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FINAL REMEDIAL INVESTIGATION REPORT

VOLUME 6

Appendices

Martin Marietta Reduction Facility
The Dalles, Oregon

GERAGHTY & MILLER, INC.
Ground-Water Consultants

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APPENDIX E

GEOLOGIC DATA

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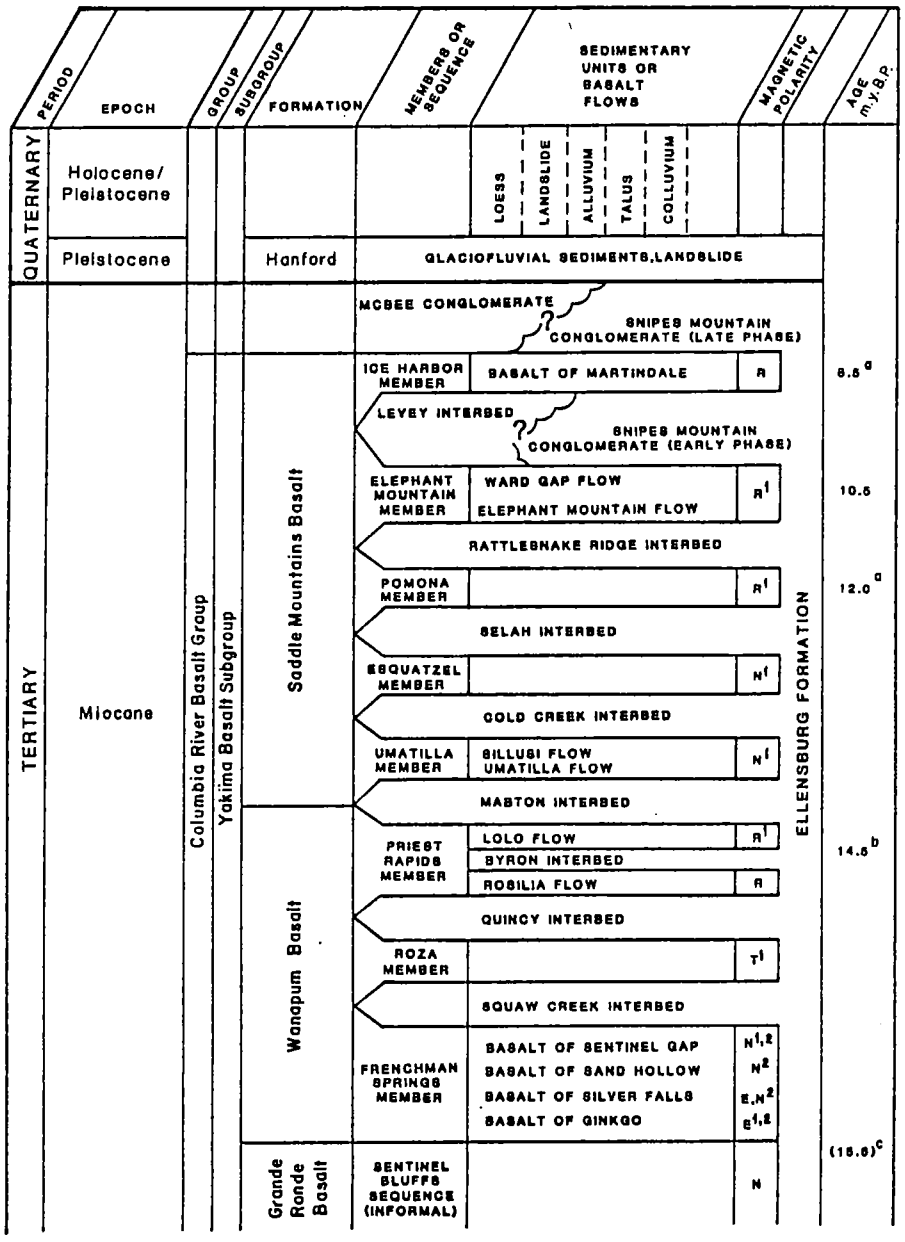
REGIONAL GEOLOGY

The Columbia River Basalt Group (CRBG) is comprised of approximately 300 flood basalt flows that erupted from linear fissures in the eastern third of the Columbia Plateau from about 17 to 6 million years ago. The total area of the CRBG has been calculated to be approximately 63,000 mi^2 (square miles) and the total volume to be 41,000 mi^3 (cubic miles) (Tolan, and others, 1987). Individual flows are typically tens mi^3 to more than 100 mi^3 in volume. Some flows extend from the eastern part of the plateau all the way to the Pacific Coast.

The CRBG is more than 10,000 ft thick in the central plateau, but thins to approximately 2,000 ft through the Cascade Range, the CRBG is probably more than 5,000 ft thick at The Dalles. The areal extent of the CRBG is reduced where it crosses the Cascade Range. The geometry of each flow was controlled by the regional topography created by folds, faults, erosion, and volcanism.

Evaluation of chemical composition (major oxides and trace elements), lithologic character, and paleomagnetism allows the subdivision of the CRBG into individual lava flows. The stratigraphy of the CRBG presented in recent papers by Swanson, and others (1979); Reidel (1983); and Beeson, and others (1985) is summarized in Figure E.1.



N = normal magnetic polarity
R = reversed magnetic polarity
T = transitional magnetic polarity
E = excursional magnetic polarity

[1] magnetic polarities from Van Alstine and Gillett (1981)
[2] magnetic polarities from Beeson et al. (1985)

[a] K-Ar dates from McKee et al. (1977)
[b] K-Ar dates from Watkins and Baksi (1974)
[c] Ar-Ar dates from Long and Duncan (1982)

Figure E.1 Regional Stratigraphy

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The CRBG flows exposed in the area of The Dalles belong to the Wanapum Basalt of the Yakima Basalt Subgroup. Exposures of the Grande Ronde Basalt and the Pomona Member of the Saddle Mountains Basalt are present to the northwest and north of The Dalles, respectively (Bela, 1982). The average major oxide compositions of the extrusives exposed in The Dalles area and the Columbia River Gorge are presented in Tables E.1 and E.2.

In the general vicinity of the MMRF, three members of the Wanapum Basalt of the CRBG are exposed. They are, from oldest to youngest: (1) the Frenchman Springs Member, consisting of up to five flows; (2) the Roza Member, consisting of a single flow; and (3) the Priest Rapids Member, consisting of two flows (Rosalia flow and Lolo flow). The Lolo flow is the uppermost unit of the CRBG in the area. The Roza Member terminates in this area, present near The Dalles Dam but absent directly beneath the MMRF.

The distribution of the CRBG flows exposed at the surface at The Dalles has been mapped in detail by Sam Sargent (1956) (Figure E.2). His map indicates that the Roza flow is continuous in the western portion of the study area. For example, to the north of Chenoweth Creek, he labeled the flow beneath the Rosalia as the Roza flow by using position-in-sequence correlation methods. However, chemical analysis of these rocks identifies them as the Sentinel Gap flow,

Table E.1 Average Major Oxide Composition of Basalts in The Dalles Area

Location		Oxide									
		SiO_2	Al_2O_3	TiO_2	FeO^2	MnO	CaO	MgO	K_2O	Na_2O	$P2O_5$
Grande Ronde Basalt	(3)	53.34	15.25	1.86	11.57	0.20	8.66	4.81	1.17	2.62	0.31
Wanapum Basalt											
Frenchman Springs Member											
- Basalt of Ginkgo	(3)	50.66	14.30	3.07	14.43	0.23	8.17	4.32	1.29	2.72	0.61
- Basalt of Silver Falls	(2)	51.80	13.98	3.08	14.09	0.22	8.46	4.08	1.13	2.43	0.54
- Basalt of Sand Hollow	(7)	51.42	14.49	2.89	13.42	0.21	8.30	4.43	1.34	2.51	0.50
- Basalt of Sentinel Gap	(9)	51.36	14.62	3.05	13.56	0.21	8.23	4.22	1.32	2.68	0.55
Roza Member*	(13)	50.60	14.35	3.01	12.44	0.23	8.65	4.59	1.17	2.43	0.54
Priest Rapids Member											
- Rasalia Flow	(4)	50.39	14.68	3.65	13.83	0.22	8.34	4.15	0.85	2.82	0.69
- Lolo Flow	(7)	50.04	14.62	3.17	13.64	0.22	8.77	4.89	1.07	2.72	0.67
Saddle Mountains Basalt											
Umatilla Member											
- Umatilla Flow	(12)	53.29	15.09	3.04	12.42	0.20	6.47	3.08	2.57	2.92	0.74
- Sillusi Flow	(6)	54.06	15.29	2.65	12.27	0.20	6.04	2.78	2.86	2.89	0.86
Esquatzel Member	(8)	51.65	14.90	3.23	13.04	0.20	8.22	3.78	1.73	2.63	0.43
Pomona Member	(29)	51.57	15.76	1.69	9.97	0.18	10.44	6.54	0.48	2.56	0.24
Elephant Mountain Member	(7)	50.30	14.41	3.58	14.40	0.21	8.41	4.29	1.15	2.45	0.50
Ice Harbor Member*											
- Basalt of Martindale	(14)	48.44	14.18	3.25	12.38	0.23	10.20	5.65	0.68	2.30	0.68

Note: All concentrations are in weight percent. Numbers in parentheses indicate numbers of analyses used in computing averages. $FeO=FeO+0.9(Fe_2O_3)$. Units indicated by * are taken from Reidel and Fecht (1981).

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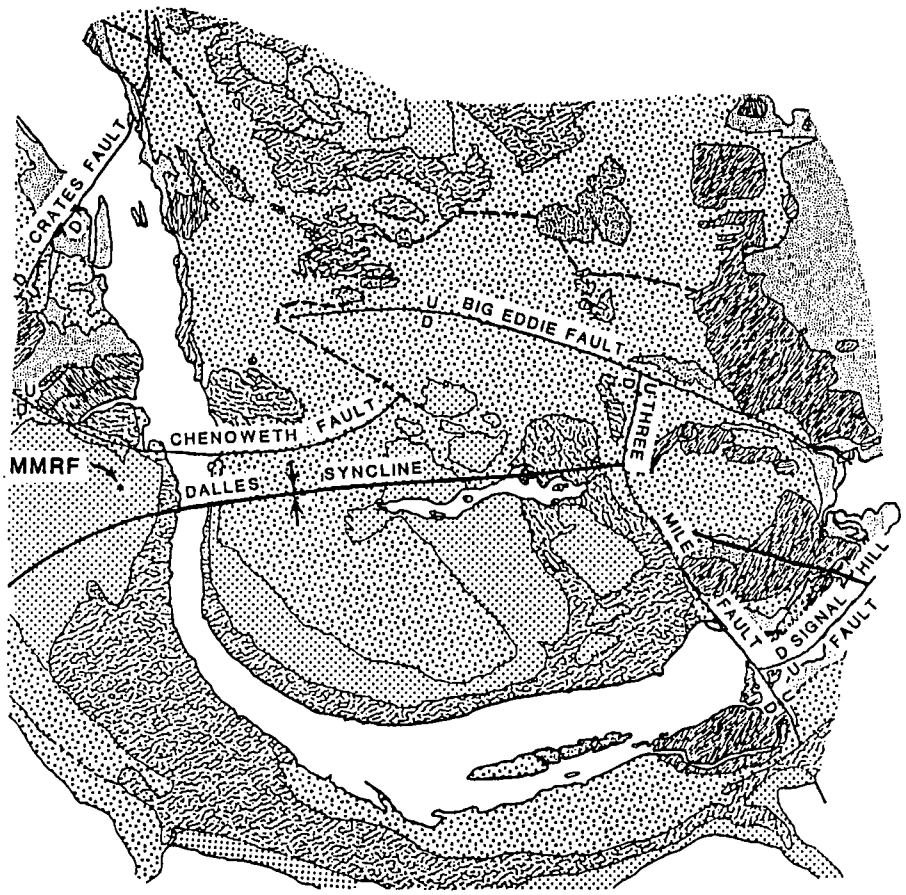
Table E.2 Average Major Oxide Composition of Basalts in the Columbia River Gorge

Location		Oxide									
		SiO_2	Al_2O_3	TiO_2	FeO	MnO	CaO	MgO	K_2O	Na_2O	P_2O_5
Grande Ronde Basalt											
Low MgO	(23)	55.23	14.91	2.14	12.18	0.20	7.01	3.56	1.70	2.53	0.33
High MgO	(23)	53.73	15.31	1.89	11.59	0.20	8.50	4.80	1.17	2.32	0.29
Wanapum Basalt											
Frenchman Springs	(49)	51.66	14.65	2.97	13.87	0.22	8.12	4.24	1.23	2.32	0.52
Roza	(9)	51.22	14.11	3.16	13.93	0.22	8.27	4.73	1.25	2.31	0.59
Priest Rapids Member											
- Rosalia Flow	(20)	50.17	14.01	3.54	14.91	0.24	8.38	4.29	1.23	2.36	0.68
- Lolo Flow	(5)	49.62	14.26	3.09	14.34	0.25	9.01	5.05	1.04	2.41	0.64
Saddle Mountains Basalt											
Pamona Member	(5)	52.37	15.70	1.63	10.45	0.18	10.36	6.79	0.57	1.51	0.23

Note: All concentrations are in weight percent. All analyses are XRF determinations by P.R. Hooper, Washington State University, Pullman, WA 99164. Numbers in parentheses indicate numbers of analyses used in computing averages. $FeO=FeO+0.9(Fe_2O_3)$.

544/19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indicating that the Roza flow is absent from the stratigraphic sequence at the MMRF.

In the vicinity of The Dalles, the Roza flow terminates and the Lolo flow narrows to form a tongue extending westward toward Mount Hood. A transition from pillow lavas formed in a shallow lake to an intracanyon flow beginning near Mosier is observed in the Rosalia flow (Tolan and Beeson, 1984). The subaqueous pillow lavas of the Rosalia flow, exposed extensively in the eastern part of The Dalles, tend to form foreset beds of lava stringers and pillows embedded in hyaloclastite. Horizontal sheets are generally absent.

Cutting samples from the BPA Celilo Substation well (T1N, R14E, center of Section 6), compared with the outcrop geology, geologists' logs, and core samples from the MMRF, have yielded the following observations:

- The Lolo and Roza flows occur in outcrop near the south end of the bridge (east of The Dalles) and in the Big Eddy well, but not in the BPA Celilo well less than a mile to the south.

- The Rosalia flow is about 125-ft thick in the Big Eddy well and in outcrop (the "highway pillow lava"), but is 150-ft thick in the Celilo well and at the Martin Marietta site. Apparently, the Rosalia is thicker where the Roza does not underlie it.

- A 20-ft interbed occurs in the Celilo well and in the Martin Marietta core hole (MW-16D), but was not noted in the Big Eddy well. This interbed seems to be associated with the absence of the Roza flow. The nose of the Roza was apparently encircled by a depression in which sediments accumulated, causing the Rosalia flow to be thicker in these places.

- In general, the stratigraphy at the BPA Celilo substation well is similar to that observed at the MMRF. However, the permeable zones in the Rosalia and Sentinel Gap flows that are aquifers beneath the MMRF are well above the water table in the Celilo well.

REGIONAL STRUCTURE

The Dalles is located in a syncline that is part of the Yakima fold belt, a series of east-to-northeast trending folds in the Columbia River basalt that extend from the Pasco Basin westward into the Cascade Range (Beeson and Tolan, 1987). The Yakima fold belt is characterized by broad synclines bordered by narrow asymmetrical anticlines that are often north verging and thrust faulted. The Dalles syncline lies south of the Columbia Hills anticline which is south verging along much of its length. The Mosier syncline lies between the Columbia Hills anticline and the Bingen anticline

to the north (Bela, 1982). The Chenoweth fault is probably a small reverse fault associated with the Columbia Hills anticline and thrust. The Yakima folds, which were developing during the Columbia River basalt eruptions (16.5-12 million years ago in The Dalles area), controlled the paleotopography and therefore the distribution of some CRBG flows. The Lolo, Rosalia, and Roza flows all show the effects of this developing structure in The Dalles area, being localized or thicker along the trough.

Another prominent structural trend in this area is the set of northwest-trending faults that are common in the western Columbia Plateau and the northern Oregon Cascade Range (Bela, 1982). The Laurel fault to the east of The Dalles is an example. The faults are probably mostly dextral strike-slip faults although vertical offsets are also common along them. The Threemile fault on the east side of The Dalles is a smaller one of these northwest-trending faults.

The Cascade Range Upwarp is another important regional feature that provides part of the structural setting of The Dalles basin. In general, the Plio-Pleistocene upwarp (Tolan and Beeson, 1984) of the Cascade Range superimposes an eastward dip on the Columbia River basalts and the earlier developed east-to-northeast trending folds.

SITE STRATIGRAPHY

The site stratigraphy presented in this report is based on the geologic samples from boreholes of production and observation wells at the MMRF, existing geologic maps (Bela, 1982; Sargent, 1956), and geologic mapping conducted during the RI. One drill hole installed during the RI (MW-16D) was continuously cored to a depth of 272 ft. The core was described lithologically, checked for magnetic polarity (top and bottom), and analyzed for chemical constituents. An undisturbed sample of the Quincy/Squaw Creek Interbed from MW-16D was submitted for laboratory analysis of hydraulic conductivity (Attachment E.1).

Cutting samples from 32 other drill holes installed during the RI were collected and described lithologically (Attachment E.2). Lithologic descriptions of on-site production wells and pre-existing monitor wells are presented in Appendix F. Cutting samples selected for chemical analysis were hand-picked and ultrasonically cleaned. The chemical analyses (Table E.3) were performed by the X-Ray Fluorescence (XRF) laboratory at Washington State University in Pullman, Washington.

Samples from borehole MW-16D at the MMRF were analyzed for major oxides, magnetic polarity, and lithologic composition. These data were used to correlate the sequence identified beneath the MMRF with the CRBG stratigraphy. The

Table E.3 Results of Chemical Analyses of Lithologic Samples

1986

CODE	SAMPLE	DD-MMM-YY HH:MM	SI KA SC KA	AL KA V KA	TI KA BA LA	FE KA RB KA	MN KA SR KA	CA KA ZR KA	MG KA Y KA	K KA NB KA	NA KA GA KA	P KA CU KA	NI KA ZN KA	CR KA
TRA1	MB12B40	25-SEP-86 22:29	49.54 0.0042	14.19 0.0350	3.161 0.0527	14.99 0.0024	0.243 0.0305	9.31 0.0182	4.38 0.0048	0.99 0.0014	2.25 0.0021	0.756 0.0038	0.0032 0.0144	0.0088
TRA1	MB12B70	25-SEP-86 22:31	49.24 0.0043	13.13 0.0436	3.546 0.0577	16.75 0.0020	0.240 0.0291	8.49 0.0206	4.36 0.0052	1.04 0.0016	2.26 0.0021	0.761 0.0018	0.0003 0.0159	0.0026
TRA1	MB12B185	25-SEP-86 22:32	50.03 0.0033	13.56 0.0423	3.661 0.0648	15.95 0.0032	0.240 0.0298	8.44 0.0215	3.66 0.0054	1.24 0.0015	2.21 0.0022	0.810 0.0025	0.0009 0.0162	0.0007
TRA1	MB13B50	25-SEP-86 22:34	49.18 0.0035	13.94 0.0346	3.144 0.0500	14.91 0.0022	0.237 0.0295	9.35 0.0178	5.15 0.0048	0.96 0.0015	2.20 0.0020	0.743 0.0029	0.0034 0.0143	0.0104
TRA1	MB13B95	26-SEP-86 03:48	49.26 0.0042	13.05 0.0407	3.525 0.0554	16.68 0.0022	0.244 0.0292	8.39 0.0209	4.43 0.0054	1.20 0.0017	2.28 0.0021	0.761 0.0027	0.0000 0.0163	0.0011
TRA1	MB13B140	26-SEP-86 03:50	49.18 0.0044	13.19 0.0411	3.558 0.0566	16.37 0.0030	0.259 0.0301	8.73 0.0211	4.23 0.0054	1.28 0.0015	2.24 0.0020	0.773 0.0032	0.0002 0.0166	0.0021
TRA1	MB14B40	26-SEP-86 03:51	48.90 0.0040	13.70 0.0369	3.107 0.0490	15.93 0.0023	0.239 0.0285	8.66 0.0178	5.27 0.0048	1.05 0.0012	2.23 0.0022	0.738 0.0039	0.0033 0.0146	0.0088
TRA1	MB14B90	26-SEP-86 03:53	49.97 0.0042	13.28 0.0428	3.597 0.0545	15.98 0.0029	0.220 0.0302	8.64 0.0215	3.80 0.0055	1.22 0.0016	2.32 0.0022	0.784 0.0021	0.0004 0.0163	0.0011
TRA1	MB14B200	26-SEP-86 03:54	50.94 0.0046	14.43 0.0457	3.911 0.0598	13.67 0.0034	0.225 0.0323	9.23 0.0228	2.73 0.0061	1.40 0.0018	2.38 0.0023	0.873 0.0031	0.0001 0.0174	0.0004
TRA1	MB15B35	26-SEP-86 03:56	49.42 0.0037	14.28 0.0360	3.254 0.0540	14.38 0.0025	0.234 0.0301	9.51 0.0184	4.57 0.0052	1.04 0.0014	2.35 0.0020	0.772 0.0044	0.0039 0.0150	0.0084
TRA1	MB15B60	26-SEP-86 09:10	50.75 0.0040	13.47 0.0428	3.657 0.0657	15.49 0.0030	0.202 0.0300	8.34 0.0225	3.43 0.0057	1.26 0.0018	2.38 0.0022	0.827 0.0038	0.0003 0.0173	0.0013
TRA1	MB15B95	26-SEP-86 09:12	49.08 0.0040	13.05 0.0416	3.525 0.0566	16.92 0.0022	0.245 0.0292	8.40 0.0206	4.45 0.0052	1.15 0.0016	2.25 0.0023	0.752 0.0022	0.0005 0.0155	0.0018
TRA1	MB1710	26-SEP-86 09:13	48.29 0.0040	15.49 0.0394	3.469 0.0770	13.72 0.0015	0.238 0.0332	9.88 0.0196	4.56 0.0048	1.00 0.0015	2.31 0.0020	0.812 0.0048	0.0041 0.0168	0.0096
TRA1	MB1815	26-SEP-86 09:15	49.52 0.0038	13.19 0.0425	3.583 0.0566	16.76 0.0028	0.212 0.0287	8.11 0.0216	4.18 0.0054	1.19 0.0016	2.30 0.0022	0.775 0.0021	0.0003 0.0159	0.0018
TRA1	MB1410	26-SEP-86 09:16	49.52 0.0043	13.58 0.0429	3.692 0.0541	16.13 0.0023	0.225 0.0307	8.80 0.0211	3.82 0.0053	1.04 0.0016	2.24 0.0023	0.781 0.0025	0.0006 0.0163	0.0019
TRA1	MB2030	26-SEP-86 09:18	49.11 0.0034	13.14 0.0403	3.567 0.0579	16.84 0.0026	0.234 0.0291	8.32 0.0209	4.45 0.0052	1.12 0.0016	2.28 0.0022	0.758 0.0032	0.0003 0.0166	0.0007
TRA1	MB2090	26-SEP-86 14:32	49.37 0.0037	13.19 0.0422	3.573 0.0575	16.33 0.0030	0.243 0.0297	8.55 0.0211	4.28 0.0055	1.31 0.0015	2.19 0.0021	0.773 0.0017	0.0000 0.0161	0.0019
TRA1	MB21525	26-SEP-86 14:33	49.27 0.0044	13.32 0.0413	3.587 0.0580	16.64 0.0027	0.228 0.0293	8.29 0.0211	4.26 0.0053	1.16 0.0015	2.29 0.0022	0.779 0.0014	0.0002 0.0159	0.0023
TRA1	MB21560	26-SEP-86 14:35	49.53 0.0039	13.40 0.0426	3.621 0.0567	15.85 0.0028	0.253 0.0306	8.89 0.0213	4.02 0.0054	1.19 0.0017	2.28 0.0020	0.778 0.0014	0.0003 0.0162	0.0013

Table E.3 (Continued)

1987

CODE	SAMPLE	DD-MMM-YY HH:MM	SIO2 % SC WT% FE203	AL203% V WT% TOTAL	TIO2 % BA WT%	TOTFEO RB WT%	MNO % SR WT%	CAO % ZR WT%	MGO % Y WT%	K20 % NB WT%	NA20 % GA WT%	P205 % CU WT%	NI WT% ZN WT%	CR WT% FEO
TRA1	MBMW4B10	12-AUG-87 12:38	49.22	13.48	3.129	13.92	0.235	9.40	5.21	0.85	2.57	0.722	0.0036	0.0102
			0.0036	0.0338	0.0461	0.0015	0.0294	0.0168	0.0041	0.0016	0.0019	0.0032	0.0130	12.5300
			1.5500	98.7500										
TRA1	MBMW4B60	12-AUG-87 12:39	50.41	12.87	3.557	14.89	0.239	8.39	4.45	1.18	2.73	0.773	0.0007	0.0024
			0.0037	0.0420	0.0557	0.0026	0.0290	0.0208	0.0048	0.0021	0.0021	0.0012	0.0147	13.4000
			1.6600	99.4900										
TRA1	MBMW4B190	12-AUG-87 12:40	51.96	13.85	3.722	12.61	0.224	8.97	3.19	1.40	2.67	0.827	0.0008	0.0032
			0.0039	0.0432	0.0599	0.0037	0.0305	0.0214	0.0053	0.0021	0.0025	0.0029	0.0164	11.3500
			1.4000	99.4300										
TRA1	MBMW185	12-AUG-87 18:55	50.05	12.97	3.580	13.87	0.239	9.39	3.90	0.89	2.67	0.756	0.0011	0.0025
			0.0036	0.0419	0.0536	0.0014	0.0306	0.0203	0.0047	0.0019	0.0025	0.0012	0.0146	12.4900
			1.5400	98.3300										
TRA1	MBMW18145	12-AUG-87 18:56	50.58	13.01	3.598	14.74	0.253	8.60	4.19	1.37	2.62	0.800	0.0009	0.0027
			0.0036	0.0405	0.0560	0.0033	0.0291	0.0208	0.0048	0.0021	0.0020	0.0018	0.0145	13.2600
			1.6400	99.7500										

Surface Samples

TRA1	MBCHEN1	28-JAN-87 12:17	49.38	12.98	3.149	15.92	0.219	8.90	5.25	1.05	2.22	0.756	34	95
			37	375	513	23	291	187	48	14	21	22	144	
TRA1	MBCHEN2	28-JAN-87 12:19	51.97	12.74	2.912	16.11	0.214	8.05	3.73	1.18	2.28	0.636	4	11
			28	405	619	33	326	203	47	13	20	0	145	
TRA1	MBCHEN3	28-JAN-87 12:20	51.78	12.64	2.880	15.93	0.232	7.80	4.09	1.48	2.34	0.635	1	17
			29	410	617	41	315	203	45	15	24	10	147	
TRA1	MBCHEN4	28-JAN-87 15:24	51.42	13.06	2.876	15.39	0.215	8.49	4.48	1.11	2.27	0.507	6	31
			131	444	524	30	332	174	39	11	22	6	129	

sedimentary interbeds between the lava flows have been assigned names based on a stratigraphic column developed from measured sections near the center of the Columbia Plateau (Figure E.1).

Correlation of the CRBG flows in the drill holes at the MMRF were initially based on the lithologic descriptions of the core and chip samples. Lithologic descriptions also allowed correlation of several irregular and crudely defined zones within the Rosalia flow. Confirmation of the original correlations was based on the results of the XRF analytical data (Table E.3) for 19 samples selected from the 9 chip-sample holes and for 6 samples from the core hole.

The deep (272 ft) borehole (MW-16D) provides a detailed base-line stratigraphic section with which the other drill holes have been correlated (Figure E.3). The stratigraphy identified at this borehole, from top to bottom, is as follows:

Lolo flow of Priest Rapids Member.....	54	ft
Sedimentary Interbed (Byron Interbed).....	2.5	ft
Rosalia flow of Priest Rapids Member.....	141	ft
Sedimentary Interbed (Quincy/Squaw Creek).....	25	ft
Sentinel Gap flow of Frenchman Springs Member..	49+	ft

The Lolo flow is a slightly open-textured (diktytaxitic) to dense, coarse-grained basalt that contains some large plagioclase phenocrysts with few vesicles. In outcrop, this

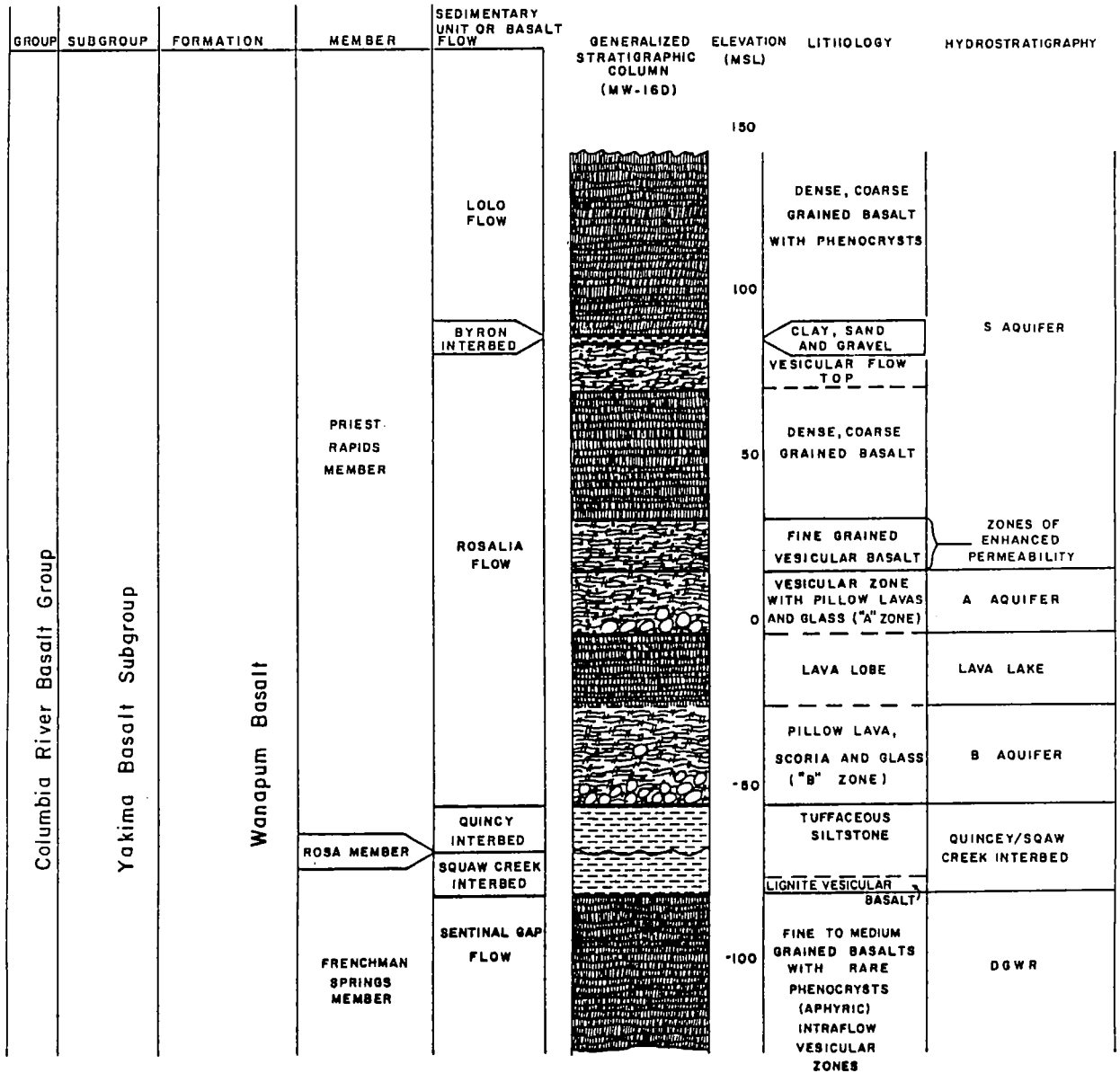

Figure E.3 Site Stratigraphy

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flow exhibits a blocky/columnar type of jointing. The joints are generally vertical and commonly contain clay or manganese oxide fillings. In the vicinity of The Dalles, the Lolo flow narrows to form a tongue extending westward toward Mount Hood.

The **Byron Interbed** contains about 1 ft of gravel overlying a clay-rich sediment that ranges in thickness from 1 to 3 ft. The **Rosalia flow** is present beneath the Byron Interbed. Pillow lavas and hyaloclastites are present in the lower two-thirds of the flow and apparently the flow was deposited in a large shallow lake. The Rosalia flow makes a transition from pillow lavas formed in a shallow lake to an intracanyon flow near Mosier (Tolan and Beeson, 1984).

Cavity fillings are more abundant in the Rosalia than in either the overlying Lolo or the underlying Sentinel Gap flows. This suggests that the Rosalia flow cooled in water and that heated water circulated through the flow during cooling, leaching, and then depositing calcite, opal, and clay minerals in vesicles.

The Rosalia flow can be divided into three subunits based on lithology. These units are, from top to bottom, the subaerial, transition, and subaqueous subunits. The subaerial part of the Rosalia is approximately 50-ft thick. The uppermost 15 ft contains abundant vesicles that are

partially filled and grades downward to a less vesicular, denser, coarse-grained rock.

At the base of this dense, coarse-grained rock is the transition zone. The transition zone, up to 20-ft-thick, forms a gradational contact between the subaerial and subaqueous parts of the flow. The transition zone is finer grained, more vesicular, and often more altered than the overlying dense rock, but it does not contain glass. The lowest part of the Rosalia flow is the subaqueous zone (80 to 100 ft thick), which is comprised of two pillow lava horizons locally separated by a lava lobe.

The upper part of the subaqueous zone contains pillow lavas and some glass with abundant clay alteration products and authigenic clays. This upper subaqueous zone is 5- to 45-ft thick and is referred to as the A aquifer.

A lava lobe up to 20-ft thick locally separates the upper and lower pillow lava horizons of the subaqueous zone. This lobe conceivably represents a surge of lava that plunged over the terminal margin of the Roza Member and blanketed the hyaloclastic debris that had washed out in front of the flow. The lobe is not considered to be extensive laterally and is quite vesicular in places. However, locally, the lava lobe provides a degree of hydraulic separation between the A and B aquifers.

The lowest 30 to 50 ft of the subaqueous zone represents the B aquifer and is characterized by an abundance of hyaloclastite (glass and scoria) with scattered pillow lavas. The base of the subaqueous zone is characterized by an enriched zone of pyrite.

The **Quincy/Squaw Creek Sedimentary Interbed** is approximately 20-ft thick and consists of a 3-ft basal lignite layer overlain by white tuffaceous siltstone and sandstone of fluvial and/or lacustrine origin. The Roza flow, which is normally present between the Quincy and Squaw Creek interbeds, is absent at the MMRF.

The **Sentinel Gap flow** is an open-textured basalt with zones of large vesicles, but in contrast to the Rosalia flow, cavities are predominantly unfilled. The vesicular flow top and intraflow vesicular zones within the Sentinel Gap flow are permeable and correspond to the top of the DGWR at the MMRF.

The **Sand Hollow flow** is an open-textured basalt with zones of larger vesicles and numerous fractures. The vesicular flow top of the Sand Hollow flow represents the primary water-yielding zone within the DGWR.

SITE STRUCTURE

The MMRF is situated on the axis of the broad, northeast-trending, The Dalles syncline. The Dalles basin is

effectively bounded by the northwest-trending Threemile fault on the east, the south limb of The Dalles syncline on the south, the Cascade Upwarp on the west, and the Chenoweth fault on the north. A geologic cross section (Figure E.4) from the Threemile fault to the Chenoweth fault presents the structure at the site as related to the greater The Dalles area. Note that the CRBG flows that are aquifers beneath the MMRF are shallower to the east and that the upper ones (Rosalia flow) are totally exposed; to the north these units are cut off by the Chenoweth fault.

Immediately beneath the site, very little structural complexity is evident. Drill hole and surface data show generally unfaulted, horizontal lava flows and interbeds (Attachment E-3). Only one drill hole (MW-8A) located at the old cathode waste pile shows more than normal fractures, and this well also shows a zone of greater than normal alteration that may be related to tectonically produced high joint density. The manganese oxide coating on these joint surfaces, similar to that found in other tectonic zones where the CRBG is fractured, indicates that these joints predate the construction activity at the site.

North of the MMRF, the Chenoweth fault marks an abrupt change in orientation of the basalt layers from nearly flat-lying to southward-dipping at 5 to 10 degrees. The Rosalia, Sentinel Gap, and Sand Hollow flows emerge at the surface to the north of the fault.

The basalt flows that crop out to the north of the MMRF, near Chenoweth Creek, were analyzed for chemical constituents (see Table E.3). This information was utilized to evaluate the character of the Chenoweth fault and to estimate the magnitude of stratigraphic offset. The following samples were collected (approximate locations indicated on Figure E.5):

CHEN 1 - Top of bluff just south of Chenoweth Creek bridge on the southeast side of the road.

This is a very coarse-grained, sparsely phyric basalt that is mapped as the Lolo flow on Sargent's map (1956). The chemical data verify the Lolo identification.

CHEN 2 - Near stream level on Chenoweth Creek, just below the bridge.

This is a medium-grained, phyric basalt that is chemically verified as basalt of Sentinel Gap. This flow crops out on both sides of the road from the bridge to the Columbia River and was mapped here as Roza by Sargent.

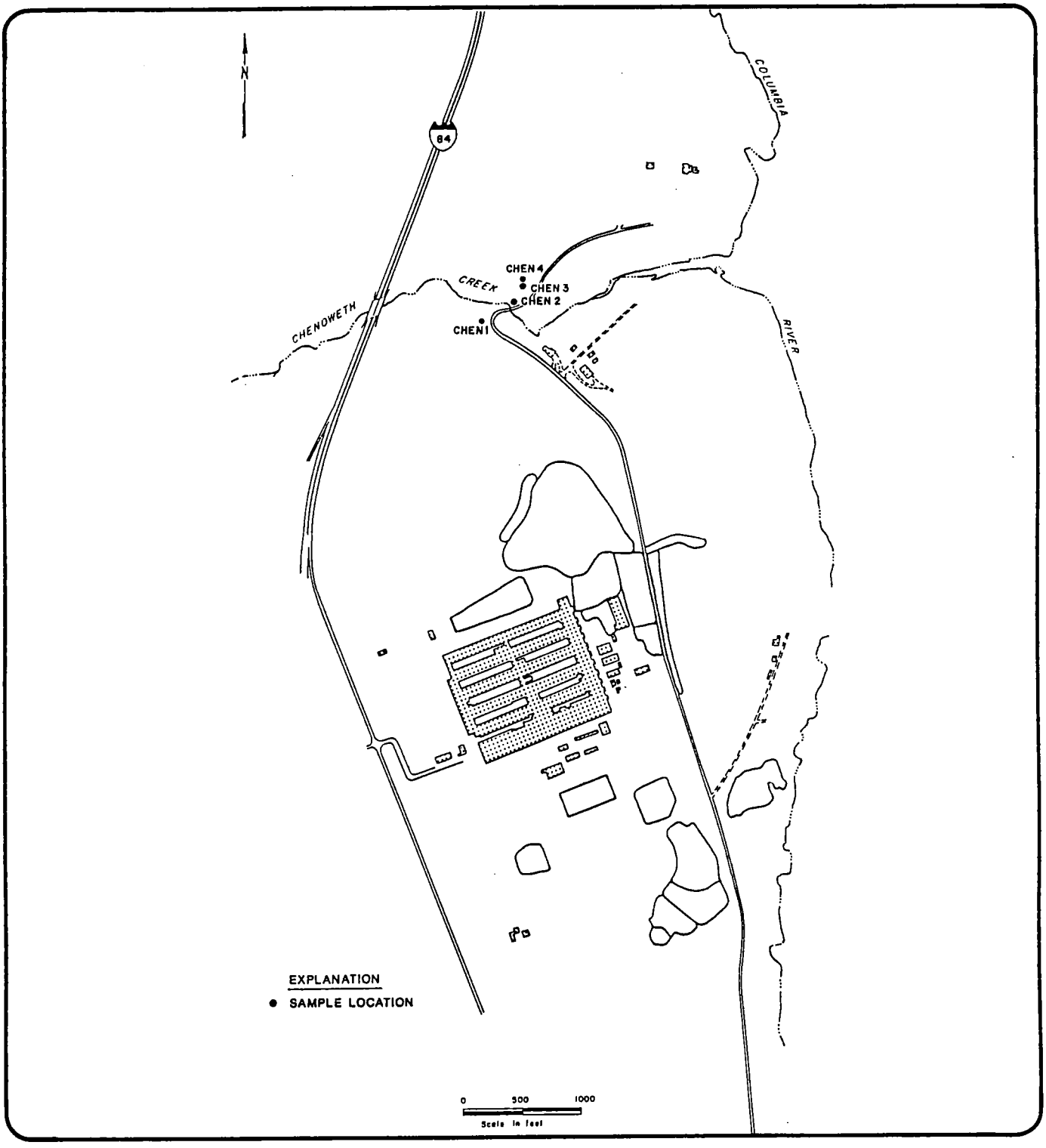

Figure E.5 Lithologic Sample Locations

CLIENT NAME:

Martin Marietta Corporation

CHEN 3 - Collected from the dense colonnade about 5 ft above the contact with another flow (CHEN 4).

This sample is from the lower part of the same flow from which sample CHEN 2 was taken. CHEN 3 is nearly chemically identical to CHEN 2, both being basalt of Sentinel Gap but mapped by Sargent as Roza.

CHEN 4 - Collected from basalt below CHEN 3.

This a very coarse-grained, highly-vesicular flow top mapped as Sentinel Gap by Sargent (1956). This flow is moderately phyric and is identified both lithologically and chemically as a basalt of Sand Hollow.

The base of the Lolo flow is exposed along River Road south of Chenoweth Creek, and the top of the Sentinel Gap flow is exposed along the road to the north of the creek. Therefore, the amount of stratigraphic offset at this location is approximately the thickness of the missing Rosalia flow plus the Quincy/Squaw Creek interbed, or about 165 ft. The Rosalia flow (A & B aquifers), complete with pillow basalt, is exposed north of the fault toward the Columbia

River (Figure E.2), suggesting less offset nearer the river. The Chenoweth fault brings the Frenchman Springs flows to the surface and marks an abrupt change in the dip of the flows.

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ATTACHMENT E.1

QUINCY SQUAW/CREEK
LABORATORY HYDRAULIC CONDUCTIVITY

RIEDEL ENVIRONMENTAL SERVICES, INC.

Portland Region:
P.O. Box 03096
Portland, Oregon 97203-0096
(503) 286-4656

July 22, 1986

Geraghty & Miller
1410 Whiskey Road
Aiken, SC 29807

Attention: Scott Keith

Dear Mr. Keith:

This letter contains the permeability test results for the gray-green siltstone rock core sent to Riedel Environmental Services, Inc. for analysis.

The permeabilities for the siltstone were run in a triaxial compression test chamber. Time was allowed for the samples tested to reach 98% of total saturation and an effective pressure of 7.5 psi was used for each test run. Two sample test runs were made for both the vertical and horizontal permeabilities and the average of the results is given.

The vertical permeability of the siltstone is 1.25X10-6 cm/sec (note the enclosed permeability test summary sheets) and was tested parallel to the core's elongated axis.

The horizontal permeability of the siltstone is 9.02X10-7 cm/sec and was tested perpendicular to the core's elongated axis. The core appears to be of marine origin. It is fairly homogenous and isotropic in physical properties, which agrees with the permeability test results. The only features discernable in the core are fossil benthic organism burrows and bioturbated soft sediment slump features seen as thin wavy brown and gray laminations. These sedimentary structures are non-directional and have little overall influence on the siltstone's permeability.

An average overall permeability for the siltstone is 1.08X10-6 cm/sec.

Also enclosed is an invoice for the work and lab testing performed. The total charge of $702.00 includes vertical and horizontal permeability tests, data analysis and interpretation of the results.

Foot of N. Portsmouth, Portland, Oregon 97217 24-Hour Hotline (800) 334-0004

If you should have any further samples to be tested for permeabilities or strengths, please contact me at our Portland office (503) 286-4656, extension 226.

Sincerely,

Dale E. Conover

Dale E. Conover
Geological Engineer

DEC:ms

Enclosure

PERMEABILITY TEST Vertical
SUMMARY SHEET

SHANNON & WILSON, INC.
GEOTECHNICAL CONSULTANTS
PORTLAND, OREGON

PROJECT _____ JOB NO. 1140
BORING NO. Core Sample SAMPLE NO. NW 16-D
DEPTH 205.5-207.0 FEET
TESTED BY RB DATE 7-13-56
CHECKED BY _____ DATE _____

$k = Q/iA$

Q = VOLUME FLOW RATE (CM^3/MIN)

A = SAMPLE AREA (CM^2)

i = PRESSURE GRADIENT (PSI/IN)

RUN #1

EFFECTIVE PRESSURE = 7.5 PSI

$Q = \frac{16.25 cc}{158 min} = 0.103$ cc/min

$A = 16.274$ cm2

$i = (27.692) \times \frac{h\ (PSI)}{L\ (IN)} = \frac{5\ PSI}{1.793} \times 27.692 = 77.22$

$453.59 / (2.54)^3 = 27.68$

$k = Q/iA = 8.196 \times 10^{-5}$ cm/min
$= 1.37 \times 10^{-6}$ cc/sec

~~RUN #2~~ RUN 1 & RUN 2 combined

EFFECTIVE PRESSURE = 7.5 PSI

Q = .0945 cc/min

$i = 27.692 \times \frac{5\ PSI}{1.793} = 77.22$

$k = .0945 / 77.22 \times 16.274 = 7.5 \times 10^{-5}$ cm/min
$= 1.25 \times 10^{-6}$ cm/sec

RUN #3 _____

EFFECTIVE PRESSURE = _____

Q = _____

i = _____

k = _____

phoned 7-14-56 6:45

ATTACHMENT E.2

LITHOLOGIC LOGS

LITHOLOGIC LOG OF MONITOR WELL MW-4B

Description	Depth (ft)	Thickness (ft)
Soil	0.0 - 2.0	2.0
Fractured rock	2.0 - 12.0	10.0
Basalt, hard, gray to black	12.0 - 15.0	3.0
Basalt, gray-green-brown, water-bearing, fractured	15.0 - 32.0	17.0
Basalt, hard, dark gray to black	32.0 - 80.0	48.0
Basalt, vesicular, dark gray to black	80.0 - 82.0	2.0
Basalt, gray-green-brown, highly fractured; clays	82.0 - 101.0	19.0
Basalt, vesicular, black to dark gray, fractured	101.0 - 104.0	3.0
Basalt, brown, dark gray, green, fractured	104.0 - 110.0	6.0
Basalt, dark gray to green	110.0 - 113.0	3.0
Basalt, dark gray-brown	113.0 - 118.0	5.0
Basalt, hard, dark gray to green	118.0 - 123.0	5.0
Basalt, vesicular, dark gray	123.0 - 138.0	15.0
Basalt, hard, dark gray to black	138.0 - 153.0	15.0
Basalt, vesicular, dark gray to green	153.0 - 161.0	8.0
Basalt, hard, dark gray to black	161.0 - 163.0	2.0
Basalt, vesicular to amydaloidal, calcite filled vesicles	163.0 - 169.0	6.0
Basalt, fractured, dark gray to black	169.0 - 178.0	9.0
Basalt, highly fractured, gray to green, water-bearing	178.0 - 195.00	17.0
Clay, green	195.0	

LITHOLOGIC LOG OF MONITOR WELL MW-9A

Description	Depth (ft)	Thickness (ft)
Fill material, brown blast rock, and soil.	0.0 - 10.0	10.0
Basalt, dark gray to black, hard, microcrystalline.....	10.0 - 40.0	30.0
Clay, dark gray to green.....	40.0 - 42.0	2.0
Basalt, dark gray to black, hard.....	42.0 - 52.0	10.0
Basalt, dark gray to black, fractured, water-bearing.....	52.0 - 55.0	3.0
Basalt, dark gray to black, hard, microcrystalline.....	55.0 - 97.0	42.0
Basalt, vesicular to slightly fractured, dark gray to black.....	97.0 - 100.0	3.0
Basalt, dark gray to black, hard, microcrystalline.....	100.0 - 125.0	25.0
Basalt, vesicular to fractured, dark gray to green, water-bearing.....	125.0 - 140.0	15.0

LITHOLOGIC LOG OF MONITOR WELL 12B

Description	Depth (ft)	Thickness (ft)
Road-bed material, crushed stone, and top soil.....	0.0 - 1.5	1.5
Top soil, silt, basalt fragments.....	1.5 - 5.0	4.5
Basalt, crypto to microcrystalline, fresh black to dark gray.....	5.0 - 8.0	3.0
Basalt, weathered, friable, fine-grained, black to dark gray.....	8.0 - 15.0	7.0
Basalt, microcrystalline, unweathered, fractured, black to dark gray.....	15.0 - 78.0	63.0
Basalt, microcrystalline, unweathered, fractured, occasssional calcite infilling.	78.0 - 95.0	17.0
Basalt, microcrystalline, amygdaloidal structures, slighty weathered, black to dark gray.....	95.0 - 96.0	1.0
Basalt, microcrystalline, fractured, no amygdaloidal structures, no infilling noted, black to dark gray.....	96.0 - 109.0	13.0
Basalt, microcrystalline, weathered, interbedded with chlorite clay; clay has gritty texture, but conchoidal fracture, clay appears to be secondary due to weathering.	109.0 - 112.0	3.0
Basalt, microcrystalline, unweathered, fractured, yields water at 130 ft, black to dark gray with a few reddish to brown inclusions.....	112.0 - 137.0	25.0
Basalt, microcrystalline, slighty weathered, interbedded with chlorite clay stringers.....	137.0 - 155.0	18.0
Basalt, microcrystalline matrix with small (1-2 mm) vesicles, clay stringers absent.....	155.0 - 158.0	3.0

Description	Depth (ft)	Thickness (ft)
Basalt, microcrystalline matrix with small (1-2 mm) vesicles, interbedded with chlorite clay, clay has conchoidal fracture and greasy feel.....	158.0 - 166.0	8.0
Basalt, vesicular structures, fractured, pyrite disseminated throughout, chlorite clay stringers present; formation yields large quantity (150-200 gpm) of water at 166 ft.....	166.0 - 203.0	37.0
Clay, chlorite, conchoidal fracture, compact, dry, greasy feel.....	203.0 - 205.0	2.0

LITHOLOGIC LOG OF MONITOR WELL 13B

Description	Depth (ft)	Thickness (ft)
Top soil, rock, fragments, silt.....	0.0 - 1.0	1.0
Basalt, microcrystalline, fresh, appears unweathered and unfractured, black to dark gray.....	1.0 - 9.0	8.0
Basalt, microcrystalline, fresh, hard but with some fracturing, black to dark gray..	9.0 - 65.0	56.0
Basalt, microcrystalline, slighty weathered, fractured, dry, black to dark gray.....	65.0 - 75.0	10.0
Basalt, microcrystalline, hard, unweathered, fractured, dry, black to dark gray.....	75.0 - 103.0	28.0
Basalt, microcrystalline, hard, unweathered, fractured, yields approximately 3 gpm at 103 ft.....	103.0 - 115.0	12.0
Basalt, microcrystalline, weathered, fractured, interbedded chlorite clay (appears to be alteration due to weathering), some reddish basalt otherwise black to dark gray.....	115.0 - 122.0	7.0
Basalt, microcrystalline, weathered, fractured, interbedded with clay, yields 150-200 gpm at 124 ft.....	122.0 - 135.0	13.0
Basalt, microcrystalline, unweathered, fractured, chlorite diminished, trace of calcite.....	135.0 - 165.0	30.0
Basalt, microcrystalline, vesicles (2-4 mm), black to dark gray.....	165.0 - 175.0	10.0
Basalt, microcrystalline, vesicles (2-4 mm), fractured, pyrite alterations and infilling.....	175.0 - 202.0	27.0
Clay, chlorite, hard and compact, conchoidal fractures, greasy lustre.....	202.0 - 205.0	3.0

LITHOLOGIC LOG OF MONITOR WELL 14B

Description	Depth (ft)	Thickness (ft)
Top soil, silt, rock fragments.....	0.0 - 1.0	1.0
Basalt, microcrystalline, fresh, hard, black to dark gray.....	1.0 - 15.0	14.0
Basalt, microcrystalline, slightly weathered, fractured, black to dark gray.....	15.0 - 35.0	20.0
Basalt, microcrystalline, unweathered, hard, does not appear fractured, black to dark gray.....	35.0 - 55.0	20.0
Basalt, weathered, fine-grained, reddish-brown, interbedded with clay (clay appears to be alteration due to weathering), yields 3-4 gpm at 71 ft.....	55.0 - 82.0	27.0
Basalt, microcrystalline, hard, unweathered, slightly fractured, black to dark gray.....	82.0 - 135.0	53.0
Basalt, microcrystalline, weathered, interbedded with clay (clay appears to be alteration product), yields more water at 136 ft.....	135.0 - 147.0	12.0
Basalt, microcrystalline, with clay and calcite, fractured, yields more water at 161 ft.....	147.0 - 171.0	24.0
Basalt, microcrystalline, vesicular structures, black to dark gray, yields 200 gpm at 171 ft.....	171.0 - 192.0	21.0
Basalt, microcrystalline, vesicular structures, with pyrite coatings, fractured, black to dark gray.....	192.0 - 203.0	11.0
Clay, chlorite, conchoidal fracture, greasy lustre, appears to be depositional unit, compact and dry.....	203.0 - 204.0	1.0

LITHOLOGIC LOG OF MONIOR WELL 15B

Description	Depth (ft)	Thickness (ft)
Fill material-black ash appearance, aluminum chips, furnace bricks.....	0.0 - 5.0	5.0
Fill material-brown soil mixed with rock fragements, basalt, aluminum flakes and balls.....	5.0 - 12.0	7.0
Basalt, dark gray to black, hard, apparent vesicles in lower 2 ft. of section.....	12.0 - 34.0	22.0
Clay, green, stiff.....	34.0 - 36.0	2.0
Basalt, dark gray to black, hard.....	36.0 - 39.0	3.0
Basalt, highly weathered, dark gray, intermixed with green clay and olivine clasts.....	39.0 - 54.0	15.0
Basalt, dark, gray, slighty weathered green clay clasts and light gray clay balls present.....	54.0 - 58.0	4.0
Basalt, dark gray, fractured, minor amounts of olvine clasts.....	58.0 - 65.0	7.0
Basalt, red, fairly soft, mixed with black basalt and olvine clasts.....	65.0 - 67.0	2.0
Basalt, dark gray to black, hard.....	67.0 - 72.0	5.0
Basalt, dark gray to black, vesicular, olvine clasts and iron reduced cuttings present.....	72.0 - 84.0	12.0
Basalt, dark gray to black, hard, moderately fractured, calcite lined fractures at 90 ft.....	84.0 - 118.0	34.0
Basalt, dark gray to black, vesicular, fairly hard. Calcite solution filled, water bearing.....	118.0 - 138.0	20.0
Basalt, dark gray to black, hard, olivine rich.....	138.0 - 150.0	12.0

Description	Depth (ft)	Thickness (ft)
Basalt, dark gray to mostly black, calcite crystals on apparent fracture planes.....	150.0 - 160.0	10.0
Basalt, dark gray to green, very soft; intermixed vesicular basalt, scoria, to fractured rock; olivine crystals and chlorite clay present in vesicles and fractures; pyrite in heavy concentrations at base.....	160.0 - 197.0	37.0
Clay, green, stiff.....	197.0 - 198.0	1.0

LITHOLOGIC LOG OF MONITOR WELL 16D

Description	Depth (ft)	Thickness (ft)
No core recovery-fill material, surface casing set at 4 ft; coring started at that point.....	0.0 - 4.0	4.0
Basalt hard microcrystalline, black, basic, upper 1 foot highly fragmented (2-10cm angular fragments), lower 1.6 ft of core, continuous (two fractures noted, 40°), solution filled with brown clay. 30% of rock matrix calcic feldspars, 60% of rock matrix ferromagnesium minerals.....	4.0 - 8.0	4.0
Brown clay with dark gray to black microcrystalline rock fragments, 1 to 3cm, rounded.....	8.0 - 14.0	6.0
Basalt, light gray, calcite rich; highly fractured (fractures at 80° to vertical) calcite (50%), ferromagnesium (50%), porous texture. Slight gradational contact.....	14.0 - 16.0	2.0
Siltstone to fine sandstone, light brown, calcite rich (80%), with fine basalt grains, isolated calcite crystals, some grains are iron stained, sharp contact.....	16.0 - 17.2	1.2
Basalt, very hard, black, microcrystalline, moderately fractured. 17.2-24 ft, ten fractures at (40-50°), calcite and sliken-slides present on fracture planes. 20-24 ft, ten fractures at (40-50°), healed with solution cement 24-25 ft, vertical fracture (10°). 25-35 ft, fracture heal marks or insipient fractures (stress fractures) in disoriented patterns. 35.5 to 37 ft, vertical fracture, water bearing, calcite lined. 39 ft, vertical fracture (20°), calcite lined. 40-45 ft, healed fracture, (30-40°). 46 ft, healed fracture, 1 ft long (10°). 48-50 ft, three near vertical fractures (1 fracture calcite filled). Vesicles at lower contact, sharp.	17.2 - 54.2	37.0
Gravel, poorly sorted, moderately well rounded, predominantely basalt fragments.	54.2 - 55.2	1.0

Description	Depth (ft)	Thickness (ft)
Interbedded reddish brown to green shaly clays, shale clasts at top, slickenslide surfaces.....	55.2 - 56.7	1.5
Amygdaloidal basalt, black, microcrystalline, somewhat ashy texture, filled with calcite solutions and crystals.....	56.7 - 60.0	3.3
Vesicular to amygdaloidal basalt, dark gray to black, hard. Vesicles filled with calcite concretions and calcite crystals, fractures present from 62.5 ft to base (60°). Chorite clay present on fracture planes, sharp contact.....	60.0 - 64.5	4.5
Basalt, dark gray to black, hard, vertical fracture in upper 6", highly weathered chlorite, iron stain and pyrite flakes. Fracture at 67.5 ft (50°). Isolated and scattered vesicles between 66 and 67.5 ft. Lower 8", black ultrabasic, olivine basalt.	64.5 - 70.0	5.5
Red basalt, amygdaloidal to sightly vesicular. Vesicles infilled with calcite crystals and overgrowths, olivine crystals, and vitrophyre crystals.....	70.0 - 72.4	2.4
Amygdaloidal basalt, black to dark gray, hard. Ultrabasic, olivine to pyroxene dominate. Vesicles filled wtih calcite crystals and concretions, gradational contact.....	72.4 - 81.5	9.1
Basalt, dark gray, basic, very hard, microcrystalline, slighty fractured. Zones of vesicles occurring at 83-84 ft and 92-94.5 ft, small, scattered (1-2 mm).....	81.5 - 115.0	33.5
Claystone, black to green, higly weathered. Chlorite clay interlaminated with black, ashy basalt, sharp contact; 6 inches of amygdaloidal basalt at base, infilled with vitrophyre, iron solutions and calcite....	115.0 - 117.0	2.0
Basalt, gray, basic, very hard, healed fractures at base (50°), contact sharp with clay below. Vesicles in basalt, with clay squeezed up into rock.....	117.0 - 118.5	1.5
Clay, green, weathered amygdaloidal basalt. Calcite present in vesicles.....	118.5 - 121.3	2.8

Description	Depth (ft)	Thickness (ft)
Basalt, vesicular to amygdaloidal, sandy texture (ashy), vesicles infilled with calcite rims, and overgrowths, gradational contact.....	121.3 - 126.0	4.7
Basalt, vesicular, brittle, dark gray to black. Vesicles 5 to 10 cm at top decreasing in size to 1 to 2 cm at base. Gradational contact.....	126.0 - 134.0	8.0
Basalt, hard, amygdaloidal on fracture planes, moderately fractured, 20-30° to irregular in places. Fractures occur every 4 to 6 inches. Some fractures healed with calcite solution, scattered isolated vesicles throughtout, sharp contact.....	134.0 - 145.5	11.5
Basalt, vesicular, dark gray to black in color, brittle, vesicles numerous and small (< 1 mm), sharp contact at base. Occassional pyrite.....	145.5 - 164.0	18.5
Basalt, alternating sequences of vesicular to fractured basalt to scoria basalt. Vesicular basalt at top grading at 168 ft to scoria.....	164.0 - 170.5	6.5
Highly fractured basalt, black, microcrystalline.....	170.5 - 178.5	8.0
Scoria, dark gray in color.....	178.5 - 182.5	4.0
Fractured basalt. No set orientation to fractures, 1 cm wide fracture infilled with clay.....	182.5 - 185.0	2.5
Scoria, black.....	185.0 - 185.5	0.5
Highly fractured basalt, black, microcrystalline.....	185.5 - 194.0	8.5
Scoria, black.....	194.0 - 195.0	1.0
Highly fractured basalt, sharp contact 6" of heavily concentrated pyrite at base.	195.0 - 198.0	3.0
Green claystone, friable at top grading to a very dense clay at 25 ft.....	198.0 - 208.0	10.0

END OF FIRST CORE RUN

Description	Depth (ft)	Thickness (ft)
TOP OF SECOND CORE RUN		
Grout cement.....	204.0 -208.0	4.0
Clay, green, wet, no cohesive structure..	208.0 - 213.0	5.0
Green clay, water saturated, most of section lost with circulation.....	213.0 - 215.5	2.5
Green clay, slightly wet, cohesive.....	215.5 - 217.0	1.5
Green clay, slighty wet, cohesive, core size reduced in diameter to 1 3/8" by water circulation. Sharp contact.....	217.0 - 220.0	3.0
Lignitic shale, sharp, brown with black lignite lens. Very platy and dry appearance with a 6" ash zone at 221 ft.....	220.0 - 223.0	3.0
Basalt, vesicular, dark gray to black hard. Vesicles larger and more numerous at the top, decreasing in size and intensity with depth. Weathered green clay in the larger vesicles. Fractures (40° to 50°) present from 228 to 232 ft. Sharp contact at base and top.....	223.0 - 232.0	9.0
Basalt, hard, dark gray to black, microcrystalline, small vesicles scattered throughout. Calcite solution filling in vesicles, six fractures present($40\text{-}50^{o}$). Large vesicles present at 236 ft.....	232.0 - 242.4	10.4
Basalt, hard, dark gray to black microcrystalline, slightly fractured. Fractures occurring between 243-245 (30° to 50°), microfractured at 245 ft. Healed vertical fracture at 245 ft., very sharp contact at base.....	242.4 - 258.4	16.0
Basalt, dark gray to black, highly vesicular, vesicles most numerous at 258.5 to 260 and 263.3 to 265. Scoria type basalt. Remaining section uniform with vesicles at 1 to 0.5 cm. Highly fractured zone at 264 ft, white calcite filling present, sharp contact at base..	258.4 - 266.8	8.4

Description	Depth (ft)	Thickness (ft)
Basalt, hard, dark gray to black, microcrystalline, moderately fractured in upper 1 ft with fractures at 0° to 30°..	266.8 - 270.0	3.2
Basalt, dark gray to black, vesicular, vesicles at 1 to 0.5 cm.....	270.0 - 272.0	2.0

LITHOLOGIC LOG OF MONITOR WELL 17S

Description	Depth (ft)	Thickness (ft)
Fill material, crushed rock, and clay.....	0.0 - 2.5	2.5
Fill material, rock.....	2.5 - 5.0	2.5
Basalt, hard, microcrystalline.....	5.0 - 14.0	9.0
Basalt, weathered, water-bearing.....	14.0 - 20.0	6.0
Basalt, vesicular, calcite crystals, highly weathered, fractured.....	20.0 - 30.0	10.0

LITHOLOGIC LOG OF MONITOR WELL 18S

Description	Depth (ft)	Thickness (ft)
Fill material, crushed rock, and clay.....	0.0 - 2.0	2.0
Basalt, hard, dark gray, microcrystalline, fractured.....	2.0 - 22.0	20.0

LITHOLOGIC LOG OF MONITOR WELL 18B

Description	Depth (ft)	Thickness (ft)
Soil-burden rock.....	0.0 - 5.0	5.0
Basalt, dark gray to black.....	5.0 - 33.0	28.0
Basalt, hard, dark gray to black.....	33.0 - 35.0	2.0
Basalt, dark gray to black.....	35.0 - 40.0	5.0
Basalt, fractured, dark gray to black.....	40.0 - 47.0	7.0
Basalt, hard, dark gray to black, calcite.	47.0 - 94.0	47.0
Basalt, fractured, dark gray to black.....	94.0 - 105.0	11.0
Basalt, dark gray to brown with green basalt, water-bearing.....	105.0 - 108.0	3.0
Basalt, hard, dark gray to black.....	108.0 - 113.0	5.0
Basalt, green to gray, with clays, highly fractured, pillow lavas.....	113.0 - 138.0	25.0
Basalt, dark gray to black, fractured.....	138.0 - 144.0	6.0
Basalt, hard, dark gray to brown.....	144.0 - 146.0	2.0
Basalt, fractured, dark gray to brown.....	146.0 - 153.0	7.0
Basalt, gray to brown, mixed with green clay.....	153.0 - 156.0	3.0
Clay, green.....	156.0 - 157.0	1.0

LITHOLOGIC LOG OF MONITOR WELL 19S

Description	Depth (ft)	Thickness (ft)
Fill material, wet clay with rock fragments.....	0.0 - 6.5	6.5
Large rocks, basalt, fill material.....	6.5 - 10.5	4.0
Basalt, highly weathered, water-bearing...	10.5 - 17.5	7.0
Basalt, hard, microcrystalline, slightly weathered.....	17.5 - 23.0	5.5
Basalt, vesicular to fractured, very soft.	23.0 - 26.0	3.0

LITHOLOGIC LOG OF MONITOR WELL 20A

Description	Depth (ft)	Thickness (ft)
Rock, fill material.....	0.0 - 1.0	1.0
Basalt, hard, microcrystalline, dark gray to black.....	1.0 - 56.0	55.0
Basalt, highly weathered, green clay clasts mixed with black microcrystalline basalt, iron-stained chips.....	56.0 - 64.0	8.0
Clay, green.....	64.0 - 72.0	8.0
Basalt, highly weathered, clay clast inseams, gray.....	72.0 - 81.0	9.0
Basalt, slighty weathered, gray with iron-stained chips.....	81.0 - 87.0	6.0
Basalt, hard, black to dark gray micro-crystalline.....	87.0 - 108.0	21.0
Basalt, soft, black to dark gray, water bearing, slighty weathered.....	108.0 - 115.0	7.0
Basalt hard, gray, microcrystalline.....	115.0 - 118.0	3.0

LITHOLOGIC LOG OF MONITOR WELL 21S

Description	Depth (ft)	Thickness (ft)
Crushed rock, road fill.....	0.0 - 3.5	3.5
Cap rock, basalt fragments mixed with surface soil (clay).....	3.5 - 4.5	1.0
Basalt, dark gray to black, hard microcrystalline.....	4.5 - 54.0	49.5
Basalt, dark gray to black, vesicular to fractured, water-bearing.....	54.0 - 54.6	0.6
Basalt, dark gray to black, vesicular, highly weathered, iron stained cuttings, calcite chips and clay fragments, water-bearing.....	54.6 - 65.0	10.4

LITHOLOGIC LOG FOR MONITOR WELL 22S

Description	Depth (ft)	Thickness (ft)
Fill and soil.....	0.0 - 7.0	7.0
Basalt, gray, hard.....	7.0 - 15.0	8.0
Basalt, brown to black, fractured, water..	15.0 - 21.0	6.0
Basalt, black to green, fractured.....	21.0 - 23.0	2.0
Basalt, black to gray, hard.....	23.0 - 59.0	36.0

LITHOLOGIC LOG FOR MONITOR WELL 23S

Description	Depth (ft)	Thickness (ft)
Fill, soil, and basalt, fractured, brown..	0.0 - 4.0	4.0
Basalt, brown to gray.....	4.0 - 13.0	9.0
Basalt, hard, black to gray.....	13.0 - 18.0	5.0
Basalt, fractured, brown to gray, water...	18.0 - 23.0	5.0
Basaslt, fractured, black to green.....	23.0 - 30.0	7.0
Basalt, hard, black.....	30.0 - 35.0	5.0

LITHOLOGIC LOG FOR MONITOR WELL 24S

Description	Depth (ft)	Thickness (ft)
Soil	0.0 - 1.5	1.5
Basalt, brown	1.5 - 4.0	2.5
Basalt, hard, gray	4.0 - 6.0	2.0
Basalt, hard, gray to black	6.0 - 15.0	9.0
Shale, gray to brown, water	15.0 - 17.0	2.0
Basalt, fractured, green to black	17.0 - 19.0	2.0
Basalt, black	19.0 - 21.5	2.5

LITHOLOGIC LOG FOR MONITOR WELL 25S

Description	Depth (ft)	Thickness (ft)
Fill, soil, and basalt, fractured.....	0.0 - 10.0	10.0
Basalt, hard, gray.....	10.0 - 15.0	5.0
Basalt, fractured, brown to black, water..	15.0 - 16.0	1.0
Basalt, fractured, green to black.....	16.0 - 18.0	2.0
Basalt, gray.....	18.0 - 21.0	3.0

LITHOLOGIC LOG FOR MONITOR WELL 26B

Description	Depth (ft)	Thickness (ft)
Fill material, rock.....	0.0 - 12.5	12.5
Basalt, fractured, dark gray to black, highly weathered.....	12.5 - 40.0	27.5
Basalt, hard, dark gray.....	40.0 - 46.0	6.0
Basalt, gray to green, highly weathered, clays present, water-bearing.....	46.0 - 53.0	7.0
Basalt, fractured, gray.....	53.0 - 60.0	7.0
Basalt, gray to green, highly fractured with green clay.....	60.0 - 65.0	5.0
Basalt, hard, dark gray.....	65.0 - 74.0	9.0
Basalt, hard, fractured, dark gray.....	74.0 - 89.0	15.0
Basalt, vesicular, dark gray to green.....	89.0 - 93.0	4.0
Basalt, slightly fractured, gray to green.	93.0 - 105.0	12.0
Basalt, hard, dark gray.....	105.0 - 109.0	4.0
Basalt, fractured, dark gray to black.....	109.0 - 113.0	4.0
Basalt, vesicular, gray to green, fractured, water-bearing.....	113.0 - 126.0	13.0
Basalt, hard, slightly fractured, dark gray to black.....	126.0 - 135.0	9.0
Basalt, vesicular, highly fractured, gray to green, clay on fractures.....	135.0 - 138.0	3.0
Basalt, hard, dark gray to black.....	138.0 - 155.0	17.0
Basalt, vesicular, highly fractured, dark gray to green, pyrite at base.....	155.0 - 191.0	36.0
Clay, green.....	191.0 - 192.0	1.0

LITHOLOGIC LOG FOR MONITOR WELL 27B

Description	Depth (ft)	Thickness (ft)
Fill material	0.0 - 10.0	10.0
Basalt, dark gray to black	10.0 - 50.0	40.0
Basalt, green to gray, with brown clays, water-bearing	50.0 - 67.0	17.0
Basalt, hard, gray	67.0 - 107.0	40.0
Basalt, gray to green to brown, clay and rock fragments, water-bearing	107.0 - 124.0	17.0
Basalt, vesicular, black to dark gray, water-bearing	124.0 - 141.0	17.0
Basalt, amygdaloidal, dark gray to green, calcite	141.0 - 145.0	4.0
Basalt, fractured, black, green to brown	145.0 - 147.0	2.0
Basalt, hard, dark gray, calcite	147.0 - 155.0	8.0
Basalt, fractured, dark gray to green, water-bearing	155.0 - 163.0	8.0
Basalt, fractured, vesicular, dark gray to green	163.0 - 186.0	23.0
Basalt, fractured, vesicular, dark gray to green, trace of pyrite	186.0 - 188.0	2.0
Pyrite	188.0 - 189.0	1.0
Clay, green	189.0	

LITHOLOGIC LOG FOR MONITOR WELL 28S

Description	Depth (ft)	Thickness (ft)
Silt, organic, rich.....	0.0 - 3.0	3.0
Basalt, highly weathered, brown to black, water at 4 ft bls.....	3.0 - 15.0	12.0
Basalt, fractured, black to gray.....	15.0 - 23.0	8.0

LITHOLOGIC LOG FOR MONITOR WELL 29S

Description	Depth (ft)	Thickness (ft)
Fill, soil, rock, fractured.....	0.0 - 8.0	8.0
Basalt, brown to gray.....	8.0 - 18.0	10.0
Basalt, fractured, gray clay, water.....	18.0 - 20.0	2.0
Basalt, fractured, green to black.....	20.0 - 25.0	5.0

LITHOLOGIC LOG FOR MONITOR WELL 30S

Description	Depth (ft)	Thickness (ft)
Fill, brown clay, cobbles.....	0.0 - 5.0	5.0
Basalt, black to gray, fractured, iron-stained.....	5.0 - 14.0	9.0
Basalt, black to gray, hard.....	14.0 - 19.0	5.0
Basalt, black to gray, vesicular, calcite.	19.0 - 21.0	2.0
Basalt, black, hard.....	21.0 - 52.0	31.0
Basalt, black, fractured, calcite.....	52.0 - 58.0	6.0
Basalt, gray to brown, fractured, vesicular, green clay.....	58.0 - 62.0	4.0

LITHOLOGIC LOG FOR MONITOR WELL 31S

Description	Depth (ft)	Thickness (ft)
Fill, brown clay, cobbles.....	0.0 - 5.0	5.0
Basalt, black to gray, hard.....	5.0 - 10.0	5.0
Basalt, black, medium.....	10.0 - 19.0	9.0
Basalt, black to brown, vesicular, calcite	19.0 - 24.0	5.0
Basalt, black to brown, hard.....	24.0 - 34.0	10.0
Basalt, black to gray-brown, medium.....	34.0 - 39.0	5.0
Basalt, black, hard.....	39.0 - 54.0	15.0
Basalt, black, medium, fractured.....	54.0 - 57.0	3.0
Basalt, black, medium, fractured, green clay.....	57.0 - 59.0	2.0
Basalt, black, vesicular, green clay, calcite.....	59.0 - 69.0	10.0
Basalt, black, medium.....	69.0 - 80.0	11.0
Basalt, black, hard.....	80.0 - 103.0	23.0
Basalt, black to brown, traces of clay, water-bearing.....	103.0 - 107.0	4.0
Basalt, dark gray, amygdaloidal, calcite-filled vesicles.....	107.0 - 108.0	1.0

LITHOLOGIC LOG FOR MONITOR WELL 32S

Description	Depth (ft)	Thickness (ft)
Fill, brown clay and cobbles.....	0.0 - 4.0	4.0
Basalt, gray to black, fractured, brown stain.....	4.0 - 11.0	7.0
Basalt, gray, fractured.....	11.0 - 15.0	4.0
Basalt, gray to black, hard.....	15.0 - 20.0	5.0
Basalt, gray, fractured.....	20.0 - 34.0	14.0
Basalt, gray to black, green.....	34.0 - 40.0	6.0

LITHOLOGIC LOG FOR MONITOR WELL 33B

Description	Depth (ft)	Thickness (ft)
Fill material, gravel, compacted.....	0.0 - 4.0	4.0
Basalt, dark gray, fairly hard.....	4.0 - 7.0	3.0
Basalt, dark gray, green clay, calcite....	7.0 - 21.0	14.0
Basalt, dark gray to brown.....	21.0 - 27.0	6.0
Basalt, dark gray, calcite.....	27.0 - 31.0	4.0
Basalt, hard, dark gray, calcite.....	31.0 - 63.0	32.0
Basalt, hard, dark gray to brown.....	63.0 - 82.0	19.0
Basalt, vesicular, black to green.....	82.0 - 84.0	2.0
Basalt, vesicular, black to green brown...	84.0 - 89.0	5.0
Basalt, dark gray, trace of green basalt..	89.0 - 92.0	3.0
Basalt, vesicular, black green.....	92.0 - 100.0	8.0
Basalt, black, green clay, inclusions.....	100.0 - 105.0	5.0
Basalt, vesicular, black to green.....	105.0 - 109.0	4.0
Basalt, vesicular, dark gray to green, fractured.....	109.0 - 111.0	2.0
Basalt, fractured, dark gray to green, water-bearing.....	111.0 - 114.0	3.0
Basalt, dark gray to green, calcite.....	114.0 - 117.0	3.0
Basalt, vesicular, black, iron-stained, pyrite.....	117.0 - 125.0	8.0
Basalt, dark gray, hard brown, amygdaloidal.....	125.0 - 131.0	6.0
Basalt, vesicular, black.....	131.0 - 144.0	13.0
Basalt, black vesicular, fairly hard, green clay infillings.....	144.0 - 160.0	16.0

Description	Depth (ft)	Thickness (ft)
Basalt, vesicular, fractured, green clay infillings, black.....	160.0 - 163.0	3.0
Basalt, black vesicular, fractured, green clay infillings and fragments.....	163.0 - 165.0	2.0
Clay, green.....	165.0 - 166.0	1.0

LITHOLOGIC LOG OF MONITOR WELL 34B

Description	Depth (ft)	Thickness (ft)
Basalt, hard, dark gray, traces of calcite	0.0 - 22.0	22.0
Basalt, dark gray with green clay, weathered zone	22.0 - 29.0	7.0
Basalt, dark gray to green, green clay overgrowths	29.0 - 36.0	7.0
Basalt, hard, dark gray	36.0 - 86.0	50.0
Basalt, dark gray, fractured	86.0 - 96.0	10.0
Basalt, dark gray, fractured vesicular	96.0 - 103.0	7.0
Basalt, vesicular, dark gray to green, traces of calcite	103.0 - 112.0	9.0
Basalt, dark gray to green, fractured, traces of calcite	112.0 - 116.0	4.0
Basalt, hard, dark gray, calcite, traces of green clay overgrowths	116.0 - 137.0	21.0
Basalt, gray to green, vesicular, water-bearing	137.0 - 146.0	9.0
Basalt, vesicular, gray to green, calcite, large vesicles	146.0 - 154.0	8.0
Basalt, fractured, gray to green, water-bearing	154.0 - 174.0	20.0
Basalt, hard, dark gray, traces of calcite	174.0 - 177.0	3.0
Basalt, fractured, gray to green, water-bearing	177.0 - 183.0	6.0
Basalt, fractured, gray to green, pyrite present on fracture planes, water-bearing.	183.0 - 186.0	3.0
Top of clay	186.0 - 187.0	1.0

ATTACHMENT E.3

CROSS SECTIONS

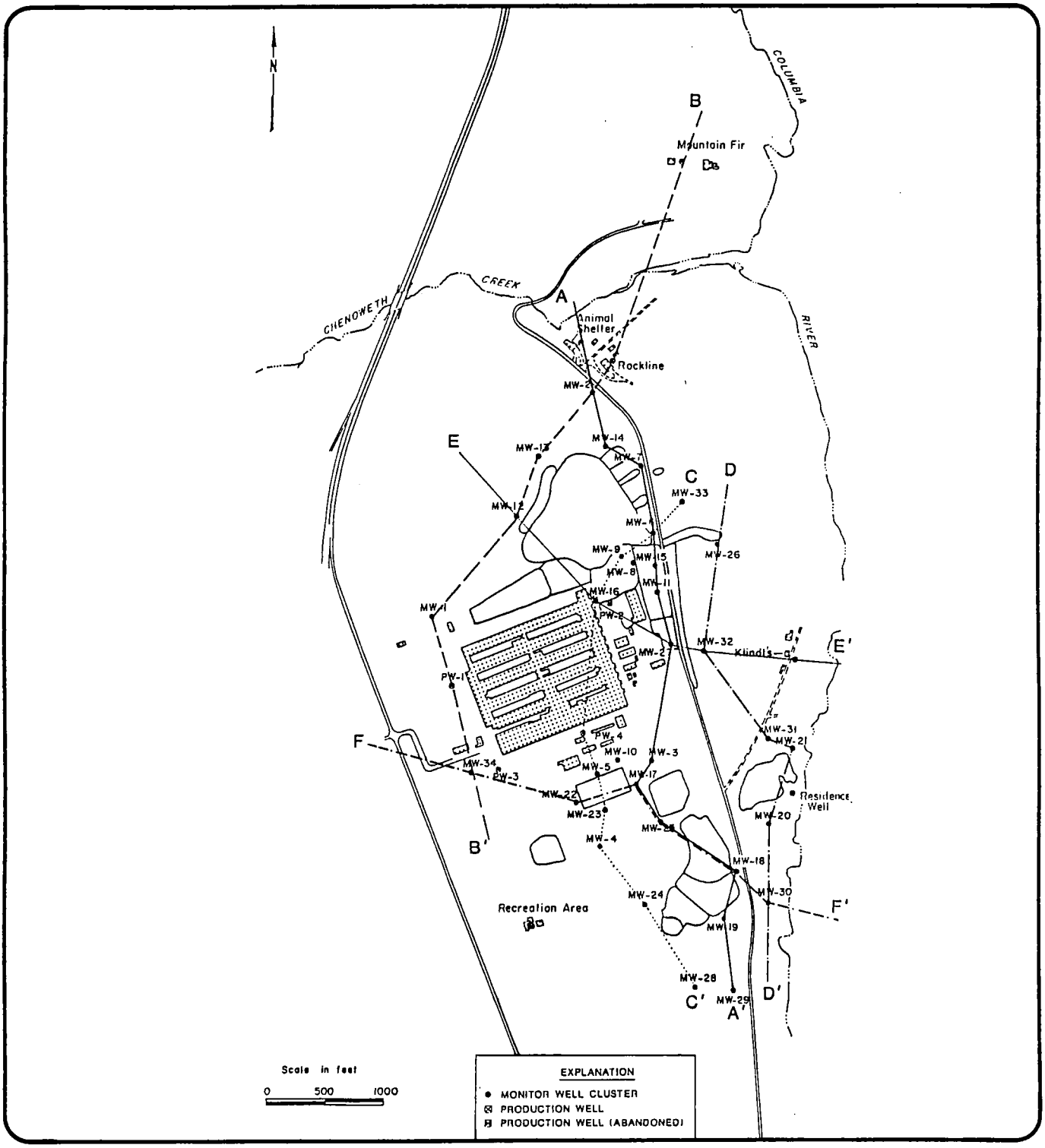


Figure E.3.1 Cross Section Location Map

CLIENT NAME:

Martin Marietta Corporation

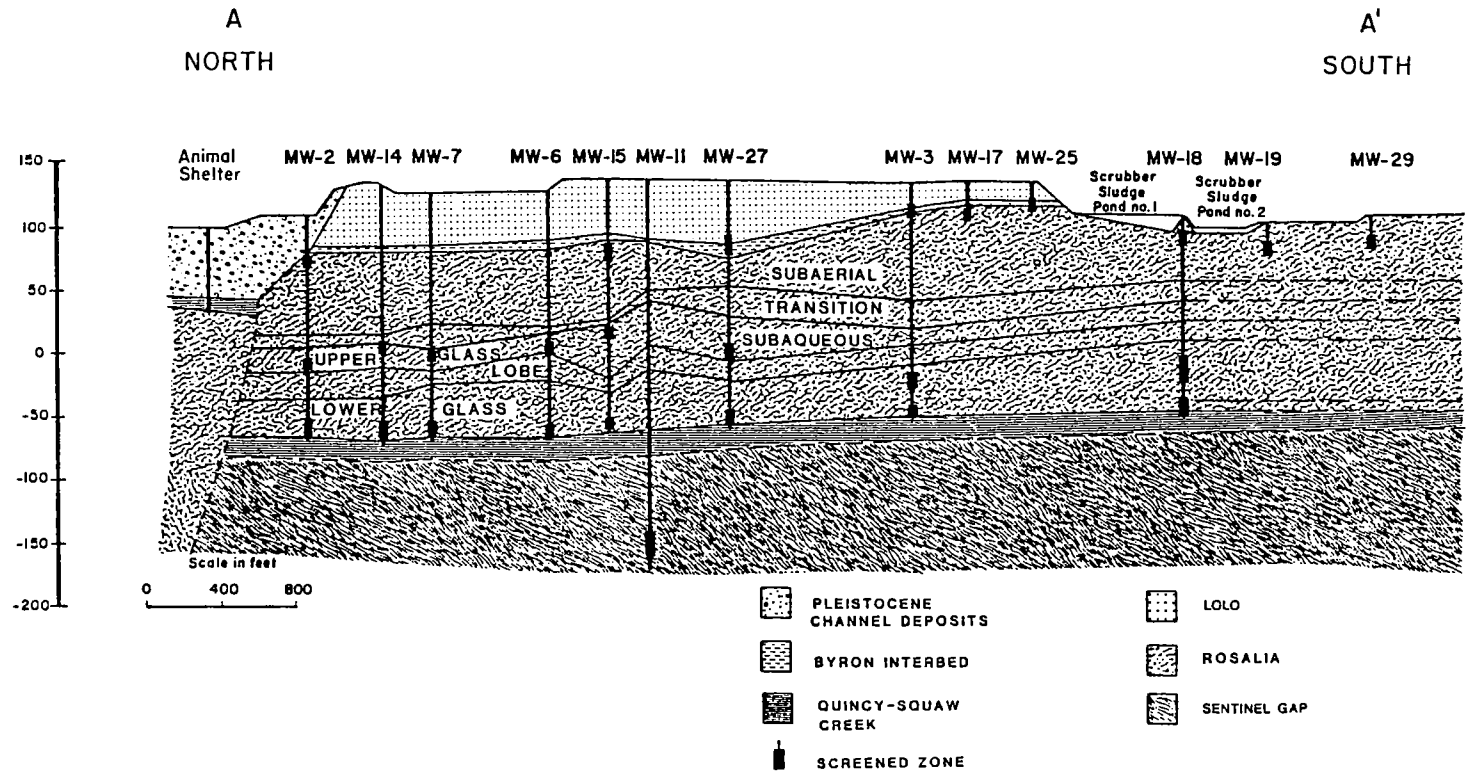
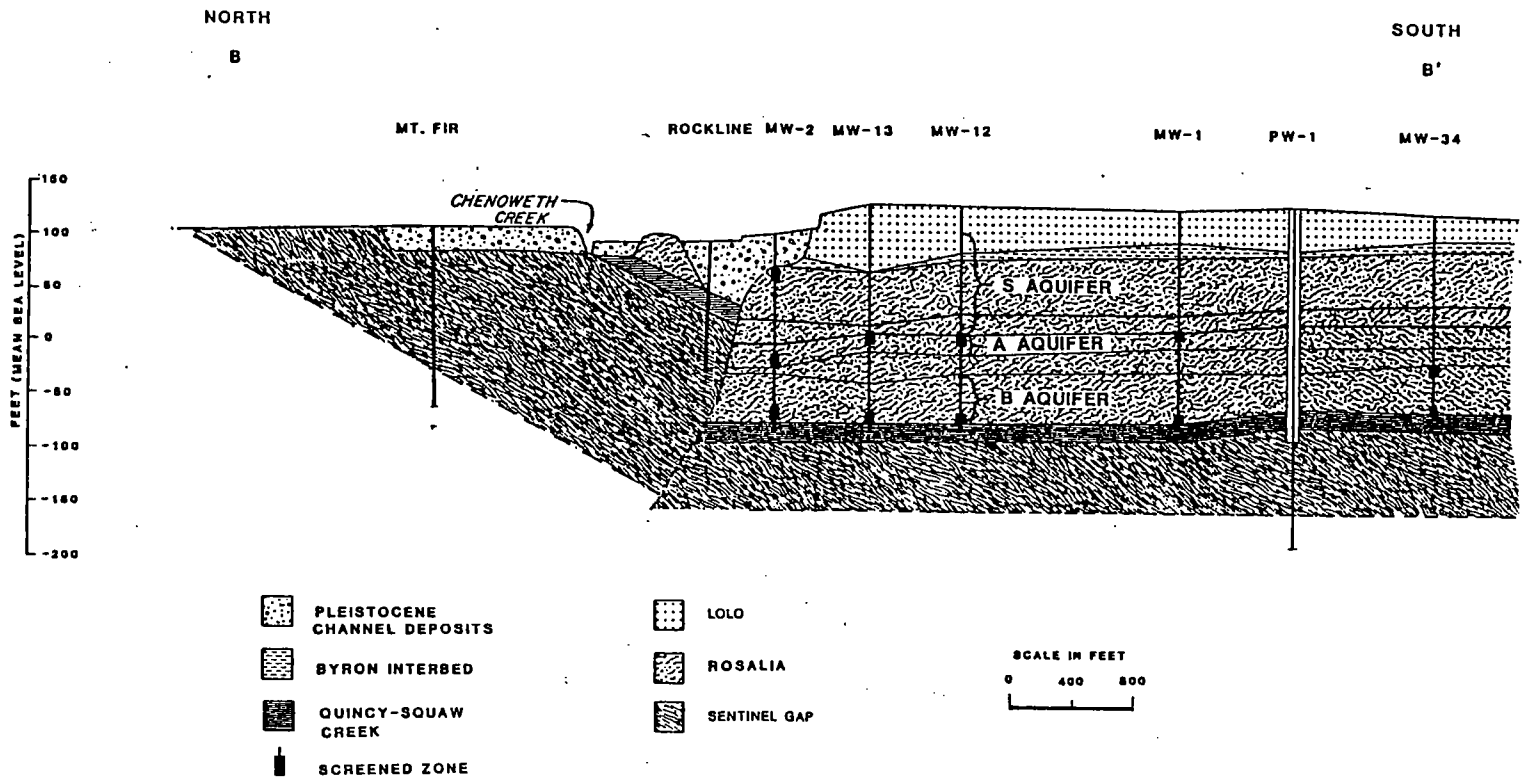


Figure E.3.2 Cross Section A-A'

CLIENT NAME:

Martin Marietta Corporation



CROSS-SECTION LOCATION SHOWN ON FIGURE E. IN APPENDIX E.3

Figure E.3.3 Cross Section B-B'

CLIENT NAME:

Martin Marietta Corporation

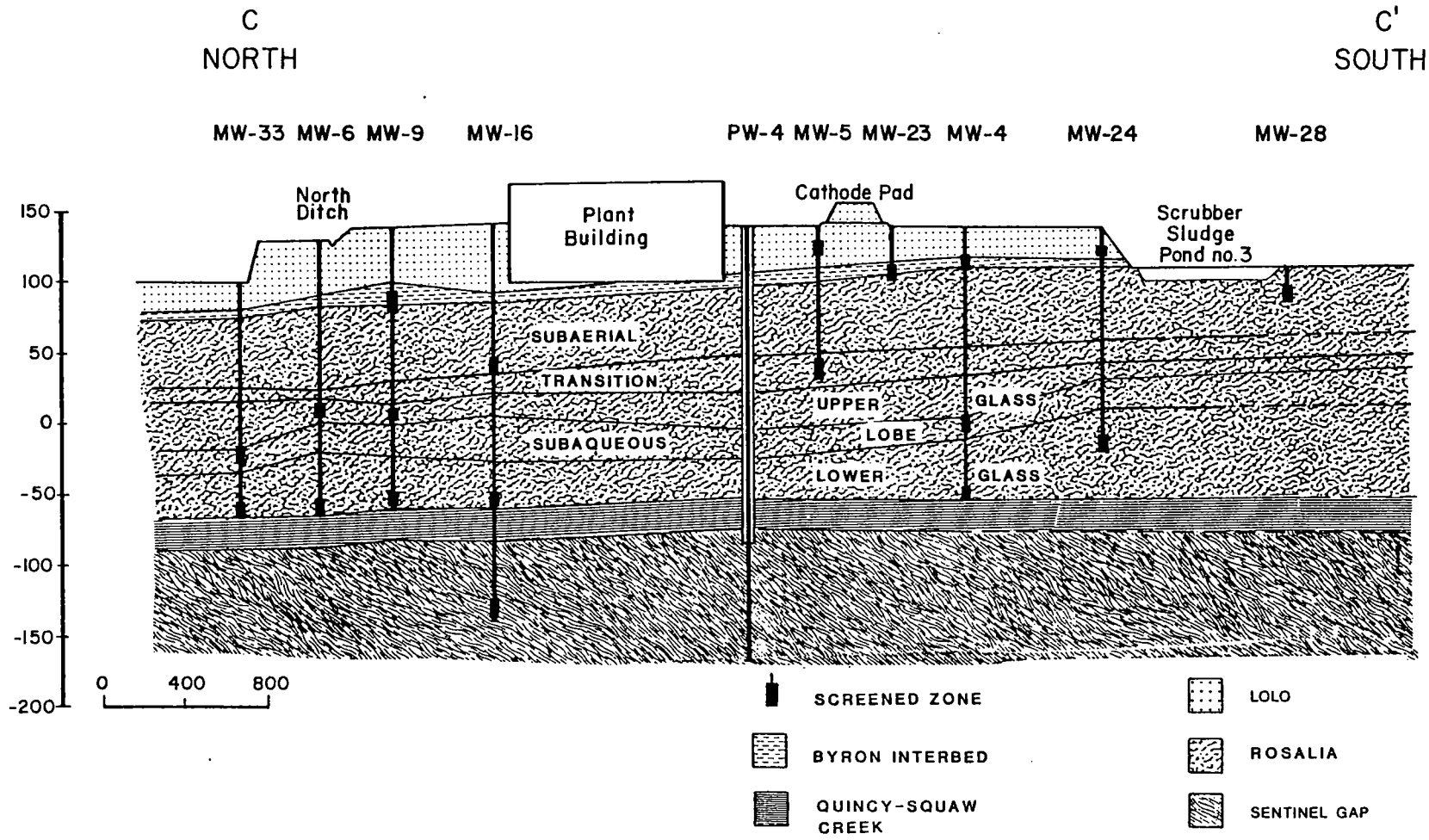


Figure E.3.4 Cross Section C-C'

CLIENT NAME:

Martin Marietta Corporation

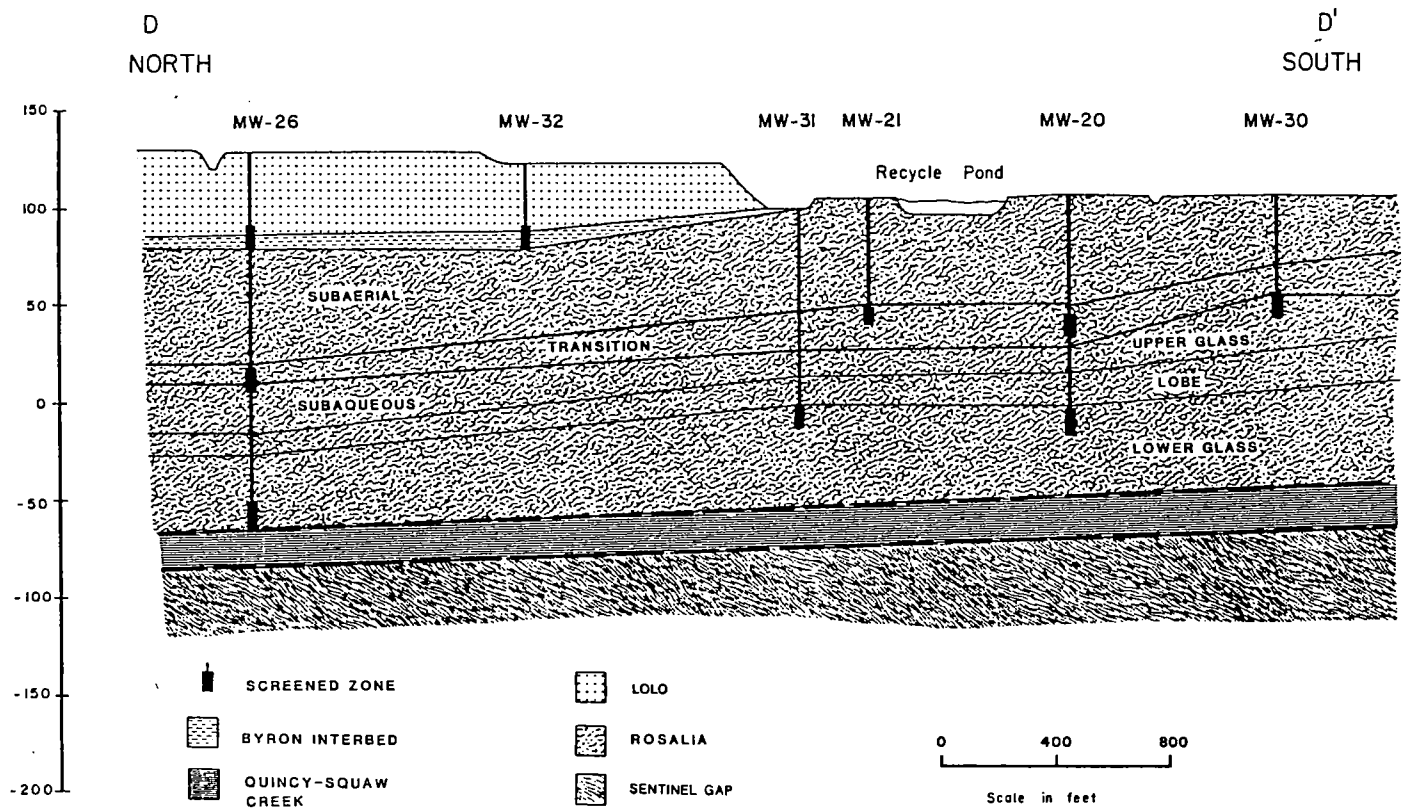


Figure E.3.5 Cross Section D-D'

CLIENT NAME:

Martin Marietta Corporation

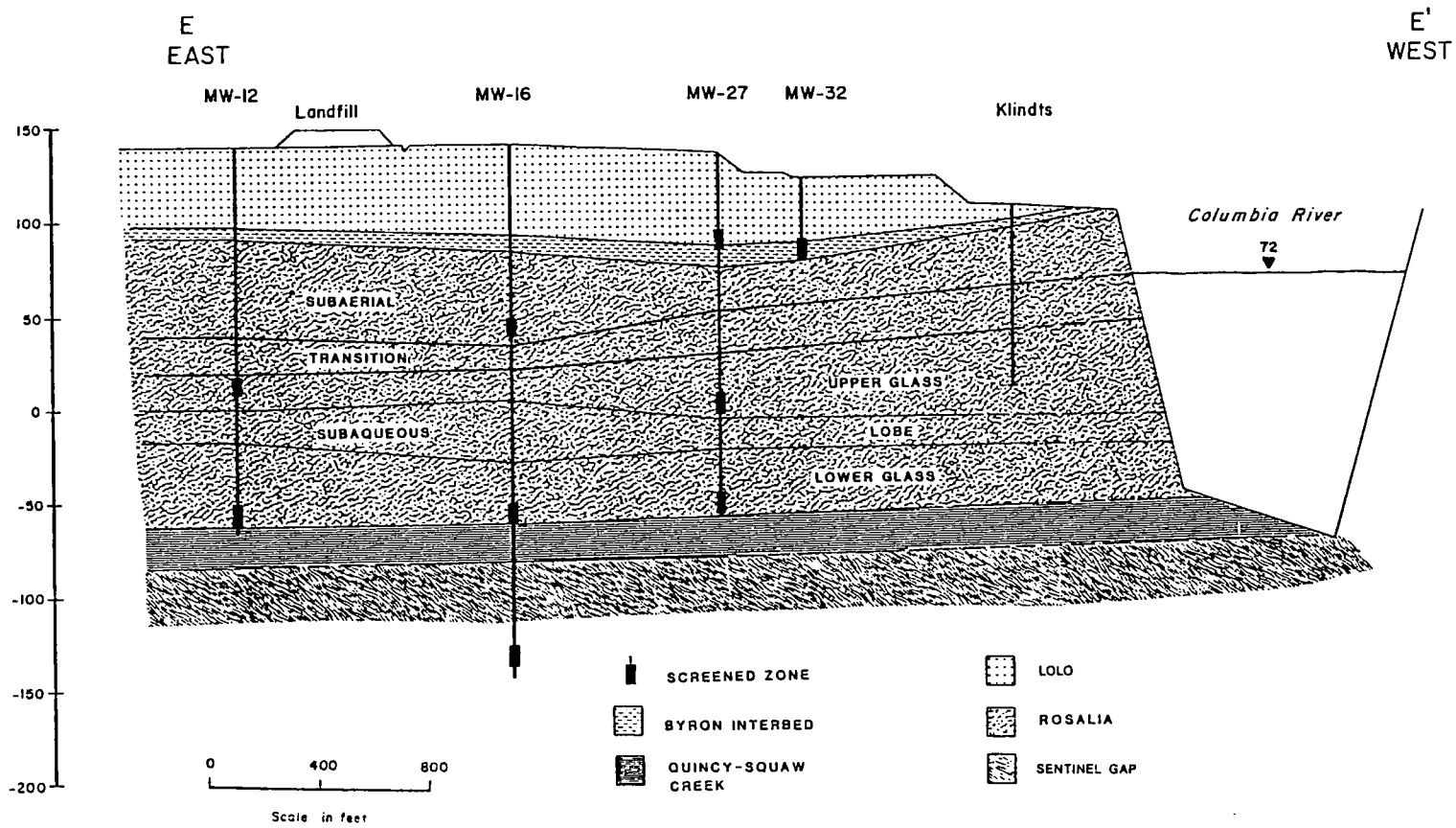


Figure E.3.6 Cross Section E-E'

CLIENT NAME:

Martin Marietta Corporation

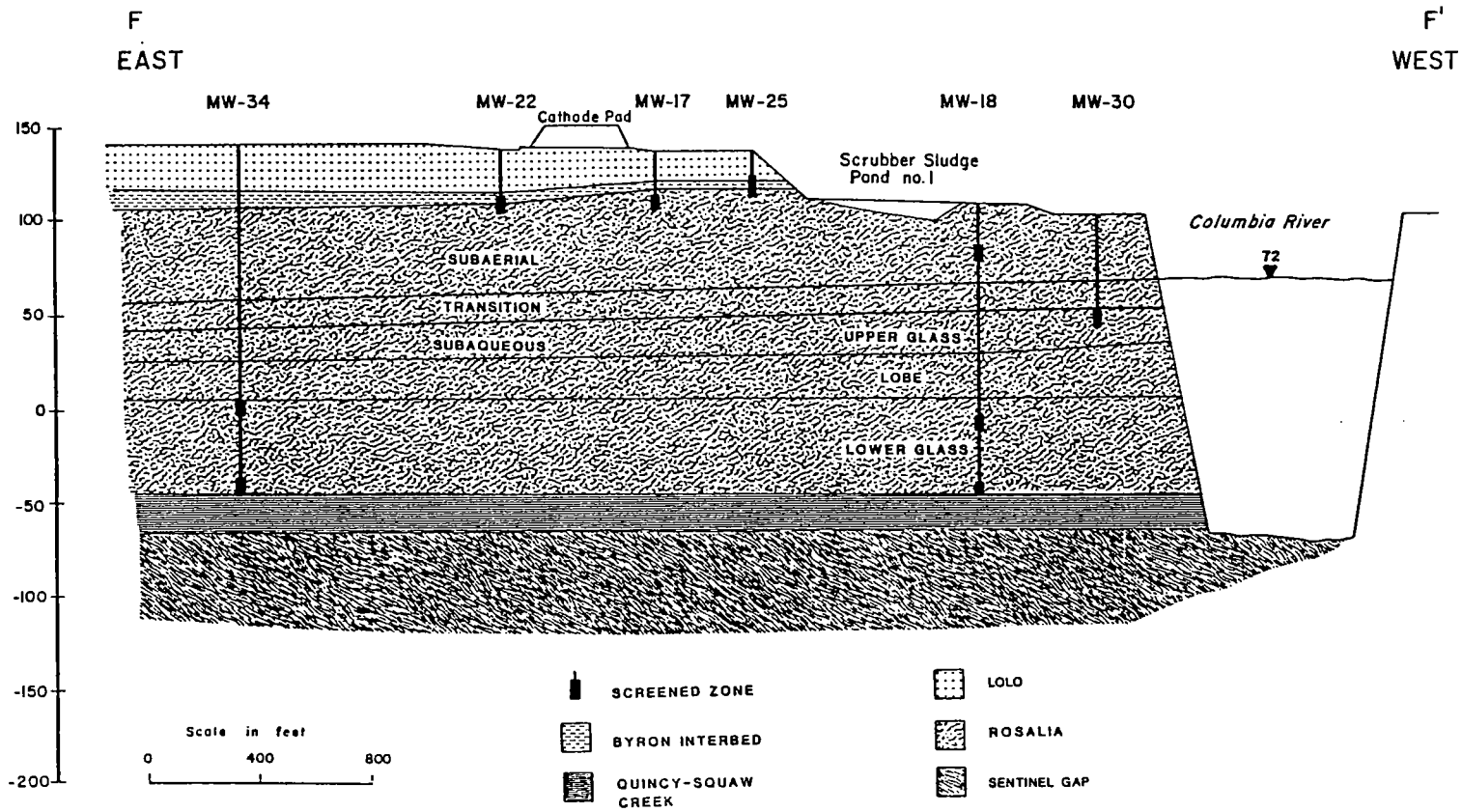


Figure E.3.7 Cross Section F-F'

CLIENT NAME:

Martin Marietta Corporation

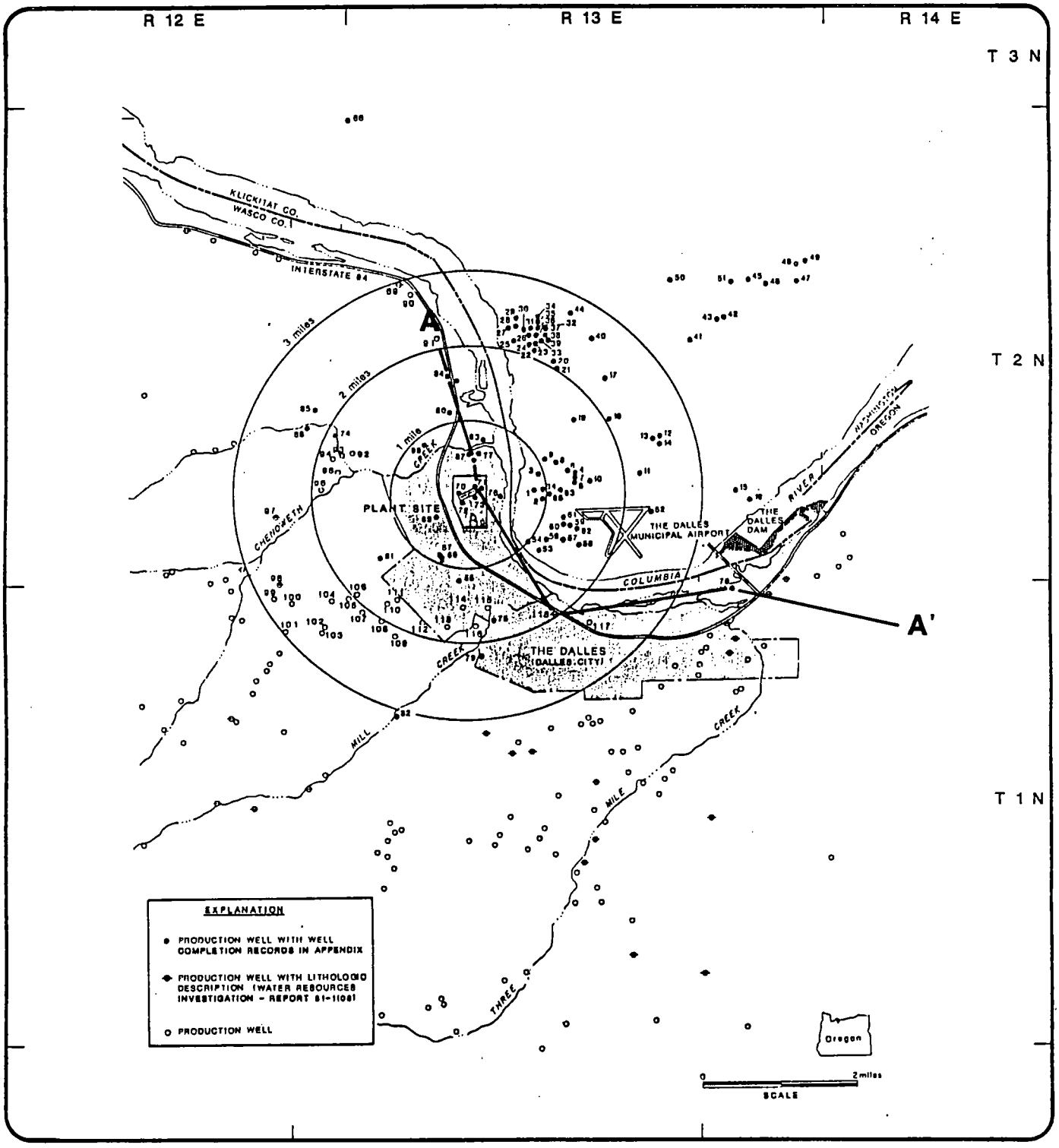
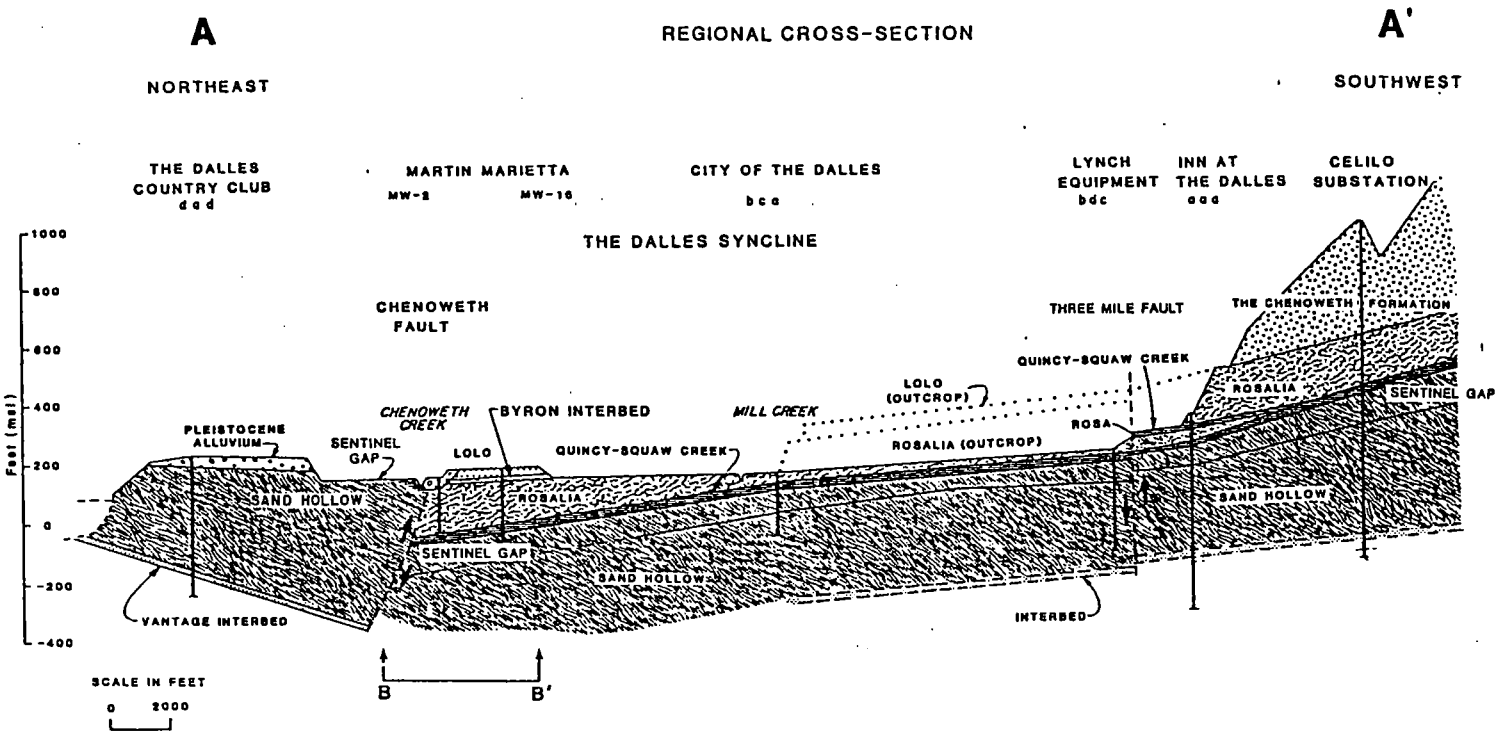


Figure E.3.8 Regional Cross Section Location Map

CLIENT NAME:

Martin Marietta Corporation



CROSS-SECTION LOCATION SHOWN ON FIGURE E. IN APPENDIX E.3

Figure E.3.9 Regional Cross Section A-A'

CLIENT NAME:

Martin Marietta Corporation

APPENDIX F

APPENDIX F

WELL-CONSTRUCTION DETAILS

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WELL-CONSTRUCTION DETAILS

Monitor-well construction details are summarized in Table F.1 and individual construction diagrams. Monitor-well locations are presented in Figure F.1.

Production wells identified in the area are shown on Figure F.2 and listed in Table F.2. Production well construction records are presented in Attachment F.2.

Table F.1 Monitor Well and Production Well Construction Summary
Martin Marietta Reduction Facility
The Dalles, Oregon

Well ID	Total Depth[1]	Screen Interval[1]	Elevation[2]	Geologic Unit
MWR-1A	140.0	129.0 - 139.0	146.62	RU
MWR-1B	197.0	186.0 - 196.0	146.81	RL
MW -2S	40.0	29.0 - 39.0	111.47	RS
MWR-2A	124.0	114.0 - 124.0	111.90	RU
MWR-2B	176.0	165.0 - 175.0	112.15	RL
MW -3S	27.0	17.0 - 27.0	138.35	B
MWR-3A	162.0	151.5 - 161.5	138.30	RL
MWR-3B	185.0	175.0 - 185.0	137.65	RL
MWR-4S	28.0	18.0 - 28.0	140.55	B
MWR-4A	139.0	129.0 - 139.0	140.21	RU
MW -4B	195.0	182.0 - 192.0	140.32	RL
MW -5S	20.5	10.5 - 20.5	141.56	L
MW -5A	100.0	90.0 - 100.0	140.34	RT
MW -6AA	126.0	121.0 - 126.0	130.58	RU
MWR-6B	190.5	159.0 - 189.0	132.34	RL
MWR-7A	138.0	127.5 - 137.5	129.38	RU
MWR-7B	192.0	181.0 - 191.0	129.68	RL
MW -8S	50.0	40.0 - 50.0	140.92	RS
MWR-8A	140.0	120.0 - 140.0	139.02	RU
MWR-8B	200.0	170.0 - 200.0	139.54	RL
MW -9S	54.0	44.0 - 54.0	141.47	RS
MWR-9A	140.0	126.0 - 136.0	141.45	RU
MWR-9B	200.0	190.0 - 200.0	141.73	RL
MW -10A	117.0	107.0 - 117.0	140.59	RT
MW -11D	304.0	275.0 - 295.0	139.52	SG
MW -12A	131.7	131.5 - 120.9	141.77	RU
MW -12B	205.0	192.4 - 202.5	142.47	RL
MW -13A	132.0	121.2 - 131.8	140.34	RU
MW -13B	205.0	191.9 - 202.5	140.33	RL
MW -14A	141.0	130.2 - 140.8	138.39	RU
MW -14B	204.0	192.7 - 203.3	138.44	RL

Table F.1 (Continued)

Well ID	Total Depth[1]	Screen Interval[1]	Elevation[2]	Geologic Unit
MW -15S	58.0	46.9 - 57.5	142.35	RS
MW -15A	123.0	112.2 - 122.8	141.80	RU
MW -15B	198.0	184.8 - 195.4	141.48	RL
MW -16A	107.0	96.4 - 107.0	144.24	RT
MW -16B	196.0	184.9 - 195.5	144.76	RL
MW -16D	269.0	258.4 - 269.0	144.44	SG
MW -17S	30.0	19.4 - 30.0	139.09	RS
MW -18S	22.0	11.4 - 22.0	111.31	RS
MW -18A	132.0	112.0 - 132.0	111.61	RL
MW -18B	157.0	145.0 - 155.0	110.62	RL
MW -19S	26.0	15.4 - 26.0	108.71	RS
MW -20S	70.0	59.4 - 70.0	110.97	RT
MW -20A	120.0	109.4 - 120.0	110.67	RL
MW -21S	65.0	54.4 - 65.0	106.46	RT
MW -22S	30.0	18.0 - 28.0	141.43	RS
MW -23S	35.0	25.0 - 35.0	140.94	RS
MW -24S	21.5	11.5 - 21.5	141.13	L
MW -24A	158.0	148.0 - 158.0	140.48	RL
MW -25S	21.5	9.0 - 19.0	140.02	B
MW -26S	50.0	40.0 - 50.0	132.85	B
MW -26A	125.0	113.0 - 123.0	133.11	RT
MW -26B	192.0	181.5 - 191.5	132.61	RL
MW -27S	54.0	42.0 - 52.0	138.64	B
MW -27A	138.0	127.0 - 137.0	137.64	RU
MW -27B	189.0	179.0 - 189.0		RL
MW -28S	23.0	6.0 - 16.0	112.16	RS
MW -29S	25.0	12.0 - 22.0	114.72	RS
MW -30S	61.5	51.5 - 61.5	109.25	RU
MW -31S	108.0	98.0 - 108.0	101.69	RL
MW -32S	40.0	30.0 - 40.0	126.70	B
MW -33A	127.0	117.0 - 127.0	104.42	RU
MW -33B	166.0	156.0 - 166.0	104.69	RL

Table F.1 (Continued)

Well ID	Total Depth[1]	Screen Interval[1]	Elevation[2]	Geologic Unit
MW -34A	161.0	151.0 - 161.0	146.58	RL
MW -34B	186.0	176.0 - 186.0	145.39	RL
PW -1	314.0	220.0 - 314.0	144.30	SG
PW -2	302.0	Sealed & Abandoned	NA	SG
PW -3	319.0	207.0 - 319.0	139.79	SG
PW -4	303.0	223.0 - 303.0	139.76	SG
Recreation	NA	NA	NA	NA
Residence	120.0	NA	NA	NAP

1 Feet below land surface.
2 Feet msl, protective casing.
NA = Not available.
B = Byron.
L = Lolo.
RS = Rosalia Subaerial.
RT = Rosalia Transition.
RU = Rosalia Upper Glass.
RL = Rosalia Lower Glass.
SG = Sentinel Gap.

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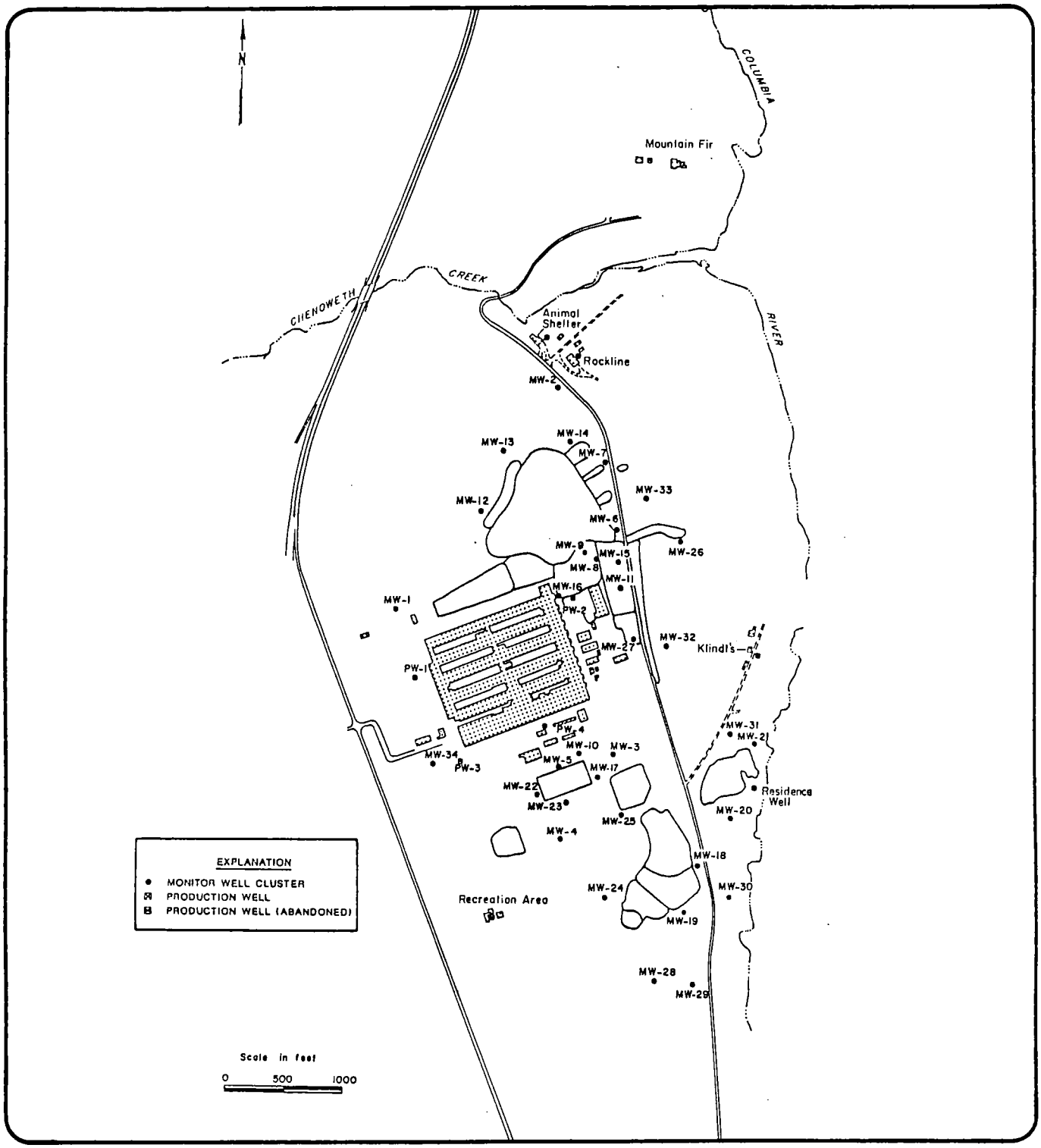

Figure F.1 Monitor-Well Locations

CLIENT NAME:

Martin Marietta Corporation

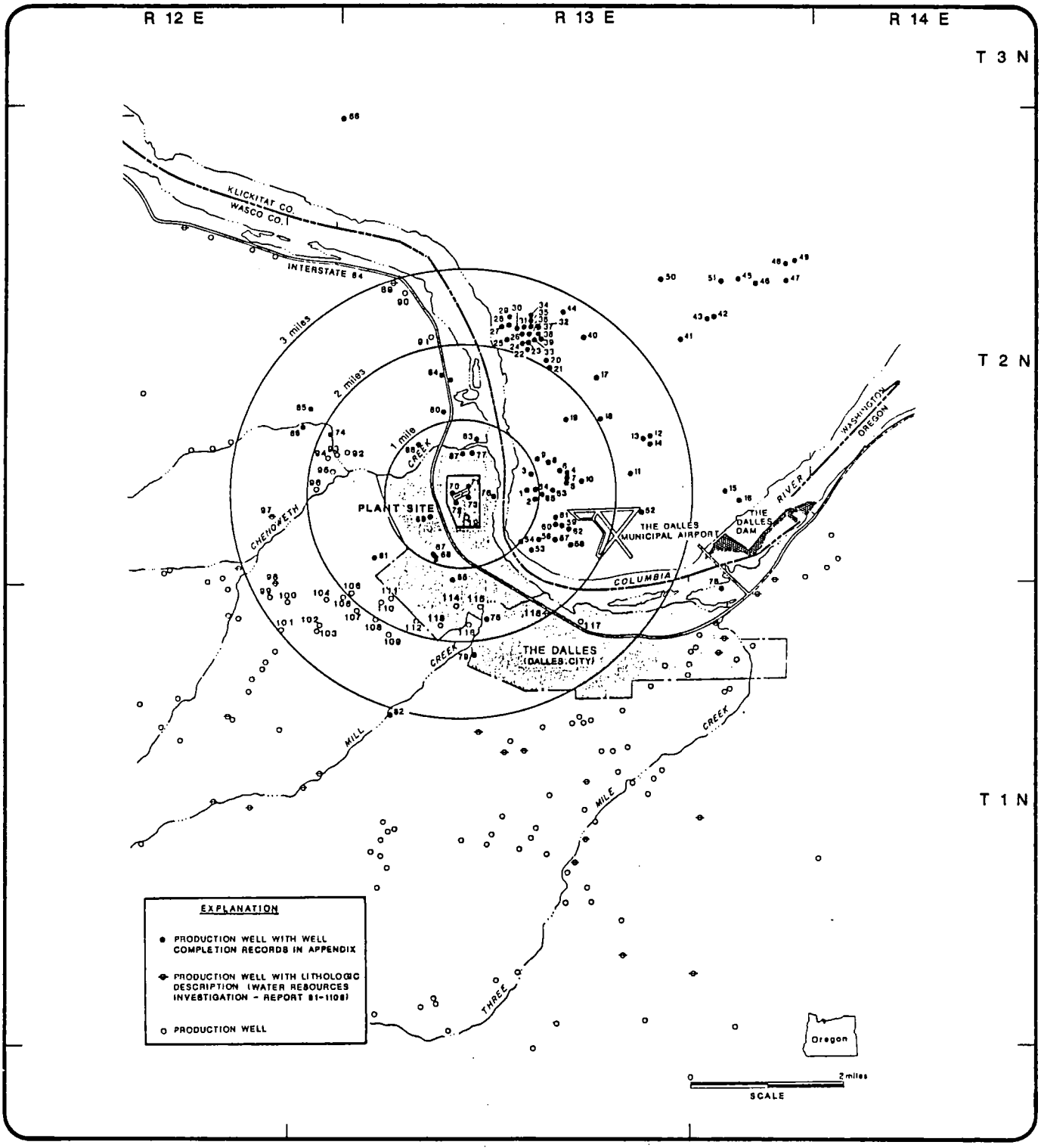

Figure F.2 Production-Well Locations

CLIENT NAME:

Martin Marietta Corporation

Table F.2 List of Available Well-Construction Records of Supply Wells in The Dalles Area

Well Number	Owner	Depth (ft)	Location
	Klickitat County		
1	Marvin Harrison	200	SE-SW-28-2-13
2	Franke Leno	205	SE-SW-28-2-13
3	Hugh Bullock	220	NE-SW-28-2-13
4	Harold Shepler	120	NE-SE-28-2-13
5	Larry Holliday	140	NE-SE-28-2-13
6	Mt. Veiw Water Association	210	NE-SE-28-2-13
7	Harold Shepler	251	NE-SE-28-2-13
8	Jim Wise	155	SW-NE-28-2-13
9	Harry Toda	170	SE-NW-28-2-13
10	Leroy Showalter	110	NW-SW-27-2-13
11	Roger Cool	125	NE-SE-27-2-13
12	Jarl Construction	215	NE-NE-27-2-13
13	Vernie Jarl	150	NE-NE-27-2-13
14	Jarl Construction	595	NE-NE-27-2-13
15	Dallesport Industrial Park	292	SE-SE-26-2-13
16	Klickitat County Port #1	210	SW-SW-25-2-13
17	Fred Smith	500	SE-NW-22-2-13
18	W.H. Gregory	285	SE-SW-22-2-13
19	Don Graves	160	SE-SE-21-2-13
20	Larry Frazier, Inc.	150	NW-NE-21-2-13
21	Darrel King	170	NW-NE-21-2-13
22	Minor's Addition Water Supply	119	SE-SW-16-2-13
23	Murdock Tract Water Fund	200	SE-SW-16-2-13
24	Ivor T. Jones	205	SE-SW-16-2-13
25	Earl B. Cooper	280	SW-SW-16-2-13
26	George McKinnen	175	E-SW-16-2-13
27	E.B. Cooper	109	NW-SW-16-2-13
28	Phillip Hearron	109	NW-SW-16-2-13
29	Ken Zeilinski	88	NW-SW-16-2-13
30	Robert G. Knowles	250	NE-SW-16-2-13
31	Pearl Fehr	115	NE-SW-16-2-13
32	Earl Cooper (1)	325	NE-SW-16-2-13
	Earl Cooper (2)	280	NE-SW-16-2-13
33	Larry Odom	330	NW-SW-16-2-13
34	Earl Cooper	175	NE-SW-16-2-13
35	Earl Cooper	150	NE-SW-16-2-13
36	Earl Cooper	344	NE-SW-16-2-13
37(1)	Cecil Odom	170	NE-SW-16-2-13
37(2)	Cecil Odom	286	NE-SW-16-2-13
37(3)	Cecil Odom	220	NE-SW-16-2-13
38	Robert Knowles	125	NE-SW-16-2-13
39	Larry Frazier	100	NE-SE-16-2-13
40	Jerry Frazier	290	SW-SW-15-2-13

Table F.2 (continued)

Well Number	Owner	Depth (ft)	Location
41	Martha Niblack	490	SE-SW-14-2-13
42	Frenche Vezina	550	NE-SE-14-2-13
43	Joseph H. Blanck	340	NE-SE-14-2-13
44	Jack Schreiner	285	NE-SE-16-2-13
45	Charles Sterrit	370	NW-NW-13-2-13
46	Ronald Johnson	340	NW-NE-13-2-13
47	Melvin Thornburg	200	NW-NE-13-2-13
48	Dennis Beeks	160	SW-SE-12-2-13
49	John Huteson, Jr.	390	SW-SE-12-2-13
50	Dan Gunkle	420	NW-NW-14-2-14
51	Yakima Indian Nation	445	NE-NE-14-2-14
52	Dallesport Water Association	334	NE-NE-34-2-13
53	Donald M. Dietz	163	SE-SW-33-2-13
54	Cliff Whitt	298	SW-SW-33-2-13
55	Cliff Whitt	298	SW-SW-33-2-13
56	Lyle School District	320	NW-SE-33-2-13
57	George Sheradella	230	NE-SE-33-2-13
58	Lyle School District	320	NE-SE-33-2-13
59	John Haggard	120	SE-NE-33-2-13
60	Foley	250	NE-NE-33-2-13
61	Mike Helyer	265	NE-NE-33-2-13
62	Dallesport Community	365	NE-NE-33-2-13
63	Bud Williams	205	SW-SE-28-2-13
64	Dallesport Domestic	182	SW-SE-28-2-13
65	Arthur Dahl	210	SW-SE-28-2-13
66	Dayton Henderson	160	NW-NW-06-2-13
	Wasco County		
67	Chenoweth Irrigation Co-op #1	258	NE-SE-32-2-13
68	Chenoweth Irrigation Co-op #2	260	NE-SE-32-2-13
69	Chenoweth Irrigation Co-op #3	275	NE-NE-32-2-13
70	Harvey Machine #1 (MMRF)	314	NW-SW-28-2-13
71	Harvey Machine #2A(A) (MMRF)	302	NE-SW-28-2-13
72	Harvey Machine #3A (MMRF)	319	SW-SW-28-2-13
73	Harvey Machine #4A (MMRF)	303	SE-SW-28-2-13
74	Jack Huffman	152	SW-SE-19-2-13
75	Jordon St. Well	291	SE-NW-04-1-13
76	Klindt	100	-------21-2-13
77	Linebarger (Rockline)	98	NW-NE-28-2-13
78	Lone Pine Well	385	NE-NW-01-1-13
79	Marks Well	570	SE-SW-04-1-13
80	Floyd Marsh	350	NE-NE-20-2-13
81	George Moon	539	---SW-32-2-13

Table F.2 (continued)

Well Number	Owner	Depth (ft)	Location
82	Mill Creek Well	371	NW-SW-08-1-13
83	Mt. Fir Lumber	145	SE-SW-21-2-13
84	Pine Wood Mobile	220	------21-2-13
85	Richard J. Murray	118	NE-SW-19-2-13
86	Neil Pake	164	SW-SW-19-2-13
87	Wasco Animal Shelter	65	NE-NW-23-2-13
88	Fred Wetle	251	SW-NE-29-2-13
89	The Dalles Country Club	480	SE-SE-17-13-2
90	Tooley Water District	306	NE-NW-17-13-2
91	Tooley Water District	32	NE-NW-17-13-2
	D. Hill	78	NE-NW-17-13-2
92	W. Pullen	Spring	NE-NE-30-13-2
93	W. Pullen	605	NE-NE-30-13-2
94	R. Walters	665	NE-NW-30-13-2
95	Lower Chenoweth Water District	243	SE-NW-30-13-2
96	Lower Chenoweth Water District	222	NE-SW-30-13-2
97	E. Kuck	443	SE-SE-25-12-2
98	C. Buster	500	SE-SE-36-12-2
99	W. Goeckel	500	NE-NE-01-12-1
100	R. Krueger	700	NW-NW-06-13-1
101	R. Goolsby	160	SE-NW-01-12-1
102	E. Ayres	360	SE-NW-06-13-1
103	J. Ayres	365	SE-NW-06-13-1
104	L. Shoemaker	880	NE-NW-06-13-1
105	L. Shoemaker	790	NW-NE-06-13-1
106	C. Smith	360	NE-NE-06-13-1
	C. Smith	350	NE-NE-06-13-1
107	M. Malcolm	103	NE-NE-06-13-1
108	E. Hendricks	530	SW-NW-05-13-1
109	Foley	323	NW-SW-05-13-1
110	Martin Marieta	537	NW-NW-05-13-1
111	J. Miller	395	NW-NW-05-13-1
112	Cherry Heights Irrigation Co.	546	SW-NE-05-13-1
113	J. Fieck	470	SE-NE-05-13-1
114	Columbia Lodges	303	SW-NW-04-13-1
115	R. Bennett	320	NW-NW-04-13-1
116	Sisters of the Holy Name	210	NE-NW-04-13-1
117	Dalles Cherry Growers	114	SE-NW-03-13-1
118	City of The Dalles	200	NE-NE-03-13-1
119	Martin Marietta Recreation Well	---	NW-NW-33-13-2

Note: Lithologic descriptions available for all wells except 16.
T0487PO4
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ATTACHMENT F.1 MONITOR-WELL CONSTRUCTION DIAGRAMS

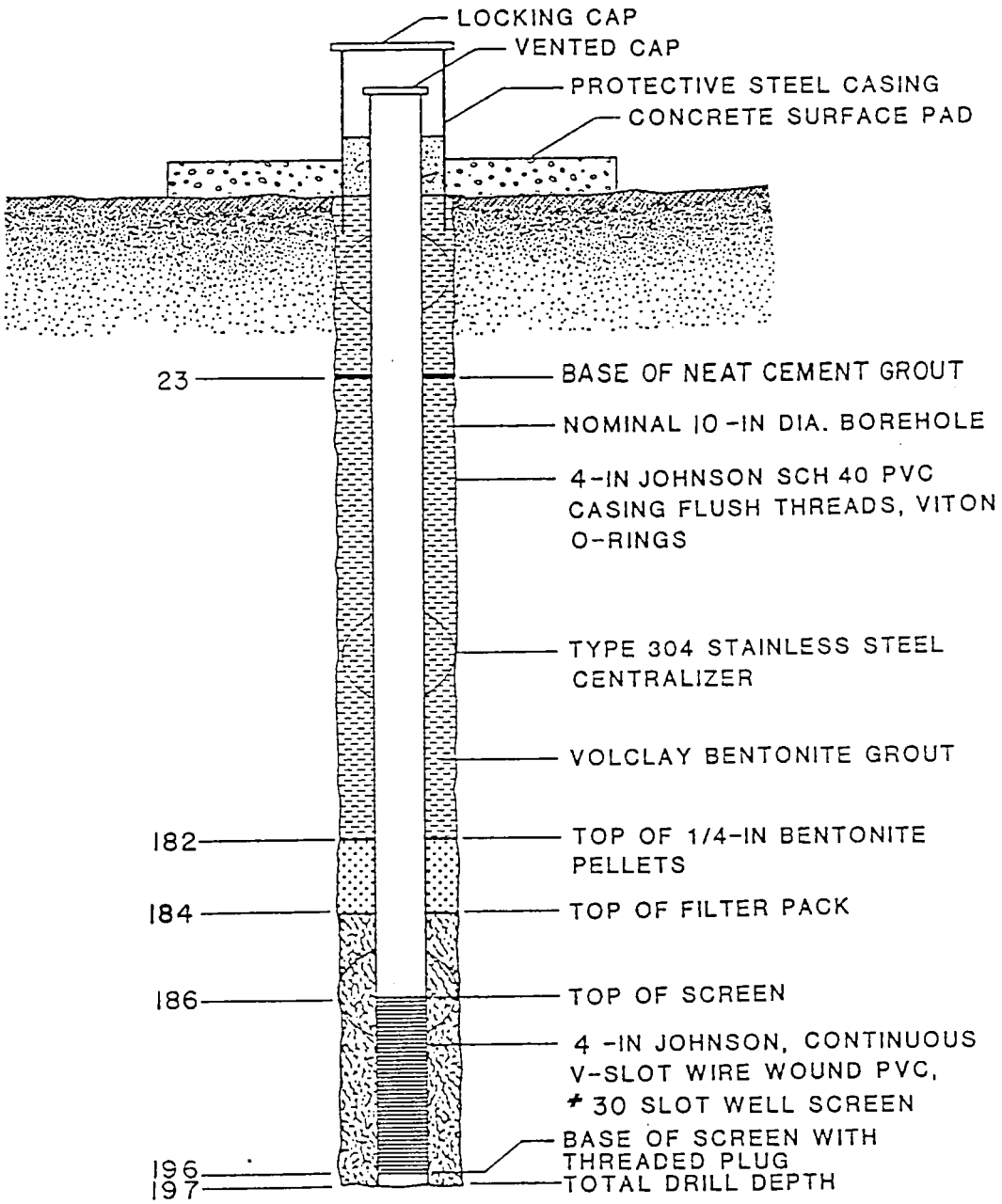
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-1B

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		143.71 - Pad	146.81 Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		06-17-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

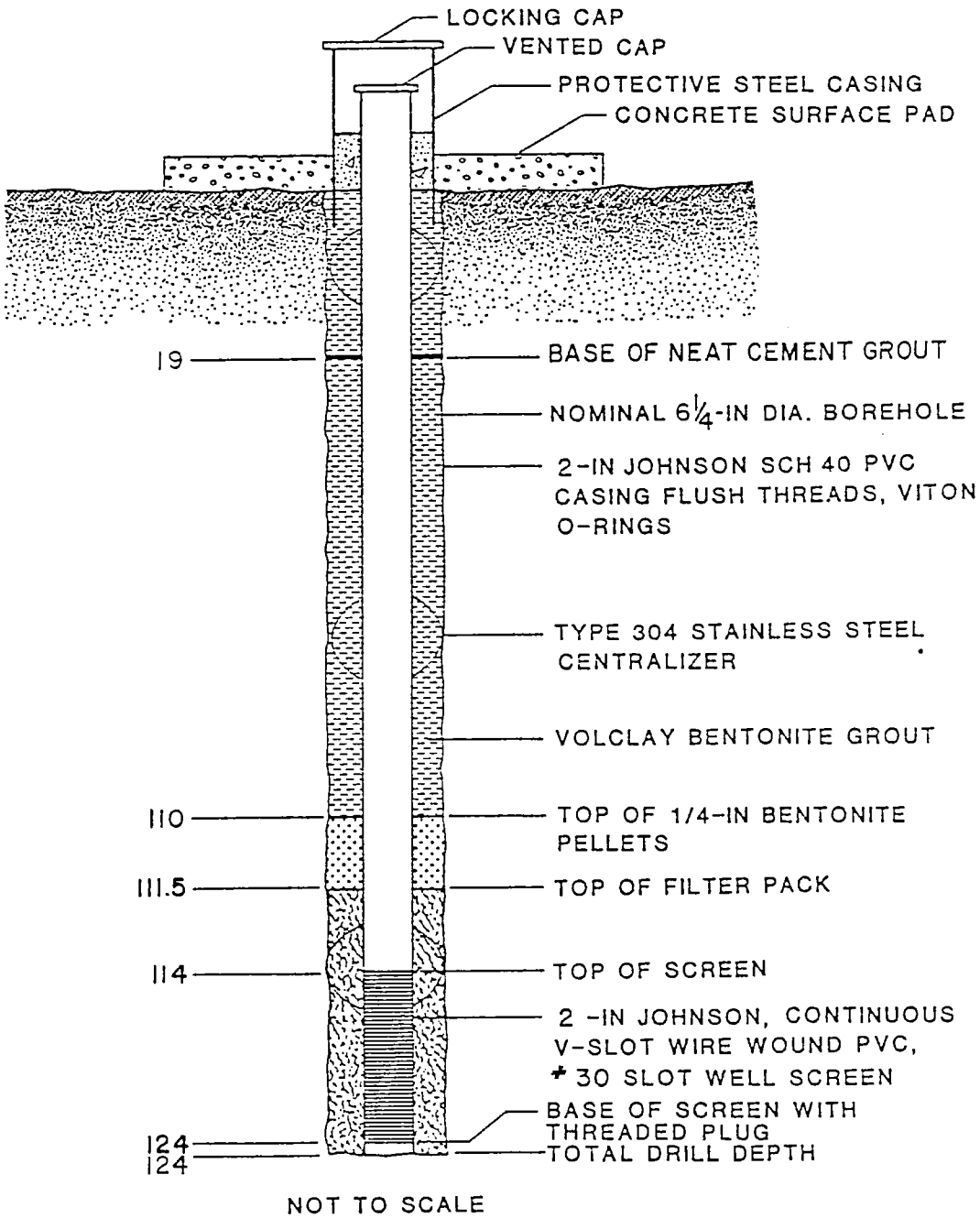
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-2A

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		108.98 - Pad	111.90
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-16-87	



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ALL MEASUREMENTS FEET BELOW LAND SURFACE

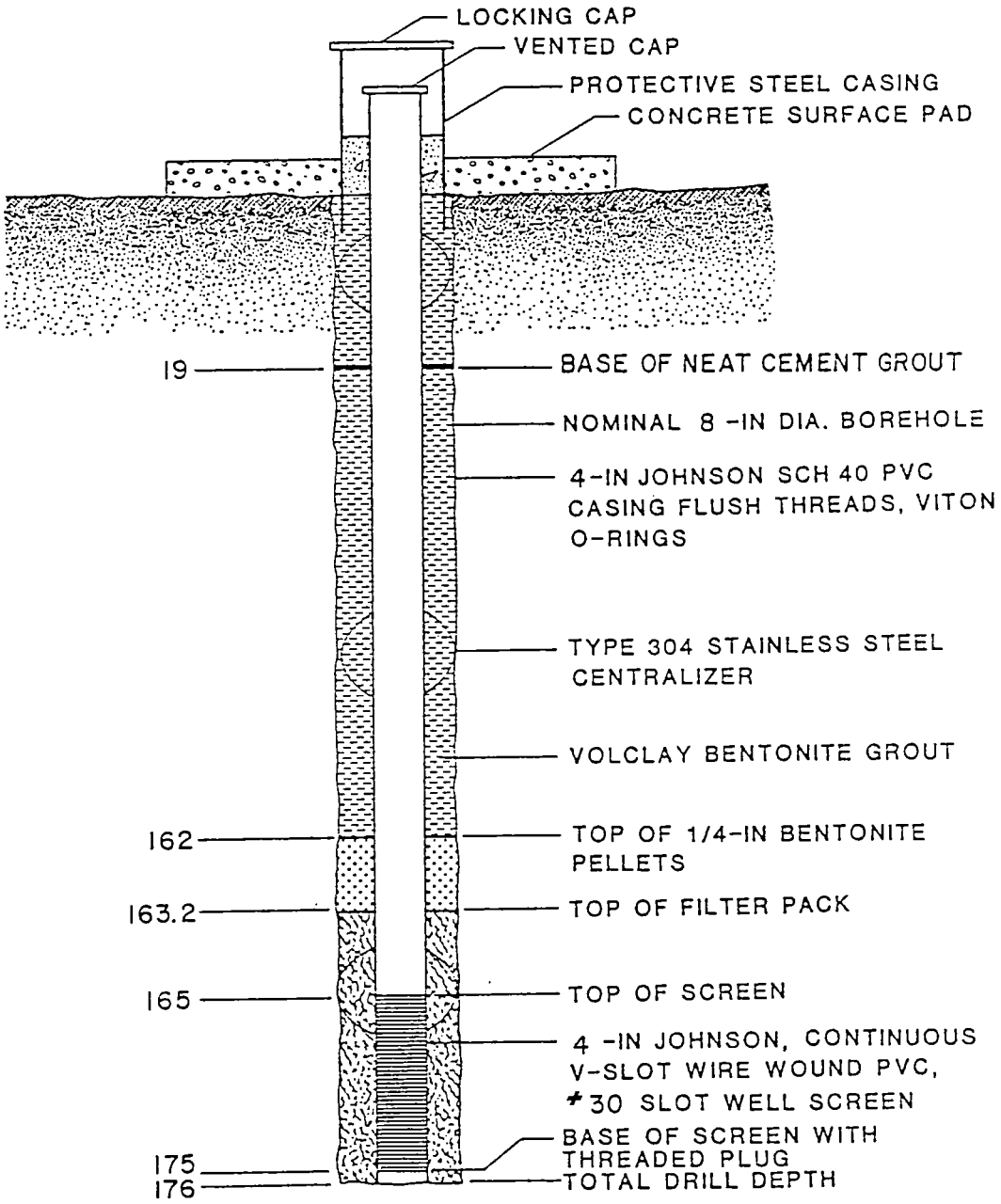
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-2B

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		109.50	112.15 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-17-87	



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ALL MEASUREMENTS FEET BELOW LAND SURFACE

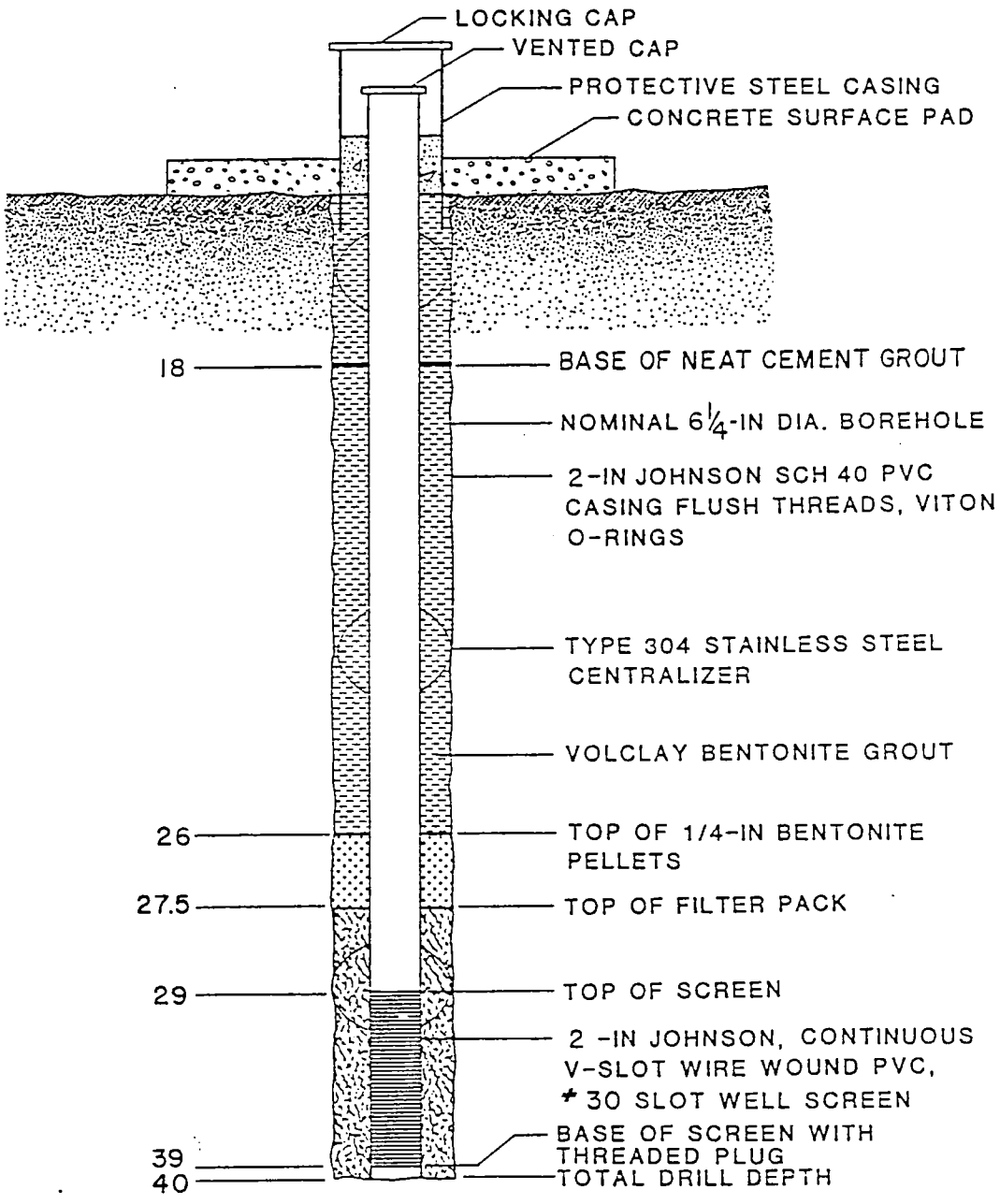
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-2S

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		108.63 - Pad	111.47 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-24-87	



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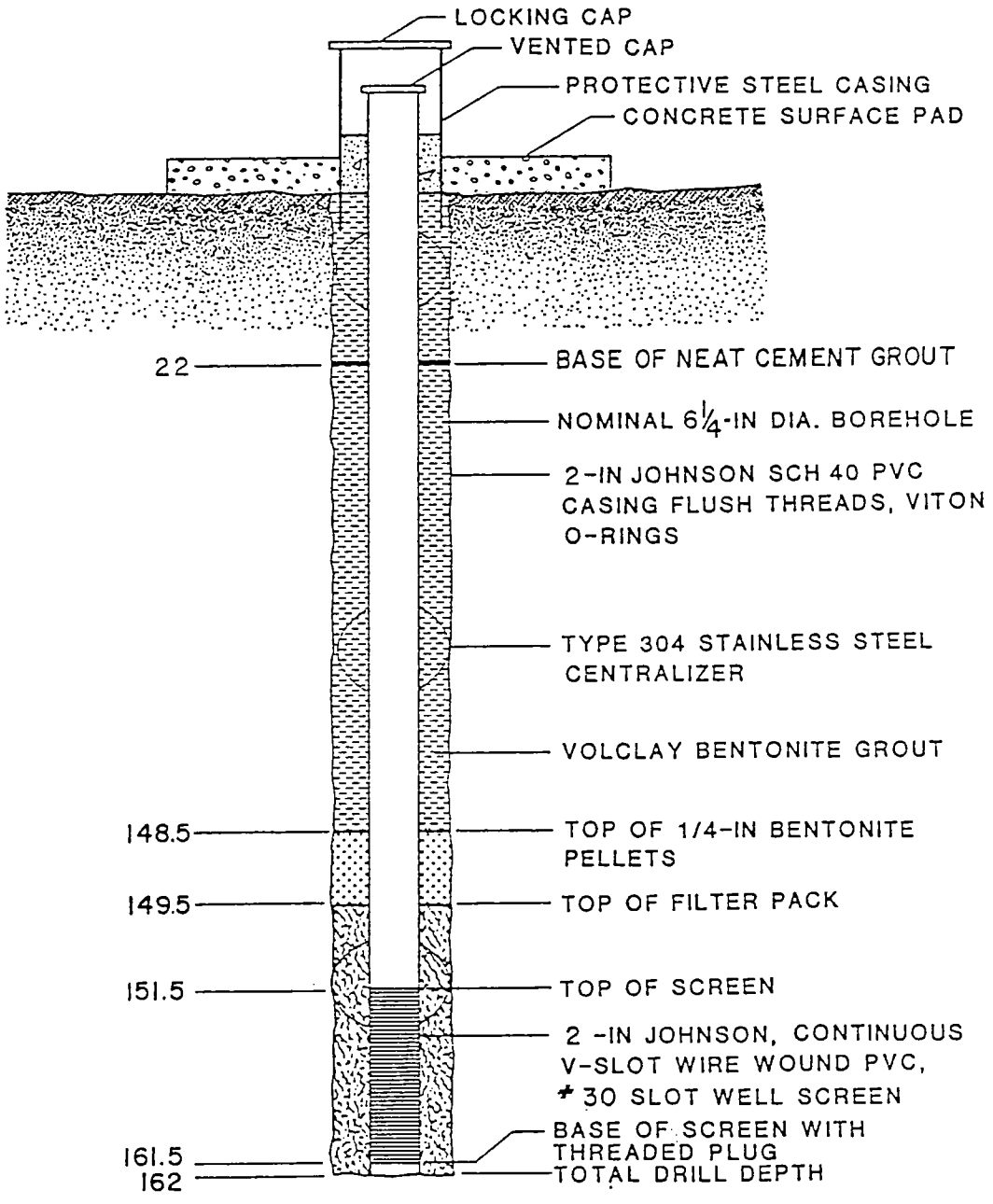
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-3A

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		135.62 - Pad	138.30 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-22-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

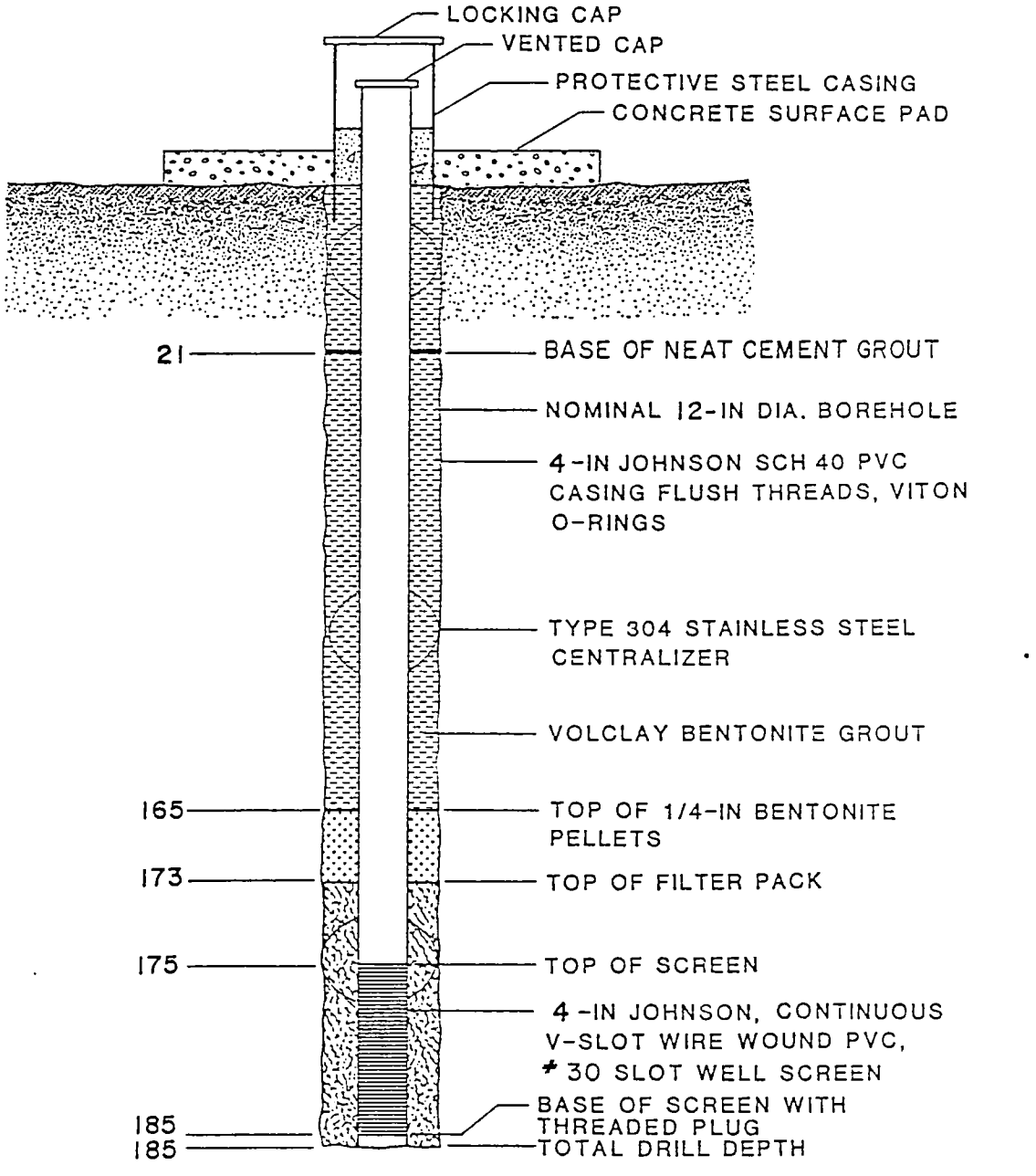
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-3B

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		134.86 - Pad	137.65 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-21-87	



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ALL MEASUREMENTS FEET BELOW LAND SURFACE

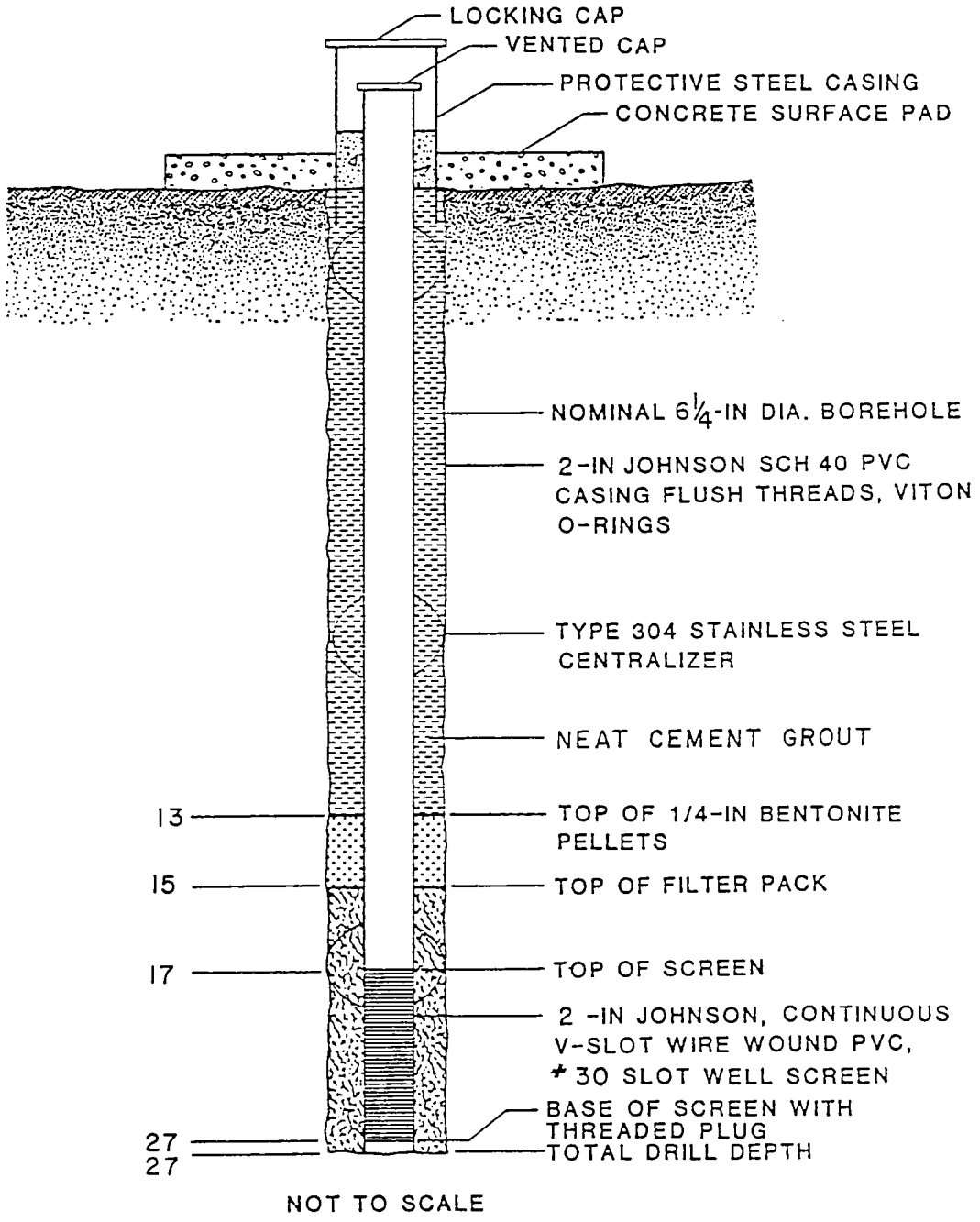
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-3S

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		135.12 - Pad	138.35 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-18-87	



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ALL MEASUREMENTS FEET BELOW LAND SURFACE

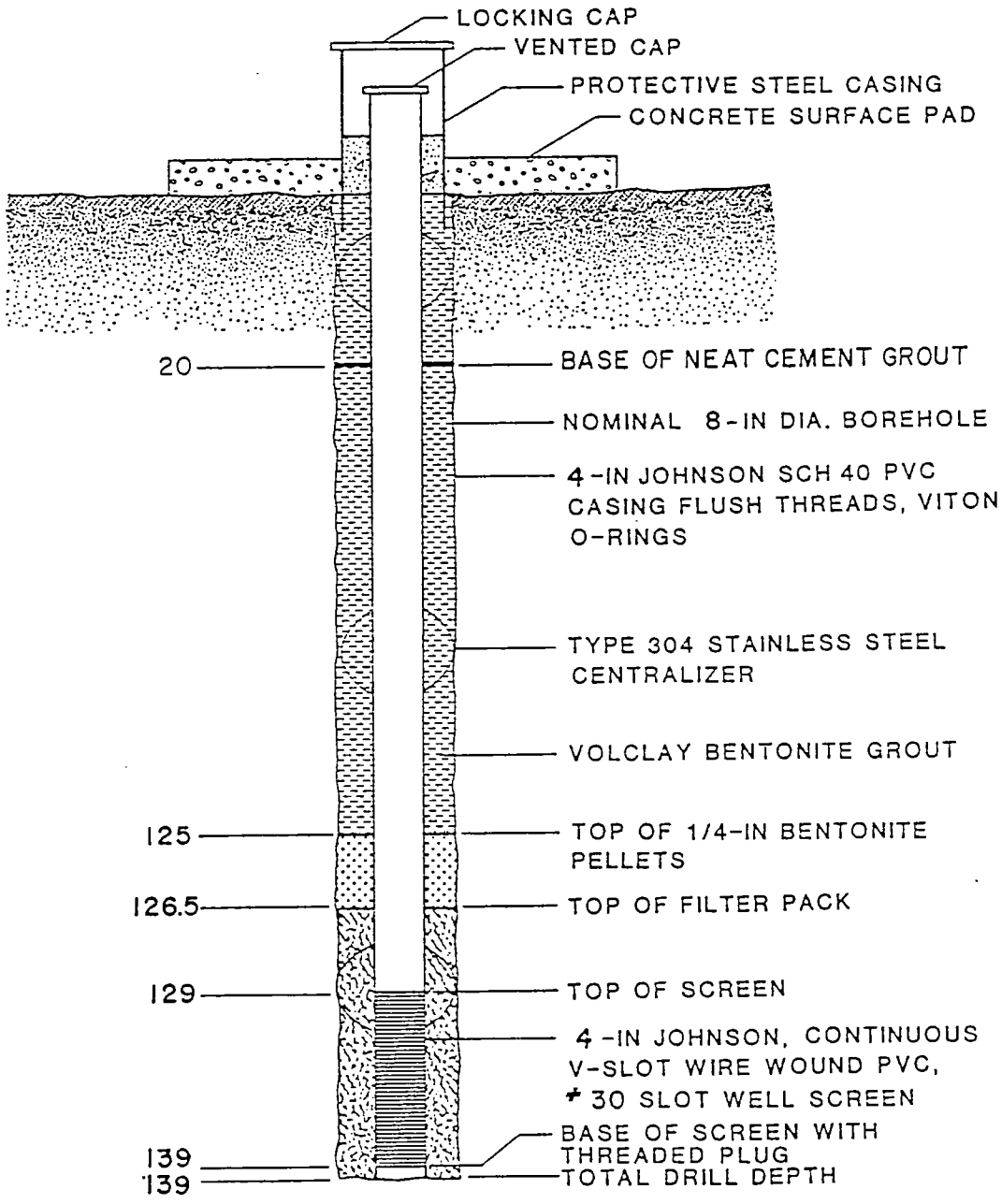
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-4A

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		138.10 - Pad	140.21 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-22-87	



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ALL MEASUREMENTS FEET BELOW LAND SURFACE

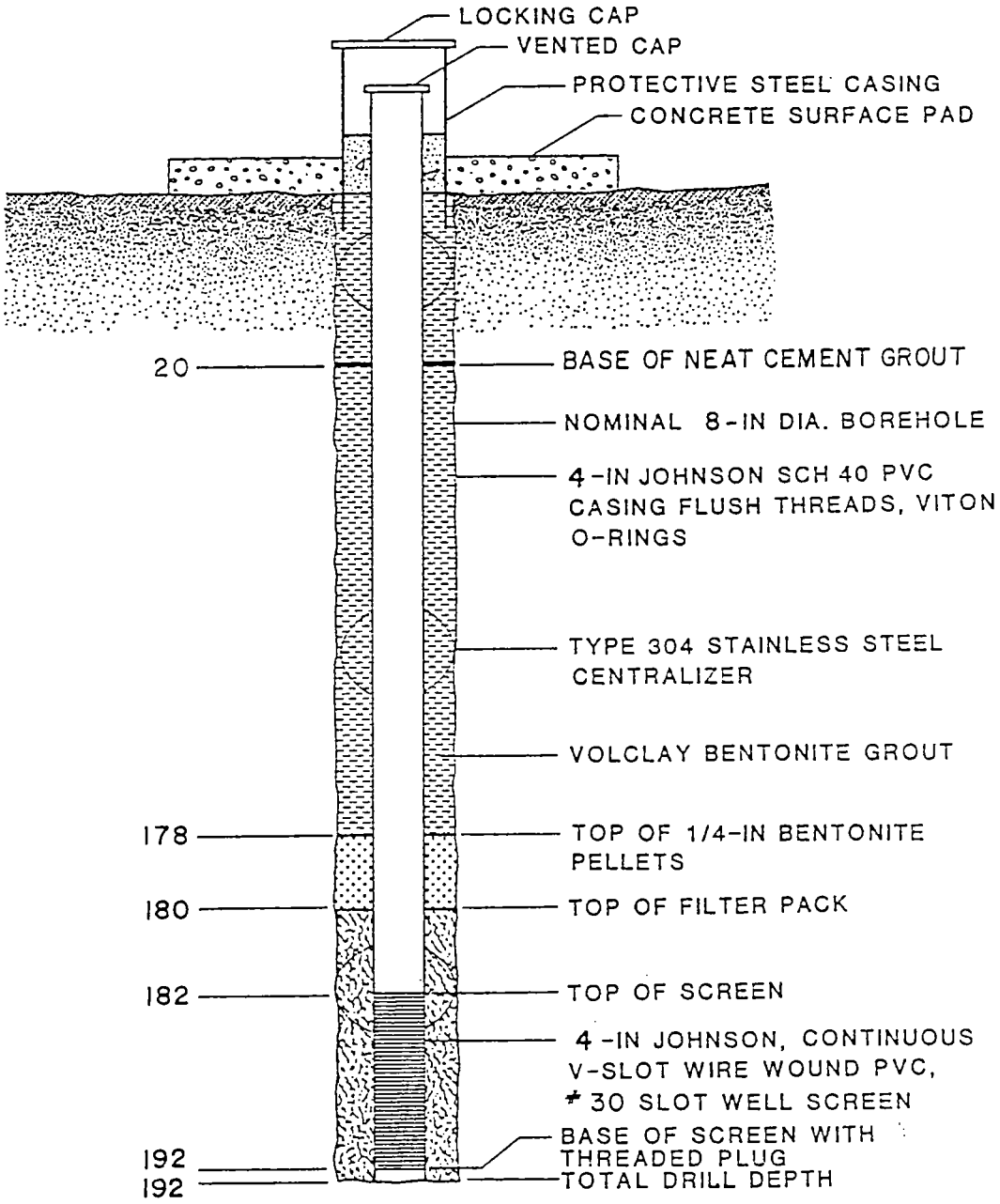
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-4B

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		137.48 - Pad	140.32 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air lift		07-23-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

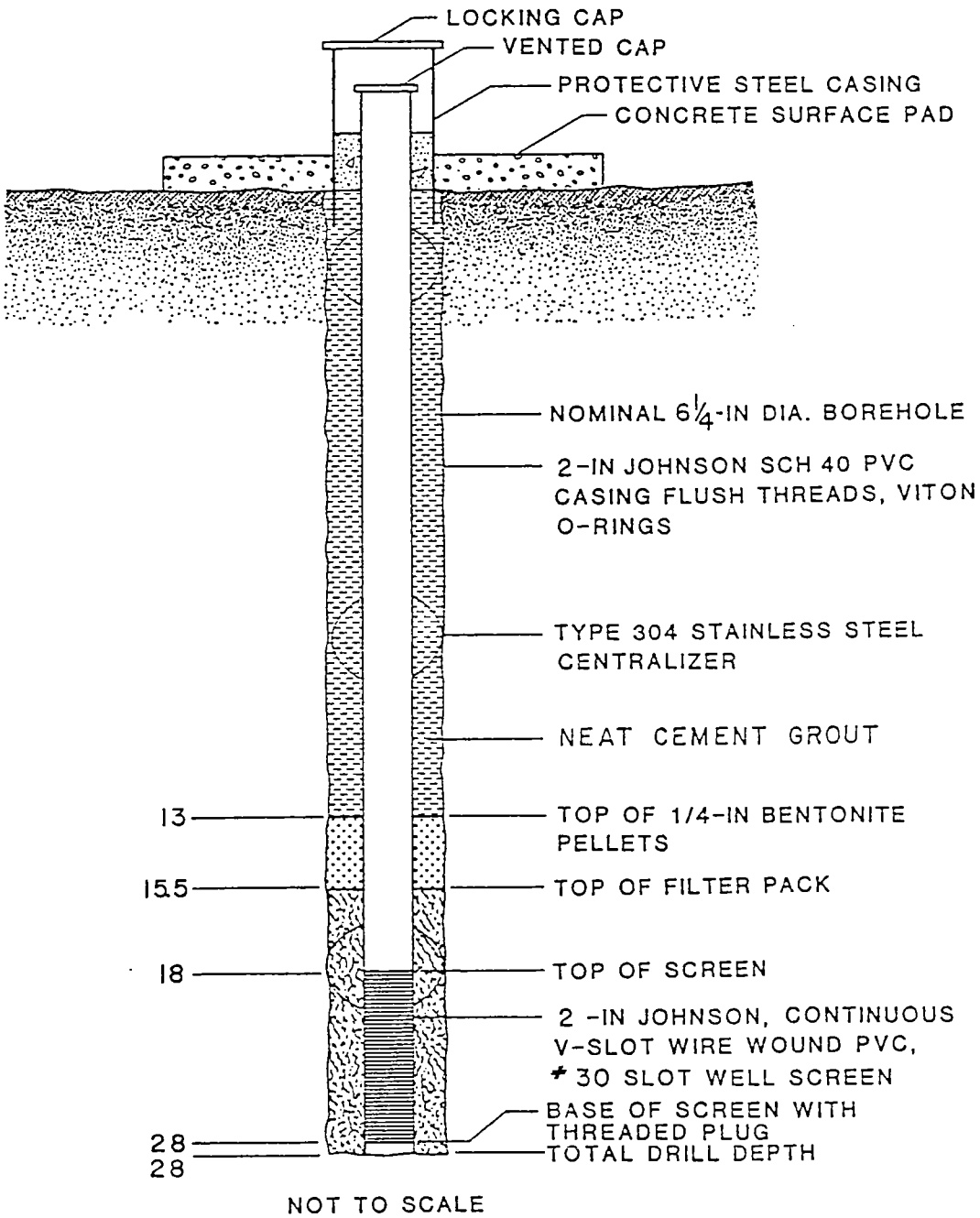
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-4S

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		138.00 - Pad	140.55 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-23-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

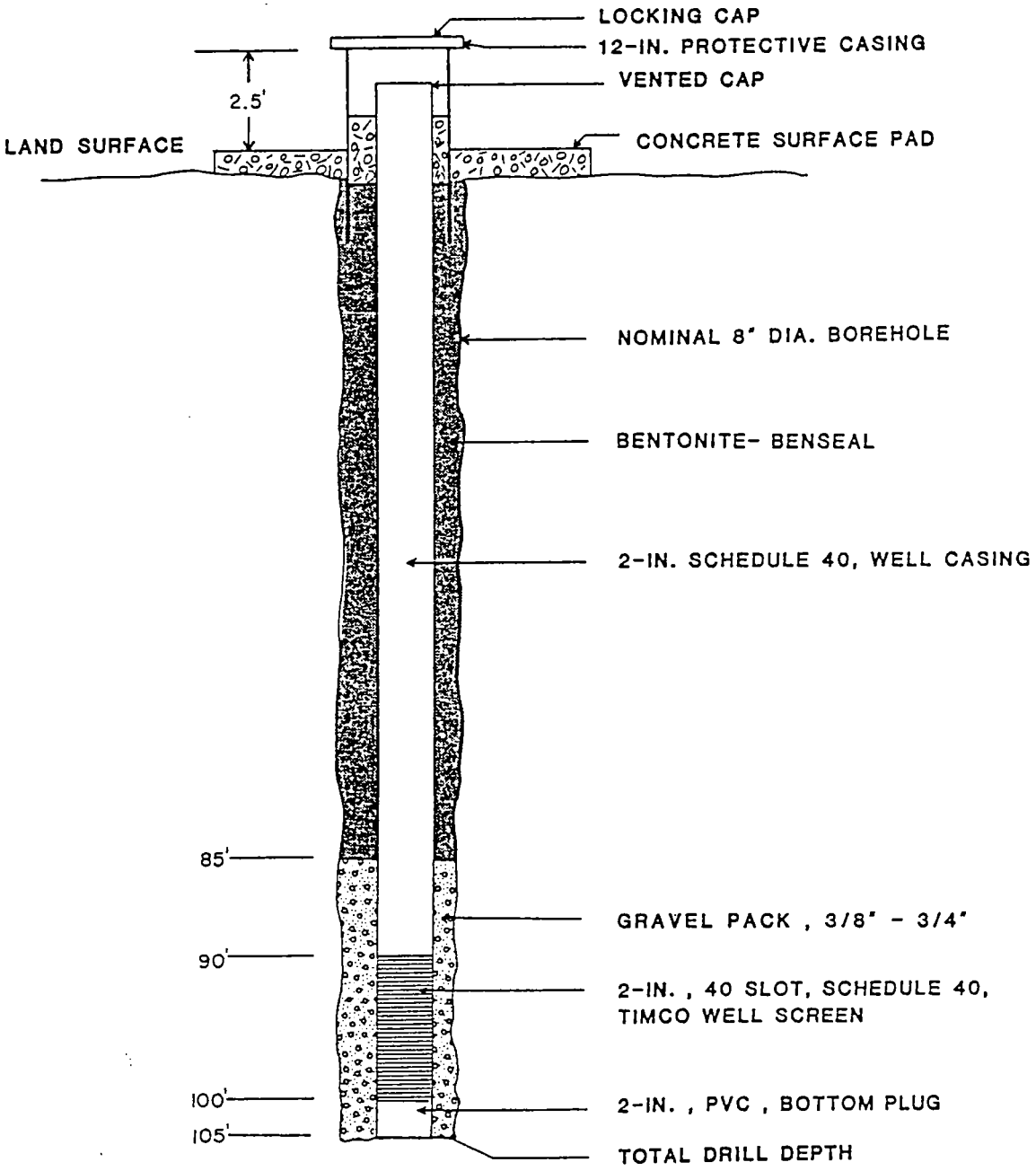
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-5A

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		137.84-pad	139.11-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift			



NOT TO SCALE

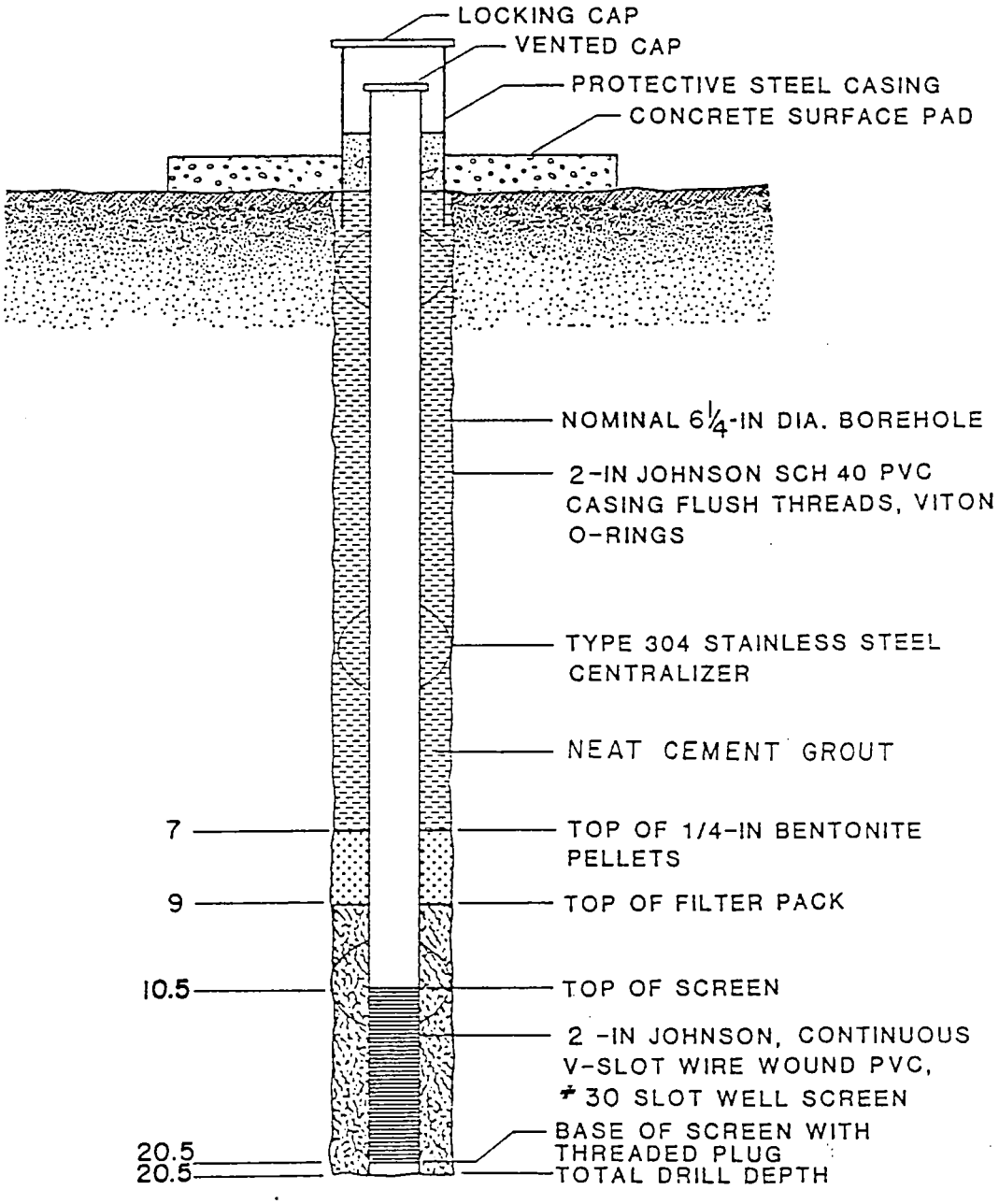
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-5S

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		138.27 - Pad	141.56 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air lift		07-18-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

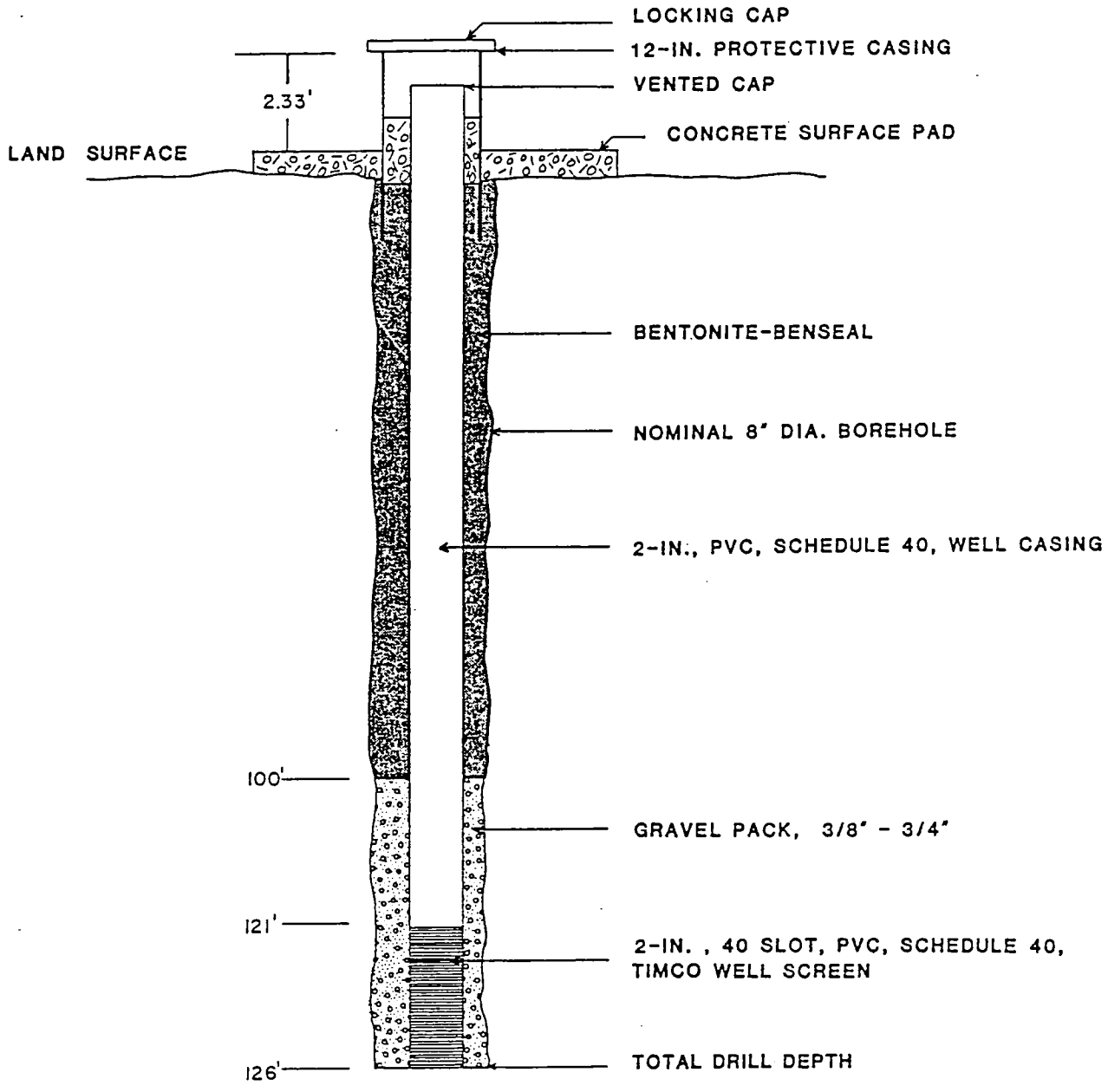
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-6AA

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		128.25-pad	130.58-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift			



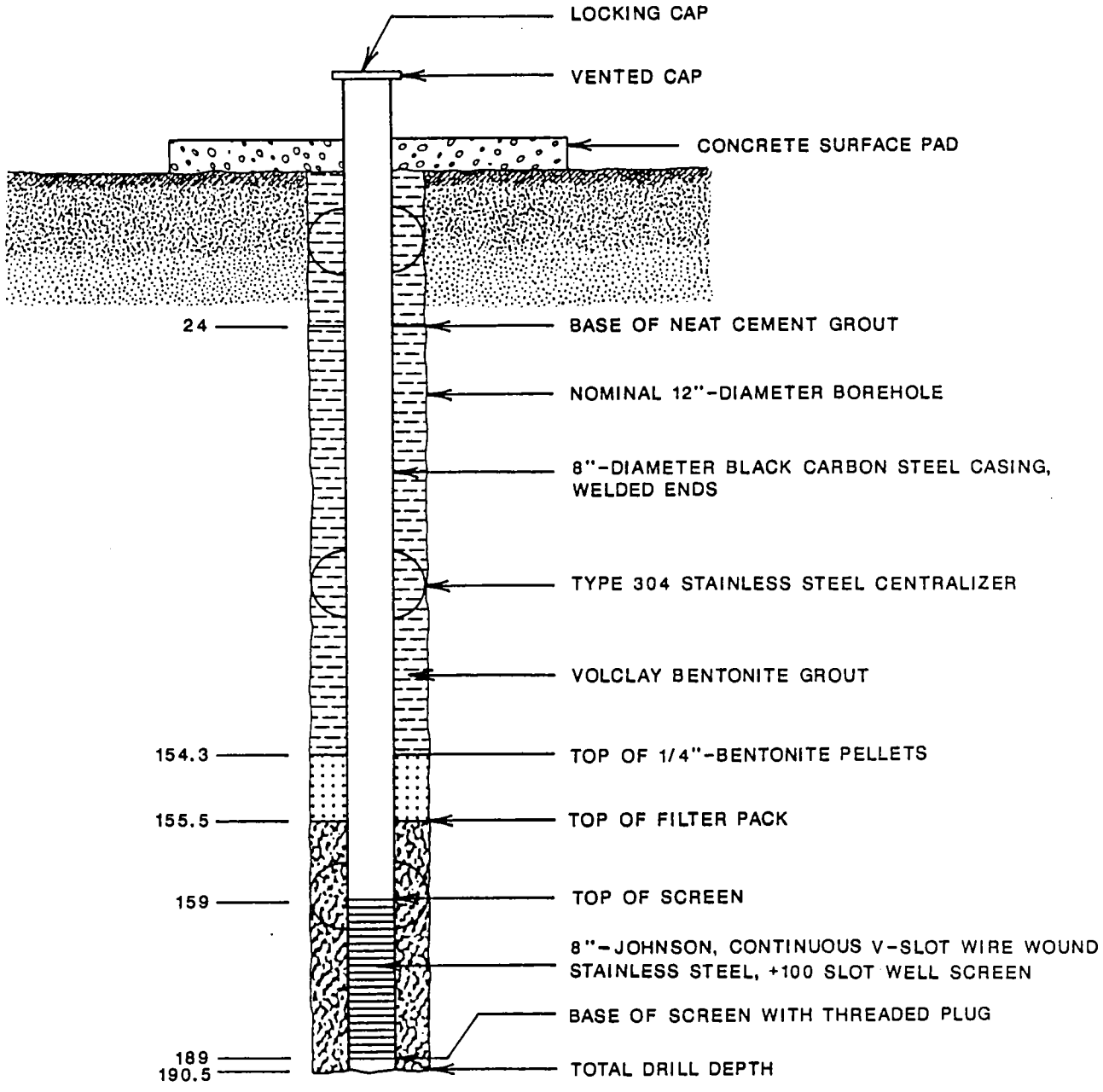
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO.: MWR-6B

PROJECT:

LOCATION:	COORDINATES:	GROUND ELEVATION:	MEASURING PT. ELEVATION:
		128.32 - Pad	132.34 - Steel
GEOLOGIST:	DRILLING CONTRACTOR:	DRILLING METHOD:	RIG TYPE:
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD:	VOLUME EVACUATED:	WELL COMPLETED:	MONITORED FORMATION:
Air Lift		07-10-87	



ALL MEASUREMENTS FEET BELOW LAND SURFACE

NOT TO SCALE

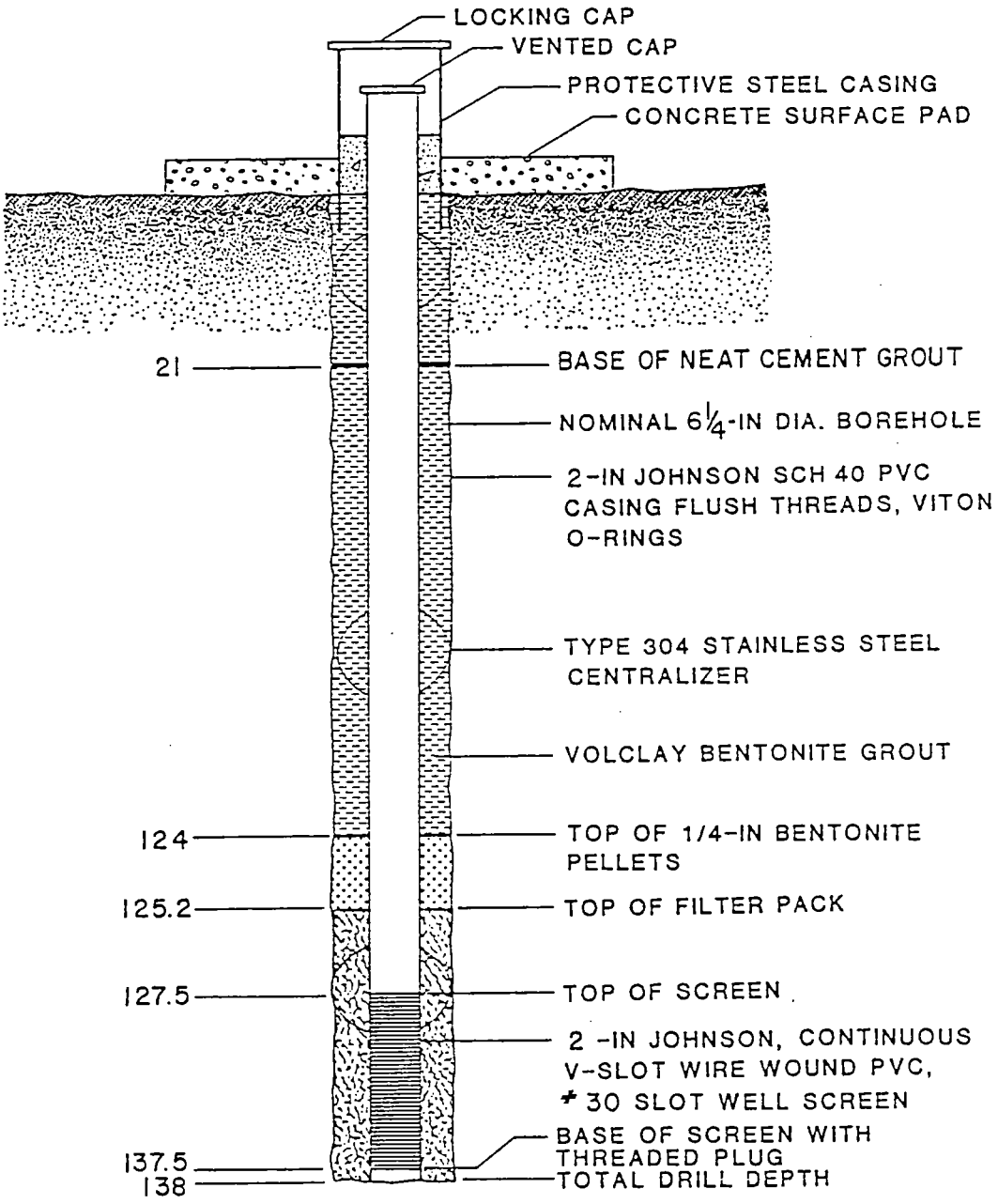
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-7A

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		126.77 - Pad	129.38 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-16-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

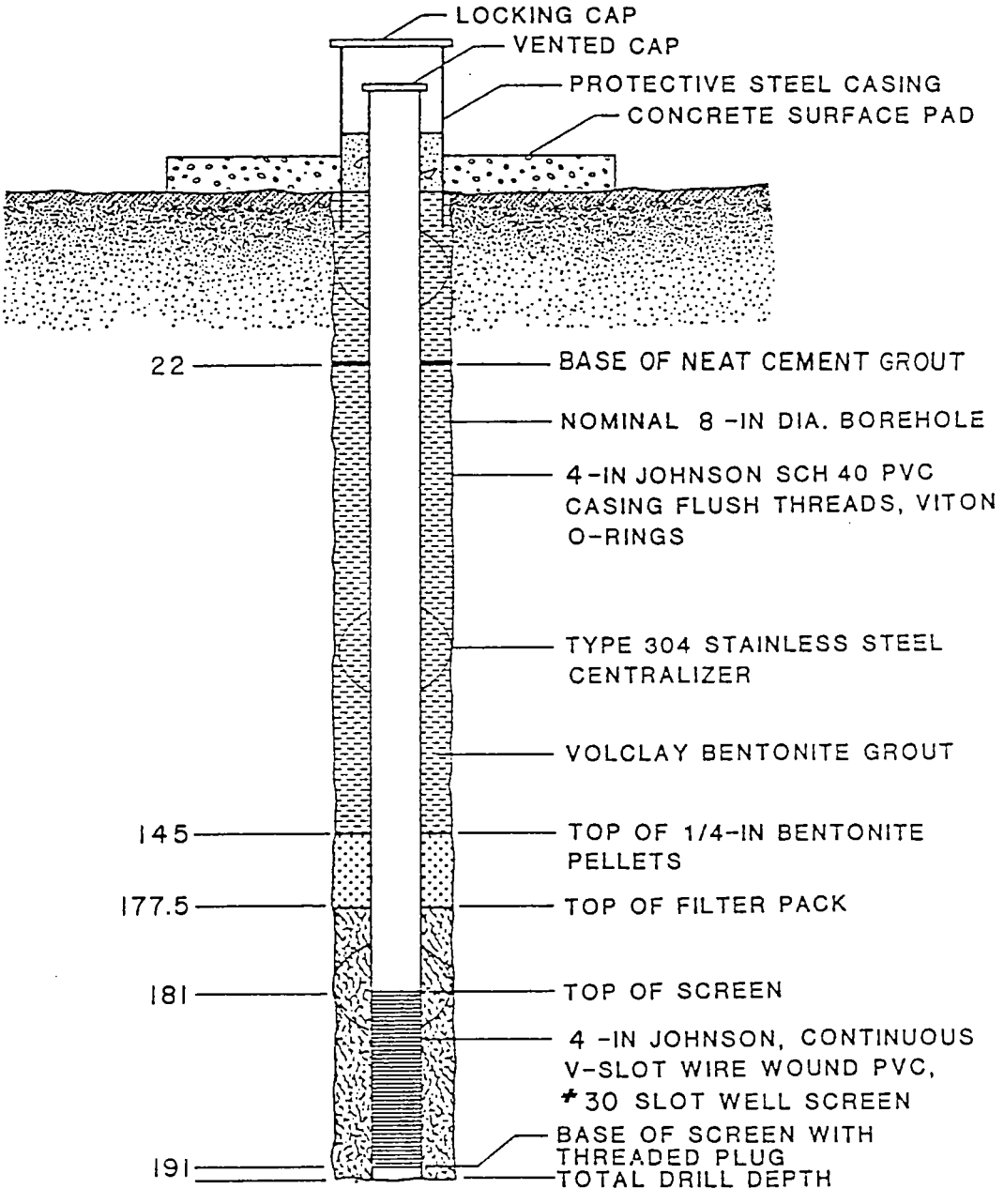
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-7B

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		126.47 - Pad	129.68 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-16-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

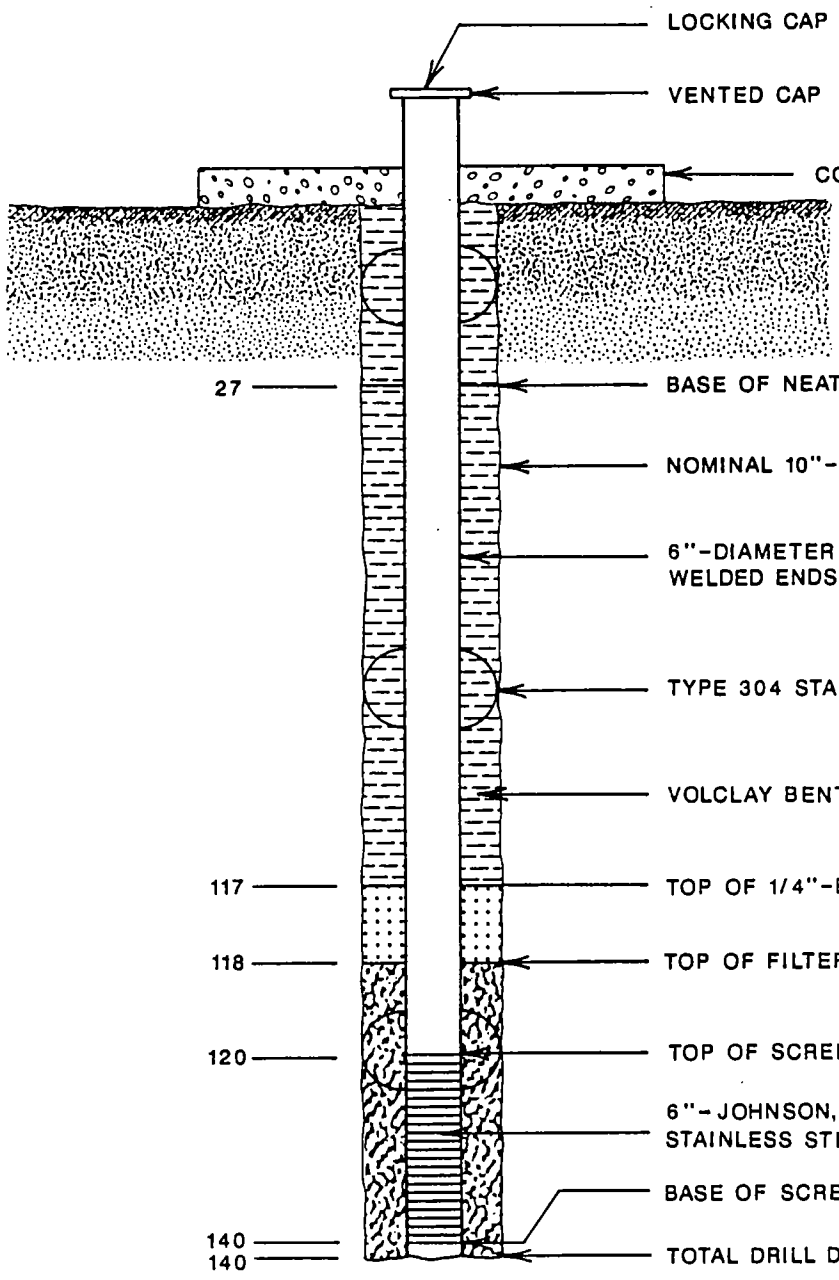
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO.: MWR-8A

PROJECT:

LOCATION:	COORDINATES:	GROUND ELEVATION:	MEASURING PT. ELEVATION:
		137.86 - Pad	139.02 - Steel
GEOLOGIST:	DRILLING CONTRACTOR:	DRILLING METHOD:	RIG TYPE:
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD:	VOLUME EVACUATED:	WELL COMPLETED:	MONITORED FORMATION:
Air Lift		07-02-87	



ALL MEASUREMENTS FEET BELOW LAND SURFACE

NOT TO SCALE

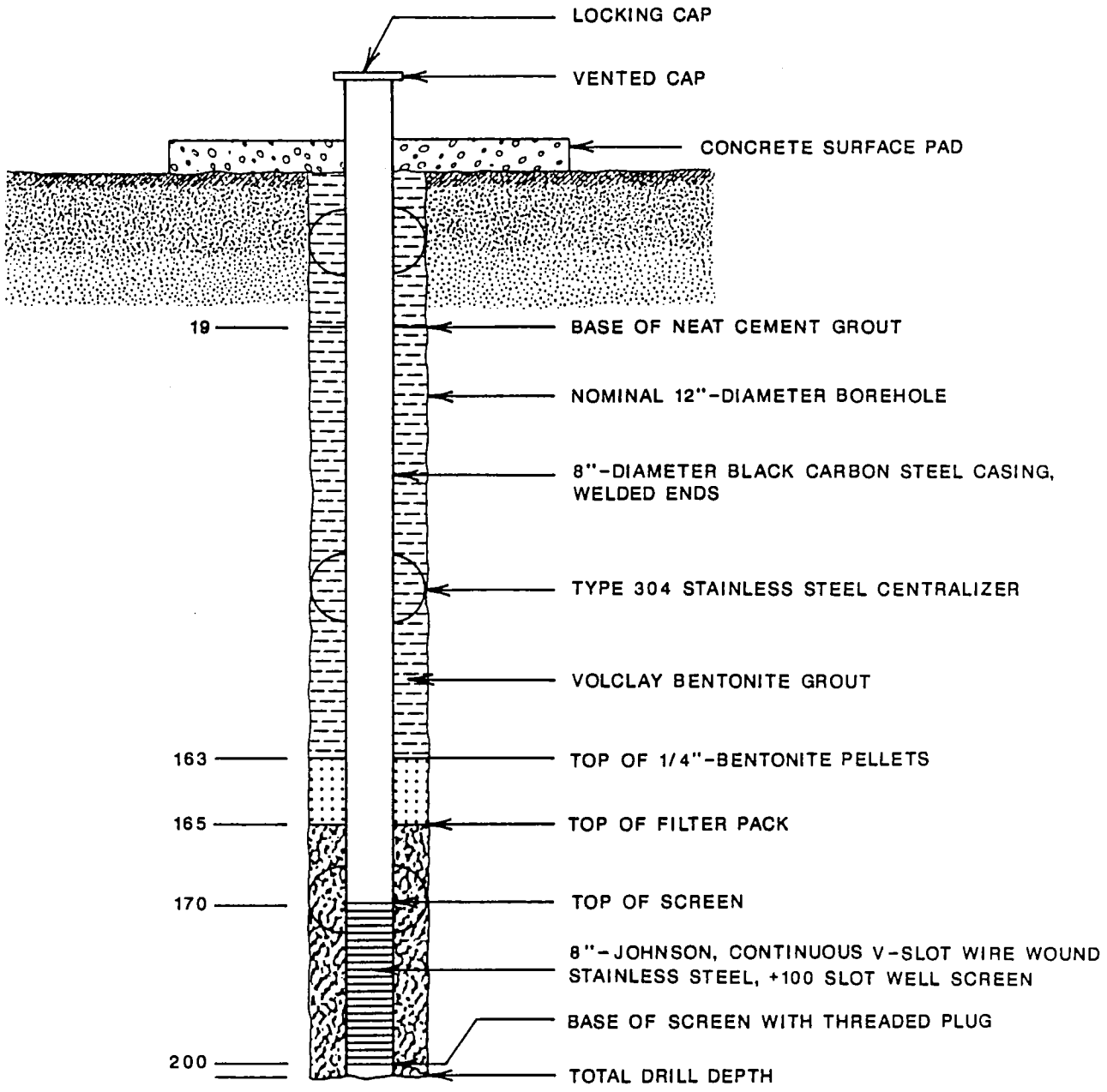
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO.: MWR-8B

