061
17	6	53.0'	1.210	11.5	295	27.0	357	.025
18	6	55.5'	.358	14.5	472	27.0	169	.0095
19	6	56.5'	6.060	5.5	167	27.0	1,012	.061
20	6	60.0'	5.161	6.0	193	27.0	996	.057
21	6	60.2'	7.246	7.5	138	27.0	1,000	.099
22	6	61.0'	0.519	9.0	568	27.0	295	.0085

than the Fort Thompson formation. Tests show that the Miami Oolite at Site A has a range of permeability from a high of 0.395 cm/sec to a low of 0.113 cm/sec with a mean permeability of 0.187 centimeters per second (cm/sec). The Fort Thompson formation has a range of permeability from a high of 0.394 cm/sec to a low of 0.00024 cm/sec with a mean permeability of 0.036 cm/sec.

The relationship of rock type to the permeability is shown for each of the six core samples in Figures 8, 9, 10, 11, 12, and 13. The highest permeability is in the upper 20 feet where the Miami Oolite is present. The limestone has varying degrees of permeability depending on the pore space interconnection and particle size. The coralline limestone has a moderate permeability.

WATER LEVELS

Canal-Aquifer Relationship

Figure 14 depicts the simultaneous groundwater levels and canal stages at each of the three cross sectional areas. Site A has the highest levels with the canal stage being 3.48 feet above NGVD, while the aquifer adjacent to the canal is approximately .25 foot lower than that ranging from 3.21 to 3.27 feet above NGVD. It is apparent that Figure 14 has a large vertical exaggeration (X800) and actually the differences in water levels is very slight. The groundwater stages show that the aquifer has a very flat surface within a 600 foot radius of the canal (fluctuating only .06 foot), and allows the canal to recharge the aquifer through this small gradient. It was noted earlier that at this site, shallow and deep wells were drilled to determine if a head difference existed at the 20 foot and 60 foot depth. The actual measured differences between these adjacent shallow and deep wells rarely exceeded .01 to .02 foot. Therefore, it was concluded that there was no head difference and the water level data from the shallow well is generally used.