PROJECT:

LOCATION:	COORDINATES:	GROUND ELEVATION:	MEASURING PT. ELEVATION:
		138.13 - Pad	139.54 - Steel
GEOLOGIST:	DRILLING CONTRACTOR:	DRILLING METHOD:	RIG TYPE:
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD:	VOLUME EVACUATED:	WELL COMPLETED:	MONITORED FORMATION:
Air Lift		07-02-87	



ALL MEASUREMENTS FEET BELOW LAND SURFACE

NOT TO SCALE

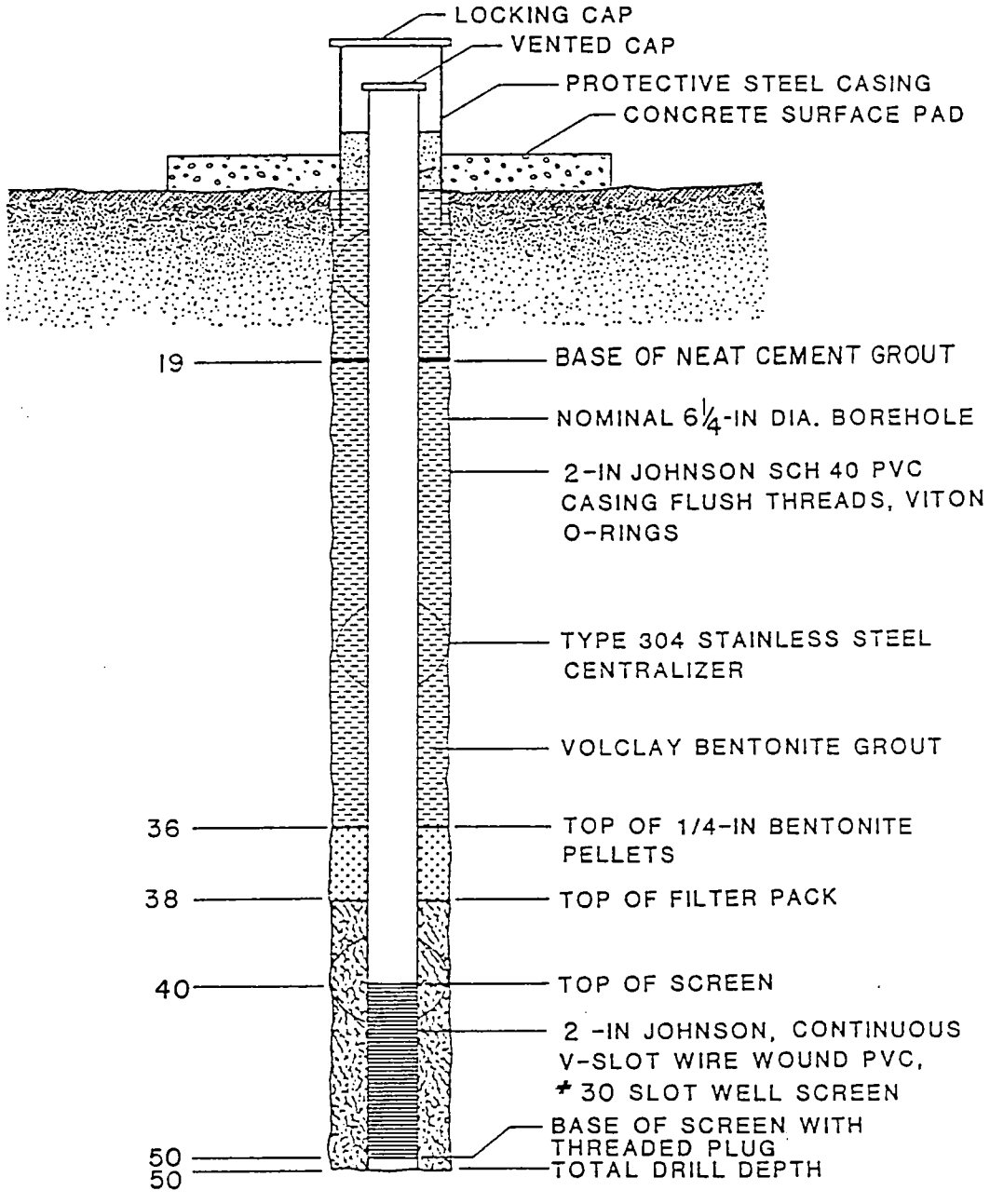
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-8S

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		137.63 - Pad	140.92 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		06-25-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

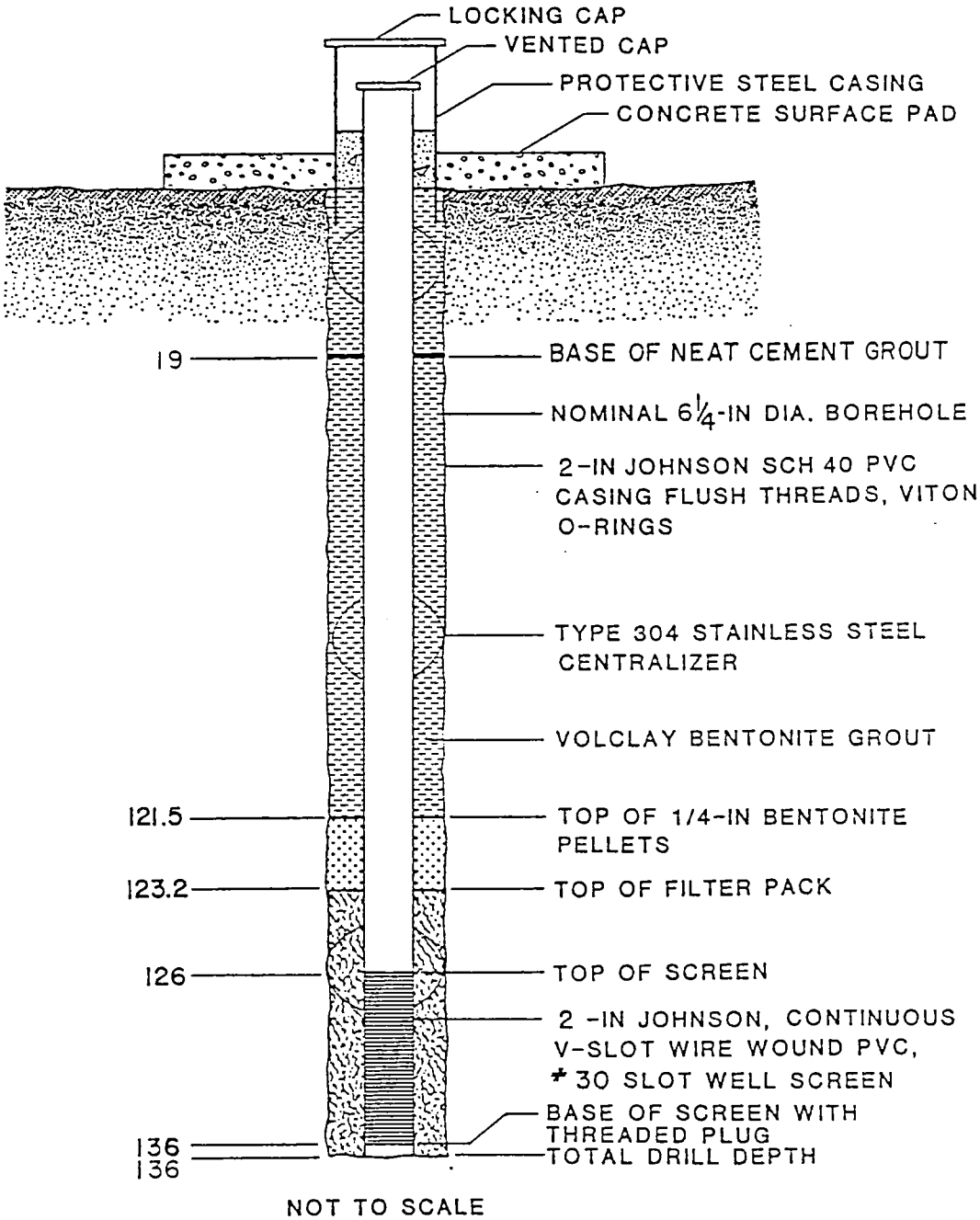
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-9A

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		138.16 - Pad	141.45 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		06-18-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

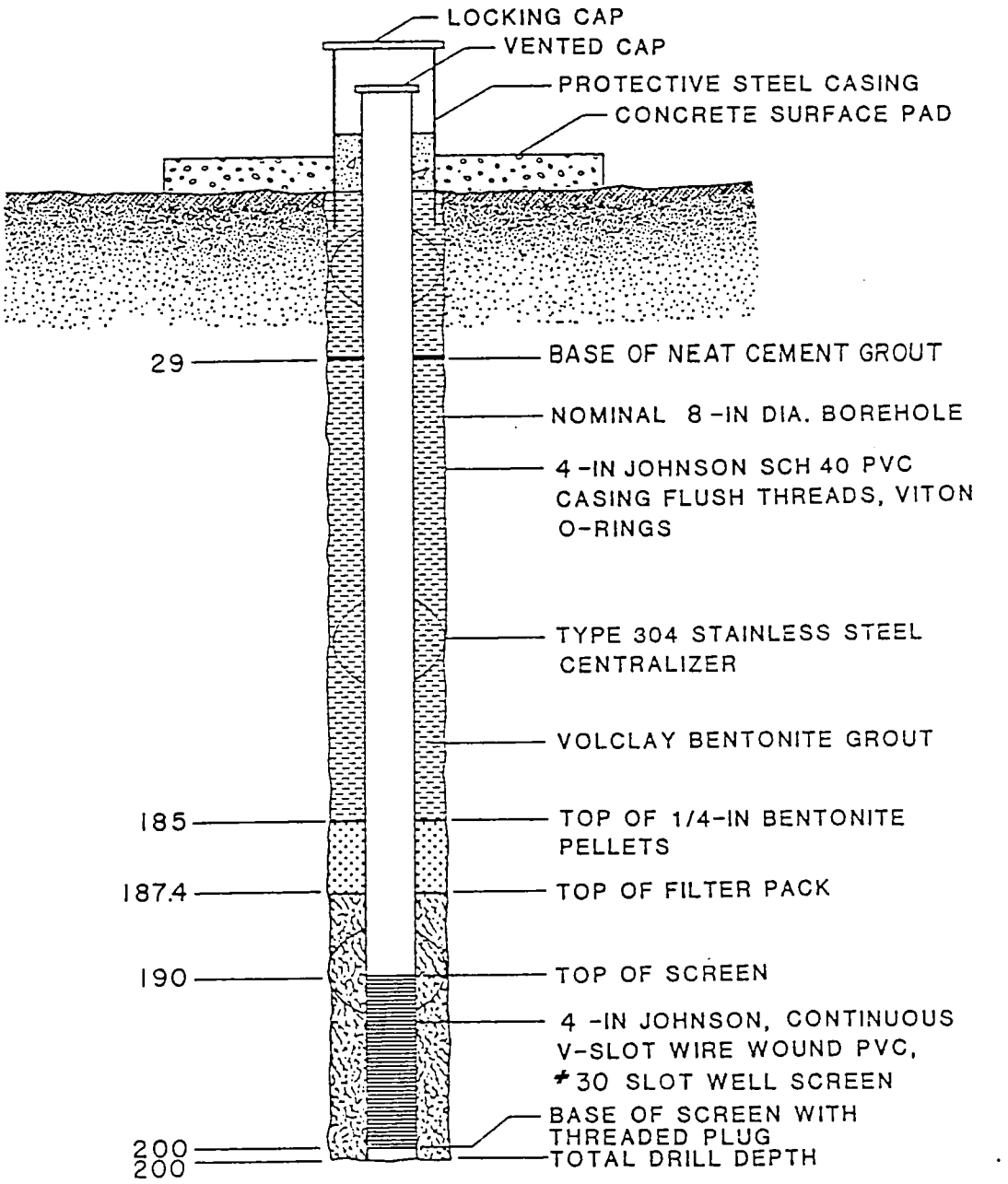
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-9B

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		138.71 - Pad	141.73 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		06-30-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

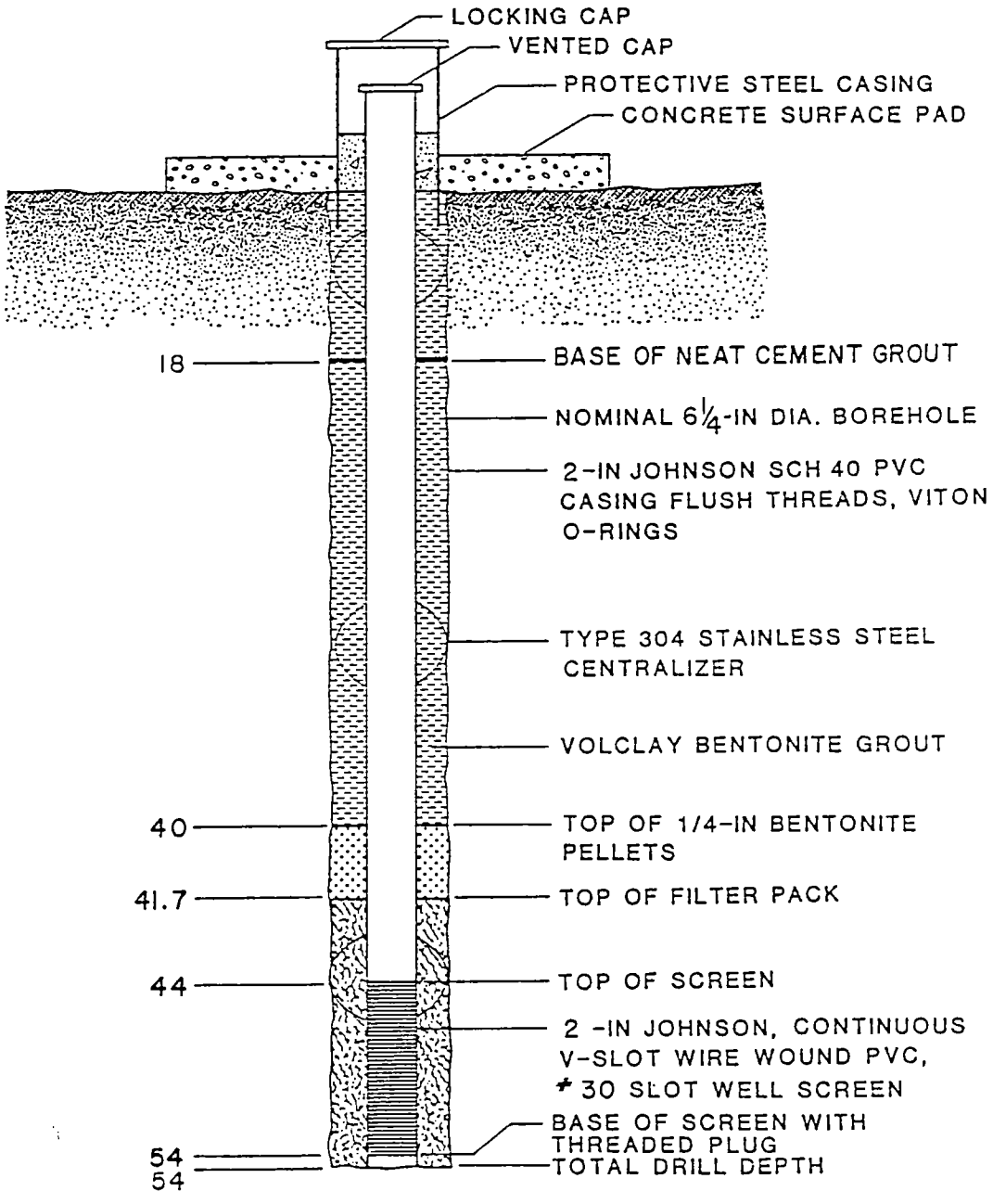
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-9S

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		138.11 - Pad	141.47 - Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		06-18-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

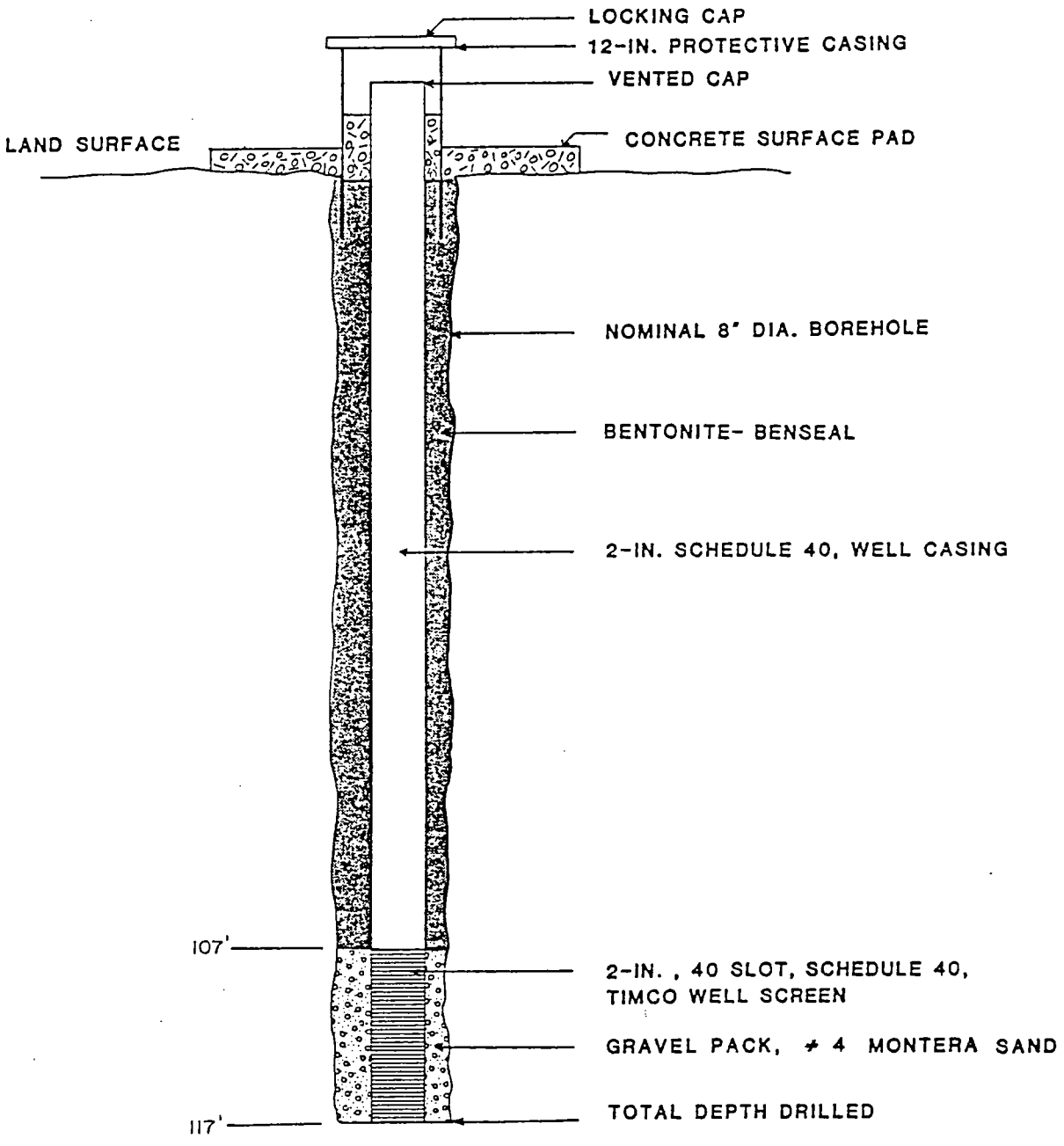
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-10A

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		138.05-pad	139.69
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift			



NOT TO SCALE

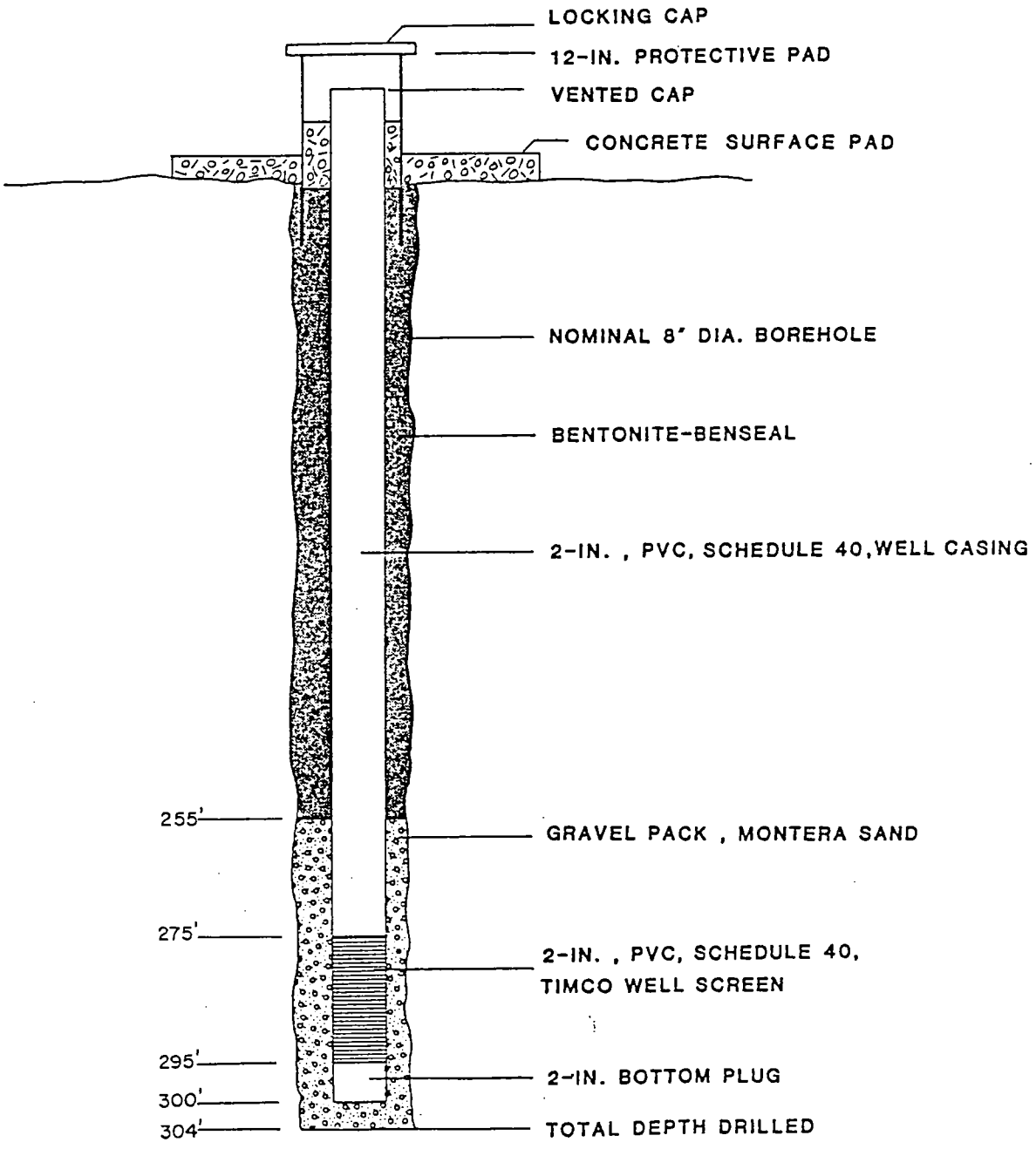
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-11D

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		137.12-pad	138.41-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift			



NOT TO SCALE

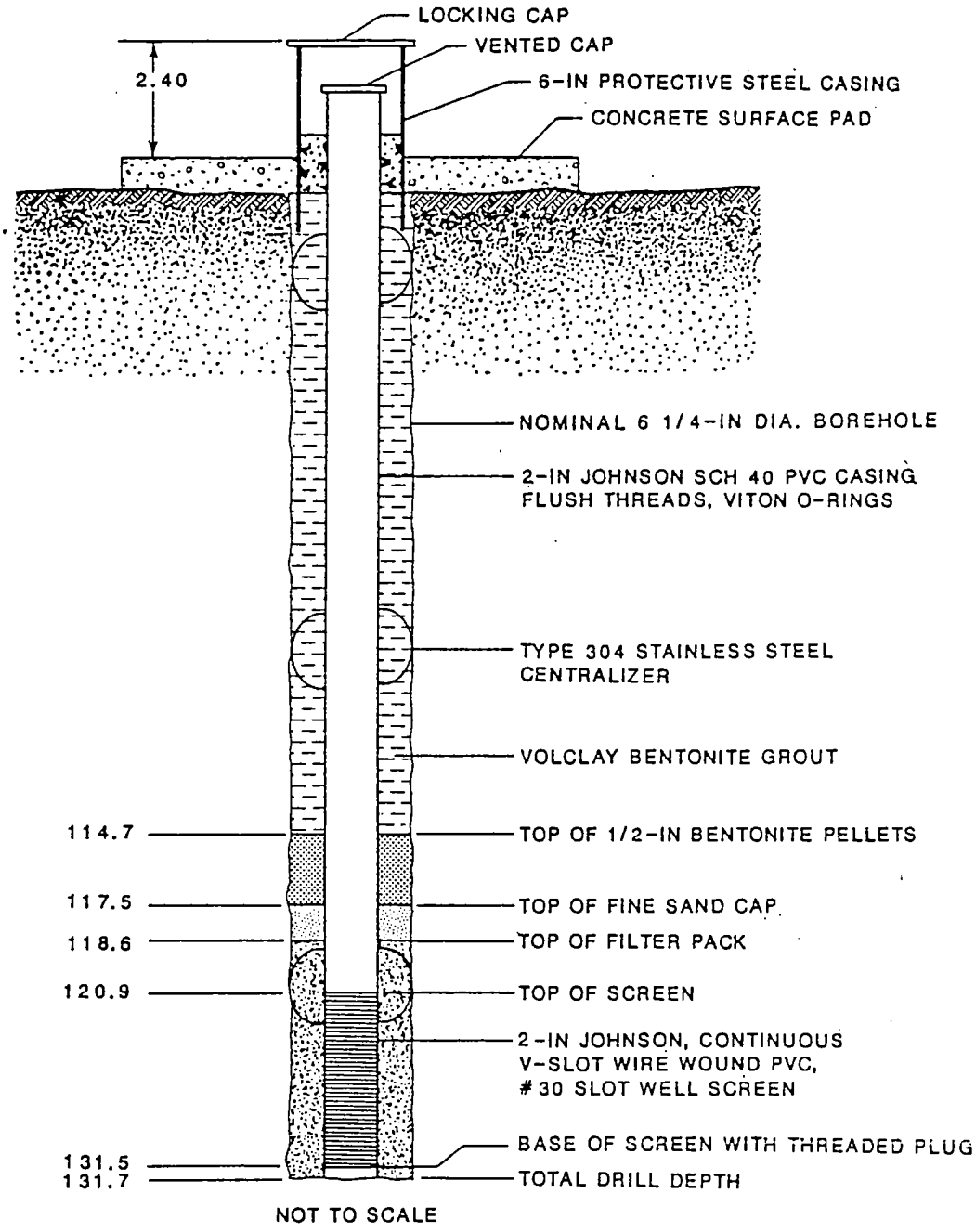
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. **MW-12A**

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility			
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	1 hour	06/05/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

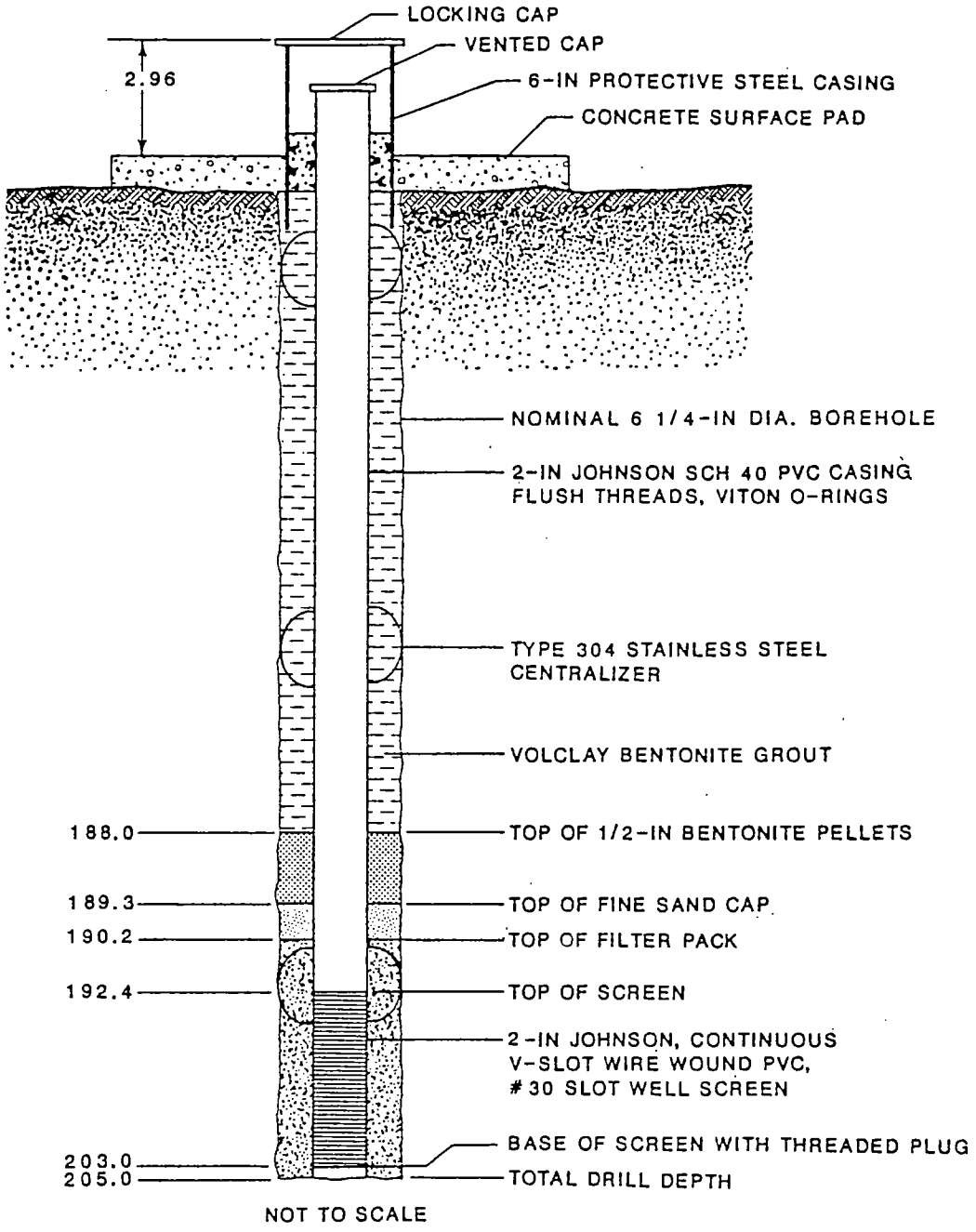
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. **MW-12B**

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility			
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	1 hour	06/06/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

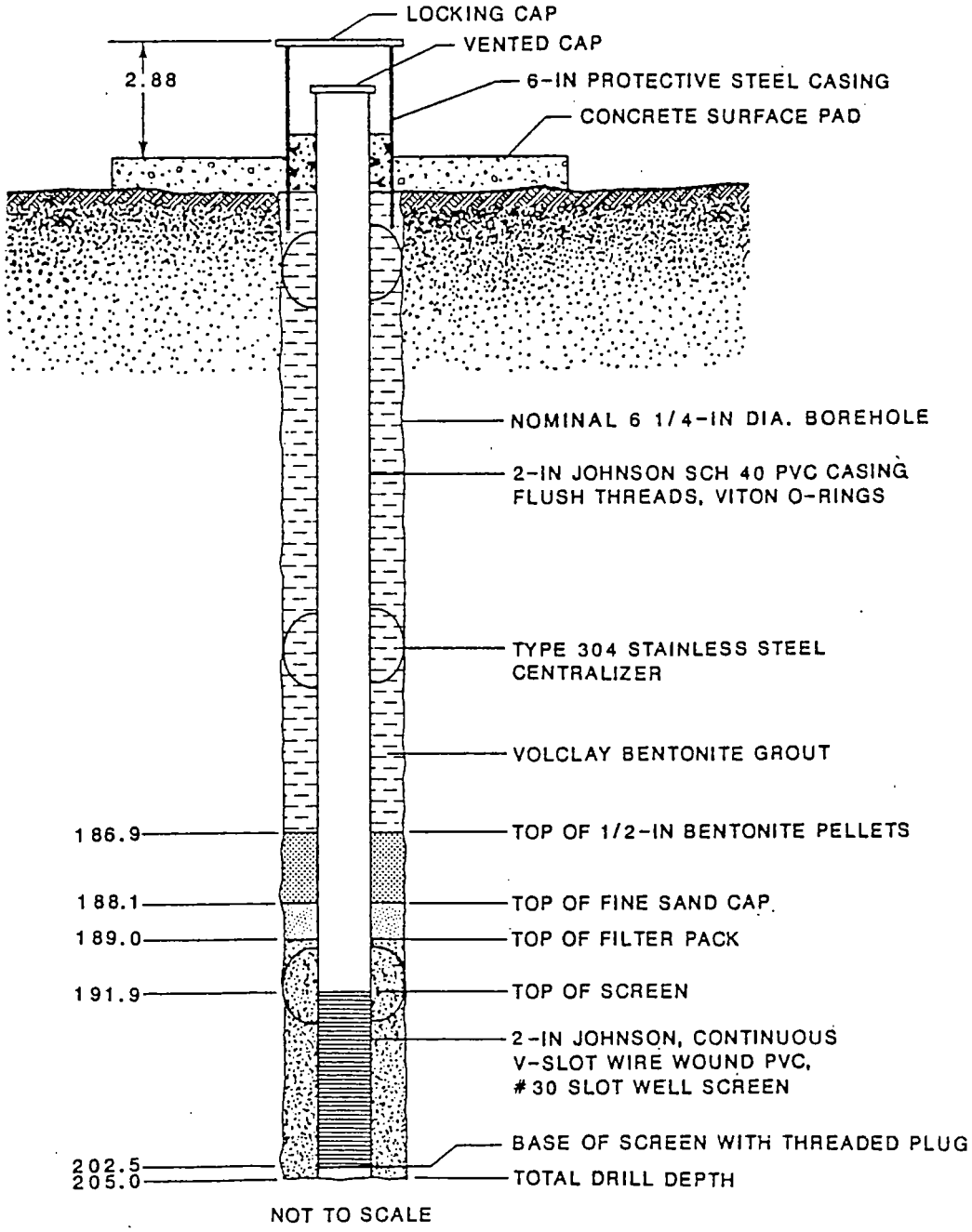
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. **MW-13B**

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility			
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	30 minutes	06/03/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

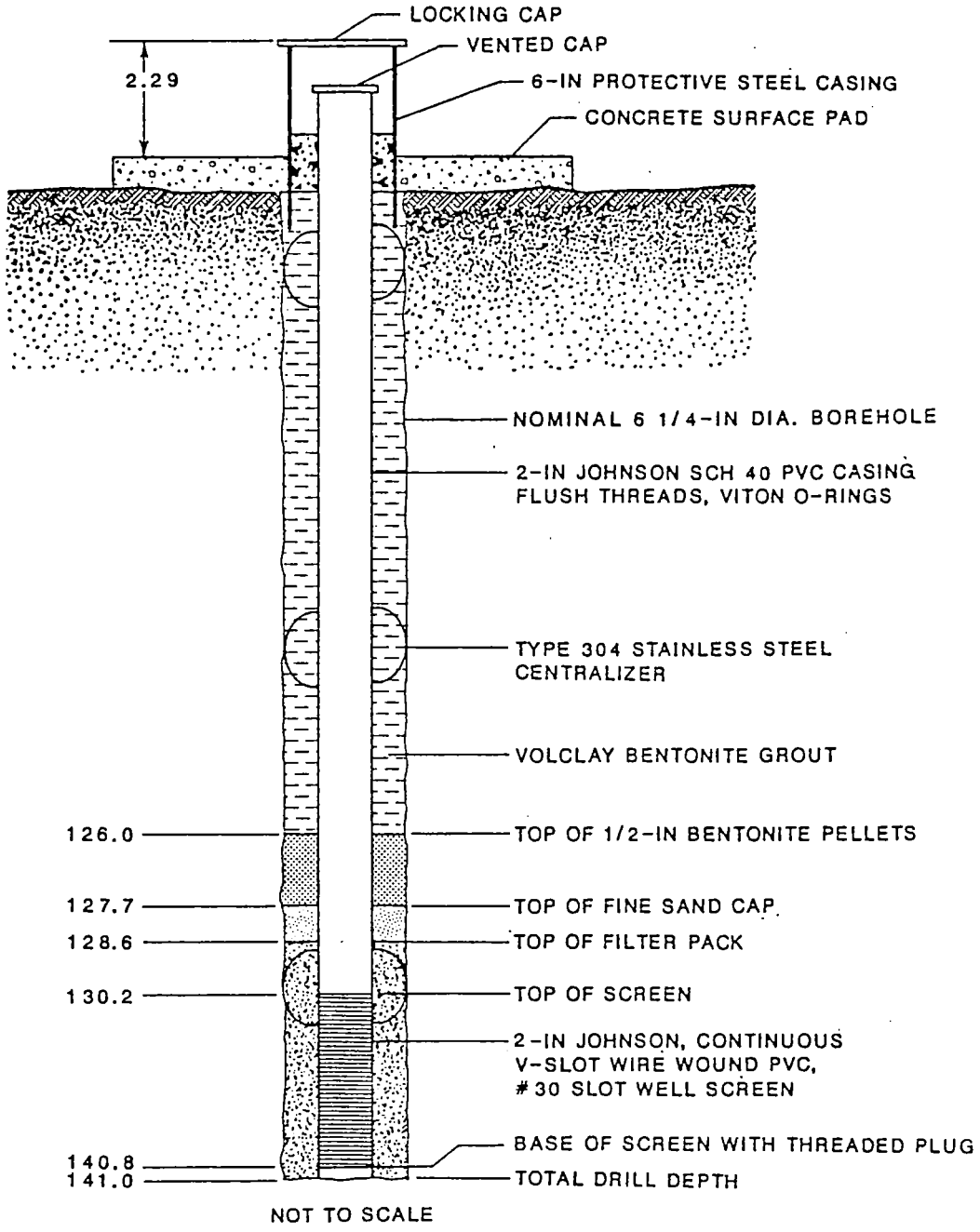
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-14A

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility			
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	30 minutes	06/10/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

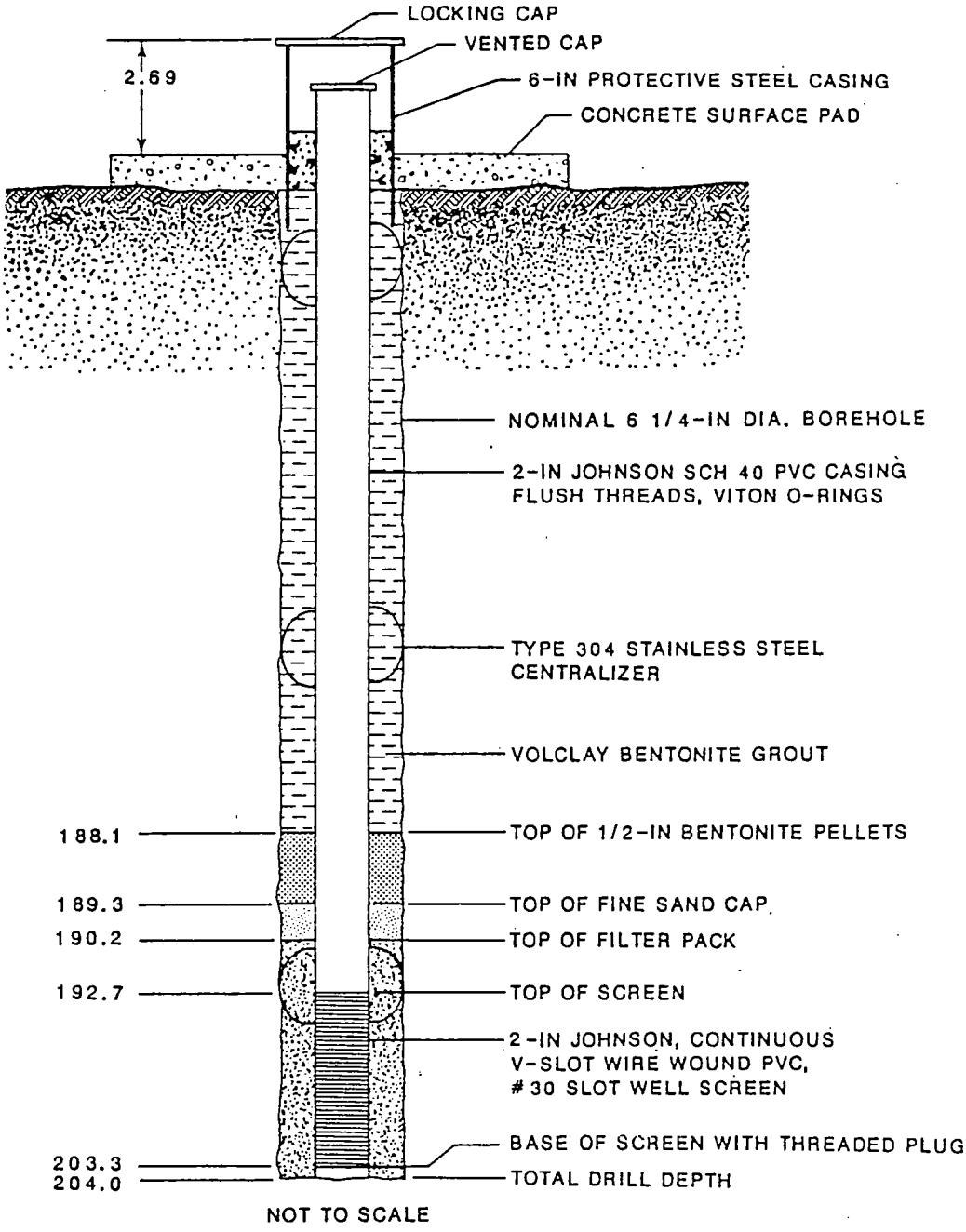
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. **MW-14B**

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility			
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	30 minutes	06/04/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

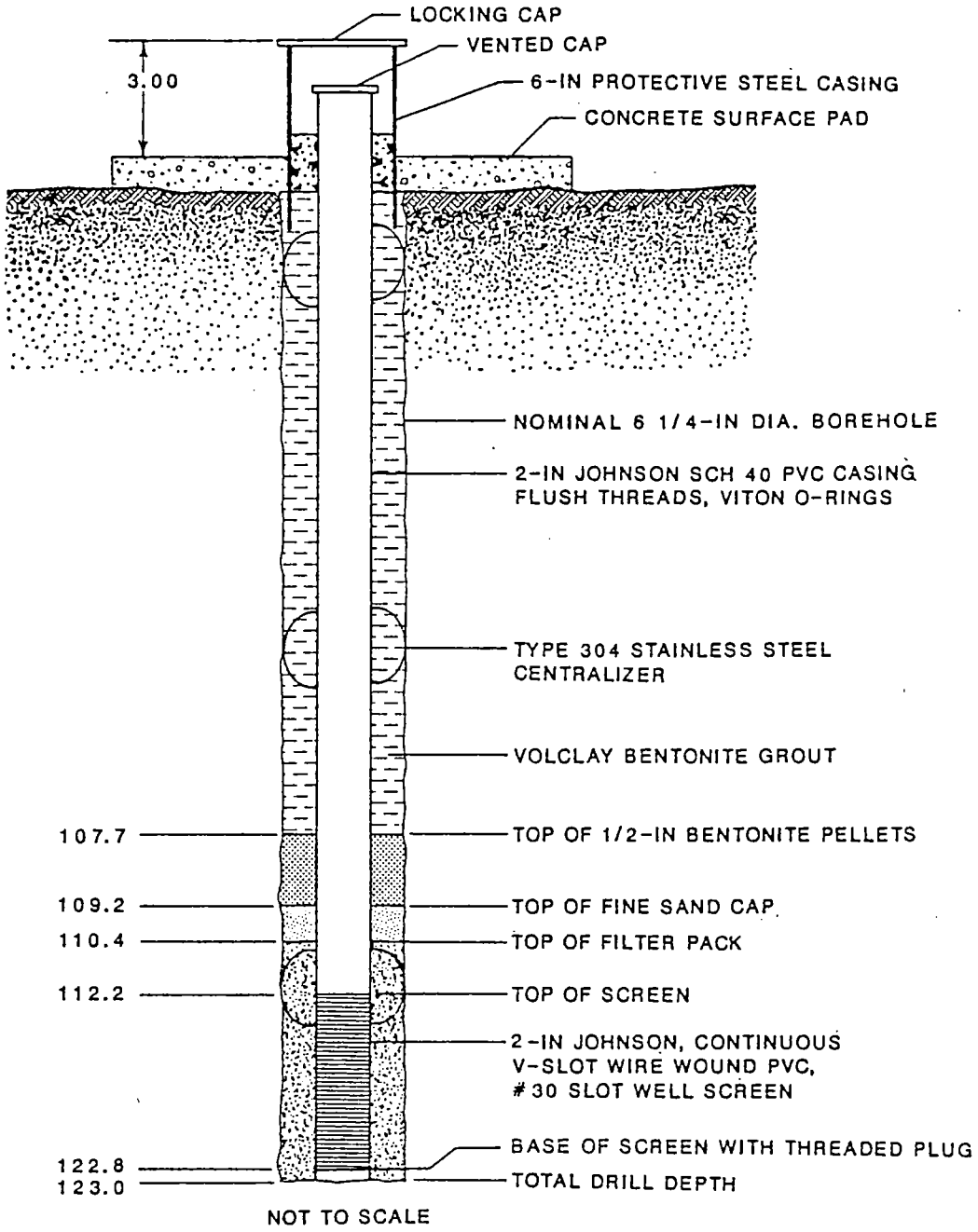
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-15A

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility			
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	2 hours	06/12/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

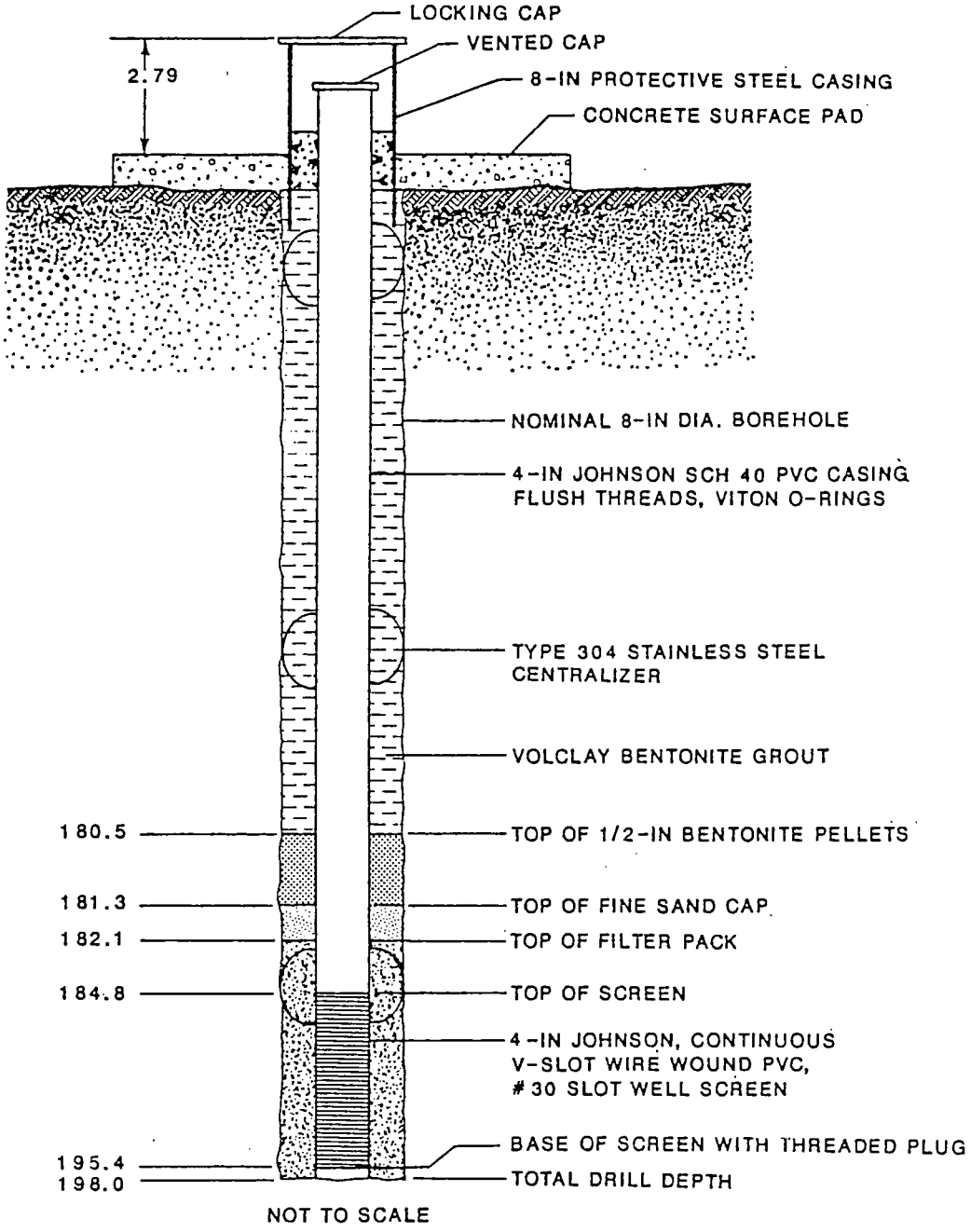
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. **MW-15B**

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		138.67-pad	141.49-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	1 hour	05/17/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

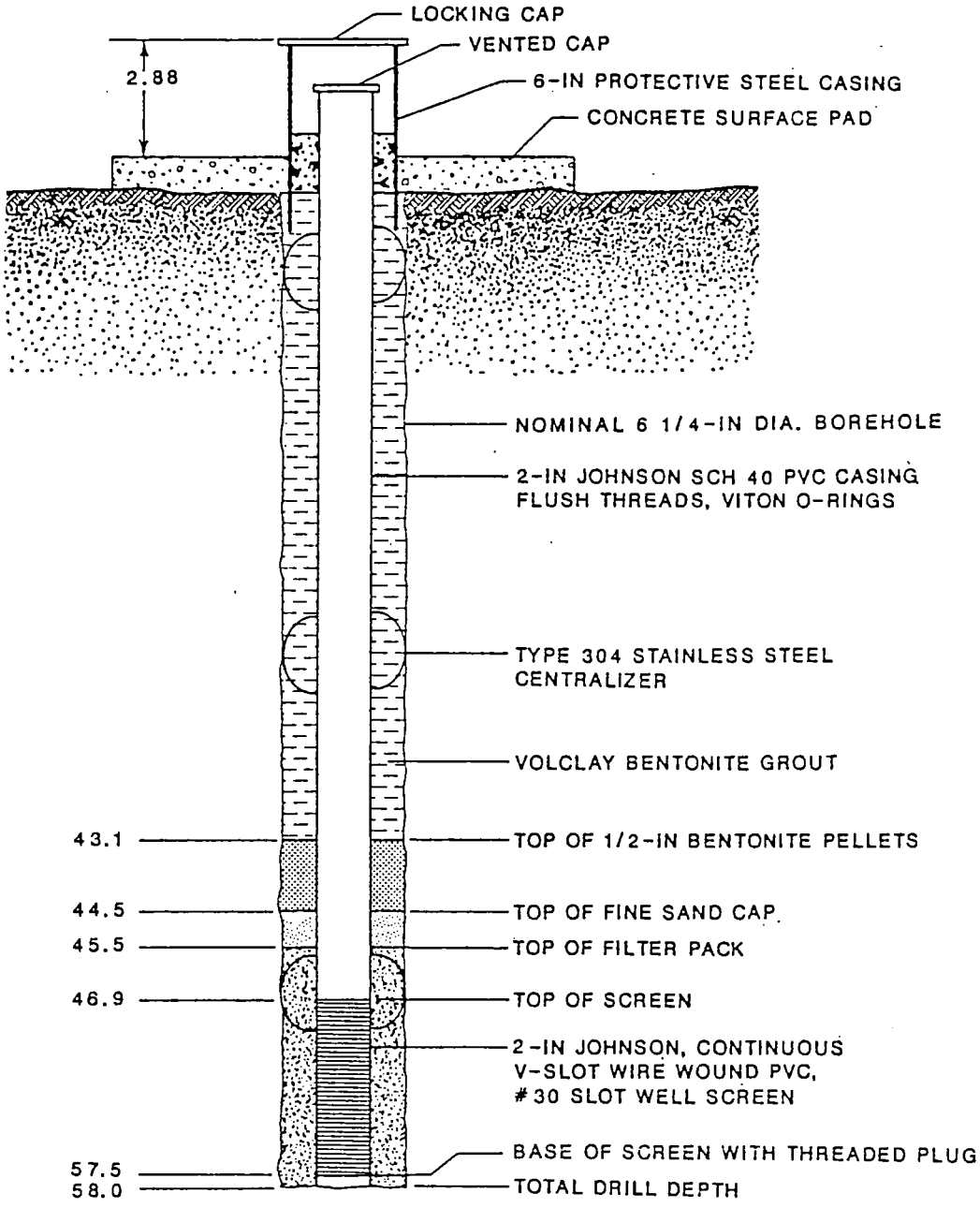
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. **MW-15S**

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		139.06-pad	142.35-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	3 hours	05/15/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

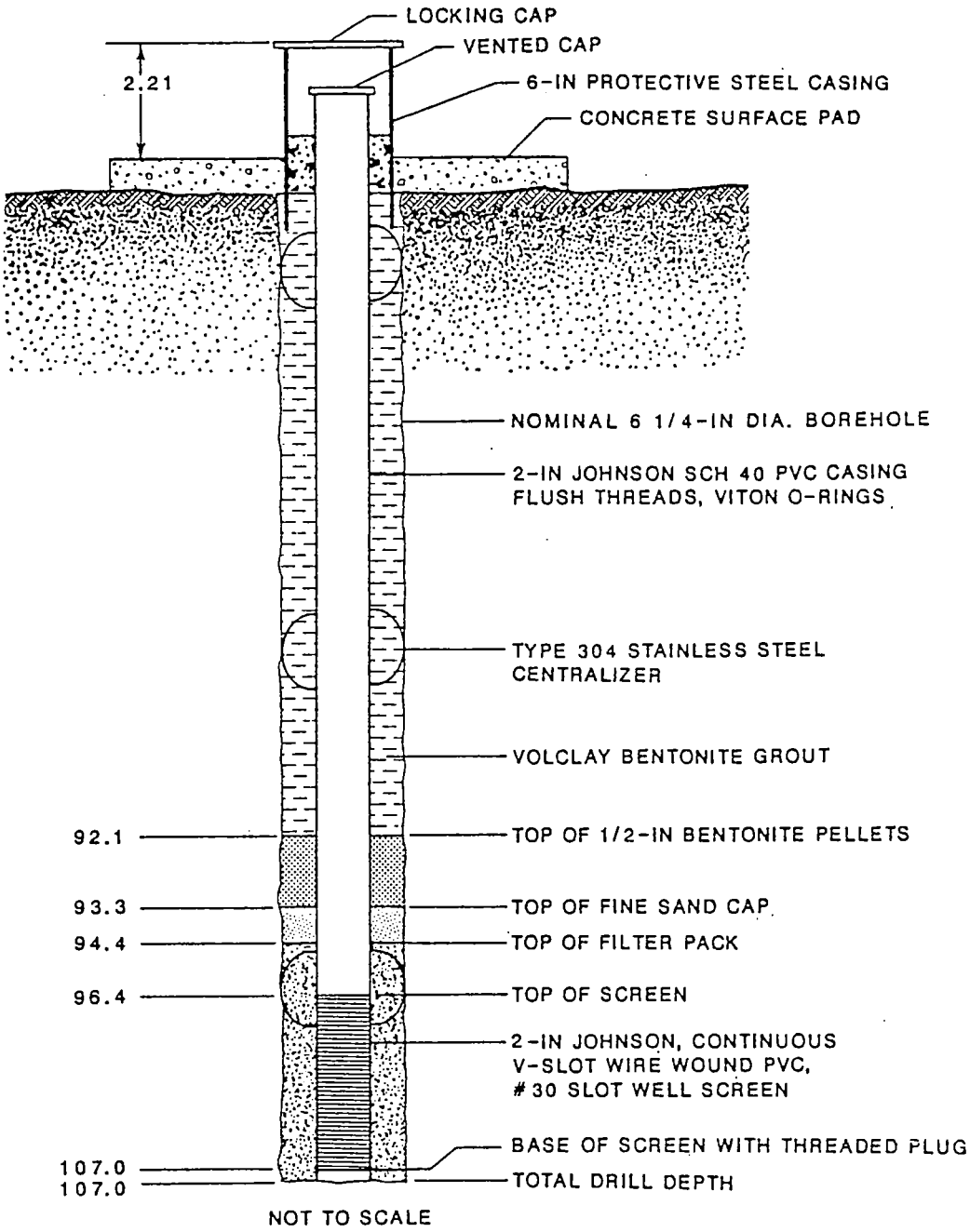
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-16A

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		142.03-pad	144.24-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG. TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	1 hour 30 minutes	06/11/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

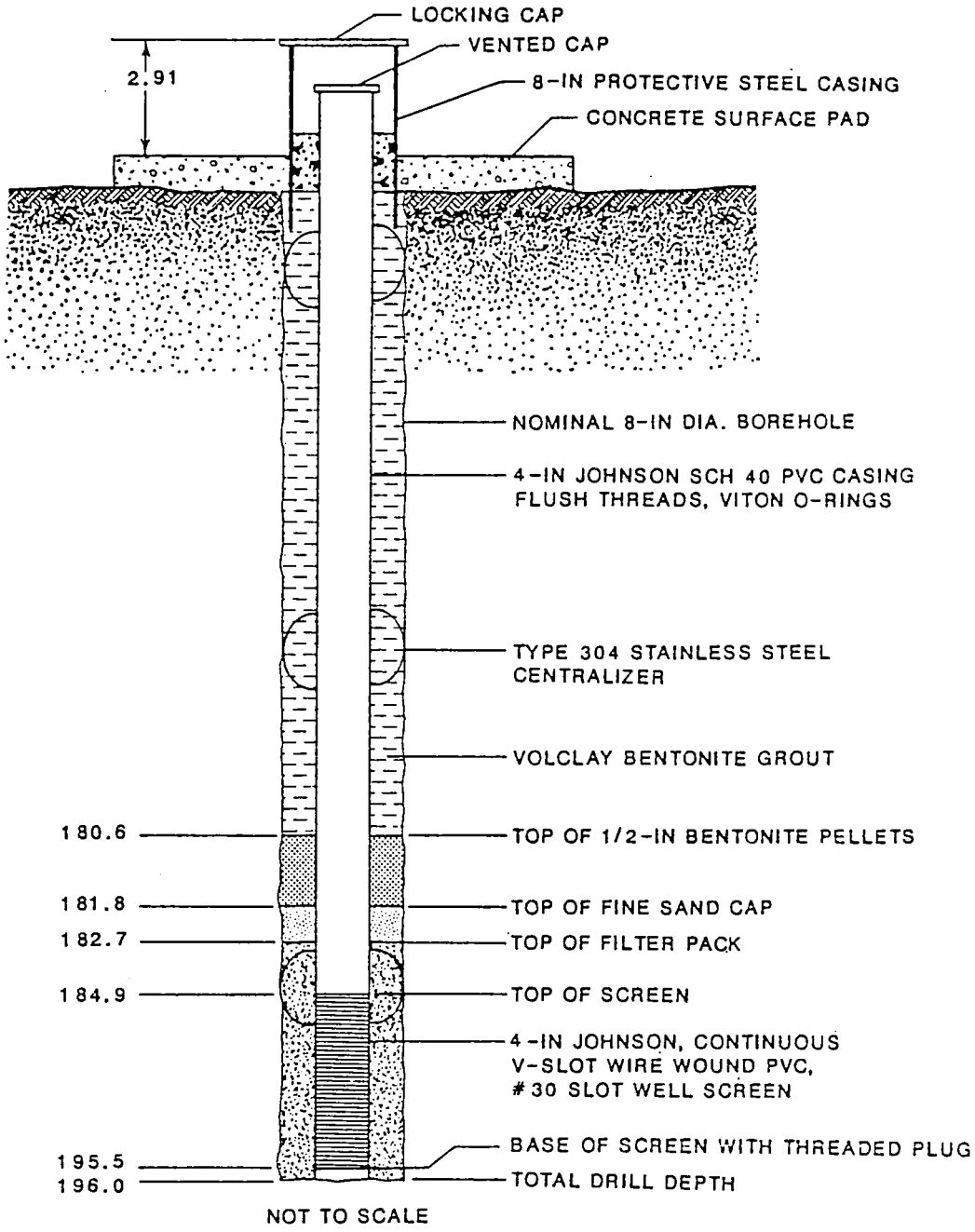
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-16B

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		141.85-pad	144.76-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	30 minutes	05/29/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

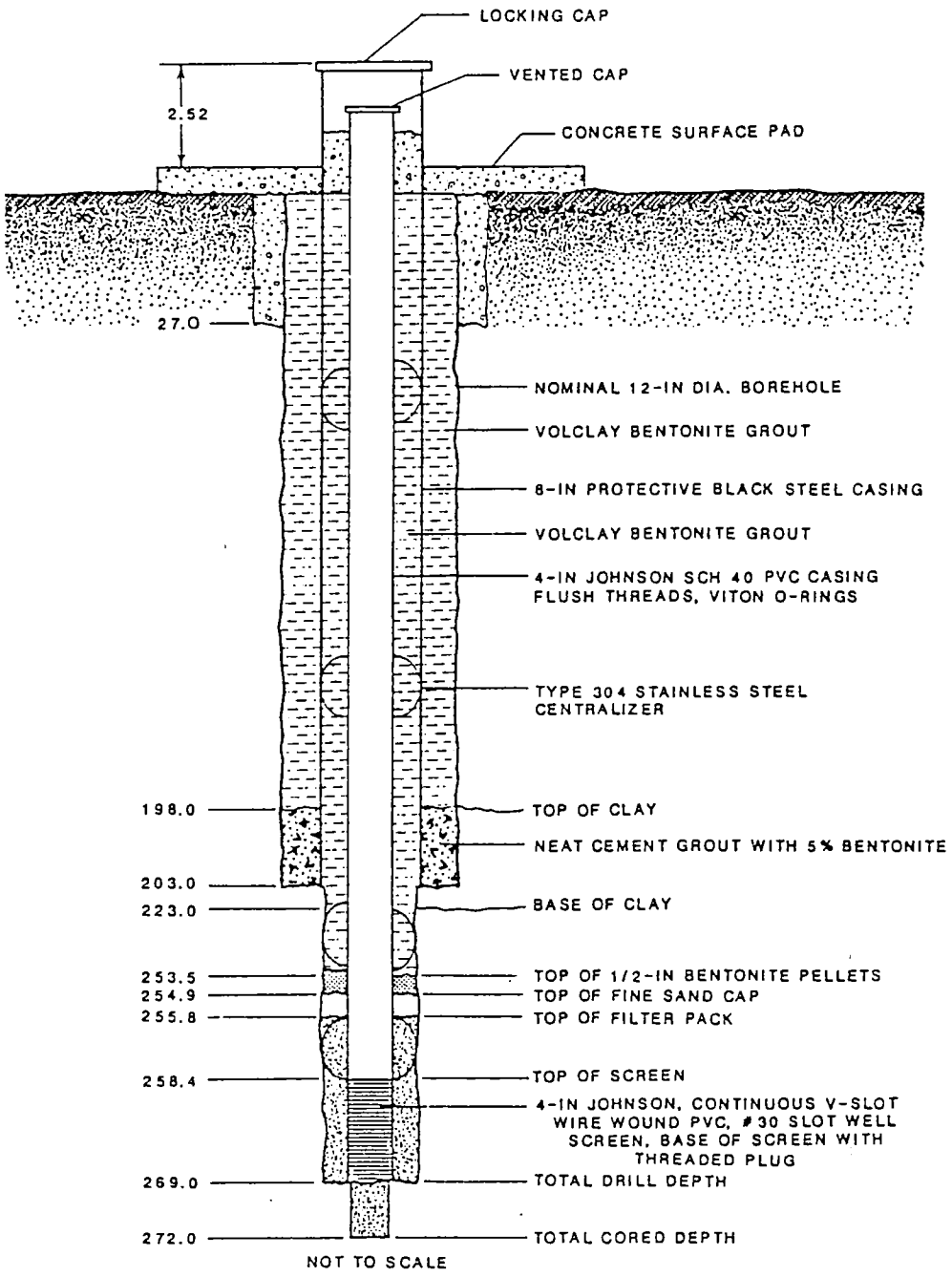
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. **MW-16D**

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		141.91-pad	144.44-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	2 hours	06/18/86	



ALL MEASUREMENTS FEET BELOW LAND SURFACE

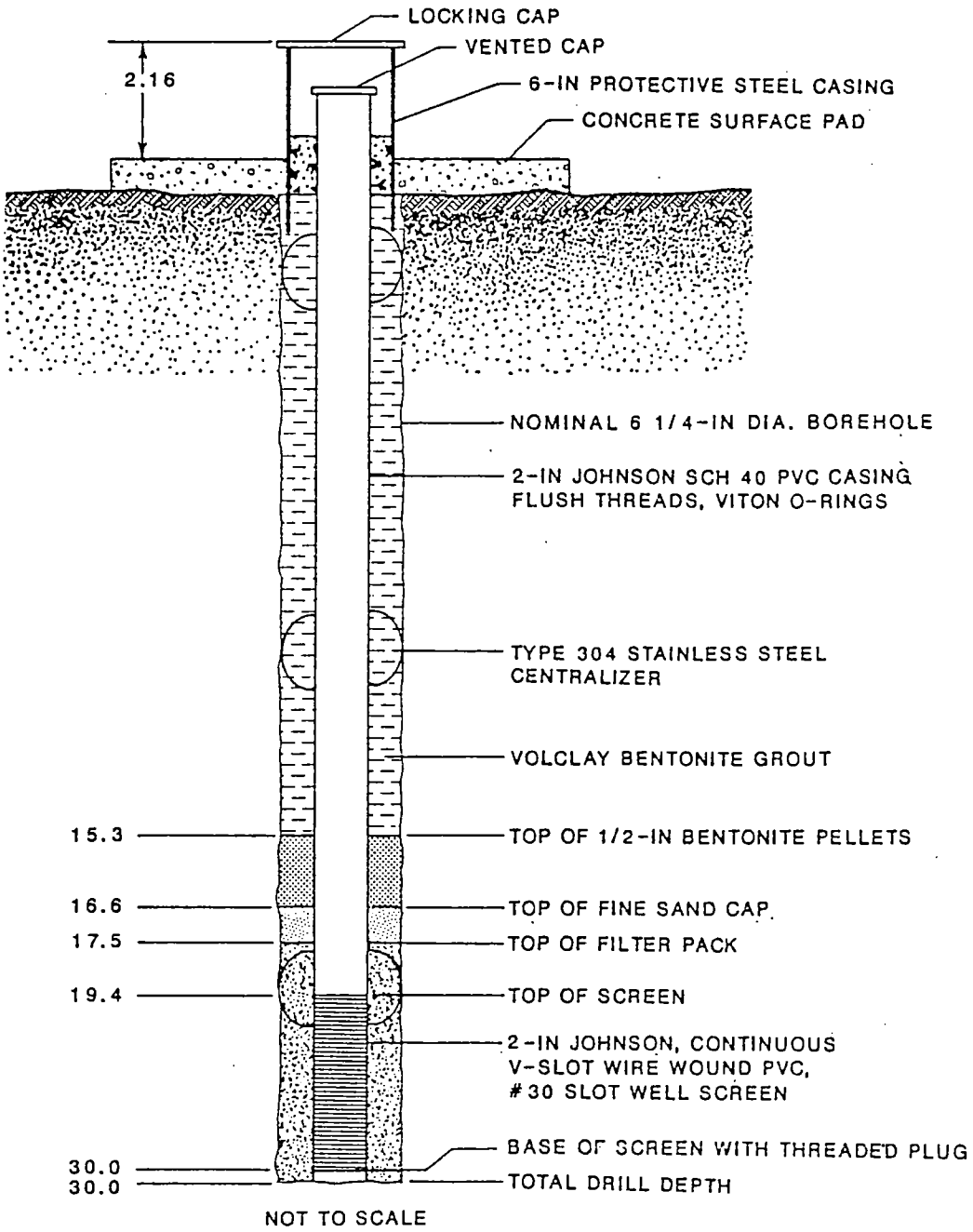
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-17S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		136.91-pad	139.09-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	2 hours	06/09/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

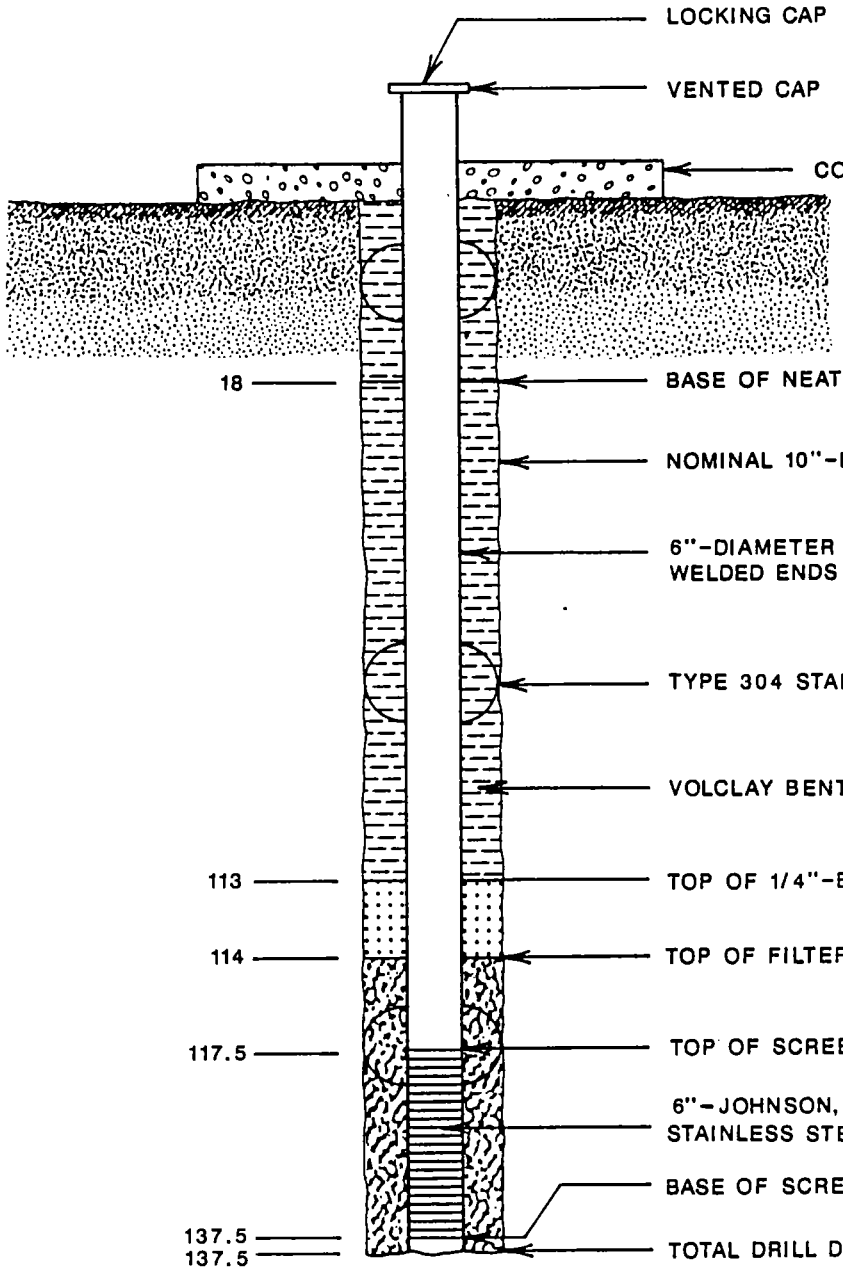
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO.: MW-18A

PROJECT:

LOCATION:	COORDINATES:	GROUND ELEVATION:	MEASURING PT. ELEVATION:
Reduction Facility		108.76	111.61 - Steel
GEOLOGIST:	**DRILLING CONTRACTOR:**	**DRILLING METHOD:**	**RIG TYPE:**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD:	**VOLUME EVACUATED:**	**WELL COMPLETED:**	**MONITORED FORMATION:**
Air Lift		07-14-87	



ALL MEASUREMENTS FEET BELOW LAND SURFACE

NOT TO SCALE

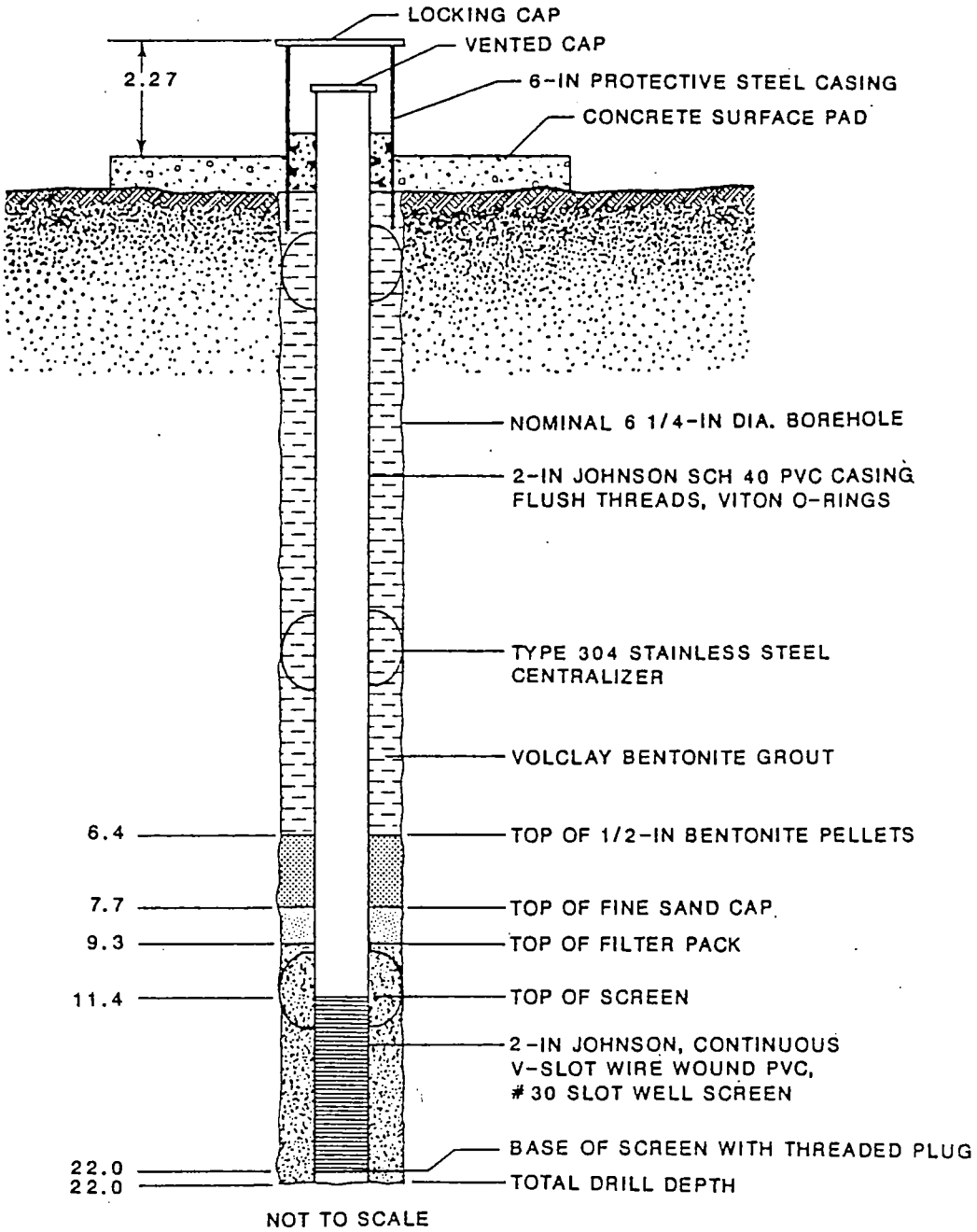
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. **MW-18S**

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		109.03-pad	111.31-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Bail	1 hour	06/09/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

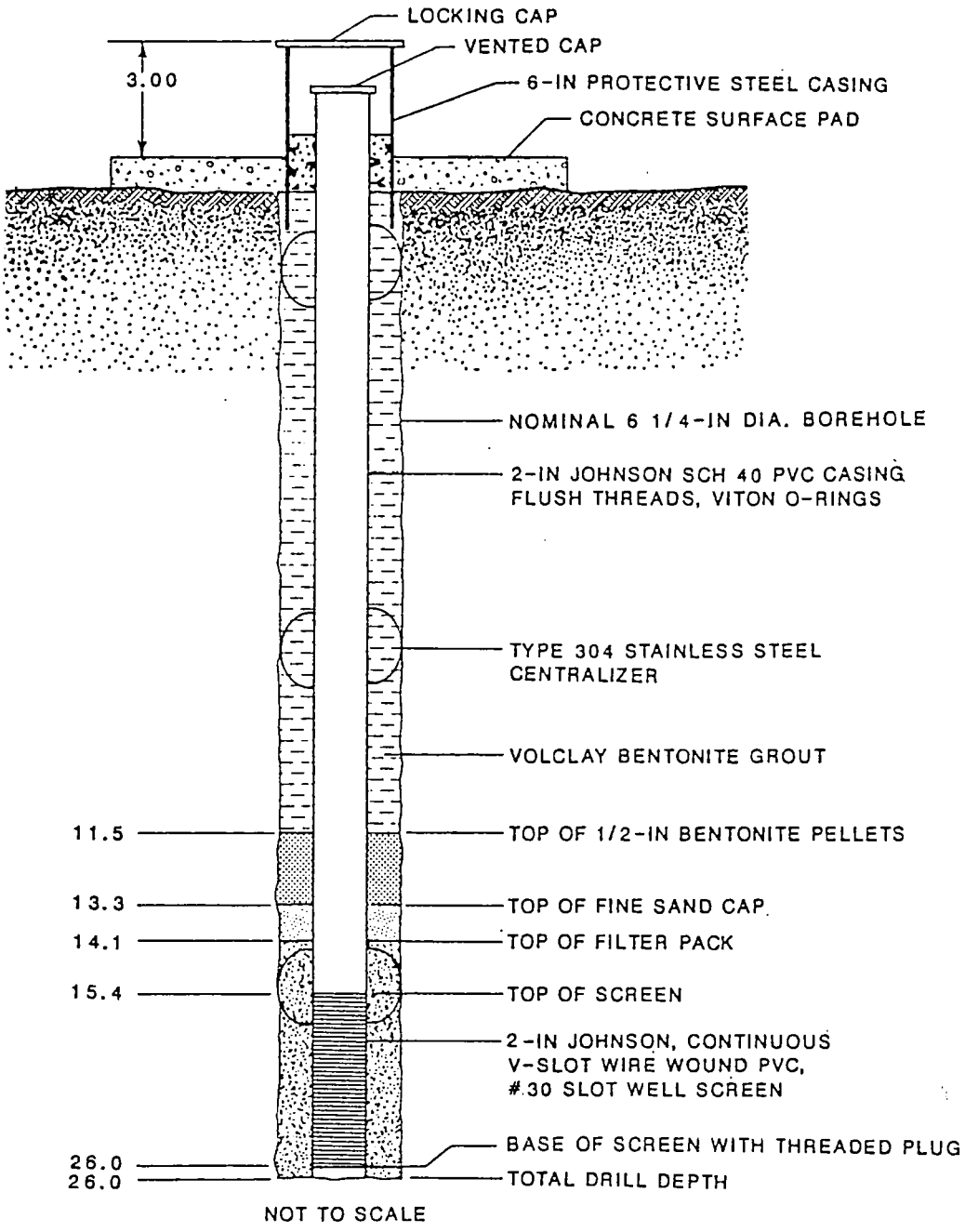
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-19S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		105.70-pad	108.71-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	1 hour	06/09/86	



ALL MEASUREMENTS FEET BELOW LAND SURFACE

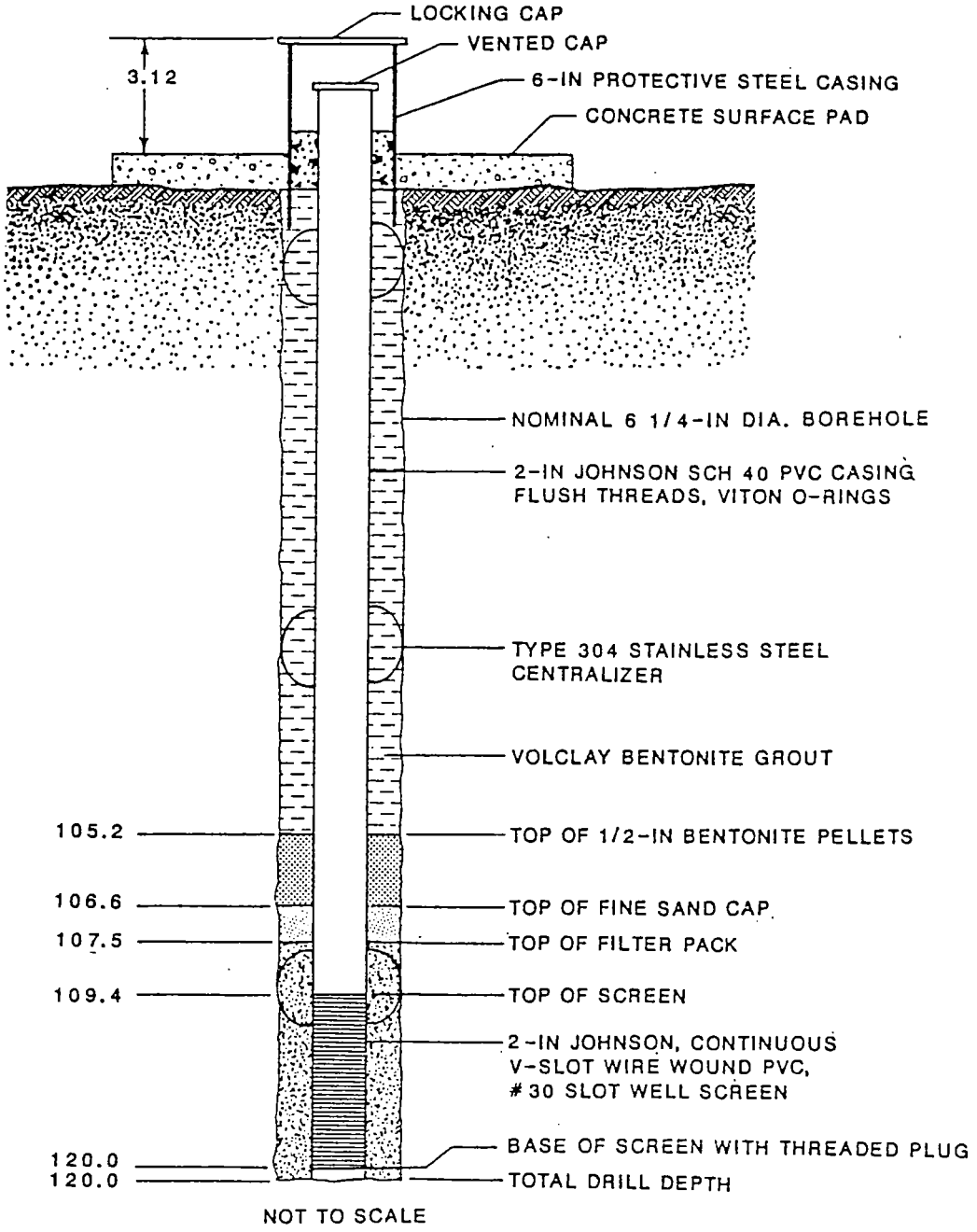
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. **MW-20A**

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		107.51-pad	110.67-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	30 minutes	06/12/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

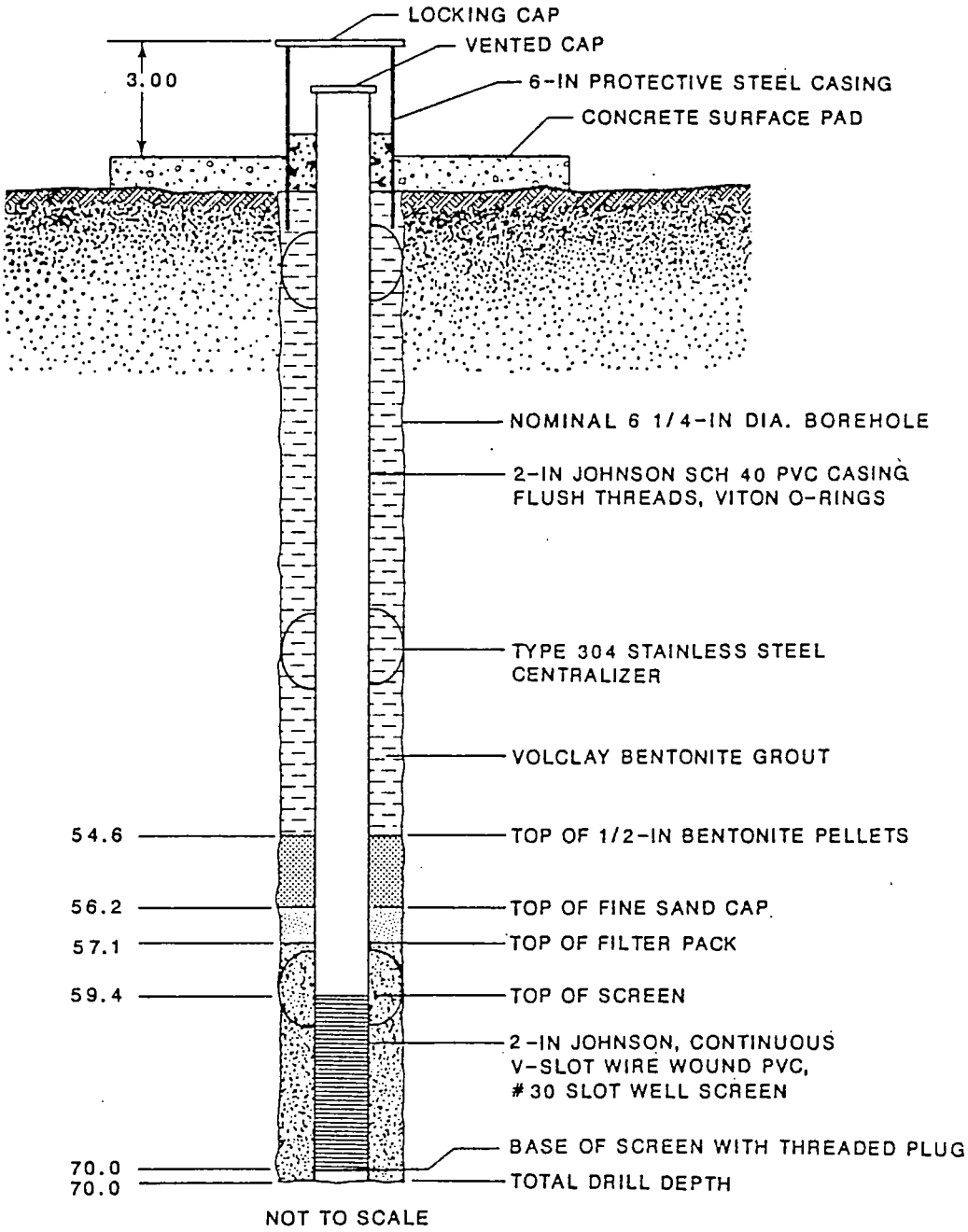
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-20S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		107.96-pad	110.97-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	1 hour 30 minutes	06/13/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

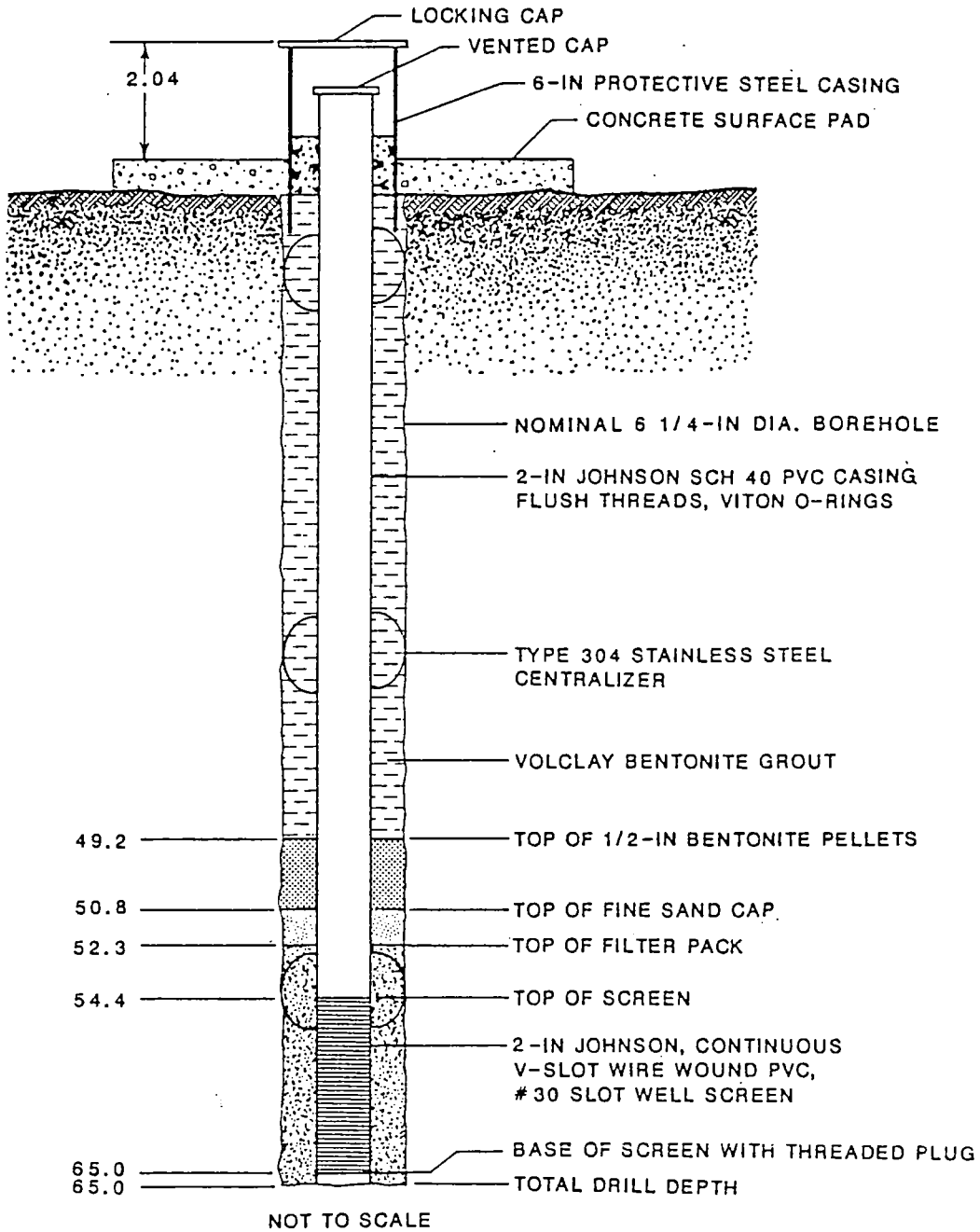
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-21S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		104.39-pad	106.46-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
P. Reinhart	West Coast Drilling	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Swab - Air Lift	1 hour	06/13/86	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

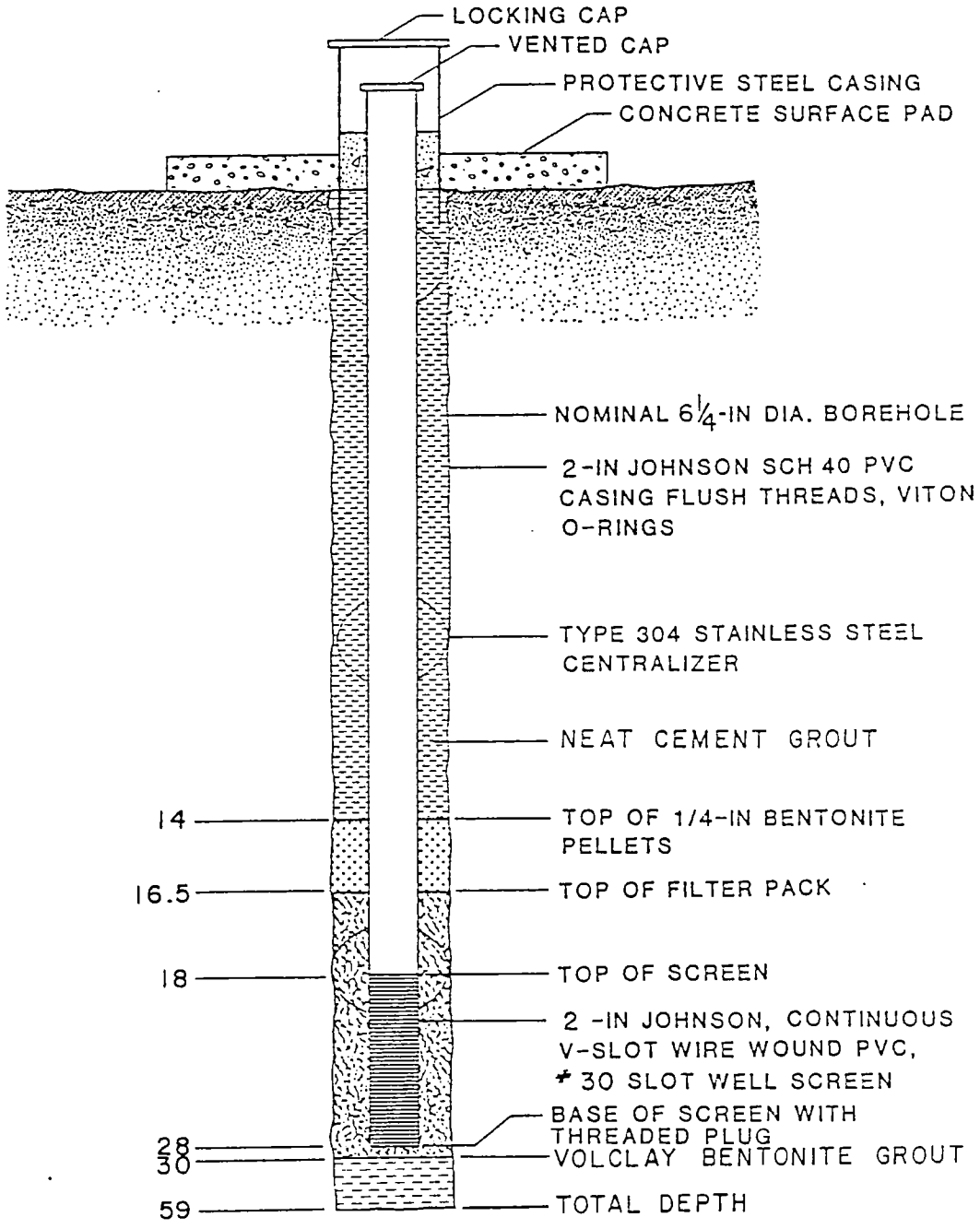
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-22S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		138.32-pad	141.43-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-23-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

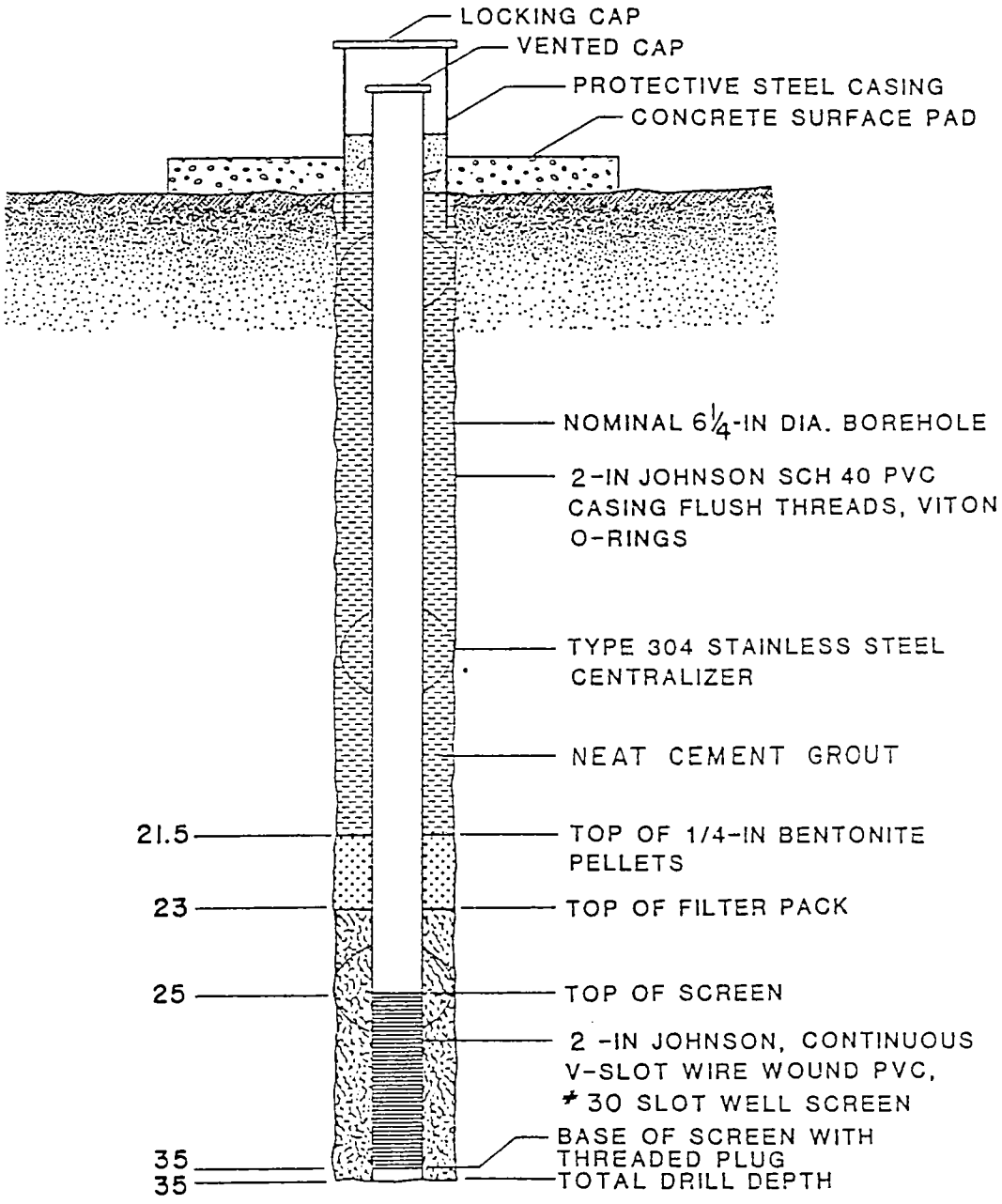
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-23S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		137.90-pad	140.94-Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-18-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

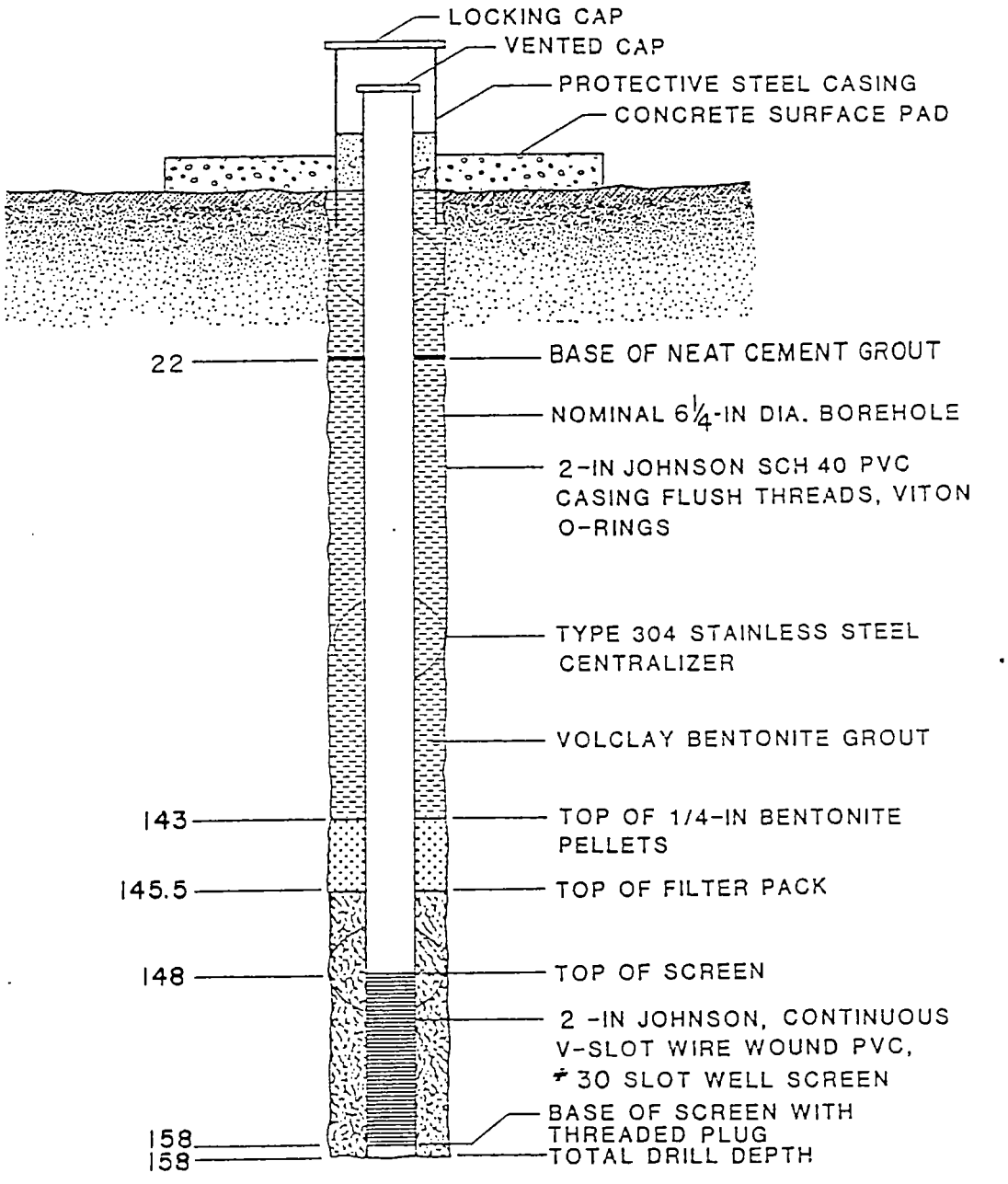
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-24A

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		137.98-pad	140.48-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-24-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

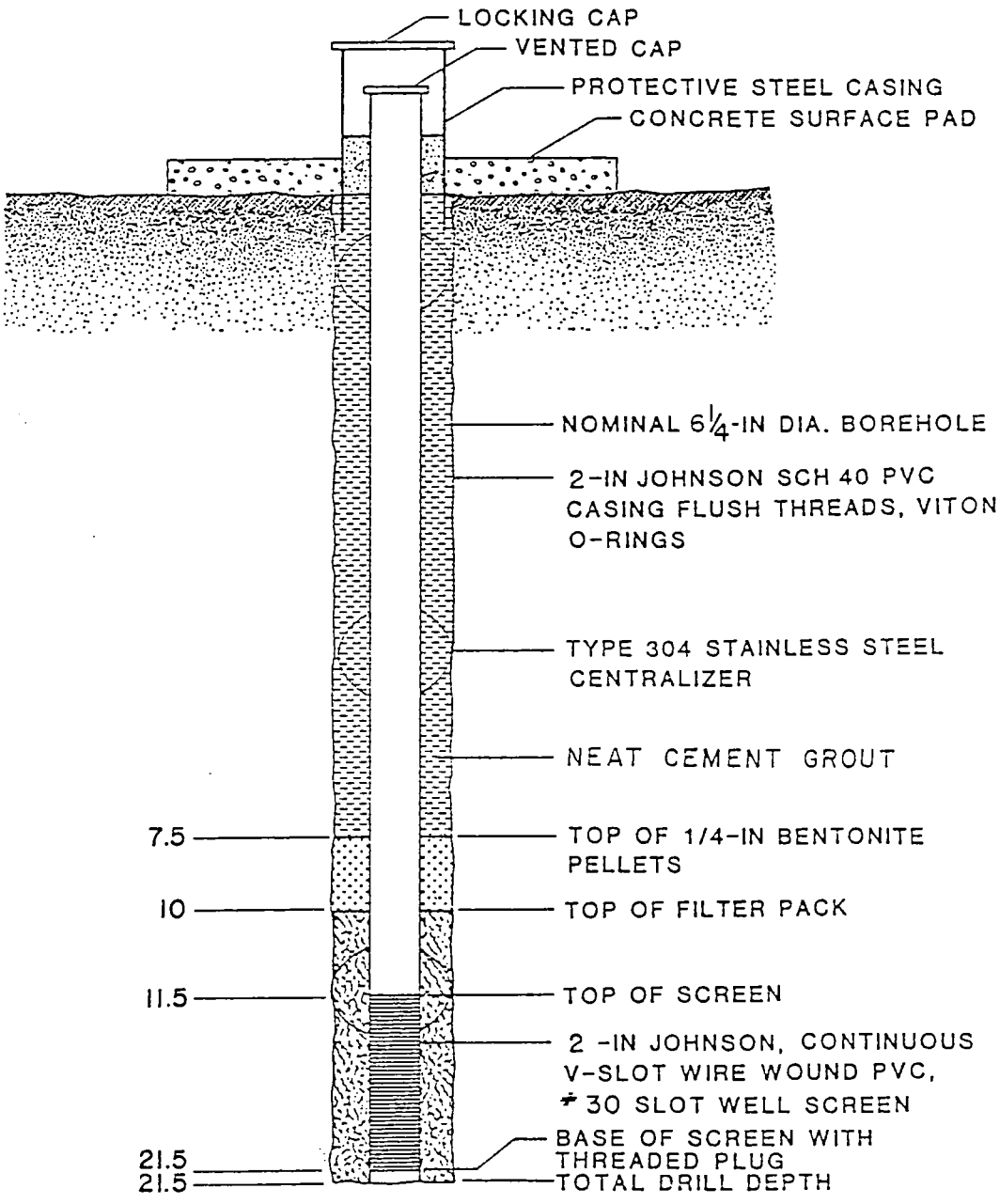
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-24S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		138.09-pad	141.13-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-18-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

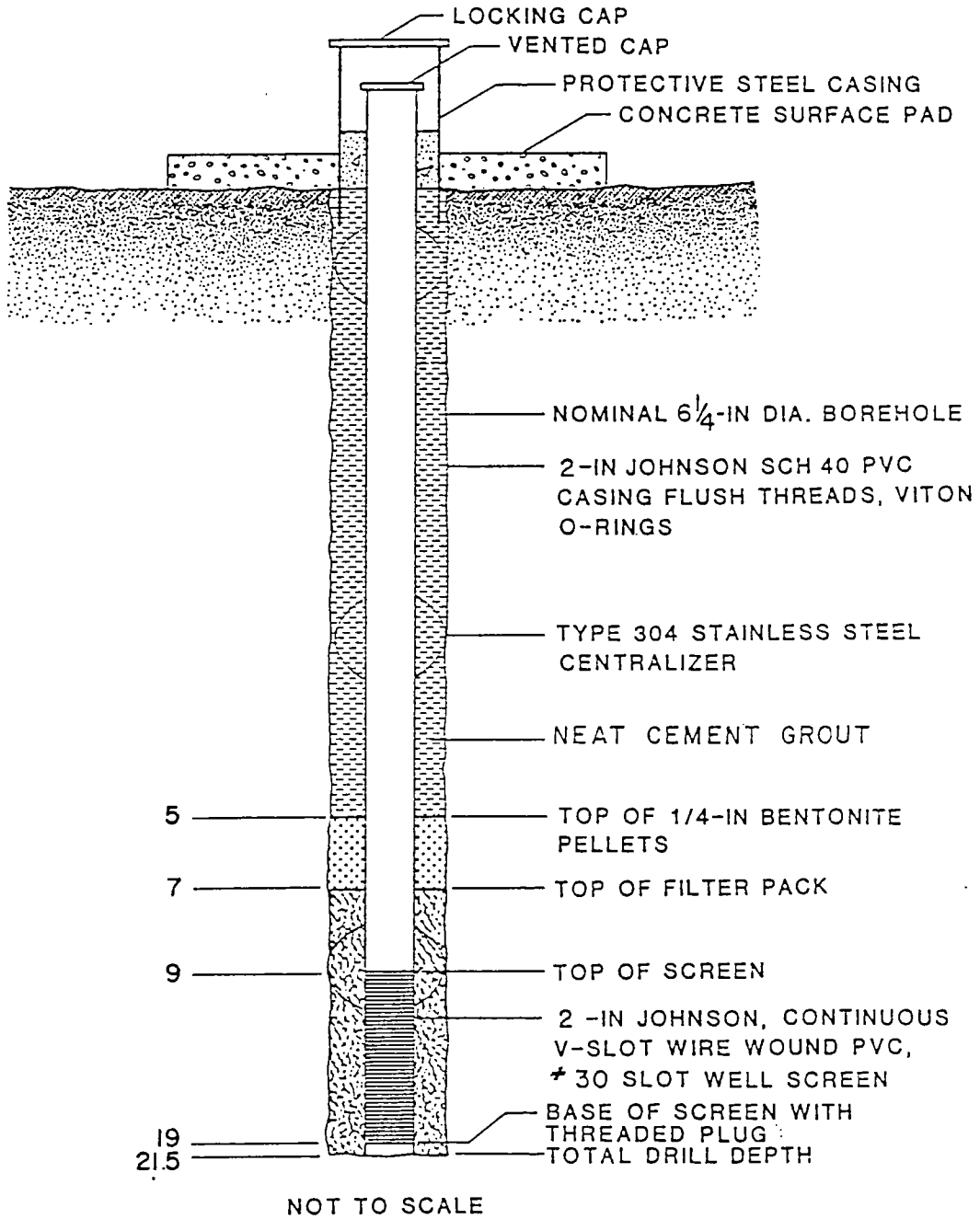
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-25S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		136.89-pad	140.02-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-23-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

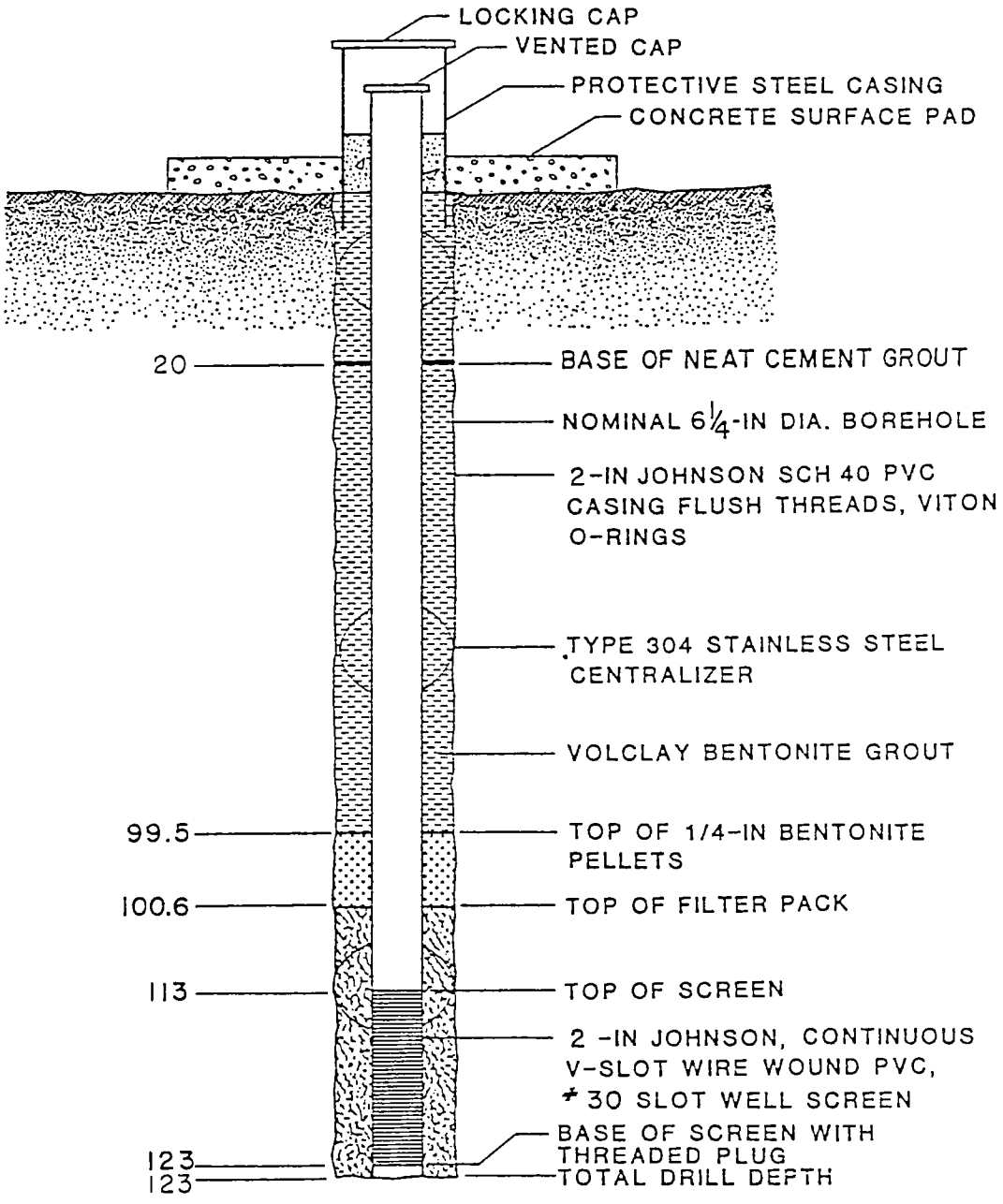
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-26A

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		129.87-pad	133.11-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-07-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

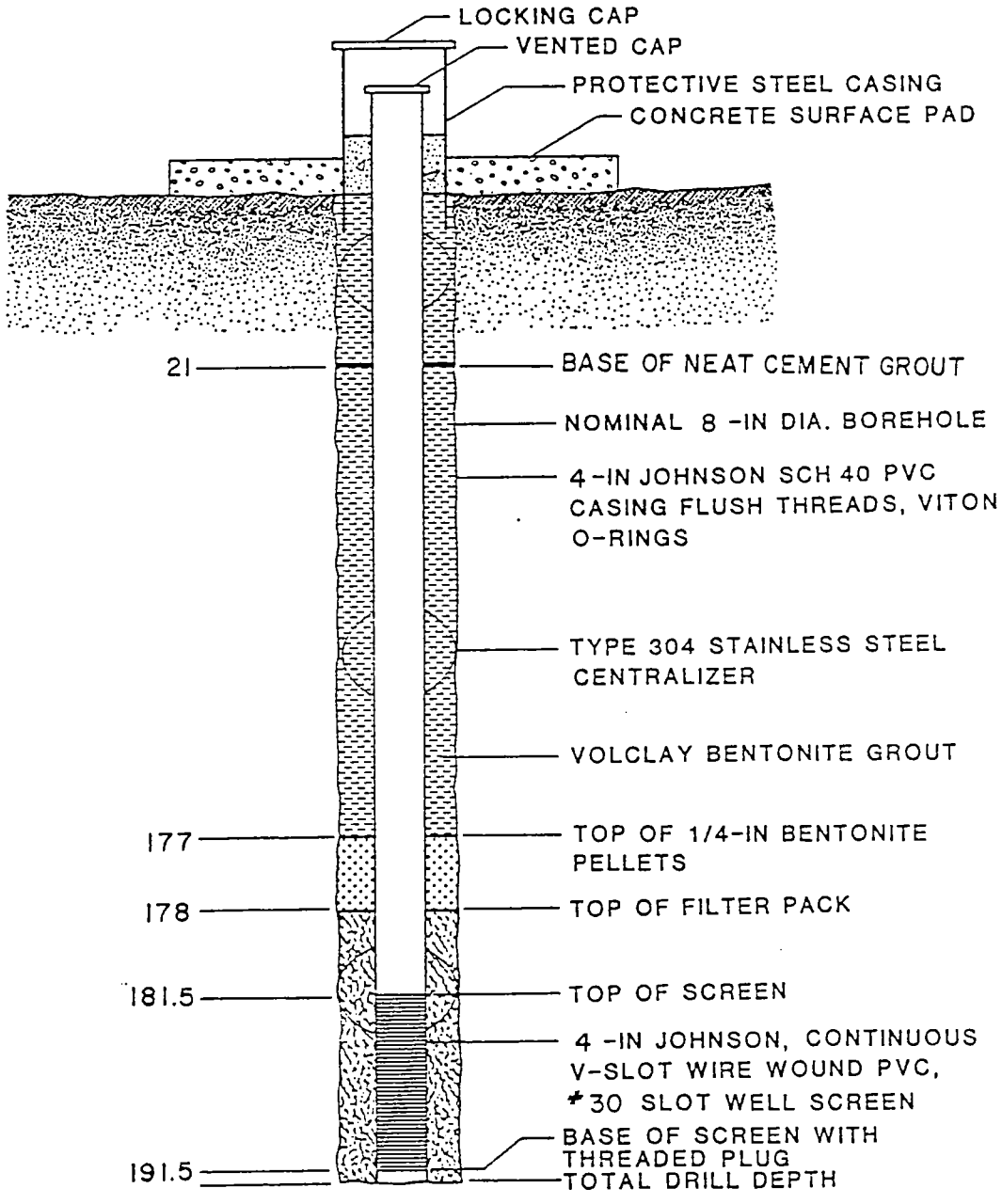
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-26B

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		129.58-pad	132.61-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-08-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

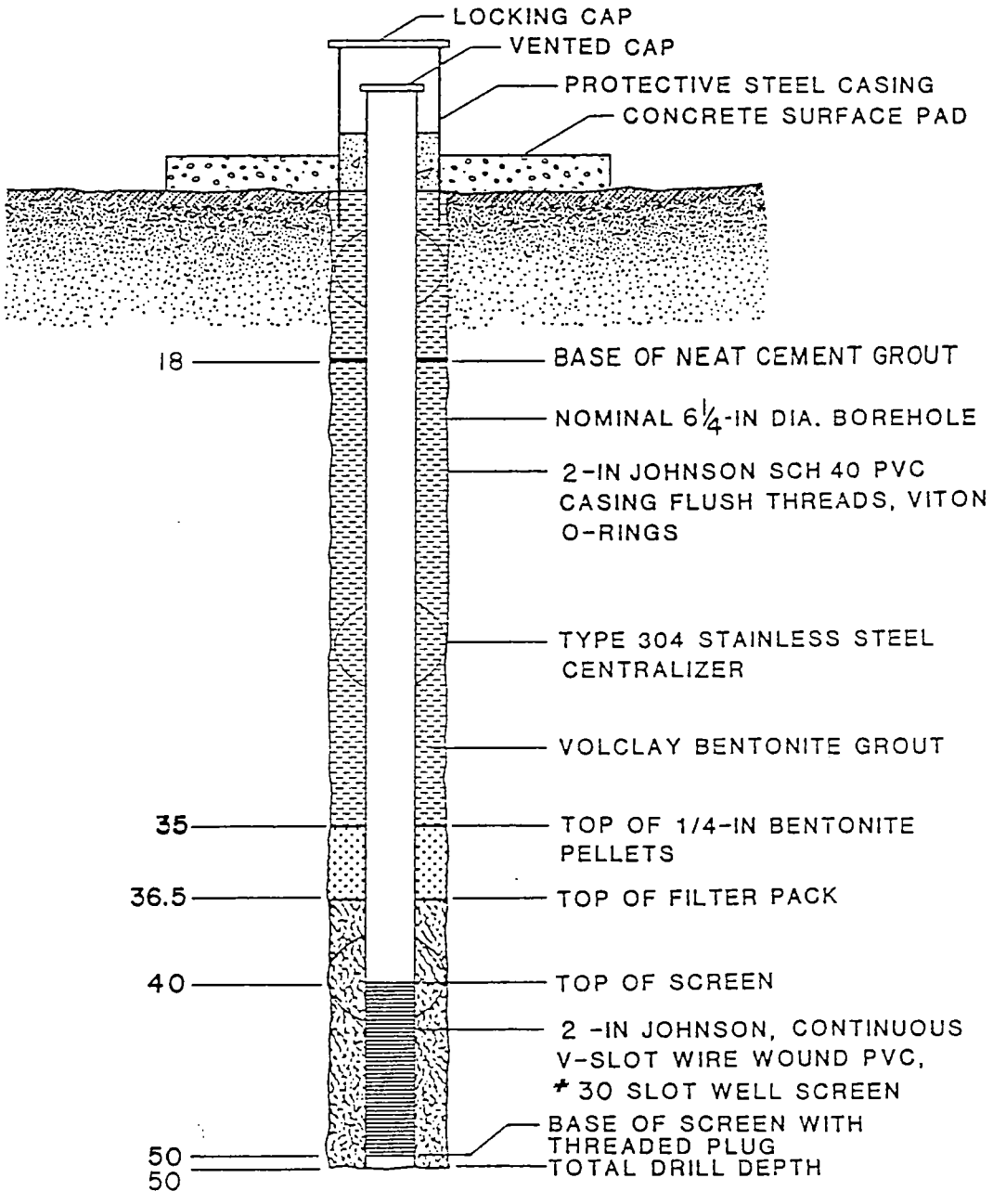
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-26S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		129.95-pad	132.85-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-08-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

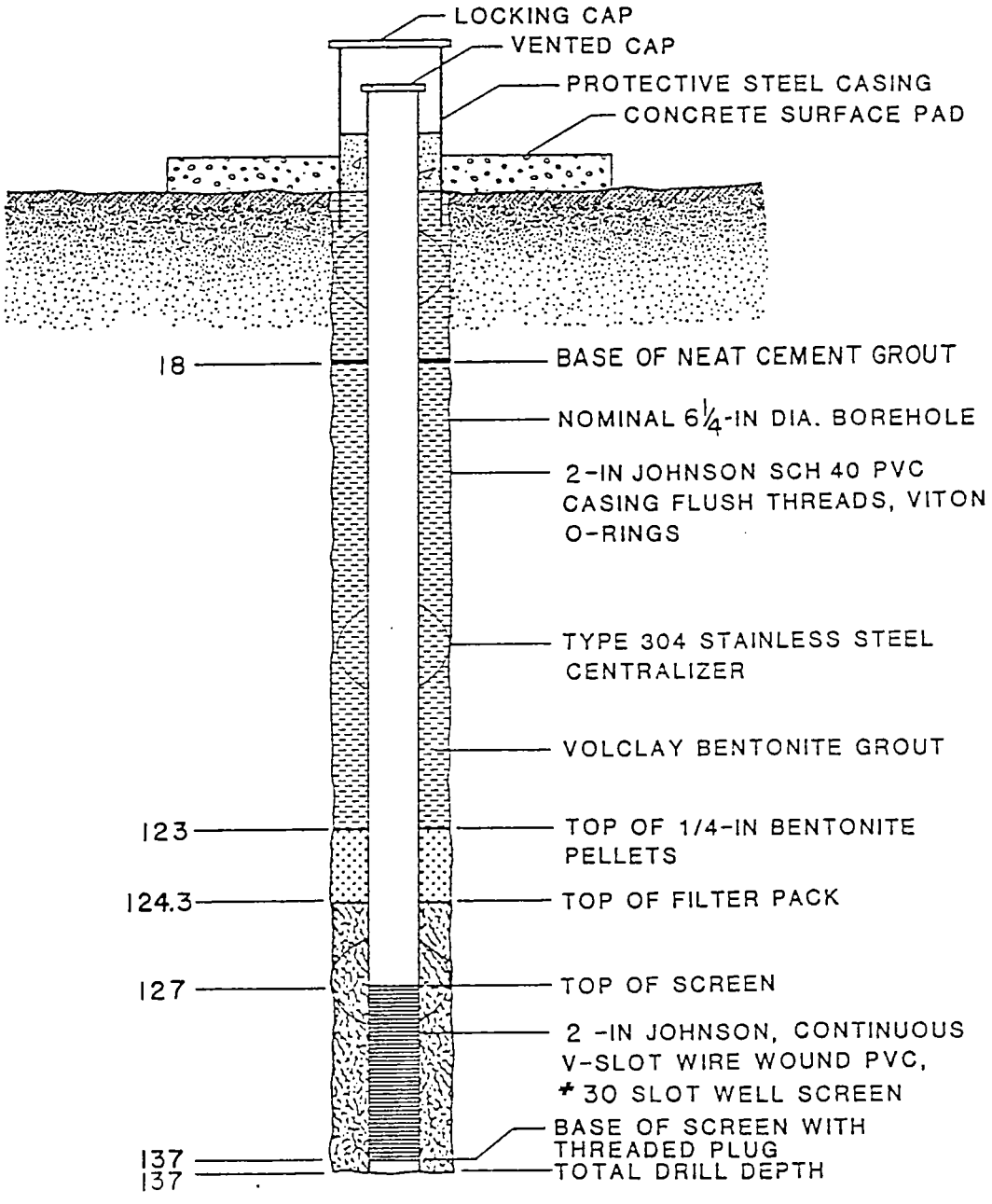
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-27A

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		135.67-pad	137.64-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-10-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

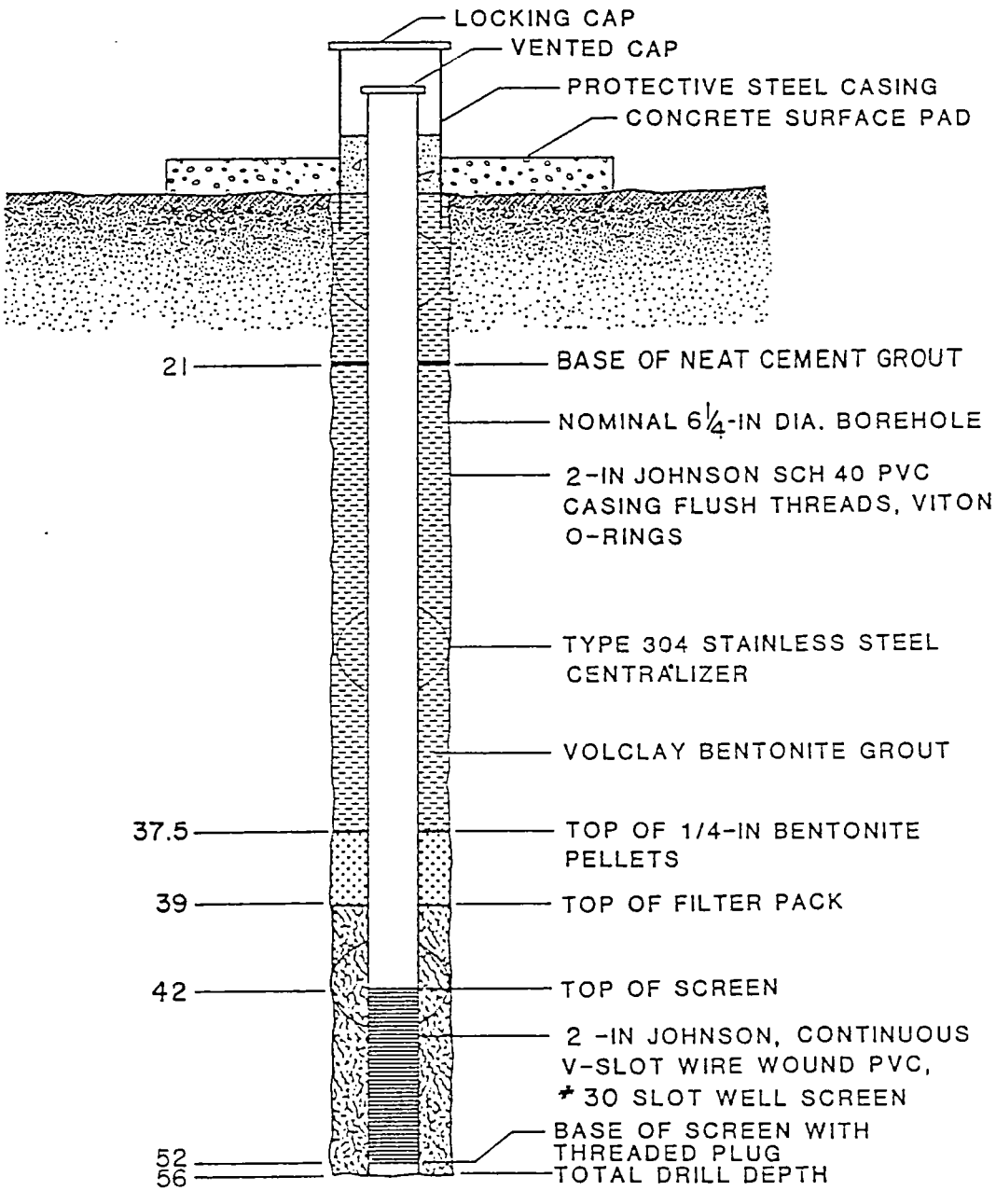
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-27S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		135.75-pad	138.64-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-01-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

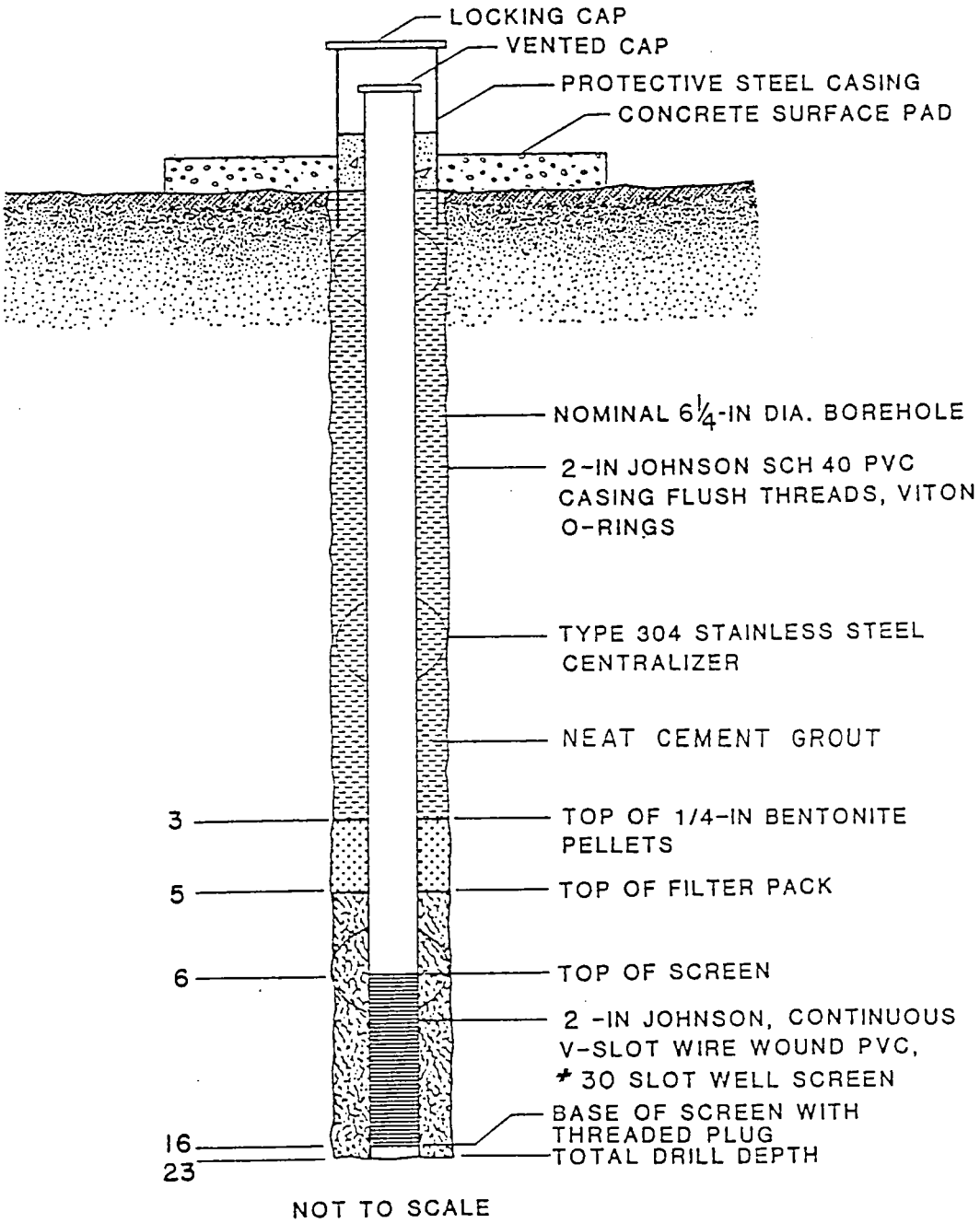
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-28S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		109.21-pad	112.16-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-23-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

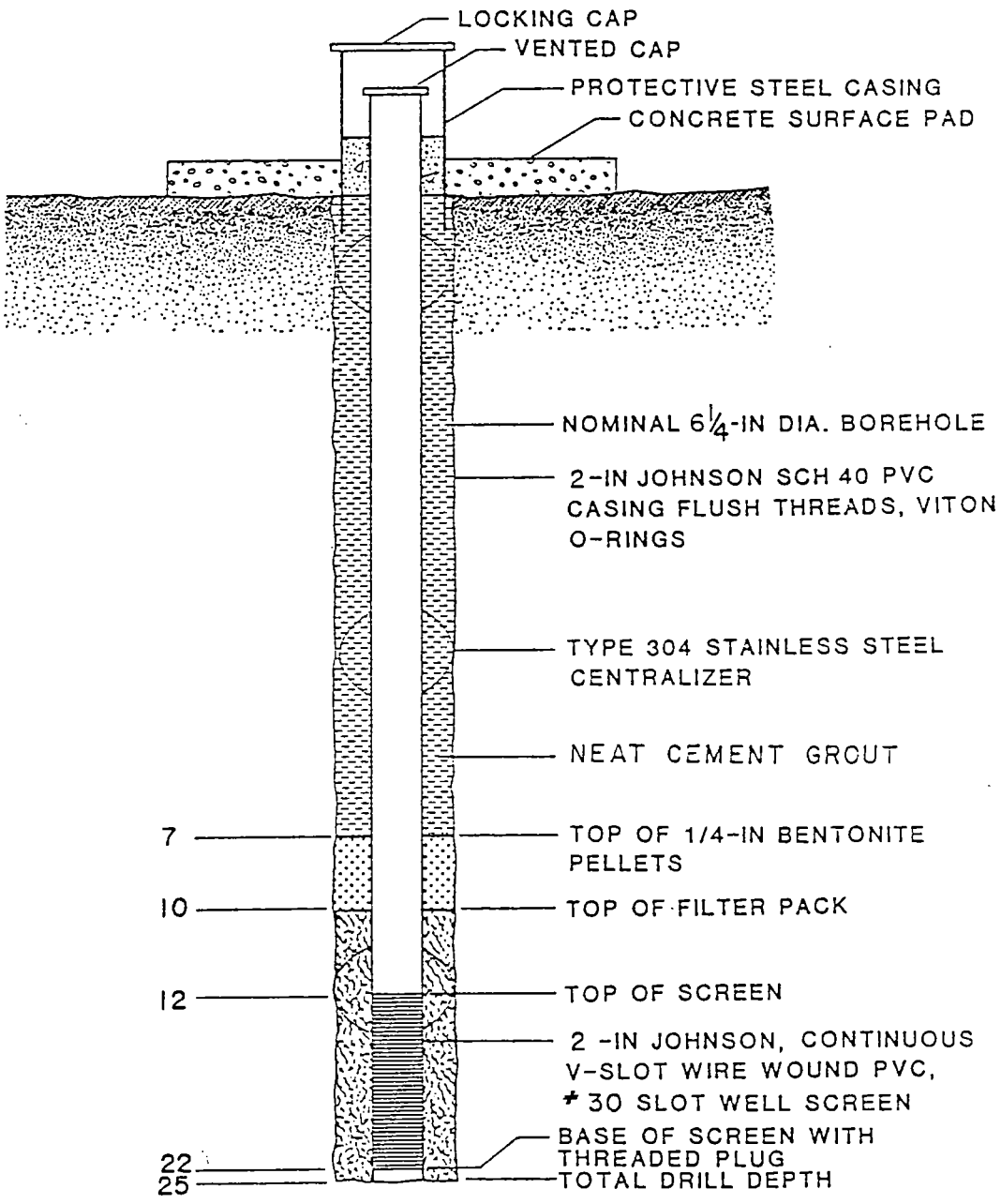
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-29S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		111.98-pad	114.72-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-23-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

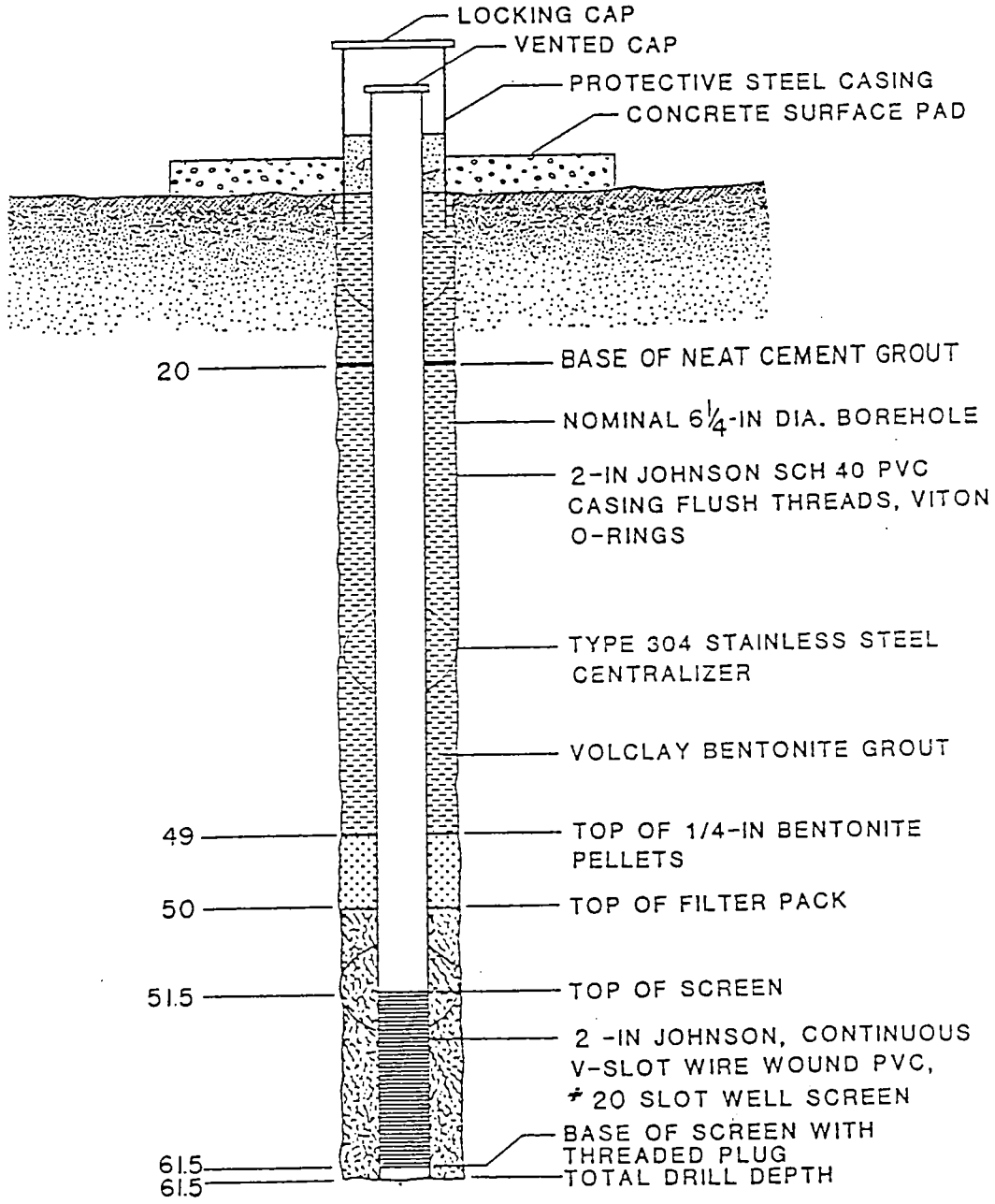
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-30S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		106.30-pad	109.25-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		08-18-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

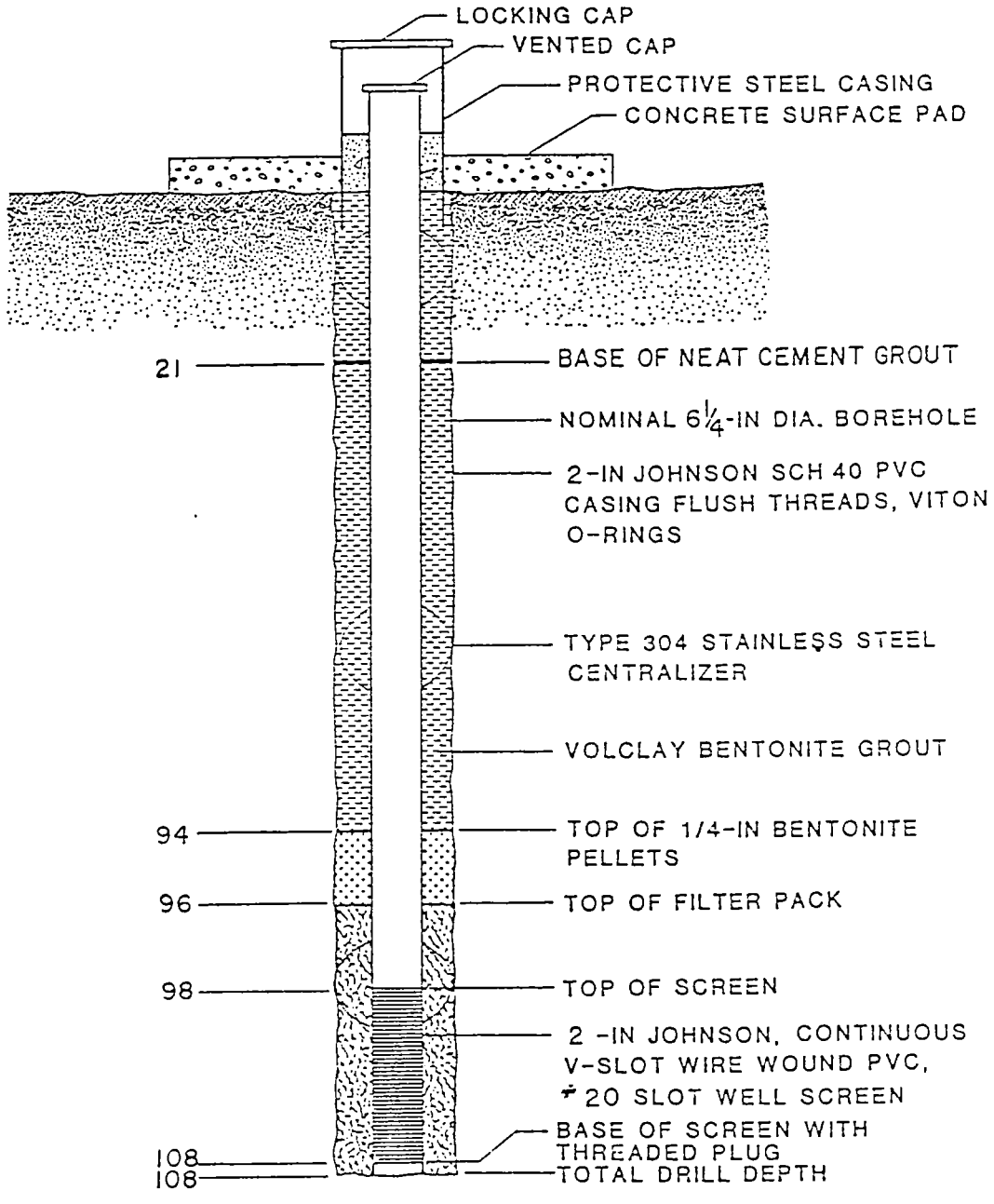
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-31S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		98.90-pad	101.69-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift			



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

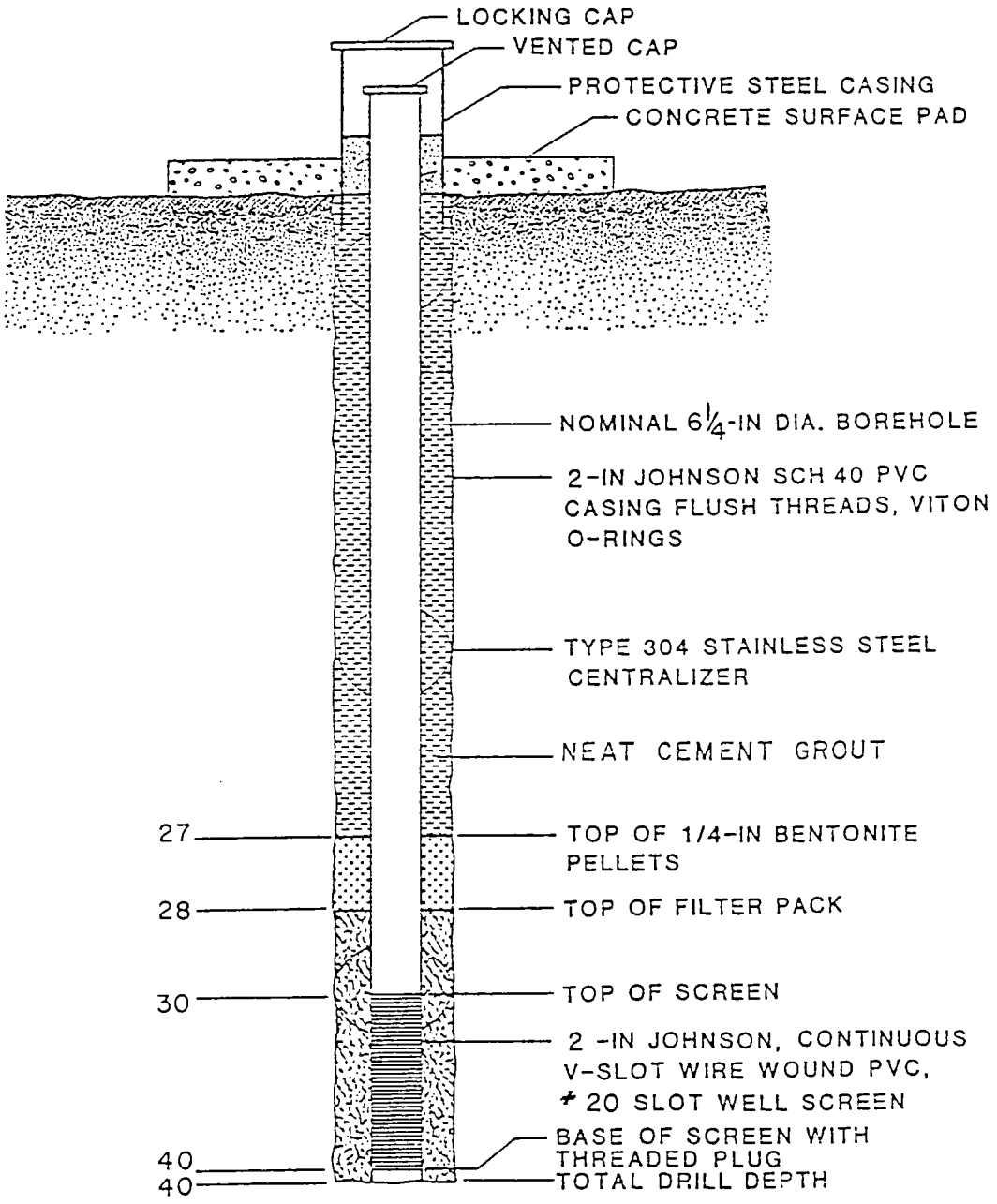
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-32S

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		123.94-pad	126.70-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		08-18-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

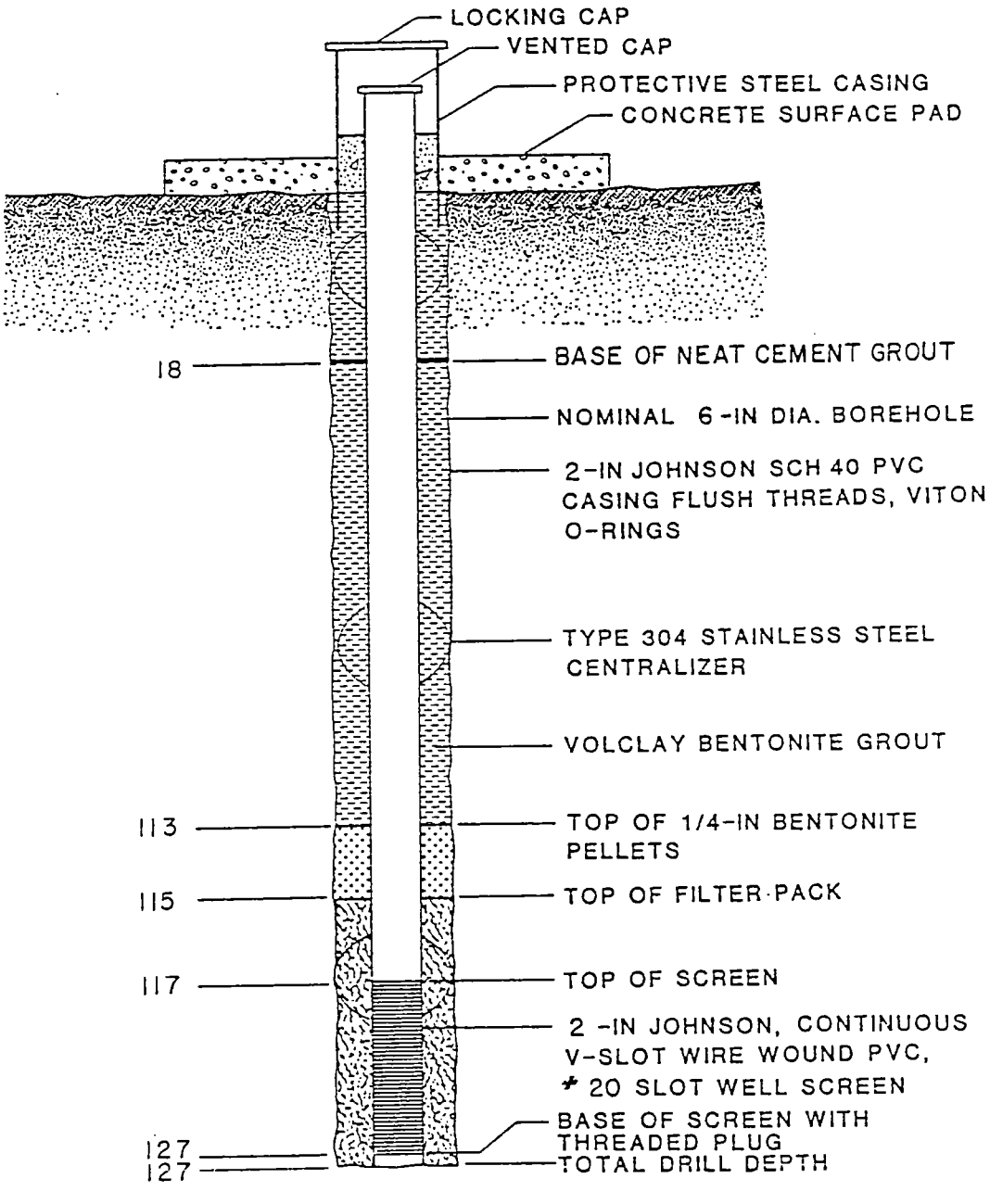
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-33A

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		101.42-pad	104.42-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		08-20-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

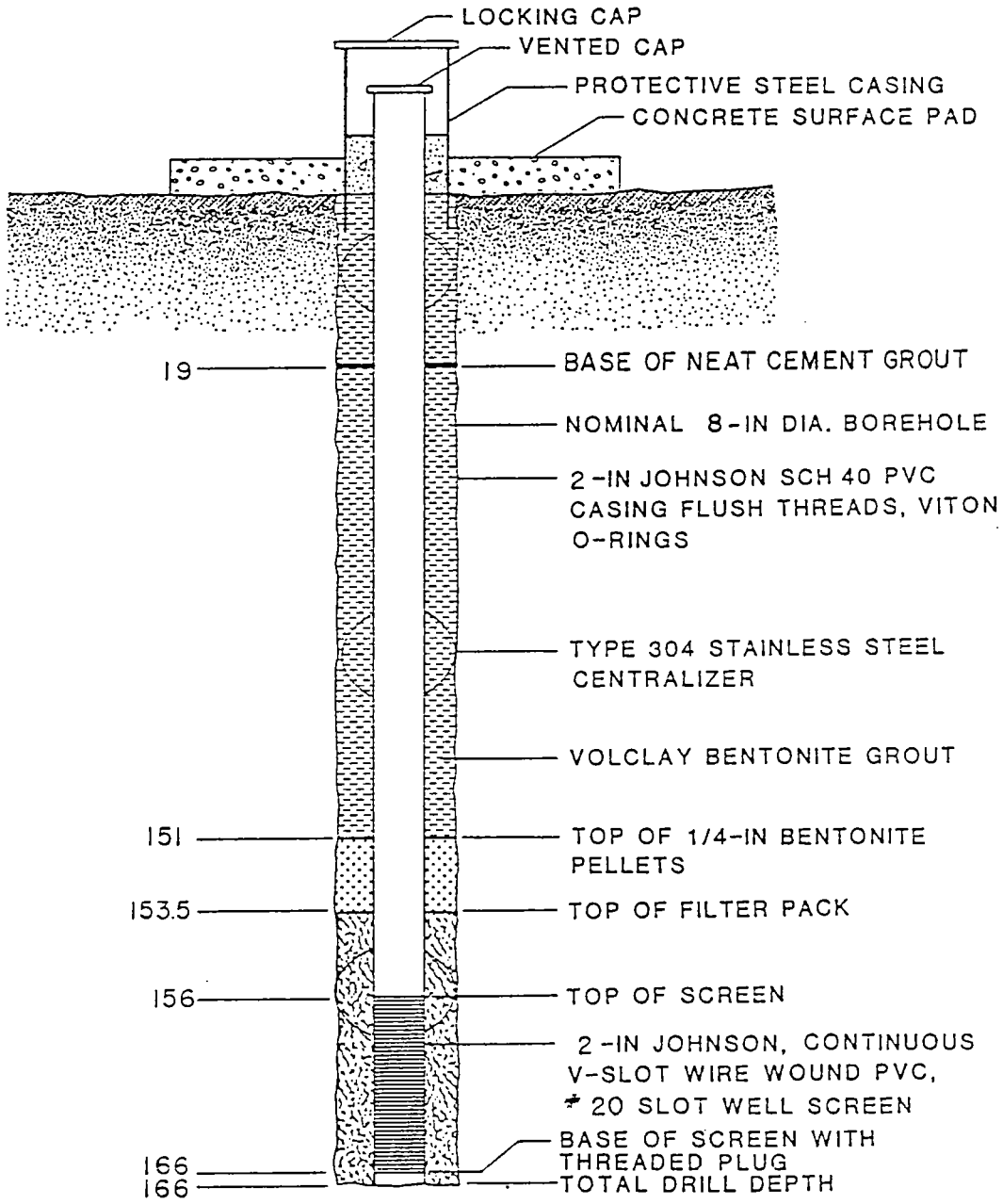
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-33B

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		101.47-pad	104.69-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift			



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

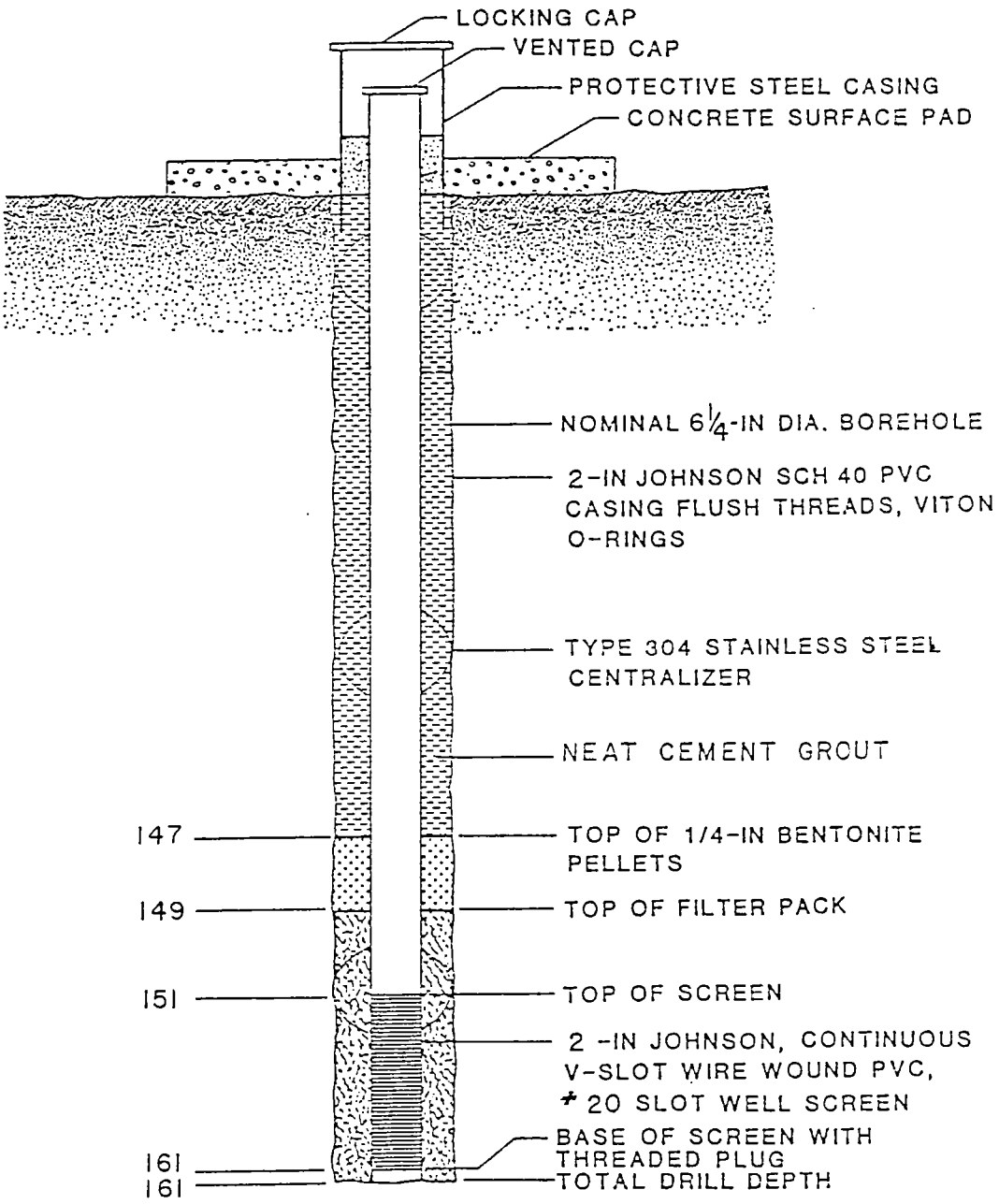
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-34A

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		143.46-pad	146.58-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift			



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

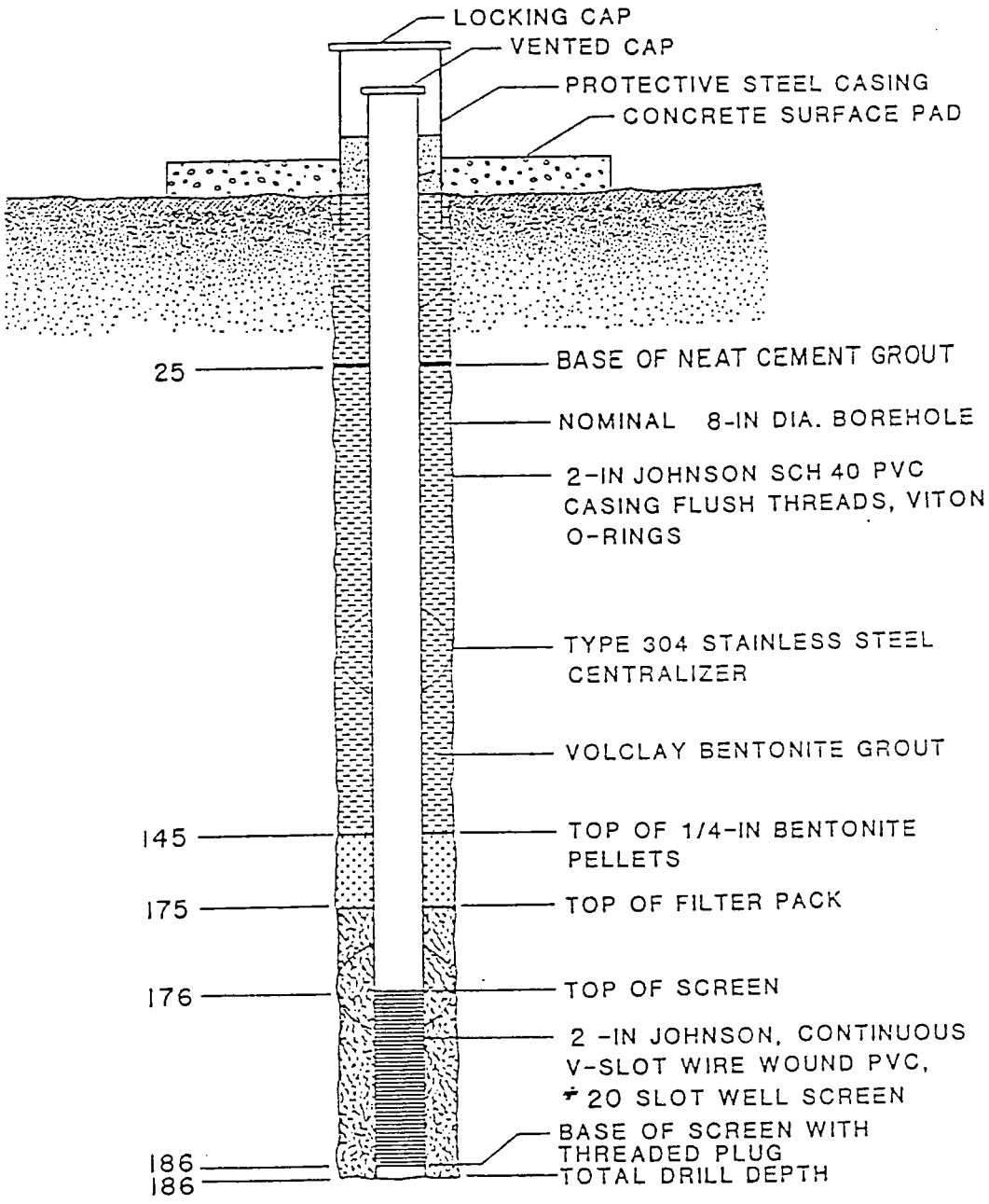
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MW-34B

PROJECT Martin Marietta Reduction Facility

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
Reduction Facility		143.46-pad	145.39-steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	STACO	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		08-19-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

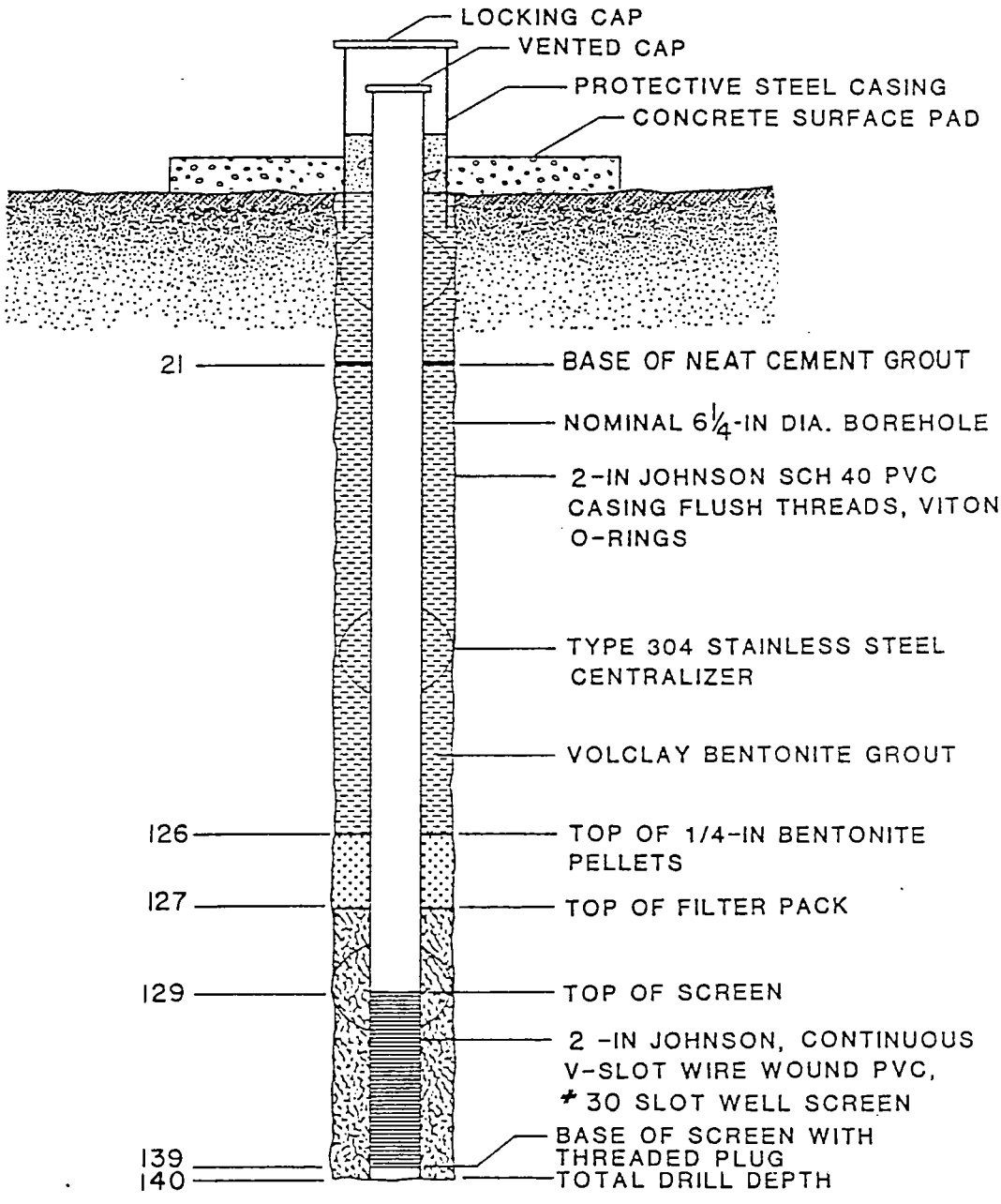
GERAGHTY & MILLER, INC.
Ground-Water Consultants

WELL CONSTRUCTION DIAGRAM

WELL NO. MWR-1A

PROJECT

LOCATION	COORDINATES	GROUND ELEVATION	MEASURING PT. ELEVATION
		143.49 - Pad	146.62-Steel
GEOLOGIST	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
	Staco	Air Rotary	Schramm
WELL DEVELOPMENT METHOD	**WELL DEVELOPMENT DURATION**	**WELL COMPLETED**	**MONITORED FORMATION**
Air Lift		07-20-87	



NOT TO SCALE

ALL MEASUREMENTS FEET BELOW LAND SURFACE

ATTACHMENT F.2 PRODUCTION WELL RECORDS

(1)

nal and First Copy with
nt of Ecology
Copy — Owner's Copy
Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. ..... /

(1) **OWNER:** Name Marvin Harrison Address 1017 Maple ST W The Dalles OR 97

(2) **LOCATION OF WELL:** County Klickitat SE ¼ SW ¼ Sec 28 T 2 N., R 13 W.M.

Bearing and distance from section or subdivision corner

(3) **PROPOSED USE:** Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one) .....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 6 inches.
Drilled 200 ft. Depth of completed well 200 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 6 " Diam. from 0 ft. to 20 ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☐ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No .....
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal cement & bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) **PUMP:** Manufacturer's Name .....
Type: ..... H.P. .....

(8) **WATER LEVELS:** Land-surface elevation above mean sea level .... ft.
Static level 95 ft. below top of well Date 9-23-80
Artesian pressure ____ lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
blow Test	100 g.p.m.				

Date of test 9-23-80
...r test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) **WELL LOG:** P

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sandy Top soil	0'	5'
gray basalt, hard	5'	55'
black basalt, porous	55'	83'
gray basalt, hard	83'	94'
black basalt, med hard	94'	108'
black basalt, vesicular WB	108'	115'
gray basalt, hard	115'	135'
black & green basalt, vesicular WB	135'	155'
Gray basalt, hard	155'	175'
gray basalt, crevised WB	175'	200'

OCT - 6 1980

Work started 9-23, 19 80 Completed 9-23, 19 80

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)

Address P.O. Box 206 Dallesport, WA 98617

[Signed] Charles E Moore (Well Driller)

License No. 0833 Date 9-23- , 19 80

F-74

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. G4-28550 / C

Permit No. ....

(1) OWNER: Name Mr. Franke Leno Address P.O.Box Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat SE ¼ SW ¼ Sec. 28 T. 2 N., R. 13E W.M.

...ing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 205 ft. Depth of completed well 205 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from - ft. to 30 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal CEMENT & BENTONITE
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 115 ft. below top of well Date 11-20-81
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
Blow Test	100 g.p.m.				

...e of test
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date 11-20-81
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand	0'	8'
Fractured gray basalt	8'	12'
gray basalt, hard	12'	55'
black basalt, & gray clay	55'	61'
black basalt, med. hard	61'	85'
black basalt, porous	85'	108'
gray basalt, hard	108'	117'
black & green basalt, (vesicular, water bearing	117'	127'
gray basalt, hard	127'	175'
BROWN & BLACK BASALT, POROUS BROKEN - WB	175'	200'

NOV 30 1981

Work started 11-18- 19 81 Completed 11-20- 19 81

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company
(Person, firm, or corporation) (Type or print)

Address P.O. Box 270-A Dallesport WA 9861

[Signed] Karl F Moon JR
(Well Driller)

License No. 0973 Date 11-23, 19 81

F-75

(USE ADDITIONAL SHEETS IF NECESSARY) EP 11-30-81

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. (3)

Permit No. ....

(1) OWNER: Name Hugh (Bon) Bullock Address P.O. Box Dallesport, WA 98617

(2) LOCATION OF WELL: County KLICKITAT — NE ¼ SW ¼ Sec. 28 T. 2 N., R. 13 E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 220 ft. Depth of completed well 220 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 18½ ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type ____ Model No.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 18½ ft.
Material used in seal CEMENT + BENTONITE
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ____ Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: ____ H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 101 ft. below top of well Date 2-27-79
Artesian pressure ____ lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
Blow Test	120 gpm				

Date of test
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil	0	7'
Brown + gray Basalt, Broken	7'	15'
Gray Basalt, Hard	15'	61'
Black Basalt, Hard	61'	81'
Red Basalt, Hard	81'	95'
Gray Basalt, Hard	95'	130
Black Basalt, Green Shale Porous - Med Hard - WB 10gpm	130'	140'
Black Basalt, Hard	140	155'
Black Basalt, Med Hard, Porous WB	155'	163'
Black + Brown Basalt, Broken Med Hard, WB	163'	210'
Green Clay - Hard WB	210'	220'

Work started 2-26, 19 79 Completed 2-27, 19 79

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Co
(Person, firm, or corporation) (Type or print)

Address STRT. 2 Box 100 Lyle WA 98635

[Signed] Karl F Moore JR
(Well Driller)

License No. 0973 Date 3-15, 19 79

F-76

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. .....

(4)

(1) OWNER: Name Harold Shepler Address Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat — NE ¼ SE ¼ Sec. 28 T. 2 N., R 13 E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 120 ft. Depth of completed well 120 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from — ft. to 20 ft.
Threaded [ ] " Diam. from ft. to ft.
Welded [X] " Diam. from ft. to ft.

Perforations: Yes [ ] No [X]
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes [ ] No [X]
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes [ ] No [X] Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes [X] No [ ] To what depth? 18 ft.
Material used in seal CEMENT + BENTONITE
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 37 ft. below top of well Date 3/10/83
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [ ] If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	Blow	TEST		40	G.P.M.

Date of test 3/10/83
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [ ] No [X]

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil	0'	5'
river gravel & boulders	5'	13'
black basalt, hard	13'	67'
black basalt, med. crevised	67'	73'
black shale & wood water bearing	73'	78'
black basalt, & green claystone, med. vesicular water bearing	78'	82'
black, brown, & green basalt, vesicular, water bearing	82'	90'
redish, gray basalt, porous	90'	94'
gray basalt, porous w/ white minerals	94'	110'
gray basalt, hard	110'	120'

RECEIVED
APR 18 1983

Work started 3-8 19 83 Completed 3-10- 19 83

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company
(Person, firm, or corporation) (Type or print)

Address P.O. Box 373 Dallesport, WA 9861

[Signed] Henry Mace
(Well Driller)

License No. 0834 Date 3-10- 1983

(USE ADDITIONAL SHEETS IF NECESSARY)

(5)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. .....

(1) **OWNER:** Name Larry Holliday Address P.O.Box 777 Dallesport, WA 986

(2) **LOCATION OF WELL:** County Klickitat NE ¼ SE ¼ Sec. 28 T. 2 N., R. 13 W.M.
Bearing and distance from section or subdivision corner Tax Lot 7 Track 31 (Sec. 28

(3) **PROPOSED USE:** Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 6 inches.
Drilled 140 ft. Depth of completed well 140 ft.

(6) **CONSTRUCTION DETAILS:**
Casing installed: 6 " Diam. from +1 ft. to 100 ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used ....
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name ....
Type .... Model No ....
Diam. .... Slot size .... from .... ft. to .... ft.
Diam. .... Slot size .... from .... ft. to .... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ....
Gravel placed from .... ft. to .... ft.

Surface seal: Yes ☒ No ☐ To what depth? 70 ft.
Material used in seal cement & bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? .... Depth of strata ....
Method of sealing strata off ....

(7) **PUMP:** Manufacturer's Name ....
Type: .... H.P. ....

(8) **WATER LEVELS:** Land-surface elevation above mean sea level .... ft.
Static level 68 ft. below top of well Date 3-11-83
Artesian pressure .... lbs. per square inch Date ....
Artesian water is controlled by .... (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? ....
Yield: .... gal./min. with .... ft. drawdown after .... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow test 35 gpm				

Date of test 3-14-83
Bailer test .... gal./min. with .... ft. drawdown after .... hrs.
Artesian flow .... g.p.m. Date ....
Temperature of water .... Was a chemical analysis made? Yes ☐ No ☒

(10) **WELL LOG:** J

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand	0	45'
Sand & River gravel	45'	57'
Clay, brown & fine gravel	57'	98'
basalt, brown, med.	98'	110'
basalt, brown, vesicular (WB)	110'	118'
basalt, brown, med.	118'	132'
basalt, brown fractured (WB) (water bearing)	132'	140'

Work started 3-11, 19 83 Completed 3-14, 19 83

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M.K. Drilling Co.
(Person, firm, or corporation) (Type or print)
Address P O Box 373 Dallesport WA.

[Signed] Charles L Moore
(Well Driller)

License No. 0833 Date 3-15, 19 83

(USE ADDITIONAL SHEETS IF NECESSARY)

(6)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. 64-27085

Permit No. ....

(1) OWNER: Name Mt. View Water Assn. Address P.O. Box 262, Dallesport, Wa. 98617

(2) LOCATION OF WELL: County Klickitat — NE ¼ SE ¼ Sec. 28 T. 2 N., R. 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic X Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary X Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 210 ft. Depth of completed well 210 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from - ft. to 95 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.

Perforations: Yes ☐ No X
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No X
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No X Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes X No ☐ To what depth? 30 ft.
Material used in seal Cement & Bentonite
Did any strata contain unusable water? Yes ☐ No X
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 125 ft. below top of well Date 3/7/80
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No X If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
Blow test	70 GPM				

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No X

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand	0'	14'
River Gravel	14'	18'
Gray Besalt - Hard	18'	65'
Black Besalt; crevised WB	65'	71'
Black & Green Clay	71'	74'
Black & Green Besalt (Porais)	74'	90'
Gray Besalt - Hard	90'	120'
Black Besalt, Med.Hard Porais	120'	135'
Gray Besalt - Hard	135'	182'
Gray Besalt - Hard	182'	191'
Black, Brown & Green Besalt - Vescular WB	191'	208'

RECEIVED
NOV 29 1982
DEPARTMENT OF ECOLOGY

Work started 3-4- 19 80 Completed 3-7- 19 80

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)

Address P.O. Box 373 Dallesport, WA 98

[Signed] Charles S Moore (Well Driller)

License No. 0833 Date 11-15- 19 82

(USE ADDITIONAL SHEETS IF NECESSARY) EP 1/28/83

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. (7)

WR ~~XXXXXX~~ Permit No. 102353

(1) OWNER: Name Harold Shepler Address Box 737 Dallesport, Wa. 98617

(2) LOCATION OF WELL: County Klickitat — NE ¼ SE ¼ Sec 28 T 2N N., R 13E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☒ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 76 ft. Depth of completed well 251 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: none " Diam. from ft. to ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☐
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 45 ft. below top of well Date 12 Dec
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
Air test 65 gal min 100% drawdown " " " " " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 20 gal./min. with 60 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

OK Mab

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Basalt black	175	185
Basalt gray	185	190
Basalt black WB	190	195
Basalt gray	195	201
Basalt black With green clay	201	205
Basalt gray	205	220
Basalt black WB	220	232
Basalt gray	232	238
Basalt black & green clayWB	238	243
Claystone gray	243	251
SWL 45		
Owner reinstalled pump		

RECEIVED
DEC 15 1975
DEPT OF ECOLOGY

Work started 12 Dec, 19 75 Completed 12 Dec, 19 75

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richard J. Murray
(Person, firm, or corporation) (Type or print)

Address 3712 W. 8th The Dalles, Oregon

[Signed] Tom Leonard
(Well Driller)

License No. 0275 Date 12 Dec, 1975

F-80

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(7) Application No. /

Permit No. ....

(1) OWNER: Name Cecil Odom Address ST. RT. 2 LYLE WA 98635

(2) LOCATION OF WELL: County Klickitat NE ¼ SW ¼ Sec 16 T 2 N., R 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 220 ft. Depth of completed well 220 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from - ft. to 120 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? ft.
Material used in seal CEMENT - BENTONITE
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 120 ft. below top of well Date 2-15-80
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" Blow TEST 65 gpm "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 2-15-80
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
TOP SOIL	0	3'
GRAY BASALT, HARD	3'	21'
BROWN BASALT, SOFT	21'	56'
BLACK & BROWN BASALT, MED	56'	75'
BROWN BASALT, VESCULAR WB	75'	95'
BROW BASALT, POROUS	95'	110'
RED BASALT, MED	110'	128'
BLACK & BROWN BASALT, MED	128'	147'
BLACK BASALT, POROUS	147'	169'
BLACK & BROWN BASALT, MED	169'	182'
BLACK BASALT, VESCULAR WB	182'	193'
GRAY BASALT HARD	193'	205
BLACK BASALT, VESCULAR WB	205'	215'
GRAY BASALT, HARD	215'	220'

Work started 1-8- 19 80 Completed 1-15 19 80

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Co.
(Person, firm, or corporation) (Type or print)

Address ST. RT. 2 Box 100 LYLE, WA 9863

[Signed] Karl Moore Jr.
(Well Driller)

License No. 0973 Date 1-15- 19 80

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Jim Wise Address Box 763 Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat SW ¼ NE ¼ Sec. 28 T. 2 N., R. 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 155 ft. Depth of completed well 155 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from — ft. to 19 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 19 ft.
Material used in seal Cement & bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 27' ft. below top of well Date 4-12
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

blow test 150 gpm
Date of test 4-12
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand	0	7'
basalt, gray, hard	7'	48'
basalt, black, & green clay w/ 2 gpm	48'	55'
basalt, gray, hard	55'	90'
basalt, black, vescular (water bearing 50 gpm)	90'	110'
basalt, gray, med. hard,	110'	140'
basalt, black, vescular w/ 100 gpm	140'	155'

Work started 4-12 19 79 Completed 4-12 19 79

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M K Drilling Co.
(Person, firm, or corporation) (Type or print)

Address Rt 2 Box 100 Lyle Wa 98635

[Signed] Charles L Moore
(Well Driller)

License No. 0833 Date 4-13, 19 79

F-82

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. WRCR
Permit No. 19363

(4)

(1) OWNER: Name Harry Toda Address P.O. Box 785 Dallesport, Wash.

(2) LOCATION OF WELL: County Klickitat — SE ¼ NW ¼ Sec. 28 T 2 N., R 13E W.M.

Sec. and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 170 ft. Depth of completed well 170 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8" Diam. from 0 ft. to 20 ft.
Threaded ☐ 6" Diam. from 10 ft. to 170 ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☒ No ☐
Type of perforator used Torch
SIZE of perforations 1/4 in. by 12 in.
24 perforations from 140 ft. to 170 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Portland cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 79 ft. below top of well Date 18 Oct 72
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 25 gal./min. with 22 ft. drawdown after 1½ hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Soil	0	6
Weathered Basalt	6	13
Blue Basalt	13	22
Weathered Basalt	22	27
Fractured Basalt SWL 6'	27	30
Black Basalt	30	66
Blue Claystone	66	68
Black Basalt SWL 18'	68	77
Gray Clay	77	95
Light Blue Clay	95	115
Yellow Clay	115	125
Blue-Gray + Brown Clay SWL 72	125	128
Gray Basalt SWL 79'	128	170

RECEIVED
OCT 31 1972
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started 1 Sept, 1972. Completed 18 Oct, 1972

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Murray Well Drilling Co (Person, firm, or corporation) (Type or print)

Address 3712 W 8th The Dalles, Ore

[Signed] Richard J Murray (Well Driller)

License No. 9219 Date 18 Oct, 1972

F-83

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

(10)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. .....

(1) OWNER: Name LeRoy & Janet Showalter Address Dallesport Wa 98617

(2) LOCATION OF WELL: County Klickitat NW ¼ SW ¼ Sec. 27 T. 2 N., R. 13 E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 110 ft. Depth of completed well 110 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from — ft. to 80 ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☒ No ☒
Type of perforator used ....
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name ....
Type .... Model No ....
Diam. .... Slot size .... from .... ft. to .... ft.
Diam. .... Slot size .... from .... ft. to .... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ....
Gravel placed from .... ft. to .... ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? .... Depth of strata ....
Method of sealing strata off ....

(7) PUMP: Manufacturer's Name ....
Type: .... H.P ....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 75 ft. below top of well Date 7-27-82
Artesian pressure .... lbs. per square inch Date ....
Artesian water is controlled by .... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? ....
Yield: .... gal./min. with .... ft. drawdown after .... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow	test	35 gpm		

Date of test 7-27-82
Bailer test .... gal./min. with .... ft. drawdown after .... hrs.
Artesian flow .... g.p.m. Date ....
Temperature of water .... Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil	0	12'
cemented gravel	12'	30'
river gravel caving	30'	79'
Basalt brown med	79'	84
Basalt brown & red vesicular water bearing	84'	110'

RECEIVED
AUG 4 1982
DEPARTMENT OF ECOLOGY

Work started July 26 19 82 Completed July 27 19 82

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M.K. Drilling Co.
(Person, firm, or corporation) & (Type or print)

Address P.O. Box 373 Dallesport WA

[Signed] Charles L Moore
(Well Driller)

License No. 0833 Date July 27, 19 82

(USE ADDITIONAL SHEETS IF NECESSARY) EP 8-20-82

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. /11

Permit No. ....

(1) OWNER: Name Roger Cool Address P.O. Box 51 Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat NE ¼ SE ¼ Sec 27 T 2 N., R 13 W.M.

ng and distance from section or subdivision corner

(3) PROPOSED USE: Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 125 ft. Depth of completed well 125 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 20 ft.
Threaded [ ] " Diam. from ft. to ft.
Welded [ ] " Diam. from ft. to ft.

Perforations: Yes [ ] No [X]
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes [ ] No [X]
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes [ ] No [X] Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes [X] No [ ] To what depth? 20' ft.
Material used in seal cement & bentanite
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 30' ft. below top of well Date 3-20-80
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [X] If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow test	65	g.p.m		

Date of test
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [ ] No [X]

(10) WELL LOG: J

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
sand	0'	7'
gray basalt, crevised hard	7'	50'
black basalt; porous & green clay	50'	57'
gray basalt, hard	63'	73'
gray & brown basalt, vesicular & wood W.B.	83'	102'
gray basalt, med.	102'	125'

RECEIVED
APR - 3 1980
DEPARTMENT OF ECOLOGY
CENTRAL OFFICE

Work started 3-19- 1980 Completed 3-20- 1980

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company
(Person, firm, or corporation) (Type or print)

Address ST. RT. 2 Box 100 Lyle, WA 98635

[Signed] Charles L Moore
(Well Driller)

License No. 0833 Date 3-31- 1980

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. C (12)
Permit No. G3-791P

(1) **OWNER:** Name Jarl Construction Address Dallesport, Washington

(2) **LOCATION OF WELL:** County Klickitat — NE ¼ NE ¼ Sec 27 T 2 N., R 13 W.M.

Bearing and distance from section or subdivision corner

(3) **PROPOSED USE:** Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 10 inches.
Drilled 215 ft. Depth of completed well 215 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 10" Diam. from 0 ft. to 19 ft.
Threaded ☐ ____" Diam. from ____ ft. to ____ ft.
Welded ☐ ____" Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 19 ft.
Material used in seal Cement grout
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) **PUMP:** Manufacturer's Name
Type: H.P.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level.... 250 ft.
Static level 48 ft. below top of well Date 6 May
Artesian pressure ____ lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 20 gal./min. with 0 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

OK mab

(10) **WELL LOG:**

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL		FROM	TO
Basalt gray		0	11
Basalt black		11	15
Basalt gray	WB	15	94
Basalt black	WB	94	121
Claystone gray		121	128
Claystone blue & green		128	156
Rock soft layered (slate?)		156	170 WB
Basalt gray hard SWL 48		170	215
There was a bit, sub, stabalizer and 60" of drill pipe left in the hole. Couldn't fish it out.			

RECEIVED
JUN 6 1975
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 22 April 19 75 Completed 6 May 19 75

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richard J. Murray (Person, firm, or corporation) (Type or print)

Address 3712 W. 8th The Dalles, Oregon

[Signed] Richard J. Murray (Well Driller)

License No. 325 Date 5 June 19 75

(USE ADDITIONAL SHEETS IF NECESSARY)

86

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. / (13)
Permit No. ....

(1) OWNER: Name Vernie Earl Address Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat — NE¼ NE¼ Sec 27 T 2 N. R 13E W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 150 ft. Depth of completed well 150 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 30 ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal Cement & Bentonit
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 55 ft. below top of well Date 4-15-80
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	air blow test				

Date of test
Bailer test 55 gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG: A

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand	0'	7'
gray basalt, med.	7'	25'
gray basalt, crevised W.B.	25'	30'
gray basalt, hard	30'	52'
black basalt, porous	52'	55'
black basalt, med. hard	55'	62'
brown basalt, vescular W.B.	62'	75'
black & green basalt, porous	75'	95'
gray basalt, med.	95'	103'
brown & red basalt, porous	103'	108'
gray basalt, hard	108'	135'
black basalt, med.	135'	138'
gray & green conclomorate W.B.	138'	145'
gray clay	145'	150'

RECEIVED
MAY 29 1980
STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Work started 4-14- 19 80 Completed 4-15-80 19

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Co.
(Person, firm, or corporation) (Type or print)

Address P.O. Box 206 Dallesport, WA

[Signed] Karl F Moore
(Well Driller)

License No. 0344 Date 4-16- 19 80

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. (14) C
Permit No. G3-791P

(1) **OWNER:** Name Jarl Construction Address Dallesport, Washington

(2) **LOCATION OF WELL:** County Klickitat — NE ¼ NE ¼ Sec. 27 T. 2 N., R 13 E.W.M. A

Bearing and distance from section or subdivision corner

(3) **PROPOSED USE:** Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one)....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 12½ to 6 inches.
Drilled 595 ft. Depth of completed well 595 ft.

(6) **CONSTRUCTION DETAILS:**
Casing installed: 14" Diam. from 0 ft. to 18 ft.
Threaded ☐ 8" Diam. from 0 ft. to 185 ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal Cement
Did any strata contain unusable water? Yes ☒ No ☐
Type of water? Sandy Depth of strata 162-177
Method of sealing strata off casing & pres. groute

(7) **PUMP:** Manufacturer's Name To be surplied by Pacific
Type: Pump H.P.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level 250 ft.
Static level 183 ft. below top of well Date 8/27/75
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
Will be by Pacific Pump " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 20 gal./min. with 0 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

OK mab

(10) **WELL LOG:**

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand gravel & boulders	0	18
Basalt gray hard	-18	50
Basalt black WB SWL 67'	-50	110
Basalt gray	110	142
Clay gray & green	142	147
Basalt black visicular WB	147	162
Sand white	162	169
Sand brown WB	169	177
Basalt black visicular WB	177	195
Basalt gray hard	195	238
Basalt black green seamsWB	238	246
Basalt gray	246	263
Basalt black visicular WB	263	275
Basalt gray columular	275	316
Basalt black	316	365
Basalt gray very hard	365	475
Basalt black	475	500
Basalt gray hard	500	538
Void	538	540
Basalt gray hard	540	575
Basalt black	575	580
Basalt gray	580	595
12" to 185' 8" to 440' 53/4" to		595'

Used 6 sacks cement under 100 lbs. air pressure to seal sand out at bottom of 8" casing. Used dump bucket to place grout.

RECEIVED
SEP 5 1975
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 9 Aug 19 75 Completed 27 Aug 19 75

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richard J. Murray
(Person, firm, or corporation) (Type or print)

Address 3712 W. 8th The Dalles, Oregon

[Signed] Richard J. Murray
(Well Driller)

License No. 325 Date 4 Sept 19 75

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Sent app 2/1/83 2

RECEIVED (15)

Application No.
Permit No. 5123565F

(1) OWNER: Name Dallesport Industrial Park Address Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat SE ¼ SE ¼ Sec. 26 T. 2 N., R. 13 E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 12 inches.
Drilled 292 ft. Depth of completed well 292 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 10" Diam. from – ft. to 98 ft.
Threaded ☐ ....." Diam. from ..... ft. to ..... ft.
Welded ☒ ....." Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used.....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name.....
Type..... Model No.....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 98 ft.
Material used in seal Cement grout
Did any strata contain unusable water? Yes ☐ No ☒
Type of water?..... Depth of strata.....
Method of sealing strata off.....

(7) PUMP: Manufacturer's Name.....
Type: ..... H.P.....

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ..... ft.
Static level 55 ft. below top of well Date Dec 4, 82
Artesian pressure ..... lbs. per square inch Date.....
Artesian water is controlled by..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?.....
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

blow test 1450 gpm

Date of test Dec 4
Bailer test..... gal./min. with..... ft. drawdown after..... hrs.
Artesian flow..... g.p.m. Date.....
Temperature of water..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand & broken basalt	0	6'
Basalt, gray, med hard, fractured	6'	27'
Basalt, black, med hard, fractured	27'	56'
Basalt brown & black, vescular & Pet. wood, WB 35 gpm	56'	70'
Basalt, brown & gray, porous WB	70'	84'
Basalt, brown, crevised WB	84'	86'
Basalt gray & brown med hard	86'	89'
Basalt, gray, hard	89'	92'
Basalt gray & brown fractured WB 150	92'	96'
Basalt gray w hard brown seams	96'	115'
Basalt brown & gray, vescular & red shale WB 400	115'	127'
Basalt, gray, hard	127'	165'
Basalt, gray & brown crevised WB	165'	167'
Basalt, gray, hard	167'	200'
Basalt, brown & quartz vescular WB	200'	203'
Basalt, gray, hard	203'	278'
Basalt black fractured & lignite	278'	284'
Basalt black vescular WB	284'	286'
Basalt, gray, med & green min.	286'	292'

Work started Oct 14, 1982 Completed Dec 4, 1982

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M.K. Drilling Co. (Person, firm, or corporation) (Type or print)

Address P.O. Box 373 Dallesport WA.

[Signed] Charles L Moore (Well Driller)

License No. 0833 Date Dec 30, 1982

F-89

(USE ADDITIONAL SHEETS IF NECESSARY) EP 2/1/83

File Original and First Copy with the Division of Water Management
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(16)

Application No. 10719
Permit No. 9862

(1) OWNER: Name Klickitat County Port Dis. #1 Address P.O. Box 426, Bingen, Washington 98605

(2) LOCATION OF WELL: County Klickitat — SW ¼ SW ¼ Sec 25 T 2 N., R 13 E W.M.
Bearing and distance from section or subdivision corner N. 81° 47' 56" E., W.M., 433.11' (50' N and 420' E for [illegible])

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal XX Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) No. 1
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6" dia. inches.
Drilled 210 ft. Depth of completed well 210 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from 0 ft. to 210 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded XX " Diam. from ft. to ft.
Casing (see remarks in well log)
Perforations: Yes ☐ No ☐ Not known
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☐ Not known
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☐ Size of gravel: Not known
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 2 ft.
Material used in seal Concrete
Did any strata contain unusable water? Yes ☐ No XX
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name Paco Pump
Type: Deep well turbine H.P. 30

(8) WATER LEVELS: Land-surface elevation above mean sea level 202 ft.
Static level 70 ft. below top of well Date 7-7-70
Artesian pressure NONE lbs. per square inch Date
Artesian water is controlled by 0 (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? Tenneson Eng. Corp.

Yield:	gal./min. with	ft. drawdown after	hrs.
250	90	4	
" 150	" 76	" 4	"
" 100	" 68	" 4	"

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
0	-160				
10 min.	-70				

Date of test 7-7-70
Bailer test — gal./min. with ft. drawdown after — hrs.
Artesian flow NONE g.p.m. Date —
Temperature of water 43° Was a chemical analysis made? Yes XX No ☐

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
This well was drilled under a contract is by the U.S. Army Corps of Engineers in conjunc with the construction of The Dalles Dam somet in the early 1950s. The Corps has not been ab to provide us with a log or data on this well. Information from The Dalles Dam resident engi Mr. Dave Larsen, who is familiar with the con- struction stages of the project, certifies to fact that this well was used for the water sup for the project headquarters complex, and then capped off at the completion of the constructi (Letter enclosed) Foundation & soils investic tions in the immediate area of the well indica a consistent picture as follows:		
Fine silty sand -	0 ~~203~~	~~200~~
Medium gray sand with fine gravel layers -	3 ~~200~~	~~180~~
Medium to coarse gray sand	3 ~~180~~	~~175~~
Medium gray sand of fine grave	2 ~~175~~	~~168~~
Fine silty sand	3 ~~168~~	~~165~~
Coarse sand & gravel	3 ~~165~~	~~150~~
Black lava bedrock	5 ~~150~~	on-dow
Experience with the general area leaves us to believe the lava bedrock is a porous basalt formation and is the water bearing strata. It is noted that the relative elevation of the static water level (approximately 130') is considerably below the controlled pool elevat behind The Dalles Dam of 160' to 155'. Becaus of the lack of well log, the exact informatio construction details is limited to what can be determined by surface surveys, inspection, and plumbing of the well.		

Work started 19 Completed 19

~~WELL DRILLER'S STATEMENT~~:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Klickitat County Port District No. 1 (Person, firm, or corporation) (Type or print)

Address P. O. Box 426, Bingen, Wn. 98605

[Signed] [signature]
Donald J. Branton ~~XXXXXXXX~~

License No. 6620 Date 7 Dec 1971

F-90 Registered Professional Engineer for Washingto

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 5-69)—5-69.

Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

Your Copy

WATER WELL REPORT
STATE OF WASHINGTON

Permit No. ... (17)

(1) OWNER: Name Fred Smith Address Dallas Port

(2) LOCATION OF WELL: County Klickitat S.E. ¼ N.W. ¼ Sec 22 T. 2 N., R. 13 W. M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☑ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 12 inches.
Drilled 500 ft. Depth of completed well 500 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 12" Diam. from 0 ft. to 90 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☑ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☑
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☑
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☑ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☑ No ☐ To what depth? 90 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name [illegible]
Type: H.P. [illegible]

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 200' ft. below top of well Date Dec 23 73
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☑ No ☐ If yes, by whom? [illegible]
Yield: 700 gal./min. with 7 ft. drawdown after 6.0 hrs.
" 700 " 280 " 11:5 "
" 700 " 193 " 4:45 "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
11.15	270	3:15	187		
1:15	183	4:15	193		
2:15	193	4:45	193		

Date of test Jan 5 1974
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 61 Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sandy Soil	0	4
Gravel	4	51
Basalt Gray	51	84
Green Clay	84	91
Black Basalt	91	203
Black Broken	203	297
Some Water Black B.	297	406
Med Grey Basalt	406	492
Hard Gray Basalt	492	500

RECEIVED
JAN 10 [illegible]
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started Sept [illegible], 19[illegible] Completed Dec [illegible], 19[illegible]

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME L & L Drilling Inc (Person, firm, or corporation) (Type or print)

Address Goldendale Wash

[Signed] Larry [illegible] (Well Driller)

License No. D-135236-73 Date , 19

(USE ADDITIONAL SHEETS IF NECESSARY)

F-91

S. F. No. 7356—OS—(Rev. 4-71).

File Original and First Copy with the Division of Water Resources
Second Copy — Owner's Copy
Third Copy — Driller's Copy

E

WATER WELL REPORT

STATE OF WASHINGTON

(18)

Application No. 11312

Permit No. ~~10322~~ 10332

(1) OWNER: Name W. H. Gregory Address 2105 S. W. 190th, Portland, Oregon

(2) LOCATION OF WELL: County Klickitat — SE ¼ SW ¼ Sec. 22 T. 2 N., R. 13 E. W.M.

Bearing and distance from section or subdivision corner 550' N. 1000' W of S 1/4 Cor. Sec. 2

(3) PROPOSED USE: Domestic ☐ Industrial ☒ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 10 inches.
Drilled 285 ft. Depth of completed well 285 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 10 3/4" Diam. from 0 ft. to 20 ft.
Threaded ☐ ____" Diam. from ____ ft. to ____ ft.
Welded ☐ ____" Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type ____ Model No.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ____ Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: ____ H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ____ ft.
Static level 77 ft. below top of well Date
Artesian pressure ____ lbs. per square inch Date
Artesian water is controlled by ____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 800 gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Hard gray basalt	20	152
Fractured basalt & volcanic ash	152	193
Hard red & black basalt	193	252
Broken basalt, volcanic ash	252	285

Work started April 30, 1973. Completed May 18, 1973

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME PROJECT: Corporation (Person, firm, or corporation) (Type or print)

Address 21075 S. W. Tualatin Valley Hwy, Aloha, O

[Signed] Edward M. Jenner (Well Driller)

License No. 223 02 6752 Date 5/23/73, 19

F-92

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—(Rev. 2-66)—2-66—5M. 4516.

1/24/73

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(19)

Application No. .....
Permit No. .....

(1) OWNER: Name Don Graves Address Dalesport Wa.

(2) LOCATION OF WELL: County Klickitat SE ¼ SE ¼ Sec. 21 T. 2 N., R. 13 E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one).... .....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 160 ft. Depth of completed well 160 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from +2 ft. to 160 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 40 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ..... ft.
Static level 125 ft. below top of well Date 9-3-82
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow test 40 gpm				

Date of test 9-2-82
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG: R

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Top soil & gravel	0	7'
river gravel boulders & sand	7'	121'
river gravel water bearing	121	160

SEP – 7 1982

Work started 8-31 19 82 Completed 9-3 19 82

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M.K. Drilling Co. (Person, firm, or corporation) (Type or print)
Address PO Box 373 Dalesport WA.
[Signed] Charles L Moore (Well Driller)
License No. 933 Date 9-3 19 82

F-93

(USE ADDITIONAL SHEETS IF NECESSARY)

RJ 9-8-82

ECY 050-1-20

(20)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Larry Frazier, Inc. Address P.O. Box 736 Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat ¼ NE ¼ Sec 21 T 2 N., R 13E W.M.

Bearing and distance from section or subdivision corner NW

B

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .... # 2
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 160 ft. Depth of completed well 150 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from - ft. to 30 ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal Cement & bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name Grundfos
Type: S P 2 H.P. 3/4

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 85 ft. below top of well Date 2-13
Artesian pressure ____ lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow test	25 g.p.m.			

Date of test 2-13-80
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Top Soil	0	6'
gray basalt, fractured	6'	25'
basalt, gray, hard	25'	85'
basalt, brown porous	85'	89'
sandstone, white	89'	119'
basalt, brown, vesicular	119'	125'
basalt black vesicular WB	125'	137'
gray basalt crevised WB	137	160'

Work started 2-13- 19 80 Completed 2-13-80 19

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K DRILLING CO.
(Person, firm, or corporation) (Type or print)

Address ST. RT. 2 BOX 100 LYLE, WA 98635

[Signed] Charles L Moore
(Well Driller)

License No. 0833 Date 2-19- 19 80

F-94

(USE ADDITIONAL SHEETS IF NECESSARY)

(21)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. /

Permit No. ....

(1) OWNER: Name Darrel King Address P.O.Box 122 Dallesport, Wa.

(2) LOCATION OF WELL: County Klickitat — NW ¼ NE ¼ Sec. 21 T. 2 N., R. 13E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 170 ft. Depth of completed well 170 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 35 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 35 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name None
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... 400 ft.
Static level 65 ft. below top of well Date 29 July
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 12 gal./min. with 90 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Soil & gravel	0	13
Rock broken	13	32
Basalt gray	32	64
Sandstone tan	64	115
Basalt gray W.B.	115	170

RECEIVED
AUG 30 1982

Work started 25 July 19 82 Completed 29 July 19 82

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Murray Well Drilling Inc.
(Person, firm, or corporation) (Type or print)

Address Rt. 4 Box 3470 The Dalles, Oregon

[Signed] Richard J. Murray (Well Driller)

License No. 325 Date 27 August 19 82

(USE ADDITIONAL SHEETS IF NECESSARY) EP 8.31.82

(22)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

R WELL REPORT
E OF WASHINGTON

Application No. ...
Permit No. ...

(1) OWNER: Name Minor's Addition Supply Address Rt. 2 Box Box 82 Lyle, WA 98635

(2) LOCATION OF WELL: County Klat — SE ¼ SW ¼ Sec 16 T 2 N., R 13E W.M.
Bearing and distance from section or subdivision corner A of Sub. Division

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ...
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well ... inches.
Drilled 260 ft. Depth of completed well 0 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from + 119 ft.
Threaded ☐ ..." Diam. from ... ft.
Welded ☒ ..." Diam. from ... ft.

Perforations: Yes ☐ No ☒
Type of perforator used ...
SIZE of perforations ... in. by ... in.
... perforations from ... ft.
... perforations from ... ft.
... perforations from ... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name ...
Type ... Mod ...
Diam. ... Slot size ... from ... ft.
Diam. ... Slot size ... from ... ft.

Gravel packed: Yes ☐ No ☒ Size of ...
Gravel placed from ... ft. to ... ft.

Surface seal: Yes ☒ No ☐ To what depth 20 ft.
Material used in seal Cement & Bonite
Did any strata contain unusable water? No ☐
Type of water? ... Depth of ...
Method of sealing strata off ...

(7) PUMP: Manufacturer's Name ...
Type: ...

(8) WATER LEVELS: Land-surface elevation above mean sea level ... ft.
Static level 135 ft. below top of well 10-85
Artesian pressure ... lbs. per square inch ...
Artesian water is controlled by ... (Cap.)

(9) WELL TESTS: Drawdown is amount water is lowered below static
Was a pump test made? Yes ☐ No ☒ If yes, by whom ...
Yield: ... gal./min. with ... ft. drawdown ... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
blow test 105 gpm					

Date of test 6-10-85
Bailer test ... gal./min. with ... ft. drawdown ... hrs.
Artesian flow ... g.p.m. Date ...
Temperature of water ... Was a chemical analysis ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil	0'	5'
sand	5	16
river gravel	16	35
brown basalt, porous	35	44
black basalt, med. crevised, greenclaystone, iron pyrite	44	73
yellow and white agate, caving	73	95
brown basalt, vescular	95	99
black basalt, porous, med. hard	99	107
gray basalt, hard	107	198
black basalt, vescular, water bearing	198	209
gray basalt, hard	209	248
black and gray iron pyrite, vescular, water bearing	248	260

JUN 17 1985

Work started 6-3, 1985 Completed 6-10-, 1985

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)

Address P.O. Box 373 Dallesport, WA 98617

[Signed] Charles B. Moore (Well Driller)

License No. 0833 Date 6-15-, 1985

6/18/85

(ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(23) Application No. 42953

Permit No. ....

(1) OWNER: Name Murdock Tract Water Fund Address PO Box 115 Dallesport, Wa.

(2) LOCATION OF WELL: County Klickitat SE ¼ SW ¼ Sec 16 T. 2 N., R 13 E W.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☒ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 250 ft. Depth of completed well 250 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 200 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☒ No ☐
Type of perforator used torch
SIZE of perforations ¼ in. by 4 in.
48 perforations from 190 ft. to 199 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☐ No ☐ To what depth? ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: None H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... 250 ft.
Static level 156 ft. below top of well Date 4/24/77
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 40 gal./min. with 76 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

F-97

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, an show thickness of aquifers and the kind and nature of the material in eac stratum penetrated, with at least one entry for each change of formatio

MATERIAL	FROM	TO
~~Basalt conglomerate~~	~~78~~	~~103~~
~~Green claystone~~	~~103~~	~~107~~
~~Sand fine WB~~	~~107~~	~~116~~
~~Cinders red~~	~~116~~	~~123~~
~~Basalt gray~~	~~123~~	~~125~~
~~Basalt black~~	~~125~~	~~128~~
~~Basalt gray hard~~	~~128m~~	~~136~~
~~Basalt red hard~~	~~136~~	~~141~~
~~Basalt gray hard~~	~~141~~	~~185~~
~~Fractures WB~~	~~135~~	~~198~~
~~Basalt gray~~	~~198~~	~~209~~
~~Basalt gray fractured WB~~	~~209~~	~~221~~
~~Basalt gray hard~~	~~221~~	~~250~~
Deepened existing hole (8") to 200' Then set 6"X.250" liner. Then drille 6" open hole to 250'		

RECEIVED
MAY 6 1977
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 21 April 19 77 Completed 24 April 19 77

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richard J. Murray (Person, firm, or corporation) (Type or print)

Address 3712 W 8th The Dalles, Oregon

[Signed] Richard J. Murray (Well Driller)

License No. 325 Date 4 May, 1977

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(24)

Application No. 11807
Permit No. 10489

(1) OWNER: Name IVOR T. JONES Address STAR ROUTE 1808 I.V.R., WA. 98633

(2) LOCATION OF WELL: County KLICKITAT NW ¼ NW ¼ Sec 16 T 2 N. R 13 WM.
Bearing and distance from section or subdivision corner 1100 N. & 750 W. of SE corner of the SWquarter Sec. 1

(3) PROPOSED USE: Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [X] Jetted [ ]

(5) DIMENSIONS: Diameter of well 6" inches.
Drilled 205 ft. Depth of completed well 205 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6" Diam. from +1 ft. to 20' ft.
Threaded [ ] ____" Diam. from ____ ft. to ____ ft.
Welded [X] ____" Diam. from ____ ft. to ____ ft.

Perforations: Yes [ ] No [X]
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes [ ] No [X]
Manufacturer's Name
Type ____ Model No.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes [ ] No [X] Size of gravel:
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes [X] No [ ] To what depth? 20 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? ____ Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: ____ H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ____ ft.
Static level 130 ft. below top of well Date 1/11/71
Artesian pressure ____ lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level Drilling Contractor
Was a pump test made? Yes [X] No [ ] If yes, by whom?
Yield: 8 gal./min. with 55 ft. drawdown after 1 hrs.
" 12 " 75 " 1 "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date
Temperature of water 52° Was a chemical analysis made? Yes [ ] No [X]

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Clay Brown	0	3'
Boulders	3'	6'
Basalt, Gray	6'	27'
Clay, Blue Green	27'	66'
Sandstone Brown	66'	74'
Vesicular Basalt, Hard	74'	156'
Fractured Basalt w/ Black Claystone Seams	156'	162'
Basalt Gray	162'	167'
Vesicular Basalt (Water Bearing in Small Veins)	167'	205'

Work started 1/7 19 71 Completed 1/11 19 71

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME O'Leary Well Drilling Inc. (Person, firm, or corporation) (Type or print)
Address P.O. Box 247-A Goldendale, Wa
[Signed] Kenneth L. O'Leary (Well Driller)
License No. 9060 Date 1/15, 1971

F-98

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. 19711

(1) OWNER: Name Ivor Jones Address Dallesport, Washington

(2) LOCATION OF WELL: County Klickitat NE¼ SW¼ ~~NW¼ SE¼~~ ¼ Sec 16 T. 2 N., R. 13 W.M.

Bearing and distance from section or subdivision corner 800'W and 400'S of center of Sec 16

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☒ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 315 ft. Depth of completed well 315 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: ____" Diam. from ____ ft. to ____ ft.
Threaded ☐ ____" Diam. from ____ ft. to ____ ft.
Welded ☐ ____" Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No .....
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☐ No ☐ To what depth? ____ ft.
Material used in seal .....
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... 450 ft.
Static level 157 ft. below top of well Date 2 June 1973
Artesian pressure ____ lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 2 June 1973
Bailer test 25 gal./min. with 0 ft. drawdown after 1½ hrs.
Artesian flow ____ g.p.m. Date .....
Temperature of water 62 Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL		FROM	TO
Start	swl 100		205
Basalt blue		205	223
Scoria	swl 119	223	235
Basalt gray	swl 158	235	250
Basalt blue		250	283
Basalt interbeded with Yellow clay		283	295
	swl 170		
Basalt gray	swl 157	295	315

Work started 23 May 19 73 Completed 2 June 19 73

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richard J. Murray (Person, firm, or corporation) (Type or print)

Address 3712 W. 8th The Dalles, Ore 97058

[Signed] Richard J Murray (Well Driller)

License No. 9219 Date 2 June 1973, 19

F+99

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. (25)

Permit No. ....

(1) OWNER: Name Earl B. Cooper Address P.O. Box 732 Dallesport WA 98617

(2) LOCATION OF WELL: County Klickitat SW ¼ SW ¼ Sec. 16 T. 2 N., R. 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 280 ft. Depth of completed well 280 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from — ft. to 28' 6" ft.
Threaded ☐ ." Diam. from ft. to ft.
Welded ☒ ." Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 25 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 105 ft. below top of well Date 7-19-78
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 100 gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil	0'	6'
Yellow Sand + Clay	6'	18'
River Gravel (water bearing)	18'	20'
Gray Basalt, Hard	20'	51'
Brown Basalt, Med. Hard	51'	62'
Brown & Gray Basalt, Med. Hard	62'	75'
Gray Basalt, Hard	75'	80'
Brown + Black Basalt, Hard	80'	82'
Black Basalt, Pourous (water bearing)	82'	90'
Gray Basalt, Hard	90'	119'
Brown Basalt, Pourous (water bearing)	119'	129'
Gray Basalt, Hard	128'	142
Black Basalt, Hard, Pourous (water bearing)	142'	152'
Gray Basalt, Hard	152'	265'
Black Basalt, Pourous (water bearing)	265'	278'
Gray Basalt, Hard	278'	280'

RECEIVED
AUG 24 1978
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 7-18- 19 78 Completed 7-19- 19 78

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Co.
(Person, firm, or corporation) (Type or print)

Address START. 2 Box 100 LYLE WA 98635

[Signed] Charles Moore
(Well Driller)

License No. 0833 Date 8-15- 19 78

F-100

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Permit No. .... (26)

(1) OWNER: Name George McKinney Address Murdock, Wa.

(2) LOCATION OF WELL: County Klickitat — E ¼ SW ¼ Sec. 16 T. 2 N., R 13 E W.M.

Give location and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☑ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☑ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☑ Jetted ☐

(5) DIMENSIONS: Diameter of well 6" inches.
Drilled 33 ft. Depth of completed well 175 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: _____" Diam. from Original ft. to _____ ft.
Threaded ☐ _____" Diam. from _____ ft. to _____ ft.
Welded ☐ _____" Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☑
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes ☐ No ☑
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes ☐ No ☑ Size of gravel: _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes ☑ No ☐ To what depth? 22' ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level .... _____ ft.
Static level 119' ft. below top of well Date 10/24/72
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? _____
Yield: 60+ GPM gal./min. with (AIR-LIFT) ft. drawdown after hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water 52° Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Basalt, Grey	142'	148'
Basalt Fractured, Grey	148'	156'
Basalt Vesecular, Brown	156'	161'
Basalt Vesecular, Grey	161'	170'
Basalt, Grey	170'	175'

RECEIVED
DEC 4 1972
DEPARTMENT OF ECOLOGY
SPOKANE REGIONAL OFFICE

Work started 10/20 19 72 Completed 10/24 19 72

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME O'Keefe Well Drilling Inc.
(Person, firm, or corporation) (Type or print)
Address P.O. Box 247-A Goldendale, Wa.
[Signed] Kenneth A. O'Keefe
(Well Driller)
License No. 9060 Date 11/28, 19 72

(USE ADDITIONAL SHEETS IF NECESSARY) E-101

1/15/73

S. F. No. 7356—OS—(Rev. 4-71).

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. (21)
Permit No. ....

(1) OWNER: Name E. B. Cooper Address Rt 2 Box 10 Lyle, Wa.

(2) LOCATION OF WELL: County Klickitat NW ¼ SW ¼ Sec 16 T 2N N., R 13E W.M. N.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 109 ft. Depth of completed well 109 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 30 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 26 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... 180 ft.
Static level 65 ft. below top of well Date 6/17/76
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 40 gal./min. with 35 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

OK MB

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Soil	0	3
Sand brown	3	16
Basalt broken	16	28
Basalt gray WB	28	65
First water 30'		
Basalt gray visicular WB	65	109

RECEIVED
JUN 22 1976
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 17 June, 19 76 Completed 17 June, 19 76

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richard J, Murray
(Person, firm, or corporation) (Type or print)

Address 3712 W 8th The Dalles, Oregon

[Signed] Richard J Murray (Well Driller)

License No. 325 Date 18 June, 19 76

F-102

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71)
ECY-070-28

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. (28)
Permit No. ....

(1) **OWNER:** Name Phillip Hearron Address Rt. 2 Box 35 Lyle, Wa.

(2) **LOCATION OF WELL:** County Klickitat NW ¼ SW ¼ Sec. 16 T. 2 N., R. 13 W.M.
Bearing and distance from section or subdivision corner

(3) **PROPOSED USE:** Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 6 inches.
Drilled 109 ft. Depth of completed well 109 ft.

(6) **CONSTRUCTION DETAILS:**
Casing installed: 6 " Diam. from 0 ft. to 59 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 58 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) **PUMP:** Manufacturer's Name
Type: H.P.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level.... 300 ft.
Static level 32 ft. below top of well Date 9 April
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 9 April 1982
Baller test 15 gal./min. with 70 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) **WELL LOG:**
Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Soil	0	6
Boulders & broken rock	6	52
Basalt gray visic. WB	52	109

RECEIVED
APR 16 1982
DEPARTMENT OF ECOLOGY
CENTRAL REGION

Work started 8 April 1982 Completed 9 April 1982

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Murray Well Drilling Inc.
(Person, firm, or corporation) (Type or print)

Address 3712 W. 8th The Dallesport, Wa.

[Signed] Richard J. Murray
(Well Driller)

License No. 325 Date 12 April 1982

F-103

(USE ADDITIONAL SHEETS IF NECESSARY) EP 4-21-82

ECY 050-1-20

(29)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. .....

(1) OWNER: Name Ken Zeilinski Address Box 221 Dallesport, Wa 98617

(2) LOCATION OF WELL: County Klickitat — NW ¼ SW ¼ Sec. 16 T. 2 N., R. 13 E W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 88 ft. Depth of completed well 88 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 59 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 58 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... 300 ft.
Static level 40 ft. below top of well Date 7 April
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 7 April 1982
Bailer test 50 gal./min. with 40 ft. drawdown after 1 hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Soil	0	5
Basalt gray	5	23
Rock brown	23	52
Basalt gray WB	52	68
Rock gray & brown visic. WB	68	88

RECEIVED
APR 16 1982
DEPARTMENT OF ECOLOGY
CENTRAL REGION

Work started 6 April, 19 82 Completed 7 April, 19 82

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Murray Well Drilling Inc.
(Person, firm, or corporation) (Type or print)

Address 3712 W 8th The Dalles, Oregon

[Signed] Richard J Murray
(Well Driller)

License No. 325 Date 12 April, 19 82

F-104

(USE ADDITIONAL SHEETS IF NECESSARY) EP 4-21-82

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(30)

Application No. .....
Permit No. .....

(1) OWNER: Name Robert G. Knowles Address Bx. 766 Dalles Port, Wa.

(2) LOCATION OF WELL: County Klickitat — NE cor. SW ¼ Sec. 16 T. 2 N., R. 13E W.M. L

...ing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☑ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☑ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☑ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 250 ft. Depth of completed well 250 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from +1' ft. to 26' ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☑ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☑
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☑
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☑ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☑ No ☐ To what depth? 18' ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☑
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 183' ft. below top of well Date 6/30/72
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☑ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" 17 GPM (AIR LIFT) "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test — gal./min. with — ft. drawdown after — hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water 56° Was a chemical analysis made? Yes ☐ No ☑

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand, Gravel + Boulders	0	27'
Basalt, Fractured.	27'	29'
Basalt	29'	35'
Claystone, Green	35'	49'
Basalts; Frac. + Visecular	49'	237'
Basalt	237'	250'
Pump Setting		
230'-240'		
unrecorded		

Work started 6/28, 1972 Completed 6/30, 1972

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME O'Leary Well Drilling Inc. (Person, firm, or corporation) (Type or print)

Address P.O. Box 247-A Goldendale, Wa.

[Signed] Kenneth L. O'Leary (Well Driller)

License No. 9060 Date 7/9, 1972

F-105

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

DOMESTIC WELL S.E.S.

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. 31
Permit No. ....

(1) **OWNER:** Name Pearl & James Fehr Address 0.04R Shultz St. Carson, WA 98610

LOCATION OF WELL: County Klickitat NE ¼ SW ¼ Sec. 16 T. 2 N., R. 13E W.M.

Bearing and distance from section or subdivision corner

(3) **PROPOSED USE:** Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

(4) **TYPE OF WORK:** Owner's number of well (if more than one)....
New well [X] Method: Dug [ ] Bored [ ]
Deepened [ ] Cable [ ] Driven [ ]
Reconditioned [ ] Rotary [X] Jetted [ ]

(5) **DIMENSIONS:** Diameter of well 6 inches.
Drilled 115 ft. Depth of completed well 115 ft.

(6) **CONSTRUCTION DETAILS:**
Casing installed: 6 " Diam. from +1 ft. to 50 ft.
Threaded [ ] " Diam. from ft. to ft.
Welded [X] " Diam. from ft. to ft.

Perforations: Yes [ ] No [X]
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes [ ] No [X]
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes [ ] No [X] Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes [X] No [ ] To what depth? 47 ft.
Material used in seal cement and bentonite
Did any strata contain unusable water? Yes [ ] No [X]
Type of water? Depth of strata
Method of sealing strata off

(7) **PUMP:** Manufacturer's Name
Type: H.P.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level.... ft.
Static level 70' ft. below top of well Date 4-19-83
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes [ ] No [ ] If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
Flow-test	125 gpm				

Date of test 4-19-83
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes [ ] No [ ]

(10) **WELL LOG:**

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
top soil	0'	7'
river gravel & boulders	7	42
brown basalt, fractured	42	47
gray basalt, hard	47	58
brown basalt, crevised		
and brown clay & wood	58	70
gray basalt, hard	70	79
black & red basalt, crevised		
water bearing	79	100
brown basalt, vescular		
water bearing	100	107
gray basalt, hard	107	111
brown basalt, vescular		
water bearing	111	115

MAY 20 1983

Work started 4-18- 19 83 Completed 4-19- 19 83

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company
(Person, firm, or corporation) (Type or print)
Address P.O.Box 373 Dallesport, WA 98617

[Signed] Kent Moore Jr
(Well Driller)

License No. 0973 Date 4-22-83 19

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(32)

Application No. .....

Permit No. .....

(1) OWNER: Name EARL COOPER AND Address PO Box 732 DALLESPORT WA. 98617

(2) LOCATION OF WELL: County KLICKITAT — NE ¼ SW ¼ Sec 16 T. 2 N., R. 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .... # 3-A
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 325 ft. Depth of completed well 325 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from - ft. to 38' 6" ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No .....
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 36 ft.
Material used in seal CEMENT + BENTONITE
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 175' ft. below top of well Date 4-5-79
Artesian pressure ____ lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" Blow" TEST 75 "gpm "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 4-5-79
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
TOP SOIL	0	4'
RIVER GRAVEL	4'	25'
BROWN BASALT, POROUS	25'	33'
GRAY BASALT, HARD	33'	60'
GRAY + BROWN BASALT, CREVICED	60'	67'
GRAY BASALT, HARD	67'	93'
BROWN BASALT, POROUS	93	100'
BLACK BASALT, MED HARD	100'	119'
GRAY BASALT, HARD	119'	165'
BROWN BASALT, POROUS	165'	190
GRAY BASALT, HARD	190'	310'
BLACK + BROWN BASALT, VESCULAR WB	310'	325'

Work started 4-4 19 79 Completed 4-5- 19 79

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K DRILLING CO
(Person, firm, or corporation) (Type or print)

Address RT 2 Box 100 LYLE, WASH 98635

[Signed] Karl Moore JR
(Well Driller)

License No. 0973 Date 4-13-, 19 79

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. 3200
Permit No. ....

(1) OWNER: Name Earl Cooper Address P.O.Box 732 Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat NE ¼ SW ¼ Sec. 16 T. 2 N., R. 13 W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☒ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 130 ft. Depth of completed well 280 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: ..." Diam. from ... ft. to ... ft.
Threaded ☐ ..." Diam. from ... ft. to ... ft.
Welded ☐ ..." Diam. from ... ft. to ... ft.

Perforations: Yes ☐ No ☐
Type of perforator used
SIZE of perforations ... in. by ... in.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

Screens: Yes ☐ No ☐
Manufacturer's Name
Type ... Model No.
Diam. ... Slot size ... from ... ft. to ... ft.
Diam. ... Slot size ... from ... ft. to ... ft.

Gravel packed: Yes ☐ No ☐ Size of gravel:
Gravel placed from ... ft. to ... ft.

Surface seal: Yes ☐ No ☐ To what depth? ... ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: ... H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 90 ft. below top of well Date 3-27-82
Artesian pressure ... lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow Test	70 gpm			

Date of test 3-27-82
Bailer test ... gal./min. with ... ft. drawdown after ... hrs.
Artesian flow ... g.p.m. Date
Temperature of water ... Was a chemical analysis made? Yes ☐ No ☒ 108

(10) WELL LOG: L

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
gray basalt, Hard	150'	179'
gray & brown basalt, vesicular, water bearing	179'	183'
gray basalt, med hard, porous	183'	195'
gray basalt, Hard	195'	275'
gray & brown basalt, crevised, med Hard	275'	280'

Work started 3-26- 19 82 Completed 3-27- 19 82

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)
Address P.O. Box 373 Dallesport, WA 9861
[Signed] Charles J Moore (Well Driller)
License No. 0833 Date 4-15- 19 82

RJ 5-4-82

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(33)

Application No. .....
Permit No. .... /

(1) OWNER: Name Larry Odom Address ST. RT. 2 LYLE, WA 98635

(2) LOCATION OF WELL: County Klickitat — NE ¼ SW ¼ Sec. 16 T. 2 N., R. 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☒ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 155 ft. Depth of completed well 330 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ....." Diam. from ..... ft. to ..... ft.
Threaded ☐ ....." Diam. from ..... ft. to ..... ft.
Welded ☐ ....." Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☐
Type of perforator used.....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☐
Manufacturer's Name.....
Type..... Model No.....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☐ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☐ No ☐ To what depth? ..... ft.
Material used in seal.....
Did any strata contain unusable water? Yes ☐ No ☐
Type of water?..... Depth of strata.....
Method of sealing strata off.....

(7) PUMP: Manufacturer's Name.....
Type: ..... H.P.....

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ..... ft.
Static level 220 ft. below top of well Date 9-12
Artesian pressure ..... lbs. per square inch Date.....
Artesian water is controlled by..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?.....
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
		blow test		25 gpm	

Date of test 9-12
Water test..... gal./min. with..... ft. drawdown after..... hrs.
Artesian flow..... g.p.m. Date.....
Temperature of water..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
gray basalt, hard	175'	270'
gray basalt, hard, crevised WB	270'	271'
gray basalt, hard	271'	300'
black basalt, med porous WB	300'	330'

RECEIVED OCT - 6 1980

Work started 9-11-, 19 80 Completed 9-12-, 19 80

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)

Address P.O. Box 206 Dallesport, WA 98611

[Signed] Charles L. Moore (Well Driller)

License No. 0533 Date 9-13-, 19 80

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

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Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(34)

Application No. .....
Permit No. .....

(1) OWNER: Name EARL COOPER ADD. Address Box 732 Dallesport, WA 98617

(2) LOCATION OF WELL: County KLICKITAT — NE ¼ SW ¼ Sec 16 T 2 N. R 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one).... 4-A
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 175 ft. Depth of completed well 175 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from - ft. to 30 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal CEMENT & BENTONITE
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 99 ft. below top of well Date 4-6-79
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" Blow TEST 20 gpm "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 4-6-79
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil	0	3'
RIVER GRAVEL	3'	10'
BROWN & GRAY BASALT, BROKEN	10'	19'
GRAY BASALT, HARD	19'	40'
BROWN BASALT, MED HARD	40'	50'
GRAY BASALT, HARD	50'	95'
BROWN BASALT, CREVISED WB	95'	97'
GRAY & BROWN BASALT MED HARD	97'	125'
BLACK & BROWN BASALT POROUS WB	125	147'
GRAY BASALT, HARD	147'	163'
BLACK BASALT, CREVISED WB	163'	175'

Work started 4-6 19 79 Completed 4-6 19 79

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K DRILLING CO
(Person, firm, or corporation) (Type or print)

Address RT 2 Box 100 LYLE WASH 98635

[Signed] Karl Moore JR
(Well Driller)

License No. 0973 Date 4-13 19 79

F-110

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
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Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(25)

Application No. .....

Permit No. .....

(1) OWNER: Name EARL Cooper ADDITION Address P.O Box 732 Dallesport WA 98617

(2) LOCATION OF WELL: County KLICKITAT NE ¼ SW ¼ Sec 16 T 2 N., R 13 W.M.

ng and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 1A
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 150 ft. Depth of completed well 150 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from - ft. to 62 ft.
Thresded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 60 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 99 ft. below top of well Date 3/30/79
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 3-30-79
Bailer test 60 gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top soil	0	4
river gravel	4	18
yellow clay	18	30
gray, sandy clay	30	50
black basalt, broken	50	55
black basalt, hard	55	72
brown basalt, crevised	72	85
gray basalt, hard	85	105
black & brown basalt, med. hard	105	115
brown basalt, vesicular (water bearing)	115	125
gray basalt, med. hard, crevised (water bearing)	125	131
black basalt, med hard	131	138
gray basalt, hard	138	144
black & brown basalt, vesicular (water bearing)	144	146
gray basalt, hard	146	150

Work started 3-29 19 79 Completed 3-30 19 79

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Co.
(Person, firm, or corporation) (Type or print)

Address Rt. 2 Box 100 Lyle WA 98635

[Signed] Henry J. Mork
(Well Driller)

License No. 0834 Date 3/31/, 19 79

F 111

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(36)

Application No. .....

Permit No. .....

(1) OWNER: Name Earl Cooper ADD. Address P O Box 732 Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat NE¼ SW¼ Sec 16 T 2 N, R 13 W.M.

Bearing and distance from section or subdivision corner L

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .... 2 A

New well ☒ Method: Dug ☐ Bored ☐ Deepened ☐ Cable ☐ Driven ☐ Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches. Drilled 344 ft. Depth of completed well 344 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from – ft. to 29 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 29 ft.
Material used in seal Cement & bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 175 ft. below top of well Date 4-3
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
blow	test	90	gpm		

Date of test 4-3
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top soil	0	4'
river gravel	4'	25'
basalt, gray, hard	25'	45'
basalt, brown, vesicular	45'	50'
basalt, gray, hard	50'	80'
basalt, gray, porous	80'	102'
basalt, brown, porous	102'	118'
basalt gray & brown, med hard	118'	135'
basalt gray hard	135'	170'
basalt, black, med hard	170'	178'
basalt, gray, hard	178	315'
basalt gray & black crevised w-B	315	322
basalt black & green vesicular WB	322	330
basalt, black & brown, vesicular WB.	330	337
basalt gray hard	337	344

Work started 4-2 19 79 Completed 4 3 19 79

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M. K. Drilling Co
(Person, firm, or corporation) (Type or print)

Address Rt 2 Box 100 Lyle WA 98635

[Signed] Charles L Moore
(Well Driller)

License No. 0833 Date 4-13, 19 79

F-112

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with the Division of Water Management
Second Copy — Owner's Copy
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WATER WELL REPORT

STATE OF WASHINGTON

(37)

Application No. 10853

Permit No. ....

(1) OWNER: Name Cecil Odom Address P.O. Box 715

(2) LOCATION OF WELL: County ~~Klickitat~~ Klickitat W/2 NE ¼ SW ¼ Sec. 16 T. 2 N., R. 13 E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 190 ft. Depth of completed well 190 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from +1 ft. to 55 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 48' ft. below top of well Date 4/21/70
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 8 gal./min. with 128 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water 52° Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Blow Sand	0	12'
Gravel Med. + Sand	12'	45'
Sand, Fine	45'	51'
Wood, Hard	51'	52'
Basalt Vesicular, Hard	52'	62'
Basalt, Brown with Some Fractures	62'	117'
Basalt, Brown Vesicular Water Bearing Aprox. 3 g.p.m.	117'	120'
Basalt, Vesicular, Gray	120'	148'
Basalt, Hard, Black	148'	166'
Basalt, Vesicular Gray Water Bearing aprox 5 G.P.M.	166'	179'
Basalt, Hard, Black	179'	184'
Basalt, Hard, Gray	184'	191'

Work started 4/17 19 70 Completed 4/21 19 70

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Gorge Contractors Inc.
(Person, firm, or corporation) (Type or print)

Address Goldendale, Wa.

[Signed] Kenneth L. O'Leary
(Well Driller)

License No. 223-01-8204 Date 4/21, 1970

F-113

S. F. No. 7356—OS—(Rev. 5-69)—5-69. OK/WRA (USE ADDITIONAL SHEETS IF NECESSARY)

3

(3720)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. .....
Permit No. .....

(1) OWNER: Name CECIL Odom Address LYLE, WA 98635

(2) LOCATION OF WELL: County KLICKITAT NE¼ SW¼ Sec. 16 T. 2 N. R. 13 W.M.
Bearing and distance from section or subdivision corner 1 D in SW 1/4 Murdock

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☒ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6" inches.
Drilled 100 ft. Depth of completed well 286 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from ..... ft. to ..... ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☐ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☐ No ☒ To what depth? ..... ft.
Material used in seal .....
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level ..... ft. below top of well Date .....
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test 40 gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Basalt, hard, gray	186'	210'
Basalt, black, vesicular	210'	214'
Basalt, black, porous, water	214'	216'
Basalt, gray, small crevases some water	216'	250'
Basalt, gray, hard	250'	286'

RECEIVED
OCT 10 1977
DEPARTMENT OF ECOLOGY
CENTRAL WASHINGTON REGION

RECEIVED
AUG 15 1977
DEPARTMENT OF ECOLOGY
CENTRAL WASHINGTON REGION

Work started 7/27 19 77 Completed 7/28 19 77

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M. J. DRILLING Co., INC. (Person, firm, or corporation) (Type or print)
Address P.O. Box 188 LYLE, WA 9863
[Signed] ..... (Well Driller)
License No. 0344 Date 7/31 19 77

(USE ADDITIONAL SHEETS IF NECESSARY)

OR

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. C

(1) OWNER: Name Robert Knowles Address Box 766 Dallesport, Wash.

(2) LOCATION OF WELL: County Klickitat NE ¼ SW ¼ Sec 16 T 2 N., R 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 125 ft. Depth of completed well 125 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 18 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... 400 ft.
Static level 108 ft. below top of well Date 13 Dec
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 20 gal./min. with 6 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

OK mab

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Soil	0	3
Basalt gray	3	33
Basalt brown	33	38
Gray Basalt	38	60
Basalt brown WB	60	78
Basalt gray	78	105
Basalt brown	105	117
Void	117	121
Basalt gray	121	125

RECEIVED
DEC 19 1975
WATER RIGHTS

Work started 13 Dec, 19 75 Completed 13 Dec, 19 75

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richard J. Murray (Person, firm, or corporation) (Type or print)

Address 3712 W8th The Dalles, Oregon

[Signed] Richard J. Murray (Well Driller)

License No. 325 Date 13 Dec, 1975

1115

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

39

Application No. .....
Permit No. .....

(1) OWNER: Name Larry Frazier INC. Address P.O. Box 736 Dallesport WA 986

(2) LOCATION OF WELL: County Klickitat NE ¼ SE ¼ Sec 16 T. 2 N., R. 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 100 ft. Depth of completed well 100 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from — ft. to 20 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☐ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 55' ft. below top of well Date 5-29-78
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test 30 gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil	0	5'
basalt, gray, broken	5'	16'
basalt, gray, med hard	16	35'
basalt, gray, hard	35'	45'
basalt, brown & gray, med hard	45'	53'
basalt, brown & black	53'	60'
basalt, gray & brown, crevased with river gravel (water)	60'	85'
basalt brown vescular (water bearing)	85'	100'

Work started 5-29- 19 78 Completed 5-29- 19 78

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M K Drilling Co (Person, firm, or corporation) (Type or print)

Address Rt 2 Box 100 Lyle WA.

[Signed] Charles Moore (Well Driller)

License No. 833 Date 6 4 19 78

F-116

(USE ADDITIONAL SHEETS IF NECESSARY)

NL

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(40)

Application No. ....
Permit No. ....

(1) OWNER: Name Jerry Frazier Address Rt.2 Box 68 The Dalles, OR 97058

(2) LOCATION OF WELL: County Klickitat SW ¼ SW ¼ Sec. 15 T. 2 N. R. 13 W.M.
Bearing and distance from section or subdivision corner

RECEIVED

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 290 ft. Depth of completed well 290 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 40 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 40 ft.
Material used in seal cement & bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 48 ft. below top of well Date 9-25-79
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
BLOW		TEST		125 9 pm	

Date of test 9-25-79
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top soil	0'	3'
black clay	3'	9'
river gravel	9'	28'
black basalt, hard	28'	58'
brown basalt, porous, & clay	58'	67'
black basalt, med. hard	67'	83'
gray basalt, med. hard	83'	120'
black basalt & green claystone	120'	130'
black basalt, porous, med. hard	130'	142'
brown basalt, med. W.B.	142'	155'
gray basalt, hard	155'	170'
brown basalt, med., porous	170'	175'
gray basalt, hard	175'	182'
black basalt, med. hard	182'	227'
white sand & agate	227'	265'
black & brown basalt, crevised W.B.	265'	273'
gray basalt, vesicular, W.B.	273'	285'
gray basalt, hard	285'	290'

Work started 9-21- 19 79 Completed 9-25- 19 79

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company
(Person, firm, or corporation) (Type or print)

Address St. Rt. 2 Box 100 Lyle, WA 98635

[Signed] Charles L Moore
(Well Driller)

License No. 0833 Date 9-26-79, 19

F-17

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(41)

Application No. ....
Permit No. ....

(1) OWNER: Name Martha Niblack Address P.O. Box 741 Dallesport WA 986.

(2) LOCATION OF WELL: County Klickitat SE ¼ SW ¼ Sec. 14 T. 2 N., R. 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 490 ft. Depth of completed well 490 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from — ft. to 60 ft.
Threaded ☐ " Diam. from .... ft. to .... ft.
Welded ☒ " Diam. from .... ft. to .... ft.

Perforations: Yes ☐ No ☒
Type of perforator used ....
SIZE of perforations .... in. by .... in.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name ....
Type .... Model No. ....
Diam. .... Slot size .... from .... ft. to .... ft.
Diam. .... Slot size .... from .... ft. to .... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ....
Gravel placed from .... ft. to .... ft.

Surface seal: Yes ☒ No ☐ To what depth? 60 ft.
Material used in seal Cement & bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? .... Depth of strata ....
Method of sealing strata off ....

(7) PUMP: Manufacturer's Name ....
Type: .... H.P. ....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 370 ft. below top of well Date 2-12-81
Artesian pressure .... lbs. per square inch Date ....
Artesian water is controlled by .... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? ....
Yield: .... gal./min. with .... ft. drawdown after .... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
....	blew	test	30	gpm	

Date of test 2-12-81
Bailer test .... gal./min. with .... ft. drawdown after .... hrs.
Artesian flow .... g.p.m. Date 2-12-81
Temperature of water .... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Top soil & river gravel	0'	10'
river gravel & boulders layers of clay	10'	54'
gray basalt	54'	118'
black basalt, crevised	118'	130'
black basalt, porous	130'	138'
brown basalt, porous	138'	154'
gray basalt, hard	154'	185'
gray basalt, hard, crevised WB	185'	137'
gray basalt, hard	187'	333'
gray basalt, porous	333'	400'
black & red basalt, med.	400'	412'
gray basalt, hard	412'	473'
gray basalt, crevised WB	473'	485'
gray basalt, hard	485'	490'

MAR 30 1981

Work started 2-9- 19 81 Completed 2-12- 19 81

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)

Address P.O. Box 206 Dallesport, WA 9861

[Signed] Charles E Moore (Well Driller)

License No. 0833 Date 2-12-, 1981

F-118

(USE ADDITIONAL SHEETS IF NECESSARY)

DK 4.03.81

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(42)

Application No. .....

Permit No. G4-25870

(1) OWNER: Name Frenche Vezina Address Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat — NE ¼ SE ¼ Sec. 14 T. 2 N., R. 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☒ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: (8"- 375') Diameter of well 6" inches.
Drilled 175 ft. Depth of completed well 550 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ....." Diam. from .... ft. to .... ft.
Threaded ☐ ....." Diam. from .... ft. to .... ft.
Welded ☐ ....." Diam. from .... ft. to .... ft.

Perforations: Yes ☐ No ☐
Type of perforator used ....
SIZE of perforations .... in. by .... in.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.

Screens: Yes ☐ No ☐
Manufacturer's Name ....
Type .... Model No. ....
Diam. .... Slot size .... from .... ft. to .... ft.
Diam. .... Slot size .... from .... ft. to .... ft.

Gravel packed: Yes ☐ No ☐ Size of gravel: ....
Gravel placed from .... ft. to .... ft.

Surface seal: Yes ☐ No ☐ To what depth? .... ft.
Material used in seal ....
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? .... Depth of strata ....
Method of sealing strata off ....

(7) PUMP: Manufacturer's Name ....
Type: .... H.P. ....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 150 ft. below top of well Date 3-15-82
Artesian pressure .... lbs. per square inch Date ....
Artesian water is controlled by .... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? ....
Yield: .... gal./min. with .... ft. drawdown after .... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

150 gpm blow test
Date of test 3-15-82
Bailer test .... gal./min. with .... ft. drawdown after .... hrs.
Artesian flow .... g.p.m. Date ....
Temperature of water .... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG: J

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
black basalt, porous, med. hard, water bearing	375'	395'
gray basalt, hard	395'	515'
black basalt, porous, med. water bearing	515'	525'
gray basalt, hard	525'	530'
black basalt, med. hard	530'	538'
black & red basalt & green claystone, porous, water bearing	538'	548'
gray basalt, hard	548'	550'

STATE OF WASHINGTON
MAR 22 1982
DEPARTMENT OF ECOLOGY
CENTRAL REGION

Work started 3-14 1982 Completed 3-16 1982

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)

Address P.O. Box 373 Dallesport, WA 98617

[Signed] Charles L Moore (Well Driller)

License No. 0833 Date 3-16 1982

(USE ADDITIONAL SHEETS IF NECESSARY) EP 3-25-82

ECY 050-1-20

...e Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

(5)

(43)

WATER WELL REPORT

STATE OF WASHINGTON

Application No. .....

Permit No. .....

(1) OWNER: Name Joseph H. Blanck Address RT 677 Box 39 Goldendale, WA 986

(2) LOCATION OF WELL: County Klickitat — NE¼ SE¼ Sec. 14 T. 2 N., R. 13 W.M.

and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 340 ft. Depth of completed well 340 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ..." Diam. from ... ft. to ... ft.
Threaded ☐ ..." Diam. from ... ft. to ... ft.
Welded ☒ 8" Diam. from — ft. to 20 ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ... in. by ... in.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ... Model No. ...
Diam. ... Slot size ... from ... ft. to ... ft.
Diam. ... Slot size ... from ... ft. to ... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ... ft. to ... ft.

Surface seal: Yes ☒ No ☐ To what depth? 20' ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ... Depth of strata ...
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ... H.P. ...

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 125' ft. below top of well Date 4/14/78
Artesian pressure ... lbs. per square inch Date ...
Artesian water is controlled by ... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? .....
Yield: ... gal./min. with ... ft. drawdown after ... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

...te of test .....
Bailer test ... gal./min. with ... ft. drawdown after ... hrs.
Artesian flow ... g.p.m. Date ...
Temperature of water ... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top soil & boulders	0	4'
basalt, gray & brown	4	12'
basalt, gray, hard	12'	40'
basalt, brown, crevased	40	65'
basalt, gray, hard	65'	75'
basalt, gray & brown crevased	75'	95'
basalt, brown, rescular	95'	100'
basalt, gray & brown, porous	100'	105'
basalt, gray, hard	105'	125'
basalt, black, hard	125	146
basalt gray, hard	146'	270'
(water bearing crevase)	(190'	-190'
basalt, black, porous	270'	275'
basalt, black, hard	275'	310'
basalt gray hard	310	340

RECEIVED

MAY 17 1978

DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 4/11/ 19 78 Completed 4/14/ 19 78

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Co.
(Person, firm, or corporation) (Type or print)

Address Rt 2 Box 100 Lyle Wn.

[Signed] Charles L Moore
(Well Driller)

License No. 833 Date 4-27, 19 78

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(44)

Application No. .....
Permit No. .....

(1) OWNER: Name Jack Schreiner Address #50 Schreiner Farms Rd. Dallesport

LOCATION OF WELL: County Klickitat — NE ¼ SE ¼ Sec. 16 T. 2 N., R. 13E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 285 ft. Depth of completed well 285 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8 " Diam. from +1 ft. to 216 ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal cement and bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ____ Depth of strata ____
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ____ H.P. ____

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 97 ft. below top of well Date 7-1-86
Artesian pressure ____ lbs. per square inch Date ____
Artesian water is controlled by ____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

BLOW-TEST 1000 gpm

Date of test 7-1-86
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date ____
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
top soil	0'	5'
brown basalt, fractured	5	25
brown and gray basalt	25	47
brown silt&white clay	47	56
gray basalt, porous, and yellow claystone	56	71
black basalt, med.&green shale	71	80
gray basalt, hard	80	87
brown basalt, med. fractured porous	87	92
yellow-brown sandstone, conglomerate	92	108
gray basalt, med. hard	108	117
brown and black basalt, med.	117	129
brown basalt, porous	129	132
brown sandstone, hard	132	136
brown basalt, porous	136	142
gray basalt, hard	142	178
Yellow&brown conglomerate	178	184
black&green basalt, fractured	184	195
brown and yellow sandstone and brown basalt	195	205
brown sandstone, soft	205	212
brown basalt, porous	212	216
black basalt, med.	216	224
gray basalt, hard	224	273
gray basalt, crevised, water bearing	273	285

RECEIVED
JUL 14 1986
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFFICE

Work started 6-25 19 86 Completed 7-1 19 86

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K DRILLING COMPANY (Person, firm, or corporation) (Type or print)

Address P.O.BOX 373 DALLESPORT, WA 98617

[Signed] Charles E Moore (Well Driller)

License No. 0833 Date 7-7 19 86

(USE ADDITIONAL SHEETS IF NECESSARY)

P-121

(4)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

45

Application No. .....

Permit No. .....

(1) OWNER: Name Charles Sterrit Address RT2 Box 82 Lyle, WA 98635

(2) LOCATION OF WELL: County Klickitat — NW¼ NW¼ Sec 13 T. 2 N., R 13 W.M. D

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 370 ft. Depth of completed well 370 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ..." Diam. from ... ft. to ... ft.
Threaded ☐ ..." Diam. from ... ft. to ... ft.
Welded ☒ 6" Diam. from 52 ft. to 7 ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ... in. by ... in.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ... Model No. ...
Diam. ... Slot size ... from ... ft. to ... ft.
Diam. ... Slot size ... from ... ft. to ... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ... ft. to ... ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ... Depth of strata ...
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ... H.P. ...

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 125 ft. below top of well Date 4/8/78
Artesian pressure ... lbs. per square inch Date ...
Artesian water is controlled by ... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ... gal./min. with ... ft. drawdown after ... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test 25 gal./min. with ... ft. drawdown after ... hrs.
Artesian flow ... g.p.m. Date ...
Temperature of water ... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil & loose basalt	0	8'
basalt, gray, fractured	8'	35'
clay, white	35'	42'
wood	42	45
basalt, gray, med hard	45'	120'
basalt, black, porous WB	120'	130'
basalt, black, med hard	130'	143'
basalt, gray, hard	143'	343'
basalt, black, vescular WB	343'	355'
basalt, gray, porous	355	362'
basalt, gray, hard	362'	370'

RECEIVED
MAY 17 1978
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 4/6/ 1978 Completed 4/8/ 1978

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Co. (Person, firm, or corporation) (Type or print)

Address R+2 Box 100 Lyle Wn

[Signed] Charles L Moore (Well Driller)

License No. 833 Date 4-27, 1978

F-122

(USE ADDITIONAL SHEETS IF NECESSARY)

RL

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(46)

Application No. /

Permit No. ....

(1) **OWNER:** Name Ronald Johnson Address 1005 Snipes The Dalles, OR 97058

(2) **LOCATION OF WELL:** County Klickitat ¼ ¼ Sec 13 T 2 N., R 13 WM.

Bearing and distance from section or subdivision corner T.L. 3 in NW NE 1/4 & NE NW 1/4 -less Tax Lots e94

(3) **PROPOSED USE:** Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) **DIMENSIONS:** Diameter of well 6 inches.
Drilled 340 ft. Depth of completed well 340 ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 6 " Diam. from 1+ ft. to 20 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal bentonite + cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) **PUMP:** Manufacturer's Name
Type: H.P.

(8) **WATER LEVELS:** Land-surface elevation above mean sea level.... ft.
Static level 152 ft. below top of well Date 5-16-84
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" blow-test 110 gpm " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 5-16-84
Baller test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) **WELL LOG:** CB

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
top soil	0'	2'
boulders and brown clay	2	14
gray basalt, hard	14	98
gray basalt, porous, med	98	106
gray and red basalt, porous med	106	110
gray basalt, med. hard	110	122
gray basalt, hard	122	330
gray basalt, fractured water bearing	330	340

JUN 15 1984

Work started 5-11 19 84 Completed 5-16-84 19

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company
(Person, firm, or corporation) (Type or print)
Address P.O.Box 373 Dallesport, WA 98617

[Signed] Charles R Moore
(Well Driller)

License No. 0833 Date 5-16-84, 19

F-123

(USE ADDITIONAL SHEETS IF NECESSARY) WA 7-10-84

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

47

Application No. .....

Permit No. .....

(1) OWNER: Name Melvin Thornburg Address Box 773 EPHRATA WA 98823

(2) LOCATION OF WELL: County Klickitat — NW¼ NE¼ Sec. 13 T. 2 N. R. 13E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 200 ft. Depth of completed well 200 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ..." Diam. from ... ft. to ... ft.
Threaded ☐ ..." Diam. from ... ft. to ... ft.
Welded ☒ 6..." Diam. from - ft. to 35 ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ... in. by ... in.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ... Model No. ...
Diam. ... Slot size ... from ... ft. to ... ft.
Diam. ... Slot size ... from ... ft. to ... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ... ft. to ... ft.

Surface seal: Yes ☒ No ☐ To what depth? 35 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ... Depth of strata ...
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ... H.P. ...

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 85 ft. below top of well Date 4/3/78
Artesian pressure ... lbs. per square inch Date ...
Artesian water is controlled by ... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ... gal./min. with ... ft. drawdown after ... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test 60 gal./min. with ... ft. drawdown after ... hrs.
Artesian flow ... g.p.m. Date ...
Temperature of water ... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil	0	4'
river gravel & boulders	4'	31'
basalt, gray, med hard	31'	95'
basalt, black, crevased	95'	130'
basalt, black, vescular WB	130'	139'
basalt, black, hard	139'	160'
basalt, brown, vescular WB	160'	185'
basalt, gray, hard	185'	200'

RECEIVED
MAY 17 1978
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 4/1 19 78 Completed 4/3 19 78

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Co
(Person, firm, or corporation) (Type or print)

Address R+2 Box 100 Lyle Wn.

[Signed] Charles L Moore
(Well Driller)

License No. 833 Date 4 - 27 19 78

F-124

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(47)

Application No. .....
Permit No. ..../.....

(1) OWNER: Name Dennis Beeks Address Dallesport WA 98617

(2) LOCATION OF WELL: County Klickitat — SW ¼ SE ¼ Sec 12 T 2 N., R 13E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 160 ft. Depth of completed well 160 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 20 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Bentonite, cement
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 60 ft. below top of well Date 3-18-80
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
AIR- TEST	20 gpm				

Date of test 3-18-80
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top soil	0'	6'
basalt, gray, broken	6'	10'
gray basalt, hard	10'	47'
black basalt; green claystone SOFT WB	47'	49'
brown; red basalt, porous	49'	63'
brown; gray basalt, porous (wood)	63'	65'
gray basalt, crevised med. hard	65'	74'
black basalt; green claystone SOFT WB	74'	76'
black basalt, med.	76'	82'
gray basalt, hard	82'	110'
gray; brown basalt, vesculer WB	110'	115'
gray basalt, hard	115'	137'
black basalt, porous	137'	145'
black & brown basalt, med. hard	145'	156'
~~black basalt~~ hard	156'	160'

RECEIVED
JUL 28 1980
DEPARTMENT OF ECOLOGY

Work started ..... 19 80 Completed 3-18- 19 80

WELL DRILLER'S STATEMENT:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Co.
(Person, firm, or corporation) (Type or print)
Address RT. 2 Box 100 Lyle, WA 98635
[Signed] Charles S Moore
(Well Driller)
License No. 0833 Date 3-19- 1980

F-125

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(48 20)

Application No. .....
Permit No. .....

(1) OWNER: Name Dennis Beeks Address Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat — SW ¼ SE ¼ Sec. 12 T. 2 N. R. 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☒ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 225 ft. Depth of completed well 385 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ..." Diam. from .. ft. to .. ft.
Threaded ☐ ..." Diam. from .. ft. to .. ft.
Welded ☐ ..." Diam. from .. ft. to .. ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations .. in. by .. in.
.. perforations from .. ft. to .. ft.
.. perforations from .. ft. to .. ft.
.. perforations from .. ft. to .. ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. .. Slot size .. from .. ft. to .. ft.
Diam. .. Slot size .. from .. ft. to .. ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from .. ft. to .. ft.

Surface seal: Yes ☐ No ☐ To what depth? .. ft.
Material used in seal
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 325 ft. below top of well Date 7-24-85
Artesian pressure .. lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
Blow-test	40 gpm				

Date of test 7-24-85
Baller test .. gal./min. with .. ft. drawdown after .. hrs.
Artesian flow .. g.p.m. Date
Temperature of water .. Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
gray basalt, hard.....	160'	355'
black basalt, vesicular, water bearing.....	355	385

AUG 2 2 1985
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFFICE

Work started 7-22 19 85 Completed 7-24 19 85

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)
Address P.O.Box 373 Dallesport, WA 98617

[Signed] Charles E Moore (Well Driller)
License No. 0833 Date 8-9- 1985

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(49)

Application No. .....
Permit No. 1

(1) OWNER: Name John HuTeson Jr. Address P.O. Box 243 Dallesport WA 98617

(2) LOCATION OF WELL: County Klickitat SW ¼ SE ¼ Sec 12 T 2 N., R 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) .....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 390 ft. Depth of completed well 390 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from - ft. to 395 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 39 ft.
Material used in seal cement & bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 225 ft. below top of well Date 10-17
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow test 80 gpm.				

Date of test 10-17
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top soil	0	4'
basalt, gray, broken	4'	33'
basalt, gray, hard	33'	133'
basalt, black, med hard, porous	133'	143'
basalt, gray, hard	143'	365'
basalt black vesicular (water bearing)	365'	390'

Work started 10-15 19 80 Completed 10-17 19 80

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M.K. Drilling Co.
(Person, firm, or corporation) (Type or print)

Address Box 206 Dallesport 98617

[Signed] Charles L Moore
(Well Driller)

License No. 0833 Date 10-17, 19 80

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(50)

Application No. .....
Permit No. .....

(1) **OWNER:** Name Dan Gunkle Address 420 Allison Way Goldendale, WA

(2) **LOCATION OF WELL:** County Klickitat — NW¼ NW¼ Sec 1H T. 2 N., R 14E W.M.

Bearing and distance from section or subdivision corner

D

(3) **PROPOSED USE:** Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) **TYPE OF WORK:** Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) **DIMENSIONS:** Diameter of well ..... inches.
Drilled ..... ft. Depth of completed well ..... ft.

(6) **CONSTRUCTION DETAILS:**

Casing installed: 8 " Diam. from 1 ft. to 40 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 40 ft.
Material used in seal cement and bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) **PUMP:** Manufacturer's Name .....
Type: ..... H.P. .....

(8) **WATER LEVELS:** Land-surface elevation above mean sea level .... ft.
Static level 35 ft. below top of well Date 6-3-86
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow-test 125 gpm				

Date of test 6-3-86
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) **WELL LOG:**

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
sand	0'	6'
brown and gray basalt, med.	6	63
brown basalt, crevised, water bearing	63	85
gray and brown basalt, med.	85	163
gray basalt, med. hard	163	182
gray basalt, brown seams, water bearing	182	190
gray basalt, hard	190	287
gray and brown basalt, crevised, water bearing	287	321
gray basalt, hard	321	420

RECEIVED
JUN 26 1986
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 5-29- 19 86 Completed 6-3- 19 86

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M- K Drilling Company
(Person, firm, or corporation) (Type or print)

Address P.O.Box 373 Dallesport, WA 98617

[Signed] Charles E Moore
(Well Driller)

License No. 0833 Date 6-24- 19 86

F-128

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

3

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(5)

Application No. /
Permit No. /

(1) OWNER: Name Yakima Indian Nation Address Toppenish, Wa.

(2) LOCATION OF WELL: County Klickatat — NE ¼ NE ¼ Sec. 14 T. 2 N., R. 14 E W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ X Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 445 ft. Depth of completed well 445 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 0 ft. to 340 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 21 ft.
Material used in seal cement grout
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 275 ft. below top of well Date 9-16-77
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 75 gal./min. with 165 ft. drawdown after 2 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG: Eli Culp

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Soil, Brn.	0	1
Clay, Brn, Boulders	1	27
Sand, Gravel, Grey, Boulders	27	42
Sand, Gravel, Dk. Grey	42	170
Boulders, Gravel, Sand, Grey	170	207
Basalt, Fractured, Loose	207	250
Basalt, Blk., Hrd.	250	265
Basalt, Fractured, Loose, BRn	265	320
Basalt, Blk. Hrd.	320	420
Basalt, Fractured, WB	420	440
Basalt, Blk., Hrd.	440	445

RECEIVED
OCT - 5 1977
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 9-9-77, 19 Completed 9-9-77, 19

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME B & B Well Drilling (Person, firm, or corporation) (Type or print)

Address Rt 7 Box 600-A, Yakima, Wa. 98903

[Signed] [signature] (Well Driller)

License No. 0700 Date 9-21-77, 19

F-129

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

52

Application No. G4-25466

Permit No. G4-25466P

(1) OWNER: Name Dallesport Water Association Address P.O. Box 131 Dallesport, Wa.

(2) LOCATION OF WELL: County Klickitat NE ¼ NE ¼ Sec 34 T 2 N., R 13E W.M.

Bearing and distance from section or subdivision corner

A

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 10 inches.
Drilled 334 ft. Depth of completed well 334 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 10 " Diam. from 0 ft. to 50 ft.
Threaded ☐ 8 " Diam. from 0 ft. to 334 ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☒ No ☐
Type of perforator used torch
SIZE of perforations ½ in. by 6 in.
307 perforations from 296 ft. to 334 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 50 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... 250 ft.
Static level 150 ft. below top of well Date 19 June
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? C. Austin
Yield: 235 gal./min. with 6 ft. drawdown after 8 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

It took 15 seconds to recouver

Date of test
Baller test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 59 Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand fine	0	12
Basalt gray hard	12	61
Clay black brown & green WB	61	83
Basalt gray hard	83	141
Basalt gray with clay seams	141	170
Basalt gray hard	170	180
Clay green	180	182
Basalt gray hard	182	186
Basalt gray visicular	186	200
Basalt gray med.	200	212
Clay green & gray	212	241
Clay brown	241	243
Basalt gray visicular W.B.	243	255
Basalt gray hard W.B.	255	301
Basalt gray med.	301	309
Basalt gray hard	309	314
Void W.B.	314	315½
Basalt gray visicular & iron pyrates	315½	334

Work started 5 June, 19 79 Completed 19 June, 19 79

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Murray Well Drilling Inc.
(Person, firm, or corporation) (Type or print)

Address 3712 W 8th The Dalles, Oregon

[Signed] Richard J. Murray (Well Driller)

License No. 325 Date 1 July, 19 79

F-130

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

ak

3

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

520

Application No. G4-25466

Permit No. G4-25466P

(1) OWNER: Name Dallesport Water Association Address P.O.Box 131 Dallesport, Wa.

(2) LOCATION OF WELL: County Klickitat — NE ¼ NE ¼ Sec. 34 T. 2 N., R 13E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☒ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well ..... inches.
Drilled.....ft. Depth of completed well.....ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ....." Diam. from ..... ft. to ..... ft.
Threaded ☐ ....." Diam. from ..... ft. to ..... ft.
Welded ☐ ....." Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☐
Type of perforator used.....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☐
Manufacturer's Name.....
Type..... Model No.....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☐ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☐ No ☐ To what depth? ..... ft.
Material used in seal.....
Did any strata contain unusable water? Yes ☐ No ☐
Type of water?..... Depth of strata.....
Method of sealing strata off.....

(7) PUMP: Manufacturer's Name.....
Type: ..... H.P.....

(8) WATER LEVELS: Land-surface elevation above mean sea level.... .....ft.
Static level .....ft. below top of well Date.....
Artesian pressure .....lbs. per square inch Date.....
Artesian water is controlled by..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?.....
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
test.....gal./min. with.....ft. drawdown after.....hrs.
Artesian flow.....g.p.m. Date.....
Temperature of water..... Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
This work was to seal the well to a depth of 200'. We pulled the casing to the 200' mark and welded two sheet metal packers on and reinstalled the casing. Then we filled the annuala space with bentonite to land surface. Then we welded a spacer between the 10" and 8" casing.		

RECEIVED
AUG 1 1980
DEPARTMENT OF ECOLOGY
CENTRAL REGION

Work started 26 July 1979 Completed 27 July 1979

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Murray Well Drilling Inc.
(Person, firm, or corporation) (Type or print)

Address 3712 W. 8th The Dalles, Oregon

[Signed] Richard J. Murray
(Well Driller)

License No. 325 Date 9 July 1980

F-131

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

3

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(53)

Application No. ....

Permit No. ....

(1) OWNER: Name Donald M. Dietz Address P.O.Box 148 Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat LOT 4-E SE ¼ SW ¼ Sec. 33 T. 2 N., R 13E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 163 ft. Depth of completed well 163 ft.

(6) CONSTRUCTION DETAILS: 4½" Liner installed from 0' to 65'
Casing installed: 6 " Diam. from 1+ ft. to 49 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 49 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 98 ft. below top of well Date 5-23-84
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow-test 40 gpm				

Date of test 5-23-84
Baller test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
top soil	0	8
black basalt & river gravel	8	20
black basalt, med.	20	118
blue clay, hard	118	138
wood and brown basalt, porous	138	142
black and red basalt, vescular, water bearing	142	163

Work started 5-22 19 84 Completed 5-23 19 84

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company
(Person, firm, or corporation) (Type or print)

Address P.O.Box 373 Dallesport, WA 98617

[Signed] Karl Merz Jr.
(Well Driller)

License No. 0973 Date 5-23 19 84

F-132

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

54

Application No. /
Permit No. ....

(1) OWNER: Name Cliff Whitt Address 813 Hostetler, The Dalles, Or.

(2) LOCATION OF WELL: County Klickitat SW ¼ SW ¼ Sec. 33 T. 2N N., R. 13E W.M.
Bearing and distance from section or subdivision corner Dallesport, Washington N

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 298 ft. Depth of completed well 298 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from +2 ft. to 58 ft.
Threaded ☐ 5 " Diam. from +1 ft. to 247 ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 58 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name Meyers Sub.
Type: Sub. H.P. 5

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 168 ft. below top of well Date 8-23-85
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? A&A Enterprises
Yield: 60 gal./min. with 1 ft. drawdown after 1 hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test 8-26-85
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand & Gravel	0	8
Basalt hard Grey	8	10
Basalt Med. Brown	10	12
Basalt hard grey	12	48
Basalt fract. med. brown	48	82
Basalt hard grey	82	123
Basalt Fract Blk	123	128
Basalt hard grey	128	133
Basalt med fract brown	133	150
Claystone hard green	150	153
Basalt med hard brown	153	155
Basalt fract, blk	155	159
Basalt soft blk	159	198
Basalt fract blk	198	204
Basalt hard blk	204	207
Claystone green	207	222
Claystone grey	222	228
Sandstone brown	228	233
Basalt hard blk	233	288
Basalt fract hard blk W/B	288	298

RECEIVED
DEC 2 1985
DEPARTMENT OF ECOLOGY

Work started 8-14-85 19 Completed 8-24-85 19

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Marinelli & Austin Drilling Co.
(Person, firm, or corporation) (Type or print)

Address P. O. Box 302, The Dalles, Or.

[Signed] (Well Driller)

License No. 0729 Date 11-19-85, 19

F-133

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

DEC 2 1985

PLEASE TYPE or PRINT IN INK

RECEIVED
SEP 17 1985
WATER RESOURCES DEPT
SALEM, OREGON

(for official use only)

DEPARTMENT OF GEOLOGY
CENTRAL REGION OFFICE

(1) OWNER:

Name Cliff Whitt

Address 813 Hostetler

City The Dalles State Or.

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☒ Driven ☐

Rotary Mud ☐ Dug ☐

Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☐

Irrigation ☐ Thermal: Withdrawal ☐ Reinjection ☐

Other: Piezometric ☐ Grounding ☐ Test ☐

(5) CASING INSTALLED:

Steel ☒ Plastic ☐

Threaded ☐ Welded ☐

6 " Diam. from +2 ft. to 58 ft. Gauge .250

" Diam. from ft. to ft. Gauge

LINER INSTALLED:

Steel ☒ Plastic ☐

Threaded ☐ Welded ☐

5 " Diam. from +1 ft. to 247 ft. Gauge Standard

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No

Manufacturer's Name

Type Model No.

Diam. Slot Size Set from ft. to ft.

Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom? A & A Enterprises

Yield: 60 gal./min. with 1 ft. drawdown after 1 hrs.

Air test gal./min. with drill stem at ft. hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes ☐ No ☒

Well seal—Material used Bentonite

Well sealed from land surface to 58 ft.

Diameter of well bore to bottom of seal 10 in.

Diameter of well bore below seal 6 in.

Amount of sealing material 3 sacks ☒ pounds ☐

How was cement grout placed? Grout pump

Was pump installed? Yes Type Meyers Sub. HP 5 Depth 231 ft.

Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of Water? depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☒ No Size of gravel:

Gravel placed from ft. to ft.

(10) LOCATION OF WELL by legal description:

County Klickitat SW ¼ SW ¼ of Section 33 of

Township 2 N (Township is North or South), Range 13 E (Range is East or West) WM

Tax Lot Lot Block Subdivision

MAILING ADDRESS OF WELL (or nearest address)

Dallesport, Wa.

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found 288 ft.

Static level 168 ft. below land surface. Date 8-24-85

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 6"

Depth drilled 298 ft. Depth of completed well 298 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Sand & Gravel	0	8	
Basalt hard grey	8	10	
Basalt fract. med. brown	10	12	
Basalt hard grey	12	48	
Basalt fract. med. brwon	48	82	
Basalt hard grey	82	123	
Basalt fract. blk	123	129	
Basalt hard grey	129	133	
Basalt med fract. brown	133	150	
Claystone hard green	150	152	
Basalt med. hard brown	152	155	
Basalt fract. blk	155	159	
Basalt soft blk	159	198	
Basalt fract blk	198	204	
Basalt hard blk	204	207	
Claystone green	207	222	
Claystone grey	222	228	
Sandstone brown	228	233	
Basalt hard blk	233	288	
Basalt fract hard blk w/b	288	298	

Date work started 8-14-85 /completed 8-20-85

Date well drilling machine moved off of well 8-24-85 19

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Date , 19

(bonded) Water Well Constructor Certification:

Bond 961560 5 (number) Issued by: Hargal, Elwood & Geiger (Surety Company Name)

On behalf of Marinelli & Austin Drilling Co. (type or print name of Water Well Constructor)

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

(Signed) (Water Well Constructor)

(Dated) 9-16-85

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310

SP*46866-690

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(56)

Application No. G4-27181

Permit No. ....

(1) OWNER: Name Lyle School District No406 Address P.O.Box 368 Lyle, WA 98635

(2) LOCATION OF WELL: County Klickitat — NW ¼ SE ¼ Sec. 33 T. 2 N., R 13E W.M.

...ing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 320 ft. Depth of completed well 320 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from — ft. to 250 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 50 ft.
Material used in seal Cement grout
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 175 ft. below top of well Date 4-15
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	Blow test	350	GPM		

Date of test 4-15-81
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top Soil	0'	6'
gray basalt, broken	6'	23'
gray & brown basalt, med.	23'	47'
gray basalt, hard	47'	56'
gray basalt, crevised&green clay	56'	65'
gray & green clay	65'	73'
black & red basalt, porous & green clay, water bearing	73'	96'
gray basalt, hard	96'	117'
black & green basalt, porous med. hard water bearing	117'	166'
black basalt, hard, crevised	166'	170'
black & green basalt, porous	170'	183'
black basalt, hard, crevised	183'	194'
green clay	194'	215'
gray sand, water bearing	215'	229'
wood, water bearing	229'	234'
gray basalt, porous, med.hard	234'	240'
red basalt, hard	240'	252'
gray basalt, hard	252'	300'
gray basalt, crevised, water bearing	300'	310'
gray basalt, hard	310'	320'

MAY - 4 1981

Work started 4-7- , 19 81 Completed 4-15- , 19 81

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company
(Person, firm, or corporation) (Type or print)

Address P.O.Box 206 Dallesport, WA 98617

[Signed] Charles L Moore
(Well Driller)

License No. 0833 Date 4-16-81, 19

F-135

(USE ADDITIONAL SHEETS IF NECESSARY)

DK 5.05.81

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

57

Application No. /
Permit No. /

(1) OWNER: Name George Sheradella Address Dallesport, Wa

(2) LOCATION OF WELL: County Klickitat — NE ¼ SE ¼ Sec. 33 T. 2 N., R. 13 W.M. J

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 230 ft. Depth of completed well 230 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 19 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☐ " Diam. from ft. to ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 19 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level 240 ft.
Static level 57 ft. below top of well Date 2/8/77
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
Bailer test 21 gal./min. with 165 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Soil	0	2
Basalt gray hard	2	62
Clay gray-green-brown	62	66
Basalt gray WB	66	195
Rock maroon	195	203
Clay & sand gray	203	205
Basalt brown WB	205	230

RECEIVED
SEP 13 1977
DEPARTMENT OF ECOLOGY
CENTRAL REGIONAL OFFICE

Work started 2 Aug, 1977. Completed 2 Aug, 1977.

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richard J. Murray (Person, firm, or corporation) (Type or print)

Address 3712 W 8th The Dalles, Oregon

[Signed] Richard J. Murray (Well Driller)

License No. 325 Date 1 Sept, 1977

(USE ADDITIONAL SHEETS IF NECESSARY)

AMMENDED . WATER WELL REPORT

LOCATION

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(58)

Application No. G4-2718

Permit No. ....

(1) OWNER: Name LYLE SCHOOL DISTRICT NO. 406 Address P.O. Box 368 Lyle WA 98635

(2) LOCATION OF WELL: County Klickitat — NE ¼ SE ¼ Sec. 33 T. 2 N., R. 13E W.M.

...ng and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☒ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 320 ft. Depth of completed well 320 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8" Diam. from — ft. to 250 ft.
Threaded ☐ ..." Diam. from ... ft. to ... ft.
Welded ☒ ..." Diam. from ... ft. to ... ft.

Perforations: Yes ☐ No ☒
Type of perforator used ...
SIZE of perforations ... in. by ... in.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name ...
Type ... Model No. ...
Diam. ... Slot size ... from ... ft. to ... ft.
Diam. ... Slot size ... from ... ft. to ... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ...
Gravel placed from ... ft. to ... ft.

Surface seal: Yes ☒ No ☐ To what depth? 52 ft.
Material used in seal Cement grout
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ... Depth of strata ...
Method of sealing strata off ...

(7) PUMP: Manufacturer's Name GRUNDFOS
Type: SUBMERSIBLE HP 15

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 175 ft. below top of well Date 4-15-81
Artesian pressure ... lbs. per square inch Date ...
Artesian water is controlled by ... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? ...
Yield: gal./min. with ft. drawdown after hrs.
" " " " "
" " " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
Blow Test		350		G.P.M.	

...ate of test 4-15-81
Bailer test ... gal./min. with ... ft. drawdown after ... hrs.
Artesian flow ... g.p.m. Date ...
Temperature of water ... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Top soil	0'	6'
gray basalt, broken	6'	23'
gray & brown basalt, med	23'	47'
gray basalt, hard	47'	56'
gray basalt, crevised & green clay	56'	65'
gray & green clay	65'	73'
black & red basalt, porous and green clay, water bearing	73'	96'
gray basalt, hard	96'	117'
black & green basalt, porous med. hard, water bearing	117'	166'
black basalt, hard, crevised	166'	170'
black & green basalt, porous	170'	183'
black basalt, hard, crevised	183'	194'
green clay	194'	215'
gray sand, water bearing	215'	229'
wood, water bearing	229'	234'
gray basalt, porous, med. hard	234'	240'
red basalt, hard	240'	252'
gray basalt, hard	252'	300'
gray basalt, crevised WB	300'	310'
gray basalt, hard	310'	320'

Work started 4-7-, 1981 Completed 4-15-, 1981

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)

Address P.O. Box 206 Dallesport, WA 986

[Signed] Karl F. Moore (Well Driller)

License No. 0344 Date 5-9-, 1981

F-137

(USE ADDITIONAL SHEETS IF NECESSARY)

DK 5-20-81

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

59

Application No. .....

Permit No. .....

(1) OWNER: Name John Haggard Address Dallesport WA 98617

(2) LOCATION OF WELL: County Klickitat SE ¼ NE ¼ Sec. 33 T. 2 N., R. 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 120 ft. Depth of completed well 120 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: ..." Diam. from .. ft. to .. ft.
Threaded ☐ ..." Diam. from .. ft. to .. ft.
Welded ☒ 6" Diam. from — ft. to 21'6" ft.

Perforations: Yes ☐ No ☒
Type of perforator used ....
SIZE of perforations .... in. by .... in.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.
.... perforations from .... ft. to .... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name ....
Type .... Model No ....
Diam. .... Slot size .... from .... ft. to .... ft.
Diam. .... Slot size .... from .... ft. to .... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: ....
Gravel placed from .... ft. to .... ft.

Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? .... Depth of strata ....
Method of sealing strata off ....

(7) PUMP: Manufacturer's Name ....
Type: .... H.P ....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 10 ft. below top of well Date 5-22
Artesian pressure .... lbs. per square inch Date ....
Artesian water is controlled by .... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? ....
Yield: .... gal./min. with .... ft. drawdown after .... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test ....
Bailer test 10 gal./min. with .... ft. drawdown after .... hrs.
Artesian flow .... g.p.m. Date ....
Temperature of water .... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG: H

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand	0	10'
River gravel	10'	23'
gray basalt med hard creviced (water bearing)	23'	60'
green Clay	60'	64'
black basalt, vescular (water bearing)	64'	70'
black basalt med. hard	70'	79'
gray basalt med hard	79'	120'

Work started 5-20- 19 78 Completed 5-22- 19 78

RECEIVED
JUN 9 1978

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Co
(Person, firm, or corporation) (Type or print)

Address ST. RT. #2 Box 100 White Swan WA 98635

[Signed] Charles L Moore
(Well Driller)

License No. 0833 Date 6/7/ 19 78

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(60)

Application No. .....

Permit No. 64-28175P

(1) OWNER: Name Thomas E., Marjory, and John Address R. Foley, 2310 Radio Way, The Da

(2) LOCATION OF WELL: County Klickitat NE¼ NE¼ NE¼ Sec. 33 T. 2 N., R. 13 E W.M.

Bearing and distance from section or subdivision corner 1250' W and 625' S from the NE corner of Sec. 33

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☒ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....

New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 250 ft. Depth of completed well 250 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 8 " Diam. from 0 ft. to 170 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☒ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 170 ft.
Material used in seal cement and bentonite
Cement grout 28 bags
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 135 ft. below top of well Date 8-18
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow test		360 gpm		

Date of test 8-18
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG: A

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
sand	0'	33'
gray basalt, hard	33	75
black basalt, porous, and green claystone.....	75	90
black basalt, med. hard.....	90	144
black basalt, med. porous, layered w/ green claystone...	144	165
gray basalt, hard.....	165	181
black&green basalt, porous...	181	206
gray and brown basalt, vescular, water bearing.....	206	225
soft, sandy, white&brown sandstone, water bearing	240	250

RECEIVED
SEP 12 1983
DEPARTMENT OF ECOLOGY
CENTRAL REGION

Work started 8-8 19 83 Completed 8-18- 19 83

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company
(Person, firm, or corporation) (Type or print)

Address P.O.Box 373 Dallesport, WA 98617

[Signed] Charles L Moore
(Well Driller)

License No. 0833 Date 8-25- 19 83

(USE ADDITIONAL SHEETS IF NECESSARY)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(61)

Application No. .....
Permit No. C

(1) OWNER: Name Mike Helyer Address Star Rt. 180E Lyle, Wa. 98635

(2) LOCATION OF WELL: County Klickitat — NE ¼ NE ¼ Sec. 33 T. 2 N., R. 13 W.M. A

...ring and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 265 ft. Depth of completed well 265 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from 0 ft. to 19 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded ☐ ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☒
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☒ No ☐ To what depth? 19 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... 300 ft.
Static level 162 ft. below top of well Date 15 Dec
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom? .....
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test 40 gal./min. with 80 ft. drawdown after 1 hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☒

OK MAB

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand brown	0	17
Basalt gray	17	60
Basalt black & clay seams WB	60	69
Basalt gray hard	69	135
Basalt black & green claystone	135	218
Claystone gray	218	235
Claystone brown	235	245
Basalt black vis. WB	245	265

RECEIVED
19 1975

Work started 14 Dec, 1975 Completed 15 Dec, 1975

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Richard J. Murray (Person, firm, or corporation) (Type or print)

Address 3712 W 8th The Dalles, Oregon

[Signed] Richard J Murray (Well Driller)

License No. 325 Date 16 Dec, 1975

F-140

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71)

File Original and First Copy with Department of Ecology
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Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(62)

Application No. 1

Permit No. ....

(1) OWNER: Name Dallesport Community Park Address Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat — NE ¼ NE ¼ Sec 33 T. 2 N., R. 13E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 8 inches.
Drilled 365 ft. Depth of completed well 365 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 8 " Diam. from — ft. to 60 ft.
Threaded ☐ 6 " Diam. from — ft. to 140 ft.
Welded ☒ LINER " Diam. from .... ft. to .... ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations ... in. by ... in.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type ... Model No.
Diam. ... Slot size ... from ... ft. to ... ft.
Diam. ... Slot size ... from ... ft. to ... ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ... ft. to ... ft.

Surface seal: Yes ☒ No ☐ To what depth? 60 ft.
Material used in seal Cement grout
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ... Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: ... H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ft.
Static level 185 ft. below top of well Date 7-29
Artesian pressure ... lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: ... gal./min. with ... ft. drawdown after ... hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow test	600+gpm			

Date of test 7-29
Bailer test ... gal./min. with ... ft. drawdown after ... hrs.
Artesian flow ... g.p.m. Date
Temperature of water ... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG: A

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand	0'	30'
gray basalt, fractured	30'	38'
gray basalt, hard	38'	90'
black & brown basalt, porous water bearing	90'	105'
gray clay	105'	110'
gray & black basalt, med hard	110'	135'
black & green basalt, porous	135'	218'
gray basalt, hard	218'	230'
black basalt, fractured & green clay water bearing	230'	243'
gray sandstone, soft	243'	255'
wood	255'	260'
red & brown basalt, hard	260'	270'
gray basalt, hard	270'	355'
black & gray basalt, crevised, iron pyrite & wood water bearing	355'	365'

Work started 7-21 19 81 Completed 7-29 19 81

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)

Address P.O. Box 206 Dallesport, WA 98617

[Signed] Charles S Moore (Well Driller)

License No. 0833 Date 8-5- 19 81

F-141

(USE ADDITIONAL SHEETS IF NECESSARY) OK EP 9-16-8

ECY 050-1-20

(62)

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. 44-27455
Permit No. ....

(1) OWNER: Name Dallesport Community Park Address Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat — NE ¼ NE ¼ Sec. 33 T. 2 N., R. 13E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☐ Irrigation ☒ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☒ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well ..... inches.
Drilled ..... ft. Depth of completed well ..... ft.

(6) CONSTRUCTION DETAILS: LINER

Casing installed: 6" Diam. from +1 ft. to 280 ft.
Threaded ☐ ....." Diam. from ..... ft. to ..... ft.
Welded ☒ ....." Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No ☐
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No ☐
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No ☐ Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes ☐ No ☐ To what depth? ..... ft.
Material used in seal .....
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P. .....

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ..... ft.
Static level ..... ft. below top of well Date .....
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? .....
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No ☐

(10) WELL LOG: A.

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Steel casing liner install from top to 280' .250 6" I.D.		

Work started 5-7- 19 86 Completed 5-10- 19 86

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)

Address P.O.Box 373 Dallesport, WA 98617

[Signed] Charles P Moore (Well Driller)

License No. 0833 Date 5-21- 19 86

F-142

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(63)

Application No. .....

Permit No. ....

(1) OWNER: Name Bud Williams Address Dallesport, Wa.

(2) LOCATION OF WELL: County Klickitat SW ¼ SE ¼ Sec 28 T 2 N. R 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic XX Industrial ☐ Municipal ☐
Irrigation XX Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) ....
New well XX Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary XX Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 205 ft. Depth of completed well 205 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from +1 ft. to 19 ft.
Threaded ☐ ..... " Diam. from ..... ft. to ..... ft.
Welded XX ..... " Diam. from ..... ft. to ..... ft.

Perforations: Yes ☐ No XX
Type of perforator used .....
SIZE of perforations ..... in. by ..... in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

Screens: Yes ☐ No XX
Manufacturer's Name .....
Type ..... Model No .....
Diam. ..... Slot size ..... from ..... ft. to ..... ft.
Diam. ..... Slot size ..... from ..... ft. to ..... ft.

Gravel packed: Yes ☐ No XX Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

Surface seal: Yes XX No ☐ To what depth? 18 ft.
Material used in seal Bentonite
Did any strata contain unusable water? Yes ☐ No XX
Type of water? ..... Depth of strata .....
Method of sealing strata off .....

(7) PUMP: Manufacturer's Name .....
Type: ..... H.P .....

(8) WATER LEVELS: Land-surface elevation above mean sea level .... ft.
Static level 119 ft. below top of well Date 12/1/71
Artesian pressure ..... lbs. per square inch Date .....
Artesian water is controlled by ..... (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No XX If yes, by whom? .....
Yield: gal./min. with ft. drawdown after hrs.
" 50 GPM Air lift " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test .....
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m. Date .....
Temperature of water ..... Was a chemical analysis made? Yes ☐ No XX

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Sand, brown	0	13
Basalt, grey	13	52
Frac basalt, black	52	57
Sandstone & claystone w/clay seams, black	57	63
Vcs basalt, grey	63	70
Frac basalt, grey	70	87
Basalt, grey	87	130
Vcs basalt, black w/green claystone seems	130	161
Basalt, grey	161	170
Vcs basalt, grey (water b)	170	205

Work started 11/29 19 71 Completed 12/1 19 71

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME O'Leary Well Drilling, Inc.
(Person, firm, or corporation) (Type or print)

Address P.O. Box 247A; Goldendale, Wa.

[Signed] Kenneth A. O'Leary
(Well Driller)

License No. 9060 Date 12/9/71, 19

F-143

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

(21)

Application No. /
Permit No. ....

(1) OWNER: Name Dallesport Domestic Water Sharers Address P.O. Box 766 Dallesport WA 98617

(2) LOCATION OF WELL: County Klickitat — SW¼ SE¼ Sec 28 T. 2 N., R. 13 W.M.
Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one).... 1
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☒ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 504 ft. Depth of completed well 152 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: — " Diam. from — ft. to — ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☐ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type ____ Model No.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☐ No ☐ To what depth? — ft.
Material used in seal —
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? ____ Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name Grundfos
Type: SP-4 H.P. 1½

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ____ ft.
Static level 110 ft. below top of well Date 1-24
Artesian pressure — lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom?
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.
" " " "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow test			7.5	gpm

Date of test 1-24
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Gray basalt, hard	98'	135'
black basalt & green claystone	135'	141'
black basalt, med hard	141'	170'
black basalt vesicular (water bearing)	170'	152'

Work started 1-24- 19 80 Completed 1-24- 19 80

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Company (Person, firm, or corporation) (Type or print)

Address S.R.T. #2 Box 100 Lyle WA 986

[Signed] Charles L Moore (Well Driller)

License No. 0233 Date 2-5- 19 80

F-144

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

(65)

Application No. /

Permit No. ....

(1) OWNER: Name Arthur E. Dahl Address P.O. Box 744 Dallesport, WA 98617

(2) LOCATION OF WELL: County Klickitat SW¼ SE¼ Sec 26 T 2 N., R 13 W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one)....

New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 210 ft. Depth of completed well 210 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6 " Diam. from — ft. to 95 ft.
Threaded ☐ ____ " Diam. from ____ ft. to ____ ft.
Welded ☒ ____ " Diam. from ____ ft. to ____ ft.

Perforations: Yes ☐ No ☒
Type of perforator used
SIZE of perforations ____ in. by ____ in.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type ____ Model No
Diam. ____ Slot size ____ from ____ ft. to ____ ft.
Diam. ____ Slot size ____ from ____ ft. to ____ ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ____ ft. to ____ ft.

Surface seal: Yes ☒ No ☐ To what depth? 30 ft.
Material used in seal Cement & bentonite
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? ____ Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name
Type: ____ H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level.... ____ ft.
Static level 125 ft. below top of well Date 3-7-80
Artesian pressure ____ lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☒ If yes, by whom?
Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
	blow test 70 g.p.m.				

Date of test
Bailer test ____ gal./min. with ____ ft. drawdown after ____ hrs.
Artesian flow ____ g.p.m. Date
Temperature of water ____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Sand	0'	14'
river gravel & boulders	14'	18'
gray basalt, hard	18'	65'
black basalt; crevised WB	65'	71'
black & green clay	71'	74'
black & green basalt, porus	74'	90'
gray basalt, hard	90'	120'
black basalt, med hard, porus	120'	135'
gray basalt, hard	135'	182'
gray basalt, hard	182'	191'
black, brown, & green basalt, vesicular WB	191'	208'

Work started 3-4- 19 80 Completed 3-7- 19 80

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME M-K Drilling Co. (Person, firm, or corporation) (Type or print)

Address S.R.T. 2 Box 100 Lyle, WA 98

[Signed] s/ Charles L Moore (Well Driller)

License No. 0833 Date 3-7- 19 80

F-145

(USE ADDITIONAL SHEETS IF NECESSARY)

ECY 050-1-20

File Original and First Copy with Department of Ecology
Second Copy — Owner's Copy
Third Copy — Driller's Copy

WATER WELL REPORT
STATE OF WASHINGTON

Application No. [illegible]
Permit No. [illegible]

(1) OWNER: Name DAYTON HENDERSON Address STAR ROUTE 201 LYLE WASH

(2) LOCATION OF WELL: County KLICKITAT NW¼ NW¼ Sec. 6 T. 3 N., R. 13 E. W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☒ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well (if more than one) 2
New well ☐ Method: Dug ☐ Bored ☐
Deepened ☒ Cable ☒ Driven ☐
Reconditioned ☐ Rotary ☐ Jetted ☐

(5) DIMENSIONS: Diameter of well 6 inches.
Drilled 160 ft. Depth of completed well 160 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from 0 ft. to 158 ft.
Threaded ☐ " Diam. from ft. to ft.
Welded ☒ " Diam. from ft. to ft.

Perforations: Yes ☒ No ☐
Type of perforator used TORCH
SIZE of perforations 1/4 in. by 8 in.
110 perforations from 120 ft. to 145 ft.
perforations from ft. to ft.
perforations from ft. to ft.

Screens: Yes ☐ No ☒
Manufacturer's Name
Type Model No.
Diam. Slot size from ft. to ft.
Diam. Slot size from ft. to ft.

Gravel packed: Yes ☐ No ☒ Size of gravel:
Gravel placed from ft. to ft.

Surface seal: Yes ☒ No ☐ To what depth? 18 ft.
Material used in seal BENTONITE
Did any strata contain unusable water? Yes ☐ No ☒
Type of water? Depth of strata
Method of sealing strata off

(7) PUMP: Manufacturer's Name MYERS
Type: [illegible] H.P. 5

(8) WATER LEVELS: Land-surface elevation above mean sea level ft.
Static level 111 ft. below top of well Date 6-24-74
Artesian pressure lbs. per square inch Date
Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☒ No ☐ If yes, by whom? [illegible]
Yield: 40 gal./min. with 39 ft. drawdown after 1 hrs.
" 40 " 39 " 2 "
" " " "

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level

Date of test
test 28 gal./min. with 31 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date 6-72
Temperature of water 56° Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
Clean To 102		102
Brown Clay SWL 42'	102	105
Rock	105	114
Lt Gray Clay	114	140
Lt Gray Clay + 1½ rock SWL 96	140	145
CONGLOMERATE 3" rock SWL 111	145	160

Work started 27 [illegible], 1972. Completed 6 June, 1972

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME MURRAY WELL DRILLING (Person, firm, or corporation) (Type or print)

Address 3712 W 8th The Dalles ORE

[Signed] Previously submitted (Well Driller)

License No. 9219 Date 7 June, 1972

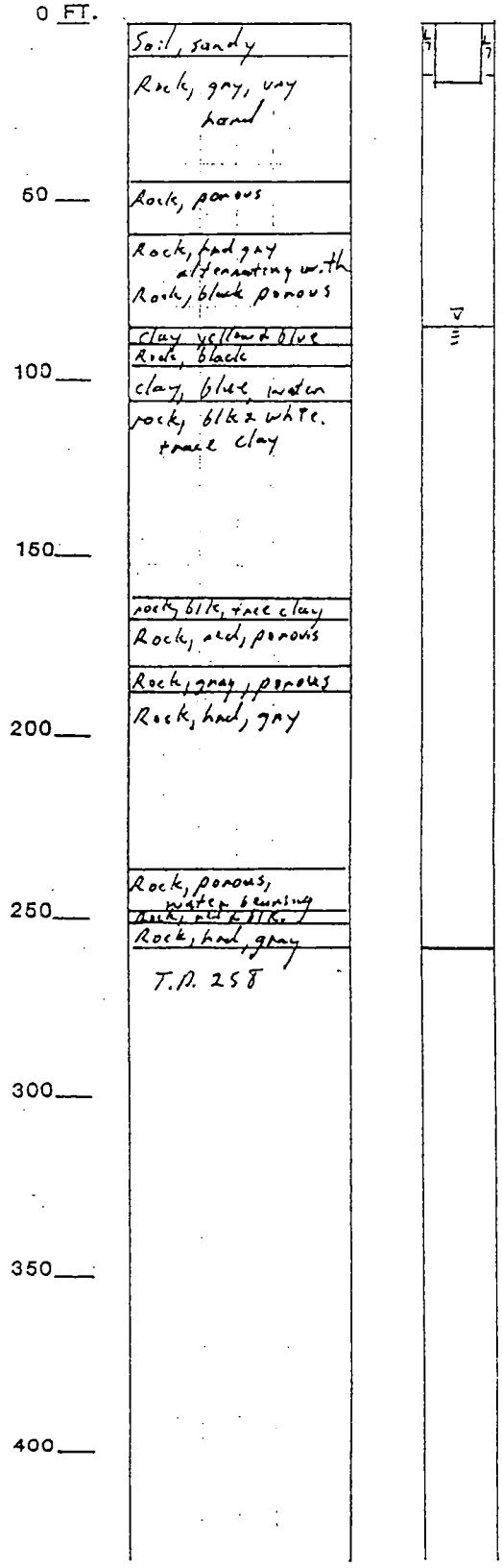
F-146

(USE ADDITIONAL SHEETS IF NECESSARY)

S. F. No. 7356—OS—(Rev. 4-71).

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Chenowith Irrigation #1
LOCATION NE¼, SE¼, sec. 32, T2N, R1E
ELEVATION
DATE INSTALLED 5/46



16' casing to 13'

water level 86' 5/46

1' drawdown @ 960 g.p.m.

STATE ENGINEER
Salem, Oregon

Well Record

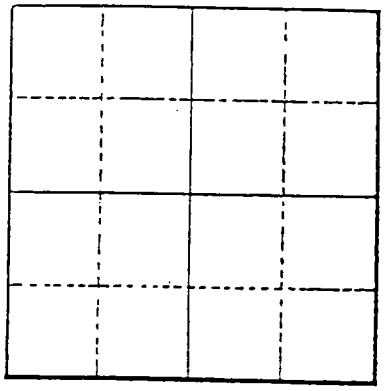
STATE WELL NO. 2N/13-32J(
COUNTY Wasco
APPLICATION NO. U-203

OWNER: Chenowith Irrigation Coop
MAILING ADDRESS:

LOCATION OF WELL: Owner's No. 1
CITY AND STATE: The Dalles, Oregon

NE ¼ SE ¼ Sec. 32 T. 2 ~~S.~~ N. R. 13 ~~W.~~ E. W.M.

Bearing and distance from section or subdivision corner



Section 32

Altitude at well 158 +

TYPE OF WELL: drilled Date Constructed 1946

Depth drilled 258 Depth cased 13

CASING RECORD:

16 INCH SET FROM 0 TO 13 FEET

FINISH:

AQUIFERS:

flow breccia (?) from 237 to 248 ft.

WATER LEVEL:

86 ft. below land surface, May 1946

PUMPING EQUIPMENT: Type H.P.
Capacity G.P.M.

WELL TESTS:

Drawdown 1 ft. after hours pumping 920 G.P.M.

Drawdown ft. after hours G.P.M.

USE OF WATER public supply Temp. 70 °F May, 1946
SOURCE OF INFORMATION U-203 - GR. 4110
DRILLER or DIGGER
ADDITIONAL DATA:
Log x Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

State Printing 89316

STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-32J(3)
County Wasco
Application No. ~~xxxxx~~ U-20[illegible]

Well Log

Owner: Chenowith Irrigation Coop Owner's No. 1

Driller: Date Drilled 1946

CHARACTER OF MATERIAL (Measurements are from drilling platform 14" above L.S.D.)	(Feet below land surface) From	To	Thickness (feet)
Soil, sandy	0	10	10
Rock, gray, very hard	10	45	35
Rock, porous, some water	45	60	15
Rock, solid gray	60	63	3
Rock, black porous	63	69	6
Rock, hard gray	69	71	2
Rock, black, porous	71	75	4
Rock, gray hard	75	78	3
Rock, black, porous	78	82	4
Rock, gray, hard	82	85	3
Clay, yellow & blue, black rock & trace of gravel	85	90	5
Rock, black	90	96	6
Blue clay, black & white rock some water	96	105	9
Traces of blue clay, gray, black & white rock some water	105	162	57
Traces of blue clay, black porous rock, traces of pyrite of iron	162	169	7
Rock, red, porous, and some iron pyrite	169	181	12
Rock, gray, porous, and some iron pyrite	181	188	7
Red and black rock, trace of iron pyrite	188	190	2
Rock, hard, gray	190	192	2
Rock, very hard, red and gray	192	203	11
Rock, very hard, gray	203	237	34

STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-32J(3)
County Wasco
Application No. U-203

Well Log

Owner: Chenowith Irrigation Coop Owner's No. 1

Driller: Date Drilled 1946

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Rock, porous, water bearing, red and black, solid pieces of pyrite of iron, water crystals(quartz?) and water sediments	237	248	11
Rock, red and black, very fine cuttings	248	251	3
Rock, hard, gray	251	258	7

STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-32J(3)

County Wasco

Application No. U-203

Water Level Record

OWNER: Chenowith Irrigation Coop OWNER'S NO. 1

Description of measuring point: Owners air line & pressure gage length of air line 160

Date	Water Level Feet (above) (below) Land Surface	Remarks	Date	Water Level Feet (above) (below) Land Surface	Remarks
8- -57		Meas. by owner 50'	1-28-59	104	No. 2 pumping
9- -57		" " " 50'	6-24-59	112	
10- -57		" " " 50'			
11- -57		" " " 50'			
12- -57		" " " 50'			
1- -58		" " " 55'			
2- -58		" " " 60'			
3- -58		" " " 60'			
4- -58		" " " 60'			
5- -58		" " " 62'			
6- -58		" " " 62'			
7- -58		" " " 62'			
8- -58		" " " 57'			
8-15-58		" " " 54'			
8-27-58		" " " 55'			
10- -58	111	" new gage			
11- -58	115	"			
12- -58	107	"			

REMARKS:

State Printing 89314

STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-32A1

County: Wasco

Application No. G33

Water Level Record

OWNER: Chenowith Irrigation Coop OWNER'S NO.

Description of measuring point:

Date	Water Level Feet (~~above~~) (below) Land Surface		Remarks	Date	Water Level Feet (~~above~~) (below) Land Surface		Remarks
4-12-60	103½	97½	ERROR OF 6' FOUND IN AIRLINE	9-1-61	124	118	
5-26-60	105	99	WSB	10-1	126	120	
7-7-60	111	105	WSB	11-1	122	116	
8-1-60	121	115		12-1	119	113	
9-1-60	123	117		1-1-62	117	111	
9-28-60	122	116		2-7-62	115	109	
~~12-9-60~~	~~116~~		~~[illegible]~~				
11-1-60	120	114					
12-1-60	116	112					
12-9-60	116	112					
1-1-61	115	109					
2-1-61	112	106					
3-1-61	110	104					
4-1-61	109	103					
5-1-61	107	101					
6-1-61	109	103					
7-1-61	114	108					
8-1	117	111					

REMARKS:

F-152

State Printing 89314

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Chenowith Irrigation #2
LOCATION NE 1/4, SE 1/4, sec. 32, T2N, R13E
ELEVATION
DATE INSTALLED 1949

DEPTH	LITHOLOGY	CONSTRUCTION DETAILS
0 FT.	Sand, gravel	10" casing to 21½'
	~~rock, broken~~	
	basalt, gray, hard	
	basalt, brown hard	
50	basalt, gray, hard	
	clay, blue water seep	
	Basalt, gray	
	Basalt gray hard	water level, 86'
100	Basalt, black blue clay	
	Clay, blue	
	Basalt, black	
150		
	Basalt, black	10" hole to 175'
	Basalt, hard, gray (at 210' T.D. water level dropped from 55' to 87')	8" hole to 260'
200		
	~~Basalt, blk, hard~~	
	Basalt, blk, water bearing	
250	Basalt, black	
	Basalt, gray, hard	700 gpm 1 ft drawdown
300		
350		
400		



STATE ENGINEER
Salem, Oregon

Well Record

STATE WELL NO. 2N/13-32J
COUNTY Wasco
APPLICATION NO. U-203
PERMIT U-154

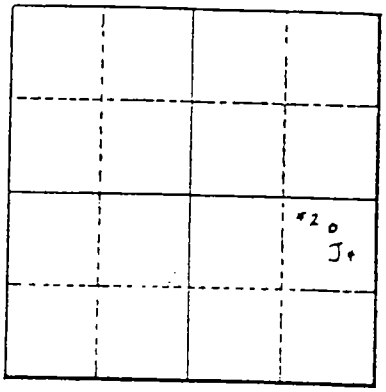
OWNER: Chenowith Irrigation Coop. Inc. MAILING ADDRESS:

LOCATION OF WELL: Owner's No. 2 CITY AND STATE: The Dalles

NE ¼ SE ¼ Sec. 32 T. 2 ~~xx~~ N. R. 13 ~~xx~~ E., W.M.

Bearing and distance from section or subdivision corner

Altitude at well



TYPE OF WELL: drilled Date Constructed 1949

Depth drilled 260 Depth cased 21½

Section 32

CASING RECORD:

10-inch hole to 175 ft, 8-inch hole to 260 ft.

10 INCH FROM 0 TO 21½ FEET

FINISH:

open hole

AQUIFERS:

Basalt, 231 to 241 ft.

WATER LEVEL:

86' below land surface

PUMPING EQUIPMENT: Type Cook H.P.

Capacity 300 G.P.M.

WELL TESTS:

Drawdown 1 ft. after hours 700 G.P.M.

Drawdown ft. after hours G.P.M.

USE OF WATER public supply Temp. °F. 19

SOURCE OF INFORMATION U-203 - GR-4/111

DRILLER or DIGGER Dorin Wilburn

ADDITIONAL DATA:

Log X Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

State Printing 69315

STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-32J(4)
County Wasco
Application No. U-203

Well Log

Owner: Chenowith Irrigation Coop. Inc Owner's No. 2

Driller: Dorin Wilburn Date Drilled

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Sand, gravel, some water	0	9½	9½
Rock, broken	9½	12	2½
Basalt, gray, hard	12	36	24
Basalt, brown, hard	36	44	8
Basalt, gray hard	44	50	6
Clay, blue, black rock, water crystals(quartz) seep of water	50	69	19
Basalt, gray	69	81	12
Basalt, gray, hard	81	89	8
Basalt, black, blue clay & water crystals(quartz)	89	110	21
Clay, blue, and black basalt	110	126	16
Basalt, black	126	169	43
Basalt, black, hard	169	174	5
Basalt, gray, hard, at 210 ft, water level dropped from 55 to 87½ ft from surface	174	229	55
Basalt, black, hard	229	231	2
Basalt, black and red, porous honeycombed, water bearing	231	241	10
Basalt, black	241	249	8
Basalt, gray, hard	249	260	11

STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-32J(4)

County Wasco

Application No. U-203

Water Level Record

OWNER: Chenowith Irrigation Coop OWNER'S NO. 2

Description of measuring point: Owners air line and gege (147' of air line)

Date	Water Level Feet (below) Land Surface	Remarks	Date	Water Level Feet (below) Land Surface	Remarks
8- -57	103	Meas. by owner	11- -58	115	meas. by owner
9- -57	103	" "	12- -58	112	
10- -57	103	" "	1-28-59	111	pumping
11- -57	100	" "	1-28-59	110 ✓	pump off 5 minutes
12- -57	94	" "	1-28-59	110	pump off 10 minute
1- -58	97	" "	3-1--59	108	Meas. by owner
2- -58	92	" "	4-1-59	107 ✓	" " "
3- -58	91	" "	4-16-59	109½	Pumping J.E.S.
4- -58	91	" "	5-1-59	111	
5- -58	92	" "	6-1-59	114	Pump on
6- -58	97		6-24-59	110 ✓	
7- -58	97		8-1-59	119 ✓	
8- -58	105 ✓		8-27-59	119	
8-15-58	111		10-1-59	122	
8-20-58	111		11-1-59	118	
8-27-58	114		12-1-59	115 ~~116~~	
9- -58	115		12-21-59	114 ✓	
10- -58	117		1-26-60	112	

REMARKS:

F-156

State Printing 89314

STATE ENGINEER
Salem, Oregon

State Well No. 7/13-32J 4

County Wasco

Application No. U203

Water Level Record

OWNER: Chenowith Irrigation Coop OWNER'S NO.

Description of measuring point: Owners air line and gage

Date	Water Level Feet ~~(above)~~ (below) Land Surface	Remarks	Date	Water Level Feet (above) (below) Land Surface	Remarks
2-17-60	110		7-1-61	116	
3-15-60	109		8-1	122	
4-12-60	109		9-1	129	
5-26-60	112	WSB	10-1	131	
7-7-60	118	WSB Pumpm	11-1	127	
8-1-60	125 ✓		12-1	125	
9-11-60	127		1-62	122	
9-1-60	128		27-62	120	
9-28-60	127 ✓				
12-9-60	123	WSB (small Pump on)			
11 1 60	126				
12 1 60	121 ✓				
1-1-61	120				
2-1-61	118				
3-1-61	115				
4-1-61	114				
5-1-61	113				
6-1-61	114				

REMARKS:

State Printing 89314

(69)

File Original, and Duplicate with the STATE ENGINEER, SALEM, OREGON

RECEIVED JUN 14 1956 STATE ENGINEER SALEM, OREGON

STATE OF OREGON

~~OBSERVATION WELL~~

Do Not State Well No. .....

Fill In App State Permit No. G33

(1) OWNER:

Name Chenowith Irrigation Cooperative

Address The Dalles, Oregon

(2) LOCATION OF WELL:

County Wasco Owner's number, if any— 3

R. F. D. or Street No. NE¼NE¼ Sec. 32 T2N R13E

Bearing and distance from section or subdivision corner

2 1/4 S 9.75 W - NE Corner Section 32, T2N R13E 32 33

Lot 4 - Track 14, Shipe Acres

(3) TYPE OF WORK (check):

New well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☒

Irrigation ☒ Test Well ☐ Other ☐

(5) EQUIPMENT:

Rotary ☐

Cable ☒

Dug Well ☐

(6) CASING INSTALLED:

Threaded ☐ Welded ☒

FROM	ft. to	ft.	Diam.	Gage or Wall
Surface	52	16	3/8	
167	190	16	3/8	
(liner)				

If gravel packed

Diameter of Bore	from ft.	to ft.

Type and size of shoe or well ring

Size of gravel:

Describe joint

(7) PERFORATIONS:

Type of perforator used none

SIZE of perforations in., length, by in.

FROM	ft. to	ft.	perf per foot	No. of rows

(8) SCREENS:

Give Manufacturer's Name, Model No. and Size

(9) CONSTRUCTION:

Was a surface sanitary seal provided? ☒ Yes ☐ No To what depth 52 ft.

Were any strata sealed against pollution? ☒ Yes ☐ No

If yes, note depth of strata

FROM surface ft. to 23 ft.

METHOD OF SEALING cement grout placed around 16" pipe

(9) WATER LEVELS:

Depth at which water was first found 256 ft.

Standing level before perforating not perf. ft.

Standing level after perforating 76 ft.

Log Accepted by: CHENOWITH IRRIGATION COOPERATIVE, Inc.

[Signed] By Owner Dated June 12, 1956

Leo N Smith V.P.

(10) WELL TESTS: R. J. Strasser Drilling Co.

Was a pump test made? ☒ Yes ☐ No If yes, by whom?

Yield: 1200 gal./min. with 2 ft. draw down after 8 hrs.

Artesian flow ..... g.p.m.

Shut-in pressure ..... lbs. per square inch.

Bailer test ..... g.p.m. with ..... ft. drawdown

Temperature of water Was a chemical analysis made? ☐ Yes ☒ No

Was electric log made of well? ☐ Yes ☒ No

(11) WELL LOG: 16

Diameter of well ..... inches.

Total depth 275 ft. Depth of completed well 275 ft.

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

Surf	to	1	Topsoil
1	"	19	Broken rock with clay
19	"	28	Black medium hard rock
28	"	71	Hard grey basalt
71	"	97	Medium hard black basalt
97	"	129	Hard grey basalt
129	"	153	Medium hard grey basalt
153	"	169	Hard grey basalt
169	"	183	Blue green clay - some rock
183	"	189	Brown soft rock
189	"	256	Hard grey rock
256	"	262	Brown porous rock(water)
262	"	269	Grey and brown rock(water)
269	"	274	Medium hard grey basalt
274	"	275	Hard grey basalt

Ground elevation at well site ..... feet above mean sea level.

Work started 19 , Completed May 1 1956

Well Driller's Statement:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME R. J. Strasser Drilling Co.
(Person, firm, or corporation) (Typed or printed)

Address 8110 SE Sunset Lane Portland 6

Driller's well number 3076

[Signed] R J Strasser (Well Driller)

License No. 10 Dated May 22, 1956

F-158

2N/13-32A 1

The Original, and Duplicate with the STATE ENGINEER, SALEM, OREGON

RECEIVED JUN 14 1956

STATE OF OREGON

~~OBSERVATION WELL~~

Fill In State Permit No. G33

(1) OWNER:

Name STATE ENGINEER SALEM, OREGON Chenowith Irrigation Cooperative

Address The Dalles, Oregon

(2) LOCATION OF WELL:

County Wasco Owner's number, if any— 3

R. F. D. or Street No. NE¼NE¼ Sec. 32 T2N R13E

Bearing and distance from section or subdivision corner

2¼'S 9.75'W - NE Corner Section 32, T2N R13E 32 33

Lot 40 Tract 14, Shipe Acres

(3) TYPE OF WORK (check):

New well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☒

Irrigation ☒ Test Well ☐ Other ☐

(5) EQUIPMENT:

Rotary ☐

Cable ☒

Dug Well ☐

(6) CASING INSTALLED:

Threaded ☐ Welded ☒

Surface

FROM	ft. to	Diam.	Gage or Wall
"	"	"	"
167 "	190 "	16 "	3/8 "
" (liner)	"	"	"
"	"	"	"
"	"	"	"

Type and size of shoe or well ring

Describe joint

If gravel packed

Diameter of Bore	from ft.	to ft.
	"	"
	"	"
	"	"
	"	"
	"	"

Size of gravel:

(7) PERFORATIONS:

Type of perforator used none

SIZE of perforations in., length, by in.

FROM	ft. to	ft.	perf per foot	No. of rows
"	"	"	" " "	" " "
"	"	"	" " "	" " "
"	"	"	" " "	" " "
"	"	"	" " "	" " "

SCREENS:

Give Manufacturer's Name, Model No. and Size

CONSTRUCTION:

Was a surface sanitary seal provided? ☒ Yes ☐ No To what depth 52 ft.

Were any strata sealed against pollution? ☒ Yes ☐ No

If yes, note depth of strata

FROM surface ft. to 23 ft.

" " "

METHOD OF SEALING cement grout placed around 16" pipe

(9) WATER LEVELS:

Depth at which water was first found 256 ft.

Standing level before perforating ft.

Standing level after perforating not perf. 76 ft.

(10) WELL TESTS:

Was a pump test made? ☒ Yes ☐ No If yes, by whom? R. J. Strasser Drilling Co.

Yield: 1200 gal./min. with 2 ft. draw down after 8 hrs.

" " " "

" " " "

Artesian flow ..... g.p.m.

Shut-in pressure ..... lbs. per square inch.

Bailer test ..... g.p.m. with ..... ft. drawdown

Temperature of water Was a chemical analysis made? ☐ Yes ☒ No

Was electric log made of well? ☐ Yes ☒ No

(11) WELL LOG:

16

Diameter of well, ... inches.

Total depth 275 ft. Depth of completed well 275 ft.

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

Surf	ft. to	1	ft. Topsoil
1	"	19	" Broken rock with clay
19	"	28	" Black medium hard rock
28	"	71	" Hard grey basalt
71	"	97	" Medium hard black basalt
97	"	129	" Hard grey basalt
129	"	153	" Medium hard grey basalt
153	"	169	" Hard grey basalt
169	"	183	" Blue green clay - some rock
183	"	189	" Brown soft rock
189	"	256	" Hard grey rock
256	"	262	" Brown porous rock(water)
262	"	269	" Grey and brown rock(water)
269	"	274	" Medium hard grey basalt
274	"	275	" Hard grey basalt

Ground elevation at well site ..... feet above mean sea level.

Work started 19 . Completed May 1 1956

Well Driller's Statement:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME R. J. Strasser Drilling Co.
(Person, firm, or corporation) (Typed or printed)

Address 8110 SE Sunset Lane Portland 6

Driller's well number 3076

[Signed] R J Strasser (Well Driller)

License No. ..... Dated May 22 19 56

Log Accepted by: CHENOWITH IRRIGATION COOPERATIVE, Inc.

[Signed] By Leo M Smith V.P. Owner Dated June 19 1956

F-159

STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-32A)1)

County Wasco

Application No. G-33

Water Level Record

OWNER: Chenowith Irrigation Coop. OWNER'S NO. 3

Description of measuring point: Owners air line and pressure gage

(length of airline=138 ft.)

Date	Water Level Feet (below) Land Surface		Remarks (ERROR- OF 6' FOUND IN AIRLINE)
8- -57	100	94	Meas. by owner
9- -57	100	94	" " "
10- -57	100	94	" " "
11- -57	100	94	" " "
12- -57	95	89	" " "
1- -58	97	91	" " "
2- -58	91	85	" " "
3- -58	91	85	" " "
4- -58	88	82	" " "
5- -58	90	84	" " "
6- -58	95	89	" " "
7- -58	95	89	" " "
8- -58	105	99	" " "
8-15-58	111	105	" " "
8-20-58	111	105	" " "
8-27-58	113	107	" " "
9- -58	113	107	" " "
10- -58	112	106	" " "
11- -58	109	103	Measured by owner
12- -58	107	101	" " "
1-28-59	105½	99½	Meas. by SGB-JES
3-1-59	105	99	Meas. by operator
4-1-59	105	99	" " "
4-16-59	104	98	JES
5-1-59	106	100	Meas. by operator
6-1-59	109	103	Pump on
6-24-59	107	101	Pump on
8-1-59	115	109	
8-27-59	117	111	
10-1-59	117	111	
11-1-59	113	107	
12-1-59	110	104	
12-21-59	108	102	
1-26-60	107	101	
2-17-60	105	99	
3-15-60	105	98	

REMARKS:

State Printing 89314

STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-32A1

County Wasco

Application No. G33

Water Level Record

OWNER: Chenowith Irrigation Coop OWNER'S NO.

Description of measuring point:

Date	Water Level Feet (above) (below) Land Surface		Remarks
4-12-60	103½	97½	
5-26-60	105	99	WSB
7-7-60	111	105	WSB
8-1-60	121	115	
9-1-60	123	117	
9-28-60	122	116	
~~12-9-60~~	~~116~~		~~Static~~
11-1-60	120	114	
12-1-60	116	112	
12 9 60	116	112	
1 1 61	115	109	
2 1 61	112	106	
3 1-61	110	104	
4 1 61	109	103	
5-1-61	107	101	
6-1-61	109	103	
7-1-61	114	108	
8-1	117	111	

Error of 6 feet in pipeline

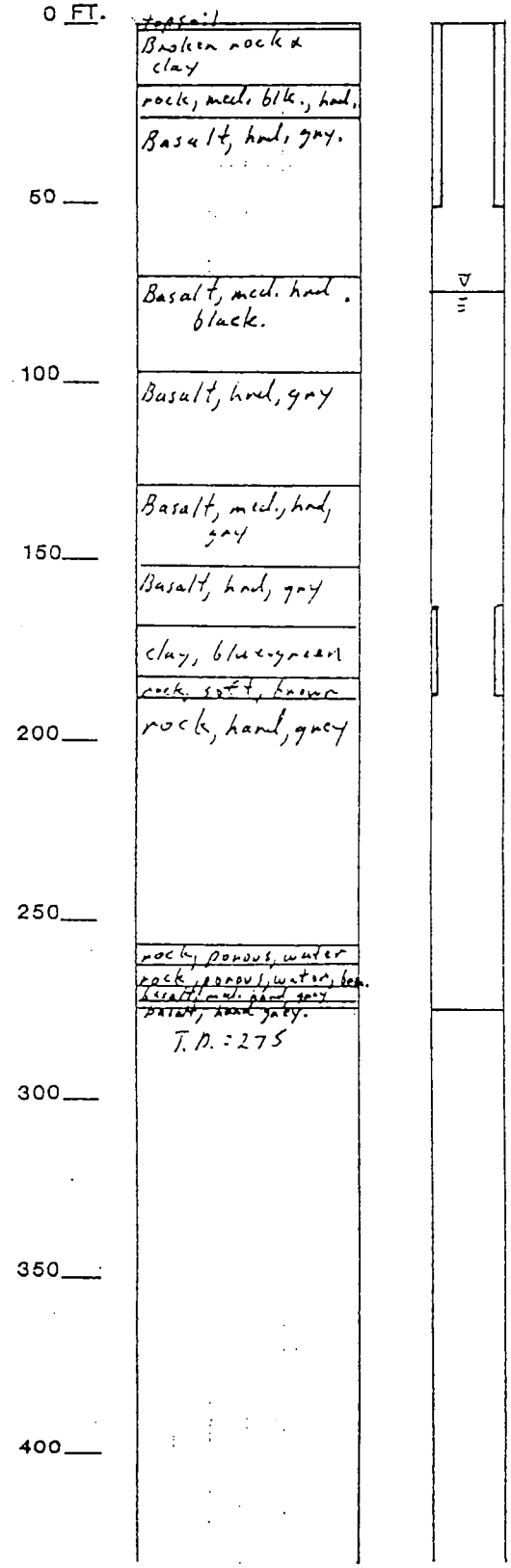
Date	Water Level Feet ~~(above)~~ (below) Land Surface		Remarks
9-1-61	124	118	
10-1	126	120	
11-1	122	116	
12-1	119	113	
1-1-62	117	111	
2-7-62	115	109	

REMARKS:

State Printing 89314

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Chenowith Irrigation #3
LOCATION NE¼, NE¼, Sec. 32, T2N, R13E
ELEVATION
DATE INSTALLED 5/1/56



16" casing to 52'

water level 76' 5/22/56

16" liner from 167' to 190'

yield: 1200 g.p.m. 2 ft drawdown 8 hours

STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-32A)1)

County Wasco

Application No. G-33

Water Level Record

OWNER: Chenowith Irrigation Coop. OWNER'S NO. 3

Description of measuring point: Owners air line and pressure gage

(length of airline=138 ft.)

Date	Water Level Feet (above) (below) Land Surface		Remarks (ERROR OF 6' FOUND IN AIRLINE)	Date	Water Level Feet (above) (below) Land Surface		Remarks
8- -57	100	94	Meas. by owner	11- -58	109	103	Measured by owner
9- -57	100	94	" " "	12- -58	107	101	" " "
10- -57	100	94	" " "	1-28-59	105½	99½	Meas. by SGB-JES
11- -57	100	94	" " "	3-1-59	105	99	Meas. by operator
12- -57	95	89	" " "	4-1-59	105	99	" " "
1- -58	97	91	" " "	4-16-59	104	98	JES
2- -58	91	85	" " "	5-1-59	106	100	Meas. by operator
3- -58	91	85	" " "	6-1-59	109	103	Pump on
4- -58	88	82	" " "	6-24-59	107	101	Pump on
5- -58	90	84	" " "	8-1-59	115	109	
6- -58	95	89	" " "	8-27-59	117	111	
7- -58	95	89	" " "	10-1-59	117	111	
8- -58	105	99	" " "	11-1-59	113	107	
8-15-58	111	105	" " "	12-1-59	110	104	
8-20-58	111	105	" " "	12-21-59	108	102	
8-27-58	113	107	" " "	1-26-60	107	101	
9- -58	113	107	" " "	2-17-60	105	99	
10- -58	112	106	" " "	3-15-60	104	98	

REMARKS:

State Printing 8931M

(70)

ORIGINAL
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RECEIVED AUG 16 1957 STATE ENGINEER

WATER WELL REPORT OBSERVATION WELL

STATE OF OREGON

State Well No. 2N/13-28M(1)

State Permit No. G-338 G-471

(1) OWNER:

Name HARVEY MACHINE CO., INC.

Address Torrance, California

(2) LOCATION OF WELL:

County Wasco Owner's number, if any— (1)

NW ¼ SW ¼ Section 28 T. 2N R. 13 E W.M.

Bearing and distance from section or subdivision corner

1358.49 ft. S 15° 53' 50" E from the quarter corner of Secs. 28 & 29 T2N R 13 E W M

TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☒ Municipal ☐

Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:

Rotary ☐ Driven ☐

Cable ☐ Jetted ☐

Dug ☐ Bored ☐

(6) CASING INSTALLED:

Threaded ☐ Welded ☒

20" O.D. Diam. from Surface ft. to 220 ft. Gage 3/8"

" Diam. from ft. to ft. Gage

" Diam. from ft. to ft. Gage

(7) PERFORATIONS:

Perforated? ☐ Yes ☒ No

Type of perforator used

SIZE of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(8) SCREENS:

Well screen installed ☐ Yes ☐ No

Manufacturer's Name

Type Model No.

Diam. Slot size Set from ft. to ft.

Diam. Slot size Set from ft. to ft.

CONSTRUCTION:

Was well gravel packed? ☐ Yes ☒ No Size of gravel:

Gravel placed from ft. to ft.

Was a surface seal provided? ☒ Yes ☐ No To what depth? 220 ft.

Material used in seal— Cement Grout

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? Depth of strata

Method of sealing strata off

(10) WATER LEVELS:

Static level 86 ft. below land surface Date 7-31-57

Artesian pressure lbs. per square inch Date

Log Accepted by: Harvey Aluminum Co.

[Signed] R. Hamill (Owner) Date July, 1957

(11) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom? Geologist

Yield: 2145	gal./min. with	4.3	ft. drawdown after	5	hrs.
" 2160	"	4.4	"	8	"
" 1260	"	1.7	"	10	"

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m. Date

Temperature of water Was a chemical analysis made? ☐ Yes ☐ No

(12) WELL LOG:

Diameter of well 20 inches.

Depth drilled 314 ft. Depth of completed well 314 ft.

Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
See attached well Log		

Work started Nov 1956 Completed July 1957

(13) PUMP:

Manufacturer's Name Not Purchased

Type: H.P.

Well Driller's Statement:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME R. J. Strasser Drilling Company (Person, firm, or corporation) (Type or print)

Address 8110 S. E. Sunset Lane, Portland 6,

Driller's well number 1

[Signed] (Well Driller)

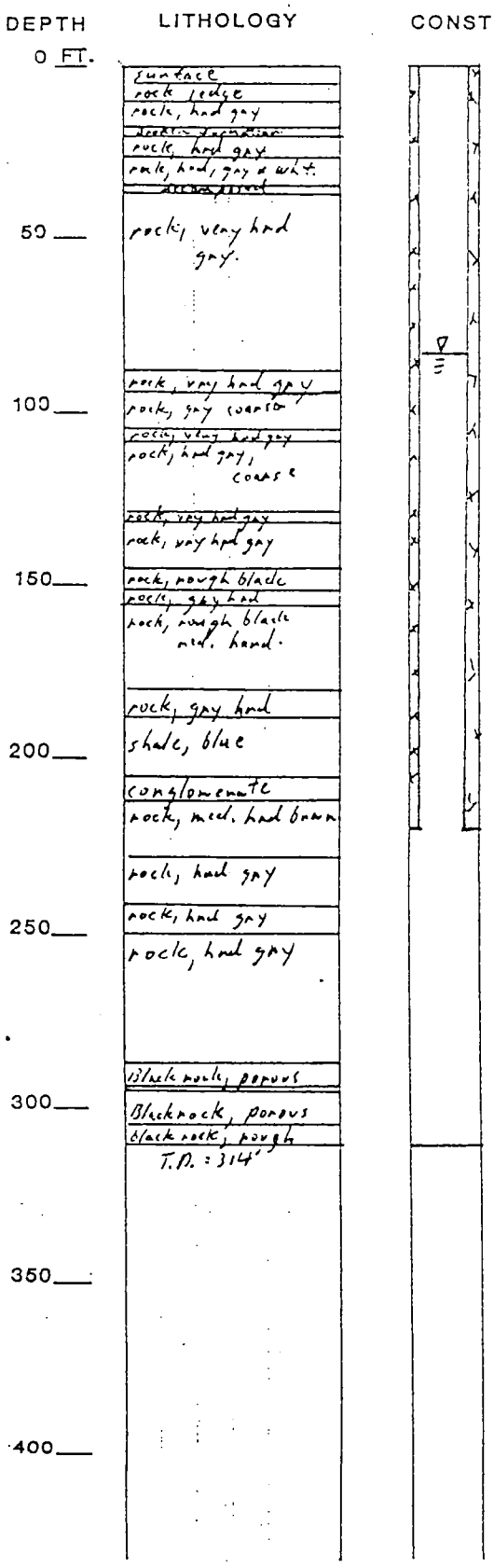
License No. 10 Date August 13, 1957

F-164

(USE ADDITIONAL SHEETS IF NECESSARY)

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Harvey Machine #1
LOCATION NW¼, SW¼, sec. 29 T2N R13E
ELEVATION
DATE INSTALLED 7/57



nominal 20" borehole
20" welded steel
open casing to 220'
cement grout
water level 86' @ 7/31/57

yeild 2145 g.p.m. at 4.3' draw down

RECEIVED
AUG 19 1957
STATE ENGINEER
SALEM, OREGON

GEOLOGIC LOG OF #1 WELL

HARVEY ALUMINUM - THE DALLES, OREGON

0' to 4'	Surface
4' to 11'	Hard sloping rock ledge
11' to 19'	Hard gray rock
19' to 21'	Broken formation
21' to 27'	Hard gray rock
27' to 36'	Mixture of colors Hard gray-black and white rock
36' to 39'	Layer of decomposed formation (similar to coal)
43' to 89'	Very hard gray rock
89' to 95'	Very hard gray rock
95' to 104'	Hard gray rock, but coarse in texture Drilled faster
104' to 108'	Very hard gray rock - very fine cuttings
108' to 129'	Hard gray rock. Same formation as the 104' to 108' strata
129' to 132'	Very hard gray rock
132' to 146'	Very hard gray rock
146' to 152'	Medium hard rough black rock
152' to 155'	Hard gray rock
155' to 166'	Medium hard rough black rock
166' to 181'	Medium hard rough black rock
181' to 189'	Hard gray rock
189' to 205'	Blue shale

Geologic Log of #1 Well
Harvey Aluminum
The Dalles, Oregon

205'	to 212'	Conglomerate
212'	to 229'	Medium hard brown rock
229'	to 242'	Hard gray rock
242'	to 250'	Hard gray rock
250'	to 255'	Hard gray rock
255'	to 260'	Hard gray rock
260'	to 262'	Hard gray rock
262'	to 265'	Hard gray rock
265'	to 268'	Hard gray rock
268'	to 271'	Hard gray rock
271'	to 264'	Hard gray rock
274'	to 277'	Hard gray rock
277'	to 279'	Hard gray rock
279'	to 281'	Hard gray rock
281'	to 284'	Hard gray rock
284'	to 286'	Hard gray rock
286'	to 288'	Porous Blackrock (water bearing)
288'	to 294'	Porous Blackrock (water bearing)
294'	to 296'	Harder, but still water-brown color
296'	to 306'	Porous Blackrock (water bearing very good)
306'	to 310'	Rough black rock

(71)

ORIGINAL
File Original and Duplicate with the STATE ENGINEER, SALEM, OREGON

WATER WELL DRILLERS REPORT
STATE OF OREGON · App 735

Do Not Fill In — State Well No. 2N/13-28 L
State Permit No. G641

RECEIVED
MAR - 5 1958
STATE ENGINEER
SALEM, OREGON

(1) OWNER:
Name Harvey Aluminum Company
Address 19200 Southwestern Avenue
Torrance, California

(2) LOCATION OF WELL:
County Wasco — Owner's number, if any — 2A
R. F. D. or Street No.
Bearing and distance from section or subdivision corner:
2057' North & 1970' W. from the ¼ 28/33 corner of Sect. 28 TWP, 2N R. 13E being within the NE¼ SW¼ of Sec. 28 TWP 2N R. bearing N 24 50' W. Dist. 2274'

(3) TYPE OF WORK (check):
New well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

PROPOSED USE (check):
Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) EQUIPMENT:
Rotary ☐
Cable ☒
Dug Well ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☒

FROM	ft. to	ft.	Diam.	Gage or Wall
0	227		10	Stndrd

Type and size of shoe or well ring
Describe joint

If gravel packed

Diameter of Bore	from ft.	to ft.

Size of gravel:

(7) PERFORATIONS:
Type of perforator used

FROM	ft. to	ft.	No. of perforations in. length, by perf per foot	No. of rows

SCREENS:
Give Manufacturer's Name, Model No. and Size

(8) CONSTRUCTION:
Was a surface sanitary seal provided? ☐ Yes ☒ No — To what depth ft.
Were any strata sealed against pollution? ☒ Yes ☐ No
If yes, note depth of strata: surface to 226'

FROM	ft. to	ft.

METHOD OF SEALING grouting casing

(9) WATER LEVELS:
Depth at which water was first found 153 ft.
Standing level before perforating ft.
Standing level after perforating 73 ft.

Log Accepted by:
[Signed] Owner — Dated 3-28, 1958 F-168
by Clerk C Cuff

(10) WELL TESTS: OBSERVATION WELL
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Driller
Yield: 1080 gal./min. with 11 ft. draw down after 8 h
Artesian flow g.p.m.
Shut-in pressure lbs. per square inch.
Bailer test g.p.m. with ft. drawdo
Temperature of water 61 Was a chemical analysis made? ☒ Yes ☐
Was electric log made of well? ☐ Yes ☒ No

(11) WELL LOG:
Diameter of well 10 inches.
Total depth 302 ft. Depth of completed well 302
Formation: Describe by color, character, size of material and structure, c show thickness of aquifers and the kind and nature of the material in ea stratum penetrated, with at least one entry for each change of formatic

0 ft. to	48 ft.	hard grey basalt
48 "	65 "	soft interbed
65 "	71 "	hard grey basalt
71 "	75 "	soft basalt
75 "	103 "	hard grey basalt crevice @ 90
103 "	108 "	soft grey basalt
108 "	111 "	hard grey basalt
111 "	115 "	caving rock
115 "	132 "	hard grey rock, sloping
132 "	153 "	lava rock
153 "	164 "	black water bearing rock
164 "	166 "	hard grey basalt
166 "	198 "	black lava rock
198 "	221 "	clay
221 "	227 "	lava rock
227 "	254 "	hard grey basalt
254 "	298 "	hard & soft layers lava rock water bearing
298 "	302 "	hard black basalt

Well Designation #2A

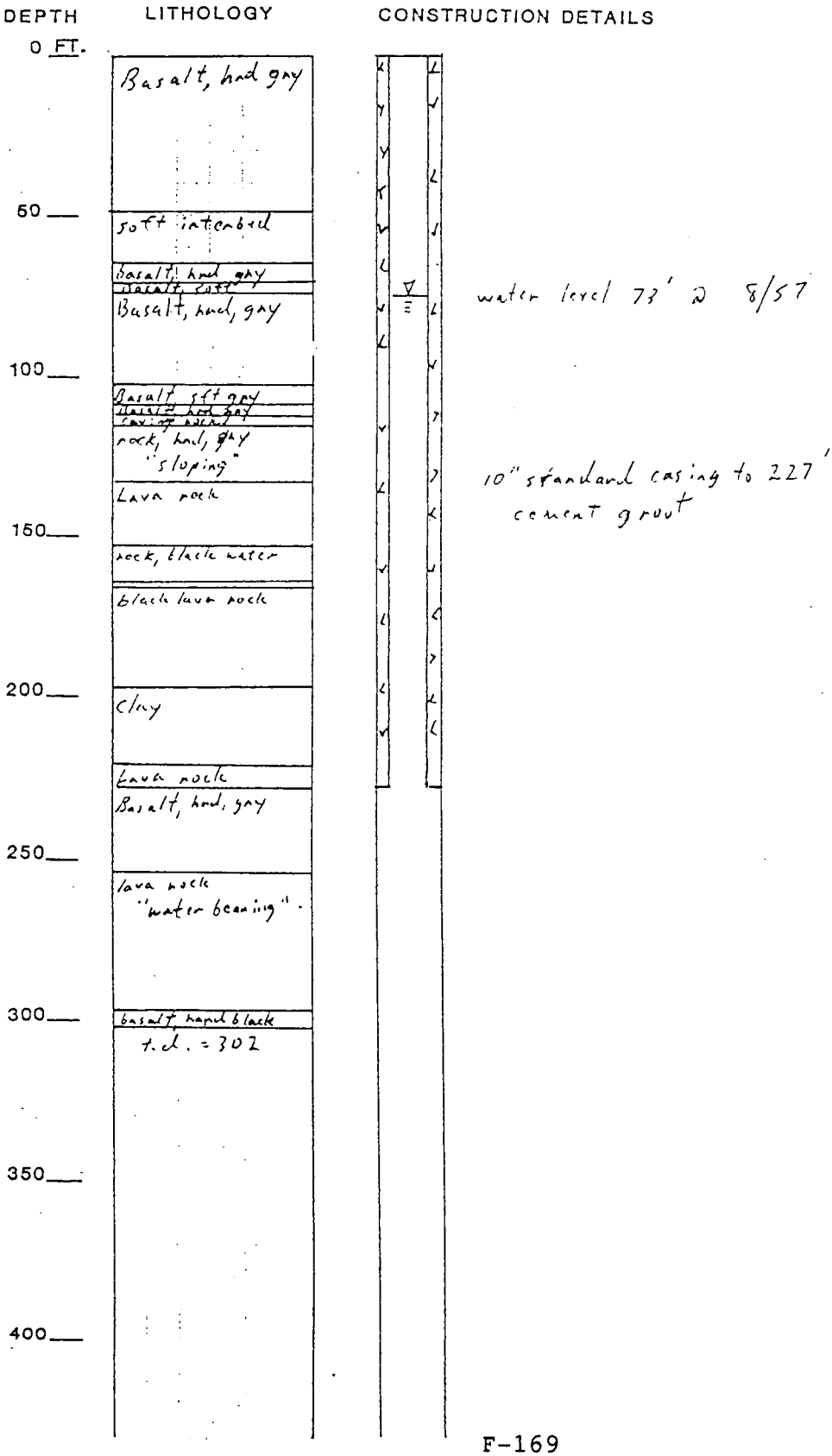
Ground elevation at well site 1[illegible]2 feet above mean sea lev
Work started 5-28-57 19 . Completed 7-21-57 19

Well Driller's Statement:
This well was drilled under my jurisdiction and this report true to the best of my knowledge and belief.

NAME Jannsen Drilling Company
(Person, firm, or corporation) (Type or print)
Address 20175 S. W. Tualatin Valley Highway
Aloha, Oregon
Driller's well number
[Signed] Edward D. Jannsen (Well Driller)
License No. 79 Dated 8-23-57, 19

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Harvey Machine #2A
LOCATION NE¼ SW¼, Sec. 28, 2N. 13E.
ELEVATION
DATE INSTALLED 7/24/57



STATE ENGINEER
Salem, Oregon

Well Record

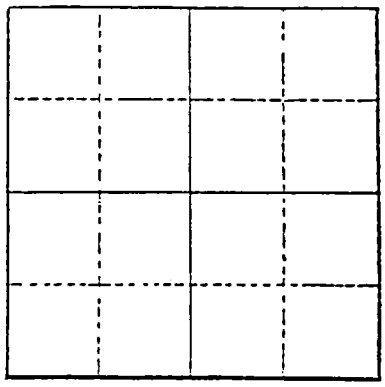
STATE WELL NO. 2N/13-28L(1)
COUNTY Wasco
APPLICATION NO. G-735

OWNER: Harvey Machine Co.
MAILING ADDRESS:
CITY AND STATE: The Dalles, Oregon

LOCATION OF WELL: Owner's No. 2-A

NE ¼ SW ¼ Sec. 28 T. 2 ~~S.~~ N. R. 13 ~~W.~~ E., W.M.

Bearing and distance from section or subdivision corner 2057' N & 970' W from S¼ corner Sec. 28



Altitude at well

TYPE OF WELL: drilled Date Constructed June-July 1957

Depth drilled 303 Depth cased 227

Section

CASING RECORD:

10" -(226'-11" of casing installed) - grouted with 1280 sacks of cement.

FINISH:

open hole below casing

AQUIFERS:

Basalt

WATER LEVEL: 73' below land surface, July 22, 1957

PUMPING EQUIPMENT: Type H.P.
Capacity G.P.M.

WELL TESTS:
Drawdown 11 ft. after hours pumping 1080 G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Industrial Temp. °F., 19
SOURCE OF INFORMATION well report
DRILLER or DIGGER A.M. Jarnsen
ADDITIONAL DATA:
Log x Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

State Printing 80316

STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-28L(1)
County Wasco
Application No. G-735

Well Log

Owner: Harvey Machine Co. Owner's No. 2-A

Driller: A. M. Jannsen Drilling Co. Date Drilled June & July 1957

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Basalt, hard gray	0	48	48
Soft interbed	48	65	17
Basalt, hard gray	65	71	6
Basalt, soft	71	75	4
Basalt, hard, gray crevice at 90'	75	103	28
Basalt, soft gray	103	108	5
Basalt, hard gray	108	111	3
Rock caving	111	115	4
Rock, hard, gray, (sloping, very hard to maintain a straight hole)	115	145	30
Lava, rock	145	153	8
Rock, black, water bearing	153	164	11
Basalt, hard, gray	164	166	2
Lava rock, black	166	198	32
Clay	198	221	23
Lava Rock	221	227	6
Basalt, hard gray	227	254	27
Hard and soft layers of lava rock water bearing	254	298	44
Basalt, hard, black	298	303	5

(71)

ORIGINAL
File Original and Duplicate with the STATE ENGINEER, SALEM, OREGON

WATER WELL DRILLERS REPORT
STATE OF OREGON

RECEIVED
MAR 1955
STATE ENGINEER
SALEM, OREGON

App 735

Do Not Fill In — State Well No. 2N/13-28 L
State Permit No. G646

(1) OWNER:
Name Harvey Aluminum Company
Address 19200 Southwestern Avenue
Torrance, California

(2) LOCATION OF WELL:
County Wasco — Owner's number, if any— 2A
R. F. D. or Street No.
Bearing and distance from section or subdivision corner
2057' North & 970' W. from the ± 28/33 corner of Sect. 28 TWP, 2N R. 13E being within the NE¼ SW¼ of Sec. 28 TWP 2N R. bearing N 24950' W. Dist. 2274'

(3) TYPE OF WORK (check):
New well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
abandonment, describe material and procedure in Item 11.

PROPOSED USE (check):
Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) EQUIPMENT:
Rotary ☐
Cable ☒
Dug Well ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☒

FROM ft.	to ft.	Diam.	Gage or Wall
0	227	10	Stndrd

If gravel packed

Diameter of Bore	from ft.	to ft.

Type and size of shoe or well ring — Size of gravel:
Describe joint

(7) PERFORATIONS:
Type of perforator used
Size of perforations in., length, by in.

FROM ft.	to ft.	perf per foot	No. of rows

SCREENS:
Give Manufacturer's Name, Model No. and Size

(8) CONSTRUCTION:
Was a surface sanitary seal provided? ☐ Yes ☒ No To what depth ft.
Were any strata sealed against pollution? ☒ Yes ☐ No
If yes, note depth of strata surface to 226'

FROM ft.	to ft.

METHOD OF SEALING grouting casing

(9) WATER LEVELS:
Depth at which water was first found 153 ft.
Standing level before perforating ft.
Standing level after perforating 73 ft.

Log Accepted by:
[Signed] [signature] Dated 7-28, 1957 F-168
by [signature]

(10) WELL TESTS: OBSERVATION WELL
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Driller
Yield: 1080 gal./min. with 11 ft. draw down after 8 h.
Artesian flow g.p.m.
Shut-in pressure lbs. per square inch.
Bailer test g.p.m. with ft. drawdown
Temperature of water 64 Was a chemical analysis made? ☒ Yes ☐
Was electric log made of well? ☐ Yes ☒ No

(11) WELL LOG:
Diameter of well 10 inches.
Total depth 302 ft. Depth of completed well 302

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

ft.	to ft.	
0	48	hard grey basalt
48	65	soft interbed
65	71	hard grey basalt
71	75	soft basalt
75	103	hard grey basalt crevice @ 90
103	108	soft grey basalt
108	111	hard grey basalt
111	115	caving rock
115	132	hard grey rock, sloping
132	153	lava rock
153	164	black water bearing rock
164	166	hard grey basalt
166	198	black lava rock
198	221	clay
221	227	lava rock
227	254	hard grey basalt
254	298	hard & soft layers lava rock water bearing
298	302	hard black basalt

Well Designation #2A

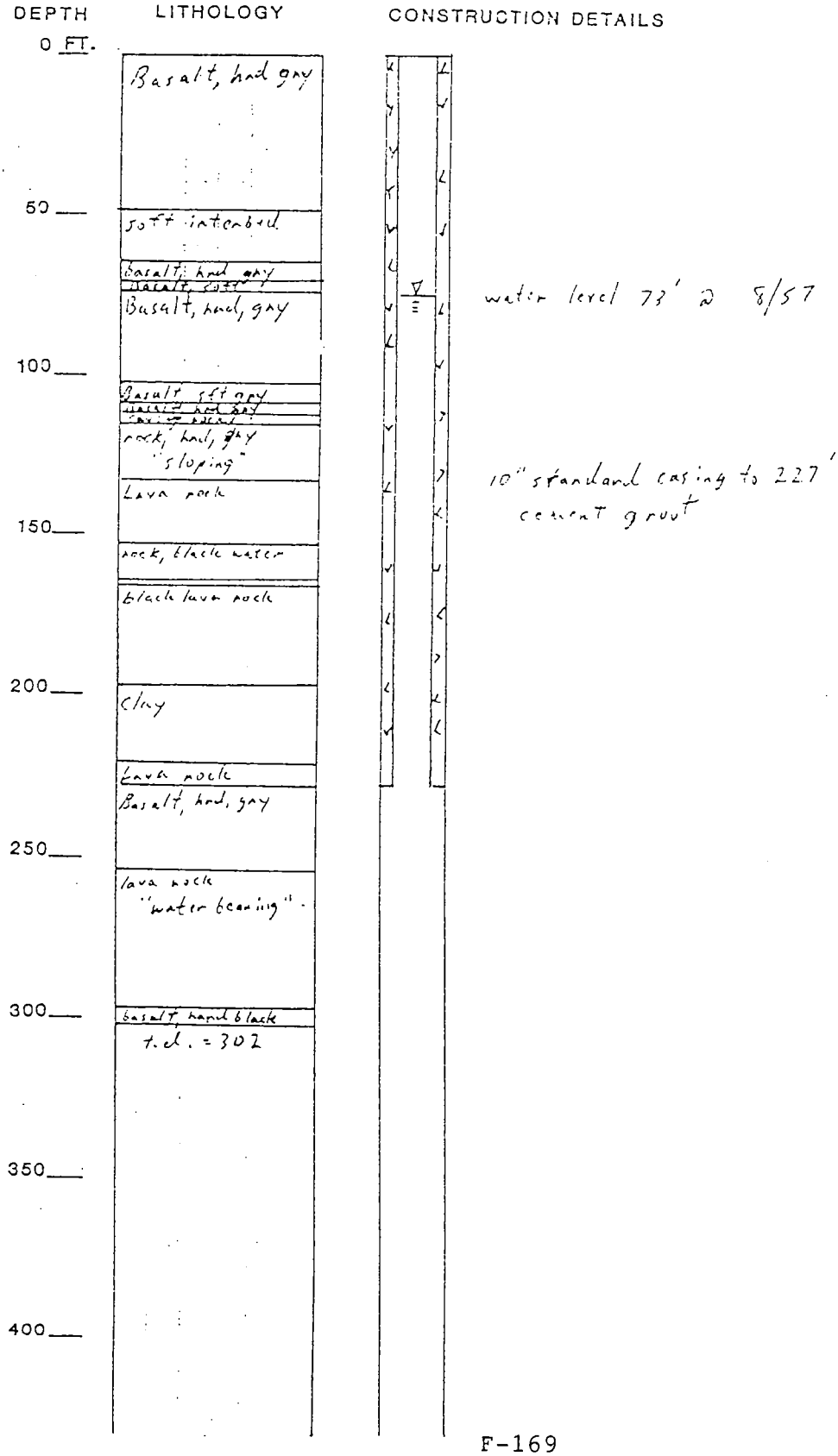
Ground elevation at well site 135.0 feet above mean sea level
Work started 5-28-57, 19 . Completed 7-24-57, 19

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Jannsen Drilling Company
(Person, firm, or corporation) (Typed or printed)
Address 20175 S. W. Tualatin Valley Highway
Aloha, Oregon
Driller's well number
[Signed] [signature] (Well Driller)
License No. 79 Dated 8-23-57, 19

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Harvey Machine #2A
LOCATION NE¼ SW¼, Sec. 28, 2N. 13E.
ELEVATION
DATE INSTALLED 7/24/57



STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-28L(1)
County Wasco
Application No. G-735

Well Log

Owner: Harvey Machine Co. Owner's No. 2-A

Driller: A. M. Jannsen Drilling Co. Date Drilled June & July 1957

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
L Basalt, hard gray	0	48	48
T Soft interbed	48	65	17
Basalt, hard gray	65	71	6
Basalt, soft	71	75	4
Basalt, hard, gray crevice at 90'	75	103	28
Basalt, soft gray	103	108	5
Basalt, hard gray ~~Basalt~~	108	111	3
Rock caving	111	115	4
Rock, hard, gray, (sloping, very hard to maintain a straight hole)	115	145	30
Lava, rock	145	153	8
Rock, black, water bearing	153	164	11
Basalt, hard, gray	164	166	2
Lava rock, black	166	198	32
Clay	198	221	23
Lava Rock	221	227	6
Basalt, hard gray	227	254	27
Hard and soft layers of lava rock water bearing	254	298	44
Basalt, hard, black	298	303	5

STATE ENGINEER
Salem, Oregon

Well Record

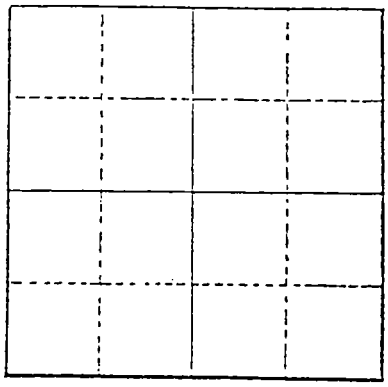
STATE WELL NO. 2N/13-28L(1)
COUNTY Wasco
APPLICATION NO. G-735

OWNER: Harvey Machine Co.
MAILING ADDRESS:

LOCATION OF WELL: Owner's No. (2-A)
CITY AND STATE: The Dalles, Oregon

NE ¼ SW ¼ Sec. 28 T. 2 ~~S~~ N. R. 13 ~~W~~ E., W.M.

Bearing and distance from section or subdivision corner 2057' N & 970' W from S¼ corner Sec. 28



Altitude at well

TYPE OF WELL: drilled Date Constructed June-July 1957

Depth drilled 303 Depth cased 227

Section

CASING RECORD:

10" -(226'-11" of casing installed) - grouted with 1280 sacks of cement.

FINISH:

open hole below casing

AQUIFERS:

Basalt

WATER LEVEL: 73' below land surface, July 22, 1957

PUMPING EQUIPMENT: Type H.P.
Capacity G.P.M.

WELL TESTS:
Drawdown 11 ft. after hours pumping 1060 G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Industrial Temp. °F. 19
SOURCE OF INFORMATION well report
DRILLER or DIGGER A.M. Jannsen
ADDITIONAL DATA:
Log x Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

State Printing 83318

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM 10, OREGON within 30 days from the date of well completion.

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

State Well No. 2N/13-2

State Permit No.

(1) OWNER:
Name Harvey Aluminum Company, Inc.
Address P.O. Box 711
The Dalles, Ore.

(2) LOCATION OF WELL:
County Wasco Driller's well number
¼ ¼ Section 28 T. 2N R. 13E W.M.
Bearing and distance from section or subdivision corner

(3) TYPE OF WORK (check):
New Well ☐ Deepening ☐ Reconditioning ☒ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☐
..." Diam. from ... ft. to ... ft. Gage ...
..." Diam. from ... ft. to ... ft. Gage ...
..." Diam. from ... ft. to ... ft. Gage ...

(7) PERFORATIONS:
Perforated? ☐ Yes ☐ No
Type of perforator used
Size of perforations ... in. by ... in.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.
... perforations from ... ft. to ... ft.

(8) SCREENS:
Well screen installed ☐ Yes ☐ No
Manufacturer's Name ...
... Model No. ...
Diam. ... Slot size ... Set from ... ft. to ... ft.
Diam. ... Slot size ... Set from ... ft. to ... ft.

(9) CONSTRUCTION:
Well seal—Material used in seal ...
Depth of seal ... ft. Was a packer used? ...
Diameter of well bore to bottom of seal ... in.
Were any loose strata cemented off? ☐ Yes ☐ No Depth ...
Was a drive shoe used? ☐ Yes ☐ No
Was well gravel packed? ☐ Yes ☐ No Size of gravel: ...
Gravel placed from ... ft. to ... ft
Did any strata contain unusable water? ☒ Yes ☐ No
Type of water? Contaminated Depth of strata 25ft.
Method of sealing strata off cement

(10) WATER LEVELS:
Static level 59 ft. below land surface Date 8, 21, 62
Artesian pressure ... lbs. per square inch Date

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(11) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? B. C.
Yield: 5 gal./min. with ... ft. drawdown after 1 hr.
" " "
" " "
Bailer test ... gal./min. with ... ft. drawdown after
Artesian flow ... g.p.m. Date
Temperature of water 58 Was a chemical analysis made? ☒ Yes

(12) WELL LOG:
Diameter of well below casing 8 in.
Depth cleaned 9 ft. Depth of completed well 120
Formation: Describe by color, character, size of material and structure; show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO

Work started 3, 13 19 62 Completed 3, 20
Date well drilling machine moved off of well 3, 21

(13) PUMP:
Manufacturer's Name Fairbanks, Morse
Type: Submersible H.P. 1

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Bert Clayton & Son
(Person, firm or corporation) (Type or print)
Address 2313 E. 10th. St. The Dalles, Ore.

Drilling Machine Operator's License No. 129
[Signed] Bert Clayton
(Water Well Contractor)
Contractor's License No. 54

(72)

ORIGINAL
File Original, and Duplicate with the STATE ENGINEER SALEM, OREGON

RECEIVED MAR 3 1958 STATE ENGINEER SALEM, OREGON

WATER WELL DRILLERS REPORT
STATE OF OREGON

Ap. G736

Do Not Fill In — State Well No. 2N/13-28N(1)
State Permit No. G647

(1) OWNER:
Name Harvey Aluminum Company
Address The Dalles, Oregon

(2) LOCATION OF WELL:
County Wasco — Owner's number, if any — 43A
R. F. D. or Street No.
Bearing and distance from section or subdivision corner
652 N. & 1840' W. from the ± 28/33 corner of Sect. 28, TWP 2N, Range 13E being within the SW¼ of SW¼ of Sec. 28 TWP 2N Range 13E bearing N 70°04' W. Dist. 1952'

(3) TYPE OF WORK (check):
New well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) EQUIPMENT:
Rotary ☐
Cable ☒
Dug Well ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☒

FROM	ft. to	ft.	Diam.	Gage or Wall
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"

If gravel packed

Diameter of Bore	from ft.	to ft.
	"	"
	"	"
	"	"
	"	"
	"	"

Type and size of shoe or well ring — Size of gravel:
Describe joint

(7) PERFORATIONS:
Type of perforator used
SIZE of perforations in., length, by in.

FROM	ft. to	ft.	perf per foot	No. of rows
"	"	"	" " "	" " "
"	"	"	" " "	" " "
"	"	"	" " "	" " "
"	"	"	" " "	" " "

SCREENS:
Give Manufacturer's Name, Model No. and Size

(8) CONSTRUCTION:
Was a surface sanitary seal provided? ☐ Yes ☒ No To what depth ft.
Were any strata sealed against pollution? ☒ Yes ☐ No
If yes, note depth of strata 207'

FROM	ft. to	ft.
" Surface	" 207'	"

METHOD OF SEALING Cementing Casing

(9) WATER LEVELS:
Depth at which water was first found 35' ft.
Standing level before perforating 77' ft.
Standing level after perforating ft.

Log Accepted by:
[Signed] Harvey Aluminum 2-28 1958
by [illegible]

(10) WELL TESTS: OBSERVATION WELL
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Driller
Yield: 1000 gal./min. with 2' 2" ft. draw down after 4 hrs.
" " " "
" " " "
Artesian flow g.p.m.
Shut-in pressure lbs. per square inch.
Bailer test g.p.m. with ft. drawdown
Temperature of water — Was a chemical analysis made? ☒ Yes ☐ No
Was electric log made of well? ☐ Yes ☒ No

(11) WELL LOG:
Diameter of well 10 inches.
Total depth 319 ft. Depth of completed well 319 ft.

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

ft. to	ft.	
0 "	5 "	Rock Fill
5 "	15 "	Fractured Rock
15 "	17 "	Broken Rock
17 "	23 "	Hard Grade Basalt
23 "	33 "	Blue Shale Interbed
33 "	50 "	Black Basalt with layers clay
50 "	63 "	Hard Black Basalt
63 "	92 "	Hard grade Basalt
92 "	96 "	Black Basalt
96 "	98 "	Black Basalt
98 "	101 "	Black Basalt with trace quartz
101 "	104 "	Black Basalt
104 "	117 "	Black Basalt with Quartz
117 "	128 "	Hard Grade Basalt
128 "	172 "	Hard & Soft Layers Black Basalt
172 "	176 "	Broken Black Basalt
176 "	180 "	Hard grade Basalt
180 "	182 "	Black Rock
182 "	202 "	Blue Clay
202 "	207 "	Rock
207 "	229 "	Black Basalt
229 "	277 "	Black Basalt with Hard & soft L
277 "	318 "	Porous Black rock water bearing
318 "	319 "	Hard Grey Rock
"	"	
"	"	
"	"	

Ground elevation at well site [illegible] feet above mean sea level.
Work started Aug. 1 1957 Completed Dec. 31 1957

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME A. M. Jannsen Drilling Company
(Person, firm, or corporation) (Typed or printed)
Address 21075 S. W. Tualatin Valley Highway
Aloha, Oregon
Driller's well number
[Signed] [signature] (Well Driller)
License No. 79 Dated January 3, 1958

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GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Harvey Aluminum #3A
LOCATION SW¼, SW¼, Sec. 28, T2N, R13E
ELEVATION 138.8
DATE INSTALLED 12/21/57

DEPTH	LITHOLOGY	CONSTRUCTION DETAILS
0 FT.	Rock fill	
	~~Fractured rock~~	
	~~broken rock~~	
	Basalt	
	Blue shale	
	Basalt clay layers	
50	Basalt hard	
	Basalt, hard blk	
100	~~BASALT blk~~	
	Basalt, blk	
	Basalt, hard	
	Basalt, hard soft layers	
150		
	~~Basalt, broken, black~~	
	~~Broken rock~~	
	Clay, blue	
200		
	~~Rock~~	
	Basalt, black	
	Basalt, black, hard & soft	
250		
	rocky, black, porous water bearing	
300		
	~~rocky, hard, grey~~	
	T.D. = 319'	
350		
400		

(73)

ORIGINAL
File Original, and Duplicate with the STATE ENGINEER, SALEM, OREGON

WATER WELL DRILLERS REPORT
STATE OF OREGON

Do Not Fill In — State Well No. 2N/13E-25 P(1)
State Permit No. G648

(1) OWNER:
STATE ENGINEER
Name Harvey Aluminum Company
Address 19200 Southwestern Avenue
Torrance, California

(2) LOCATION OF WELL:
County Wasco — Owner's number, if any— 41
R. F. D. or Street No.
Bearing and distance from section or subdivision corner
981' North and 1078' west from ¼ 23/33 Corner Section 28 TWP. 2N Range 13E
boring within the SE ¼, SW¼ of Section 28 TWP 2E Range 13E bearing N. 70°16' W. Dist. 1457'

(3) TYPE OF WORK (check):
New well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) EQUIPMENT:
Rotary ☐
Cable ☒
Dug Well ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☒

			Diam	Gage or Wall
FROM	0 ft.	to 223 ft.	10	stndrd
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"
"	"	"	"	"

Type and size of shoe or well ring
Describe joint

If gravel packed

Diameter of Bore	from ft	to ft
	"	"
	"	"
	"	"
	"	"
	"	"

Size of gravel:

(7) PERFORATIONS:
Type of perforator used

Size of perforations		in., length, by	in.
FROM	ft. to	ft. perf per foot	No. of rows
"	"	" " "	" " "
"	"	" " "	" " "
"	"	" " "	" " "
"	"	" " "	" " "

SCREENS:
Give Manufacturer's Name, Model No. and Size

(8) CONSTRUCTION:
Was a surface sanitary seal provided? ☐ Yes ☒ No To what depth ft.
Were any strata sealed against pollution? ☐ Yes ☐ No
If yes, note depth of strata surface to 227'

FROM	ft. to	ft.
"	"	"

METHOD OF SEALING grouting casing

(9) WATER LEVELS:
Depth at which water was first found 262 ft.
Standing level before perforating ft.
Standing level after perforating 74 ft.

Log Accepted by:
[Signed] Harvey Aluminum Inc. F-175
Date
by Orville C. Cook

(10) WELL TESTS:
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Driller
Yield: 1170 gal./min. with 3 ft. draw down after 8 hrs.
" " " "
" " " "
Artesian flow g.p.m.
Shut-in pressure lbs. per square inch.
Bailer test g.p.m. with ft. drawdown
Temperature of water Was a chemical analysis made? ☒ Yes ☐
Was electric log made of well? ☐ Yes ☒ No

(11) WELL LOG:
Diameter of well, 10 inches.
Total depth 303 ft. Depth of completed well 303

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation

ft. to	ft.	
0 "	10 "	fill
10"	28 "	broken basalt
28"	30 "	hard basalt
30"	41 "	soft rock & clay
41"	58 "	black basalt
58 "	89 "	hard rock basalt
89"	98 "	weathered basalt
98"	110 "	hard grey basalt
110"	115 "	grey basalt with clear quart
115"	132 "	hard grey basalt
132"	140 "	porous grey basalt
140"	143 "	hard grey basalt
143"	155 "	porous grey lava rock
155"	162 "	hard grey basalt
162"	190 "	coal or peat
190"	195 "	grey clay
195"	212 "	clay with small gravel
212"	217 "	brown clay and rock
217"	223 "	rock
223"	258 "	hard grey basalt
258"	262 "	hard grey basalt
262"	290 "	porous basalt with hard & s
"	"	l
290"	300 "	grey basalt slightly porous
300"	303 "	Rock firm but turning brown
"	"	with bits of clay
"	"	

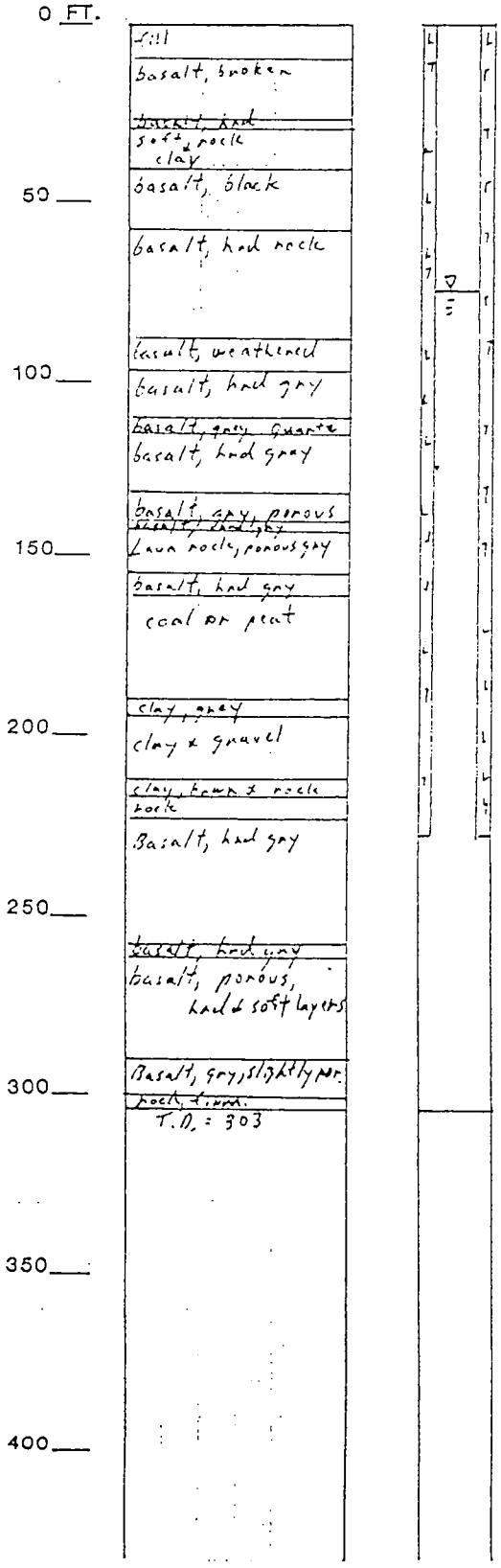
Ground elevation at well site 1231.32 feet above mean sea l
Work started 5-28-57 19 . Completed 7-27-57

Well Driller's Statement:
This well was drilled under my jurisdiction and this repo true to the best of my knowledge and belief.

NAME A. M. Jannsen Drilling Company
(Person, firm, or corporation) (Typed or printed)
Address 20175 S. W. Tualatin Valley Highway
Aloha, Oregon
Driller's well number
[Signed] Edward M. Jannsen
(Well Driller)
License No. 79 Dated 8-23-57 19

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Harvey Machine #4A
LOCATION SE¼, SW¼, Sec. 28, 2N 13E
ELEVATION
DATE INSTALLED 7/27/57



well abandoned 3/19/85
cyanide in water.

water level at 74' at 7/57

10" standard casing set to 227'
grout.

yield 1170 gpm 3 ft 8 hrs.

~~OBSERVATION WELL~~

STATE ENGINEER
Salem, Oregon

Well Record

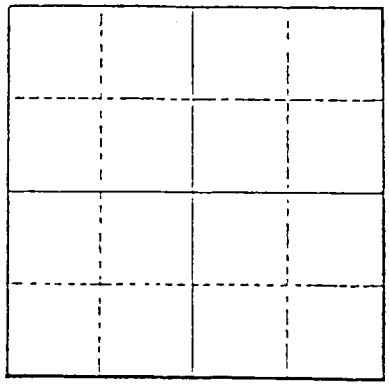
STATE WELL NO. 2N/13-28P(1)
COUNTY Wasco
APPLICATION NO. G-737
Permit G-647

OWNER: Earvey Machine Co.
MAILING ADDRESS: P. O. Box 711
CITY AND STATE: The Dalles, Oregon

LOCATION OF WELL: Owner's No. (4A)

S½ ¼ SW ¼ Sec. 28 T. 2 ~~S~~ N. R. 13 ~~W~~ E., W.M.

Bearing and distance from section or subdivision corner ~~8815~~ 981' N. & 1,078' W from S¼ corner Section 28



Altitude at well

TYPE OF WELL: drilled Date Constructed June-July 1957

Depth drilled 303 Depth cased 273

Section 28

CASING RECORD:
14" set to 15 feet
223 feet of 10-inch, grouted with 380 sacks of cement.

FINISH:

AQUIFERS:
Basalt

WATER LEVEL:
74' below land surface, July 1957

PUMPING EQUIPMENT: Type H.P.
Capacity G.P.M.

WELL TESTS:
Drawdown 3 ft. after hours Pumping 1170 G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Industrial Temp. °F., 19
SOURCE OF INFORMATION well report
DRILLER or DIGGER A.M. Jannsen
ADDITIONAL DATA:
Log x Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

of this report are to be filed with the STATE ENGINEER, SALEM, OREGON within 30 days from the date of well completion.

NOV - 6 1970
STATE ENGINEER
SALEM, OREGON

WELL REPORT
STATE OF OREGON
(Please type or print)
(Do not write above this line)

State Well No. 2N/13-19dc

State Permit No.

(1) OWNER:
Name Mr. & Mrs. Jack Huffman
Address Route 4, The Dalles, Oregon 97058

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:
Threaded ☐ Welded ☒
6" Diam. from 0 ft. to 34 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Slot size Set from ft. to ft.
Slot size Set from ft. to ft.

(8) WATER LEVEL: Completed well.
Static level 25 ft. below land surface Date 10-6-70
Artesian pressure lbs. per square inch Date

(9) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Driller
Yield: 10 gal./min. with 34 ft. drawdown after 1 hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m. Date
Temperature of water 54° Was a chemical analysis made? ☐ Yes ☒ No

(10) CONSTRUCTION:
Well seal—Material used Bentonite
Depth of seal 22 ft.
Diameter of well bore to bottom of seal 10 in.
Were any loose strata cemented off? ☐ Yes ☒ No Depth
Was a drive shoe used? ☒ Yes ☐ No
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(11) LOCATION OF WELL:
County Wasco Driller's well number
SW¼ SE¼ Section 19 T. 2N R. 13E W.M.
Bearing and distance from section or subdivision corner

(12) WELL LOG:
Diameter of well below casing 6"
Depth drilled 152 ft. Depth of completed well 152 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level as drilling proceeds. Note drilling rates.

MATERIAL	From	To	SWL
Rock, broken	0	12	
Clay, brown sandy	12	24	
Rock, gray broken	24	29	
Rock, gray/seams	29	36	
Rock, black	36	79	25
Crevise	79	89	25
Rock, gray/green seams	89	110	25
Rock, gray/lignite seam	110	115	25
Rock, gray/green seams	115	152	25

Work started Aug. 22, 1970 Completed Oct. 7, 1970
Date well drilling machine moved off of well October 7, 1970

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] (Drilling Machine Operator) Date Nov. 3, 1970
Drilling Machine Operator's License No. 129

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
NAME Bert Clayton & Son (Person, firm or corporation) (Type or print)
Address 2313 E. 10th St., The Dalles, Ore.
[Signed] Bert Clayton (Water Well Contractor)
Contractor's License No. 54 Date Nov. 3, 1970

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(USE ADDITIONAL SHEETS IF NECESSARY)

(74)

filed with the JAN 30 1972 STATE OF OREGON

STATE ENGINEER, SALEM, OREGON (Please type or print)

within 30 days from the date of well completion. SALEM, OREGON (Do not write above this line)

State Well No. 2N/13-19CC

State Permit No.

) OWNER:

me Mr. & Mrs. Jack G. Huffman

Address Rt 4, Box 215-A, The Dalles, Ore.

(2) TYPE OF WORK (check):

New Well ☐ Deepening ☒ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

CASING INSTALLED: None Threaded ☐ Welded ☐

_____" Diam. from _____ ft. to _____ ft. Gage _____

_____" Diam. from _____ ft. to _____ ft. Gage _____

_____" Diam. from _____ ft. to _____ ft. Gage _____

PERFORATIONS: Perforated? ☐ Yes ☒ No.

Type of perforator used

Size of perforations _____ in. by _____ in.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

_____ perforations from _____ ft. to _____ ft.

(7) SCREENS: Well screen installed? ☐ Yes ☒ No

Manufacturer's Name

Type _____ Model No.

Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.

Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom? driller

Yield: 20 gal./min. with 10 ft. drawdown after 2 hrs.

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.

Artesian flow _____ g.p.m.

Temperature of water 54° Depth artesian flow encountered _____ ft.

(9) CONSTRUCTION:

Well seal—Material used same seal - Bentonite

Well sealed from land surface to _____ ft.

Diameter of well bore to bottom of seal _____ in.

Diameter of well bore below seal _____ in.

Number of sacks of cement used in well seal _____ sacks

Number of sacks of bentonite used in well seal _____ sacks

Brand name of bentonite

Number of pounds of bentonite per 100 gallons of water _____ lbs./100 gals.

Was a drive shoe used? ☐ Yes ☐ No Plugs _____ Size: location _____ ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? _____ depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☒ No Size of gravel: F-179

Gravel placed from _____ ft. to _____ ft.

(10) LOCATION OF WELL:

County Wasco Driller's well number

SW ¼ SE ¼ Section 19 T. 2N R. 13 E W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found originally 79 ft.

Static level 25 ft. below land surface. Date 12/16/7

Artesian pressure _____ lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 6"

Depth drilled 83 ft. Depth of completed well 235 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Rock, greenish-gray	152	188	36'
Rock, greenish w/pyrites	188	195	36'
Rock, greenish-gray	195	203	32'
Rock, greenish-gray	203	235	26'
Water bearing from 190'			

Work started Nov. 20, 1971 Completed Dec. 16, 19 7

Date well drilling machine moved off of well Dec. 16, 19 7

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] _____ (Drilling Machine Operator) Date 1-15, 1972

Drilling Machine Operator's License No. 129

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name Bert Clayton & Son (Person, firm or corporation) (Type or print)

Address 2313 E. 10th Street, The Dalles,

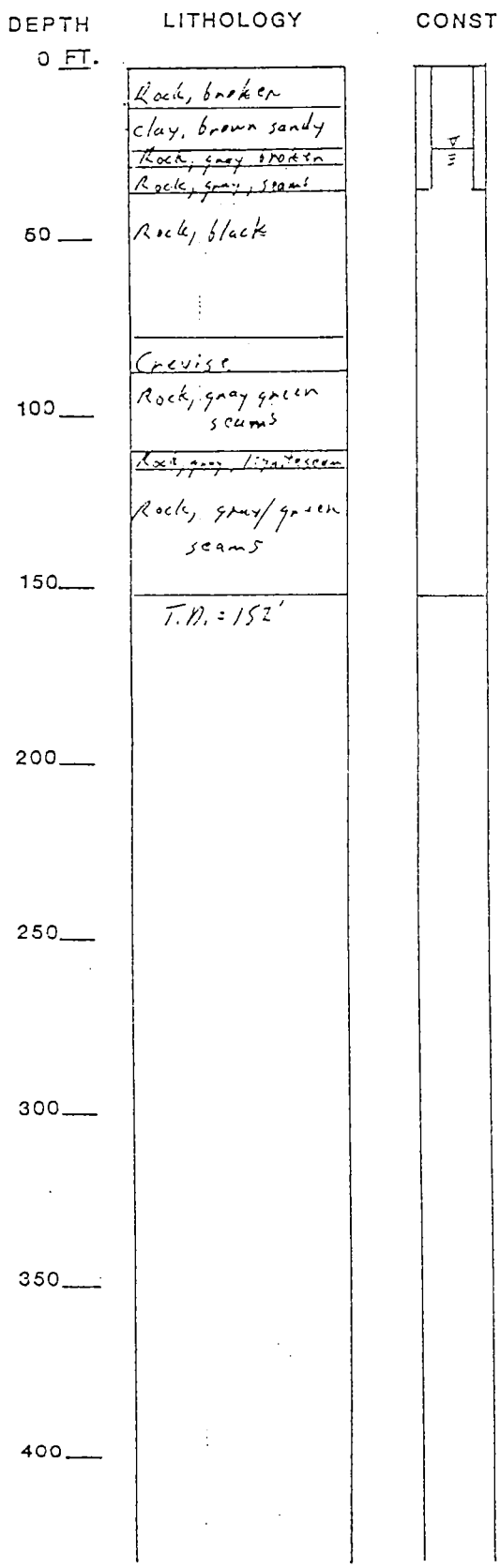
[Signed] _____ (Water Well Contractor)

Contractor's License No. 54 Date Jan. 15, 19 7

(USE ADDITIONAL SHEETS IF NECESSARY)

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Jack Huffman
LOCATION SW¼ SE¼, sec. 19, T 2N, R 13E
ELEVATION
DATE INSTALLED 10/7/70



6" casing to 34'

water level 26' at 10/6/70

yield, 19 gpm, 34' drawdown, 1hr.

STATE OF OREGON
OREGON STATE HEALTH DIVISION
Department of Human Resources

SMALL PUBLIC WATER SUPPLY
SANITARY SURVEY REPORT

(75)

☒ Community ☐ Non-Community

I. **Basic Information**
Supply Name _____ Phone _____
Address _____ City _____ Zip _____
County _____ Township _____ N/S Range _____ E/W Section No. _____ Tax Lot No. _____
Establishment _____ Pop. Served _____ No. of Service Connections _____
Contact Person _____ Title _____ Phone _____ Certification _____
Owner _____ Phone _____ Type Ownership: ☒ Public ☐ Private
Period of Operation: ☐ 12 Month ☒ Seasonal If Seasonal: From ____ to ____ Annual Disinfection ☐ Yes ☐ No

II. **Wells** (Source of Information: ☐ Owner ☐ Measured ☒ Well log (attached))
~~Total No.~~ Wells _____ Drilling Method _____ Depth _____ ft. Casing Depth _____ ft.
Casing Diameter _____ in. Year Installed _____ Approval Date _____ ☐ OSHD ☐ County
Well Driller _____ Pump Installer _____
Well House: ☒ Yes ☐ No Slab: ☒ Yes ☐ No Other Enclosure: _____ ☒ Heated, Lighted, Insulated
100 ft. Isolation Area: ☐ Owned ☐ Easement ☒ Other _____
Casing Termination: ☐ Pitless Adaptor ☒ Well House ☐ Basement Offset ☐ Pit (Drained: ☐ Yes ☐ No)
12 in. Above Grade or Floor: ☐ Yes ☐ No Approved Well Seal: ☐ Yes ☐ No Water Level Device _____
Approved Casing Material: ☐ Yes ☐ No Well or Well Site Subject to Flooding: ☐ Yes ☒ No
Casing Vent Provided: ☐ Yes ☐ No Grouting Material _____
Distance to Potential Contamination _____ ft. Source _____
(tile field, sewer, surface water)
Distance to Potential Contamination _____ ft. Source _____
(tile field, sewer, surface water)
If Sewer is within 100 Feet, is Material and Installation Approved: ☐ Yes ☐ No
Distance to Major Source of Contamination _____ ft. Source _____
(landfill, chemical waste, sewage lagoon)

III. **Other Source** ☐ Infiltration Gallery ☐ Spring ☐ Surface Source
Security (Signs, Fences, Etc.) _____
Minimum Available Flow _____ gpm ☐ Measured ☐ Estimate Approval Date _____ ☐ OSHD ☐ County
Distance to Potential Contamination _____ ft. Source _____
Source Area Ownership _____
Springs: ☐ Surface Runoff Ditch ☐ Fencing ☐ Proper Springbox Construction ☐ Screened Overflow
☐ Bottom Drain ☐ Hatch and Curbing Comments _____
Surface Source: Source Name _____ Intake Location _____
☐ Impounding Reservoir ☐ Diversion Dam ☐ Multiple Intake ☐ Screens ☐ Spillway ☐ Provision for
Draining Impoundment _____ Comments _____
Infiltration Gallery: Depth of Piping _____ ft. Installed in ☐ Riverbank ☐ Under Riverbed
Sanitary Hazard Upstream from intake ☐ Yes ☐ No Describe _____
Wet Well: Diameter ___ in. Depth ___ ft. Lateral: Diam. ___ in. Length ___ ft.
Openings: ☐ Slots ☐ Well Screen Distance to Surface Water _____

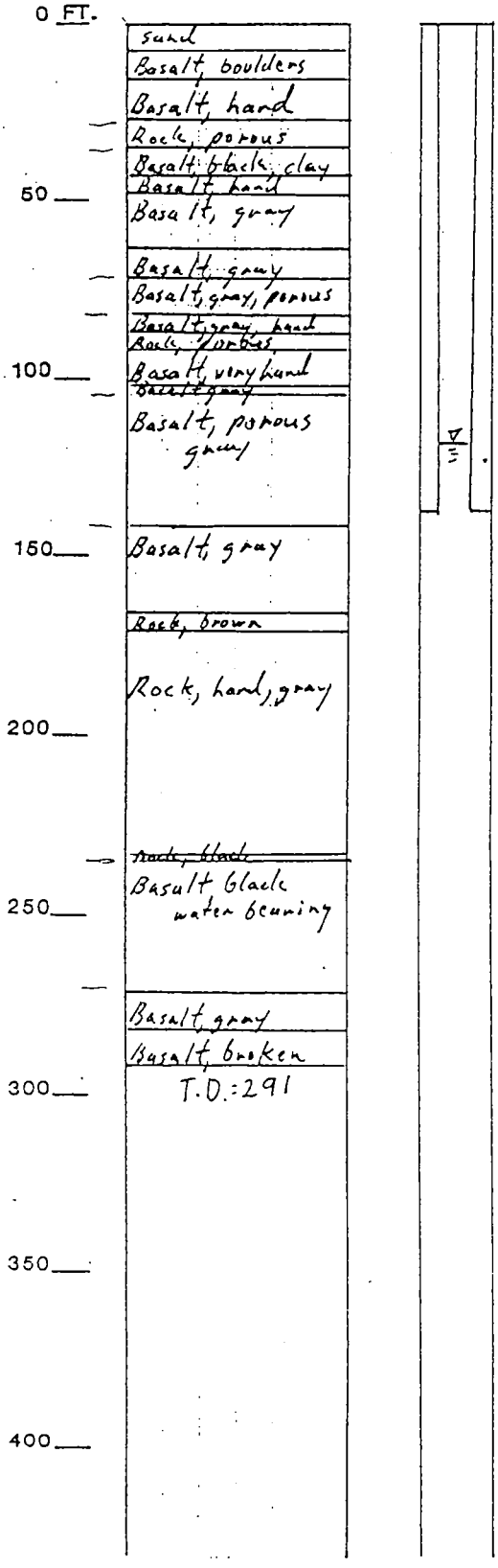
IV. **Pump**
Type: ☐ Shallow Well Jet ☐ Deep Well Jet ☐ Submersible ☒ Vertical Turbine ☐ Other _____
Location: ☒ Well ☒ Well House ☐ Basement ☐ Pit (Properly Drained: ☐ Yes ☐ No)
☐ Other _____
Installation Approved: ☐ Yes ☐ No Pump Capacity 2000 gpm Pump Capacity Adequate: ☒ Yes ☐ No
☐ Water Lube ☒ Oil Lube Hp 900 Type and Model _____
Pump Setting/Drop Pipe Length 250 ft. Protected Suction Line: ☐ Yes ☐ No ☐ Not Applicable
Sample Tap: ☒ Raw ☒ Treated
☒ Pump to Waste Piping Pump Removal Provision: ☒ Yes ☐ No Subject to Flooding: ☐ Yes ☒ No

33-5 (1/83)

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Jordan St. Well
LOCATION SE¼, NW¼, Sec. 4, T1N, R13E
ELEVATION 189.6 Ft. m.s.l.
DATE INSTALLED 1954

15



Jordan ST Well

STATE ENGINEER
Salem, Oregon

OBSERVATION WELL
Well Record

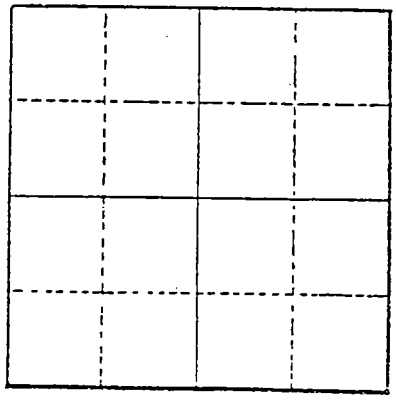
STATE WELL NO. 1N/13-4F(
COUNTY Wasco
APPLICATION NO. .....

OWNER: The Dalles
MAILING ADDRESS: .....

LOCATION OF WELL: Owner's No. .....
CITY AND STATE: .....

SE ¼ NW ¼ Sec. 4 T. 1 N. R. 13 E. W.M.

Bearing and distance from section or subdivision corner .....



Altitude at well 189.6

TYPE OF WELL: Drilled. Date Constructed 1954

Depth drilled 291 Depth cased 137

Section 4

CASING RECORD:

18-inch from 0 to 137 feet, cemented at bottom.
(Fill placed around well and unknown length of casing added to top.
Original land surface approximately 8' below street level.)

FINISH:

Open well below casing

AQUIFERS:

Basalt from 234 to 272 feet

WATER LEVEL:

118' below top of casing

PUMPING EQUIPMENT: Type Turbine H.P. .....
Capacity ..... G.P.M.

WELL TESTS:
* Drawdown 7 ft. after ..... hours pumping 1,000 G.P.M.
Drawdown 12½ ft. after ..... hours pumping 1,400 G.P.M.

USE OF WATER Public supply Temp. ..... °F. ....., 19....
SOURCE OF INFORMATION .....
DRILLER or DIGGER R. J. Strasser Drilling Co.
ADDITIONAL DATA:
Log x Water Level Measurements x Chemical Analysis x Aquifer Test .....

REMARKS:

* Drawdown 16 feet pumping 1,600 gpm
Drawdown 18.5 feet pumping 1,800 gpm
Drawdown 23 feet pumping 2,000 gpm
Drawdown 25.5 feet pumping 2,200 gpm
Drawdown 30 feet pumping 2,500 gpm

STATE ENGINEER
Salem, Oregon

(15)
State Well No. 1N/13-4F(1)
County Wasco
Application No. G-23

Well Log

Owner: The Dalles Owner's No. Jordan St.

Driller: R. J. Strasser Drilling Co. Date Drilled 1954

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Soil and sand	0	8	8
Gray basalt boulders and sand	8	16	8
Basalt, hard, broken gray	16	27	11
Rock, porous black, brown clay in seams	27	36	9
Basalt, black, blue clay in seams	36	43	7
Basalt, hard gray	43	48	5
Basalt, medium hard gray	48	64	16
Basalt, hard, gray	64	73	9
Basalt, medium hard gray, water at 78' porous	73	83	10
Basalt, hard, gray	83	87	4
Rock, porous, gray, more water	87	93	6
Basalt, very hard, gray	93	102	9
Basalt, medium, gray	102	104	2
Basalt, porous, gray, some blue clay in seams and hard streaks varying from 4" to 6" thick in lenses 2' to 4' apart	104	141	37
Basalt, gray	141	166	25
Rock, brown	166	171	5
Rock, hard gray	171	234	63
Rock, black, porous, with some water	234	236	2
Basalt, black, water bearing	236	272	36
Basalt, medium hard, gray	272	283	11
Basalt, broken, gray, caving	283	291	8

(76)

STATE ENGINEER
Salem, Oregon

Well Record

STATE WELL NO. 2N/13-21
COUNTY Wasco
APPLICATION NO. _____

OWNER: Walter Klindt

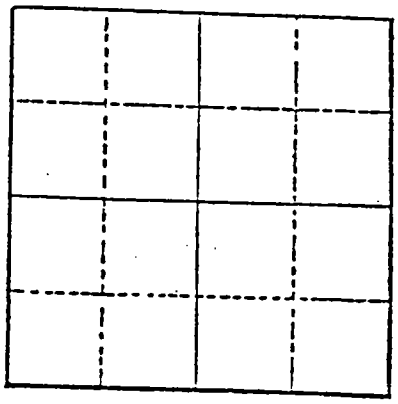
MAILING ADDRESS: _____

LOCATION OF WELL: Owner's No. _____

CITY AND STATE: _____

____¼ ____¼ Sec. 21 T. 2 ~~S.~~ N. R. 13 ~~W.~~ E., W.M.

Bearing and distance from section or subdivision corner _____



Altitude at well 90 ft.

TYPE OF WELL: drilled Date Constructed _____

Depth drilled 100 ft. Depth cased _____

Section _____

CASING RECORD:

4-inch dia.

FINISH:

AQUIFERS:

porous basalt

WATER LEVEL:

-24.5 ft.

PUMPING EQUIPMENT: Type deep well H.P. _____

Capacity 5 G.P.M.

WELL TESTS:

Drawdown _____ ft. after _____ hours _____ G.P.

Drawdown _____ ft. after _____ hours _____ G.P.

USE OF WATER domestic Temp. _____ °F.

SOURCE OF INFORMATION U.S.G.S. 659 B ~~Well 22~~ Well #12, 19__

DRILLER or DIGGER _____

ADDITIONAL DATA:

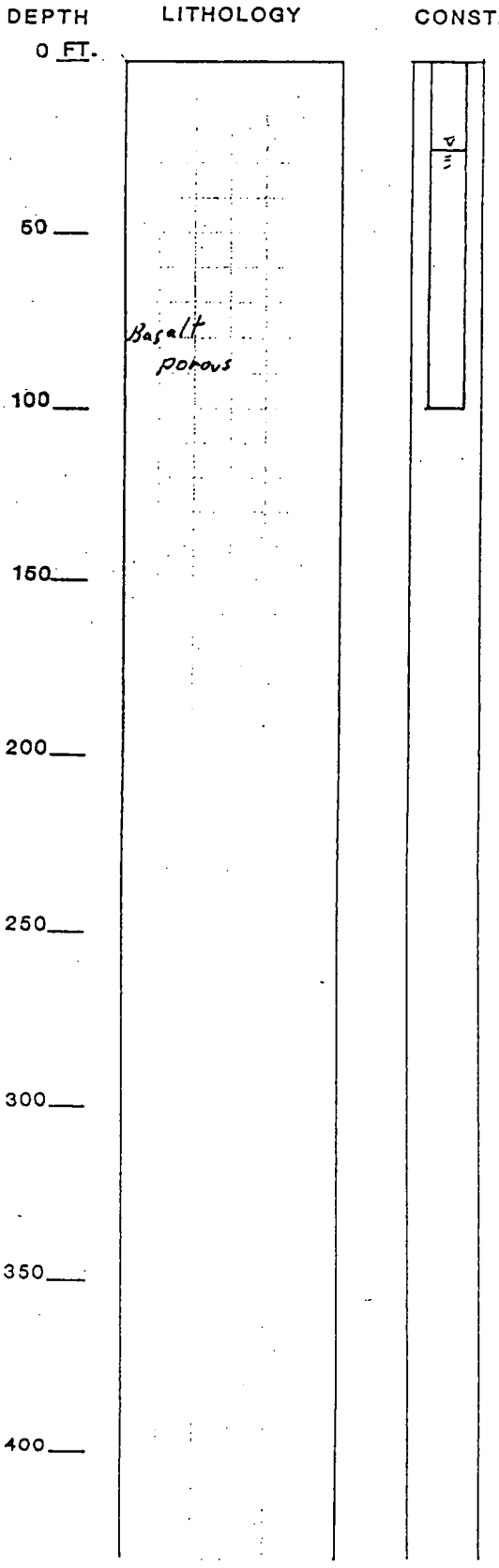
Log _____ Water Level Measurements _____ Chemical Analysis _____ Aquifer Test _____

REMARKS:

Measuring point is top of casing.

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Klindt
LOCATION sec. 21, R2N, T13E
ELEVATION
DATE INSTALLED



Water level 24½' no date

5 gpm pump.

STATE ENGINEER
Salem, Oregon

Well Record

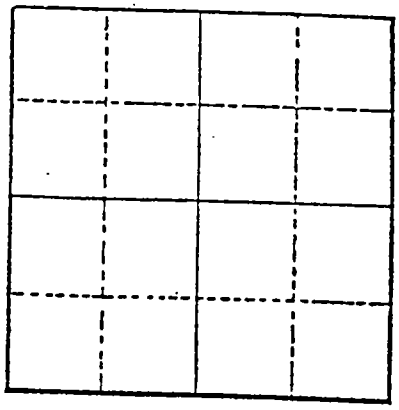
STATE WELL NO. 2N/13-21
COUNTY Wasco
APPLICATION NO. .....

OWNER: Walter Klindt
MAILING ADDRESS: .....

LOCATION OF WELL: Owner's No. .....
CITY AND STATE: .....

.....¼ .....¼ Sec. 21 T. 2 ~~S.~~ N., R. 13 ~~W.~~ E., W.M.

Bearing and distance from section or subdivision corner .....



Section .....

Altitude at well 690 ft.

TYPE OF WELL: drilled Date Constructed .....

Depth drilled 100 ft. Depth cased .....

CASING RECORD:

4-inch dia.

FINISH:

AQUIFERS:

porous basalt

WATER LEVEL:

-24.5 ft.

PUMPING EQUIPMENT: Type deep well H.P. .....
Capacity 5 G.P.M.

WELL TESTS:
Drawdown ..... ft. after ..... hours ..... G.P.
Drawdown ..... ft. after ..... hours ..... G.P.

USE OF WATER domestic Temp. ..... °F. ....., 19...
SOURCE OF INFORMATION U.S.G.S. 659 B ~~April 22~~ Well #12
DRILLER or DIGGER .....
ADDITIONAL DATA:
Log ..... Water Level Measurements ..... Chemical Analysis ..... Aquifer Test .....

REMARKS:
Measuring point is top of casing.

WATER WELL REPORT
STATE OF OREGON

#R - date should be Feb. 2, 1983 cow 2/25/83

RECEIVED
FEB 18 1983
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 2N/13E-28

State Permit No. (77)

(1) OWNER:
Name Carl Linebarger
Address River Road
City The Dalles, Oregon State 87058

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED: Steel ☒ Plastic ☐ Threaded ☐ Welded ☒
8 " Diam. from 0 ft. to 38 ft. Gauge .250
" Diam. from ft. to ft. Gauge

LINER INSTALLED:
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS: Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
gal./min. with ft. drawdown after hrs.
Air test 100 gal./min. with drill stem at 90 ft. 1 hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION: Special standards: Yes ☒ No ☐
Well seal—Material used Cement
Well sealed from land surface to 18 ft.
Diameter of well bore to bottom of seal 12 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal 15 sacks
How was cement grout placed? Pumped
Was pump installed? No Type HP Depth ft.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Wasco Driller's well number
NW ¼ NE ¼ Section 28 T. 2N R 13E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: River Road

(11) WATER LEVEL: Completed well.
Depth at which water was first found 45 ft.
Static level 43 ft. below land surface. Date 2 Ja
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 8
Depth drilled 98 ft. Depth of completed well 98 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Sand & broken basalt	0	12	
Claystone gray	12	37	
Lignight WB	37	45	
Basalt gray visic.	45	58	
Basalt gray WB	58	98	43

Work started 21 Jan 1983 Completed 2 Feb 1983
Date well drilling machine moved off of well 3 Feb 1983

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
(Signed) Richard J. Murray (Drilling Machine Operator) Date 17 Feb 1983
Drilling Machine Operator's License No.

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Murray Well Drilling Inc. (Person, firm or corporation) (Type or print)
Address Rt. 4 Box 3470 The Dalles, Oregon
(Signed) Richard J. Murray (Water Well Contractor)
Contractor's License No. Date 17 Feb 1983

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

F-188

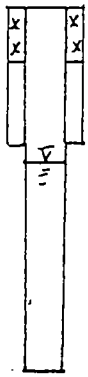
SP-12658-690

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Linebarger
LOCATION NW¼, NE¼, sec. 28, T2N, R13E
ELEVATION
DATE INSTALLED 2/3/83

DEPTH | LITHOLOGY | CONSTRUCTION DETAILS

0 FT.
Sand & broken basalt
clay stone (gray)
Lignite
50 — Basalt, gray visc
Basalt, gray
100 — T.D.: 98
150
200
250
300
350
400



12" hole to 38'
8" casing to 38'
cement grout to 18'
8" hole to 98'
water level at 43'

WATER RESOURCES DEPT.
SALEM, OREGON

State Permit No. .....

(1) OWNER: (Rocklin Road)

Name Carl Linebarger

Address River Road

City The Dalles, Oregon State 87058

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED: Steel ☒ Threaded ☐ Plastic ☐ Welded ☒

8 " Diam. from 0 ft. to 38 ft. Gauge .250

" Diam. from ft. to ft. Gauge

(6) LINER INSTALLED:

" Diam. from ft. to ft. Gauge

(7) PERFORATIONS: Perforated? ☐ Yes ☒ No

Type of perforator used

Size of perforations in. by in

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(8) SCREENS: Well screen installed? ☐ Yes ☒ No

Manufacturer's Name

Type Model No.

Diam. Slot Size Set from ft. to ft.

Diam. Slot Size Set from ft. to ft.

(9) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?

gal./min. with ft. drawdown after hrs.

First 100 gal./min. with drill stem at 90 ft. 1 hrs.

Last test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ft.

(10) CONSTRUCTION: Special standards: Yes ☐ No ☐

Well seal—Material used Cement

Well sealed from land surface to 18 ft.

Diameter of well bore to bottom of seal 12 in.

Diameter of well bore below seal 8 in.

Number of sacks of cement used in well seal 15 sacks

How was cement grout placed? Pumped

Was pump installed? No Type HP Depth ft.

Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of Water? depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☒ No Size of gravel:

Gravel placed from ft. to ft.

(10) LOCATION OF WELL:

County Wasco Driller's well number

NW ¼ NE ¼ Section 28 T. 2N R. 13E

Tax Lot # Lot Blk Subdivision

Address of well location: River Road

(11) WATER LEVEL: Completed well.

Depth at which water was first found 45

Static level 43 ft. below land surface. Date 2

Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 8

Depth drilled 98 ft. Depth of completed well 98

Formation: Describe color, texture, grain size and structure of materials; and thickness and nature of each stratum and aquifer penetrated, with at least one for each change of formation. Report each change in position of Static Water and indicate principal water-bearing strata.

MATERIAL	From	To	S
Sand & broken basalt	0	12	
Claystone gray	12	37	
Lignight WB	37	45	
Basalt gray visic.	45	58	
Basalt gray WB	58	98	4

Work started 21 Jan 19 83 Completed 2 Feb

Date well drilling machine moved off of well 3 Feb

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials and information reported above are true to my best knowledge and be

[Signed] Richard J. Murray (Drilling Machine Operator) Date 17 Feb

Drilling Machine Operator's License No.

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is tr the best of my knowledge and belief.

Name Murray Well Drilling Inc. (Person, firm or corporation) (Type or print)

Address R.t. 4 Box 3470 The Dalles, Orego

[Signed] Richard J. Murray (Water Well Contractor)

Contractor's License No. Date 17 Feb, 19

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

F-190

SP-1285

STATE OF OREGON

should be Feb. 2, 198 cow 2/25/83

FEB 18 1983
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. .....

State Permit No. .....

Rock Crusher

(1) OWNER:

Name Carl Linebarger
Address River Road
City The Dalles, Oregon State 87058

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:

Steel ☒ Plastic ☐
Threaded ☐ Welded ☒

8 " Diam. from 0 ft. to 38 ft. Gauge .250
..... " Diam. from ..... ft. to ..... ft. Gauge .....

(6) LINER INSTALLED:

..... " Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No

Type of perforator used
Size of perforations in. by in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No

Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?
..... gal./min. with ..... ft. drawdown after ..... hrs.
Test 100 gal./min. with drill stem at 90 ft. 1 hrs.
Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.
Artesian flow ..... g.p.m.
Temperature of water ..... Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:

Special standards: Yes ☒ No ☐

Well seal—Material used Cement
Well sealed from land surface to 18 ft.
Diameter of well bore to bottom of seal 12 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal 15 sacks
How was cement grout placed? Pumped

Was pump installed? No Type ..... HP ..... Depth ..... ft.
Was a drive shoe used? ☒ Yes ☐ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of Water? ..... depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

(10) LOCATION OF WELL:

County Wasco Driller's well number
NW ¼ NE ¼ Section 28 T. 2N R. 13E W.
Tax Lot # Lot Blk Subdivision
Address at well location: River Road

(11) WATER LEVEL: Completed well.

Depth at which water was first found 45 ft.
Static level 43 ft. below land surface. Date 2 Ja
Artesian pressure ..... lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 8
Depth drilled 98 ft. Depth of completed well 98 ft.

Formation: Describe color, texture, grain size and structure of materials; and sho thickness and nature of each stratum and aquifer penetrated, with at least one entr for each change of formation. Report each change in position of Static Water Leve and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Sand & broken basalt	0	12	
Claystone gray	12	37	
Lignight WB	37	45	
Basalt gray visic.	45	58	
Basalt gray WB	58	98	43

Work started 21 Jan 1983 Completed 2 Feb 198
Date well drilling machine moved off of well 3 Feb 198

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials use and information reported above are true to my best knowledge and belief.

[Signed] Richard J. Murray (Drilling Machine Operator) Date 17 Feb 98

Drilling Machine Operator's License No. .....

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true t the best of my knowledge and belief.

Name Murray Well Drilling Inc. (Person, firm or corporation) (Type or print)
Address Rt. 4 Box 3470 The Dalles, Oregon
[Signed] Richard J. Murray (Water Well Contractor)
Contractor's License No. ..... Date 17 Feb ..... 19..

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

SP-12658-69

F-191

The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

(Do not write above this line)

State Well No. 1N/13E-1 bc (18)

State Permit No.

OWNER:
Name City of The Dalles
Address City Hall- 313 Court Street
The Dalles, Oregon 97058

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☒
Irrigation ☐ Test Well ☐ Other ☐

( )CASING INSTALLED:
Threaded ☐ Welded ☒
20" Diam. from 0 ft. to 24 ft. Gage .250
16" Diam. from +18" ft. to 385 ft. Gage .375
" Diam. from ft. to ft. Gage

PERFORATIONS:
Perforated? ☒ Yes ☐ No.
Type of perforator used Factory Perforated
Size of perforations ½" in. by 2½" in.
2432 perforations from 309 ft. to 385 ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☒ Yes ☐ No If yes, by whom? Schneider Equipment Inc.
Yield: gal./min. with ft. drawdown after hrs.
See attached Test Data
" " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Cement Grout
Well sealed from land surface to 24 ft.
Diameter of well bore to bottom of seal 24" in.
Diameter of well bore below seal 18" in.
Number of sacks of cement used in well seal 38 sacks
How was cement grout placed? Pressure Grouted.
1 sack of National Brand bentonite mixed with cement grout.
Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Wasco Driller's well number
NE ¼ NW ¼ Section 1 T. 1N R. 13E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 59 ft.
Static level 71 ft. below land surface. Date 7/11/7
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 0
Depth drilled 385 ft. Depth of completed well 385 ft.

Formation: Describe color, texture, grain size and structure of materials, and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Fill Material Rock & Dirt	0	8	
Basalt Grey & Brown Fractured	8	12	
Basalt Grey Hard	12	59	
Basalt Brown & Grey Porous	59	77	W.B.
Basalt Grey Hard	77	139	
Basalt Grey Porous with Green Streaks	139	145	W.B.
Basalt Grey Hard	145	198	
Basalt Grey & Green Porous	198	204	W.B.
Basalt Grey Hard	204	289	
Basalt Grey Porous	289	295	W.B.
Basalt Grey Hard	295	311	
Basalt Grey & Green Very Porous	311	337	W.B.
Basalt Grey Fractured	337	342	W.B.

Work started June 11 19 79 Completed July 11 19 79
Date well drilling machine moved off of well July 11 19 79

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Steven M. Stadelman (Drilling Machine Operator) Date July 25 19 79
Drilling Machine Operator's License No. 860

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name WEST COAST DRILLING CO. INC. (Person, firm or corporation) (Type or print)
Address 220 Academy St. Mt. Angel, OR 9736
[Signed] Charles E. Stadelman (Water Well Contractor)
Contractor's License No. 519 Date July 25 19 79

F-192

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-119

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310
within 30 days from the date of well completion.

WATER WELL REPORT

STATE OF OREGON
(Please type or print)
(Do not write above this line)

(78)

State Well No. 1N/13E-11K

State Permit No. .....

OWNER:

Name City of The Dalles Log (cont'd)

Address

(2) TYPE OF WORK (check):

New Well ☐ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☐ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:

Threaded ☐ Welded ☐

....." Diam. from ..... ft. to ..... ft. Gage .....
....." Diam. from ..... ft. to ..... ft. Gage .....
....." Diam. from ..... ft. to ..... ft. Gage .....

(6) PERFORATIONS:

Perforated? ☐ Yes ☐ No.

Type of perforator used

Size of perforations ..... in. by ..... in.

..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

SCREENS:

Well screen installed? ☐ Yes ☐ No

Manufacturer's Name .....

Type ..... Model No. .....

Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom?

Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.
" " "
" " "

Water test ..... gal./min. with ..... ft. drawdown after ..... hrs.

Artesian flow ..... g.p.m.

Temperature of water ..... Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:

Well seal—Material used .....

Well sealed from land surface to ..... ft.

Diameter of well bore to bottom of seal ..... in.

Diameter of well bore below seal ..... in.

Number of sacks of cement used in well seal ..... sacks

How was cement grout placed? .....

Was drive shoe used? ☐ Yes ☐ No Plugs ..... Size: location ..... ft.

Did any strata contain unusable water? ☐ Yes ☐ No

Type of water? ..... depth of strata

Method of sealing strata off

Was well gravel packed? ☐ Yes ☐ No Size of gravel: .....

Gravel placed from ..... ft. to ..... ft.

(10) LOCATION OF WELL:

County ..... Driller's well number .....

¼ ¼ Section T. R. W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found ..... ft.

Static level ..... ft. below land surface. Date .....

Artesian pressure ..... lbs. per square inch. Date .....

(12) WELL LOG:

Diameter of well below casing .....

Depth drilled ..... ft. Depth of completed well ..... ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Basalt Grey Hard	342	363	
Basalt Grey Broken	363	374	
Basalt Grey Hard	374	377	
Basalt Grey Broken	377	383	W.B.
Basalt Grey Very Hard	383	385	

[illegible]
[illegible]
JUL [illegible]
WATER RESOURCES DEPT
SALEM, OREGON

Work started ..... 19 Completed 19

Date well drilling machine moved off of well 19

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used, and information reported above are true to my best knowledge and belief.

[Signed] Steven M. Stedele Date 7-25, 1979
(Drilling Machine Operator)

Drilling Machine Operator's License No. 860

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name WEST COAST DRILLING CO., INC.
(Person, firm or corporation) (Type or print)

Address 220 Academy St., Mt. Angel, OR 973[illegible]

[Signed] Charles E. Stedele
(Water Well Contractor)

Contractor's License No. 519 Date July 25, 1979

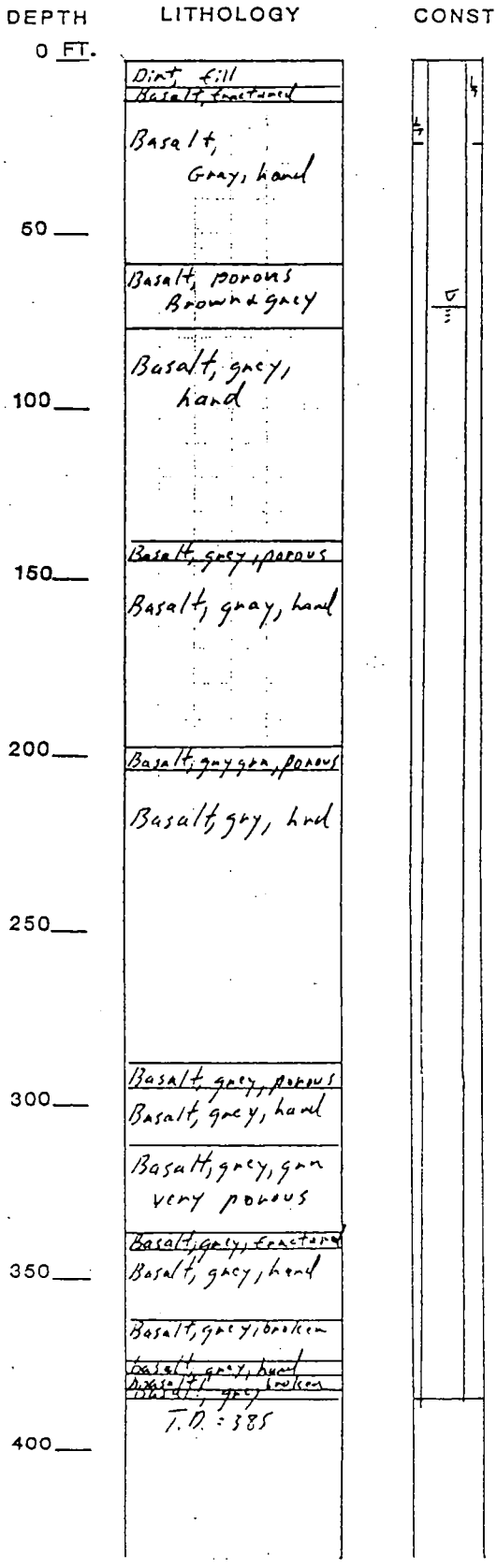
F-193

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*45656-110

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Lone Pine Well
LOCATION NE¼, NW¼ Sec 1, T1N, R3E
ELEVATION
DATE INSTALLED 1979



20" casing to 24'
grout from 24' to surface

16" casing to 385'

water level 71', 7/11/79

perforations 309' to 385'

STATE OF OREGON
OREGON STATE HEALTH DIVISION
Department of Human Resources

SMALL PUBLIC WATER SUPPLY
SANITARY SURVEY REPORT

☒ Community ☐ Non-Community

I. **Basic Information**
Supply Name [illegible] Phone [illegible]
Address _____ City _____ Zip _____
County [illegible] Township _____ N/S Range _____ E/W Section No. 1 Tax Lot No. _____
Establishment _____ Pop. Served _____ No. of Service Connections _____
Contact Person _____ Title _____ Phone _____ Certification _____
Owner [illegible] Phone _____ Type Ownership: ☒ Public ☐ Private
Period of Operation: ☐ 12 Month ☒ Seasonal If Seasonal: From ____ to ____ Annual Disinfection ☐ Yes ☐ No

II. **Wells** (Source of Information: ☐ Owner ☐ Measured ☐ Well log (attached))
Total ~~No~~. Wells [illegible] Drilling Method [illegible] Depth 385 ft. Casing Depth 385 ft.
Casing Diameter [illegible] in. Year Installed [illegible] Approval Date [illegible] ☒ OSHD ☐ County
Well Driller [illegible] Pump Installer _____
Well House: ☒ Yes ☐ No Slab: ☒ Yes ☐ No Other Enclosure: _____ ☒ Heated, Lighted, Insulated
100 ft. Isolation Area: ☒ Owned ☐ Easement ☒ Other [illegible]
Casing Termination: ☐ Pitless Adaptor ☒ Well House ☐ Basement Offset ☐ Pit (Drained: ☐ Yes ☐ No)
12 in. Above Grade or Floor: ☐ Yes ☐ No Approved Well Seal: ☒ Yes ☐ No Water Level Device [illegible]
Approved Casing Material: ☒ Yes ☐ No Well or Well Site Subject to Flooding: ☐ Yes ☒ No
Casing Vent Provided: ☐ Yes ☐ No Grouting Material [illegible]
Distance to Potential Contamination [illegible] ft. Source [illegible]
(tile field, sewer, surface water)
Distance to Potential Contamination _____ ft. Source _____
(tile field, sewer, surface water)
If Sewer is within 100 Feet, is Material and Installation Approved: ☐ Yes ☐ No
Distance to Major Source of Contamination _____ ft. Source _____
(landfill, chemical waste, sewage lagoon)

III. **Other Source** ☐ Infiltration Gallery ☐ Spring ☐ Surface Source
Security (Signs, Fences, Etc.) _____
Minimum Available Flow _____ gpm ☐ Measured ☐ Estimate Approval Date _____ ☐ OSHD ☐ County
Distance to Potential Contamination _____ ft. Source _____
Source Area Ownership _____
Springs: ☐ Surface Runoff Ditch ☐ Fencing ☐ Proper Springbox Construction ☐ Screened Overflow
☐ Bottom Drain ☐ Hatch and Curbing Comments _____
Surface Source: Source Name _____ Intake Location _____
☐ Impounding Reservoir ☐ Diversion Dam ☐ Multiple Intake ☐ Screens ☐ Spillway ☐ Provision for Draining Impoundment _____ Comments _____
Infiltration Gallery: Depth of Piping _____ ft. Installed in ☐ Riverbank ☐ Under Riverbed
Sanitary Hazard Upstream from intake ☐ Yes ☐ No Describe _____
Wet Well: Diameter ____ in. Depth ____ ft. Lateral: Diam. ____ in. Length ____ ft.
Openings: ☐ Slots ☐ Well Screen Distance to Surface Water _____

IV. **Pump**
Type: ☐ Shallow Well Jet ☐ Deep Well Jet ☐ Submersible ☒ Vertical Turbine ☐ Other _____
Location: ☐ Well ☒ Well House ☐ Basement ☐ Pit (Properly Drained: ☐ Yes ☐ No)
☐ Other _____
Installation Approved: ☒ Yes ☐ No Pump Capacity [illegible] gpm Pump Capacity Adequate: ☒ Yes ☐ No
☐ Water Lube ☒ Oil Lube Hp [illegible] Type and Model _____
Pump Setting/Drop Pipe Length [illegible] ft. Protected Suction Line: ☐ Yes ☐ No ☐ Not Applicable
Sample Tap: ☐ Raw ☒ Treated
☐ Pump to Waste Piping Pump Removal Provision: ☒ Yes ☐ No Subject to Flooding: ☐ Yes ☒ No

33-5 (1/83)

Well Test Data

Date: July 18, 1979

Customer: City of The Dalles
Lone Pine Well-Test # 2

Pumping Equipment: Aurora 14R Bowl - 5 stage
10' of 8" Suction Pipe
350' of 10" Column
Approximately 150' of 8" discharge piping
12" CD Orifice Tube

Pumping Level Readings: From Ametek Direct Reading Guage on 350' of 3/8" air line. Actual depth of bottom of air line was 346' from ground level and direct reading gunge was calibrated for 350' of air line.