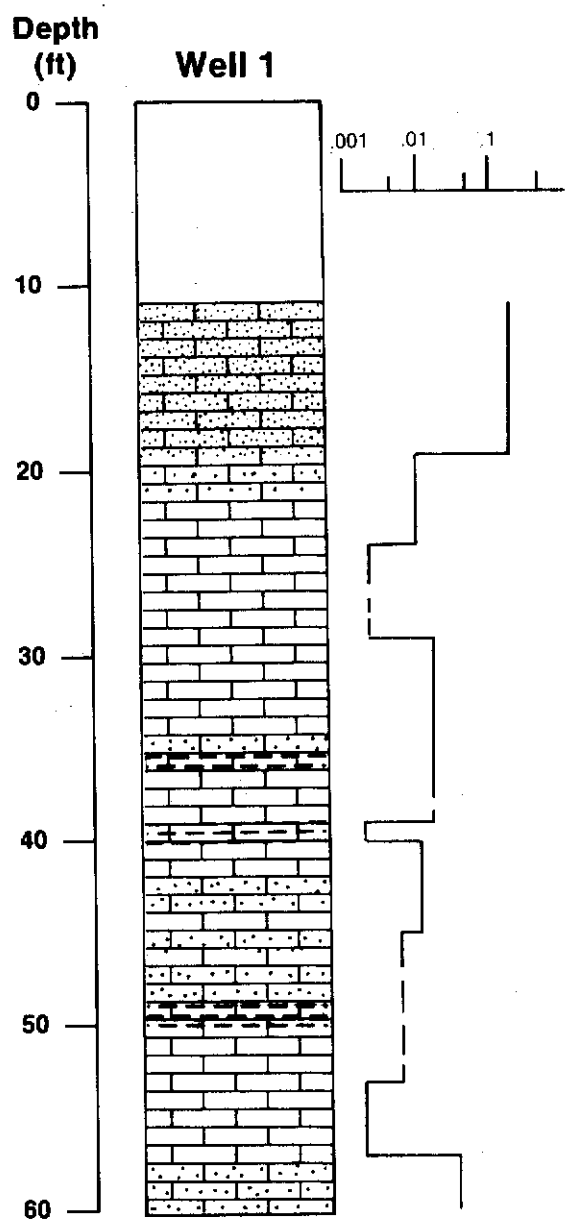


Figure 8 Geology and Permeability of Well 1

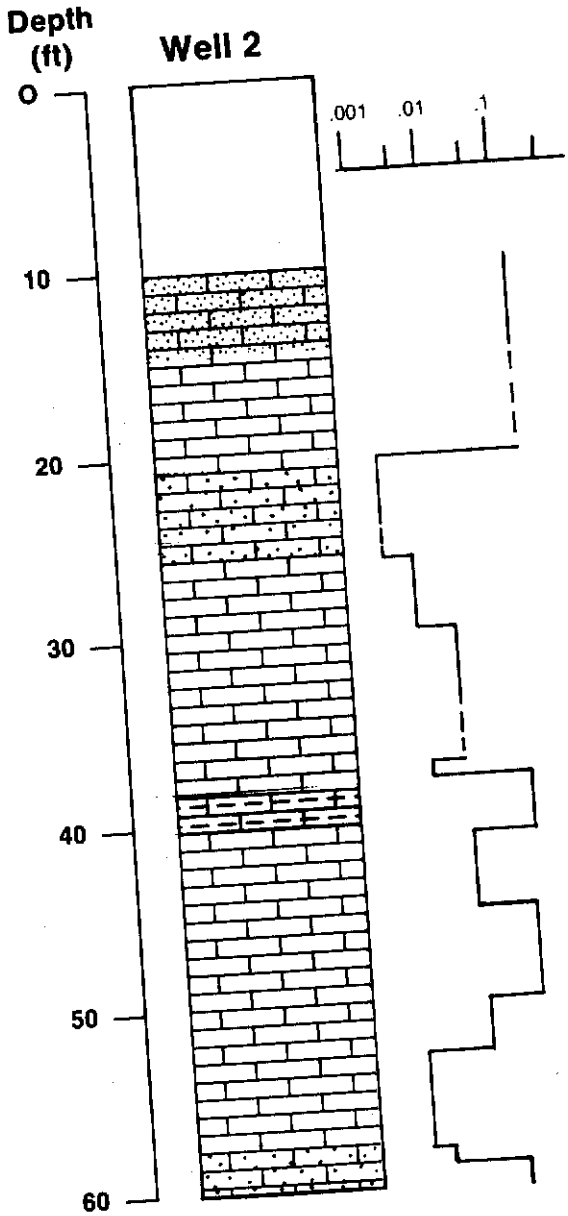


Figure 9 Geology and Permeability of Well 2

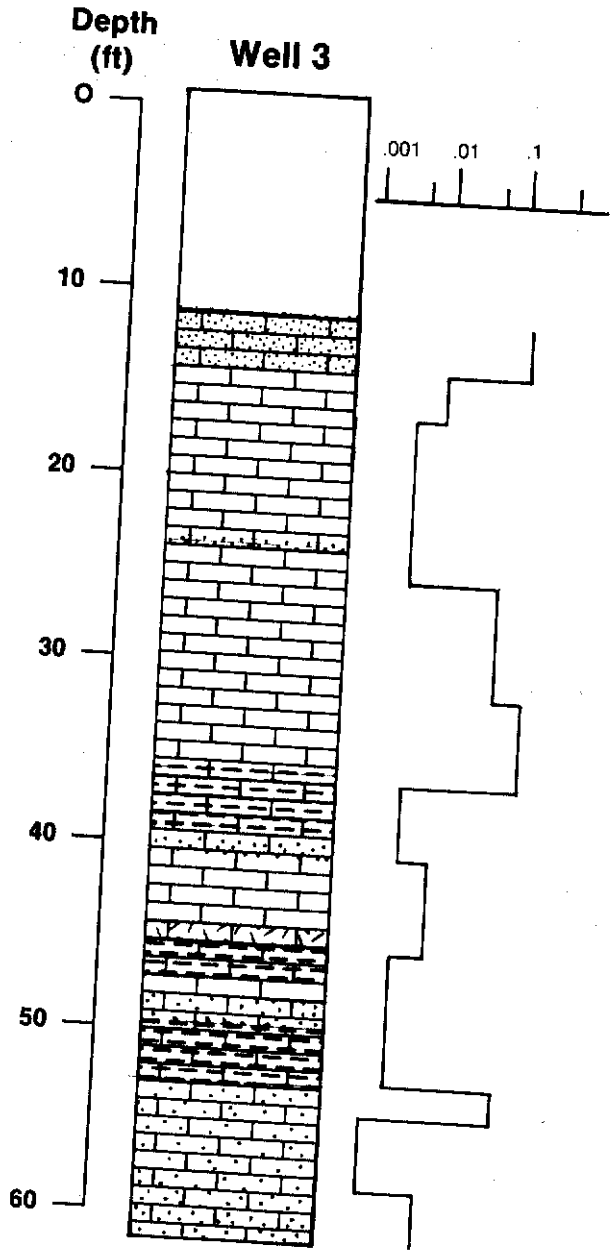


Figure 10 Geology and Permeability of Well 3

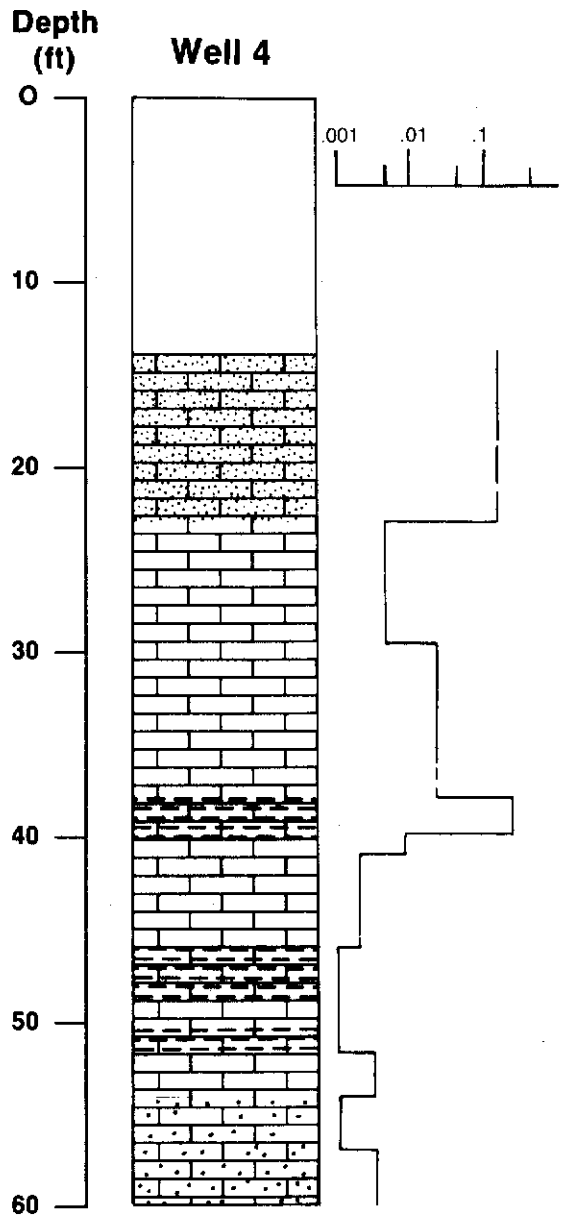


Figure 11 Geology and Permeability of Well 4

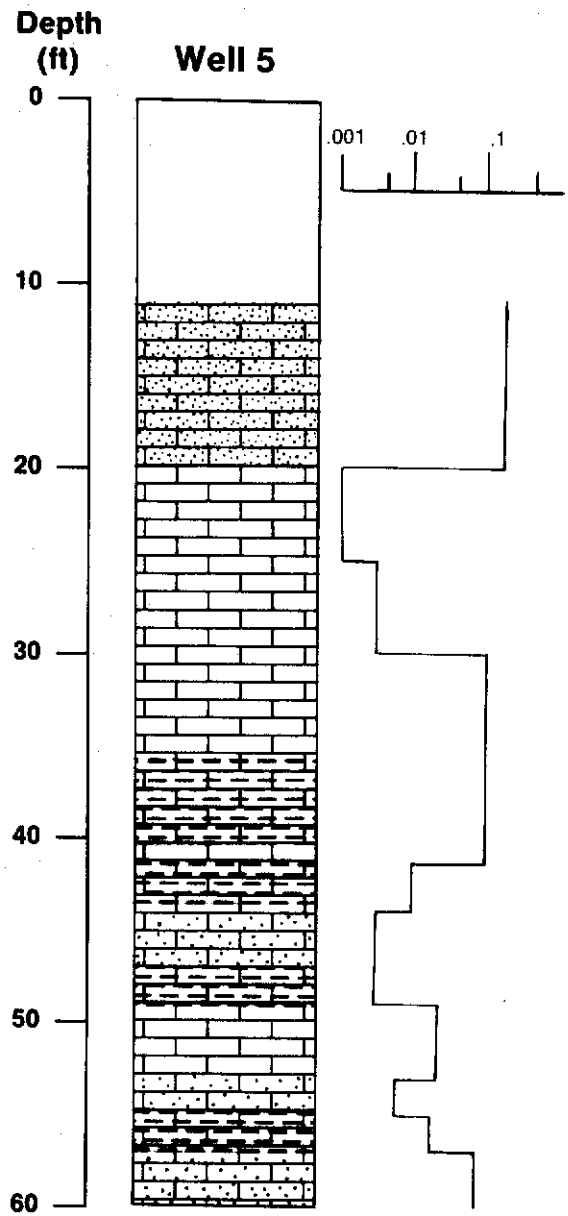


Figure 12 Geology and Permeability of Well 5

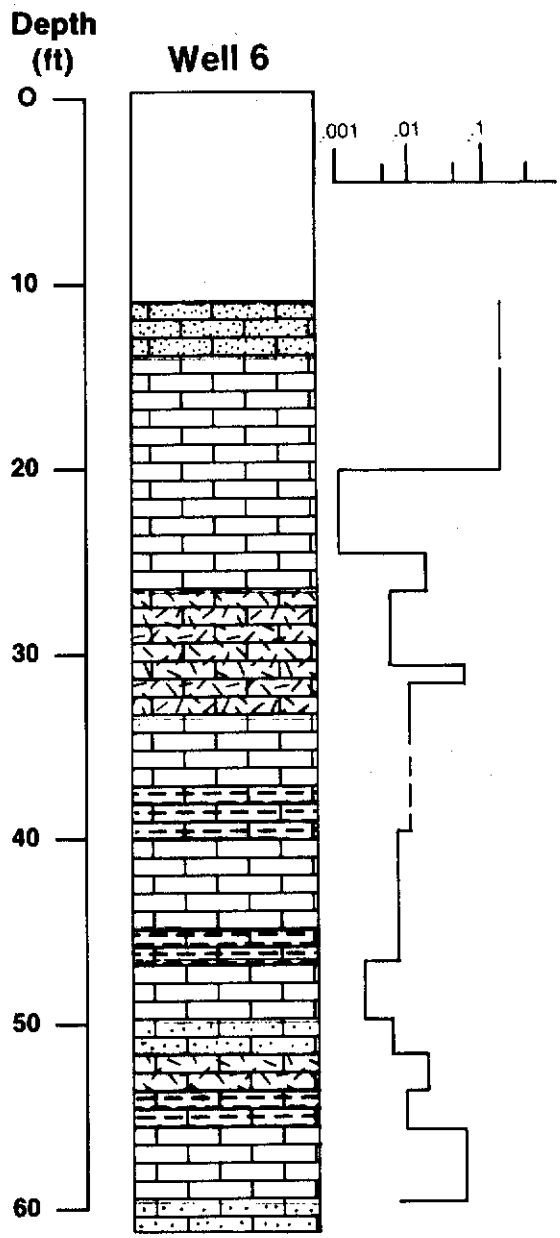


Figure 13 Geology and Permeability of Well 6

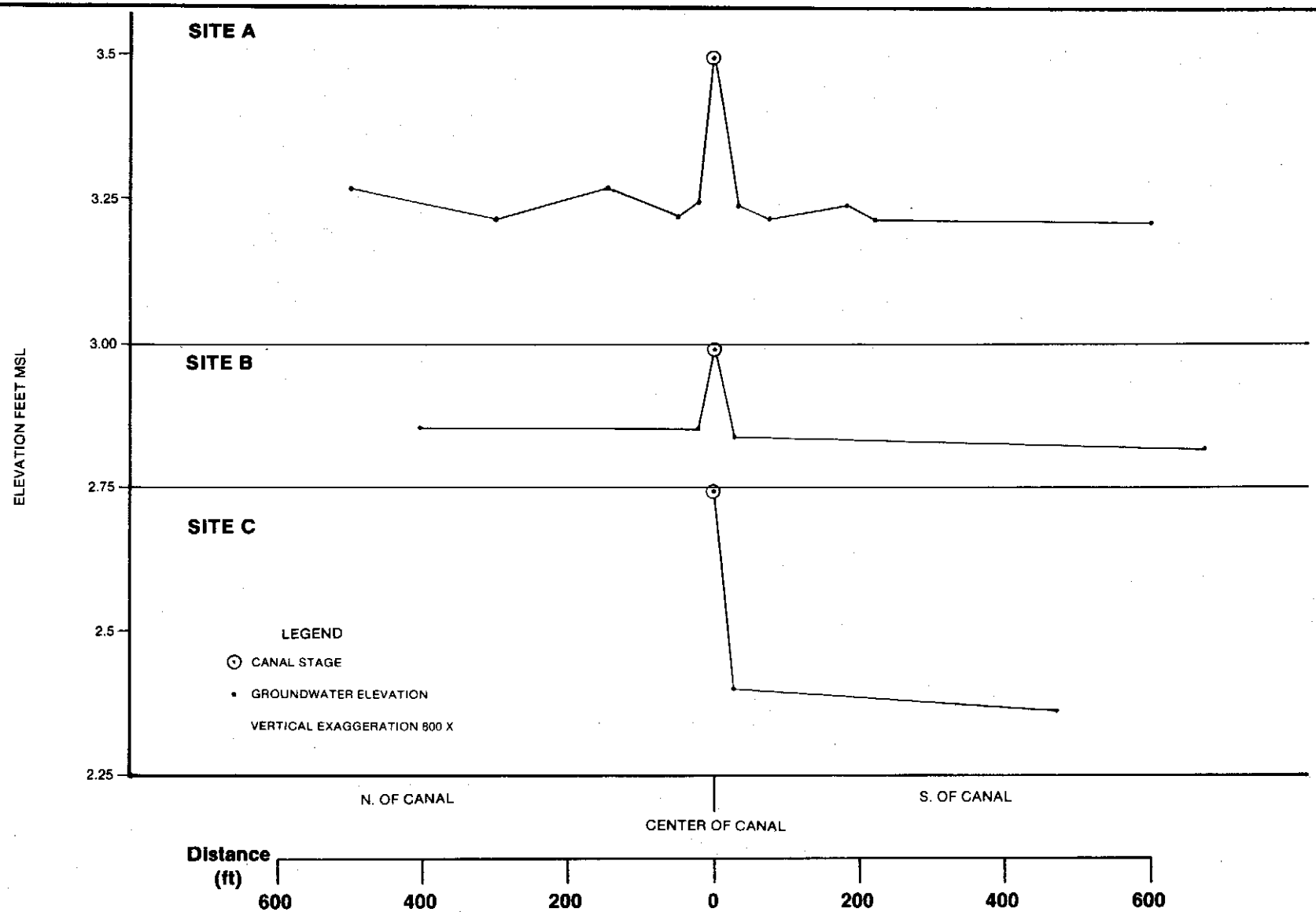


Figure 14 **COMPARISION OF SIMULTANEOUS VALUES BETWEEN CANAL STAGE AND GROUNDWATER LEVELS**

The same situation occurs at Site B where the canal stage was 2.97 feet above NGVD while the adjacent groundwater levels ranged from 2.82 to 2.85 feet above NGVD. This similar case reflects a .12 to .15 foot head difference from the canal to the adjacent aquifer and only a .03 foot difference within the aquifer itself.

Site C, while having only two wells, still shows the same relationship. The canal is approximately .35 foot higher than the very flat aquifer surface.

These very low gradients between the aquifer and the canal are due to: 1) the high transmissivity of the aquifer, and 2) the high degree of hydraulic connection due to the very porous and permeable nature of the rock.

The advantages and disadvantages of the inter-connection was discussed by Klein and Hull (1978).

> "The benefits area: (1) Flood prevention by the rapid removal of excess water to the ocean through operation of control structures in canals; and (2) the movement of ground water from the interior to the coastal areas where it can infiltrate the aquifer and maintain high water levels to retard saltwater intrusion. Problems related to good aquifer-canal interconnection are: (1) The movement of saltwater into the aquifer along the coast and tidal canals during times of low water; and (2) the threat of pollutants entering the aquifer from the land surface or from canals, and moving long distances."

The relationship between the water level readings from the wells and the canal stage is linear and has a very high correlation. Figure 15 shows linear regression analysis plots of the water levels in wells 6A and 7A as compared to the stage at S-196, and the water levels in wells 15A and 16A as compared to the stage at S-167. Each of the data points indicate the canal stage to be higher than the aquifer elevation. The linear regression for well 7A versus C-103 stage at S-196 has a near perfect slope of one. The y intercept at .21 foot confirms the observations from Figure 14 indicating the canal stage to be approximately .2 foot above the adjacent aquifer elevation. These linear relationships can be useful in the absence of data to predict heads when given either canal stage or aquifer elevation data.

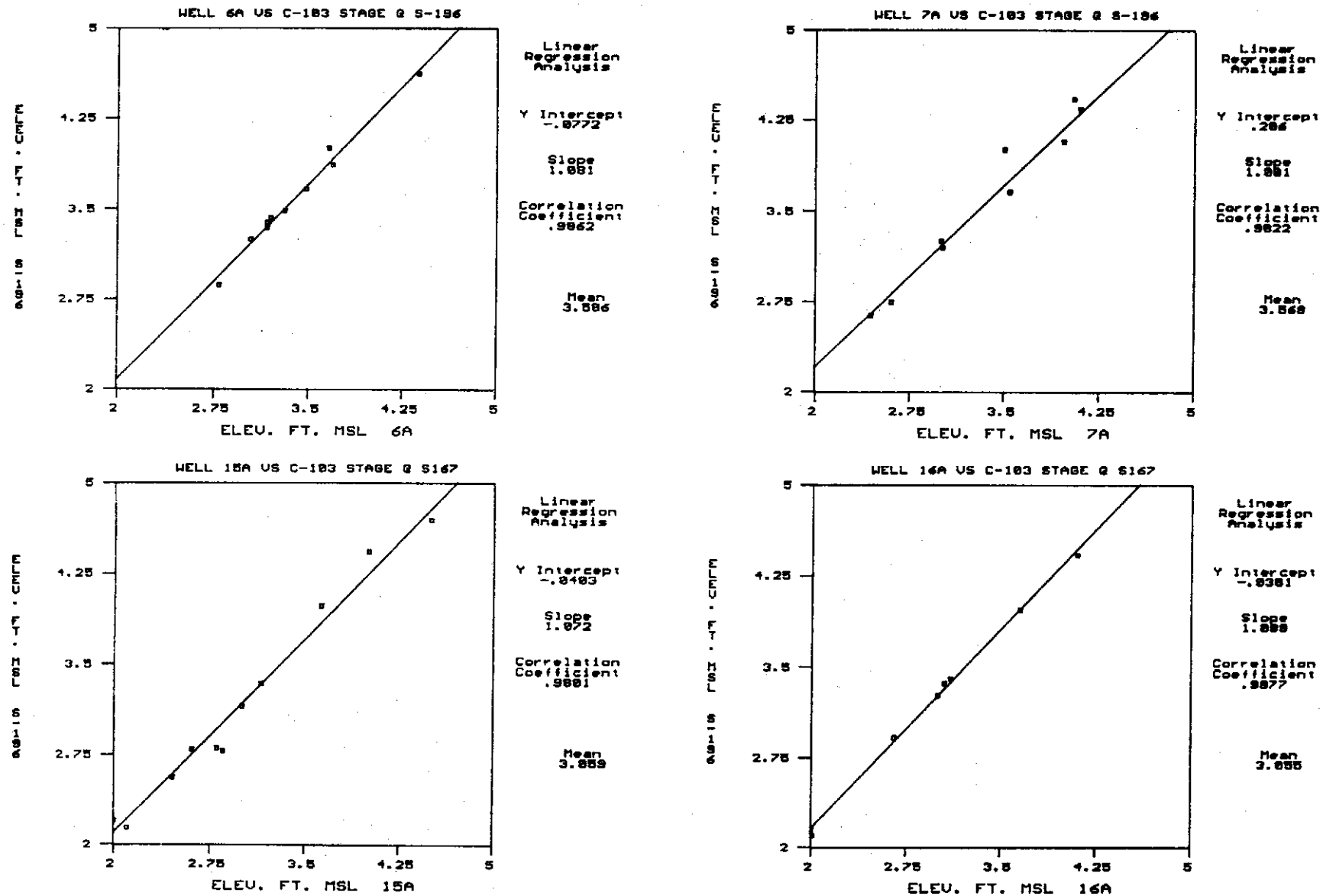


Figure 15 **LINEAR RELATIONSHIPS BETWEEN CANAL STAGE AND GROUNDWATER LEVELS**

Seasonal Fluctuations

Between January and June 1981, 14.15 inches of precipitation were recorded at rainfall gauging station MRF6126 (Figure 1). From July to December of the same year, 60.57 inches of rain fell in the C-103 vicinity. Figure 16 illustrates the daily rainfall and its effect on the C-103 stage and groundwater levels. The data used to plot the groundwater elevation is from well 9A, and the stage data from S-196 upstream, both located at Site A.

As previously discussed, the strong linear relationship between the well data and the stage data allows for the prediction of either canal or groundwater stages in the absence of water level data. At site A the well data is taken from a continuous strip chart recorder while the canal stage is read from a staff gauge. For this reason, there was more water level data while some stage data was missing (especially on weekends). Therefore, the linear equation

$$y = 1.001\ X + .206 \qquad (1)$$

was used for missing early time stage data in Figure 16. These values are depicted by an X. In addition, the storm event in mid-August required more frequent readings than the data available from the S-196 staff gauge. It was readily apparent from empirical observation that equation (1) did not hold true for high rainfall (or high gradient) periods. In addition, S-167 was equipped with a continuous recorder which recorded the storm event precisely. Therefore, an additional linear equation relating values from S-167 to S-196 during high water periods (Figure 17) was used for comparison with the water levels in well 9A. These values are depicted on Figure 16 by an O. Note that there are actual S-196 staff readings taken during the event that helped calibrate the curve.

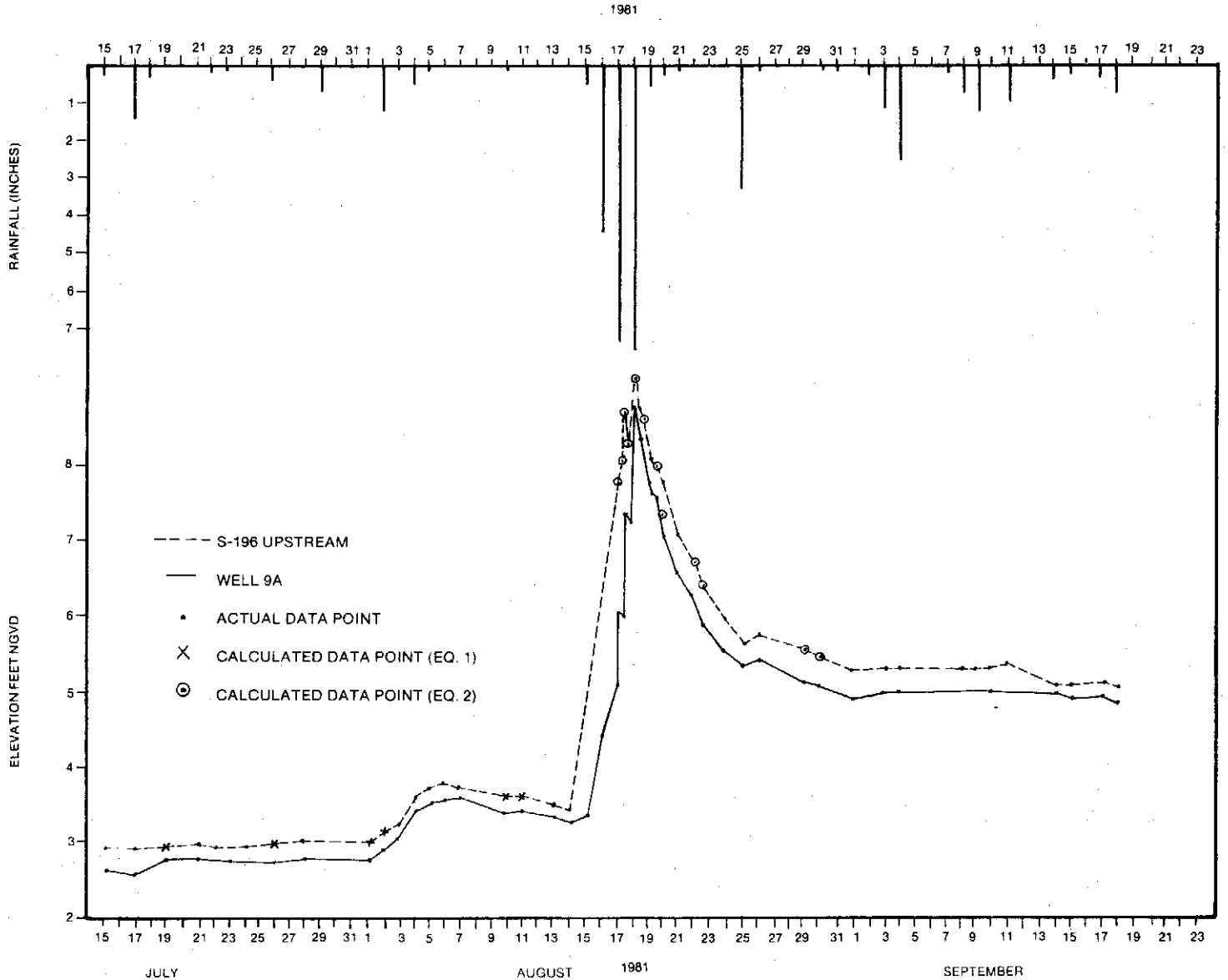


Figure 16 **SEASONAL FLUCTUATIONS OF CANAL STAGE AND GROUNDWATER LEVELS COMPARED WITH RAINFALL**

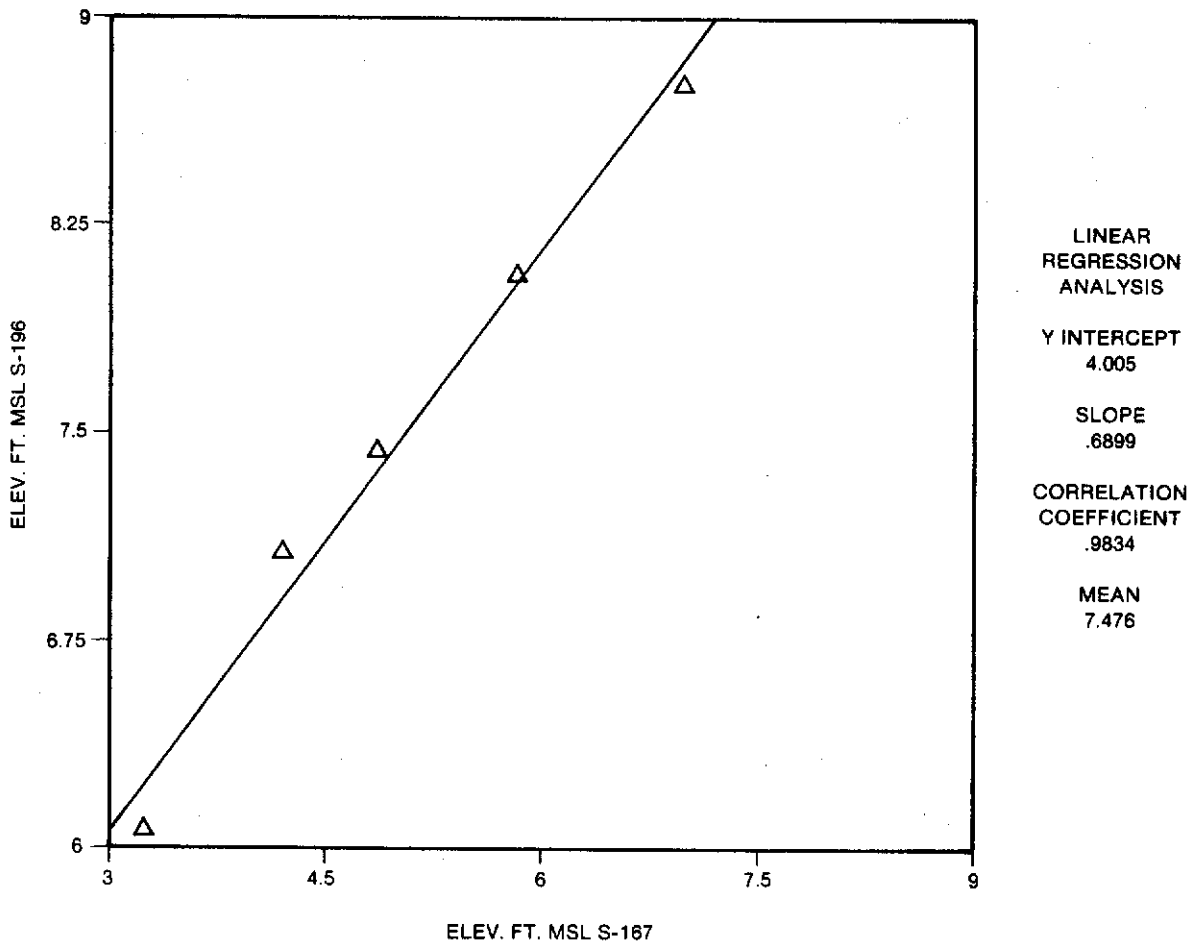


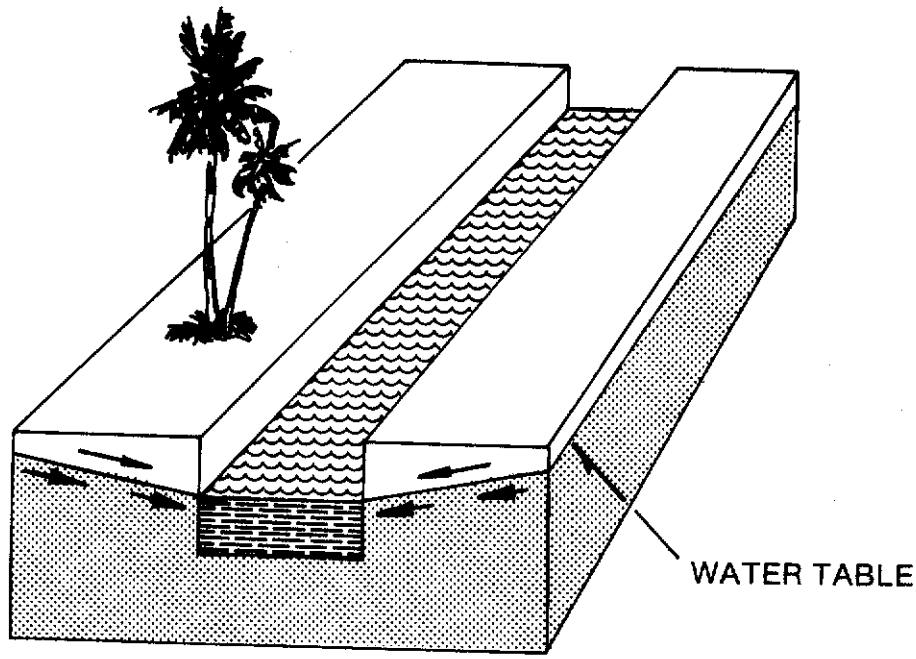
Figure 17 **LINEAR RELATIONSHIP BETWEEN S-196 AND S-167 DURING HIGH WATER LEVELS**

The linear equation used from Figure 17 is

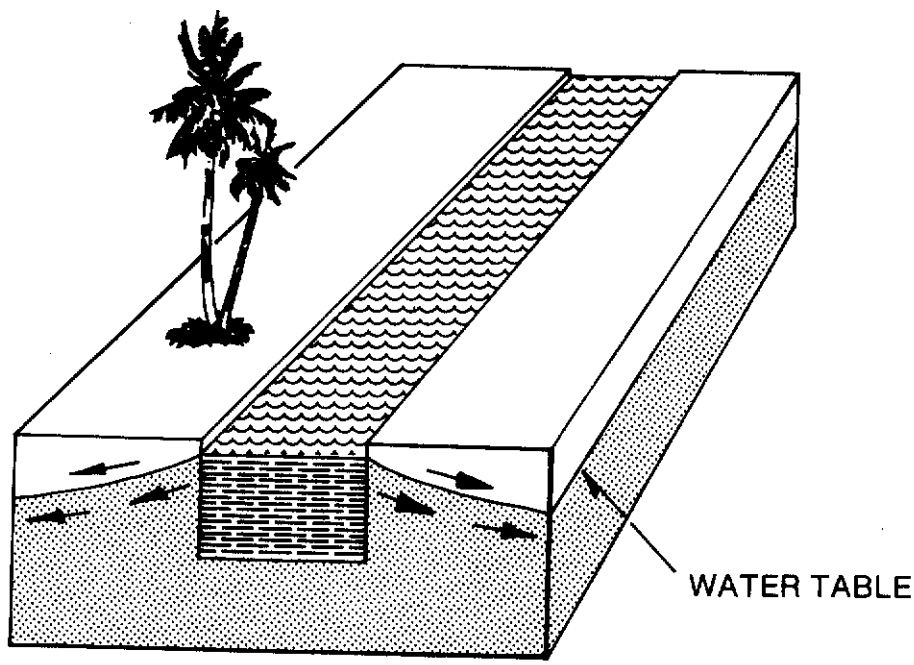
$$y = .690\ X + 4.10 \qquad (2)$$

The water levels in mid July represent the typical dry season or low water elevation of 2.5 to 3.0 feet above NGVD. A storm event in early April increased levels to approximately 3.5 feet above NGVD. Water levels began to recede until August 14, 1981 when a major storm event began. Between August 14, 1981 and August 19, 1981, 21 inches of precipitation was recorded at rainfall gauging station MRF6126. This caused a sharp rise of both the aquifer and canal levels. The canal peaked at 9.15 feet above NGVD and the aquifer rose to 8.80. Water levels then again receded until August 25, 1981, when 6.5 inches of rain increased levels slightly. By September 1981, the water levels were approximately 5 feet above NGVD, and slowly dropping.

During this entire span, illustrated in Figure 16, the canal stage remained above the aquifer and by a relatively constant amount. In fact, the author has been unable to find a single instance when the groundwater table was above the canal stage, even during dry periods when this scenario might be expected. The situation is shown graphically in Figure 18 taken from Klein and others (1975). During the entire period of record for this study the situation, as depicted in the lower portion of the figure, has occurred. Even during low canal stages, as shown in the upper portion of the figure, the inflow of water to the canal does not occur. This is due to the water management practices of maintaining high canal stages. Headwater design criteria for S-167 is 5.6 feet above NGVD, and for S-196 the headwater is 6.5 and the tailwater 5.5 feet above NGVD. Therefore, the gates are usually closed to attain these regulation stages.



When the water level in an aquifer is higher than that in a canal that penetrates it, water moves toward the canal.



When the water level in a canal is higher than that in the aquifer it penetrates, water moves into the aquifer.

Figure 18 — Hydraulic connection between a canal and an aquifer (Klein and others, 1975)

FLOW MEASUREMENTS

Discharge measurements were made at four locations along C-103; two at Site A and one each at Sites B and C. Measurements were taken using a handheld Price type AA four-vane vertical axis meter. Summaries for the discharge measurements made at each location are shown in Tables 7 through 10.

Table 7 shows that an attempt was made to measure flow upstream of S-196. This was a difficult location to transect and the abundance of weed did not allow the flowmeter to turn. Zero discharge was measured at this station and it was subsequently dropped.

Table 8 shows the discharge measurement approximately 350 feet downstream of S-196 at the Richard Road bridge. Average discharge for the four measurements taken was 7.75 cubic feet per second (cfs). One reading was taken on 2/18/81; however, since it rained approximately 5 inches that evening a new measurement was taken on 2/19/81. The velocity increased from .25 feet per second (fps) to .38 fps, as did the discharge which increased from 7.35 cfs to 11.5 cfs.

Table 9 is the discharge measurement for Site B taken at the Redland Road bridge and C-103. The velocity and the discharge were relatively constant during the three measurements. The velocity averaged .21 fps and the discharge averaged 35.5 cfs.

Table 10 shows the three measurements taken for Site C at the McMinn Road bridge and C-103. The mean velocity for the three readings averaged .13 fps and the discharge averaged 18.33 cfs.

WATER QUALITY

A complete summary of all water quality samples collected between 7/15/79 and 3/1/83 is found in Appendix II. As many as four samples per well were collected and up to 28 parameters analyzed. Appendix II is organized by

FORM 615
Rev. 7/77

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
Discharge Measurement Summary Sheet

Discharge measurements of C-103 Above S-196 (Site A)

No.	Date	Party	Width	Area	Mean velocity	Gage height	Discharge	Rating Shift adj.	Rating Percent diff.	Method	Number meas. sections	Gage height change	Time	Meas. rated	Gate(s) Open	ΔH	REMARKS
			Feet	Sq ft	Fps	Feet	Cfs	Feet				Feet	Hr				
1	6/10/80	Brindle Shaw	36.5			4.14	0				6						Heavy, weeds and debris No flow to turn meter

DONE:
CHECKED:

TABLE 7. DISCHARGE MEASUREMENTS AT C-103 ABOVE S-196 (SITE A)

FORM 615
Rev. 7/77

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
Discharge Measurement Summary Sheet

Discharge measurements of C-103 at Richard Road (Site A)

No.	Date	Party	Width	Area	Mean velocity	Gage height	Discharge	Rating: Shift adj.	Rating: Percent diff.	Method	Number meas. sections	Gage height change	Time	Meas. rated	Gate(s) Open	ΔH	REMARKS
			Feet	Sq ft	Fps	Feet	Cfs	Feet				Feet	Hr				
1	6/10/80	Brindle Shaw	7.0	45.6	.21	3.63	9.35				2						Clear, with heavy weeds
2	2/18/81	Brindle Shaw	10.0	29.6	.25	2.60	7.35			.6	6		.25				Clear
3	2/19/81	Brindle Shaw	10.0	30.4	.38	3.24	11.5			.6	6		.33				Clear, 5" rain since prev. measurement
4	1/4/83	Phillippy Shaw	12.0	25.6	.11	3.18	2.78			.2 .6 .8	3						Clear

DONE: _____
CHECKED: _____

TABLE 8. DISCHARGE MEASUREMENTS AT C-103 AT RICHARD ROAD (SITE A)

FORM 615
Rev. 7/77

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
Discharge Measurement Summary Sheet

Discharge measurements of C-103 at Redland Road (Site B)

No.	Date	Party	Width	Area	Mean velocity	Gage height	Discharge	Rating Shift adj.	Rating Percent diff.	Method	Number meas. sections	Gage height change	Time	Meas. rated	Gate(s) Open	ΔH	REMARKS
			Feet	Sq ft	Fps	Feet	Cfs	Feet				Feet	Hr				
1	6/10/80	Brindle Shaw	28.0	200.4	.20	3.58	39.5		.2 .6 .8	8			.50				Clear, heavy weeds
2	2/19/81	Brindle Shaw	27.5	161.9	.19	3.11	31.5		.2 .8	16			1.00				Clear, heavy bottom
3	1/4/83	Phillippy Shaw	27.3	147.9	.24	3.07	35.43		.2 .8	10			.50				Clear

DONE: _____
CHECKED: _____

TABLE 9. DISCHARGE MEASUREMENTS AT C-103 AT REDLAND ROAD (SITE B)

FORM 615
Rev. 7/77

SOUTH FLORIDA WATER MANAGEMENT DISTRICT
Discharge Measurement Summary Sheet

Discharge measurements of C-103 at McMinn Road (Site C)

No.	Date	Party	Width	Area	Mean velocity	Gage height	Discharge	Rating Shift adj.	Rating Percent diff.	Method	Number meas. sections	Gage height change	Time	Meas. rated	Gate(s) Open	ΔH	REMARKS
			Feet	Sq ft	Fps	Feet	Cfs	Feet				Feet	Hr				
1	6/10/80	Brindle Shaw	26.5	151.0	.15	3.52	23.0			.2 .6 .8	8		.50				Clear, heavy bottom, weeds
2	2/19/81	Brindle Shaw	24.5	142.6	.10	3.18	14.0			.2 .8	18		.91				Clear, heavy bottom, weeds
3	1/4/83	Phillippy Shaw	26.0	117.5	.15	2.95	18.0			.2 .8	10		.58				Clear

DONE: _____
CHECKED: _____

TABLE 10. DISCHARGE MEASUREMENTS AT C-103 AT McMINN ROAD (SITE C)

station and gives the number of values, average standard deviation, minimum value, and maximum value for each parameter.

The concentration of major ions can be evaluated using the Piper trilinear diagram (Figure 19). The sample plot in the diamond is indicative of sodium bicarbonate type waters. These are indicative of freshly recharged water in a carbonate aquifer. All of the wells are fairly closely spaced in Figure 19 (which includes samples from all stations) indicating similar sources and geochemical conditions in the aquifer.

To evaluate changes in water quality with time, additional post pumping data must be examined. It has been noted that recently there has been an apparent increase in iron; however, an evaluation of this situation is beyond the scope of this report. Since it has been mentioned that the canal stage is higher than the aquifer, allowing contaminants to enter the aquifer from the canal, additional analyses for pesticides, herbicides, and other organics should be made.

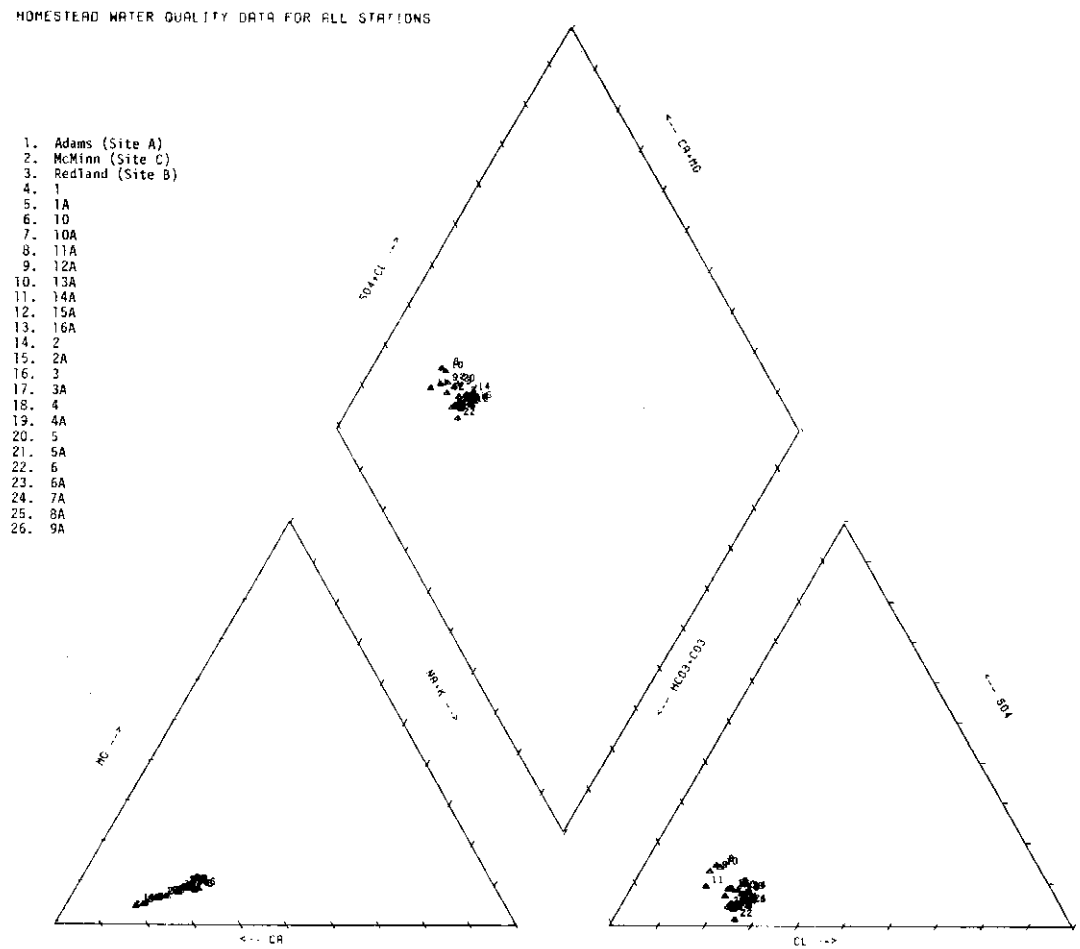


Figure 19 Piper Trilinear Diagram for All C-103 Sampling Stations

CONCLUSIONS

1. The surface of the aquifer in the C-103 area is extremely flat, deviating approximately .06 foot within 600 feet of the canal.
2. C-103 maintained a higher elevation (approximately .25 feet) than the adjacent groundwater levels throughout the period of study.
3. The aquifer and the canal respond rapidly to rainfall events and show similar hydrographs throughout a rainstorm event.
4. The canal rarely reaches regulation stage, and the gates are generally kept closed.
5. The permeability of the upper 25 feet of the aquifer is extremely high as water flows through large interconnected pores.
6. There is a lower permeability layer present at a depth of 30 feet; however, it is not confining enough to cause a difference in head between the shallow (20 feet) and deep (60 feet) wells.
7. The high degree of interconnection between the aquifer and the canal is beneficial in that it is effective for flood protection. The movement of groundwater east from the water conservation areas helps maintain high water levels, thereby retarding saltwater intrusion. However, from a water quality viewpoint, it is detrimental due to the threat of pollutants entering the canals and increasing the extent of contamination.
8. A linear equation of,

   $$y = 1.001\ X + .206$$

   can be used to predict canal stage from nearby aquifer elevations during low stage periods.
9. Flows were low and recorded mainly seepage around the structures. Velocities are at the lower limit of detection for the meter used.
10. Water quality data is fairly uniform and representative of calcium bicarbonate type water.