Pump first started at 1:46 pm at low RPM.

Pump shut off at 1:48 pm due to low oil cut off.

Pump restarted at 2:05 pm at approximately 1400 gpm.

Pump shut off at 2:20 pm due to high water temperature.

Pump restarted at 2:55 pm for sustained pump test.

Static Water Level: 200' from ground level at 1:45 pm July 18, 1979
126' from ground level at 9:00 am July 18, 1979

Water Temperature: 15° C at 5:00 pm

Well Test Data

City of The Dalles July 18, 1979

Time	Pumping Level*	Orifice Plate	Orifice Head	Gallons Per Minute
2:05 pm	182	9⅜"	19"	1910
2:10	174	"	30"	2370
2:15		"	54"	3160
Pump Off				
2:55 pm	183			
3:00	186	9½"	58"	3280
3:15	191	"	58"	3280
3:30	191	"	55"	3200
3:45	193	"	55"	3200
4:00	193	"	54½"	3180
4:15	193	"	54½"	3180
4:30	194	"	54½"	3180
4:45	195	"	54½"	3180
5:00	196	"	55"	3200
5:15	197	"	56"	3230
5:30	198	"	56½"	3240
5:45	198	"	57½"	3270
6:00	198	"	57½"	3270
6:15	198½	"	57½"	3270
6:30	199	"	58½"	3300
6:45	199	"	58½"	3300
7:00	199	"	58½"	3300
7:15	199	"	58½"	3300
7:30	199	"	58½"	3300
7:45	199	"	58½"	3300
8:00	200	"	58½"	3300
8:15	200	"	58½"	3300
8:30	200	"	59"	3300
8:45	212	"	59"	3320
9:00	212	"	73½"	3320
9:15	212	"	72½"	3710
9:30	212½"	"	73"	3670
9:45	212½	"	73"	3690
9:46	slowed pump back to approximately 2500 gpm		73"	3690
9:48	197	9½"	33"	3690
10:00	176	"	33"	2480
10:05	175	"	33"	2480
10:10	175	"	33"	2480
10:12	slowed pump back to approximately 2000 gpm			2480
10:13	163	9½"	21½"	
10:20	163	"	23"	2010
10:25	163	"	23"	2080
10:30	163	"	23"	2080
10:35	shut pump off to check recovery			2080

* Datum Reference: Ground Level

Well Test Data

City of The Dalles July 18, 1979

Recovery Test

Time	Water Level*	Air Line Pressure **
	Pump Shut off after pumping 2080 gpm from 163'	
10:35 pm	133'	92 psig
10:35:30	133'	92
10:36	132.3'	92½
10:37	132.3'	92½
10:38	132.3'	92½
10:39	131.2'	93
10:40	128.9'	94
10:45	127.7'	94½
10:50	127.7'	94½
10:55	126.5'	95
11:00		
July 19, 1979		
9:00 am	122'	97

* Datum Reference: Ground level
Computed water level based on pressure in air line.

** Airline pressure as read from 200 lb pressure guage at top of air line. Bottom of Air line set at 346' below ground level.

SCHNEIDER EQUIPMENT, INC.
21881 RIVER ROAD N. E.
ST. PAUL, OREGON 97137
(503) 633-2666

1st Marx Well

(79) cdb

STATE ENGINEER
Salem, Oregon

OBSERVATION WELL

Well Record

STATE WELL NO. 1N13-4P(1)
COUNTY Wasco
APPLICATION NO. U-135
Perm U-127

OWNER: The Dalles

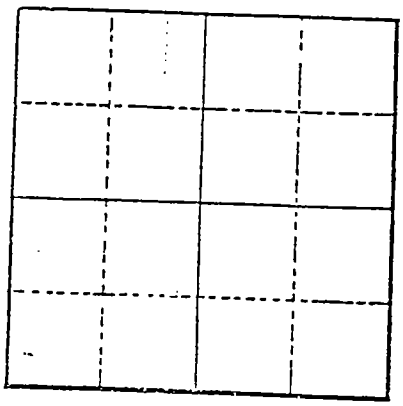
MAILING ADDRESS:

LOCATION OF WELL: Owner's No. Marx Well

CITY AND STATE: The Dalles, Oregon

SE ¼ SW ¼ Sec. 4 T. 1 N R. 13 E W.M.

Bearing and distance from section or subdivision corner



Section 4

Altitude at well

TYPE OF WELL: drilled Date Constructed 1931

Depth drilled 570 Depth cased 116

CASING RECORD:

12"- set to 116'

FINISH:

open hole

AQUIFERS:

Basalt

WATER LEVEL: 217 feet - 1931

February 9 or 10, 1959, water level 238' below L.S.D.

PUMPING EQUIPMENT: Type B. J. Submersible 8" H.P. 125
Capacity 1,200 G.P.M.

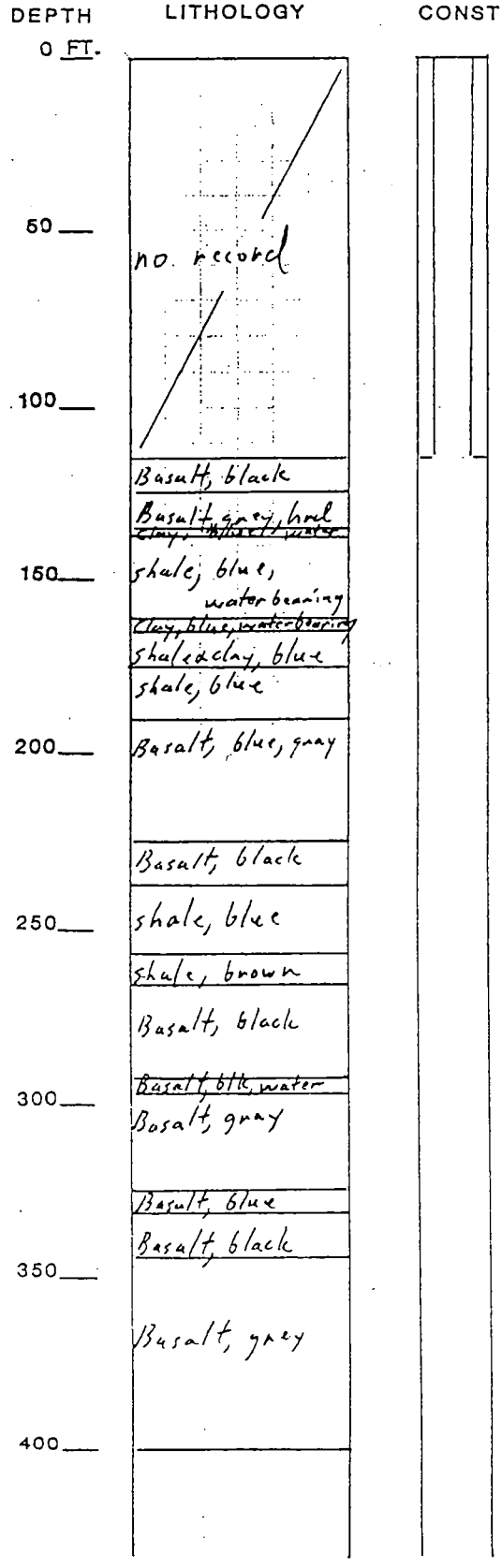
WELL TESTS:
Drawdown 4 ft. after 50 hours pumping 1200 G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Municipal Temp. °F., 19
SOURCE OF INFORMATION U-135
DRILLER or DIGGER W. Wilburn
ADDITIONAL DATA:
Log x Water Level Measurements Chemical Analysis X Aquifer Test

REMARKS:

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Marks Well
LOCATION SE¼, SW¼, Sec 4, T1N, R1E
ELEVATION
DATE INSTALLED 1931

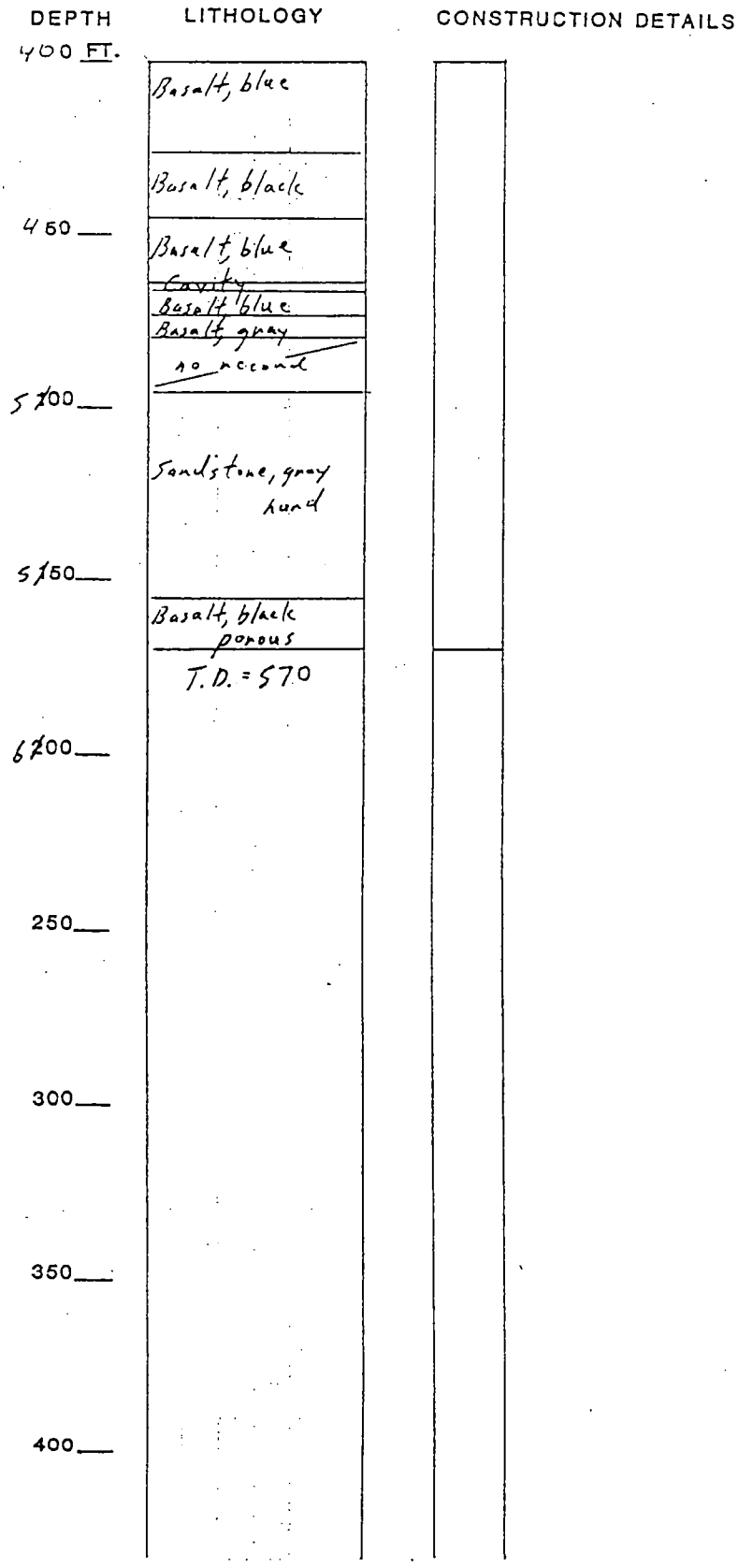


12" casing set to 116'

note: water level dropped from 36' to 215' in this unit.

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Marks Well cont'
LOCATION
ELEVATION
DATE INSTALLED



STATE OF OREGON
OREGON STATE HEALTH DIVISION
Department of Human Resources

SMALL PUBLIC WATER SUPPLY
SANITARY SURVEY REPORT

☑ Community ☐ Non-Community

I. **Basic Information**
Supply Name Marks Well Phone 296-5101
Address _____ City _____ Zip _____
County Wasco Township 1 N/S Range 13 E/W Section No. 4 Tax Lot No. _____
Establishment _____ Pop. Served _____ No. of Service Connections _____
Contact Person _____ Title _____ Phone _____ Certification _____
Owner The Dalles City Phone 296-5431 Type Ownership: ☒ Public ☐ Private
Period of Operation: ☐ 12 Month ☒ Seasonal If Seasonal: From ____ to ____ Annual Disinfection ☐ Yes ☐ No

II. **Wells** (Source of Information: ☒ Owner ☐ Measured ☒ Well log (attached))
~~Total No.~~ Wells Marks Drilling Method _____ Depth 510 ft. Casing Depth 116 ft.
Casing Diameter 12 in. Year Installed 1931 Approval Date _____ ☐ OSHD ☐ County
Well Driller W. Wilbur Pump Installer _____
Well House: ☒ Yes ☐ No Slab: ☒ Yes ☐ No Other Enclosure: _____ ☒ Heated, Lighted, Insulated
100 ft. Isolation Area: ☒ Owned ☐ Easement ☒ Other Skyline Rd.
Casing Termination: ☐ Pitless Adaptor ☒ Well House ☐ Basement Offset ☐ Pit (Drained: ☐ Yes ☐ No)
12 in. Above Grade or Floor: ☐ Yes ☐ No Approved Well Seal: ☐ Yes ☐ No Water Level Device 4" Line
Approved Casing Material: ☐ Yes ☐ No Well or Well Site Subject to Flooding: ☐ Yes ☒ No
Casing Vent Provided: ☐ Yes ☐ No Grouting Material _____
Distance to Potential Contamination 2500 ft. Source Sewer in Mill Creek Rd
(tile field, sewer, surface water)
Distance to Potential Contamination _____ ft. Source _____
(tile field, sewer, surface water)
If Sewer is within 100 Feet, is Material and Installation Approved: ☐ Yes ☐ No
Distance to Major Source of Contamination _____ ft. Source _____
(landfill, chemical waste, sewage lagoon)

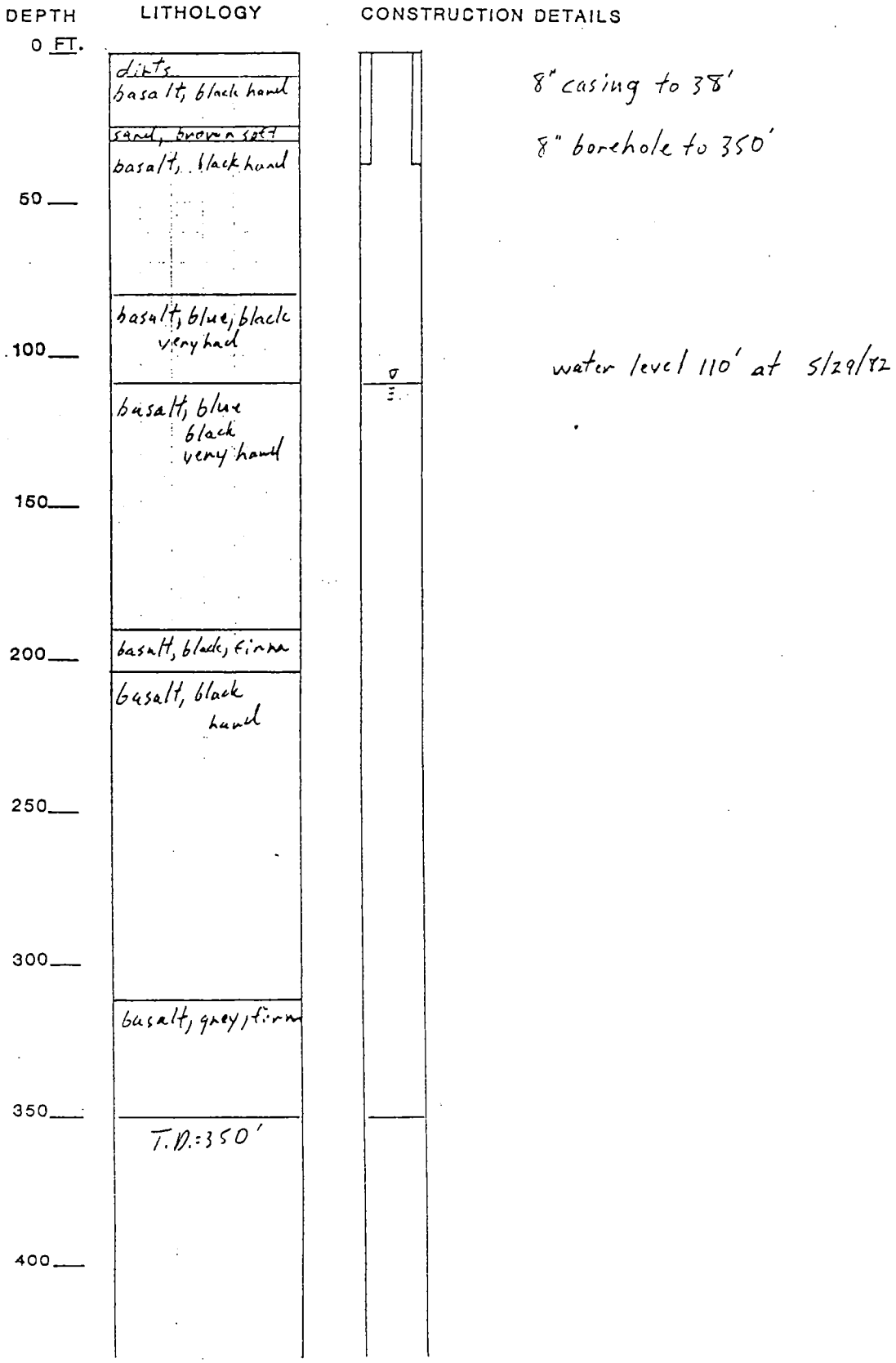
III. **Other Source** ☐ Infiltration Gallery ☐ Spring ☐ Surface Source
Security (Signs, Fences, Etc.) _____
Minimum Available Flow _____ gpm ☐ Measured ☐ Estimate Approval Date _____ ☐ OSHD ☐ County
Distance to Potential Contamination _____ ft. Source _____
Source Area Ownership _____
Springs: ☐ Surface Runoff Ditch ☐ Fencing ☐ Proper Springbox Construction ☐ Screened Overflow
☐ Bottom Drain ☐ Hatch and Curbing Comments _____
Surface Source: Source Name _____ Intake Location _____
☐ Impounding Reservoir ☐ Diversion Dam ☐ Multiple Intake ☐ Screens ☐ Spillway ☐ Provision for Draining Impoundment _____ Comments _____
Infiltration Gallery: Depth of Piping _____ ft. Installed in ☐ Riverbank ☐ Under Riverbed
Sanitary Hazard Upstream from intake ☐ Yes ☐ No Describe _____
Wet Well: Diameter ____ in. Depth ____ ft. Lateral: Diam. ____ in. Length ____ ft.
Openings: ☐ Slots ☐ Well Screen Distance to Surface Water _____

IV. **Pump**
Type: ☐ Shallow Well Jet ☐ Deep Well Jet ☐ Submersible ☒ Vertical Turbine ☐ Other _____
Location: ☐ Well ☒ Well House ☐ Basement ☐ Pit (Properly Drained: ☐ Yes ☐ No)
☐ Other _____
Installation Approved: ☐ Yes ☐ No Pump Capacity 1300 gpm Pump Capacity Adequate: ☒ Yes ☐ No
☐ Water Lube ☒ Oil Lube Hp 200 Type and Model U.S. Motor 1-200 Turbine
Pump Setting/Drop Pipe Length 500 ft. Protected Suction Line: ☐ Yes ☐ No ☐ Not Applicable
Sample Tap: ☒ Raw ☒ Treated
☒ Pump to Waste Piping Pump Removal Provision: ☒ Yes ☐ No Subject to Flooding: ☒ Yes ☐ No

33-5 (1/83)

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Floyd Marsh
LOCATION NE¼, NE¼, sec. 20, T2N, R13E
ELEVATION
DATE INSTALLED 5/31/82



STATE ENGINEER
Salem, Oregon

State Well No. (17) 1S/13-4E(1)
County Wasco
Application No. U-135

Well Log

Owner: City of The Dalles Owner's No. Marx Well

Driller: W. Wilburn Date Drilled 1931

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
No record	0	116	116
Basalt, black	116	124	8
Basalt, gray, hard	124	135	11
Clay, blue, water bearing	135	138	3
Shale, blue, water bearing	138	161	23
Clay, blue, water bearing	161	165	4
Shale, and clay, blue	165	176	11
Shale, blue, streaks of basalt	176	190	14
Basalt, blue and gray	190	226	36
Basalt, black	226	237	11
Shale, blue	237	256	19
Shale, brown	256	266	10
Basalt, black	266	292	26
Basalt, black, porous, waterbearing, water level dropped from 36' to 215 feet.	292	296	4
Basalt, gray	296	325	29
Basalt, blue	325	331	6
Basalt, black	331	344	13
Basalt, gray	344	400	56
Basalt, blue	400	427	27
Basalt, black	427	445	18
Basalt, blue	445	464	19
Cavity, water bearing, cuttings washed away	464	466	2

STATE ENGINEER
Salem, Oregon

(79)

State Well No. 1N/13-4P(1)
County Wasco
Application No. U-135

Well Log

Owner: City of The Dalles Owner's No. Marx Well

Driller: Date Drilled

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Basalt, blue	466	474	8
Basalt, gray	474	480	6
No record	480	496	16
Sandstone, gray hard	496	556	60
Basalt, black, porous, cuttings washed away, static head did not change	556	570	14

WATER WELL REPORT
STATE OF OREGON

6 | a
c | b

RECEIVED
JUL 6 1982
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. 2n/13E-26

State Permit No. .....

(1) OWNER:
Name Floyd W. Marsh
Address Rt.4, The Dalles
City The Dalles State Ore. 97058

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☒ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐
Thermal ☐ Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:
Steel ☒ Plastic ☐
Threaded ☐ Welded ☒
8 " Diam. from 0 ft. to 38 ft. Gauge .250
" Diam. from ft. to ft. Gauge

LINER INSTALLED:
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:
Perforated? ☐ Yes ☐ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

7) SCREENS:
Well screen installed? ☐ Yes ☐ No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
Air test 125 gal./min. with drill stem at 350 ft. 2 hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water 54 Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☐
Well seal—Material used cement w/ bentonite
Well sealed from land surface to 38 ft.
Diameter of well bore to bottom of seal 12 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal 23 sacks
How was cement grout placed? pressure grouted
Was pump installed? no Type HP Depth ft.
Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:
County Wasco Driller's well number 62
NE ¼ NE ¼ Section 20 T. 2 N R. 13 East W.M.
Tax Lot # 1190 Lot Blk Subdivision
Address at well location: Rt.4, The Dalles, Ore. 97058

(11) WATER LEVEL: Completed well.
Depth at which water was first found 188
Static level 110 ft. below land surface. Date 5/28/82
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 8
Depth drilled 350 ft. Depth of completed well 350

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
dirt & rocks	0	8	
basalt black hard	8	25	
sand, broun soft	25	30	
basalt black hard	30	80	
basalt blue black verry hard	80	108	105
basalt blue black verry hard	108	190	110
basalt black firm to hard	190	205	110
basalt black hard	205	312	110
basalt grey firm	312	350	110

Work started March 29 19 82 Completed May 29 19 82
Date well drilling machine moved off of well May 31 19 82

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] (Drilling Machine Operator) Date June 30 19 82
Drilling Machine Operator's License No. 1113

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Harry Douthit Well Drilling (Person, firm or corporation) (Type or print)
Address Rt.5 Box 141, The Dalles, Ore. 97058
[Signed] (Water Well Contractor)
Contractor's License No. 571 Date June 30 19 82

F-206

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

SP-12058-E

(81)

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM 10, OREGON within 30 days from the date of well completion.

RECEIVED
AUG 27 1964
STATE ENGINEER
SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON
(Please type or print)

State Well No. 2N/13-32
State Permit No.

(1) OWNER:
Name George Moon
Address 850 S. W. Cherry Rights Road, The Dalles, Oregon

(2) LOCATION OF WELL:
County Wasco Driller's well number
¼ ¼ Section 32 T. 2 N R. 13 E W.M.
Bearing and distance from section or subdivision corner
From the SW corner 542 feet north and 1688 feet east to well site

(3) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED:
Threaded ☐ Welded ☐
8" Diam. from 0 ft. to 18½ ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(7) PERFORATIONS:
Perforated? ☐ Yes ☐ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(8) SCREENS:
Well screen installed ☐ Yes ☐ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(9) CONSTRUCTION:
Well seal—Material used in seal Cement
Depth of seal 18½ ft. Was a packer used?
Diameter of well bore to bottom of seal 12 in.
Were any loose strata cemented off? ☐ Yes ☐ No Depth
Was a drive shoe used? ☐ Yes ☐ No
Was well gravel packed? ☐ Yes ☐ No Size of gravel:
Gravel placed from ft. to ft.
Were any strata contain unusable water? ☐ Yes ☒ No
Type of water? Depth of strata
Method of sealing strata off

(10) WATER LEVELS:
Static level 440 ft. below land surface Date 8/24/64
Artesian pressure lbs. per square inch Date

(11) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Bailer test 7½ gal./min. with 10 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water 67 Was a chemical analysis made? ☐ Yes ☐ No

(12) WELL LOG:
Diameter of well below casing 8"
Depth drilled 539 ft. Depth of completed well 539 ft.
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Claystone, blue	0	3
Sandstone, gray	3	31
Sandstone, brown	31	75
Sandstone, gray	75	84
Sandstone, brown	84	224
Sandstone, black	224	279
Sandstone, gray	279	433
Sandstone, brown.- streaks of gravel with water	433	495
Brown sandstone & clay	495	524
Sandstone, brown	524	539

Work started 19 . Completed 8-24 1964
Date well drilling machine moved off of well 19

(13) PUMP:
Manufacturer's Name
Type: H.P.

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

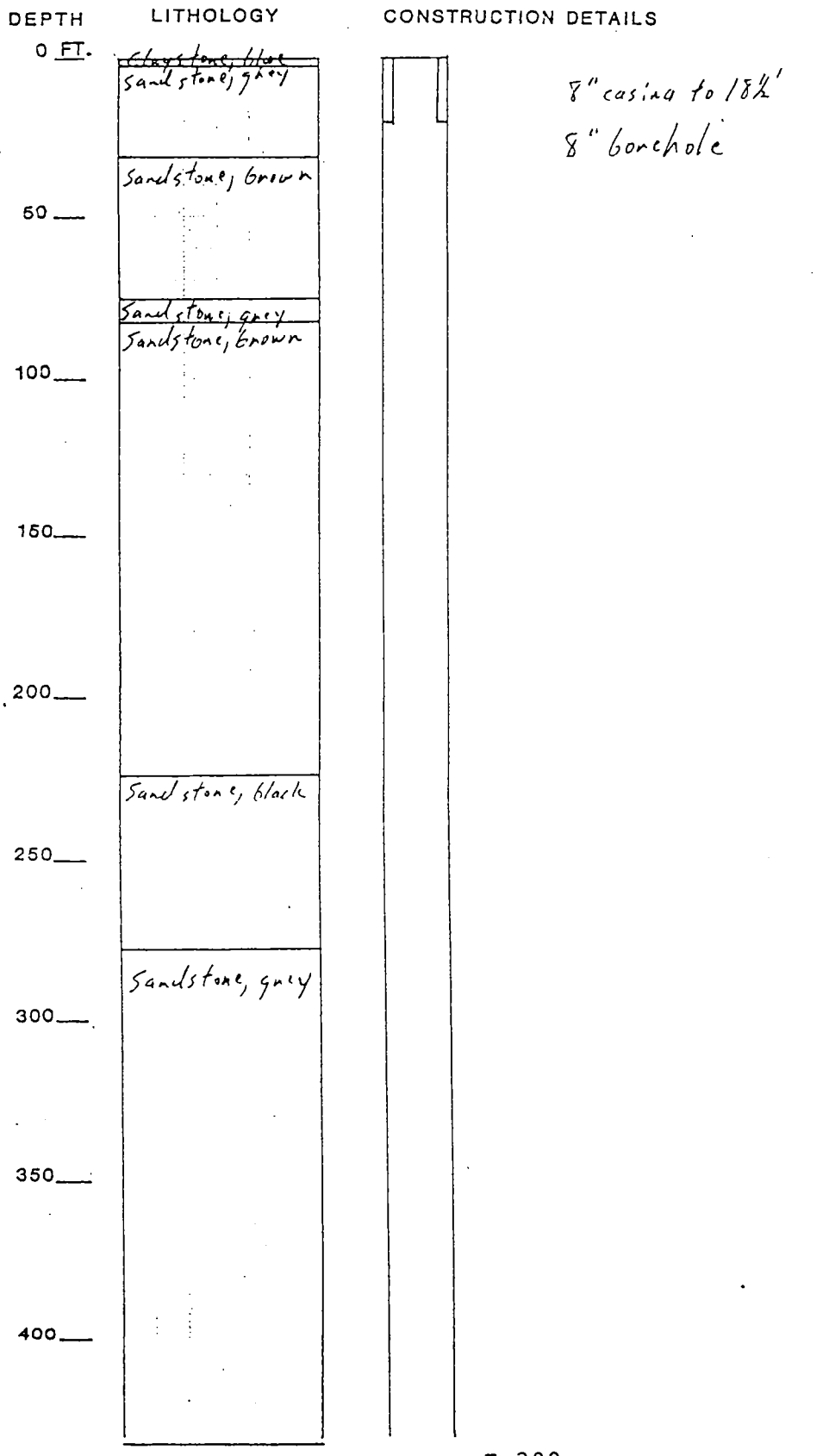
NAME Dorin Wilburn (Person, firm or corporation) (Type or print)
Address 812 E 7th Street, The Dalles, Ore
Drilling Machine Operator's License No. 96
[Signed] Dorin Wilburn (Water Well Contractor)
Contractor's License No. 80 Date 8-25, 1964

F-207

(USE ADDITIONAL SHEETS IF NECESSARY)

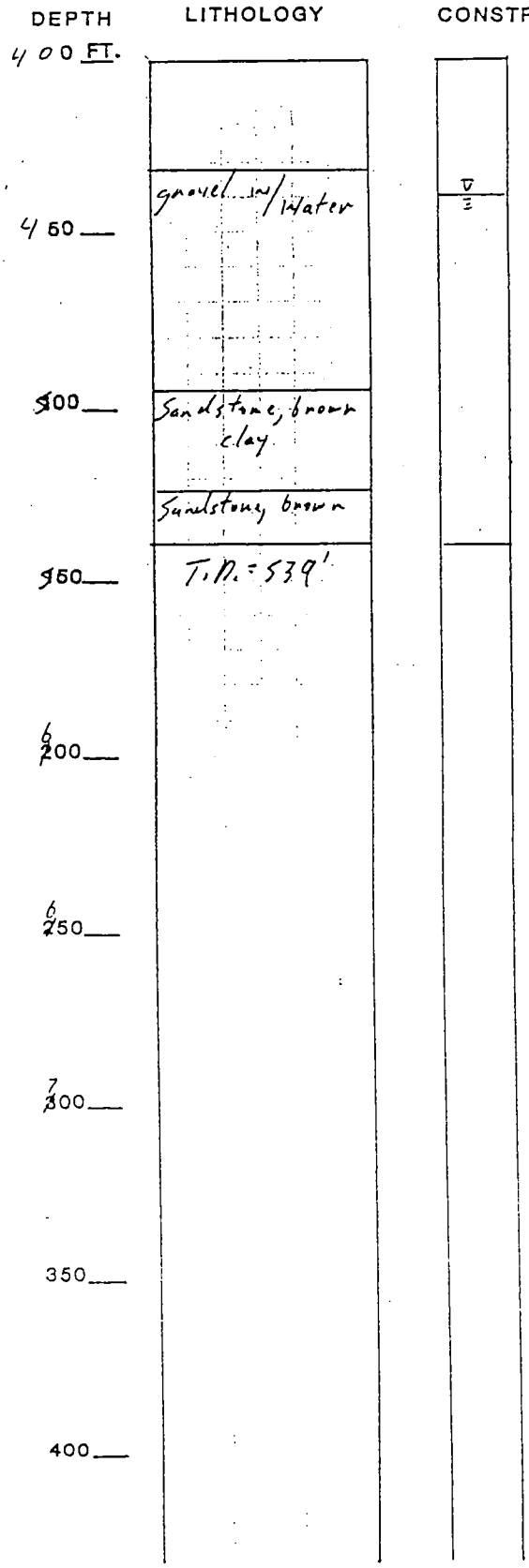
GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME George Moon
LOCATION Sec 32, T2N, R13E
ELEVATION
DATE INSTALLED 8/24/64



GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME George Moon
LOCATION SW¼, Sec. 32, T2N, R13E.
ELEVATION
DATE INSTALLED



water level 440' 8/24/64

(82)

STATE ENGINEER
Salem, Oregon

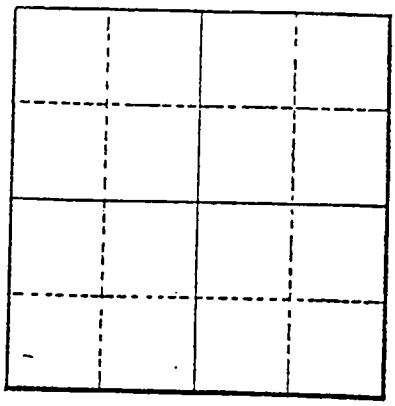
Mill Creek Well

Well Record

STATE WELL NO. 1N/13-8M(1)
COUNTY Wasco
APPLICATION NO. U-181

OWNER: Mill Creek Irrig. Coop. Inc.
MAILING ADDRESS: Rt. 2
CITY AND STATE: The Dalles

LOCATION OF WELL: Owner's No. .....
NW ¼ SW ¼ Sec. 8 T. 1 N/S R. 13 E/W W.M.
Bearing and distance from section or subdivision corner .....



Section 8

Altitude at well .....

TYPE OF WELL: drilled Date Constructed 1945
Depth drilled 371 Depth cased .....

CASING RECORD:

12-inch, set to _____.

FINISH:

Open well below casing

AQUIFERS:

Basalt

WATER LEVEL:

249' in 1945

PUMPING EQUIPMENT: Type Turbine H.P. 75
Capacity ..... G.P.M.

WELL TESTS:

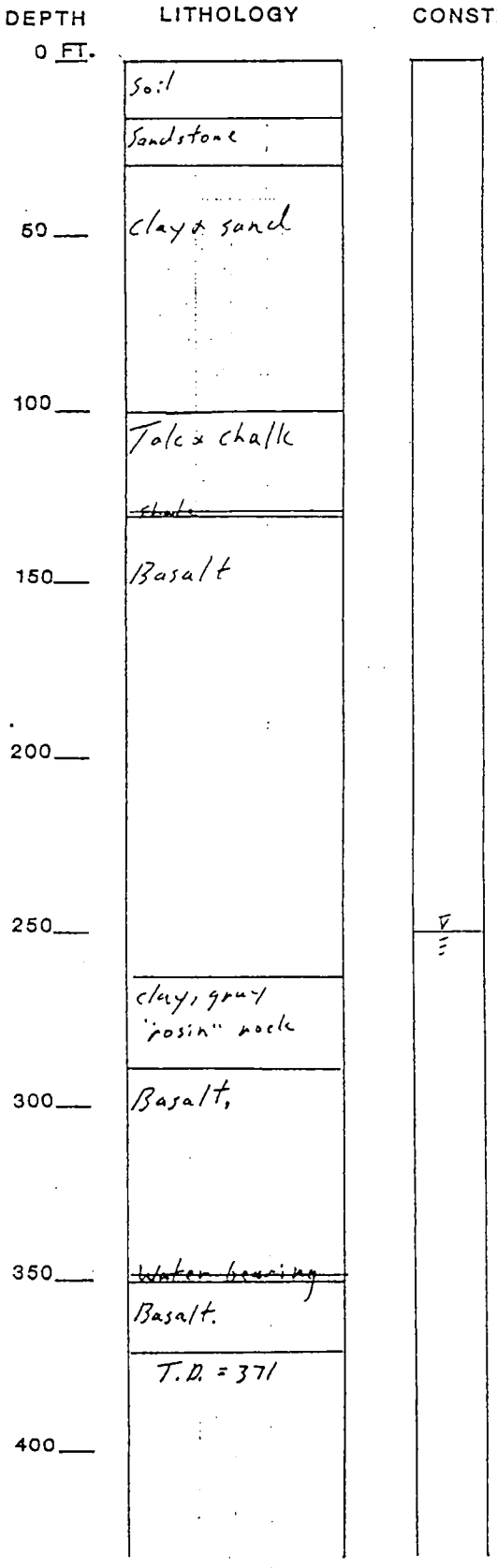
Drawdown 1 ft. after 100 hours pumping 550 G.P.M.
Drawdown ..... ft. after ..... hours ..... G.P.M.

USE OF WATER Irrigation Temp. ..... °F. ....., 19.....
SOURCE OF INFORMATION U-181
DRILLER or DIGGER Bert Clayton
ADDITIONAL DATA:
Log x Water Level Measurements x Chemical Analysis ..... Aquifer Test .....

REMARKS: Permit No. U-169, Certificate No. 20790

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Mill Creek Well
LOCATION NW¼, SW¼, Sec. 8, T1N, R13E
ELEVATION
DATE INSTALLED 1945



water level 249' 1945

STATE OF OREGON
OREGON STATE HEALTH DIVISION
Department of Human Resources

SMALL PUBLIC WATER SUPPLY
SANITARY SURVEY REPORT

☐ Community ☐ Non-Community

I. **Basic Information**
Supply Name _____ Phone _____
Address _____ City _____ Zip _____
County _____ Township _____ N/S Range _____ E/W Section No. _____ Tax Lot No. _____
Establishment _____ Pop. Served _____ No. of Service Connections _____
Contact Person _____ Title _____ Phone _____ Certification _____
Owner _____ Phone _____ Type Ownership: ☒ Public ☐ Private
Period of Operation: ☐ 12 Month ☒ Seasonal If Seasonal: From ____ to ____ Annual Disinfection ☐ Yes ☐ No

II. **Wells** (Source of Information: ☒ Owner ☐ Measured ☒ Well log (attached))
Total ~~No.~~ Wells _____ Drilling Method _____ Depth _____ ft. Casing Depth ____ ft.
Casing Diameter _____ in. Year Installed _____ Approval Date _____ ☐ OSHD ☐ County
Well Driller _____ Pump Installer _____
Well House: ☒ Yes ☐ No Slab: ☐ Yes ☐ No Other Enclosure: _____ ☐ Heated, Lighted, Insulated
100 ft. Isolation Area: ☐ Owned ☒ Easement ☐ Other _____
Casing Termination: ☐ Pitless Adaptor ☐ Well House ☐ Basement Offset ☐ Pit (Drained: ☐ Yes ☐ No)
12 in. Above Grade or Floor: ☐ Yes ☐ No Approved Well Seal: ☐ Yes ☐ No Water Level Device _____
Approved Casing Material: ☐ Yes ☐ No Well or Well Site Subject to Flooding: ☒ Yes ☐ No _____
Casing Vent Provided: ☐ Yes ☐ No Grouting Material _____
Distance to Potential Contamination _____ ft. Source _____
(tile field, sewer, surface water)
Distance to Potential Contamination _____ ft. Source _____
(tile field, sewer, surface water)
If Sewer is within 100 Feet, is Material and Installation Approved: ☐ Yes ☐ No
Distance to Major Source of Contamination _____ ft. Source _____
(landfill, chemical waste, sewage lagoon)

III. **Other Source** ☐ Infiltration Gallery ☐ Spring ☐ Surface Source
Security (Signs, Fences, Etc.) _____
Minimum Available Flow _____ gpm ☐ Measured ☐ Estimate Approval Date _____ ☐ OSHD ☐ County
Distance to Potential Contamination _____ ft. Source _____
Source Area Ownership _____
Springs: ☐ Surface Runoff Ditch ☐ Fencing ☐ Proper Springbox Construction ☐ Screened Overflow
☐ Bottom Drain ☐ Hatch and Curbing Comments _____
Surface Source: Source Name _____ Intake Location _____
☐ Impounding Reservoir ☐ Diversion Dam ☐ Multiple Intake ☐ Screens ☐ Spillway ☐ Provision for
Draining Impoundment _____ Comments _____
Infiltration Gallery: Depth of Piping _____ ft. Installed in ☐ Riverbank ☐ Under Riverbed
Sanitary Hazard Upstream from intake ☐ Yes ☐ No Describe _____
Wet Well: Diameter ____ in. Depth ____ ft. Lateral: Diam. ____ in. Length ____ ft.
Openings: ☐ Slots ☐ Well Screen Distance to Surface Water _____

IV. **Pump**
Type: ☐ Shallow Well Jet ☐ Deep Well Jet ☐ Submersible ☒ Vertical Turbine ☐ Other _____
Location: ☐ Well ☒ Well House ☐ Basement ☐ Pit (Properly Drained: ☐ Yes ☐ No)
☐ Other _____
Installation Approved: ☐ Yes ☐ No Pump Capacity _____ gpm Pump Capacity Adequate: ☐ Yes ☐ No
☐ Water Lube ☒ Oil Lube Hp _____ Type and Model _____
Pump Setting/Drop Pipe Length _____ ft. Protected Suction Line: ☐ Yes ☐ No ☐ Not Applicable
Sample Tap: ☒ Raw ☐ Treated
☐ Pump to Waste Piping Pump Removal Provision: ☒ Yes ☐ No Subject to Flooding: ☐ Yes ☐ No
_____

33-5 (1/83)

STATE ENGINEER
Salem, Oregon

State Well No. 1N/13-8H(1)
County Wasco
Application No. U-181

Well Log

Owner: Mill Creek Irrigation Coop. Inc. Owner's No.

Driller: Bert Clayton Date Drilled 1945

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Soil, gravel, and boulders	0	18	18
Sandstone and boulders	18	30	12
Clay and sand	30	100	70
Talc and chalk	100	129	29
Shale, brittle, some water	129	130	1
Basalt	130	263	133
Clay, gray, and "rosin" rock	263	289	26
Basalt	289	349	60
Open, water bearing	349	350	1
Basalt	350	371	21

filed with the
STATE ENGINEER, SALEM, OREGON 97310
within 30 days from the date
of well completion.

STATE OF OREGON
(Please type or print) MAY 16 1974
(Do not write above this line) STATE ENGINEER

State Well No. 2S/13E-21 (BC)
State Permit No. Chip mill

(1) OWNER:
Name MT. Fir Lumber Co.
Address The Dalles, Or.

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary ☑ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☑ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

CASING INSTALLED: Threaded ☐ Welded ☑
6" Diam. from +1 ft. to 20' ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS: Perforated? ☐ Yes ☑ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS: Well screen installed? ☐ Yes ☑ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
Bailer test 60 gal./min. with 60 ft. drawdown after 1 hrs.
Artesian flow g.p.m.
Temperature of water 54° Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Well seal—Material used Bentonite + Cement
Well sealed from land surface to 20' ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 1 sacks
Number of sacks of bentonite used in well seal 2 sacks
Brand name of bentonite National
Number of pounds of bentonite per 100 gallons of water 1000 lbs./100 gals.
Was a drive shoe used? ☐ Yes ☑ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☑ No Size of gravel:
Gravel placed from ft. to ft.

F-214

(10) LOCATION OF WELL:
County Wasco Driller's well number
SE ¼ SW ¼ Section 21 T. 2 S R. 13 E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.
Depth at which water was first found 119
Static level 65 ft. below land surface. Date 4/19/74
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 6
Depth drilled 145 ft. Depth of completed well 145 ft.
Formation: Describe color, texture, grain size and structure of material and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Clay & Boulders, Brown	0	15	
Basalt, Gray	15'	119'	
Basalt, Vesicular, Brown	119'	140'	65
Basalt, Gray	140'	145	65

Work started 4/15 1974 Completed 4/19 1974
Date well drilling machine moved off of well 4/19 19

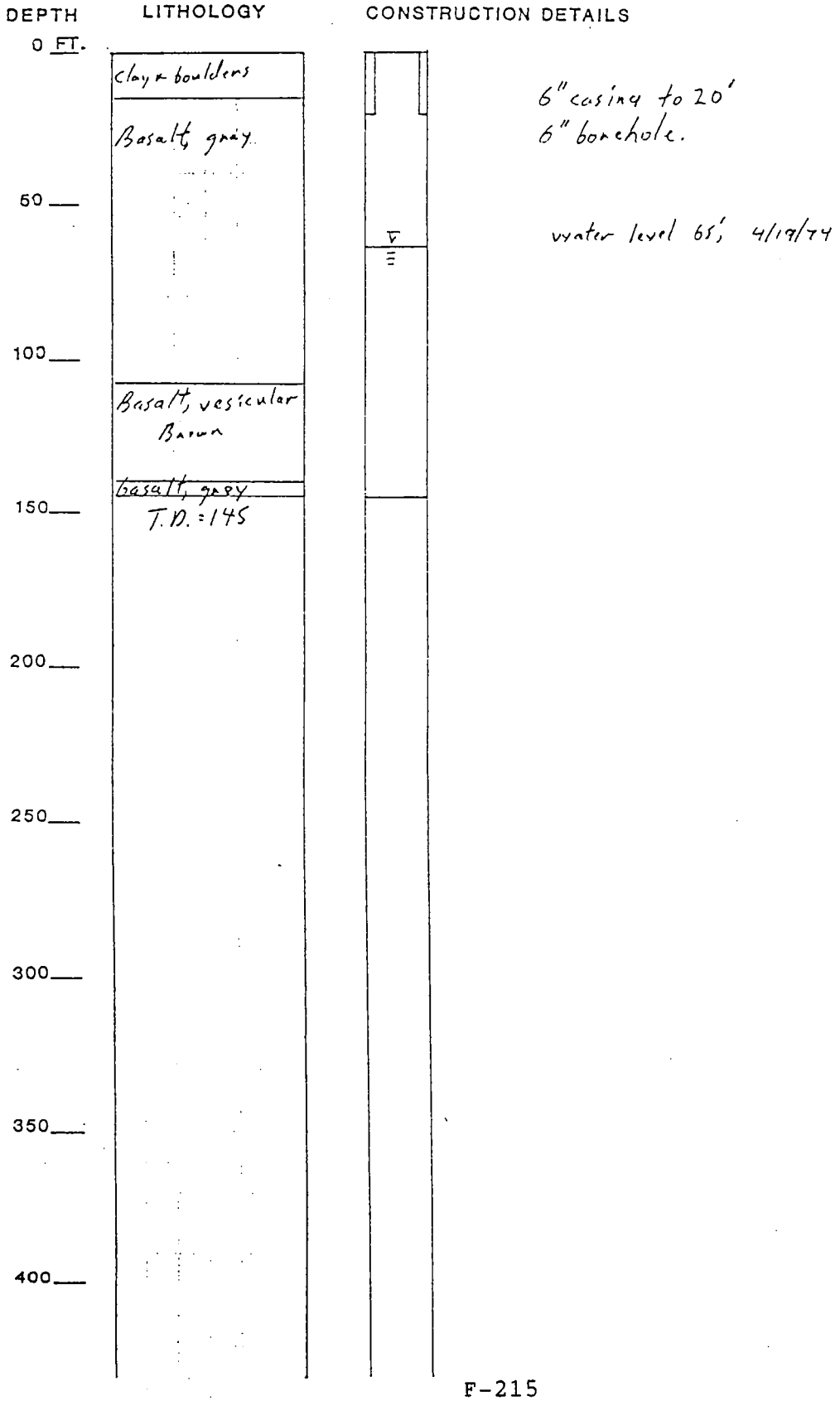
Drilling Machine Operator's Certification:
This well was constructed under my direct supervisio
Materials used and information reported above are true to m
best knowledge and belief.
[Signed] (Drilling Machine Operator) Date 5/15, 197
Drilling Machine Operator's License No. 890

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report
true to the best of my knowledge and belief.
Name O'Leary Well Drilling Inc. (Person, firm or corporation) (Type or print)
Address P.O. Box 247-A Goldendale, Wa
[Signed] (Water Well Contractor)
Contractor's License No. 496 Date 5/15, 197

(USE ADDITIONAL SHEETS IF NECESSARY)

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Mt. Fir Lumber Co.
LOCATION SE¼, SW¼, Sec. 21, T2N, R13E
ELEVATION
DATE INSTALLED 4/19/74



The original and first copy of this report are to be filed with the STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

RECEIVED NOV 20 1959 STATE ENGINEER SALEM, OREGON

WATER WELL REPORT

STATE OF OREGON

(Please type or print) (Do not write above this line)

(84)

State Well No. 2N/13-27b

State Permit No. .....

(1) OWNER:

Name Pine West Mobile Manor

Address The Dalles Ore

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☒ Other ☐

(5) CASING INSTALLED:

Threaded ☐ Welded ☒

5" Diam. from 0 ft. to 18 ft. Gage .250

..." Diam. from ..... ft. to ..... ft. Gage .....

..." Diam. from ..... ft. to ..... ft. Gage .....

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No.

Type of perforator used .....

Size of perforations ..... in. by ..... in.

..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No

Manufacturer's Name .....

Type ..... Model No. .....

Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

(8) WATER LEVEL: Completed well.

Static level 130 ft. below land surface Date 10-11-59

Artesian pressure None lbs. per square inch Date

(9) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom? Driller

Yield: 25 gal./min. with 5 ft. drawdown after 24 hrs.

- - -

- - -

Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.

Artesian flow None g.p.m. Date

Temperature of water 57 Was a chemical analysis made? ☐ Yes ☒ No

(10) CONSTRUCTION:

Well seal—Material used Cement & Bentonite

Depth of seal 18 ft.

Diameter of well bore to bottom of seal 12" in.

Were any loose strata cemented off? ☐ Yes ☒ No Depth .....

Was a drive shoe used? ☐ Yes ☒ No

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? ..... depth of strata .....

Method of sealing strata off .....

Was well gravel packed? ☐ Yes ☒ No Size of gravel: .....

Gravel placed from ..... ft. to ..... ft.

F-216

(11) LOCATION OF WELL:

County Wasco Driller's well number .....

¼ ¼ Section ..... T. ..... R. ..... W.M.

Bearing and distance from section or subdivision corner

(12) WELL LOG:

Diameter of well below casing 6"

Depth drilled 220 ft. Depth of completed well 216 ft.

Formation: Describe color, texture, grain size and structure of materials and show thickness and nature of each stratum and aquifer penetrated with at least one entry for each change of formation. Report each change in position of Static Water Level as drilling proceeds. Note drilling rates.

MATERIAL	From	To	SWL
Sandy Topsoil	0	6	
Gray Sand	6	13	
Black Basalt	13	108	
Fractured Basalt	108	125	120
Black Basalt	125	196	120
Fractured Basalt	196	210	120
Black Basalt	210	220	120

Work started 10-4-59 19 59 Completed 10-11-59 19

Date well drilling machine moved off of well 10-13-59 19

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] ..... Date 10-13-59 19

(Drilling Machine Operator)

Drilling Machine Operator's License No. 157

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Stewart Drilling Co.

(Person, firm or corporation) (Type or print)

Address Box 233, Prineville Ore.

[Signed] .....

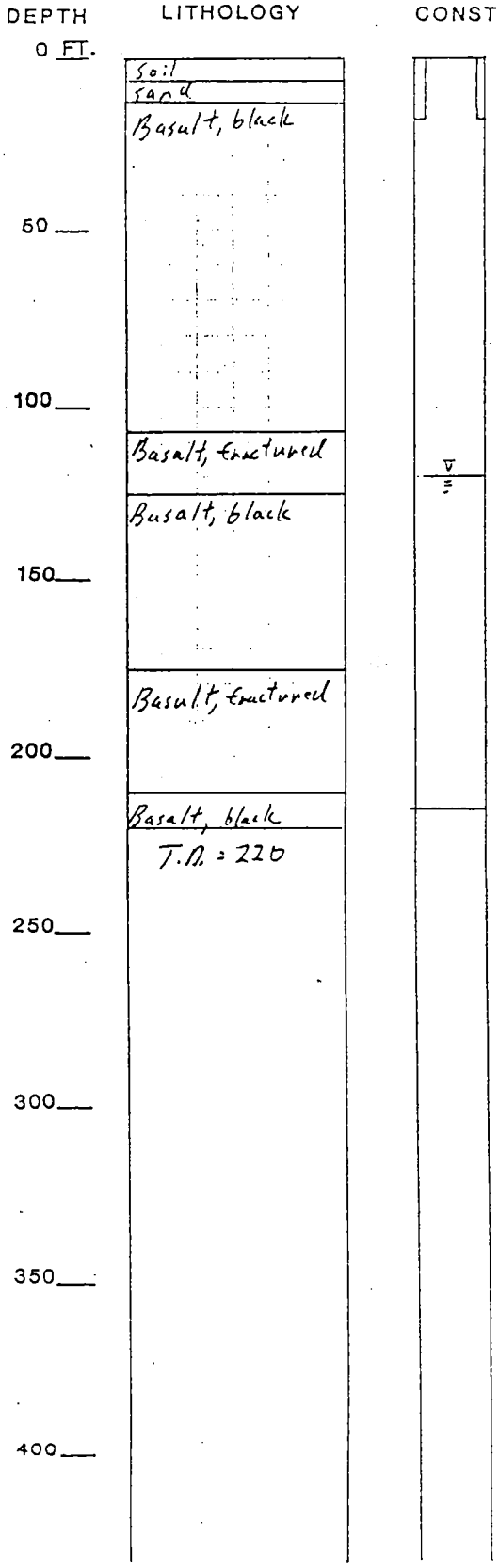
(Water Well Contractor)

Contractor's License No. 253 Date 10-13-59 19

(USE ADDITIONAL SHEETS IF NECESSARY)

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Pine Wood Mobile Manor
LOCATION S-21-T2N-R13E bbc
ELEVATION
DATE INSTALLED 10/13/69



5" casing to 18'
6" borehole

water level 120' 10/11/69

yield 85 g.p.m. 5 ft 34 hrs.

Filed with the
STATE ENGINEER, SALEM, OREGON 97310
within 30 days from the date
of well completion.

STATE OF OREGON
(Please type or print)
(Do not write above this line)

STATE ENGINEER
SALEM, OREGON

State Well No. 2N/13E-19

State Permit No. 85

(1) OWNER:

Name Richard T Murray
Address 3112 w 8Th
The Dalles, Ore

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:

Threaded ☐ Welded ☒
6" Diam. from 0 ft. to 51 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Bailer test 6 gal./min. with 57 ft. drawdown after 1 hrs.
Artesian flow g.p.m.
Temperature of water 53 Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Well seal—Material used Portland Cement
Well sealed from land surface to 19 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 22 sacks
Number of sacks of bentonite used in well seal 1/2 sacks
Brand name of bentonite National
Number of pounds of bentonite per 100 gallons of water 220 lbs./100 gals.
Was a drive shoe used? ☒ Yes ☐ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL:

County Wasco Driller's well number
NE ¼ SW ¼ Section 19 T. 2N R. 13E W.M.
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found 60 ft.
Static level 32 ft. below land surface. Date 3 Dec 72
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 6"
Depth drilled 118 ft. Depth of completed well 118 ft.

Formation: Describe color, texture, grain size and structure of material, and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Soil + Boulders	0	8	
Basalt gray soft	8	50	
Basalt gray hard	50	60	
Basalt Fracture zone	60	62	32
Basalt gray hard	62	95	
Basalt gray soft	95	118	

Work started 22 Nov 1972 Completed 5 Dec 1972
Date well drilling machine moved off of well 6 Dec 1972

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Richard T Murray (Drilling Machine Operator) Date 22 Dec, 1972

Drilling Machine Operator's License No. owner

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name (Person, firm or corporation) (Type or print)
Address
[Signed] (Water Well Contractor)
Contractor's License No. Date 19

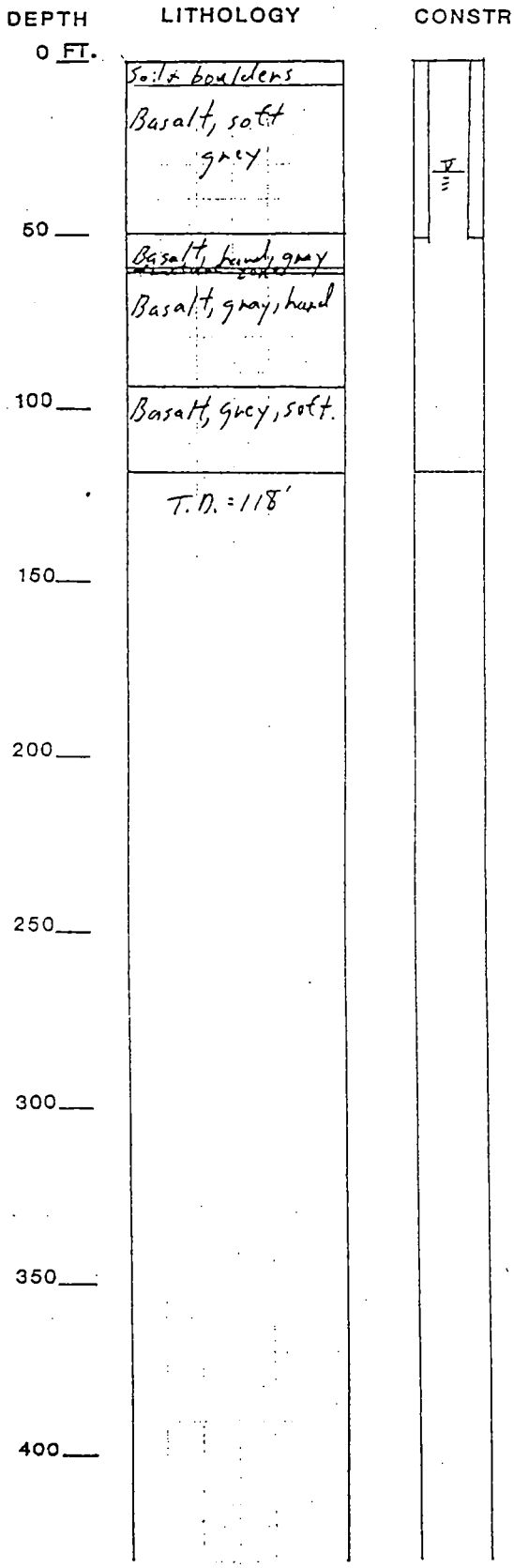
F-218

(USE ADDITIONAL SHEETS IF NECESSARY)

SP*(6656-11)

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Richard J Murray
LOCATION NE¼, SW¼, Sec. 19, T2N, R13E
ELEVATION
DATE INSTALLED 12/5/72



water level 32' 12/3/72
6" casing to 51'

The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT.
SALEM, OREGON 97310
within 30 days from the date of well completion.

WATER WELL REPORT

STATE OF OREGON

(Please type or print)

(Do not write above this line)

(86) State Well No. 2N/13E-19

State Permit No. _____

) OWNER:

Name Neil Pake

Address 1022 Maple West
The Dalles, OR 97058

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☒ Driven ☐
Cable ☐ Jetted ☐
Dug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) CASING INSTALLED:

Threaded ☐ Welded ☒

____" Diam. from 0 ft. to 20 ft. Gage .250
____" Diam. from ____ ft. to ____ ft. Gage ____
____" Diam. from ____ ft. to ____ ft. Gage ____

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No.

Type of perforator used

Size of perforations ____ in. by ____ in.

____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.
____ perforations from ____ ft. to ____ ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No

Manufacturer's Name ____

Type ____ Model No. ____

Diam. ____ Slot size ____ Set from ____ ft. to ____ ft.
Diam. ____ Slot size ____ Set from ____ ft. to ____ ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?

Yield: ____ gal./min. with ____ ft. drawdown after ____ hrs.

Bailer test 25 gal./min. with 60 ft. drawdown after 1 hrs.

Artesian flow ____ g.p.m.

Temperature of water 54° Depth artesian flow encountered ____ ft.

CONSTRUCTION:

Well seal—Material used cement grout

Well sealed from land surface to 19 ft.

Diameter of well bore to bottom of seal 10 in.

Diameter of well bore below seal 8 in.

Number of sacks of cement used in well seal 8 sacks

How was cement grout placed? pressure grouted

Was a drive shoe used? ☒ Yes ☐ No Plugs ____ Size: location ____ ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of water? ____ depth of strata ____

Method of sealing strata off ____

Was well gravel packed? ☐ Yes ☒ No Size of gravel: ____ F-220

Gravel placed from ____ ft. to ____ ft.

(10) LOCATION OF WELL:

County Wasco Driller's well number

SW ¼ SW ¼ Section 19 T. 2 N R. 13 E. W.M.

Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found 139 ft.

Static level 66 ft. below land surface. Date 9-20-7

Artesian pressure ____ lbs. per square inch. Date ____

(12) WELL LOG:

Diameter of well below casing 8"

Depth drilled 164 ft. Depth of completed well 164 ft.

Formation: Describe color, texture, grain size and structure of material and show thickness and nature of each stratum and aquifer penetrated with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Rock, decomposed	0	15	
Rock, grey	15	20	
Rock, decomposed	20	124	
Rock, porous red & gray	124	139	
Rock, porous gray	139	154	66
Rock, gray	154	164	66

OCT 1 1979
WATER RESOURCES DEPT
SALEM, OREGON

Work started Sept. 15 1979 Completed Sept. 20 197

Date well drilling machine moved off of well Sept. 20 197

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Gilbert Clayton (Drilling Machine Operator) Date Oct. 17, 1979

Drilling Machine Operator's License No. 129

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name Gilbert Clayton Well Drilling (Person, firm or corporation) (Type or print)

Address Rt 1, Box 61-A, The Dalles, OR 970

[Signed] Gilbert Clayton (Water Well Contractor)

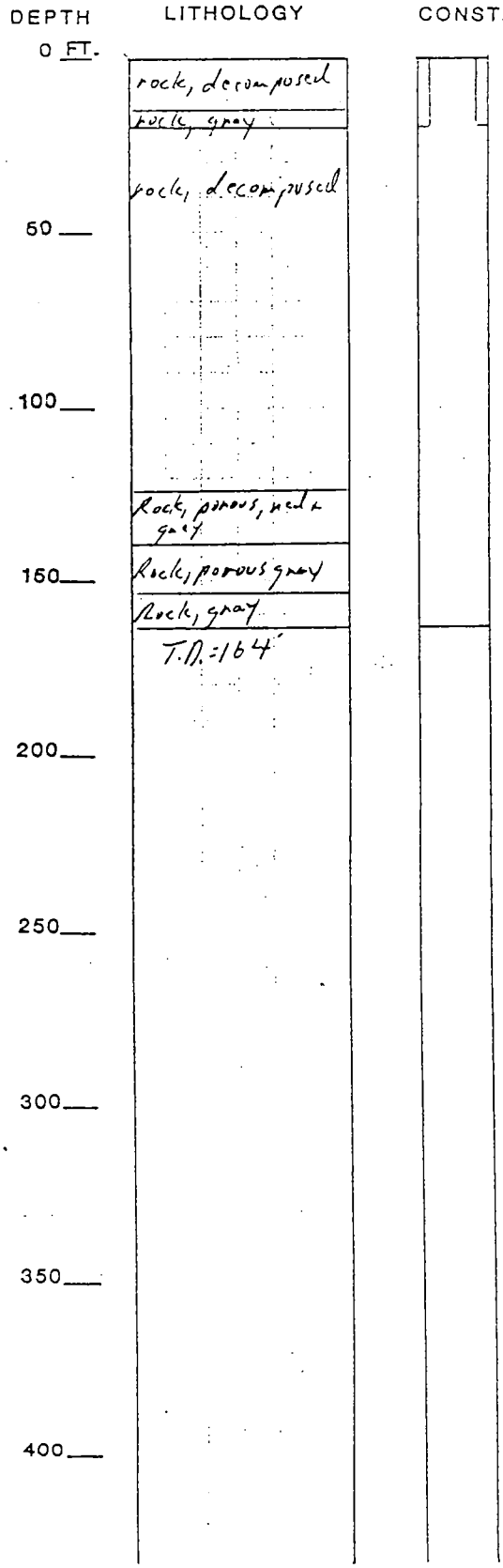
Contractor's License No. 569 Date Oct. 17, 197

(USE ADDITIONAL SHEETS IF NECESSARY)

SP145000

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Neil Pake
LOCATION SW¼, SW¼, sec. 19, T2N, R.13E
ELEVATION
DATE INSTALLED 9/20/79



...ned with the ... STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

.03 CN

STATE OF OREGON
(Please type or print)
(Do not write above this line)

DEC 18 1975
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 2N/13E-2
Permit No. (87)

(1) OWNER: (Animal Shelter)

Name Wasco County
Address Court House, The Dalles, Oregon

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary ☐ Driven ☐
Cable ☐ Jetted ☐
Bug ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

CASING INSTALLED:

Threaded ☐ Welded ☐

8" Diam. from 0 ft. to 58 ft. Gage .250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS:

Perforated? ☐ Yes ☒ No.

Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No

Manufacturer's Name
Type Model No.
Diam. Slot size Set from ft. to ft.
Diam. Slot size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
Air test 16 gal. min. with 100% drawdown
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Well seal—Material used Bentonite & cement
Well sealed from land surface to 30 ft.
Diameter of well bore to bottom of seal 12 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal 3 sacks
Number of sacks of bentonite used in well seal 7 sacks
Brand name of bentonite Yellow stone
Number of pounds of bentonite per 100 gallons of water 100 lbs./100 gals.
Was a drive shoe used? ☐ Yes ☐ No Plugs Size: location ft.
Is any strata contain unusable water? ☐ Yes ☐ No
Type of water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☐ No Size of gravel:
Gravel placed from ft. to ft.

F-222

(10) LOCATION OF WELL:

County Wasco Driller's well number
NE ¼ NW ¼ Section 23 T. 2N R. 13E
Bearing and distance from section or subdivision corner

(11) WATER LEVEL: Completed well.

Depth at which water was first found 30
Static level 30 ft. below land surface. Date 16 D
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 8
Depth drilled 58 ft. Depth of completed well 58

Formation: Describe color, texture, grain size and structure of mate and show thickness and nature of each stratum and aquifer penetr with at least one entry for each change of formation. Report each chan position of Static Water Level and indicate principal water-bearing st

MATERIAL	From	To	S
Sand brown	0	1	
Boulders	1	7	
Conglomerate red WP	7	58	
Basalt black [illegible] with green claystone	58	58	3

Work started 15 Dec 1975 Completed 16 Dec
Date well drilling machine moved off of well 17 Dec

Drilling Machine Operator's Certification:

This well was constructed under my direct supervis Materials used and information reported above are true to best knowledge and belief.

[Signed] Richard J. Murray (Drilling Machine Operator) Date 16 Dec, 1
Drilling Machine Operator's License No. 737

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this repo true to the best of my knowledge and belief.

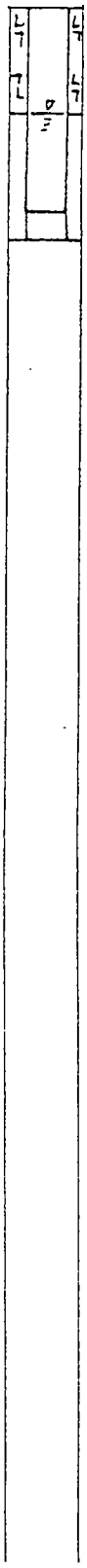
Name Richard J. Murray (Person, firm or corporation) (Type or print)
Address 3712 W 8th The Dalles, Oregon
[Signed] Richard J. Murray (Water Well Contractor)
Contractor's License No. [illegible] Date [illegible] Dec

(USE ADDITIONAL SHEETS IF NECESSARY)

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Wasco Co. Animal Shelter
LOCATION NE 1/4, NW 1/4, sec 23, T2N, R13E
ELEVATION
DATE INSTALLED 12/17/75

DEPTH	LITHOLOGY	CONSTRUCTION DETAILS
0 FT.	~~Sand brown~~ boulders	12" hole to 30'
	conglomerate	8" hole to 65'
		8" dia. casing to 58' water level 30' 12/16/75
50		no apparent screen
	claystone and Basalt, visic. T.D. = 65'	
100		
150		
200		
250		
300		
350		
400		



(88)

STATE ENGINEER
Salem, Oregon

State Well No. 2N/13-29G(2)
County Wasco
Application No. U-442

Well Log

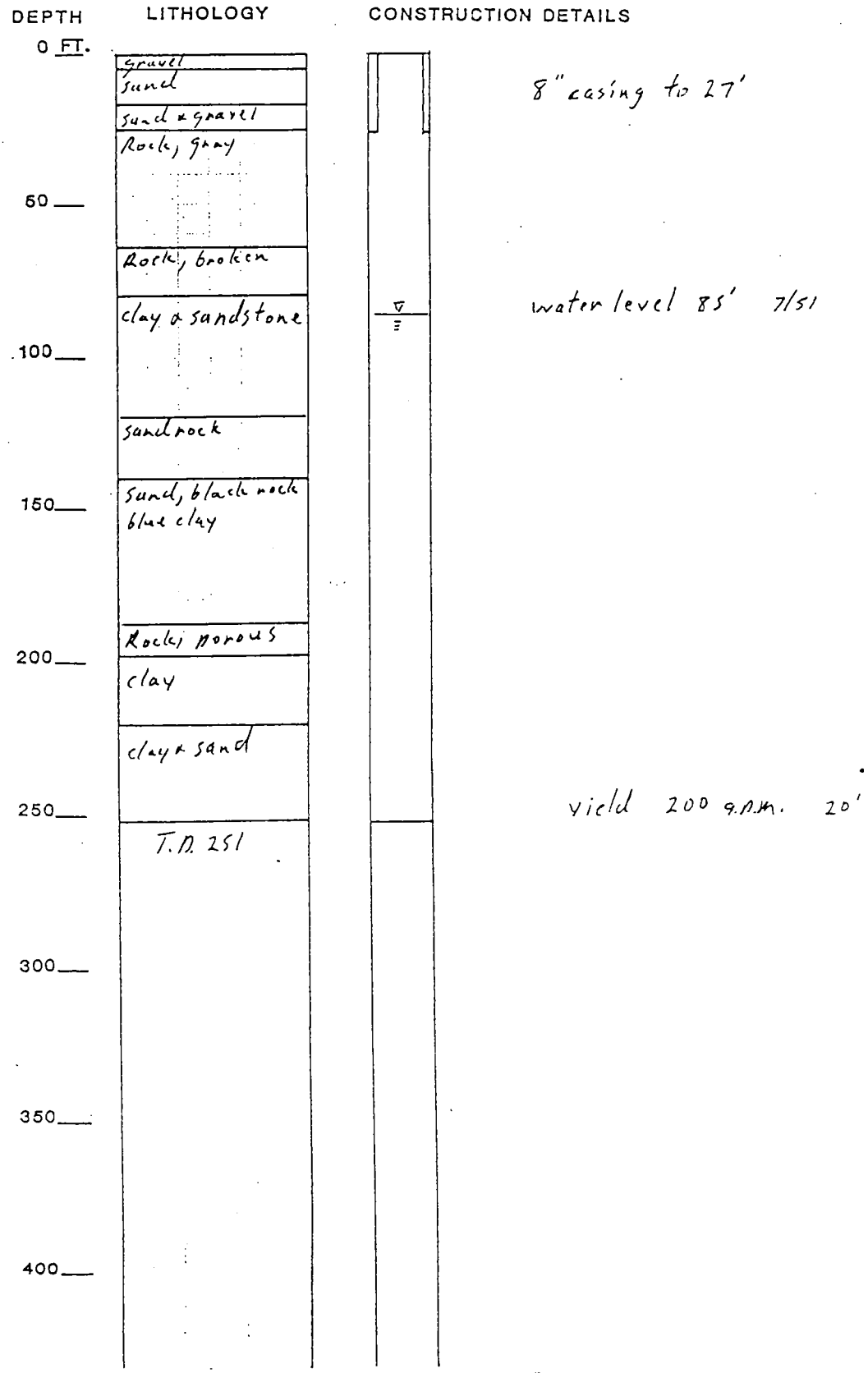
Owner: Fred Wetle Owner's No.

Driller: Date Drilled 1950-51

CHARACTER OF MATERIAL	(Feet below land surface) From	To	Thickness (feet)
Gravel	0	6	6
Sand	6	18	12
Sand and gravel	18	26	8
Rock, gray	26	64	38
Rock, broken	64	80	16
Clay and sandstone	80	119	39
Sandrock	119	140	21
Sand, black, rock, black, and blue clay	140	188	48
Rock, Porous	188	198	10
Clay	198	220	22
Clay and Sand	220	251	31

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Freel Wetle
LOCATION SW¼, NE¼, Sec. 29, T2N, R13E.
ELEVATION
DATE INSTALLED 1951



STATE ENGINEER
Salem, Oregon

Well Record

STATE WELL NO. 2N/13-29G(
COUNTY Wasco
APPLICATION NO. U-442

OWNER: Fred Wetle

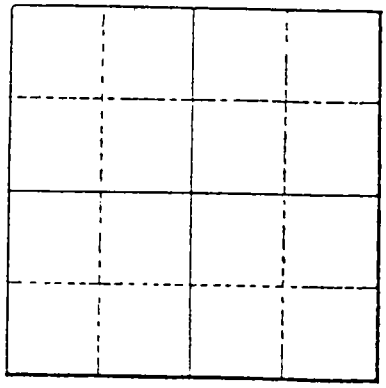
MAILING ADDRESS:

LOCATION OF WELL: Owner's No.

CITY AND STATE:

SW ¼ NE ¼ Sec. 29 T. 2 ~~S~~ N. R. 13 ~~W~~ E. W.M.

Bearing and distance from section or subdivision corner



Section 29

Altitude at well

TYPE OF WELL: drilled Date Constructed 1950-51

Depth drilled 251 Depth cased 27

CASING RECORD:

8-inch, set to 27 feet

FINISH:

AQUIFERS:

WATER LEVEL: 85 ft. July 1951

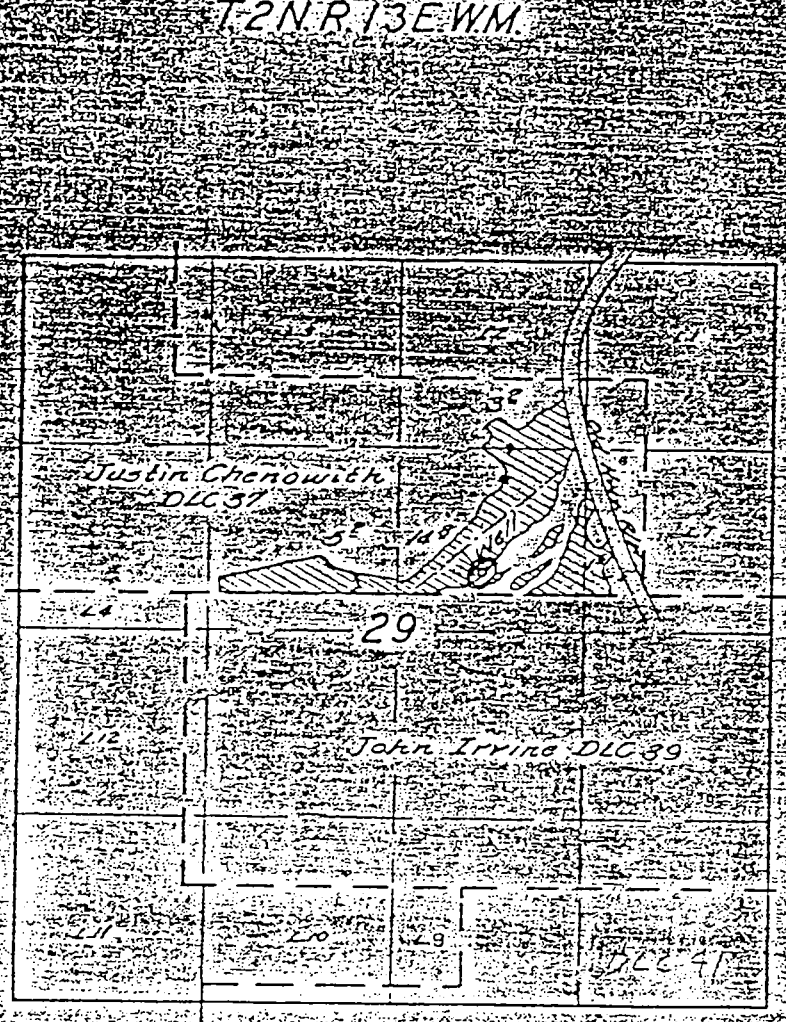
PUMPING EQUIPMENT: Type Turbine H.P. 15
Capacity G.P.M.

WELL TESTS:
Drawdown 20 ft. after hours pumping 200 G.P.M.
Drawdown ft. after hours G.P.M.

USE OF WATER Temp. °F., 19
SOURCE OF INFORMATION
DRILLER or DIGGER
ADDITIONAL DATA:
Log Water Level Measurements Chemical Analysis Aquifer Test

REMARKS:

State Printing 80316



FINAL PROOF SURVEY

UNDER

Application No. U-442 Permit No. U-413

IN NAME OF

Fred Wetle

Surveyed Nov. 11 1959, by C.O. Bartels

F-227

STATE ENGINEER
Salem, Oregon

State Well No. 7/13-29G(2)

County WASCO

Application No. .....

Water Level Record

OWNER: Fred Wetle OWNER'S NO. .....

Description of measuring point: Owners air line and gage

Date	Water Level Feet ~~(above)~~ (below) Land Surface	Remarks	Date	Water Level Feet (above) (below) Land Surface	Remarks
1-28-59	105				
4-6-59	100				
5-7-59	107				
8-27-59	118				
10-7-59	117				
11-24-59	112				
12-21-59	110				
2-17-60	107				
3-15-60	105				
4-12-60	104½				
5-26-60	100'+	Break in line? WSB - lost pressure at 100'			
7-7-60	?	WSB CAN'T MEASURE			
2-7-62	116				

REMARKS: .....

F-228

State Printing 89314

(80)

WATER WELL REPORT
STATE OF OREGON

RECEIVED
AUG 31 1983
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 2N/13E-28

Permit No. .....

PLEASE TYPE or PRINT IN INK

Ground Water Monitoring Well # 1

(1) OWNER:
Name Martin Mariotta
Address 3313 2nd St.
City The Dalles State Or

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☒
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:
Steel ☐ Threaded ☐ Plastic ☒ Welded ☐

2 " Diam. from +1 ft. to 197 ft. Gauge sch 40
4 " Diam. from +1 ft. to 139 ft. Gauge sch 40

LINER INSTALLED: 110 40

" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:
Well screen installed? ☒ Yes ☐ No
Manufacturer's Name Hydrophilic
Type PVC Model No. 40
Diam. 2 Slot Size 40 Set from 95 ft. to 105 ft.
Diam. 4 Slot Size 100 Set from 124 ft. to 134 ft.
2 110 192 202

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
---- gal/min. with ft. drawdown after hrs.
" " " "
Air test --- gal/min. with drill stem at ft. hrs.
Bailer test --- gal/min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☒
Well seal—Material used Cement grout
Well sealed from land surface to 18,108'-113', 169'-174' ft.
Diameter of well bore to bottom of seal 10 in. 197'-207'
Diameter of well bore below seal 10 in.
Number of sacks of cement used in well seal 21 sacks
How was cement grout placed? press pumped
Was pump installed? no Type HP Depth ft.
Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☒ Yes ☐ No Size of gravel: 3/4-1"
Gravel placed from 18-108 ft. to 113-139 ft.
169-197

(10) LOCATION OF WELL:
County Wasco Driller's well number # 1
¼ ¼ Section 28 T. 2N R 13E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: same as mailing

(11) WATER LEVEL: Completed well.
Depth at which water was first found 95 ft.
Static level 78,117,67' ft. below land surface. Date 8-9-83
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing -----
Depth drilled 207 ft. Depth of completed well 197 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Soil med brn	0	1	
Dirt-clay med brn	1	4	
Basalt fract. brn-grey	4	7	
Basalt hard grey	7	55	
Claystone, soft blk-grn	55	73	
Basalt med, blk-grey	73	113	
Basaltporous, grey-grn	113	121	
Basalt hard grey	121	124	
Basalt porous, grey-grn	124	132	
Basalt porous med grey	132	153	
Basalt hard grey	153	174	
Basalt fract. grey-grn	174	197	
Claystone med grn-grey	197	207	

Work started 7-27 19 83 Completed 8-8-83 1983
Date well drilling machine moved off of well 8-8 1983

(unbonded) Water Well Constructor Certification (If applicable):
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] ..... Date ....., 19.....

Bonded Water Well Constructor Certification:
Bond _____ (number) Issued by: _____ Surety Company Name
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name West Coast Drilling Co. Inc. (Person, firm or corporation) (Type or print)
Address 220 Academy St. N. Angel, Or.
[Signed] ..... Water Well Constructor
Date 8-11 , 19 83

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the

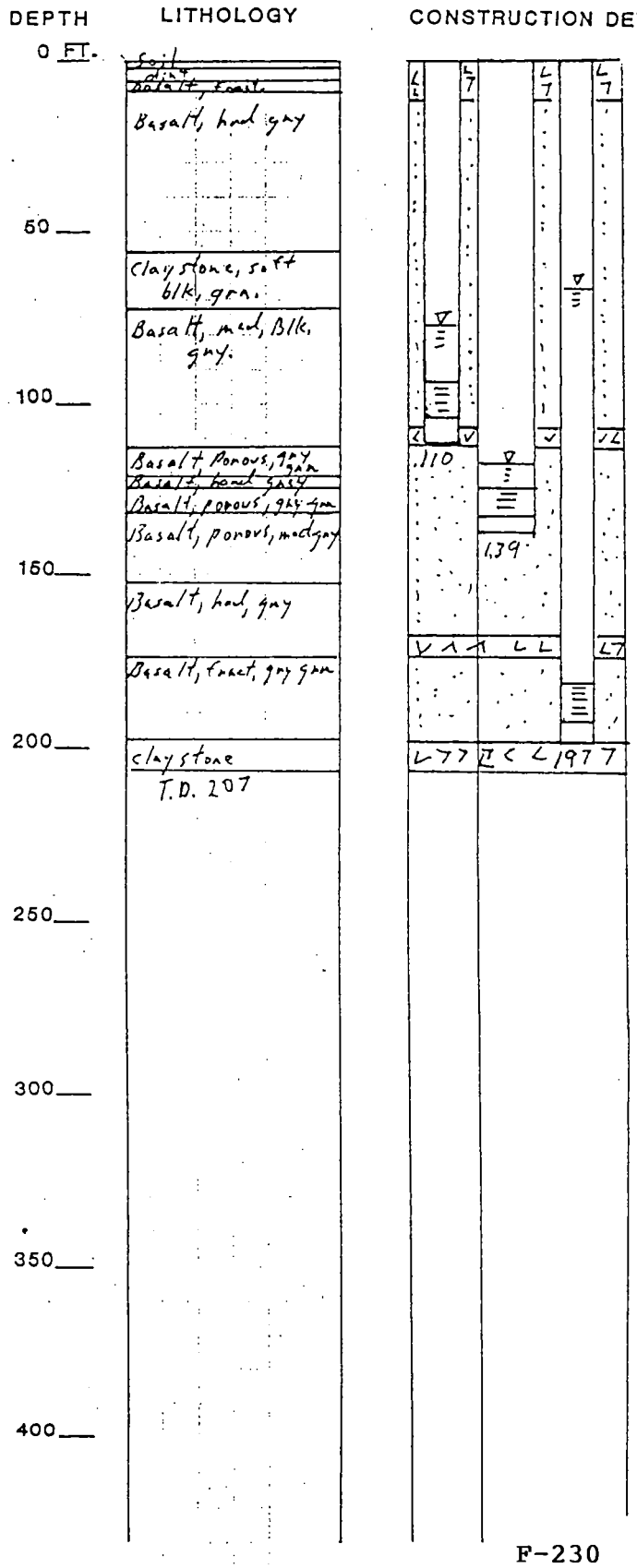
F-229

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

SP* 45292-590

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta #1
LOCATION Sec. 28, 2N, 13E
ELEVATION
DATE INSTALLED 8/8/83



water levels
78', 117', 67' at 8/9/83

sch 40 P.V.C casing

WATER WELL REPORT
STATE OF OREGON

RECEIVED
AUG 3 1 1983
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 2h/13E-28

State Permit No. .....

PLEASE TYPE or PRINT IN INK

Ground Water Monitor... 2

(1) OWNER:

Name Martin Marietta
Address 3313 West 2nd St.
City The Dallas State Or.

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☒ Municipal ☐
Irrigation ☐ Test Well ☒ Other ☒
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:

Steel ☐ Plastic ☒
Threaded ☒ Welded ☐

2 " Diam. from +1 ft. to 173 ft. Gauge sch 40
6 " Diam. from +1 ft. to 87 ft. Gauge 40

LINER INSTALLED:

..... " Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS:

Well screen installed? ☒ Yes ☐ No
Manufacturer's Name Hydrophilic
Type PVC Model No. 40
Diam. 2 Slot Size 40 Set from 72 ft. to 82 ft.
Diam. 6 Slot Size 100 Set from 158 ft. to 168 ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☒ Yes ☐ No If yes, by whom? A&H Pump
Yield: gal./min. with ft. drawdown after hrs.
" " " "
Air test ------ gal./min. with drill stem at ft. hrs.
Bailer test ----- gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:

Special standards: Yes ☐ No ☒
Well seal—Material used Cement grout
Well sealed from land surface to 20, 125-130, 176-183 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 10 in.
Number of sacks of cement used in well seal 25 sacks
How was cement grout placed? press pumped

Was pump installed? no Type ..... HP ..... Depth ..... ft.
Was a drive shoe used? ☐ Yes ☒ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☒ Yes ☐ No Size of gravel: 1/2 - 1/2
Gravel placed from 20-125 ft. to 130-176 ft.

(10) LOCATION OF WELL:

County Wasco Driller's well number # 2
¼ ¼ Section 28 T. 2N R. 13E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: same as mailing

(11) WATER LEVEL: Completed well.

Depth at which water was first found 61 ft.
Static level 85, 65' ft. below land surface. Date 8-9-83
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing ------
Depth drilled 183 ft. Depth of completed well 176 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Gravel, bouldars loose	0	16	
Claystone brken, grey-blk	16	28	
Basalt hard grey	28	61	
Basalt porous, grn-grey	61	82	
Basalt hard grey	82	101	
Basalt porous, grn-grey	101	125	
Basalt hard grey	125	129	
Basalt porous, grey-grn & brown	129	170	
Basalt hard grey	170	173	
Claystone- clay, grn-grey	173	183	

Work started 7-29 1983 Completed 8-5 1983
Date well drilling machine moved off of well 8-5 1983

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] ..... Date ....., 19.....

Bonded Water Well Constructor Certification:

Bond _____ (number) Issued by: _____ Surety Company Name

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name West Coast Drilling Co. Inc. (Person, firm or corporation) (Type or print)
Address 220 Academy St. Mt. Angel, Or.
[Signed] [signature] Water Well Constructor
Date 8-11 1983

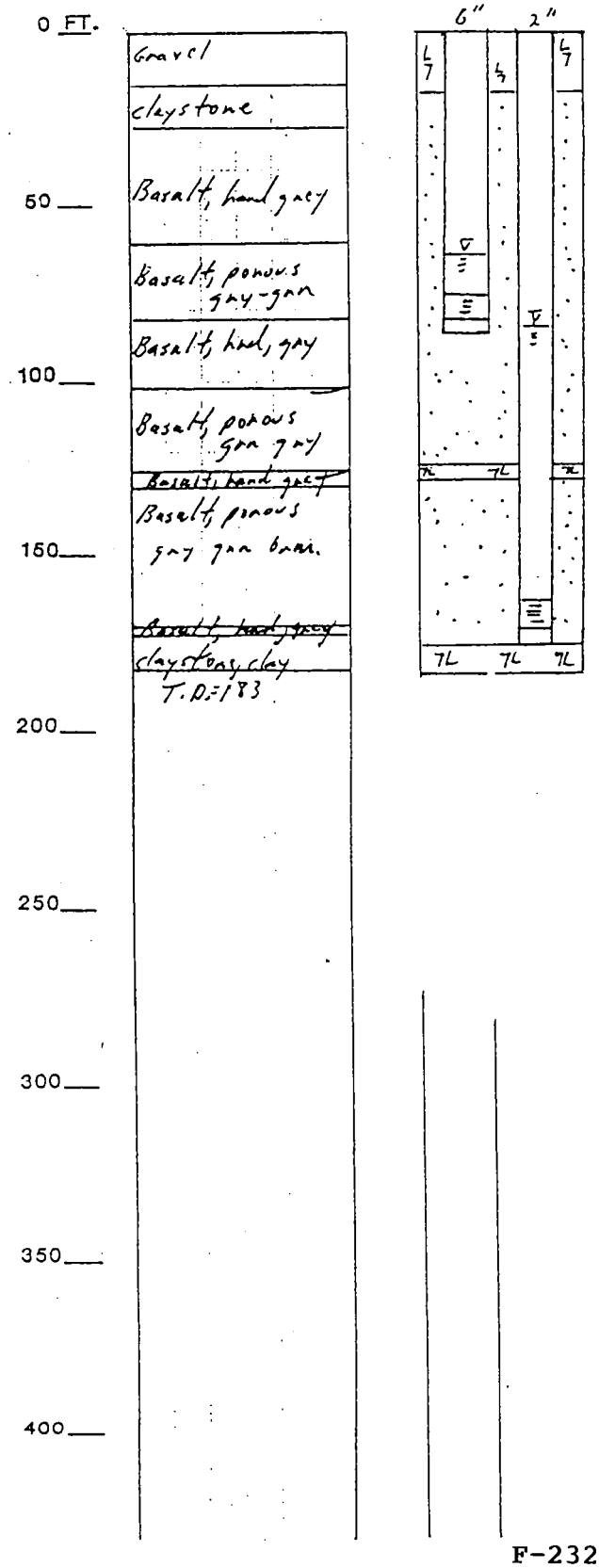
NOTICE TO WATER WELL CONSTRUCTOR F-231
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SF 45292-690

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta #2
LOCATION sec. 28, T2N, R13E
ELEVATION
DATE INSTALLED 8/5/83

DEPTH | LITHOLOGY | CONSTRUCTION DETAILS



10" borehole
6" casing, P.V.C., to 87'
2" casing, P.V.C., to 173'

grout 0-20, 125-130, 176-183.
6" screen 72'-82'
water levels 65' & 85' 8/5/83

2" screen 158' to 168'

WATER WELL REPORT
STATE OF OREGON

RECEIVED
AUG 31 1983
WATER RESOURCES DEPT.
SALEM, OREGON

State Well No. 2N/13E-28

PLEASE TYPE or PRINT IN INK — State Permit No.

Ground Water Monitor Well

(1) OWNER:
Name Martin Marietta
Address 3313 West 2nd St.
City The Dallas State Or.

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☒ Other ☒
Thermal: ☐ Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:
Steel ☐ Threaded ☒ Plastic ☒ Welded ☐

2" Diam. from +1 ft. to 122 ft. Gauge sch 40
4" Diam. from +1 ft. to 163 ft. Gauge 40
LINER INSTALLED: +1 185 40
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

SCREENS:
Well screen installed? ☒ Yes ☐ No
Manufacturer's Name Hydrophilic
Type PVC Model No. 40
Diam. 2 Slot Size 40 Set from 107 ft. to 117 ft.
Diam. 4 Slot Size 100 Set from 149 ft. to 159 ft.
2 [illegible] [illegible]

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: ---- gal./min. with ft. drawdown after hrs.
" " " "
Air test ------ gal./min. with drill stem at ft. hrs.
Bailer test ------ gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☒
Well seal—Material used cement grout
Well sealed from land surface to 18,140-145, 160-165 ft.
Diameter of well bore to bottom of seal 10 in. 185-193
Diameter of well bore below seal 10 in.
Number of sacks of cement used in well seal 19 sacks
How was cement grout placed? press pumped
Was pump installed? no Type HP Depth ft.
Was drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☒ Yes ☐ No Size of gravel: 3/4
Gravel placed from 18-140 ft. to 145-160 ft. 165-185

(10) LOCATION OF WELL:
County Jasco Driller's well number
¼ ¼ Section 28 T. 2N R 13E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location:

(11) WATER LEVEL: Completed well
Depth at which water was first found 100 ft.
Static level 78,120,120' ft. below land surface. Date 8-9-83
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing ------
Depth drilled 193 ft. Depth of completed well 185 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Soil med brown	0	1	
Basalt fract. grey	1	4	
Basalt hard grey	4	21	
Basalt fract, blk-grn	21	26	
Basalt med grey-brn	26	30	
Basalt hard grey	30	95	
Basalt fract grey-brn	95	101	
Basalt grn, brn, grey	101	117	
Basalt hard grey	117	146	
Basalt porous blk-grn	146	168	
Basalt fract blk-brn	168	182	
Basalt hard grey	182	185	
Claystone med green	185	193	

Work started 8-1 1983 Completed 8-9 1983
Date well drilling machine moved off of well 8-9 1983

(unbonded) Water Well Constructor Certification (If applicable):
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] ..... Date ....., 19.....

Bonded Water Well Constructor Certification:
Bond _____ (number) Issued by: _____ (Surety Company Name)
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name West Coast Drilling Co. Inc. (Person, firm or corporation) (Type or print)
Address 220 Academy St. Ft. Angel, Or.
[Signed] [signature] Water Well Constructor
Date 8-11, 1983

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the

F-233

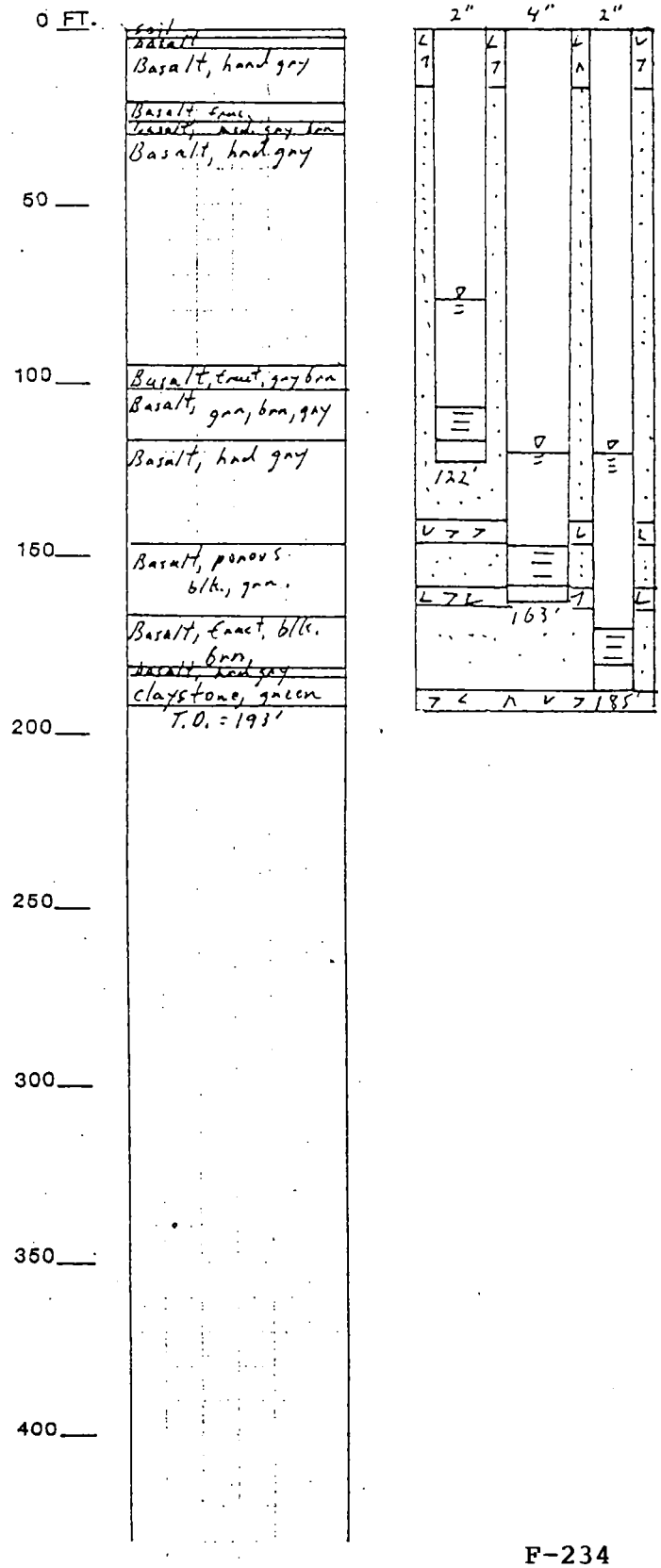
WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion

SP* 45292-880

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta #3
LOCATION sec. 28, 2N, 13E
ELEVATION
DATE INSTALLED 8/9/83

DEPTH | LITHOLOGY | CONSTRUCTION DETAILS



WATER WELL REPORT
STATE OF OREGON

RECEIVED
JUN 6 1984
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. 2N/13E-28
Permit No. .....

PLEASE TYPE or PRINT IN INK

(1) OWNER: # 4A
Name MARTIN MARIETTA
Address P.O. BOX 711
City THE DALLES State OR 97058

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☑ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check): MONITORING.
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☑
Thermal: ☐ Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED: Steel ☐ Plastic ☑
Threaded ☑ Welded ☐
2 " Diam. from +1 ft. to 37 ft. Gauge SCHED 40
" Diam. from ..... ft. to ..... ft. Gauge .....

LINER INSTALLED:
" Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS: Perforated? ☐ Yes ☑ No
Type of perforator used
Size of perforations in. by in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS: Well screen installed? ☑ Yes ☐ No
Manufacturer's Name TIMCO
Type P.V.C. Model No.
Diam. 2 Slot Size 40 Set from 37 ft. to 42 ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
Yield: gal/min. with ft. drawdown after hrs.
NO YIELD TEST WAS MADE
Air test gal/min. with drill stem at ft. hrs.
Bailer test gal/min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION: Special standards: Yes ☑ No ☐
Well seal—Material used BEN SEAL
Well sealed from land surface to 30 ft.
Diameter of well bore to bottom of seal 8 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal NONE sacks
How was cement grout placed?
150 lbs OF BENSEAL USED AT A RATE OF 2 lbs PER-GALLON OF WATER
Was pump installed? NO Type HP Depth ft.
Was a drive shoe used? ☐ Yes ☑ No Plugs Size: location ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☑ Yes ☐ No Size of gravel: 3/8 - 3/4
Gravel placed from 30 ft. to 42 ft.

(10) LOCATION OF WELL:
County WASCO Driller's well number 4A
¼ ¼ Section 28 T. 2N R. 13E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: SAME AS MAILING

(11) WATER LEVEL: Completed well
Depth at which water was first found 37 ft.
Static level 15 ft. below land surface. Date 4-26-8
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 8
Depth drilled 40 ft. Depth of completed well 40 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
BRN-GREY FRAC. BASAIT	0	3	
DECOMPOSED BASAIT BRN	3	12	
CLAYSTONE BRN & CHARCOAL	12	19	
BASAIT BLK FRACTURED	19	37	
BASAIT BRN FRACTURED	37	40	W.B.

Work started 4-25 19 84 Completed 4-26 19 8
Date well drilling machine moved off of well 4-26 19 84

(unbonded) Water Well Constructor Certification (if applicable):
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Steven N. Stadel Date 5-22, 19 84

Bonded Water Well Constructor Certification:
Bond (number) Issued by: (Surety Company Name)
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name First Coast Drilling Co., Inc. (Person, firm or corporation) (Type or print)
Address 220 Madrona St.
Mt. Angel, OR 97362
[Signed] (Water well constructor)
503-845-6824
Date 5-22, 1984

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the

F-235

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion

SP* 45292-800

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta #4A
LOCATION sec. 28, 2N, 13E
ELEVATION
DATE INSTALLED 4/26/84

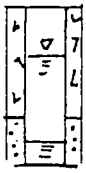
DEPTH | LITHOLOGY | CONSTRUCTION DETAILS

0 FT.

basalt, brn, gry, frac.
basalt, decomposed
clay stone, brn & char
basalt, blk, frac.
~~basalt, brn frac.~~

T.D. = 40' or 42'?

50
100
150
200
250
300
350
400



casing 2" sch. 40 P.V.C.
static water level 15', 4-26-84
grout 0-30' "Ben-Seal"
screen, 37' to 42'

WATER WELL REPORT
STATE OF OREGON

State Well No. 2N/13E-28

State Permit No. .....

PLEASE TYPE or PRINT IN INK

(1) OWNER: # 4B

Name MARTIN MARIETTA

Address P.O. BOX 711 THE DALLES

City ..... State OR 97058

(2) TYPE OF WORK (check):

New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☑ Driven ☐
Rotary Mud ☐ Dug ☐
[illegible] ☐ Bored ☐

(4) PROPOSED USE (check): MONITORING

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☑
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED: Steel ☐ Plastic ☑ Threaded ☑ Welded ☐

2" Diam. from +1 ft. to 100 ft. Gauge SCHED. 40

..... " Diam. from ..... ft. to ..... ft. Gauge .....

(6) LINER INSTALLED:

..... " Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS: Perforated? ☐ Yes ☑ No

Type of perforator used

Size of perforations ..... in. by ..... in.

..... perforations from ..... ft. to ..... ft.

..... perforations from ..... ft. to ..... ft.

..... perforations from ..... ft. to ..... ft.

(7) SCREENS: Well screen installed? ☑ Yes ☐ No

Manufacturer's Name TIMCO

Type P.V.C. Model No. .....

Diam. 2 Slot Size 40 Set from 100 ft. to 105 ft.

Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☑ No If yes, by whom?

Yield: ..... gal./min. with ..... ft. drawdown after ..... hrs.

NO YIELD TEST WAS MADE

Air test ..... gal./min. with drill stem at ..... ft. ..... hrs.

Bailer test ..... gal./min. with ..... ft. drawdown after ..... hrs.

Artesian flow ..... g.p.m.

Temperature of water ..... Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION: Special standards: Yes ☑ No ☐

Well seal—Material used BEN-SEAL

Well sealed from land surface to 30' & 40-90 ft.

Diameter of well bore to bottom of seal 8 in.

Diameter of well bore below seal 8 in.

Number of sacks of cement used in well seal NONE sacks

How was ~~cement~~ grout placed? PUMPING

400 lbs OF BEN-SEAL USED AT A RATIO OF 2 lbs PER GALLON OF WATER

Was pump installed? NO Type ..... HP ..... Depth ..... ft.

Was a drive shoe used? ☐ Yes ☑ No Plugs ..... Size: location ..... ft.

Did any strata contain unusable water? ☐ Yes ☑ No

Type of Water? ..... depth of strata

Method of sealing strata off

Was well gravel packed? ☑ Yes ☐ No Size of gravel: 3/8 - 3/4

Gravel placed from 90 ft. to 105 ft.

(10) LOCATION OF WELL: #

County WASCO Driller's well number 4B

¼ ¼ Section 28 T. 2N R. 13E W.M.

Tax Lot # ..... Lot ..... Blk ..... Subdivision .....

Address at well location: SAME AS MAILING

(11) WATER LEVEL: Completed well.

Depth at which water was first found 94 ft.

Static level 24 ft. below land surface. Date 4-26-8[illegible]

Artesian pressure ..... lbs. per square inch. Date .....

(12) WELL LOG: Diameter of well below casing .....

Depth drilled ..... ft. Depth of completed well ..... ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
BRN-GREY FRAC. BASALT	0	3	
DECOMPOSED BASALT BRN	3	12	
CLAYSTONE BRN & CHARCOAL	12	19	
BASALT BLK FRACTURED	19	37	
BASALT BRN FRACTURED	37	40	
BASALT BLK HARD	40	72	
BASALT BRN WTHRD	72	86	
BASALT BLK HRD	86	94	
VASICULAR BASALT BRN AND BLACK	94	105	W.B.

Work started 4-25 1984 Completed 4-26 1984

Date well drilling machine moved off of well 4-26 1984

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Steven N. Stadel Date 5-22 1984

Bonded Water Well Constructor Certification:

Bond ..... (number) Issued by: ..... Surety Company Name

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name West Coast Drilling Co., Inc. (Person, firm or corporation) (Type or print)

Address 220 Academy St. Mt. Angel, OR 97362

[Signed] [signature] 503-845-0824 Constructor

Date 5-22 1984

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the

F-237

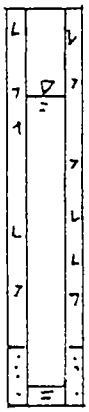
WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310
within 30 days from the date of well completion.

SP 45292-890

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta #4B
LOCATION sec. 28, 2N, 13E
ELEVATION
DATE INSTALLED 4/26/84

DEPTH	LITHOLOGY	CONSTRUCTION DETAILS
0 FT.	~~Basalt, frac. brn, gry~~	
	Basalt, decomp.	
	claystone, brn, char	
	Basalt, blk, fractur.	water level 24', 4-26-84
	~~Basalt, brn, frac.~~	casing 2" sch. 40 P.V.C.
50	Basalt, blk, hrd	grout 0-90
	Basalt, Brn, wthrd	
	Basalt, Blk, hrd	
100	Basalt, brn & blk. vesicular	screen 100' to 105'
	T.D. = 105	
150		
200		
250		
300		
350		
400		



WATER WELL REPORT
STATE OF OREGON

RECEIVED
JUN 6 1984
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. 2N/13E-28

PLEASE TYPE or PRINT IN INK

Permit No. .....

(1) OWNER: #5
Name MARTIN MARIETTA
Address P.O. BOX 711
City THE DALLES State OR 97058

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☑ Driven ☐
Rotary Mud ☐ Dug ☐
☐ Bored ☐

(4) PROPOSED USE (check): MONITORING
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☑
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED: Steel ☐ Plastic ☑ Threaded ☑ Welded ☐
2 " Diam. from +1 ft. to 90 ft. Gauge SCHED 40
2 " Diam. from 100 ft. to 105 ft. Gauge SCHED 40

LINER INSTALLED:
..... " Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS: Perforated? ☐ Yes ☑ No
Type of perforator used
Size of perforations in. by in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS: Well screen installed? ☑ Yes ☐ No
Manufacturer's Name TIMCO
Type P.V.C. Model No. .....
Diam. 2 Slot Size 40 Set from 90 ft. to 100 ft.
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
NO YIELD TEST WAS MADE
Air test gal./min. with drill stem at ft. hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION: Special standards: Yes ☑ No ☐
Well seal—Material used BEN-SEAL
Well sealed from land surface to 85 ft.
Diameter of well bore to bottom of seal 6 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal NONE sacks
How was cement grout placed? PUMPED
250 lbs OF BEN-SEAL WAS USED AT A RATIO OF 2 lbs PER GALLON OF WATER
Was pump installed? NO Type ..... HP ..... Depth ..... ft.
Was a drive shoe used? ☐ Yes ☑ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☑ Yes ☐ No Size of gravel: 3/8 - 3/4
Gravel placed from 85 ft. to 105 ft.

(10) LOCATION OF WELL:
County WASCO Driller's well number 5
¼ ¼ Section 28 T. 2N R. 13E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: SAME AS MAILING

(11) WATER LEVEL: Completed well.
Depth at which water was first found 90 ft.
Static level 41 ft. below land surface. Date 4-30-
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 0
Depth drilled 105 ft. Depth of completed well 105 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
BASALT BROKEN GREY + BRN	0	3	
BASALT GREY HARD	3	26	
CLAYSTONE GREEN	26	34	
BASALT GREY HARD	34	90	
BASALT FRACTURED BLK W/BRN STREAKS	90	105	W.B

Work started 4-27 1984 Completed 4-30 1984
Date well drilling machine moved off of well 4-30 1984

(unbonded) Water Well Constructor Certification (if applicable):
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Steven N. Stadeli Date 5-22, 1984

Bonded Water Well Constructor Certification:
Bond _____ (number) Issued by: _____ (Surety Company Name)
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name West Coast Drilling Co., Inc. (Type or print)
Address 220 Academy St. Mt. Angel, OR 97362
[Signed] [signature] 503-845-6824 (Constructor)
Date 5-22, 1984

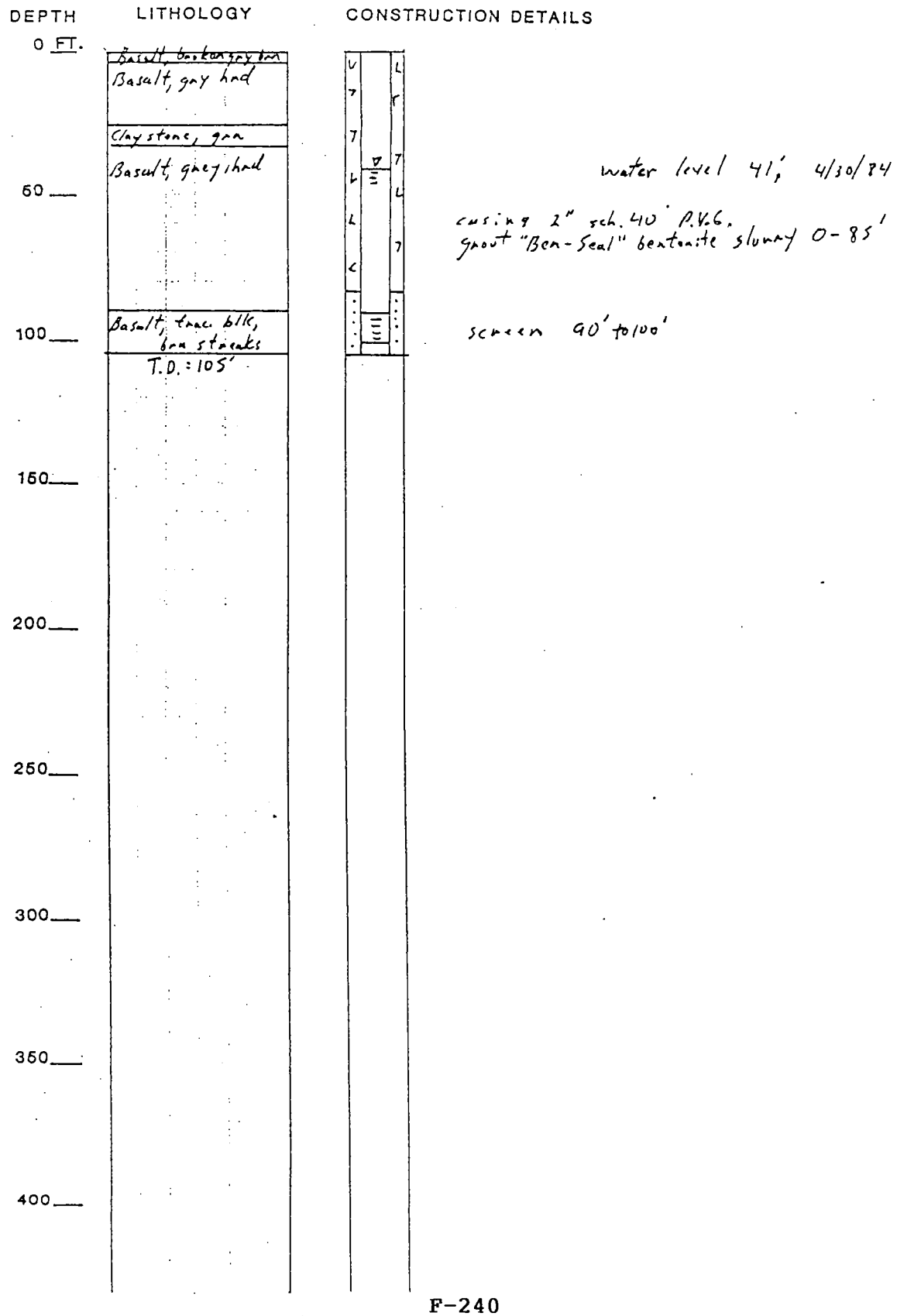
NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

F-239

SP 46292-880

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta #5
LOCATION sec 28, 2N, 13E
ELEVATION
DATE INSTALLED 4/30/84



WATER WELL REPORT
STATE OF OREGON

RECEIVED
JUN 6 1984
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. 2N/13E-28
State Permit No. .....

PLEASE TYPE or PRINT IN INK

(1) OWNER:
Name MARTIN MARIETTA #6A
Address P.O. BOX 711
City THE DALLES State OR 97058

(2) TYPE OF WORK (check):
New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☑ Driven ☐
Rotary Mud ☐ Dug ☐
☐ Bored ☐

(4) PROPOSED USE (check):
MONITORING
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☑
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED: Steel ☐ Plastic ☑
Threaded ☑ Welded ☐
2" Diam. from 41 ft. to 114 ft. Gauge SCHED. 40
2" Diam. from 119 ft. to 124 ft. Gauge SCHED. 40

LINER INSTALLED:
..... " Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS: Perforated? ☐ Yes ☑ No
Type of perforator used
Size of perforations in. by in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS: Well screen installed? ☑ Yes ☐ No
Manufacturer's Name TIMCO
Type P.V.C. Model No. .....
Diam. 2 Slot Size 40 Set from 114 ft. to 119 ft.
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☑ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
NO YIELD TEST WAS MADE:
Air test gal./min. with drill stem at ft. hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION: Special standards: Yes ☑ No ☐
Well seal—Material used BEN-SEAL
Well sealed from land surface to 104 ft.
Diameter of well bore to bottom of seal 8 in.
Diameter of well bore below seal 8 in.
Number of sacks of cement used in well seal NONE sacks
How was cement grout placed? PUMPED
450 lbs OF BEN-SEAL WAS USED AT A RATIO OF 2 lbs PER GALLON OF WATER
Was pump installed? NO Type ..... HP ..... Depth ..... ft.
Was a drive shoe used? ☐ Yes ☑ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☑ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☑ Yes ☐ No Size of gravel: 3/8 - 3/4
Gravel placed from 104 ft. to 124 ft.

(10) LOCATION OF WELL:
County WASCO Driller's well number #6A
¼ ¼ Section 28 T. 2N R. 13E W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: SAME AS MAILING

(11) WATER LEVEL: Completed well.
Depth at which water was first found 111 ft.
Static level 84 ft. below land surface. Date 5-2-3
Artesian pressure lbs. per square inch. Date

(12) WELL LOG: Diameter of well below casing 0
Depth drilled 124 ft. Depth of completed well 124 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
BASALT GREY BROKEN	0	3	
BASALT GREY HRD	3	42	
CLAYSTONE GREEN	42	46	
BASALT GREY + BRN + GREEN POROUS	46	59	
BASALT GREY HRD	59	111	
BASALT GREY, GREEN, BRN POROUS	111	124	W.B.

Work started 4-30 1984 Completed 5-2 1984
Date well drilling machine moved off of well 5-2 1984

(unbonded) Water Well Constructor Certification (if applicable):
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Steven N. Stadel Date 5-22, 1984

Bonded Water Well Constructor Certification:
Bond _____ (number) Issued by: _____ Surety Company Name
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name West Coast Drilling Co., Inc. (Type or print)
Address 226 Academy St.
Mt. Angel OR 97362
[Signed] [signature] Water Well Constructor
503-845-6824
Date 5-22, 1984

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

F-241

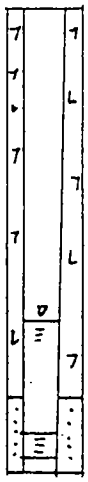
SP-45292-690

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta #6A
LOCATION sec. 28, 2N, 13E
ELEVATION
DATE INSTALLED 5-2-30

DEPTH | LITHOLOGY | CONSTRUCTION DETAILS

0 FT.
Basalt, gray, brn
Basalt, gray, hard
50
clay stone, green
Basalt, gray, brn, gnn porous
Basalt, gray, hard.
100
Basalt, gray, gnn, brn porous
T.D. = 124'
150
200
250
300
350
400



casing 2", sch. 40 P.V.C.
grout, "ben-seal" bentonite 0-104'

water level, 84' 5-2-30

screen 114' to 119'

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

JUN 6 1984

WATER RESOURCES DEPT
SALEM, OREGON

2N/13E-28

PLEASE TYPE or PRINT (for official use only)

(1) OWNER:

Name MARTIN MARIETTA # 6AA

Address P.O. Box 711

City THE DALLES ORE State 97058

(2) TYPE OF WORK (check):

New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☑ Driven ☐

Rotary Mud ☐ Dug ☐

Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐

Irrigation ☐ Thermal ☐ Injection ☐

Other: MONITORING

Piezometric ☐ Grounding ☐ Test ☐

(5) CASING INSTALLED:

Steel ☐ Plastic ☑

Threaded ☑ Welded ☐

2 " Diam. from +1 ft. to 121 ft. Gauge SCHED. 40

" Diam. from ft. to ft. Gauge

LINER INSTALLED:

Steel ☐ Plastic ☐

Threaded ☐ Welded ☐

" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:

Perforated? ☐ Yes ☑ No

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☑ Yes ☐ No

Manufacturer's Name TIMCO

Type P.V.C. Model No.

Diam. 2 Slot Size 40 Set from 121 ft. to 126 ft.

Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☑ No If yes, by whom?

gal./min. with ft. drawdown after hrs.

NO YIELD TEST WAS MADE.

Air test gal./min. with drill stem at ft. hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes ☑ No ☐

Well seal—Material used BEN-SEAL

Well sealed from land surface to 100 ft.

Diameter of well bore to bottom of seal 8 in.

Diameter of well bore below seal 8 in.

Amount of sealing material 250 sacks ☐ pounds ☑

How was cement grout placed? PUMPED

Was pump installed? NO Type HP Depth ft.

Was a drive shoe used? ☐ Yes ☑ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☑ No

Type of Water? depth of strata

Method of sealing strata off

Was well gravel packed? ☑ Yes ☐ No Size of gravel: 3/8 - 3/4

Gravel placed from 100 ft. to 126 ft.

(10) LOCATION OF WELL by legal description:

County WASCO ¼ ¼ of Section 28 of

Township T2N (Township is North or South) Range 13E (Range is East or West) WM.

Tax Lot Lot Block Subdivision

MAILING ADDRESS OF WELL (or nearest address) SAME

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found 111 ft.

Static level 84 ft. below land surface. Date 5-16-8

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 0

Depth drilled 126 ft. Depth of completed well 126 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
BASALT GREY BROKEN	0	3	
BASALT GREY HRD	3	42	
GAYSTONE GREEN	42	46	
BASALT GREY +BRN + GREEN	46	59	
BASALT GREY HRD	59	111	
BASALT GREY GREEN BRN	111	126	W.B.

Date work started 5-15-84 /completed 5-16-84

Date well drilling machine moved off of well 5-16-84 19

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

(Signed) Steven M. Stachle Date 5-22, 19 84

(bonded) Water Well Constructor Certification:

Bond (number) Issued by: (Surety Company Name)

On behalf of West Coast Drilling Co., Inc. (Type or print name of Water Well Constructor)

220 Academy St

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. [illegible] OR 97062

(Signed) (Water Well Constructor)

(Dated) 5-22-84

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the

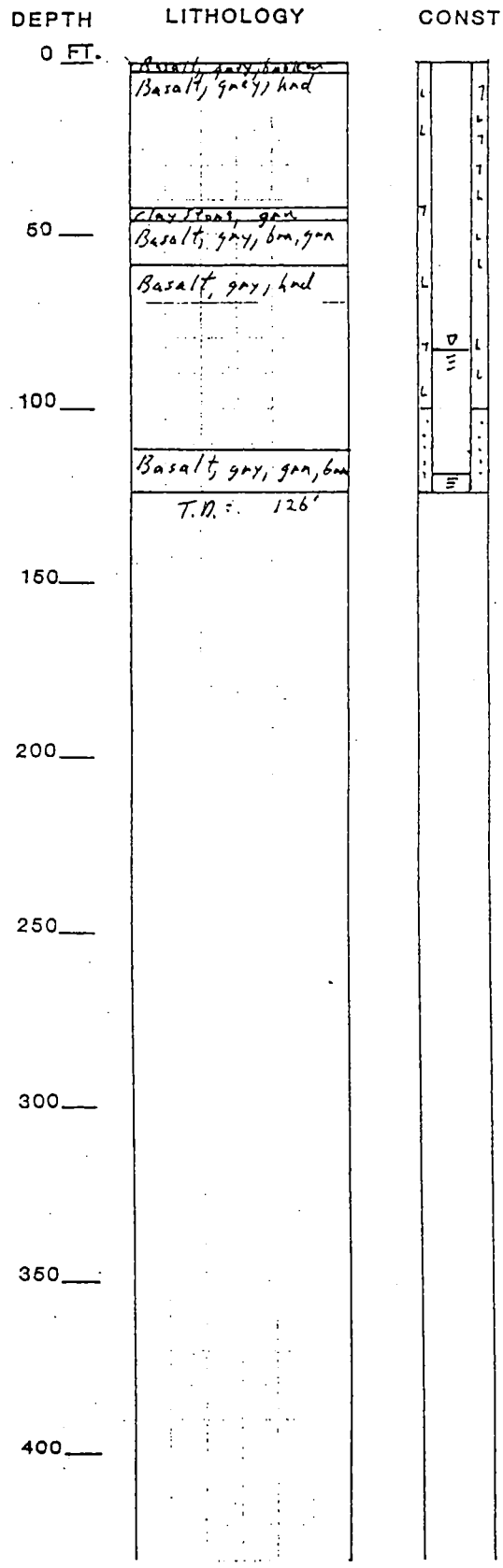
F-243

WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP* 46705-690

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta #6AA
LOCATION sec. 2E, T2N, R13E
ELEVATION
DATE INSTALLED 5/16/84



casing 2" sch. 40 P.V.C.
grout, "BEN-SEAL" bentonite slurry
0-100'

water level 84', 5-16-84

screen, 121' to 126'

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

RECEIVED
JUN 6 1984
WATER RESOURCES DEPT
SALEM, OREGON

2N/13E-28

PLEASE TYPE or PRINT IN INK (for official use only)

(1) OWNER:

Name MARTIN MARIETTA #6B

Address P.O. Box 711

City THE DALLES ORE State 97058

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☒ Driven ☐

Rotary Mud ☐ Dug ☐

Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐

Irrigation ☐ Thermal Withdrawal ☐ Reinjection ☐

Other: MONITORING

Piezometric ☐ Grounding ☐ Test ☐

(5) CASING INSTALLED:

Steel Threaded ☐ Plastic ☒ Welded ☐

2 " Diam. from +1 ft. to 173 ft. Gauge SCHED 40

2 " Diam. from 183 ft. to 183 ft. Gauge SCHED 40

LINER INSTALLED:

Steel Threaded ☐ Plastic ☐ Welded ☐

" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

7) SCREENS:

Well screen installed? ☒ Yes ☐ No

Manufacturer's Name TIMCO

Type P.V.C. Model No.

Diam. 2 Slot Size 40 Set from 173 ft. to 183 ft.

Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?

ld: gal./min. with ft. drawdown after hrs.

NO YIELD TEST WAS MADE.

Air test gal./min. with drill stem at ft. hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

operature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes ☒ No ☐

Well seal—Material used BEN-SEAL

Well sealed from land surface to 104 & 124-150 ft.

Diameter of well bore to bottom of seal 8 in.

Diameter of well bore below seal 8 in.

Amount of sealing material 450 sacks ☐ pounds ☒

How was cement grout placed? PUMPED

Was pump installed? NO Type HP Depth ft.

Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.

Any strata contain unusable water? ☐ Yes ☒ No

ype of Water? depth of strata

Method of sealing strata off

Was well gravel packed? ☒ Yes ☐ No Size of gravel: 3/8 - 3/4

Gravel placed from 150 ft. to 188 ft.

(10) LOCATION OF WELL by legal description:

County WASCO ¼ ¼ of Section 28 of

Township 2N (Township is North or South) Range 13E (Range is East or West) WM.

Tax Lot Lot Block Subdivision

MAILING ADDRESS OF WELL (or nearest address) SAME AS OWNER

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found 151 ft.

Static level 84 ft. below land surface. Date 5-2-84

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 0

Depth drilled ~~188~~ 194 ft. Depth of completed well 188 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
BROKEN ROCK	0	3	
BASALT GREY HRD	3	42	
CLAYSTONE GREEN	42	46	
BASALT GREY & BRN & GREEN POROUS	46	59	
BASALT GREY HARD	59	111	
BASALT GREY GREEN POROUS	111	127	
BASALT GREY HRD	127	151	
BASALT BRN GREY SOME GREEN VERY POROUS	151	188	
CLAYSTONE GREEN	188	194	
HOLE WAS BACK PLUGGED W/ BENSEAL FROM 194' BACK TO 188'			

Date work started 4-30-84 /completed 5-2-84

Date well drilling machine moved off of well 5-2-84 19

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Steven N. Haskins Date 5-22, 19 84

(bonded) Water Well Constructor Certification:

Bond (number) Issued by: (Surety Company Name)

On behalf of West Coast Drilling Co., Inc. (Name of Water Well Constructor)

220 Academy St. Ste A Ph. 503-[illegible]6824

Albany, OR 97321

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

(Signed) (Water Well Constructor)

(Dated) 5-22-84

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the

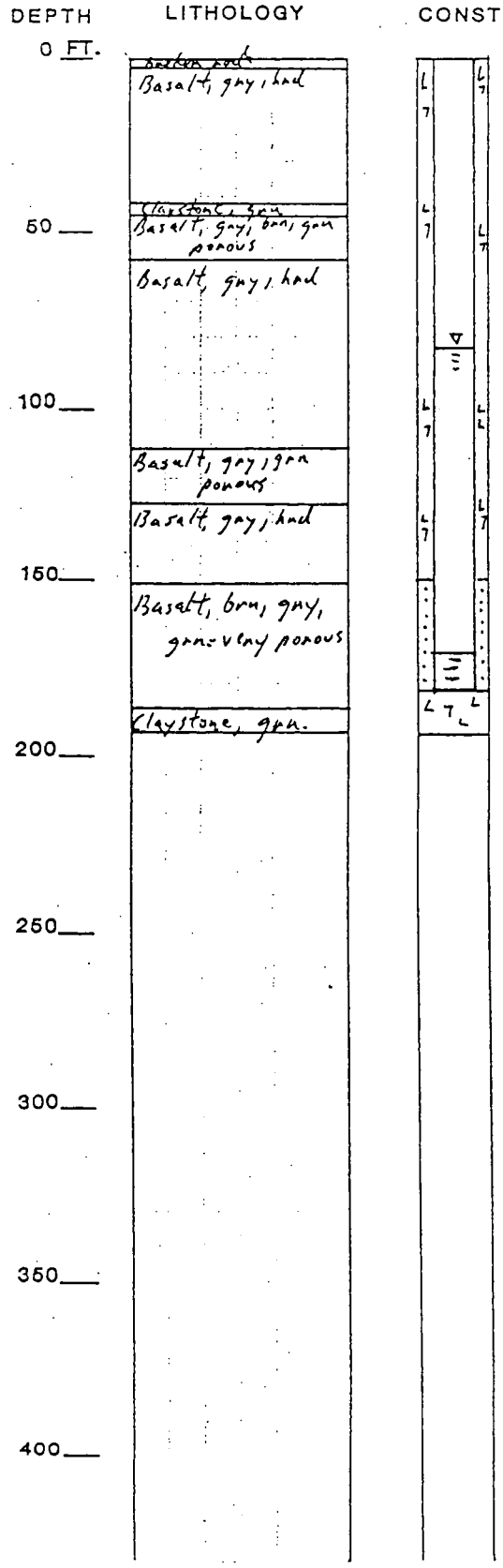
F-245

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

SP* 46866-690

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta #6B
LOCATION sec 28, T2N, R13E
ELEVATION
DATE INSTALLED 5/22/84



2" sch 40 P.V.C. casing
"Ben Seal" bentonite grout

water level at 84'. 5/2/84

screen 173' to 183'

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

JUN 6 1984

WATER RESOURCES DEPT
SALEM, OREGON

2N/13E-28

PLEASE TYPE or PRINT IN INK (for official use only)

(1) OWNER:

* 7A

Name MARTIN MARIETTA

Address P.O. BOX 711

City THE DALLES OREGON State 97058

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☒ Driven ☐

Rotary Mud ☐ Dug ☐

Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐

Irrigation ☐ Thermal: Withdrawal ☐ Reinjection ☐

Other: MONITORING Piezometric ☐ Grounding ☐ Test ☐

(5) CASING INSTALLED:

Steel ☐ Threaded ☒ Plastic ☒ Welded ☐

2 " Diam. from +1 ft. to 115 ft. Gauge SCHED 40

2 " Diam. from 120 ft. to 123 ft. Gauge SCHED 40

LINER INSTALLED: Steel ☐ Threaded ☐ Plastic ☐ Welded ☐

" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☒ Yes ☐ No

Manufacturer's Name TIMCO

Type P.V.C. Model No.

Diam. 2 Slot Size 40 Set from 115 ft. to 120 ft.

Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?

ld: gal./min. with ft. drawdown after hrs.

NO YIELD TEST WAS MADE

Air test gal./min. with drill stem at ft. hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

mperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes ☒ No ☐

Well seal—Material used BEN-SEAL

Well sealed from land surface to 104 ft.

Diameter of well bore to bottom of seal 8 in.

Diameter of well bore below seal 8 in.

Amount of sealing material 450 sacks ☐ pounds ☒

How was cement grout placed? PUMPED

Was pump installed? NO Type HP Depth ft.

Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of Water? depth of strata

Method of sealing strata off

Was well gravel packed? ☒ Yes ☐ No Size of gravel: 3/8 - 3/4

Gravel placed from 104 ft. to 123 ft.

(10) LOCATION OF WELL by legal description:

County WASCO ¼ ¼ of Section 28

Township 2N (Township is North or South) Range 13E (Range is East or West) WM

Tax Lot Lot Block Subdivision

MAILING ADDRESS OF WELL (or nearest address) SAME

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found 109 ft

Static level 56 ft. below land surface. Date 5-2-

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 0

Depth drilled 123 ft. Depth of completed well 123 ft

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
BASAIT GREY HRD	0	37	
CLAYSTONE GREEN-GREY	37	42	
BASAIT GREY POROUS	42	51	
BASALT GREY HRD	51	109	
BASALT GREY POROUS	109	117	W.B.
BASALT GREY HRD	117	123	

Date work started 5-2-84 /completed 5-3-84

Date well drilling machine moved off of well 5-4-84 19

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Steven N. Hudel Date 5-22, 1984

(bonded) Water Well Constructor Certification:

Bond (number) Issued by: (Surety Company Name)

On behalf of West Coast Drilling Co., Inc. (Type or print name of Water Well Constructor)

220 Applegate St. The Dalles, OR 97058

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief: 5

(Signed) (Water Well Constructor)

(Dated) 5-22-84

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the

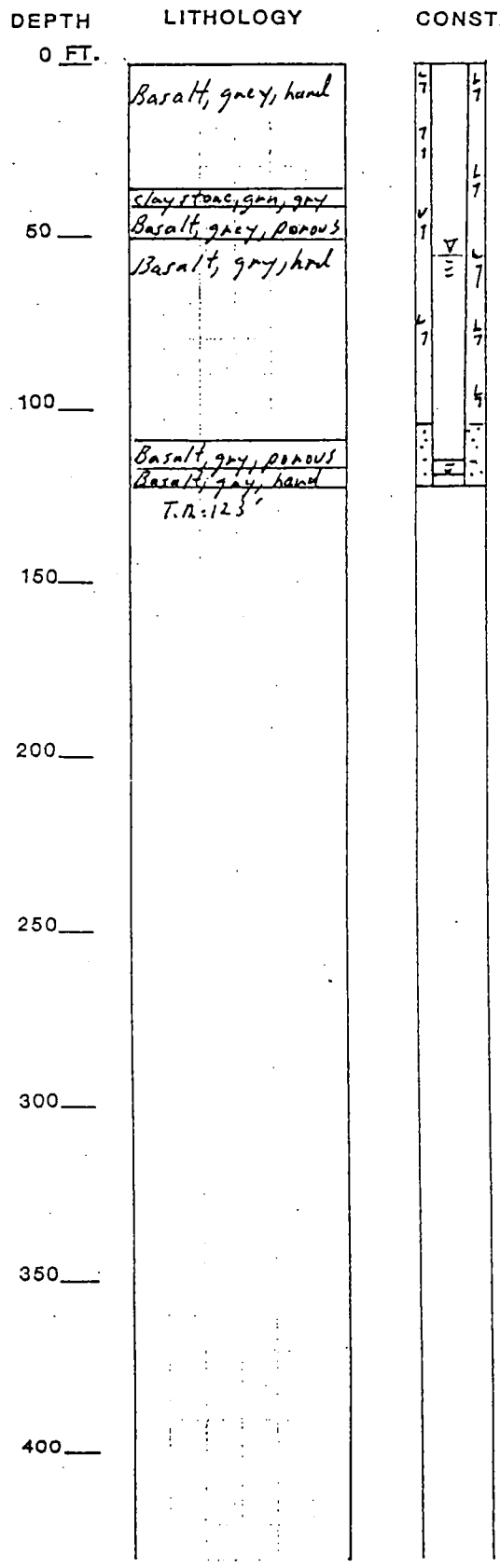
F-247

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion

SP* 65865-890

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta, #7A
LOCATION Sec. 28, T2N, R13E
ELEVATION
DATE INSTALLED 5/4/84



STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

RECEIVED
JUN 6 1984
WATER RESOURCES DEPT
SALEM, OREGON

2N/13E-28

PLEASE TYPE or PRINT (for official use only)

(1) OWNER:

Name MARTIN MARIETTA H 78

Address P.O. BOX 711

City THE DALLES OREGON State 97058

(2) TYPE OF WORK (check):

New Well ☑ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☑ Driven ☐

Rotary Mud ☐ Dug ☐

Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐

Irrigation ☐ Thermal: Injection ☐ Reinjection ☐

Other: MONITORING

Piezometric ☐ Grounding ☐ Test ☐

(5) CASING INSTALLED:

Steel ☐ Plastic ☑

Threaded ☑ Welded ☐

2 " Diam. from +1 ft. to 165 ft. Gauge SCHED 40

2 " Diam. from 170 ft. to 180 ft. Gauge "

LINER INSTALLED:

Steel ☐ Plastic ☑

Threaded ☑ Welded ☐

" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:

Perforated? ☐ Yes ☑ No

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☑ Yes ☐ No

Manufacturer's Name TIMCO

Type P.V.C. Model No.

Diam. 2 Slot Size 40 Set from 165 ft. to 170 ft.

Diam. 2 Slot Size Set from 180 ft. to 185 ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☑ No If yes, by whom?

ld: gal./min. with ft. drawdown after hrs.

~0 YIELD TEST WAS MADE

Air test gal./min. with drill stem at ft. hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

mperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes ☑ No ☐

Well seal—Material used BEN-SEAL

Well sealed from land surface to 104 + 123-140 ft.

Diameter of well bore to bottom of seal 8 in.

Diameter of well bore below seal 8 in.

Amount of sealing material 450 sacks ☐ pounds ☑

How was cement grout placed? PUMPED

Was pump installed? NO Type HP Depth ft.

Was a drive shoe used? ☐ Yes ☑ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☑ No

Type of Water? depth of strata

Method of sealing strata off

Was well gravel packed? ☑ Yes ☐ No Size of gravel: 3/8 - 3/4

Gravel placed from 140 ft. to 190 ft.

(10) LOCATION OF WELL by legal description:

County WASCO ¼ ¼ of Section 28 of

Township 2N (Township is North or South) Range 13E (Range is East or West) WM

Tax Lot Lot Block Subdivision

MAILING ADDRESS OF WELL (or nearest address) SAME

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found 151 ft.

Static level 88 ft. below land surface. Date 5-4-

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 0

Depth drilled 197 ft. Depth of completed well 190 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
BASALT GREY HRD	0	37	
CLAYSTONE GREEN-GREY	37	42	
BASALT GREY POROUS	42	51	
BASALT GREY HRD	51	109	
BASALT GREY POROUS	109	117	
BASALT GREY HRD	117	122	
BASALT GREY & GREEN SEMI-FRACTURED	122	143	
BASALT GREY HRD	143	145	
BASALT GREY & BRN POROUS	145	151	
BASALT GREY & GREEN VERY POROUS	151	192	
CLAY STONE GREEN	192	197	
HOLE WAS BACK PLUGGED WITH BEN-SEAL FROM 197 - 190			

Date work started 5-2-84 /completed 5-3-84

Date well drilling machine moved off of well 5-4-84 19

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Steven N. Studebaker Date 5-22, 19 84

(bonded) Water Well Constructor Certification:

Bond (number) Issued by: (Surety Company Name)

On behalf of West Coast Drilling Co., Inc. (typed name of bonded Water Well Constructor)

Mt. Angel, OR 97362

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief. 503-845-6824

(Signed) (Water Well Constructor)

(Dated) 5-22-84

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the

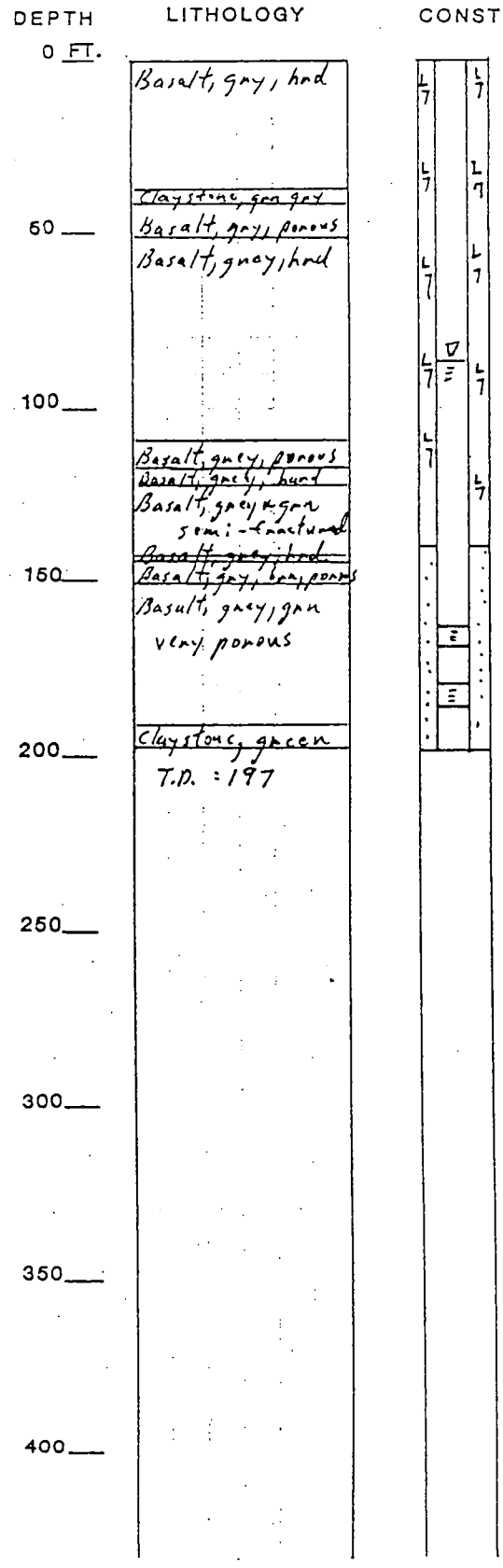
F-249

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

SP* 46A66-6M0

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta #7B
LOCATION Sec. 25, T2N, R13E
ELEVATION
DATE INSTALLED 5/4/84



8" hole
2" sch. 40. P.V.C. casing
"Bon-Seal" bentonite slurry

water level 88' 5/4/84

screen 165'-170', 180'-185'

STATE OF OREGON MAY 15 1985

WATER WELL REPORT WATER RESOURCES DEPT

(as required by ORS 537.765) SALEM, OREGON PLEASE TYPE or PRINT IN INK

2N/13E-28CL

Ground Water Monitoring Well # 10 (for official use only)

(1) OWNER:

Name Martin Marietta

Address P.O. Box 711

City The Dalles State Or.

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☒ Driven ☐

Rotary Mud ☐ Dug ☐

Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐

Irrigation ☐ Thermal: Withdrawal ☐ Reinjection ☐

Other: Piezometric ☒ Grounding ☐ Test ☒

(5) CASING INSTALLED:

Steel ☐ Plastic ☒

Threaded ☒ Welded ☐

2 " Diam. from +1 ft. to 107 ft. Gauge PVC-850-40

" Diam. from ft. to ft. Gauge

LINER INSTALLED:

none

Steel ☐ Plastic ☐

Threaded ☐ Welded ☐

" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

7) SCREENS:

Well screen installed? ☒ Yes ☐ No

Manufacturer's Name Timco

Type PVC Model No. sch 40

Diam. 2" Slot Size 40 Set from 107 ft. to 117 ft.

Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

Air test 7+ gal./min. with drill stem at 117 ft. 1 hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes ☒ No ☐

Well seal—Material used Bentonite-Benseal-

Well sealed from land surface to 107 ft.

Diameter of well bore to bottom of seal 6¼ in.

Diameter of well bore below seal 6¼ in.

Amount of sealing material 310 sacks ☐ pounds ☒

How was cement grout placed? pumped thru 2" grout pipe

Was pump installed? no Type HP Depth ft.

Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.

Any strata contain unusable water? ☐ Yes ☒ No

Type of Water? depth of strata

Method of sealing strata off

Was well gravel packed? ☒ Yes ☐ No Size of gravel #4 Montera sand

Gravel placed from 117 ft. to 107 ft.

(10) LOCATION OF WELL by legal description:

County Wasco SE ¼ SW ¼ of Section 28 of

Township 2N (Township is North or South) Range 13E (Range is East or West) WM.

Tax Lot Lot Block Subdivision

MAILING ADDRESS OF WELL (or nearest address) M&M Aluminum plant The Dalles, Or.

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found 28 ft.

Static level 46.53 ft. below land surface. Date 3-21-8

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 0

Depth drilled 117 ft. Depth of completed well 117 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Clay & cobbles	0	2.5	
Fract rock med brn	2.5	7	
Fract rock gray-brn	7	14	
Basalt hard gray	14	27	
Claystn med gray	27	43	
Basaltic rubble, gray brown, green med-hard	43	92	
Basaltic rubble with clay innerbeds gray	92	104.5	
Basalt med blk	104.5	109	
Basaltic rubble	109	115	
Basalt med blk	115	117	

Date work started 312 85 /completed 3-13-85

Date well drilling machine moved off of well 3-13-85 19

(unbonded) Water Well Constructor Certification (If applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Date , 19

(bonded) Water Well Constructor Certification:

Bond (number) Issued by: Union Indemnity (Surety Company Name)

On behalf of West Coast Drill (Type or print name of Water Well Constructor)

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

(Signed) (Water Well Constructor)

(Dated) 5-13-85

NOTICE TO WATER WELL CONSTRUCTOR

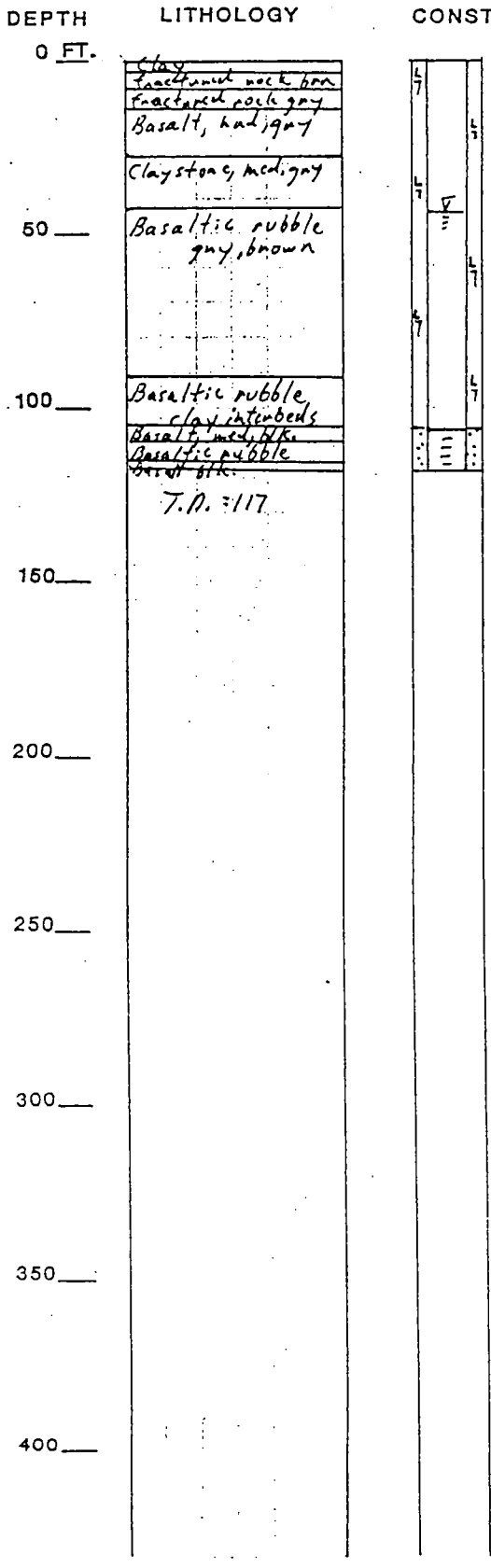
The original and first copy of this report are to be filed with the

F-251

WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta #10
LOCATION SE¼, SW¼, sec. 28, T2N, R13E
ELEVATION
DATE INSTALLED 3/21/85



6¼" hole
"Ben Seal" bentonite grout slurry
2" sch. 40 P.V.C. casing
water level 46' 3/21/85

screen 107' - 117'

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

MAY 15 1985

WATER RESOURCES DEPT
SALEM, OREGON

PLEASE TYPE or PRINT IN INK

2N/13E-28C

Ground Water Monitoring Well # 11

(for official use only)

(1) OWNER:

Name Martin Marietta

Address P.O. Box 711

City The Dalles, State Or.

(2) TYPE OF WORK (check):

New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☒ Driven ☐

Rotary Mud ☐ Dug ☐

Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐

Irrigation ☐ Thermal: Withdrawal ☐ Reinjection ☐

Other: Piezometric ☒ Grounding ☐ Test ☒

(5) CASING INSTALLED:

Steel ☐ Plastic ☐

Threaded ☐ Welded ☐

2 " Diam. from +1 ft. to 275 ft. Gauge PVC # 40

2 " Diam. from 295 ft. to 300 ft. Gauge PVC # 40

LINER INSTALLED:

Steel ☐ Plastic ☐

none Threaded ☐ Welded ☐

" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:

Perforated? ☐ Yes ☒ No

Size of perforations in. by in.

perforations from ft. to ft.

perforations from ft. to ft.

perforations from ft. to ft.

SCREENS:

Well screen installed? ☒ Yes ☐ No

Manufacturer's Name Timco

Type PVC Model No. # 40

Diam. 2 Slot Size 40 Set from 275 ft. to 295 ft.

Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?

Yield: gal./min. with ft. drawdown after hrs.

Air test gal./min. with drill stem at ft. hrs.

Bailer test gal./min. with ft. drawdown after hrs.

Artesian flow g.p.m.

Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes ☒ No ☐

Well seal—Material used Bentonite-Benseal

Well sealed from land surface to 255 ft.

Diameter of well bore to bottom of seal 8" in.

Diameter of well bore below seal 8 in.

Amount of sealing material 1500 sacks ☐ pounds ☒

How was cement grout placed? Pumped thru 2" pipes

Was pump installed? no Type HP Depth ft.

Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.

Did any strata contain unusable water? ☐ Yes ☒ No

Type of Water? depth of strata

Method of sealing strata off

Was well gravel packed? ☒ Yes ☐ No Size of gravel: # 4

Gravel placed from 255 ft. to 304 monterae sand

(10) LOCATION OF WELL by legal description:

County Wasco NE ¼ SW ¼ of Section 28 of

Township 2N (Township is North or South) Range 13E (Range is East or West) WM.

Tax Lot Lot Block Subdivision

MAILING ADDRESS OF WELL (or nearest address) Martin Marietta Aluminum plant, The Dalles Or.

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found 45 ft.

Static level 100.83 ft. below land surface. Date 3-21-85

Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 0

Depth drilled 304 ft. Depth of completed well 300 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Crushed rock & fill	0	12	
Basalt brn-gray fract	12	14	
Basalt hard gray	14	45	
Basalt Visic. black	45	49	
Basalt hard blk	49	84	
Basalt visic. gray	84	87	
Basalt hard gray-blk-grn	87	94	Trace
Basalt hard gray-blk-grn visic.	94	119	a.G
Basalt visic. blk-grn-wht	119	128	
Basalt hard gray	128	133	
Basalt med gray-brn-grn	133	146	T.
Basalt hard gray	146	149	
Basalt visic gray	149	196	2.6
Clay med green	196	214	
Clay med brn-wood inseams	214	224	
Basalt hard gray	224	232	
Basalt gray-brn inseams	232	257	
Basalt semi visic. gray	257	261	
Basalt hard gray	261	274	
next page			

Date work started 3-19-85 /completed 3-21-85

Date well drilling machine moved off of well 3-21-85 19

(unbonded) Water Well Constructor Certification (If applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Steven M. Stadeli Date 5-14 19 85

(bonded) Water Well Constructor Certification:

Bond (number) Issued by: Union Indemnity (Surety Company Name)

On behalf of West Coast Drilling Chuck Stadeli (type or print name of Water Well Constructor)

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

(Signed) (Water Well Constructor)

(Dated) 5-13-85

NOTICE TO WATER WELL CONSTRUCTOR F-253 WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310

The original and first copy of this report are to be filed with the within 30 days from the date of well completion.

SP*46866-800

Yg.2g2 2N/13E-28CA

STATE OF OREGON MAY 15 1985
WATER WELL REPORT WATER RESOURCES DEPT
(as required by ORS 537.765) SALEM, OREGON PLEASE TYPE or PRINT IN INK
Ground Water Monitoring # 11 (for official use only)

1) OWNER:

Name Martin Marietta
Address P.O. Box 711
City The Dalles State Or.

(2) TYPE OF WORK (check):

New Well ☐ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☐ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Thermal: Withdrawal ☐ Reinjection ☐
Other: Piezometric ☐ Grounding ☐ Test ☐

(5) CASING INSTALLED:

Steel ☐ Plastic ☐
Threaded ☐ Welded ☐

_____" Diam. from _____ ft. to _____ ft. Gauge _____
_____" Diam. from _____ ft. to _____ ft. Gauge _____

LINER INSTALLED:

Steel ☐ Plastic ☐
Threaded ☐ Welded ☐

_____" Diam. from _____ ft. to _____ ft. Gauge _____

(6) PERFORATIONS:

Perforated? ☐ Yes ☐ No
Size of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

7) SCREENS:

Well screen installed? ☐ Yes ☐ No
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot Size _____ Set from _____ ft. to _____ ft.
Diam. _____ Slot Size _____ Set from _____ ft. to _____ ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☐ No If yes, by whom?
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
_____
Air test _____ gal./min. with drill stem at _____ ft. _____ hrs.
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Artesian flow _____ g.p.m.
Temperature of water _____ Depth artesian flow encountered _____ ft.

(9) CONSTRUCTION:

Special standards: Yes ☐ No ☐
Well seal—Material used _____
Well sealed from land surface to _____ ft.
Diameter of well bore to bottom of seal _____ in.
Diameter of well bore below seal _____ in.
Amount of sealing material _____ sacks ☐ pounds ☐
How was cement grout placed? _____
_____
_____
Was pump installed? _____ Type _____ HP _____ Depth _____ ft.
Was a drive shoe used? ☐ Yes ☐ No Plugs _____ Size: location _____ ft.
Did any strata contain unusable water? ☐ Yes ☐ No
Type of Water? _____ depth of strata _____
Method of sealing strata off _____
Was well gravel packed? ☐ Yes ☐ No Size of gravel: _____
Gravel placed from _____ ft. to _____ ft.

(10) LOCATION OF WELL by legal description:

County _____ ¼ ¼ of Section _____ of
Township _____ (Township is North or South) Range _____ (Range is East or West) WM.
Tax Lot _____ Lot _____ Block _____ Subdivision _____
MAILING ADDRESS OF WELL (or nearest address) _____

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found _____ ft.
Static level _____ ft. below land surface. Date _____
Artesian pressure _____ lbs. per square inch. Date _____

(12) WELL LOG:

Diameter of well below casing _____
Depth drilled _____ ft. Depth of completed well _____ ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Basalt visic brn-red-gry	274	276	
Basalt hard gray	276	304	
Basalt visic fract	276	304	

Date work started _____ /completed _____
Date well drilling machine moved off of well _____ 19

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Steven N. Hladki Date _____, 19 ____

(bonded) Water Well Constructor Certification:

Bond _____ (number) Issued by: _____ (Surety Company Name)
On behalf of _____ (type or print name of Water Well Constructor)

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
(Signed) _____ (Water Well Constructor)
(Dated) _____

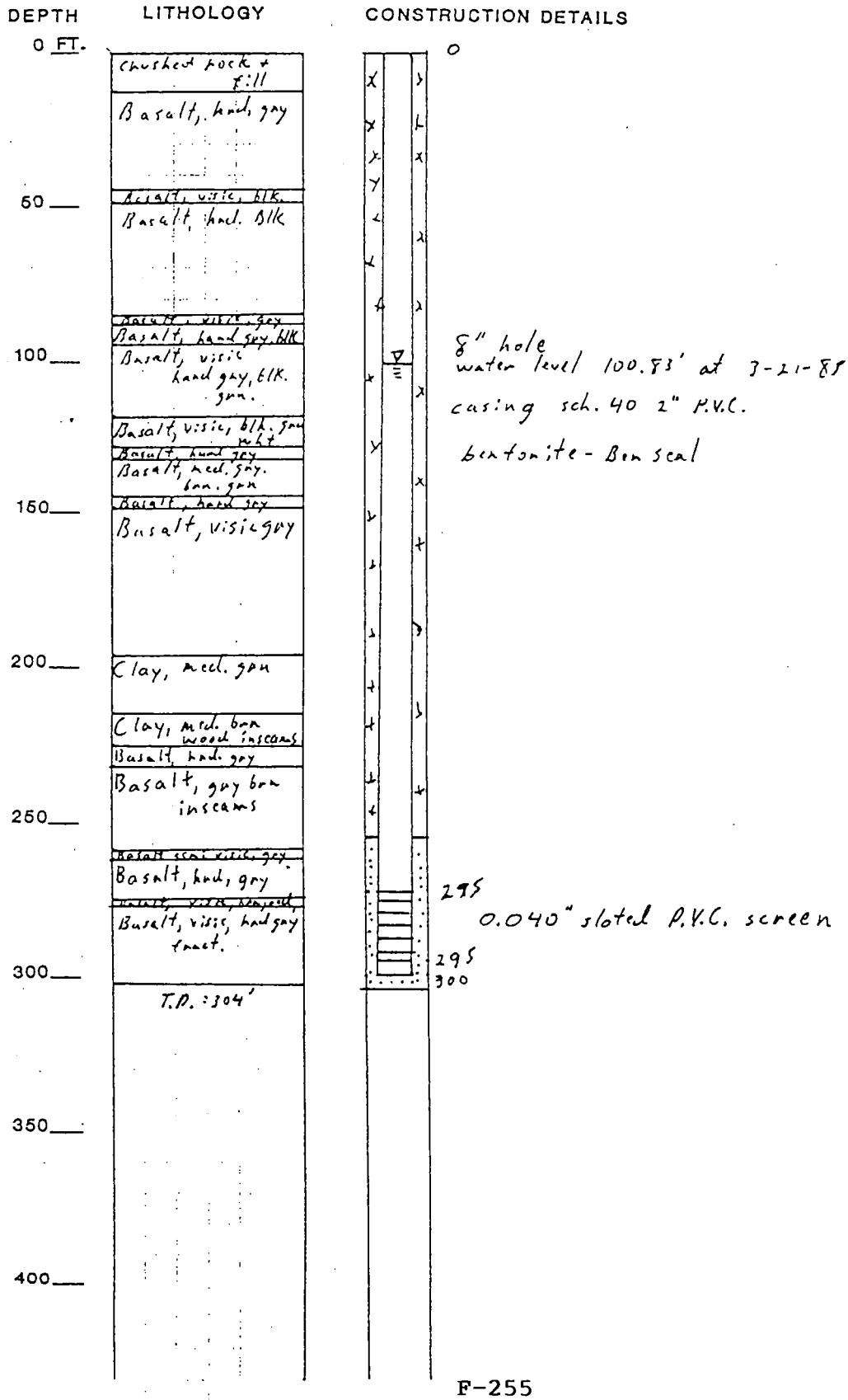
NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

F-254

SP* 46586-690

GERAGHTY & MILLER
Ground-Water Consultants

WELL NAME Martin Marietta, G.W.M. Well #11
LOCATION NE¼ of SW¼, sec. 28, 2N, 8E
ELEVATION
DATE INSTALLED 3/21/85



F-255

STATE OF OREGON

WATER WELL REPORT

(as required by ORS 537.765)

MAY 16 1985

WATER RESOURCES DEPT
SALEM, OREGON

TYPE or PRINT IN INK

2N/13E 28
abandon
(for official use only)

(1) OWNER:

Name Martin Marietta
Address P.O. Box 711
City The Dalles, State Or.

(2) TYPE OF WORK (check):

New Well ☐ Deepening ☐ Reconditioning ☐ Abandon ☒
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☐ Bored ☐

(4) PROPOSED USE (check):

Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☒ Thermal: Withdrawal ☐ Reinjection ☐
Other: Piezometric ☐ Grounding ☐ Test ☐

(5) CASING INSTALLED:

none
Steel ☐ Plastic ☐
Threaded ☐ Welded ☐
" Diam. from ft. to ft. Gauge
" Diam. from ft. to ft. Gauge

LINER INSTALLED:

none
Steel ☐ Plastic ☐
Threaded ☐ Welded ☐
" Diam. from ft. to ft. Gauge

(6) PERFORATIONS:

Perforated? ☒ Yes ☐ No
Size of perforations ½ & 3/8 in. by round in.
898 perforations from 11 ft. to 227 ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:

Well screen installed? ☐ Yes ☒ No
Manufacturer's Name
Type Model No.
Diam. Slot Size Set from ft. to ft.
Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?
gal./min. with ft. drawdown after hrs.
Air test gal./min. with drill stem at ft. hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
perature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes ☐ No ☒
Well seal—Material used Cement & bent.
Well sealed from land surface to 303 ft.
Diameter of well bore to bottom of seal 0 in.
Diameter of well bore below seal 0 in.
Amount of sealing material 11 bent- 194 cement ☒ pounds ☐
How was cement grout placed? pumped from bottom up toward surface thru 2" pipes with wilden pump
Was pump installed? no Type HP Depth ft.
Was a drive shoe used? ☐ Yes ☒ No Plugs Size: location ft.
Did any strata contain unusable water? ☒ Yes ☐ No
Type of Water Cyanide depth of strata 0 to ? TD
Method of sealing strata off perf. & grout-abandon
Was well gravel packed? ☐ Yes ☒ No Size of gravel:
Gravel placed from ft. to ft.

(10) LOCATION OF WELL by legal description:

County Wasco ¼ ¼ of Section 28 of
Township 2N (Township is North or South) Range 13E (Range is East or West) W.M.
Tax Lot Lot Block Subdivision
MAILING ADDRESS OF WELL (or nearest address) M&M Aluminum plant The Dalles, Or.

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found abandoned ft.
Static level 0 ft. below land surface. Date 3-19-8
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 0
Depth drilled 0 ft. Depth of completed well 0 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Bentonite comb. slurry of national & 8 mesh pumped from	303	250	
Cement grout pumped from 250' up to apprx 100' 1st stage. cement grout pumped from apprx 100' up to surface 2nd stage.			
Perforations were constructed using oil well perforater shaped charges manufactured by Gearhart Co. using apprx 700 5½ & 200 3½			

Date work started 3-14-85 /completed 3-19-85
Date well drilling machine moved off of well 3-19-85 19

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

(Signed) Date , 19

(bonded) Water Well Constructor Certification:

Bond (number) Issued by: Union Indemnity (Surety Company Name)
On behalf of West Coast Drlng Chuck Stadeli (Type or print name of Water Well Constructor)

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

(Signed) (Water Well Constructor)
(Dated) 3-15-85

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the

F-256

WATER RESOURCES DEPARTMENT,
SALEM, OREGON 97310
within 30 days from the date of well completion.

SP 4666-600

APPENDIX G

HYDROGEOLOGIC DATA

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POTENTIOMETRIC DATA

Water-level measurements were collected from on-site monitor wells during Phases I and II of the RI. Attachment G.1 presents hydrographs produced from these measurements. Prior to reconstruction of wells MW-1A through MW-9B (except well MW-5A) during the Phase II work, water-level measurements from these wells generally represent composite hydraulic heads over a large vertical interval. Representative Water-level measurements collected since completion of the Phase II work program are presented in Table G.1.

Aquifer Tests

To characterize the hydraulic properties of various aquifers underlying the site, slug tests and constant-rate pumping tests were performed. Slug tests were conducted in the S, A, and B aquifers and constant-rate pumping tests in the A and B aquifers and the DGWR. Analysis and interpretation of test data are described below and are summarized in Tables G.2 and G.3.

Slug Tests

Slug tests are designed to determine the hydraulic conductivity of a volume of material surrounding the screened or open hole section of an aquifer. These tests are conducted by lowering or raising the water level in a piezometer

Table G.1: Representative Water Level Elevations.
(all values in ft, msl)

WELL	5/6-Aug-87*	13-Aug-87	23-Aug-87	25-Aug-87	28-Aug-87
MWR-1A	-	-	29.30	29.26	25.71
MWR-1B	29.07	28.03	29.42	29.35	-
MW-2S	86.26	86.14	85.59	85.47	85.21
MWR-2A	28.74	27.93	29.25	29.25	24.66
MWR-2B	28.88	28.02	29.42	29.39	24.80
MW-3S	127.82	126.93	127.25	127.14	127.02
MWR-3A	28.60	27.88	29.30	29.09	23.76
MWR-3B	28.77	27.94	29.42	29.35	24.40
MWR-4S	122.35	122.27	122.16	122.14	122.09
MWR-4A	28.83	27.99	29.34	29.78	23.95
MW-4B	28.76	27.90	29.30	-	24.34
MW-5S	131.14	-	131.47	-	131.53
MW-5A	84.11	-	86.92	86.71	86.88
MW-6AA	36.12	35.51	26.52	32.20	32.72
MWR-6B	28.79	27.91	29.32	29.27	24.55
MWR-7A	28.76	27.93	29.31	29.25	24.59
MWR-7B	28.86	28.03	29.39	29.29	24.70
MW-8S	92.39	92.61	92.62	92.52	92.59
MWR-8A	36.21	35.61	26.15	31.88	33.46
MWR-8B	28.81	27.93	28.98	28.87	-
MW-9S	113.56	119.10	118.78	118.57	118.74
MWR-9A	36.02	35.40	26.78	32.07	33.55
MWR-9B	28.85	27.99	29.42	29.29	24.56
MW-10A	81.86	83.66	84.02	83.73	84.02
MW-11D	30.68	29.78	28.68	28.03	28.22
MW-12A	34.66	33.96	31.11	31.26	31.89
MW-12B	28.69	27.98	29.26	29.16	27.86
MW-13A	34.86	34.18	30.89	31.37	32.20
MW-13B	28.74	27.91	29.30	29.21	25.70
MW-14A	28.82	27.99	28.90	29.29	24.69
MW-14B	28.78	27.94	29.34	29.26	24.62
MW-15S	99.28	99.97	99.24	99.28	99.45
MW-15A	37.50	36.82	27.85	33.53	35.15
MW-15B	28.69	27.82	29.23	29.14	24.46
MW-16A	67.47	67.21	66.95	66.76	66.77
MW-16B	28.79	27.92	29.31	29.24	24.67
MW-16D	30.26	29.80	28.58	28.07	28.16
MW-17S	128.06	127.89	127.69	127.65	127.62
MW-18S	99.85	94.87	99.89	99.84	99.83
MW-18A	28.69	27.88	29.27	29.20	24.34
MW-18B	28.65	27.99	29.29	29.15	24.33
MW-19S	98.64	98.08	97.61	97.52	97.46
MW-20S	73.55	73.71	71.04	70.61	71.85
MW-20A	28.68	27.86	29.25	29.15	24.00
MW-21S	73.29	73.44	70.22	69.68	71.53
MW-22S	128.67	128.76	129.71	129.97	129.91
MW-23S	125.97	125.77	125.65	125.58	125.48
MW-24S	121.07	121.11	120.99	120.96	120.94
MW-24A	67.00	69.58	82.17	82.06	81.46

Table G.1 (Continued)

WELL	5/6-Aug-87*	13-Aug-87	23-Aug-87	25-Aug-87	28-Aug-87
MW-25S	123.28	123.15	122.99	122.92	122.86
MW-26S	95.38	95.80	95.93	95.86	95.99
MW-26A	77.21	77.24	76.73	76.56	76.56
MW-26B	28.90	28.16	29.51	29.40	-
MW-27S	121.59	121.77	138.64	-	99.85
MW-27A	27.75	26.90	28.32	28.21	23.10
MW-27B	-	-	-	-	-
MW-28S	103.87	103.27	103.18	103.04	102.94
MW-29S	100.04	99.54	99.03	98.91	98.86

* "S" well water level elvations were measured on Aug. 5. "A", "B", and "C" water level elevations were measured on Aug. 6.

\- Not measured.

Table G.2 Slug-Test Results

Monitor Well No.	Aquifer	Hydraulic Conductivity Bouwer feet/day	Hydraulic Conductivity Hvorslev feet/day
	Open Well Packer Tests		
MW-15S	S	23.1	24.4
MW-20S	S	0.7	0.4
MW-16A	S	3.5	3.9
MW-13A	A	44.9	65.1
MW-14A	A	6.3	8.1
MW-15A	A	40.3	42.6
MW-20A	B	75.7	61.1
	Cased Well Tests		
MW-16A	S	0.2	---
MW-6A	A	87	135.5
MW-7A	A	0.042	---
MW-8A	A	14.3	17.8
MW-14A	A	6.0	7.3
MW-15A	A	7.6	10.9

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Table G.3. Aquifer Test Results

Well Number	Transmissivity (gpd/ft)	Storage Coefficient	Distance from Pumping Wells (ft)
	A Aquifer (pumping well 8A)		
6AA	2,900	2×10^{-4}	345
9A	2,600	2×10^{-3}	76
15A	2,800	2×10^{-4}	193
	B Aquifer (pumping well 8B)		
6B	220,000	6×10^{-4}	345
6B[1/]	220,000	6×10^{-4}	345
9B	250,000	7×10^{-3}	76
15B	330,000	1×10^{-3}	193
16B	190,000	3×10^{-4}	439
26B	180,000	2×10^{-4}	654
27B	260,000	2×10^{-4}	629

1/ = Corrected for barometric efficiency.

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or monitor well and measuring the rate of water-level recovery.

A total of 13 slug tests were performed at the MMRF site. Four of the tests were performed on wells screened in the S aquifer, 8 were on wells screened in the A aquifer, and one test was performed on a well screened in the B aquifer (Attachment G.2).

Two methods were used to analyze water-level recovery data recorded during the slug tests. The method of Bouwer and Rice (1976) is suitable for a partially-penetrating well in an unconfined aquifer. Hvorslev's method (1951) assumes a point piezometer in a confined or unconfined aquifer.

Table G.2 summarizes hydraulic conductivity values calculated from the slug-test data. The data indicate that the hydraulic conductivity of the S aquifer ranged from about 0.2 to 24.4 ft/day. Hydraulic conductivity values obtained from analysis of slug test data in the A aquifer indicated an average hydraulic conductivity of about 26 ft/day. Based on an average thickness of 30 feet, the average transmissivity of the A aquifer is calculated to be about 780 ft^2/day.

Constant-Rate Pumping Tests

Two aquifer tests of the DGWR were performed. On March 17, 1986, production well PW-3 was pumped at a constant discharge rate of about 930 gpm for one week. Drawdown-time data were recorded at a number of observation wells in the DGWR as well as in the A and B aquifers (Attachment G.3). Well PW-4 was tested on September 22, 1986, at a constant discharge rate of about 860 gpm for about 8 hours. Water-level response was recorded at monitor wells in the B aquifer (Attachment G.4).

Water-level response due to changes in atmospheric pressure was evaluated in order to determine the barometric efficiency of the various aquifers prior to interpretation of the test results. The A and B aquifers and the DGWR showed an unusually high barometric efficiency of 100 percent. According to McWhorter and Sunada (1977), the barometric efficiency can be unity (100 percent) when the overlying strata are thick, rigid formations which transmit only a small part of the increased load due to atmospheric pressure change to the top of the confined aquifer.

Drawdown data from the observation wells were corrected for atmospheric pressure changes and plotted on semi-log paper versus time since pumping started. The corrected data for observation wells in the A and B aquifers showed virtually no response to the pumping at well PW-3.

Production well PW-4 was pumped in an attempt to determine the influence of DGWR pumping on the overlying B aquifer. No direct response in B aquifer water levels was apparent during this test (Attachment G.4). Fluctuations which did occur appear to be related to other interferences such as pumping for irrigation or change in river stage.

Corrected drawdown data for DGWR observation wells MW-11D, PW-1, and PW-4 showed a definite response to pumping at PW-3, but total drawdown in these wells did not exceed 0.35 ft. The limited response precluded quantitative analyses, yet the small observed drawdowns at a pumping rate close to 1,000 gpm indicates high transmissivity. A qualitative analyses of the test of PW-3 using the Jacob straight-line method (Attachment G.3) yields a transmissivity on the order of 500,000 gpd/ft.

During 1960 and 1961, the City of The Dalles and the U.S. Geological Survey conducted a series of artificial recharge tests of the DGWR (Foxworthy and Bryant, 1967). As part of that investigation, an 8-hour pumping test of the Jordan Street well was conducted at a pumping rate of 2,340 gpm. Based on the drawdown measured at an observation well, a transmissivity of about 1,000,000 gpd/ft was calculated by the non-equilibrium equation of Theis (1935). Analyses of recovery data from the recharge well resulted in a calculated transmissivity of 320,000 gpd/ft. The authors stated that "...because local conditions differed substantially from the

conditions assumed in the analytical methods (Wenzel, 1942, p 87-88), the values derived indicate only approximately the transmissibility of the aquifer at the two wells but serve to suggest the range of transmissibility of the aquifer."

To conduct aquifer tests of the DGWR at the site that would yield adequate data for quantitative analysis, it is estimated that pumping rates above 5,000 gpm would be required; existing production wells yield about 1,000 gpm. The transmissivity value of 500,000 gpd/ft obtained from testing of production well PW-3 is in good agreement with the previous work of Foxworthy and Bryant (1967), and is sufficient for the purposes of the remedial investigation and feasibility study.

The A aquifer was tested in September 1987 by pumping well MW-8A at an average rate of 15.3 gpm for 1 day (1,440 min.) The effects of this stress were observed in wells MW-9A, 76 ft northwest of MW-8A; MW-15A, 193 ft east of MW-8A; and MW-6AA, 345 ft northeast of well MW-8A (Attachment G.5). Well MW-1A, 1,756 ft west of MW-8A was beyond the effects of pumping. Fluctuations of water levels in the observation wells were adjusted for trends observed in well MW-1A.

Results of the test of MW-8A (Table G.2) indicate a transmissivity of about 3,000 gpd/ft, and storage coefficient of 1×10^{-3}. Drawdown data diverge from the type curve after

about 25 minutes of pumping in a manner that suggests an impermeable boundary at about 500 ft from the pumped well. After pumping ceased, water levels recovered only about 6 ft of the total 10-ft drawdown, indicating that induced leakage was considerably less than the rate of pumping during the period of measurement.

Aquifer tests were also conducted at wells MW-8B, MW-14B, and MW-15B. Well 14B was tested on September 2, 1986 for about 46 hours, and well 15B was tested for approximately 24 hours on September 17, 1986. Well MW-8B was tested on August 27, 1987, for about 72 hours.

Wells MW-14B and MW-15B were pumped at a constant-discharge rate of 58 gpm. Pumping well MW-14B produced drawdown in a number of observation wells in both the A and B aquifer (Attachment G.6). During the test at MW-15B, water levels were affected by some factor(s) other than pumping, partially masking the response (Attachment G.7). Analysis of these test data produced a transmissivity value on the order of 10,000 gpd/ft and a storativity of about 10^{-3} for the B aquifer.

Results of the short-term tests of wells in the B aquifer indicated that the B aquifer could be pumped at a considerably higher rate than 58 gpm. Therefore, a long-term

test of MW-8B was conducted to determine aquifer characteristics with a greater degree of confidence.

Well MW-8B was pumped at an average rate of 500 gpm. Six observation wells were continuously monitored during the tests: MW-9B, 76 ft northwest of 8B; MW-15B, 193 ft east of 8B; MW-6B, 345 ft northeast of 8B; MW-16B, 439 ft southwest of 8B; MW-26B, 654 ft east of 8B; and MW-27B, about 629 ft south of 8B. Well MW-1B, about 1,750 ft west of 8B, was used as the control well but, because of the high transmissivity of the B aquifer, was also affected by the pumping. No corrections were made for trend in water levels unrelated to pumping.

All observation wells responded in a nearby identical manner to the stress of pumping (Attachment G.8). Plots of drawdowns fell along the type curve for only ten minutes, then diverged severly in response to impermeable boundaries. Methods of hydrologic boundary analysis developed by Stallman and Ferris (Ferris, and others, 1962) were used in an attempt to identify the impermeable boundaries. These distances generally correspond with the distance to Columbia River and the outcrop of the B aquifer, respectively.

Data from all six observation wells provide values of transmissivity and storativity within a small range of values: transmissivity of the B aquifer is moderately high

at 200,000 gpd/ft; storage coefficient of 1×10^{-3} indicates semi-confined (artesian) conditions (Table G.3).

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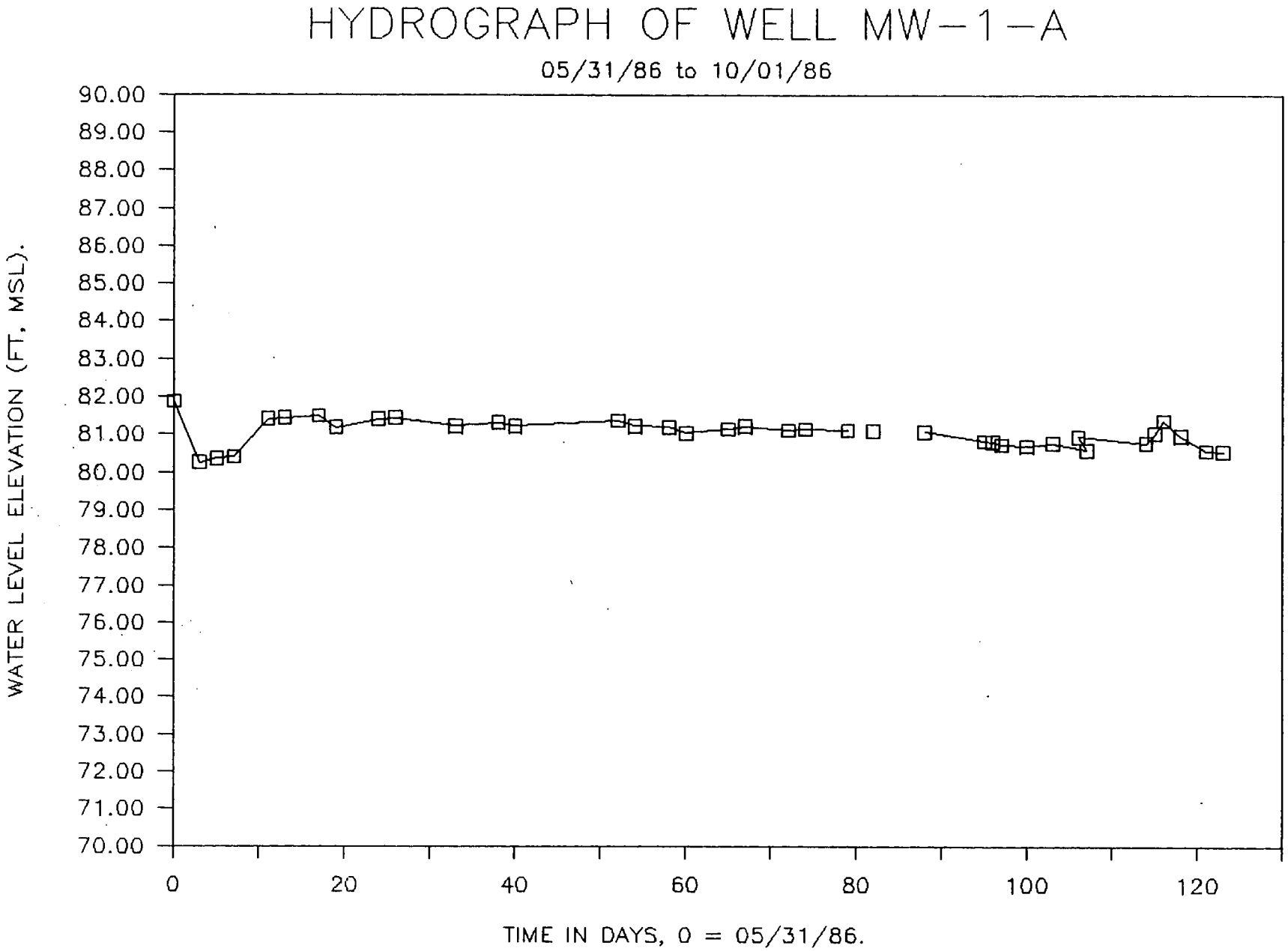
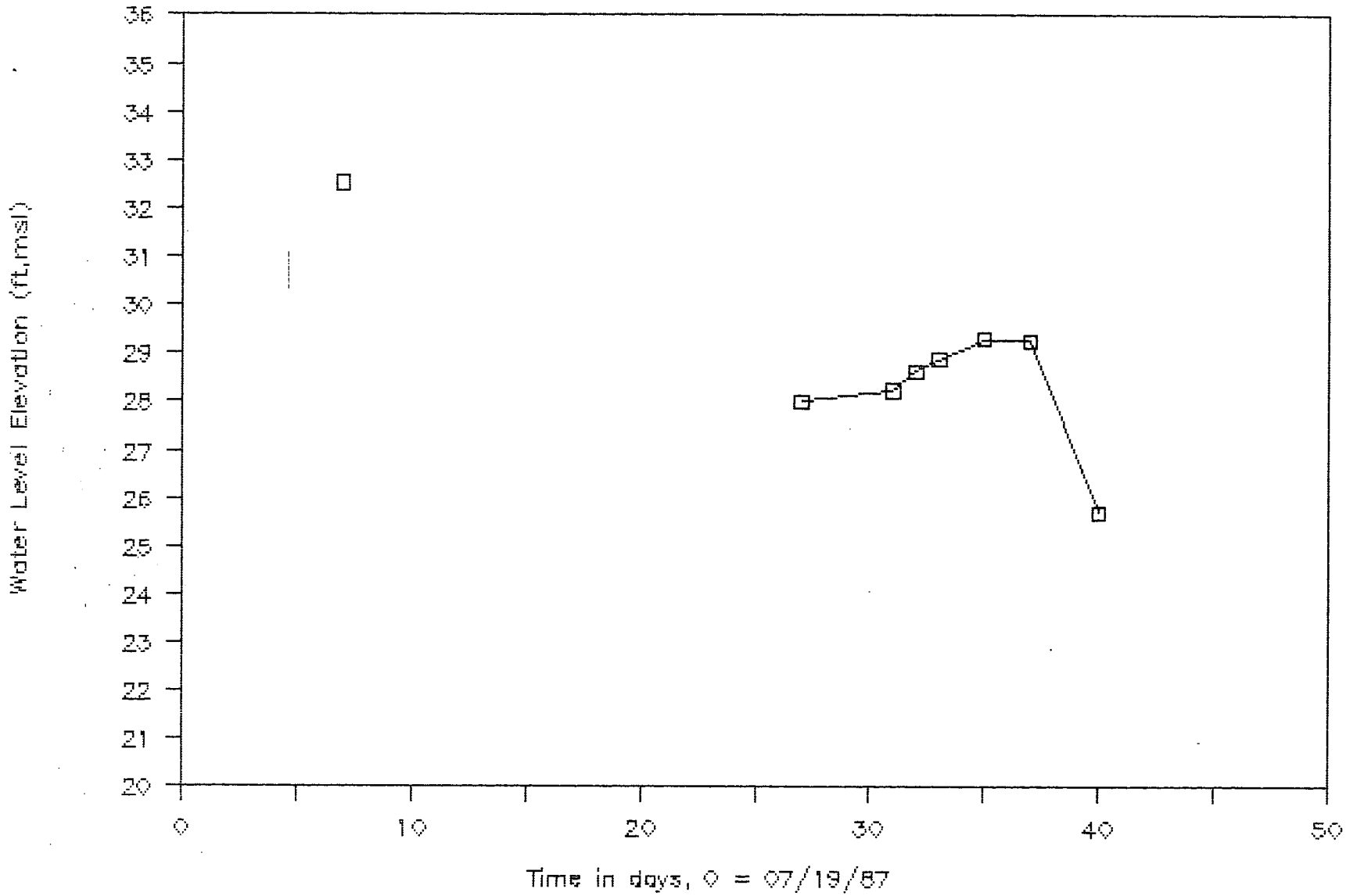
ATTACHMENT G.1

HYDROGRAPHS

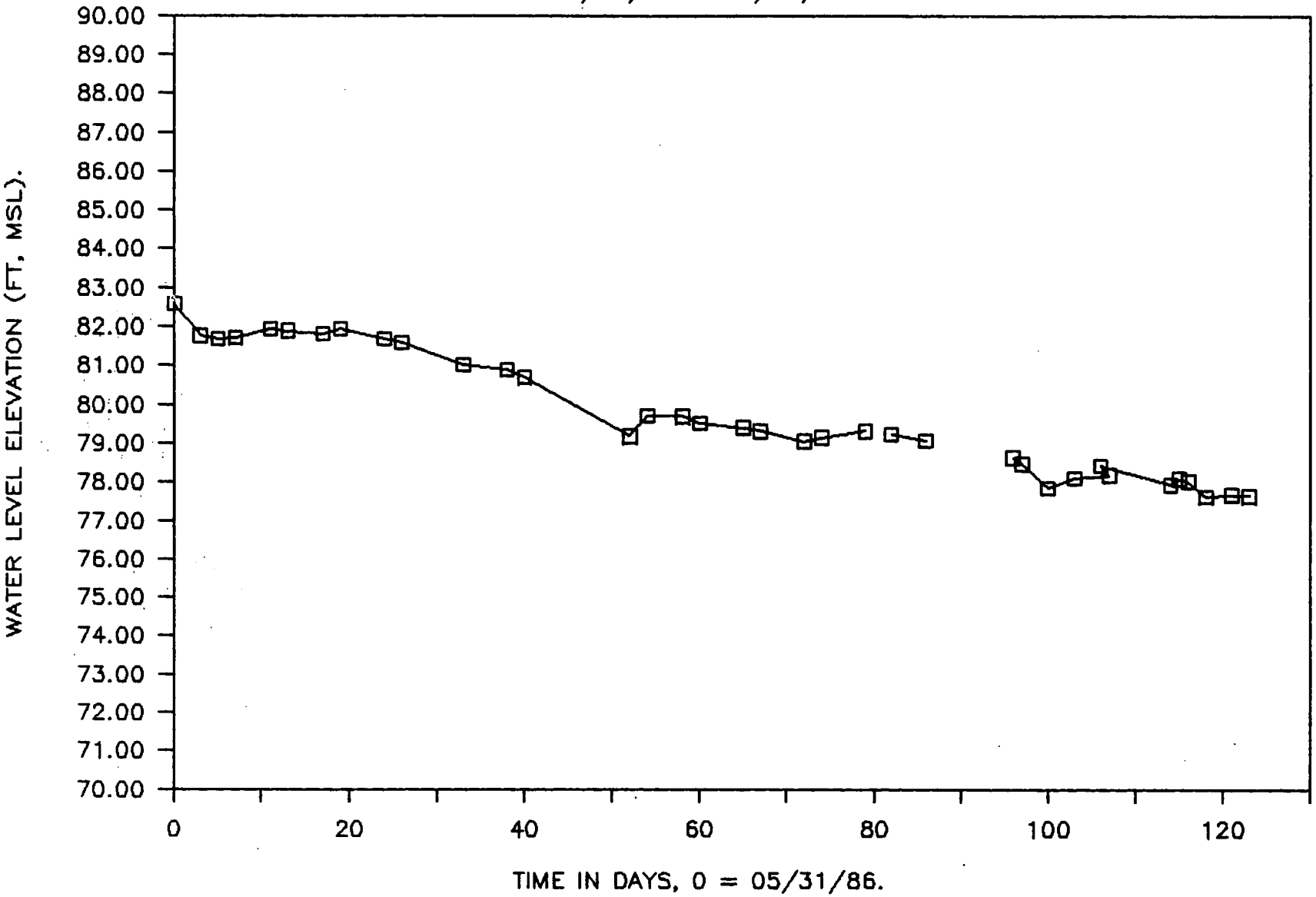

HYDROGRAPH OF WELL MW-1-A
05/31/86 to 10/01/86
WATER LEVEL ELEVATION (FT, MSL).
90.00
89.00
88.00
87.00
86.00
85.00
84.00
83.00
82.00
81.00
80.00
79.00
78.00
77.00
76.00
75.00
74.00
73.00
72.00
71.00
70.00
0
20
40
60
80
100
120
TIME IN DAYS, 0 = 05/31/86.