RECOMMENDATIONS

1. Since the changes in water level readings are less than .25 foot, very accurate data is needed. The constant gradient from the canal to the aquifer, even during low water periods, is questionable. Therefore, each well and each staff gauge or stage recorder station should be resurveyed to insure accuracy.
2. Continue water quality monitoring to evaluate changes in water quality, especially iron, and analyze for organic contaminants when possible.

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APPENDIX I

SOUTH FLORIDA WMD - LITHO LOG PRINTOUT

W-10306C
DADE CO. T56S R38E SEC 34NE 25 30 57 N 80 30 53 W
TOTAL DEPTH-00061 FT. ELEV.- 008 FT. SAMPLES- 00011-00061 FT.
COMPLETED- 79.08.17 DEPTH WORKED 00061 FT.

WELL NAME-
C103, SFWMD, PETE DAUENHAUER- DRILLER, CONTINUOUS CORE
REMARKS-
DESCRIBED BY JEFF HERR (APRIL 1983), SAMPLE QUALITY EXCELLENT.
HYDROGEOLOGIC UNITS
11.0- 61.0 FT. BISCAYNE AQUIFER

STRATIGRAPHIC FORMATIONS -

11.0- 14.0 MIAMI OOLITE
14.0- 61.0 FT. THOMPSON FORMATION

LITHOLOGIC LOG
W-10306C. DADE CO. T56S, R38E, SEC 34NE

.0- 11.0 NO SAMPLE,

11.0- 14.0 LIMESTONE, WHITE TO DARK YELLOWISH ORANGE, 35% POROSITY, VUGULAR, MOLDIC, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: OOLITE, CRYSTALS, INTRACLASTS, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, SPARRY CALCITE CEMENT, IRON STAIN, MOLLUSKS,

MIAMI OOLITE

14.0- 15.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT YELLOWISH ORANGE, 10% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, BIOGENIC, INTRACLASTS, 40% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, GOOD INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 07% SPAR, 01% CALCITE, IRON STAIN, MOLLUSKS, FOSSIL FRAGMENTS,

15.0- 20.0 LIMESTONE, WHITE TO VERY LIGHT GRAY, 20% POROSITY, VUGULAR, MOLDIC, INTERGRANULAR, GRAIN TYPE: CALCILUTITE, INTRACLASTS, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: MICROCRYSTALLINE TO VERY FINE, POOR INDURATION, CALCILUTITE MATRIX, CHALKY, MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS, WORM TRACES,

20.0- 24.5 CALCILUTITE, VERY LIGHT ORANGE TO WHITE, 01% POROSITY, PIN POINT VUGS, FRACTURE, GRAIN TYPE: CALCILUTITE, CRYSTALS, 01% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE, GOOD INDURATION, CALCILUTITE MATRIX, 01% SPAR,

LITHOLOGIC LOG
W-10306C. DADE CO. T56S, R38E, SEC 34NE

24.5- 25.0 LIMESTONE, WHITE TO GRAYISH ORANGE, 05% POROSITY, INTERGRANULAR, FRACTURE, GRAIN TYPE: CALCILUTITE, INTRACLASTS, BIOGENIC, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, 02% QUARTZ, 02% SPAR,

25.0- 26.5 LIMESTONE, VERY LIGHT GRAY TO DARK YELLOWISH ORANGE, 20% POROSITY, INTERGRANULAR, GRAIN TYPE: BIOGENIC, SKELETAL CAST, CALCILUTITE, 85% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: COARSE, RANGE: MICROCRYSTALLINE TO VERY COARSE, MODERATE INDURATION, CALCILUTITE MATRIX, 05% SPAR, COQUINA, MOLLUSKS, BRYOZOA, FOSSIL FRAGMENTS,

SPIRAL PLATE SHAPED FOSSILS PRESENT

26.5- 34.5 LIMESTONE, VERY LIGHT GRAY TO LIGHT YELLOWISH ORANGE, 20% POROSITY, MOLDIC, VUGULAR, INTERGRANULAR, GRAIN TYPE: BIOGENIC, SKELETAL CAST, CALCILUTITE, 90% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MEDIUM, RANGE: CRYPTOCRYSTALLINE TO COARSE, MODERATE INDURATION, SPARRY CALCITE CEMENT, CALCILUTITE MATRIX, 15% CALCILUTITE, IRON STAIN, MOLLUSKS, CORAL, FOSSIL FRAGMENTS,

34.5- 35.5 LIMESTONE, VERY LIGHT GRAY TO LIGHT YELLOWISH ORANGE, 15% POROSITY, VUGULAR, FRACTURE, GRAIN TYPE: INTRACLASTS, SKELETAL CAST, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 15% SPAR, CHALKY, MOLLUSKS, FOSSIL FRAGMENTS,

35.5- 36.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT GRAY, 20% POROSITY, FRACTURE, MOLDIC, GRAIN TYPE: CRYSTALS, CALCILUTITE, SKELETAL CAST, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: CRYPTOCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, GOOD INDURATION, SPARRY CALCITE CEMENT, CALCILUTITE MATRIX, 20% CALCILUTITE, 02% PHOSPHATIC GRAVEL, MOLLUSKS, FOSSIL MOLDS,

36.0- 37.5 LIMESTONE, VERY LIGHT GRAY TO LIGHT YELLOWISH ORANGE, 20% POROSITY, FRACTURE, MOLDIC, GRAIN TYPE: INTRACLASTS, CRYSTALS, CALCILUTITE, 30% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 10% SPAR, 02% QUARTZ, MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS,

37.5- 40.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT YELLOWISH ORANGE, 30% POROSITY, FRACTURE, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 10% SPAR, 10% CLAY, MOLLUSKS, FOSSIL MOLDS,

MUDSTONE

LITHOLOGIC LOG
W-10306C. DADE CO. T56S, R38E, SEC 34NE

40.0- 45.2 LIMESTONE, WHITE TO LIGHT GRAY, 15% POROSITY, VUGULAR, GRAIN TYPE: CALCILUTITE, INTRACLASTS, 40% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, 05% QUARTZ, IRON STAIN, MOLLUSKS,

45.2- 46.4 LIMESTONE, LIGHT GRAY TO MODERATE LIGHT GRAY, 10% POROSITY, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: MICROCRYSTALLINE TO VERY FINE, MODERATE INDURATION, 10% CLAY, 05% QUARTZ, MOLLUSKS,

MOLLUSKS ARE PREDOMINANTLY THIN WALLED GASTROPODS ,
MUDSTONE

46.4- 49.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT GRAY, 15% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: INTRACLASTS, CALCILUTITE, CRYSTALS, 80% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MEDIUM, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, 07% SPAR, 05% CALCITE, MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS,

49.0- 50.0 LIMESTONE, WHITE TO MODERATE LIGHT GRAY, 10% POROSITY, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: MICROCRYSTALLINE TO VERY FINE, GOOD INDURATION, CALCILUTITE MATRIX, 05% QUARTZ, 05% CLAY, 01% CALCITE, IRON STAIN,

50.0- 51.5 LIMESTONE, WHITE, 05% POROSITY, MOLDIC, INTERGRANULAR, GRAIN TYPE: CALCILUTITE, INTRACLASTS, 45% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, GOOD INDURATION, CALCILUTITE MATRIX, 25% QUARTZ, MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS,

51.5- 54.0 LIMESTONE, WHITE TO MODERATE YELLOWISH BROWN, 20% POROSITY, FRACTURE, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 75% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO VERY COARSE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 15% CALCITE, CORAL,

54.0- 56.0 LIMESTONE, VERY LIGHT GRAY TO VERY LIGHT ORANGE, 10% POROSITY, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, 15% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 15% QUARTZ, MOLLUSKS,

MUDSTONE

LITHOLOGIC LOG
W-10306C. DADE CO. T56S, R38E, SEC 34NE

56.0- 60.0 LIMESTONE, VERY LIGHT GRAY, 10% POROSITY, MOLDIC, INTERGRANULAR, VUGULAR, GRAIN TYPE: BIOGENIC, INTRACLASTS, CALCILUTITE, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, 15% QUARTZ, MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS,

60.0- 60.5 LIMESTONE, VERY LIGHT GRAY TO VERY LIGHT ORANGE, 15% POROSITY, MOLDIC, INTERGRANULAR, GRAIN TYPE: BIOGENIC, INTRACLASTS, CALCILUTITE, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: MICROCRYSTALLINE TO FINE, POOR INDURATION, SPARRY CALCITE CEMENT, CALCILUTITE MATRIX, 15% QUARTZ, 15% SPAR, MOLLUSKS, CORAL, FOSSIL FRAGMENTS, FOSSIL MOLDS,

60.5- 61.0 LIMESTONE, WHITE, 10% POROSITY, VUGULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: MICROCRYSTALLINE TO MICROCRYSTALLINE, MODERATE INDURATION, CALCILUTITE MATRIX, 45% QUARTZ, 05% SPAR,

TD

SOUTH FLORIDA WMD - LITHO LOG PRINTOUT

W-10305C

DADE CO. T56S R38E SEC 34NE 25 31 07 N 80 30 53 W
TOTAL DEPTH-00060 FT. ELEV.- 008 FT. SAMPLES- 00011-00060 FT.
COMPLETED- 79.08.14 DEPTH WORKED 00060 FT.

REMARKS-
DESCRIBED BY JEFF HERR (MARCH 1983), SAMPLE QUALITY-EXCELLENT
HYDROGEOLOGIC UNITS
11.0- 60.0 FT. BISCAYNE AQUIFER

STRATIGRAPHIC FORMATIONS -

11.0- 20.0 MIAMI OOLITE
20.0- 60.0 FT. THOMPSON FORMATION

LITHOLOGIC LOG
W-10305C. DADE CO. T56S, R38E, SEC 34NE

.0- 11.0 NO SAMPLE,

11.0- 15.0 LIMESTONE, VERY LIGHT ORANGE, 35% POROSITY, VUGULAR, MOLDIC, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, OOLITES,

15.0- 19.0 LIMESTONE, VERY LIGHT ORANGE TO LIGHT BROWN, 40% POROSITY, VUGULAR, MOLDIC, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, IRON STAIN, OOLITES,

19.0- 20.0 LIMESTONE, VERY LIGHT ORANGE TO LIGHT YELLOWISH ORANGE, 15% POROSITY, VUGULAR, GRAIN TYPE: INTRACLASTS, CALCILUTITE, CRYSTALS, 75% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO COARSE, POOR INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 10% CALCITE, OOLITES,

20.0- 25.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT GRAY, 05% POROSITY, VUGULAR, INTERGRANULAR, GRAIN TYPE: INTRACLASTS, CALCILUTITE, CRYSTALS, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, BANDED, 10% QUARTZ, 05% CALCITE,

INDURATION VARIES FROM POOR TO MODERATE

LITHOLOGIC LOG
W-10305C. DADE CO. T56S, R38E, SEC 34NE

25.0- 30.0 LIMESTONE, WHITE TO VERY LIGHT ORANGE, 05% POROSITY, VUGULAR, PIN POINT VUGS, MOLDIC, GRAIN TYPE: INTRACLASTS, CALCILUTITE, CRYSTALS, 90% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: CRYPTOCRYSTALLINE TO VERY COARSE, GOOD INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, BANDED, BRECCIATED, MOTTLED, MOLLUSKS,

SPIRAL PLATE SHAPED FOSSIL PRESENT AT 27 FOOT INTERVAL

30.0- 35.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT GRAY, 10% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: INTRACLASTS, CALCILUTITE, CRYSTALS, 80% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: CRYPTOCRYSTALLINE TO VERY COARSE, POOR INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 05% CALCITE, MOLLUSKS, WORM TRACES, FOSSIL MOLDS,

35.0- 36.0 LIMESTONE, WHITE, 10% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 80% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: CRYPTOCRYSTALLINE TO COARSE, POOR INDURATION, CALCILUTITE MATRIX, CHALKY,

36.0- 40.5 LIMESTONE, MODERATE LIGHT GRAY TO MODERATE GRAY, 20% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 05% CALCITE, 05% QUARTZ, 05% CLAY, IRON STAIN, MOLLUSKS, FOSSIL MOLDS,

MUDSTONE, CHANNELS LARGER AND MORE COMMON THAN IN PREVIOUS WELLS

40.5- 41.2 LIMESTONE, WHITE, 05% POROSITY, VUGULAR, GRAIN TYPE: CALCILUTITE, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 05% QUARTZ,

41.2- 43.5 LIMESTONE, MODERATE LIGHT GRAY TO MODERATE GRAY, 15% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 05% CALCITE, 05% QUARTZ, 05% CLAY, IRON STAIN, MOLLUSKS, FOSSIL MOLDS,

MUDSTONE

43.5- 45.0 LIMESTONE, VERY LIGHT GRAY, 02% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, GOOD INDURATION, CALCILUTITE MATRIX, 35% QUARTZ, 05% CALCITE, MOLLUSKS, FOSSIL MOLDS,

VUG AT TOP OF FORMATION FILLED IN WITH MATERIAL FROM OVERLYING BED

LITHOLOGIC LOG
W-10305C. DADE CO. T56S, R38E, SEC 34NE

45.0- 47.0 LIMESTONE, WHITE TO VERY LIGHT GRAY, 05% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 25% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, POOR INDURATION, CALCILUTITE MATRIX, 25% QUARTZ, MOLLUSKS, FOSSIL MOLDS,

47.0- 49.0 LIMESTONE, LIGHT GRAY, 10% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, POOR INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 05% CALCITE, 02% QUARTZ, 05% CLAY,

MUDSTONE

49.0- 50.0 LIMESTONE, WHITE, 10% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 25% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, POOR INDURATION, CALCILUTITE MATRIX, 02% CALCITE,

50.0- 53.0 LIMESTONE, LIGHT GRAY, 10% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 05% CALCITE, 05% CLAY, 05% QUARTZ,

53.0- 55.0 LIMESTONE, WHITE, 05% POROSITY, VUGULAR, INTERGRANULAR, GRAIN TYPE: CALCILUTITE, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: CRYPTOCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE, MODERATE INDURATION, 35% QUARTZ, MOLLUSKS,

55.0- 57.0 LIMESTONE, WHITE TO VERY LIGHT ORANGE, 10% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 30% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 07% CALCITE, 03% CLAY,

MUDSTONE

57.0- 60.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT GRAY, 10% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: INTRACLASTS, CRYSTALS, 90% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MEDIUM, RANGE: VERY FINE TO COARSE, GOOD INDURATION, SPARRY CALCITE CEMENT, CALCILUTITE MATRIX, 35% QUARTZ, 15% CALCITE, MOLLUSKS, FOSSIL MOLDS,

TD

SOUTH FLORIDA WMD - LITHO LOG PRINTOUT

W-10304C

DADE CO. T56S R38E SEC 34NE 25 31 04 N 80 30 53 W
TOTAL DEPTH-00060 FT. ELEV.- 008 FT. SAMPLES- 00014-00060 FT.
COMPLETED- 79.08.13 DEPTH WORKED 00060 FT.

WELL NAME-
C103, SFWMD, PETE DAUENHAUER- DRILLER, CONTINUOUS CORE
REMARKS-
DESCRIBED BY JEFF HERR (MARCH 1983), SAMPLE QUALITY-EXCELLENT.
HYDROGEOLOGIC UNITS
14.0- 60.0 FT. BISCAYNE AQUIFER

STRATIGRAPHIC FORMATIONS -

14.0- 23.0 MIAMI OOLITE
23.0- 60.0 FT. THOMPSON FORMATION

LITHOLOGIC LOG
W-10304C. DADE CO. T56S, R38E, SEC 34NE

.0- 14.0 NO SAMPLE,

14.0- 15.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT YELLOWISH ORANGE, 35% POROSITY, VUGULAR, MOLDIC, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: INTRACLASTS, CALCILUTITE, CRYSTALS, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: CRYPTOCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 07% CALCITE, OOLITES,

15.0- 17.5 LIMESTONE, VERY LIGHT GRAY TO VERY LIGHT ORANGE, 25% POROSITY, VUGULAR, INTERGRANULAR, GRAIN TYPE: INTRACLASTS, CALCILUTITE, CRYSTALS, 30% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, POOR INDURATION, CALCILUTITE MATRIX, 10% SPAR, OOLITES,

17.5- 23.0 LIMESTONE, VERY LIGHT GRAY TO VERY LIGHT ORANGE, 25% POROSITY, VUGULAR, INTERGRANULAR, GRAIN TYPE: INTRACLASTS, CALCILUTITE, CRYSTALS, 30% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, POOR INDURATION, CALCILUTITE MATRIX, BANDED, 10% SPAR, OOLITES,

23.0- 24.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT GRAY, 05% POROSITY, INTERGRANULAR, VUGULAR, GRAIN TYPE: INTRACLASTS, CRYSTALS, CALCILUTITE, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO MEDIUM, MODERATE INDURATION, SPARRY CALCITE CEMENT, CALCILUTITE MATRIX, BANDED, 10% QUARTZ, FOSSIL MOLDS,

LITHOLOGIC LOG
W-10304C. DADE CO. T56S, R38E, SEC 34NE

24.0- 28.0 LIMESTONE, WHITE TO VERY LIGHT GRAY, 02% POROSITY, INTERGRANULAR, GRAIN TYPE: CRYSTALS, INTRACLASTS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: CRYPTOCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO FINE, GOOD INDURATION, SPARRY CALCITE CEMENT, BANDED, MOLLUSKS,

SPIRAL PLATE SHAPED FOSSILS PRESENT

28.0- 33.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT YELLOWISH ORANGE, 07% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 20% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 15% CALCITE, MOLLUSKS, FOSSIL MOLDS,

33.0- 35.0 LIMESTONE, VERY LIGHT GRAY TO GRAYISH ORANGE, 10% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 15% CALCITE, MOLLUSKS, FOSSIL MOLDS,

35.0- 38.0 LIMESTONE, WHITE, 10% POROSITY, VUGULAR, GRAIN TYPE: CALCILUTITE, INTRACLASTS, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MEDIUM, RANGE: MICROCRYSTALLINE TO COARSE, POOR INDURATION, CALCILUTITE MATRIX, CHALKY, MOLLUSKS, FOSSIL MOLDS,

38.0- 40.0 LIMESTONE, MODERATE LIGHT GRAY TO MODERATE GRAY, 05% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 05% CALCITE, 05% CLAY, MOLLUSKS, FOSSIL MOLDS,

MOLLUSKS PREDOMINANTLY GASTROPODS WITH THIN WALLS, MUDSTONE

40.0- 41.0 CALCILUTITE, VERY LIGHT GRAY TO MODERATE LIGHT GRAY, 05% POROSITY, VUGULAR, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 05% CALCITE, 05% CLAY, 05% QUARTZ,

41.0- 45.0 LIMESTONE, WHITE TO LIGHT YELLOWISH ORANGE, 02% POROSITY, VUGULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, GOOD INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 10% CALCITE,

LITHOLOGIC LOG
W-10304C. DADE CO. T56S, R38E, SEC 34NE

45.0- 46.0 LIMESTONE, VERY LIGHT GRAY, 05% POROSITY, VUGULAR, GRAIN TYPE: CALCILUTITE, INTRACLASTS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, POOR INDURATION, CALCILUTITE MATRIX, 05% QUARTZ, 02% CALCITE, WORM TRACES, MOLLUSKS, FOSSIL MOLDS,

46.0- 48.5 CALCILUTITE, VERY LIGHT GRAY TO LIGHT GRAY, 05% POROSITY, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 05% QUARTZ, 02% CALCITE, MOLLUSKS, FOSSIL MOLDS,

MUDSTONE

48.5- 50.5 CALCILUTITE, VERY LIGHT GRAY, 05% POROSITY, MOLDIC, PIN POINT VUGS, GRAIN TYPE: CALCILUTITE, CRYSTALS, 25% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, GOOD INDURATION, CALCILUTITE MATRIX, 10% QUARTZ, 05% CALCITE, MOLLUSKS, FOSSIL MOLDS,

50.5- 51.7 LIMESTONE, LIGHT GRAY TO MODERATE LIGHT GRAY, 05% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 05% CALCITE, 05% CLAY, 05% QUARTZ, MOLLUSKS, FOSSIL MOLDS,

MUDSTONE

51.7- 53.0 LIMESTONE, LIGHT GRAY TO MODERATE LIGHT GRAY, 02% POROSITY, PIN POINT VUGS, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, GOOD INDURATION, 10% QUARTZ, 05% CALCITE, MOLLUSKS, FOSSIL MOLDS,

53.0- 57.0 LIMESTONE, VERY LIGHT GRAY, 10% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, 30% QUARTZ, 05% CALCITE, CHALKY, MOLLUSKS, FOSSIL MOLDS,

57.0- 60.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT GRAY, 10% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 20% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, 20% QUARTZ, 15% CALCITE, MOLLUSKS, FOSSIL MOLDS,

TD

SOUTH FLORIDA WMD - LITHO LOG PRINTOUT

W-10303C
DADE CO. T56S R38E SEC 34NE 25 31 02 N 80 30 53 W
TOTAL DEPTH-00062 FT. ELEV.- 008 FT. SAMPLES- 00012-00062 FT.
COMPLETED- 79.08.12 DEPTH WORKED 00060 FT.

WELL NAME-
C105, SFWMD, PETE DAUENHAUER- DRILLER, CONTINUOUS CORE
REMARKS-
DESCRIBED BY JEFF HERR (MARCH 1983), SAMPLE QUALITY-EXCELLENT.
HYDROGEOLOGIC UNITS
12.0- 62.0 FT. BISCAYNE AQUIFER

STRATIGRAPHIC FORMATIONS -

12.0- 15.0 MIAMI OOLITE
15.0- 62.0 FT. THOMPSON FORMATION

LITHOLOGIC LOG
W-10303C. DADE CO. T56S, R38E, SEC 34NE

.0- 12.0 NO SAMPLE,

12.0- 15.0 LIMESTONE, VERY LIGHT GRAY TO DARK YELLOWISH ORANGE, 40% POROSITY, VUGULAR, MOLDIC, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: OOLITE, OOLITE CAST, CRYSTALS, 75% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, IRON STAIN, 01% QUARTZ SAND, OOLITES,

15.0- 16.7 LIMESTONE, VERY LIGHT GRAY TO LIGHT BROWN, 10% POROSITY, VUGULAR, PIN POINT VUGS, INTERGRANULAR, GRAIN TYPE: CRYSTALS, 15% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: MICROCRYSTALLINE TO FINE, GOOD INDURATION, SPARRY CALCITE CEMENT, IRON STAIN, 05% QUARTZ SAND,

16.7- 17.5 LIMESTONE, VERY LIGHT GRAY TO GRAYISH ORANGE, 12% POROSITY, VUGULAR, INTERGRANULAR, GRAIN TYPE: CRYSTALS, INTRACLASTS, 25% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO COARSE, MODERATE INDURATION, SPARRY CALCITE CEMENT, CALCILUTITE MATRIX, IRON STAIN, WORM TRACES, MOLLUSKS,

17.5- 22.5 LIMESTONE, WHITE, 30% POROSITY, VUGULAR, INTERGRANULAR, GRAIN TYPE: INTRACLASTS, CRYSTALS, 40% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MEDIUM, RANGE: MICROCRYSTALLINE TO COARSE, POOR INDURATION, CALCILUTITE MATRIX, 02% CALCITE, MOLLUSKS,

LITHOLOGIC LOG
W-10303C. DADE CO. T56S, R38E, SEC 34NE

22.5- 24.5 CALCILUTITE, VERY LIGHT GRAY TO LIGHT BROWNISH GRAY, 02% POROSITY, PIN POINT VUGS, LOW PERMEABILITY, GRAIN TYPE: CALCILUTITE, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: CRYPTOCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE, GOOD INDURATION, CALCILUTITE MATRIX, BANDED, MOTTLED, 02% CALCITE, 01% QUARTZ, FOSSIL MOLDS,

24.5- 24.7 LIMESTONE, WHITE TO VERY LIGHT GRAY, 10% POROSITY, INTERGRANULAR, PIN POINT VUGS, GRAIN TYPE: CRYSTALS, CALCILUTITE, INTRACLASTS, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, POOR INDURATION, CALCILUTITE MATRIX, 25% QUARTZ SAND, 15% CALCITE,

24.7- 26.7 CALCILUTITE, WHITE TO VERY LIGHT GRAY, 02% POROSITY, PIN POINT VUGS, LOW PERMEABILITY, GRAIN TYPE: CALCILUTITE, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: CRYPTOCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE, GOOD INDURATION, CALCILUTITE MATRIX, MOTTLED, 02% CALCITE, 01% QUARTZ, FOSSIL MOLDS,

26.7- 30.0 LIMESTONE, VERY LIGHT GRAY, 05% POROSITY, INTERGRANULAR, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 45% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, POOR INDURATION, CALCILUTITE MATRIX, BANDED, IRON STAIN, 05% CALCITE, MOLLUSKS, FOSSIL MOLDS,

30.0- 32.5 LIMESTONE, LIGHT GRAY, 20% POROSITY, INTERGRANULAR, VUGULAR, GRAIN TYPE: BIOGENIC, INTRACLASTS, CALCILUTITE, 80% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, POOR INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 05% CALCITE, MOLLUSKS,

NUMEROUS LARGE PELYCYPOD SHELLS AND CASTS UP TO 5 CM. CHIONE SP. IS PRESENT IN LARGE NUMBERS

32.5- 34.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT GRAY, 15% POROSITY, MOLDIC, INTERGRANULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, 45% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 05% CALCITE, MOLLUSKS,

34.0- 37.0 LIMESTONE, VERY LIGHT GRAY TO DARK YELLOWISH ORANGE, 10% POROSITY, INTERGRANULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 40% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: VERY FINE TO COARSE, POOR INDURATION, CALCILUTITE MATRIX, MOTTLED, MOLLUSKS,

37.0- 40.0 LIMESTONE, MODERATE GRAY, 12% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO FINE, GOOD INDURATION, CALCILUTITE MATRIX, 05% CALCITE, 05% CLAY, MOLLUSKS,

MOLLUSKS PREDOMINANTLY GASTROPODS WITH THIN WALLED SHELLS, MUDSTONE

40.0- 40.8 CALCILUTITE, WHITE TO MODERATE LIGHT GRAY, 07% POROSITY, VUGULAR, PIN POINT VUGS, MOLDIC, GRAIN TYPE: CALCILUTITE, INTRACLASTS, CRYSTALS, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 10% SPAR, 05% CLAY, MOLLUSKS, FOSSIL MOLDS,

SOME CHANNELS FILLED WITH SEDIMENTS FROM OVERLYING BED AT 37 FOOT INTERVAL

40.8- 41.1 CALCILUTITE, WHITE TO LIGHT YELLOWISH ORANGE, 25% POROSITY, VUGULAR, GRAIN TYPE: CALCILUTITE, INTRACLASTS, 60% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO COARSE, POOR INDURATION, CALCILUTITE MATRIX, 25% QUARTZ, FOSSIL MOLDS,

41.1- 45.2 CALCILUTITE, WHITE TO LIGHT YELLOWISH ORANGE, 07% POROSITY, VUGULAR, PIN POINT VUGS, INTERGRANULAR, GRAIN TYPE: CALCILUTITE, INTRACLASTS, 40% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 15% QUARTZ, 05% CALCITE, IRON STAIN, FOSSIL MOLDS,

45.2- 46.2 CALCILUTITE, WHITE TO LIGHT YELLOWISH ORANGE, 20% POROSITY, MOLDIC, INTRAGRANULAR, INTERGRANULAR, GRAIN TYPE: CALCILUTITE, BIOGENIC, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, POOR INDURATION, CALCILUTITE MATRIX, 15% QUARTZ, CORAL, MOLLUSKS,

46.2- 48.3 CALCILUTITE, LIGHT GRAY, 10% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 10% CALCITE, 05% CLAY, MOLLUSKS, FOSSIL MOLDS,

MUDSTONE

48.3- 49.2 LIMESTONE, WHITE, 05% POROSITY, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, 90% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO FINE, GOOD INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, BANDED, 20% CALCITE, MOLLUSKS, FOSSIL MOLDS,

49.2- 50.0 LIMESTONE, WHITE, 15% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, 00% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE, GOOD INDURATION, CALCILUTITE MATRIX, BANDED, 45% QUARTZ, MOLLUSKS, FOSSIL MOLDS, WORM TRACES,

LITHOLOGIC LOG
W-10303C. DADE CO. T56S, R38E, SEC 34NE

50.0- 50.8 LIMESTONE, VERY LIGHT GRAY TO LIGHT YELLOWISH ORANGE, 15% POROSITY, MOLDIC, GRAIN TYPE: CALCILUTITE, SKELETAL, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: MICROCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 20% QUARTZ, MOLLUSKS, FOSSIL MOLDS,

50.8- 53.5 LIMESTONE, LIGHT GRAY TO MODERATE LIGHT GRAY, 15% POROSITY, MOLDIC, GRAIN TYPE: CALCILUTITE, SKELETAL CAST, 45% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 05% QUARTZ, 05% CALCITE, 05% CLAY, MOLLUSKS, FOSSIL MOLDS,

MUDSTONE, THIN WALLED GASTROPODS PRESENT IN LARGE NUMBERS

53.5- 55.0 LIMESTONE, LIGHT GRAY, 07% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: CRYPTOCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE, MODERATE INDURATION, CALCILUTITE MATRIX, 45% QUARTZ, 05% CALCITE, MOLLUSKS, FOSSIL MOLDS,

55.0- 56.0 LIMESTONE, VERY LIGHT GRAY, 20% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 40% QUARTZ, 10% CALCITE, MOLLUSKS, FOSSIL MOLDS,

56.0- 59.4 LIMESTONE, LIGHT GRAY, 10% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, 30% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 40% QUARTZ, 10% CLAY, BROWN ANHYDRITE CRYSTALS, MOLLUSKS, FOSSIL MOLDS,

59.4- 62.0 LIMESTONE, VERY LIGHT GRAY, 10% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, 60% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 30% QUARTZ, 20% CLAY, BROWN ANHYDRITE CRYSTALS, MOLLUSKS, FOSSIL MOLDS,

TD

SOUTH FLORIDA WMD - LITHO LOG PRINTOUT

W-10302C

DADE CO. T56S R38E SEC 34NE 25 31 00 N 80 30 53 W
TOTAL DEPTH-00060 FT. ELEV.- 008 FT. SAMPLES- 00010-00060 FT.
COMPLETED- 79.08.11 DEPTH WORKED 00060 FT.