HYDROGRAPH OF WELL MWR-1A

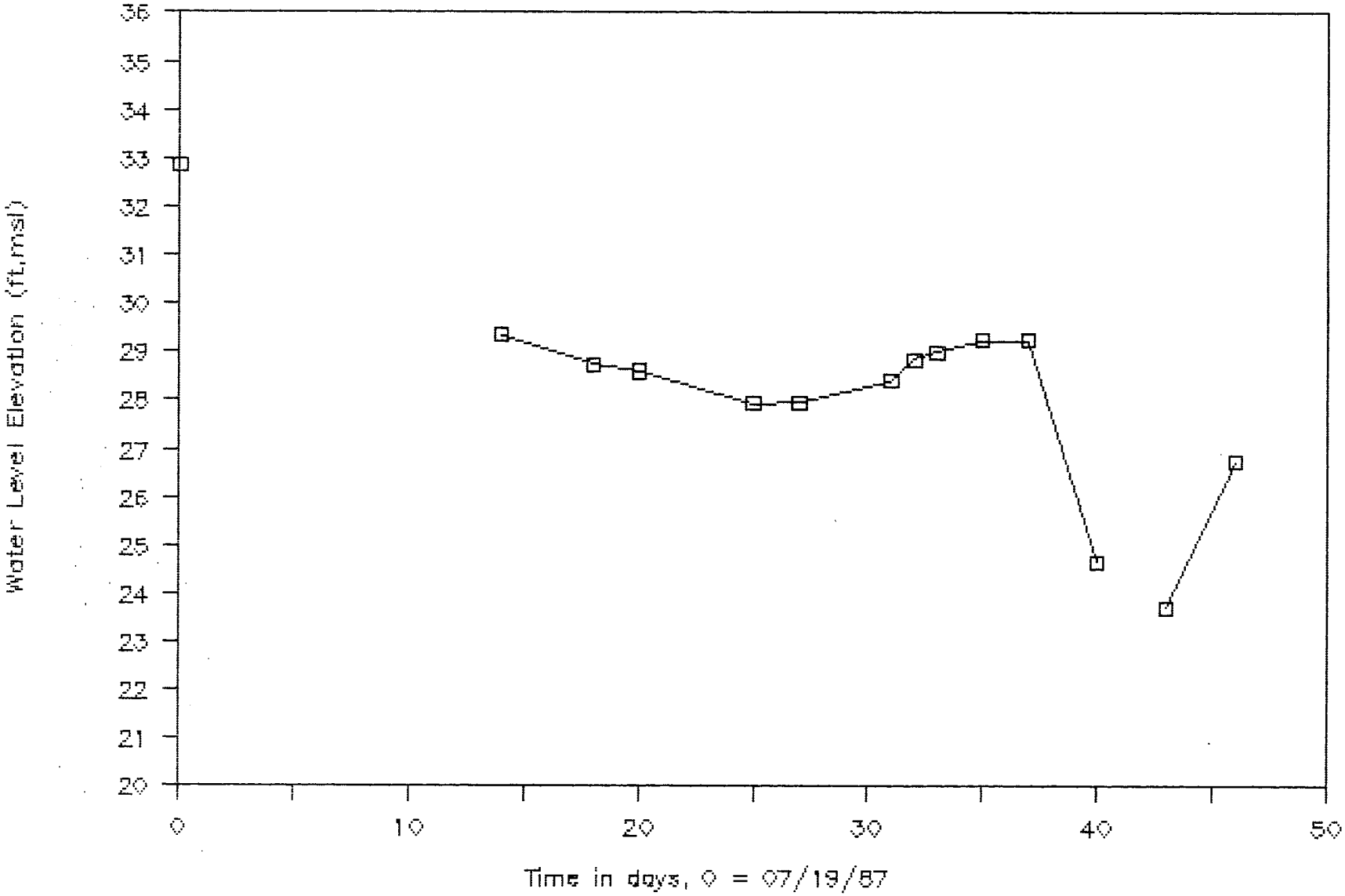


HYDROGRAPH OF WELL MW-2-A

05/31/86 to 10/01/86

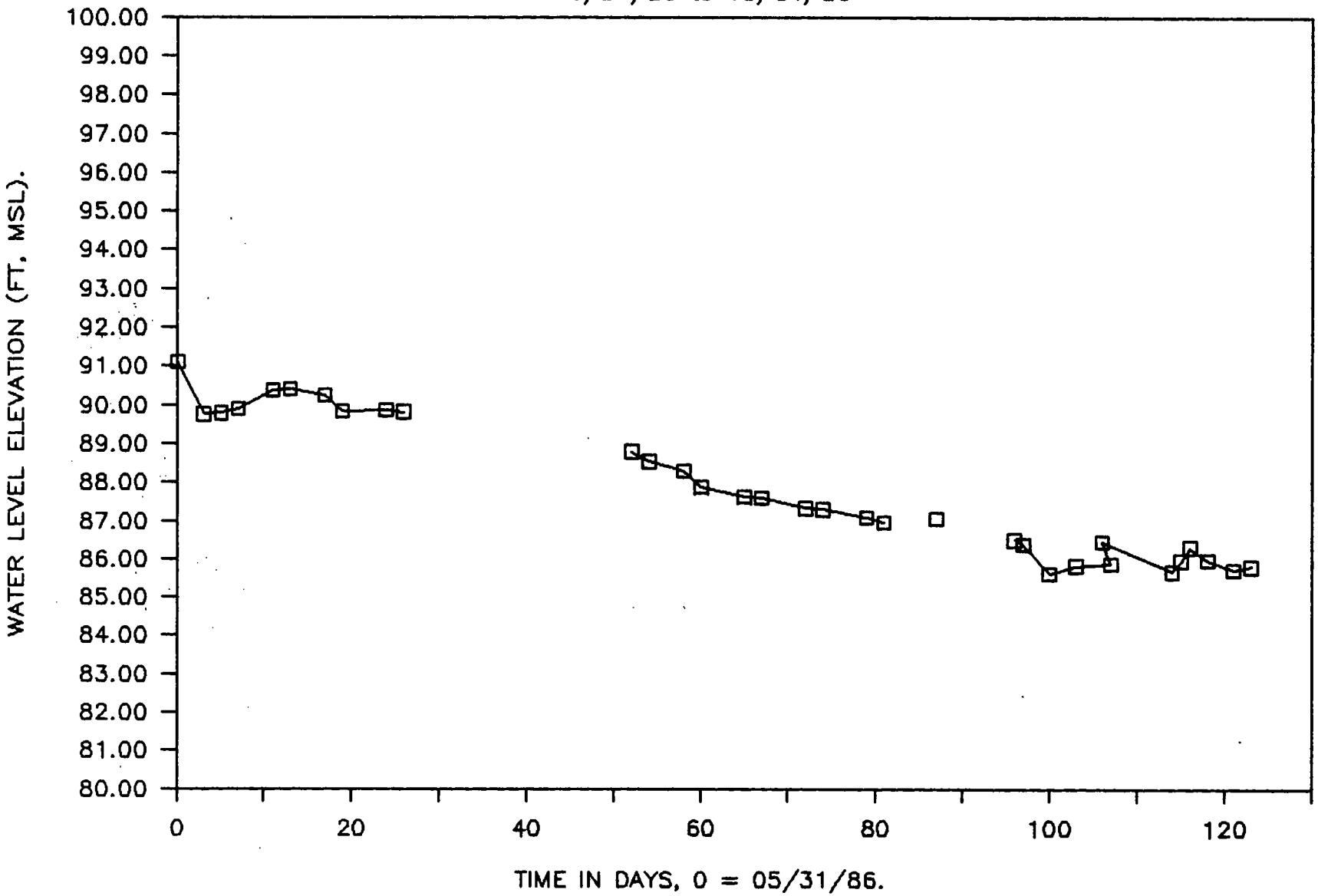


HYDROGRAPH OF WELL MWR-2A

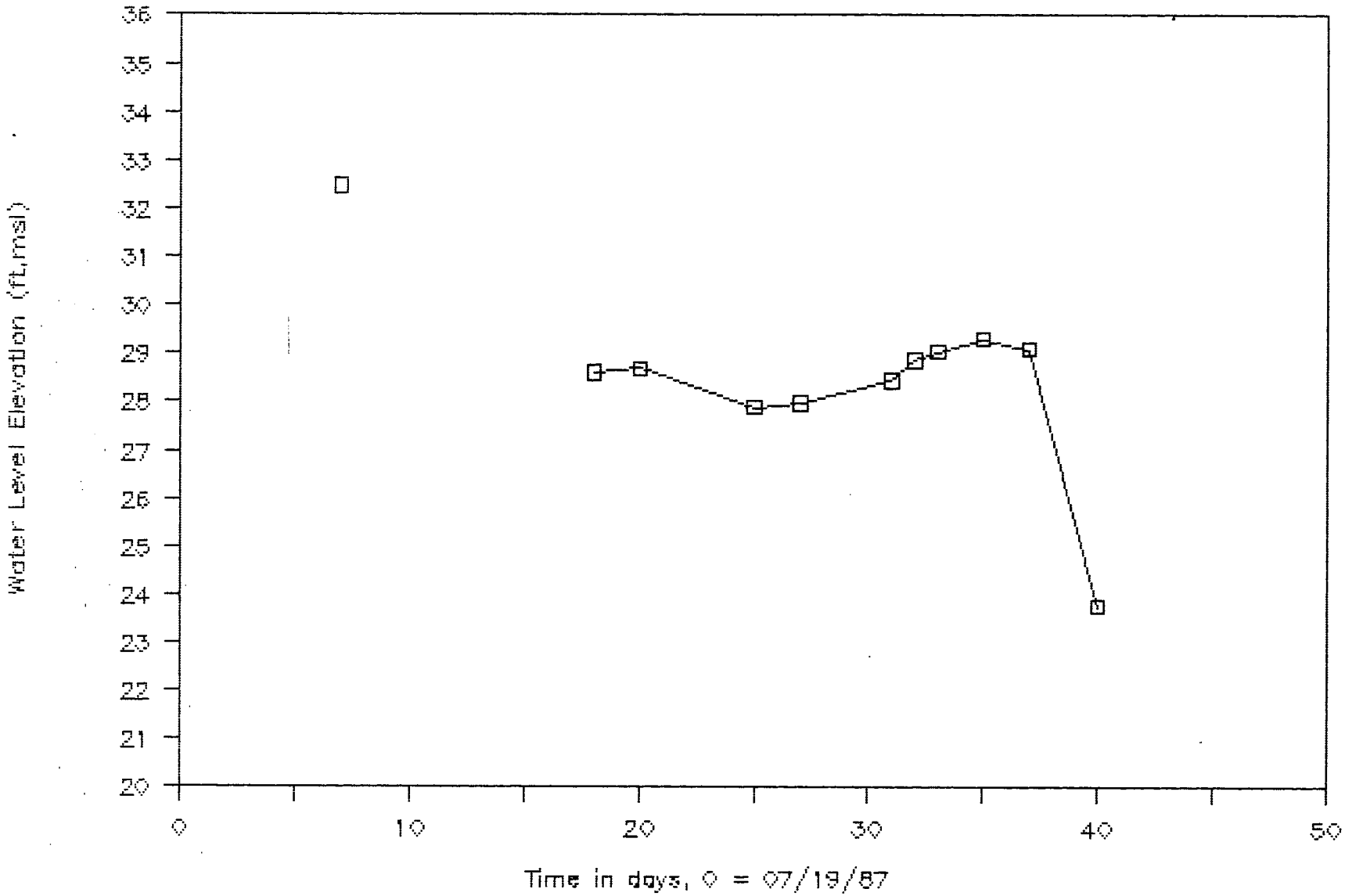


HYDROGRAPH OF WELL MW-3-A

05/31/86 to 10/01/86

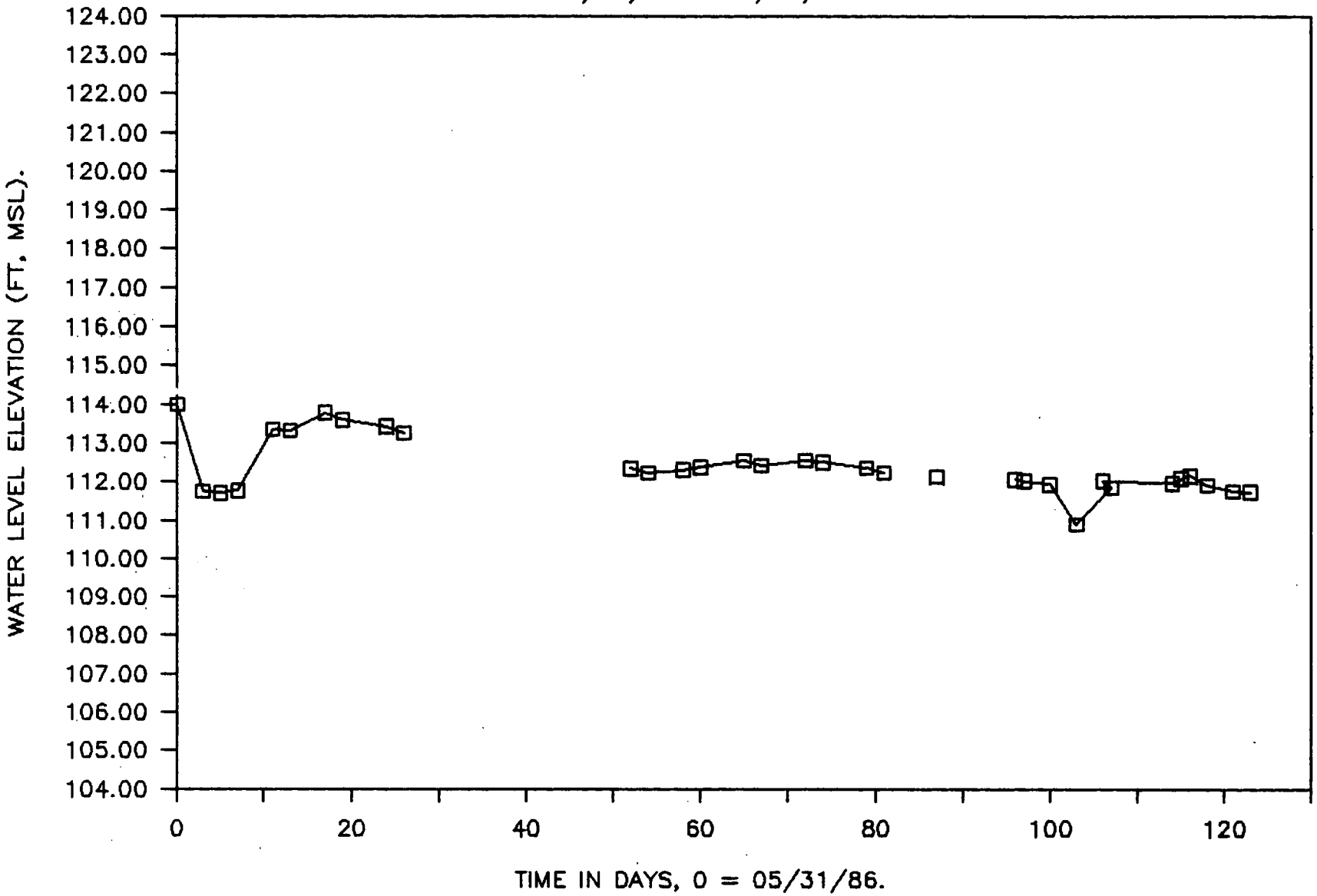


HYDROGRAPH OF WELL MWR-3A

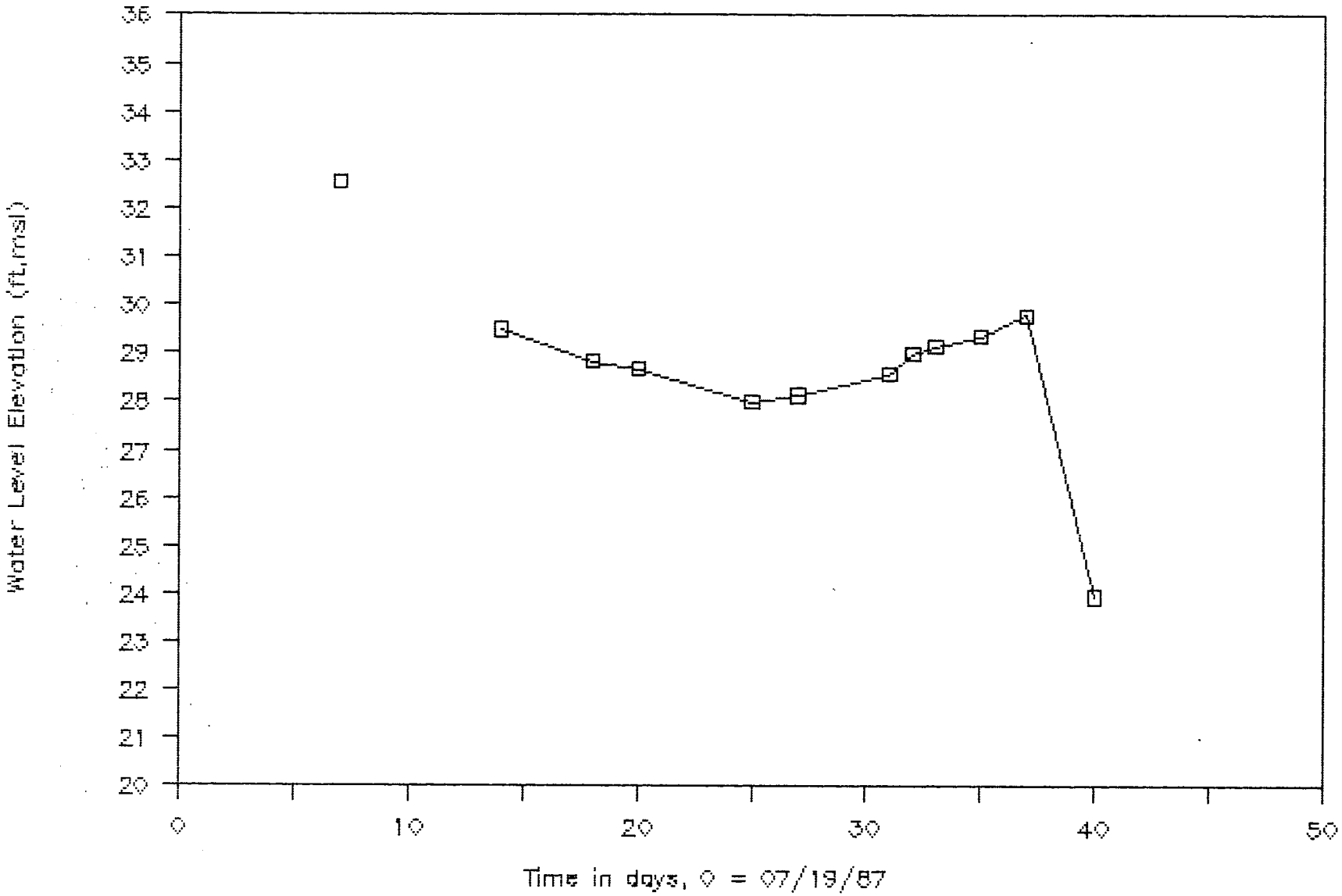


HYDROGRAPH OF WELL MW-4-A

05/31/86 to 10/01/86

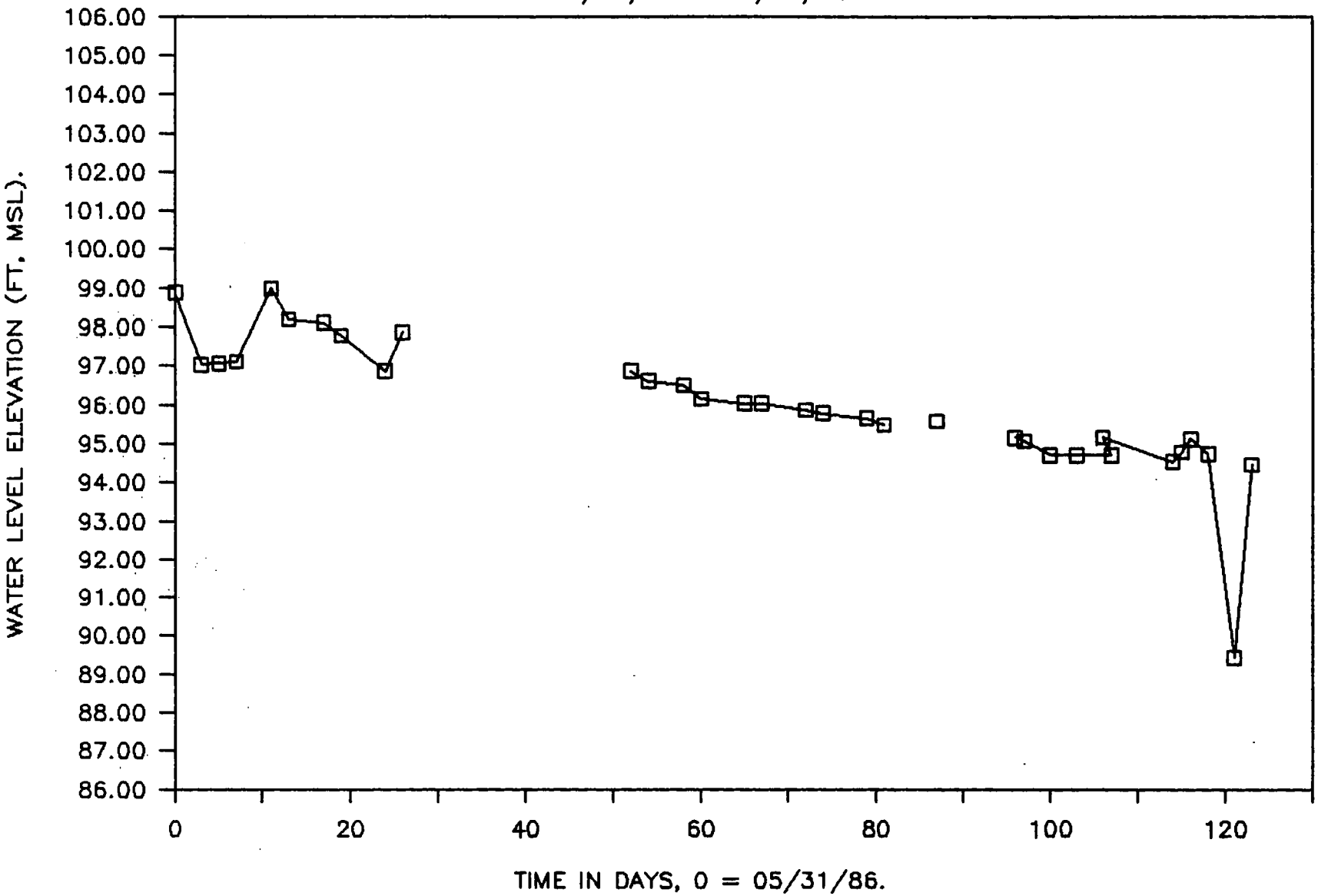


HYDROGRAPH OF WELL MWR-4A

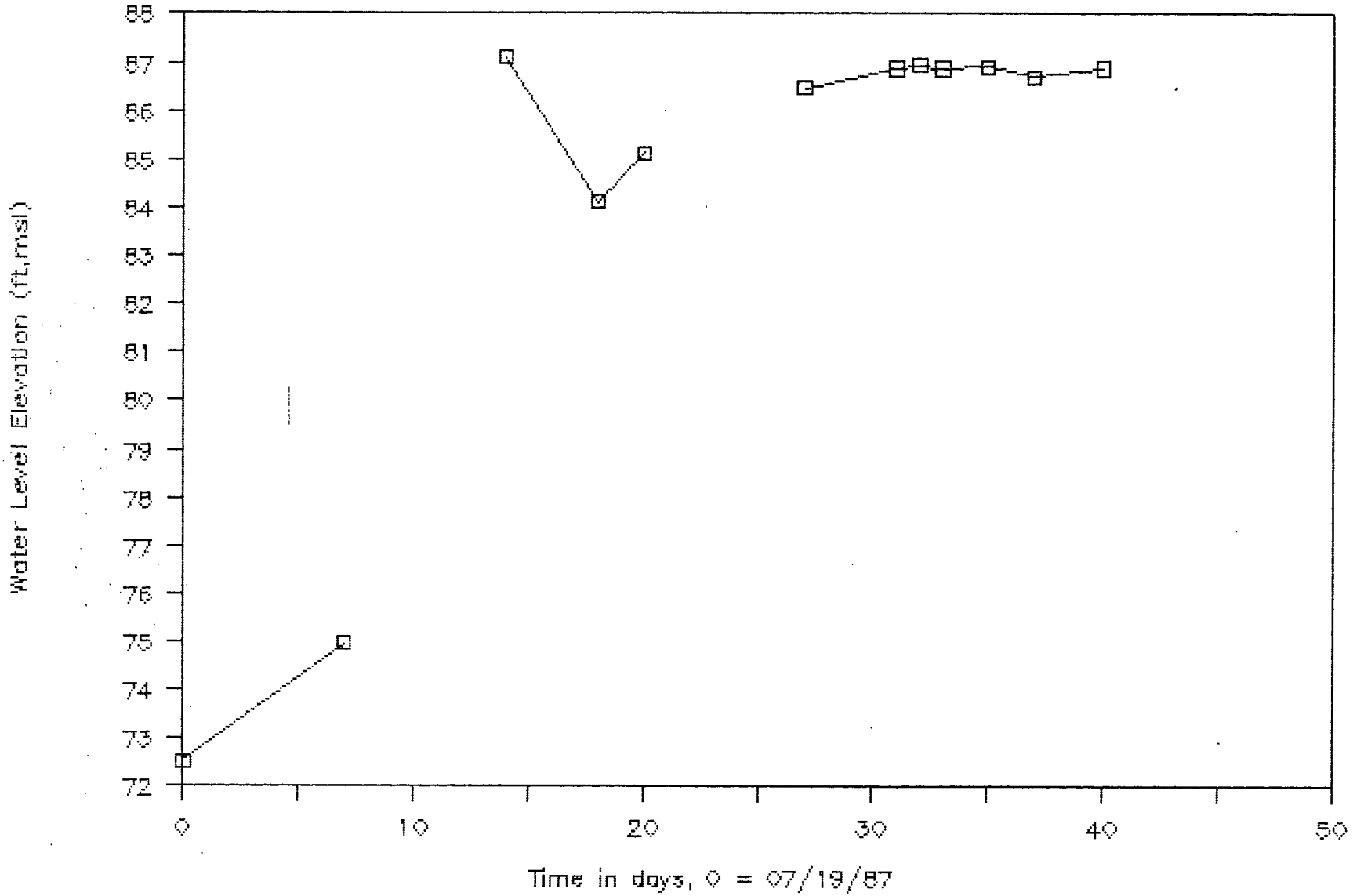


HYDROGRAPH OF WELL MW-5-A

05/31/86 to 10/01/86

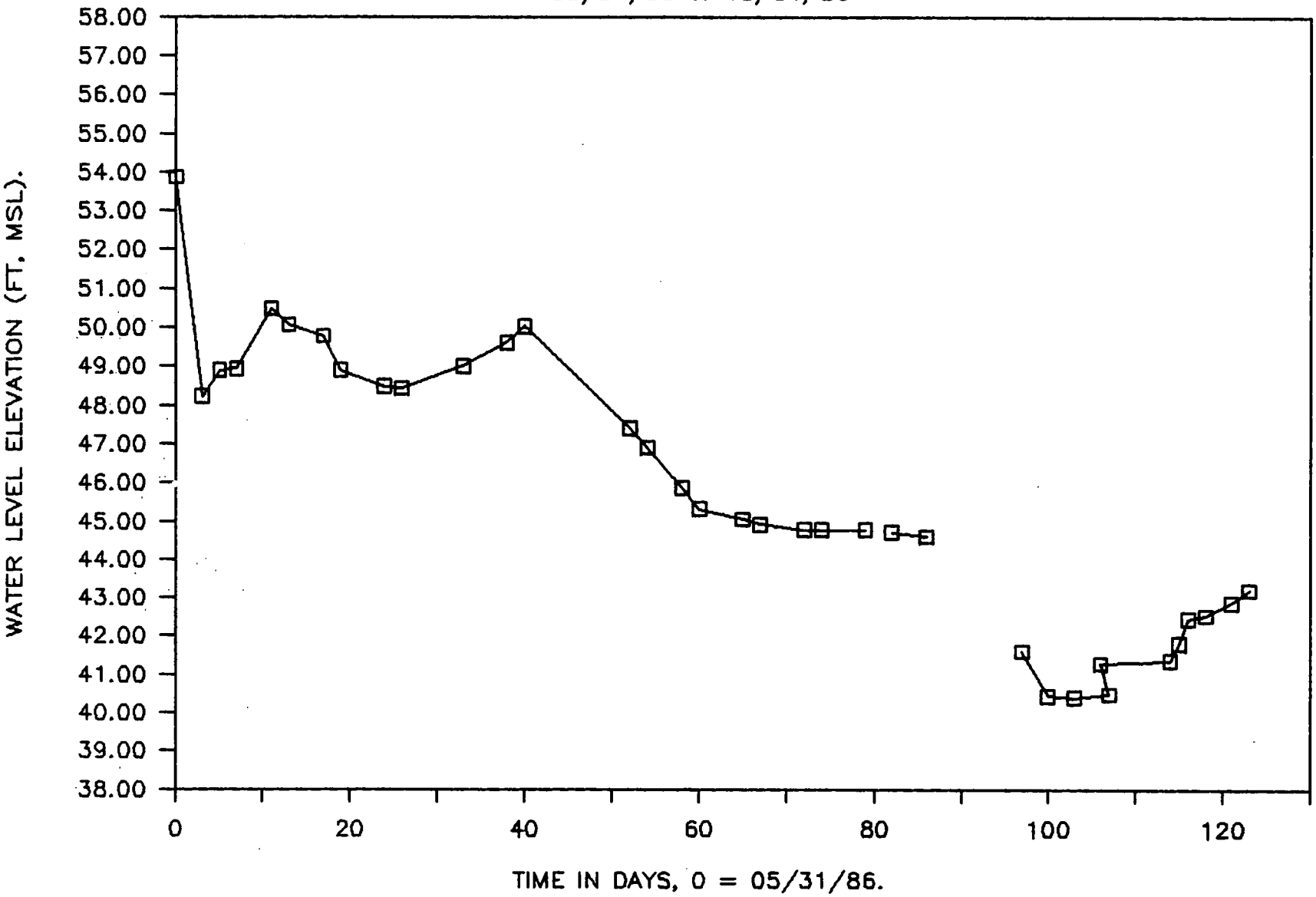


HYDROGRAPH OF WELL MW-5A



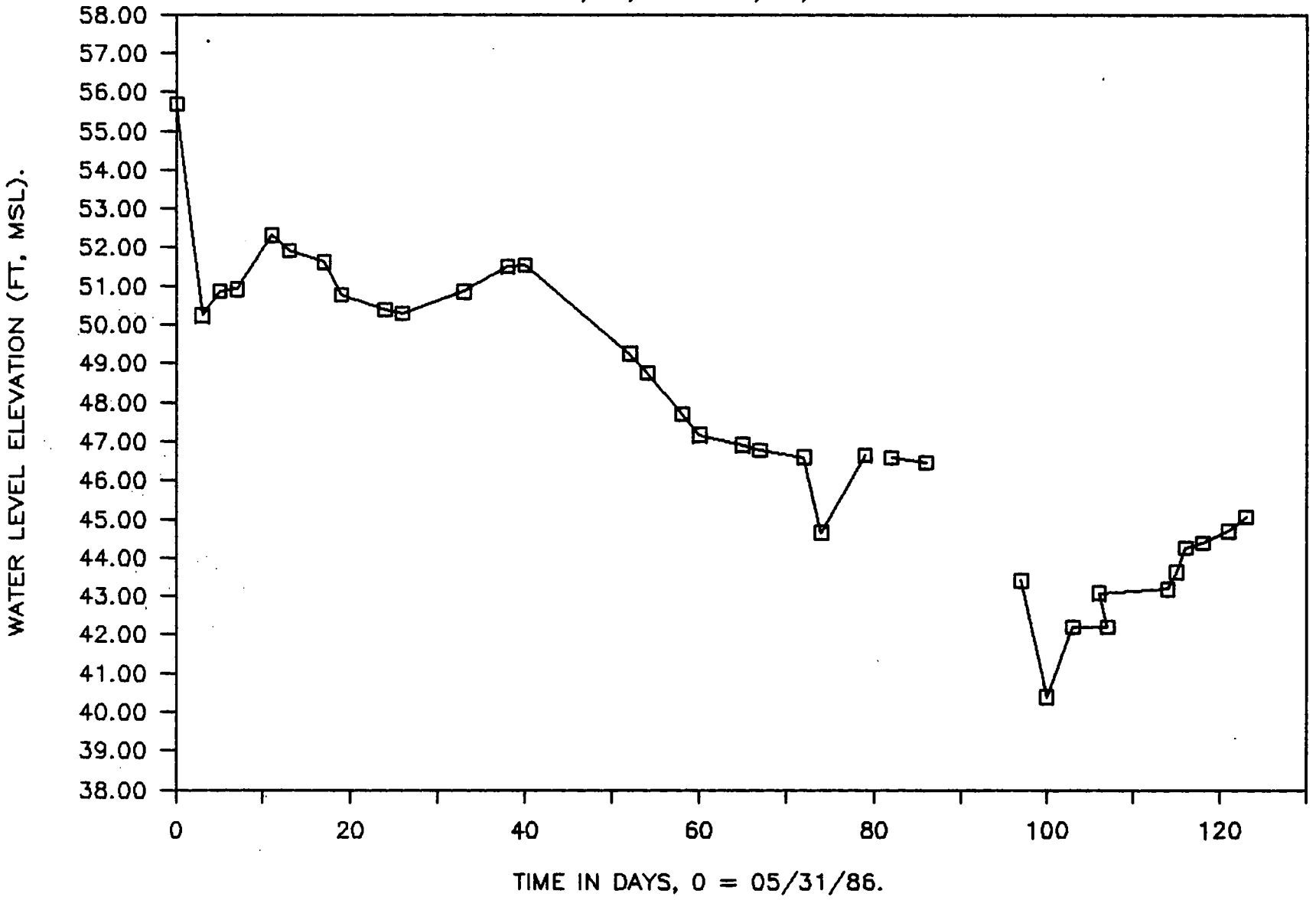
HYDROGRAPH OF WELL MW-6-A

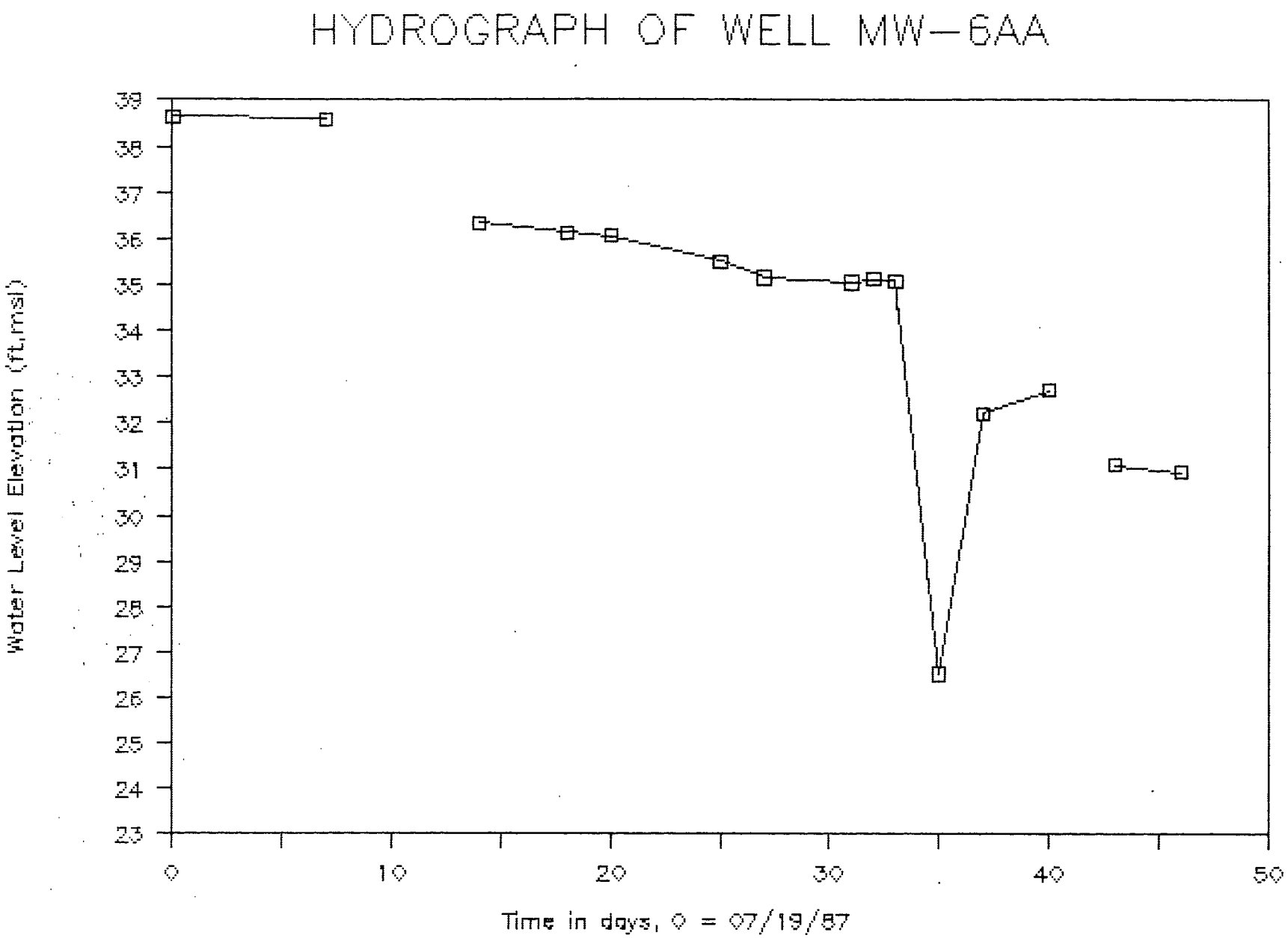
05/31/86 to 10/01/86



HYDROGRAPH OF WELL MW-6-AA

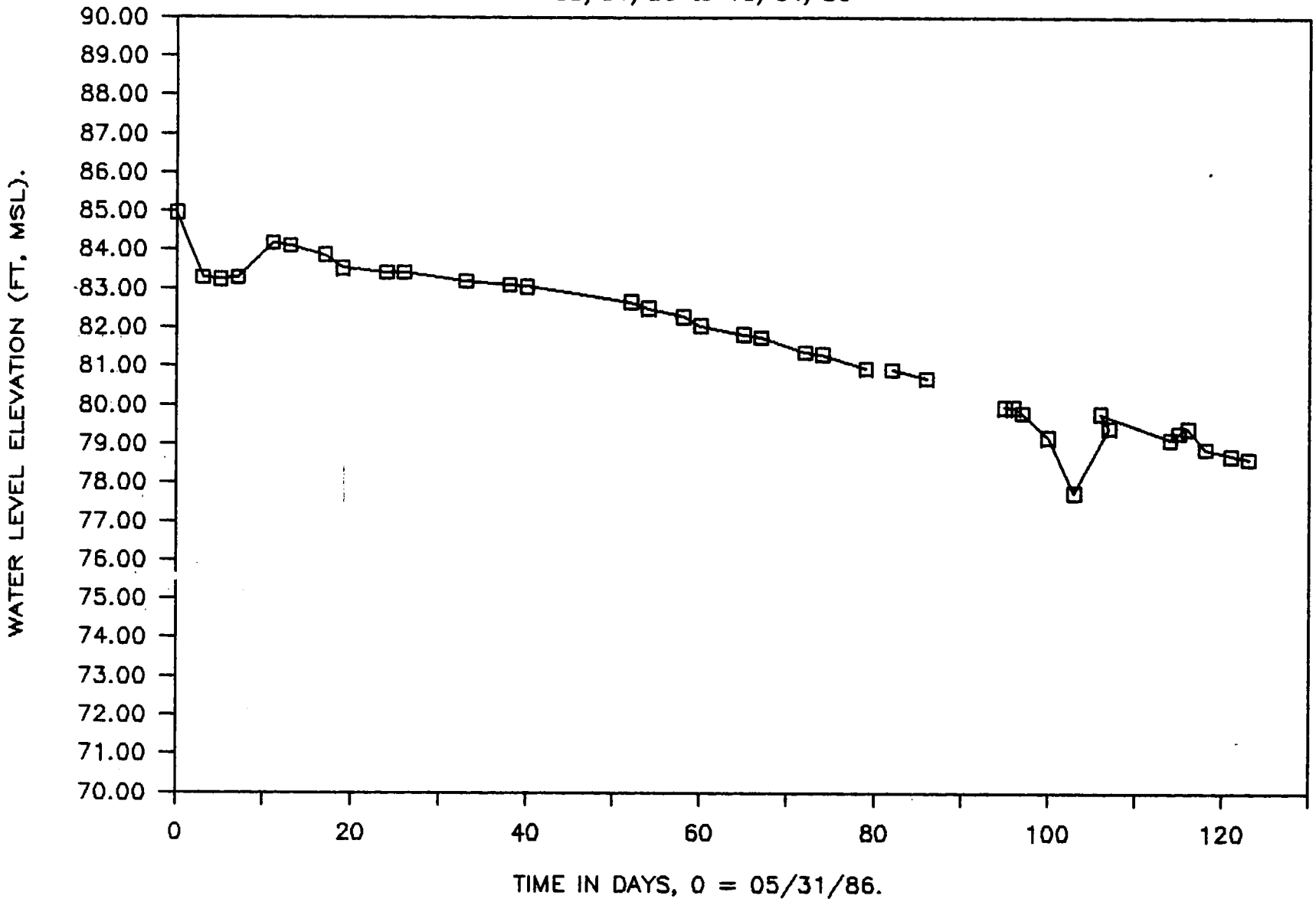
05/31/86 to 10/01/86



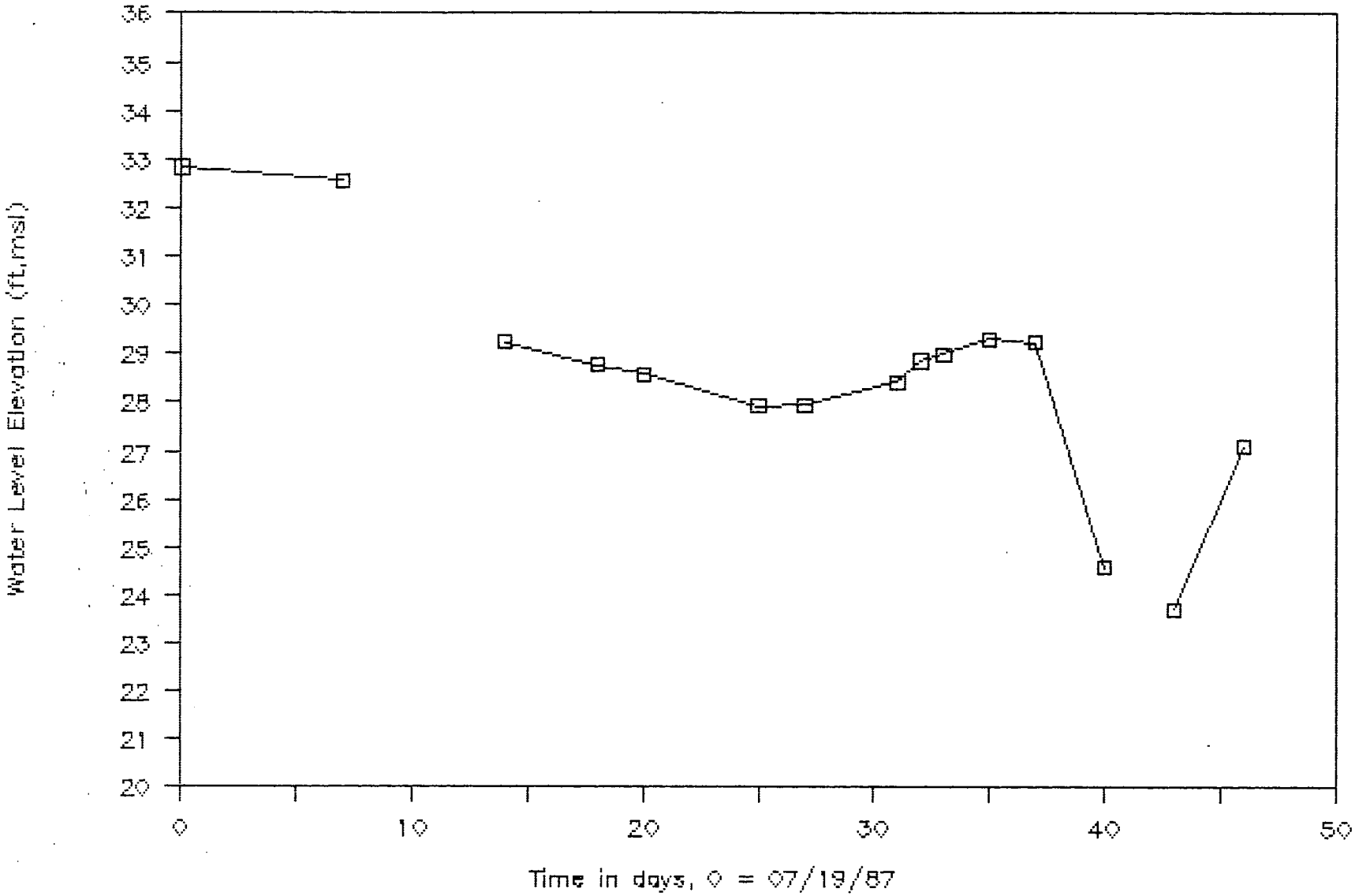

HYDROGRAPH OF WELL MW-6AA
Water Level Elevation (ft,msl)
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
0
10
20
30
40
50
Time in days, 0 = 07/19/87

HYDROGRAPH OF WELL MW-7-A

05/31/86 to 10/01/86

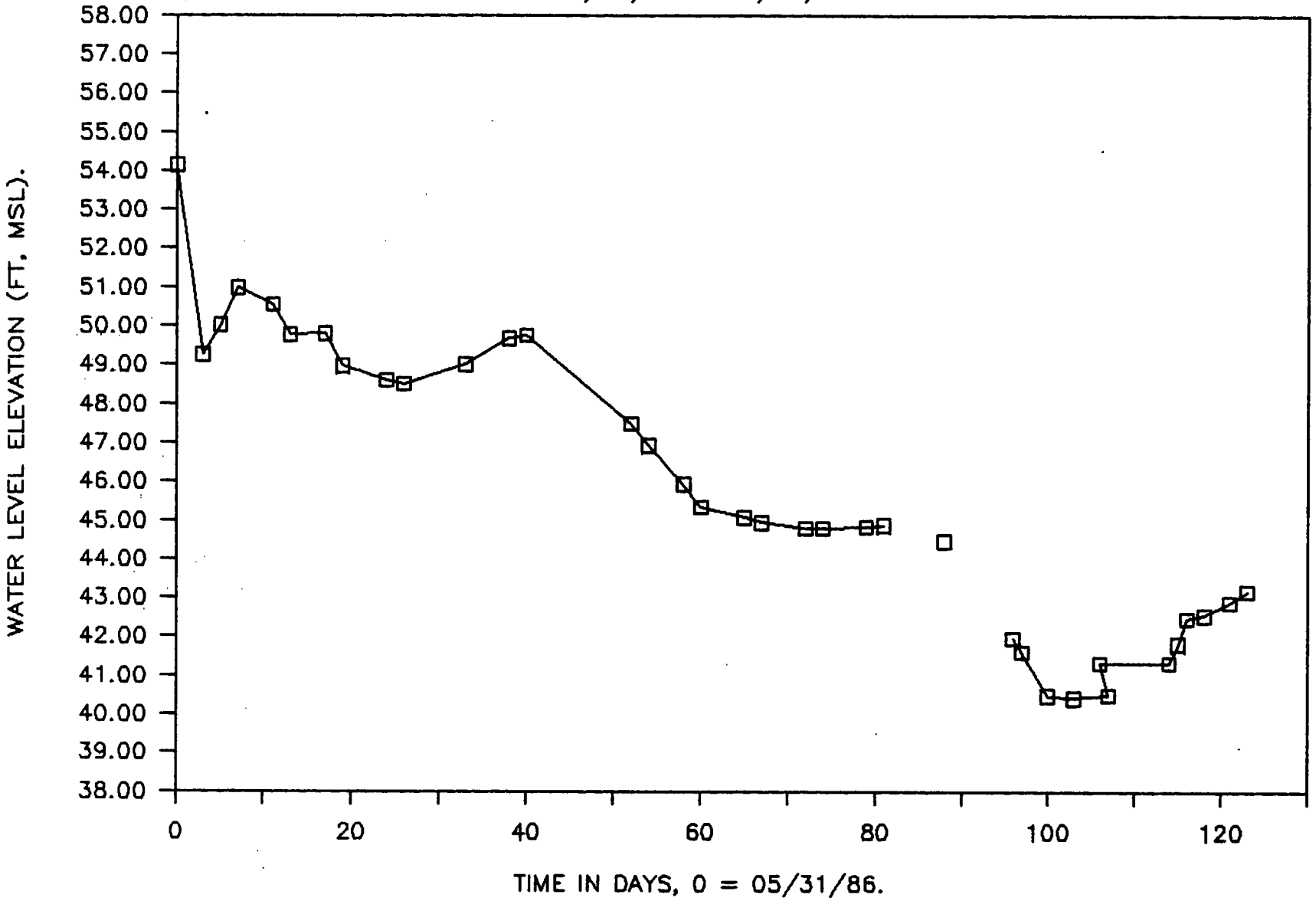


HYDROGRAPH OF WELL MWR-7A

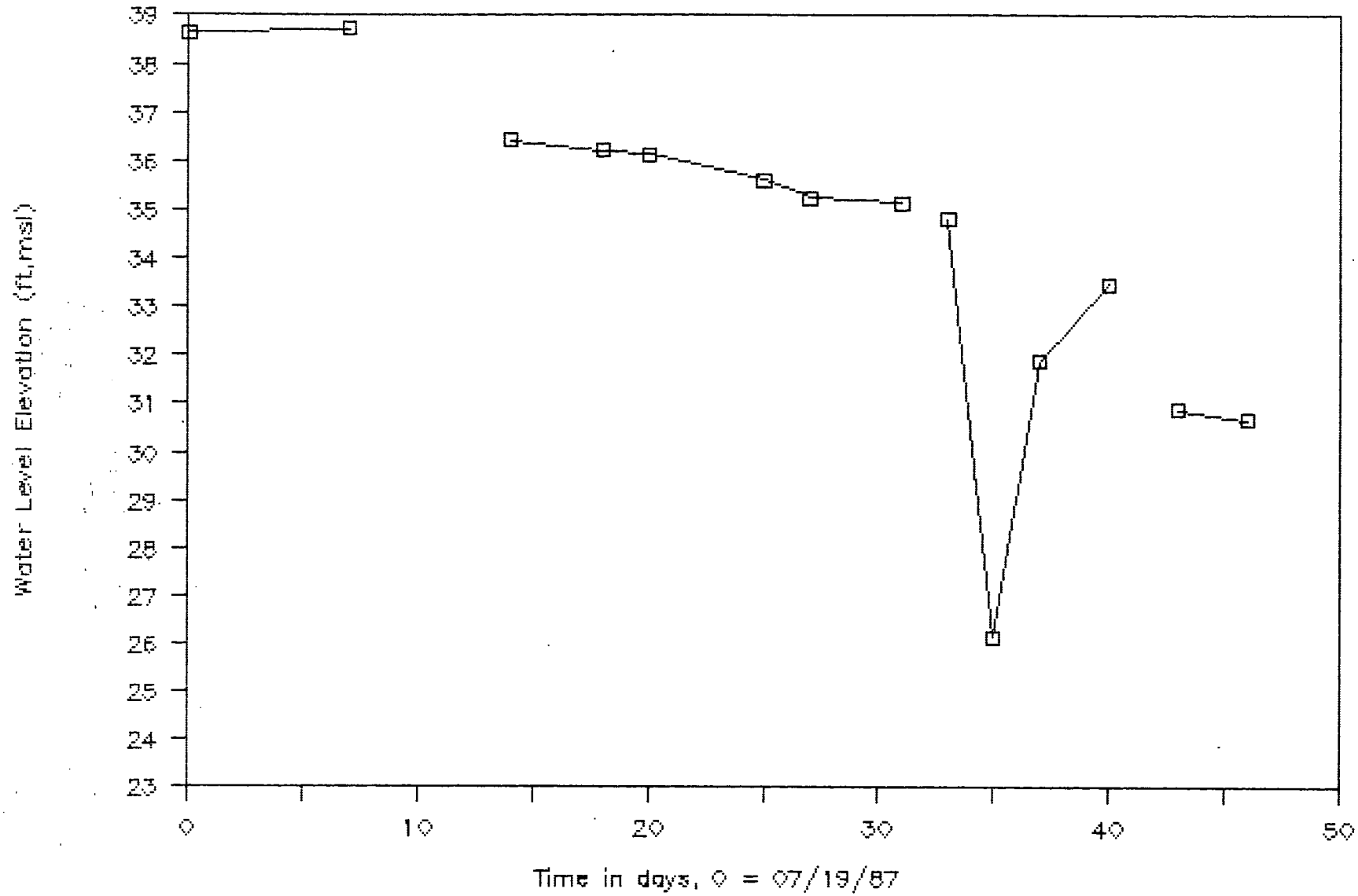


HYDROGRAPH OF WELL MW-8-A

05/31/86 to 10/01/86

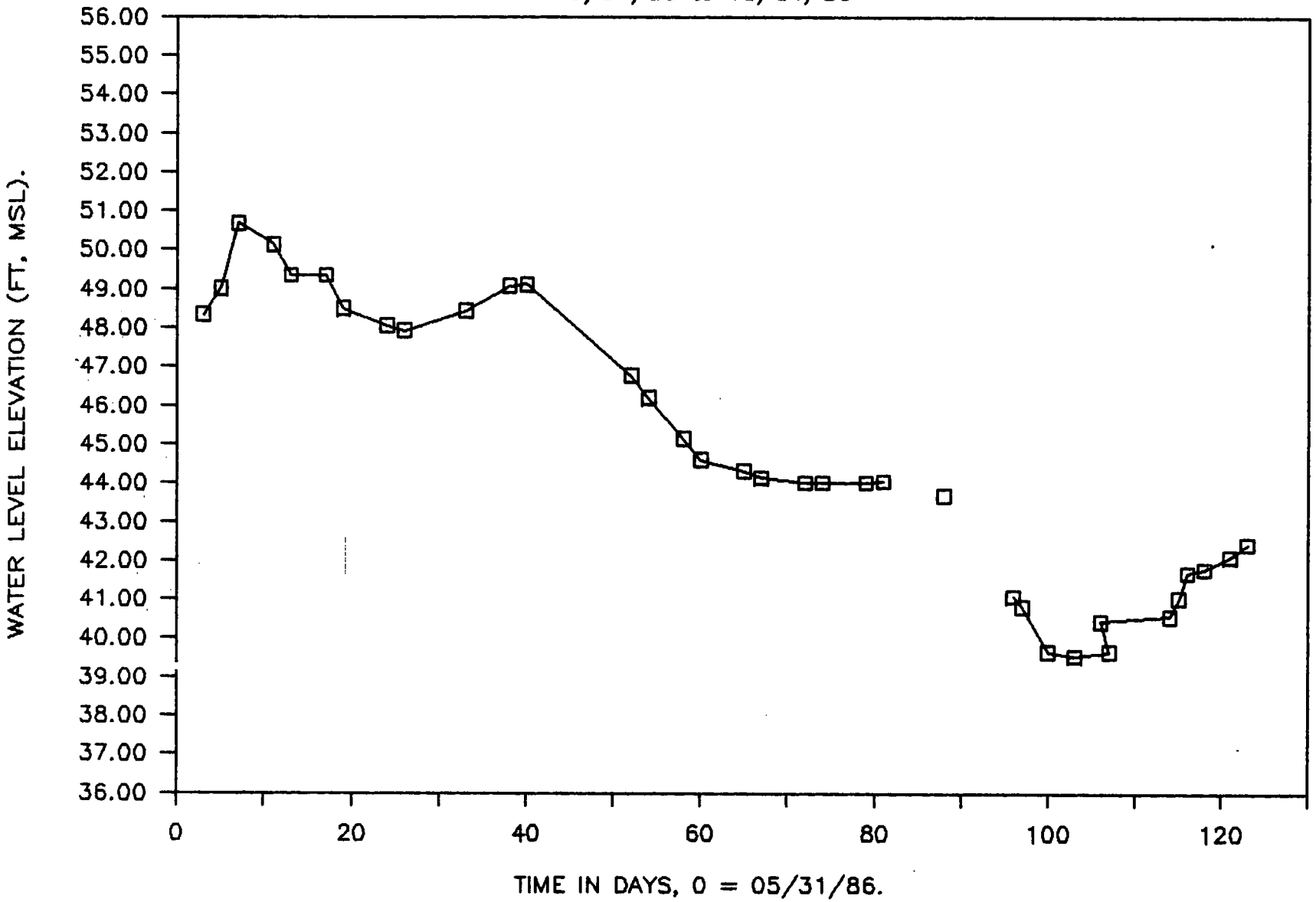


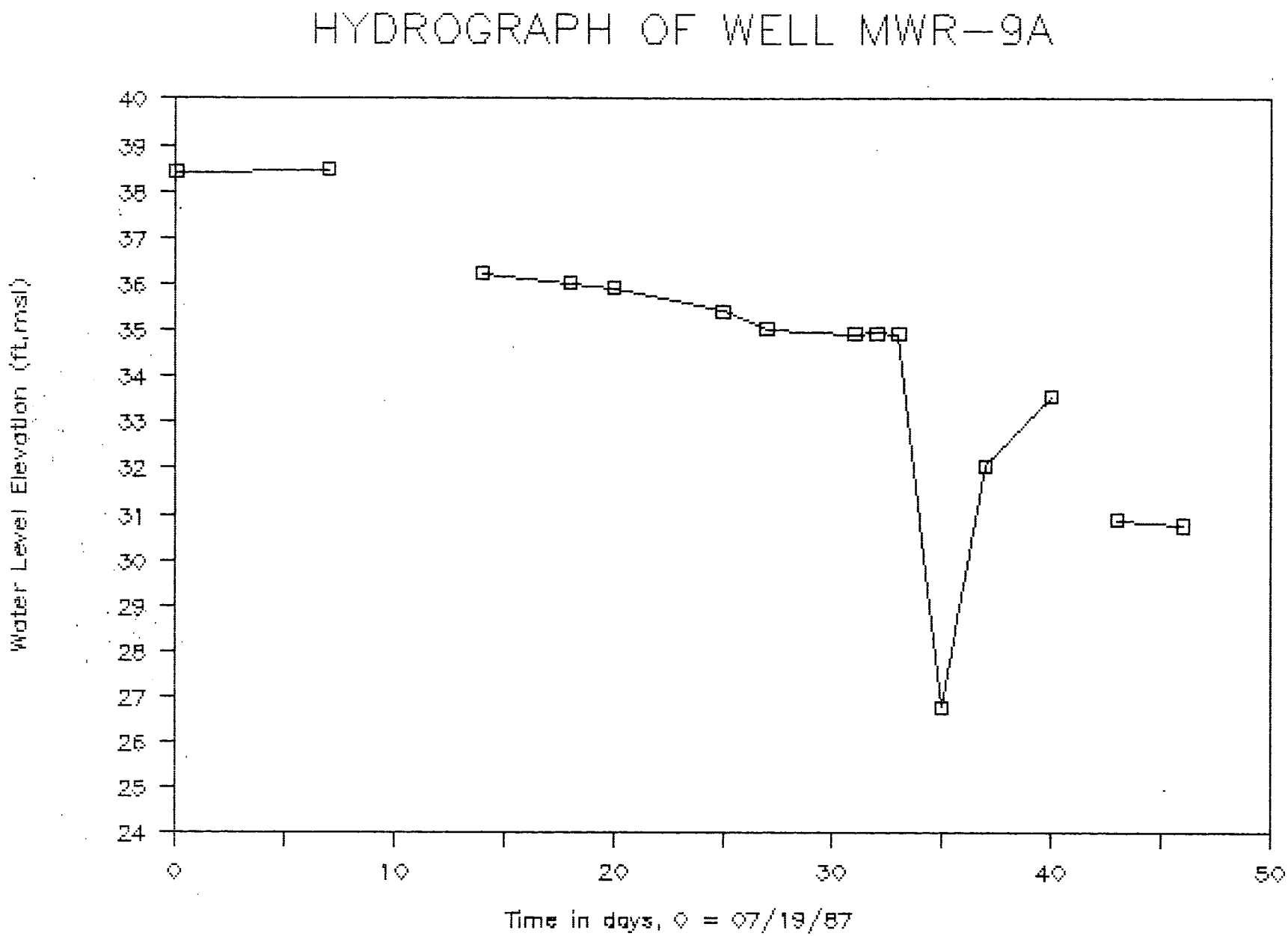
HYDROGRAPH OF WELL MWR-8A



HYDROGRAPH OF WELL MW-9-A

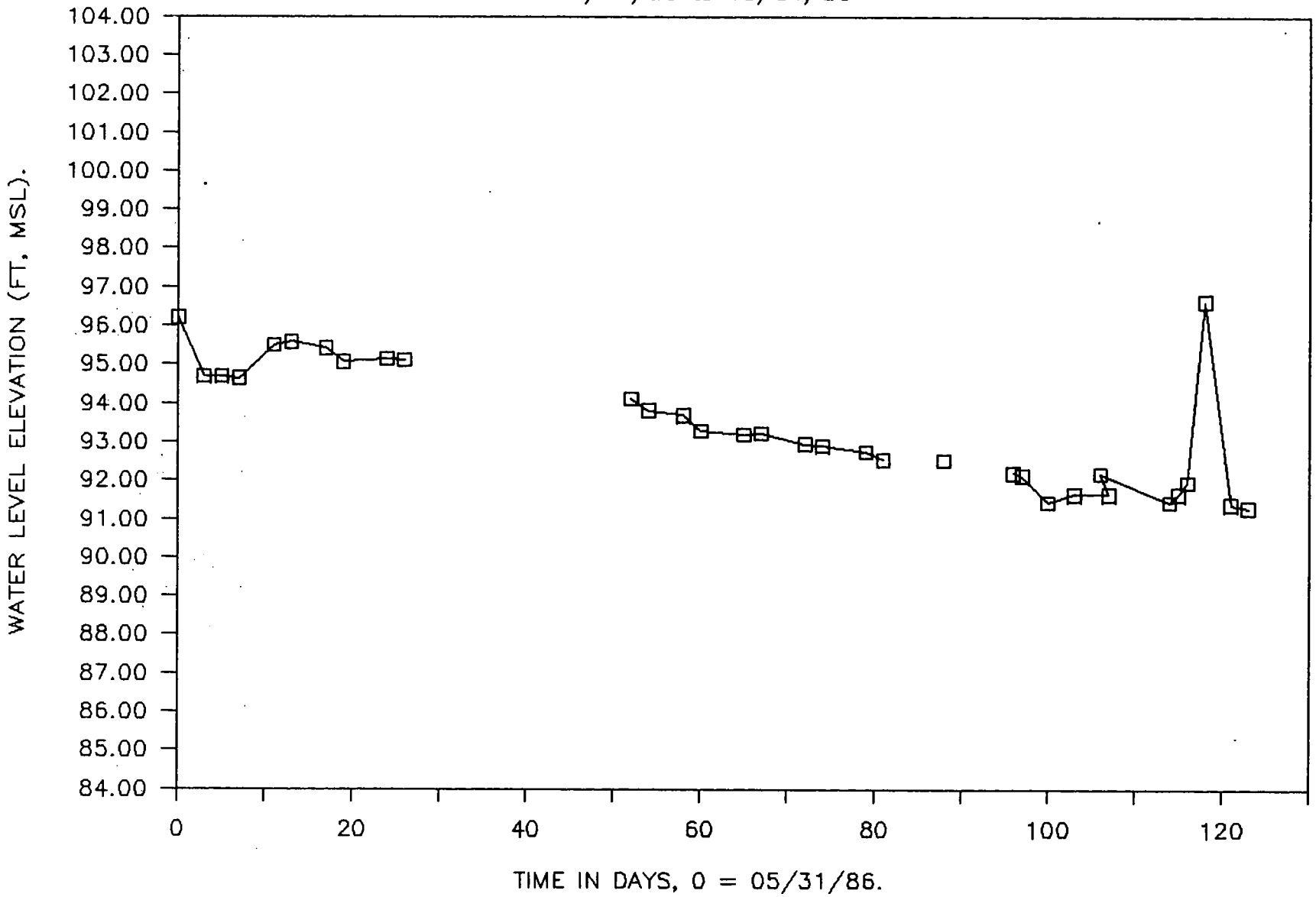
05/31/86 to 10/01/86



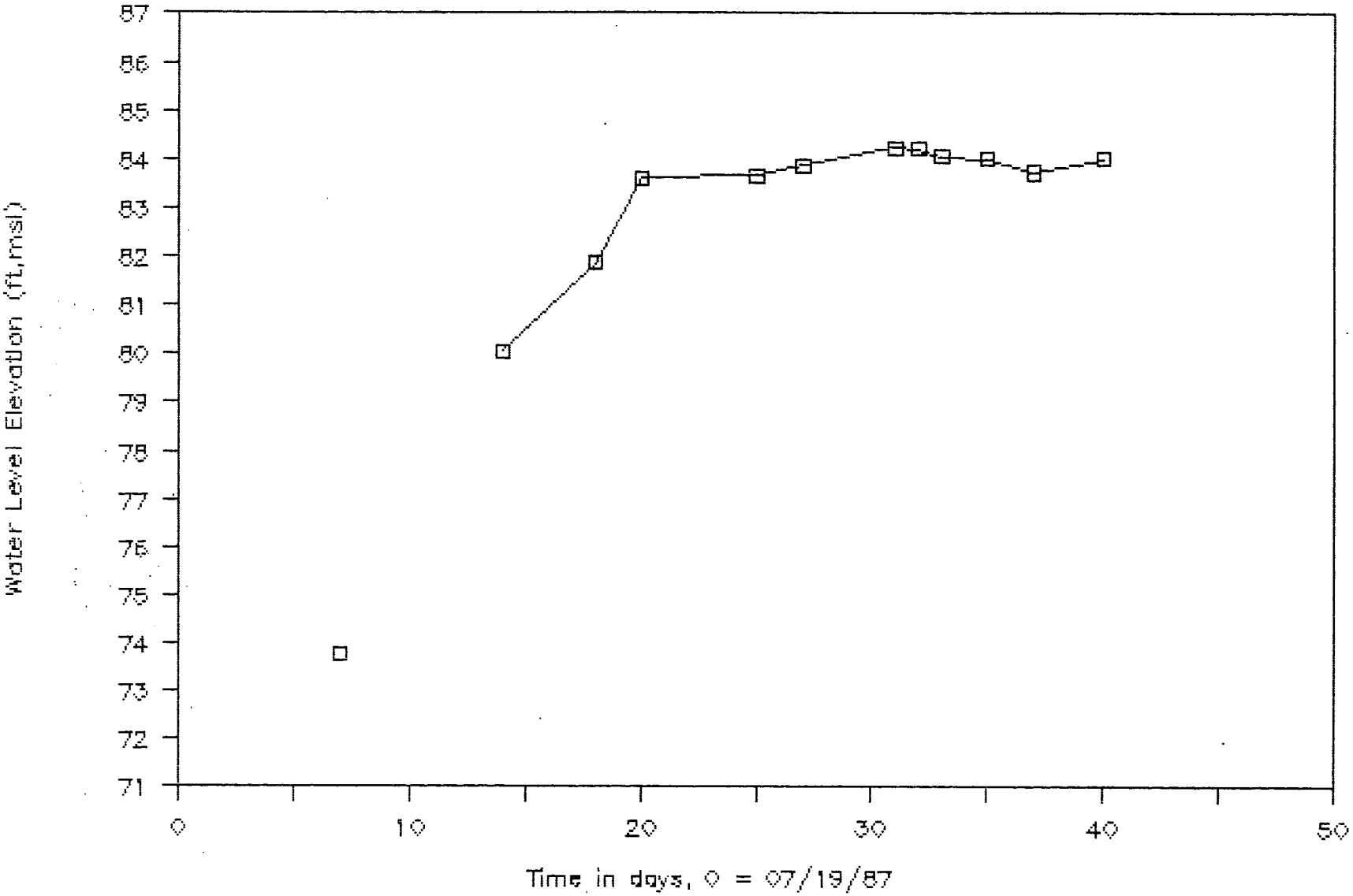

HYDROGRAPH OF WELL MWR-9A
Water Level Elevation (ft,msl)
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
0
10
20
30
40
50
Time in days, ◇ = 07/19/87

HYDROGRAPH OF WELL MW-10-A

05/31/86 to 10/01/86

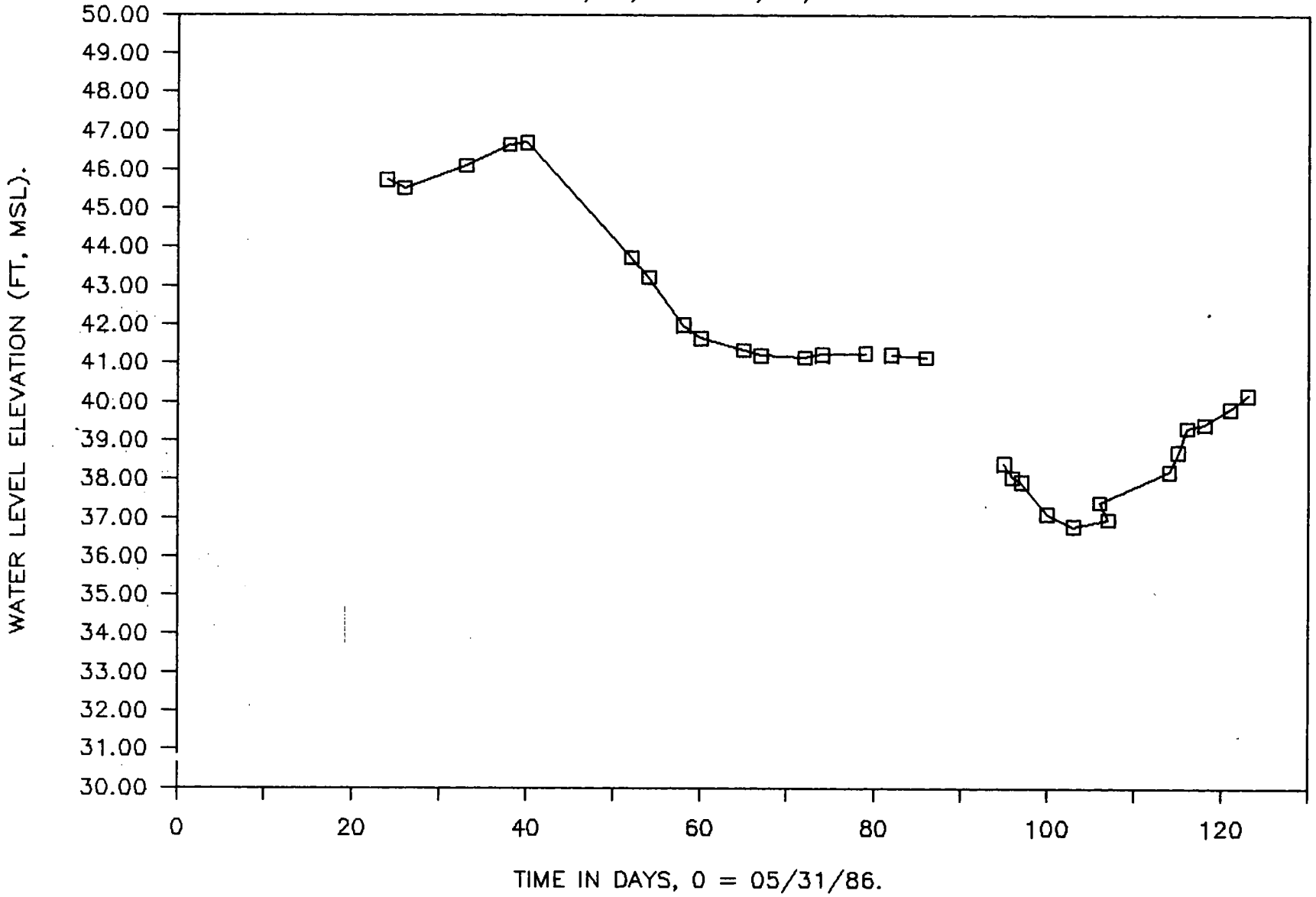


HYDROGRAPH OF WELL MW-10A

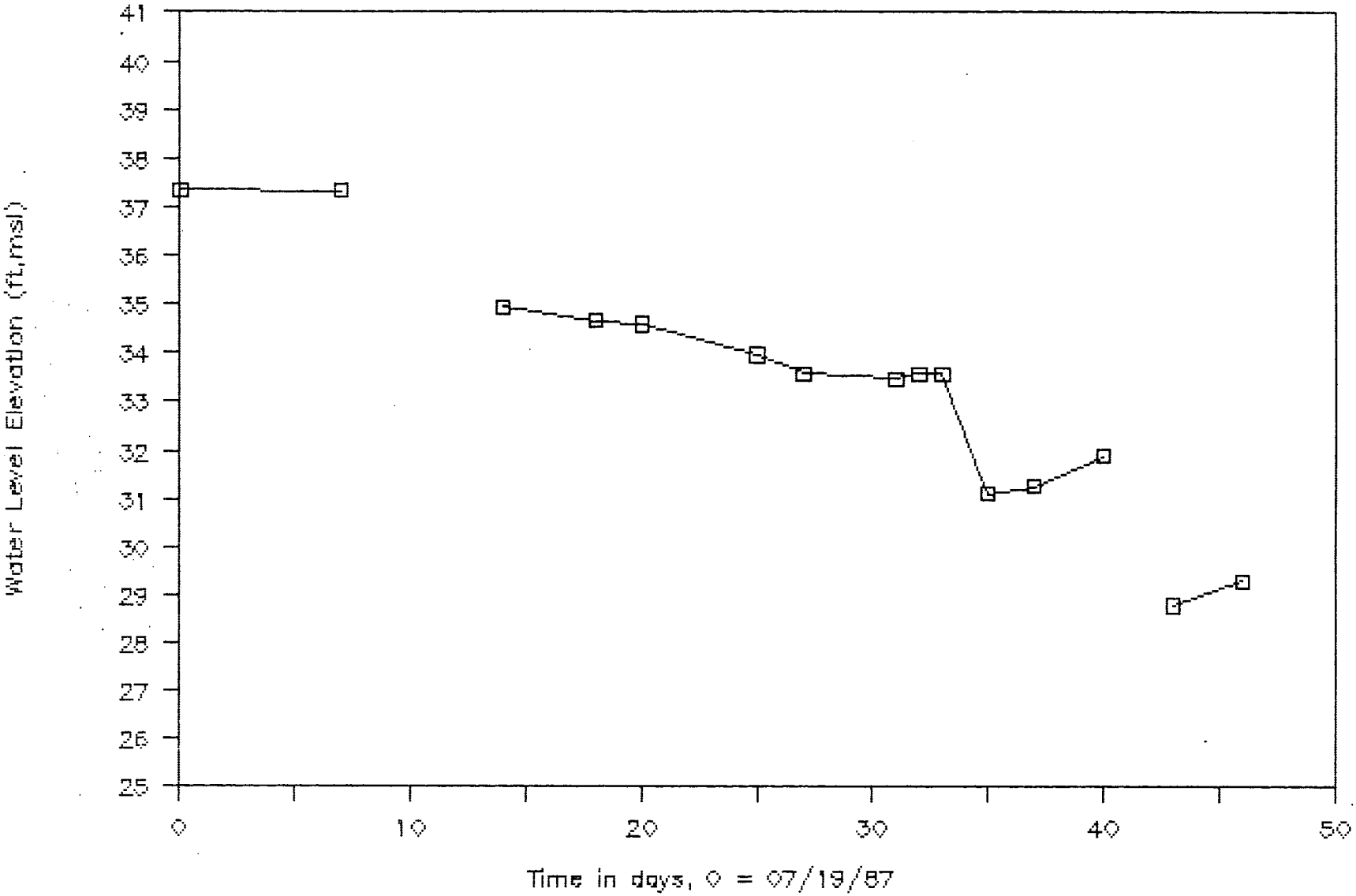


HYDROGRAPH OF WELL MW-12-A

05/31/86 to 10/01/86

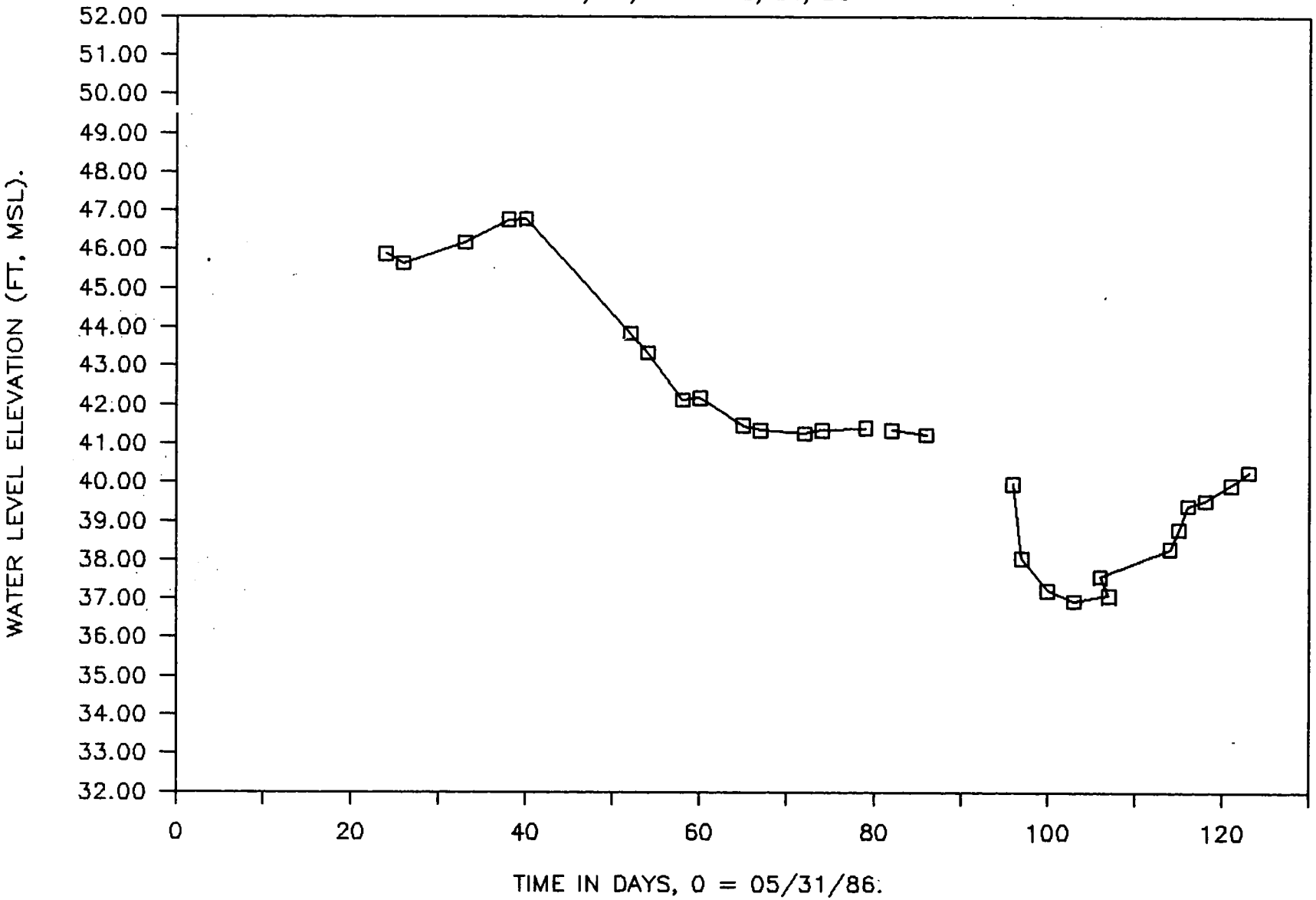


HYDROGRAPH OF WELL MW-12A

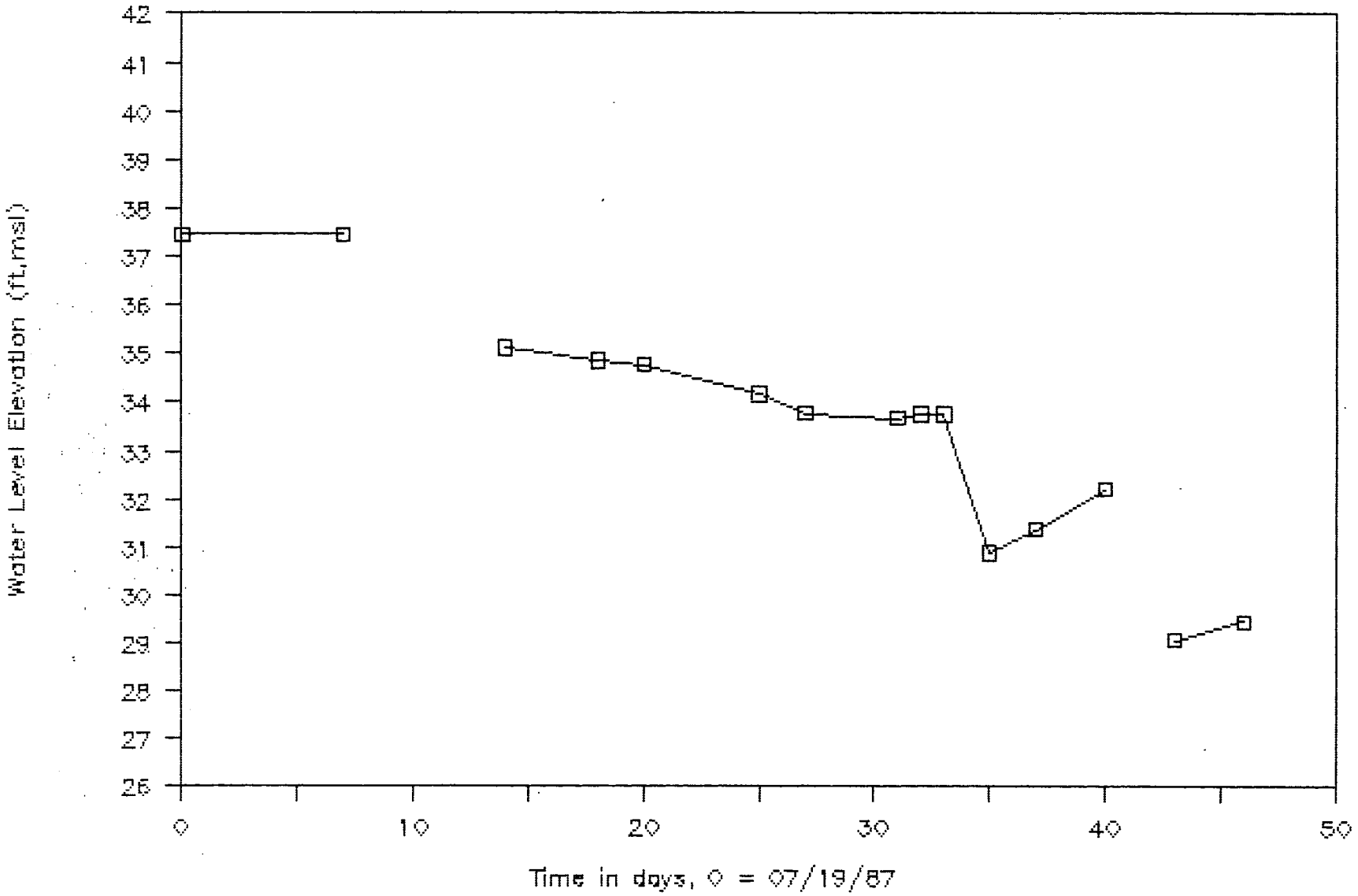


HYDROGRAPH OF WELL MW-13-A

05/31/86 to 10/01/86

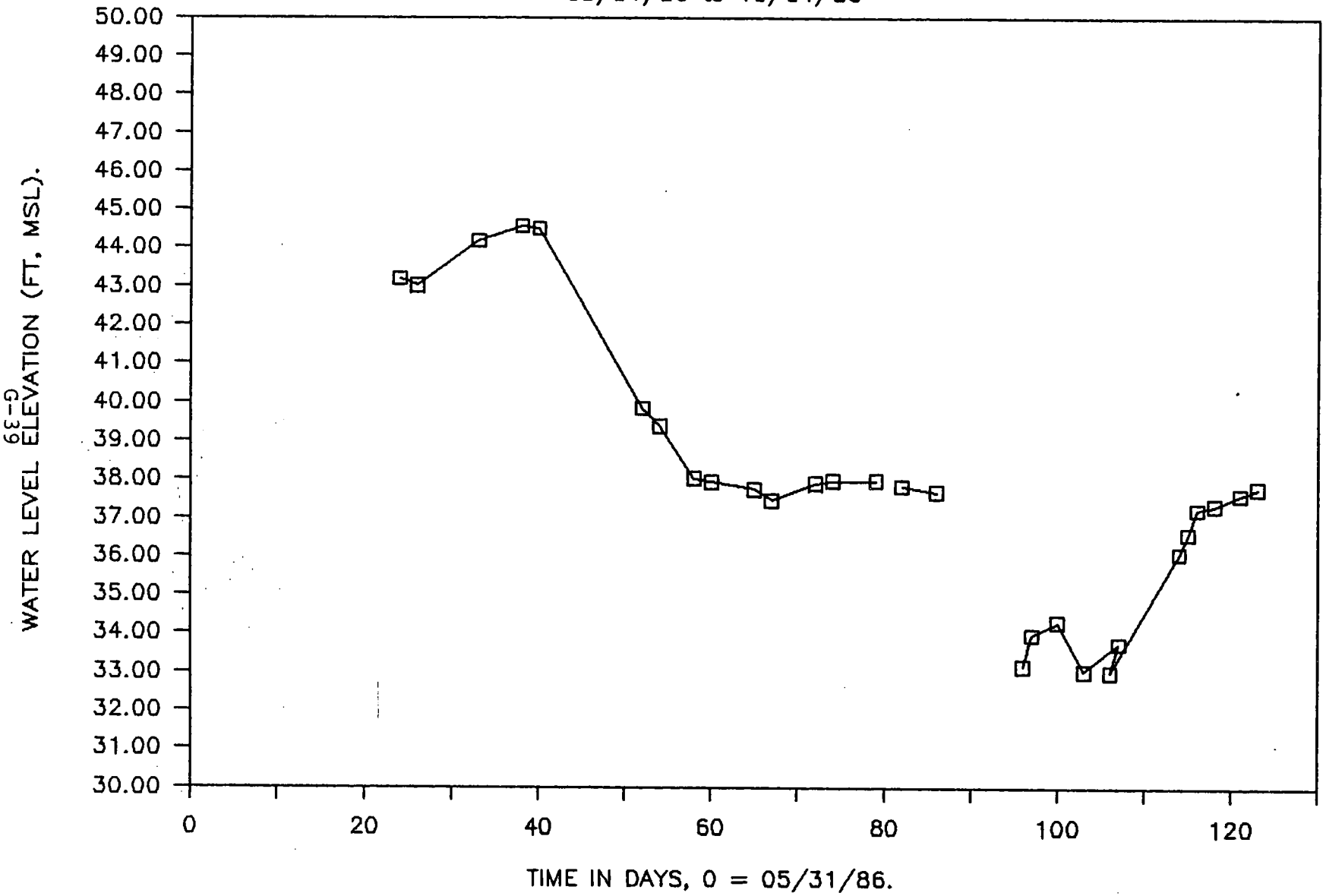


HYDROGRAPH OF WELL MW-13A

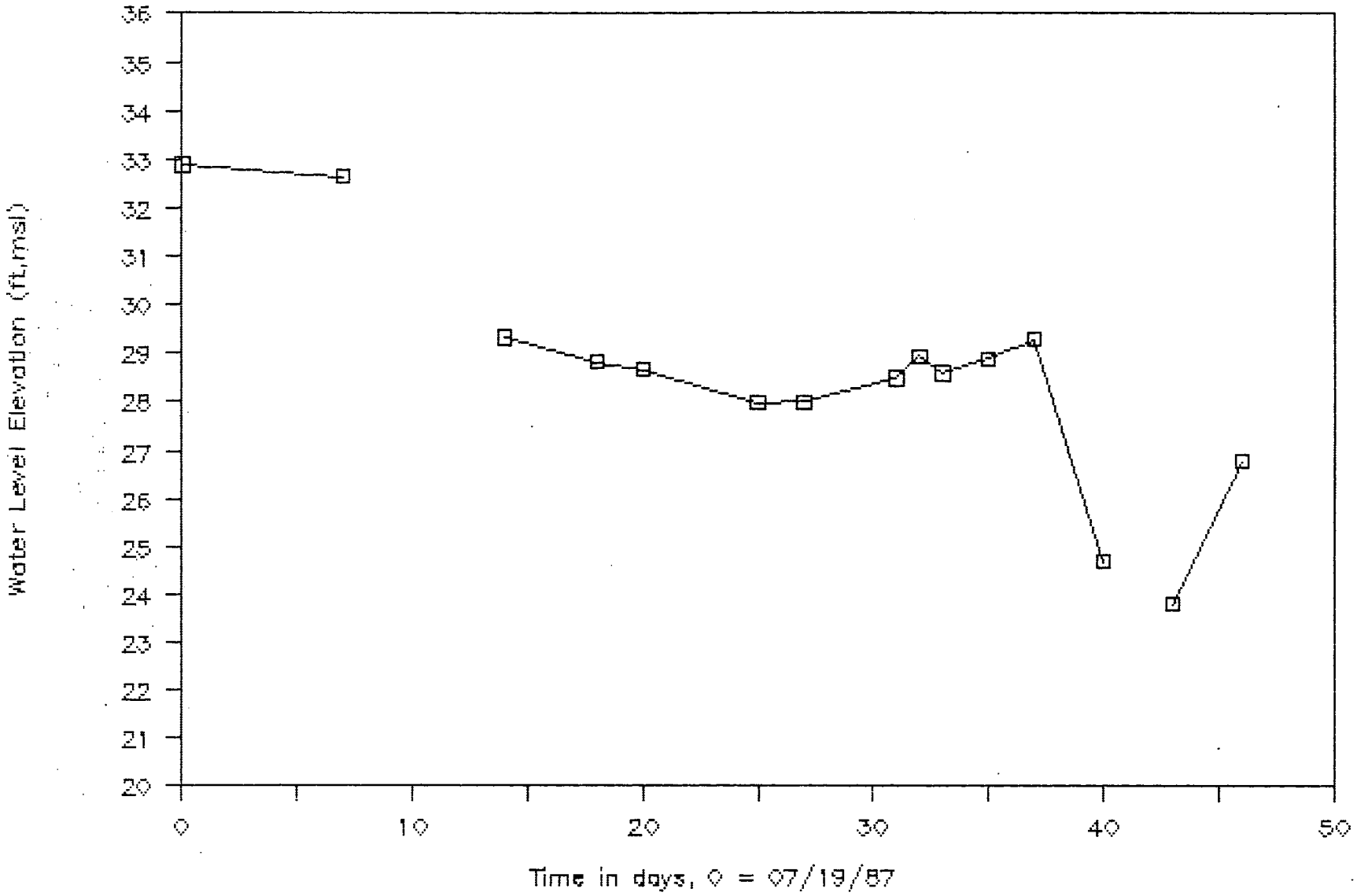


HYDROGRAPH OF WELL MW-14-A

05/31/86 to 10/01/86

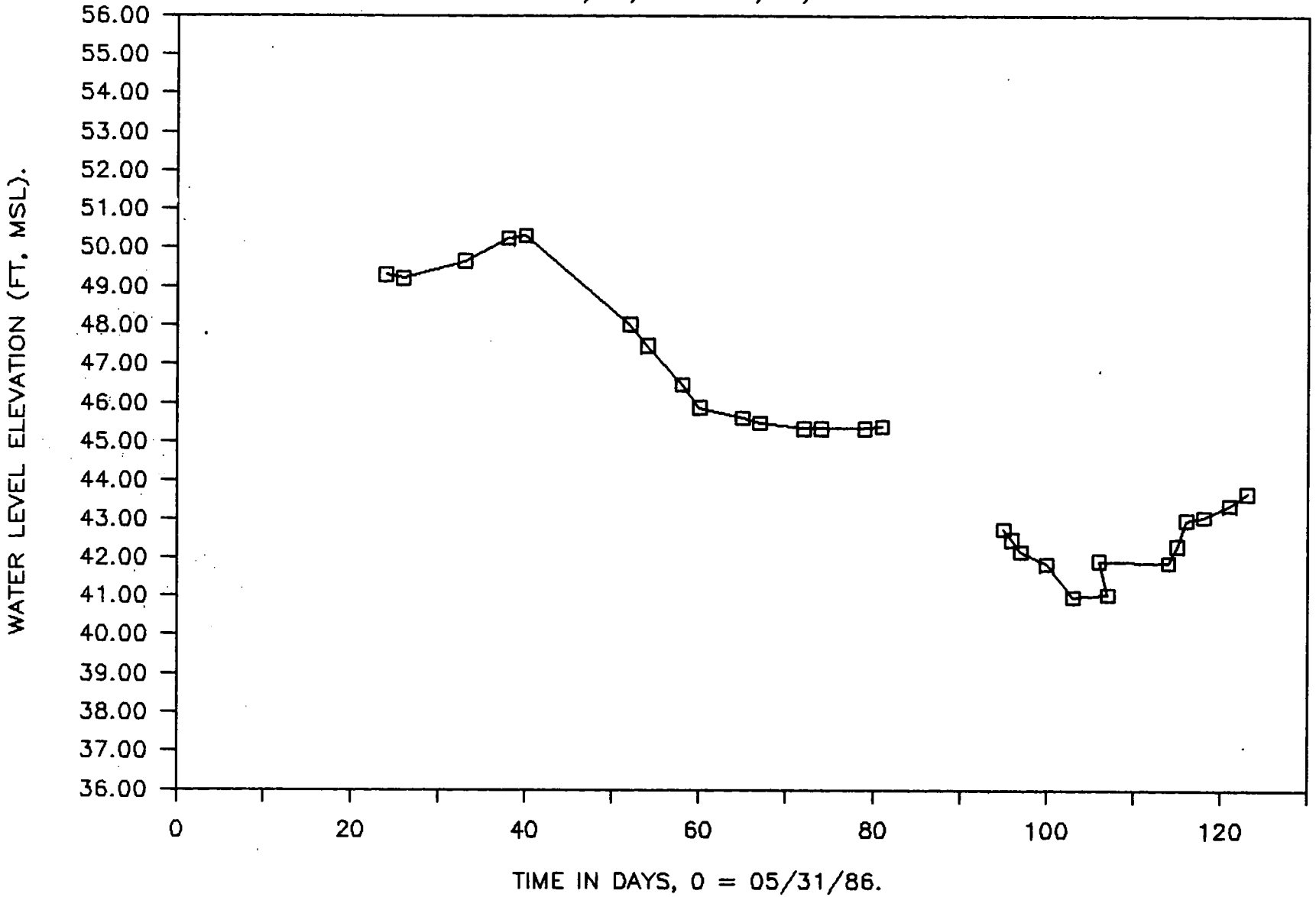


HYDROGRAPH OF WELL MW-14A

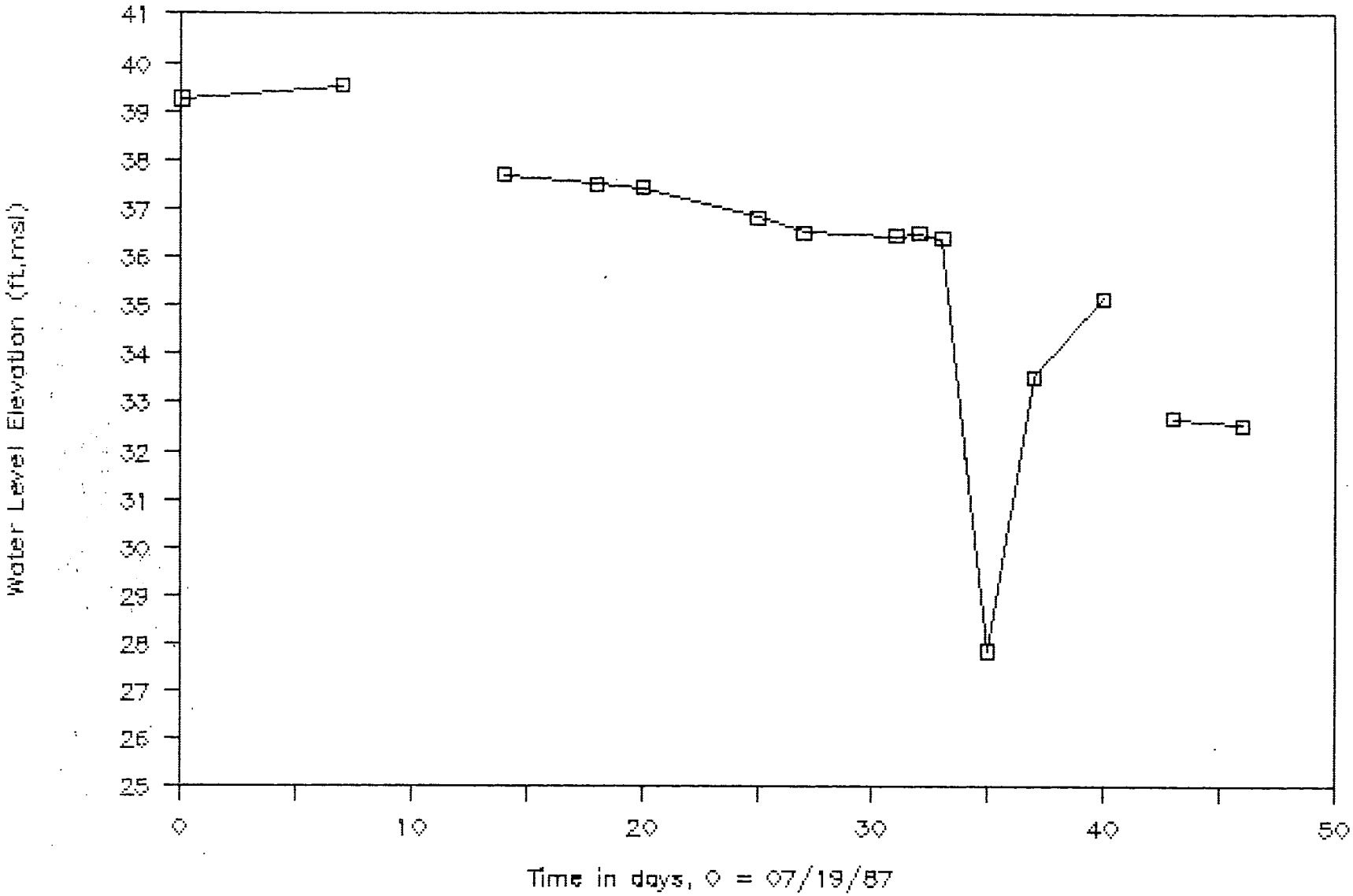


HYDROGRAPH OF WELL MW-15-A

05/31/86 to 10/01/86

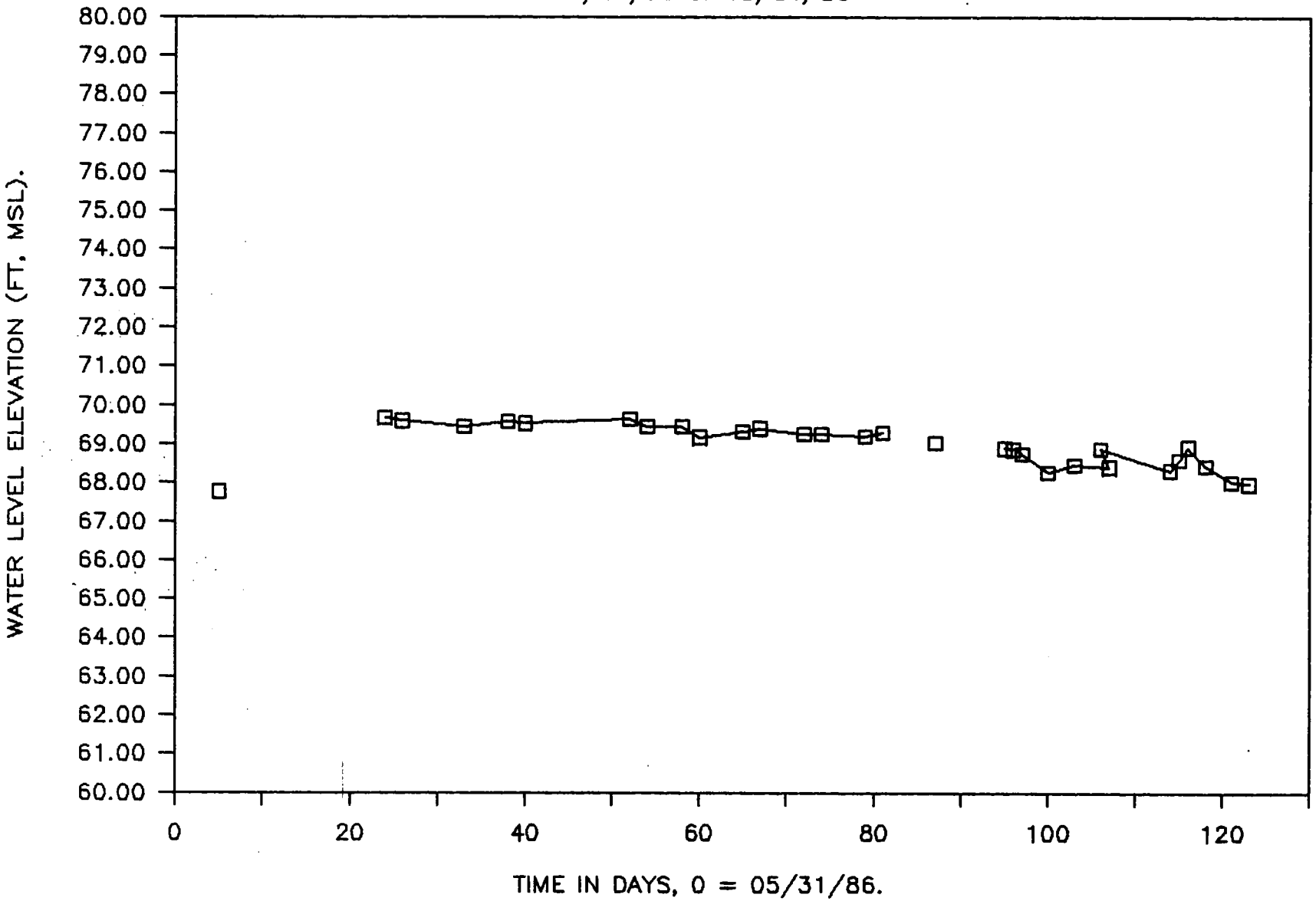


HYDROGRAPH OF WELL MW-15A

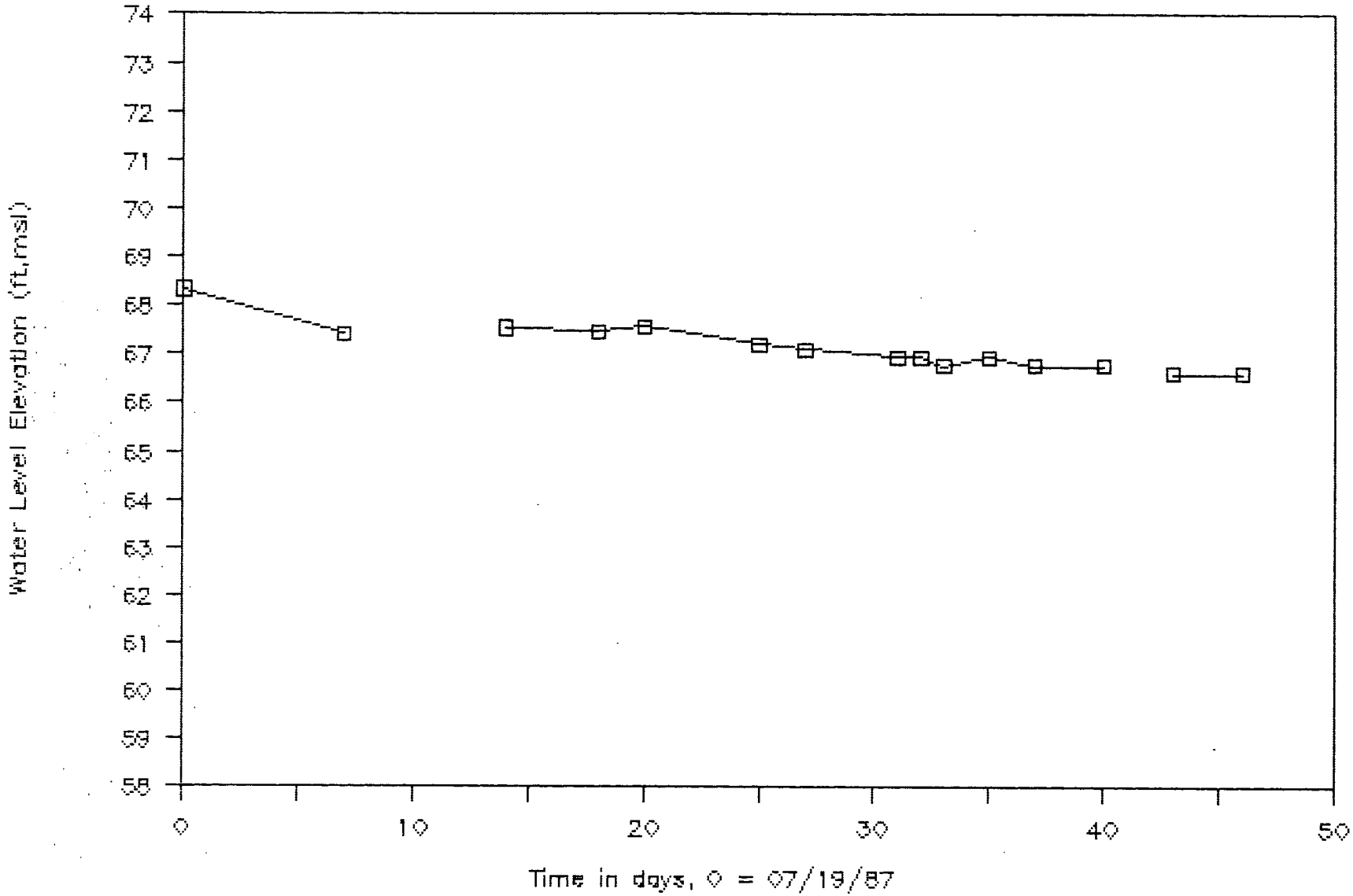


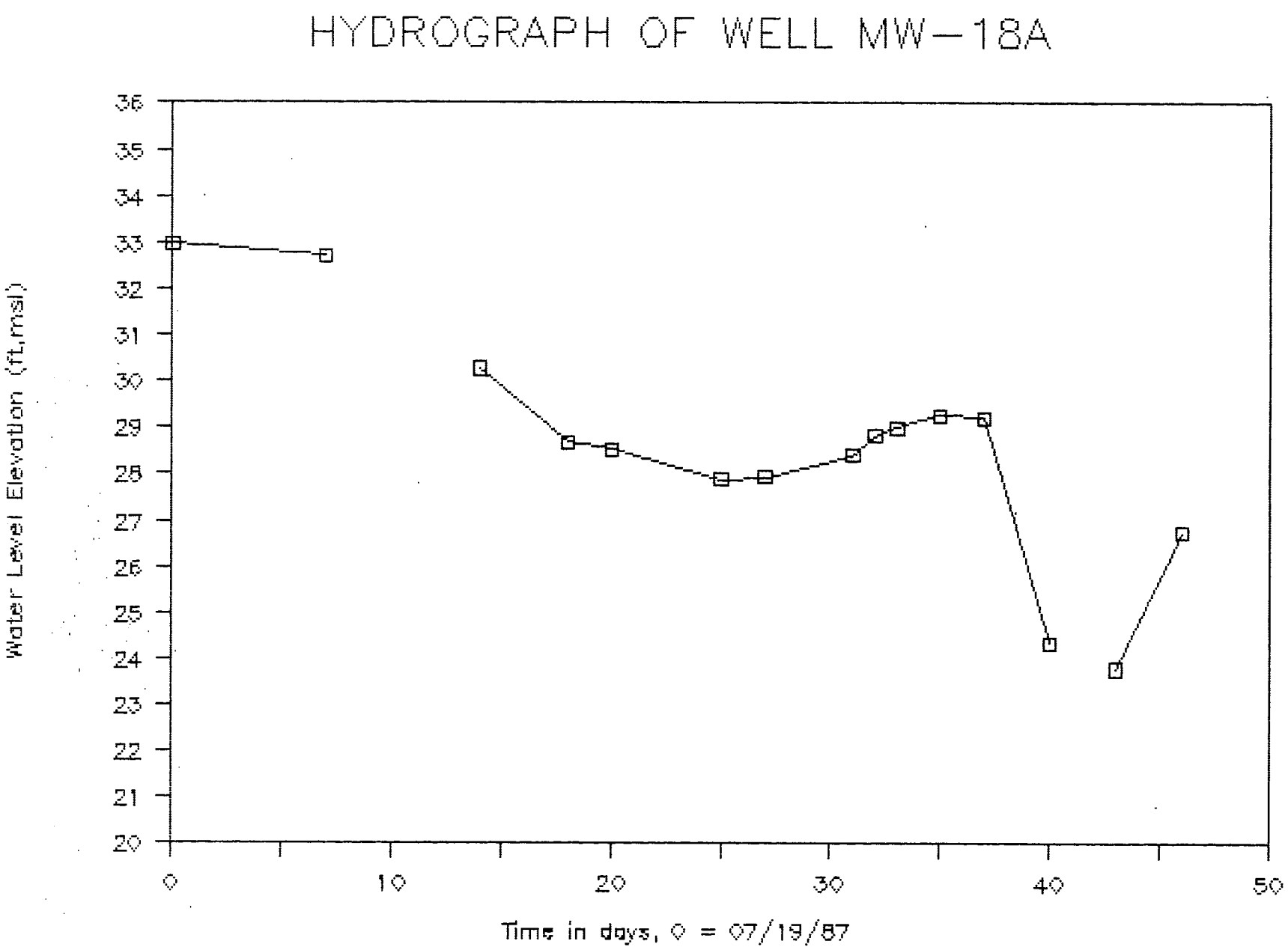
HYDROGRAPH OF WELL MW-16-A

05/31/86 to 10/01/86



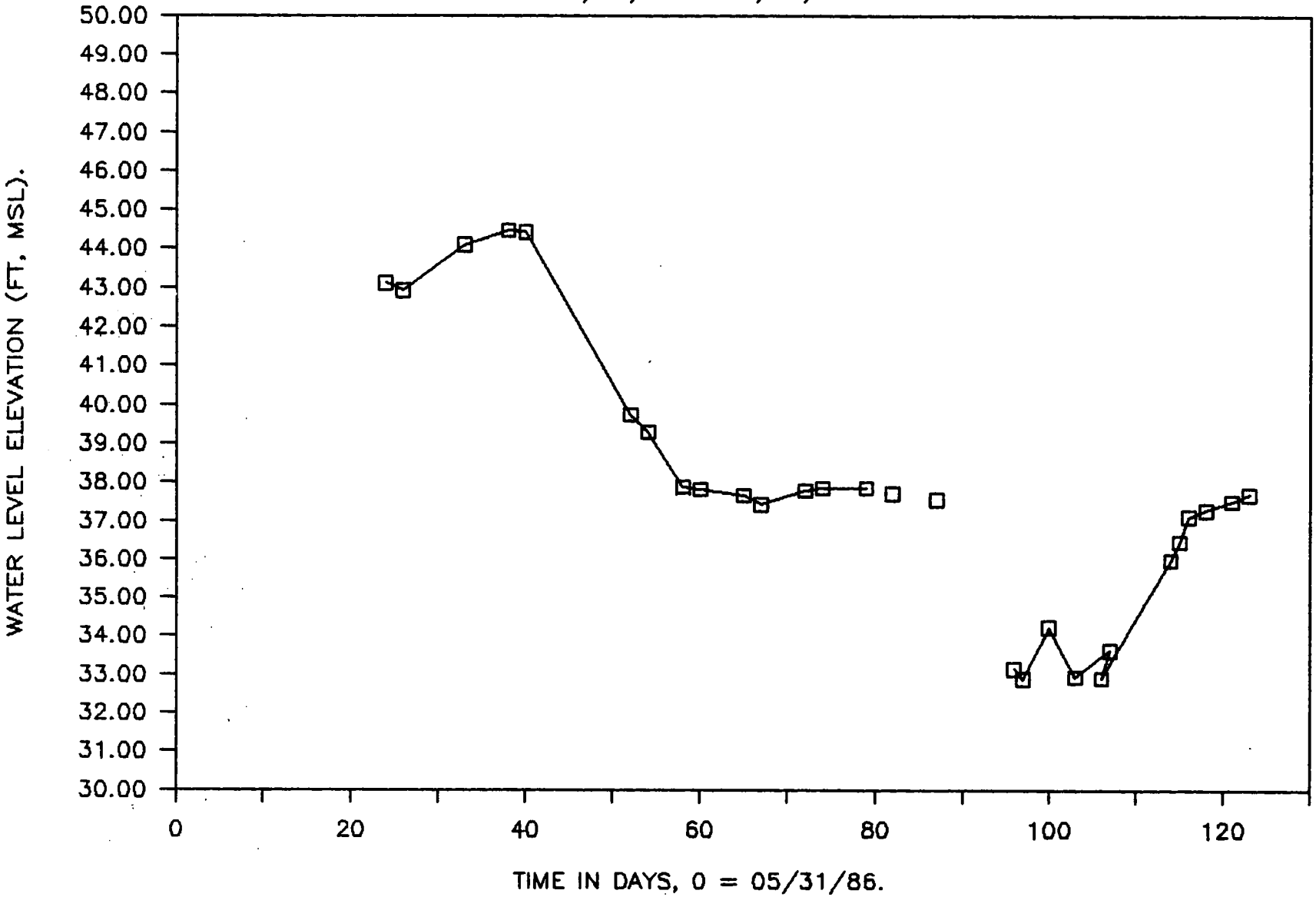
HYDROGRAPH OF WELL MW-16A



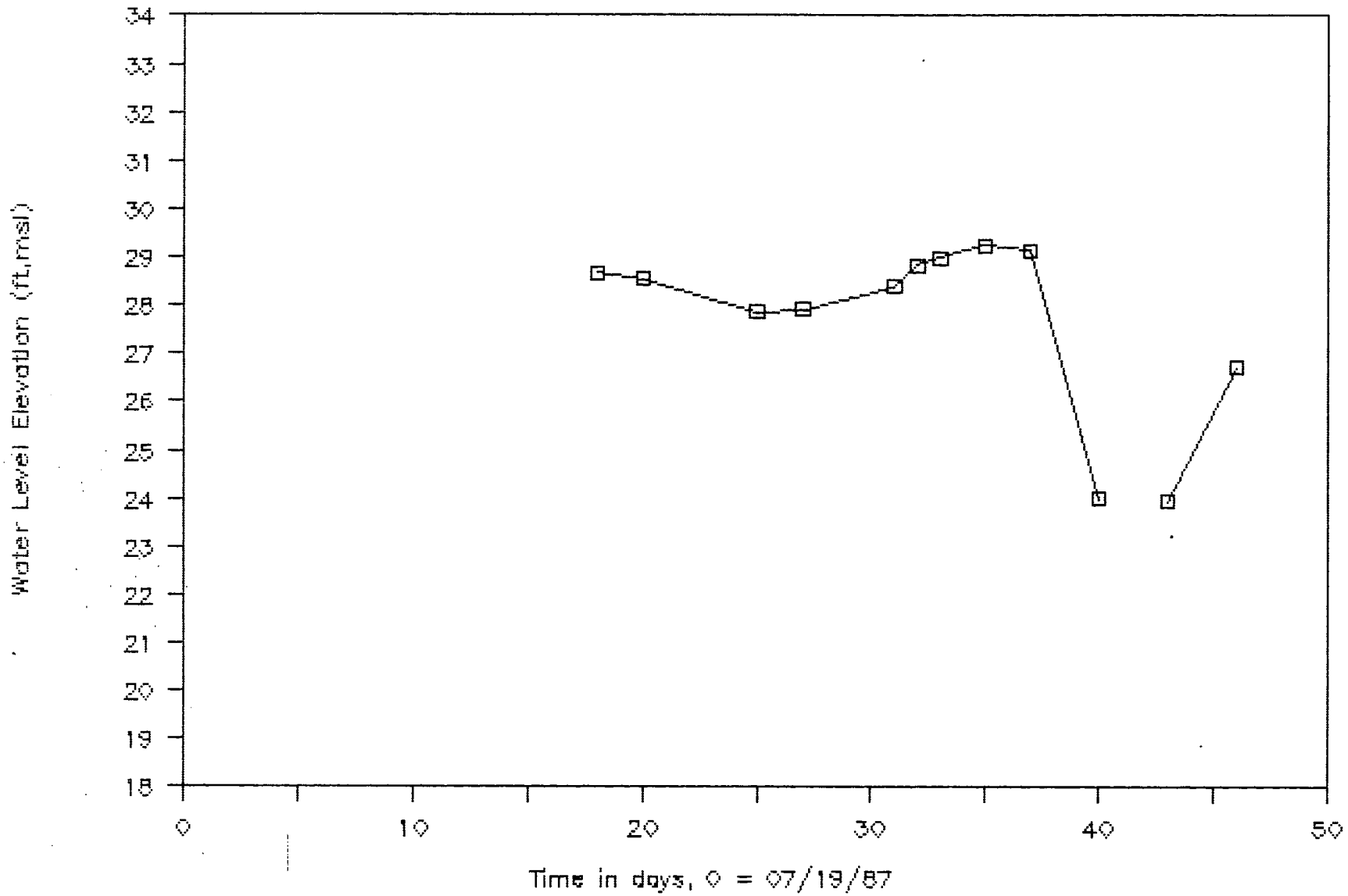

HYDROGRAPH OF WELL MW-18A
Water Level Elevation (ft,msl)
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
20
0
10
20
30
40
50
Time in days, ◇ = 07/19/87

HYDROGRAPH OF WELL MW-20-A

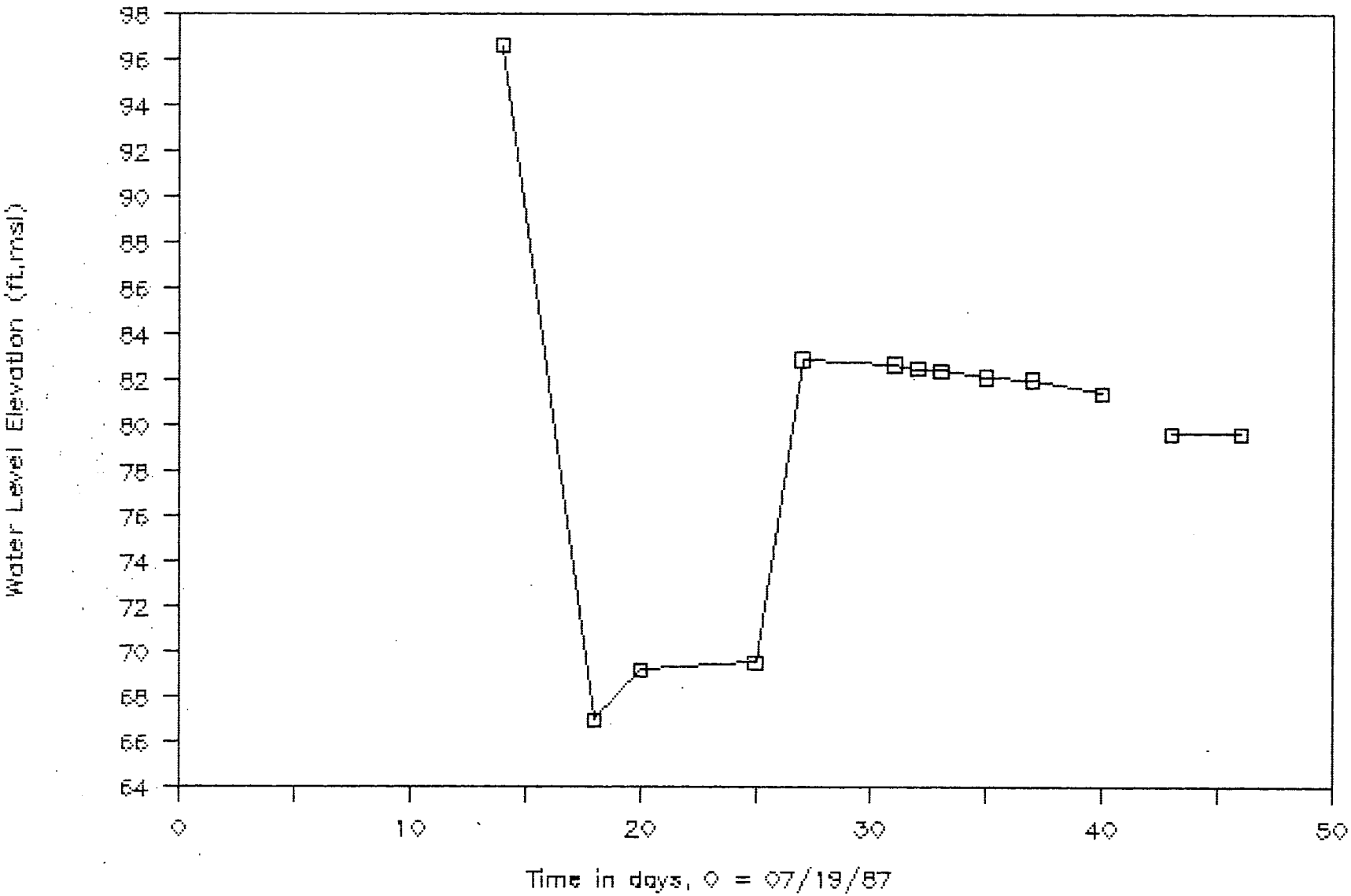
05/31/86 to 10/01/86



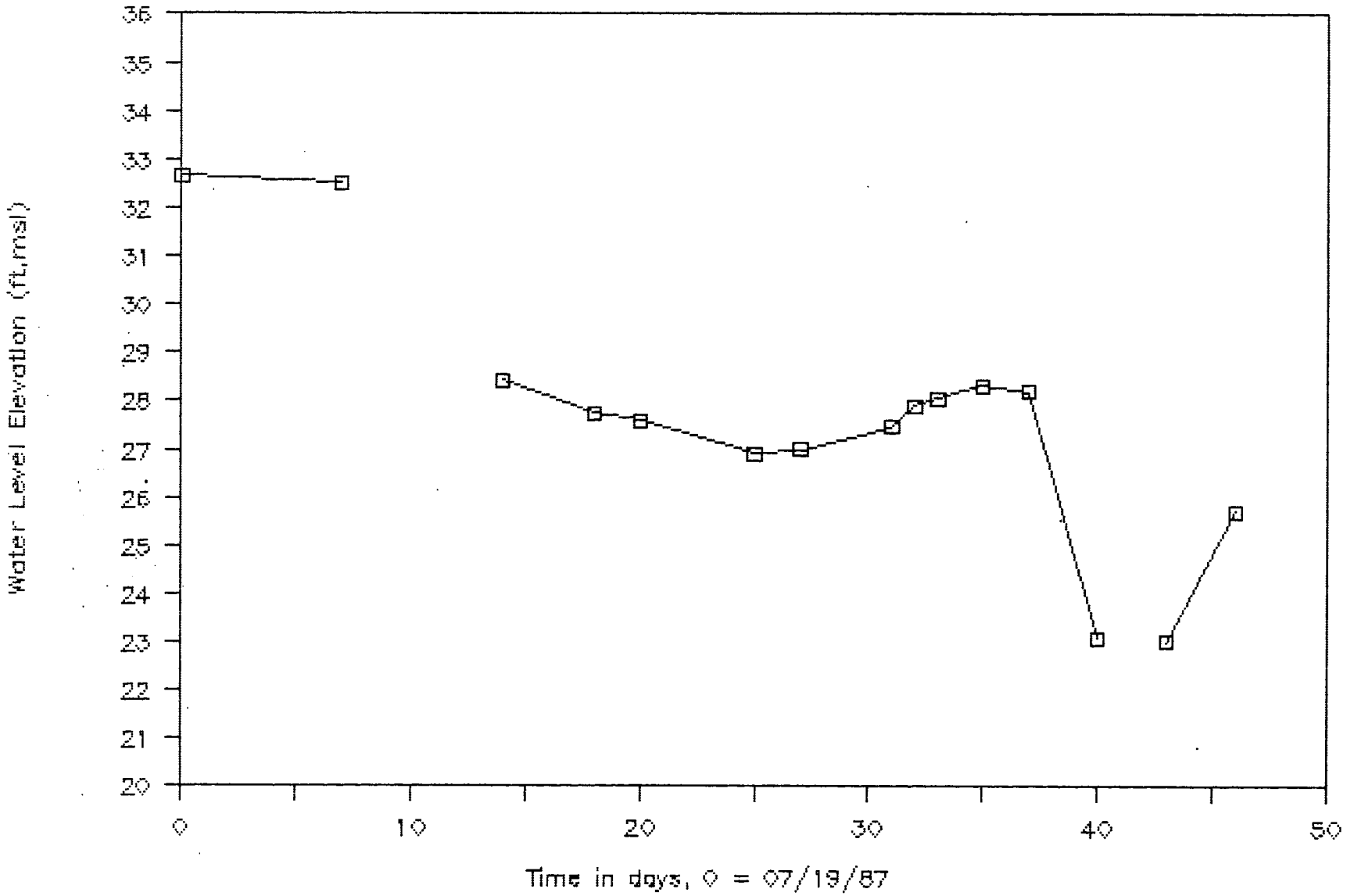
HYDROGRAPH OF WELL MW-20A

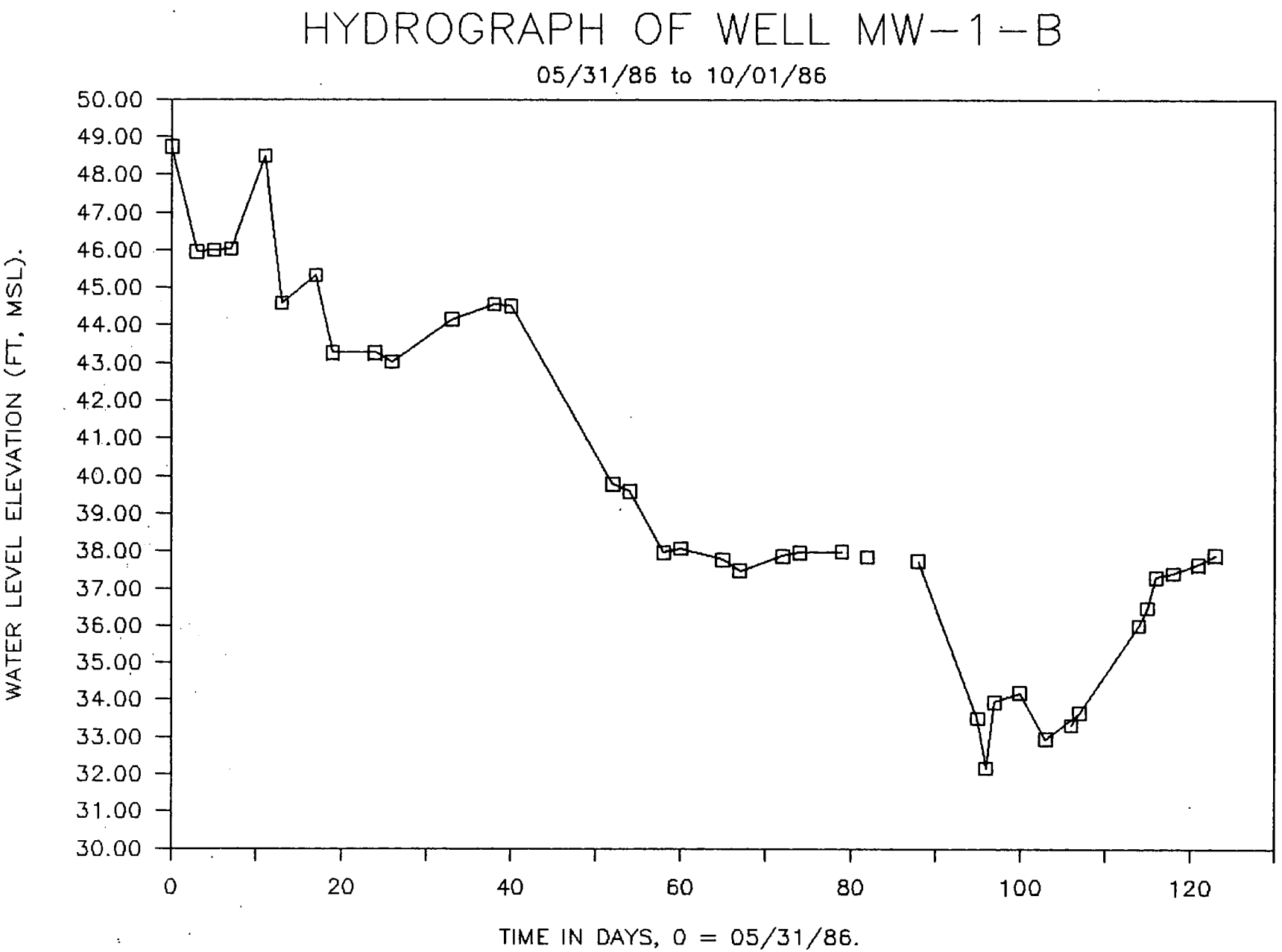


HYDROGRAPH OF WELL MW-24A

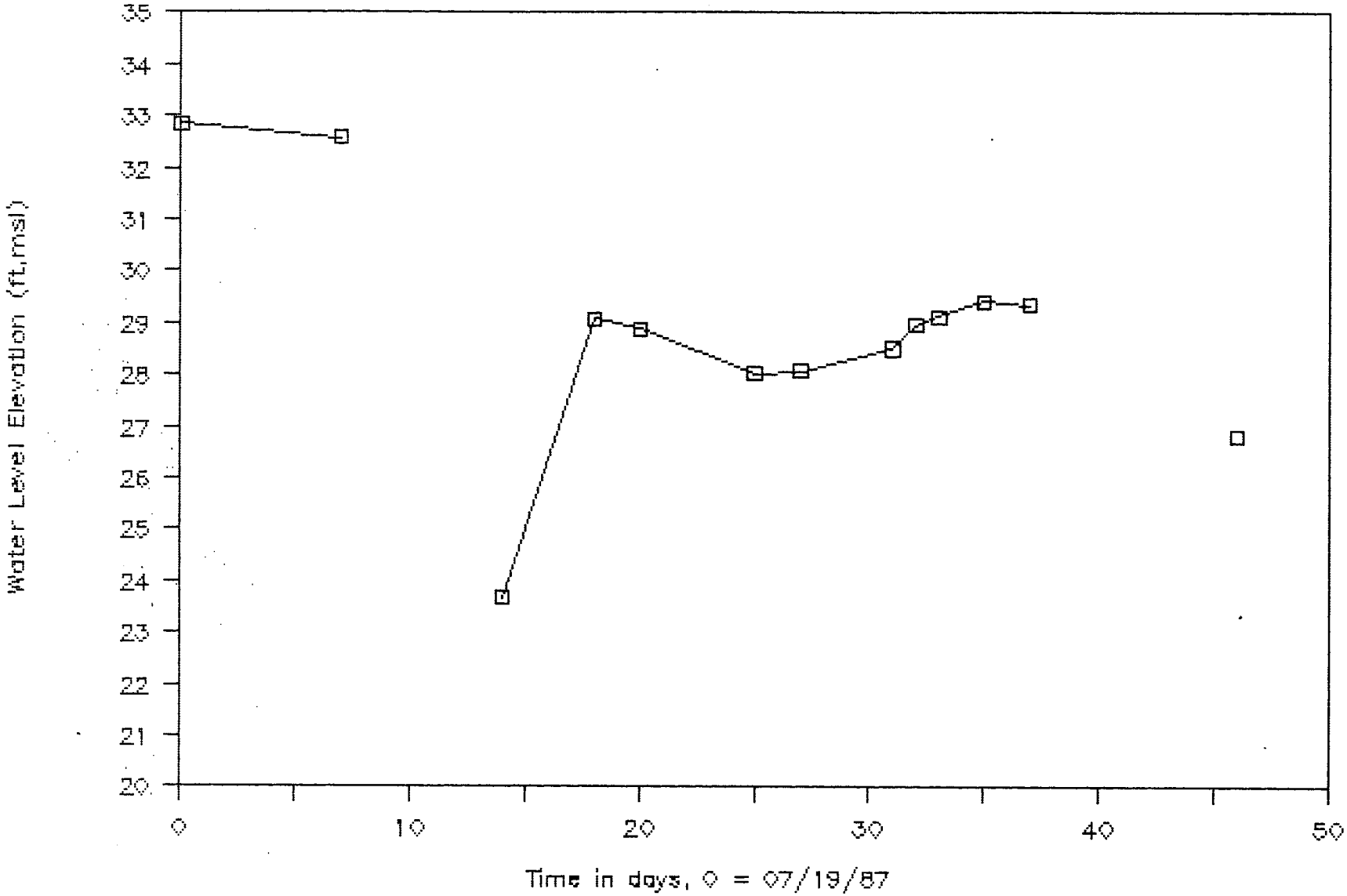


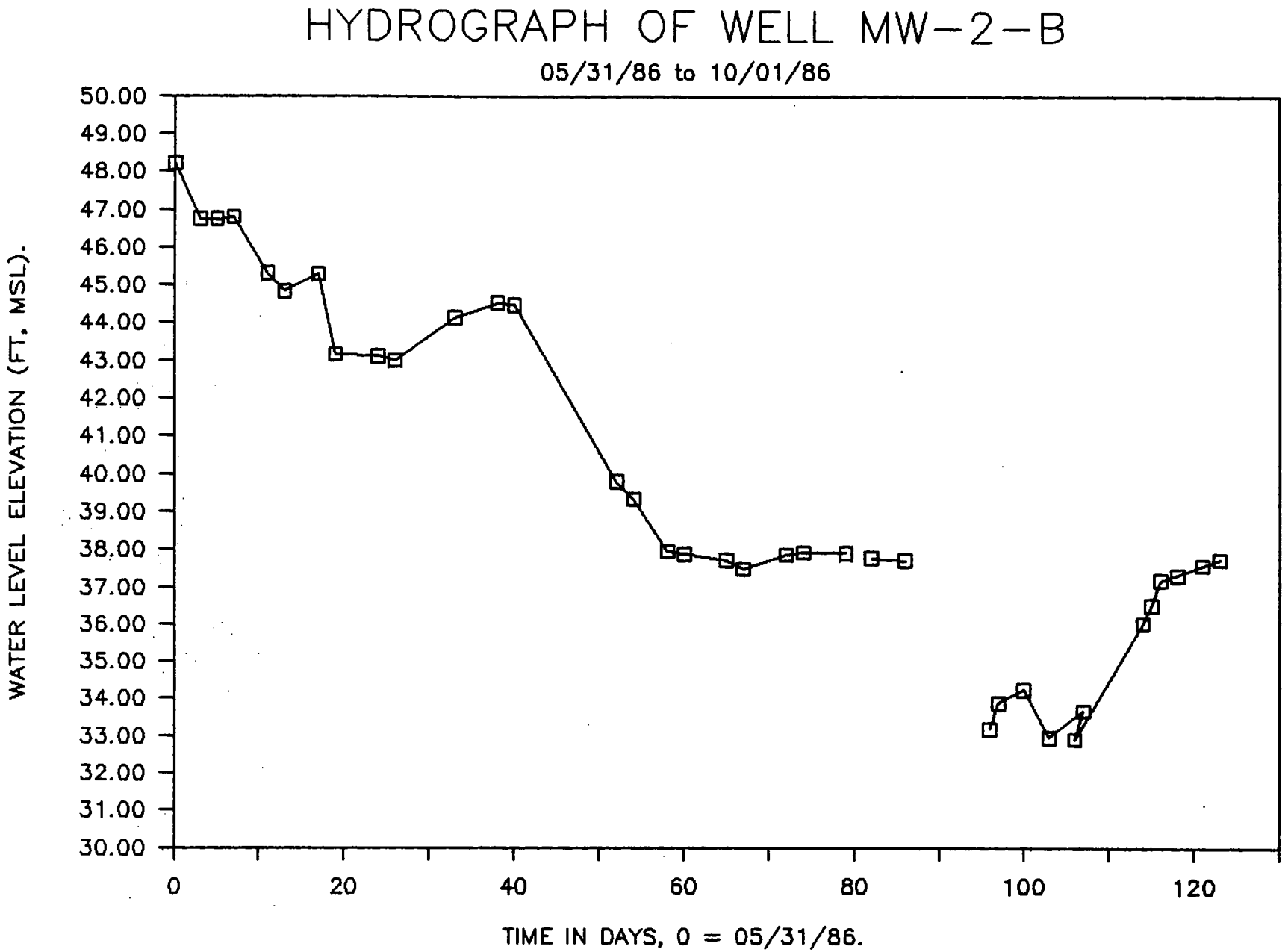
HYDROGRAPH OF WELL MW-27A



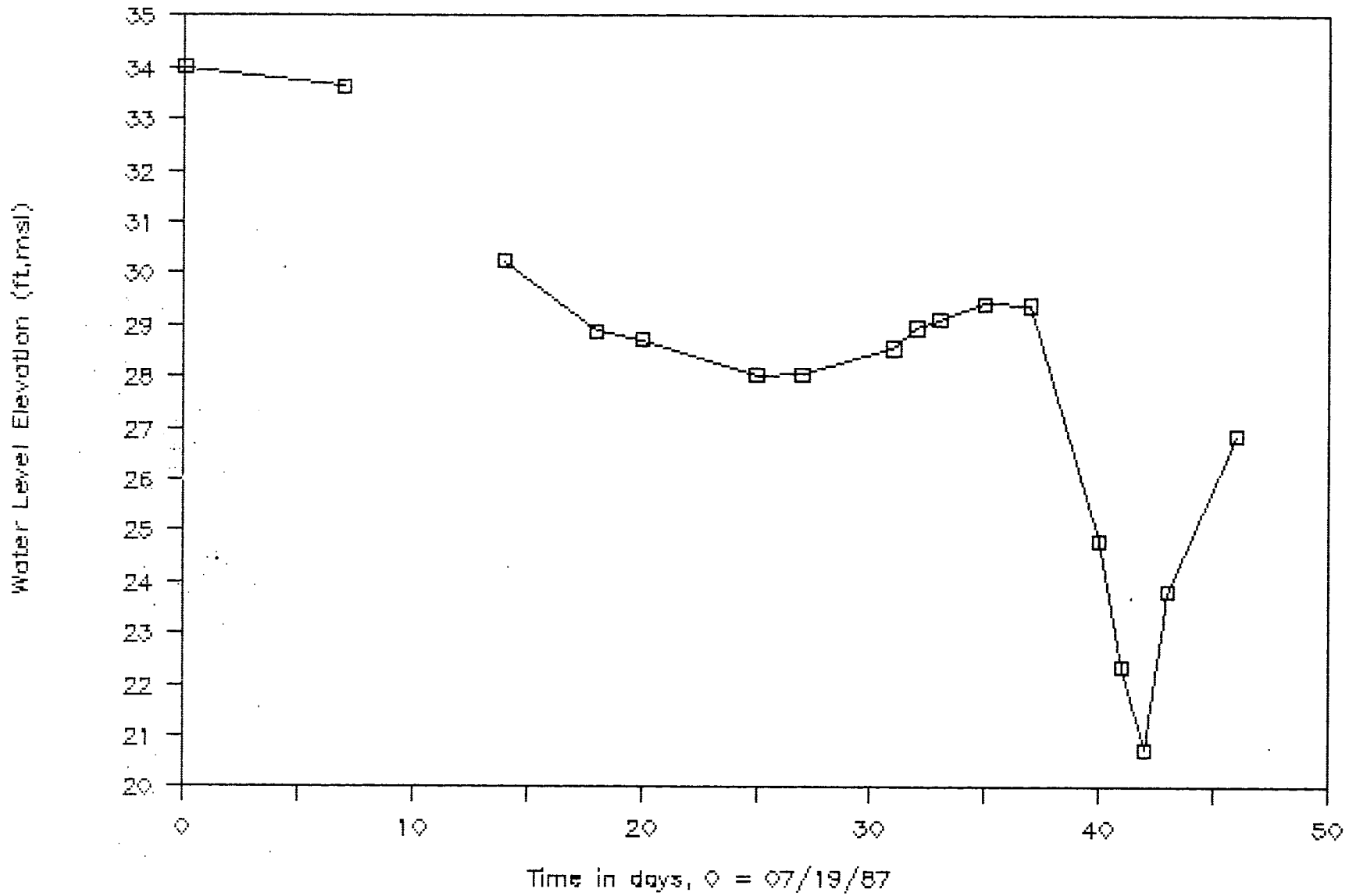

HYDROGRAPH OF WELL MW-1-B
05/31/86 to 10/01/86
WATER LEVEL ELEVATION (FT. MSL).
50.00
49.00
48.00
47.00
46.00
45.00
44.00
43.00
42.00
41.00
40.00
39.00
38.00
37.00
36.00
35.00
34.00
33.00
32.00
31.00
30.00
0
20
40
60
80
100
120
TIME IN DAYS, 0 = 05/31/86.

HYDROGRAPH OF WELL MWR-1B



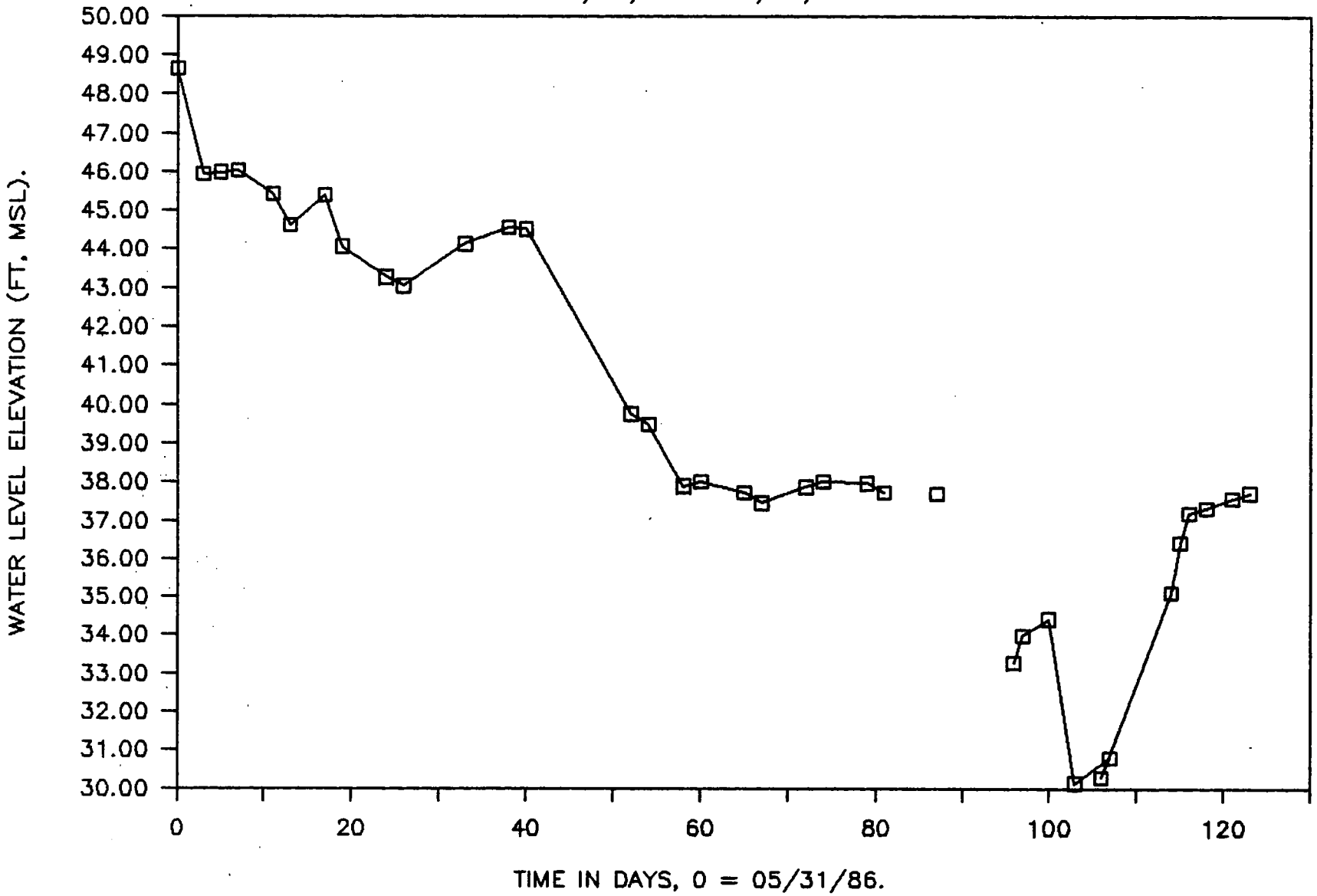

HYDROGRAPH OF WELL MW-2-B
05/31/86 to 10/01/86
WATER LEVEL ELEVATION (FT. MSL).
50.00
49.00
48.00
47.00
46.00
45.00
44.00
43.00
42.00
41.00
40.00
39.00
38.00
37.00
36.00
35.00
34.00
33.00
32.00
31.00
30.00
0
20
40
60
80
100
120
TIME IN DAYS, 0 = 05/31/86.