WELL NAME-
C103, SFWMD, PETE DAUENHAUER- DRILLER, CONTINUOUS CORE
REMARKS-
DESCRIBED BY JEFF HERR (MARCH 1983), SAMPLE QUALITY- EXCELLENT.
HYDROGEOLOGIC UNITS
10.0- 60.0 FT. BISCAYNE AQUIFER

STRATIGRAPHIC FORMATIONS -

10.0- 14.5 MIAMI OOLITE
14.5- 60.0 FT. THOMPSON FORMATION

LITHOLOGIC LOG
W-10302C. DADE CO. T56S, R38E, SEC 34NE

.0- 10.0 NO SAMPLE,

10.0- 14.5 LIMESTONE, WHITE TO LIGHT YELLOWISH ORANGE, 35% POROSITY, VUGULAR, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: OOLITE, OOLITE CAST, 90% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, 05% QUARTZ SAND, IRON STAIN, NO FOSSIL, OOLITES,

14.5- 15.0 LIMESTONE, LIGHT YELLOWISH ORANGE TO WHITE, 10% POROSITY, VUGULAR, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: CRYSTALS, SKELETAL CAST, 75% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO GRANULE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, IRON STAIN, 02% QUARTZ SAND, NO FOSSIL,

15.0- 18.0 LIMESTONE, WHITE TO MODERATE YELLOWISH BROWN, 07% POROSITY, VUGULAR, PIN POINT VUGS, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: CRYSTALS, CALCILUTITE, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO MEDIUM, POOR INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, IRON STAIN, 07% QUARTZ SAND, NO FOSSIL,

18.0- 20.5 LIMESTONE, VERY LIGHT GRAY TO MODERATE YELLOWISH BROWN, 40% POROSITY, VUGULAR, INTERGRANULAR, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: CALCILUTITE, SKELETAL, CRYSTALS, 90% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, POOR INDURATION, CALCILUTITE MATRIX, MOLLUSKS, FOSSIL MOLDS,

LITHOLOGIC LOG
W-10302C. DADE CO. T56S, R38E, SEC 34NE

20.5- 24.5 LIMESTONE, YELLOWISH GRAY, 01% POROSITY, INTERGRANULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 60% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: MICROCRYSTALLINE TO FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 35% QUARTZ SAND, 20% SPAR, NO FOSSIL,

24.5- 25.0 LIMESTONE, LIGHT BROWNISH GRAY TO YELLOWISH GRAY, 02% POROSITY, PIN POINT VUGS, LOW PERMEABILITY, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, GOOD INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 30% LIMESTONE, NO FOSSIL,

25.0- 25.7 LIMESTONE, VERY LIGHT ORANGE TO WHITE, 15% POROSITY, VUGULAR, FRACTURE, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 80% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 25% QUARTZ SAND, 10% SPAR,

25.7- 29.2 LIMESTONE, WHITE TO LIGHT YELLOWISH ORANGE, 05% POROSITY, INTERGRANULAR, PIN POINT VUGS, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 25% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: MICROCRYSTALLINE TO FINE, MODERATE INDURATION, BANDED, 10% QUARTZ, 05% SPAR, MOLLUSKS, BRYOZOA, FOSSIL FRAGMENTS,

29.2- 30.0 LIMESTONE, WHITE, 15% POROSITY, MOLDIC, GRAIN TYPE: SKELETAL, INTRACLASTS, CALCILUTITE, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, POOR INDURATION, CALCILUTITE MATRIX, 05% SPAR, IRON STAIN, MOLLUSKS, BRYOZOA, FOSSIL FRAGMENTS, FOSSIL MOLDS,

30.0- 34.0 LIMESTONE, WHITE TO GRAYISH ORANGE, 20% POROSITY, FRACTURE, MOLDIC, VUGULAR, GRAIN TYPE: CRYSTALS, CALCILUTITE, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: CRYPTOCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, GOOD INDURATION, SPARRY CALCITE CEMENT, CALCILUTITE MATRIX, 25% CALCILUTITE, IRON STAIN, MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS,

34.0- 37.0 LIMESTONE, VERY LIGHT GRAY TO GRAYISH ORANGE, 20% POROSITY, FRACTURE, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, INTRACLASTS, 20% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 15% SPAR, IRON STAIN, MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS,

37.0- 38.0 LIMESTONE, LIGHT BLUISH GRAY, 20% POROSITY, VUGULAR, INTERGRANULAR, GRAIN TYPE: INTRACLASTS, BIOGENIC, 90% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MEDIUM, RANGE: MICROCRYSTALLINE TO COARSE, POOR INDURATION, CALCILUTITE MATRIX, 10% SPAR,

LITHOLOGIC LOG
W-10302C. DADE CO. T56S, R38E, SEC 34NE

38.0- 40.0 CLAY, MODERATE LIGHT GRAY TO MODERATE GRAY, 15% POROSITY, MOLDIC, LOW PERMEABILITY, MODERATE INDURATION, CALCILUTITE MATRIX, FOSSIL MOLDS,

40.0- 49.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT GRAY, 05% POROSITY, INTERGRANULAR, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, BIOGENIC, 15% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, FOSSIL MOLDS, MOLLUSKS,

49.0- 50.0 LIMESTONE, WHITE, 20% POROSITY, MOLDIC, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: CALCILUTITE, BIOGENIC, 25% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO COARSE, POOR INDURATION, CALCILUTITE MATRIX, 02% QUARTZ SAND, 02% SPAR, MOLLUSKS, FOSSIL MOLDS,

50.0- 52.5 LIMESTONE, VERY LIGHT GRAY TO WHITE, 10% POROSITY, MOLDIC, VUGULAR, GRAIN TYPE: CALCILUTITE, 05% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, MODERATE INDURATION, CALCILUTITE MATRIX, 01% SPAR, 01% QUARTZ SAND, MOLLUSKS,

52.5- 55.0 LIMESTONE, WHITE, 15% POROSITY, MOLDIC, INTERGRANULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, POOR INDURATION, CALCILUTITE MATRIX, 05% QUARTZ SAND, 05% SPAR, MOLLUSKS, FOSSIL MOLDS,

POROSITY MAY BE HIGHER DUE TO PRESENCE OF LARGE VUGS.
SMALL SPHERES COMPOSED OF QUARTZ GRAINS ALSO PRESENT

55.0- 57.5 LIMESTONE, WHITE TO VERY LIGHT GRAY, 20% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 15% QUARTZ SAND, 05% SPAR, MOLLUSKS, FOSSIL MOLDS,

57.5- 59.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT GRAY, 10% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 35% QUARTZ SAND, 10% SPAR, MOLLUSKS, FOSSIL MOLDS,

59.0- 60.0 LIMESTONE, LIGHT BLUISH GRAY, 25% POROSITY, INTERGRANULAR, VUGULAR, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: BIOGENIC, SKELETAL, 95% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: COARSE, RANGE: GRANULE TO FINE, POOR INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 35% QUARTZ SAND, 10% SPAR, MOLLUSKS, FOSSIL FRAGMENTS,

FENESTRAL POROSITY
TD

SOUTH FLORIDA WMD - LITHO LOG PRINTOUT

W-10301C

DADE CO. T56S R38E SEC 34NE 25 30 56 N 80 30 53 W
TOTAL DEPTH-00060 FT. ELEV.- 006 FT. SAMPLES- 00011-00060 FT.
COMPLETED- 79.08.10 DEPTH WORKED 00060 FT.

WELL NAME-
C103, SFWMD, PETE DAUENHAUER- DRILLER, CONTINUOUS CORE
REMARKS-
DESCRIBED BY JEFF HERK (MARCH 1983), SAMPLE QUALITY-EXCELLENT.
HYDROGEOLOGIC UNITS
24.0- 60.0 FT. BISCAYNE AQUIFER

STRATIGRAPHIC FORMATIONS -

11.0- 19.5 MIAMI OOLITE
19.5- 60.0 FT. THOMPSON FORMATION

LITHOLOGIC LOG
W-10301C. DADE CO. T56S, R38E, SEC 34NE

.0- 11.0 NO SAMPLE,

11.0- 19.5 LIMESTONE, WHITE TO LIGHT YELLOWISH ORANGE, 35% POROSITY, VUGULAR, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: OOLITE, OOLITE CAST, CRYSTALS, 90% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, 05% QUARTZ SAND, IRON STAIN, OOLITES, MOLLUSKS, WORM TRACES,

19.5- 21.5 LIMESTONE, MODERATE YELLOWISH BROWN TO LIGHT YELLOWISH ORANGE, 05% POROSITY, PIN POINT VUGS, GRAIN TYPE: CALCILUTITE, CRYSTALS, 30% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO VERY FINE, GOOD INDURATION, CALCILUTITE MATRIX, 35% QUARTZ SAND, IRON STAIN, NO FOSSIL,

21.5- 24.0 LIMESTONE, VERY LIGHT GRAY, 12% POROSITY, INTERGRANULAR, MOLDIC, GRAIN TYPE: CALCILUTITE, CRYSTALS, SKELETAL CAST, 50% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: MICROCRYSTALLINE TO MEDIUM, MODERATE INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 05% QUARTZ SAND, MOLLUSKS,

24.0- 28.0 LIMESTONE, GRAYISH ORANGE PINK, 02% POROSITY, PIN POINT VUGS, GRAIN TYPE: CALCILUTITE, 06% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: CRYPTOCRYSTALLINE, RANGE: CRYPTOCRYSTALLINE TO MICROCRYSTALLINE, GOOD INDURATION, CALCILUTITE MATRIX,

LITHOLOGIC LOG
W-10301C. DADE CO. T56S, R38E, SEC 34NE

26.0- 29.0 LIMESTONE, WHITE, 15% POROSITY, VUGULAR, INTERGRANULAR, MOLDIC, GRAIN TYPE: INTRACLASTS, SKELETAL, 95% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: COARSE, RANGE: MEDIUM TO GRANULE, MODERATE INDURATION, SPARRY CALCITE CEMENT, CALCILUTITE MATRIX, BEDDED, 10% SPAR, 02% CALCILUTITE, COQUINA, MOLLUSKS, BRYOZOA, FOSSIL FRAGMENTS, FOSSIL MOLDS,

29.0- 34.0 LIMESTONE, VERY LIGHT GRAY, 10% POROSITY, MOLDIC, INTERCRYSTALLINE, VUGULAR, GRAIN TYPE: INTRACLASTS, BIOGENIC, SKELETAL CAST, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: MICROCRYSTALLINE TO VERY COARSE, MODERATE INDURATION, CALCILUTITE MATRIX, 20% CALCILUTITE, 04% SPAR, MOLLUSKS, BRYOZOA, FOSSIL MOLDS,

34.0- 35.0 CALCARENITE, DARK YELLOWISH ORANGE TO MODERATE YELLOWISH BROWN, 01% POROSITY, INTRAGRANULAR, LOW PERMEABILITY, GOOD INDURATION, SPARRY CALCITE CEMENT, 20% QUARTZ SAND,

35.0- 36.0 CLAY, MODERATE LIGHT GRAY, 05% POROSITY, MOLDIC, LOW PERMEABILITY, GOOD INDURATION, CALCILUTITE MATRIX, MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS,

MUDSTONE

36.0- 39.0 LIMESTONE, WHITE, 05% POROSITY, MOLDIC, GRAIN TYPE: CALCILUTITE, BIOGENIC, 20% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: CRYPTOCRYSTALLINE, RANGE: VERY FINE TO CRYPTOCRYSTALLINE, MODERATE INDURATION, CALCILUTITE MATRIX, 05% QUARTZ, CHALKY, MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS,

CHILNE SP. ABUNDANT

39.0- 40.0 CLAY, MODERATE LIGHT GRAY TO LIGHT GRAY, 10% POROSITY, INTRAGRANULAR, GOOD INDURATION, CALCILUTITE MATRIX, MOLLUSKS, FOSSIL FRAGMENTS, FOSSIL MOLDS,

40.0- 42.0 LIMESTONE, VERY LIGHT GRAY, 07% POROSITY, VUGULAR, GRAIN TYPE: CALCILUTITE, 20% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: CRYPTOCRYSTALLINE, RANGE: VERY FINE TO CRYPTOCRYSTALLINE, GOOD INDURATION, CALCILUTITE MATRIX, 10% QUARTZ, CHALKY, MEDIUM RECRYSTALLIZATION, MOLLUSKS,

42.0- 44.0 LIMESTONE, VERY LIGHT GRAY, 15% POROSITY, VUGULAR, MOLDIC, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: CALCILUTITE, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: FINE TO CRYPTOCRYSTALLINE, GOOD INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 25% QUARTZ, 10% SPAR, MOLLUSKS, FOSSIL MOLDS,

LITHOLOGIC LOG
W-10301C. DADE CO. T56S, R38E, SEC 34NE

44.0- 45.0 LIMESTONE, VERY LIGHT GRAY TO LIGHT GRAY, 07% POROSITY, VUGULAR, MOLDIC, LOW PERMEABILITY, GRAIN TYPE: CALCILUTITE, 20% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: VERY FINE TO CRYPTOCRYSTALLINE, GOOD INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 10% QUARTZ, 05% SPAR, MOLLUSKS, BRYOZOA,

45.0- 46.0 LIMESTONE, VERY LIGHT GRAY, 10% POROSITY, VUGULAR, MOLDIC, LOW PERMEABILITY, GRAIN TYPE: CALCILUTITE, SKELETAL, SKELETAL CAST, 20% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: VERY FINE TO CRYPTOCRYSTALLINE, GOOD INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 15% QUARTZ, 10% SPAR, MOLLUSKS, FOSSIL MOLDS,

PECTEN SP.

46.0- 47.0 LIMESTONE, VERY LIGHT GRAY, 15% POROSITY, VUGULAR, MOLDIC, LOW PERMEABILITY, GRAIN TYPE: CALCILUTITE, SKELETAL, CRYSTALS, 25% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: VERY FINE TO CRYPTOCRYSTALLINE, GOOD INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 10% SPAR, MOLLUSKS,

47.0- 49.0 LIMESTONE, VERY LIGHT GRAY, 35% POROSITY, VUGULAR, POSSIBLY HIGH PERMEABILITY, GRAIN TYPE: CALCILUTITE, CRYSTALS, SKELETAL, 75% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: FINE TO CRYPTOCRYSTALLINE, GOOD INDURATION, CALCILUTITE MATRIX, SPARRY CALCITE CEMENT, 15% QUARTZ, 05% SPAR, MOLLUSKS,

49.0- 50.0 CLAY, VERY LIGHT GRAY TO LIGHT GRAY, 15% POROSITY, MOLDIC, VUGULAR, INTERGRANULAR, POOR INDURATION, CALCILUTITE MATRIX, CLAY MATRIX, 20% QUARTZ, 01% SPAR, MOLLUSKS, PLANKTONIC FORAMINIFERA,

MUDSTONE

50.0- 53.0 LIMESTONE, WHITE TO VERY LIGHT GRAY, 10% POROSITY, VUGULAR, MOLDIC, INTERGRANULAR, GRAIN TYPE: CALCILUTITE, SKELETAL CAST, CRYSTALS, 75% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MEDIUM TO MICROCRYSTALLINE, POOR INDURATION, CALCILUTITE MATRIX, 10% QUARTZ, 01% SPAR, MOLLUSKS,

53.0- 54.0 LIMESTONE, WHITE TO VERY LIGHT GRAY, 02% POROSITY, MOLDIC, GRAIN TYPE: CRYSTALS, 85% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MEDIUM TO VERY FINE, GOOD INDURATION, SPARRY CALCITE CEMENT, 10% CALCILUTITE, MOLLUSKS,

54.0- 56.0 LIMESTONE, VERY LIGHT GRAY, 10% POROSITY, VUGULAR, MOLDIC, GRAIN TYPE: CRYSTALS, CALCILUTITE, 60% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: FINE TO MICROCRYSTALLINE, GOOD INDURATION, SPARRY CALCITE CEMENT, BANDED, 10% CALCILUTITE, 03% QUARTZ, MOLLUSKS,

LITHOLOGIC LOG
W-103010. DALE CO. T5oS, R30E, SEC 34NE

56.0- 57.0 LIMESTONE, WHITE, 20% POROSITY, INTERGRANULAR, GRAIN TYPE: CALCILUTITE, CRYSTALS, 10% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: MICROCRYSTALLINE, RANGE: VERY FINE TO CRYPTOCRYSTALLINE, MODERATE INDURATION, CALCILUTITE MATRIX, 45% QUARTZ, MOLLUSKS,

57.0- 58.0 LIMESTONE, WHITE TO VERY LIGHT GRAY, 15% POROSITY, INTERGRANULAR, MOLDIC, GRAIN TYPE: CRYSTALS, CALCILUTITE, SKELETAL CAST, 20% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: VERY FINE, RANGE: CRYPTOCRYSTALLINE TO MEDIUM, MODERATE INDURATION, SPARRY CALCITE CEMENT, 30% QUARTZ, WORM TRACES, MOLLUSKS, BRYOZOA,

58.0- 59.0 SAND, WHITE TO DARK RED PURPLE, 15% POROSITY, INTERGRANULAR, GRAIN SIZE: FINE, RANGE: MEDIUM TO VERY FINE, SUB-ANGULAR, MEDIUM SPHERICITY, MODERATE INDURATION, SPARRY CALCITE CEMENT, CALCILUTITE MATRIX, 20% SPAR, MOLLUSKS, FOSSIL MOLDS, BRYOZOA,

59.0- 60.0 LIMESTONE, VERY LIGHT GRAY, 05% POROSITY, MOLDIC, INTERGRANULAR, VUGULAR, GRAIN TYPE: CRYSTALS, BIOGENIC, 70% ALLOCHEMICAL CONSTITUENTS, GRAIN SIZE: FINE, RANGE: MEDIUM TO VERY FINE, GOOD INDURATION, SPARRY CALCITE CEMENT, 25% QUARTZ, MOLLUSKS, BRYOZOA,

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APPENDIX II

HOMESTEAD WATER QUALITY DATA BEFORE S-331 PUMPING

PROJECT HOM DATE OF PRINTING 12/03/84

PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = ADAMS CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				4	3	4	4	4	0	0	0
AVERAGE				26.7	537.	484.	7.73	7.33			
ST. DEV.				1.3	90.	67.	.31	.25			
MIN. VAL.				25.3	433.	405.	7.40	7.01			
MAX. VAL.				28.1	592.	600.	8.15	7.60			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	4	4	2	1	1	2	3	1	1	4	4
AVERAGE	.063	.005	.22	1.34	.95	.003	.005	.004	5.3	220.5	367.0
ST. DEV.	.035	.002	.23			.001	.001			25.9	34.4
MIN. VAL.	.025	.004	.06	1.34	.95	.002	.004	.004	5.3	186.7	336.0
MAX. VAL.	.109	.007	.38	1.34	.95	.004	.006	.004	5.3	240.9	402.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	DISS FE MG/L
NUM. VALS.	4	4	4	4	4	4	4	0	2
AVERAGE	26.92	1.16	78.71	5.81	42.0	13.4	4.45		.03
ST. DEV.	8.30	.56	8.22	1.43	7.1	6.3	.33		.01
MIN. VAL.	20.26	.65	67.50	4.40	33.3	8.1	4.03		.02
MAX. VAL.	37.25	1.48	85.37	7.32	49.0	22.2	4.76		.03

HOMESTEAD WATER QUALITY DATA BEFORE S-331 PUMPING

PROJECT HOM DATE OF PRINTING 12/03/84

PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = MC MINN CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				1	0	1	1	1	0	0	0
AVERAGE				28.1		500.	7.55	7.20			
ST. DEV.											
MIN. VAL.				28.1		500.	7.55	7.20			
MAX. VAL.				28.1		500.	7.55	7.20			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TONN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TOPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	1	1	1	1	0	1	1	0	0	1	1
AVERAGE	.394	.026	.01	1.68		.002	.050			264.0	368.0
ST. DEV.											
MIN. VAL.	.394	.026	.01	1.68		.002	.050			264.0	368.0
MAX. VAL.	.394	.026	.01	1.68		.002	.050			264.0	368.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	1	1	1	1	1	1	1	0	1
AVERAGE	24.97	4.07	97.55	4.97	45.7	26.5	4.23		.02
ST. DEV.									
MIN. VAL.	24.97	4.07	97.55	4.97	45.7	26.5	4.23		.02
MAX. VAL.	24.97	4.07	97.55	4.97	45.7	26.5	4.23		.02

HOMESTEAD WATER QUALITY DATA BEFORE S-331 PUMPING

PROJECT HOM DATE OF PRINTING 12/03/84

PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = REDLAND CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SO MG/L
NUM. VALS.				3	2	3	3	3	0	0	0
AVERAGE				26.5	575.	521.	7.73	7.36			
ST. DEV.				1.4	1.	67.	.28	.35			
MIN. VAL.				25.3	574.	465.	7.50	7.09			
MAX. VAL.				26.0	575.	595.	8.05	7.76			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TOKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TOPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SO MG/L
NUM. VALS.	3	3	1	1	0	1	3	0	0	3	3
AVERAGE	.365	.021	.01	3.14		.002	.005			239.5	774.0
ST. DEV.	.250	.017					.003			8.0	698.2
MIN. VAL.	.071	.004	.01	3.14		.002	.003			230.3	356.0
MAX. VAL.	.529	.037	.01	3.14		.002	.009			244.6	1580.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	3	3	3	3	3	3	3	0	1
AVERAGE	30.28	3.04	86.13	5.94	42.8	25.1	4.35		.02
ST. DEV.	5.75	1.63	2.69	1.58	3.9	2.6	.18		
MIN. VAL.	24.81	1.17	84.05	4.97	38.6	22.6	4.14		.02
MAX. VAL.	36.28	4.10	89.17	7.76	46.4	27.8	4.47		.02

HOMESTEAD WATER QUALITY DATA BEFORE S-331 PUMPING

PROJECT HOM DATE OF PRINTING 12/03/84

PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 1 CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				4	3	4	4	4	0	0	0
AVERAGE				25.7	494.	480.	7.75	7.33			
ST. DEV.				1.6	90.	94.	.24	.38			
MIN. VAL.				24.4	411.	421.	7.40	6.76			
MAX. VAL.				26.0	590.	620.	7.95	7.57			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TORN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TOPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	4	4	2	1	1	2	3	1	1	4	4
AVERAGE	.252	.006	.05	1.27	.76	.003	.017	.004	5.3	209.1	354.3
ST. DEV.	.166	.002	.05			.001	.017			28.1	43.2
MIN. VAL.	.046	.004	.01	1.27	.76	.002	.002	.004	5.3	182.1	330.0
MAX. VAL.	.445	.007	.08	1.27	.76	.004	.036	.004	5.3	244.3	419.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	4	4	4	4	4	4	4	0	2
AVERAGE	30.22	1.15	74.01	5.91	44.1	13.1	4.26		.03
ST. DEV.	6.55	.30	9.04	1.70	8.5	8.6	.38		.01
MIN. VAL.	22.95	.71	66.00	4.20	33.7	5.4	3.86		.02
MAX. VAL.	40.31	1.39	84.33	8.20	54.4	23.6	4.61		.03

HOMESTEAD WATER QUALITY DATA BEFORE S-331 PUMPING

PROJECT HGM DATE OF PRINTING 12/03/84

PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 7A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				3	2	3	3	3	0	0	0
AVERAGE				26.0	511.	467.	7.55	7.10			
ST. DEV.				2.0	134.	51.	.23	.28			
MIN. VAL.				24.4	416.	415.	7.30	6.77			
MAX. VAL.				28.3	606.	516.	7.75	7.29			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	3	3	2	1	1	2	2	1	1	3	3
AVERAGE	.405	.076	.01	1.54	.73	.003	.011	.004	5.3	221.7	356.0
ST. DEV.	.437	.066	.00			.001	.013			32.7	43.3
MIN. VAL.	.107	.024	.01	1.54	.73	.002	.002	.004	5.3	184.2	330.0
MAX. VAL.	.907	.151	.01	1.54	.73	.004	.020	.004	5.3	243.9	406.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	3	3	3	3	3	2	2	0	2
AVERAGE	29.90	1.33	78.22	6.43	44.4	9.9	4.48		.03
ST. DEV.	7.50	.22	9.96	1.99	10.5	5.4	.65		.01
MIN. VAL.	23.40	1.17	66.70	4.30	33.3	6.0	4.02		.02
MAX. VAL.	38.11	1.58	84.09	8.25	54.2	13.7	4.94		.03

HOMESTEAD WATER QUALITY DATA BEFORE S-331 PUMPING

PROJECT HOM DATE OF PRINTING 12/03/84

PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 6 CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				4	3	4	[illegible]	4	0	0	0
AVERAGE				26.6	523.	465.	7.64	7.27			
ST. DEV.				2.4	102.	118.	.39	.35			
MIN. VAL.				23.8	428.	375.	7.30	6.79			
MAX. VAL.				29.0	630.	635.	8.15	7.62			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	4	4	2	1	1	2	3	1	1	4	4
AVERAGE	.219	.025	.02	1.82	.66	.016	.026	.004	5.3	204.4	345.8
ST. DEV.	.199	.024	.01			.016	.016			35.6	52.7
MIN. VAL.	.016	.004	.01	1.82	.66	.004	.011	.004	5.3	171.5	288.0
MAX. VAL.	.464	.046	.02	1.82	.66	.027	.043	.004	5.3	253.1	410.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	4	4	4	4	4	4	4	0	2
AVERAGE	30.38	1.68	72.66	5.58	42.9	13.6	3.83		.03
ST. DEV.	6.79	.60	11.71	1.56	6.9	7.6	.82		.01
MIN. VAL.	24.00	1.17	61.53	4.33	34.4	6.8	2.72		.02
MAX. VAL.	37.89	2.53	88.58	7.76	51.0	23.6	4.70		.03

HOMESTEAD WATER QUALITY DATA BEFORE S-331 PUMPING

PROJECT HOM DATE OF PRINTING 12/03/84

PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 8A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR.MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				4	3	4	4	4	0	0	0
AVERAGE				27.0	551.	516.	7.59	7.13			
ST. DEV.				1.2	108.	79.	.23	.30			
MIN. VAL.				25.2	426.	450.	7.35	6.76			
MAX. VAL.				27.9	614.	630.	7.90	7.47			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	4	4	2	1	1	2	3	1	1	4	4
AVERAGE	1.196	.093	.01	.57	.49	.003	.002	.004	5.5	227.8	380.0
ST. DEV.	1.978	.094	.00			.001	.001			28.6	46.5
MIN. VAL.	.016	.007	.01	.57	.49	.002	.002	.004	5.5	185.5	332.0
MAX. VAL.	4.152	.224	.01	.57	.49	.004	.003	.004	5.5	248.3	430.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	DISS FE MG/L
NUM. VALS.	4	4	4	4	4	4	4	0	2
AVERAGE	32.14	3.03	79.94	6.83	46.9	11.5	4.52		.03
ST. DEV.	6.61	1.71	8.87	1.67	9.5	6.9	.37		.01
MIN. VAL.	23.20	1.47	66.70	4.60	32.9	5.0	4.07		.02
MAX. VAL.	39.50	4.55	85.10	8.64	53.3	19.4	4.91		.03

HOMESTEAD WATER QUALITY DATA BEFORE S-331 PUMPING

PROJECT HOM DATE OF PRINTING 12/03/84

PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/85 MO/DA/YR

STATION = 9A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				3	2	3	3	3	0	0	0
AVERAGE				26.8	517.	462.	7.48	7.06			
ST. DEV.				.8	131.	38.	.10	.27			
MIN. VAL.				25.9	424.	420.	7.40	6.80			
MAX. VAL.				27.4	609.	495.	7.60	7.34			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TONN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	3	3	2	1	1	2	2	1	1	3	3
AVERAGE	1.000	.017	.01	1.48	.51	.003	.004	.004	5.7	223.2	355.3
ST. DEV.	1.024	.020	.00			.001	.001			31.3	40.2
MIN. VAL.	.058	.005	.01	1.48	.51	.002	.003	.004	5.7	187.1	320.0
MAX. VAL.	2.075	.023	.01	1.48	.51	.004	.005	.004	5.7	243.3	399.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	DISS FE MG/L
NUM. VALS.	3	3	3	3	3	3	3	0	2
AVERAGE	29.98	2.77	79.04	6.27	44.8	10.4	4.53		.03
ST. DEV.	5.07	1.47	10.75	1.12	10.8	6.6	.42		.01
MIN. VAL.	23.20	1.34	68.70	5.00	33.1	5.0	4.04		.02
MAX. VAL.	32.69	4.26	88.38	7.09	54.5	18.0	4.79		.03

HOMESTEAD WATER QUALITY DATA BEFORE S-331 PUMPING

PROJECT HOM DATE OF PRINTING 12/03/84

PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 1A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				4	3	4	4	4	0	0	0
AVERAGE				26.8	532.	504.	7.56	7.04			
ST. DEV.				2.2	104.	77.	.17	.46			
MIN. VAL.				24.5	412.	445.	7.40	6.55			
MAX. VAL.				28.8	601.	610.	7.80	7.48			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	4	4	2	1	1	2	3	1	1	4	4
AVERAGE	.207	.042	.01	1.68	1.01	.003	.003	.004	5.4	225.2	367.0
ST. DEV.	.122	.029	.00			.001	.001			30.0	46.1
MIN. VAL.	.045	.004	.01	1.68	1.01	.002	.002	.004	5.4	183.5	320.0
MAX. VAL.	.340	.076	.01	1.68	1.01	.004	.004	.004	5.4	251.9	418.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	DISS FE MG/L
NUM. VALS.	4	4	4	4	4	4	4	0	2
AVERAGE	31.17	1.19	79.94	6.22	44.2	12.7	4.56		.03
ST. DEV.	8.11	.31	9.49	1.59	7.4	6.7	.38		.01
MIN. VAL.	23.60	.80	66.40	4.30	33.3	5.5	4.03		.02
MAX. VAL.	39.20	1.56	87.73	7.98	49.0	20.8	4.87		.03

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PARAMETER RANGE OF VALUES UNITS

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STATION = 6A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				4	3	4	4	4	0	0	0
AVERAGE				26.5	517.	481.	7.68	7.23			
ST. DEV.				2.1	85.	54.	.37	.41			
MIN. VAL.				24.2	423.	421.	7.35	6.74			
MAX. VAL.				28.2	589.	545.	8.20	7.72			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TOKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TOPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	4	4	2	1	1	2	3	1	1	4	4
AVERAGE	.282	.026	.01	2.10	.68	.003	.005	.004	5.3	225.0	351.5
ST. DEV.	.074	.040	.00			.001	.002			22.9	39.5
MIN. VAL.	.190	.004	.01	2.10	.68	.002	.003	.004	5.3	192.3	315.0
MAX. VAL.	.369	.085	.01	2.10	.68	.004	.007	.004	5.3	244.1	400.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	4	4	4	4	4	4	4	0	2
AVERAGE	29.05	1.30	80.78	5.66	41.6	11.2	4.35		.03
ST. DEV.	6.07	.14	7.29	1.23	7.3	5.6	.49		.01
MIN. VAL.	23.80	1.17	70.10	4.20	34.6	5.0	3.85		.02
MAX. VAL.	37.57	1.50	86.36	6.91	51.1	16.6	4.82		.03

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PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 10 CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				3	2	3	3	3	0	0	0
AVERAGE				26.3	441.	398.	7.55	7.12			
ST. DEV.				.6	37.	17.	.22	.39			
MIN. VAL.				25.8	414.	380.	7.40	6.67			
MAX. VAL.				26.9	467.	414.	7.80	7.38			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TOKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TOPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	3	3	2	1	1	2	2	1	1	3	3
AVERAGE	.536	.004	.03	1.13	.28	.004	.366	.041	5.8	172.9	305.7
ST. DEV.	.488	.000	.03			.001	.489			14.2	31.6
MIN. VAL.	.004	.004	.01	1.13	.28	.003	.020	.041	5.8	157.1	270.0
MAX. VAL.	.964	.004	.05	1.13	.28	.004	.712	.041	5.8	184.5	330.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	3	3	3	3	3	3	3	0	2
AVERAGE	26.69	2.06	61.57	4.65	40.6	9.9	3.18		.04
ST. DEV.	4.12	.37	4.97	.45	7.2	7.0	.78		.02
MIN. VAL.	22.50	1.66	55.99	4.20	32.3	5.0	2.38		.02
MAX. VAL.	30.74	2.36	65.50	5.10	44.9	18.0	3.94		.05

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PARAMETER RANGE OF VALUES UNITS

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STATION = 10A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				4	3	4	4	4	0	0	0
AVERAGE				26.0	532.	495.	7.59	7.16			
ST. DEV.				1.6	98.	60.	.21	.30			
MIN. VAL.				23.8	428.	441.	7.35	6.73			
MAX. VAL.				27.2	622.	580.	7.85	7.40			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	4	3	2	1	1	2	3	1	1	4	4
AVERAGE	.169	.044	.02	2.10	.45	.003	.004	.004	6.1	222.4	352.8
ST. DEV.	.170	.068	.01			.001	.001			20.8	35.0
MIN. VAL.	.010	.004	.01	2.10	.45	.002	.003	.004	6.1	191.4	304.0
MAX. VAL.	.390	.122	.02	2.10	.45	.004	.005	.004	6.1	234.6	387.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	4	4	4	4	4	4	4	0	2
AVERAGE	32.00	1.71	76.21	6.58	46.1	13.1	4.45		.22
ST. DEV.	4.98	.25	6.91	.99	10.9	9.1	.24		.28
MIN. VAL.	24.80	1.44	67.90	5.30	32.3	5.0	4.13		.02
MAX. VAL.	36.26	2.04	82.62	7.67	58.9	25.0	4.66		.42