HYDROGRAPH OF WELL MWR-2B

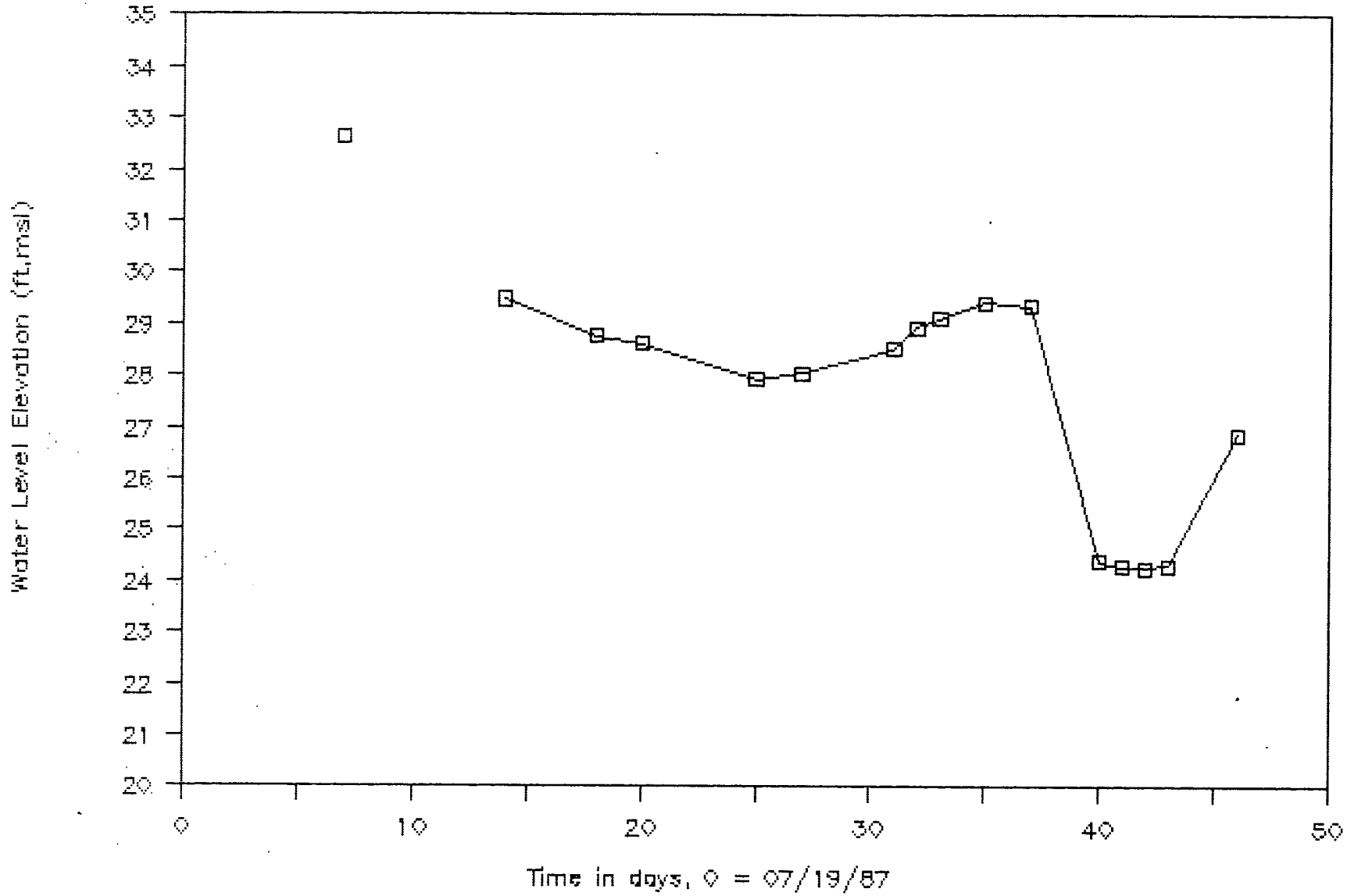


HYDROGRAPH OF WELL MW-3-B

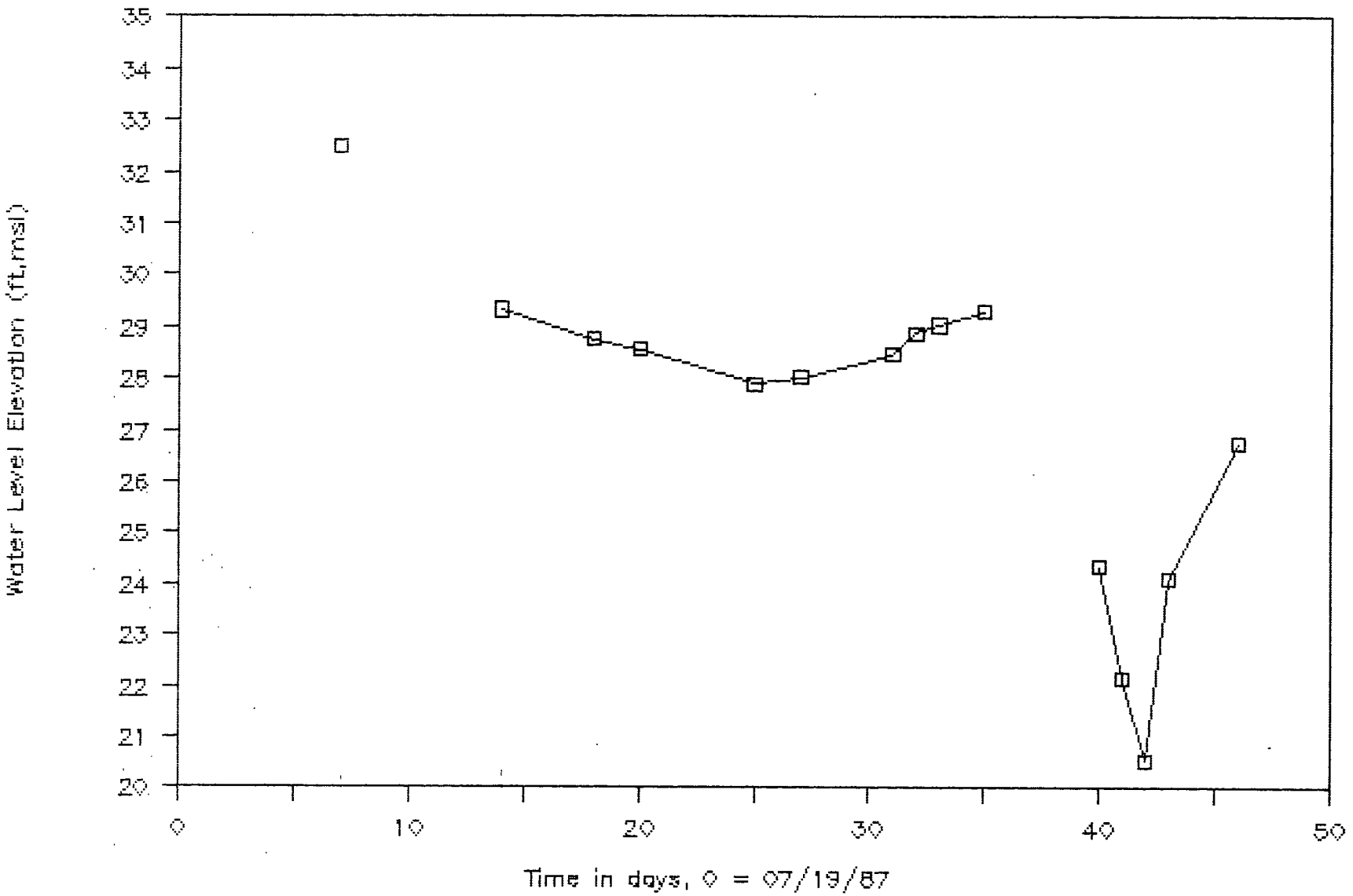
05/31/86 to 10/01/86



HYDROGRAPH OF WELL MWR-3B

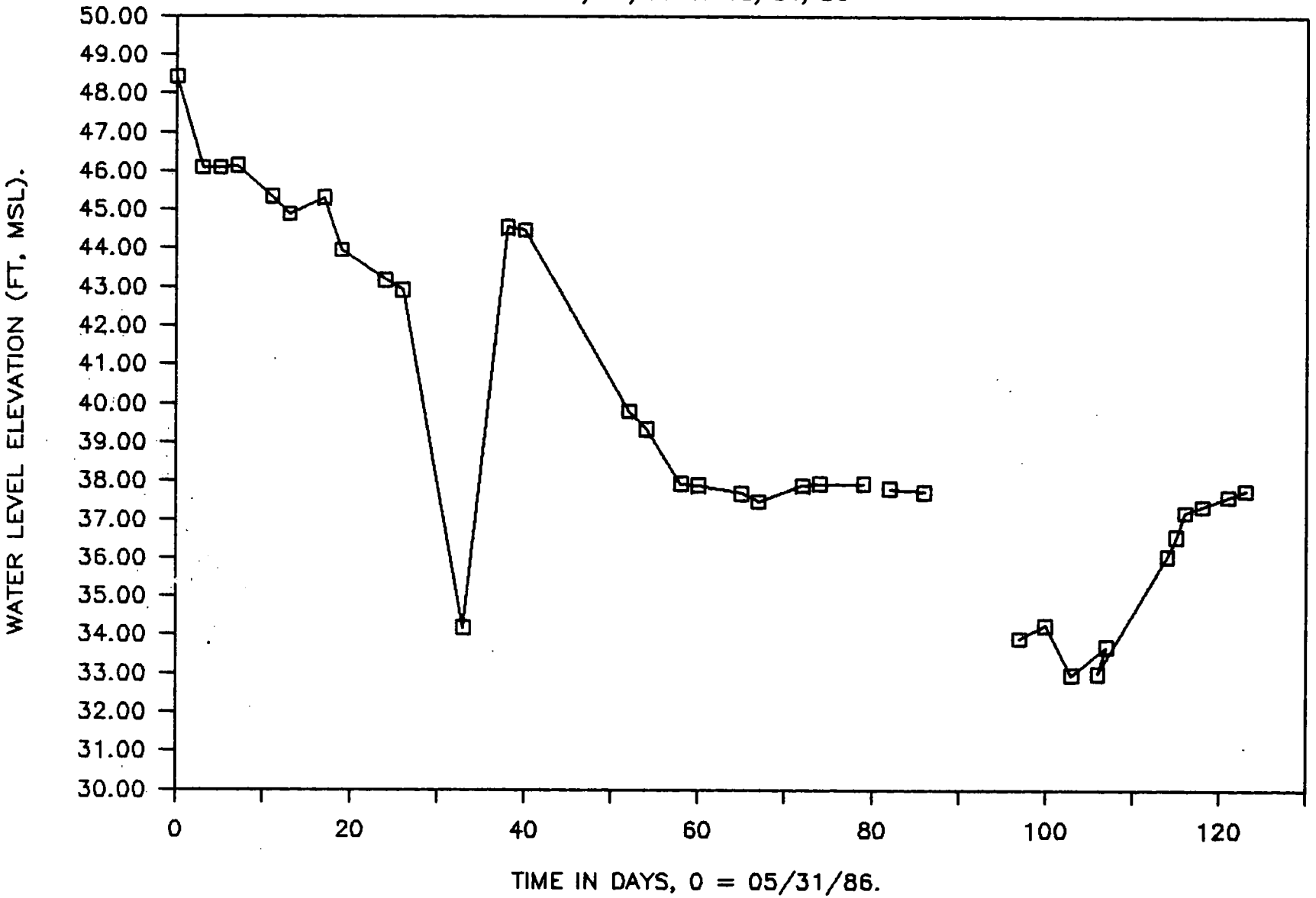


HYDROGRAPH OF WELL MW—4B

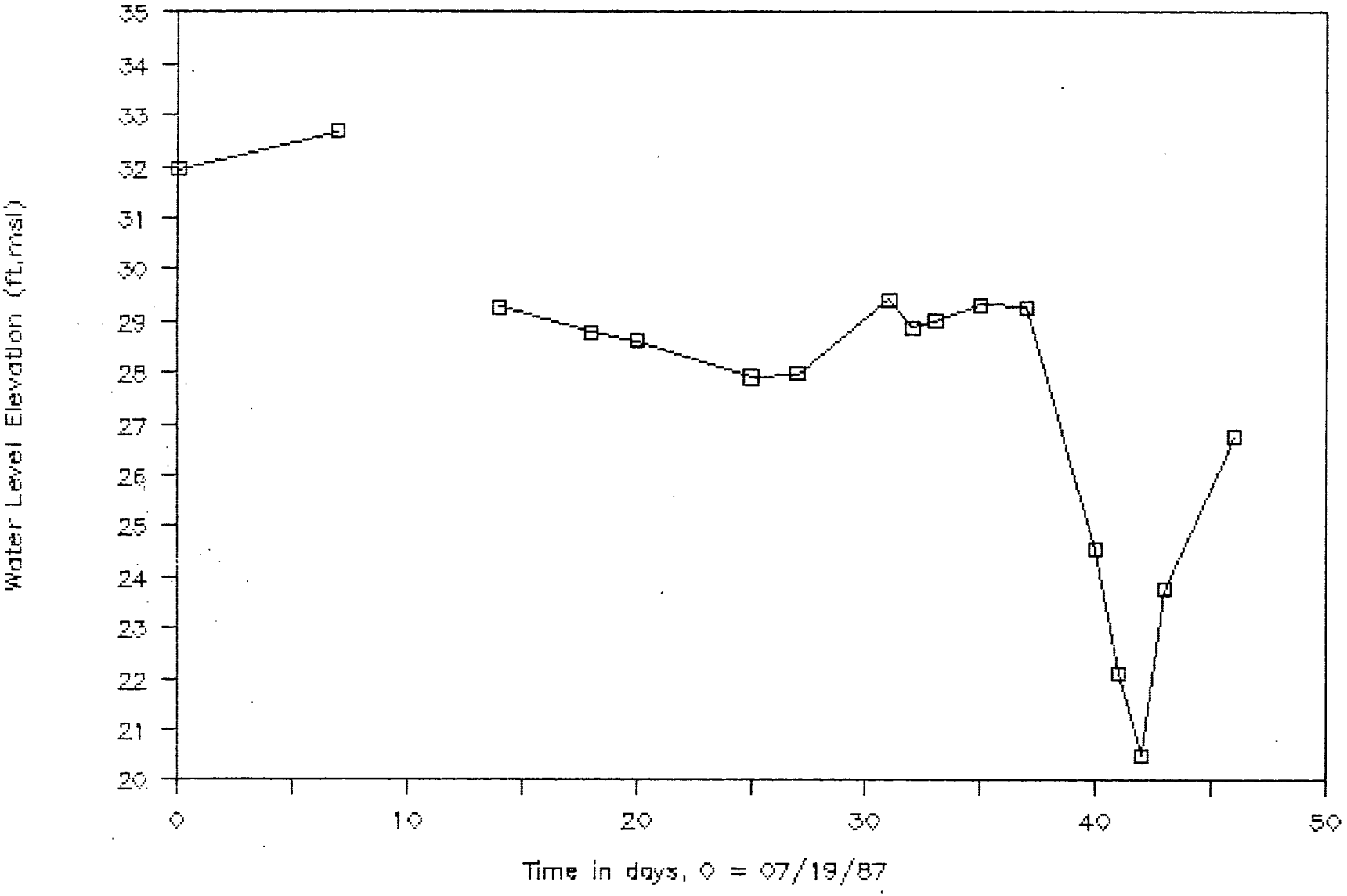


HYDROGRAPH OF WELL MW-6-B

05/31/86 to 10/01/86

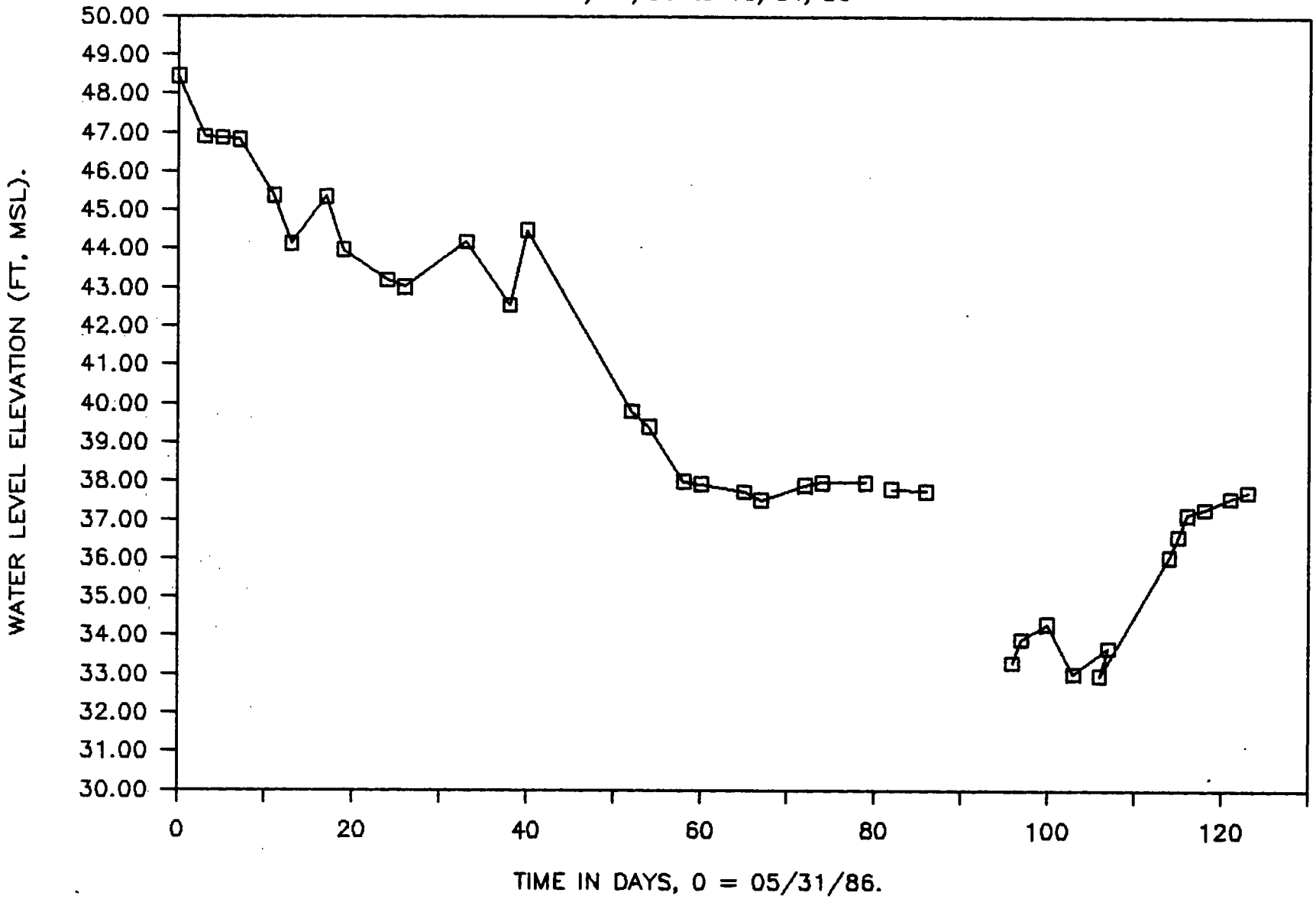


HYDROGRAPH OF WELL MWR-6B

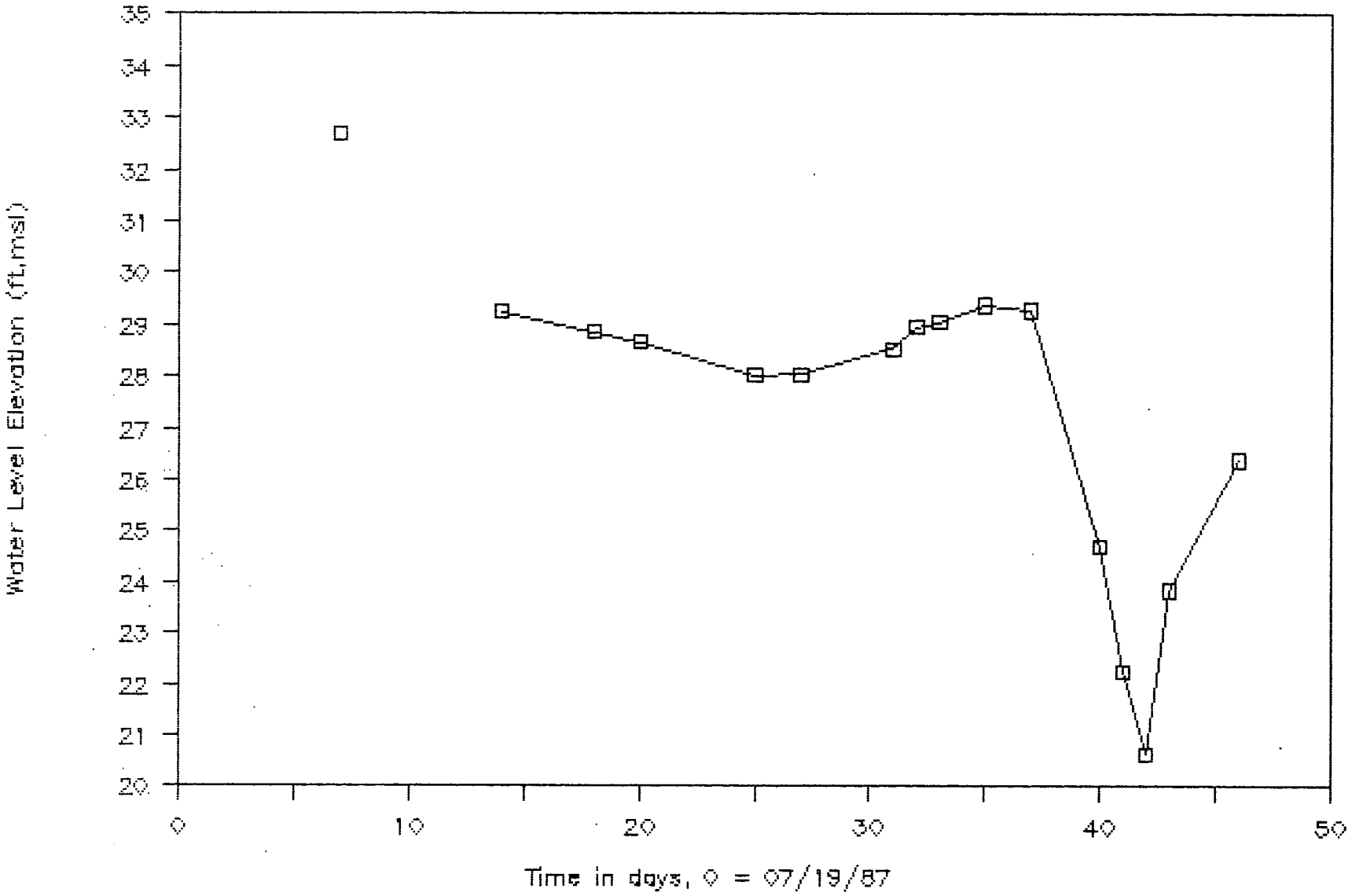


HYDROGRAPH OF WELL MW-7-B

05/31/86 to 10/01/86

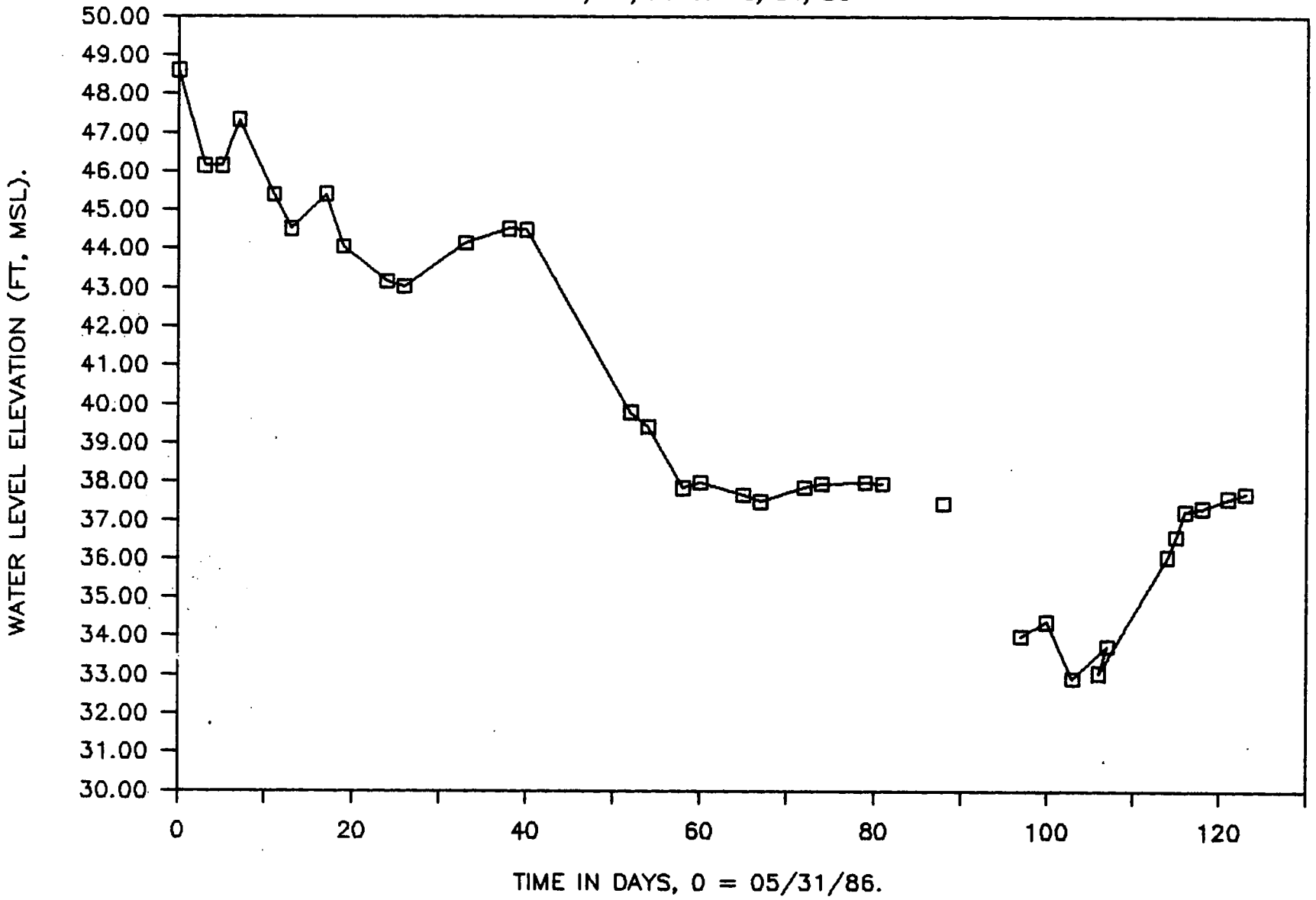


HYDROGRAPH OF WELL MWR-7B

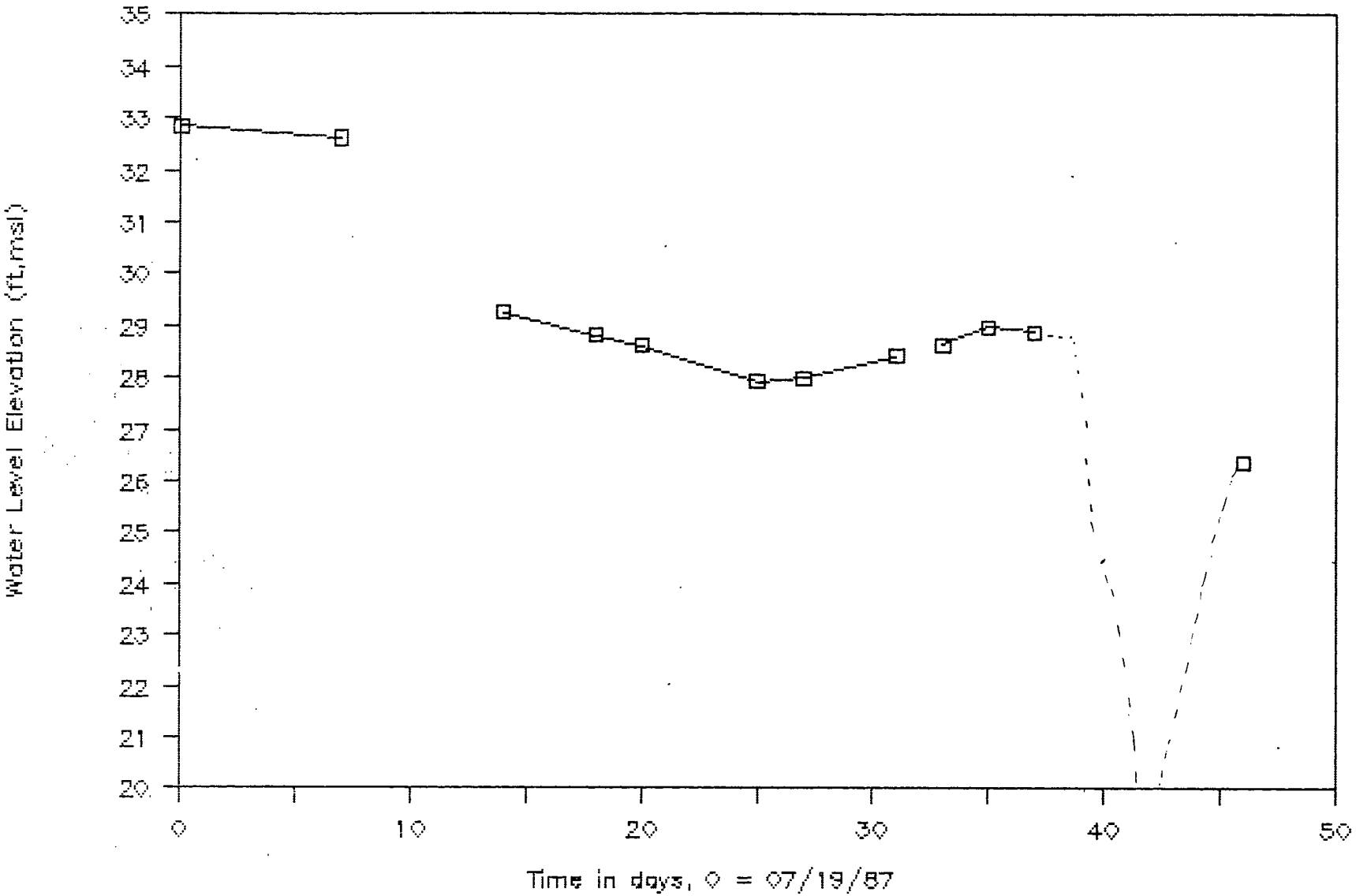


HYDROGRAPH OF WELL MW-8-B

05/31/86 to 10/01/86

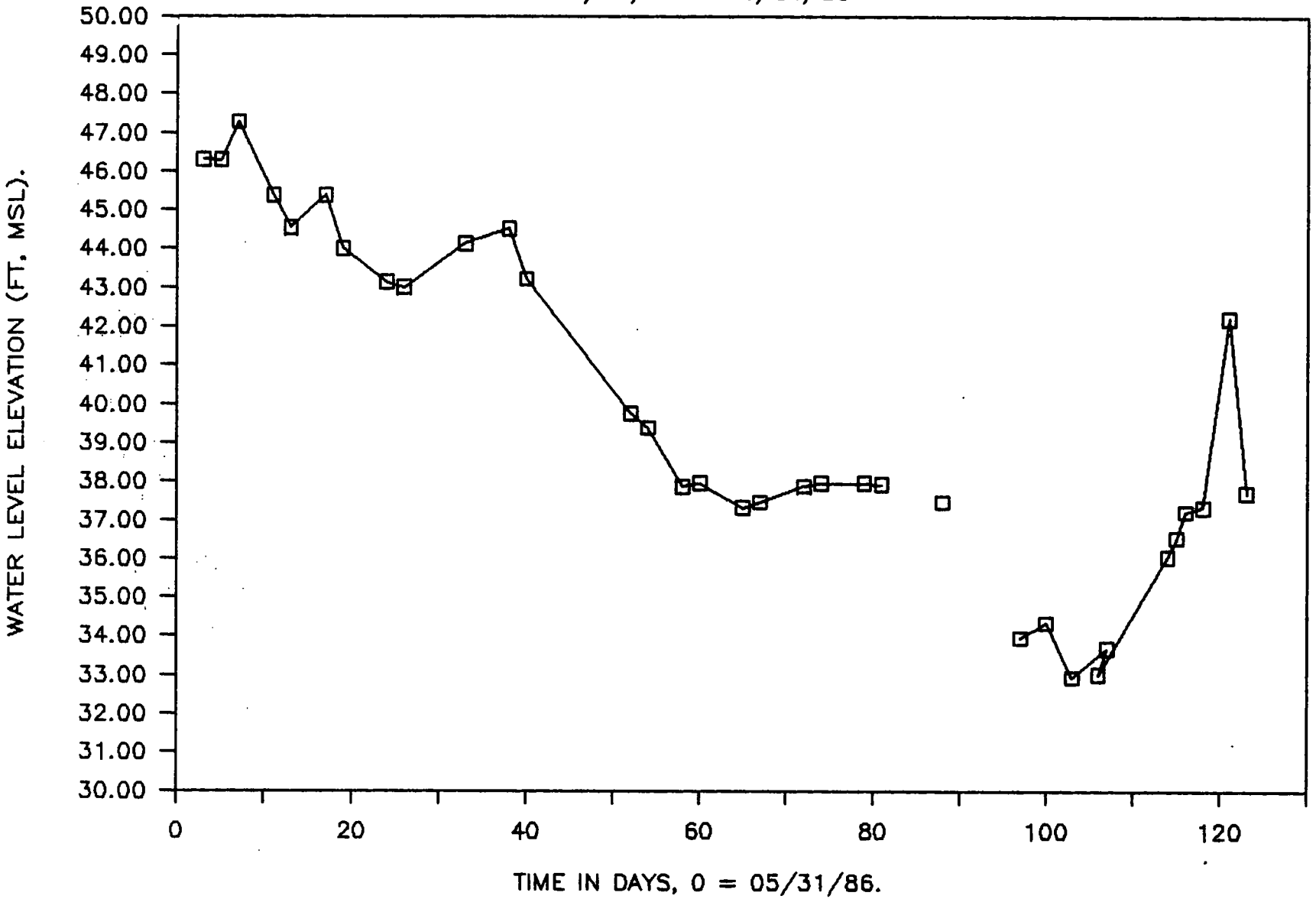


HYDROGRAPH OF WELL MWR-8B

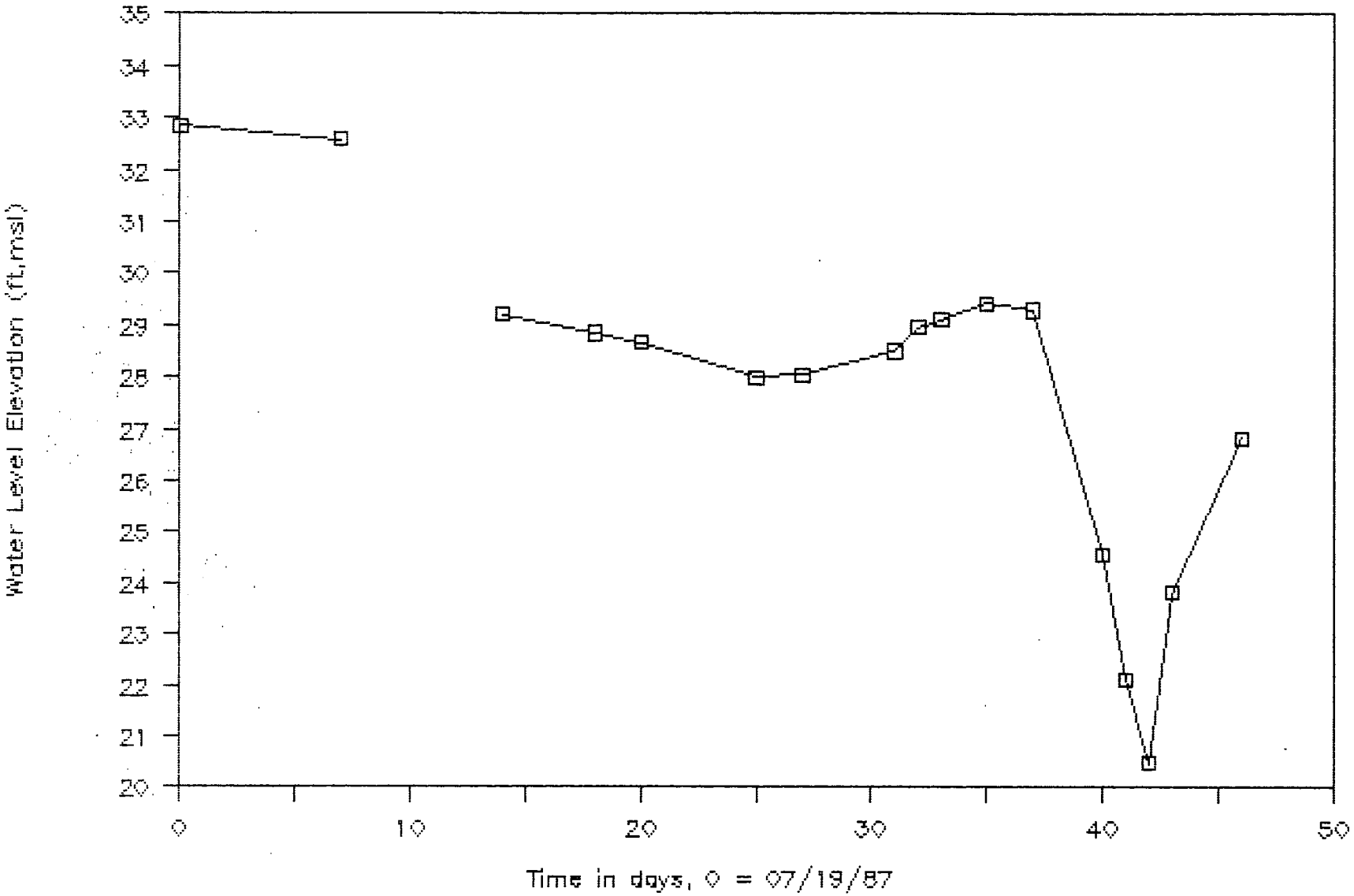


HYDROGRAPH OF WELL MW-9-B

05/31/86 to 10/01/86

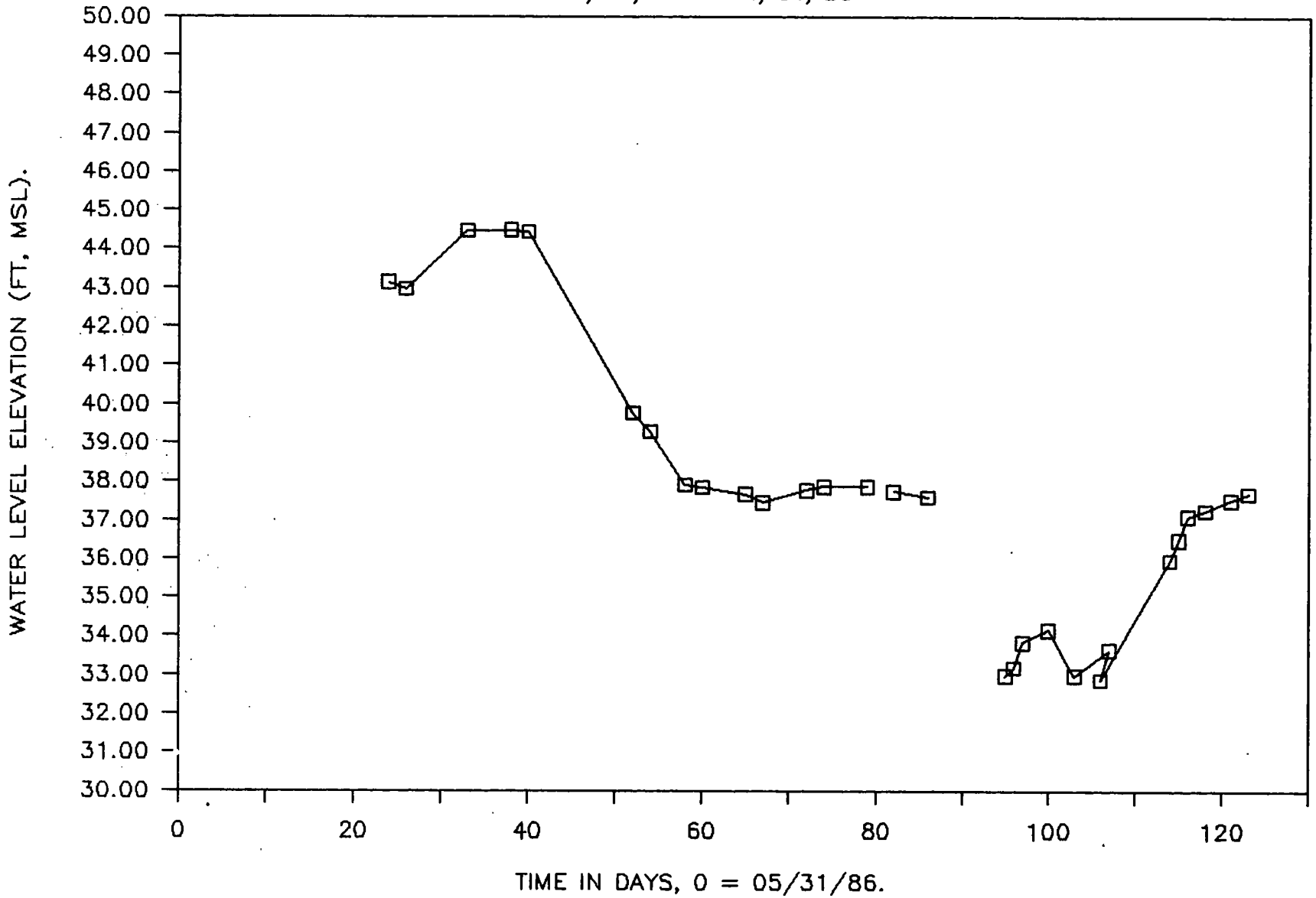


HYDROGRAPH OF WELL MWR—9B

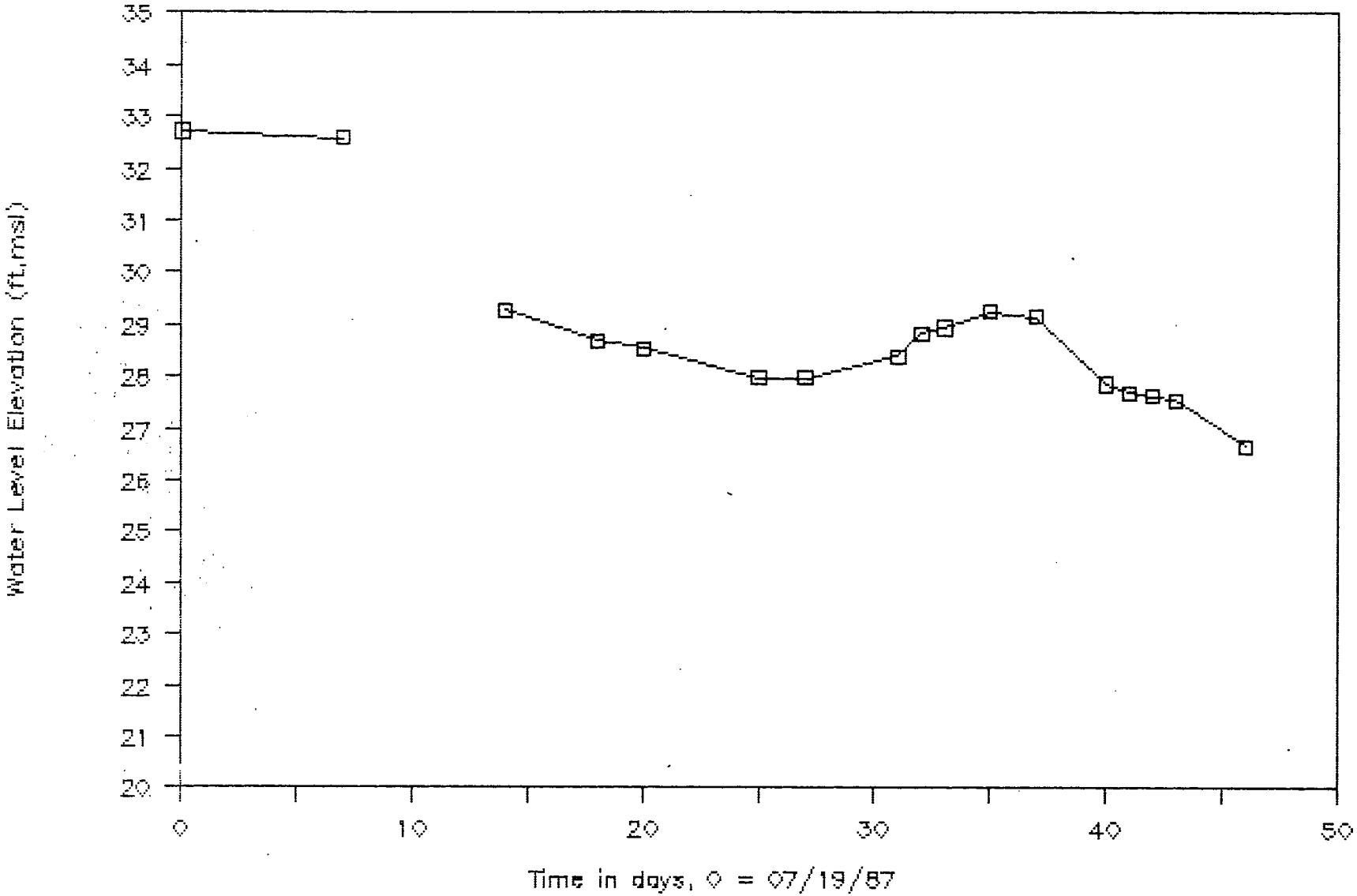


HYDROGRAPH OF WELL MW-12-B

05/31/86 to 10/01/86

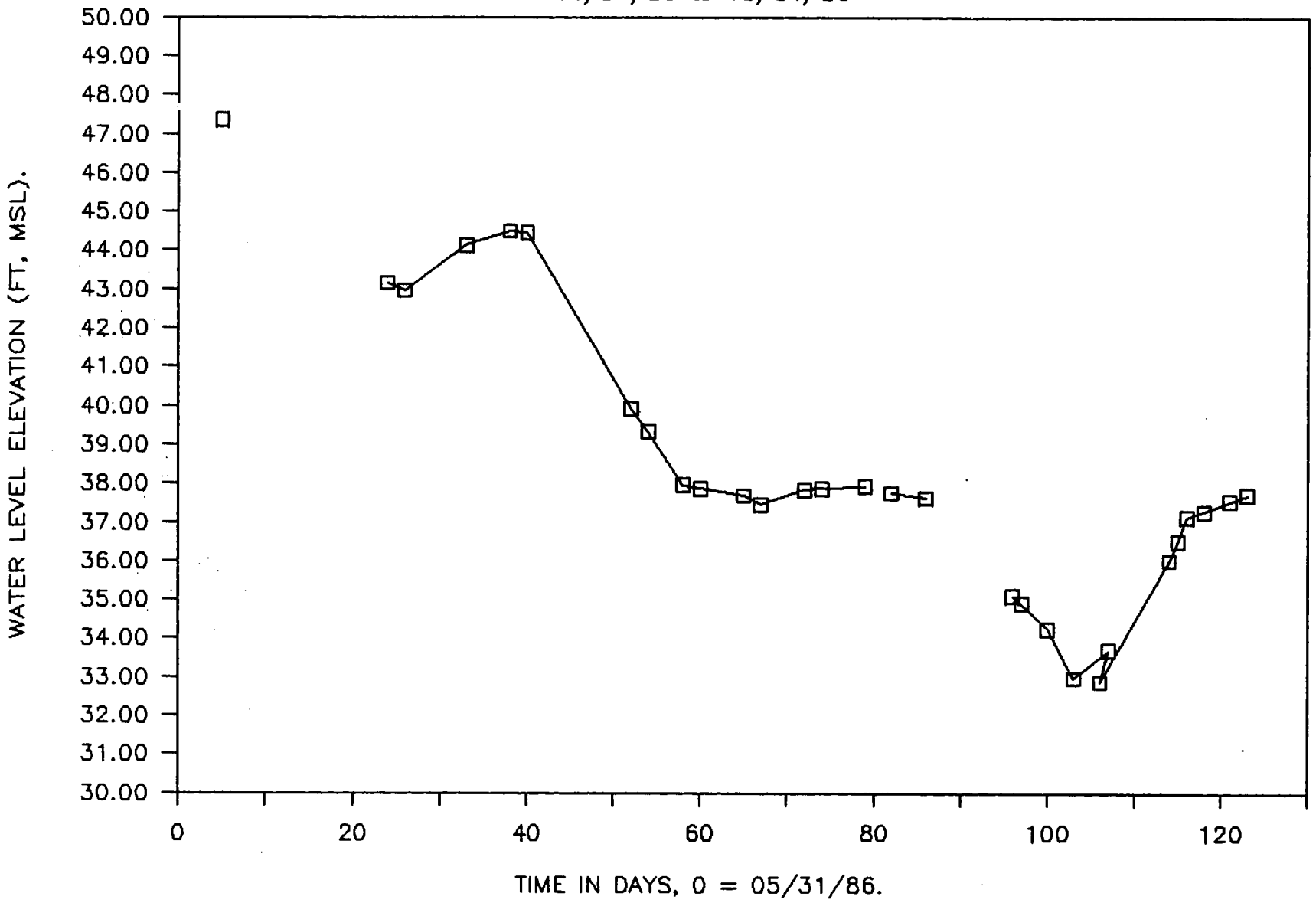


HYDROGRAPH OF WELL MW-12B

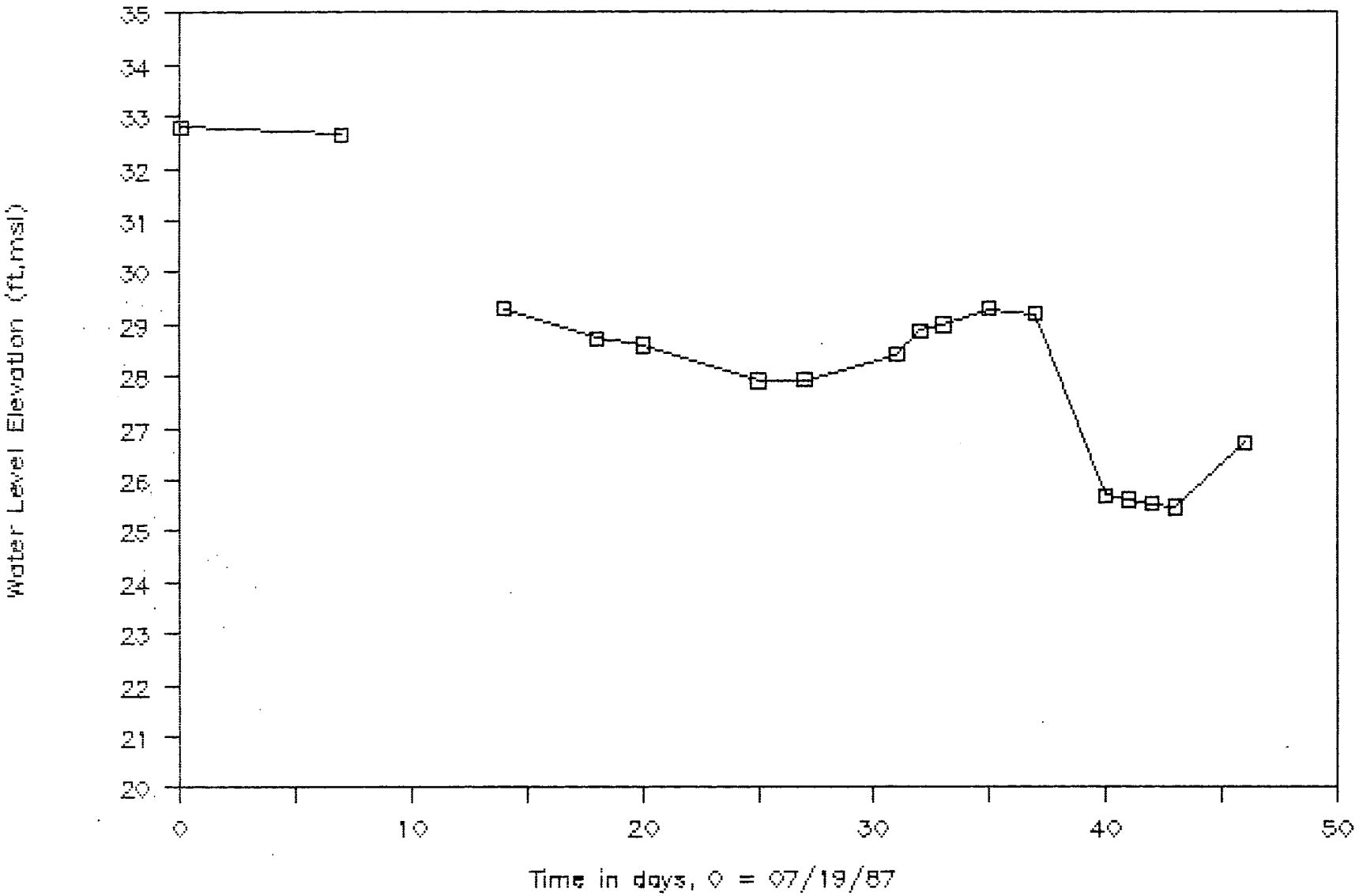


HYDROGRAPH OF WELL MW-13-B

05/31/86 to 10/01/86

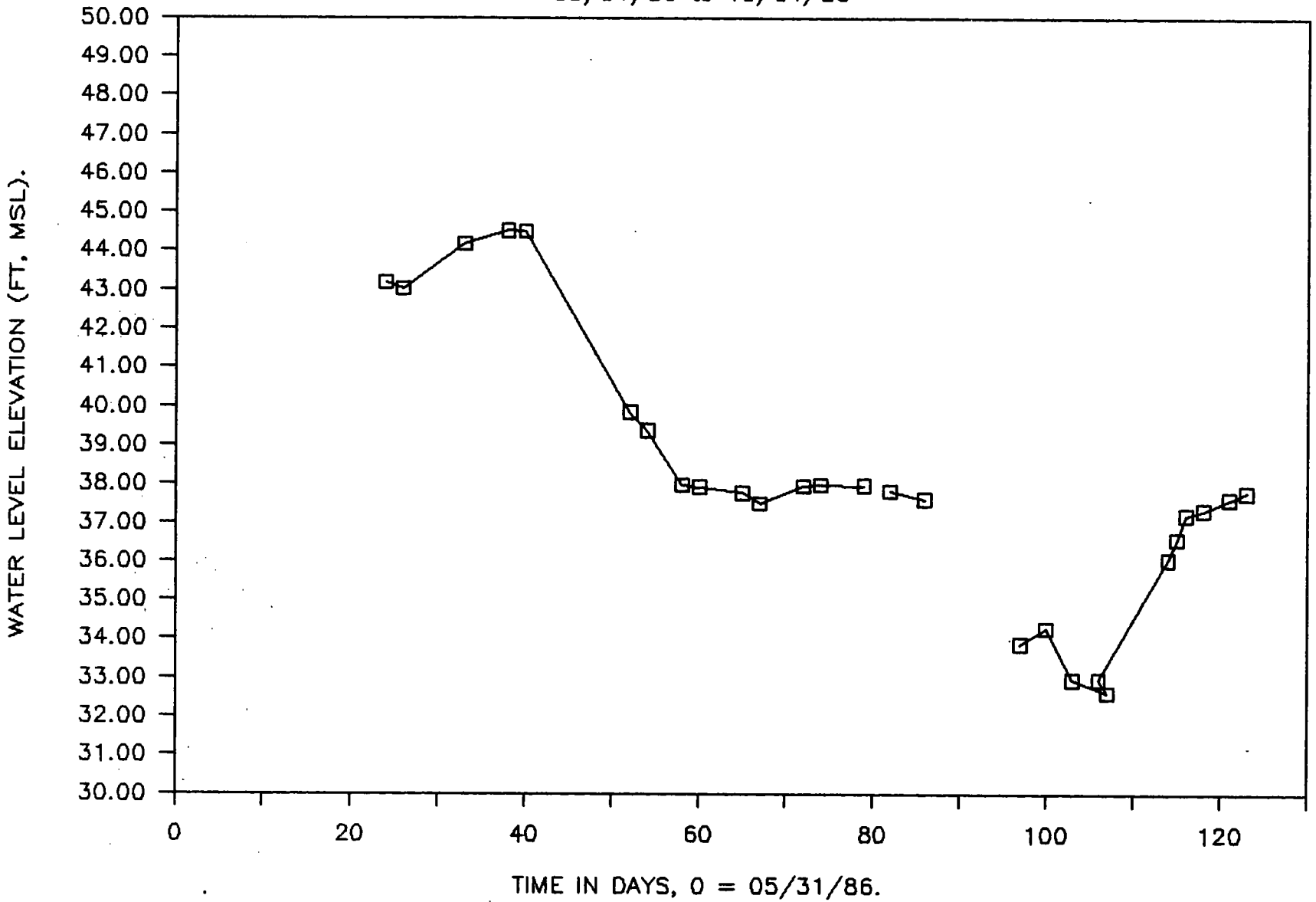


HYDROGRAPH OF WELL MW-13B

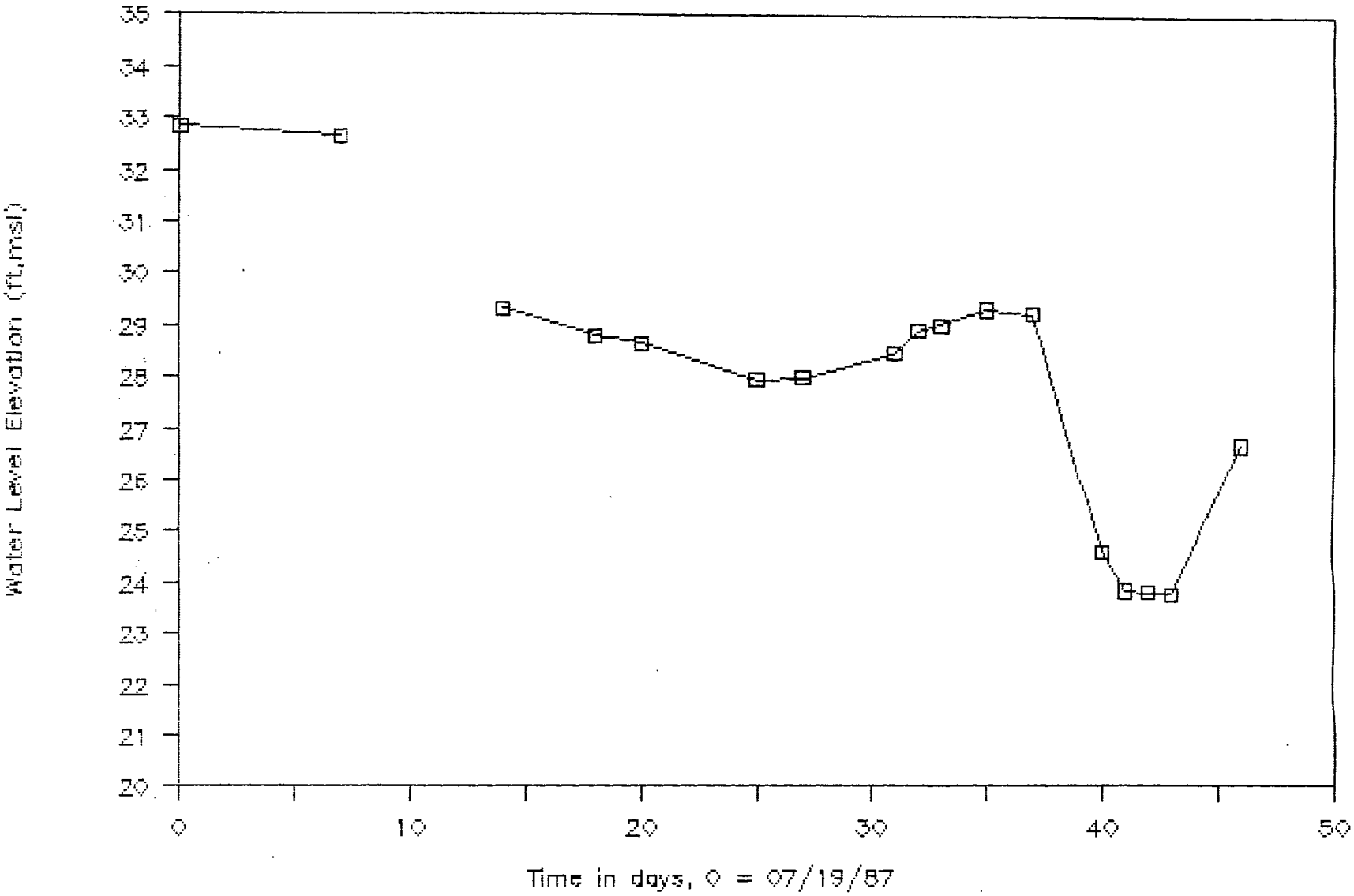


HYDROGRAPH OF WELL MW-14-B

05/31/86 to 10/01/86

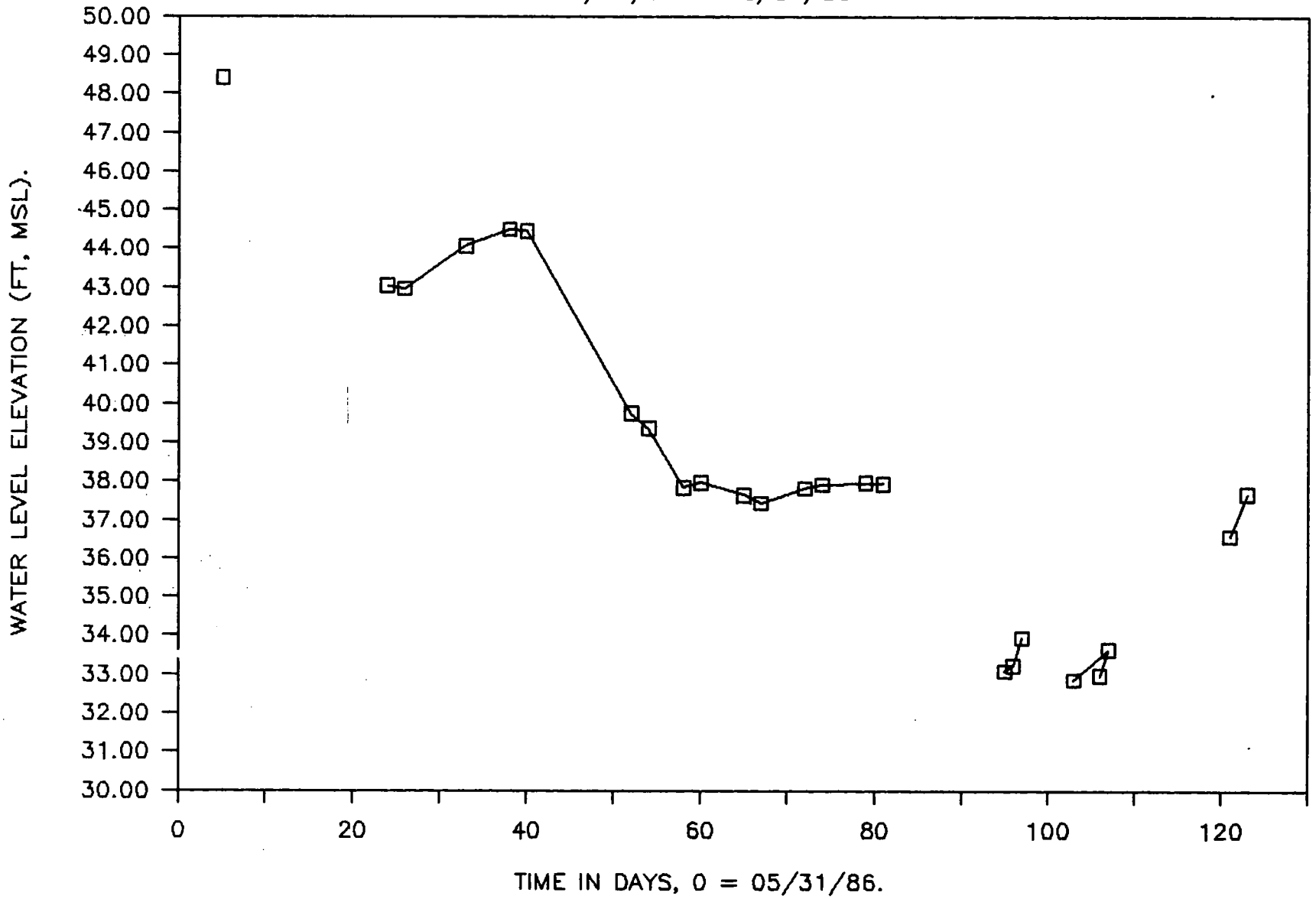


HYDROGRAPH OF WELL MW-14B

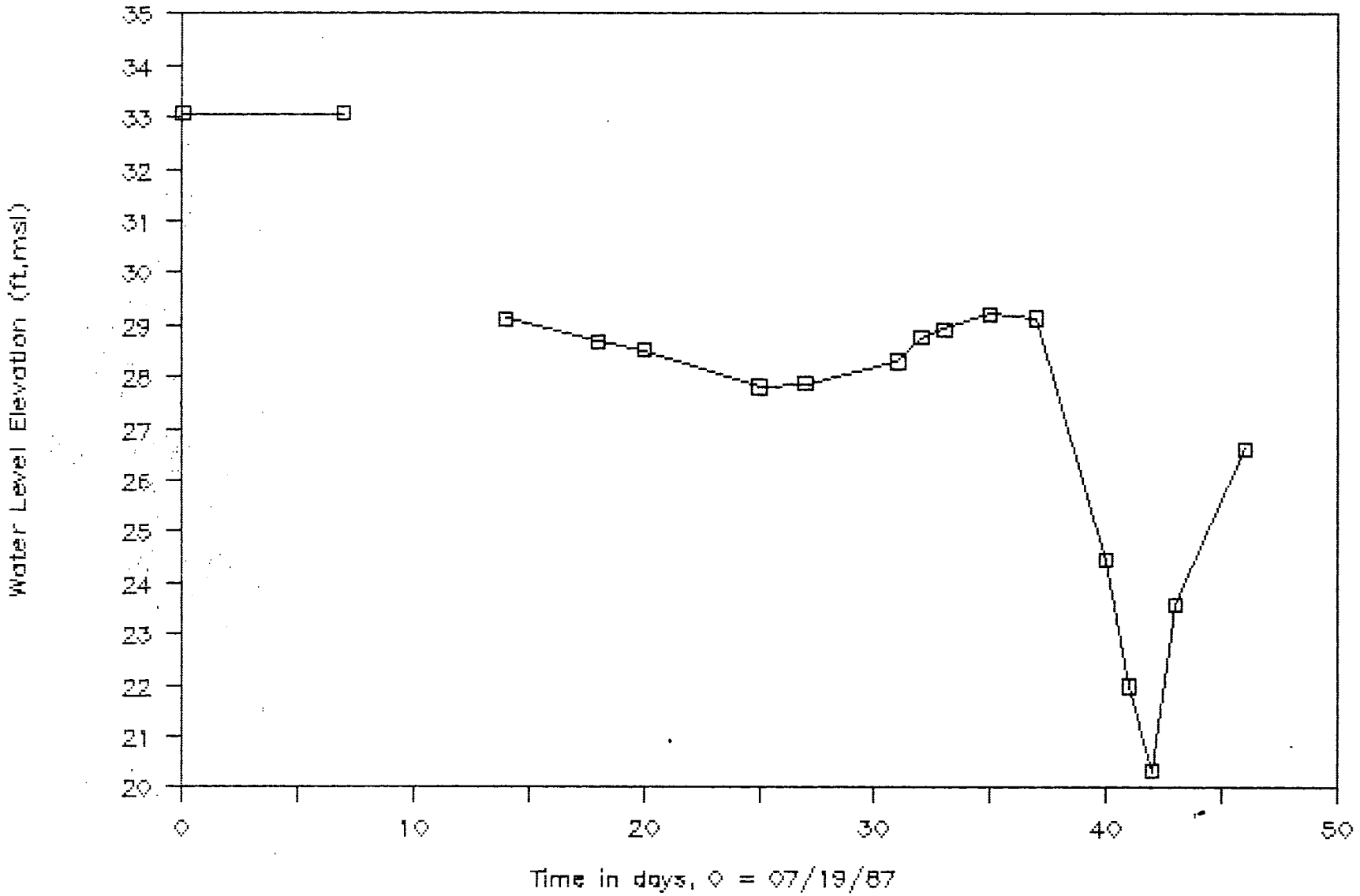


HYDROGRAPH OF WELL MW-15-B

05/31/86 to 10/01/86

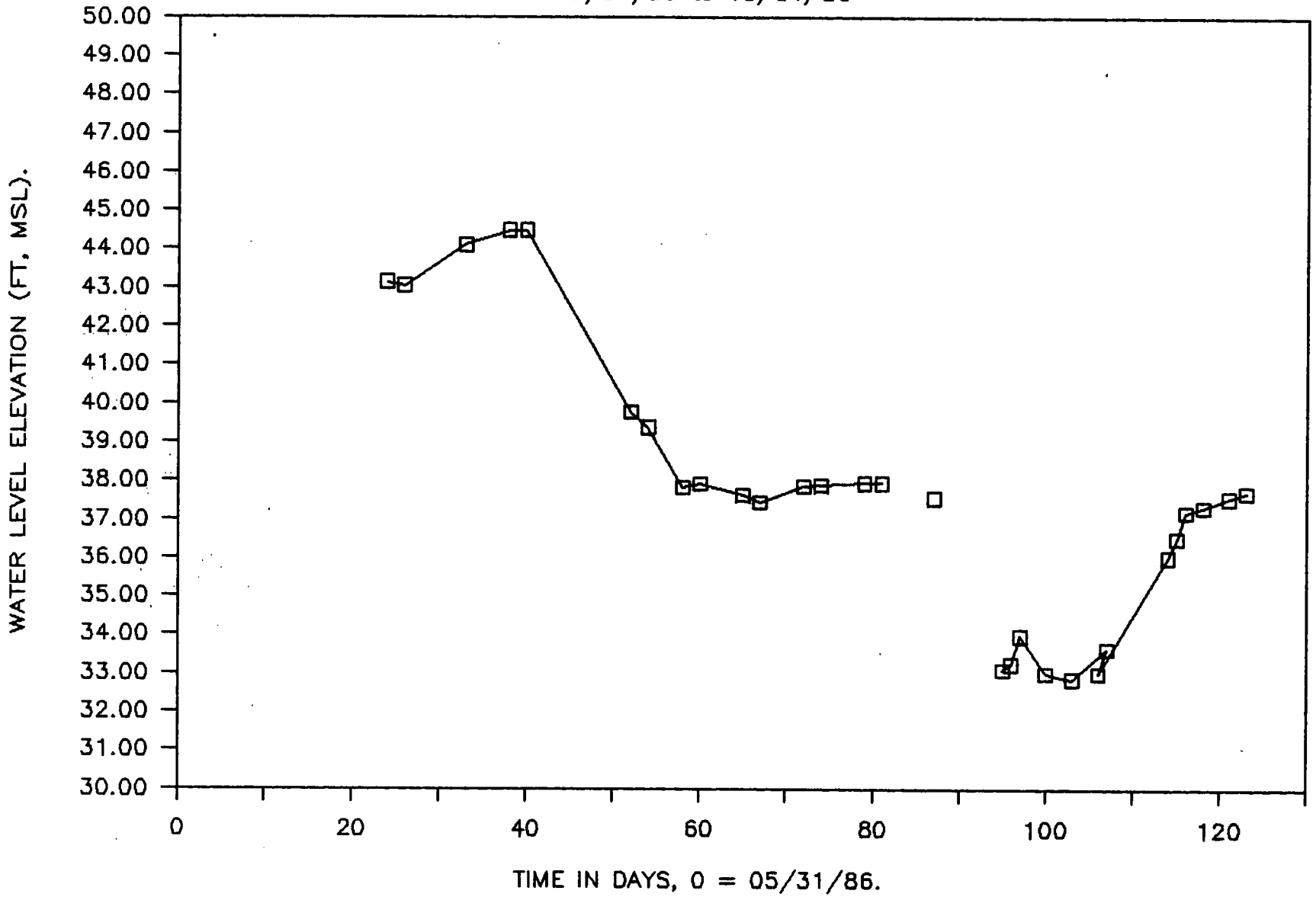


HYDROGRAPH OF WELL MW-15B

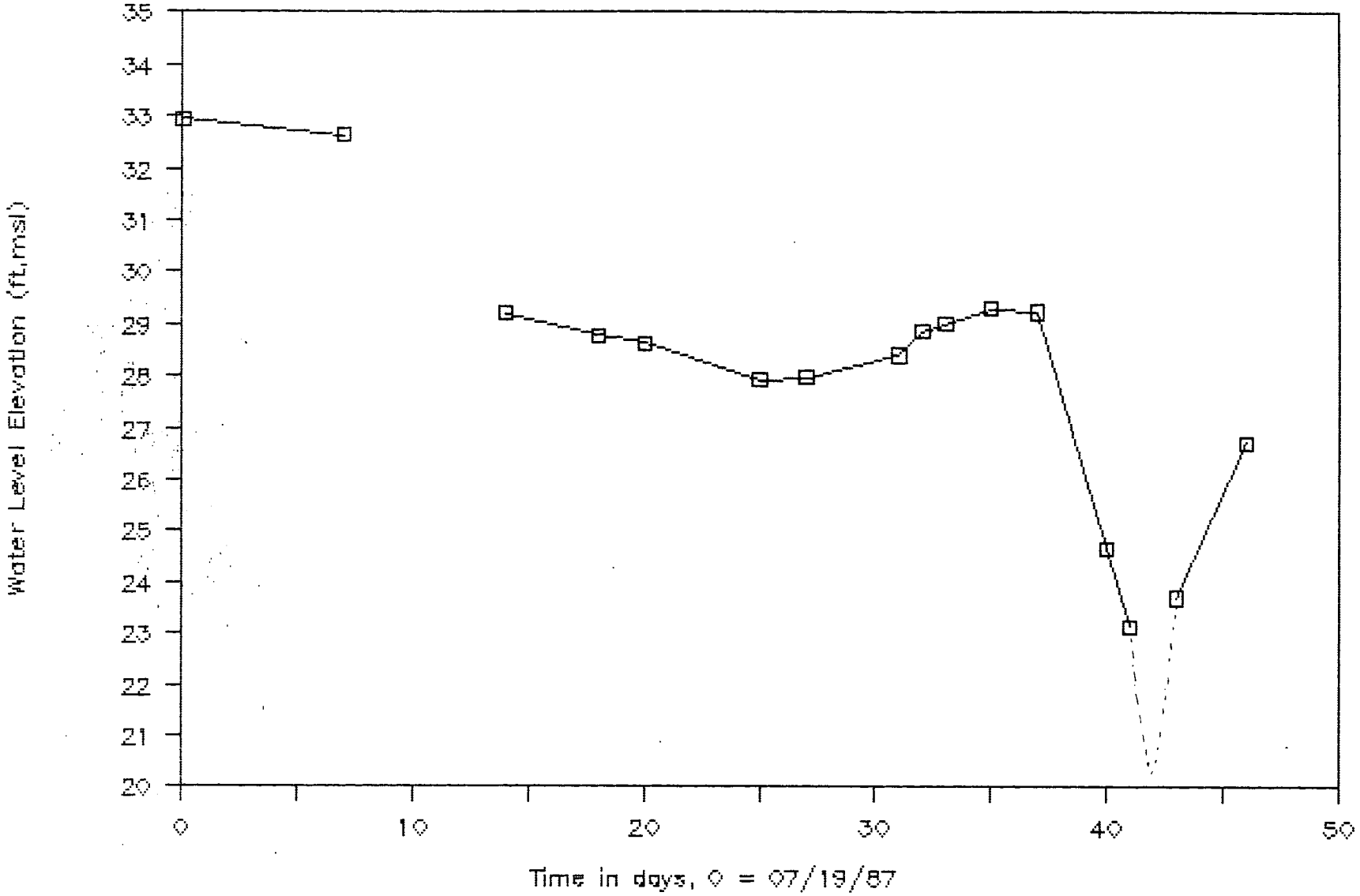


HYDROGRAPH OF WELL MW-16-B

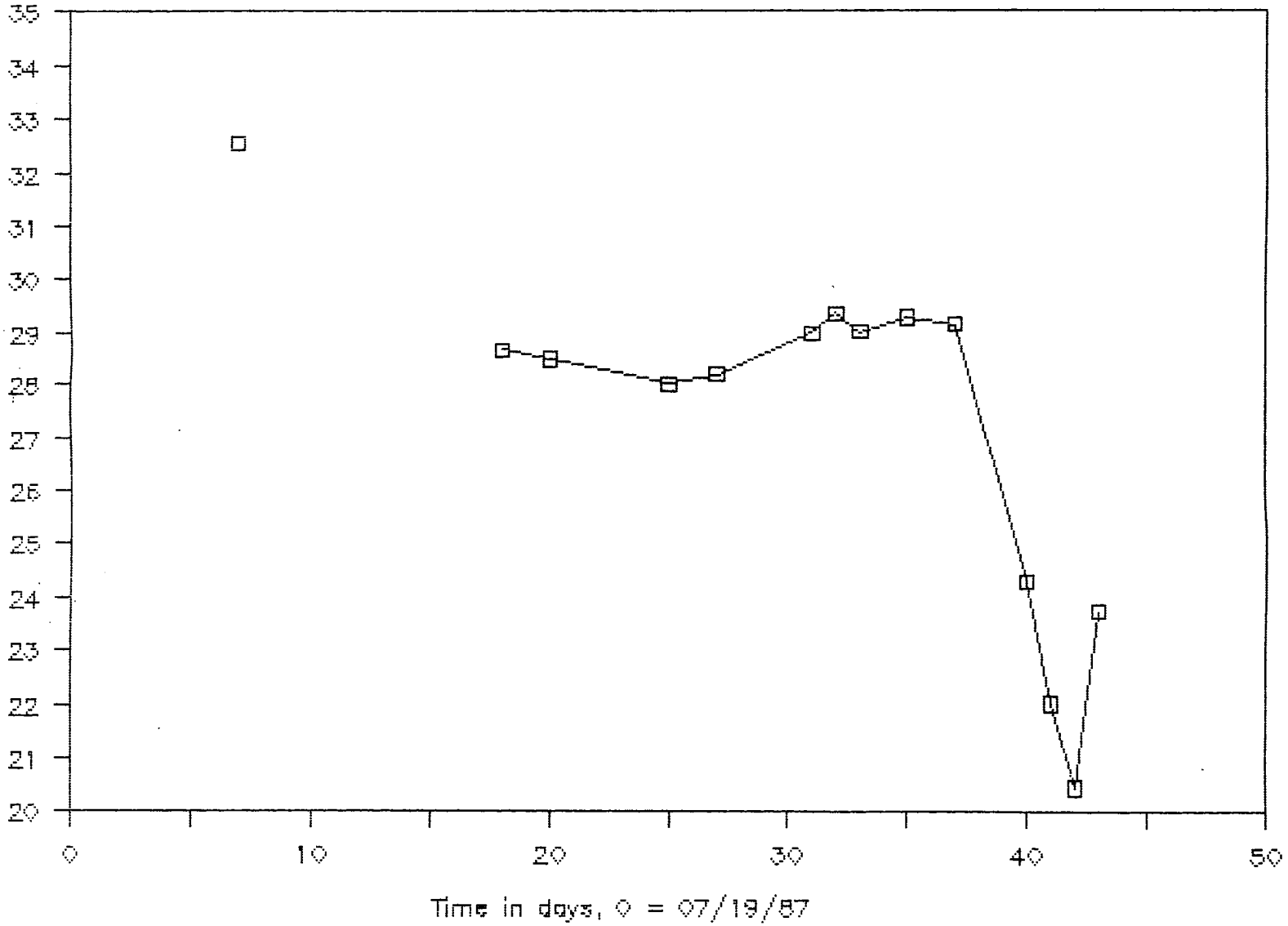
05/31/86 to 10/01/86



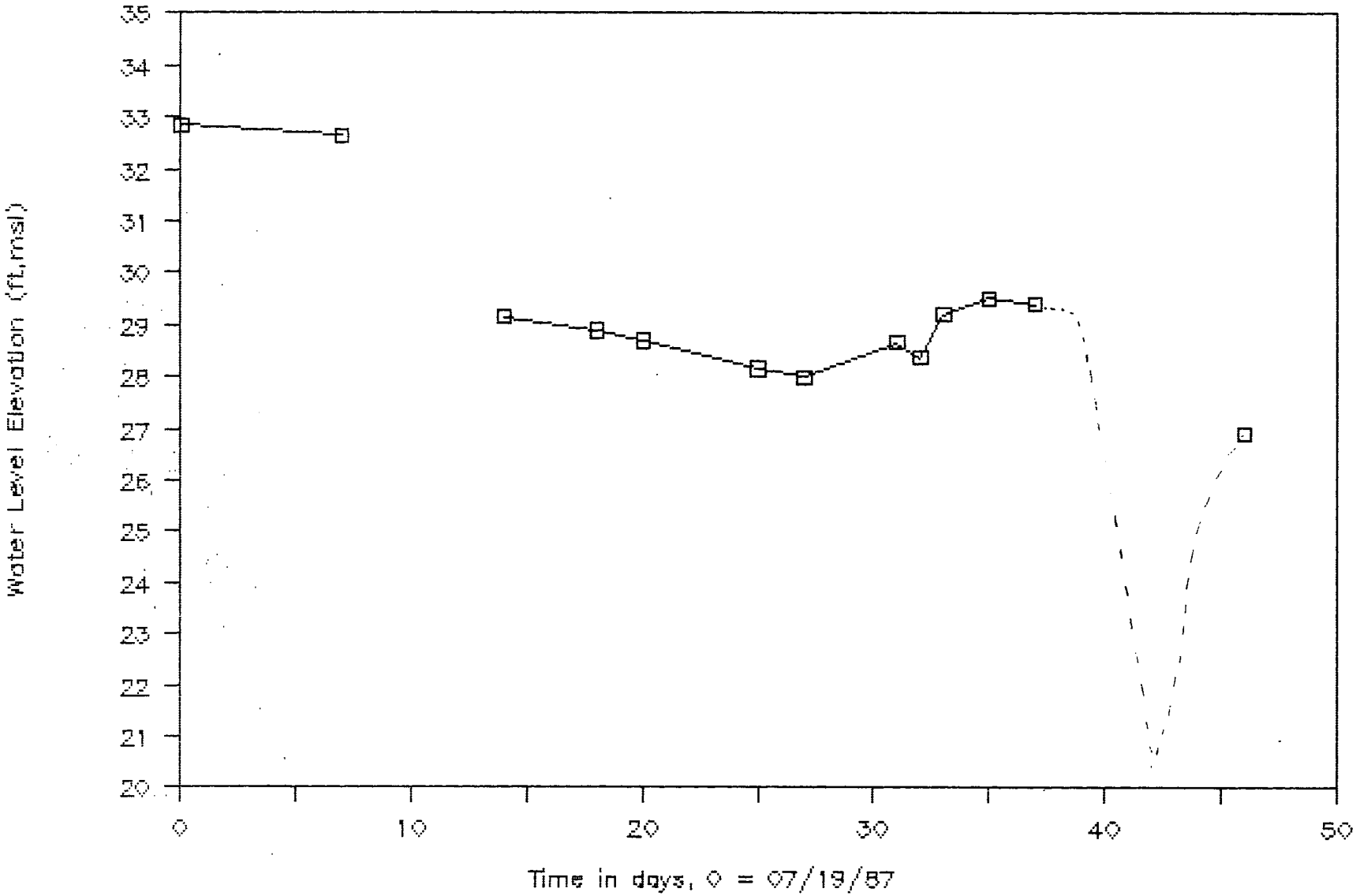
HYDROGRAPH OF WELL MW-16B



HYDROGRAPH OF WELL MW-18B

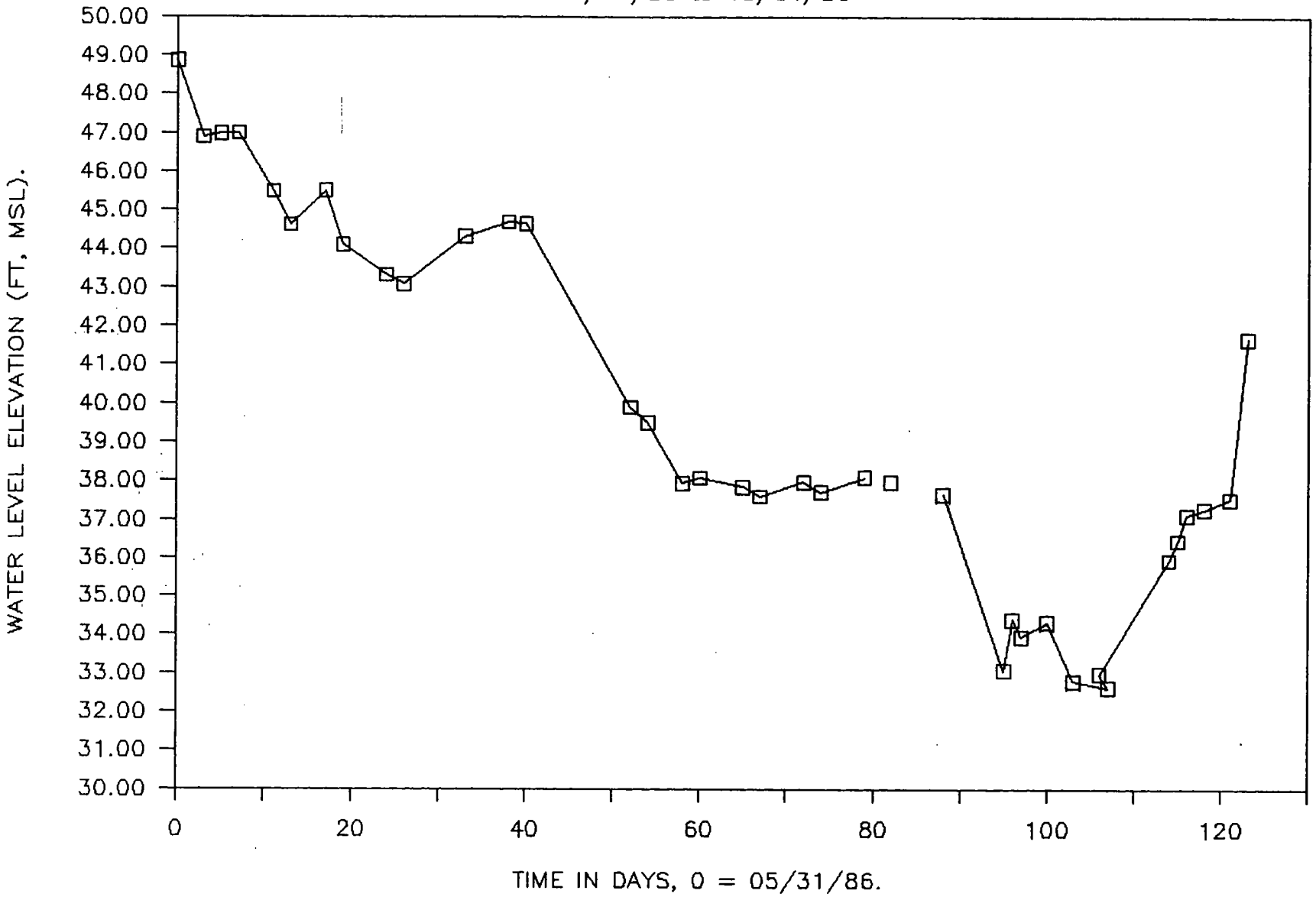


HYDROGRAPH OF WELL MW—26B



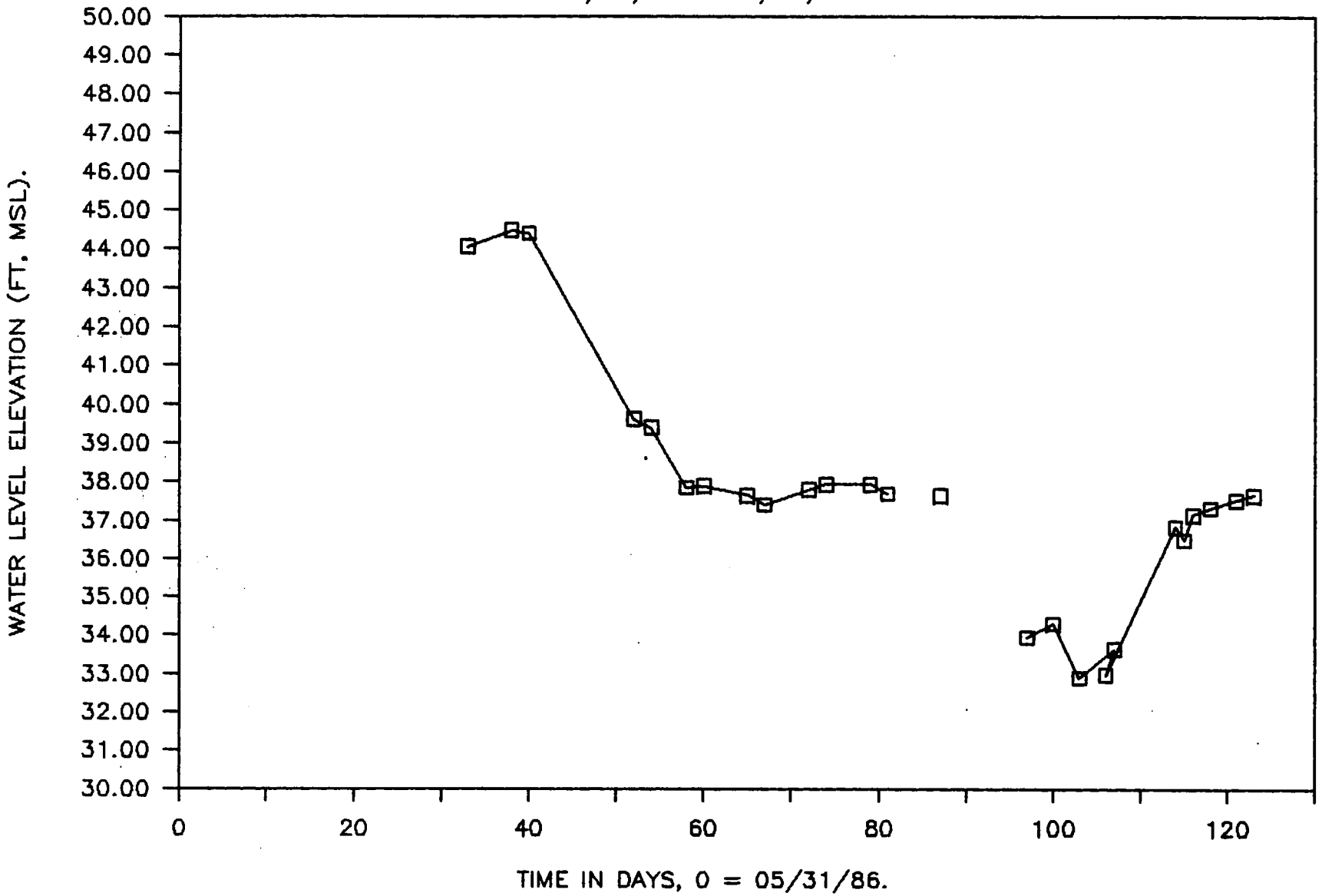
HYDROGRAPH OF WELL MW-1-C

05/31/86 to 10/01/86



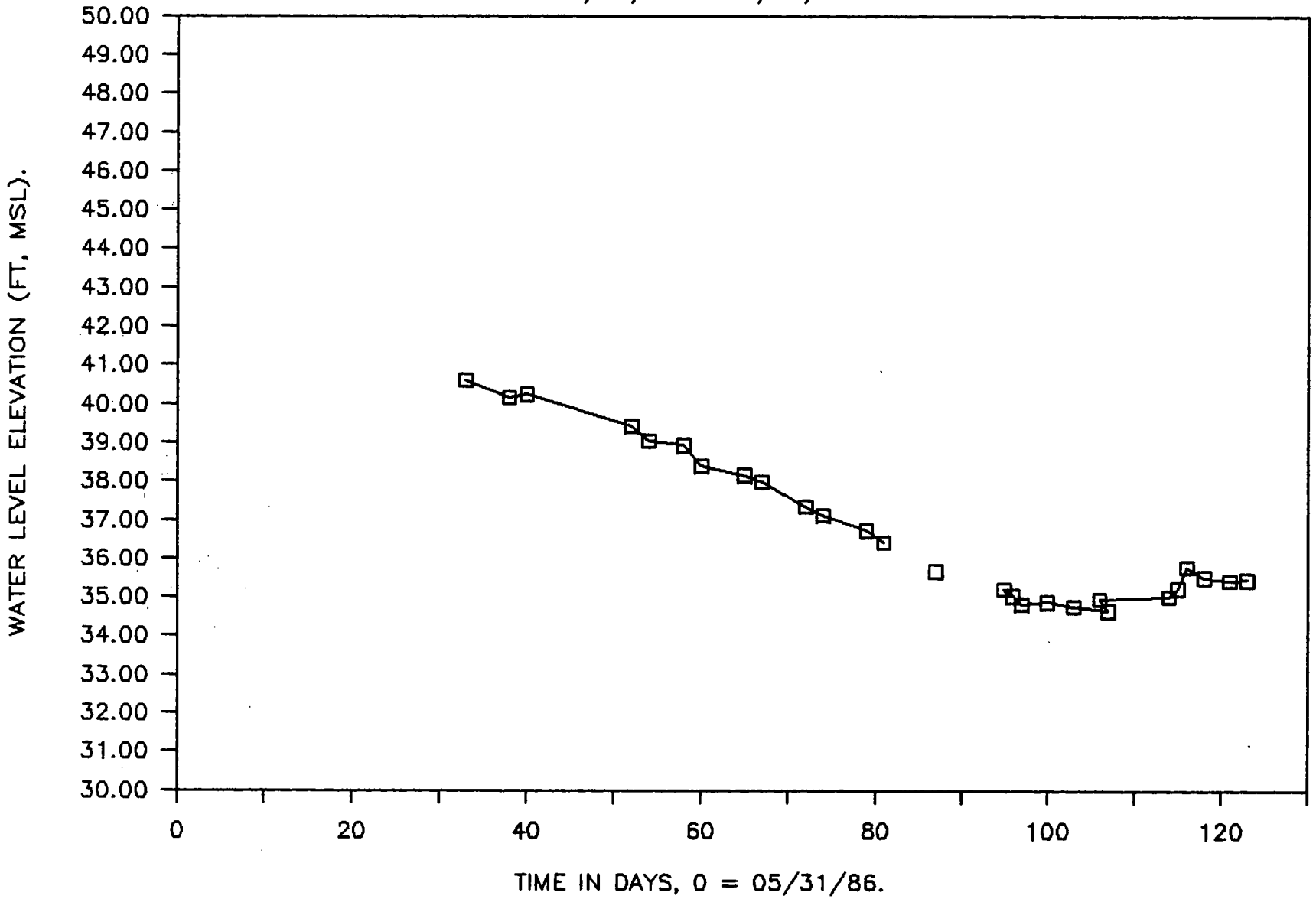
HYDROGRAPH OF WELL MW-3-C

05/31/86 to 10/01/86



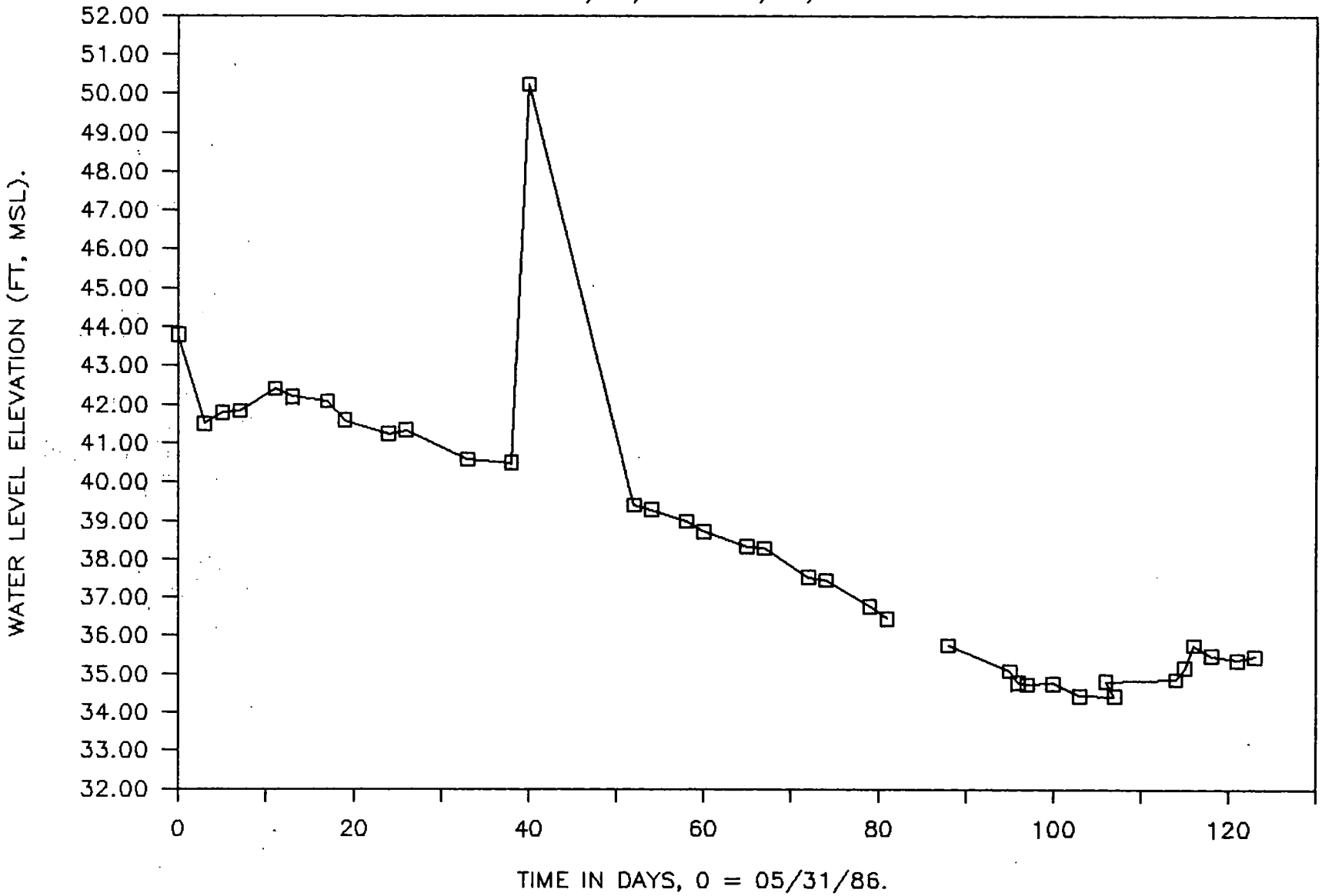
HYDROGRAPH OF WELL MW-16-D

05/31/86 to 10/01/86

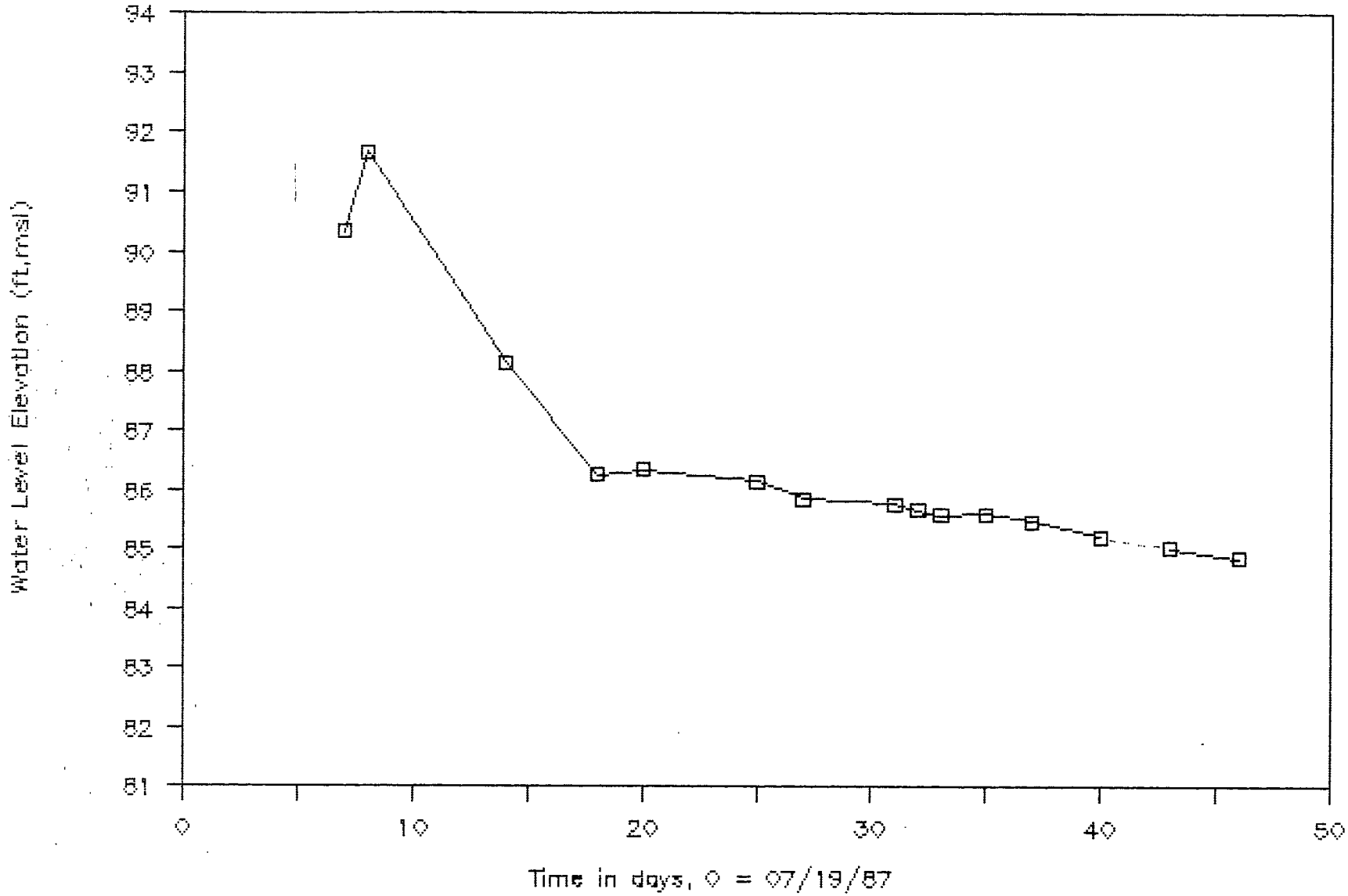


HYDROGRAPH OF WELL MW-11-D

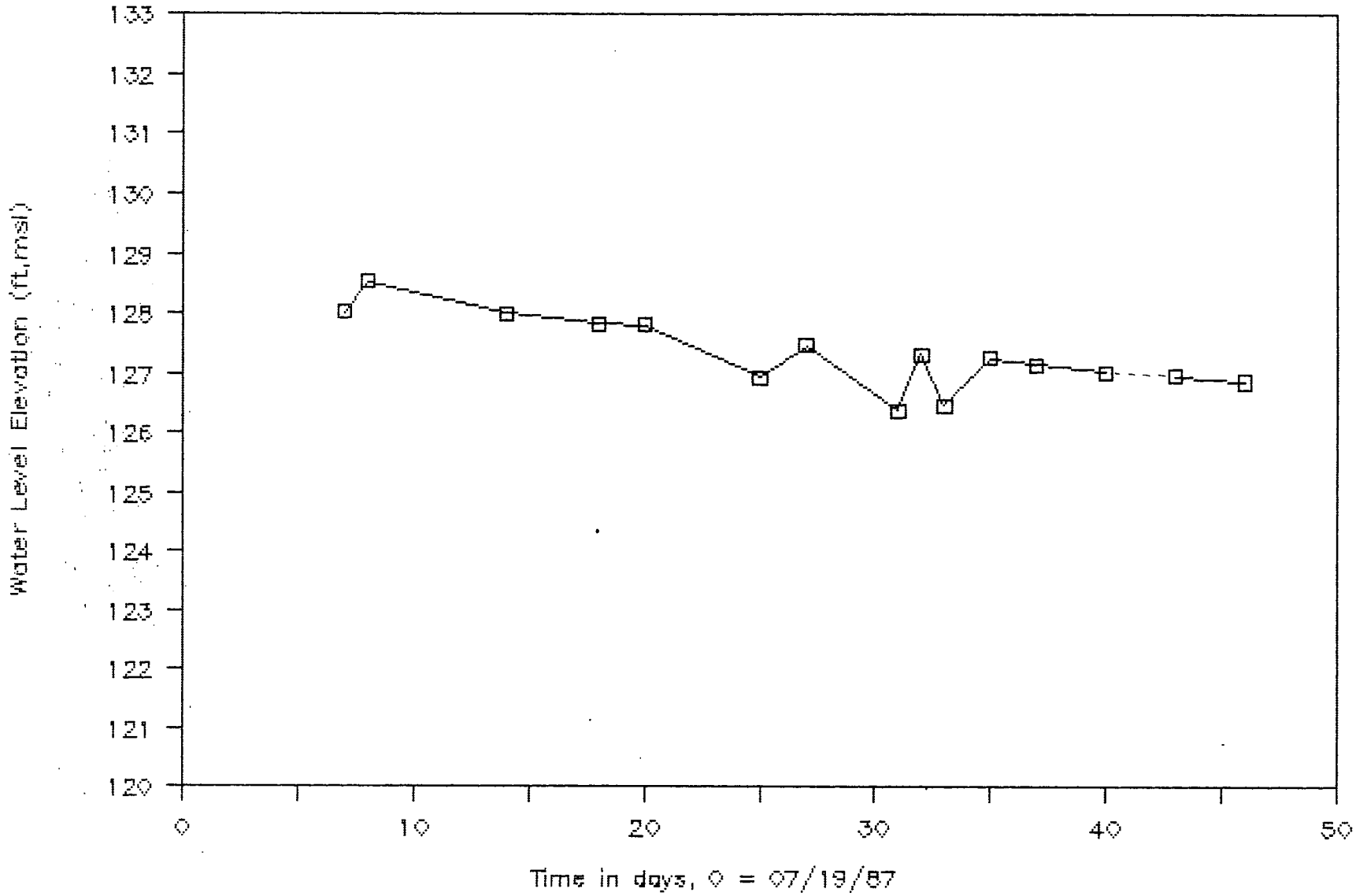
05/31/86 to 10/01/86



HYDROGRAPH OF WELL MW-2S

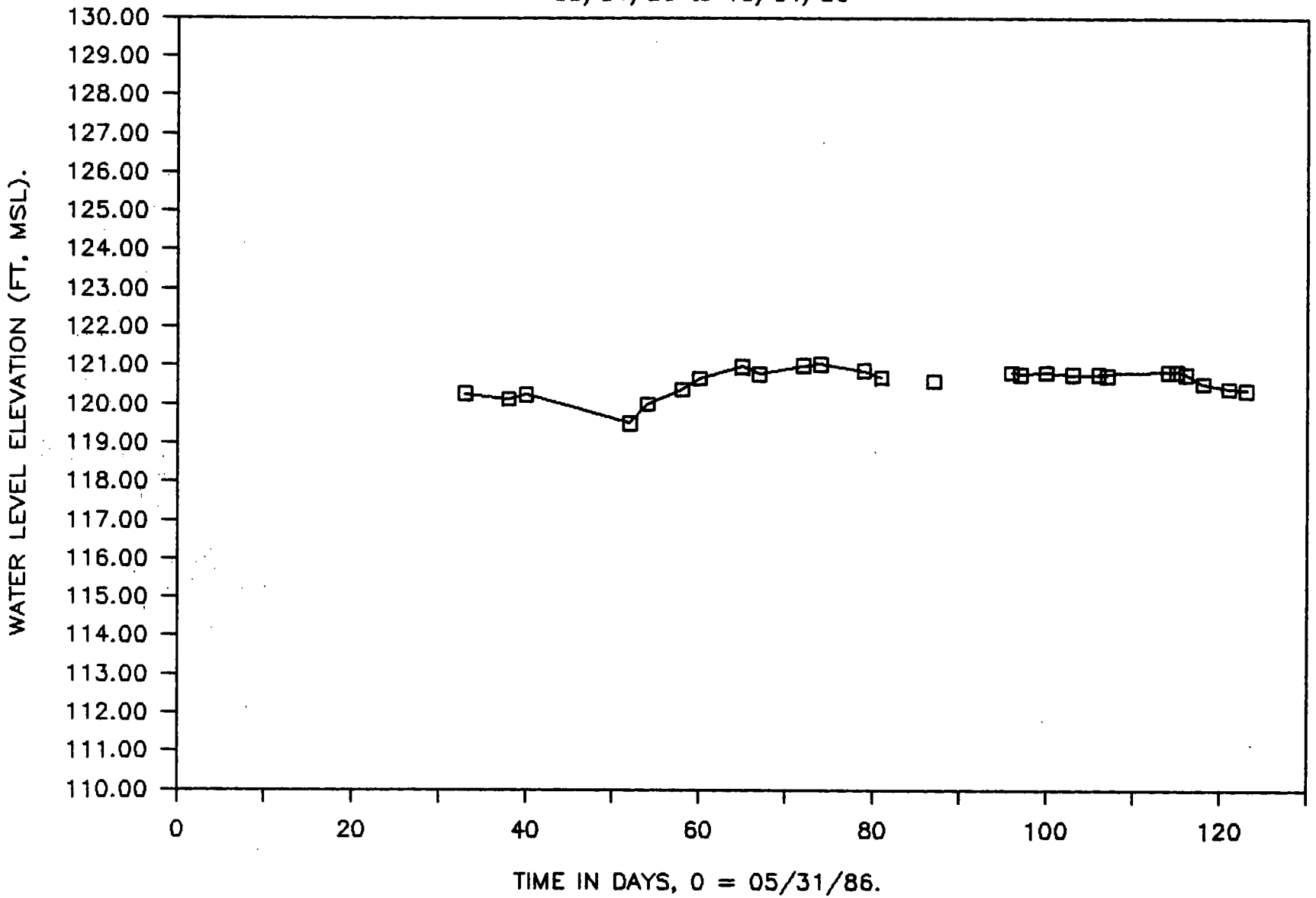


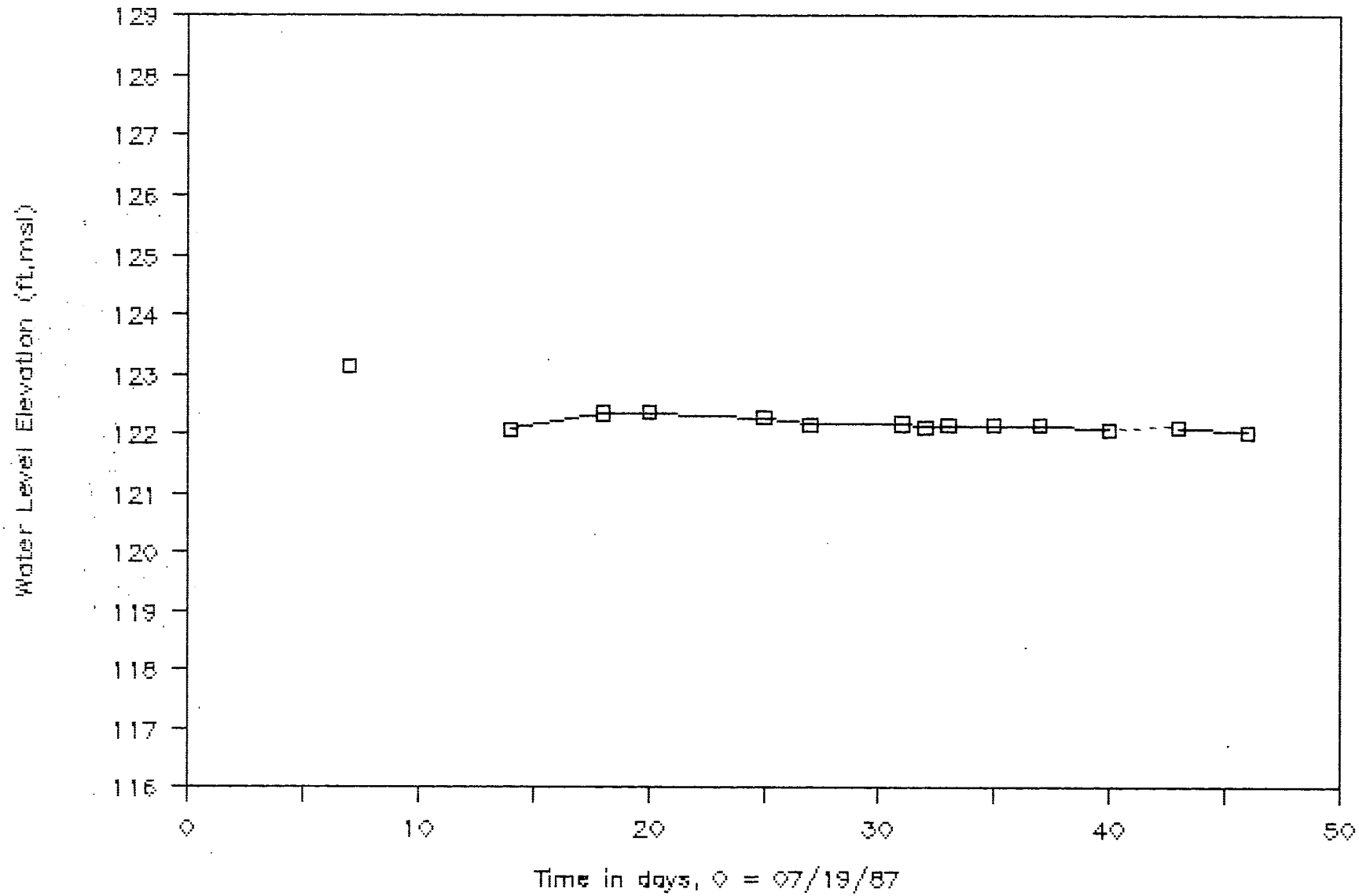
HYDROGRAPH OF WELL MW-3S



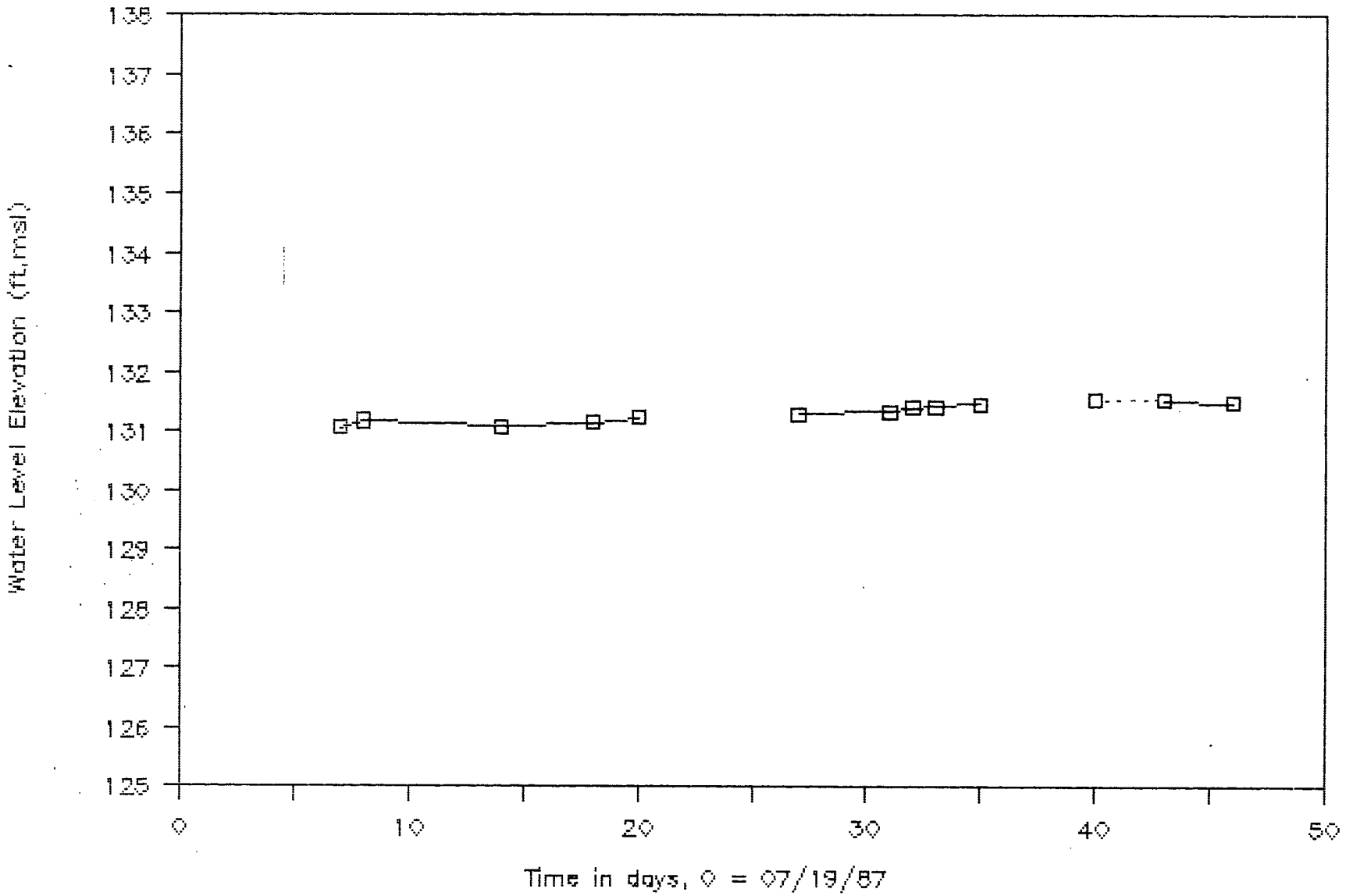
HYDROGRAPH OF WELL MW-4-S

05/31/86 to 10/01/86

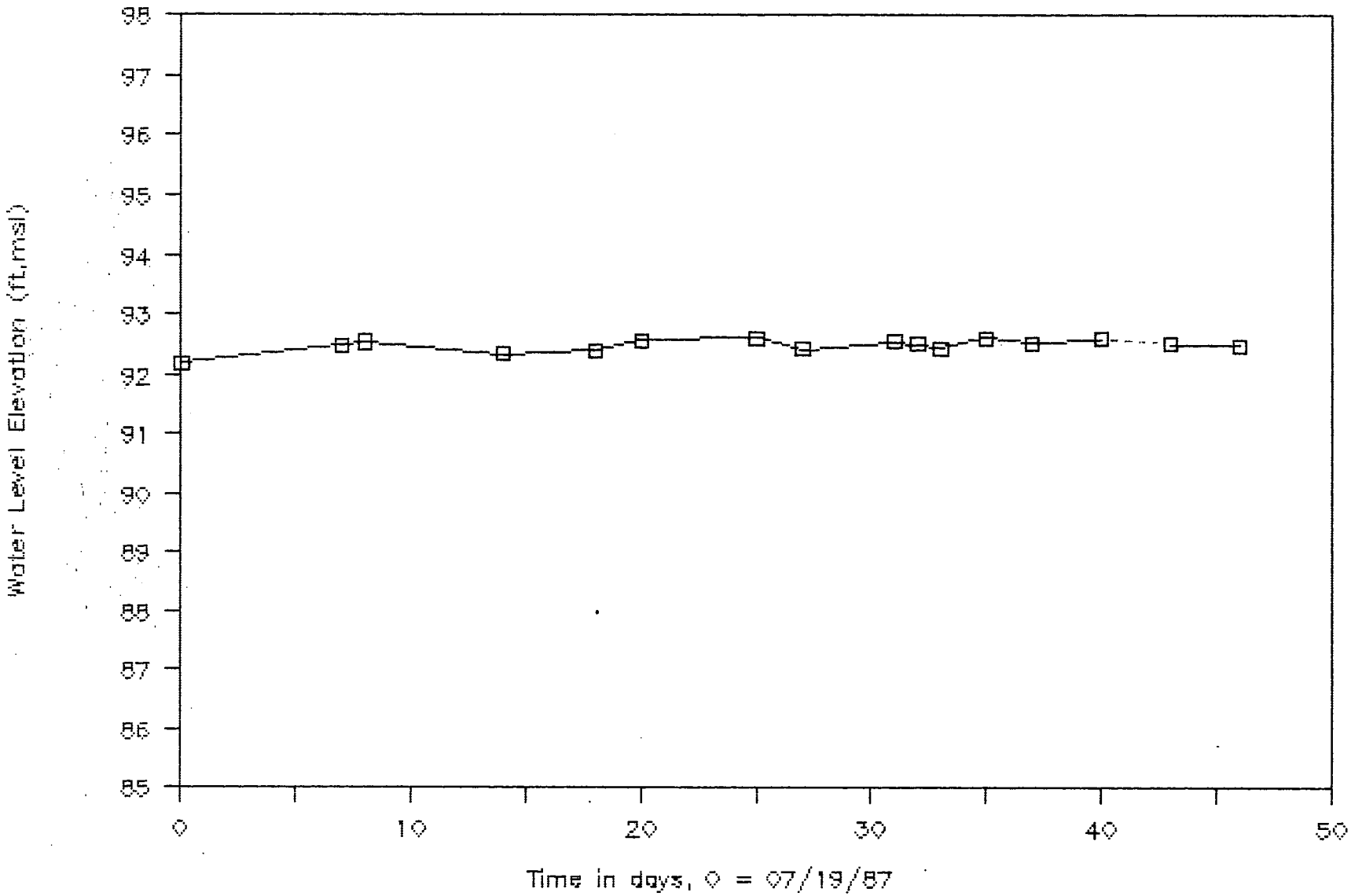



HYDROGRAPH OF WELL MWR-4S
Water Level Elevation (ft,msl)
129
128
127
126
125
124
123
122
121
120
119
118
117
116
0
10
20
30
40
50
Time in days, ◇ = 07/19/87

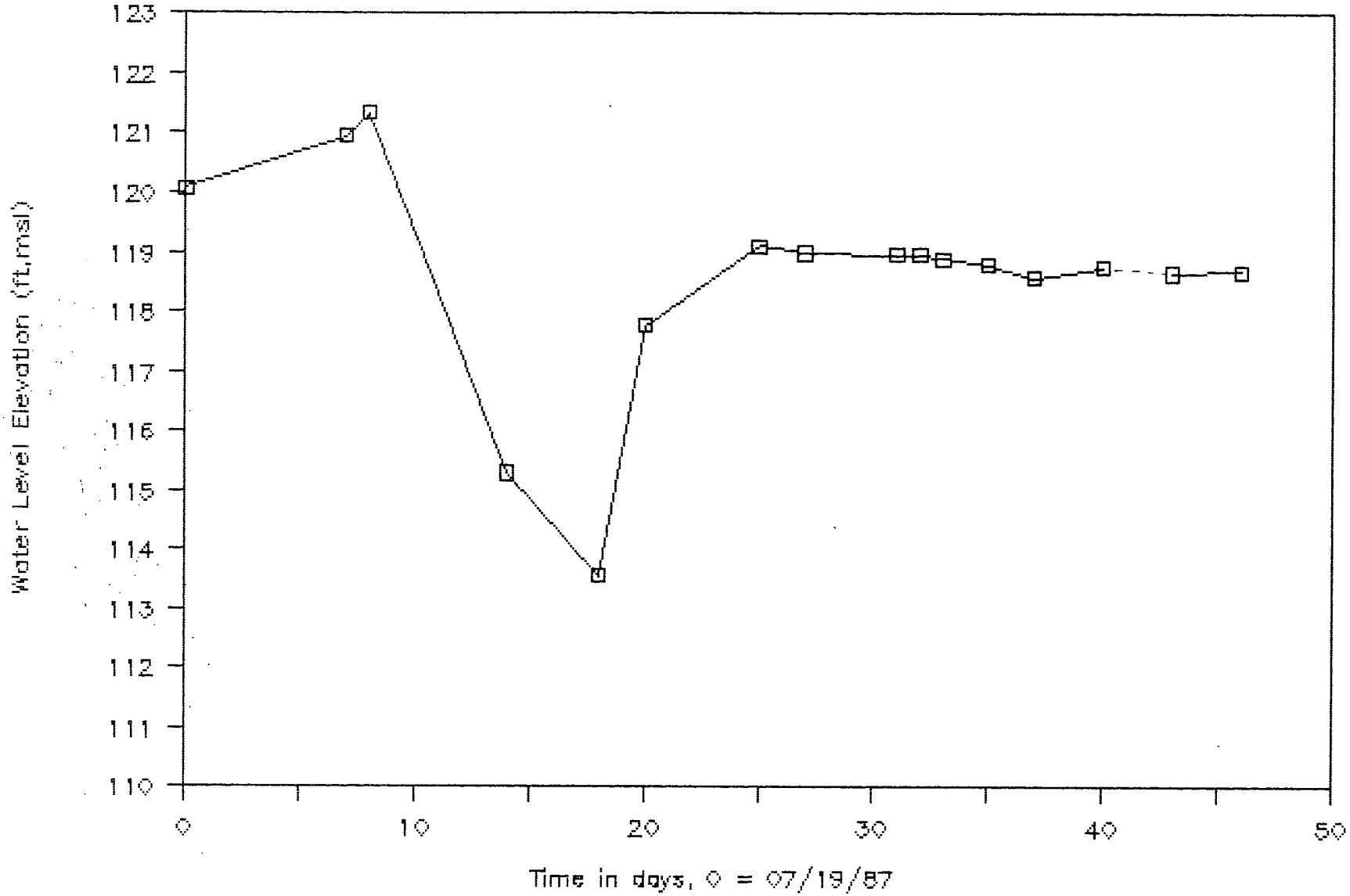
HYDROGRAPH OF WELL MW-5S



HYDROGRAPH OF WELL MW-8S

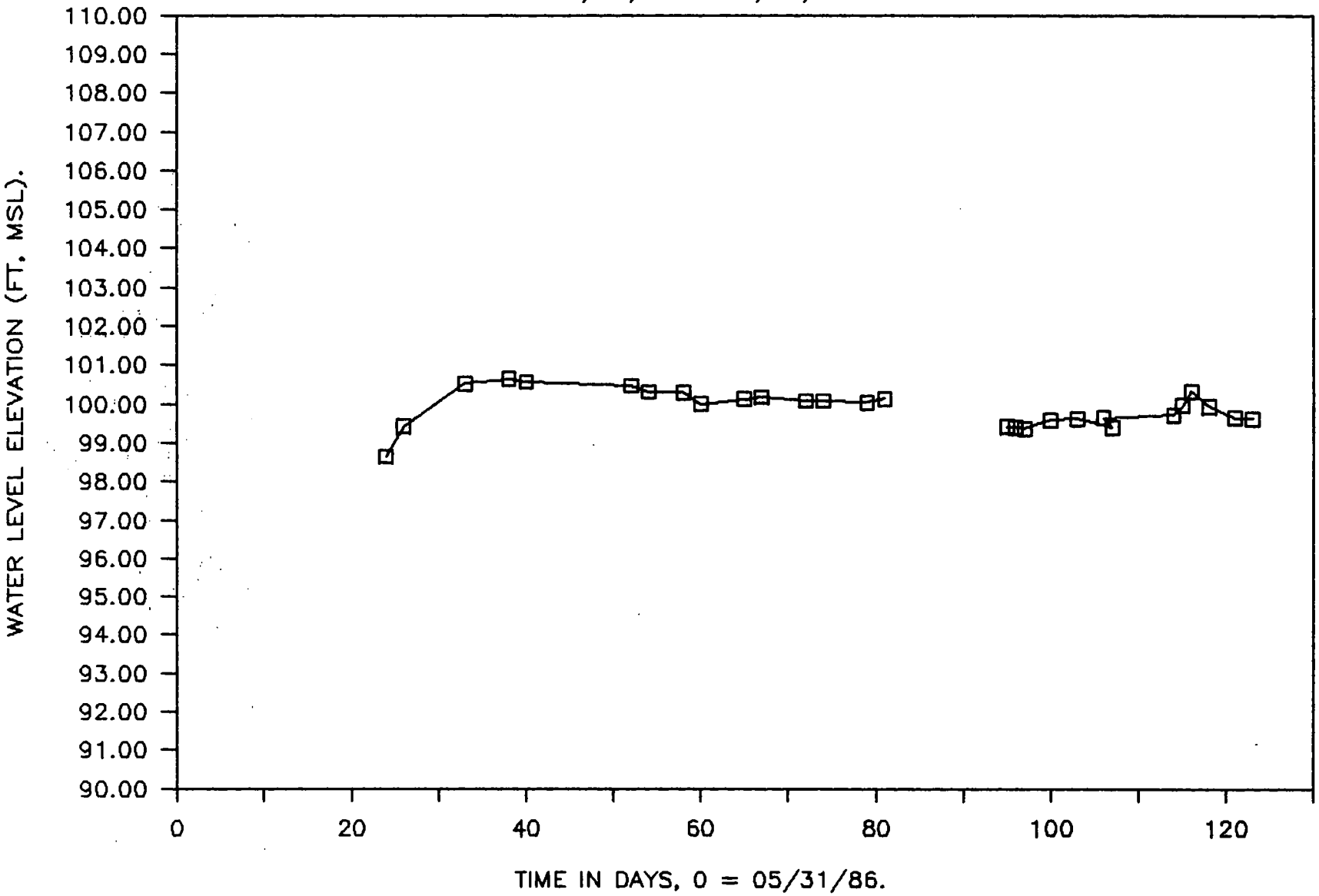


HYDROGRAPH OF WELL MW-9S

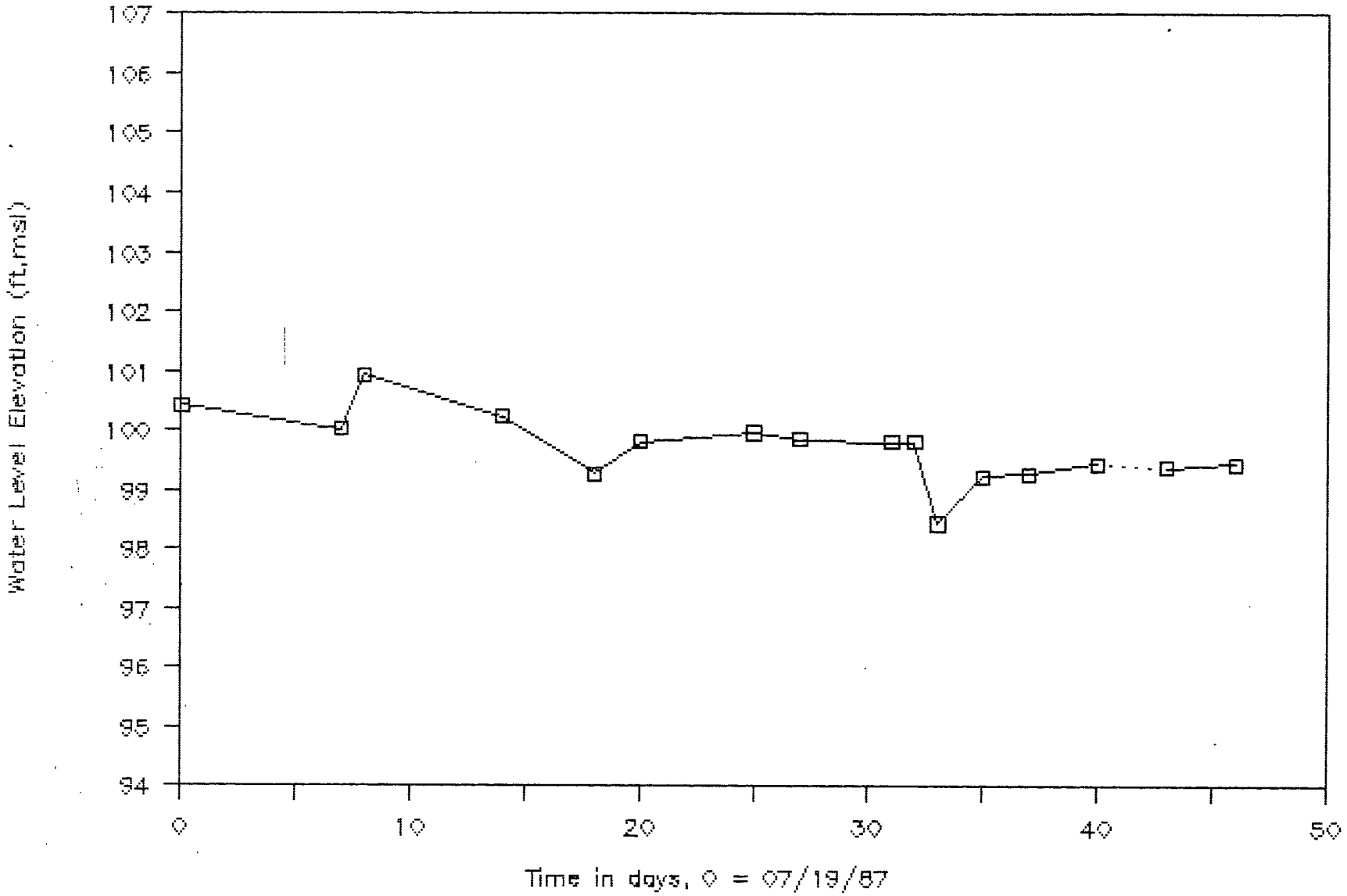


HYDROGRAPH OF WELL MW-15-S

05/31/86 to 10/01/86

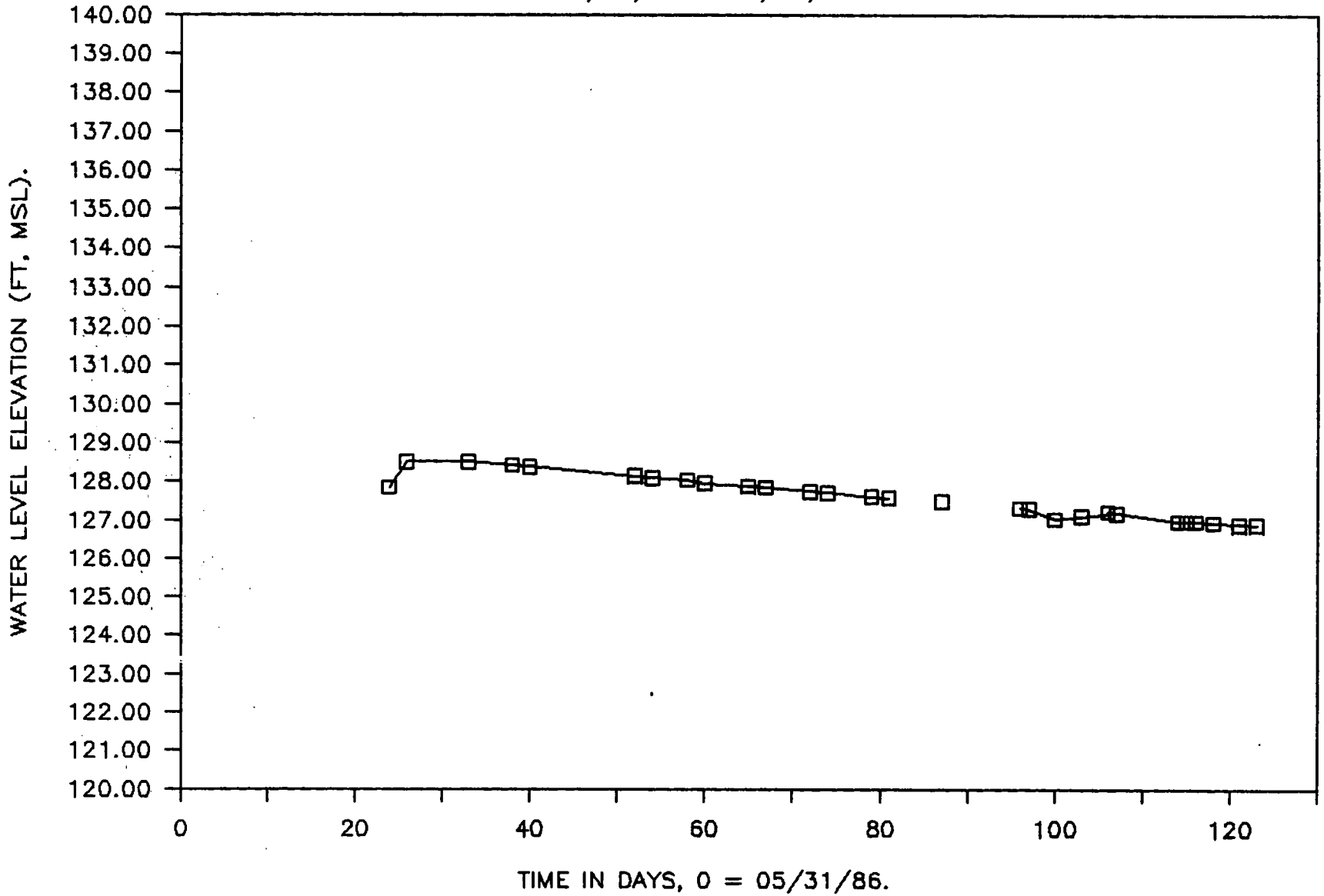


HYDROGRAPH OF WELL MW-15S

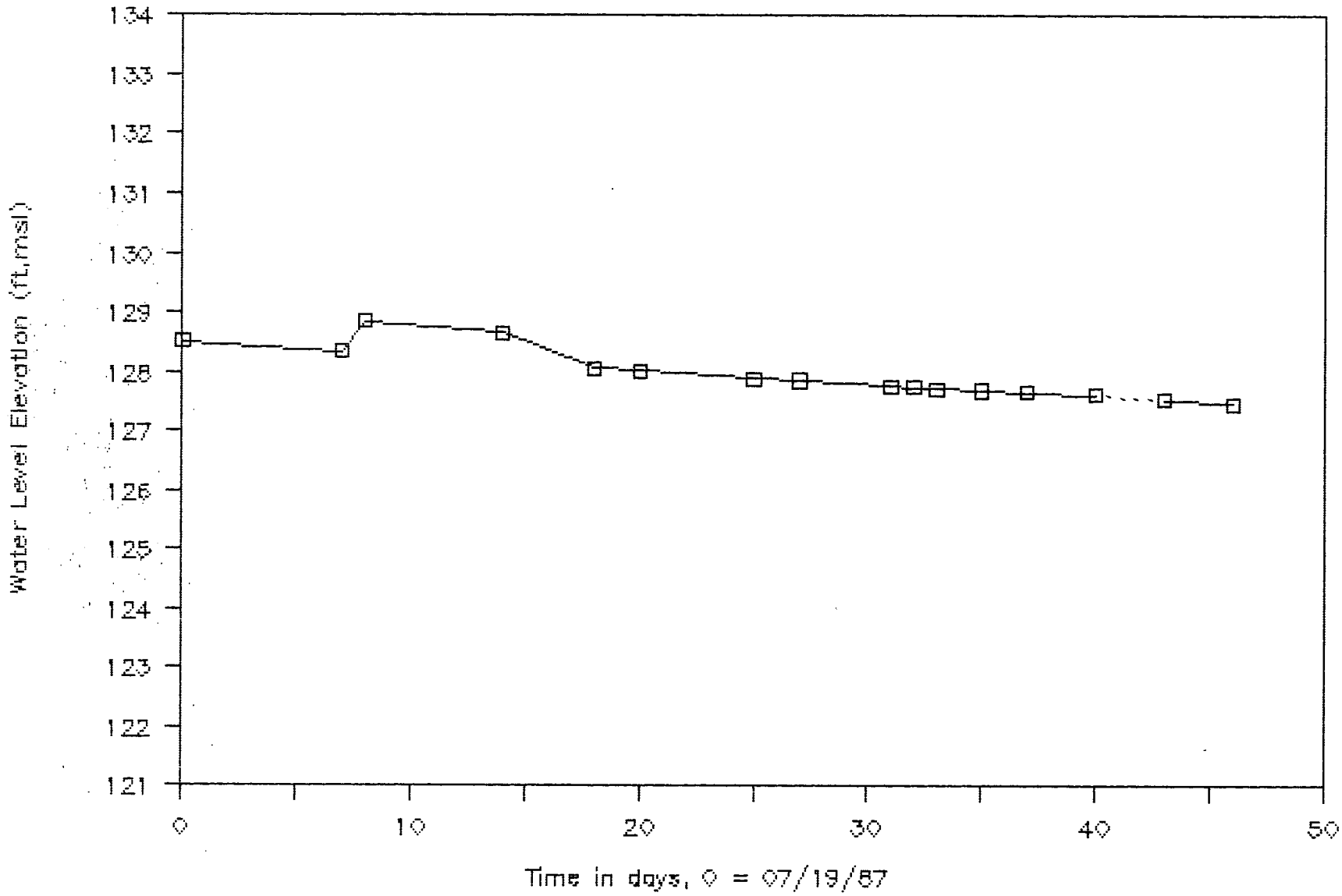


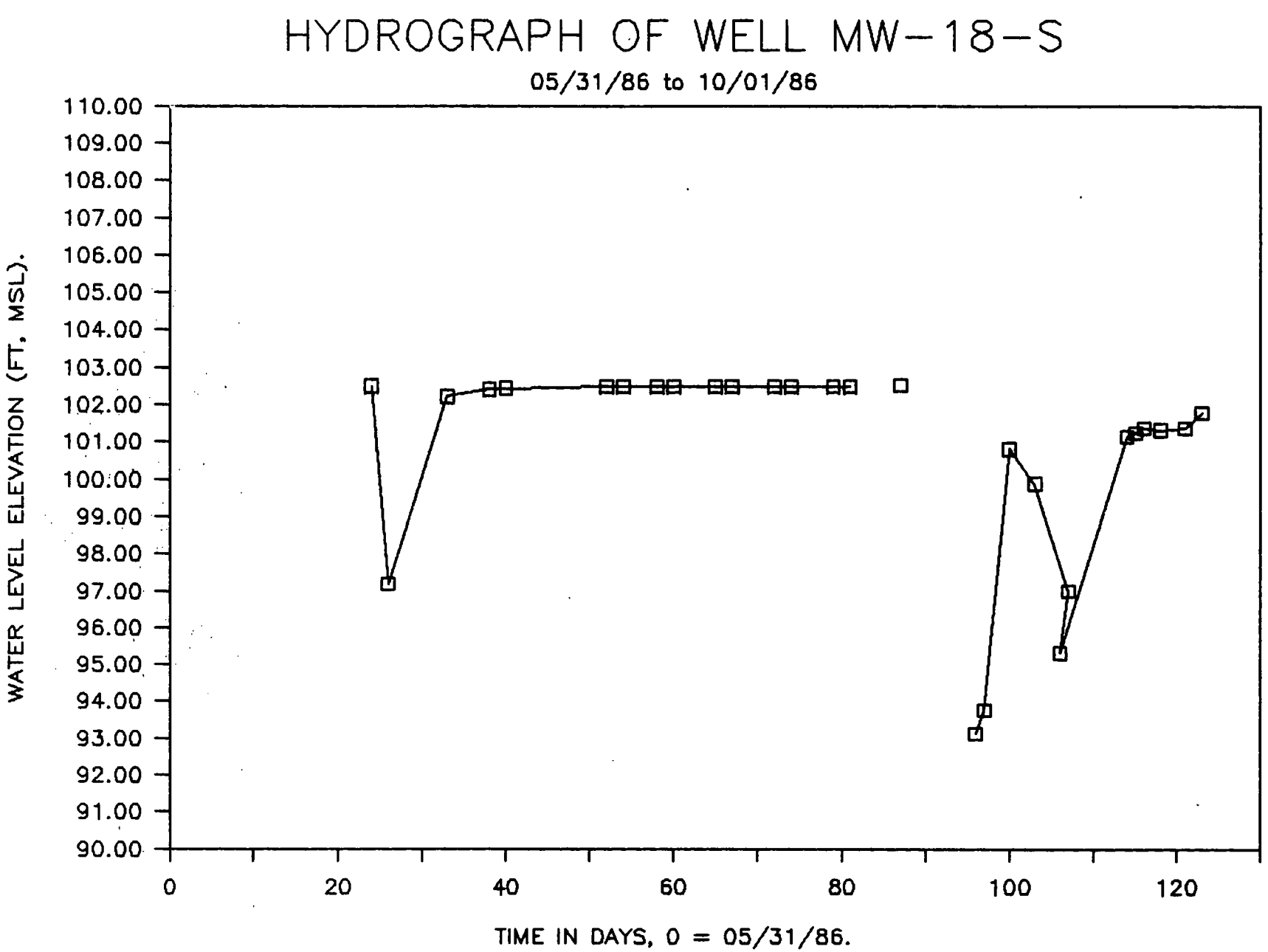
HYDROGRAPH OF WELL MW-17-S

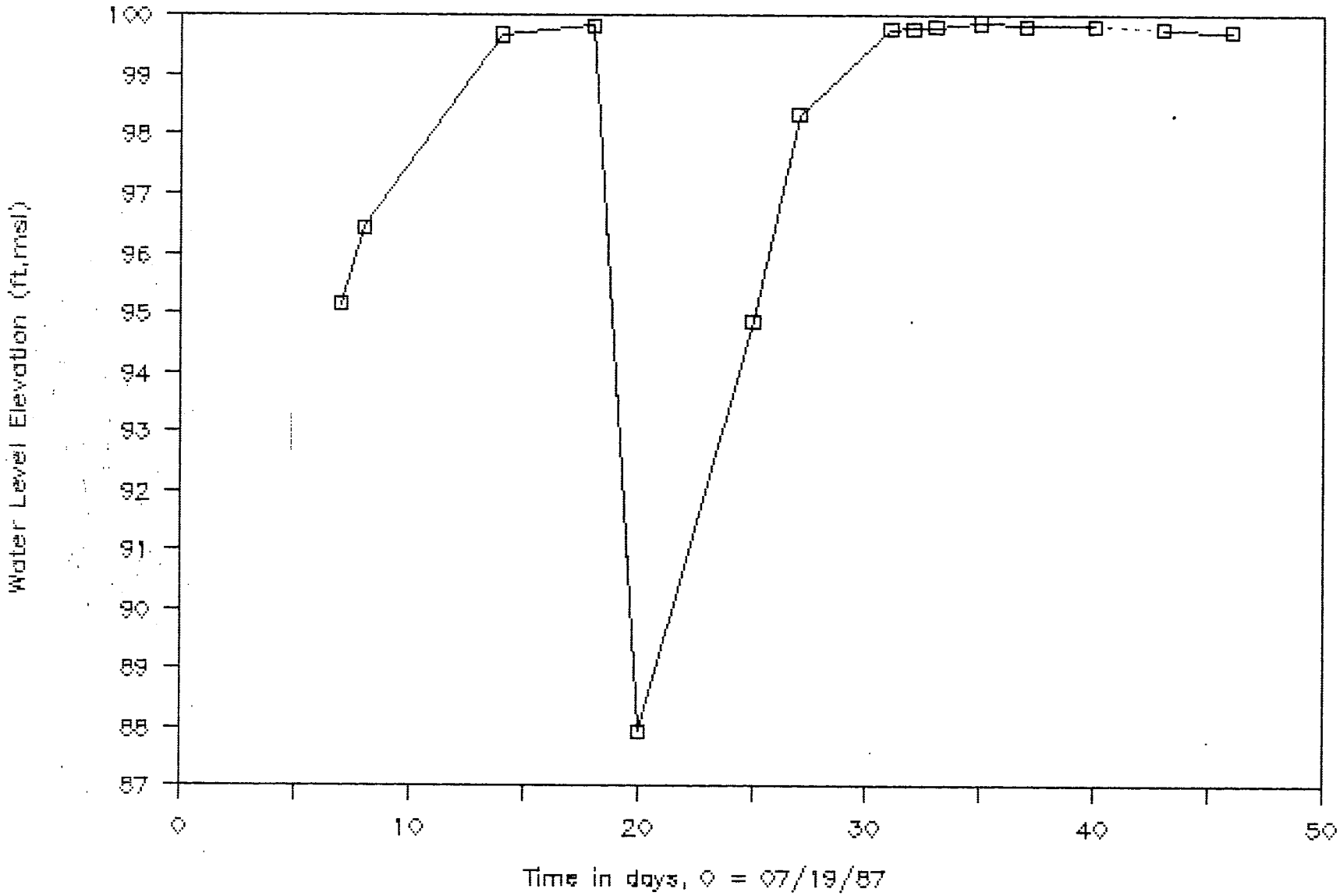
05/31/86 to 10/01/86

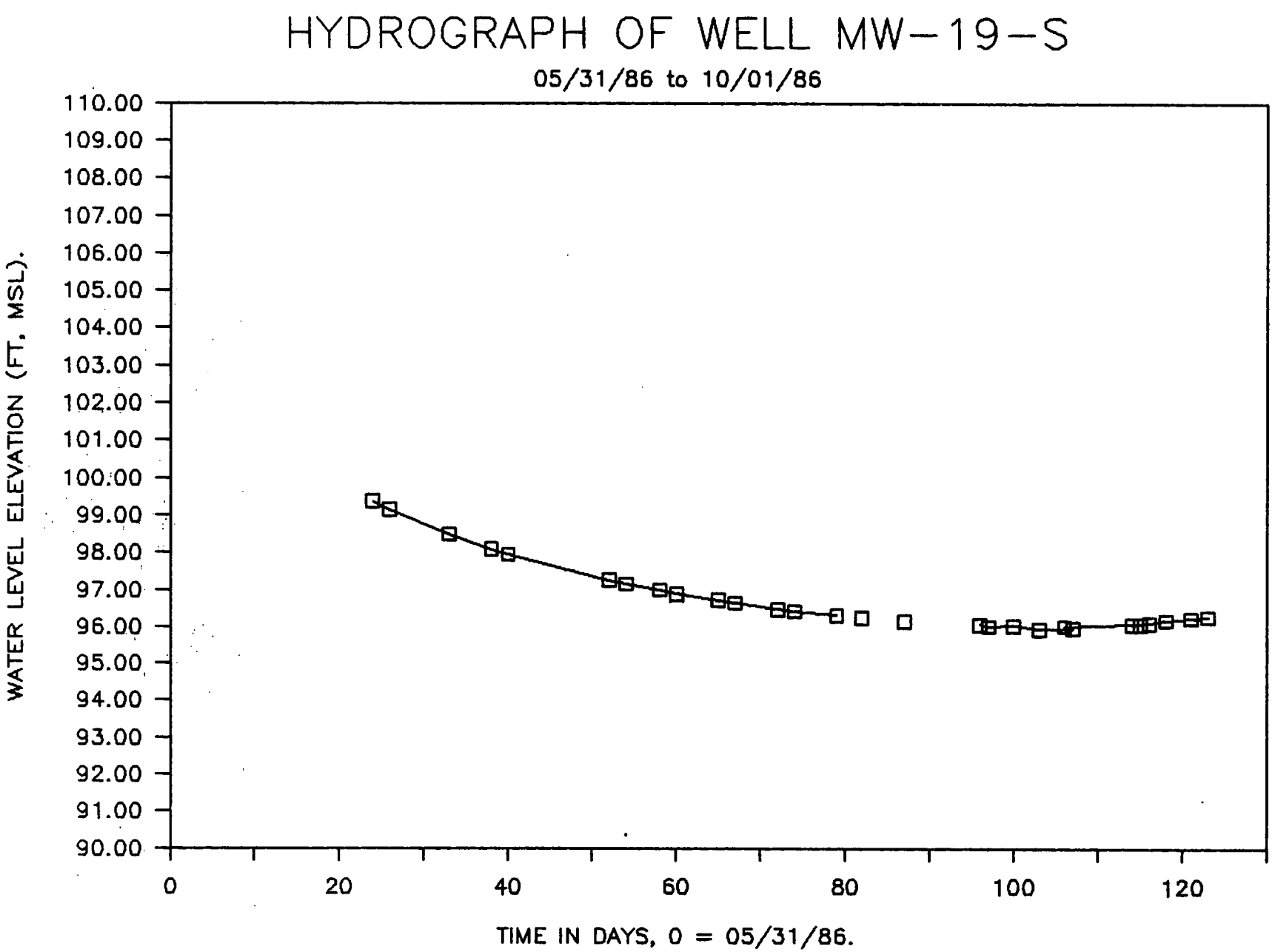


HYDROGRAPH OF WELL MW-17S

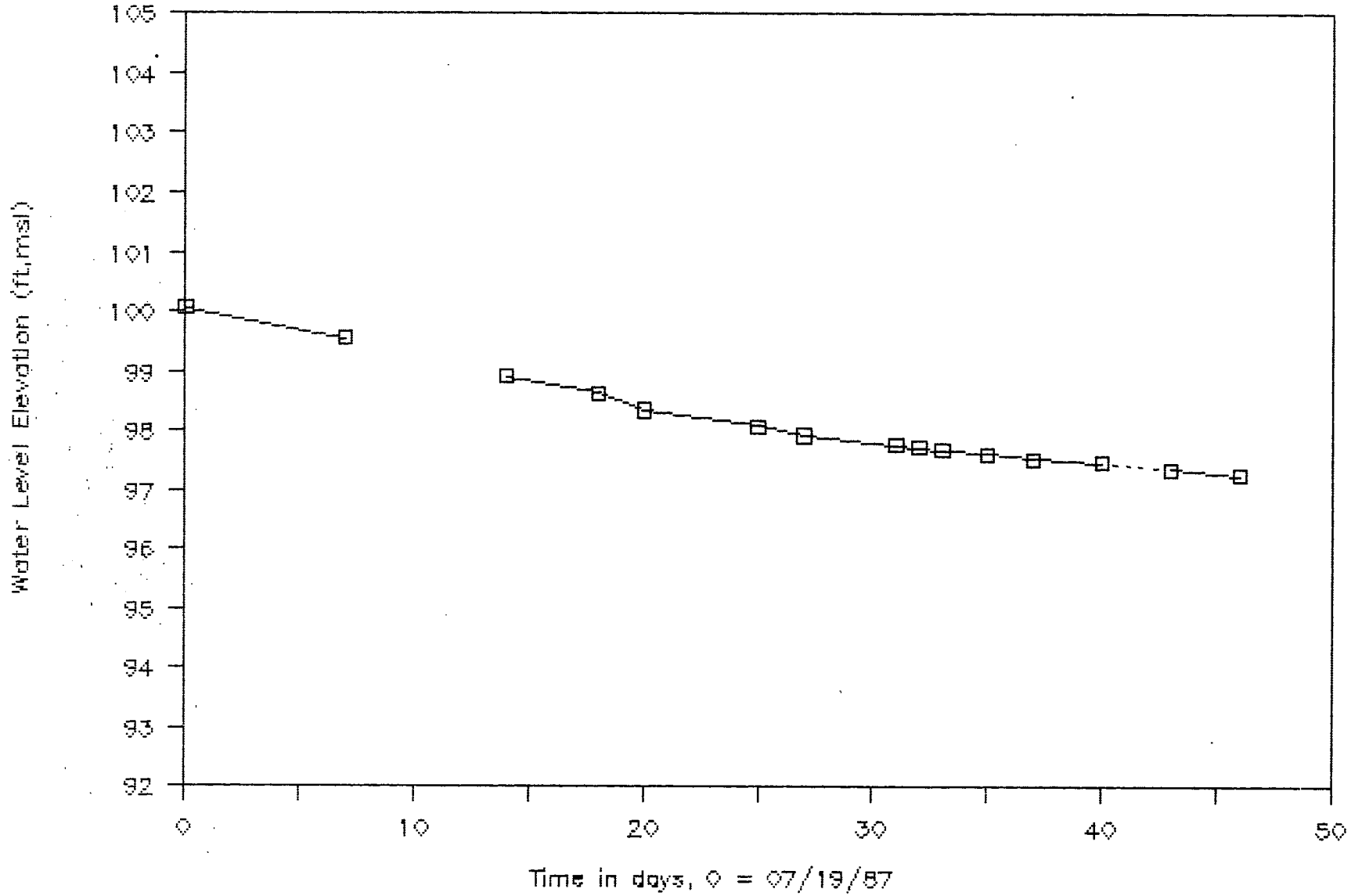



HYDROGRAPH OF WELL MW-18-S
05/31/86 to 10/01/86
WATER LEVEL ELEVATION (FT. MSL).
110.00
109.00
108.00
107.00
106.00
105.00
104.00
103.00
102.00
101.00
100.00
99.00
98.00
97.00
96.00
95.00
94.00
93.00
92.00
91.00
90.00
0
20
40
60
80
100
120
TIME IN DAYS, 0 = 05/31/86.


HYDROGRAPH OF WELL MW-18S
Water Level Elevation (ft,msl)
100
99
98
97
96
95
94
93
92
91
90
89
88
87
0
10
20
30
40
50
Time in days, 0 = 07/19/87

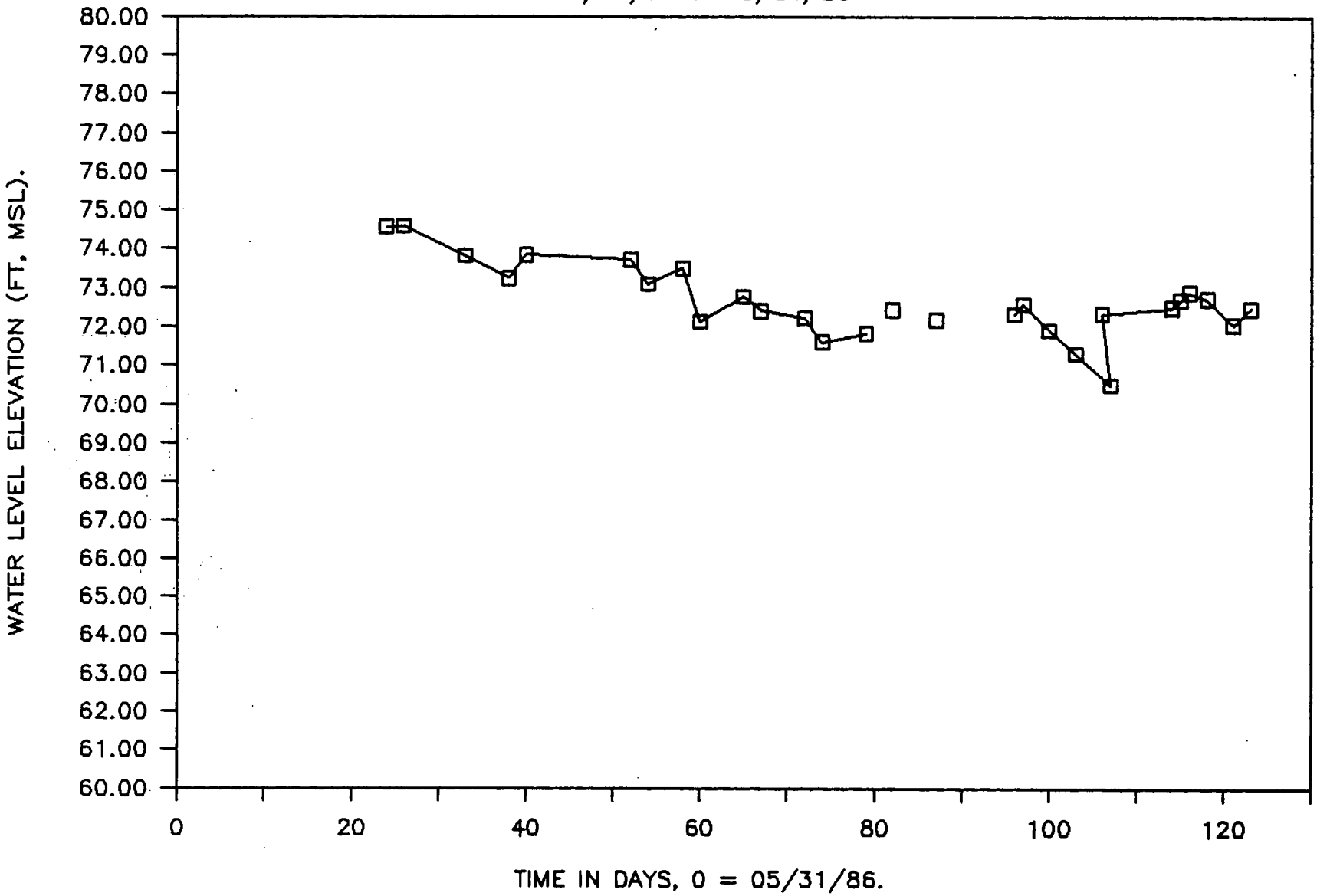

HYDROGRAPH OF WELL MW-19-S
05/31/86 to 10/01/86
WATER LEVEL ELEVATION (FT. MSL).
110.00
109.00
108.00
107.00
106.00
105.00
104.00
103.00
102.00
101.00
100.00
99.00
98.00
97.00
96.00
95.00
94.00
93.00
92.00
91.00
90.00
0
20
40
60
80
100
120
TIME IN DAYS, 0 = 05/31/86.

HYDROGRAPH OF WELL MW-19S

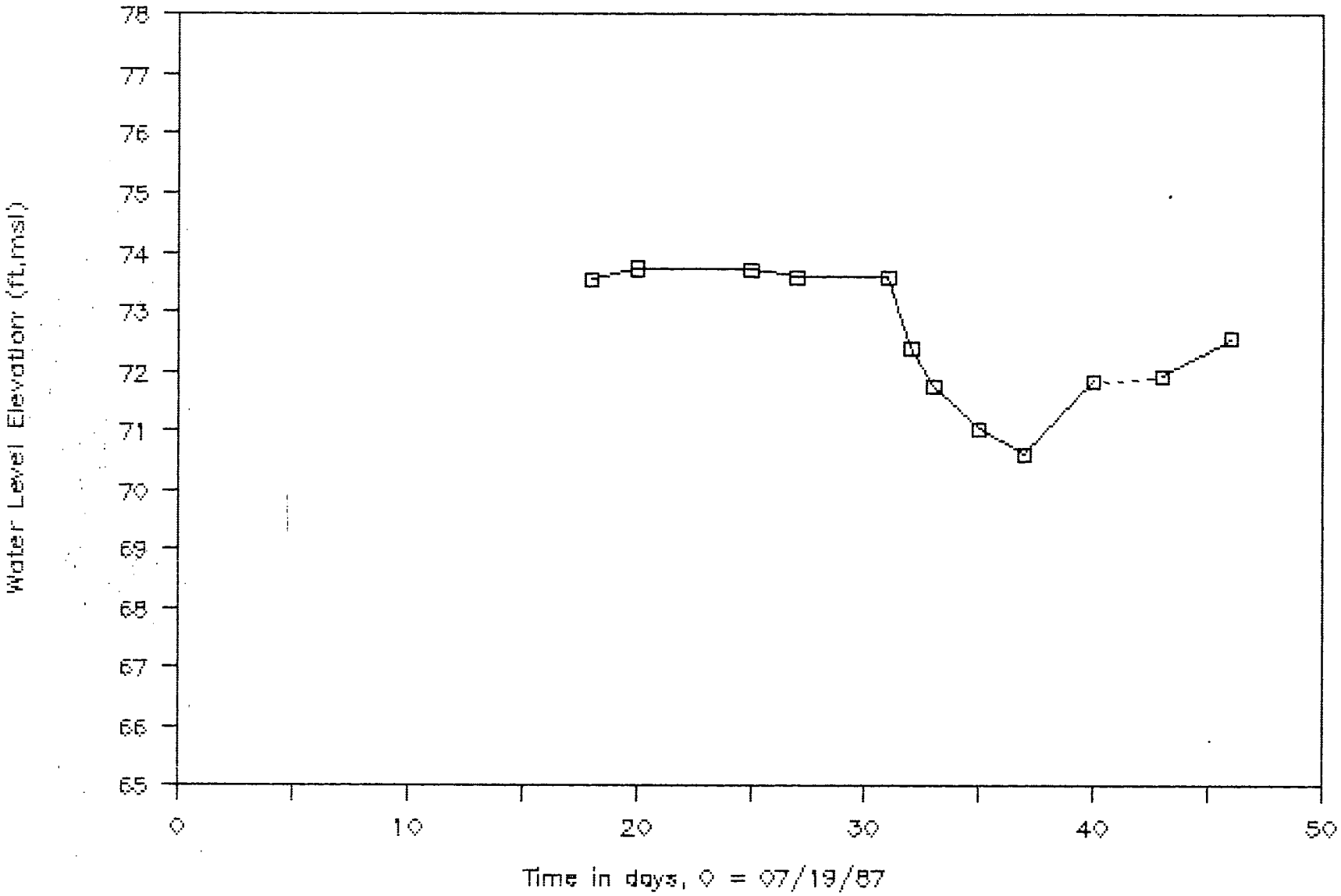


HYDROGRAPH OF WELL MW-20-S

05/31/86 to 10/01/86

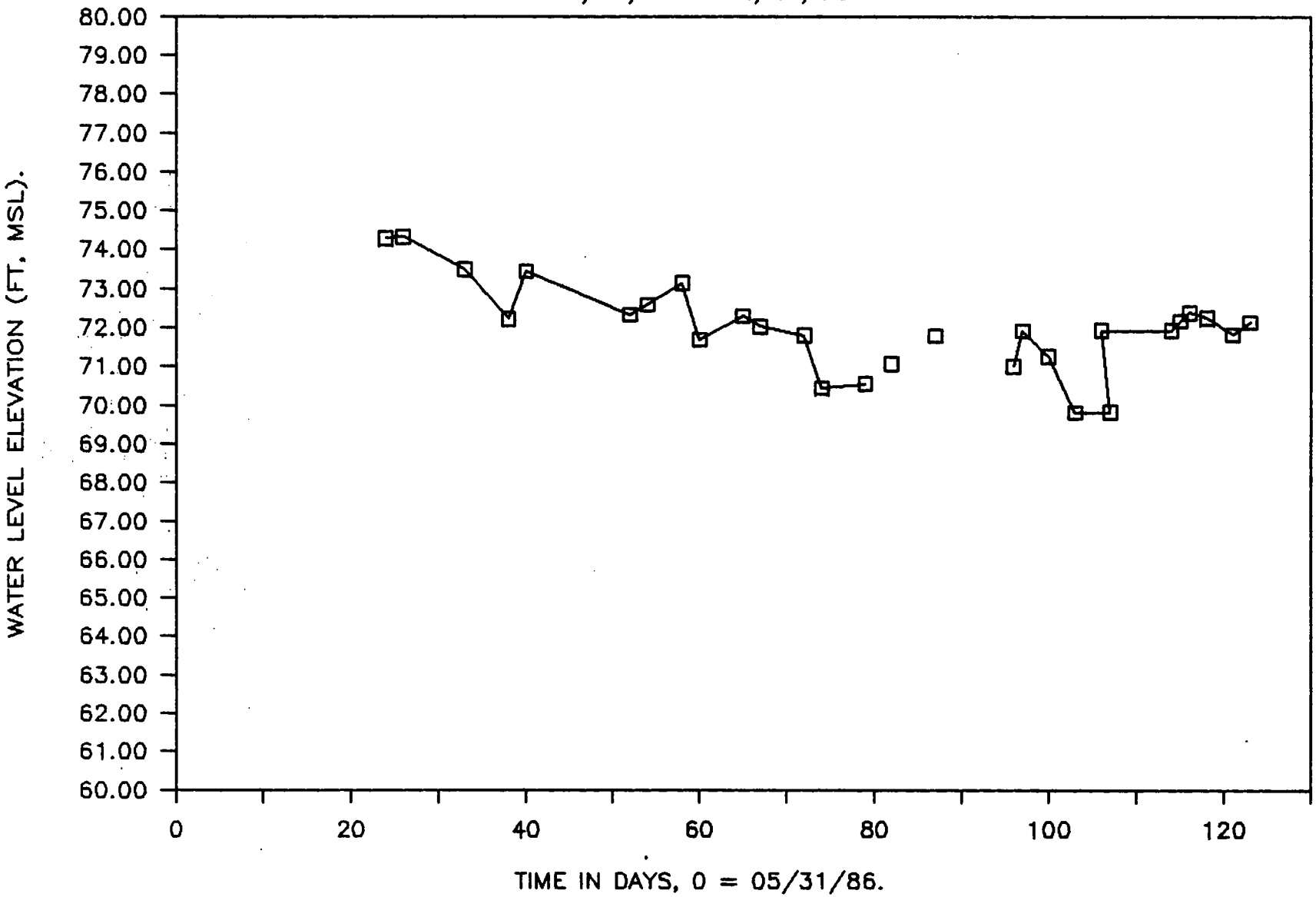


HYDROGRAPH OF WELL MW-20S

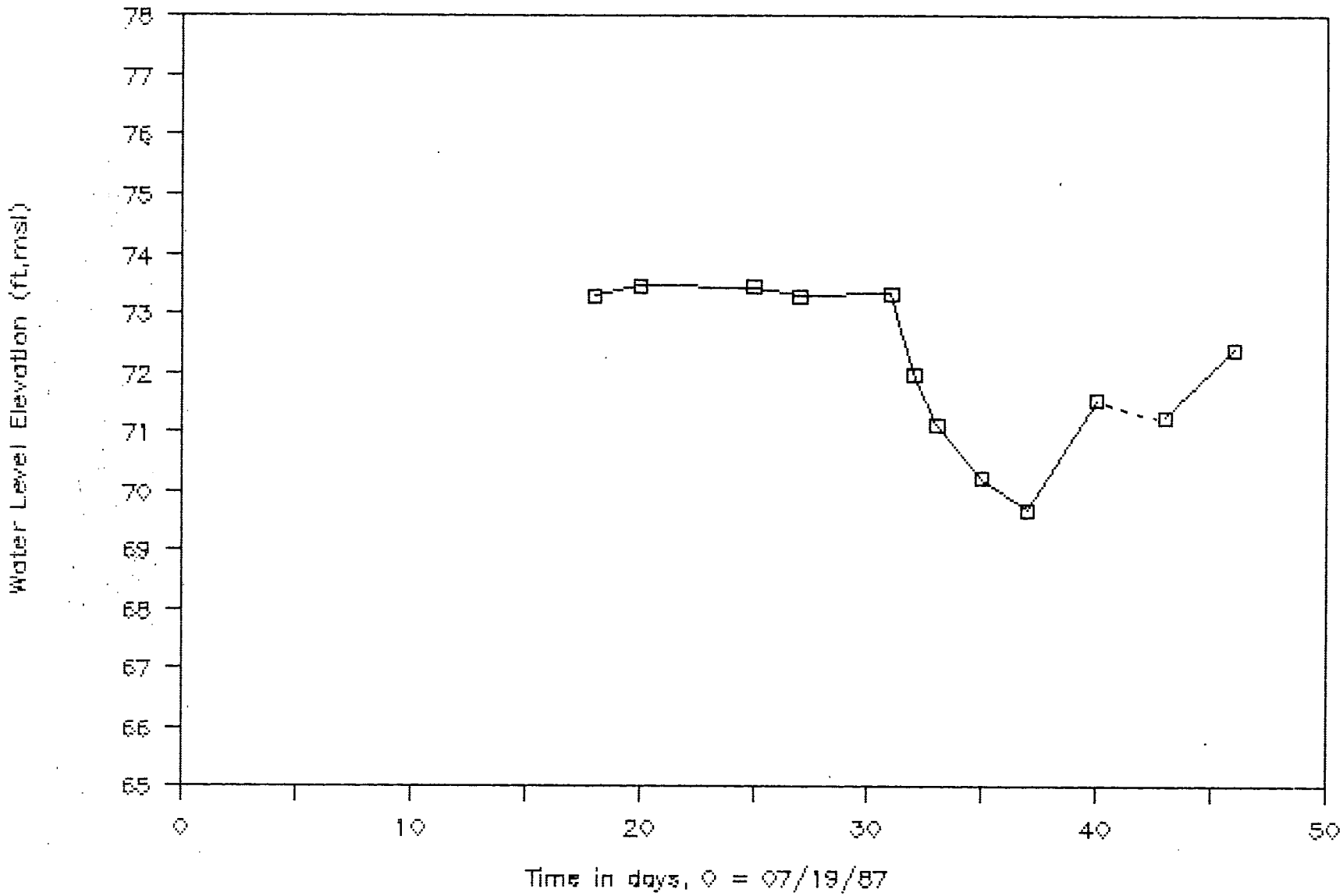


HYDROGRAPH OF WELL MW-21-S

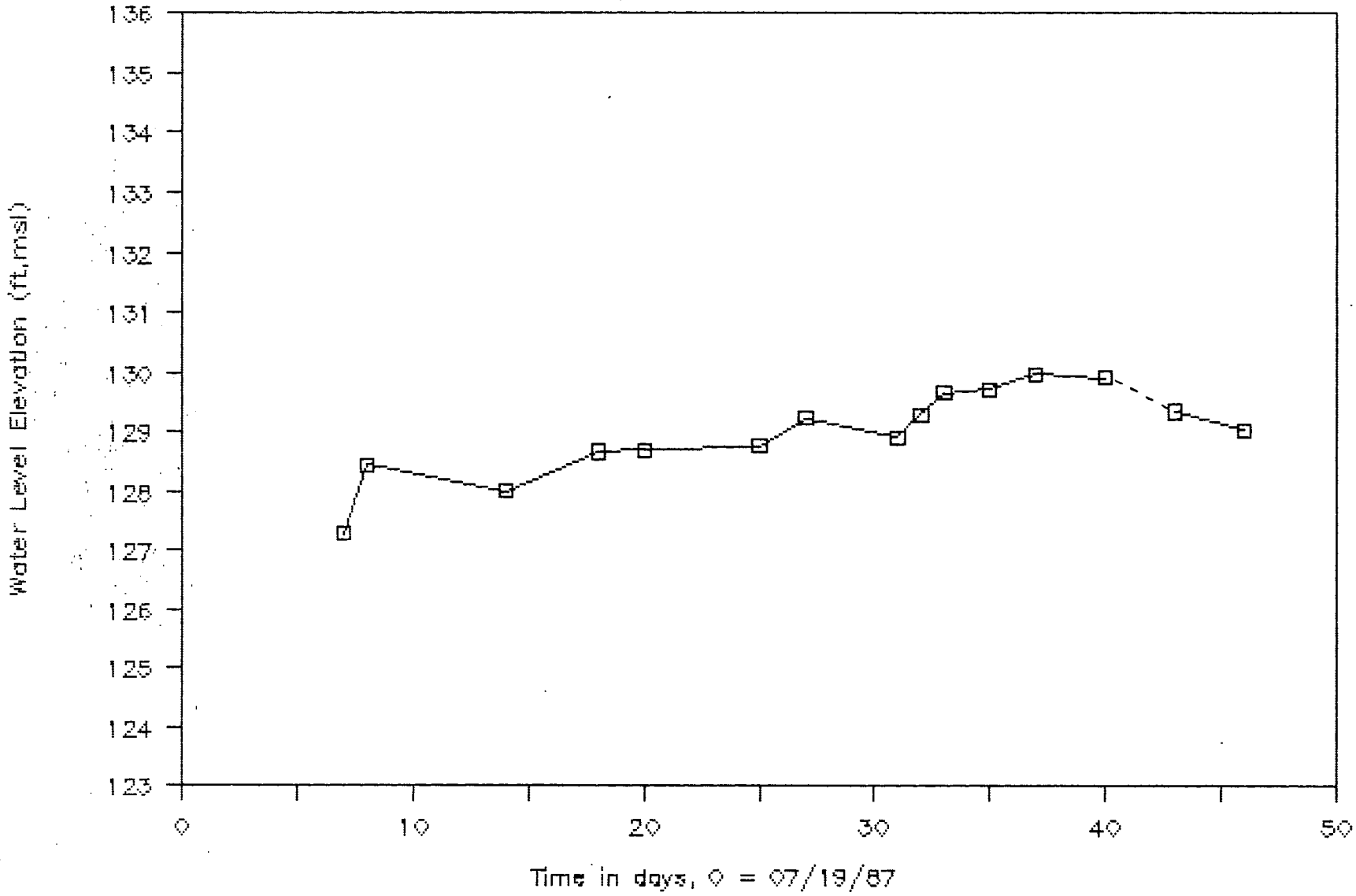
05/31/86 to 10/01/86



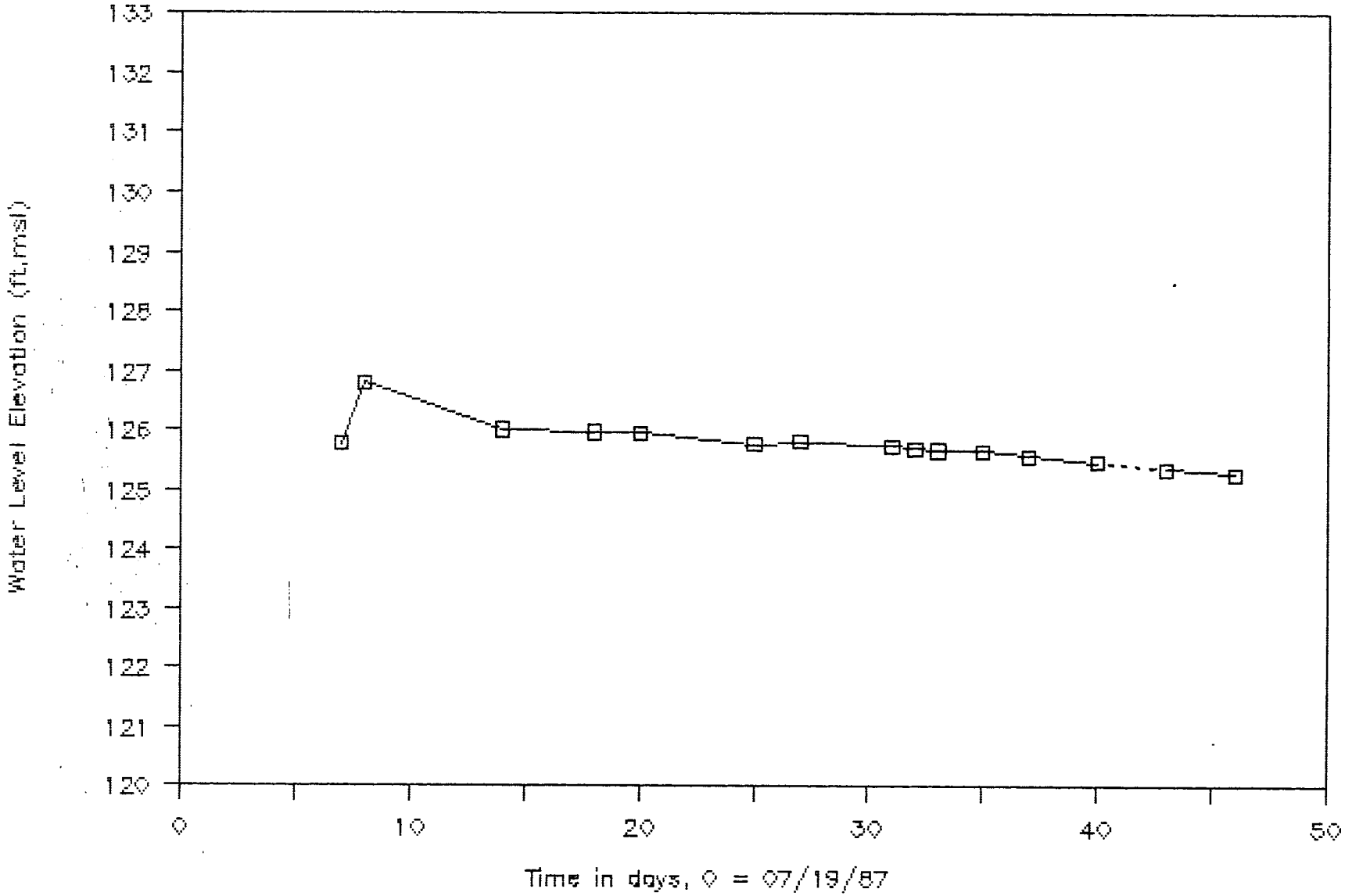
HYDROGRAPH OF WELL MW-21S



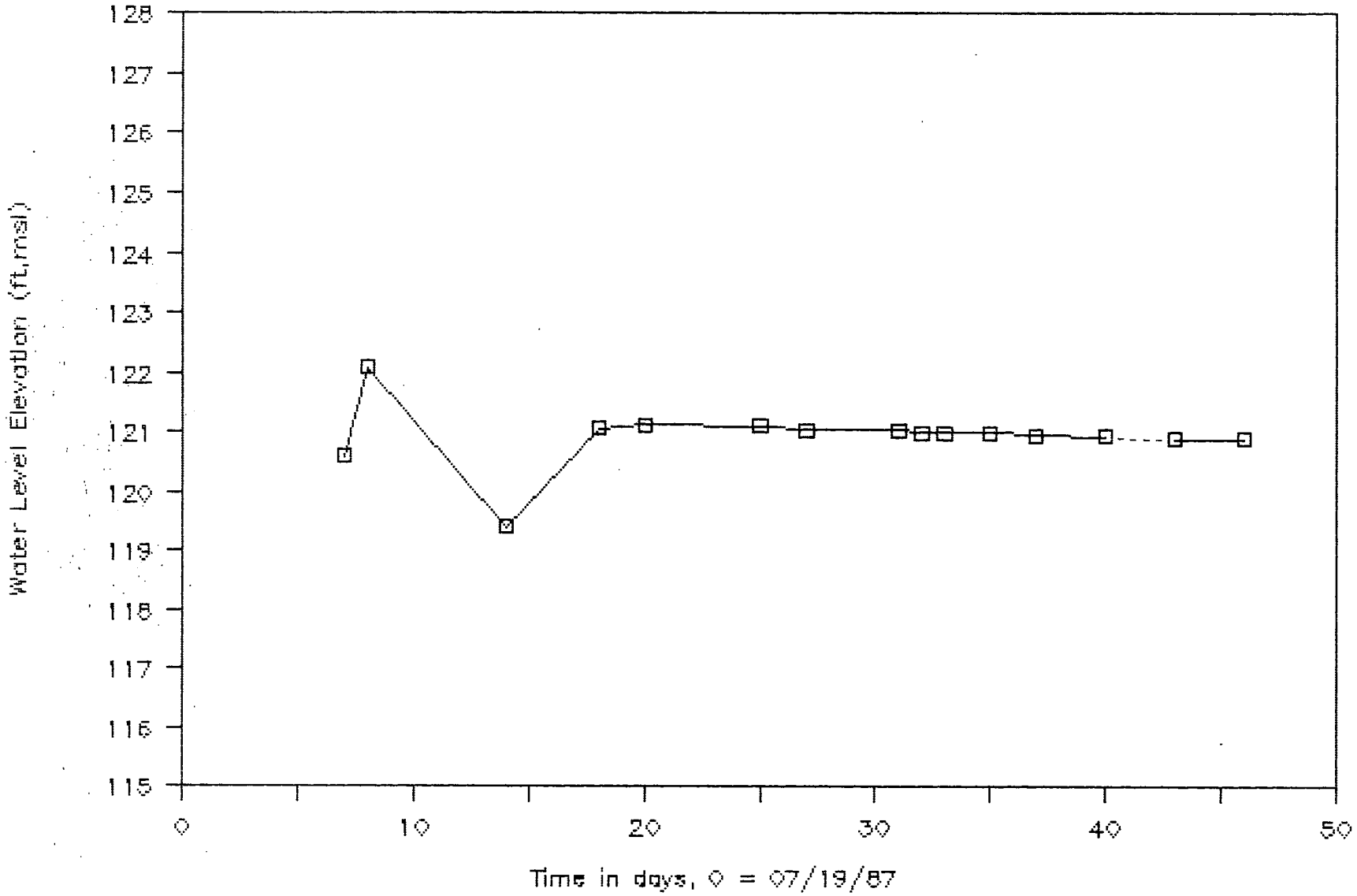
HYDROGRAPH OF WELL MW-22S



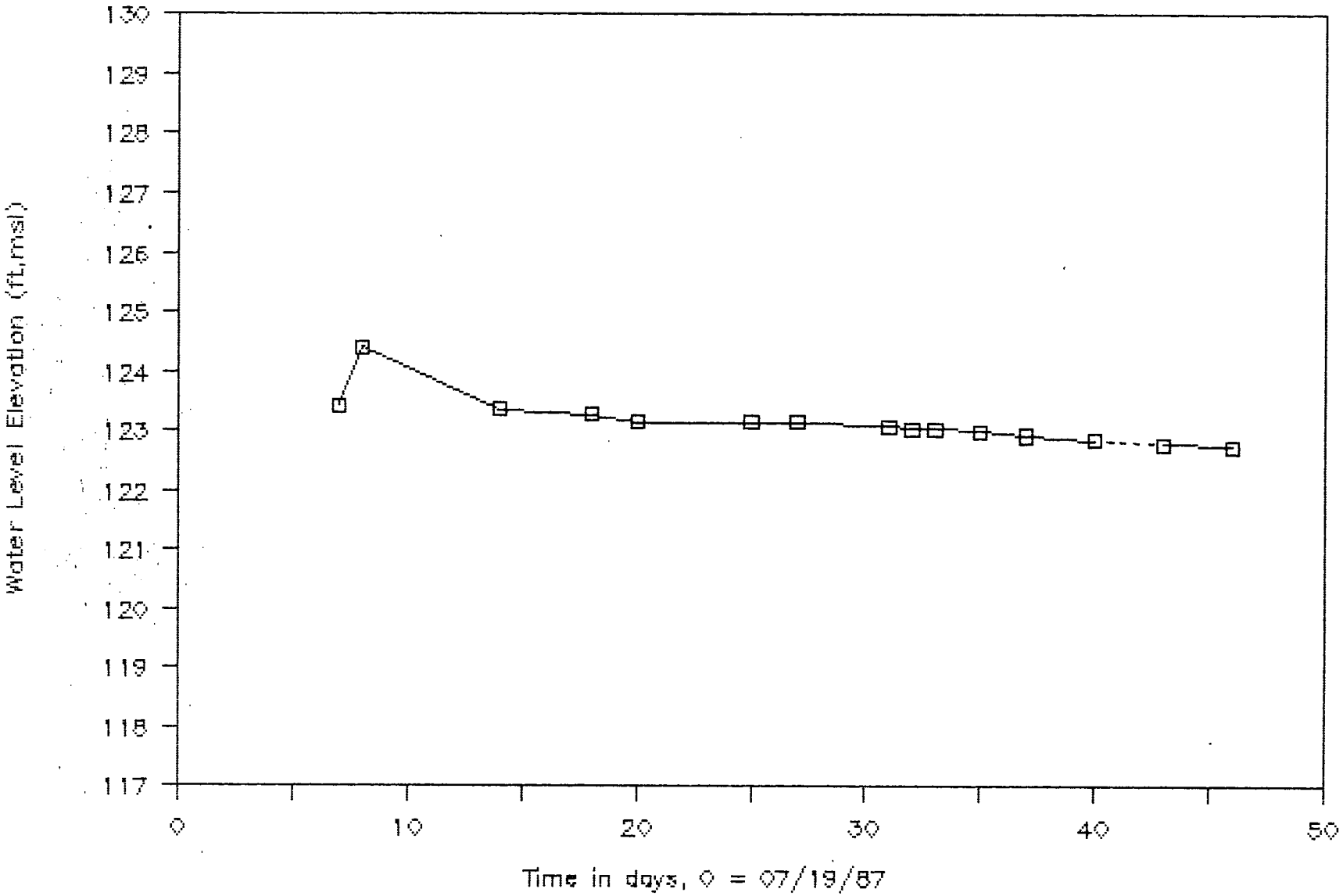
HYDROGRAPH OF WELL MW-23S



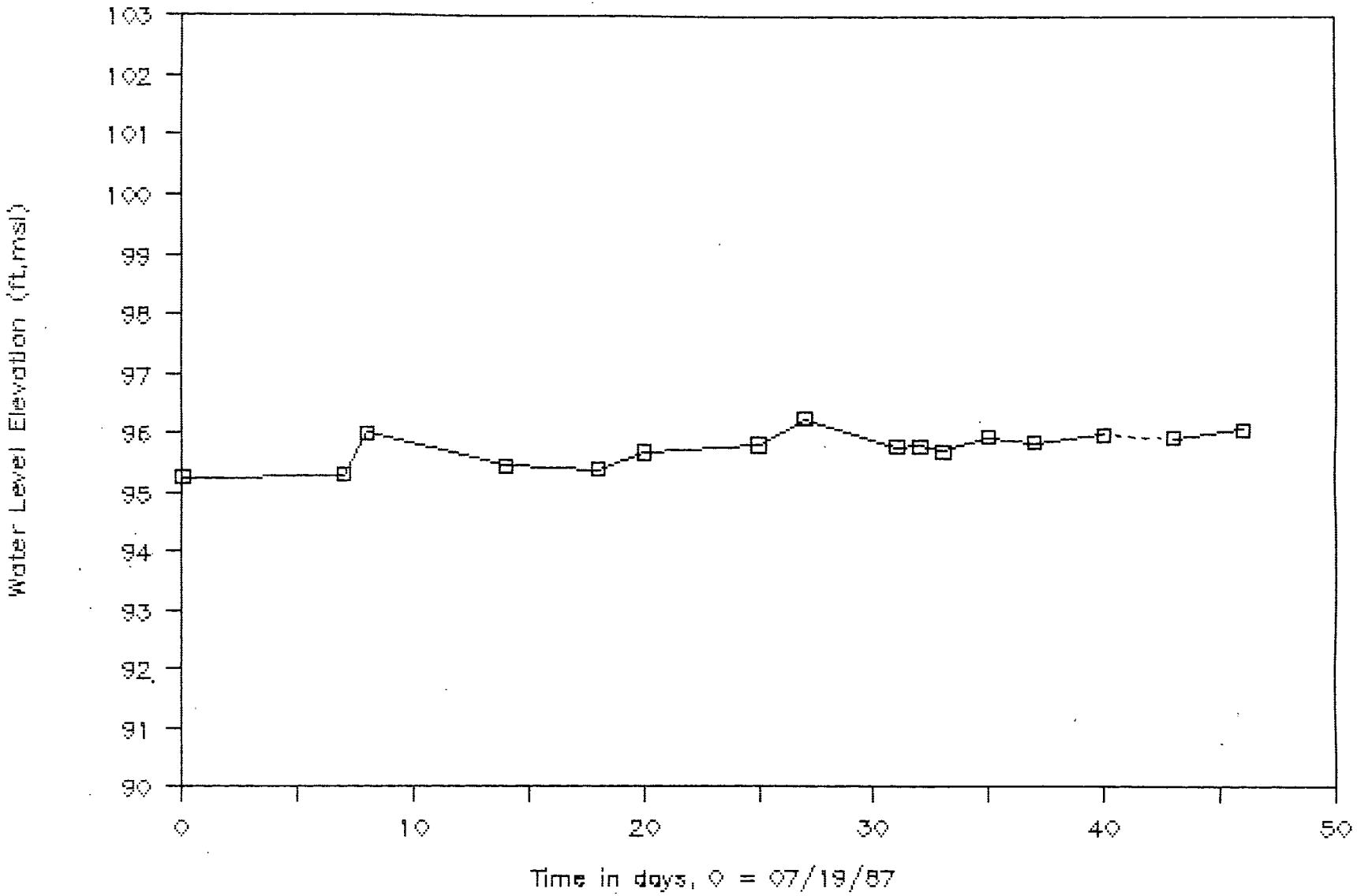
HYDROGRAPH OF WELL MW-24S



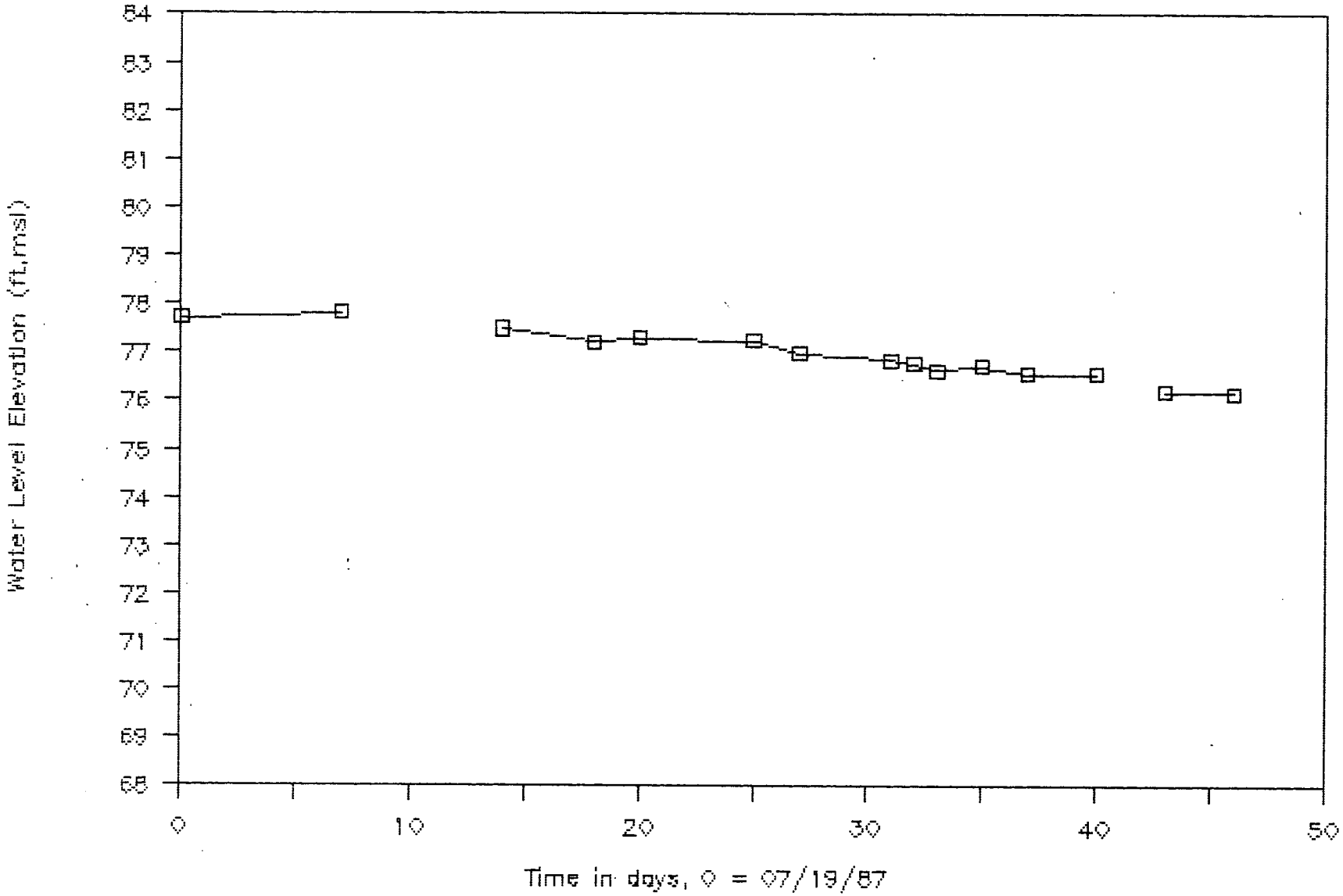
HYDROGRAPH OF WELL MW-25S



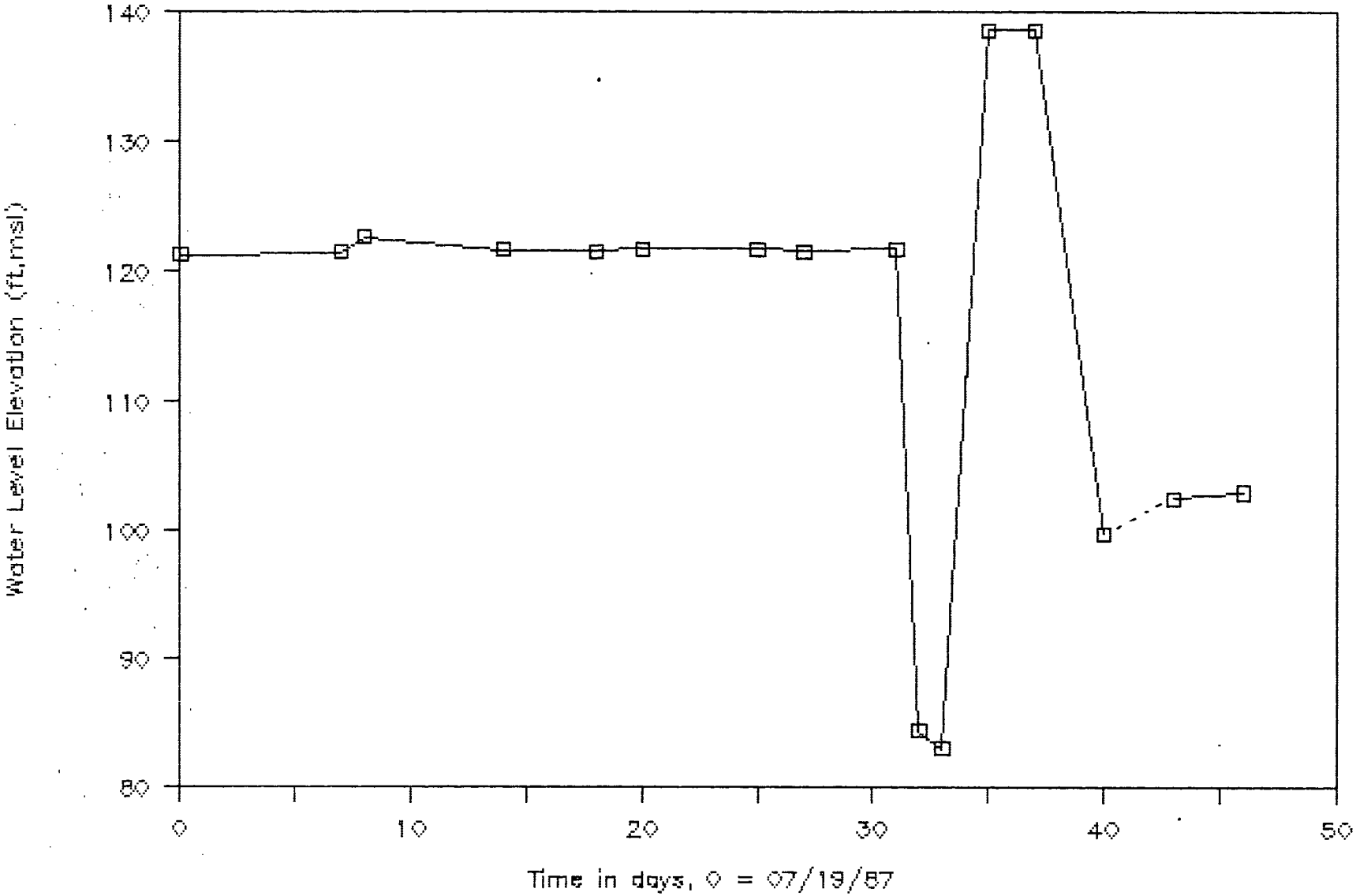
HYDROGRAPH OF WELL MW-26S



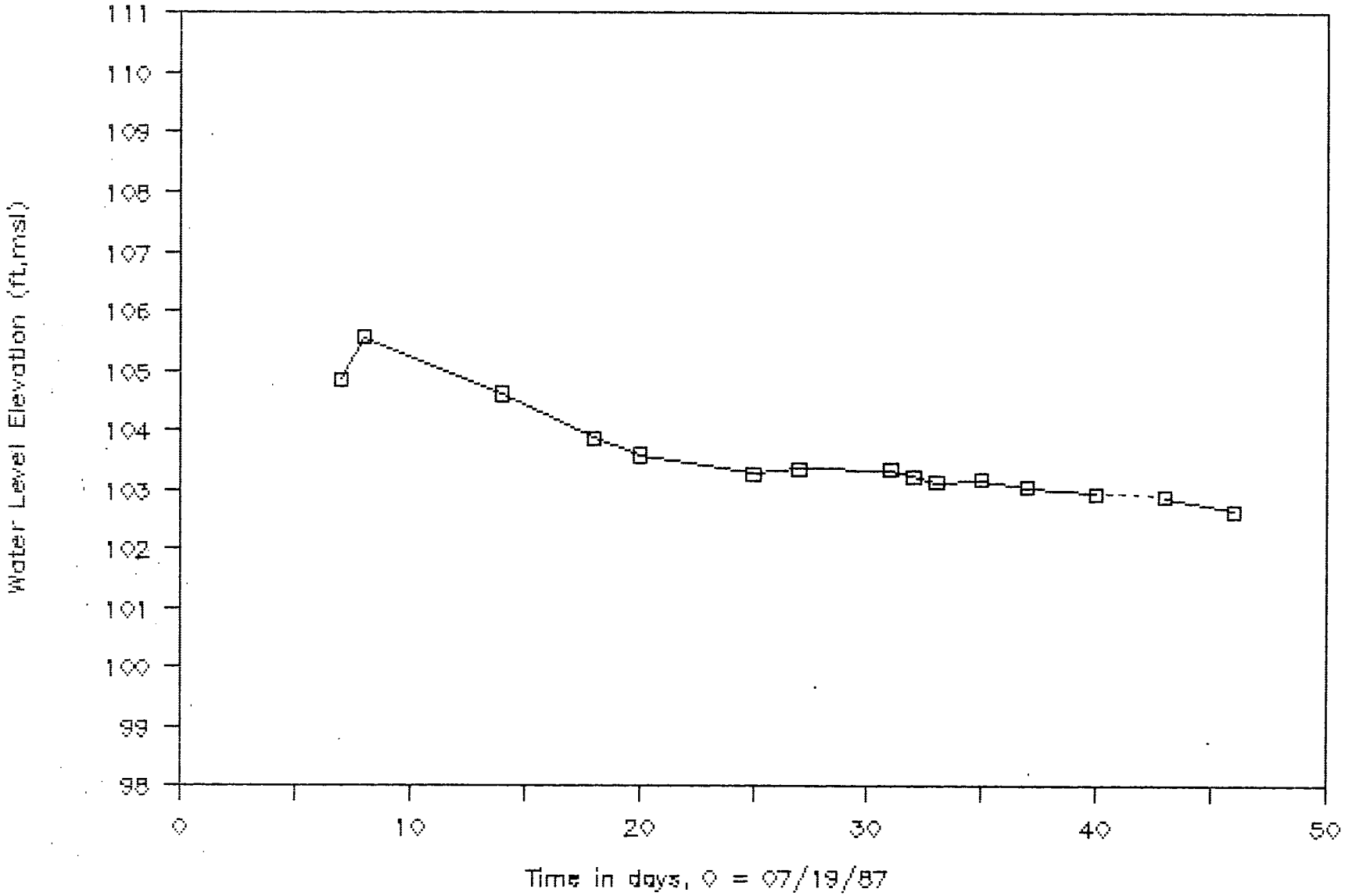
HYDROGRAPH OF WELL MW-26A



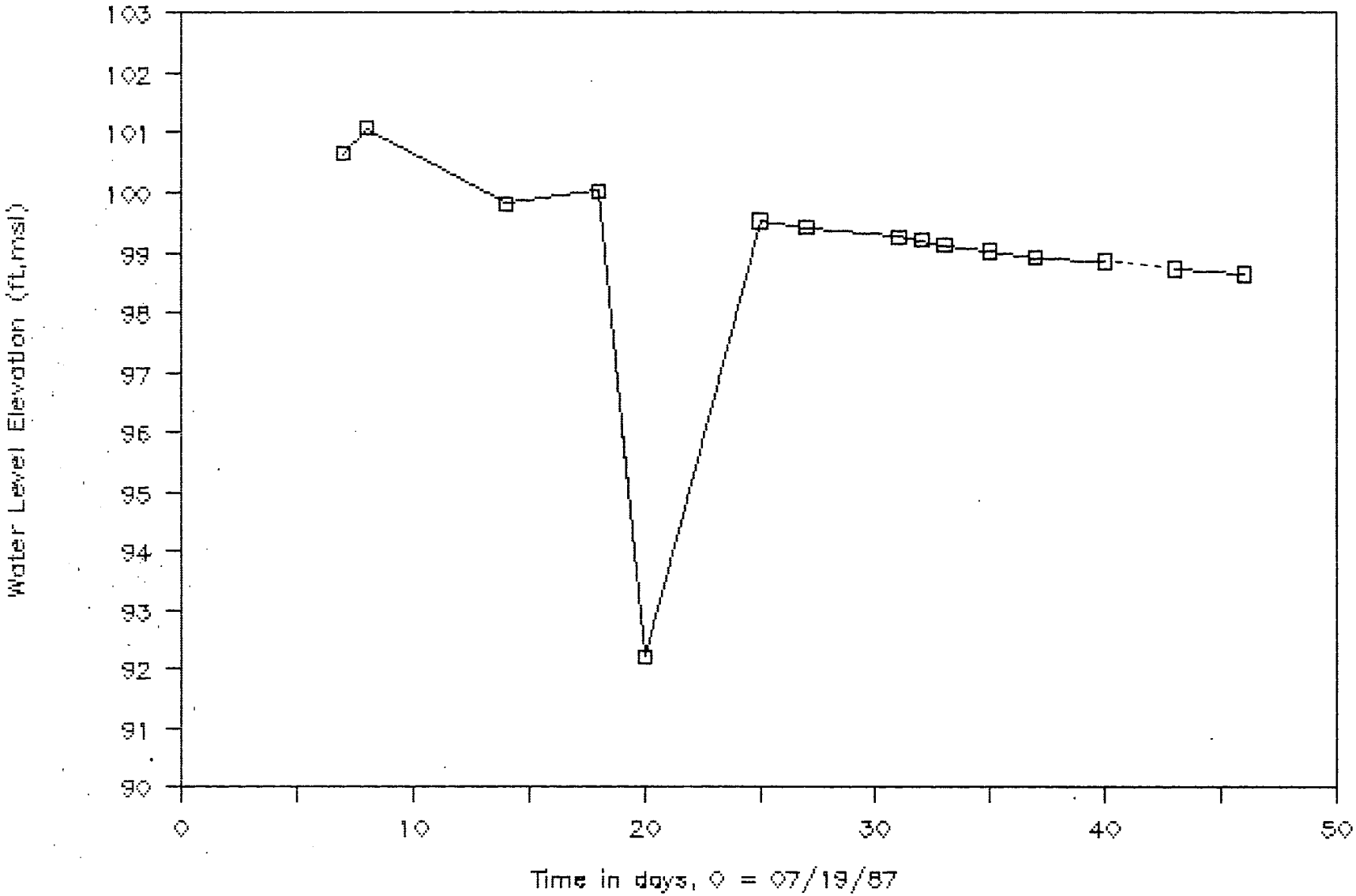
HYDROGRAPH OF WELL MW-27S



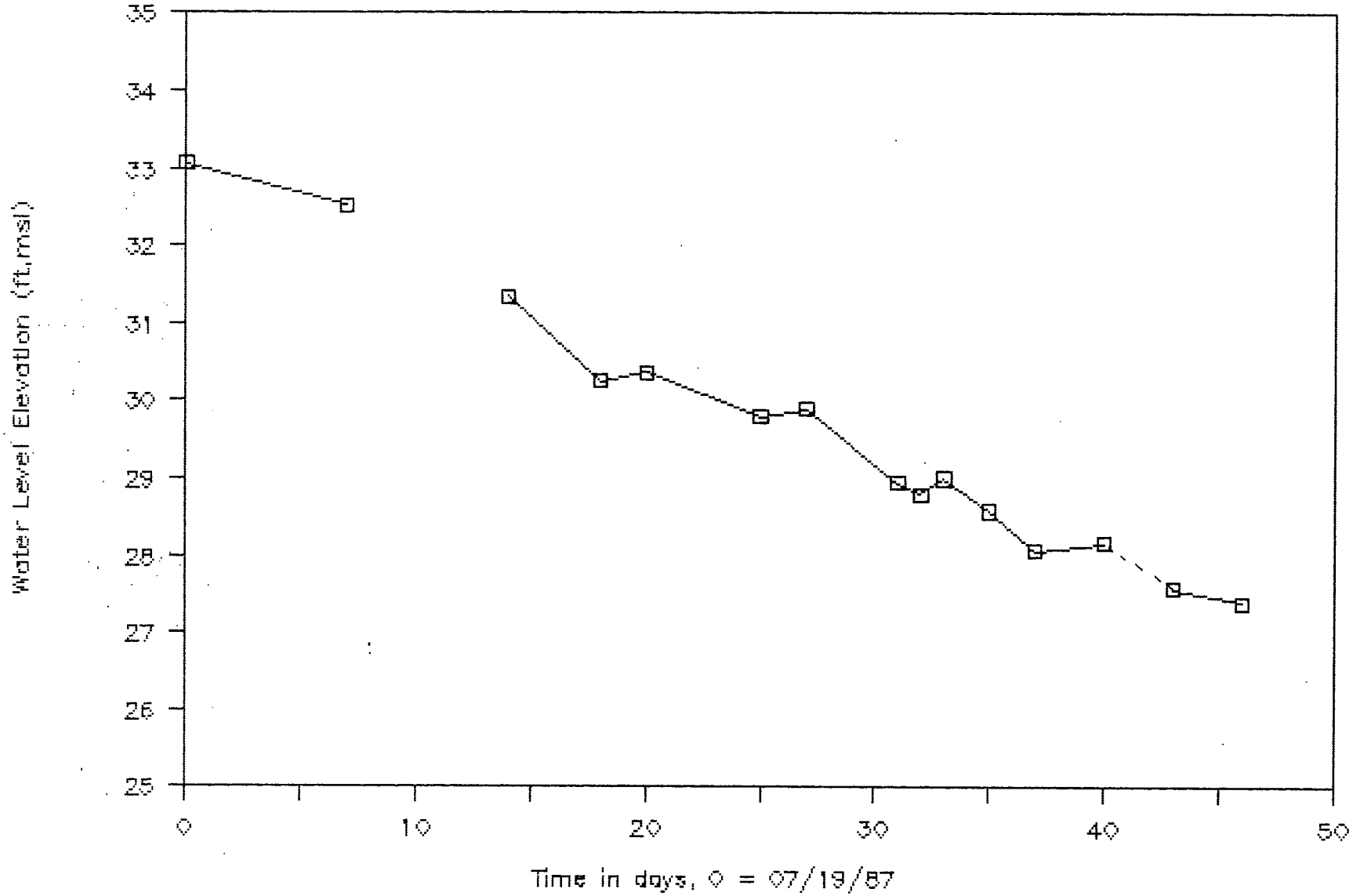
HYDROGRAPH OF WELL MW-28S



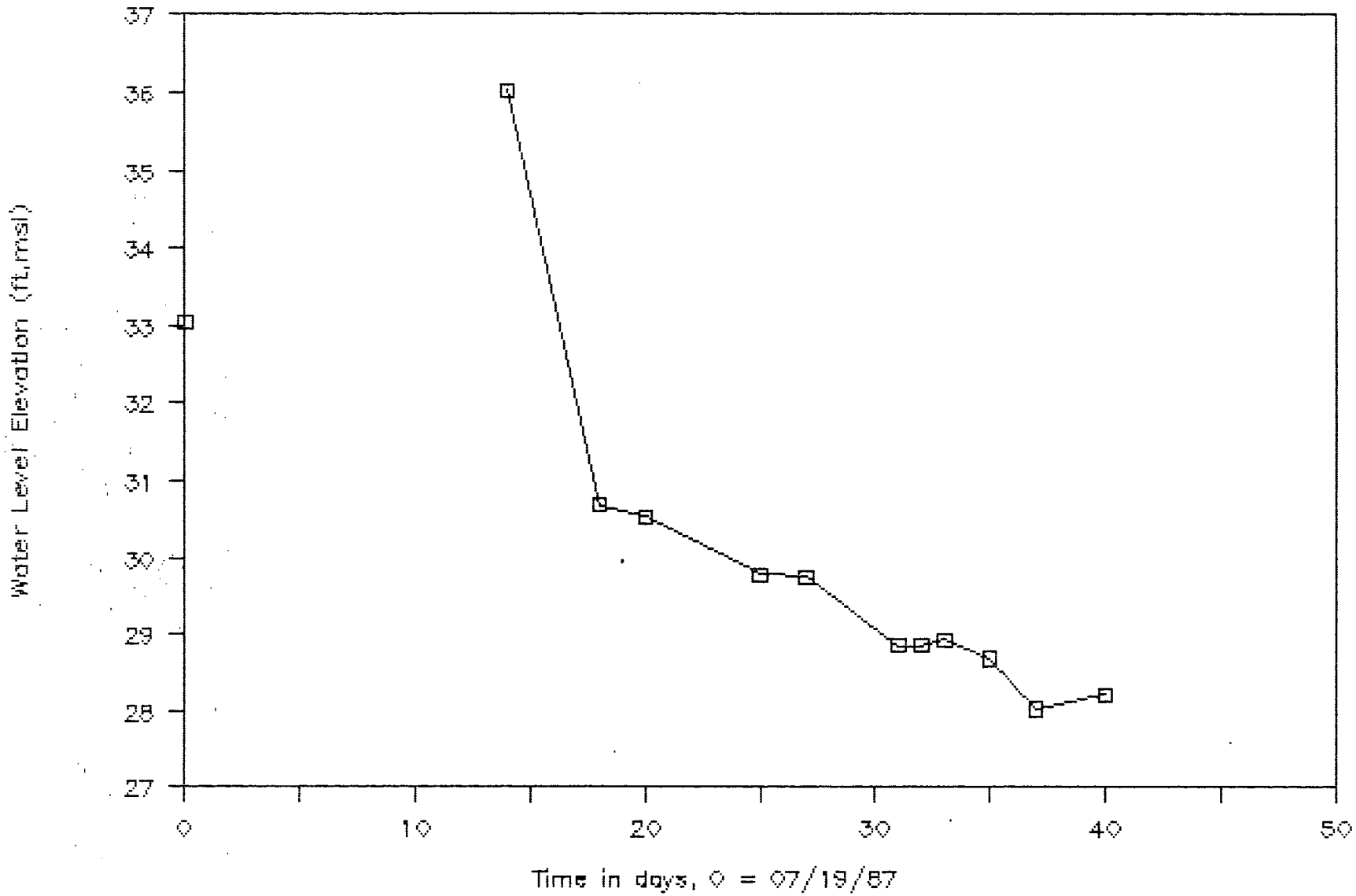
HYDROGRAPH OF WELL MW-29S



HYDROGRAPH OF WELL MW-16D

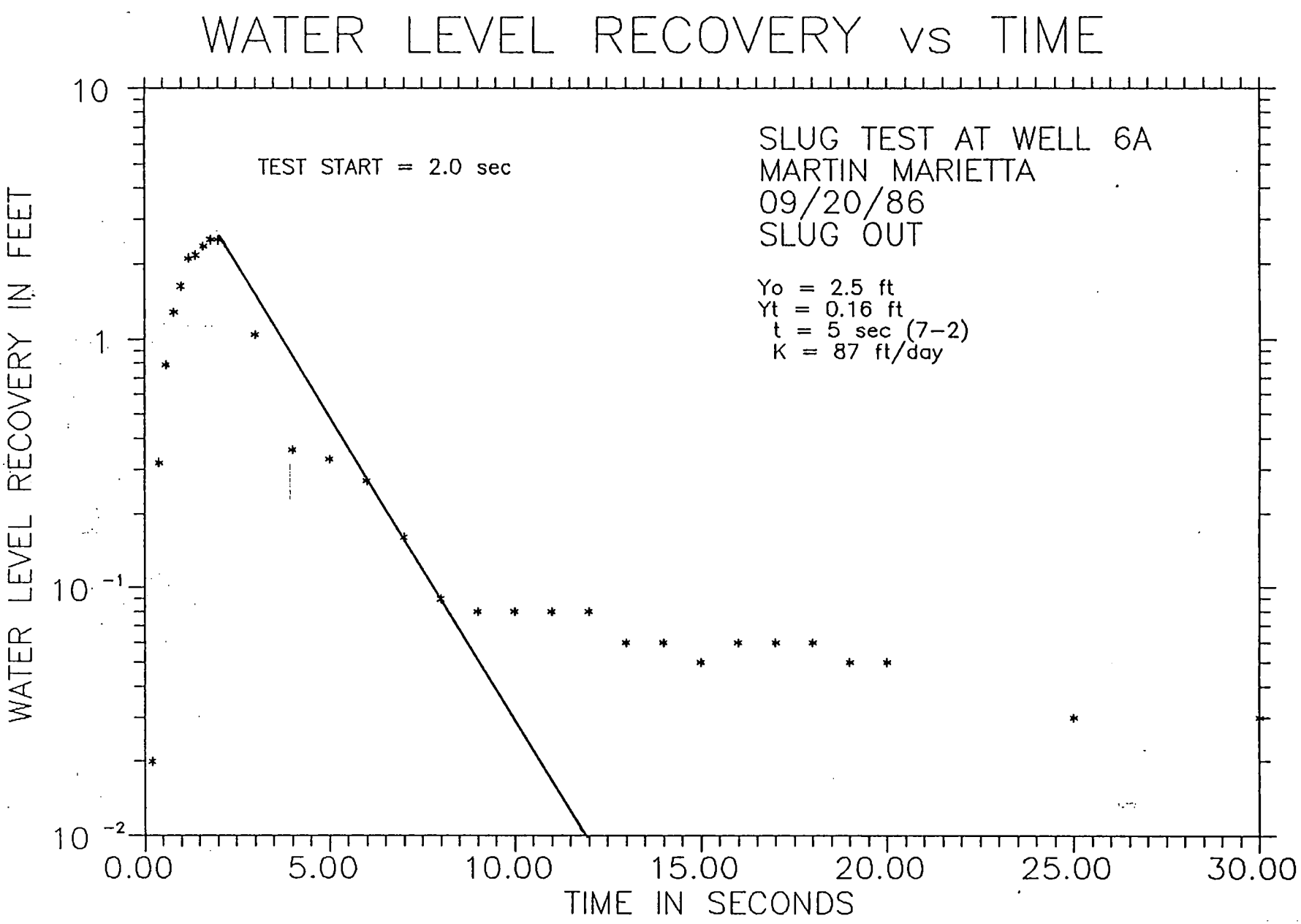


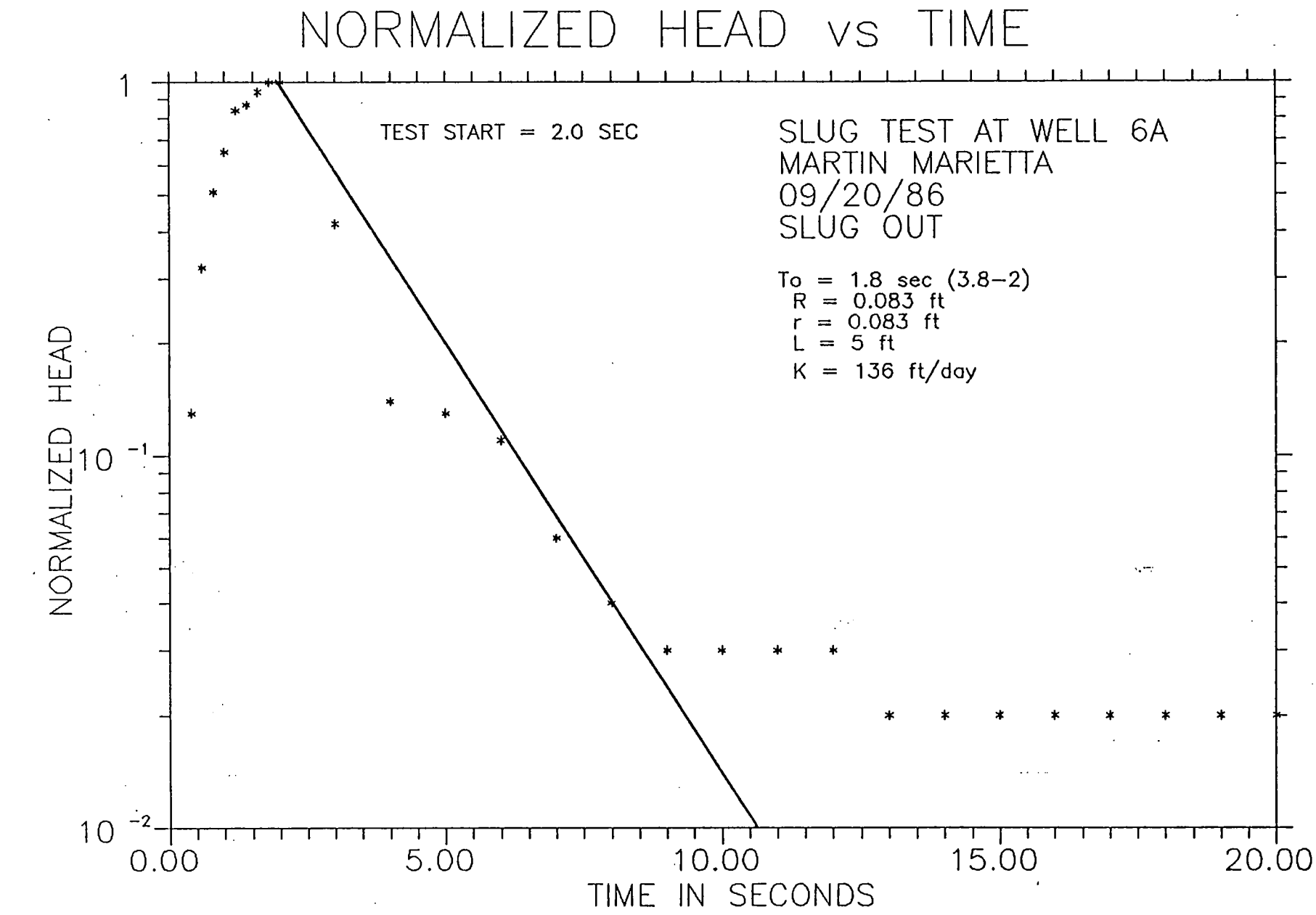
HYDROGRAPH OF WELL MW-11D

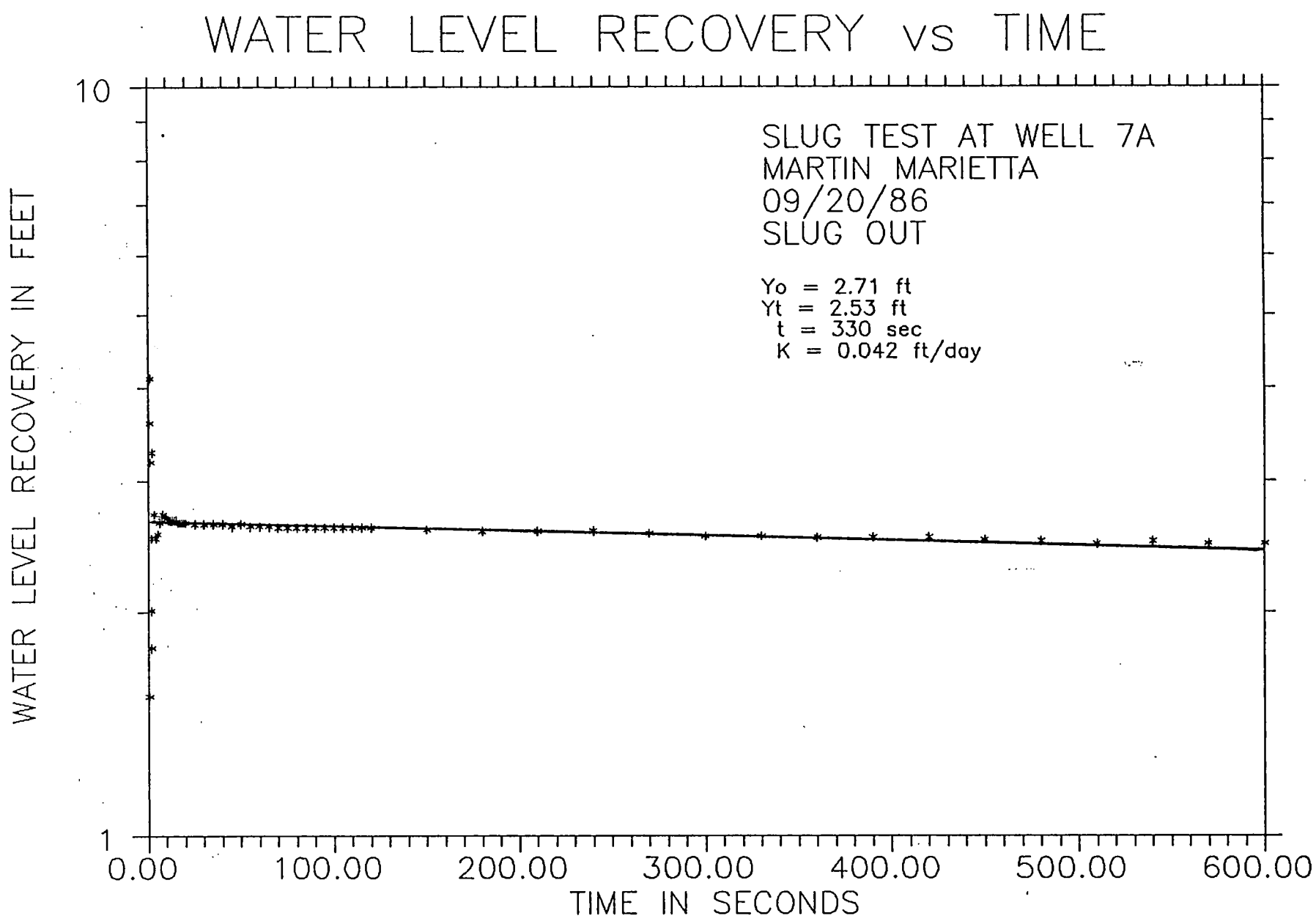


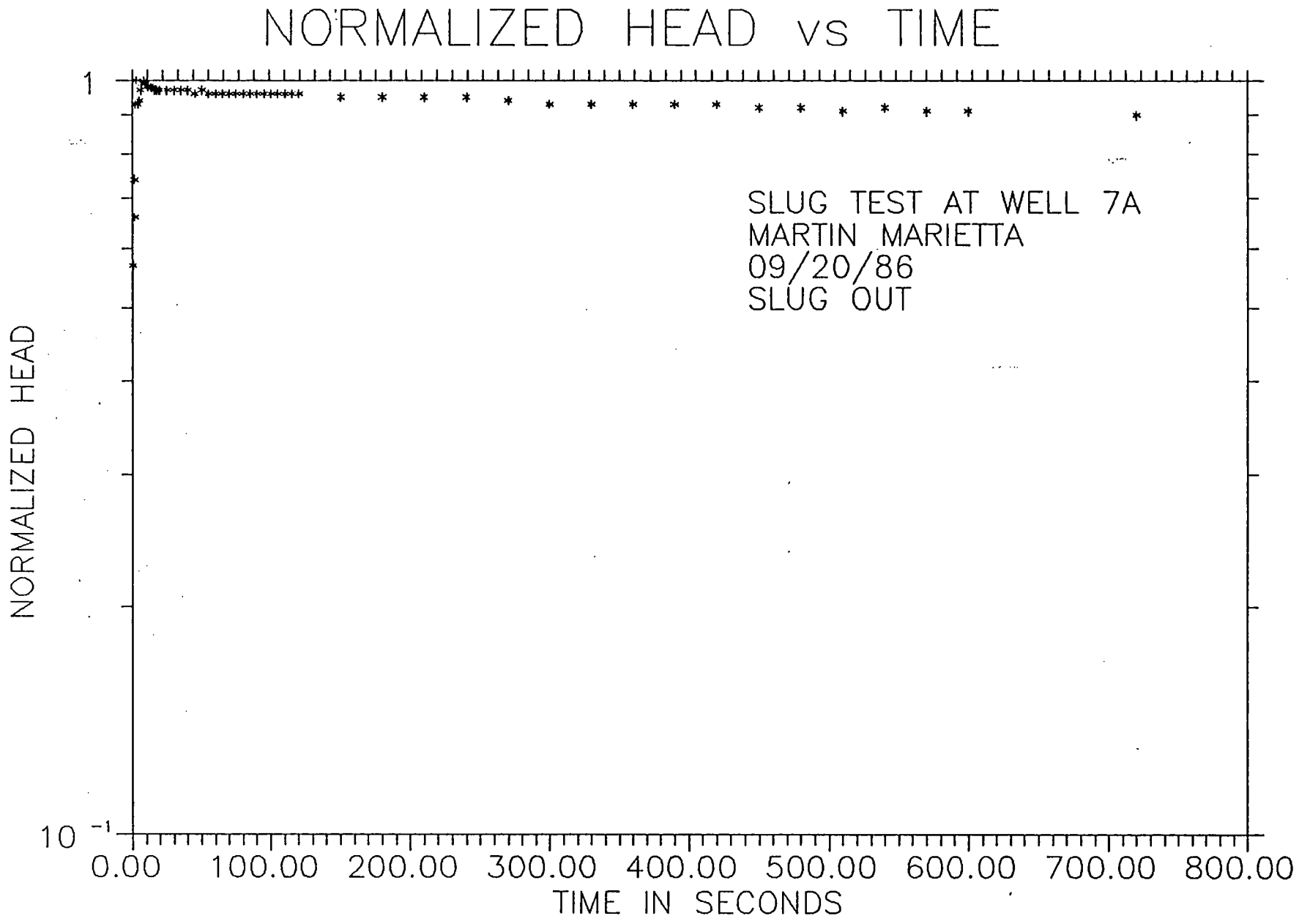
ATTACHMENT G.2

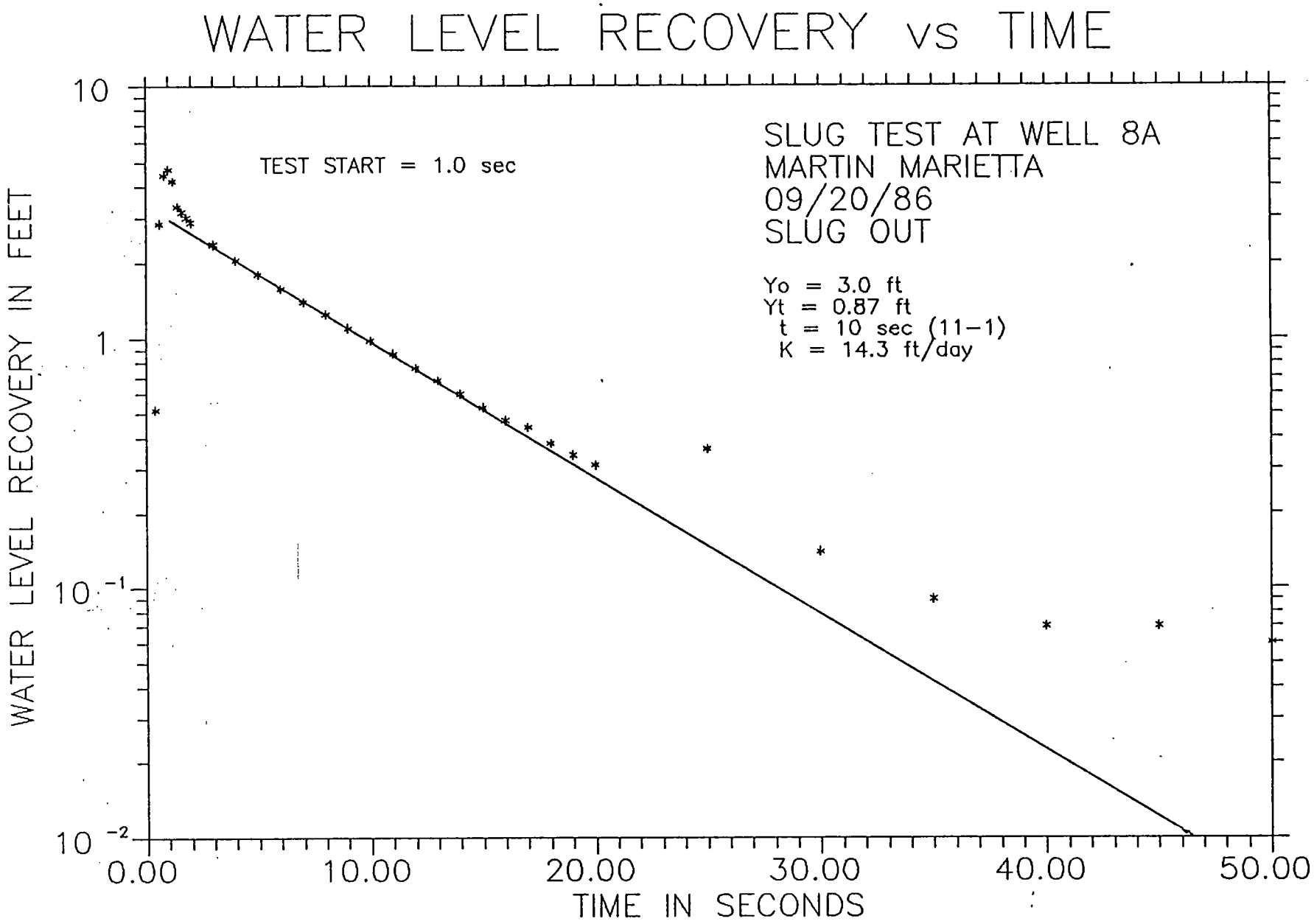
SLUG-TEST ANALYSES

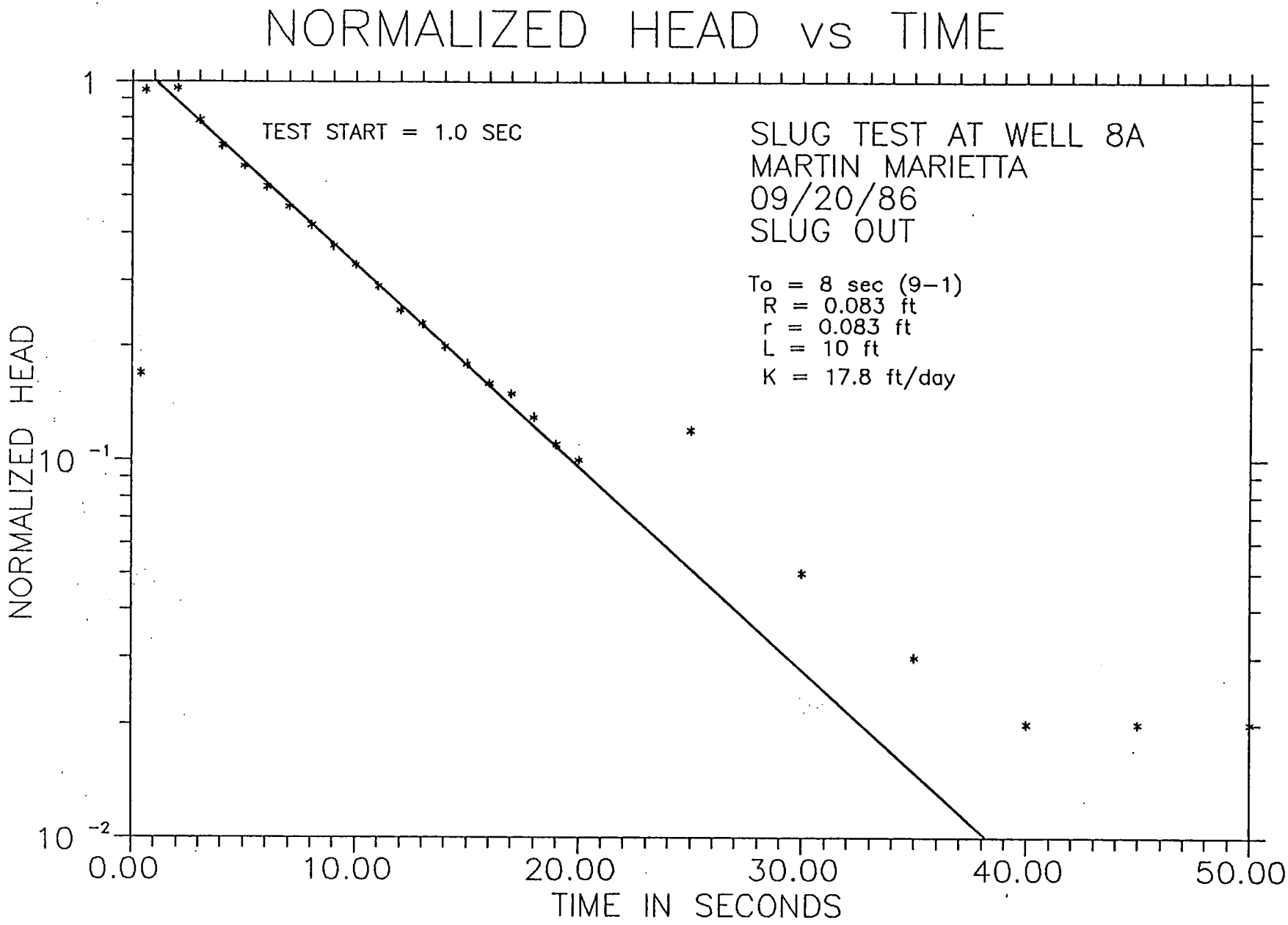

WATER LEVEL RECOVERY vs TIME
SLUG TEST AT WELL 6A
MARTIN MARIETTA
09/20/86
SLUG OUT
TEST START = 2.0 sec
Yo = 2.5 ft
Yt = 0.16 ft
t = 5 sec (7-2)
K = 87 ft/day
WATER LEVEL RECOVERY IN FEET
10
1
10 -1
10 -2
0.00
5.00
10.00
15.00
20.00
25.00
30.00
TIME IN SECONDS

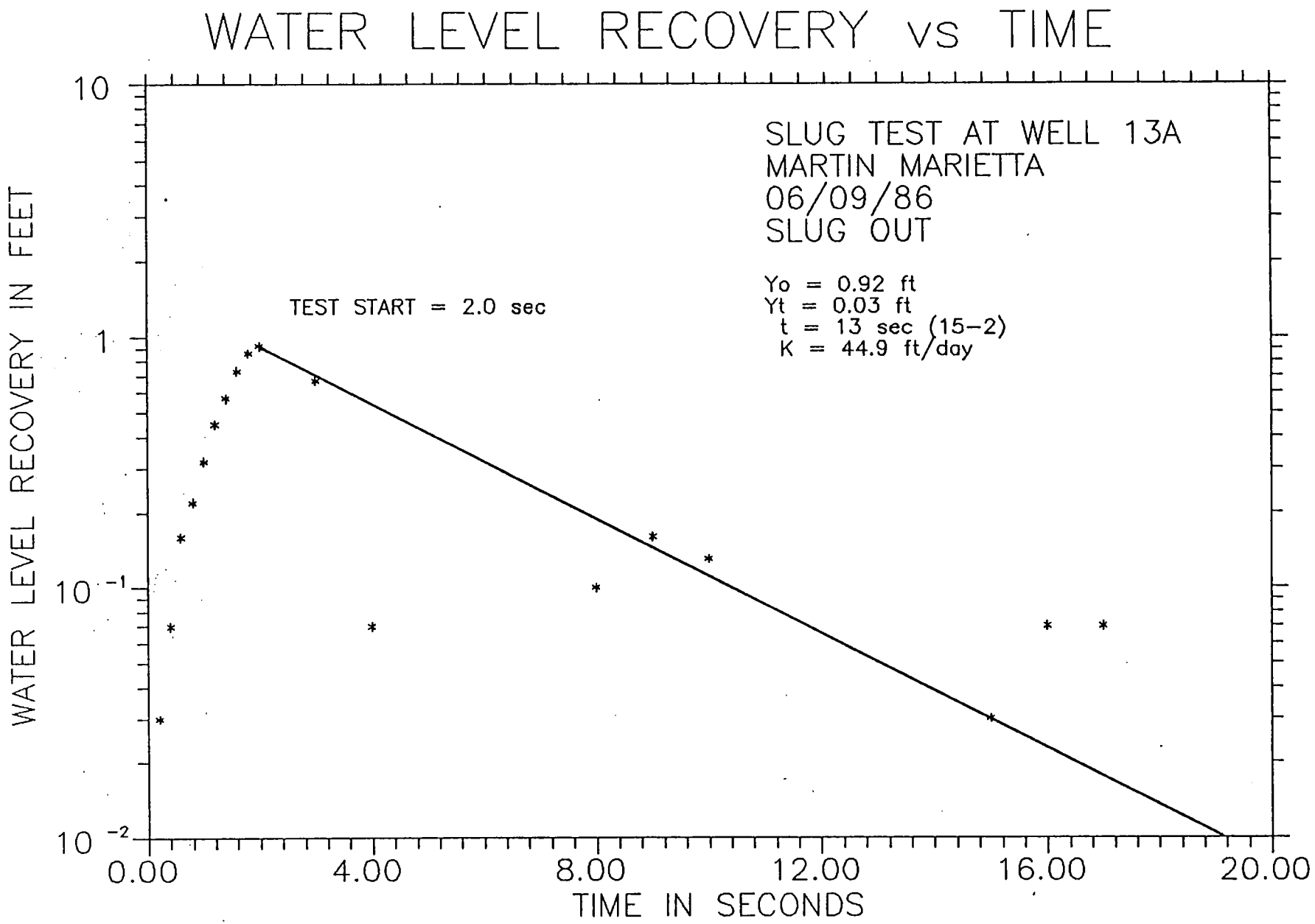

NORMALIZED HEAD vs TIME
TEST START = 2.0 SEC
SLUG TEST AT WELL 6A
MARTIN MARIETTA
09/20/86
SLUG OUT
To = 1.8 sec (3.8-2)
R = 0.083 ft
r = 0.083 ft
L = 5 ft
K = 136 ft/day
NORMALIZED HEAD
1
10 -1
10 -2
0.00
5.00
10.00
15.00
20.00
TIME IN SECONDS

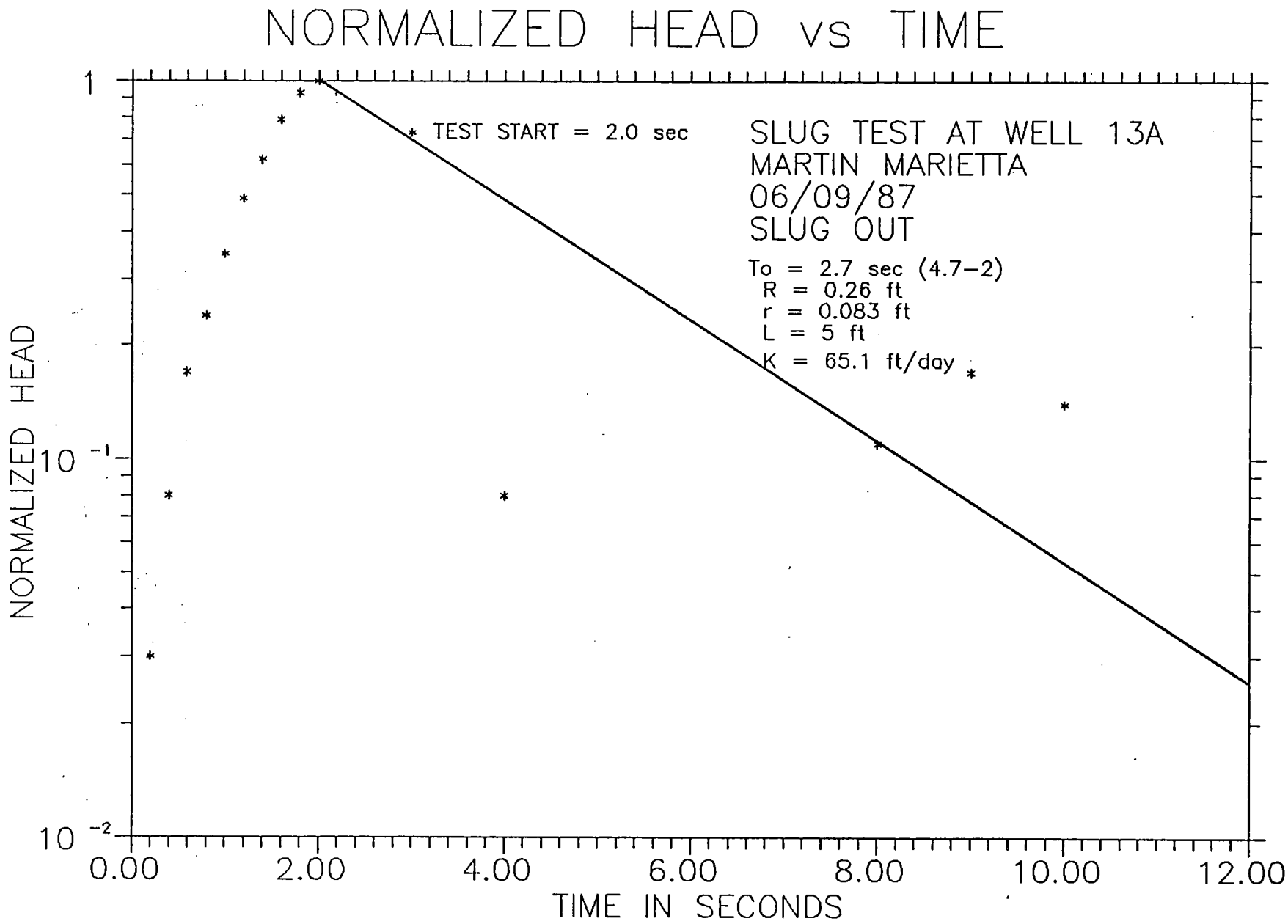

WATER LEVEL RECOVERY vs TIME
SLUG TEST AT WELL 7A
MARTIN MARIETTA
09/20/86
SLUG OUT
Yo = 2.71 ft
Yt = 2.53 ft
t = 330 sec
K = 0.042 ft/day
WATER LEVEL RECOVERY IN FEET
10
1
0.00
100.00
200.00
300.00
400.00
500.00
600.00
TIME IN SECONDS

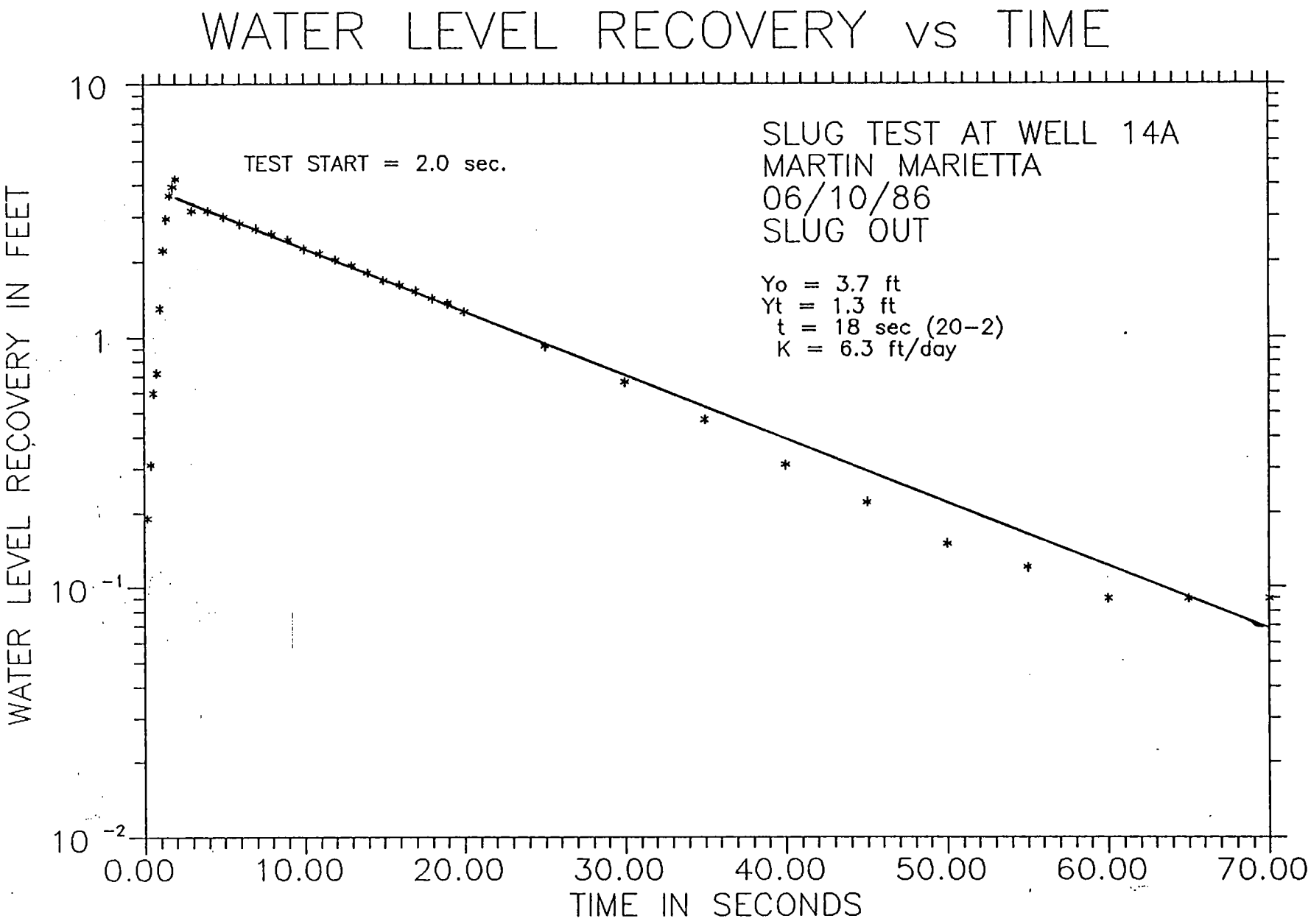

NORMALIZED HEAD vs TIME
1
10 -1
NORMALIZED HEAD
SLUG TEST AT WELL 7A
MARTIN MARIETTA
09/20/86
SLUG OUT
0.00
100.00
200.00
300.00
400.00
500.00
600.00
700.00
800.00
TIME IN SECONDS

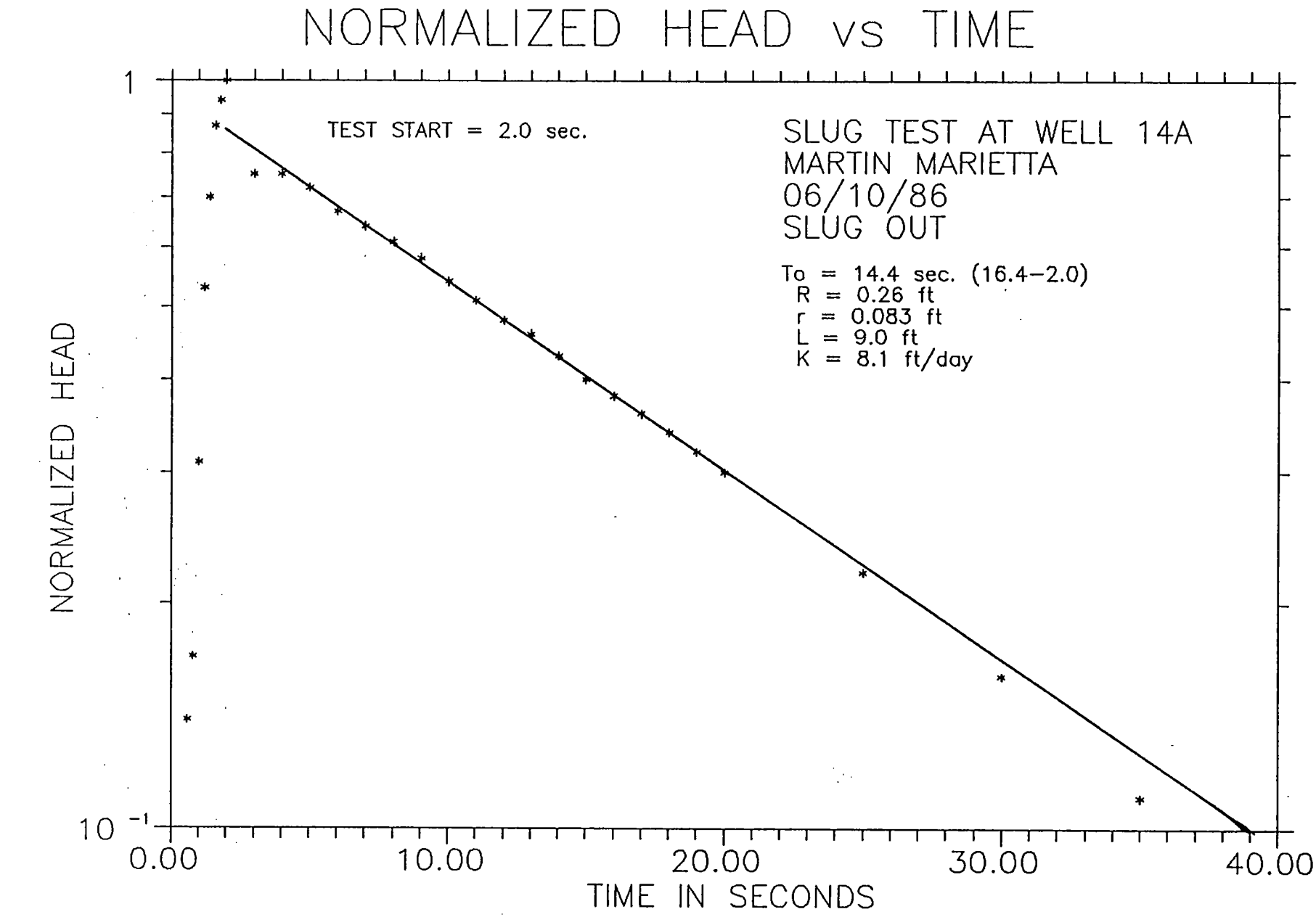

WATER LEVEL RECOVERY vs TIME
TEST START = 1.0 sec
SLUG TEST AT WELL 8A
MARTIN MARIETTA
09/20/86
SLUG OUT
Yo = 3.0 ft
Yt = 0.87 ft
t = 10 sec (11-1)
K = 14.3 ft/day
WATER LEVEL RECOVERY IN FEET
10
1
10 -1
10 -2
0.00
10.00
20.00
30.00
40.00
50.00
TIME IN SECONDS

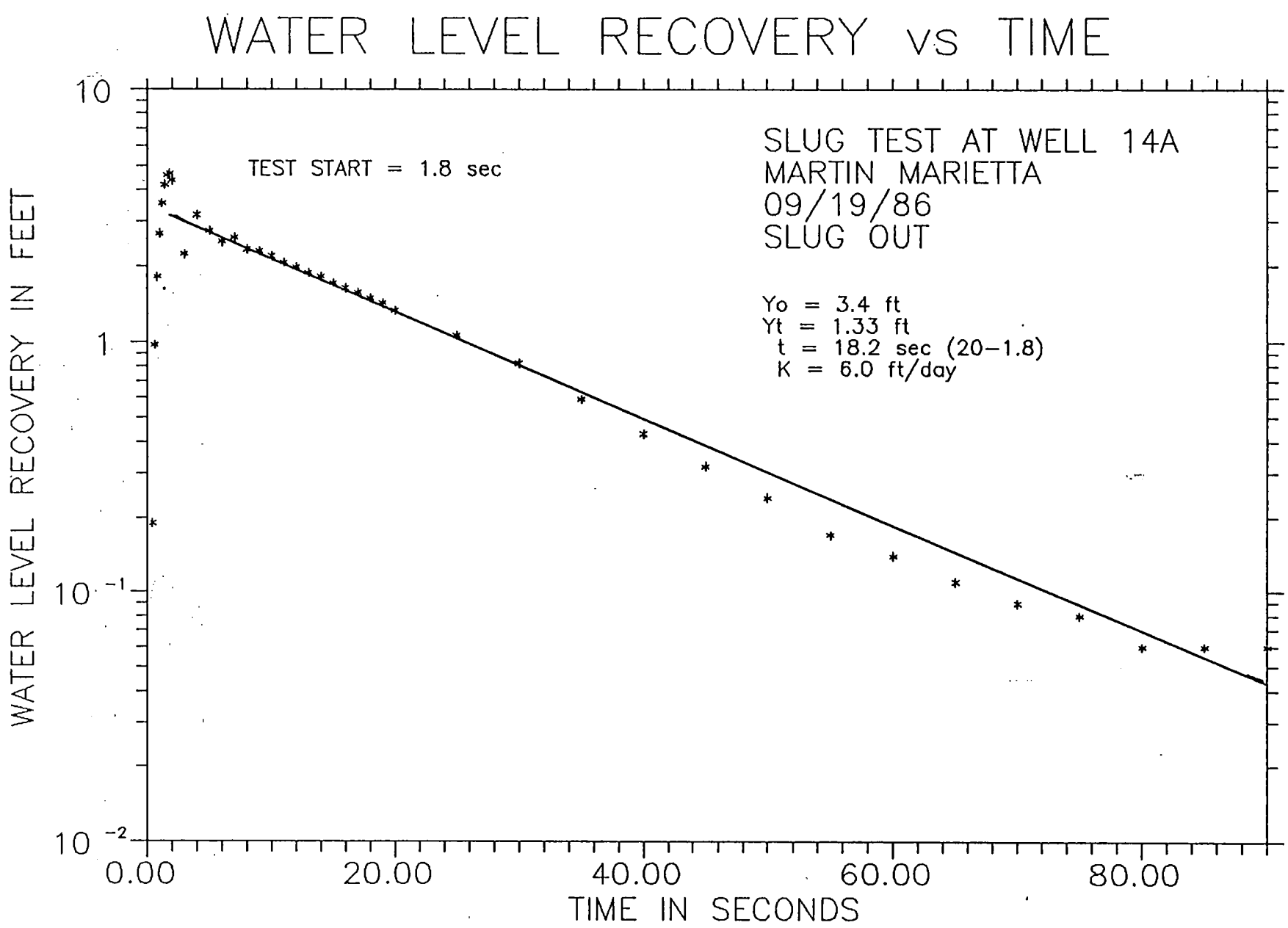

NORMALIZED HEAD vs TIME
TEST START = 1.0 SEC
SLUG TEST AT WELL 8A
MARTIN MARIETTA
09/20/86
SLUG OUT
To = 8 sec (9-1)
R = 0.083 ft
r = 0.083 ft
L = 10 ft
K = 17.8 ft/day
NORMALIZED HEAD
1
10 -1
10 -2
0.00
10.00
20.00
30.00
40.00
50.00
TIME IN SECONDS

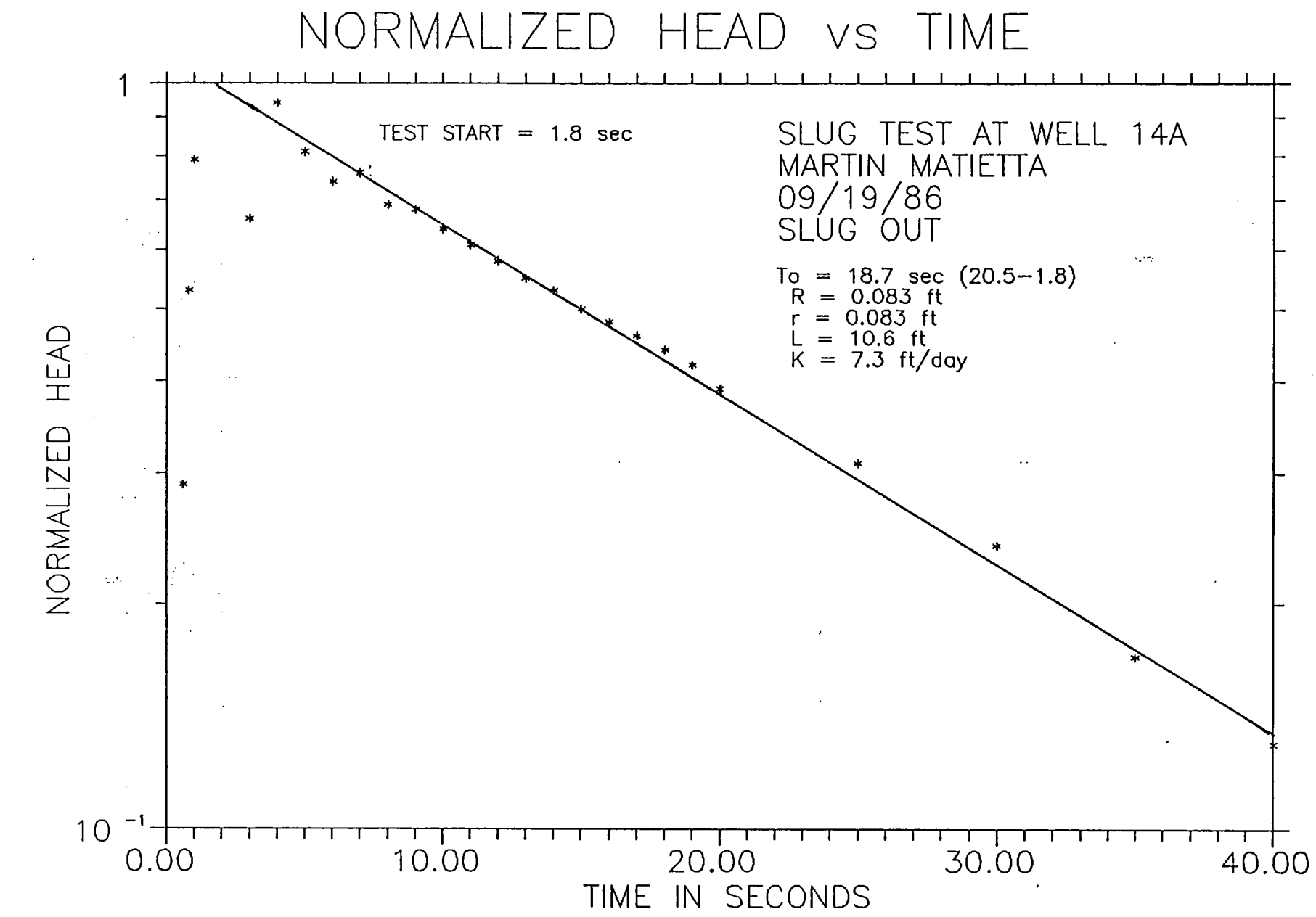

WATER LEVEL RECOVERY vs TIME
SLUG TEST AT WELL 13A
MARTIN MARIETTA
06/09/86
SLUG OUT
Yo = 0.92 ft
Yt = 0.03 ft
t = 13 sec (15-2)
K = 44.9 ft/day
TEST START = 2.0 sec
WATER LEVEL RECOVERY IN FEET
10
1
10 -1
10 -2
0.00
4.00
8.00
12.00
16.00
20.00
TIME IN SECONDS

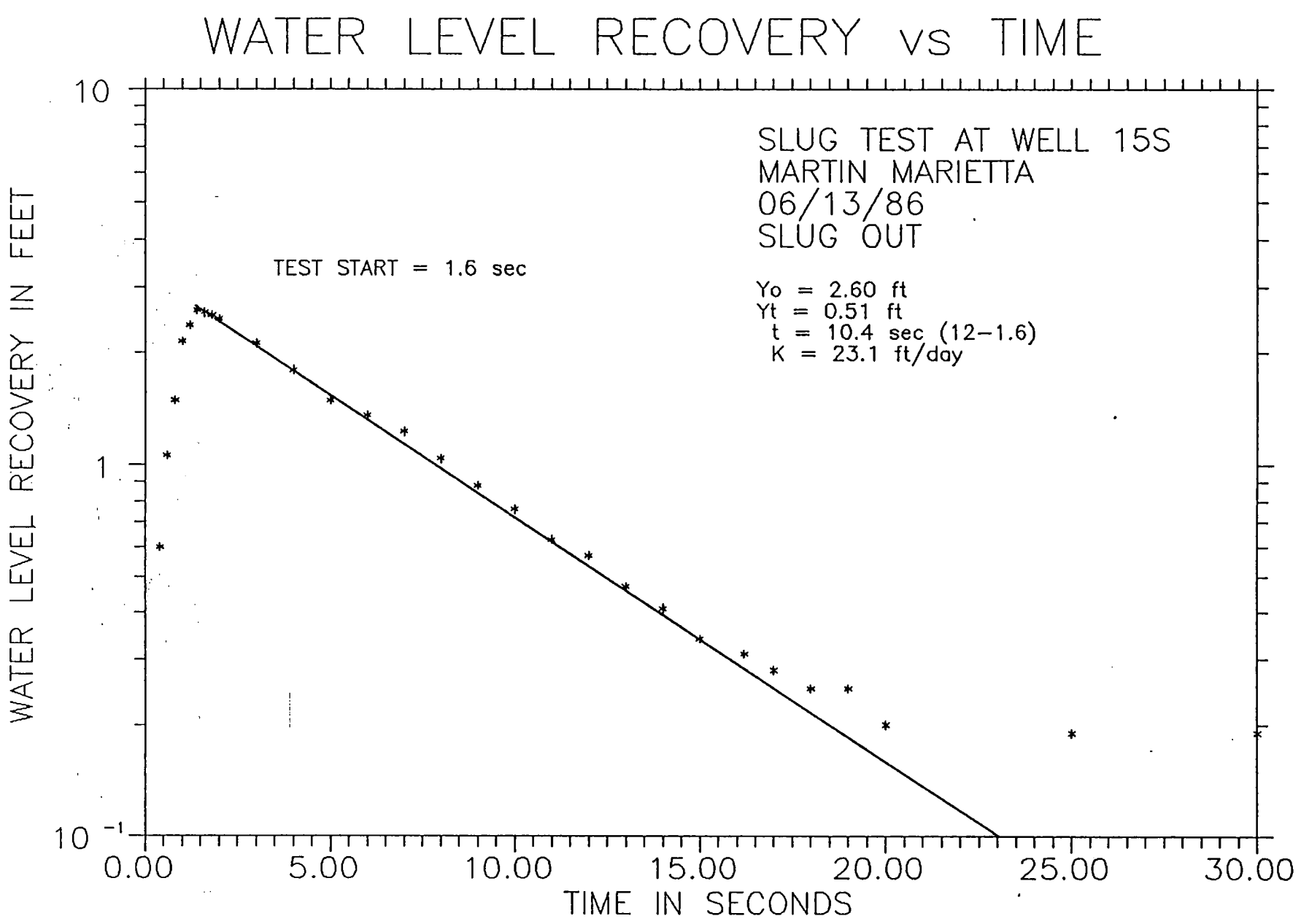

NORMALIZED HEAD vs TIME
TEST START = 2.0 sec
SLUG TEST AT WELL 13A
MARTIN MARIETTA
06/09/87
SLUG OUT
To = 2.7 sec (4.7-2)
R = 0.26 ft
r = 0.083 ft
L = 5 ft
K = 65.1 ft/day
NORMALIZED HEAD
1
10 -1
10 -2
0.00
2.00
4.00
6.00
8.00
10.00
12.00
TIME IN SECONDS

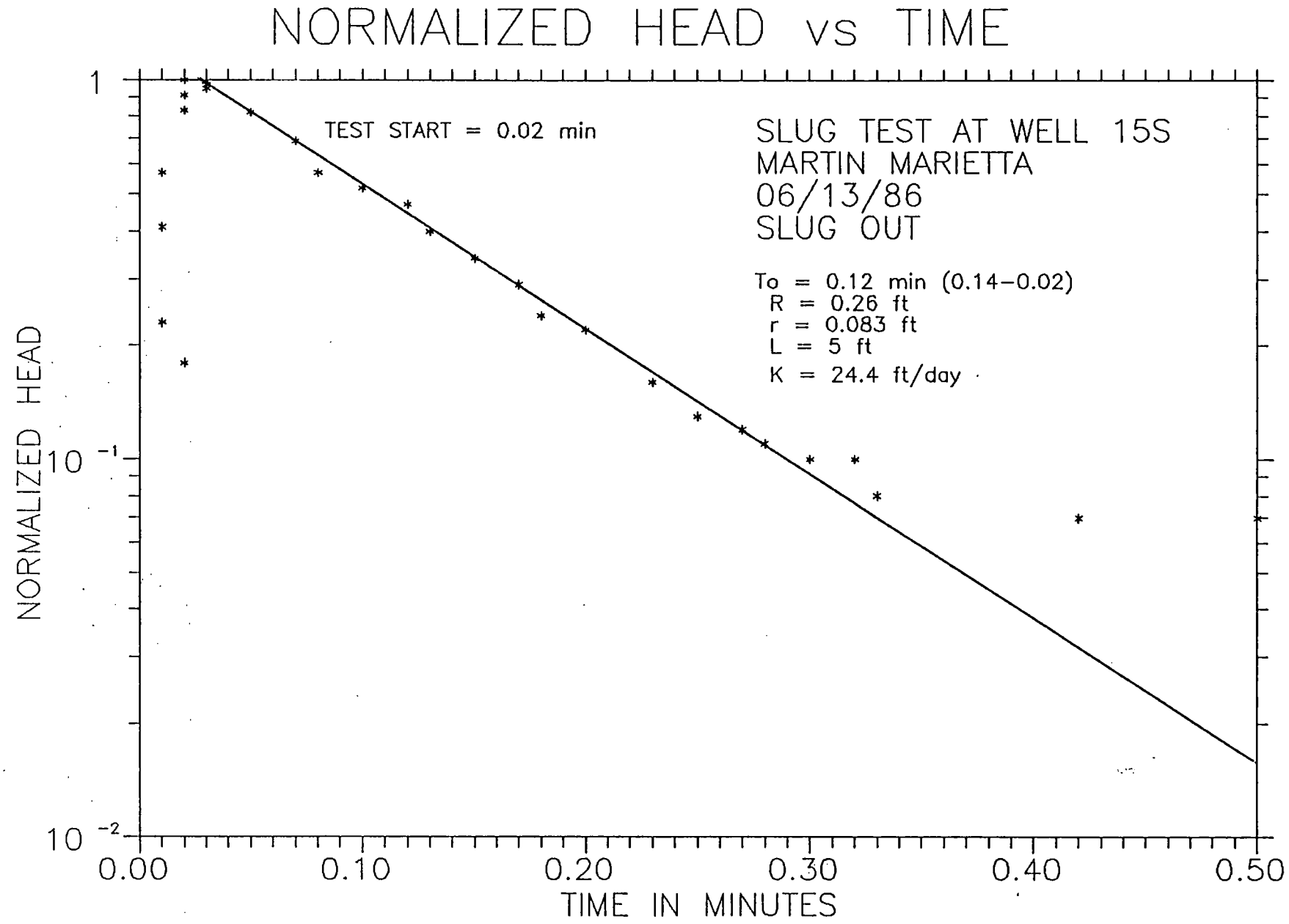

WATER LEVEL RECOVERY vs TIME
TEST START = 2.0 sec.
SLUG TEST AT WELL 14A
MARTIN MARIETTA
06/10/86
SLUG OUT
Yo = 3.7 ft
Yt = 1.3 ft
t = 18 sec (20-2)
K = 6.3 ft/day
WATER LEVEL RECOVERY IN FEET
10
1
10 -1
10 -2
0.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
TIME IN SECONDS