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PARAMETER RANGE OF VALUES UNITS

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STATION = 12A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				3	2	3	3	3	0	0	0
AVERAGE				24.7	548.	515.	7.57	7.20			
ST. DEV.				.5	13.	75.	.23	.23			
MIN. VAL.				24.3	538.	440.	7.35	6.99			
MAX. VAL.				25.2	557.	590.	7.80	7.45			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TOKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	3	3	1	1	0	1	3	0	0	3	3
AVERAGE	1.428	.005	.01	1.06		.002	.004			252.6	357.7
ST. DEV.	.345	.001					.002			3.2	38.6
MIN. VAL.	1.051	.004	.01	1.06		.002	.003			249.2	314.0
MAX. VAL.	1.729	.006	.01	1.06		.002	.006			255.4	387.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	3	3	3	3	3	3	3	0	1
AVERAGE	20.02	6.18	95.16	3.66	30.4	36.6	4.14		.02
ST. DEV.	7.29	.63	2.05	.51	6.3	9.9	.09		
MIN. VAL.	12.17	5.52	92.83	3.34	23.7	27.9	4.05		.02
MAX. VAL.	26.59	6.77	96.69	4.24	36.2	47.3	4.23		.02

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PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 11A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				3	2	3	3	3	0	0	0
AVERAGE				25.4	542.	519.	7.57	7.25			
ST. DEV.				.5	21.	76.	.18	.20			
MIN. VAL.				25.1	527.	462.	7.40	7.02			
MAX. VAL.				26.0	557.	605.	7.75	7.40			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TOKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	3	3	1	1	0	1	3	0	0	3	3
AVERAGE	1.406	.007	.01	1.68		.002	.003			254.3	373.3
ST. DEV.	.361	.005					.001			8.6	20.2
MIN. VAL.	1.160	.004	.01	1.68		.002	.002			244.8	355.0
MAX. VAL.	1.821	.013	.01	1.68		.002	.004			261.4	395.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	DISS FE MG/L
NUM. VALS.	3	3	3	3	3	3	3	0	1
AVERAGE	17.43	5.94	96.66	3.14	33.0	42.2	4.16		.02
ST. DEV.	5.50	.09	2.94	.39	6.2	14.1	.08		
MIN. VAL.	12.51	5.85	93.31	2.66	26.0	33.2	4.08		.02
MAX. VAL.	23.36	6.02	98.76	3.58	38.0	58.4	4.23		.02

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PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 14A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				2	1	2	1	2	0	0	0
AVERAGE				24.5	520.	476.	7.50	7.11			
ST. DEV.				.1		23.		.16			
MIN. VAL.				24.4	520.	460.	7.50	6.99			
MAX. VAL.				24.5	520.	492.	7.50	7.22			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	2	2	1	1	0	1	2	0	0	2	2
AVERAGE	1.472	.005	.01	1.96		.002	.007			253.5	866.0
ST. DEV.	.202	.001					.001			15.1	784.9
MIN. VAL.	1.329	.004	.01	1.96		.002	.006			242.8	311.0
MAX. VAL.	1.614	.006	.01	1.96		.002	.008			264.1	1421.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	2	2	2	2	2	2	2	0	1
AVERAGE	18.11	4.99	95.65	3.56	31.3	25.9	4.02		.02
ST. DEV.	2.21	.06	6.12	.06	1.4	2.8	.00		
MIN. VAL.	16.55	4.94	91.32	3.52	30.3	23.9	4.02		.02
MAX. VAL.	19.67	5.03	99.98	3.60	32.3	27.9	4.02		.02

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PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 13A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				3	2	3	3	3	0	0	0
AVERAGE				24.5	556.	536.	7.62	7.32			
ST. DEV.				.8	11.	57.	.23	.29			
MIN. VAL.				24.0	550.	490.	7.40	6.99			
MAX. VAL.				25.4	565.	600.	7.85	7.50			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	3	3	1	1	0	1	3	0	0	3	3
AVERAGE	1.284	.004	.01	1.48		.002	.003			253.5	372.7
ST. DEV.	.352	.000					.001			5.1	21.1
MIN. VAL.	.878	.004	.01	1.48		.002	.002			248.4	353.0
MAX. VAL.	1.497	.004	.01	1.48		.002	.004			258.6	395.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	3	3	3	3	3	3	3	0	1
AVERAGE	19.65	5.71	95.65	3.56	35.5	40.7	4.22		.02
ST. DEV.	7.64	.72	.77	.82	3.1	8.0	.04		
MIN. VAL.	13.52	4.96	94.78	2.65	32.3	35.8	4.18		.02
MAX. VAL.	28.21	6.39	96.23	4.46	38.5	50.0	4.25		.02

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PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 16A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				1	0	2	1	2	0	0	0
AVERAGE				26.6		501.	7.15	6.96			
ST. DEV.						1.		.02			
MIN. VAL.				26.6		500.	7.15	6.94			
MAX. VAL.				26.6		502.	7.15	6.97			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TOKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	2	2	1	1	0	1	2	0	0	2	2
AVERAGE	.896	.004	.01	1.61		.002	.009			246.6	351.0
ST. DEV.	.562	.000					.010			12.9	35.4
MIN. VAL.	.500	.004	.01	1.61		.002	.002			237.4	326.0
MAX. VAL.	1.295	.004	.01	1.61		.002	.016			255.7	376.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	2	2	2	2	2	2	2	0	0
AVERAGE	26.56	3.84	90.56	4.96	45.3	24.7	4.12		
ST. DEV.	1.77	.35	5.48	.18	.6	6.6	.09		
MIN. VAL.	25.31	3.59	86.69	4.83	44.9	20.0	4.05		
MAX. VAL.	27.81	4.09	94.44	5.08	45.7	29.3	4.18		

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PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 15A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				1	0	2	1	2	0	0	0
AVERAGE				28.0		489.	7.35	7.02			
ST. DEV.						13.		.05			
MIN. VAL.				28.0		480.	7.35	6.98			
MAX. VAL.				28.0		498.	7.35	7.05			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TOKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	2	2	1	1	0	1	2	0	0	2	2
AVERAGE	.491	.005	.01	1.27		.002	.013			258.4	367.0
ST. DEV.	.104	.001					.016			11.6	24.0
MIN. VAL.	.417	.004	.01	1.27		.002	.002			250.2	350.0
MAX. VAL.	.564	.005	.01	1.27		.002	.024			266.6	384.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	IDISS FE MG/L
NUM. VALS.	2	2	2	2	2	2	2	0	1
AVERAGE	26.31	3.96	95.21	5.03	44.3	20.6	4.34		.02
ST. DEV.	1.89	.18	4.79	.08	2.1	8.3	.15		
MIN. VAL.	24.97	3.83	91.82	4.97	42.8	14.7	4.23		.02
MAX. VAL.	27.64	4.09	98.59	5.08	45.7	26.5	4.44		.02

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PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 2A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				2	1	2	2	2	0	0	0
AVERAGE				27.1	561.	486.	7.58	7.19			
ST. DEV.				.9		6.	.04	.29			
MIN. VAL.				26.4	561.	481.	7.55	6.98			
MAX. VAL.				27.7	561.	490.	7.60	7.39			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	2	2	1	1	0	1	2	0	0	2	2
AVERAGE	.499	.010	.01	1.20		.002	.008			226.3	348.0
ST. DEV.	.480	.004					.004			1.7	.0
MIN. VAL.	.159	.007	.01	1.20		.002	.005			225.1	348.0
MAX. VAL.	.838	.012	.01	1.20		.002	.010			227.5	348.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	2	2	2	2	2	2	2	0	1
AVERAGE	30.83	2.11	80.25	6.29	47.5	13.0	4.70		.02
ST. DEV.	4.94	.78	.71	.01	3.7	3.0	.21		
MIN. VAL.	27.33	1.56	79.75	6.28	44.9	10.8	4.55		.02
MAX. VAL.	34.32	2.66	80.75	6.30	50.1	15.1	4.85		.02

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PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 2 CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				3	2	3	3	3	0	0	0
AVERAGE				26.4	532.	464.	7.92	7.46			
ST. DEV.				1.6	102.	139.	.38	.31			
MIN. VAL.				24.9	460.	375.	7.55	7.15			
MAX. VAL.				28.0	604.	625.	8.30	7.76			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	3	3	1	1	0	1	3	0	0	3	3
AVERAGE	.131	.004	.01	1.13		.012	.009			201.4	331.3
ST. DEV.	.110	.000					.006			43.0	69.0
MIN. VAL.	.004	.004	.01	1.13		.012	.002			173.8	281.0
MAX. VAL.	.205	.004	.01	1.13		.012	.013			251.0	410.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	3	3	3	3	3	3	3	0	1
AVERAGE	29.91	1.66	71.51	5.56	45.5	20.3	3.64		.02
ST. DEV.	8.56	.21	14.06	1.95	7.1	10.6	.85		
MIN. VAL.	21.61	1.45	62.92	4.06	39.6	9.5	2.97		.02
MAX. VAL.	38.70	1.86	87.73	7.76	53.3	30.6	4.59		.02

HOMESTEAD WATER QUALITY DATA BEFORE S-331 PUMPING

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PARAMETER RANGE OF VALUES UNITS

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STATION = 3A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				2	1	2	2	2	0	0	0
AVERAGE				27.5	551.	484.	7.53	7.22			
ST. DEV.				.6		12.	.04	.18			
MIN. VAL.				27.1	551.	475.	7.50	7.09			
MAX. VAL.				27.9	551.	492.	7.55	7.35			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TOKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	2	2	1	1	0	1	2	0	0	2	2
AVERAGE	1.069	.024	.01	2.79		.002	.002			232.2	356.0
ST. DEV.	1.452	.024					.000			12.6	11.3
MIN. VAL.	.042	.007	.01	2.79		.002	.002			223.3	348.0
MAX. VAL.	2.095	.041	.01	2.79		.002	.002			241.1	364.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	DISS FE MG/L
NUM. VALS.	2	2	2	2	2	2	2	0	1
AVERAGE	31.27	2.11	62.26	6.51	47.6	13.8	4.67		.02
ST. DEV.	2.47	1.39	4.72	.18	6.7	6.0	.35		
MIN. VAL.	29.52	1.12	76.92	6.38	42.8	9.5	4.42		.02
MAX. VAL.	33.01	3.09	85.60	6.64	52.3	18.0	4.91		.02

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PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 3 CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				2	2	2	2	2	0	0	0
AVERAGE				25.6	515.	518.	7.98	7.59			
ST. DEV.				2.1	78.	152.	.53	.25			
MIN. VAL.				24.1	460.	410.	7.60	7.41			
MAX. VAL.				27.0	570.	625.	8.35	7.77			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	2	2	0	0	0	0	2	0	0	2	2
AVERAGE	.221	.034					.013			215.2	364.0
ST. DEV.	.071	.042					.013			48.1	66.5
MIN. VAL.	.170	.004					.003			181.2	317.0
MAX. VAL.	.271	.063					.022			249.2	411.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	2	2	2	2	2	2	2	0	0
AVERAGE	34.48	2.12	76.14	6.09	47.5	20.7	3.94		
ST. DEV.	4.83	.54	16.40	1.74	6.6	14.0	.88		
MIN. VAL.	31.06	1.73	64.54	4.86	42.8	10.8	3.32		
MAX. VAL.	37.89	2.50	87.73	7.32	52.2	30.6	4.56		

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PARAMETER RANGE OF VALUES UNITS

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STATION = 4 CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				2	2	2	2	2	0	0	0
AVERAGE				25.7	560.	555.	7.50	7.21			
ST. DEV.				2.1	16.	78.	.21	.31			
MIN. VAL.				24.2	548.	500.	7.35	6.99			
MAX. VAL.				27.1	571.	610.	7.65	7.43			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TOKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	2	2	0	0	0	0	2	0	0	2	2
AVERAGE	.096	.023					.003			235.5	383.0
ST. DEV.	.081	.027					.000			6.6	25.5
MIN. VAL.	.038	.004					.003			230.8	365.0
MAX. VAL.	.153	.042					.003			240.1	401.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	2	2	2	2	2	2	2	0	0
AVERAGE	37.73	1.67	83.29	6.68	49.5	21.4	4.54		
ST. DEV.	.23	.07	2.67	.02	.6	18.8	.09		
MIN. VAL.	37.57	1.62	81.40	6.66	49.0	8.1	4.47		
MAX. VAL.	37.89	1.72	85.18	6.69	49.9	34.7	4.60		

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PARAMETER RANGE OF VALUES UNITS

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STATION = 4A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				2	1	2	2	2	0	0	0
AVERAGE				27.0	583.	509.	7.43	7.20			
ST. DEV.				.1		12.	.04	.29			
MIN. VAL.				26.9	583.	500.	7.40	6.99			
MAX. VAL.				27.0	583.	517.	7.45	7.40			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	2	2	1	1	0	1	2	0	0	2	2
AVERAGE	.769	.036	.10	2.45		.002	.006			245.3	363.5
ST. DEV.	.131	.038					.001			4.5	21.9
MIN. VAL.	.676	.009	.10	2.45		.002	.005			242.1	348.0
MAX. VAL.	.861	.063	.10	2.45		.002	.007			248.5	379.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	2	2	2	2	2	2	2	0	1
AVERAGE	33.91	1.96	86.76	6.96	51.8	13.0	4.95		.02
ST. DEV.	2.87	.26	.57	.75	6.9	4.9	.05		
MIN. VAL.	31.88	1.76	86.36	6.43	46.9	9.5	4.91		.02
MAX. VAL.	35.94	2.16	87.16	7.49	56.7	16.5	4.98		.02

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PARAMETER RANGE OF VALUES UNITS

DATE 7/15/80 - 3/ 1/83 MO/DA/YR

STATION = 5 CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				1	0	1	1	1	0	0	0
AVERAGE				26.6		380.	7.70	7.39			
ST. DEV.											
MIN. VAL.				26.6		380.	7.70	7.39			
MAX. VAL.				26.6		380.	7.70	7.39			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TOKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TOPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	1	1	1	1	0	1	1	0	0	1	1
AVERAGE	.042	.004	.11	1.44		.016	.039			197.0	279.0
ST. DEV.											
MIN. VAL.	.042	.004	.11	1.44		.016	.039			197.0	279.0
MAX. VAL.	.042	.004	.11	1.44		.016	.039			197.0	279.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	1	1	1	1	1	1	1	0	1
AVERAGE	21.94	3.06	72.27	4.02	39.1	19.4	3.00		.02
ST. DEV.									
MIN. VAL.	21.94	3.06	72.27	4.02	39.1	19.4	3.00		.02
MAX. VAL.	21.94	3.06	72.27	4.02	39.1	19.4	3.00		.02

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PARAMETER RANGE OF VALUES UNITS

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STATION = 5A CODE

	STATION CODE	DATE MO/DA/YR	TIME HOUR,MIN	TEMP CENT	SP COND UMHOS/CM	LAB COND UMHOS/CM	PH	LAB PH	TURB JTU	COLOR UNITS	T.SUS.SD MG/L
NUM. VALS.				1	0	1	1	1	0	0	0
AVERAGE				26.7		500.	7.95	7.31			
ST. DEV.											
MIN. VAL.				26.7		500.	7.95	7.31			
MAX. VAL.				26.7		500.	7.95	7.31			

	NOX MG N/L	NO2 MG N/L	NH4 MG N/L	TKN MG N/L	TDKN MG N/L	OPO4 MG P/L	TPO4 MG P/L	TDPO4 MG P/L	SIO2 MG/L	HARDNESS MG/LCACO	T.DIS.SD MG/L
NUM. VALS.	1	1	1	1	0	1	1	0	0	1	1
AVERAGE	.406	.144	.47	1.50		.002	.004			249.9	383.0
ST. DEV.											
MIN. VAL.	.406	.144	.47	1.50		.002	.004			249.9	383.0
MAX. VAL.	.406	.144	.47	1.50		.002	.004			249.9	383.0

	NA MG/L	K MG/L	CA MG/L	MG MG/L	CL MG/L	SO4 MG/L	ALK MEQ/L	TOTAL FE MG/L	TDISS FE MG/L
NUM. VALS.	1	1	1	1	1	1	1	0	1
AVERAGE	34.91	1.98	87.51	7.63	58.9	15.1	4.86		.02
ST. DEV.									
MIN. VAL.	34.91	1.98	87.51	7.63	58.9	15.1	4.86		.02
MAX. VAL.	34.91	1.98	87.51	7.63	58.9	15.1	4.86		.02