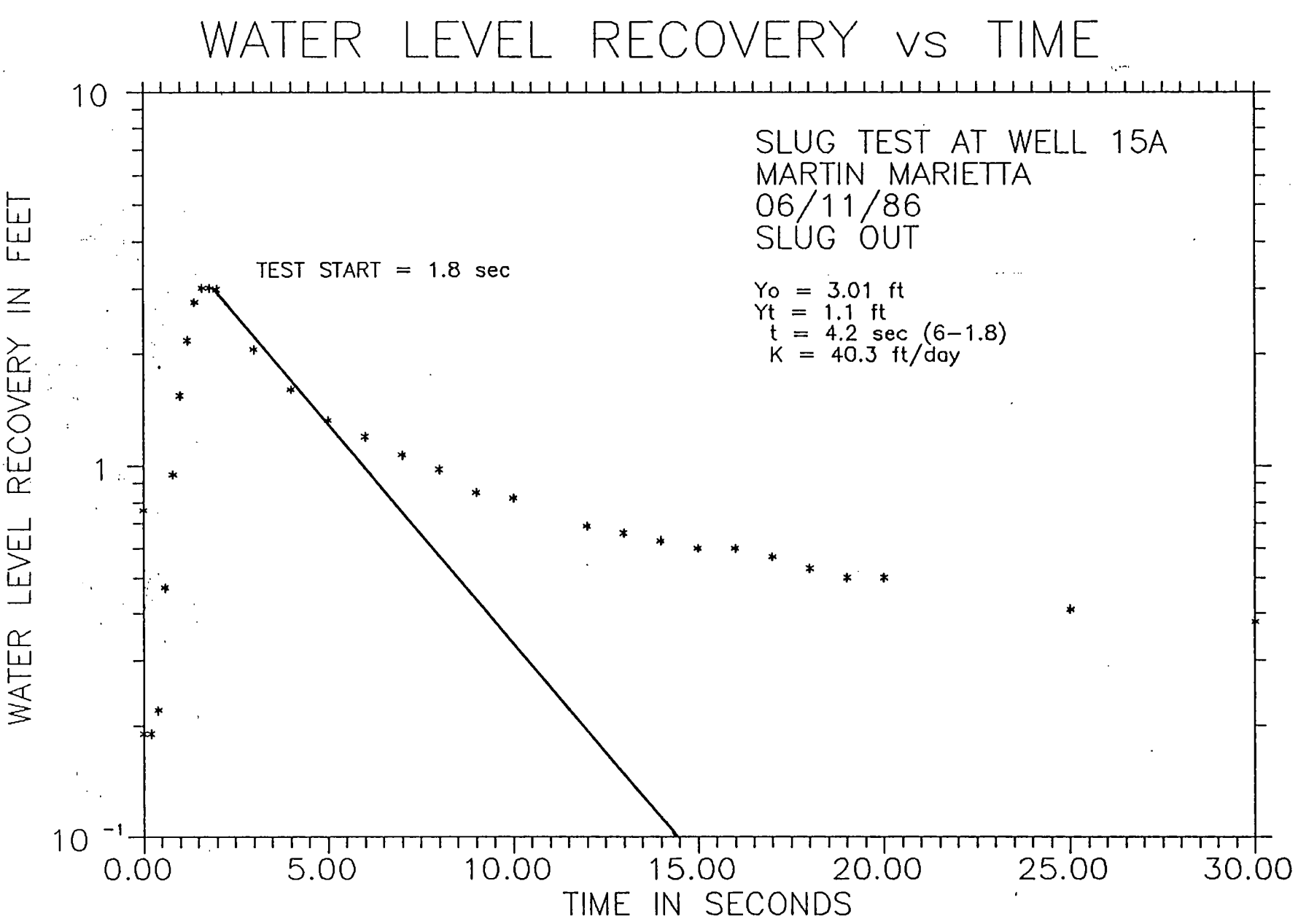

NORMALIZED HEAD vs TIME
TEST START = 2.0 sec.
SLUG TEST AT WELL 14A
MARTIN MARIETTA
06/10/86
SLUG OUT
To = 14.4 sec. (16.4−2.0)
R = 0.26 ft
r = 0.083 ft
L = 9.0 ft
K = 8.1 ft/day
NORMALIZED HEAD
1
10 -1
0.00
10.00
20.00
30.00
40.00
TIME IN SECONDS

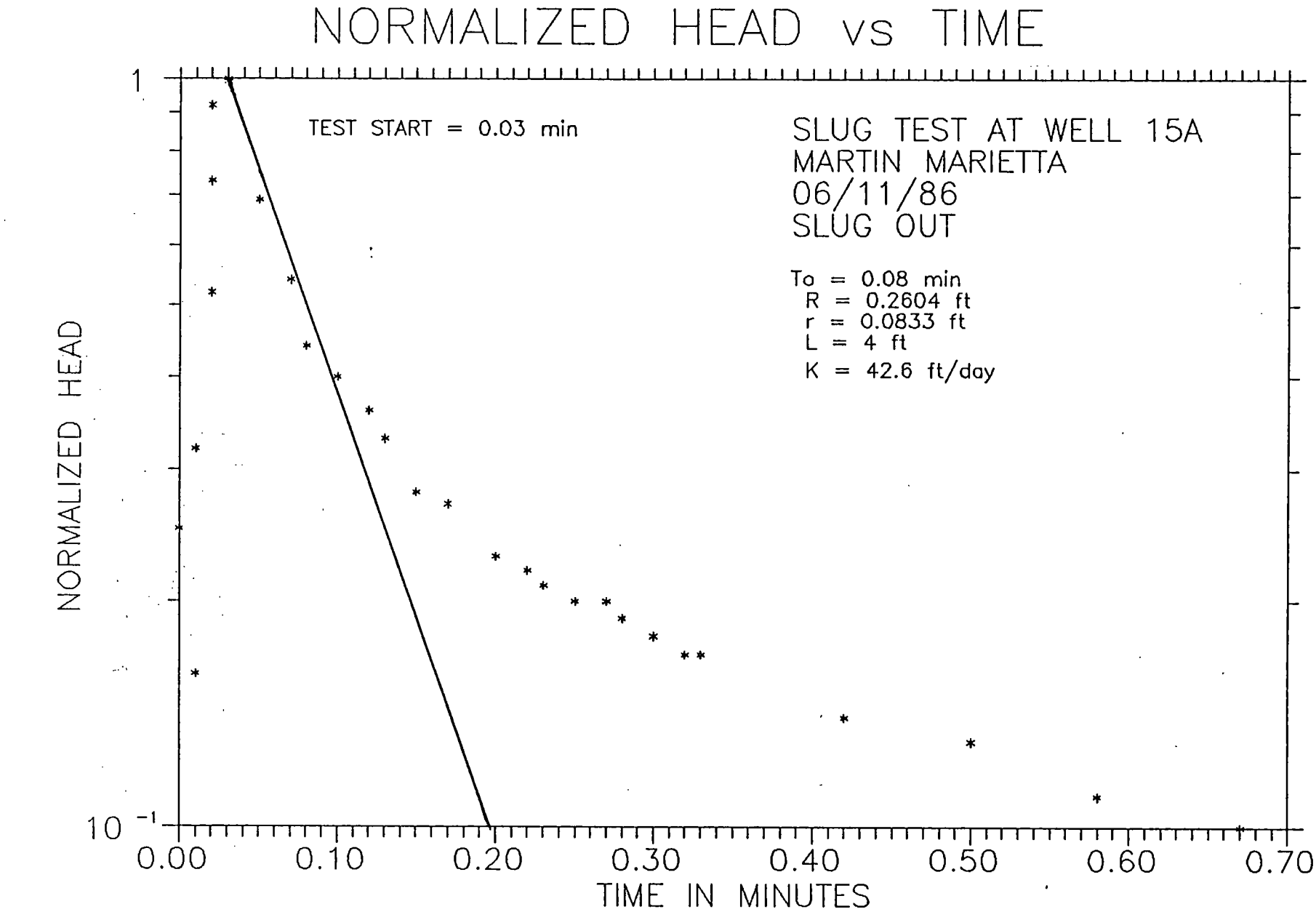

WATER LEVEL RECOVERY vs TIME
TEST START = 1.8 sec
SLUG TEST AT WELL 14A
MARTIN MARIETTA
09/19/86
SLUG OUT
Yo = 3.4 ft
Yt = 1.33 ft
t = 18.2 sec (20-1.8)
K = 6.0 ft/day
WATER LEVEL RECOVERY IN FEET
10
1
10 -1
10 -2
0.00
20.00
40.00
60.00
80.00
TIME IN SECONDS

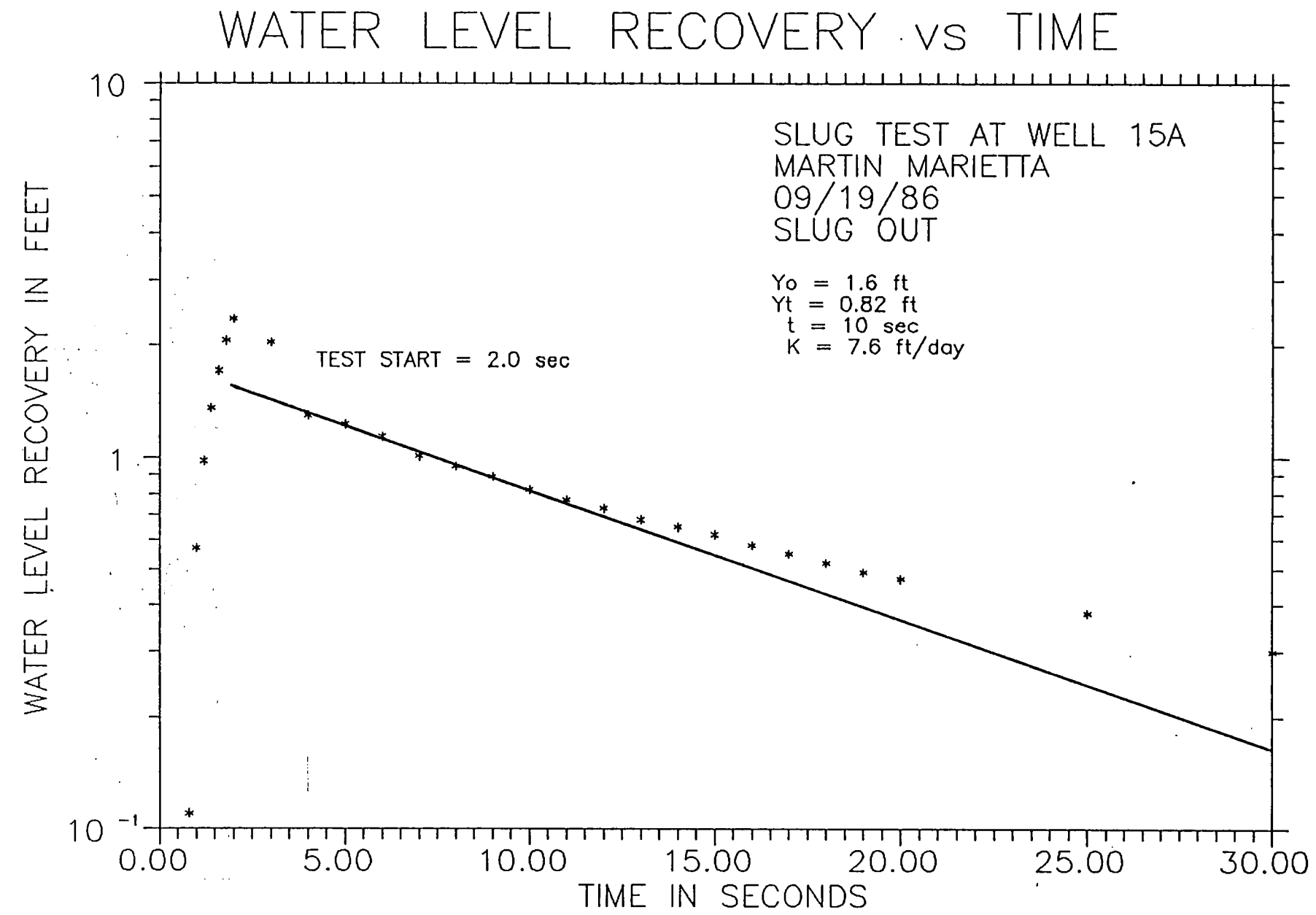

NORMALIZED HEAD vs TIME
TEST START = 1.8 sec
SLUG TEST AT WELL 14A
MARTIN MATIETTA
09/19/86
SLUG OUT
To = 18.7 sec (20.5-1.8)
R = 0.083 ft
r = 0.083 ft
L = 10.6 ft
K = 7.3 ft/day
NORMALIZED HEAD
1
10 -1
0.00
10.00
20.00
30.00
40.00
TIME IN SECONDS

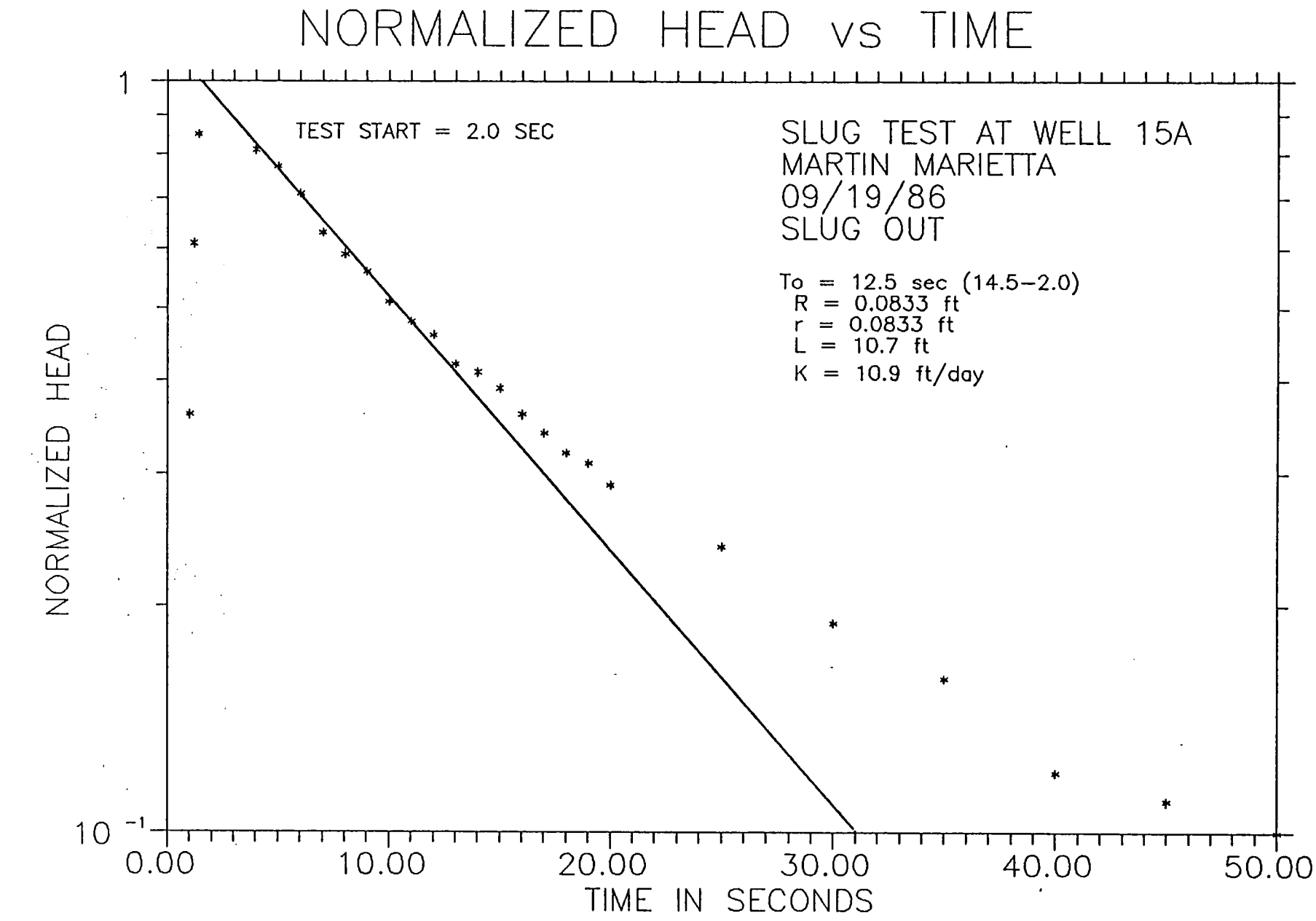

WATER LEVEL RECOVERY vs TIME
SLUG TEST AT WELL 15S
MARTIN MARIETTA
06/13/86
SLUG OUT
TEST START = 1.6 sec
Yo = 2.60 ft
Yt = 0.51 ft
t = 10.4 sec (12-1.6)
K = 23.1 ft/day
WATER LEVEL RECOVERY IN FEET
10
1
10 -1
0.00
5.00
10.00
15.00
20.00
25.00
30.00
TIME IN SECONDS

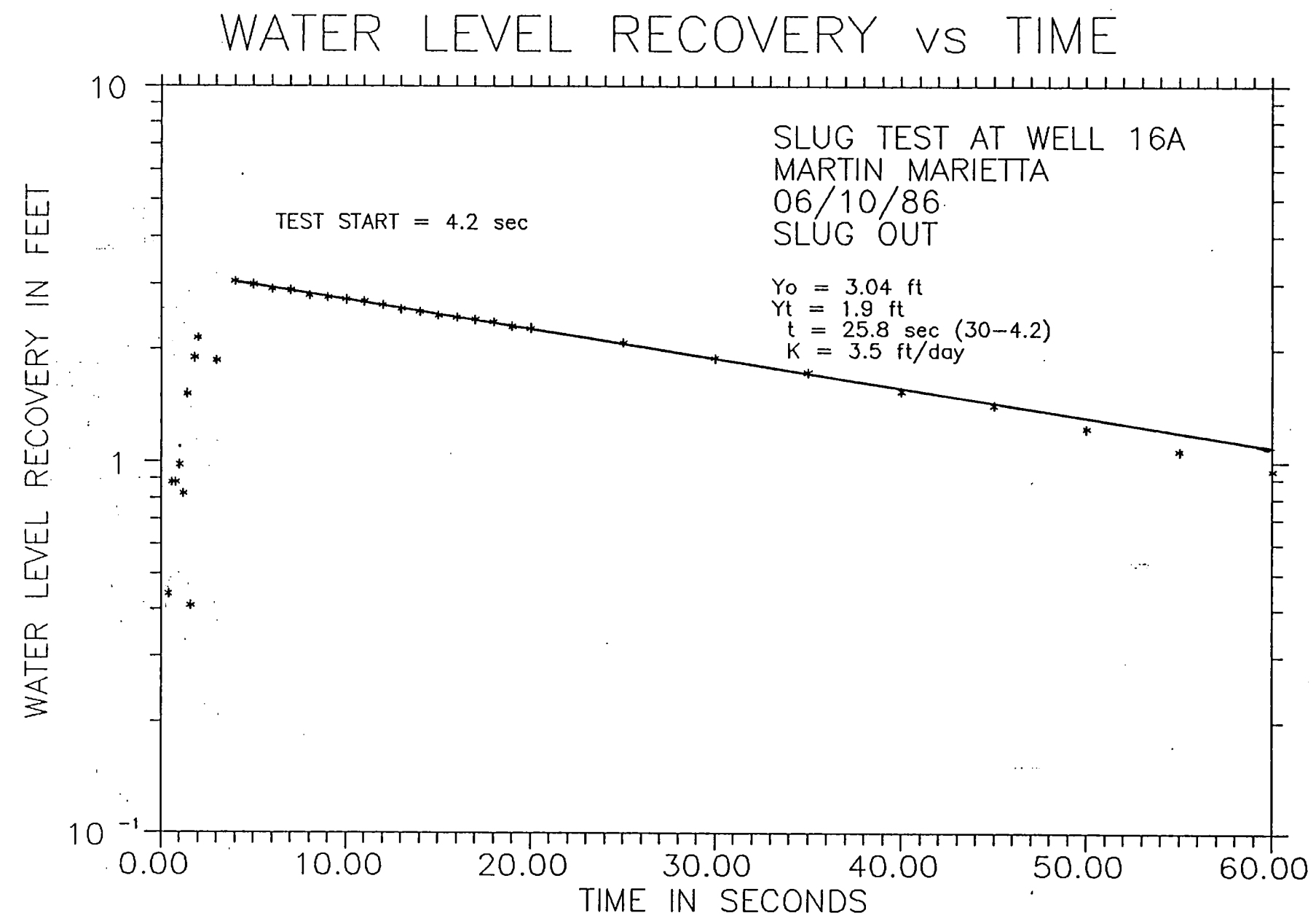

NORMALIZED HEAD vs TIME
TEST START = 0.02 min
SLUG TEST AT WELL 15S
MARTIN MARIETTA
06/13/86
SLUG OUT
To = 0.12 min (0.14-0.02)
R = 0.26 ft
r = 0.083 ft
L = 5 ft
K = 24.4 ft/day
NORMALIZED HEAD
1
10 -1
10 -2
0.00
0.10
0.20
0.30
0.40
0.50
TIME IN MINUTES

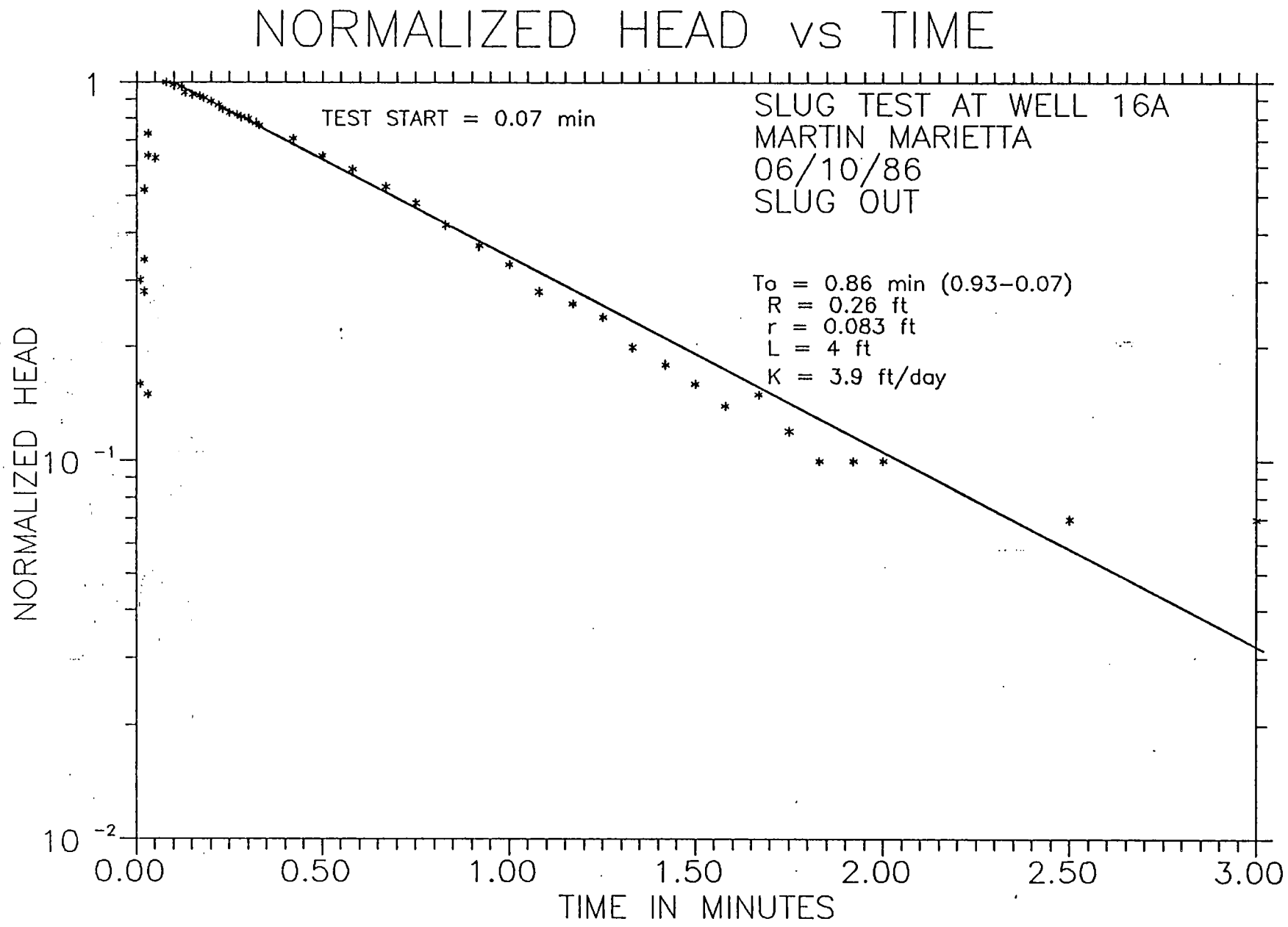

WATER LEVEL RECOVERY vs TIME
SLUG TEST AT WELL 15A
MARTIN MARIETTA
06/11/86
SLUG OUT
TEST START = 1.8 sec
Yo = 3.01 ft
Yt = 1.1 ft
t = 4.2 sec (6-1.8)
K = 40.3 ft/day
WATER LEVEL RECOVERY IN FEET
TIME IN SECONDS
10
1
10 -1
0.00
5.00
10.00
15.00
20.00
25.00
30.00

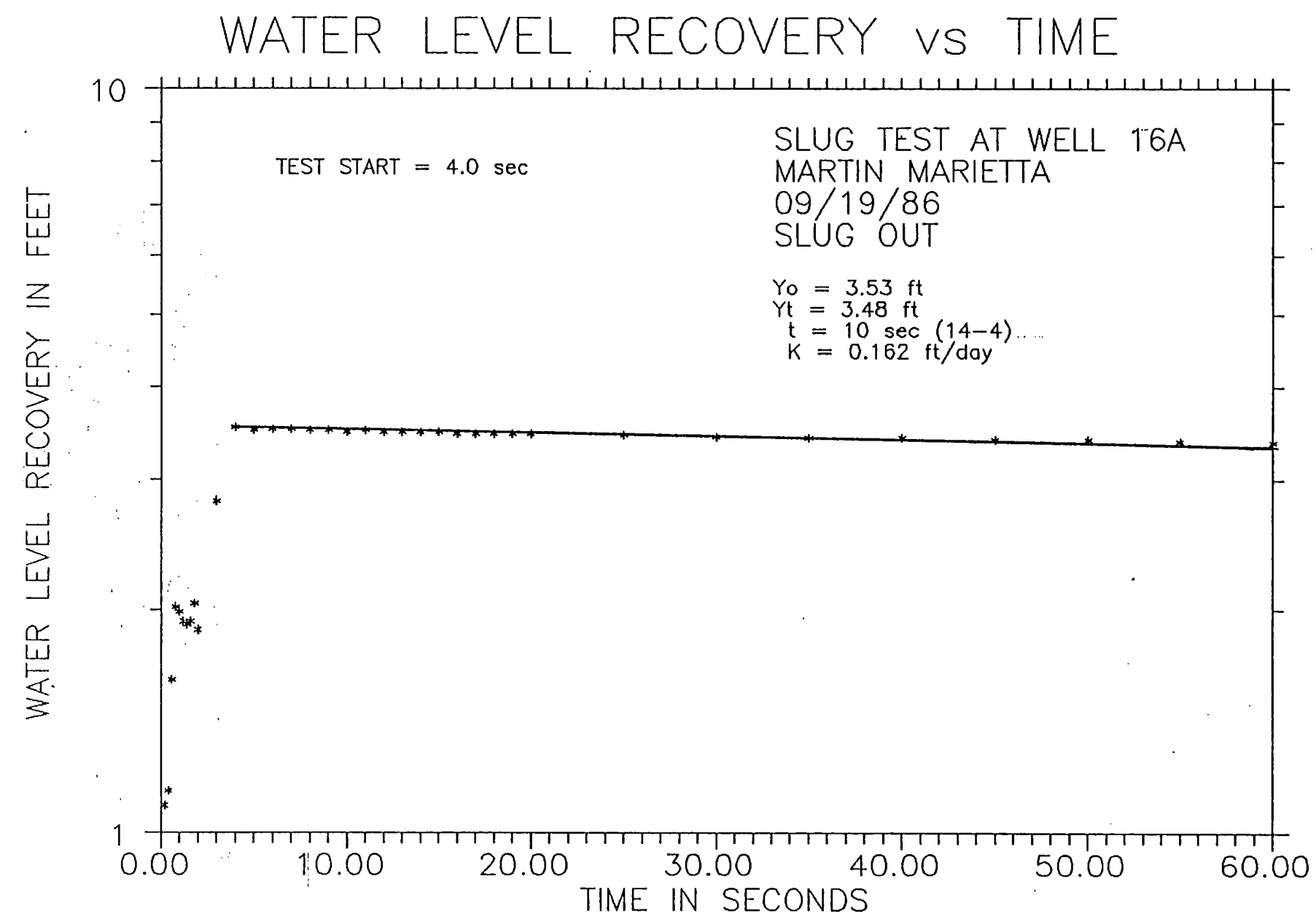

NORMALIZED HEAD vs TIME
TEST START = 0.03 min
SLUG TEST AT WELL 15A
MARTIN MARIETTA
06/11/86
SLUG OUT
To = 0.08 min
R = 0.2604 ft
r = 0.0833 ft
L = 4 ft
K = 42.6 ft/day
NORMALIZED HEAD
1
10 -1
0.00
0.10
0.20
0.30
0.40
0.50
0.60
0.70
TIME IN MINUTES

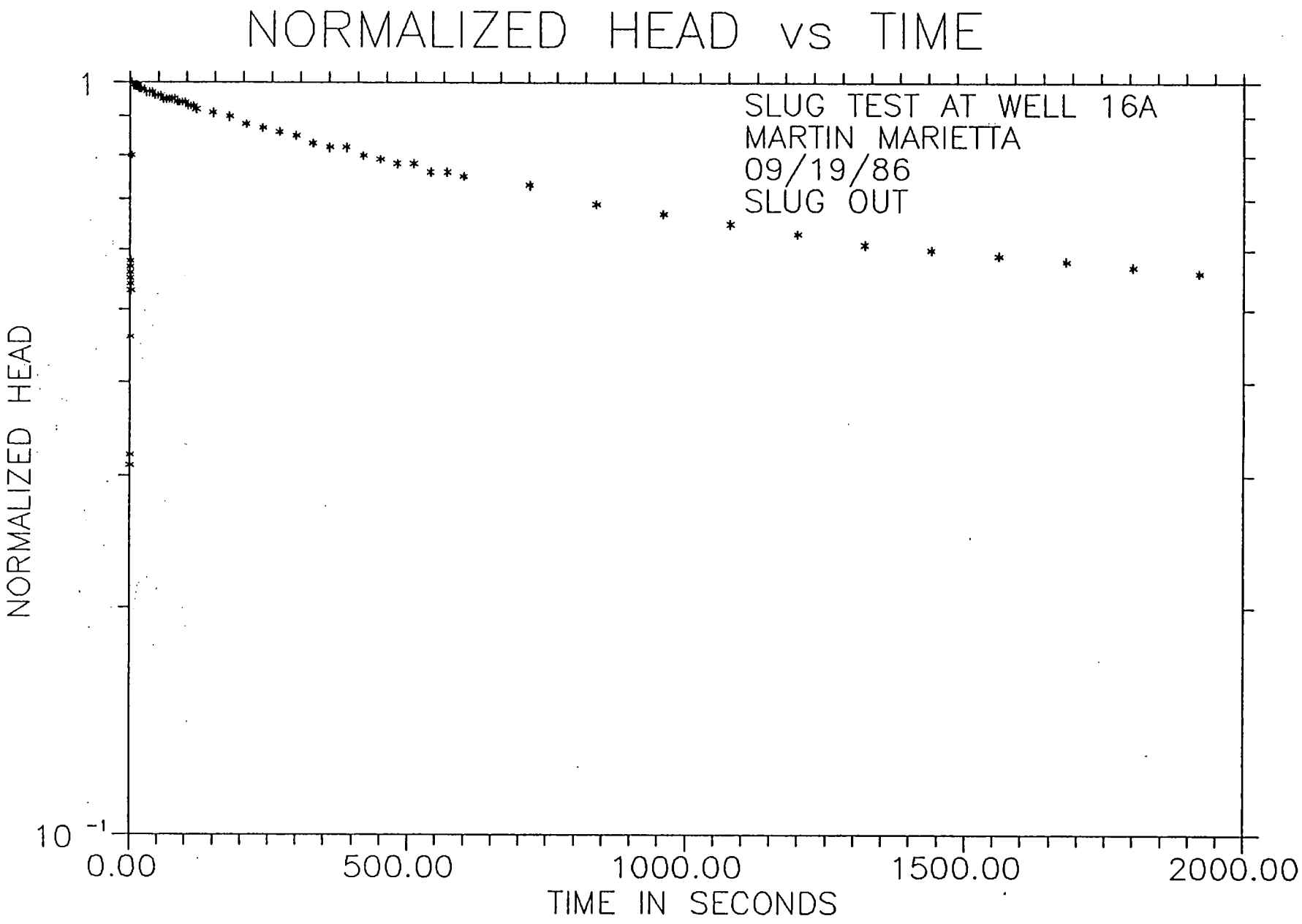

WATER LEVEL RECOVERY vs TIME
SLUG TEST AT WELL 15A
MARTIN MARIETTA
09/19/86
SLUG OUT
Yo = 1.6 ft
Yt = 0.82 ft
t = 10 sec
K = 7.6 ft/day
TEST START = 2.0 sec
WATER LEVEL RECOVERY IN FEET
10
1
10 -1
0.00
5.00
10.00
15.00
20.00
25.00
30.00
TIME IN SECONDS

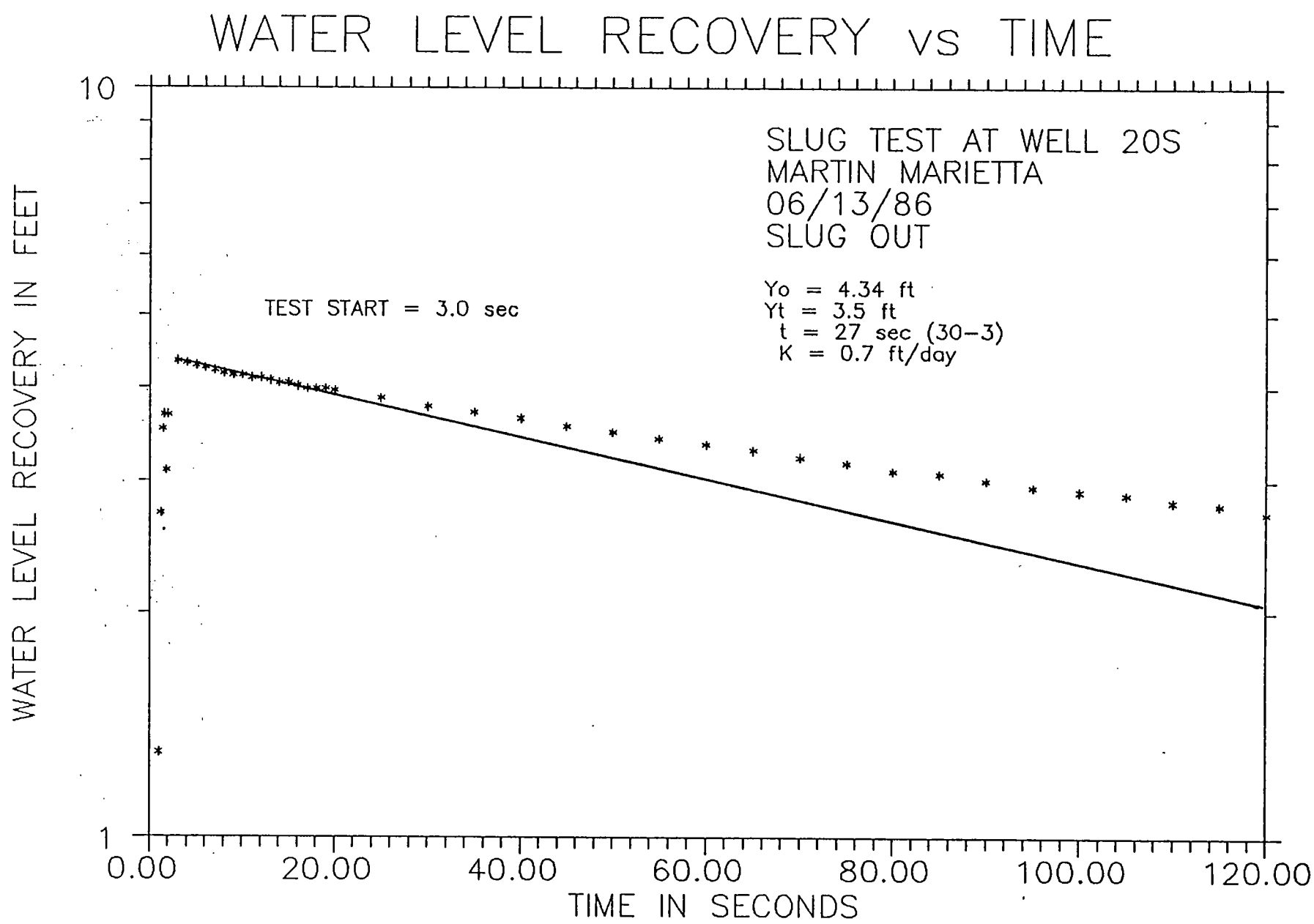

NORMALIZED HEAD vs TIME
TEST START = 2.0 SEC
SLUG TEST AT WELL 15A
MARTIN MARIETTA
09/19/86
SLUG OUT
To = 12.5 sec (14.5-2.0)
R = 0.0833 ft
r = 0.0833 ft
L = 10.7 ft
K = 10.9 ft/day
NORMALIZED HEAD
1
10 -1
0.00
10.00
20.00
30.00
40.00
50.00
TIME IN SECONDS

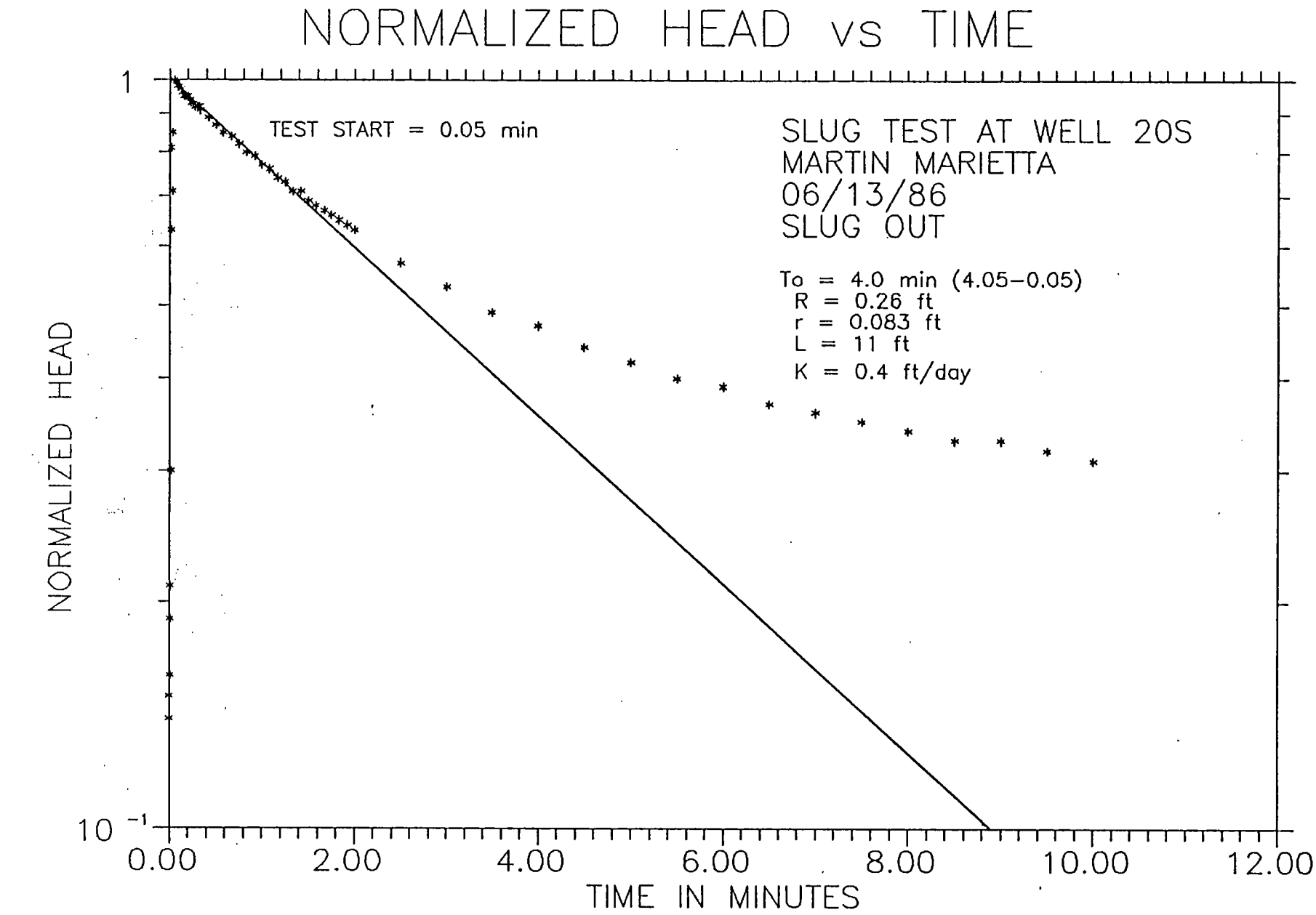

WATER LEVEL RECOVERY vs TIME
SLUG TEST AT WELL 16A
MARTIN MARIETTA
06/10/86
SLUG OUT
TEST START = 4.2 sec
Yo = 3.04 ft
Yt = 1.9 ft
t = 25.8 sec (30-4.2)
K = 3.5 ft/day
WATER LEVEL RECOVERY IN FEET
10
1
10 -1
0.00
10.00
20.00
30.00
40.00
50.00
60.00
TIME IN SECONDS

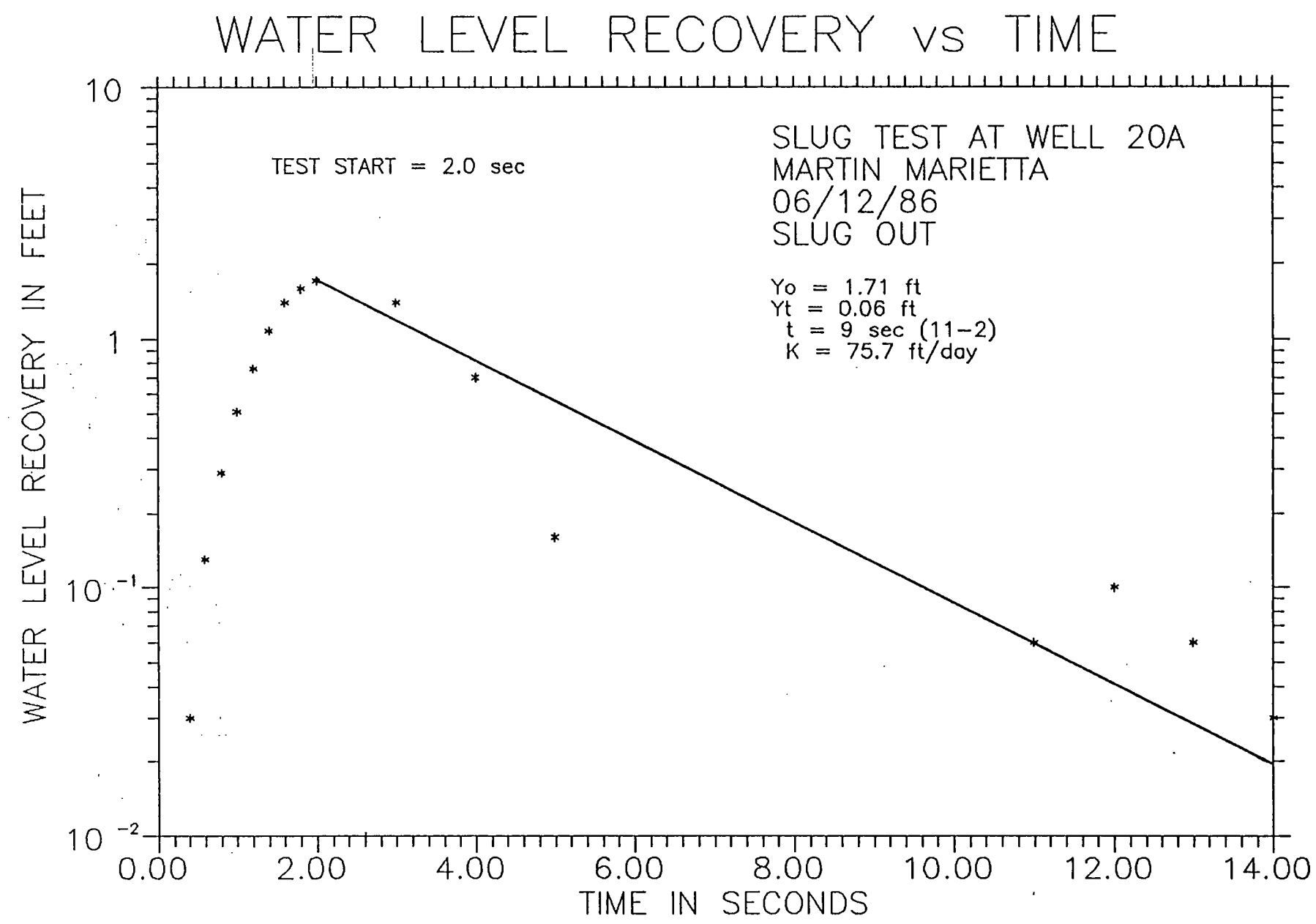

NORMALIZED HEAD vs TIME
TEST START = 0.07 min
SLUG TEST AT WELL 16A
MARTIN MARIETTA
06/10/86
SLUG OUT
To = 0.86 min (0.93-0.07)
R = 0.26 ft
r = 0.083 ft
L = 4 ft
K = 3.9 ft/day
NORMALIZED HEAD
1
10 -1
10 -2
0.00
0.50
1.00
1.50
2.00
2.50
3.00
TIME IN MINUTES

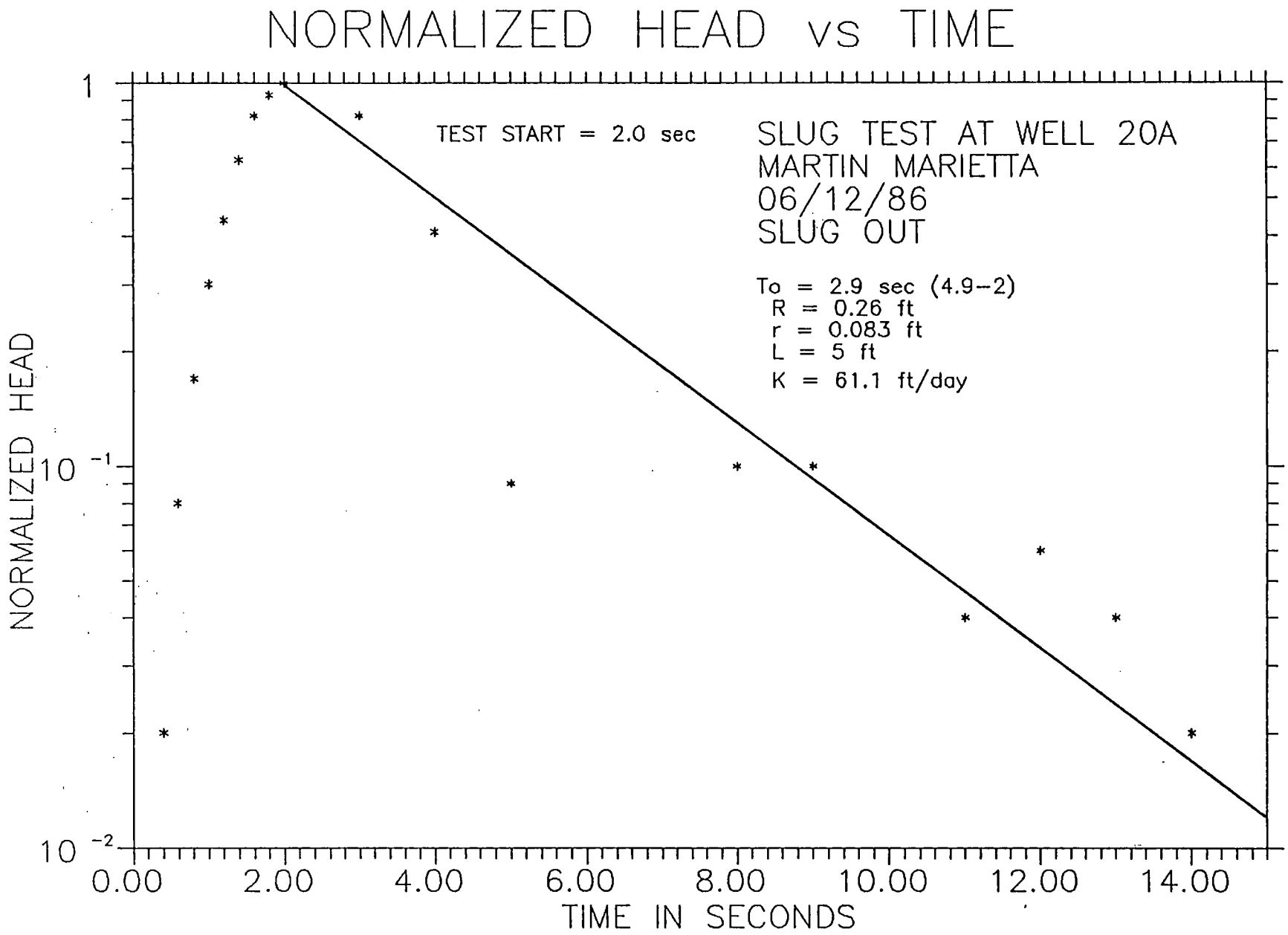

WATER LEVEL RECOVERY vs TIME
TEST START = 4.0 sec
SLUG TEST AT WELL 16A
MARTIN MARIETTA
09/19/86
SLUG OUT
Yo = 3.53 ft
Yt = 3.48 ft
t = 10 sec (14-4)
K = 0.162 ft/day
WATER LEVEL RECOVERY IN FEET
10
1
0.00
10.00
20.00
30.00
40.00
50.00
60.00
TIME IN SECONDS


NORMALIZED HEAD vs TIME
SLUG TEST AT WELL 16A
MARTIN MARIETTA
09/19/86
SLUG OUT
NORMALIZED HEAD
1
10 -1
0.00
500.00
1000.00
1500.00
2000.00
TIME IN SECONDS


WATER LEVEL RECOVERY vs TIME
SLUG TEST AT WELL 20S
MARTIN MARIETTA
06/13/86
SLUG OUT
Yo = 4.34 ft
Yt = 3.5 ft
t = 27 sec (30-3)
K = 0.7 ft/day
TEST START = 3.0 sec
WATER LEVEL RECOVERY IN FEET
TIME IN SECONDS
10
1
0.00
20.00
40.00
60.00
80.00
100.00
120.00

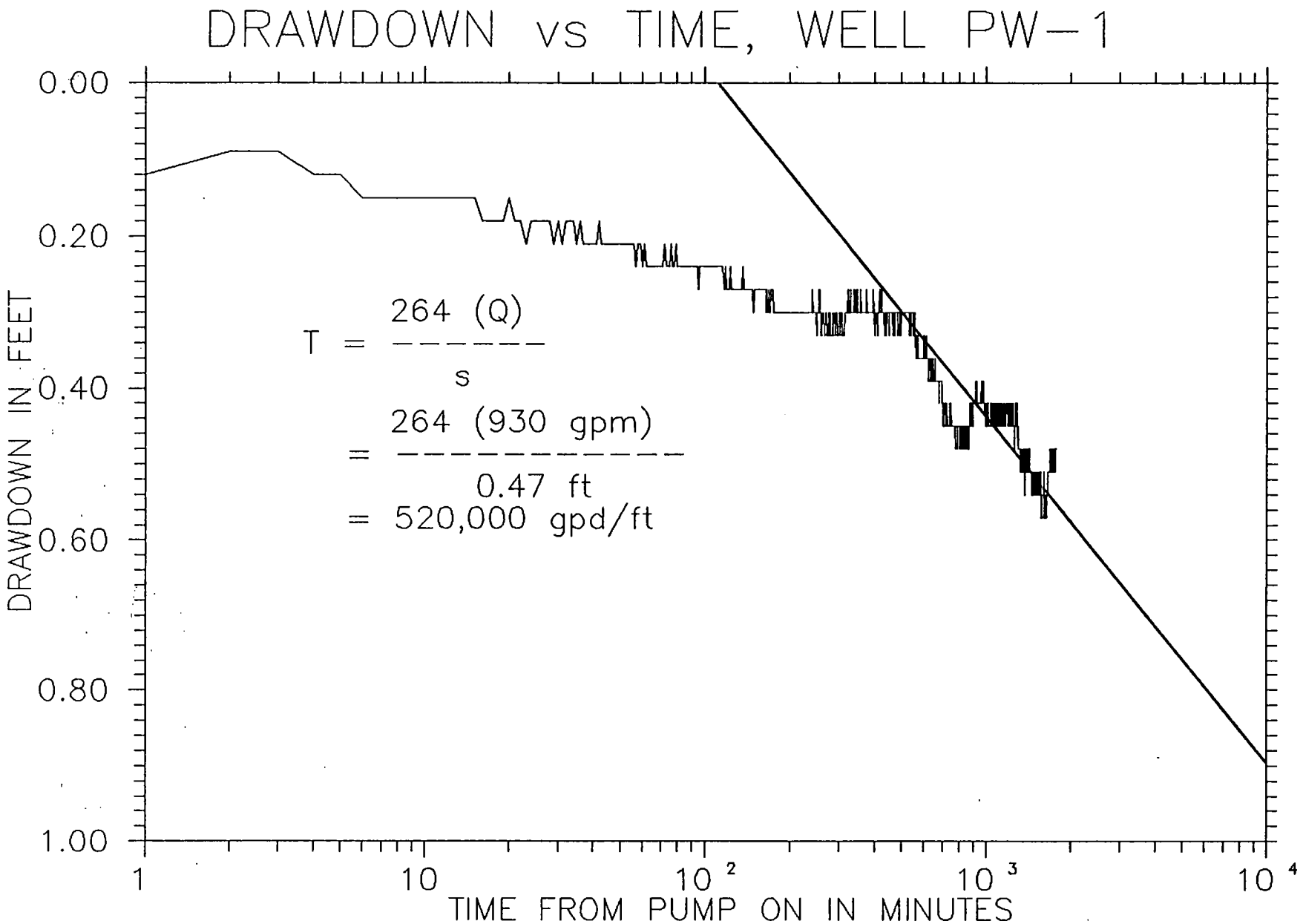

NORMALIZED HEAD vs TIME
TEST START = 0.05 min
SLUG TEST AT WELL 20S
MARTIN MARIETTA
06/13/86
SLUG OUT
To = 4.0 min (4.05-0.05)
R = 0.26 ft
r = 0.083 ft
L = 11 ft
K = 0.4 ft/day
NORMALIZED HEAD
1
10 -1
0.00
2.00
4.00
6.00
8.00
10.00
12.00
TIME IN MINUTES


WATER LEVEL RECOVERY vs TIME
SLUG TEST AT WELL 20A
MARTIN MARIETTA
06/12/86
SLUG OUT
TEST START = 2.0 sec
Yo = 1.71 ft
Yt = 0.06 ft
t = 9 sec (11-2)
K = 75.7 ft/day
WATER LEVEL RECOVERY IN FEET
10
1
10 -1
10 -2
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
TIME IN SECONDS


NORMALIZED HEAD vs TIME
TEST START = 2.0 sec
SLUG TEST AT WELL 20A
MARTIN MARIETTA
06/12/86
SLUG OUT
To = 2.9 sec (4.9-2)
R = 0.26 ft
r = 0.083 ft
L = 5 ft
K = 61.1 ft/day
NORMALIZED HEAD
1
10 -1
10 -2
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
TIME IN SECONDS

ATTACHMENT G.3

PUMP-TEST ANALYSIS, WELL PW-3

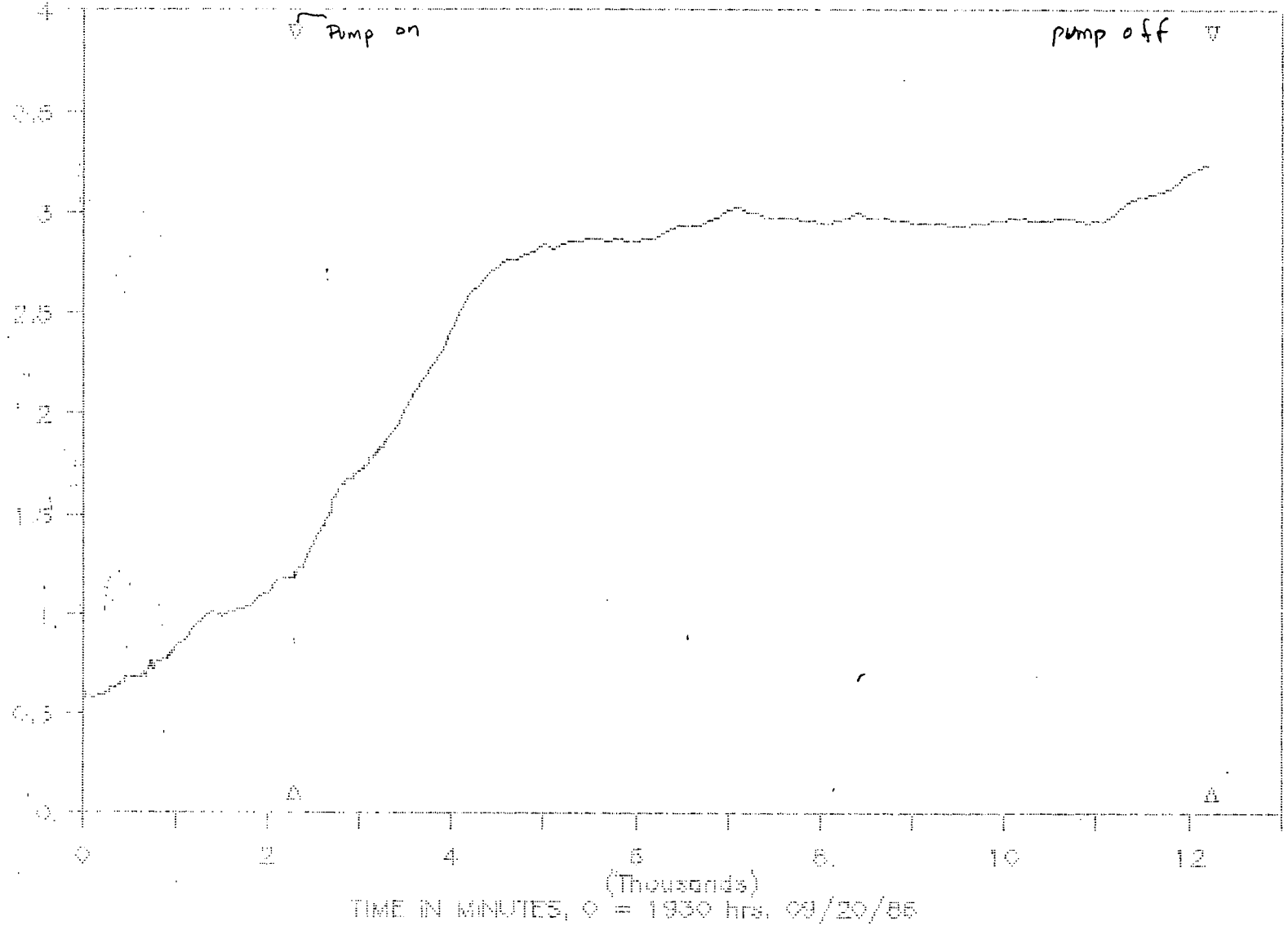

DRAWDOWN vs TIME, WELL PW-1
0.00
0.20
0.40
0.60
0.80
1.00
DRAWDOWN IN FEET
T = 264 (Q) / s
= 264 (930 gpm) / 0.47 ft
= 520,000 gpd/ft
1
10
10 2
10 3
10 4
TIME FROM PUMP ON IN MINUTES

ATTACHMENT G.4

PUMP-TEST ANALYSIS, WELL PW-4

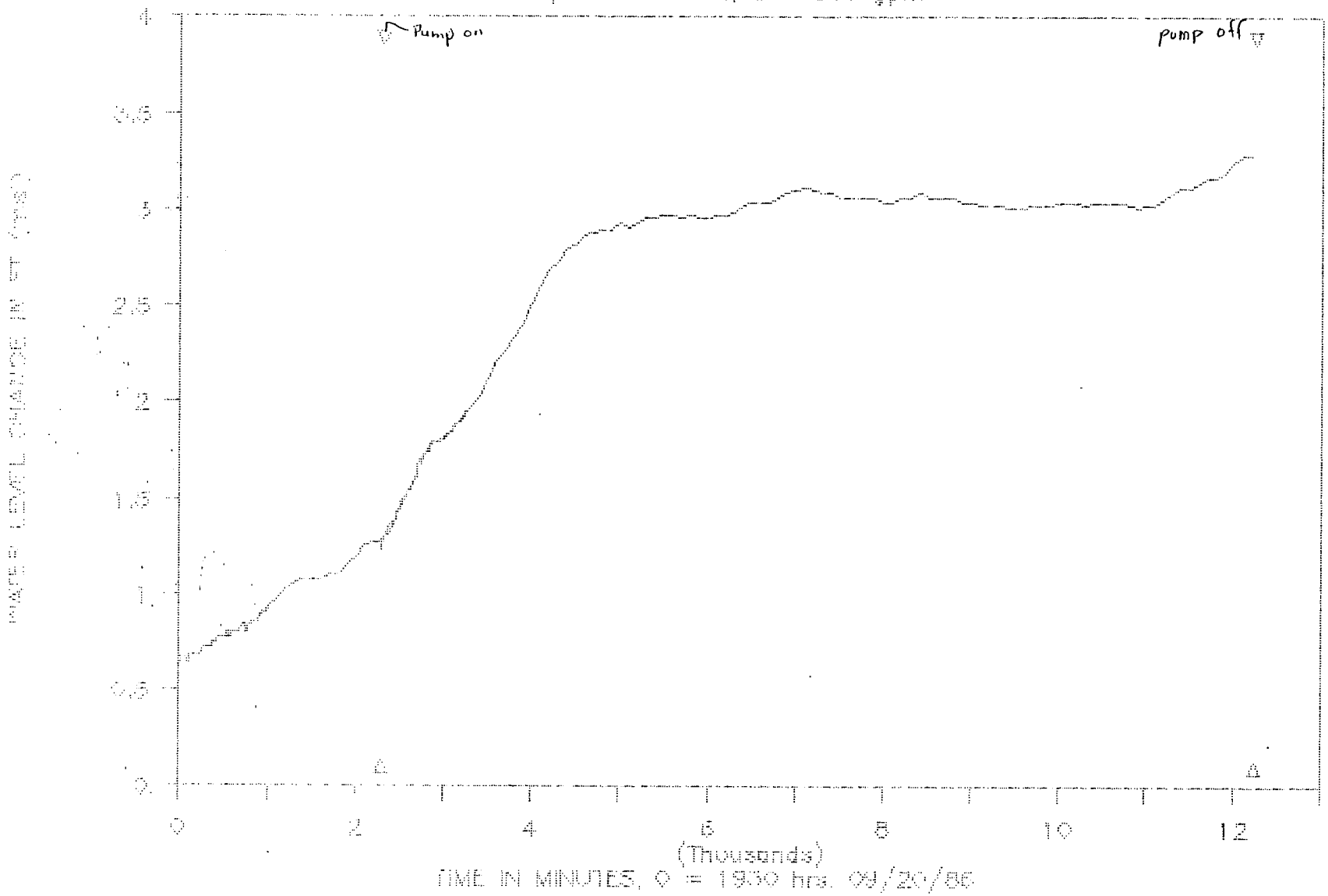
WATER LEVEL CHANGE vs TIME FOR WELL 3--B

Pumped well PW--4; Q = 660 gpm



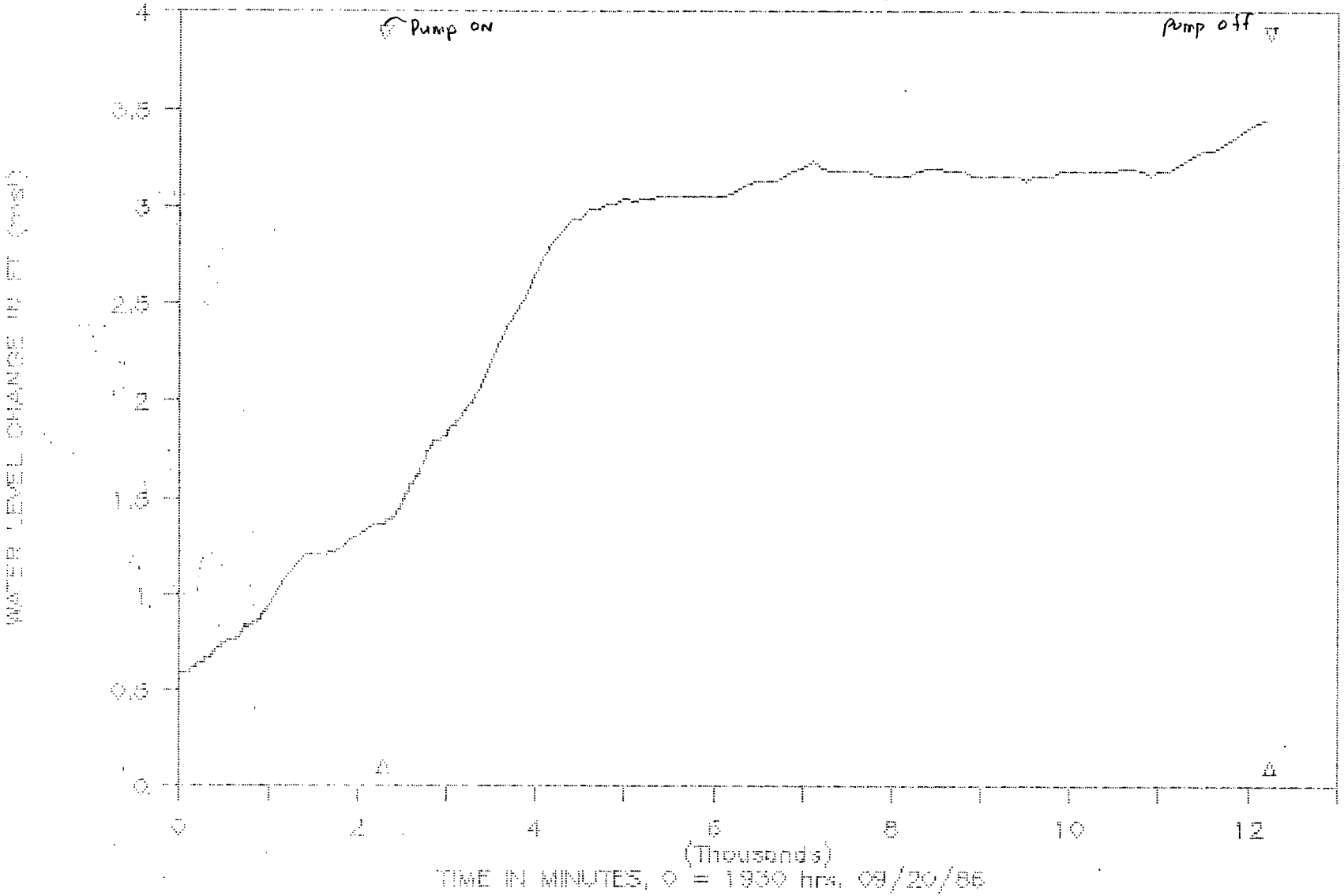
WATER LEVEL CHANGE vs TIME FOR WELL 3-C

Pumped well PW-4, Q = 860 gpm



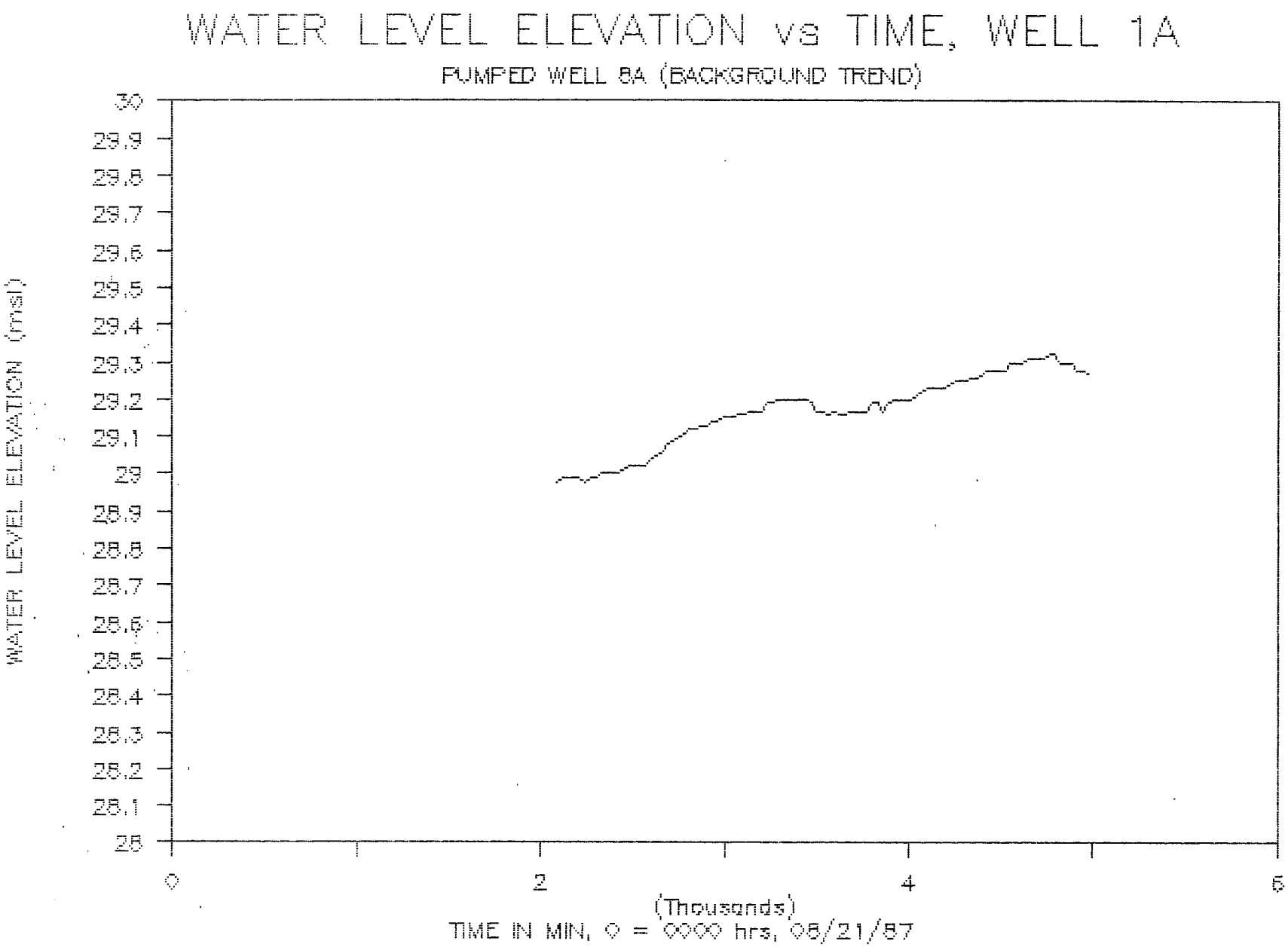
WATER LEVEL CHANGE vs TIME FOR WELL 8--B

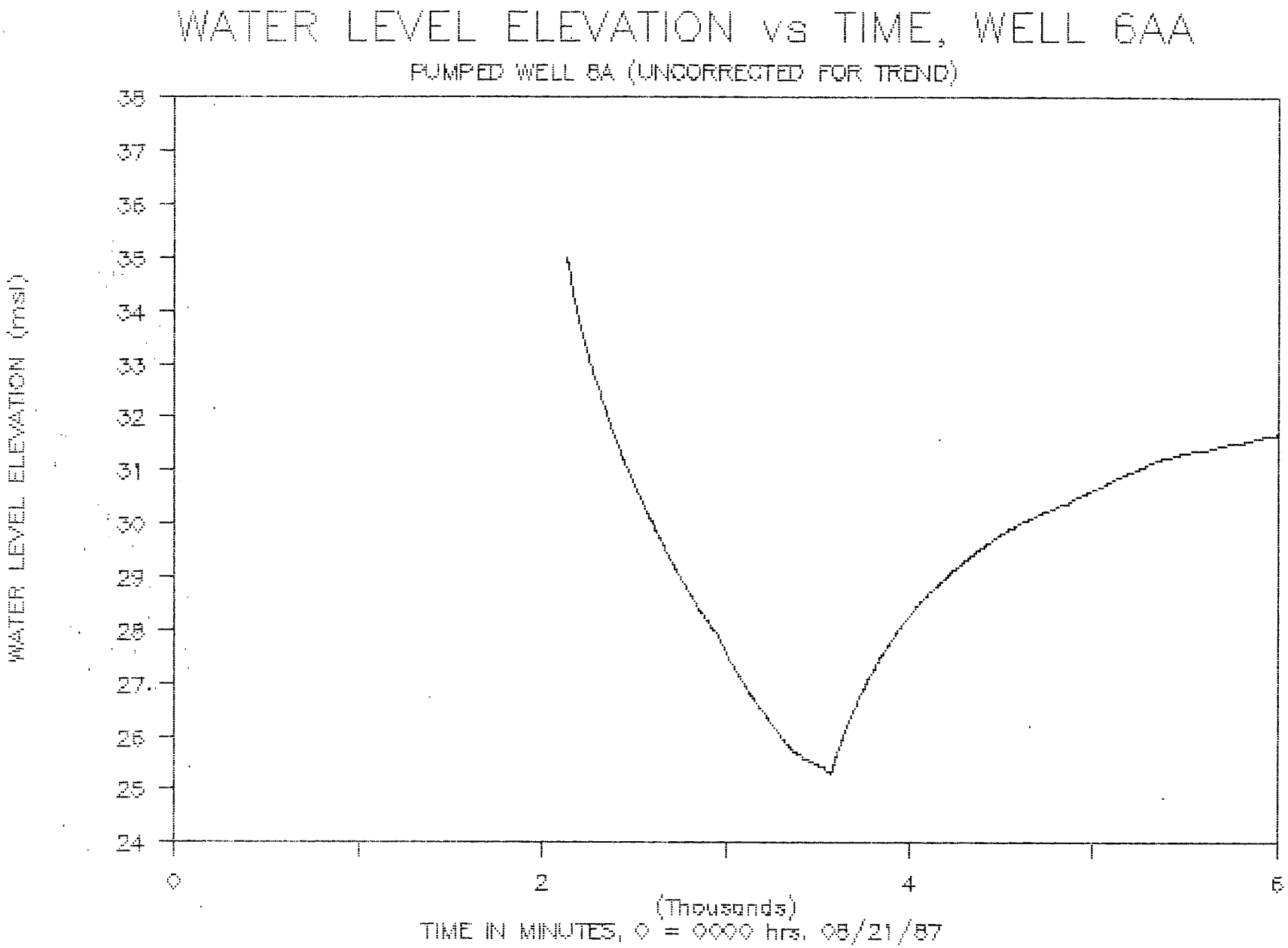
Pumped well PW-4, Q = 860 gpm

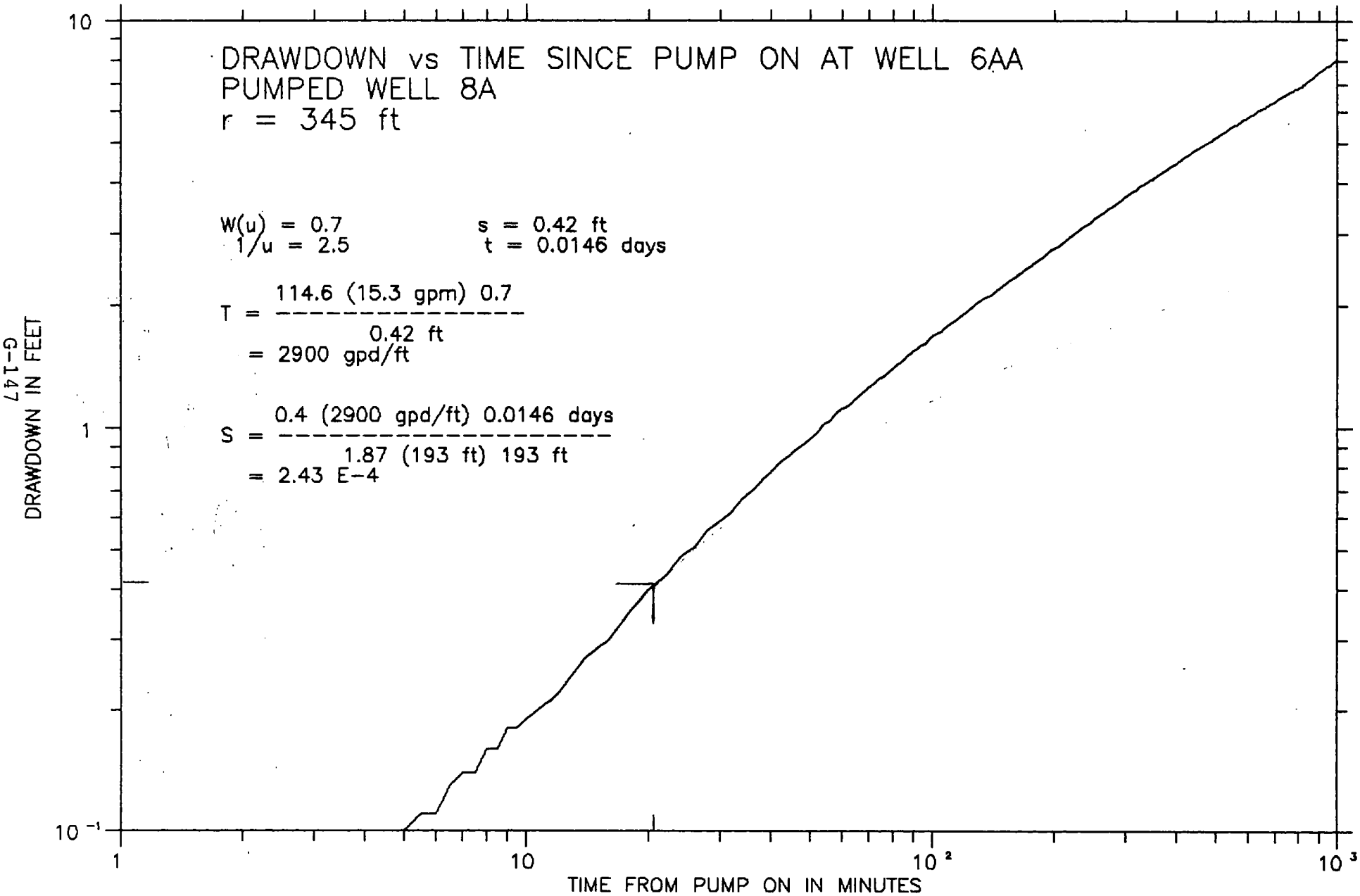


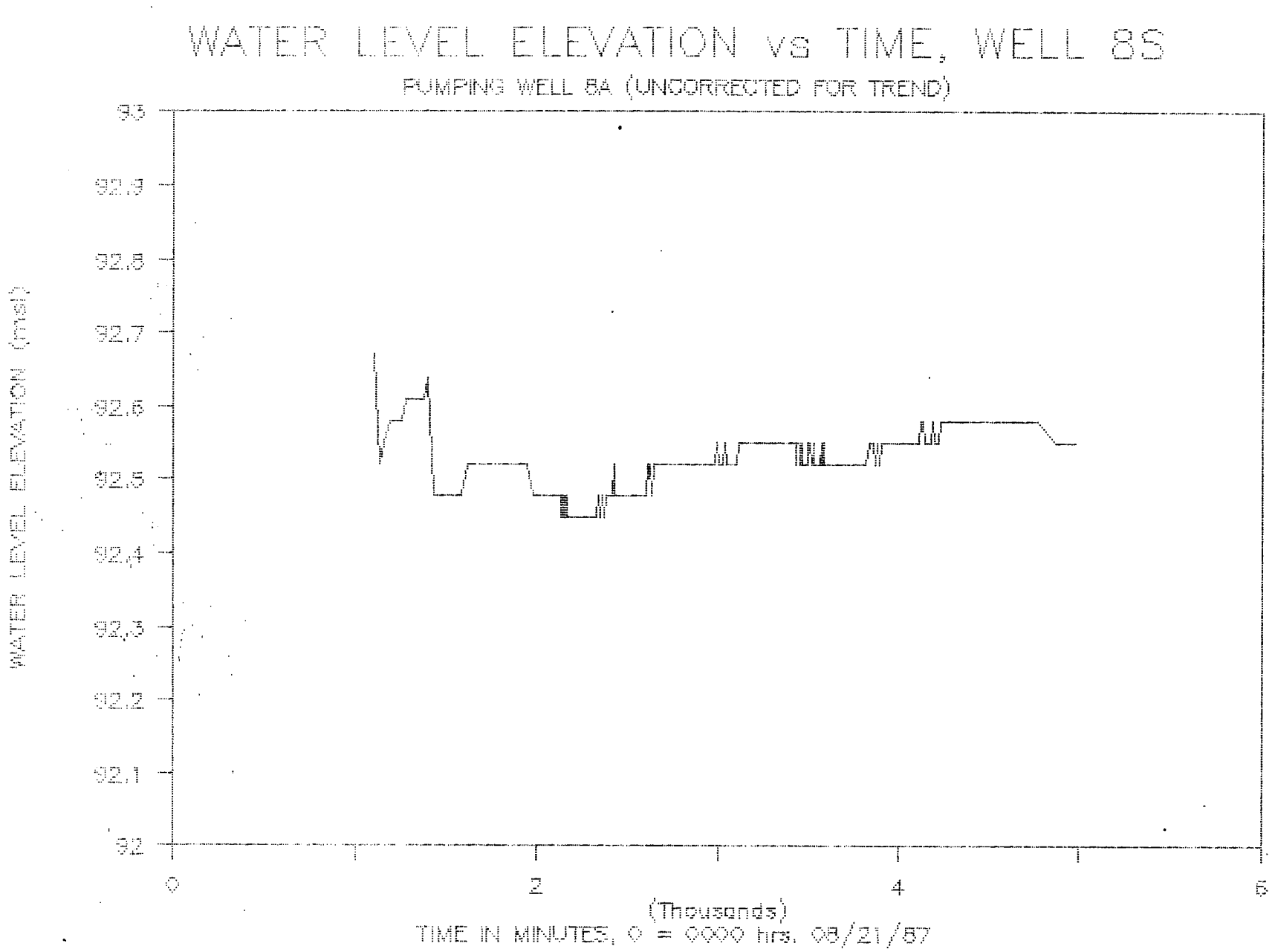
ATTACHMENT G.5

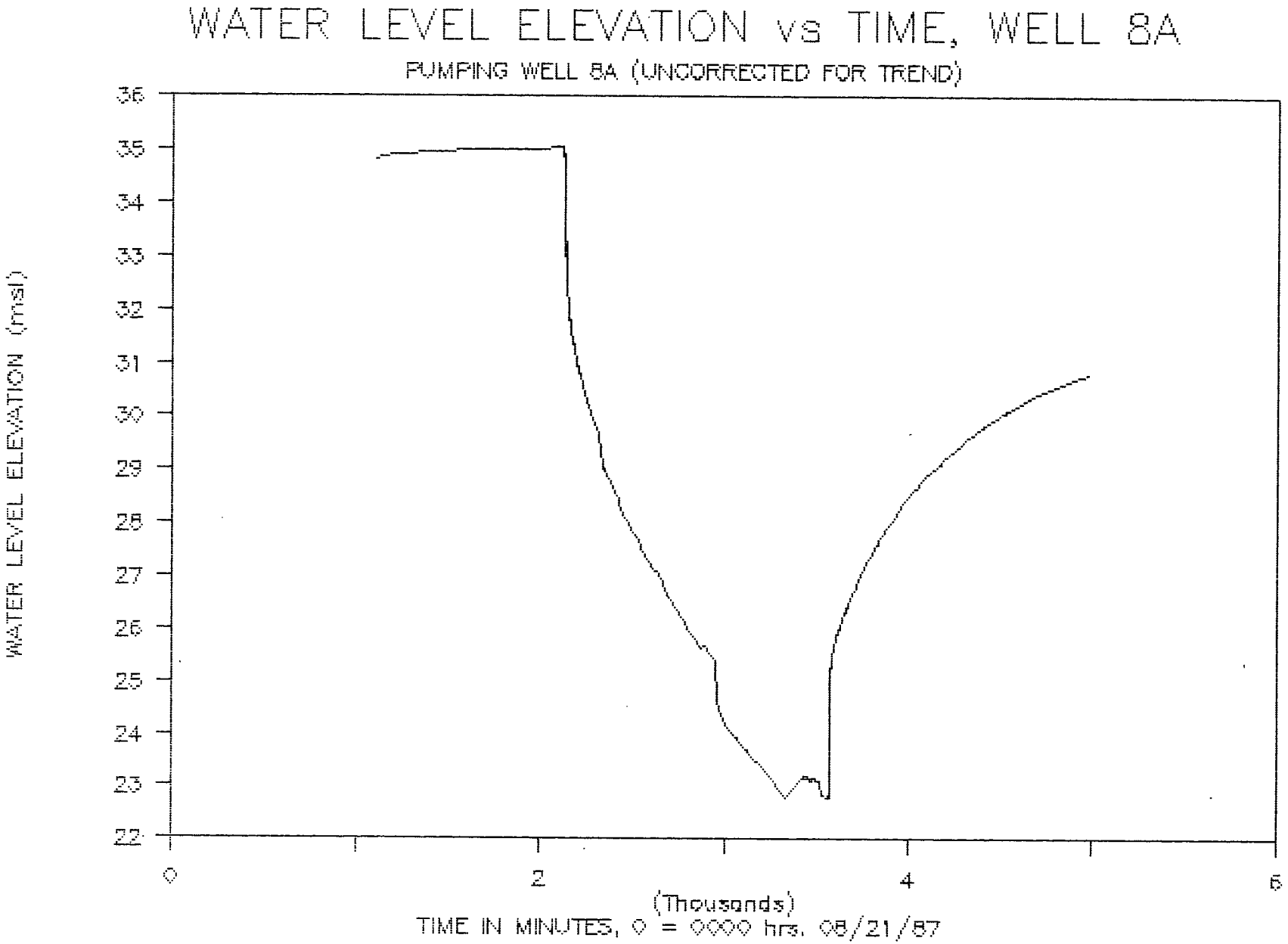
PUMP-TEST ANALYSIS, WELL 8A

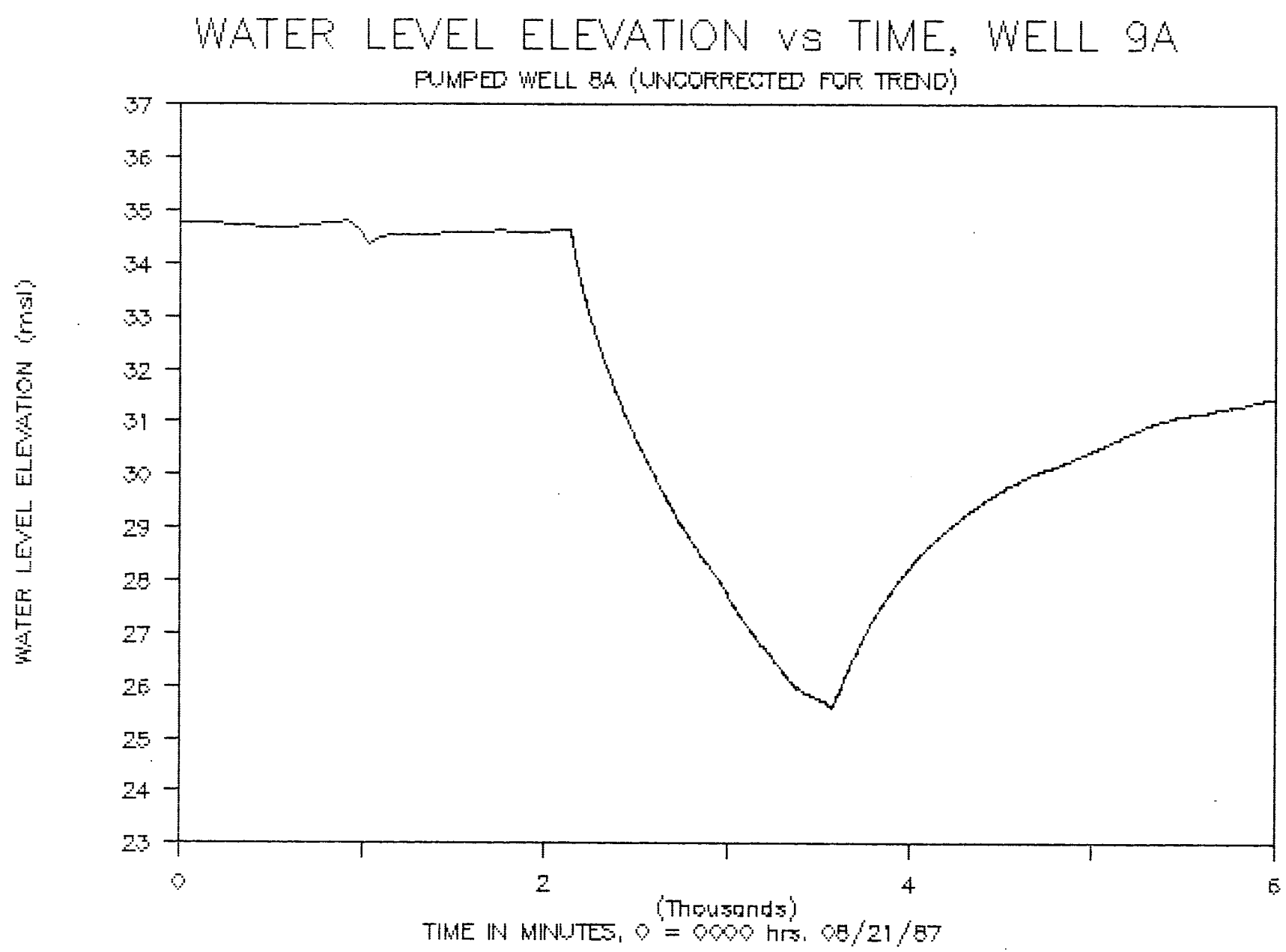

WATER LEVEL ELEVATION vs TIME, WELL 1A
PUMPED WELL 8A (BACKGROUND TREND)
WATER LEVEL ELEVATION (msl)
30
29.9
29.8
29.7
29.6
29.5
29.4
29.3
29.2
29.1
29
28.9
28.8
28.7
28.6
28.5
28.4
28.3
28.2
28.1
28
0
2
4
6
(Thousands)
TIME IN MIN, 0 = 0000 hrs, 08/21/87

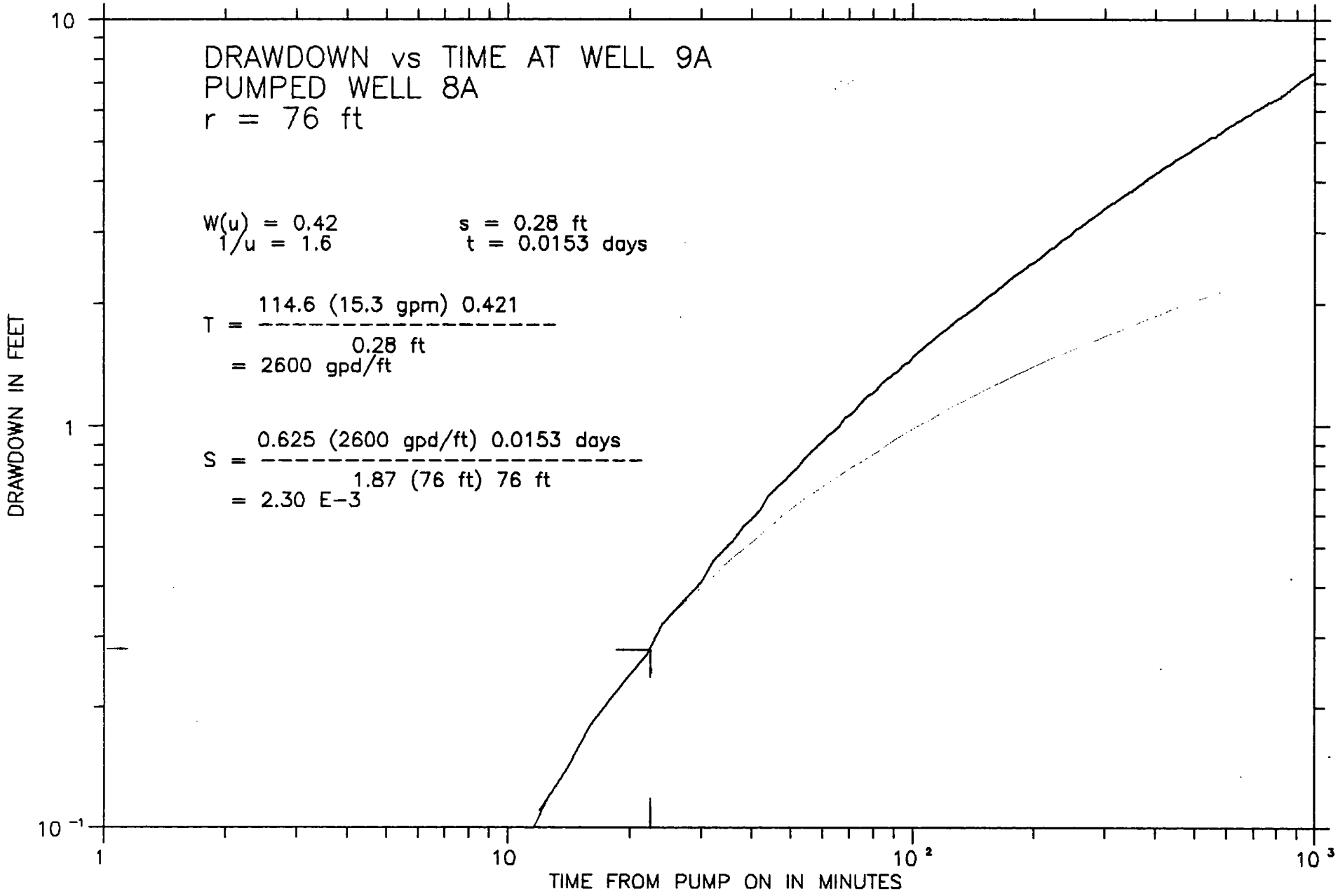

WATER LEVEL ELEVATION vs TIME, WELL 6AA
PUMPED WELL 6A (UNCORRECTED FOR TREND)
WATER LEVEL ELEVATION (msl)
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
0
2
4
6
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/21/87


DRAWDOWN vs TIME SINCE PUMP ON AT WELL 6AA
PUMPED WELL 8A
r = 345 ft
W(u) = 0.7
1/u = 2.5
s = 0.42 ft
t = 0.0146 days
T = 114.6 (15.3 gpm) 0.7 / 0.42 ft
= 2900 gpd/ft
S = 0.4 (2900 gpd/ft) 0.0146 days / 1.87 (193 ft) 193 ft
= 2.43 E-4
DRAWDOWN IN FEET
TIME FROM PUMP ON IN MINUTES
10
1
10 -1
1
10
10 2
10 3

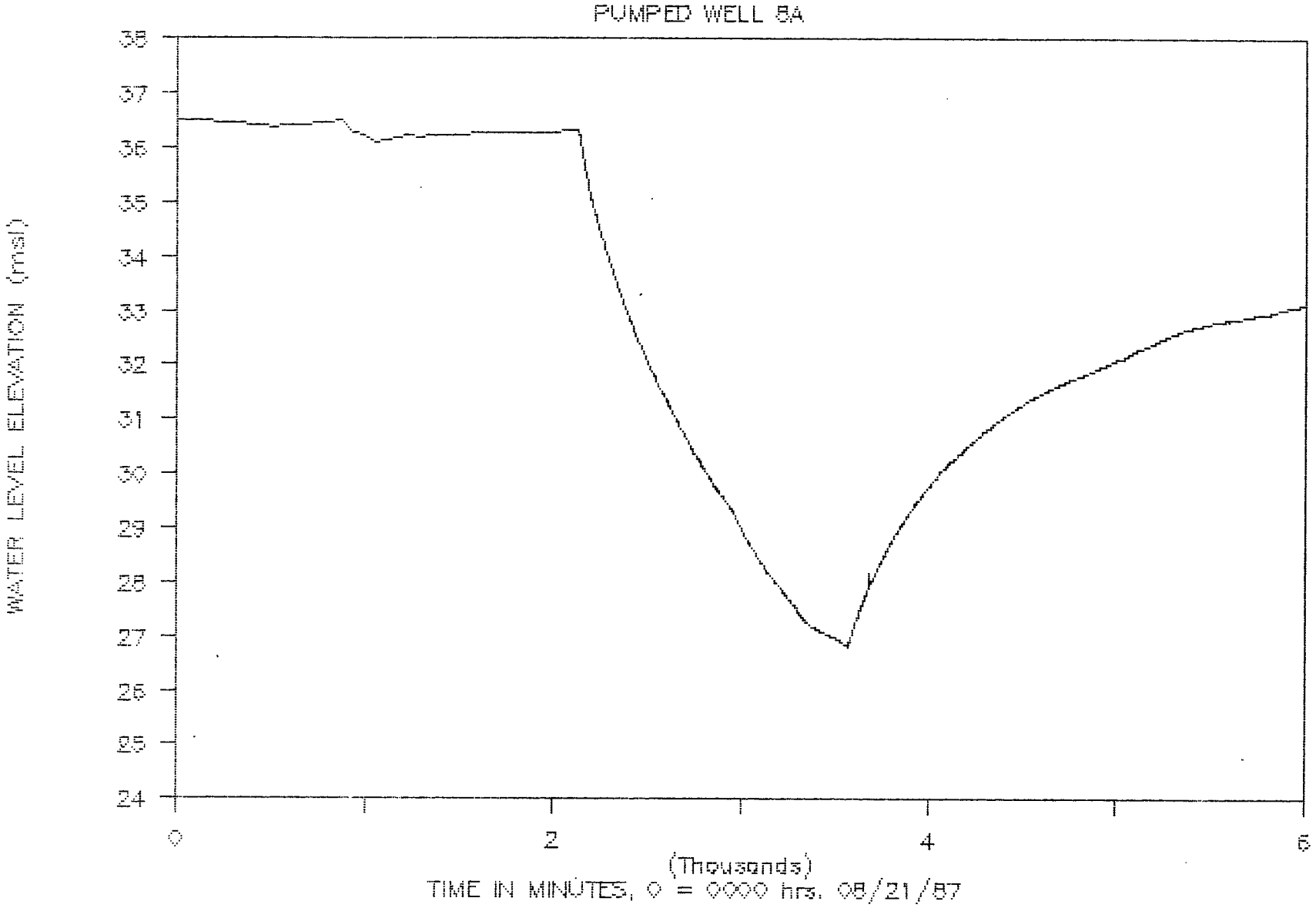

WATER LEVEL ELEVATION vs TIME, WELL 8S
PUMPING WELL 8A (UNCORRECTED FOR TREND)
WATER LEVEL ELEVATION (msl)
93
92.9
92.8
92.7
92.6
92.5
92.4
92.3
92.2
92.1
92
0
2
4
6
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/21/87

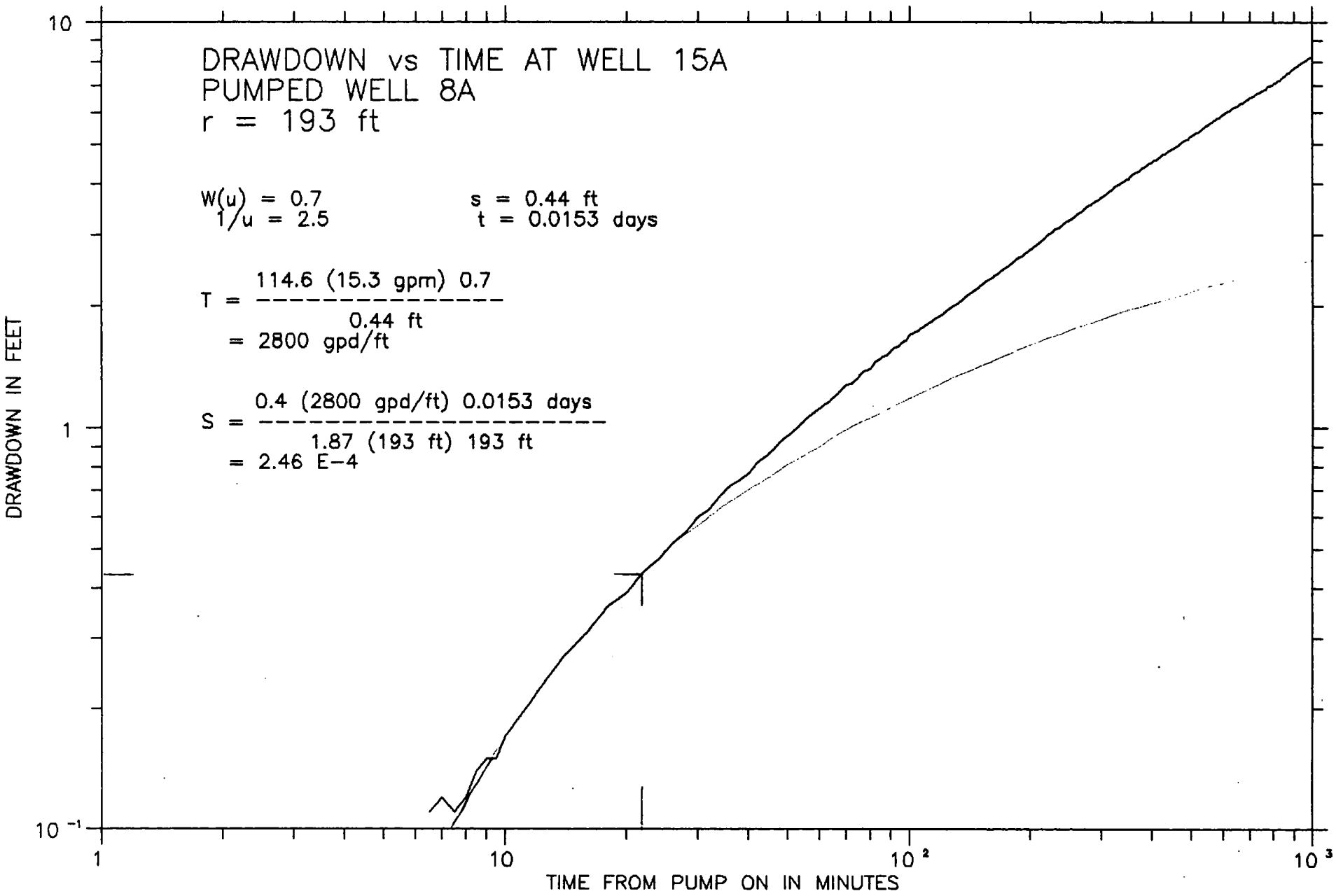

WATER LEVEL ELEVATION vs TIME, WELL 8A
PUMPING WELL 8A (UNCORRECTED FOR TREND)
WATER LEVEL ELEVATION (msl)
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
0
2
4
6
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/21/87

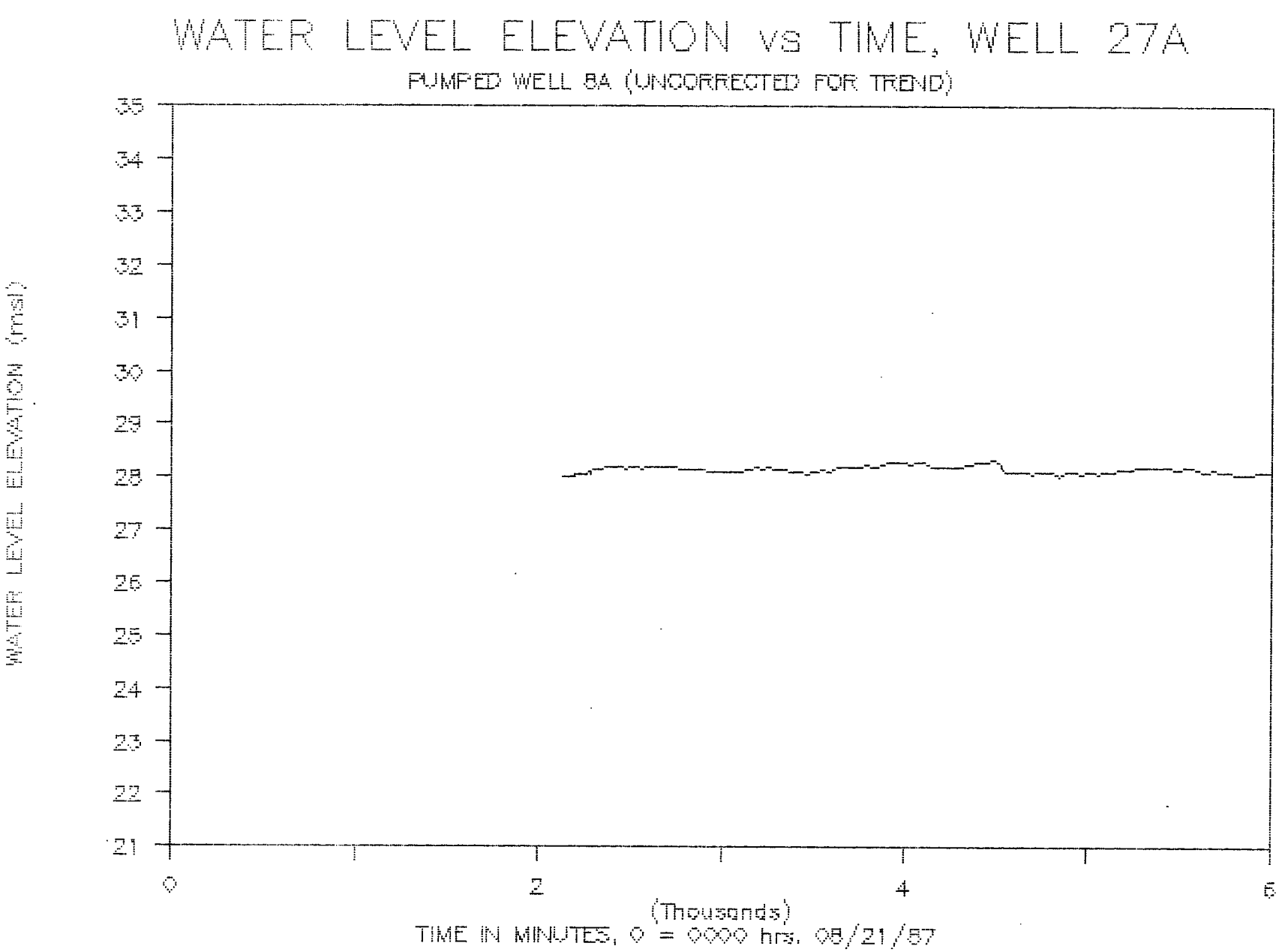

WATER LEVEL ELEVATION vs TIME, WELL 9A
PUMPED WELL 8A (UNCORRECTED FOR TREND)
WATER LEVEL ELEVATION (msl)
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
0
2
4
6
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/21/87


DRAWDOWN vs TIME AT WELL 9A
PUMPED WELL 8A
r = 76 ft
W(u) = 0.42
1/u = 1.6
s = 0.28 ft
t = 0.0153 days
T = 114.6 (15.3 gpm) 0.421 / 0.28 ft
= 2600 gpd/ft
S = 0.625 (2600 gpd/ft) 0.0153 days / 1.87 (76 ft) 76 ft
= 2.30 E-3
DRAWDOWN IN FEET
10
1
10 -1
1
10
10 2
10 3
TIME FROM PUMP ON IN MINUTES

WATER LEVEL ELEVATION vs TIME, WELL 15A




DRAWDOWN vs TIME AT WELL 15A
PUMPED WELL 8A
r = 193 ft
W(u) = 0.7
1/u = 2.5
s = 0.44 ft
t = 0.0153 days
T = 114.6 (15.3 gpm) 0.7 / 0.44 ft
= 2800 gpd/ft
S = 0.4 (2800 gpd/ft) 0.0153 days / 1.87 (193 ft) 193 ft
= 2.46 E-4
DRAWDOWN IN FEET
TIME FROM PUMP ON IN MINUTES
10
1
10 -1
1
10
10 2
10 3

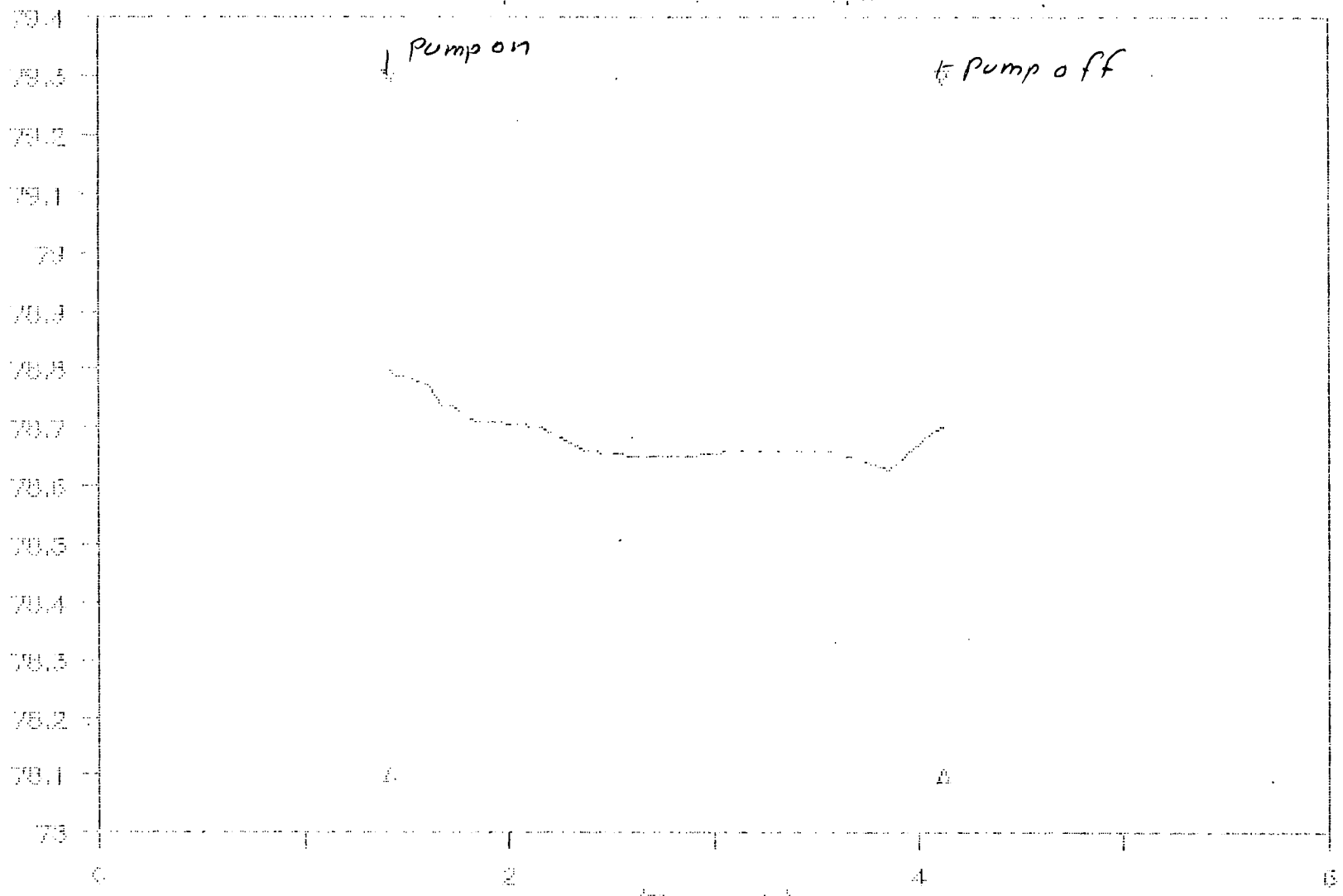

WATER LEVEL ELEVATION vs TIME, WELL 27A
PUMPED WELL 8A (UNCORRECTED FOR TREND)
WATER LEVEL ELEVATION (msl)
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
0
2
4
6
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/21/87

ATTACHMENT G.6

PUMP-TEST ANALYSIS, WELL 14B

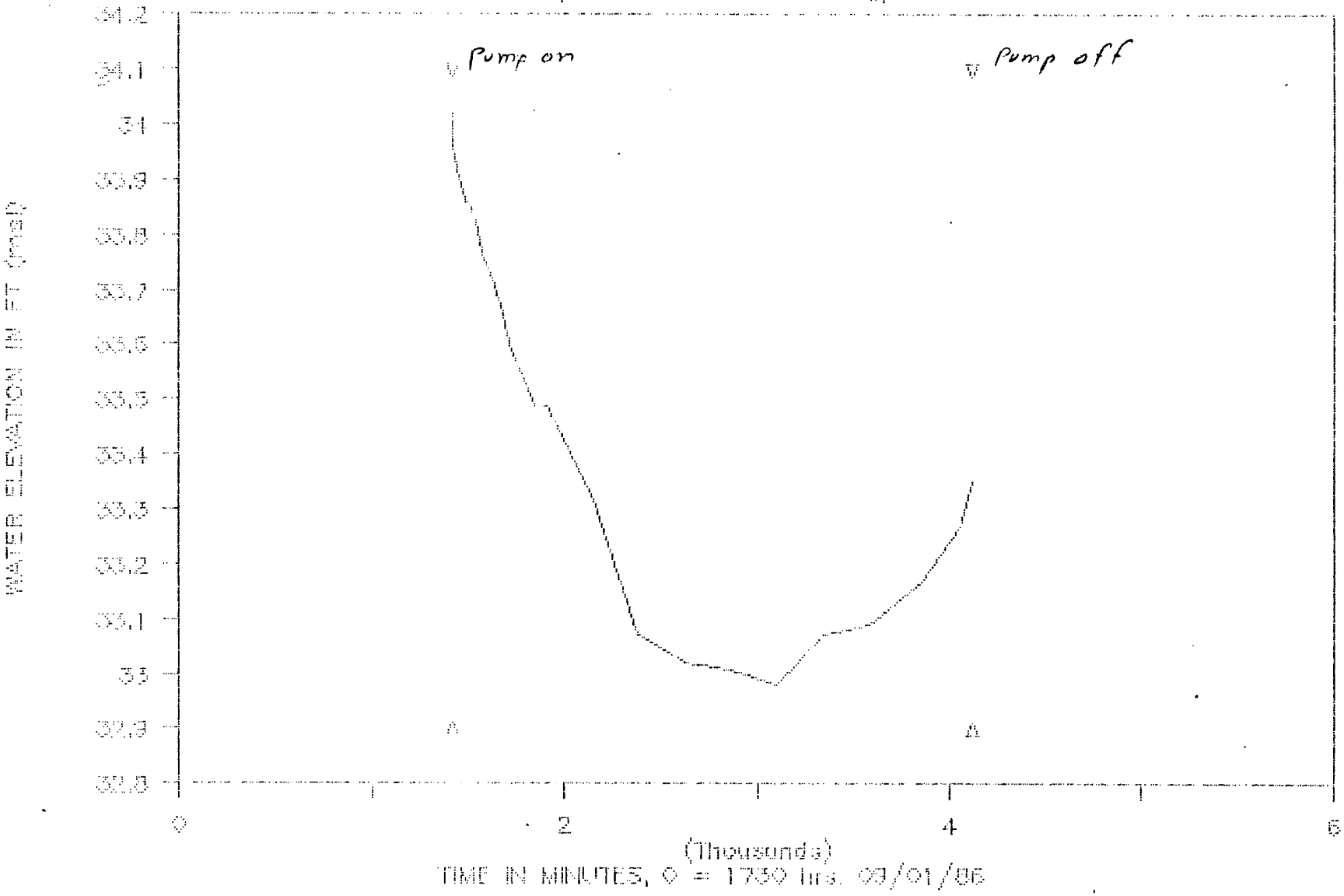
WATER ELEVATION vs TIME FOR WELL 2--A

Pumped well 14--B, Q = 50 gpm



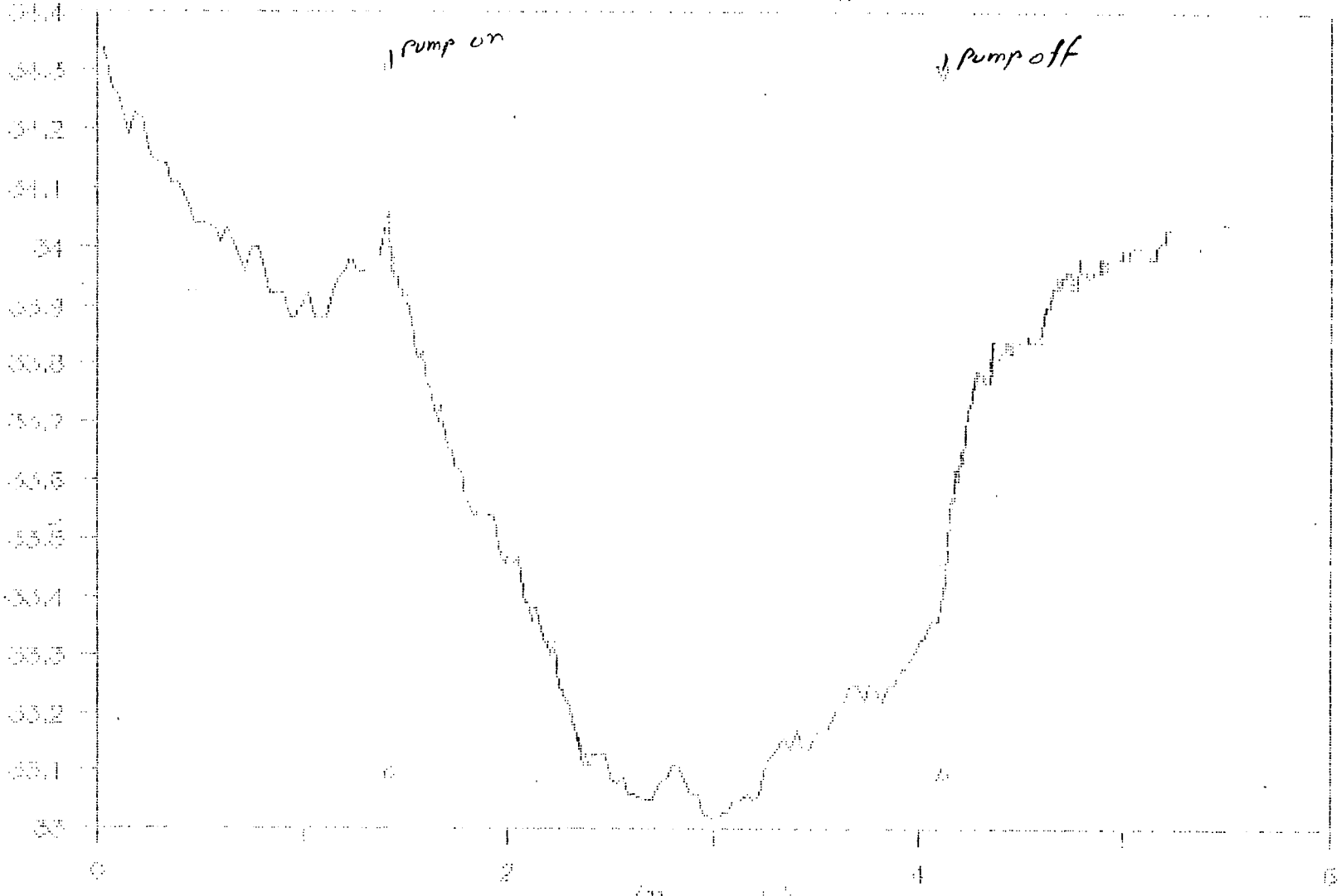
WATER ELEVATION, vs TIME FOR WELL 2--B

Pumped well 14--B, Q = 50 gpm



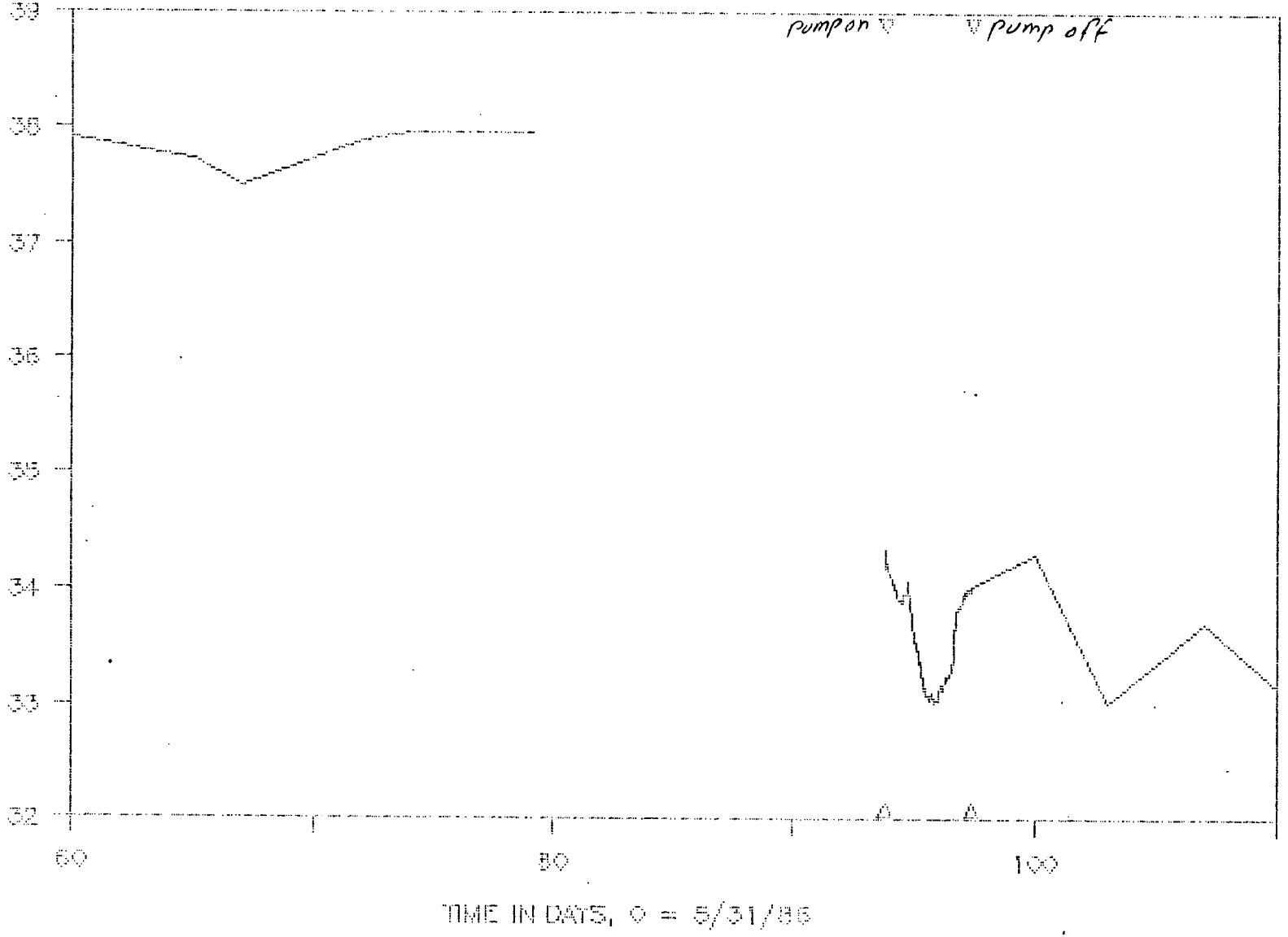
WATER ELEVATION vs TIME FOR WELL 7-B

Pumped well 14-B, Q = 60 gpm



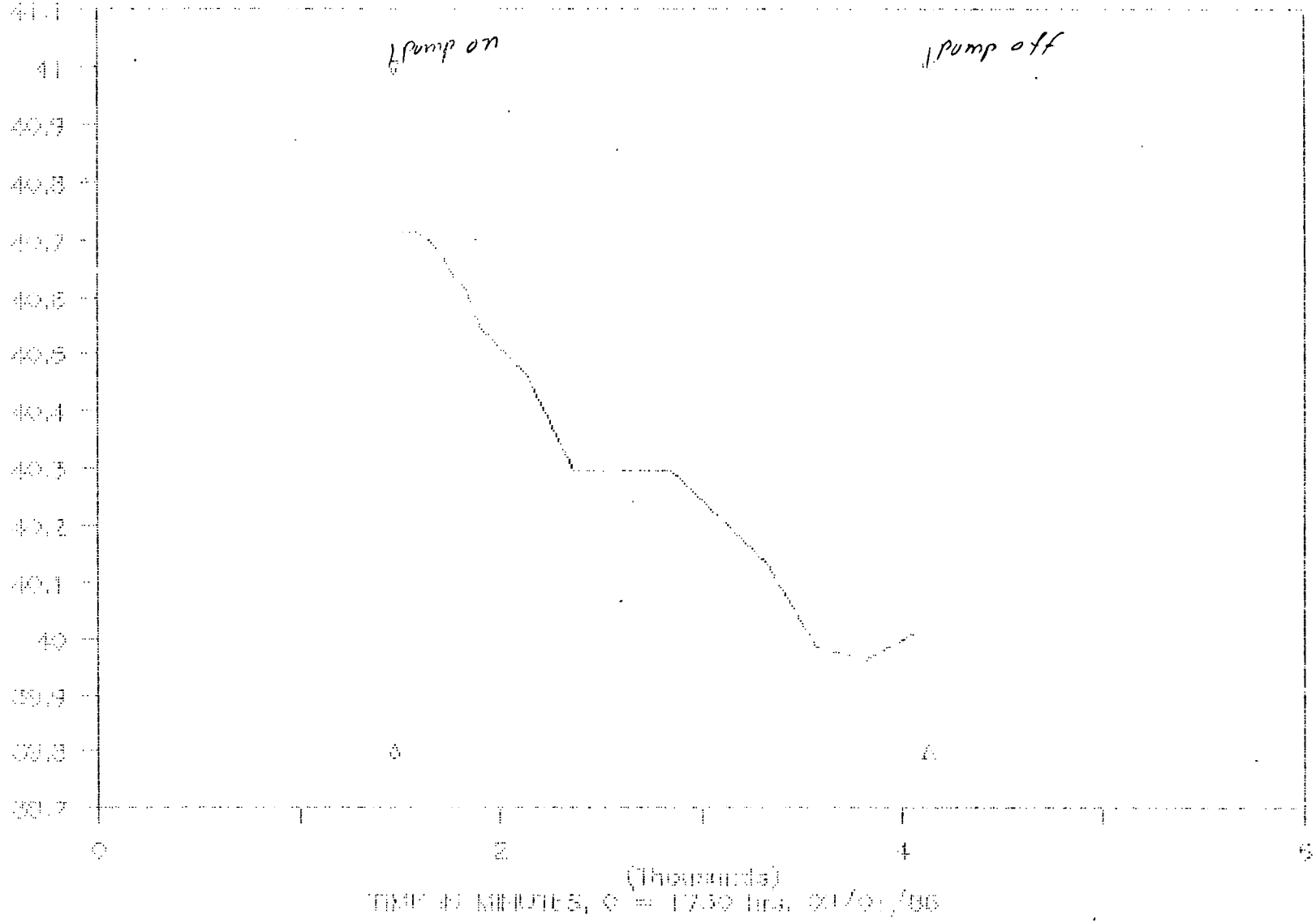
WATER ELEVATION vs TIME FOR WELL 7--B

BACKGROUND AND PUMP TEST DATA



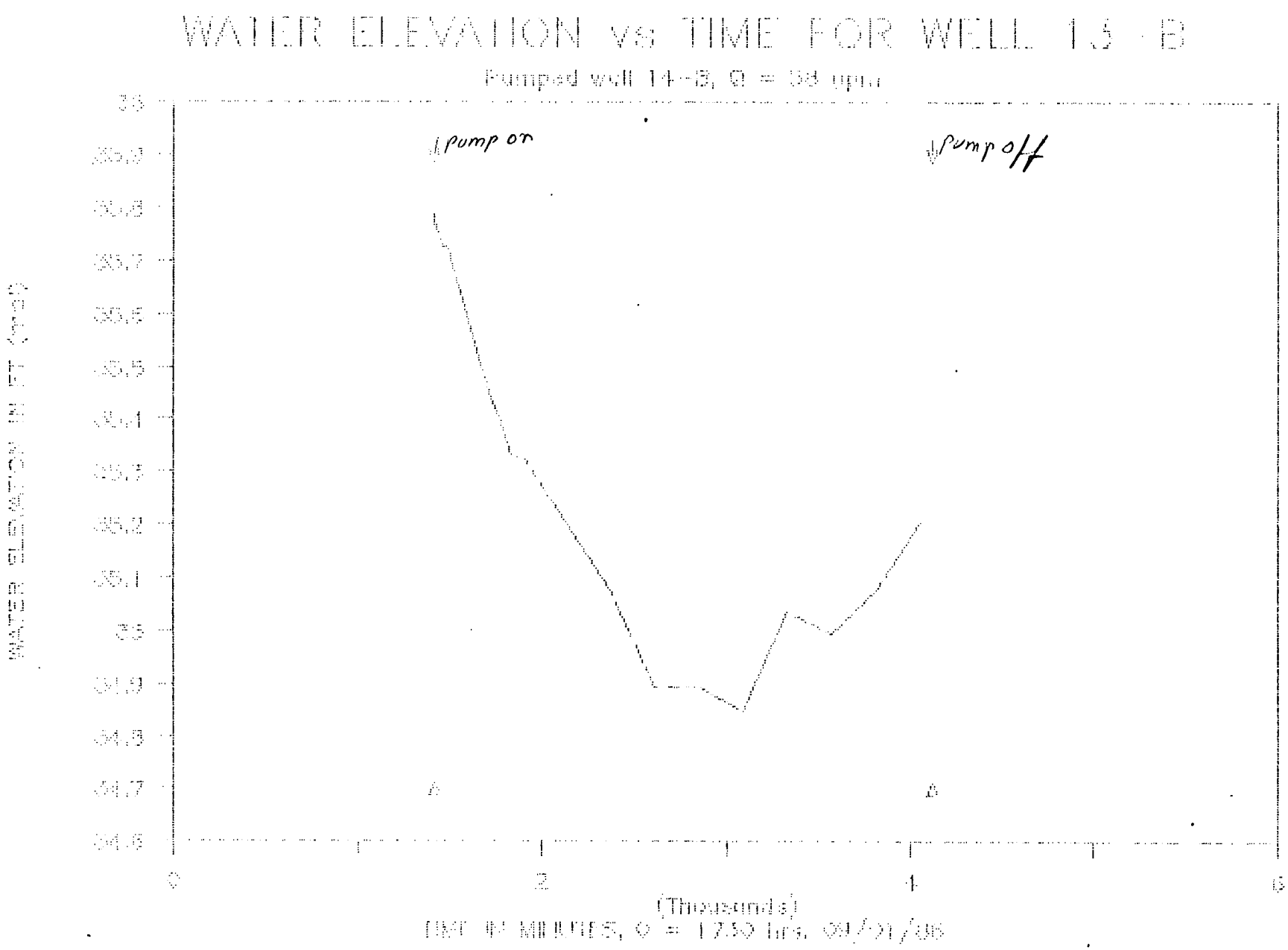
WATER ELEVATION vs TIME FOR WELL 13-A

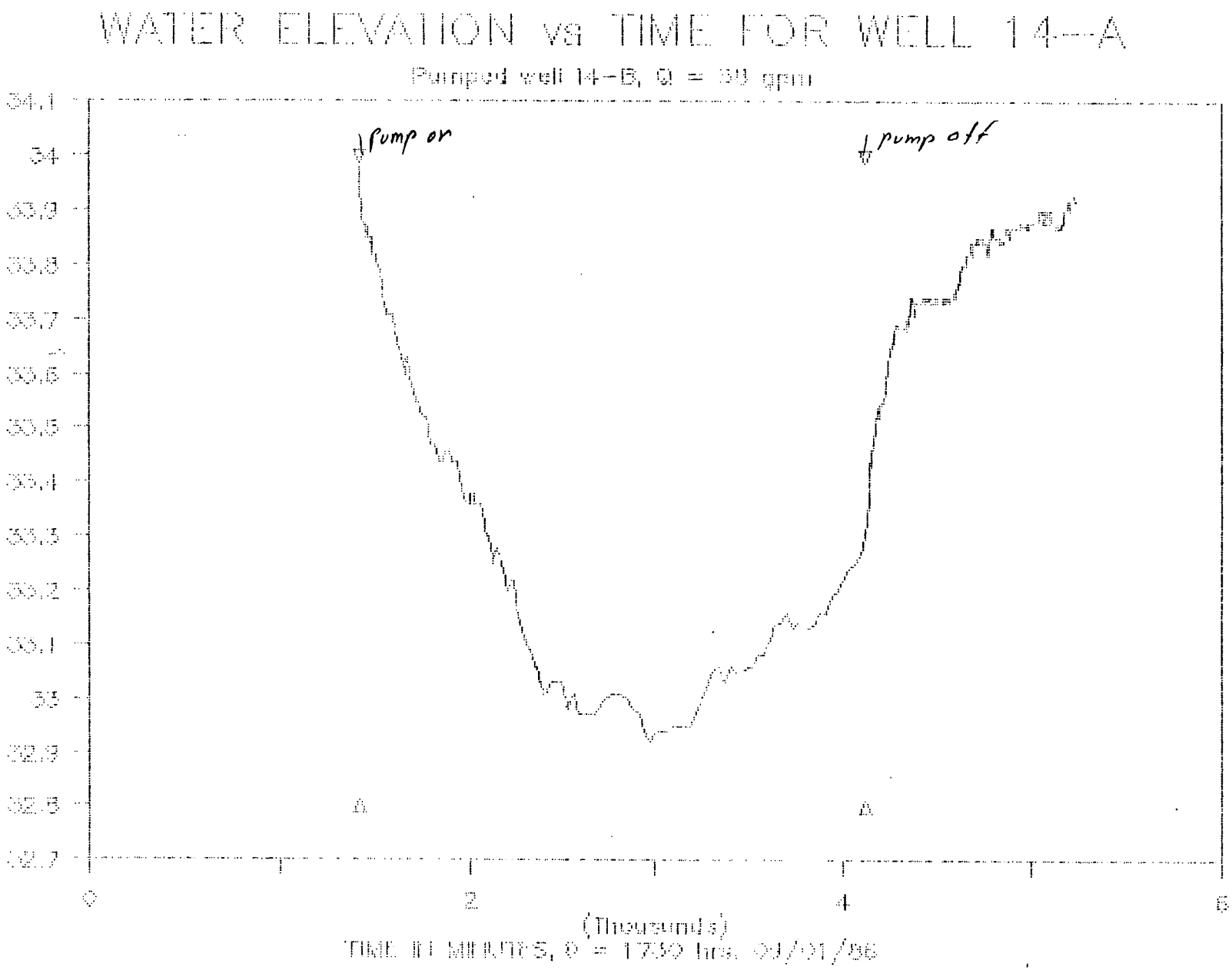
Pumped well 14-B, Q = 50 gpm



WATER ELEVATION IN FT (msl)

G-160


WATER ELEVATION vs TIME FOR WELL 13-B
Pumped well 14-B, Q = 58 gpm
pump on
pump off
WATER ELEVATION IN FT (msl)
35.9
35.8
35.7
35.6
35.5
35.4
35.3
35.2
35.1
35
34.9
34.8
34.7
34.6
0
2
4
6
(Thousands)
TIME IN MINUTES, Q = 1730 hrs. 09/01/86

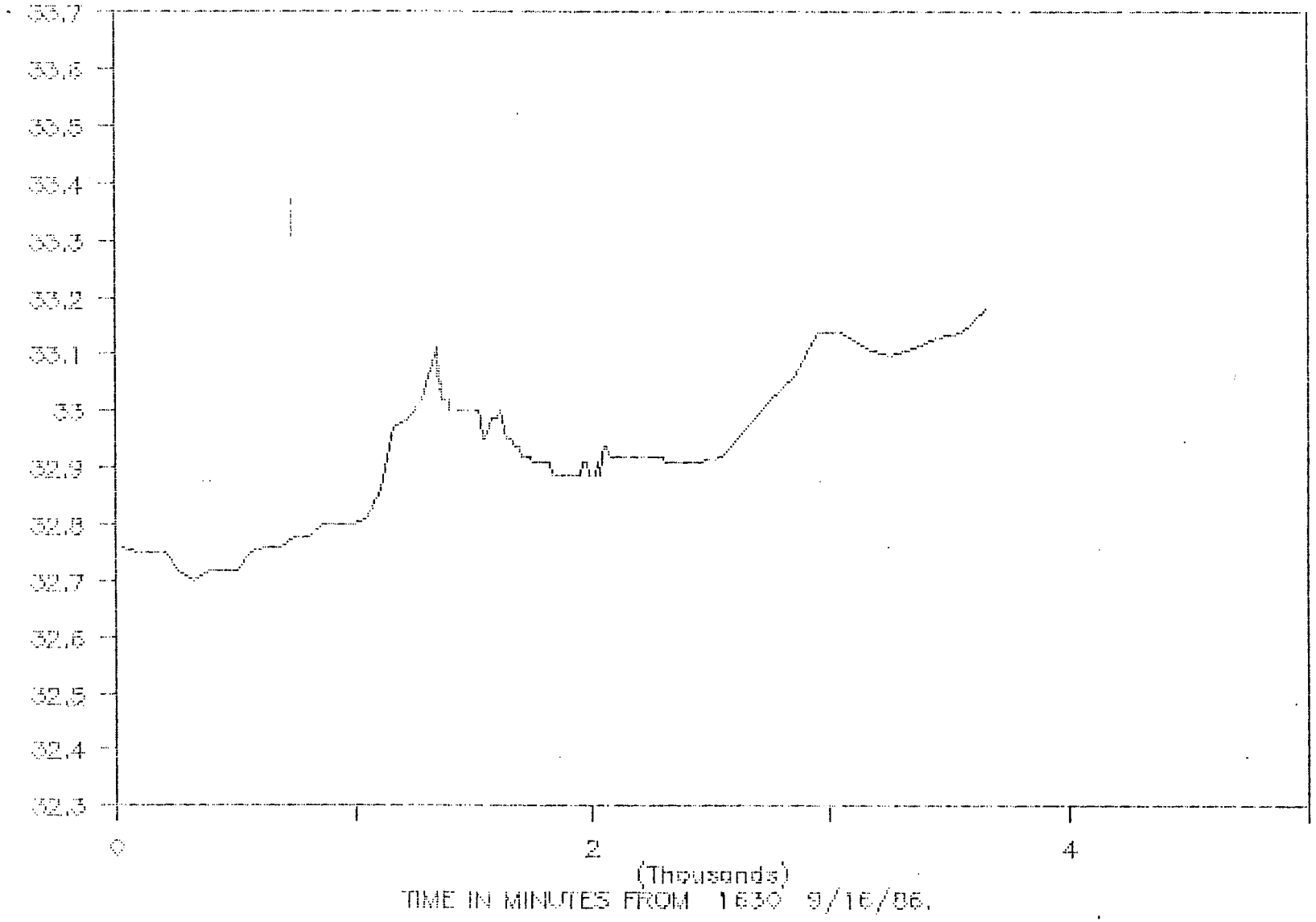

WATER ELEVATION vs TIME FOR WELL 14--A
Pumped well 14-B, Q = 30 gpm
pump on
pump off
34.1
34
33.9
33.8
33.7
33.6
33.5
33.4
33.3
33.2
33.1
33
32.9
32.8
32.7
0
2
4
6
(Thousands)
TIME IN MINUTES, 0 = 1750 hrs. 04/01/86
WATER ELEVATION IN FT (msl)

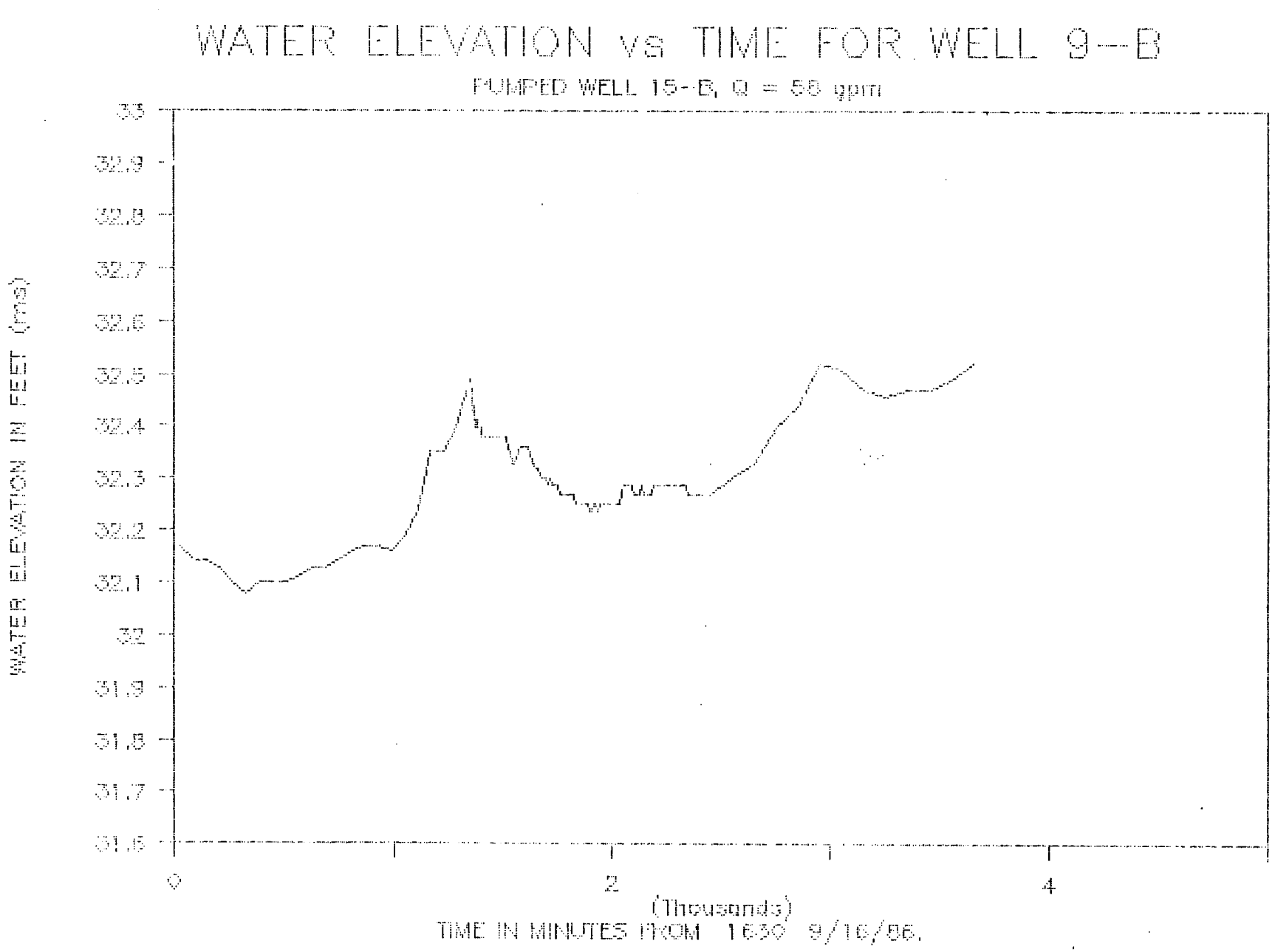
ATTACHMENT G.7

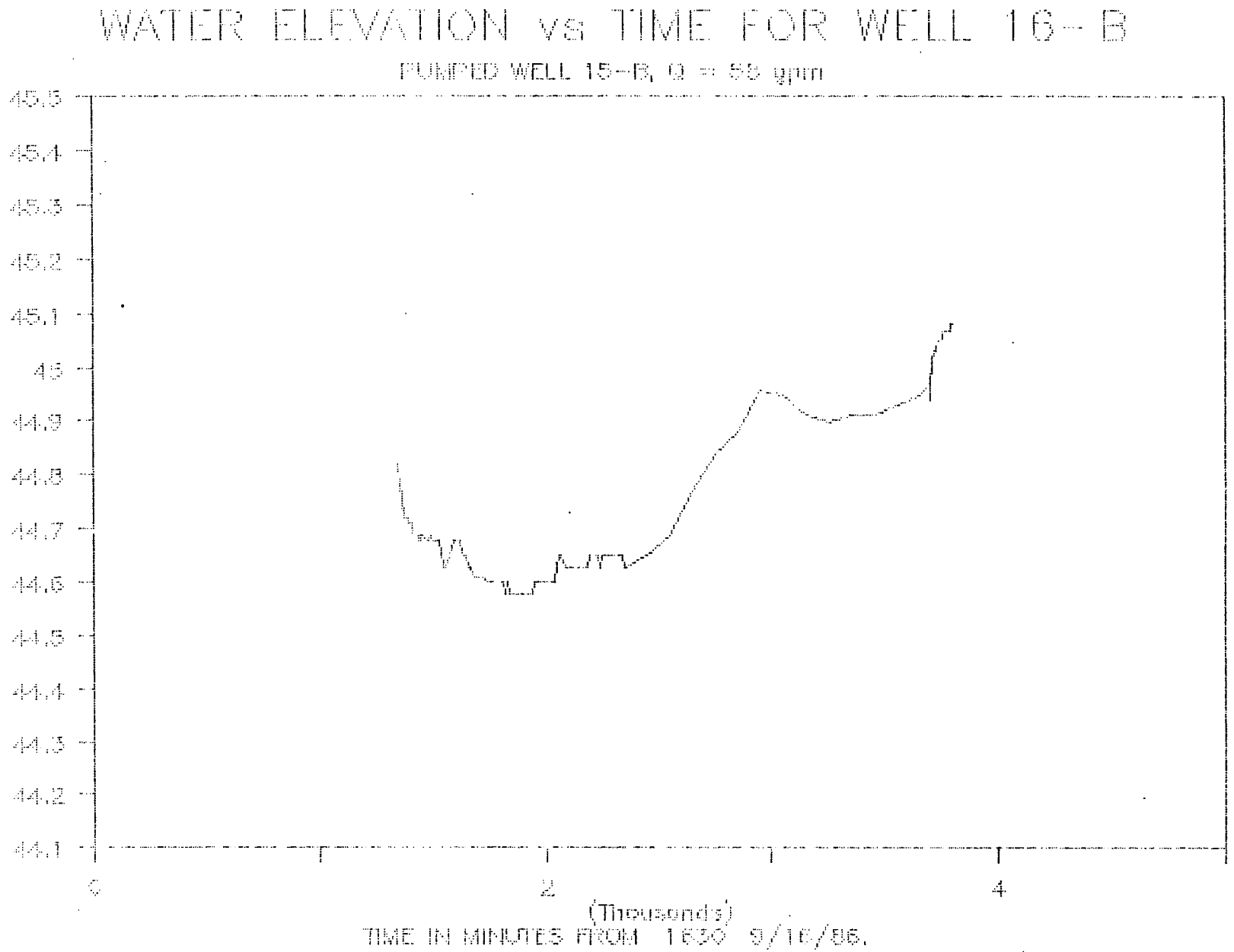
PUMP-TEST ANALYSIS, WELL 15B

WATER ELEVATION vs TIME FOR WELL 8--B

PUMPED WELL 15-B

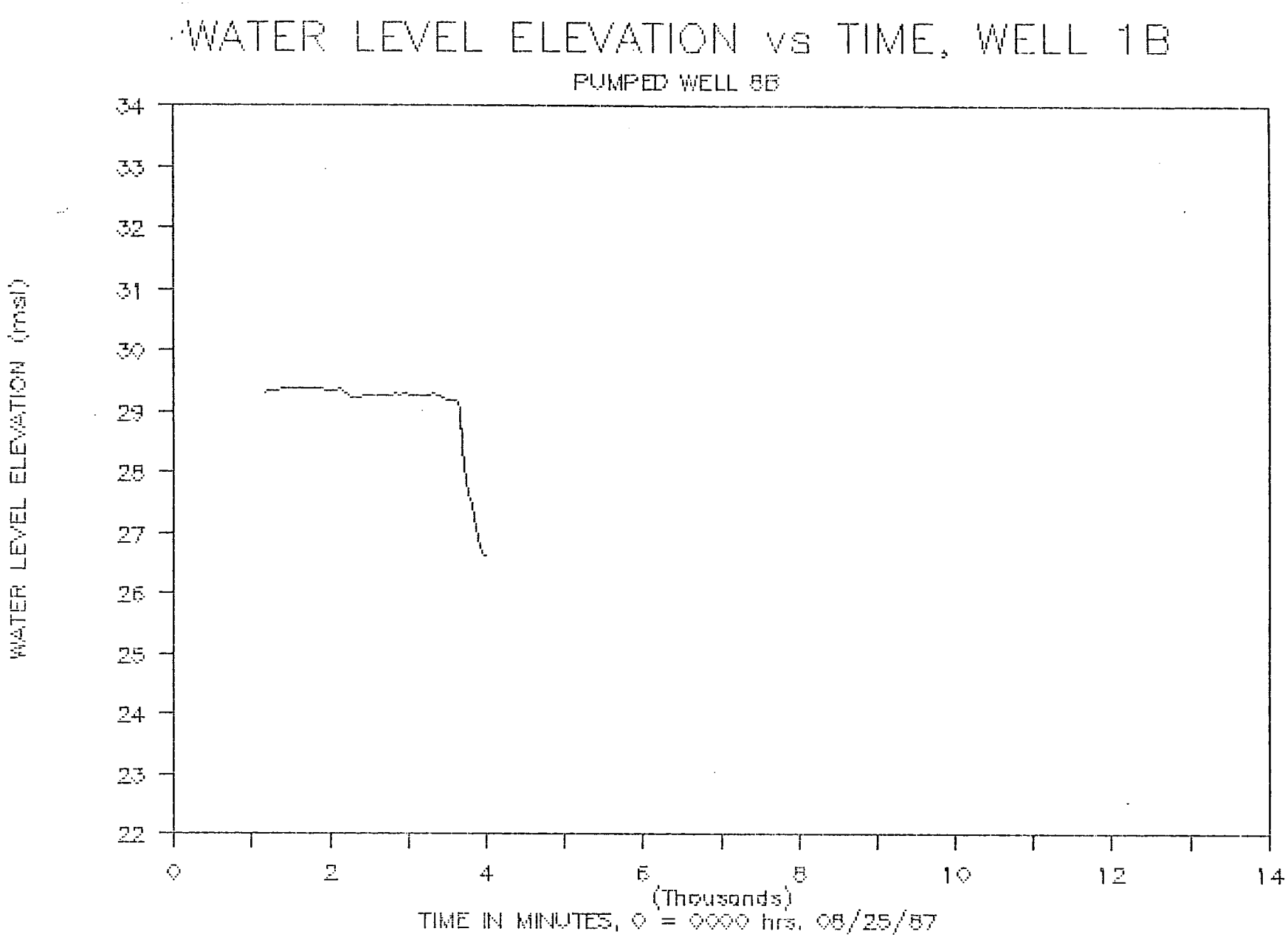


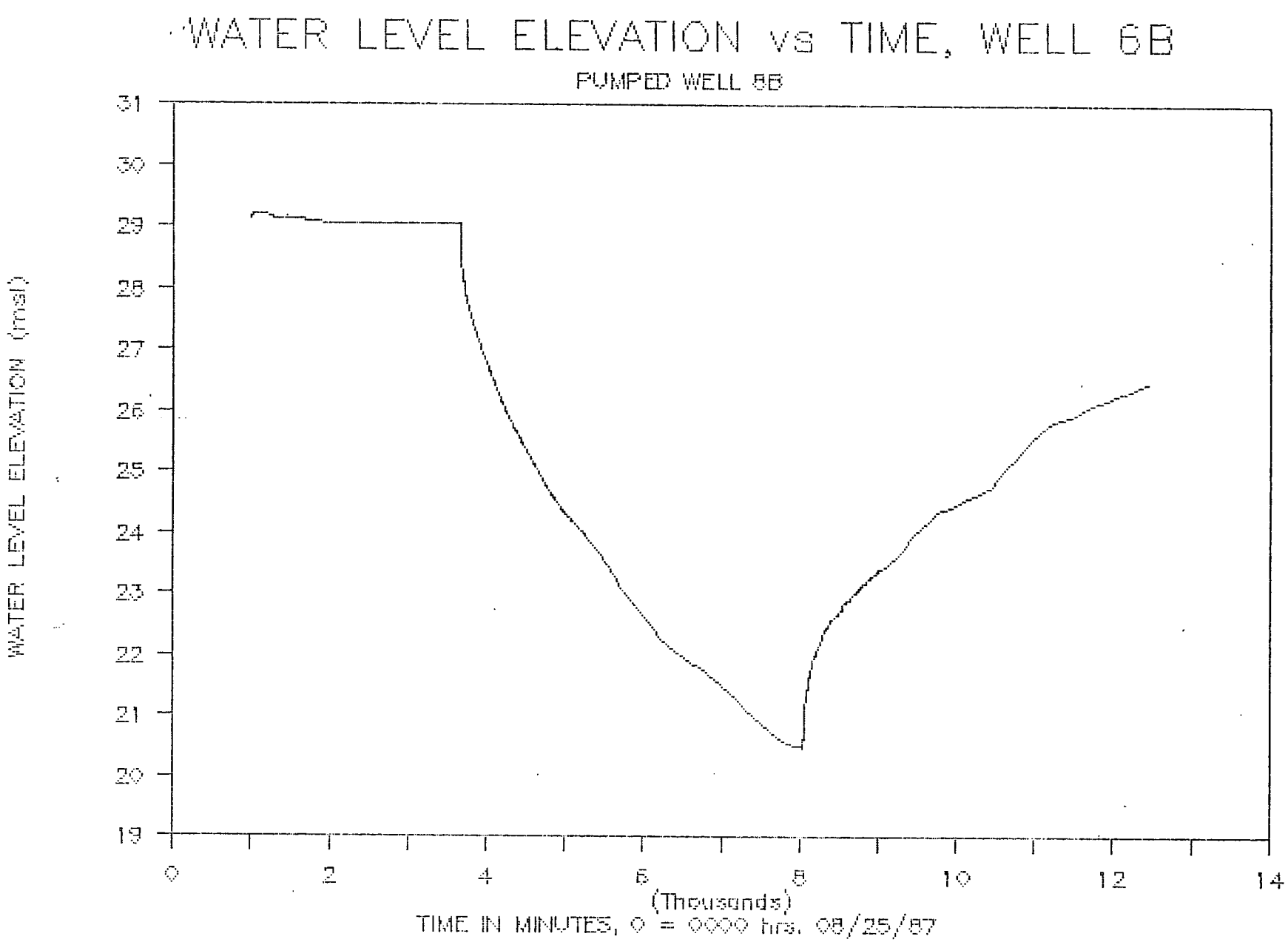

WATER ELEVATION vs TIME FOR WELL 9--B
PUMPED WELL 15-B, Q = 58 gpm
WATER ELEVATION IN FEET (msl)
33
32.9
32.8
32.7
32.6
32.5
32.4
32.3
32.2
32.1
32
31.9
31.8
31.7
31.6
0
2
4
(Thousands)
TIME IN MINUTES FROM 1630 9/16/96.

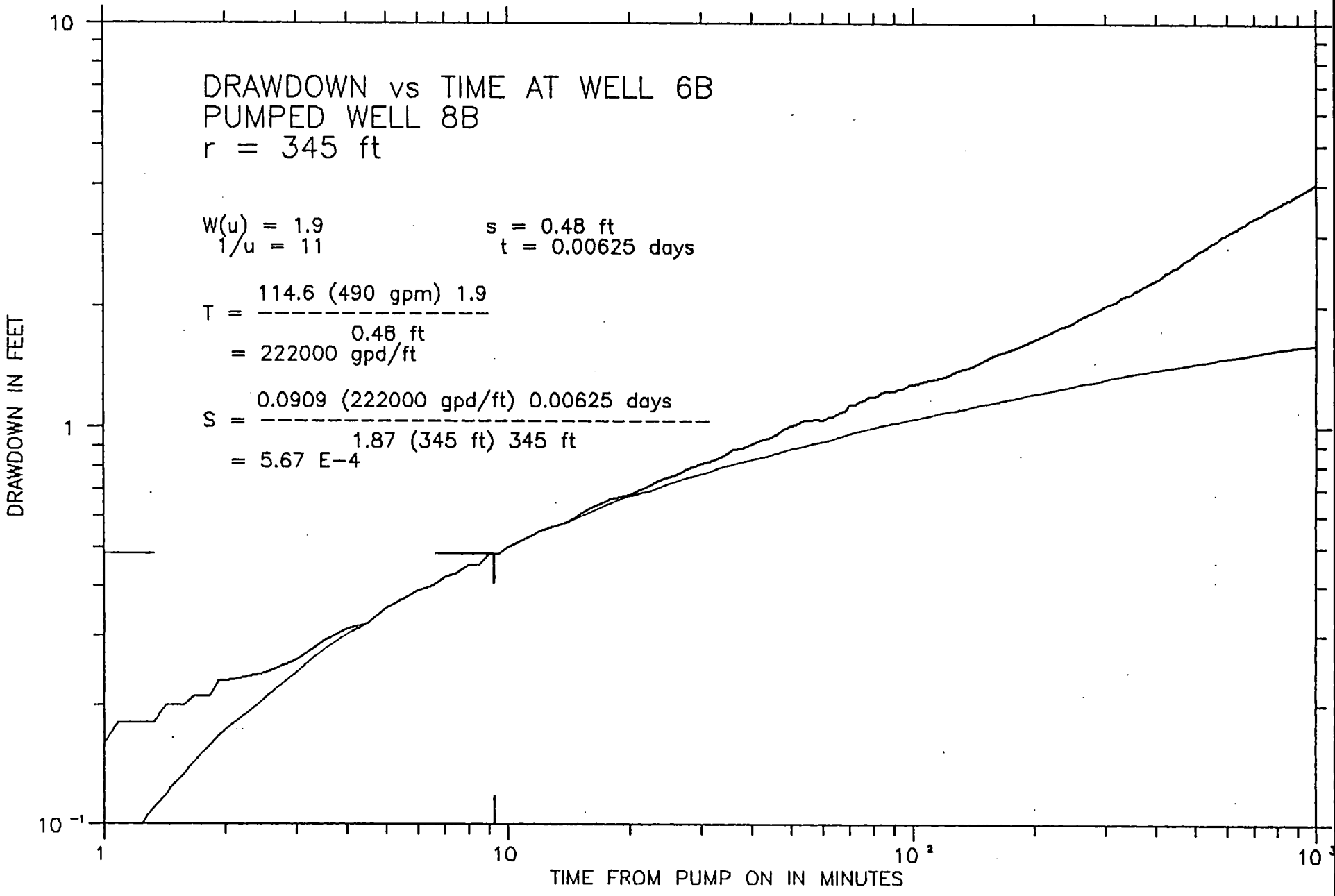

WATER ELEVATION vs TIME FOR WELL 16-B
PUMPED WELL 15-B, Q = 58 gpm
WATER ELEVATION IN FEET (msl)
45.5
45.4
45.3
45.2
45.1
45
44.9
44.8
44.7
44.6
44.5
44.4
44.3
44.2
44.1
0
2
4
(Thousands)
TIME IN MINUTES FROM 1630 9/16/86.

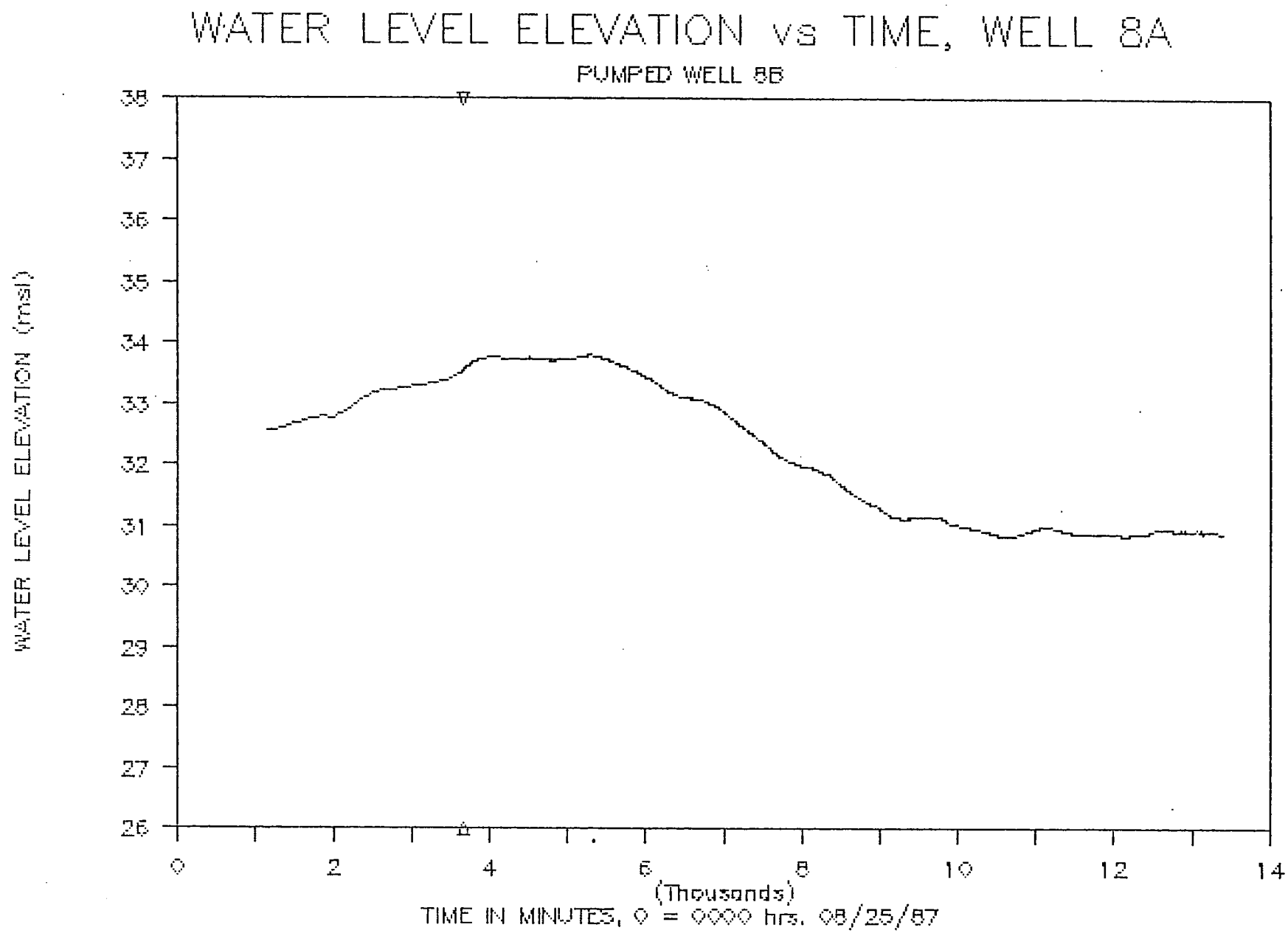
ATTACHMENT G.8

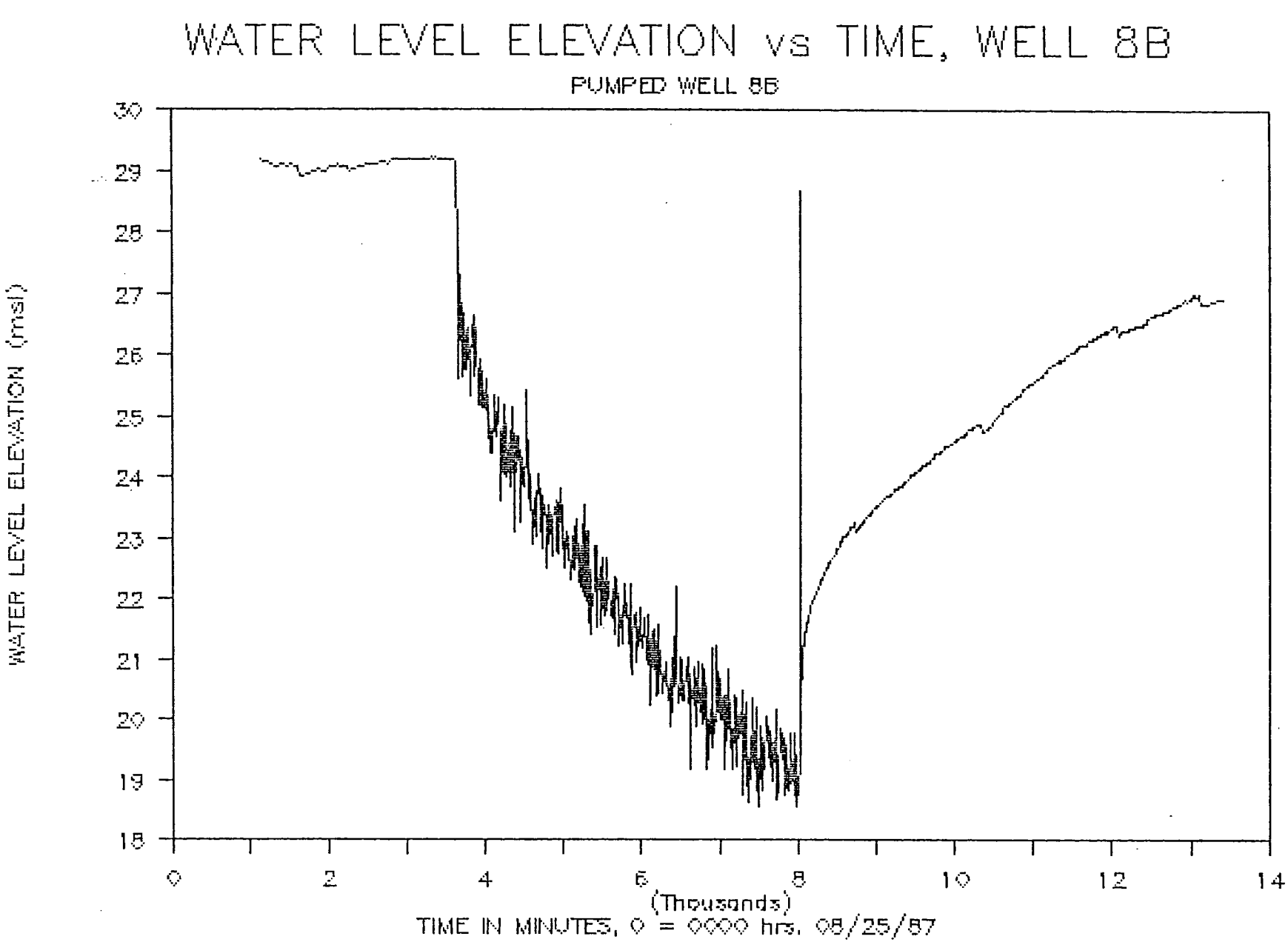
PUMP-TEST ANALYSIS, WELL 8B

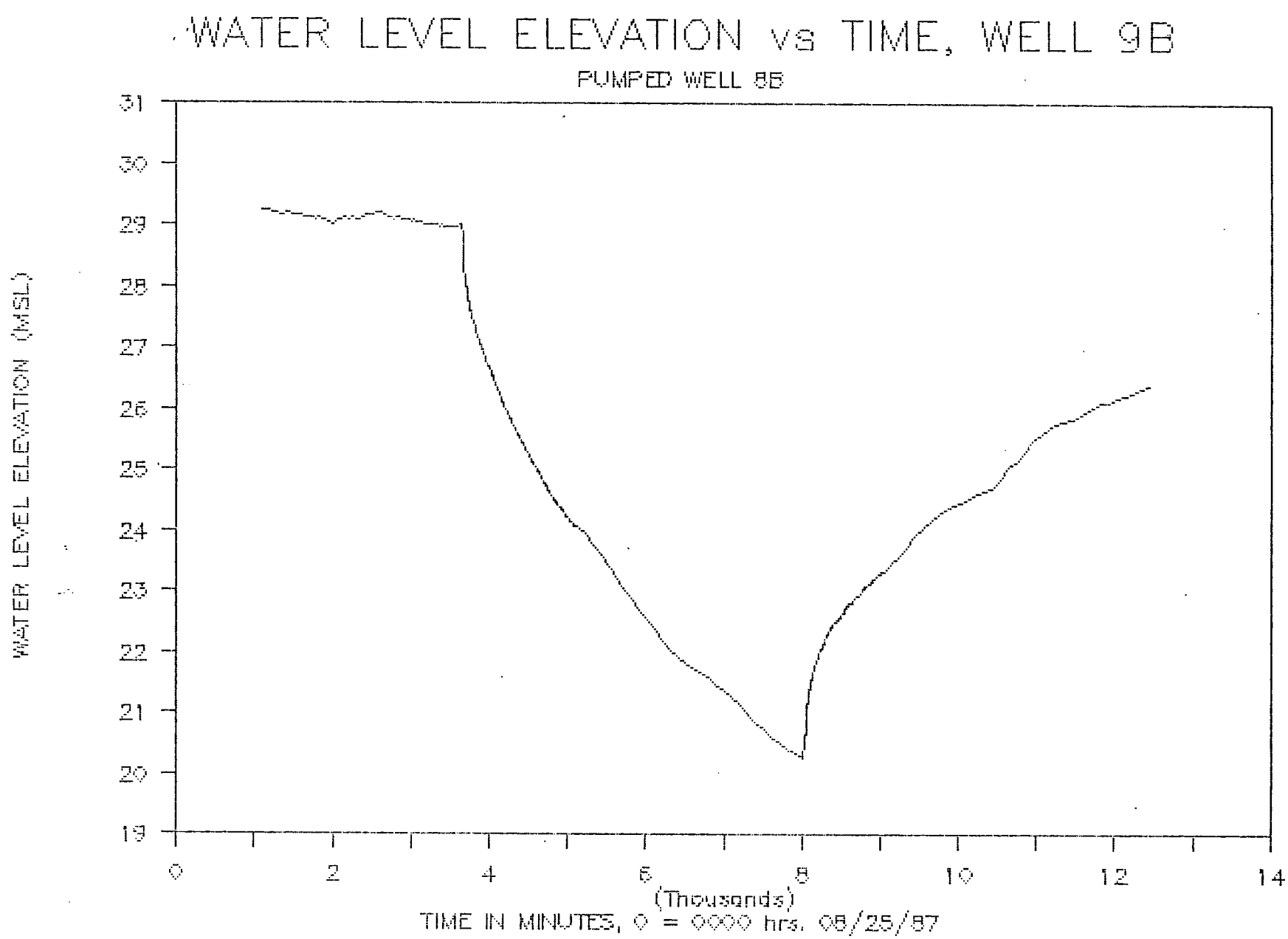

WATER LEVEL ELEVATION vs TIME, WELL 1B
PUMPED WELL 8B
WATER LEVEL ELEVATION (msl)
34
33
32
31
30
29
28
27
26
25
24
23
22
0
2
4
6
8
10
12
14
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/25/87

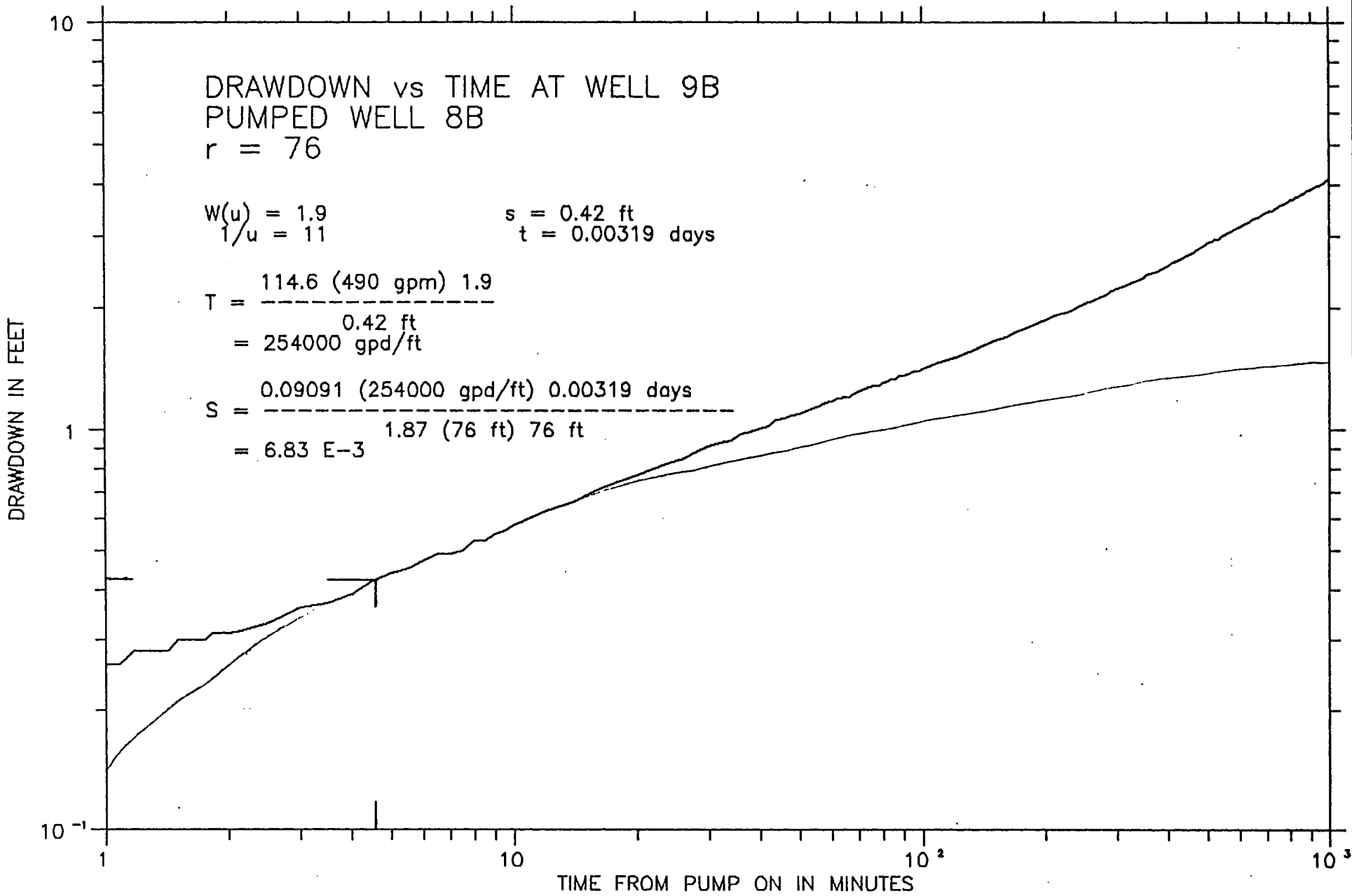

WATER LEVEL ELEVATION vs TIME, WELL 6B
PUMPED WELL 6B
WATER LEVEL ELEVATION (msl)
31
30
29
28
27
26
25
24
23
22
21
20
19
0
2
4
6
8
10
12
14
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/25/87

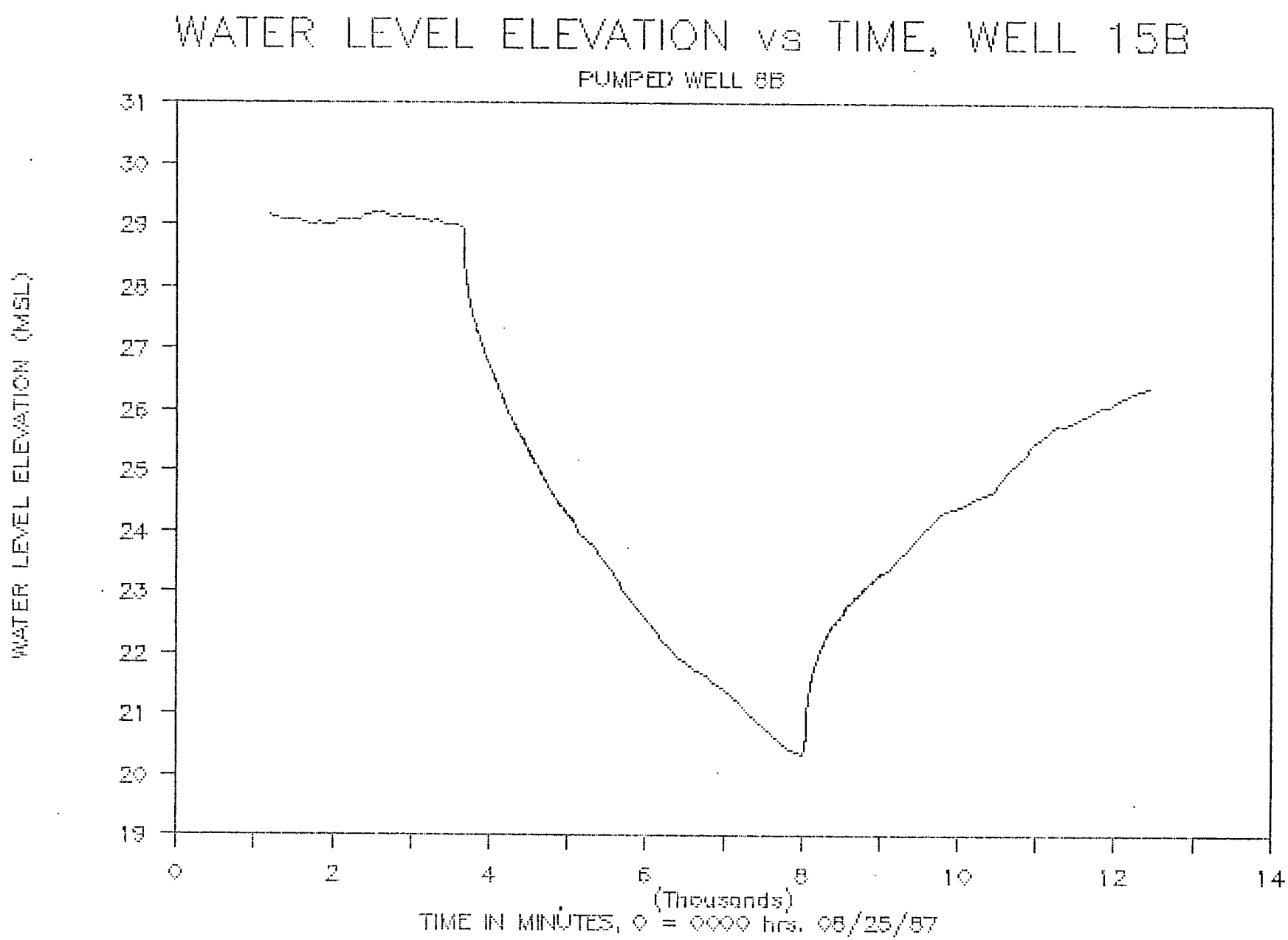

DRAWDOWN vs TIME AT WELL 6B
PUMPED WELL 8B
r = 345 ft
W(u) = 1.9
1/u = 11
s = 0.48 ft
t = 0.00625 days
T = 114.6 (490 gpm) 1.9 / 0.48 ft
= 222000 gpd/ft
S = 0.0909 (222000 gpd/ft) 0.00625 days / 1.87 (345 ft) 345 ft
= 5.67 E-4
10
1
10 -1
1
10
10 2
10 3
DRAWDOWN IN FEET
TIME FROM PUMP ON IN MINUTES

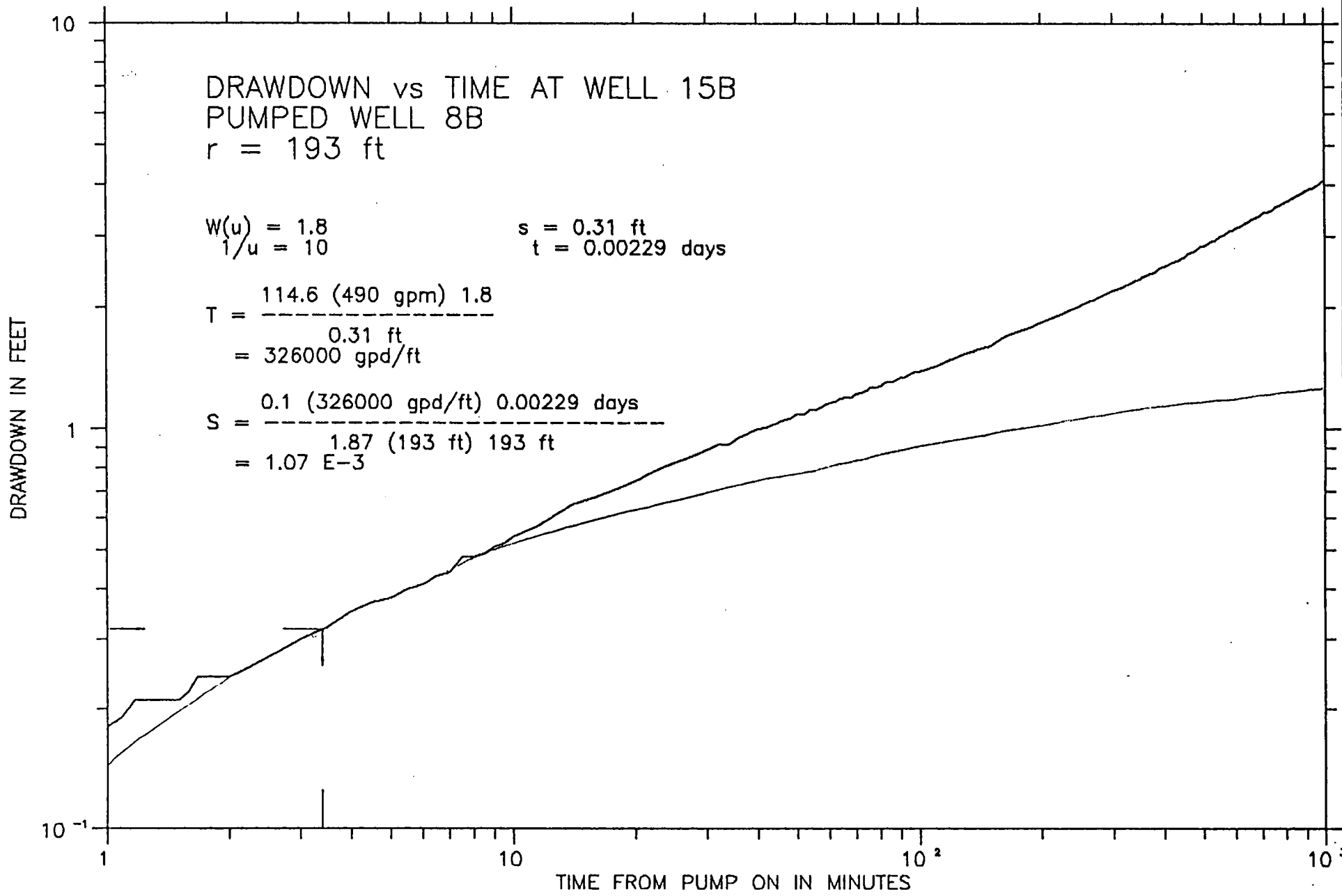

WATER LEVEL ELEVATION vs TIME, WELL 8A
PUMPED WELL 8B
WATER LEVEL ELEVATION (msl)
38
37
36
35
34
33
32
31
30
29
28
27
26
0
2
4
6
8
10
12
14
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/25/87

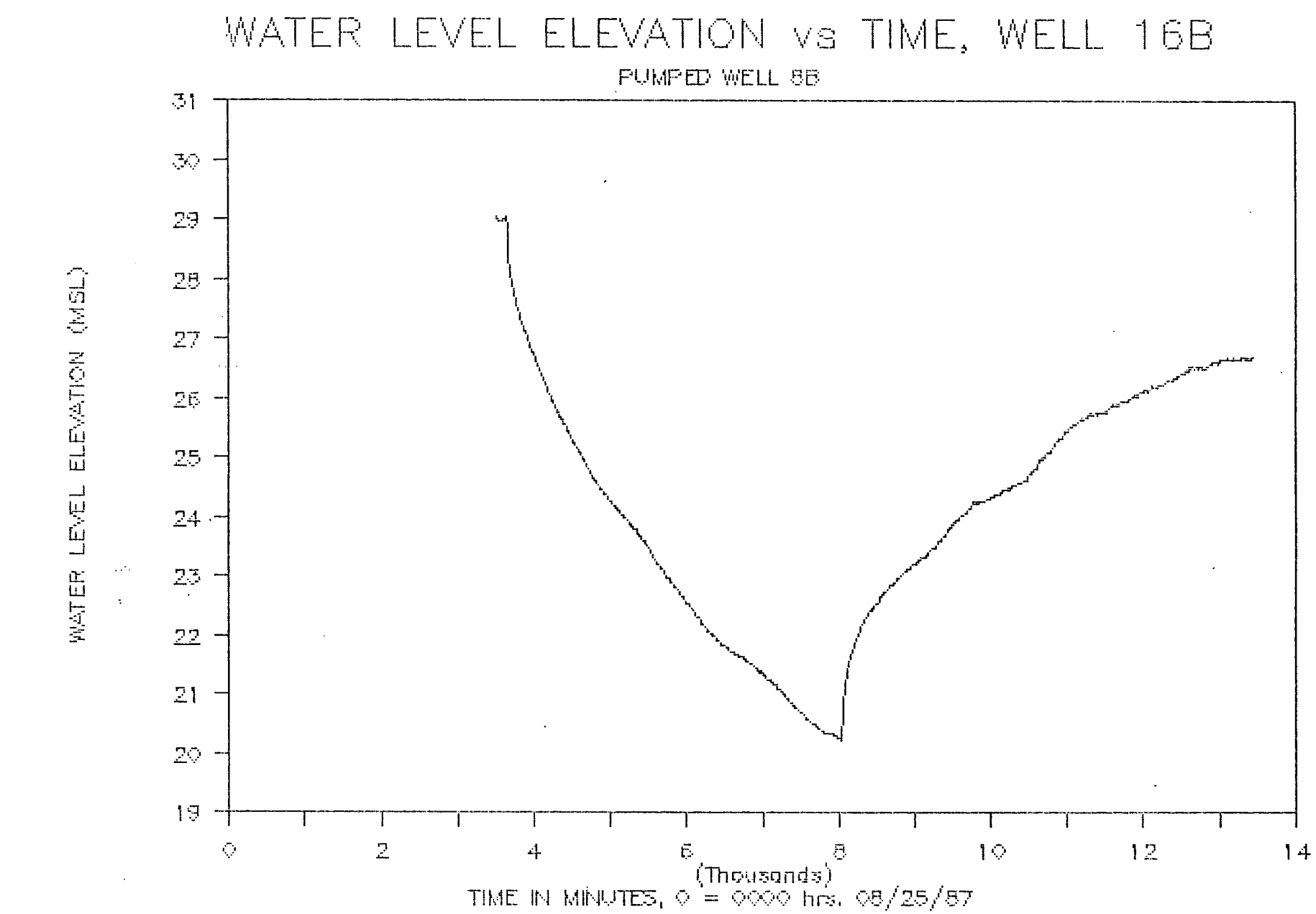

WATER LEVEL ELEVATION vs TIME, WELL 8B
PUMPED WELL 8B
WATER LEVEL ELEVATION (msl)
30
29
28
27
26
25
24
23
22
21
20
19
18
0
2
4
6
8
10
12
14
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/25/87

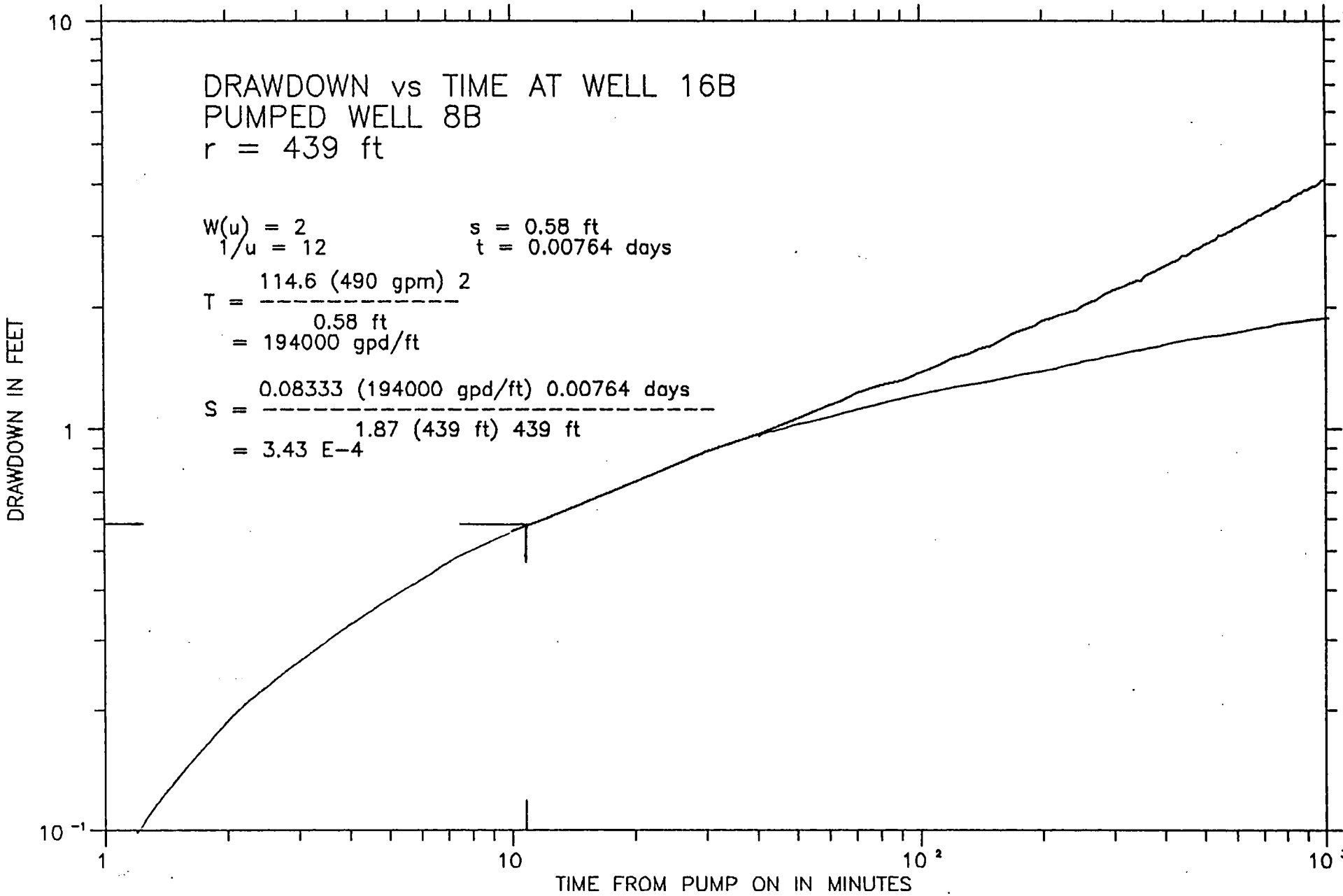

WATER LEVEL ELEVATION vs TIME, WELL 9B
PUMPED WELL 8B
WATER LEVEL ELEVATION (MSL)
31
30
29
28
27
26
25
24
23
22
21
20
19
0
2
4
6
8
10
12
14
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/25/87


DRAWDOWN vs TIME AT WELL 9B
PUMPED WELL 8B
r = 76
W(u) = 1.9
1/u = 11
s = 0.42 ft
t = 0.00319 days
T = 114.6 (490 gpm) 1.9 / 0.42 ft
= 254000 gpd/ft
S = 0.09091 (254000 gpd/ft) 0.00319 days / 1.87 (76 ft) 76 ft
= 6.83 E-3
10
1
10 -1
1
10
10 2
10 3
DRAWDOWN IN FEET
TIME FROM PUMP ON IN MINUTES

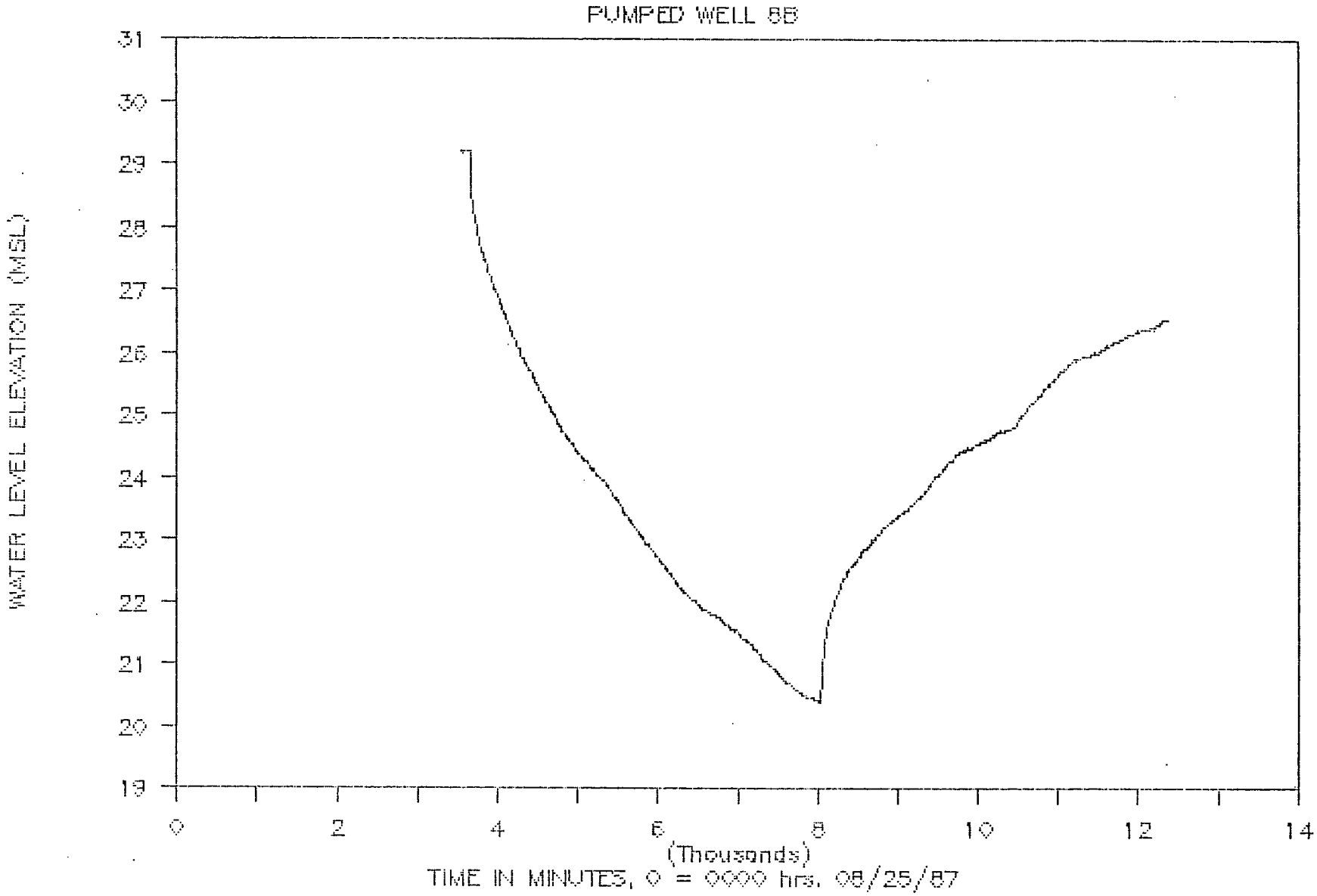

WATER LEVEL ELEVATION vs TIME, WELL 15B
PUMPED WELL 8B
WATER LEVEL ELEVATION (MSL)
31
30
29
28
27
26
25
24
23
22
21
20
19
0
2
4
6
8
10
12
14
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/25/87

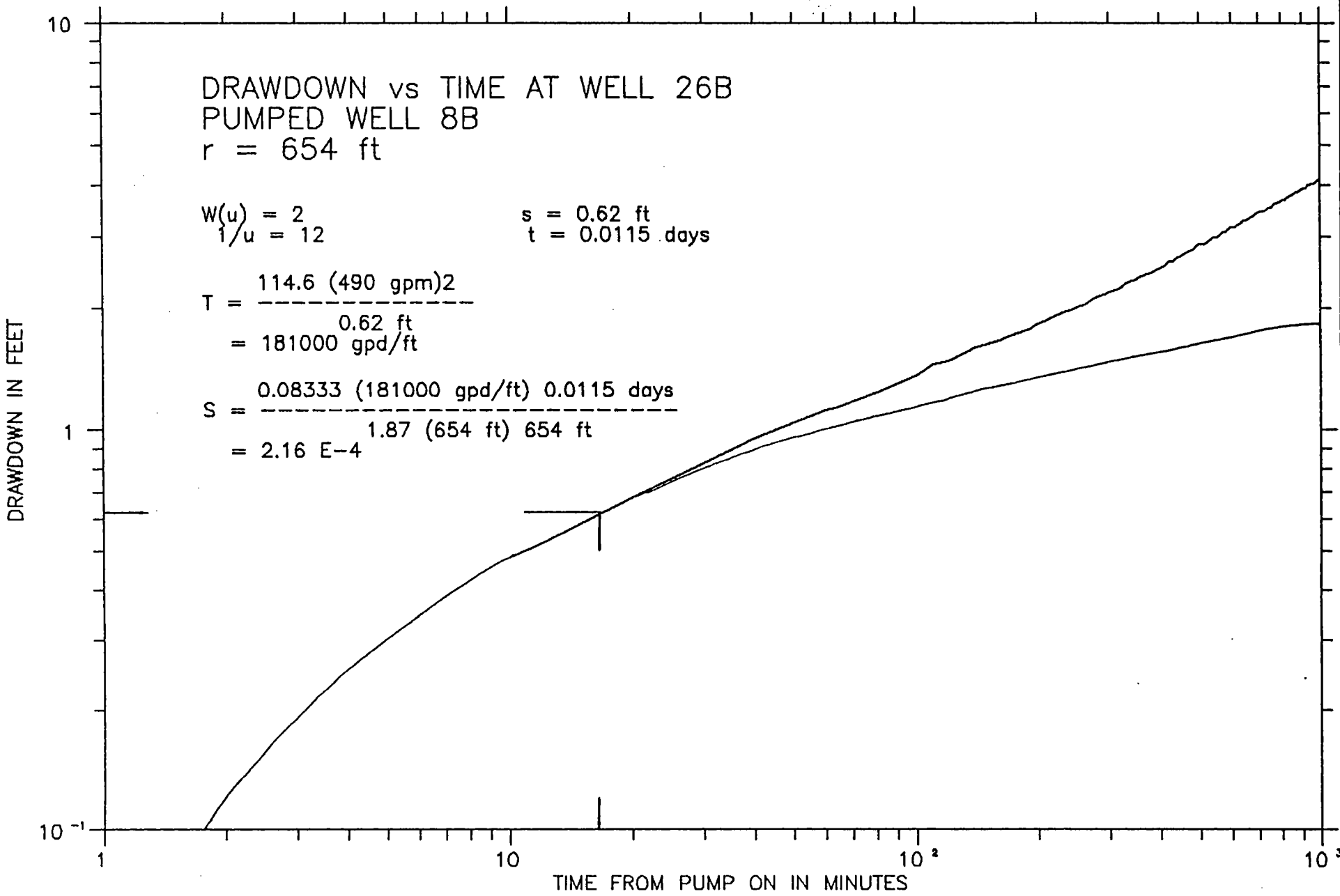

DRAWDOWN vs TIME AT WELL 15B
PUMPED WELL 8B
r = 193 ft
W(u) = 1.8
1/u = 10
s = 0.31 ft
t = 0.00229 days
T = 114.6 (490 gpm) 1.8 / 0.31 ft
= 326000 gpd/ft
S = 0.1 (326000 gpd/ft) 0.00229 days / 1.87 (193 ft) 193 ft
= 1.07 E-3
DRAWDOWN IN FEET
10
1
10 -1
1
10
10 2
10
TIME FROM PUMP ON IN MINUTES

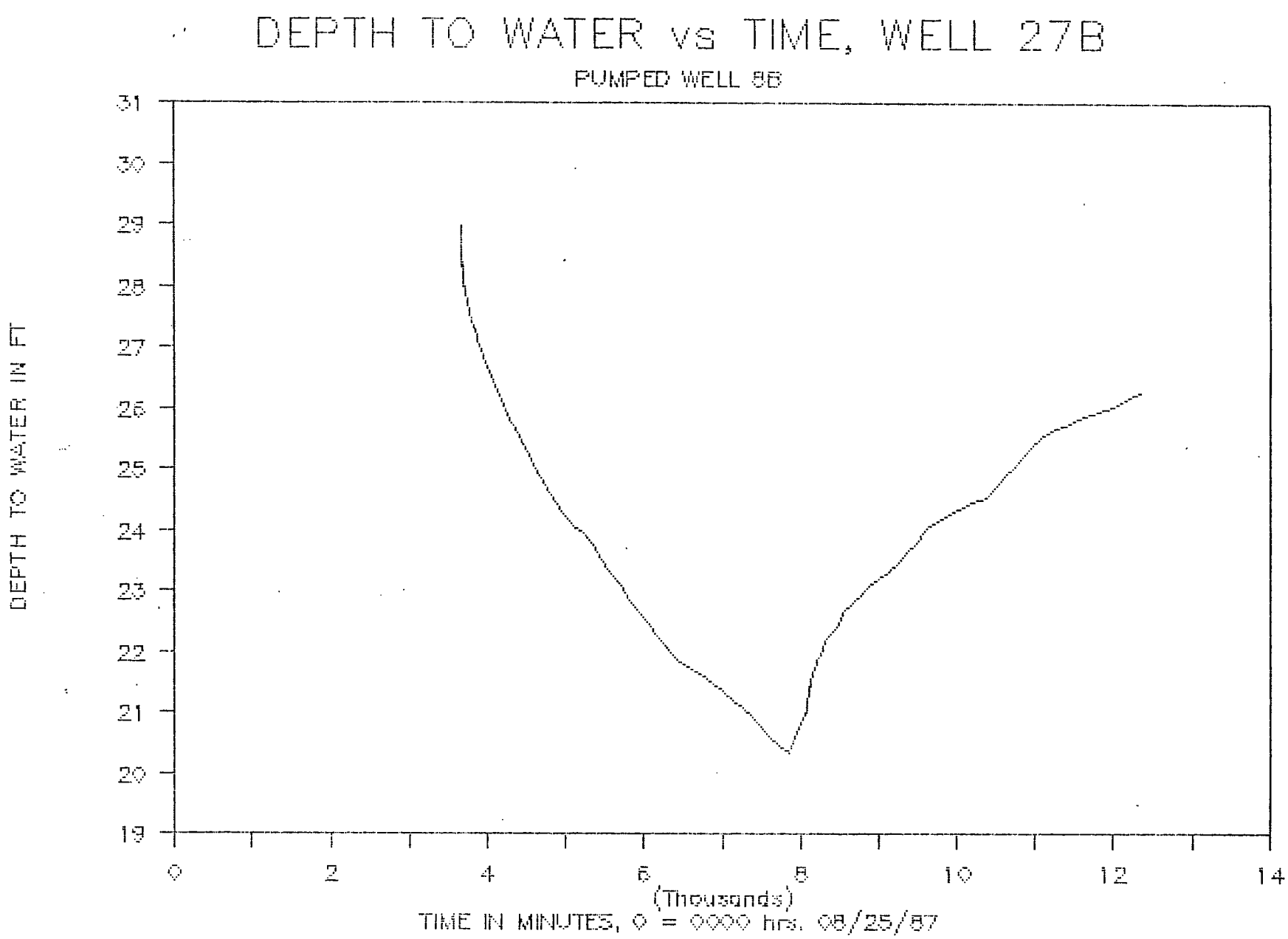

WATER LEVEL ELEVATION vs TIME, WELL 16B
PUMPED WELL 8B
WATER LEVEL ELEVATION (MSL)
31
30
29
28
27
26
25
24
23
22
21
20
19
0
2
4
6
8
10
12
14
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/25/87

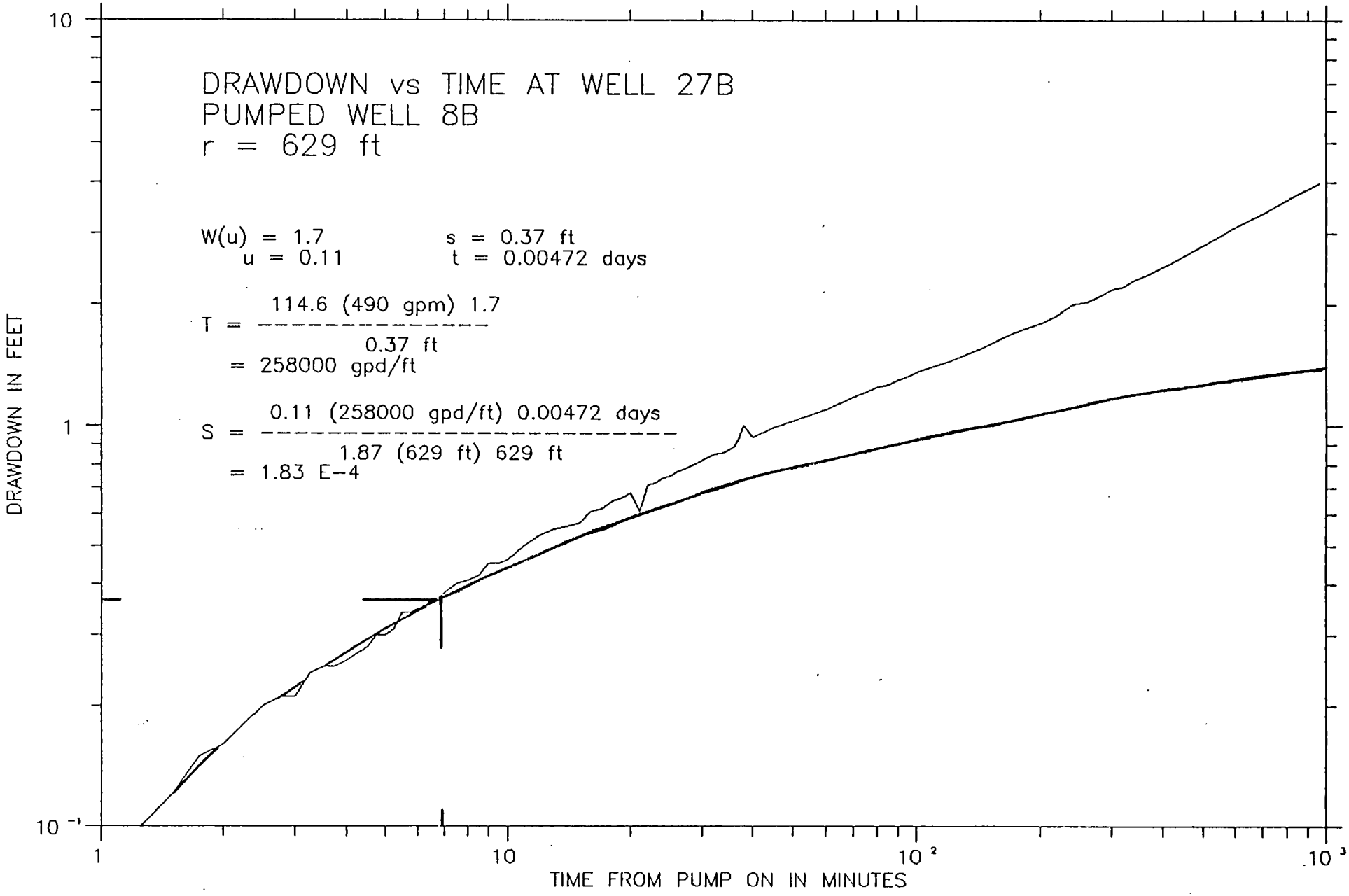

DRAWDOWN vs TIME AT WELL 16B
PUMPED WELL 8B
r = 439 ft
W(u) = 2
1/u = 12
s = 0.58 ft
t = 0.00764 days
T = 114.6 (490 gpm) 2 / 0.58 ft
= 194000 gpd/ft
S = 0.08333 (194000 gpd/ft) 0.00764 days / 1.87 (439 ft) 439 ft
= 3.43 E-4
DRAWDOWN IN FEET
TIME FROM PUMP ON IN MINUTES
10
1
10 -1
1
10
10 2

WATER LEVEL ELEVATION vs TIME, WELL 26B




DRAWDOWN vs TIME AT WELL 26B
PUMPED WELL 8B
r = 654 ft
W(u) = 2
1/u = 12
s = 0.62 ft
t = 0.0115 days
T = 114.6 (490 gpm)2 / 0.62 ft
= 181000 gpd/ft
S = 0.08333 (181000 gpd/ft) 0.0115 days / 1.87 (654 ft) 654 ft
= 2.16 E-4
DRAWDOWN IN FEET
TIME FROM PUMP ON IN MINUTES
10
1
10 -1
1
10
10 2
10 3


DEPTH TO WATER vs TIME, WELL 27B
PUMPED WELL 8B
DEPTH TO WATER IN FT
31
30
29
28
27
26
25
24
23
22
21
20
19
0
2
4
6
8
10
12
14
(Thousands)
TIME IN MINUTES, 0 = 0000 hrs. 08/25/87


DRAWDOWN vs TIME AT WELL 27B
PUMPED WELL 8B
r = 629 ft
W(u) = 1.7
u = 0.11
s = 0.37 ft
t = 0.00472 days
T = 114.6 (490 gpm) 1.7 / 0.37 ft
= 258000 gpd/ft
S = 0.11 (258000 gpd/ft) 0.00472 days / 1.87 (629 ft) 629 ft
= 1.83 E-4
10
1
10 -1
1
10
10 ²
10 ³
DRAWDOWN IN FEET
TIME FROM PUMP ON IN MINUTES

G-182

ATTACHMENT G.9:

POTENTIOMETRIC CROSS SECTIONS AND MAPS

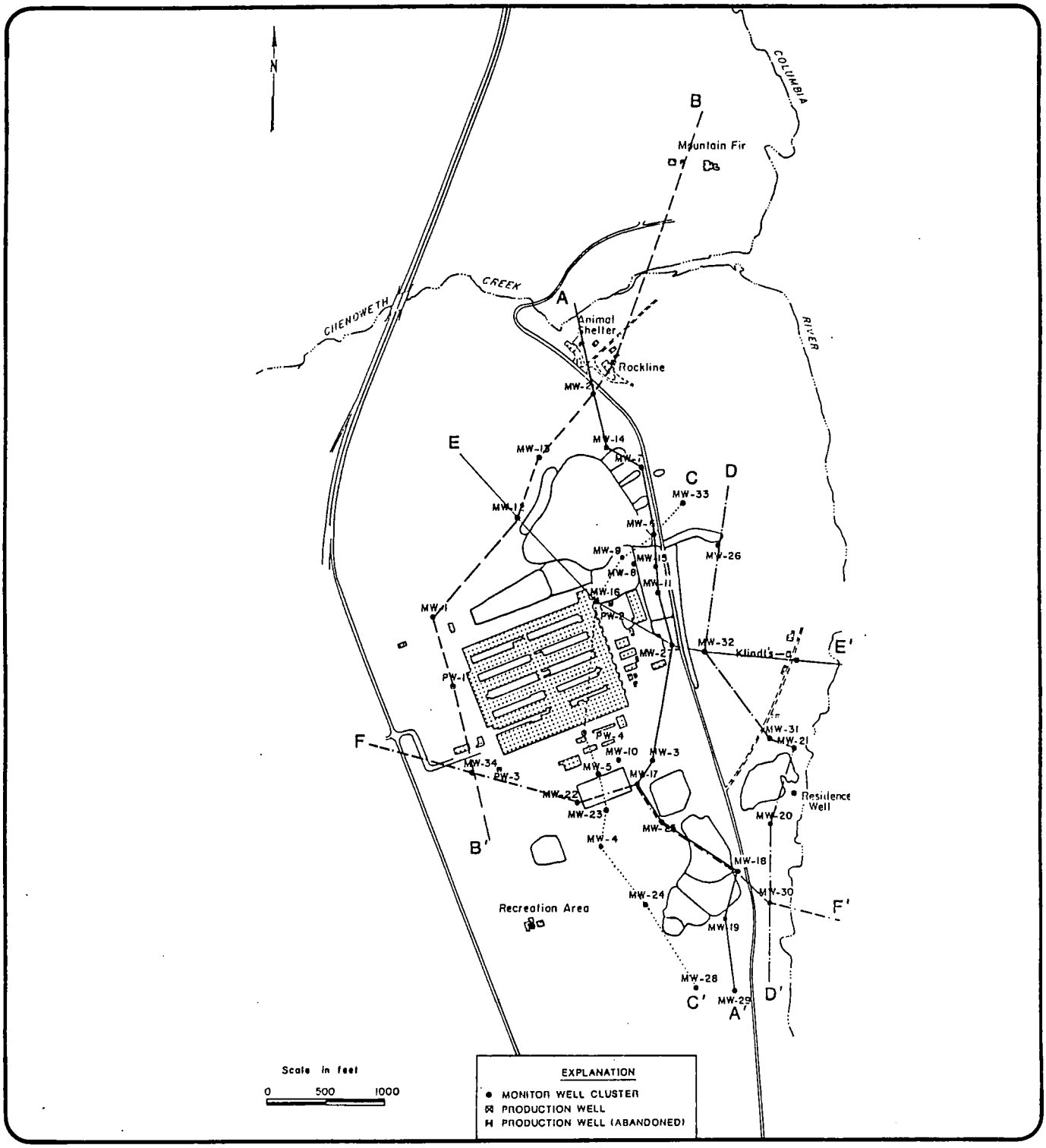


Figure G.9.1 Cross Section Location Map

CLIENT NAME:

Martin Marietta Corporation

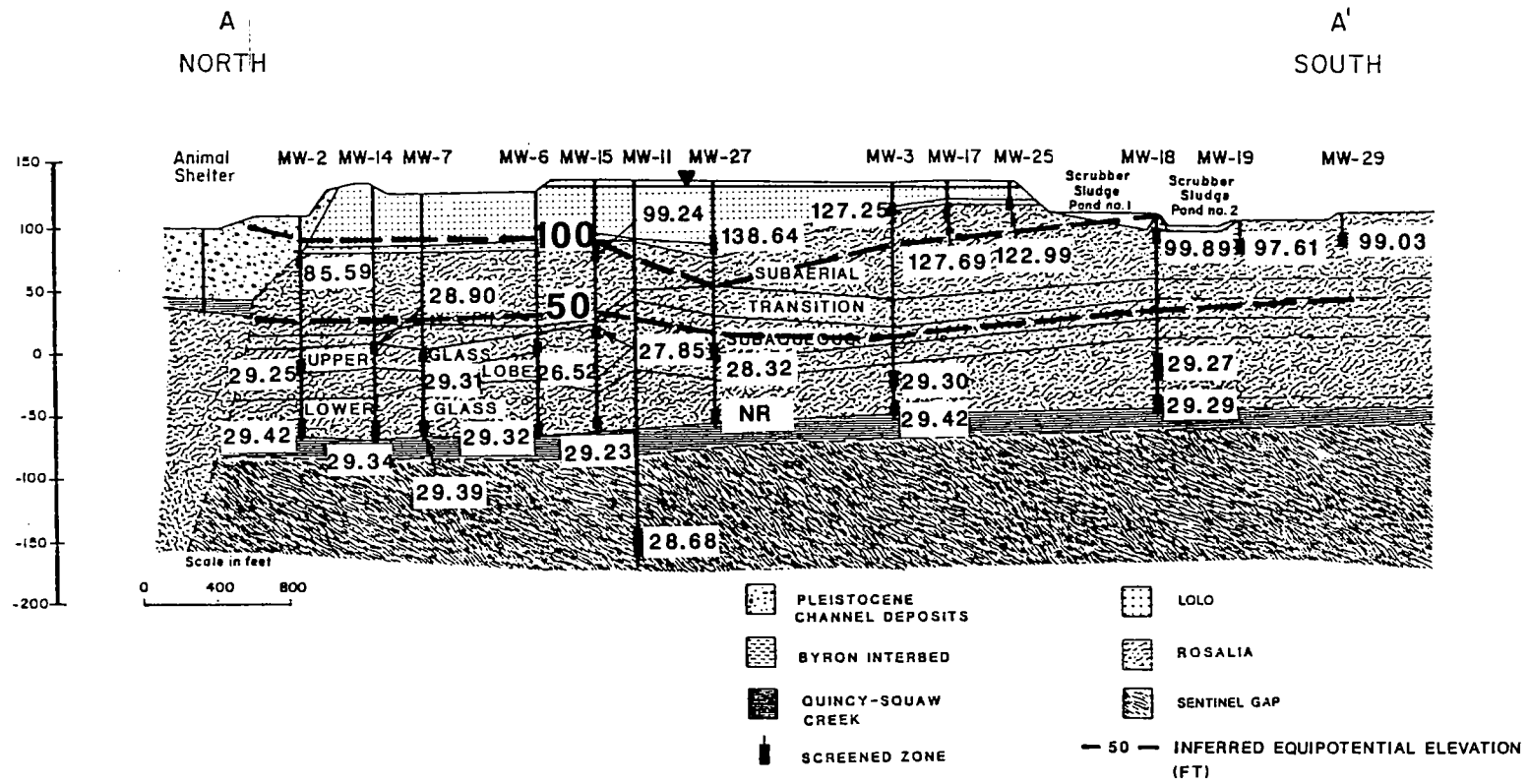
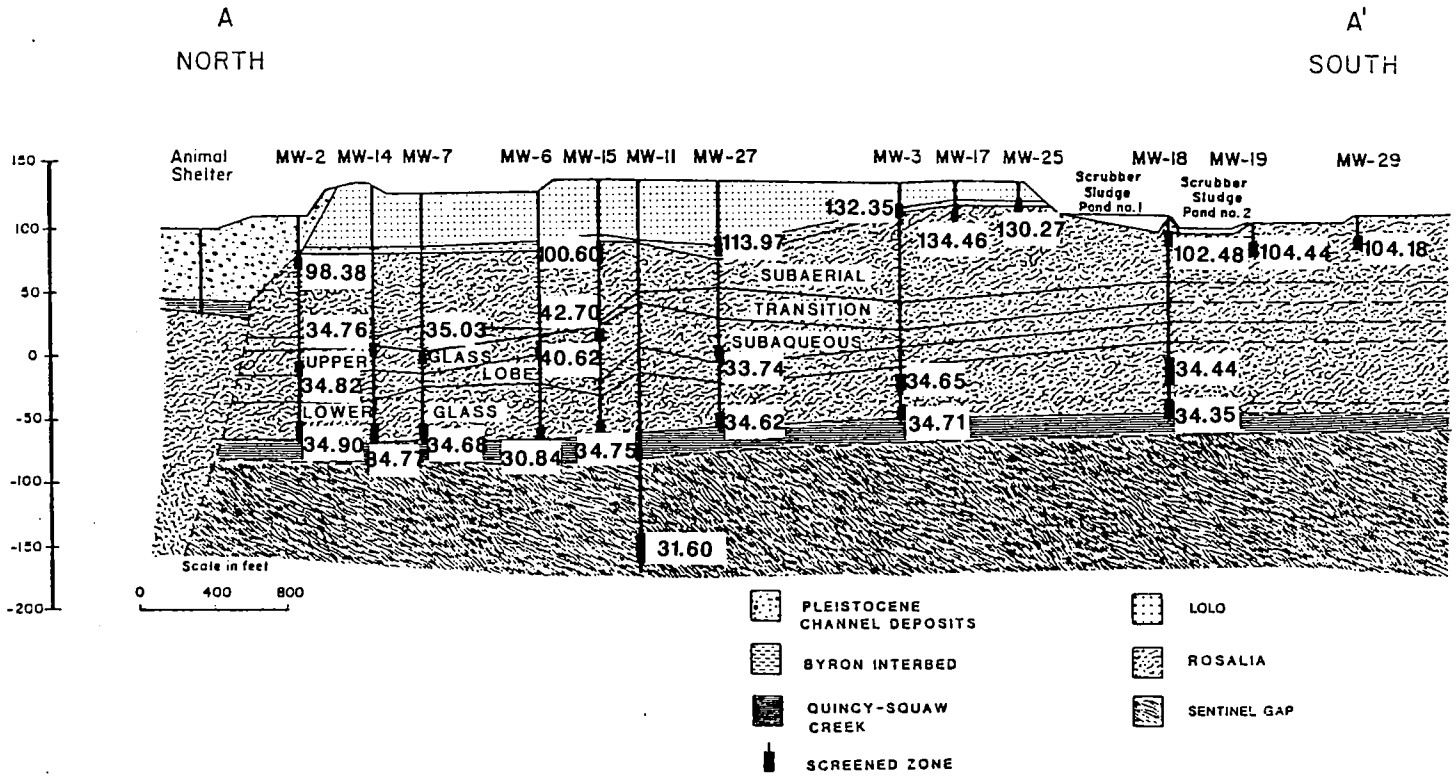


Figure G.9.2 Potentiometric Cross Section A-A' (8/28/87).

CLIENT NAME:

Martin Marietta Corporation



WATER LEVELS MEASURED 1/28/88

Figure G.9.3 Potentiometric Cross Section A-A' (1/28/88).

CLIENT NAME:

Martin Marietta Corporation

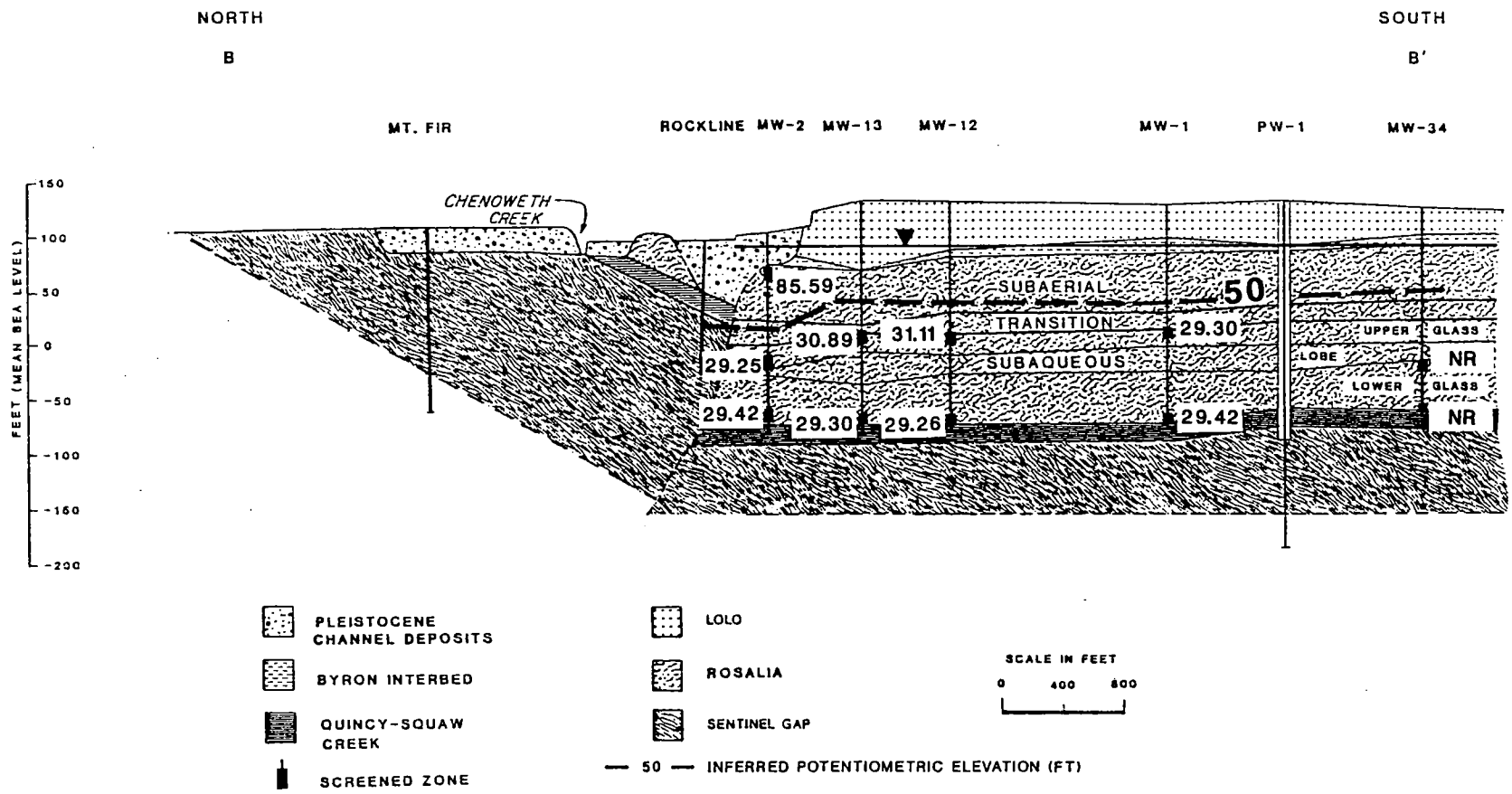


Figure G.9.4 Potentiometric Cross Section B-B' (8/28/87).

CLIENT NAME:

Martin Marietta Corporation

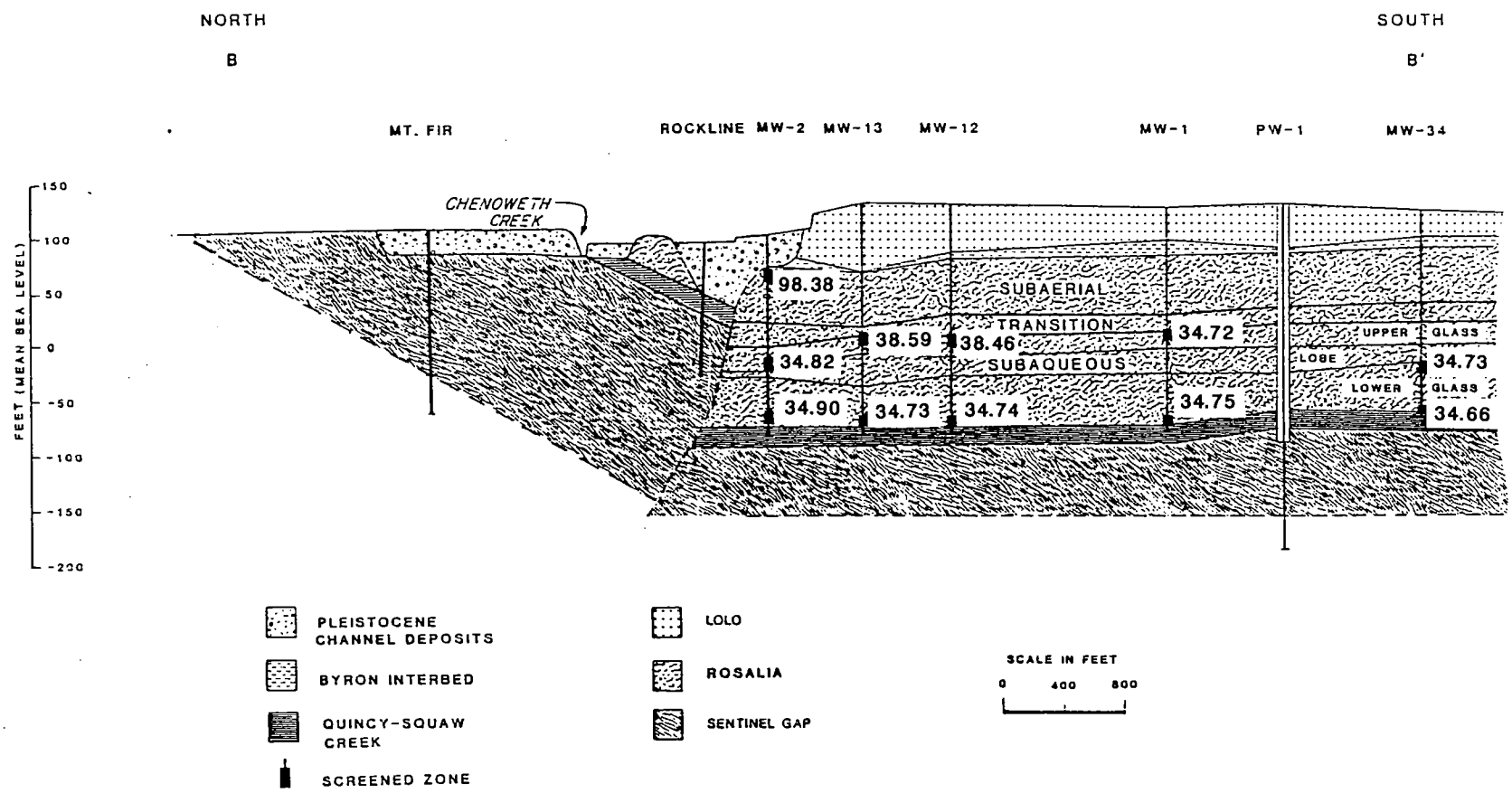


Figure G.9.5 Potentiometric Cross Section B-B' (1/28/88).

CLIENT NAME:

Martin Marietta Corporation

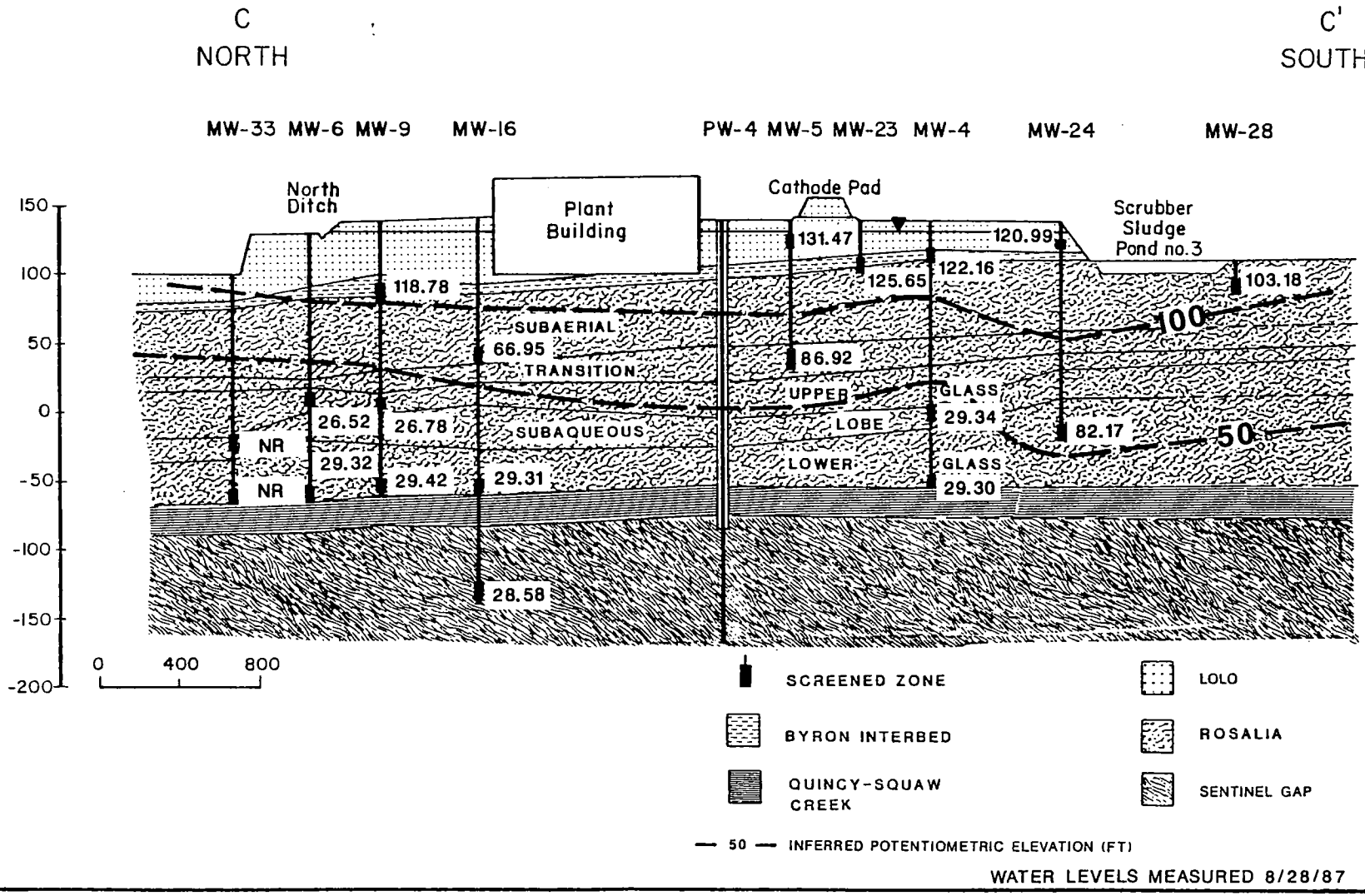


Figure G.9.6 Potentiometric Cross Section C-C' (8/28/87).

CLIENT NAME:

Martin Marietta Corporation

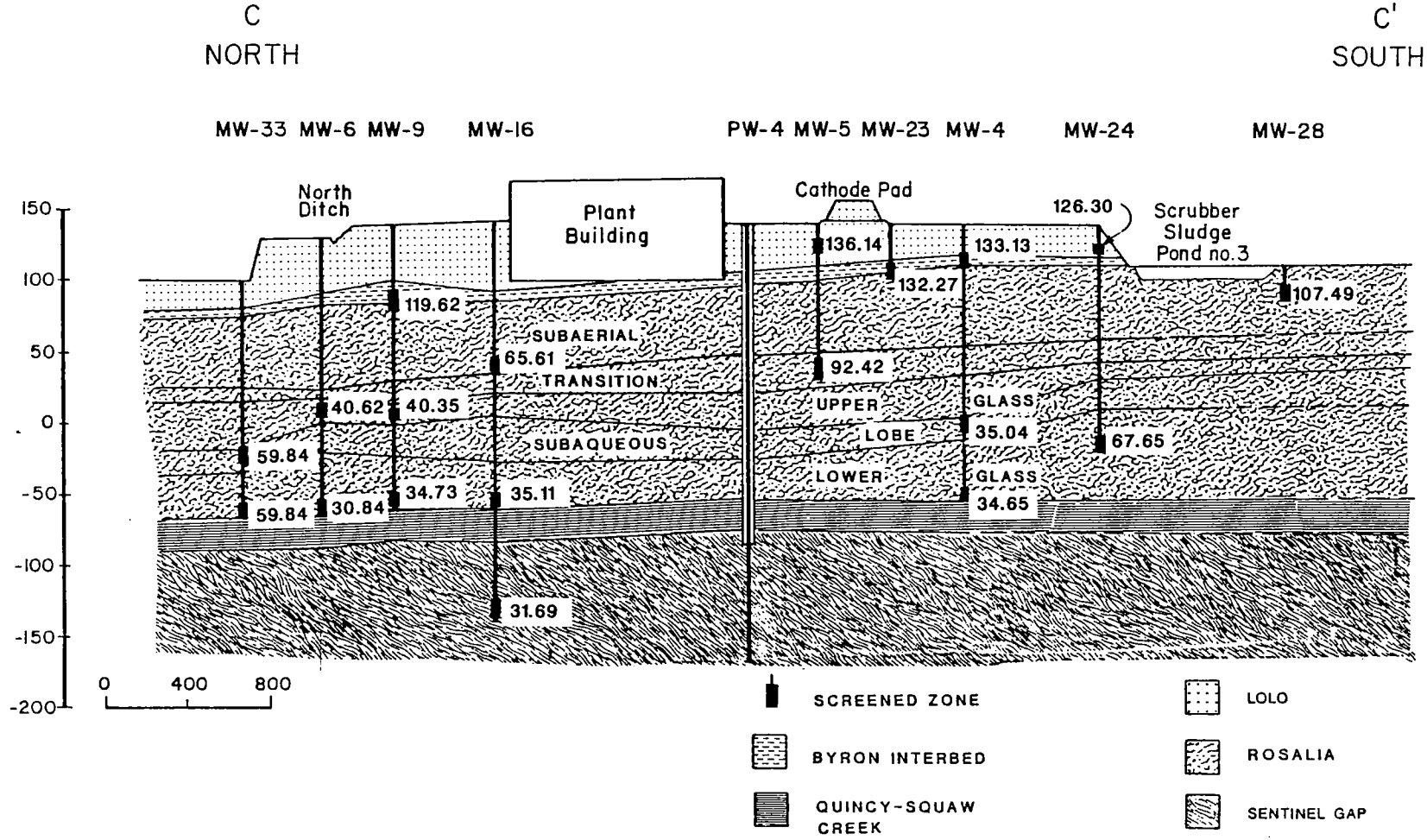
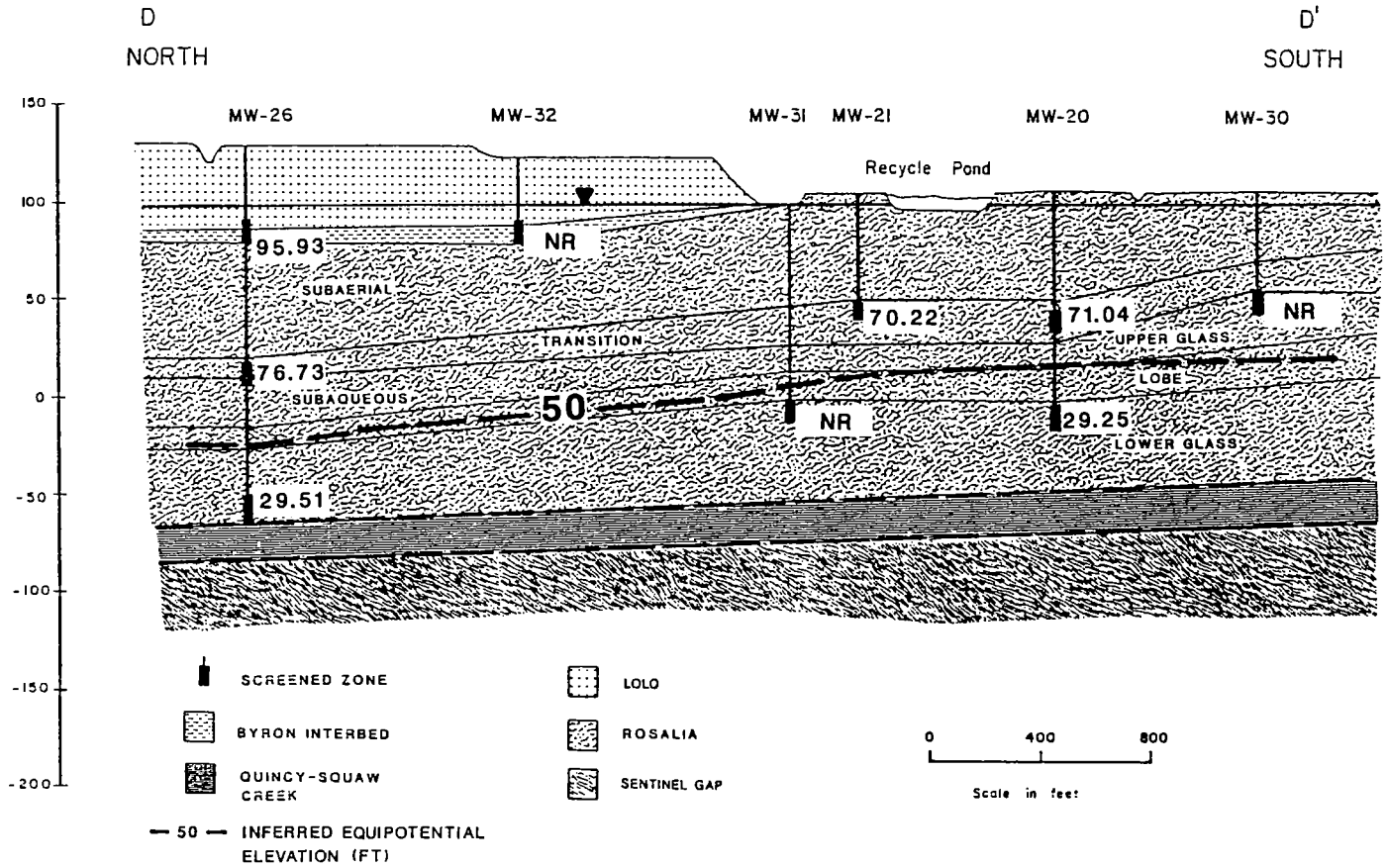


Figure G.9.7 Potentiometric Cross Section C-C' (1/28/88).

CLIENT NAME:

Martin Marietta Corporation

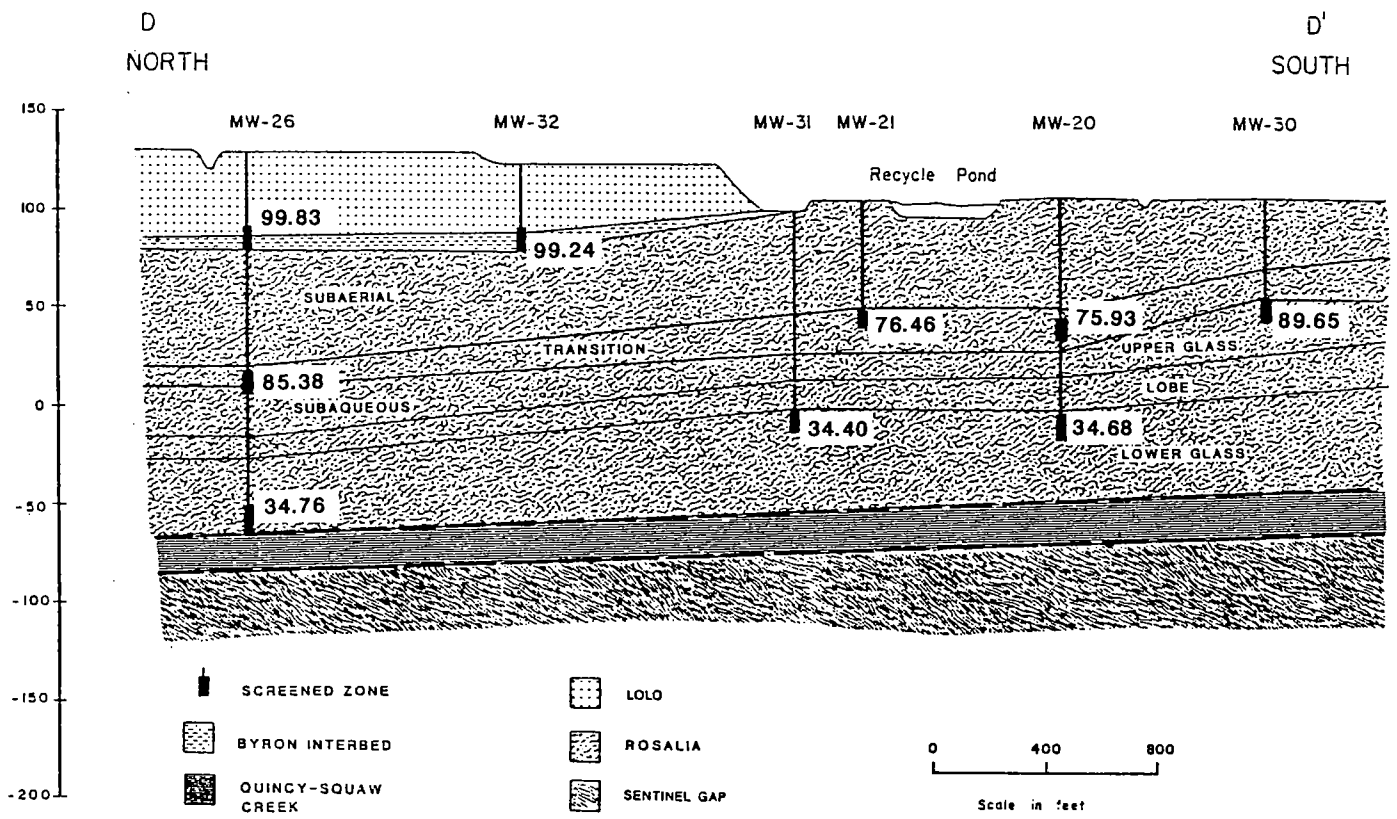


WATER LEVELS MEASURED 8/28/87

Figure G.9.8 Potentiometric Cross Section D-D' (8/28/87).

CLIENT NAME:

Martin Marietta Corporation



WATER LEVELS MEASURED 1/28/88

Figure G.9.9 Potentiometric Cross Section D-D' (1/28/88).

CLIENT NAME:

Martin Marietta Corporation

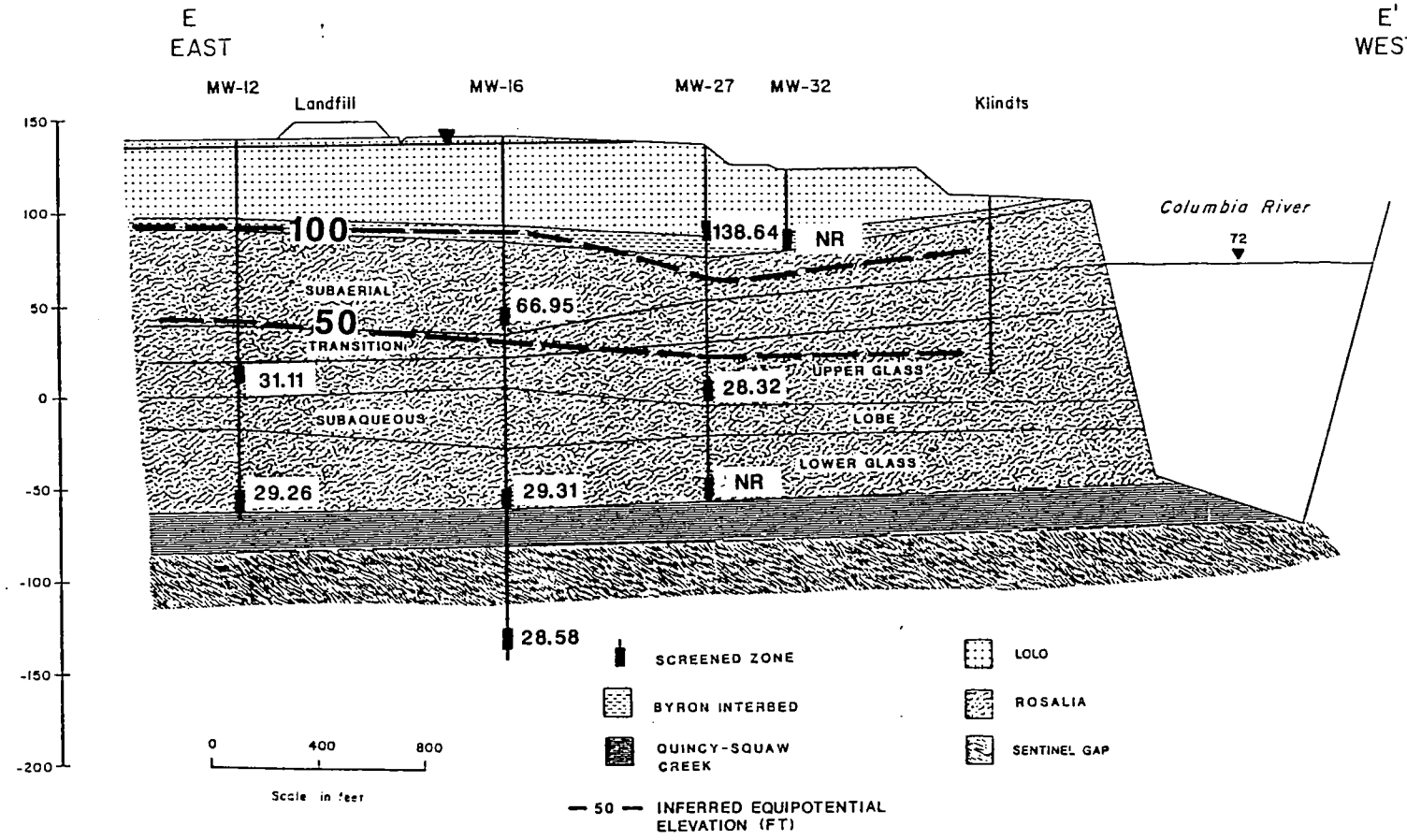


Figure G.9.10 Potentiometric Cross Section E-E' (8/28/87).

CLIENT NAME:

Martin Marietta Corporation

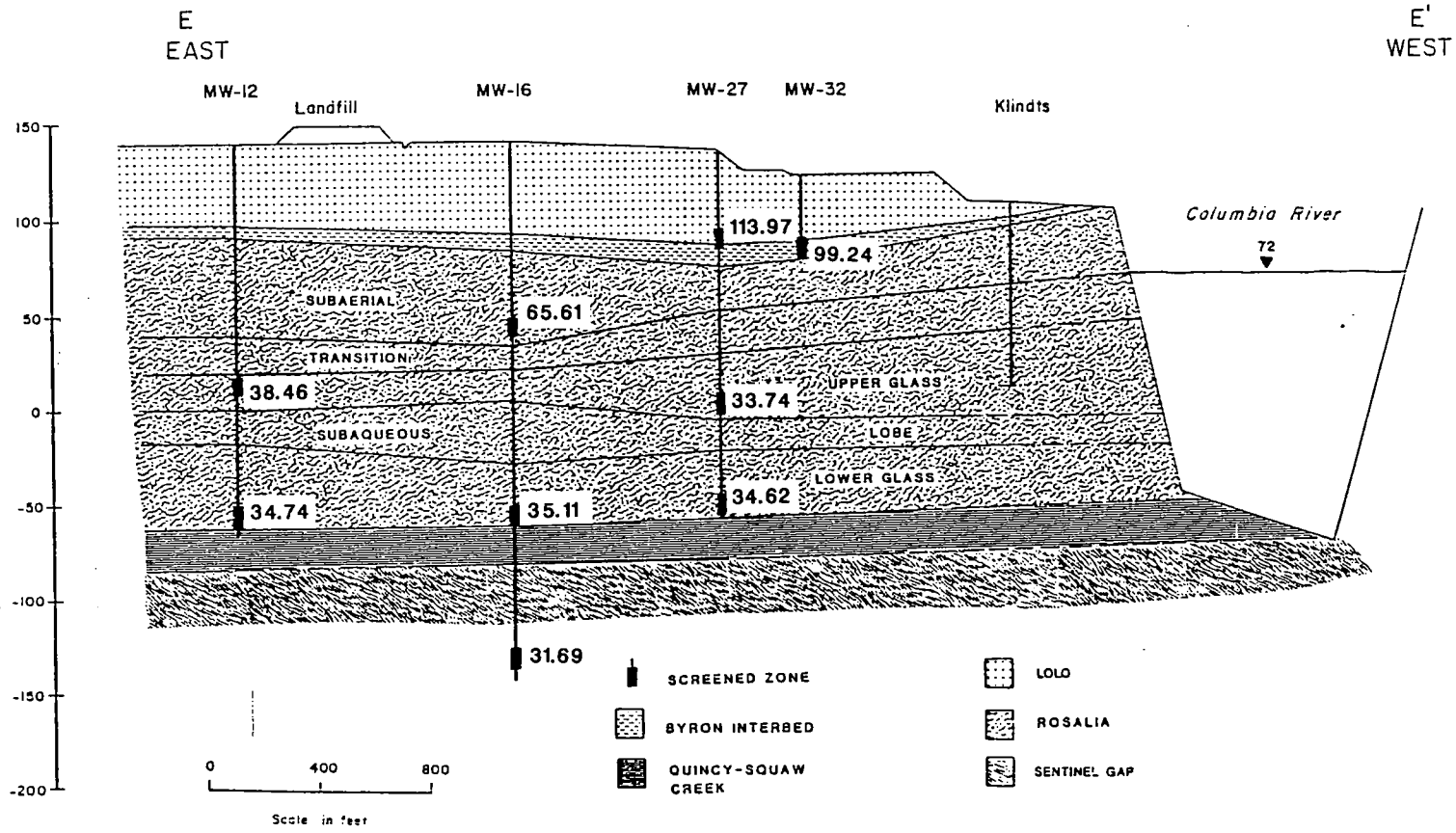


Figure G.9.11 Potentiometric Cross Section E-E' (1/28/88).

CLIENT NAME:

Martin Marietta Corporation

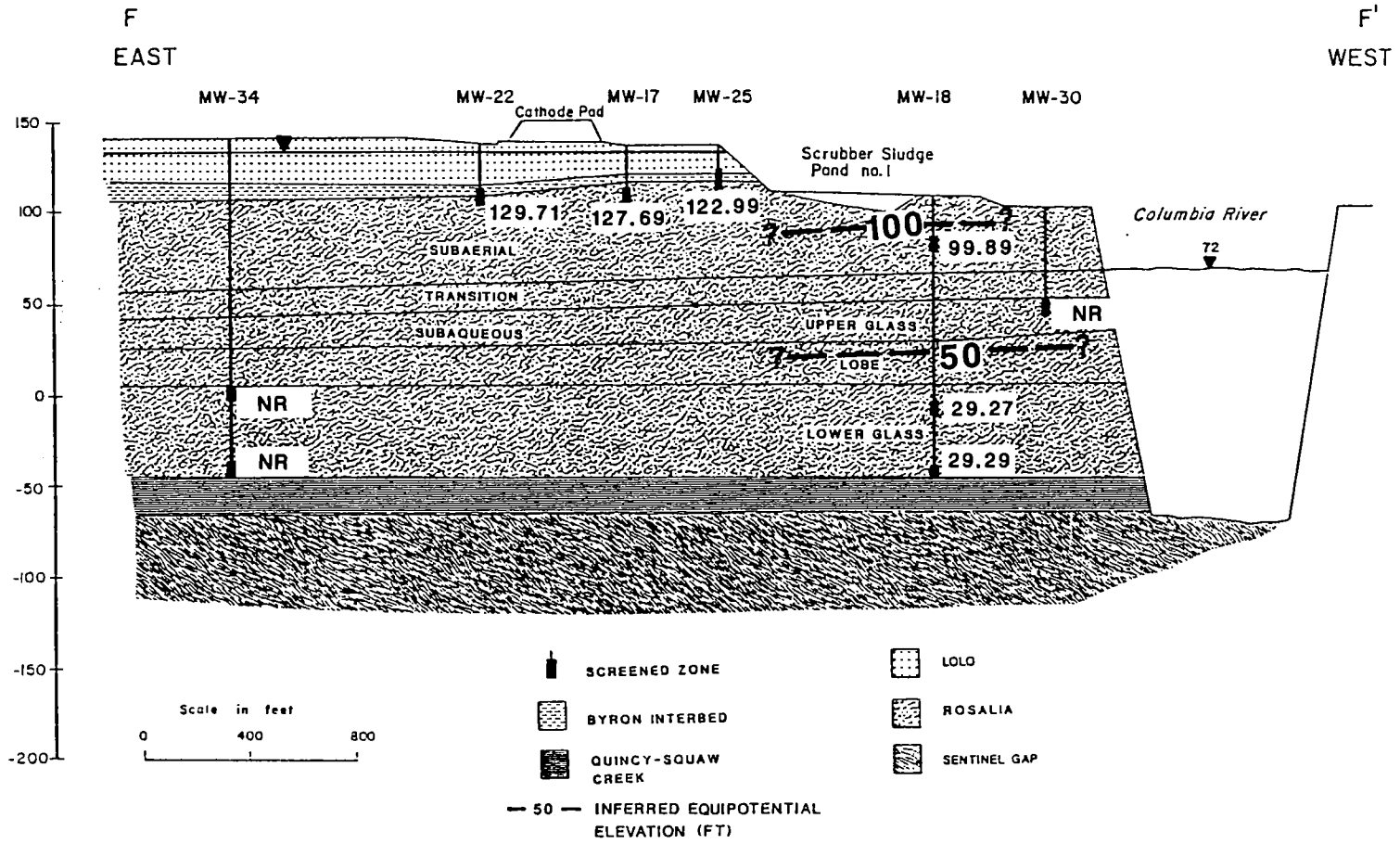


Figure G.9.12 Potentiometric Cross Section F-F' (8/28/87).

CLIENT NAME:

Martin Marietta Corporation

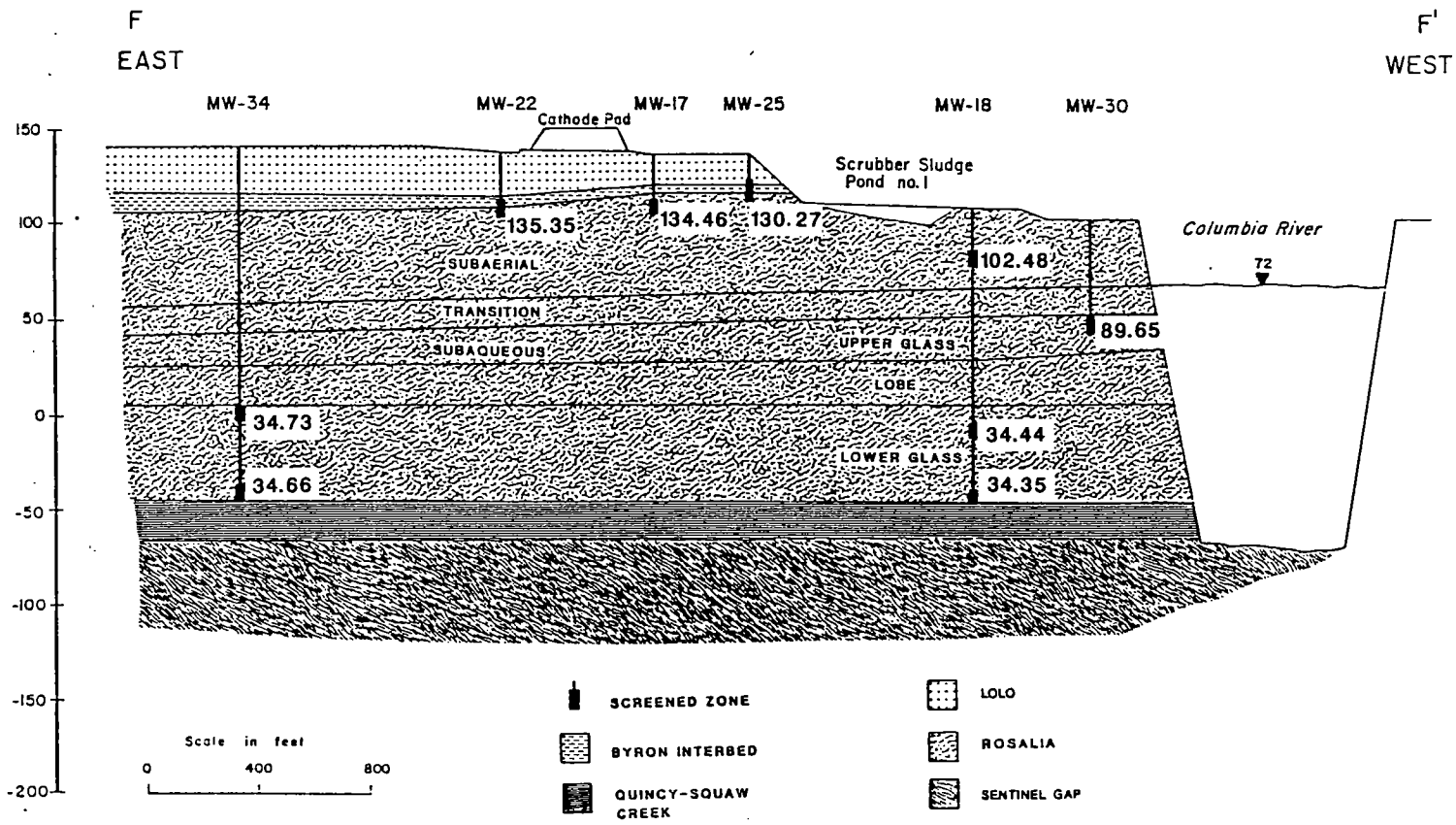


Figure G.9.13 Potentiometric Cross Section F-F' (1/28/88).

CLIENT NAME:

Martin Marietta Corporation

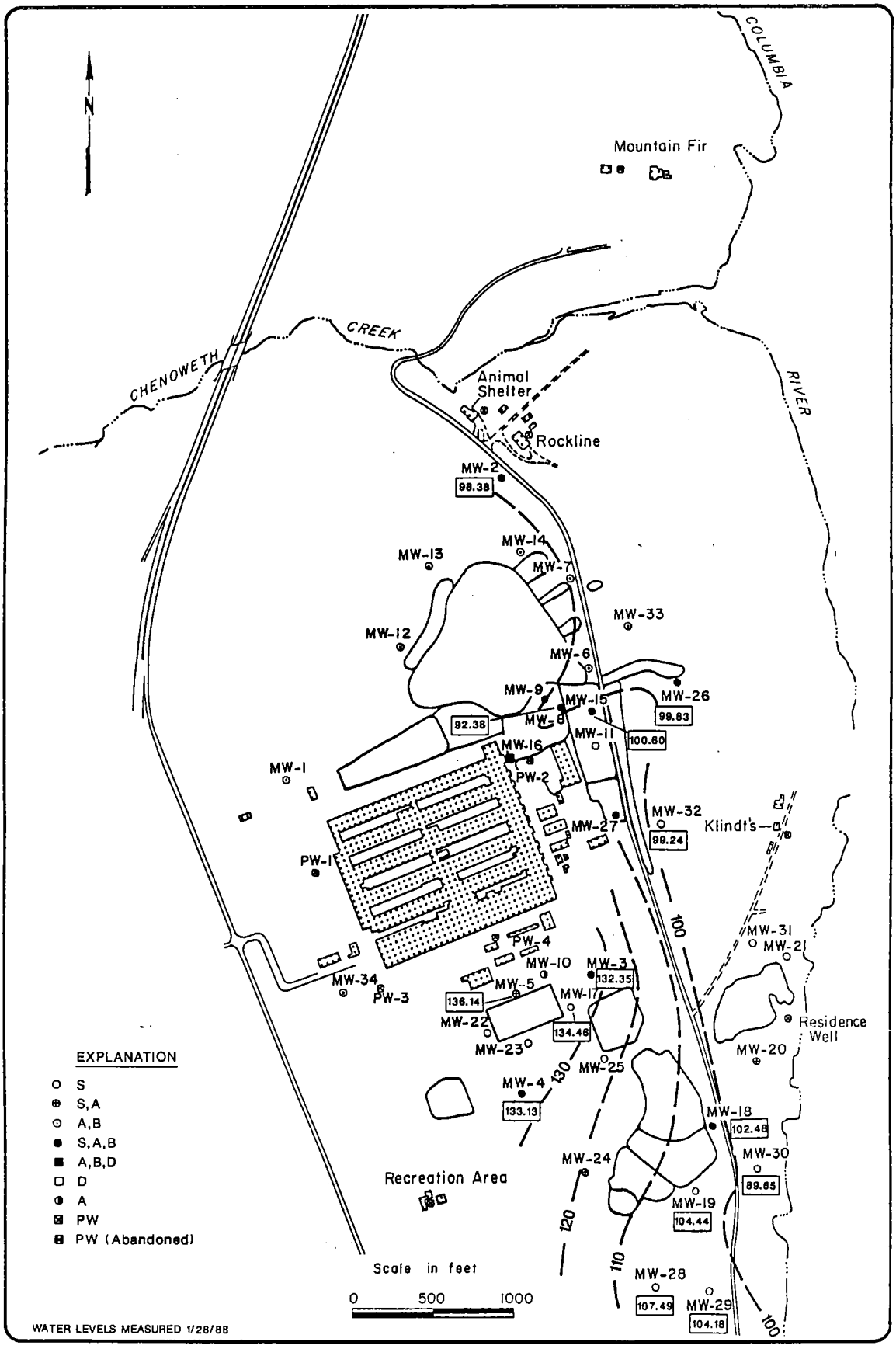


Figure G.9.14 Water-Table Contour Map (S Aquifer), January 28, 1988.

CLIENT NAME:
Martin Marietta Corporation

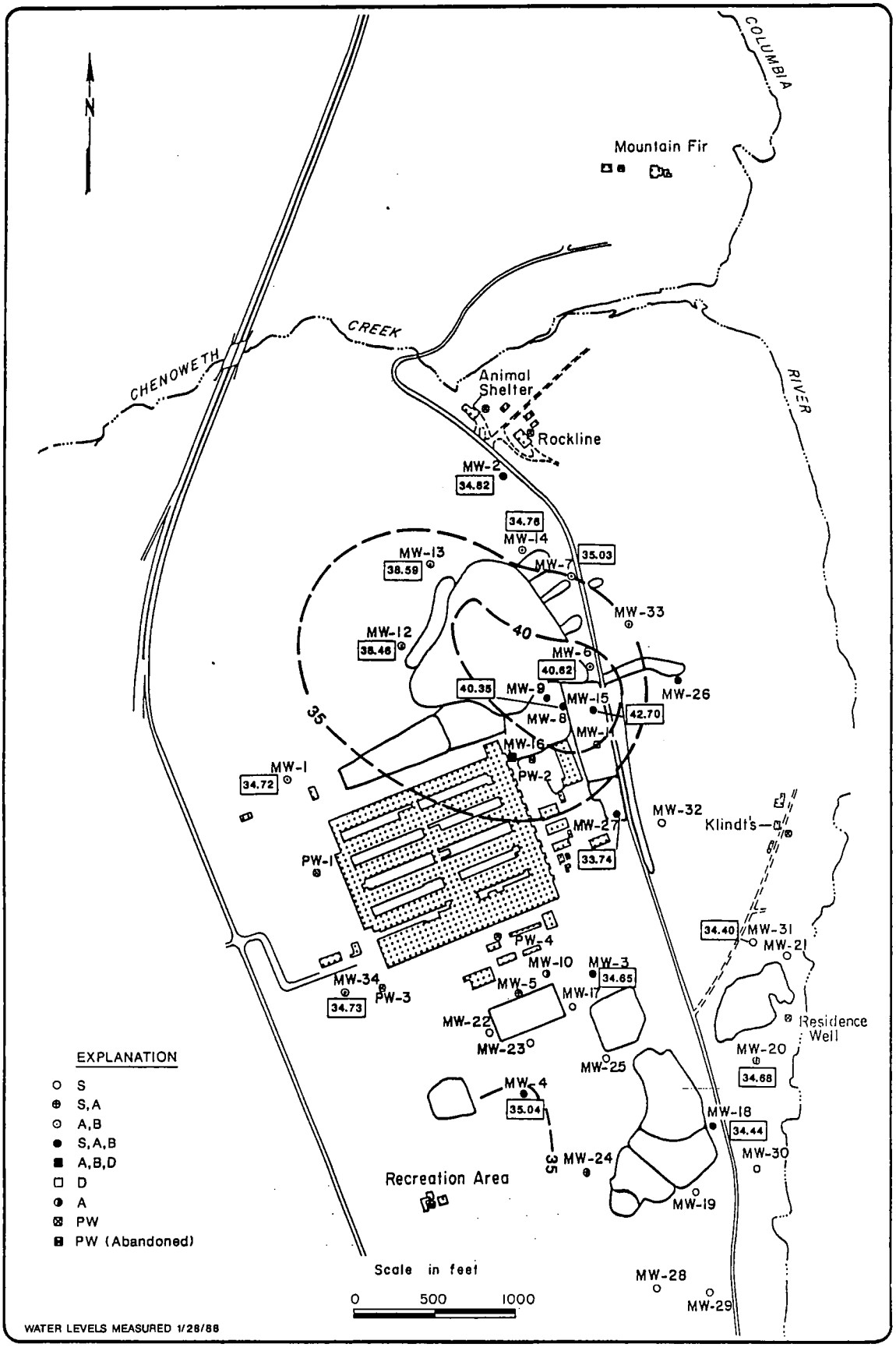


Figure G.9.15 Potentiometric Surface of the A Aquifer, January 28, 1988.

CLIENT NAME:

Martin Marietta Corporation

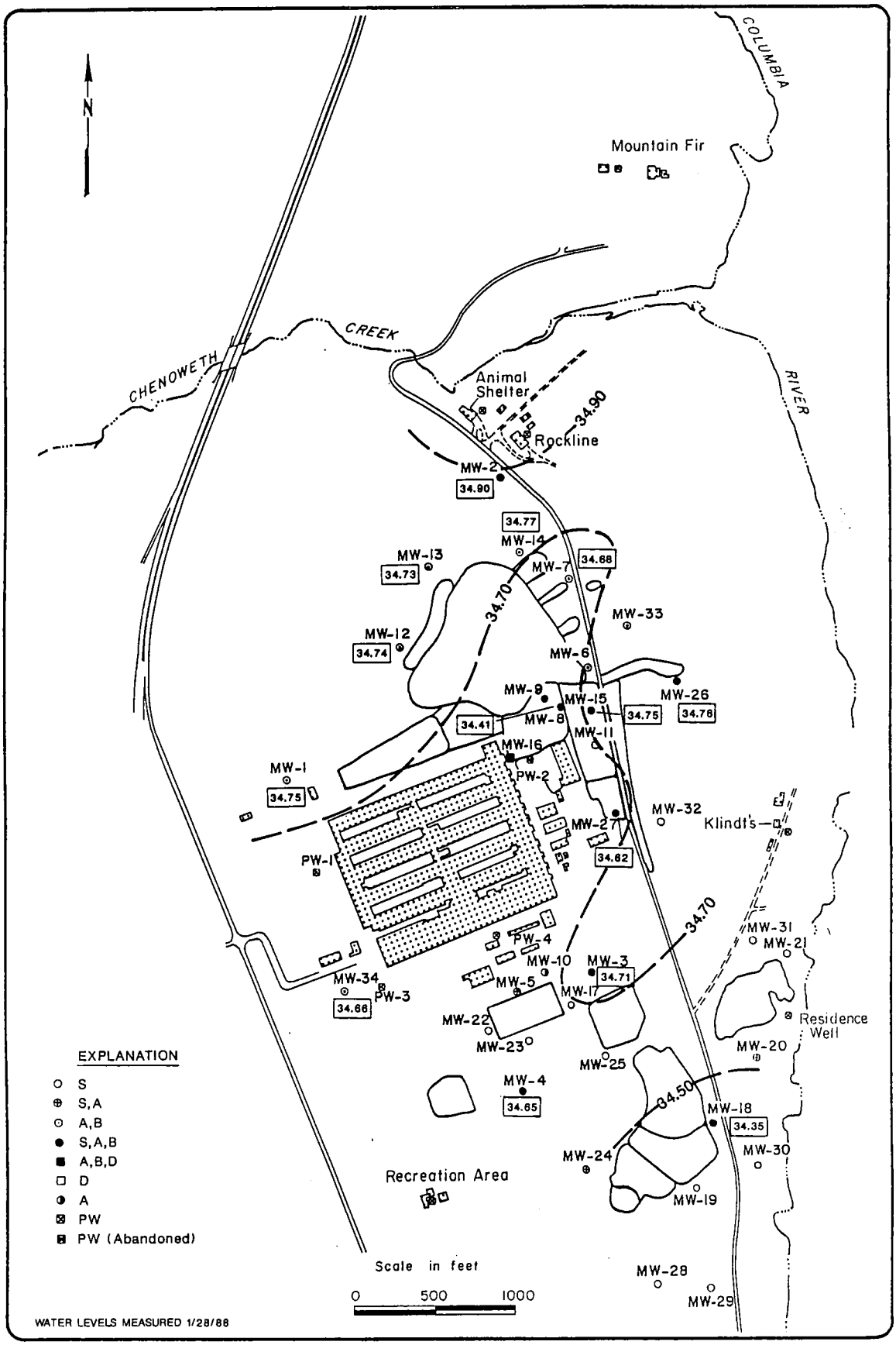


Figure G.9.16 Potentiometric Surface of B Aquifer (1/28/88).

CLIENT NAME:

Martin Marietta Corporation

ATTACHMENT G.10:

GROUND-WATER TRANSPORT MODEL DOCUMENTATION

PRINCETON UNIVERSITY LIBRARY
32101 008503755
CONVERSION PROJECT

ANALYTICAL MODELS FOR GROUNDWATER POLLUTION AND HYDROLOGY

by

Robert W. Cleary and Michael J. Ungs

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AEROSPACE COLLECTION

Report 78-WR-15

Water Resources Program
Dept. of Civil Eng.
Princeton University
Princeton, New Jersey

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FOREWARD

This manual contains mathematical models and associated user-oriented computer programs which have been designed for groundwater pollution and hydrology problems.

The models are based on the convective-dispersive mass transport equation and have been solved by integral transform methods. In most cases, the final solution is in closed-form; in a few of the models,part of the solution is in integral form, as it cannot be reduced further. In these cases, the final integral is evaluated by a variable point (up to 256) Gauss quadrature scheme. The computer program for Gaussian quadrature,needed for some of these models,must be inserted at the indicated (by comment cards) place in the program.

Each program contains a generous amount of comment cards to aid the user in applying the program to his particular needs. In addition, at the end of each program is a list of sample data which is immediately followed by a sample output listing. The programs have been successfully tested on the IBM 360/91. They will run on other computers as is or with only minor modification.

ATHEMATICAL MODELS AND ANALYTICAL SOLUTIONS

There are seven mass transport models and two groundwater flow models whose individual characteristics are described below under computer programs. The equations and solutions precede the computer programs but are in the same order as their corresponding programs. The format for each model is:

1. Figure
2. Mathematical Model (Partial Differential Equation)
3. Analytical Solution

II. EXAMPLE DERIVATION

II. COMPUTER PROGRAMS

Each of the models in the first section of the manual has a user-oriented computer program. At the end of this program is a list of data which is immediately followed by a sample output listing. A list of the models follows:

MODEL	EXPLANATION
Model 1	One-Dimensional Mass Transport: First Type Boundary Condition
Model 2	One-Dimensional Mass Transport: Third Type Boundary Condition
Model 3	Two-Dimensional Mass Transport: Strip B.C.; Finite Width
Model 4	Two-Dimensional Mass Transport: Strip B.C.; Infinite Width
Model 5	Two-Dimensional Mass Transport: Gaussian, Infinite Width B.C.
Model 6	Three-Dimensional Mass Transport: Patch Source; Finite Dimensions
Model 7	Three-Dimensional Mass Transport: Bivariate Gaussian Source
Model 8	Two-Dimensional Groundwater Flow: infinite dimensions
Model 9	Two-Dimensional Groundwater Flow: finite dimensions
DGAUSS	Double Precision Gaussian Quadrature Program: up to 256 Gauss Pts

NOTATION

SYMBOL	EXPLANATION
C	contaminant concentration
C_o	maximum contaminant concentration on the boundary
C_p	maximum or peak concentration of Gaussian source
D_x	dispersion coefficient in the X-direction
D_y	dispersion coefficient in the Y-direction
D_z	dispersion coefficient in the Z-direction
H	total height of the aquifer(Z-direction)
K	first order decay constant
S	standard deviation of the Gaussian source
S_y	standard deviation of the bivariate Gaussian source (Y-direction)
S_z	standard deviation of the bivariate Gaussian source (Z-direction)
t	time
V	velocity (one-dimensional models)
V_x	X-direction velocity
V_y	Y-direction velocity
V_z	Z-direction velocity
W	total width of the aquifer (Y-direction)
X	distance in the X-direction
Y	distance in the Y-direction
Y_1	distance in the Y-direction to location of the source
Y_2	distance in the Y-direction to location of the source
Y_o	centered location of the Gaussian source (Y-direction)
Z	distance in the Z-direction
Z_1	distance in the Z-direction to location of the source
Z_2	distance in the Z-direction to location of the source
Z_o	centered location of the Gaussian source (Z-direction)

SYMBOL	EXPLANATION
ρ	correlation coefficient of the source = $\mathrm{cov}[Y,Z]/S_y S_z$
γ	first order decay constant for the exponential boundary source

CALCULATION OF GAUSSIAN AND BIVARIATE GUASSIAN COEFFICIENTS

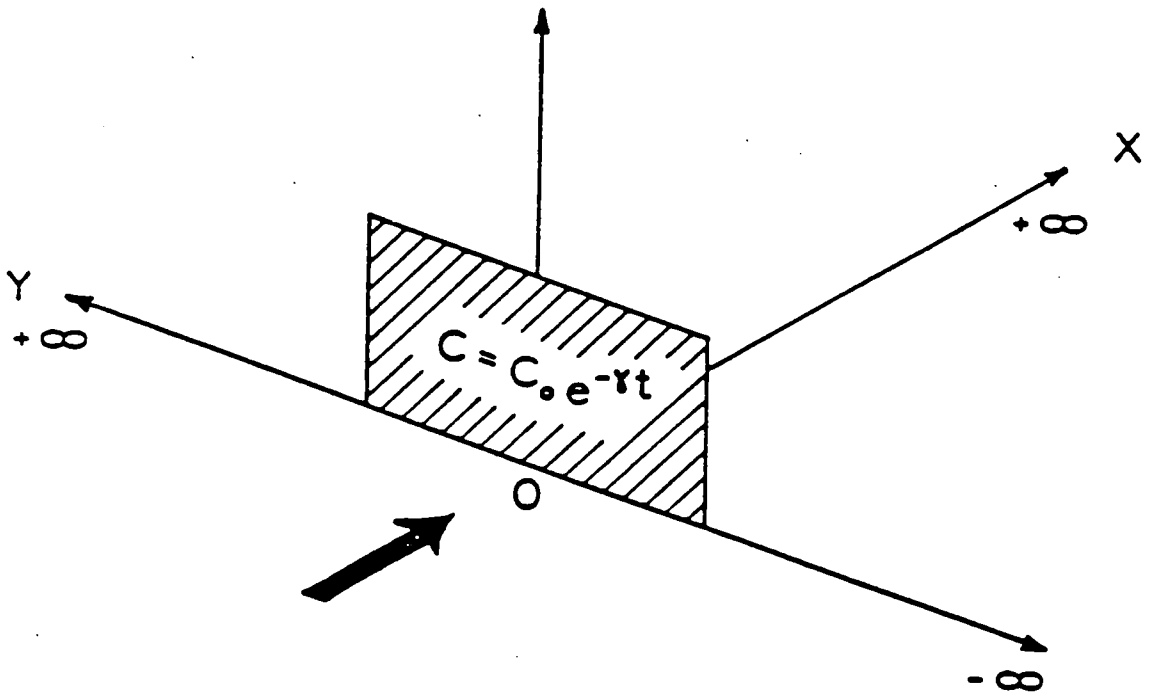
$$S = \frac{e^{\gamma t}}{C_p\sqrt{2\pi}} \int_{-\infty}^{\infty} C(0,Y,t)\,dY$$

$$(S_y)^2 = \frac{\int_{-\infty}^{\infty} (Y-Y_o)^2\, C(0,Y,Z,t)\,dY}{\int_{-\infty}^{\infty} C(0,Y,Z,t)\,dY} \qquad (S_z)^2 = \frac{\int_{-\infty}^{\infty} (Z-Z_o)^2\, C(0,Y,Z,t)\,dZ}{\int_{-\infty}^{\infty} C(0,Y,Z,t)\,dY}$$

$$\sqrt{1-\rho^2} = \frac{e^{\gamma t}}{C_p^2\, S_y S_z} \int_{-\infty}^{\infty}\int C(0,Y,Z,t)\,dY\,dZ$$

$C(0,Y,Z,t)$ and $C(0,Y,t)$ are the observed (field data) concentration distributions which one is trying to fit a Gaussian form to. For example, in the case of $C(0,Y,t)$ one would plot $C_{observed}$ vs. Y and the area under the curve would equal the integral above.

TWO-DIMENSIONAL INFINITE GROUND WATER MODEL



STRIP SOURCE

TWO-DIMENSIONAL MASS TRANSPORT EQUATION

(STRIP SOURCE — Infinite Width)

$$\frac{\partial C}{\partial t} + V_x \frac{\partial C}{\partial X} + V_y \frac{\partial C}{\partial Y} = D_x \frac{\partial^2 C}{\partial X^2} + D_y \frac{\partial^2 C}{\partial Y^2} - KC$$

$C = C_o e^{-\gamma t}$ $\quad X = 0 \quad$ $Y_1 \leq Y \leq Y_2$

$C = 0 \quad X = 0 \quad$ all other Y

$\frac{\partial C}{\partial Y} \text{ ----> } 0 \quad Y \text{ ----> } \pm \infty$

$\frac{\partial C}{\partial X} \text{ ----> } 0 \quad X \text{ ----> } + \infty$

$C = 0 \quad t = 0$

ANALYTICAL SOLUTION

$$C(X,Y,t) = \frac{C_o X}{4\sqrt{\pi D_x}} e^{\left\{\frac{V_x X}{2D_x} - \gamma t\right\}} \cdot \int_{\tau=0}^{t} \frac{e^{-(K - \gamma + \frac{V_x^2}{4D_x})\tau - \frac{X^2}{4D_x\tau}}}{\tau^{3/2}}$$

$$\cdot \left\{ - \operatorname{erfc}\left(\frac{(Y_2-Y)}{2\sqrt{D_y\tau}} + \frac{V_y}{2}\sqrt{\frac{\tau}{D_y}}\right) + \operatorname{erfc}\left(\frac{Y_1-Y}{2\sqrt{D_y\tau}} + \frac{V_y}{2}\sqrt{\frac{\tau}{D_y}}\right)\right\} d\tau$$

```
$STORAGE:2
$LARGE
C*************************************************************************CLE00
C                                                                        CLE00
C                                                                        CLE00
C          TWO-DIMENSIONAL GROUNDWATER MASS TRANSPORT MODEL              CLE00
C                                                                        CLE00
C                          ANALYTICAL SOLUTION                           CLE00
C                                                                        CLE00
C                       STRIP BOUNDARY CONDITION                         CLE00
C                                                                        CLE00
C                            INFINITE WIDTH                              CLE00
C                                                                        CLE00
C                                                                        CLE00
C*************************************************************************CLE00
C*************************************************************************CLE00
C*************************************************************************CLE00
C                                                                        CLE00
C                                                                        CLE00
C          THIS PROGRAM WAS PREPARED UNDER A CONTRACT WITH THE           CLE00
C     NASSAU-SUFFOLK REGIONAL PLANNING BOARD PURSUANT TO SECTION 208,    CLE00
C     FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972             CLE00
C     (PL92-500), DR. ROBERT W. CLEARY, PRINCIPAL INVESTIGATOR.  THIS    CLE00
C     PROJECT HAS BEEN FINANCED IN PART WITH FEDERAL FUNDS FROM THE      CLE00
C     UNITED STATES ENVIRONMENTAL PROTECTION AGENCY UNDER GRANT NUMBER   CLE00
C     P002103-01-0.  THE CONTENTS DO NOT NECESSARILY REFLECT THE VIEWS   CLE00
C     AND POLICIES OF THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY. CLE00
C                                                                        CLE00
C                                                                        CLE00
C*************************************************************************CLE00
C                                                                        CLE00
C                                                                        CLE00
C     FOR FURTHER INFORMATION, CONTACT:                                  CLE00
C                                                                        CLE00
C                    DR. ROBERT W. CLEARY                                CLE00
C                    WATER RESOURCES PROGRAM                             CLE00
C                    DEPARTMENT OF CIVIL ENGINEERING                     CLE00
C                    PRINCETON UNIVERSITY                                CLE00
C                    PRINCETON, NEW JERSEY 08540                         CLE00
C                                                                        CLE00
C                                                                        CLE00
C*************************************************************************CLE00
C                                                                        CLE00
C                                                                        CLE00
C                                                                        CLE00
C                                                                        CLE00
C                                                                        CLE00
C     THIS PROGRAM NUMERICALLY COMPUTES THE SOLUTION TO THE              CLE00
C     TWO-DIMENSIONAL  (SEMI-INFINITE IN X AND INFINITE IN Y)            CLE00
C     CONVECTIVE-DISPERSIVE MASS TRANSPORT EQUATION AND PLOTS OUT AN     CLE00
C     11X11 PLOT OF NORMALIZED CONCENTRATIONS AT FOUR DIFFERENT TIME     CLE00
C     VALUES.                                                            CLE00
C     NOTE:  THE GAUSS-LEGENDRE QUADRATURE SCHEME IS USED FOR            CLE00
C     NUMERICAL INTEGRATION                                              CLE00
```

```
C                                                                       CLE00
C                                                                       CLE00
C***********************************************************************CLE00
C                                                                       CLE00
      IMPLICIT REAL*8 (A-H,O-Z)                                         CLE00
      REAL*8 K                                                          CLE00
      COMMON/SUMER/ NMAX                                                CLE00
      DIMENSION CC0Y(200),XPSTN(200),YPSTN(200),TPSTN(200)              CLE00
C***********************************************************************CLE00
C                                                                       CLE00
C                                                                       CLE00
C                                                                       CLE00
C                     ****  MODEL PARAMETERS  ****                      CLE00
C                                                                       CLE00
C        CC0        C/C0 :  CONCENTRATION NORMALIZED BY THE INITIAL     CLE00
C                        CONCENTRATION  ( 1 )                           CLE00
C        DX         DISPERSION IN THE X DIRECTION (L**2/T)             CLE00
C        DY         DISPERSION IN THE Y DIRECTION (L**2/T)             CLE00
C        VX         VELOCITY OF WATER IN X DIRECTION (L/T)             CLE00
C        VY         VELOCITY OF WATER IN Y DIRECTION (L/T)             CLE00
C        GAMMA      FIRST ORDER DECAY RATE ON BOUNDARY CONDITION (1/T) CLE00
C                     (IT IS EITHER ZERO OR A POSITIVE QUANTITY)        CLE00
C        K          FIRST ORDER DECAY RATE OF SYSTEM (1/T)             CLE00
C                     (FOR DECAY , IT IS A POSITIVE QUANTITY)           CLE00
C        X          X POSITION IN SPACE TO BE EVALUATED (L)            CLE00
C        Y          Y POSITION IN SPACE TO BE EVALUATED (L)            CLE00
C        Y1,Y2      AT X = 0, THESE VALUES DELINEATE THE EXTENT OF THE  CLE00
C                     CONTAMINATION SOURCE WHERE  Y2#Y1                 CLE00
C        NMAX       NUMBER OF GAUSS POINTS TO BE USED                  CLE00
C                     ( IT CAN ONLY HAVE THE VALUE OF EITHER  4,5,6,10, CLE00
C                       15,20,60,104,256)                               CLE00
C                                                                       CLE00
C       DX=.1                                                            CLE0
C       DY=.1                                                            CLE0
C       VX=.1                                                            CLE0
C       VY=0.                                                            CLE0
C       GAMMA=0.                                                         CLE0
C       K=0.                                                             CLE0
C       Y1=-6.                                                           CLE0
C       Y2=6.                                                            CLE0
C       NMAX=60                                                          CLE0
      OPEN (UNIT=7,FILE='CLSIMP.IN')
      OPEN (UNIT=8,FILE='CLSIMP.OUT')
      OPEN (UNIT=9,FILE='CLSIMP.PLT')
      READ (7,*) DX,DY,VX,VY,GAMMA,K,Y1,Y2,NMAX
      WRITE(9,888) DX,DY,VX,VY,GAMMA,K,Y1,Y2,NMAX
  888 FORMAT(' DX=',F10.6,' DY=',F10.6,' VX=',F10.6,' VY=',F10.6,
     *       ' GAMMA=',F10.8,' K=',F10.8,' Y1=',F8.3,' Y2=',F8.3,
     *       ' # GAUSS PTS=',I6)
C                                                                       CLE00
C***********************************************************************CLE00
C                                                                       CLE00
C     THE PROGRAM COMPUTES CONCENTRATION VALUES AT  11 DIFFERENT X      CLE00
C     COORDINATES, AT  11 DIFFERENT Y COORDINATES, AND AT 11 DIFFERENT  CLE00
```

```
C     TIME VALUES.                                                      CLE01
C                                                                       CLE01
C        NX         NUMBER OF  X  SPACE POSITIONS TO BE EVALUATED       CLE01
C        NY         NUMBER OF  Y  SPACE POSITIONS TO BE EVALUATED       CLE01
C        NT         NUMBER OF TIME VALUES TO BE EVALUATED               CLE01
C                                                                       CLE01
C     NOTE:  IF SOME OTHER NUMBER OF GRID POSITIONS OR TIMES ARE        CLE01
C     DESIRED, THE FOLLOWING FORMAT STATEMENTS MUST BE CHANGED:         CLE01
C     = 20,25,40,60                                                     CLE01
C                                                                       CLE01
C      NX=11                                                            CLE01
C      NY=11                                                            CLE01
C      NT=1                                                             CLE01
      READ (7,*)NX,NY,NT
C                                                                       CLE01
C                                                                       CLE01
C***********************************************************************CLE01
C                                                                       CLE01
      WRITE(8,10)                                                       CLE01
10    FORMAT(//////////,50X,'NUMERICAL SOLUTION TO THE SATURATED',//,   CLE01
     2 40X,'UNSTEADY-STATE TWO DIMENSIONAL GROUNDWATER POLLUTION PROBLEMCLE01
     3',/,45X,'(USING A GAUSS-LEGENDRE QUADRATURE SCHEME)'              CLE01
     3  ,///,59X,'MODEL PARAMETERS',/,55X,'(UNITS OF FEET AND DAYS)',  CLE01
     4 ///)                                                             CLE01
      WRITE(8,14) NMAX                                                  CLE01
14    FORMAT(33X,'NUMBER OF GAUSS POINTS USED:  NMAX = ', I4)           CLE01
      WRITE(8,15)  GAMMA,K,DX,DY,VX,VY                                  CLE01
15    FORMAT(39X,'SOURCE DECAY CONSTANT: GAMMA = ',E13.6,'  (PER DAY)', CLE01
     2 /,28X,'GROUNDWATER POLLUTION DECAY RATE:    K  = ',E13.6,       CLE01
     3'  (PER DAY)',/,31X,'DISPERSION IN THE X DIRECTION:   DX  = ',   CLE01
     4E13.6,'  (SQ FT/DAY)',/, 31X,'DISPERSION IN THE Y DIRECTION:   DY CLE01
     5 = ',E13.6,'  (SQ FT/DAY)',/,21X,  'GROUNDWATER VELOCITY IN THE X CLE01
     6DIRECTION:   VX  = ', E13.6,'  (FT/DAY)',/,                      CLE01
     A21X,'GROUNDWATER VELOCITY IN THE Y DIRECTION:   VY  = ',E13.6,   CLE01
     B '  (FT/DAY)',///,25X,'BOUNDARY CONDITIONS AT X=0',/)            CLE01
      WRITE(8,16) Y1,Y2                                                 CLE01
16    FORMAT(35X,'         LIMITS OF SOURCE:',3X,'Y1  = ', E13.6,'  (FT)CLE01
     2',/,64X,'Y2  = ',E13.6,'  (FT)',/,40X,'WIDTH OF THE AQUIFER:    W CLE01
     3 = ',  ' INFINITE')                                              CLE01
C                                                                       CLE01
C     READ   THE COORDINATES AT WHICH THE MODEL IS TO BE EVALUATED AT   CLE01
C     THE FIRST  3  CARDS CONTAIN X COORDINATES (FEET)                  CLE01
C     READ IN ONLY  11 COORDINATES                                      CLE01
C     READ IN 5 VALUES OF X ON THE FIRST CARD, 5 ON THE SECOND CARD     CLE01
C     AND 1 ON THE THIRD CARD, USING F10.3 FORMAT                       CLE01
      DO 801 I=1,NX
       READ(7,*) XPSTN(I)                                               CLE01
  801 CONTINUE
      WRITE(*,*) NX
C                                                                       CLE01
C     THE NEXT  3  DATA CARDS CONTAIN Y COORDINATES (FEET)              CLE01
C     READ IN ONLY  11 Y COORDINATES                                    CLE01
C     READ IN 5 VALUES OF Y ON THE FIRST CARD, 5 ON THE SECOND CARD     CLE01
C     AND 1 ON THE THIRD CARD, USING F10.3 FORMAT                       CLE01
```

```
      DO 802 I=1,NY
       READ(7,*) YPSTN(I)
  802 CONTINUE
      WRITE(*,*) NY                                                    CLE01
C                                                                      CLE01
C     THE NEXT DATA CARD CONTAINS TIME VALUES (DAYS)                   CLE01
C     READ IN ONLY FOUR TIME EVALUATIONS                               CLE01
C     READ IN ALL 4 TIME VALUES ON ONE CARD IN F10.3 FORMAT            CLE01
      DO 803 I=1,NT
       READ(7,*) TPSTN(I)
  803 CONTINUE
      WRITE(*,*) NT                                                    CLE01
C                                                                      CLE01
C                                                                      CLE01
      DO 1000 IT=1,NT                                                  CLE01
       WRITE(*,*) IT
 39   FORMAT( 40X,'DISTANCE ACROSS[FT]',// ,5X, 11(1X,F6.2))
      WRITE(8,40) (YPSTN(I),I=1,NY)
40    FORMAT( 95X,'DISTANCE ACROSS[FT]',// ,26X, 11(1X,F6.2))
      DO 900 IX=1,NX
      DO 800 IY=1,NY
      CALL GWP2DG(  K,GAMMA,TPSTN(IT),XPSTN(IX),YPSTN(IY),Y1,Y2,DX,DY,  CLE01
     $ VX,VY,CC0Y(IY))                                                 CLE01
800   CONTINUE                                                         CLE01
      WRITE(8,60)  XPSTN(IX),(CC0Y(I),I=1,NY)                          CLE01
      YEAR=TPSTN(IT)/365.
      WRITE(9,62)  TPSTN(IT),YEAR,XPSTN(IX),
     *             (CC0Y(I),I=1,NY)
60    FORMAT( 17X,F6.1, ' -  ',11( 1X,F6.3),/,24X,';',/,24X,';')       CLE01
62    FORMAT(F10.1,F10.1,F10.4,20F8.4)
900   CONTINUE                                                         CLE01
      WRITE(8,910) TPSTN(IT)                                           CLE01
910   FORMAT(24X,'V',/ ,20X,'DISTANCE',/,21X,'DOWN(FT)',40X,'TIME = ',  CLE01
     $F10.3,' DAYS',//,24X,'X')                                        CLE01
1000  CONTINUE                                                         CLE01
      STOP                                                             CLE01
      END                                                              CLE01
      SUBROUTINE GWP2DG(K,GAMMA,T,X,Y,Y1,Y2,DX,DY,VX,VY,CC0)           CLE01
C                                                                      CLE01
C                                                                      CLE01
C                                                                      CLE01
C     ANALYTIC SOLUTION TO THE SATURATED UNSTEADY-STATE TWO-DIMENSIONAL CLE01
C     GROUNDWATER POLLUTION MODEL WITH A CONTINUOUS  "PATCH" SOURCE    CLE01
C     USING THE GAUSS-LEGENDRE QUADRATURE INTEGRATION SCHEME           CLE01
C                                                                      CLE01
C     NOTE:  THE SOLUTION ALLOWS FOR VELOCITY IN BOTH THE X AND Y      CLE01
C     DIRECTIONS                                                       CLE01
C                                                                      CLE01
C                                                                      CLE01
C                                                                      CLE01
      IMPLICIT REAL*8(A-H,O-Z)                                         CLE01
      REAL*8 K                                                         CLE01
      COMMON/SUMER/ NMAX                                               CLE01
      DIMENSION W(256),Z(256)                                          CLE01
```

```
C                                                                       CLE01
C                                                                       CLE01
      PI=3.14159265358979D0                                             CLE01
      CC0=0.                                                            CLE02
C      AT TIME  T = 0,  THE SOLUTION IS ZERO                            CLE02
      IF(T.LE.0.) RETURN                                                CLE02
      IF(Y1.GT.Y2) WRITE(6,25) Y1,Y2                                    CLE02
25    FORMAT(//////////,30X,'*****  ERROR FROM SUBROUTINE  GWP2DG  *****CLE02
     2',///,10X,'Y2  MUST BE GREATER OR EQUAL TO  Y1  BUT YOU HAVE',//, CLE02
     3  20X,'Y1 = ', E13.6,10X,'Y2 = ',E13.6,//,20X,'PROGRAM SHALL STOP CLE02
     4AFTER FORMAT 25 IN SUBROUTINE GWP2DG')                            CLE02
      IF(Y1.GT.Y2) STOP                                                 CLE02
      IF(Y.LT.Y2.AND.Y.GT.Y1.AND.X.EQ.0.) CC0=1.0                       CLE02
      IF ((DABS(Y-Y2)).LT.1.0E-4.AND.X.EQ.0.0) CC0=0.5                  CLE02
      IF ((DABS(Y-Y1)).LT.1.0E-4.AND.X.EQ.0.0) CC0=0.5                  CLE02
      IF(X.EQ.0.) RETURN                                                CLE02
C        A          LOWER LIMIT OF INTEGRATION                         CLE02
C        B          UPPER LIMIT OF INTEGRATION                         CLE02
      A=0.                                                              CLE02
      B=T                                                               CLE02
      CALL DGAUSS(A,B,Z,W,NMAX)                                         CLE02
      SUM=0.                                                            CLE02
      DO 1000 I=1,NMAX                                                  CLE02
      EX=VX*X/2./DX-GAMMA*T-(K-GAMMA+VX*VX/4./DX)*Z(I)-X*X/4./DX/Z(I)   CLE02
      EFC1=(Y1-Y)/2./DSQRT(DY*Z(I))+VY/2.*DSQRT(Z(I)/DY)                CLE02
      EFC2=(Y2-Y)/2./DSQRT(DY*Z(I))+VY/2.*DSQRT(Z(I)/DY)                CLE02
      CALL EXPERF(EX,EFC1,E1)                                           CLE02
      CALL EXPERF(EX,EFC2,E2)                                           CLE02
      TERM=0.                                                           CLE02
      IF(DABS(E1).GT.1.D-20.OR.DABS(E2).GT.1.D-20) TERM=(E1-E2)*W(I)/    CLE02
     $ Z(I)**1.5                                                        CLE02
      SUM=SUM+TERM                                                      CLE02
1000   CONTINUE                                                         CLE02
      CC0=SUM*X/4./DSQRT(PI*DX)                                         CLE02
      IF(CC0.LE.0.) CC0=0.                                              CLE02
      RETURN                                                            CLE02
      END                                                               CLE02
      DOUBLE PRECISION FUNCTION DERFC(X)
      IMPLICIT REAL*8 (A-H,O-Z)
      DIMENSION D(201)
      PI=3.14159265358979323846433
      C=2.D0/DSQRT(PI)
      H=X*.01D0
      DO 10 I=1,101
      Y=H*(I-1)
  10  D(I)=DEXP(-Y*Y)
      EZ=0
      DO 20 I=3,101,2
  20  EZ=EZ+(D(I-2)+4D0*D(I-1)+D(I))*H/3D0
      DERF=C*EZ
      DERFC=1D0-DERF
      RETURN
      END
      SUBROUTINE EXPERF(XX,YY,ZZ)                                       CLE02
```

```
      IMPLICIT REAL*8 (A-H,O-Z)                                          CLE02
      REAL*8 NUM,NN,N,XX,YY,ZZ                                           CLE02
C                                                                        CLE02
C     THIS SUBROUTINE TAKES EXP(X)*ERFC(Y) = Z                           CLE02
C                                                                        CLE02
C     THIS SUBROUTINE IS INTENDED FOR HANDLING LARGE VALUES OF X AND Y   CLE02
C     THEN USING AN ASYMPTOTIC EXPANSION FOR ERFC.                       CLE02
      PI = 3.14159265358D0                                               CLE02
      IF(YY.LT.0.D0) GO TO 500                                           CLE02
C     FOR LARGE POSITIVE VALUES OF Y, ERFC(Y) -# 0.                      CLE02
      EXY2 = XX-YY*YY                                                    CLE02
      IF(EXY2.LE.-160.) ZZ=0.                                            CLE02
      IF(EXY2.LE.-160.) RETURN                                           CLE02
C     THE ASYMPTOTIC  ERFC(Y)  EXPANSION IS VALID TOO  12 PLACES IF      CLE02
C     Y # 7.5                                                            CLE02
      IF((YY.LE.7.5).AND.(XX.LE.174.6)) ZZ= DEXP(XX)*DERFC(YY)           CLE02
      IF((YY.LE.7.5).AND.(XX.LE.174.6)) RETURN                           CLE02
C                                                                        CLE02
      SUM = 1.D0                                                         CLE02
      DENOM = 2.D0*YY*YY                                                 CLE02
      TERM0=1.                                                           CLE02
      I=1                                                                CLE02
30    CONTINUE                                                           CLE02
      I=I+1                                                              CLE02
      IF(I.GE.12) GO TO 100                                              CLE02
      N = I                                                              CLE02
      IF(DABS(TERM0/SUM).LE.1.D-15) GO TO 100                            CLE02
      TERM = TERM0*(-1.D0)*(2.D0*N-3.D0)/DENOM                           CLE02
C     AS SOON AS THE NEWLY COMPUTED TERM BECOMES LARGER THEN THE         CLE02
C     PREVIOUS ONE, STOP THE SUMMATION.                                  CLE02
      IF(DABS(TERM).GE.DABS(TERM0)) GO TO 100                            CLE02
      SUM = SUM + TERM                                                   CLE02
      TERM0 = TERM                                                       CLE02
      GO TO 30                                                           CLE02
100   CONTINUE                                                           CLE02
      IF(EXY2.LT.174.6) ZZ=DEXP(EXY2)*SUM/(DSQRT(PI)*YY)                 CLE02
      IF(EXY2.LT.174.6) RETURN                                           CLE02
C     FOR  X-Y*Y # 174.6  , BREAK UP THE EXPONENT INTO N TERMS           CLE02
      NNUM = EXY2/50.D0                                                  CLE02
      NN=NNUM                                                            CLE02
      EXY2N = EXY2/NN                                                    CLE02
      SUMN=(SUM/(DSQRT(PI)*YY))**(1.D0/NN)                               CLE02
      TERM=1.D0                                                          CLE02
      DO 300 I=1,NNUM                                                    CLE02
      TERM=TERM*DEXP(EXY2N)*SUMN                                         CLE02
300   CONTINUE                                                           CLE02
      ZZ= TERM                                                           CLE02
      RETURN                                                             CLE02
500   CONTINUE                                                           CLE02
C     FOR LARGE NEGATIVE VALUES OF Y, ERFC(Y) -# 2.                      CLE02
      IF(XX.LT.-174.0) ZZ=0.                                             CLE02
      IF(XX.LT.-174.0)  RETURN                                           CLE02
      IF(YY.LT.-13.3) ZZ=DEXP(XX)*2.D0                                   CLE02
      IF (YY.GE.-13.3) ZZ=DEXP(XX)*DERFC(YY)                             CLE02
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      RETURN                                                            CLE02
      END                                                               CLE02
      SUBROUTINE DGAUSS(A,B,Z,W,N)                                      CLE02
C                                                                       CLE02
C        COMPUTE THE FIRST  N  ROOTS AND WEIGHT FACTORS TO THE          CLE02
C     GAUSS-LEGENDRE QUADRATURE INTEGRATION SCHEME                      CLE02
C        FOR THE SOLUTION OF INTEGRALS OF THE FORM                      CLE02
C                                                                       CLE02
C                 INTEGRAL OF  F(Z)*DZ = SUM OF  W(I)*F(Z(I))           CLE02
C                                        AS  I = 1,... N                CLE02
C               INTEGRATED FROM  A TO B                                 CLE02
C                                                                       CLE03
C                                                                       CLE03
      IMPLICIT REAL*8(A-H,O-Z)                                          CLE03
      DIMENSION W(256),Z(256)                                           CLE03
C                                                                       CLE03
C        A          LOWER LIMIT OF INTEGRATION                         CLE03
C                                                                       CLE03
C        B          UPPER LIMIT OF INTEGRATION                         CLE03
C                                                                       CLE03
C        Z          ROOTS OF THE LEGENDRE POLYNOMIALS P(N+1)(Z)        CLE03
C                                                                       CLE03
C        W          WEIGHT FACTORS FOR THE GAUSS-LEGENDRE QUADRATURE   CLE03
C                                                                       CLE03
C        N          NUMBER OF INTEGRATION POINTS                       CLE03
C     N CAN ONLY HAVE THE VALUE OF EITHER 4,5,6,10,15,20,60,104,256     CLE03
C                                                                       CLE03
C                                                                       CLE03
C                                                                       CLE03
C                                                                       CLE03
C     THE ROOTS AND WEIGHT FACTORS FOR THE NORMALIZED INTEGRAL ARE TAKENCLE03
C     FROM :                                                            CLE03
C        APPLIED NUMERICAL METHODS                                      CLE03
C        BY : B. CARNAHAN, H.A. LUTHER AND J.O. WILKES                  CLE03
C             JOHN WILEY AND SONS, INC.    , 1969                       CLE03
      CONTINUE                                                          CLE03
C      AND IN ADDITION :                                                CLE03
C               GAUSSIAN QUADRATURE FORMULAS                            CLE03
C      BY : A.H. STROUD AND DON SECREST                                 CLE03
C        PRINTICE-HALL, INC.    1966                                    CLE03
C                                                                       CLE03
C                                                                       CLE03
C                                                                       CLE03
C        PROGRAMME WAS WRITTEN BY :  MICHAEL J. UNGS  JULY, 1976        CLE03
C                                                                       CLE03
C                                                                       CLE03
C              CHECK IF  A # B                                          CLE03
      IF(B.LT.A) WRITE(6   ,1) A,B,N                                    CLE03
    1 FORMAT(/////////,50X,'*****  ERROR IN SUBROUTINE DGAUSS *****',///CLE03
     2 ,40X,'THE FOLLOWING VALUES WHERE SPECIFIED',//,30X,'LOWER LIMIT OCLE03
     3F INTEGRATION   A = ',D20.12,/,30X,'UPPER LIMIT OF INTEGRATION   BCLE03
     4 = ',D20.12,/,17X,'NUMBER OF GAUSSIAN INTEGRATION POINTS     N = 'CLE03
     5, I5,//,35X,'YOU VIOLATED THE CONDITION THAT LIMIT B MUST BE GREATCLE03
     6ER OR EQUAL THEN LIMIT  A',//,30X,'PROGRAM SHALL STOP AFTER FORMATCLE03
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     7 1  IN SUBROUTINE  DGAUSS')                                        CLE03
      IF(B.LT.A) STOP                                                    CLE03
C                                                                        CLE03
C              NORMALIZED ROOTS AND WEIGHTS                              CLE03
C                                                                        CLE03
      IF(N.NE.4) GO TO 50                                                CLE03
      Z(1)=.3399810435848562D0                                           CLE03
      Z(3)=.8611363115940525D0                                           CLE03
      W(1)=.6521451548625461D0                                           CLE03
      W(3)=.3478548451374538D0                                           CLE03
      GO TO 10000                                                        CLE03
50    IF(N.NE.5) GO TO 60                                                CLE03
      Z(1)=0.                                                            CLE03
      Z(2)=.5384693101056830D0                                           CLE03
      Z(4)=.9061798459386639D0                                           CLE03
      W(1)=.5688888888888888D0                                           CLE03
      W(2)=.4786286704993664D0                                           CLE03
      W(4)=.2369268850561890D0                                           CLE03
      GO TO 10000                                                        CLE03
60    IF(N.NE.6) GO TO 100                                               CLE03
      Z(1)=.2386191860831969D0                                           CLE03
      Z(3)=.6612093864662645D0                                           CLE03
      Z(5)=.9324695142031520D0                                           CLE03
      W(1)=.4679139345726910D0                                           CLE03
      W(3)=.3607615730481386D0                                           CLE03
      W(5)=.1713244923791703D0                                           CLE03
      GO TO 10000                                                        CLE03
100   IF(N.NE.10) GO TO 150                                              CLE03
      Z(1)=.1488743389816310D0                                           CLE03
      Z(3)=.4333953941292470D0                                           CLE03
      Z(5)=.6794095682990240D0                                           CLE03
      Z(7)=.8650633666889850D0                                           CLE03
      Z(9)=.9739065285171720D0                                           CLE03
      W(1)=.2955242247147530D0                                           CLE03
      W(3)=.2692667193099960D0                                           CLE03
      W(5)=.2190863625159820D0                                           CLE03
      W(7)=.1494513491505810D0                                           CLE03
      W(9)=.0666713443086880D0                                           CLE03
      GO TO 10000                                                        CLE03
150     IF(N.NE.15) GO TO 200                                            CLE03
      Z(1)=0.                                                            CLE03
      Z(2)=.2011940939974350D0                                           CLE03
      Z(4)=.3941513470775630D0                                           CLE03
      Z(6)=.5709721726085390D0                                           CLE03
      Z(8)=.7244177313601700D0                                           CLE03
      Z(10)=.8482065834104270D0                                          CLE03
      Z(12)=.9372733924007060D0                                          CLE03
      Z(14)=.9879925180204850D0                                          CLE03
      W(1)=.2025782419255610D0                                           CLE03
      W(2)=.1984314853271110D0                                           CLE03
      W(4)=.1861610001155620D0                                           CLE03
      W(6)=.1662692058169940D0                                           CLE03
      W(8)=.1395706779261540D0                                           CLE03
      W(10)=.1071592204671720D0                                          CLE03
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      W(12)=.070366047488108D0                                          CLE03
      W(14)= .030753241996117D0                                         CLE03
      GO TO 10000                                                       CLE03
  200  IF(N.NE.20) GO TO 600                                            CLE04
      Z(1)=.7652652113349733D-01                                        CLE04
      Z(3)=.2277858511416450D0                                          CLE04
      Z(5)=.3737060887154195D0                                          CLE04
      Z(7)=.5108670019508270D0                                          CLE04
      Z(9)=.6360536807265150D0                                          CLE04
      Z(11)=.7463319064601507D0
      Z(13)=.8391169718222188D0                                         CLE04
      Z(15)=.9122344282513259D0                                         CLE04
      Z(17)= .9639719272779137D0                                        CLE04
      Z(19)=.9931285991850949D0                                         CLE04
      W(1)=.1527533871307258D0                                          CLE04
      W(3)=.1491729864726037D0                                          CLE04
      W(5)=.1420961093183820D0                                          CLE04
      W(7)=.1316886384491766D0                                          CLE04
      W(9)=.1181945319615184D0                                          CLE04
      W(11)=.1019301198172404D0                                         CLE04
      W(13)=.8327674157670474D-01                                       CLE04
      W(15)=.6267204833410906D-01                                       CLE04
      W(17)=.4060142980038694D-01                                       CLE04
      W(19)=.1761400713915211D-01                                       CLE04
      GO TO 10000                                                       CLE04
  600  IF(N.NE.60) GO TO 1040                                           CLE04
      Z(1)=.2595977230124779D-01                                        CLE04
      Z(3)=.7780933394953656D-01                                        CLE04
      Z(5)=.1294491353969450D0                                          CLE04
      Z(7)=.1807399648734254D0                                          CLE04
      Z(9)=.2315435513760293D0                                          CLE04
      Z(11)=.2817229374232616D0                                         CLE04
      Z(13)=.3311428482684481D0                                         CLE04
      Z(15)=.3796700565767979D0                                         CLE04
      Z(17)=.4271737415830783D0                                         CLE04
      Z(19)=.4735258417617071D0                                         CLE04
      Z(21)=.5186014000585697D0                                         CLE04
      Z(23)=.5622789007539445D0                                         CLE04
      Z(25)=.6044405970485103D0                                         CLE04
      Z(27)=.6449728284894770D0                                         CLE04
      Z(29)=.6837663273813554D0                                         CLE04
      Z(31)=.7207165133557303D0                                         CLE04
      Z(33)=.7557237753065856D0                                         CLE04
      Z(35)=.7886937399322640D0                                         CLE04
      Z(37)=.8195375261621457D0                                         CLE04
      Z(39)=.8481719847859296D0                                         CLE04
      Z(41)=.8745199226468983D0                                         CLE04
      Z(43)=.8985103108100459D0                                         CLE04
      Z(45)=.9200784761776275D0                                         CLE04
      Z(47)=.9391662761164232D0                                         CLE04
      Z(49)=.9557222558399961D0                                         CLE04
      Z(51)=.9697017887650527D0                                         CLE04
      Z(53)=.9810672017525981D0                                         CLE04
      Z(55)=.9897878952222217D0                                         CLE04
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      Z(57)=.9958405251188381D0                                         CLE04
      Z(59)=.9992101232274360D0                                         CLE04
      W(1)=.5190787763122063D-01                                        CLE04
      W(3)=.5176794317491018D-01                                        CLE04
      W(5)=.5148845150098093D-01                                        CLE04
      W(7)=.5107015606985562D-01                                        CLE04
      W(9)=.5051418453250937D-01                                        CLE04
      W(11)=.4982203569055018D-01                                       CLE04
      W(13)=.4899557545575683D-01                                       CLE04
      W(15)=.4803703181997118D-01                                       CLE04
      W(17)=.4694898884891220D-01                                       CLE04
      W(19)=.4573437971611448D-01                                       CLE04
      W(21)=.4439647879578711D-01                                       CLE04
      W(23)=.4293889283593564D-01                                       CLE04
      W(25)=.4136555123558475D-01                                       CLE04
      W(27)=.3968069545238079D-01                                       CLE04
      W(29)=.3788886756924344D-01                                       CLE04
      W(31)=.3599489805108450D-01                                       CLE04
      W(33)=.3400389272494642D-01                                       CLE04
      W(35)=.3192121901929632D-01                                       CLE04
      W(37)=.2975249150078894D-01                                       CLE04
      W(39)=.2750355674992479D-01                                       CLE04
      W(41)=.2518047762152124D-01                                       CLE04
      W(43)=.2278951694399781D-01                                       CLE04
      W(45)=.2033712072945728D-01                                       CLE04
      W(47)=.1782990101420772D-01                                       CLE04
      W(49)=.1527461859678479D-01                                       CLE04
      W(51)=.1267816647681596D-01                                       CLE04
      W(53)=.1004755718228798D-01                                       CLE04
      W(55)=.7389931163345455D-02                                       CLE04
      W(57)=.4712729926953568D-02                                       CLE04
      W(59)=.2026811968873758D-02                                       CLE04
      GO TO 10000                                                       CLE04
1040    IF(N.NE.104) GO TO 2560                                         CLE04
      Z(1)=.1503080570420580D-01                                        CLE04
      Z(3)=.4507883345537786D-01                                        CLE04
      Z(5)=.7508612251067031D-01                                        CLE04
      Z(7)=.1050255546478664D0                                          CLE04
      Z(9)=.1348700729684854D0                                          CLE04
      Z(11)=.1645927063496751D0                                         CLE04
      Z(13)=.1941665938185881D0                                         CLE04
      Z(15)=.2235650088272125D0                                         CLE04
      Z(17)=.2527613834057209D0                                         CLE04
      Z(19)=.2817293321725080D0                                         CLE04
      Z(21)=.3104426761792209D0                                         CLE04
      Z(23)=.3388754665692306D0                                         CLE04
      Z(25)=.3670020080281650D0                                         CLE04
      Z(27)=.3947968820053119D0                                         CLE04
      Z(29)=.4222349696849036D0                                         CLE04
      Z(31)=.4492914746865266D0                                         CLE05
      Z(33)=.4759419454741398D0                                         CLE05
      Z(35)=.5021622974534502D0                                         CLE05
      Z(37)=.5279288347376772D0                                         CLE05
      Z(39)=.5532182715620344D0                                         CLE05
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Z(41)=.5780077533275774D0                                          CLE05
Z(43)=.6022748772554004D0                                          CLE05
Z(45)=.6259977126325152D0                                          CLE05
Z(47)=.6491548206311185D0                                          CLE05
Z(49)=.6717252736833362D0                                          CLE05
Z(51)=.6936886743939371D0                                          CLE05
Z(53)=.7150251739739257D0                                          CLE05
Z(55)=.7357154901783585D0                                          CLE05
Z(57)=.7557409247321753D0
Z(59)=.7750833802283033D0                                          CLE05
Z(61)=.7937253764827685D0                                          CLE05
Z(63)=.8116500663320458D0                                          CLE05
Z(65)=.8288412508583829D0                                          CLE05
Z(67)=.8452833940293626D0                                          CLE05
Z(69)=.8609616367385050D0                                          CLE05
Z(71)=.8758618102342710D0                                          CLE05
Z(73)=.8899704489254118D0                                          CLE05
Z(75)=.9032748025512220D0                                          CLE05
Z(77)=.9157628477059157D0                                          CLE05
Z(79)=.9274232987070864D0                                          CLE05
Z(81)=.9382456177991042D0                                          CLE05
Z(83)=.9482200246834838D0                                          CLE05
Z(85)=.9573375053700733D0                                          CLE05
Z(87)=.9655898203461570D0                                          CLE05
Z(89)=.9729695120673583D0                                          CLE05
Z(91)=.9794699117905919D0                                          CLE05
Z(93)=.9850851458144620D0                                          CLE05
Z(95)=.9898101413367193D0                                          CLE05
Z(97)=.9936406326897030D0                                          CLE05
Z(99)=.9965731714060389D0                                          CLE05
Z(101)=.9986051626519773D0                                         CLE05
Z(103)=.9997352218760882D0                                         CLE05
 W(  1) =     .3005934726091462D-01                                CLE05
 W(  3) =     .3003218199259360D-01                                CLE05
 W(  5) =     .2997787600578057D-01                                CLE05
 W(  7) =     .2989647837794739D-01                                CLE05
 W(  9) =     .2978806266985645D-01                                CLE05
 W( 11) =     .2965272685908227D-01                                CLE05
 W( 13) =     .2949059325146727D-01                                CLE05
 W( 15) =     .2930180837059142D-01                                CLE05
 W( 17) =     .2908654282535595D-01                                CLE05
 W( 19) =     .2884499115580069D-01                                CLE05
 W( 21) =     .2857737165729427D-01                                CLE05
 W( 23) =     .2828392618325631D-01                                CLE05
 W( 25) =     .2796491992658968D-01                                CLE05
 W( 27) =     .2762064118002044D-01                                CLE05
 W( 29) =     .2725140107556215D-01                                CLE05
 W( 31) =     .2685753330333987D-01                                CLE05
 W( 33) =     .2643939381002810D-01                                CLE05
 W( 35) =     .2599736047717519D-01                                CLE05
 W( 37) =     .2553183277970497D-01                                CLE05
 W( 39) =     .2504323142490426D-01                                CLE05
 W( 41) =     .2453199797222264D-01                                CLE05
 W( 43) =     .2399859443422820D-01                                CLE05
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      W( 45) =     .2344350285908004D-01                              CLE05
      W( 47) =     .2286722489489493D-01                              CLE05
      W( 49) =     .2227028133640237D-01                              CLE05
      W( 51) =     .2165321165429792D-01                              CLE05
      W( 53) =     .2101657350772073D-01                              CLE05
      W( 55) =     .2036094224029680D-01                              CLE05
      W( 57) =     .1968691036020432D-01                              CLE05
      W( 59) =     .1899508700473277D-01                              CLE05
      W( 61) =     .1828609738982209D-01                              CLE05
      W( 63) =     .1756058224508301D-01                              CLE05
      W( 65) =     .1681919723481482D-01                              CLE05
      W( 67) =     .1606261236555251D-01                              CLE05
      W( 69) =     .1529151138069267D-01                              CLE05
      W( 71) =     .1450659114276789D-01                              CLE05
      W( 73) =     .1370856100396590D-01                              CLE05
      W( 75) =     .1289814216552733D-01                              CLE05
      W( 77) =     .1207606702671645D-01                              CLE05
      W( 79) =     .1124307852416543D-01                              CLE05
      W( 81) =     .1039992946259468D-01                              CLE05
      W( 83) =     .9547381838326911D-02                              CLE05
      W( 85) =     .8686206157923711D-02                              CLE05
      W( 87) =     .7817180756425343D-02                              CLE05
      W( 89) =     .6941091125180975D-02                              CLE05
      W( 91) =     .6058729274750651D-02                              CLE05
      W( 93) =     .5170893207327752D-02                              CLE05
      W( 95) =     .4278386752472274D-02                              CLE05
      W( 97) =     .3382020818687030D-02                              CLE05
      W( 99) =     .2482621802176784D-02                              CLE05
      W(101) =     .1581095291194842D-02                              CLE05
      W(103) =     .6794761824845529D-03                              CLE05
      GO TO 10000                                                     CLE05
2560   IF(N.NE.256) GO TO 3000                                        CLE05
      Z(1)=.6123912375189529D-02                                      CLE05
      Z(3)=.1837081847881366D-01                                      CLE05
      Z(5)=.3061496877997902D-01                                      CLE05
      Z(7)=.4285452653637909D-01                                      CLE05
      Z(9)=.5508765569463398D-01                                      CLE05
      Z(11)=.6731252116571640D-01                                     CLE05
      Z(13)=.7952728910023296D-01                                     CLE05
      Z(15)=.9173012716351955D-01                                     CLE05
      Z(17)=.1039192048105094D0                                       CLE05
      Z(19)=.1160926935603328D0                                       CLE06
      Z(21)=.1282487672706070D0                                       CLE06
      Z(23)=.1403856024113758D0                                       CLE06
      Z(25)=.1525013783386563D0                                       CLE06
      Z(27)=.1645942775675538D0                                       CLE06
      Z(29)=.1766624860449019D0                                       CLE06
      Z(31)=.1887041934213888D0                                       CLE06
      Z(33)=.2007175933231266D0                                       CLE06
      Z(35)=.2127008836226259D0                                       CLE06
      Z(37)=.2246522667091319D0                                       CLE06
      Z(39)=.2365699497582840D0                                       CLE06
      Z(41)=.2484521450010566D0                                       CLE06
      Z(43)=.2602970699919425D0                                       CLE06
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Z(45)=.2721029478763366D0                                       CLE06
Z(47)=.2838680076570817D0                                       CLE06
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Z(111)=.6286050494690149D0                                      CLE06
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      W(221)=.2641776825427490D-02                                      CLE08
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      W(245)=.8618537014200890D-03                                      CLE08
      W(247)=.7121541634733206D-03                                      CLE08
      W(249)=.5623489540314098D-03                                      CLE08
      W(251)=.4124632544261763D-03                                      CLE08
      W(253)=.2625349442964459D-03                                      CLE08
      W(255)=.1127890178222721D-03                                      CLE08
      GO TO 10000                                                       CLE08
3000   CONTINUE                                                         CLE08
      WRITE(6,4000)N                                                    CLE08
4000  FORMAT(/////,40X,'*****  ERROR FLAG FROM SUBROUTINE DGAUSS *****',CLE08
     2//,20X,'SUBRO INE  DGAUSS  DOES NOT CONTAIN THE  N= ', I3,        CLE08
     $' ROOTS AND WEIGHT FACTORS',                                      CLE08
     3                  /, 20X,'FOR THE GAUSS-LEGENDRE QUADRADURE INTEGCLE08
     4RATION SCHEME, THEY MUST BE ADDED ',/ 30X,'PROGRAM SHALL END AFT')CLE08
      STOP                                                              CLE08
10000   CONTINUE                                                        CLE08
C                                                                       CLE08
C             CONSTRUCT THE REMAINING COEFFICIENTS FROM THE GIVEN ONES  CLE08
C                                                                       CLE08
      N0=0                                                              CLE08
      NF=N/2                                                            CLE08
      IF(Z(1).EQ.0.) N0=1                                               CLE08
      NJ=N0                                                             CLE08
      DO 10100 J=1,NF                                                   CLE08
      NJ=NJ+2                                                           CLE08
      Z(NJ)=-Z(NJ-1)                                                    CLE08
10100  W(NJ)=W(NJ-1)                                                    CLE08
C      CHECK IF LOWER AND UPPER INTEGRATION LIMITS ARE FINITE           CLE08
C     OR INFINITE                                                       CLE08
      IF(A.LE.-1.D+10) GO TO 30000                                      CLE08
      IF(B.GE.1.D+10) GO TO 50000                                       CLE08
C                                                                       CLE08
C        ADJUST THE COEFFICIENTS TO ACCOUNT FOR THE NON-NORMALIZED      CLE08
C     LIMITS OF INTEGRATION                                             CLE08
C     WHERE                                                             CLE08
C        W(I)       WN(I)*(B-A)/2                                      CLE08
C                                                                       CLE08
C        Z(I)       (ZN(I)*(B-A)+B+A)/2                                CLE08
C                                                                       CLE08
C                    WHERE WN(I) AND  ZN(I)  ARE THE NORMALIZED         CLE08
C                       GAUSSIAN WEIGHTS AND ROOTS                      CLE08
C     SEE PAGE 104 AND EQ 2.98 IN THE ' APPLIED NUMERICAL METHODS'      CLE08
```

```
C                                                                       CLE08
      DO 20000 I=1,N                                                    CLE08
      W(I)=W(I)*(B-A)/2.D0                                              CLE08
20000  Z(I)=(Z(I)*(B-A)+B+A)/2.D0                                       CLE08
      RETURN                                                            CLE08
30000   CONTINUE                                                        CLE08
C                                                                       CLE08
C     SPECIAL CASE WHEN  A --# - INFINITY                               CLE08
C                                                                       CLE08
      DO 40000 I=1,N                                                    CLE08
      W(I)=W(I)/(Z(I)+1.D0)                                             CLE08
40000  Z(I)=B+DLOG((Z(I)+1.D0)/2.D0)                                    CLE08
C     CHECK IF THIS INTEGRAL HAS INFINITE UPPER AND LOWER LIMITS        CLE08
C     OF INTEGRATION                                                    CLE08
      IF(B.GE.1.D+10) GO TO 80000                                       CLE08
      RETURN                                                            CLE08
50000 CONTINUE                                                          CLE09
C                                                                       CLE09
C        SPECIAL CASE WHEN  B--# INFINITY                               CLE09
C                                                                       CLE09
      DO 60000 I=1,N                                                    CLE09
      W(I)=W(I)/(Z(I)+1.D0)                                             CLE09
60000 Z(I)=A+DLOG(2.D0/(Z(I)+1.D0))                                     CLE09
C     CHECK IF ONE IS TRYING TO SOLVE THE INFINITE INTEGRAL             CLE09
      IF(A.LE.-1.D+10) GO TO 80000                                      CLE09
      RETURN                                                            CLE09
80000 CONTINUE                                                          CLE09
      II=0                                                              CLE09
C     IF WE  WANT TO SOLVE A PROBLEM WITH  A--# - INFINITY AND          CE#91
C     B --# + INFINITY, THEN BREAK THE INTEGRATION INTO TWO             CLE09
C     SEMI-INFINITE INTEGRALS                                           CLE09
C     THUS :  F(X)*DX (-INF,+INF) = F(X)*DX (-INF,0) + F(X)*DX (0,+INF) CLE09
C                                                                       CLE09
      WRITE(6,  90000) A,B,N                                            CLE09
90000   FORMAT(//////////,30X,'*****  ERROR IN SUBROUTINE  DGAUSS  *****CLE09
     2',//, 30X,'DGAUSS WAS CALLED WITH  A = ', D20.12,/, 54X,'B = ',   CLE09
     3D20.12,/, 51X,'  N  = ', I3,///,10X,'THIS SUBROUTINE CAN NOT HANDLCLE09
     4E AN INTEGRAL WHERE BOTH THE UPPER AND LOWER LIMITS OF INTEGRATIONCLE09
     5 ARE INFINITE', ///, 20X,'WHAT TO DO ...DEFINE A NEW PROBLEM SUCH CLE09
     6THAT',//,20X,  'F(X)*DX (-INF,+INF)  =  F(X)*DX (-INF,0)  +  F(X)*CLE09
     7DX (0,+INF)   WHERE  INF = 1.D+20 ',//,20X,'PROGRAM SHALL END AFTECLE09
     8R FORMAT 90000 IN SUBROUTINE DGAUSS')                             CLE09
      IF(II.EQ.0) STOP                                                  CLE09
      RETURN                                                            CLE09
      END                                                               CLE09
```

ASSUMPTIONS and PARAMETER VALUES:

LINE SOURCE IS 2000 FEET WIDE
RECEPTOR IS 5280 FT DOWNGRADIENT OF SOURCE
HORIZONTAL GROUNDWATER VELOCITY: Vx=1.3 FT/DAY, Vy=0 FT/DAY
NO VERTICAL FLOW
LONGITUDINAL DISPERSIVITY= 100 FT/DAY ->
LATERAL DISPERSION (Dx) = 130 FT**2/DAY
TRANSVERSE DISPERSIVITY= ~~50 FT/DAY -> 65 FT/DAY~~ 60 FT/DAY
TRANSVERSE DISPERSION (Dy) = ~~65~~ 78 FT**2/DAY
NO VERTICAL DISPERSION
CONSTITUENTS DO NOT DECAY (K=0)
NO RETARDATION
CONCENTRATIONS AT SOURCE HAVE 16 YEAR HALF-LIFE ->
GAMMA=.000119

APPENDIX H

AIR QUALITY DATA

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Analysis Results: June 10-18, 1986

Report No. 86-35

CENTER FOR OCCUPATIONAL HEALTH ENGINEERING

Industrial Hygiene Surveillance Report
Aluminum Reduction Plant
The Dalles, Oregon

July 1986

Prepared for:

J. Bou
V.P. Commercial Operations
Martin Marietta Corporation
6801 Rockledge Drive
Bethesda, Maryland 20817

Prepared by:

R.D. Huntington, CIHT

B.P. McCarthy, CIHT

MARTIN MARIETTA CORPORATION
Martin Marietta Laboratories
Center for Occupational Health Engineering
1450 South Rolling Road
Baltimore, Maryland 21227
(301) 247-0700

Martin Marietta Laboratories
Center for Occupational Health Engineering

Survey Information Sheet

NAME OF OPERATION: Martin Marietta Aluminum Reduction Plant

LOCATION: The Dalles, Oregon

DATE(S) OF SURVEY: June 10-18, 1986

PERSONS CONDUCTING SURVEY: B. McCarthy, R.D. Huntington

NUMBER OF EMPLOYEE SAMPLES: 24 + 4 field blanks
NUMBER OF AREA SAMPLES: 17

WEATHER CONDITIONS:

		Wind	
Date	Sky	Velocity	Direction
6/10	Clear	<10	270°
6/11	Clear	<10	270°
6/12	Clear	<10	270°
6/13	Clear	<10	270°
6/18	Clear	15-20	270°

METHODS OF ANALYSES: NIOSH 0500, 7904, 7902, 3rd Edition, ASTM #1356

ANALYSIS CONDUCTED BY: F. Schneidman, E. Poblete, B. McCarthy

EXECUTIVE SUMMARY

An Industrial Hygiene survey was conducted at the Martin Marietta Aluminum Reduction Plant, The Dalles, Oregon on June 10 - 18, 1986 at the request of J. Bou, V.P. Commercial Operations and C. Matthews, Corporate Director of Safety and Health.

The objective of this survey was to determine and document full shift personnel exposure to the following airborne contaminants:

- particulate and gaseous fluorides
- particulate and gaseous cyanides
- polynuclear aromatics
- total dust.

Participating in this survey were employees (drill operators) of West Coast Drilling Company and two on-site representatives of Geraghty & Miller involved in developing shallow and deep water monitoring wells.

During this survey 24 personnel samples were collected while drilling monitoring wells at Sites 15, 16, 20, and 21 for the determination of fluorides, both particulate and gaseous, polynuclear aromatics, and total dust. In addition, 17 area samples were collected upwind and downwind of each active drill site in order to determine fugitive contaminant levels.

It must be emphasized that cyanide determinations were not obtained in the employees 'breathing zone', because of the hazard imposed to the driller by the sampling equipment (glass liquid impingers). However, area particulate and gaseous cyanide samples were obtained as close as practical to the employees breathing zone.

Of the personnel evaluated none were found to exceed the OSHA's Permissible Exposure Limit for:

- Hydrogen cyanide
- Cyanide
- Fluoride
- Total dust.

Of the personnel evaluated for polynuclear aromatics (Benzene Soluble Fraction of the total dust) three were found to exceed the OSHA Permissible Exposure Limit (PEL) of 0.2 mg/m^3, and three were found to exceed the action level (one half the PEL).

Air sampling collection followed the sampling methodologies in NIOSH Method #7904 (cyanides, aerosol and gas), method #7902 for fluorides (aerosol and gas), ASTM Method (modified) #D-1356 for Coal Tar Pitch Volatiles (Benzene Solubles, PNA's), and a modified NIOSH 0500 for total dust. Personnel sampling pumps calibrated to ~ 2.0 l/min. were used in series with an impinger and a prefilter for cyanide and pretreated filters in standard 37 mm diameter cassettes for fluoride collection. Sampling for total dust and coal tar pitch was accomplished using 37 mm diameter cassettes with a glass fiber/silver membrane filter combination. Flow rates and sampling equipment were checked periodically throughout each sampling period. The subsequent chemical analyses were performed at the

Center for Occupational Health Engineering following the analytical procedures prescribed in NIOSH Methods 7904, 7902, 0500, and ASTM Method D-1356.

Attached are detailed air sampling summaries for each of the analytes along with a site layout indicating the approximate location where the samples were obtained.

Survey Dates: June 13-18, 1986
Plant: The Dalles Aluminum Reduction Plant
OSHA Contaminant: Total Dust
OSHA PEL: 15 mg/m^3

SUMMARY OF AIR SAMPLING DATA

Lab Analysis #	Employee Name	Employee S.S. #	Job Function/ Location	Sampling Duration Mins.	Air Vol. m^3	Sample[1] Wt. mg	TWA mg/m^3
86-547	C. Stadeli	542-64-4845	Driller/Site 21	162	0.316	0.753	2.40
86-548	C. Johanson	540-90-9536	Driller/Site 21	113	0.210	(2)	--
86-549	P. Rinehart	394-48-9584	G&M Observer/ Site 16	162	0.295	0.070	0.24
86-550	R. Romanelli	331-72-8273	Driller/Site 16	173	0.325	0.174	0.54
86-551	C. Stadeli	542-64-4845	Driller/Site 16	527	0.938	3.02	3.22[3]
86-552	P. Rinehart	394-48-9584	G&M Observer/ Site 16	531	0.966	11.128	11.52[3]
86-553	C. Johanson	540-90-9534	Driller/Site 16	531	0.998	2.884	2.9

(1)Analyzed in accordance with NIOSH Method #0500.
(2)Pump malfunction sample void.
(3)Personnel splashed with drilling debris due to a well blow back.

Plant: The Dalles Aluminum Reduction Plant
OSHA Contaminant: Particulate Cyanide
OSHA PEL: 5 mg/m^3

SUMMARY OF AIR SAMPLING DATA

Lab Analysis #	Employee Name	Employee S.S. #	Job Function/ Location	Sampling Duration Mins.	Air Vol. m^3	Sample[1] Wt. mg	TWA mg/m^3
86-496	Area	--	--/Site 20	312	0.268	N.D.[2]	--
86-497	Area	--	--/Site 20	316	0.265	N.D.	--
86-498	Area	--	Fenceline/Site 20	239	0.220	N.D.	--
86-499	Area	--	Downwind/Site 15	505	0.429	N.D.	--
86-500	Area	--	Upwind/Site 15	509	0.468	N.D.	--
86-501	Area	--	Upwind/Site 16	569	0.489	N.D.	--
86-502	Area	--	Downwind/Site 16	565	0.475	N.D.	--
86-503	Area	--	Upwind/Site 20	452	0.380	N.D.	--
86-504	Area	--	Downwind/Site 20	455	0.419	N.D.	--
86-505	Area	--	Upwind/Site 16	457	0.393	N.D.	--
86-506	Area	--	Downwind/Site 16	457	0.388	N.D.	--
86-507	Area	--	Upwind/Site 16	170	0.340	N.D.	--
86-508	Area	--	On Rig/Site 21	110	0.101	N.D.	--
86-509	Area	--	Downwind/Site 16	180	0.353	N.D.	--
86-510	Field Blank	--	--	--	--	N.D.	--

(1)Analyzed in accordance with NIOSH Method #7904.
(2)Not detectable (<2.5 µg/ml).

Survey Dates: June 16-18, 1986
Plant: The Dalles Aluminum Reduction Plant
OSHA Contaminant: Hydrogen Cyanide
OSHA PEL: 10 ppm

SUMMARY OF AIR SAMPLING DATA

Lab Analysis #	Employee Name	Employee S.S. #	Job Function/ Location	Sampling Duration Mins.	Air Vol. m^3	Sample[1] Wt. mg	TWA mg/m^3
86-511	Area	--	--/Site 20	312	0.268	N.D.[2]	--
86-512	Area	--	--/Site 20	316	0.265	N D.	--
86-513	Area	--	Fenceline/Site 20	239	0.220	N.D.	--
86-514	Area	--	Downwind/Site 15	505	0.429	N.D.	--
86-515	Area	--	Upwind/Site 15	509	0.468	N.D.	--
86-516	Area	--	Upwind/Site 16	569	0.489	N.D.	--
86-517	Area	--	Downwind/Site 16	565	0.475	N.D.	--
86-518	Area	--	Upwind/Site 20	452	0.380	N.D.	--
86-519	Area	--	Downwind/Site 20	455	0.419	N.D.	--
86-520	Area	--	Upwind/Site 16	457	0.393	N.D.	--
86-521	Area	--	Downwind/Site 16	457	0.388	N.D.	--
86-522	Area	--	Upwind/Site 16	170	0.340	N.D.	--
86-523	Area	--	On Rig/Site 21	110	0.101	N.D.	--
86-524	Area	--	Downwind/Site 16	180	0.353	N.D.	--
86-525	Field Blank	--	--	--	--	N.D.	--

(1)Analyzed in accordance with NIOSH Method #7904.
(2)Not detectable (<2.5 µg/ml).

Plant: The Dalles Aluminum Reduction Plant
OSHA Contaminant: Particulate Fluoride
OSHA PEL: 2.5 mg/m^3

SUMMARY OF AIR SAMPLING DATA

Lab Analysis #	Employee Name	Employee S.S. #	Job Function/ Location	Sampling Duration Mins.	Air Vol. m^3	Sample(1) Wt. mg	TWA mg/m^3
86-526	Area	--	Fenceline/Site 20 —	249	0.451	0.003	0.007
86-527	C. Stadeli	542-64-4845	Driller/Site 20	295	0.502	0.004	0.008
86-528	P. Rinehart	394-48-9584	G&M Observer/Site 20	272	0.446	0.008	0.017
86-529	C. Johanson	540-90-9536	Driller/Site 20	295	0.546	0.004	0.007
86-530	C. Stadeli	542-64-4845	Driller/Site 20	520	0.884	0.009	0.010
86-531	P. Rinehart	394-48-9584	G&M Observer/Site 20	526	0.863	0.006	0.007
86-532	C. Johanson	540-90-9536	Driller/Site 20	519	0.960	0.002	0.002
86-533	S. Stadeli	544-64-8355	Driller/Site 16	419	0.758	0.005	0.007
86-534	E. Horn	562-25-6631	Driller/Site 16	410	0.800	0.005	0.006
86-535	S. Keith	472-78-3811	G&M Observer/ Site 16 & 15	419	0.771	0.003	0.003
86-536	E. Horn	562-25-6631	Driller/Site 16	403	0.746	0.004	0.005
86-537	S. Stadeli	544-64-8355	Driller/Site 15	404	0.743	0.003	0.004
86-538	S. Keith	472-78-3811	G&M Observer/ Site 16 & 15	419	0.687	0.002	0.003
86-539	P. Rinehart	394-48-9584	G&M Observer/Site 20	363	0.657	0.004	0.006
86-540	D. Prithard	511-70-9400	Driller/Site 16	367	0.716	0.002	0.003
86-541	R. Ronanelli	531-72-8273	Driller/Site 16	370	0.629	0.002	0.003

Survey Dates: June 10-18, 1986
Plant The Dalles Aluminum Reduction Plant
OSHA Contaminant: Particulate Fluoride
OSHA PEL: 2.5 mg/m^3

SUMMARY OF AIR SAMPLING DATA (Continued)

Lab Analysis #	Employee Name	Employee S.S. #	Job Function/ Location	Sampling Duration Mins.	Air Vol. m^3	Sample[1] Wt. mg	TWA mg/m^3
86-542	S. Keith	472-78-3811	G&M Observer/Site 21	175	0.341	0.002	0.006
86-543	D. Prithard	511-70-9400	Driller/Site 16	168	0.304	0.003	0.010
86-544	Area	--	--/Site 16	449	0.879	0.002	0.002
86-545	Area	--	--/Site 16	451	0.879	0.003	0.003
86-546	Field Blank	--	--	--	--	N.D.[2]	--

(1) Analyzed in accordance with NIOSH Method #7902.
(2) Not detectable (< 0.04 µg/ml).

Plant: The Dalles Aluminum Reduction Plant
OSHA Contaminant: Gaseous Fluoride
OSHA PEL: 2.5 mg/m^3

SUMMARY OF AIR SAMPLING DATA

Lab Analysis #	Employee Name	Employee S.S. #	Job Function/ Location	Sampling Duration Mins.	Air Vol. m^3	Sample[1] Wt. mg	TWA mg/m^3
86-526	Area	--	Fenceline/Site 20	249	0.451	<0.003	<0.007
86-527	C. Stadeli	542-64-4845	Driller/Site 20	295	0.502	<0.003	<0.006
86-528	P. Rinehart	394-48-9584	G&M Observer/Site 20	272	0.446	<0.003	<0.007
86-529	C. Johanson	540-90-9536	Driller/Site 20	295	0.546	<0.003	<0.005
86-530	C. Stadeli	542-64-4845	Driller/Site 20	520	0.884	<0.003	<0.003
86-531	P. Rinehart	394-48-9584	G&M Observer/Site 20	526	0.863	<0.003	<0.003
86-532	C. Johanson	540-90-9536	Driller/Site 20	519	0.960	<0.003	<0.003
86-533	S. Stadeli	544-64-8355	Driller/Site 16	419	0.758	<0.003	<0.004
86-534	E. Horn	562-25-6631	Driller/Site 16	410	0.800	<0.003	<0.004
86-535	S. Keith	472-78-3811	G&M Observer/ Site 16 & 15	419	0.771	<0.003	<0.004
86-536	E. Horn	562-25-6631	Driller/Site 16	403	0.746	<0.003	<0.004
86-537	S. Stadeli	544-64-8355	Driller/Site 15	404	0.743	<0.003	<0.004
86-538	S. Keith	472-78-3811	G&M Observer/ Site 16 & 15	419	0.687	<0.003	<0.004
86-539	P. Rinehart	394-48-9584	G&M Observer/Site 20	363	0.657	<0.003	<0.005
86-540	D. Prithard	511-70-9400	Driller/Site 16	367	0.716	<0.003	<0.004
86-541	R. Ronanelli	531-72-8273	Driller/Site 16	370	0.629	<0.003	<0.004

Survey Dates: June 13 - 18, 1986
Plant: Aluminum Reduction Plant - The Dalles, Oregon
OSHA Contaminant: Coal Tar Pitch Volatiles (Benzene Soluble Fraction)
OSHA PEL: 0.2 mg/m^3

SUMMARY OF AIR SAMPLING DATA

Lab Analysis #	Employee Name	Employee S.S. #	Job Function/ Location	Sampling Duration Mins.	Air Vol. m^3	Sample[1] Wt. (mg)	TWA mg/m^3
86-547	C. Stadeli	542-64-4845	Drill Oper./ Site 21	162	0.316	0.138	0.435
86-548	C. Johanson	540-90-9536	Drill Oper./ Site 21	113	0.210	0.100	0.476
86-549	P. Rinehart	394-48-9584	G&M Advisor/ Site 16	162	0.295	0.115	0.390
86-550	R. Romanelli	231-72-8273	Drill Oper./ Site 16	173	0.325	0.060	0.185
86-551	C. Stadeli	542-64-4845	Drill Oper./ Site 16	527	0.938	0.120	0.128
86-552	P. Rinehart	394-48-9584	G&M Advisor/ Site 16	531	0.966	0.133	0.137
86-553	C. Johanson	540-90-9536	Drill Oper./ Site 16	531	0.998	0.020	0.020
86-554	Field Blank	--	--	--	--	void	--
	Reagent Blank	--	--	--	--	0.009	--

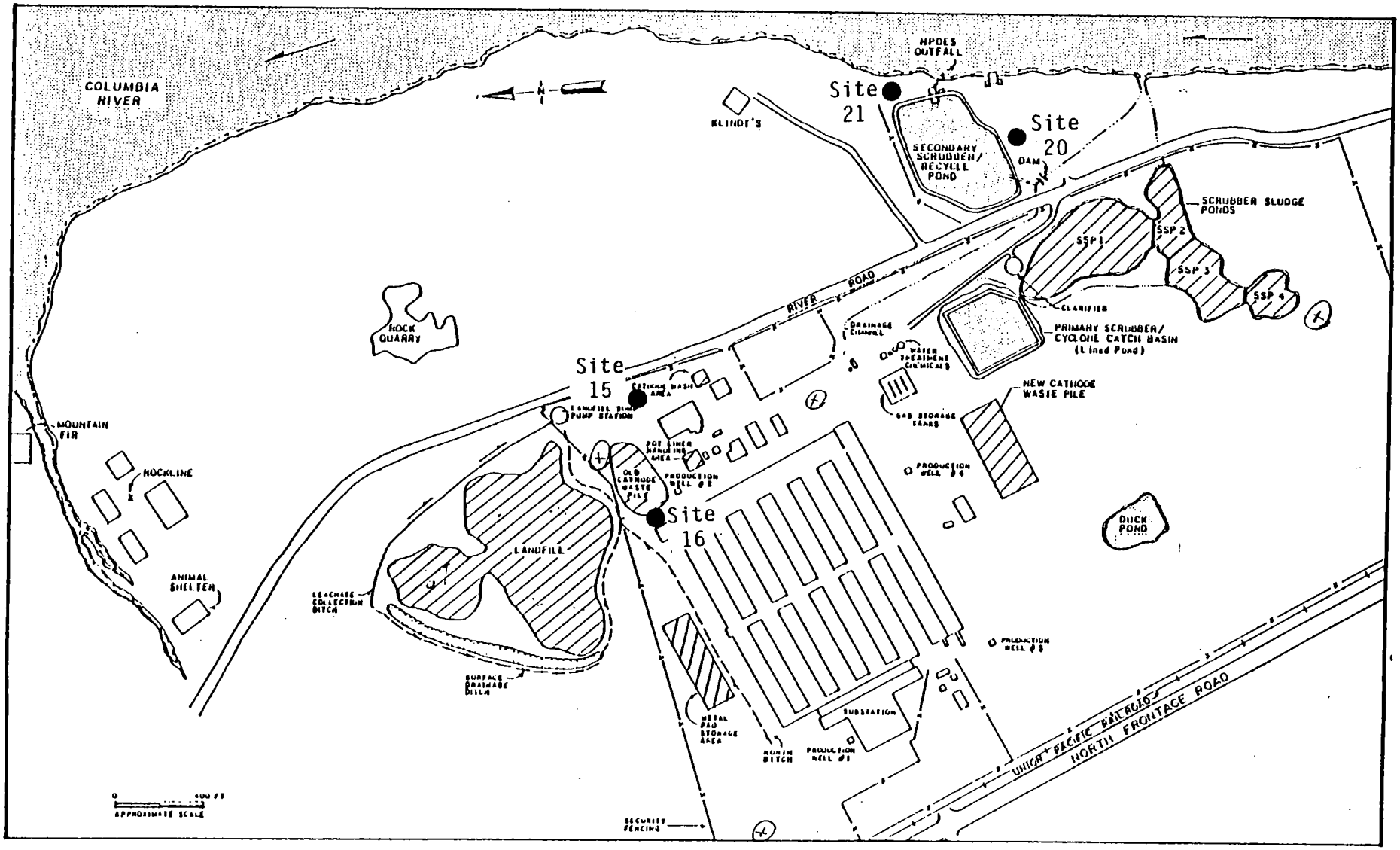
[1]Analyzed in accordance with the ASTM Method D-1356 (modified).

Survey tes: June 10-18, 1986
Plant: .he Dalles Aluminum Reduction Plant
OSHA Contaminant: Gaseous Fluoride
OSHA PEL: 2.5 mg/m^3

SUMMARY OF AIR SAMPLING DATA (Continued)

Lab Analysis #	Employee Name	Employee S.S. #	Job Function/ Location	Sampling Duration Mins.	Air Vol. m^3	Sample[1] Wt. mg	TWA mg/m^3
86-542	S. Keith	472-78-3811	G&M Observer/Site 21	175	0.341	<0.003	<0.009
85-543	D. Prithard	511-70-9400	Driller/Site 16	168	0.304	<0.003	<0.010
86-544	Area	--	--/Site 16	449	0.813	<0.003	<0.004
86-545	Area	--	--/Site 16	451	0.879	<0.003	<0.003
86-546	Field Blank	--	--	--	--	N.D.[2]	--

(1)Analyzed in accordance with NIOSH Method #7902.
(2)Not detectable (< 0.04 µg/ml).


COLUMBIA RIVER
N
NPDES OUTFALL
Site 21
Site 20
KLINDT'S
SECONDARY SCRUBBER/ RECYCLE POND
DAM
SCRUBBER SLUDGE PONDS
SSP 1
SSP 2
SSP 3
SSP 4
CLARIFIER
PRIMARY SCRUBBER/ CYCLONE CATCH BASIN (Lined Pond)
RIVER ROAD
DRAINAGE CHANNEL
ROCK QUARRY
Site 15
NEW CATHODE WASTE PILE
MOUNTAIN FIR
HOCKLINE
ANIMAL SHELTER
OLD CATHODE WASTE PILE
PRODUCTION WELL #6
Site 16
DUCK POND
LANDFILL
LEACHATE COLLECTION DITCH
SURFACE DRAINAGE DITCH
PRODUCTION WELL #5
SUBSTATION
METAL PAD STORAGE AREA
NORTH DITCH
PRODUCTION WELL #1
UNION PACIFIC RAILROAD
NORTH FRONTAGE ROAD
SECURITY FENCING
APPROXIMATE SCALE

Analysis Results: June 16-18, 1986

Report No. 87-37

CENTER FOR OCCUPATIONAL HEALTH ENGINEERING

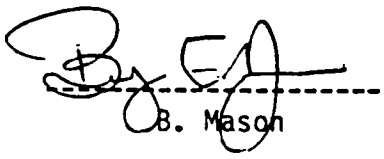
Industrial Hygiene Surveillance Report
Aluminum Reduction Plant
The Dalles, Oregon

July 1987

Prepared for:

J. Bou
V.P. Commercial Operations
Martin Marietta Corporation
6801 Rockledge Drive
Bethesda, Maryland 20817

Prepared by:



B. Mason

Approved by:



R.D. Huntington, CIHT

MARTIN MARIETTA CORPORATION
Martin Marietta Laboratories
Center for Occupational Health Engineering
1450 South Rolling Road
Baltimore, Maryland 21227
(301) 247-0700

Martin Marietta Laboratories
Center for Occupational Health Engineering

Survey Information Sheet

NAME OF OPERATION: The Dalles Reduction Facility

LOCATION: The Dalles, Oregon

DATE(S) OF SURVEY: 16 June 1987 - 18 June 1987

PERSONS CONDUCTING SURVEY: B. Mason

CHEMICAL AGENTS:
- Gaseous and Particulate cyanide
- Gaseous and Particulate fluoride
- Coal tar pitch volatiles (benzene soluble fraction)
- Total Dust

NUMBER OF PERSONNEL SAMPLES:
- 20 Gaseous and Particulate cyanide (18 samples, 2 blanks)

NUMBER OF AREA SAMPLES:
- 20 Gaseous and Particulate fluoride (18 samples, 2 bl[illegible]s)
- 10 Coal tar pitch volatiles/total dust (9 samples, 1 [illegible]ni

WEATHER CONDITIONS:

Date	Sky	Wind Velocity	Wind Direction
16 June	Clear	10-15 MPH	315°
17 June	Clear	2-6 MPH	045°
18 June	Clear	8-12 MPH	315°

METHODS OF ANALYSES:
- NIOSH 7902 (Gaseous and Particulate cyanide)
- NIOSH 7904 (Gaseous and Particulate fluoride)
- NIOSH 0500 (Total Dust)
- ASTM 1356 Modified (Coal tar pitch volatiles, benzene soluble fraction)

PERSONNEL CONDUCTING ANALYSES: E. Poblete, F. Schneidman

SUMMARY

An Industrial Hygiene survey was performed at The Dalles Reduction Facility, The Dalles, Oregon, during the period of 16 June 1987 through 18 June, 1987 at the request of J. Bou, V.P. Commercial Operations and C. Matthews, Corporate Director of Safety and Health, and was coordinated with L. Grabowski, Site Manager.

The objective of this survey was to evaluate and document full-shift personnel exposure to the following airborne contaminants:

- Gaseous and Particulate Cyanide
- Gaseous and Particulate Fluoride
- Coal Tar Pitch Volatiles (Benzene Soluble Fraction)
- Total Dust.

Participating in this survey were employees (drill operators) of West Coast Drilling Company and on-site representatives of Geraghty & Miller involved in developing shallow and deep water monitoring wells.

During this survey 12 personnel samples were collected while drilling monitoring wells at Site 16 (old cathode waste pile) for the determination of fluorides, both particulate and gaseous, coal tar pitch volatiles, and total dust. In addition, 36 area samples were collected upwind and downwind of each active drill site in order to determine fugitive contaminant levels.

It must be emphasized that cyanide determinations were not obtained in the employees 'breathing zone', because of the hazard imposed to the driller by the sampling equipment (glass liquid impingers). However, area particulate and gaseous cyanide samples were obtained as close as practical to the employees breathing zone.

Of the personnel evaluated none were found to exceed the OSHA's Permissible Exposure Limit for:

- Hydrogen cyanide
- Cyanide
- Fluoride
- Coal tar pitch volatiles
- Total dust.

Air sampling collection followed the sampling methodologies in NIOSH Method #7904 (cyanides, particulate and gaseous), method #7902 for fluorides (particulate and gaseous), a modified NIOSH 0500 for total dust, and ASTM Method #D1356 for Coal Tar Pitch Volatiles. Personnel sampling pumps calibrated to ~ 2.0 ℓ/min. were used in series with an impinger and a prefilter for cyanide and pretreated filters in standard 37 mm diameter cassettes for fluoride collection. Flow rates and sampling equipment were checked periodically throughout each sampling period. The subsequent chemical analyses were performed at the Center for Occupational Health Engineering following the analytical procedures prescribed in NIOSH Methods 7904, 7902, 0500, and ASTM D1356.

Attached are detailed air sampling summaries for each of the analytes along with a site layout indicating the approximate location where the samples were obtained, and complete documentation for each sample collected.

Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Particulate Cyanide
OSHA PEL: 5.0 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA(1)

Lab Analysis #	Employee Name	Location	Sampling Duration Mins.	Air Sample Volume (L)	Cyanide Concentration (mg/sample)	8-Hour TWA (mg/cu.m)	Severity TWA/PEL
Collected 16 June 1987		Test Well 8A					
87-0757	Area Sample	Downwind of Drill Rig	391	228.0	<0.020	<0.072	<0.01
87-0758	Area Sample	Upwind of Drill Rig	509	287.0	<0.020	<0.074	<0.01
87-0759	Area Sample	Drill Rig	480	263.0	<0.020	<0.076	<0.01
Collected 17 June 1876		Test Well 9S					
87-0760	Area Sample	Upwind of Drill Rig	332	194.0	<0.020	<0.071	<0.01
87-0761	Area Sample	Downwind of Drill Rig	437	255.0	<0.020	<0.071	<0.01
87-0762	Area Sample	Drill Rig	345	194.0	<0.020	<0.074	<0.01

Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Particulate Cyanide
OSHA PEL: 5.0 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA(1)

Lab Analysis #	Employee Name	Location	Sampling Duration Mins.	Air Sample Volume (L)	Cyanide Concentration (mg/sample)	8-Hour TWA (mg/cu.m)	Severity(2) TWA/PEL
Collected 18 June 1987		Test Well 9S					
87-0773	Area Sample	Downwind of Drill Rig	385	217.0	<0.020	<0.074	<0.01
87-0774	Area Sample	Upwind of Drill Rig	515	243.9	<0.020	<0.082	<0.01
87-0775	Area Sample	Drill Rig	516	283.0	<0.020	<0.076	<0.01
87-0776	Field Blank		--	--	<0.020	--	--

(1)Samples were analyzed via NIOSH Method 7904, an ion sensitive electrode method having a lower limit of detection of 0.020 mg cyanide per sample.

(2)Severity is an index relating a contaminants measured 8 hour Time Weighted Average (TWA), to its OSHA Permissible Exposure Limit (PEL). A severity value of greater than 1.0 indicates an overexposure to the contaminant.

Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Hydrogen Cyanide
OSHA PEL: 5.0 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA(1)

Lab Analysis #	Employee Name	Location	Sampling Duration Mins.	Air Sample Volume (L)	Hydrogen Cyanide Concentration (mg/sample)	8-Hour TWA (mg/cu.m)	Severity(2) TWA/PEL
Collected 16 June 1987		Test Well 8A					
87-0767	Area Sample	Downwind of Drill Rig	391	228.0	<0.020	<0.072	<0.01
87-0768	Area Sample	Upwind of Drill Rig	509	287.0	<0.020	<0.074	<0.01
87-0769	Area Sample	Drill Rig	480	263.0	<0.020	<0.076	<0.01
Collected 17 June 1987		Test Well 9S					
87-0770	Area Sample	Upwind of Drill Rig	332	194.0	0.020	0.071	0.01
87-0771	Area Sample	Downwind of Drill Rig	437	255.0	<0.020	<0.071	<0.01
87-0772	Area Sample	Drill Rig	345	194.0	<0.020	<0.074	<0.01

Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Hydrogen Cyanide
OSHA PEL: 5.0 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA(1)

Lab Analysis #	Employee Name	Location	Sampling Duration Mins.	Air Sample Volume (L)	Hydrogen Cyanide Concentration (mg/sample)	8-Hour TWA (mg/cu.m)	Severity(2) TWA/PEL
Collected 18 June 1987		Test Well 9S					
87-0773	Area Sample	Downwind of Drill Rig	385	217.0	<0.020	<0.074	<0.01
87-0774	Area Sample	Upwind of Drill Rig	515	258.0	<0.020	<0.082	<0.01
87-0775	Area Sample	Drill Rig	516	283.0	<0.020	<0.076	<0.01
87-0776	Field Blank		--	--	<0.020	--	--

(1)Samples were analyzed via NIOSH Method 7904, an ion sensitive electrode method having a lower limit of detection of 0.020 mg cyanide per sample.

(2)Severity is an index relating a contaminants measured 8 hour Time Weighted Average (TWA), to its OSHA Permissible Exposure Limit (PEL). A severity value of greater than 1.0 indicates an overexposure to the contaminant.

Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Hydrogen Fluoride
OSHA PEL: 2.5 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA(1)

Lab Analysis #	Employee Name/ S.S. #	Function/ Location	Sampling Duration Mins.	Air Sample Volume (L)	Fluoride Concentration (mg/sample)	8-Hour TWA (mg/cu.m)	Severity(2) TWA/PEL
Collected 16 June 1987		Test Well 8A					
87-0747	Area Sample	Downwind of Drill Rig	511	904.0	<0.002	<0.002	<0.01
87-0748	Area Sample	Upwind of Drill Rig	509	758.0	<0.002	<0.002	<0.01
87-0749	Casey Burton (516-86-5633)	Driller Helper/ Drill Rig	413	718.0	<0.002	<0.002	<0.01
Collected 17 June 1987		Test Well 9S					
87-0730	Area Sample	Upwind of Drill Rig	429	746.0	<0.003	<0.003	<0.01
87-0731	Area Sample	Downwind of Drill Rig	437	651.0	<0.003	<0.003	<0.01
87-0732	Casey Burton (516-86-5663)	Driller Helper/ Drill Rig	385	681.0	<0.003	<0.003	<0.01

Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Hydrogen Fluoride
OSHA PEL: 2.5 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA(1)

Lab Analysis #	Employee Name/ S.S. #	Function/ Location	Sampling Duration Mins.	Air Sample Volume (L)	Fluoride Concentration (mg/sample)	8-Hour TWA (mg/cu.m)	Severity(2) TWA/PEL
Collected 18 June 1987		Test Well 9S					
87-0753	Area Sample	Downwind of Drill Rig	515	896.0	<0.002	<0.002	<0.01
87-0754	Casey Burton (516-86-5663)	Driller Helper/ Drill Rig	421	627.0	<0.003	<0.003	<0.01
87-0755	Area Sample	Upwind of Drill Rig	515	903.0	<0.002	<0.002	<0.01
87-0756	Field Blank		--	--	<0.002	--	--

(1) Samples were analyzed via NIOSH Method 7904, an ion sensitive electrode method having a lower limit of detection of 0.002 mg fluoride per sample.

(2) Severity is an index relating a contaminants measured 8 hour Time Weighted Average (TWA), to its OSHA Permissible Exposure Limit (PEL). A severity value of greater than 1.0 indicates an overexposure to the contaminant.

Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Particulate Fluoride
OSHA PEL: 2.5 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA[1]

Lab Analysis #	Employee Name/ S.S. #	Function/ Location	Sampling Duration Mins.	Air Sample Volume (L)	Fluoride Concentration (mg/sample)	8-Hour TWA (mg/cu.m)	Severity[2] TWA/PEL
Collected 16 June 1987		Test Well 8A					
87-0737	Area Sample	Downwind of Drill Rig	511	904.0	0.002	0.002	<0.01
87-0738	Area Sample	Upwind of Drill Rig	509	758.0	<0.002	<0.002	<0.01
87-0739	Casey Burton (516-86-5633)	Driller Helper/ Drill Rig	413	718.0	<0.002	<0.002	<0.01
Collected 17 June 1987		Test Well 9S					
87-0740	Area Sample	Upwind of Drill Rig	429	746.0	<0.003	<0.003	<0.01
87-0741	Area Sample	Downwind of Drill Rig	437	651.0	<0.003	<0.003	<0.01
87-0742	Casey Burton (516-86-5663)	Driller Helper/ Drill Rig	385	681.0	0.004	0.003	<0.01

Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Particulate Fluoride
OSHA PEL: 2.5 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA(1)

Lab Analysis #	Employee Name/ S.S. #	Function/ Location	Sampling Duration Mins.	Air Sample Volume (L)	Fluoride Concentration (mg/sample)	8-Hour TWA (mg/cu.m)	Severity(2) TWA/PEL
Collected 18 June 1987		Test Well 9S					
87-0743	Area Sample	Downwind of Drill Rig	515	896.0	<0.002	<0.002	<0.01
87-0744	Casey Burton (516-86-5633)	Driller Helper/ Drill Rig	421	627.0	0.004	0.004	<0.01
87-0745	Area Sample	Upwind of Drill Rig	515	903.0	<0.002	<0.002	<0.01
87-0746	Field Blank		--	--	<0.002	--	--

(1)Samples were analyzed via NIOSH Method 7904, an ion sensitive electrode method having a lower limit of detection of 0.002 mg fluoride per sample.

(2)Severity is an index relating a contaminants measured 8 hour Time Weighted Average (TWA), to its OSHA Permissible Exposure Limit (PEL). A severity value of greater than 1.0 indicates an overexposure to the contaminant.

Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Total Dust
OSHA PEL: 15.0 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA(1)

Lab Analysis #	Employee Name/ S.S. #	Function/ Location	Sampling Duration Mins.	Air Sample Volume (L)	Total Dust Weight (mg/sample)	8-Hour TWA (mg/cu.m)	Severity(2) TWA/PEL
Collected 16 June 1987		Test Well 8A					
87-0777	Jon McElwain (571-23-4914)	Driller/ Drill Rig	399	806.0	0.779	0.647	0.04
87-0778	Area Sample	Upwind of Drill Rig	509	1028.0	<0.001	<0.001	<0.01
87-0779	Area Sample	Downwind of Drill Rig	509	1033.0	0.065	0.066	<0.01
Collected 17 June 1987		Test Well 9S					
87-0780	Area Sample	Upwind of Drill Rig	430	869.0	0.038	0.039	<0.01
87-0781	Jon McElwain (571-23-4914)	Driller/ Drill Rig	385	778.0	0.959	0.989	0.07
87-0782	Area Sample	Downwind of Drill Rig	437	887.0	0.067	0.069	<0.01

Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Total Dust
OSHA PEL: 15.0 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA(1)

Lab Analysis #	Employee Name/ S.S. #	Function/ Location	Sampling Duration Mins.	Air Sample Volume (L)	Total Dust Weight (mg/sample)	8-Hour TWA (mg/cu.m)	Severity(2) TWA/PEL
Collected 18 June 1987		Test Well 9S					
87-0783	Area Sample	Downwind of Drill Rig	515	1045.0	0.126	0.129	<0.01
87-0784	Jon McElwain (571-23-4914)	Driller/ Drill Rig	421	850.0	0.396	0.408	0.03
87-0785	Area Sample	Upwind of Drill Rig	515	1020.0	0.098	0.103	<0.01
87-0786	Field Blank		--	--	<0.001	--	--

(1)Samples were analyzed via Modified NIOSH Method 0500, having a lower detection limit of 0.001 mg/sample.

(2)Severity is an index relating a contaminants measured 8 hour Time Weighted Average (TWA), to its OSHA Permissible Exposure Limit (PEL). A severity value of greater than 1.0 indicates an overexposure to the contaminant.

Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Coal Tar Pitch Volatiles (Benzene Soluble Fraction)
OSHA PEL: 0.20 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA(1)

Lab Analysis #	Employee Name/ S.S. #	Function/ Location	Sampling Duration Mins.	Air Sample Volume (L)	Benzene Soluble Fraction (mg/sample)	8-Hour TWA (mg/cu.m)	Severity(2) TWA/PEL
Collected 16 June 1987		Test Well 8A					
87-0777	Jon McElwain (571-23-4914)	Driller/ Drill Rig	399	806.0	<0.001	<0.001	<0.01
87-0778	Area Sample	Downwind of Drill Rig	509	1028.0	<0.001	<0.001	<0.01
87-0779	Area Sample	Upwind of Drill Rig	509	1033.0	0.060	0.061	0.31
Collected 17 June 1987		Test Well 9S					
87-0780	Area Sample	Upwind of Drill Rig	430	869.0	<0.001	<0.001	<0.01
87-0781	Jon McElwain (571-23-4914)	Driller/ Drill Rig	385	778.0	0.035	0.036	0.18
87-0782	Area Sample	Downwind of Drill Rig	437	887.0	<0.001	<0.001	<0.01

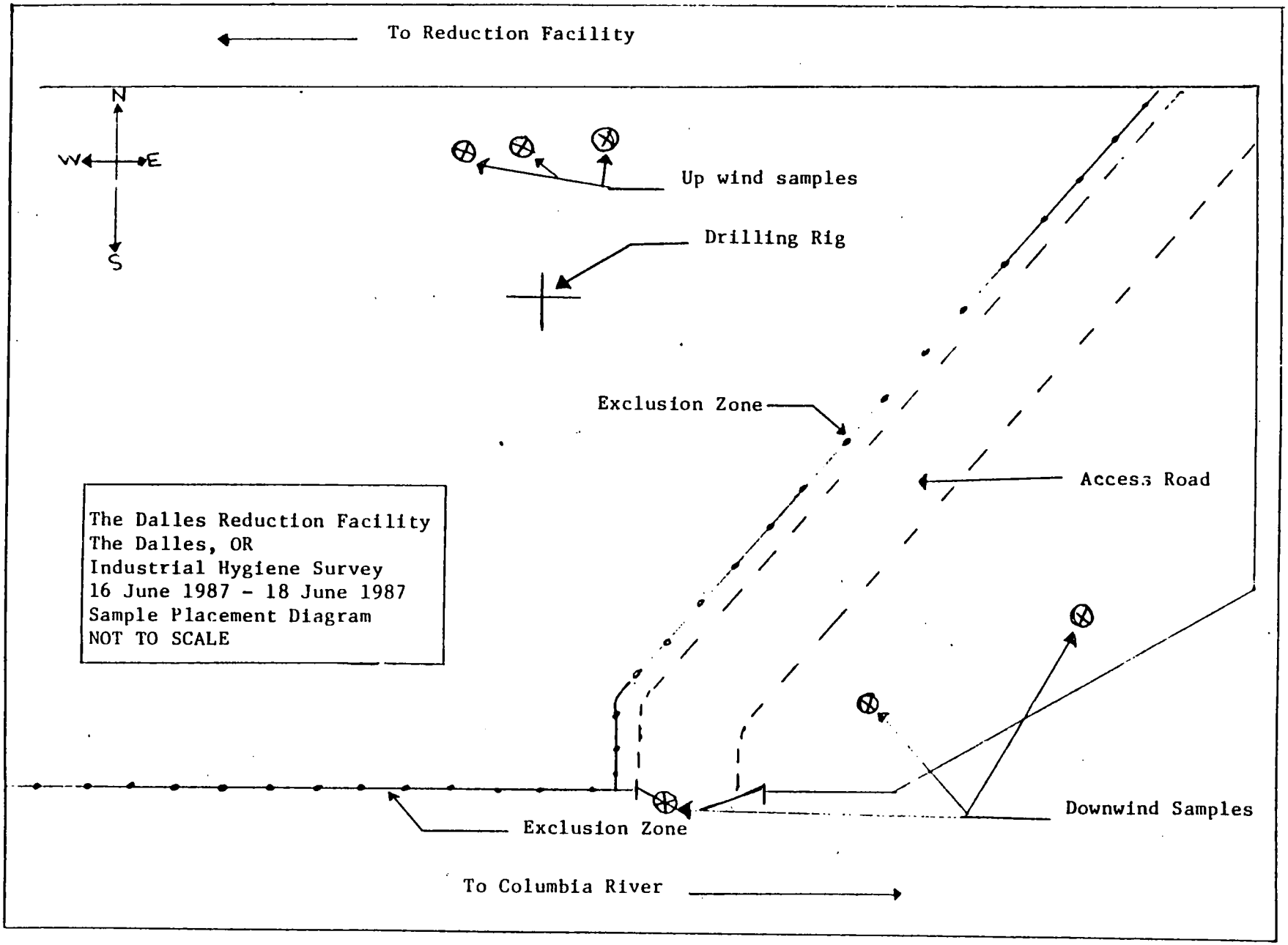
Location: The Dalles Reduction Facility
Dates of Sampling: 16 June 1987 - 18 June 1987
Analyte: Coal Tar Pitch Volatiles (Benzene Soluble Fraction)
OSHA PEL: 0.20 mg/cu.m, 8 hour TWA

SUMMARY OF AIR SAMPLING DATA(1)

Lab Analysis #	Employee Name/ S.S. #	Function/ Location	Sampling Duration Mins.	Air Sample Volume (L)	Benzene Soluble Fraction (mg/sample)	8-Hour TWA (mg/cu.m)	Severity(2) TWA/PEL
Collected 18 June 1987		Test Well 9S					
87-0783	Area Sample	Downwind of Drill Rig	515	1045.0	0.010	0.009	0.04
87-0784	Jon McElwain (571-23-4914)	Driller/ Drill Rig	421	850.0	0.010	0.009	0.04
87-0785	Area Sample	Upwind of Drill Rig	515	1020.0	0.025	0.027	0.14
87-0786	Field Blank		--	--	<0.001	--	--

(1)Samples were analyzed via ASTM D1356, a gravimetric method having a lower limit of detection of 0.001 mg per sample.

(2)Severity is an index relating a contaminants measured 8 hour Time Weighted Average (TWA), to its OSHA Permissible Exposure Limit (PEL). A severity value of greater than 1.0 indicates an overexposure to the contaminant.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W
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Up wind samples
Drilling Rig
Exclusion Zone
Access Road
The Dalles Reduction Facility
The Dalles, OR
Industrial Hygiene Survey
16 June 1987 - 18 June 1987
Sample Placement Diagram
NOT TO SCALE
Downwind Samples
Exclusion Zone
To Columbia River

Analysis Results: June 25-26, 1987

Report No. 87-38

CENTER FOR OCCUPATIONAL HEALTH ENGINEERING

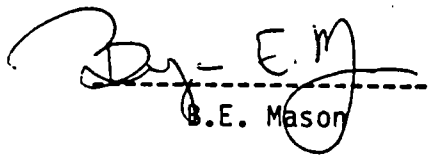
Chemical Analysis Report

August 1987

Prepared for:

J. Bou
V.P. Commercial Operations
Martin Marietta Corporation
6801 Rockledge Drive
Bethesda, Maryland 20817

Prepared by:



B.E. Mason

MARTIN MARIETTA CORPORATION
Martin Marietta Laboratories
Center for Occupational Health Engineering
1450 South Rolling Road
Baltimore, Maryland 21227
(301) 247-0700

SUMMARY

On 29 June 1987, Mr. L. Knight of Geraghty and Miller, Inc., submitted a total of thirty-five (35) airborne samples taken at The Dalles Reduction Facility on June 25 and 26, 1987 to the COHE for analysis. The samples were analyzed as follows:

- Seven (7) samples for Particulate Fluoride were analyzed via NIOSH 7902, an ion specific electrode method having a lower limit of detection of 0.002 mg particulate fluoride per sample

- Seven (7) samples for Gaseous Fluoride were analyzed via NIOSH 7902, an ion specific electrode method having a lower limit of detection of 0.002 mg gaseous fluoride per sample

- Seven (7) samples for Particulate Cyanide were analyzed via NIOSH 7904, an ion specific electrode method having a lower limit of detection of 0.020 mg particulate cyanide per sample

- Seven (7) samples for Hydrogen Cyanide were analyzed via NIOSH 7904, an ion specific electrode method having a lower limit of detection of 0.020 mg hydrogen cyanide per sample

- Seven (7) samples for Total Dust and Coal Tar Pitch Volatiles, benzene soluble fraction, were analyzed via NIOSH 0500 and ASTM 1356, respectively. Both methods are gravimetric techniques, having a lower limit of detection of 0.001 mg of analyte per sample.

Of the samples submitted, one area sample (Lab Analysis #87-0840) was found to exceed the OSHA Permissible Exposure Limit (PEL) for Coal Tar Pitch Volatiles, benzene soluble fraction.

A detailed summary of the air sampling data is attached.

Location: The Dalles Reduction Facility
Survey Dates: 25 June 1987 - 26 June 1987
Analyte: Particulate Fluoride
OSHA PEL: 2.5 mg/cu.m,8 hour TWA

Submitted By: L. Knight
Date Submitted: 29 June 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (L)	Fluoride Concentration (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
Survey Date 25 June 1987								
87 - 0809	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	48	83.5	<0.002	<0.003	<0.01
87 - 0810	Area Sample	On Trackhoe, In Cab	Excavation of Test Pits	50	74.5	<0.002	<0.003	<0.01
87- 0811	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	47	83.2	<0.002	<0.003	<0.01
Survey Date 26 June 1987								
87- 0812	Area Sample	On Trackhoe, In Cab	Excavation of Test Pits	560	834.4	0.013	0.018	0.01
87- 0813	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	560	974.4	0.004	0.005	<0.01
87- 0814	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	560	991.2	0.002	0.002	<0.01
87- 0815	Field Blank	N/A	N/A	N/A	N/A	<0.002	N/A	N/A

Analyst: F. Schneidman
Date: 20 July 1987

1)Samples were analyzed via NIOSH 7902,an ion specific electrode method having a lower limit of detection of 0.002 mg per sample for particulate fluoride.

Location: The Dalles Reduction Facility
Survey Dates: 25 June 1987 - 26 June 1987
Analyte: Hydrogen Fluoride
OSHA PEL: 2.5 mg/cu.m,8 hour TWA

Submitted By: L. Knight
Date Submitted: 29 June 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (L)	Fluoride Concentration (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
Survey Date 25 June 1987								
87 - 0816	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	48	83.5	<0.002	<0.003	<0.01
87 - 0817	Area Sample	On Trackhoe, In Cab	Excavation of Test Pits	50	74.5	<0.002	<0.003	<0.01
87- 0818	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	47	83.2	<0.002	<0.003	<0.01
Survey Date 26 June 1987								
87- 0819	Area Sample	On Trackhoe, In Cab	Excavation of Test Pits	560	834.4	<0.002	<0.004	<0.01
87- 0820	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	560	974.4	<0.002	<0.004	<0.01
87- 0821	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	560	991.2	<0.002	<0.004	<0.01
87- 0822	Field Blank	N/A	N/A	N/A	N/A	<0.002	N/A	N/A

Analyst: F. Schneidman
Date: 20 July 1987

1)Samples were analyzed via NIOSH 7902,an ion specific electrode method having a lower limit of detection of 0.002 mg per sample for hydrogen fluoride.

Location: The Dalles Reduction Facility
Survey Dates: 25 June 1987 - 26 June 1987
Analyte: Particulate Cyanide
OSHA PEL: 5.0 mg/cu.m,8 hour TWA

Submitted By: L. Knight
Date Submitted: 29 June 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (L)	Cyanide Concentration (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
Survey Date 25 June 1987								
87 - 0823	Area Sample	On Trackhoe, In Cab	Excavation of Test Pits	50	25.0	<0.020	<0.080	<0.02
87 - 0824	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	48	26.3	<0.020	<0.080	<0.02
87- 0825	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	40	22.5	<0.020	<0.080	<0.02
Survey Date 26 June 1987								
87- 0826	Area Sample	On Trackhoe, In Cab	Excavation of Test Pits	560	280.0	<0.020	<0.100	<0.02
87- 0827	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	(2)	(2)	<0.020.	(2)	(2)
87- 0828	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	557	305.2	<0.020	<0.090	<0.02
87- 0829	Field Blank	N/A	N/A	N/A	N/A	<0.020	N/A	N/A

Analyst: F.Schneidman
Date: 13 July 1987

1)Samples were analyzed via NIOSH 7904,a ion specific electrode method having a lower limit of detection for cyanide of 0.020 mg particulate cyanide per sample.
2)Information concerning stop time was not supplied for this sample.

Location: The Dalles Reduction Facility
Survey Dates: 25 June 1987 - 26 June 1987
Analyte: Hydrogen Cyanide
OSHA PEL: 5.0 mg/cu.m,8 hour TWA

Submitted By: L Knight
Date Submitted: 29 June 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (L)	Cyanide Concentration (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
Survey Date 25 June 1987								
87 - 0830	Area Sample	On Trackhoe, In Cab	Excavation of Test Pits	50	25.0	<0.020	<0.090	<0.02
87 - 0831	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	48	26.3	<0.020	<0.080	<0.02
87- 0832	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	40	22.5	<0.020	<0.080	<0.02
Survey Date 26 June 1987								
87- 0833	Area Sample	On Trackhoe, In Cab	Excavation of Test Pits	415	207.5	<0.020	<0.090	<0.02
87- 0834	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	(2)	(2)	<0.020	(2)	(2)
87- 0835	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	557	305.2	Sample Voided,No Liquid in Container		
87- 0836	Field Blank	N/A	N/A	N/A	N/A	<0.020	N/A	N/A

Analyst: F.Schneidman
Date: 13 July 1987

1)Samples were analyzed via NIOSH 7904,a ion specific electrode method having a lower limit of detection for cyanide of 0.020 mg hydrogen cyanide per sample.
2)Information concerning stop time was not supplied for this sample.

Location: The Dalles Reduction Facility
Survey Dates: 25 June 1987 - 26 June 1987
Analyte: Total Dust
OSHA PEL: 15.0 mg/cu.m,8 hour TWA

Submitted By: L. Knight
Date Submitted: 29 June 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (m^3)	Total Dust Concentration (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
Survey Date 25 June 1987								
87 - 0837	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	47	0.095	0.030	<0.003	<0.01
87 - 0838	C. Stadeli	Operator, Trackhoe	Excavation of Test Pits	75	0.152	0.153	0.157	0.01
87- 0839	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	48	0.094	<0.001	<0.001	<0.01
Survey Date 26 June 1987								
87- 0840	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	560	1.137	0.256	0.263	0.02
87- 0841	C. Stadeli	Operator, Trackhoe	Excavation of Test Pits	560	1.131	0.482	0.497	0.03
87- 0842	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	560	1.131	0.254	0.263	0.02
87- 0843	Field Blank	N/A	N/A	N/A	N/A	<0.001	N/A	N/A

Analyst: E. Poblete
Date: 6 July 1987

1)Samples were analyzed via a modified NIOSH 0500,a gravimetric method having a lower limit of detection of 0.001 mg per sample for total dust.

Location: The Dalles Reduction Facility
Survey Dates: 25 June 1987 - 26 June 1987
Analyte: Coal Tar Pitch Volatiles,Benzene Soluble Fraction
OSHA PEL: 0.2 mg/cu.m,8 hour TWA

Submitted By: L. Enright
Date Submitted: 29 June 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (m^3)	Benzene Soluble Fraction (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
Survey Date 25 June 1987								
87 - 0837	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	47	0.095	<0.001	<0.002	<0.01
87 - 0838	C. Stadeli	Operator, Trackhoe	Excavation of Test Pits	75	0.152	<0.001	<0.002	<0.01
87- 0839	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	48	0.094	<0.001	<0.002	<0.01
Survey Date 26 June 1987								
87- 0840	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	560	1.137	0.235	0.240	1.20
87- 0841	C. Stadeli	Operator, Trackhoe	Excavation of Test Pits	560	1.131	0.075	0.077	0.39
87- 0842	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	560	1.131	0.015	0.015	0.02
87- 0843	Field Blank	N/A	N/A	N/A	N/A	<0.001	N/A	N/A

Analyst: E. Poblete
Date: 6 July 1987

1)Samples were analyzed via ASTM D1356,a gravimetric method having a lower limit of detection for benzene soluble Coal Tar Pitch Volatiles of 0.001 mg per sample.

Analysis Results: June 27, 1987

Report No. 87-42

CENTER FOR OCCUPATIONAL HEALTH ENGINEERING

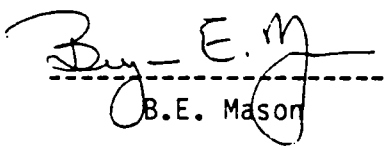
Chemical Analysis Report

August 1987

Prepared for:

J. Bou
V.P. Commercial Operations
Martin Marietta Corporation
6801 Rockledge Drive
Bethesda, Maryland 20817

Prepared by:



B.E. Mason

MARTIN MARIETTA CORPORATION
Martin Marietta Laboratories
Center for Occupational Health Engineering
1450 South Rolling Road
Baltimore, Maryland 21227
(301) 247-0700

SUMMARY

On 1 July 1987, Mr. F. Edwards of Geraghty and Miller, Inc., submitted a total of fifteen (15) samples taken at The Dalles Reduction Facility on 27 June 1987, to the COHE for analysis. The samples were analyzed as follows:

- Three (3) samples for Particulate Fluoride were analyzed via NIOSH 7902, an ion specific electrode method having a lower limit of detection of 0.002 mg particulate fluoride per sample

- Three (3) samples for Gaseous Fluoride were analyzed via NIOSH 7902, an ion specific electrode method having a lower limit of detection of 0.002 mg gaseous fluoride per sample

- Three (3) samples for Particulate Cyanide were analyzed via NIOSH 7904, an ion specific electrode method having a lower limit of detection of 0.020 mg particulate cyanide per sample

- Three (3) samples for Gaseous Cyanide were analyzed via NIOSH 7904, an ion specific electrode method having a lower limit of detection of 0.020 mg gaseous cyanide per sample

- Three (3) samples for Total Dust and Coal Tar Pitch Volatiles, benzene soluble fraction, were analyzed via NIOSH 0500 and ASTM 1356, respectively. Both methods are gravimetric techniques, having a lower limit of detection of 0.001 mg of analyte per sample.

None of the samples submitted were found to exceed the OSHA Permissible Exposure Limit (PEL) for any of the analytes sampled.

A detailed summary of the air sampling data is attached.

Location: The Dalles Reduction Facility
Date of Sampling: 27 June 1987
Analyte: Particulate Fluoride
OSHA PEL: 2.5 mg/cu.m, 8 Hour TWA

Submitted By: F. Edwards
Date Submitted: 1 July 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (L)	Fluoride Concentration (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
87 - 0858	Area Sample	On Trackhoe In Cab	Excavation of Test Pits	217	323.3	0.007	0.010	<0.01
87 - 0859	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	218	385.9	<0.002	<0.002	<0.01
87 - 0860	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	217	377.6	0.008	0.010	<0.01

Analyst: F. Schneidman
Date: 27 July 1987

1)Samples were analyzed via NIOSH 7902,a ion specific electrode method for the determination of Particulate Fluoride,having a lower limit of detection of 0.002 mg per sample

Location: The Dalles Reduction Facility
Date of Sampling: 27 June 1987
Analyte: Hydrogen Fluoride
OSHA PEL: 2.5 mg/cu.m, 8 Hour TWA

Submitted By: F. Edwards
Date Submitted: 1 July 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (L)	Fluoride Concentration (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
87 - 0861	Area Sample	On Trackhoe In Cab	Excavation of Test Pits	217	323.3	<0.002	<0.003	<0.01
87 - 0862	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	218	385.9	<0.002	<0.003	<0.01
87 - 0863	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	217	377.6	<0.002	<0.003	<0.01

Analyst: F. Schneidman
Date: 27 July 1987

1)Samples were analyzed via NIOSH 7902,a ion specific electrode method for the determination of Hydrogen Fluoride,having a lower limit of detection of 0.002 mg per sample

Location: The Dalles Reduction Facility
Date of Sampling: 27 June 1987
Analyte: Particulate Cyanide
OSHA PEL: 5.0 mg/cu.m, 8 Hour TWA

Submitted By: F. Edwards
Date Submitted: 1 July 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (L)	Cyanide Concentration (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
87 - 0864	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	218	119.5	<0.020	<0.080	<0.02
87 - 0865	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	218	119.5	<0.020	<0.080	<0.02
87 - 0866	Area Sample	On Trackhoe In Cab	Excavation of Test Pits	217	108.5	<0.020	<0.090	<0.02

Analyst: F. Schneidman
Date: 27 July 1987

1)Samples were analyzed via NIOSH 7904,a ion specific electrode method for the determination of Particulate Cyanide,having a lower limit of detection of 0.020 mg per sample

Location: The Dalles Reduction Facility
Date of Sampling: 27 June 1987
Analyte: Hydrogen Cyanide
OSHA PEL: 5.0 mg/cu.m, 8 Hour TWA

Submitted By: F. Edwards
Date Submitted: 1 July 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (L)	Cyanide Concentration (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
87 - 0867	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	218	119.5	<0.020	<0.080	<0.02
87 - 0868	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	218	119.5	0.025	0.099	0.02
87 - 0869	Area Sample	On Trackhoe In Cab	Excavation of Test Pits	217	108.5	0.060	0.260	0.05

Analyst: F. Schneidman
Date: 27 July 1987

1)Samples were analyzed via NIOSH 7904,a ion specific electrode method for the determination of Hydrogen Cyanide,having a lower limit of detection of 0.020 mg per sample

Location: The Dalles Reduction Facility
Date of Sampling: 27 June 1987
Analyte: Total Dust
OSHA PEL: 15.0 mg/cu.m, 8 Hour TWA

Submitted By: F. Edwards
Date Submitted: 1 July 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (m^3)	Total Dust Concentration (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
87 - 0870	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	218	0.443	0.119	0.122	0.01
87 - 0871	Don Johnson	Operator, Trackhoe	Excavation of Test Pits	217	0.438	0.539	0.557	0.04
87 - 0872	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	217	0.378	0.875	1.047	0.07

Analyst: E. Poblete
Date: 10 July 1987

1)Samples were analyzed via a modified NIOSH 0500,a gravimetric method for the determination of total dust,having a lower limit of detection of 0.001 mg per sample

Location: The Dalles Reduction Facility
Date of Sampling: 27 June 1987
Analyte: Coal Tar Pitch Volatiles,Benzene Soluble Fraction
OSHA PEL: 0.20 mg/cu.m, 8 Hour TWA

Submitted By: F. Edwards
Date Submitted: 1 July 1987

SUMMARY OF AIR SAMPLING DATA (1)

Lab Analysis Number	Employee Name	Location	Process	Sampling Duration (mins)	Sampled Volume (m^3)	Benzene Soluble Fraction (mg/sample)	8 Hour TWA (mg/cu.m)	Severity (TWA/PEL)
87 - 0870	Area Sample	Upwind of Trackhoe	Excavation of Test Pits	218	0.443	0.005	0.005	0.03
87 - 0871	Don Johnson	Operator, Trackhoe	Excavation of Test Pits	217	0.438	<0.001	<0.001	<0.01
87 - 0872	Area Sample	Downwind of Trackhoe	Excavation of Test Pits	217	0.378	0.010	0.012	0.06

Analyst: E. Poblete
Date: 10 July 1987

1)Samples were analyzed via ASTM 1356,a gravimetric method for the determination of Coal Tar Pitch Volatiles,benzene soluble fraction,having a lower limit of detection of 0.001 mg per sample

Results of Chemical Analysis of
Air, Drilling Fluid, and Tank Truck Samples
Collected Between June 4 and July 25, 1986

RESULTS OF CHEMICAL ANALYSIS OF AIR, DRILLING FLUID AND TANK TRUCK SAMPLES COLLECTED BETWEEN 4 JUNE AND 25 JULY 1986 FROM THE MARTIN MARIETTA REDUCTION FACILITY, THE DALLES, OREGON

Prepared for

Martin Marietta
Northwest Operations
The Dalles Reduction Plant
3313 West 2nd
The Dalles OR 97058

Prepared by

Martin Marietta Environmental Systems
Sampling and Analytical Services
9200 Rumsey Road
Columbia, MD 21045

21 August 1986

Table 1. List of samples received on 4 June 1986 and corresponding laboratory tracking numbers

Martin Marietta Reduction Facility Sample ID			Martin Marietta Environmental Systems Lab ID
529 AMA-Air	5/29/86	10:31	4158
529 AMB-Air	5/29/86	08:52	4159
529 AMC-Air	5/29/86	09:00	4160
529 AMD-Air	5/29/86	09:11	4161
529 PMA-Air	5/29/86	15:03	4162
529 PMB-Air	5/29/86	13:19	4163
529 PMC-Air	5/29/86	13:30	4164
529 PMD-Air	5/29/86	13:40	4165
530 AMA-Air	5/30/86	11:41	4166
530 AMB-Air	5/30/86	10:04	4167
530 AMC-Air	5/30/86	10:10	4168
530 AMD-Air	5/30/86	10:26	4169
530 PMA-Air	5/30/86	16:03	4170
530 PMB-Air	5/30/86	14:15	4171
530 PMC-Air	5/30/86	14:26	4172
530 PMD-Air	5/30/86	14:47	4173
Trip Blank 1	5/27/86	16:00	4174
Field Blank 1	5/30/86	14:00	4175

Table 2. List of samples received on 6 June 1986 and corresponding laboratory tracking numbers

Martin Marietta Reduction Facility Sample ID			Martin Marietta Environmental Systems Lab ID
62 PMB-Air	6/2/86	13:54	4408
62 PMA-Air	6/2/86	15:32	4409
62 PMD-Air	6/2/86	14:12	4410
62 PMC-Air	6/2/86	14:02	4411
62 AMA-Air	6/2/86	11:03	4412
62 AMD-Air	6/2/86	09:48	4413
62 AMB-Air	6/2/86	09:30	4414
62 AMC-Air	6/2/86	09:38	4415
64 AMB-Air	6/4/86	09:59	4416
64 AMC-Air	6/4/86	10:09	4417
64 AMD-Air	6/4/86	10:21	4418
64 AMA-Air	6/4/86	11:50	4419
64 PMA-Air	6/4/86	16:35	4420
64 PMC-Air	6/4/86	15:10	4421
64 PMB-Air	6/4/86	15:02	4422
64 PMD-Air	6/4/86	15:25	4423
Trip Blank 2	5/27/86	16:00	4424
Field Blank 2	5/30/86	14:00	4425

Table 3. List of samples received on 13 June 1986 and corresponding laboratory tracking numbers

Martin Marietta Reduction Facility Sample ID			Martin Marietta Environmental Systems Lab ID
Tank Truck	6/12/86	05:45	4830
Tank Truck	6/12/86	05:45	4831
Tank Truck	6/12/86	05:45	4832
69 AMD-Air	6/9/86	09:53	4833
69 AMB-Air	6/9/86	09:31	4834
69 AMC-Air	6/9/86	09:40	4835
69 AMA-Air	6/9/86	11:11	4836
69 PMD-Air	6/9/86	14:13	4837
69 PMA-Air	6/9/86	15:30	4838
69 PMC-Air	6/9/86	13:58	4839
69 PMB-Air	6/9/86	13:50	4840
611 AMB-Air	6/11/86	08:44	4841
611 AMA-Air	6/11/86	08:34	4842
611 AMD-Air	6/11/86	10:02	4843
611 AMC-Air	6/11/86	08:51	4844
611 PMA-Air	6/11/86	13:45	4845
611 PMC-Air	6/11/86	14:00	4846
611 PMD-Air	6/11/86	14:11	4847
611 PMB-Air	6/11/86	13:55	4848
Field Blank 3	6/12/86	10:00	4849
Trip Blank 3	5/27/86	16:00	4850

Table 4. List of samples received on 20 June 1986 and corresponding laboratory tracking numbers

Martin Marietta Reduction Facility Sample ID			Martin Marietta Environmental Systems Lab ID
616 AMC-Air	6/16/86	09:55	4935
616 AMD-Air	6/16/86	10:05	4936
616 AMA-Air	6/16/86	11:19	4937
616 AMB-Air	6/16/86	09:49	4938
616 PMD-Air	6/16/86	14:20	4939
616 PMA-Air	6/16/86	15:31	4940
616 PMB-Air	6/16/86	14:01	4941
616 PMC-Air	6/16/86	14:09	4942
618 AMA-Air	6/18/86	11:15	4943
618 AMB-Air	6/18/86	09:41	4944
618 AMD-Air	6/18/86	10:01	4945
618 AMC-Air	6/18/86	09:49	4946
618 PMA-Air	6/18/86	16:14	4947
618 PMC-Air	6/18/86	14:42	4948
618 PMD-Air	6/18/86	14:52	4949
618 PMB-Air	6/18/86	14:34	4950
Field Blank 4	6/19/86	09:30	4951
Trip Blank 4	6/19/86	09:30	4952
16D #1 210	6/18/86	06:45	4953
16D #2 210	6/18/86	06:50	4954
16D #3 215	6/18/86	07:15	4955
16D #4 220	6/18/86	07:30	4956
16D #5 225	6/18/86	07:45	4957

Table 4. Continued

Martin Marietta Reduction Facility Sample ID			Martin Marietta Environmental Systems Lab ID
16D #6 235	6/18/86	07:50	4958
16D #7 245	6/18/86	08:00	4959
16D #8 245	6/18/86	08:15	4960
16D #9 255	6/18/86	09:10	4961
16D #10 265	6/18/86	09:20	4962
Trip Blank 5	6/18/86	15:00	4963

Table 5. List of samples received on 27 June 1986 and corresponding laboratory tracking numbers

Martin Marietta Reduction Facility Sample ID			Martin Marietta Environmental Systems Lab ID
623 AMA-Air	6/23/86	09:29	4989
623 AMD-Air	6/23/86	09:59	4990
623 AMB-Air	6/23/86	09:40	4991
623 AMC-Air	6/23/86	09:46	4992
623 PMD-Air	6/23/86	13:58	4993
623 PMC-Air	6/23/86	13:47	4994
623 PMA-Air	6/23/86	15:09	4995
623 PMB-Air	6/23/86	13:42	4996
625 AMB-Air	6/25/86	08:46	4997
625 AMC-Air	6/25/86	08:54	4998
625 AMA-Air	6/25/86	10:22	4999
625 AMD-Air	6/25/86	09:11	0001
625 PMA-Air	6/25/86	15:11	0002
625 PMC-Air	6/25/86	13:48	0003
625 PMB-Air	6/25/86	13:36	0004
625 PMD-Air	6/25/86	14:00	0005
Trip Blank 5	6/19/86	11:00	0006
Field Blank 5	6/26/86	07:00	0007

Table 6. List of samples received on 11 July 1986 and corresponding laboratory tracking numbers

Martin Marietta Reduction Facility Sample ID			Martin Marietta Environmental Systems Lab ID
77 AMA-Air	7/7/86	10:32	0094
77 AMC-Air	7/7/86	10:06	0095
77 AMD-Air	7/7/86	10:18	0096
77 AMB-Air	7/7/86	10:01	0097
77 PMC-Air	7/7/86	14:16	0098
77 PMA-Air	7/7/86	14:41	0099
77 PMB-Air	7/7/86	14:10	0100
77 PMD-Air	7/7/86	14:27	0101
79 AMA-Air	7/9/86	11:39	0102
79 AMB-Air	7/9/86	10:12	0103
79 AMC-Air	7/9/86	10:18	0104
79 AMD-Air	7/9/86	10:28	0105
79 PMD-Air	7/9/86	14:43	0106
79 PMB-Air	7/9/86	14:14	0107
79 PMA-Air	7/9/86	15:55	0108
79 PMC-Air	7/9/86	14:30	0109
Trip Blank 6	7/8/86	13:00	0110
Field Blank 6	7/10/86	08:30	0111

Table 7. List of samples received on 18 July 1986 and corresponding laboratory tracking numbers

Martin Marietta Reduction Facility Sample ID			Martin Marietta Environmental Systems Lab ID
714 AMA-Air	7/14/86	10:26	0118
714 AMB-Air	7/14/86	08:54	0119
714 AMC-Air	7/14/86	09:00	0120
714 AMD-Air	7/14/86	09:13	0121
714 PMA-Air	7/14/86	15:01	0122
714 PMB-Air	7/14/86	13:31	0123
714 PMC-Air	7/14/86	13:36	0124
714 PMD-Air	7/14/86	13:45	0125
716 AMA-Air	7/16/86	09:58	0126
716 AMD-Air	7/16/86	10:25	0127
716 AMB-Air	7/16/86	10:07	0128
716 AMC-Air	7/16/86	10:13	0129
716 PMA-Air	7/16/86	15:30	0130
716 PMB-Air	7/16/86	14:02	0131
716 PMC-Air	7/16/86	14:07	0132
716 PMD-Air	7/16/86	14:16	0133
Trip Blank	7/11/86	13:00	0134
Field Blank 7	7/17/86	09:30	0135

Table 8. List of samples received on 25 July 1986 and corresponding laboratory tracking numbers

Martin Marietta Reduction Facility Sample ID			Martin Marietta Environmental Systems Lab ID
721 AMD-Air	7/21/86	10:32	0180
721 AMC-Air	7/21/86	10:22	0181
721 AMB-Air	7/21/86	10:14	0182
721 AMA-Air	7/21/86	11:43	0183
721 PMC-Air	7/21/86	14:55	0184
721 PMA-Air	7/21/86	16:23	0185
721 PMB-Air	7/21/86	14:50	0186
721 PMD-Air	7/21/86	15:05	0187
723 AMC-Air	7/23/86	09:52	0188
723 AMA-Air	7/23/86	11:17	0189
723 AMD-Air	7/23/86	10:02	0190
723 AMB-Air	7/23/86	04:46	0191
723 PMA-Air	7/23/86	14:13	0192
723 PMB-Air	7/23/86	14:19	0193
723 PMD-Air	7/23/86	14:36	0194
723 PMC-Air	7/23/86	14:24	0195
Trip Blank 8	7/24/86	09:00	0196
Field Blank 8	7/24/86	09:00	0197

Table 9. Results of analysis for cyanide in air samples collected on 29 and 30 May 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
529 AMA	4158	<0.26	<0.087
529 AMB	4159	<0.26	<0.087
529 AMC	4160	<0.26	<0.087
529 AMD	4161	<0.26	<0.087
529 PMA	4162	<0.26	<0.087
529 PMB	4163	<0.26	<0.087
529 PMC	4164	<0.26	<0.087
529 PMD	4165	<0.26	<0.087
530 AMA	4166	<0.26	<0.087
530 AMB	4167	<0.26	<0.087
530 AMC	4168	<0.26	<0.087
530 AMD	4169	<0.26	<0.087
530 PMA	4170	<0.26	<0.087
530 PMB	4171	<0.26	<0.087
530 PMC	4172	<0.26	<0.087
530 PMD	4173	<0.26	<0.087
Trip Blank 1	4174	<0.26	<0.087
Field Blank 1	4175	<0.26	<0.087

Table 10. Results of analysis for cyanide in air samples collected on 2 and 4 June 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
62 AMA	4412	<0.26	<0.087
62 AMB	4414	<0.26	<0.087
62 AMC	4415	<0.26	<0.087
62 AMD	4413	<0.26	<0.087
62 PMA	4409	<0.26	<0.087
62 PMB	4408	<0.26	<0.087
62 PMC	4411	<0.26	<0.087
62 PMD	4410	<0.26	<0.087
64 AMA	4419	<0.26	<0.087
64 AMB	4416	<0.26	<0.087
64 AMC	4417	<0.26	<0.087
64 AMD	4418	<0.26	<0.087
64 PMA	4420	<0.26	<0.087
64 PMB	4422	<0.26	<0.087
64 PMC	4421	<0.26	<0.087
64 PMD	4423	<0.26	<0.087
Trip Blank 2	4424	<0.26	<0.087
Field Blank 2	4425	<0.26	<0.087

Table 11. Results of analysis for cyanide in air samples collected on 9 and 11 June 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
69 AMA	4836	<0.26	<0.087
69 AMB	4834	<0.26	<0.087
69 AMC	4835	<0.26	<0.087
69 AMD	4833	<0.26	<0.087
69 PMA	4838	<0.26	<0.087
69 PMB	4840	<0.26	<0.087
69 PMC	4839	<0.26	<0.087
69 PMD	4837	<0.26	<0.087
611 AMA	4842	<0.26	<0.087
611 AMB	4841	<0.26	<0.087
611 AMC	4844	<0.26	<0.087
611 AMD	4843	<0.26	<0.087
611 PMA	4845	<0.26	<0.087
611 PMB	4848	<0.26	<0.087
611 PMC	4846	<0.26	<0.087
611 PMD	4847	<0.26	<0.087
Field Blank 3	4849	<0.26	<0.087
Trip Blank 3	4850	<0.26	<0.087

Table 12. Results of analysis for cyanide in air samples collected on 16 and 18 June 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
616 AMA	4937	<0.26	<0.087
616 AMB	4938	<0.26	<0.087
616 AMC	4935	<0.26	<0.087
616 AMD	4936	<0.26	<0.087
616 PMA	4940	<0.26	<0.087
616 PMB	4941	<0.26	<0.087
616 PMC	4942	<0.26	<0.087
616 PMD	4939	<0.26	<0.087
618 AMA	4943	<0.26	<0.087
618 AMB	4944	<0.26	<0.087
618 AMC	4946	<0.26	<0.087
618 AMD	4945	<0.26	<0.087
618 PMA	4947	<0.26	<0.087
618 PMB	4950	<0.26	<0.087
618 PMC	4948	<0.26	<0.087
618 PMD	4949	<0.26	<0.087
Field Blank 4	4951	<0.26	<0.087
Trip Blank 4	4952	<0.26	<0.087

Table 13. Results of analysis for cyanide in air samples collected on 23 and 25 June 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
623 AMA	4989	<0.26	<0.087
623 AMB	4991	<0.26	<0.087
623 AMC	4992	<0.26	<0.087
623 AMD	4990	<0.26	<0.087
623 PMA	4995	<0.26	<0.087
623 PMB	4996	<0.26	<0.087
623 PMC	4994	<0.26	<0.087
623 PMD	4993	<0.26	<0.087
625 AMA	4999	<0.26	<0.087
625 AMB	4997	<0.26	<0.087
625 AMC	4998	<0.26	<0.087
625 AMD	0001	<0.26	<0.087
625 PMA	0002	<0.26	<0.087
625 PMB	0004	<0.26	<0.087
625 PMC	0003	<0.26	<0.087
625 PMD	0005	<0.26	<0.087
Trip Blank 5	0006	<0.26	<0.087
Field Blank 5	0007	<0.26	<0.087

Table 14. Results of analysis for cyanide in air samples collected on 7 and 9 July 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
77 AMA	0094	<0.26	<0.087
77 AMB	0097	<0.26	<0.087
77 AMC	0095	<0.26	<0.087
77 AMD	0096	<0.26	<0.087
77 PMA	0099	<0.26	<0.087
77 PMB	0100	<0.26	<0.087
77 PMC	0098	<0.26	<0.087
77 PMD	0101	<0.26	<0.087
79 AMA	0102	<0.26	<0.087
79 AMB	0103	<0.26	<0.087
79 AMC	0104	<0.26	<0.087
79 AMD	0105	<0.26	<0.087
79 PMA	0108	<0.26	<0.087
79 PMB	0107	<0.26	<0.087
79 PMC	0109	<0.26	<0.087
79 PMD	0106	<0.26	<0.087
Trip Blank 6	0110	<0.26	<0.087
Field Blank 6	0111	<0.26	<0.087

Table 15. Results of analysis for cyanide in air samples collected on 14 and 16 July 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
714 AMA	0118	<0.26	<0.087
714 AMB	0119	<0.26	<0.087
714 AMC	0120	<0.26	<0.087
714 AMD	0121	<0.26	<0.087
714 PMA	0122	<0.26	<0.087
714 PMB	0123	<0.26	<0.087
714 PMC	0124	<0.26	<0.087
714 PMD	0125	<0.26	<0.087
716 AMA	0126	<0.26	<0.087
716 AMB	0128	<0.26	<0.087
716 AMC	0129	<0.26	<0.087
716 AMD	0127	<0.26	<0.087
716 PMA	0130	<0.26	<0.087
716 PMB	0131	<0.26	<0.087
716 PMC	0132	<0.26	<0.087
716 PMD	0133	<0.26	<0.087
Trip Blank	0134	<0.26	<0.087
Field Blank 7	0135	<0.26	<0.087

Table 16. Results of analysis for cyanide in air samples collected on 21 and 23 July 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
721 AMA	0183	<0.26	<0.087
721 AMB	0182	<0.26	<0.087
721 AMC	0181	<0.26	<0.087
721 AMD	0180	<0.26	<0.087
721 PMA	0185	<0.26	<0.087
721 PMB	0186	<0.26	<0.087
721 PMC	0184	<0.26	<0.087
721 PMD	0187	<0.26	<0.087
723 AMA	0189	<0.26	<0.087
723 AMB	0191	<0.26	<0.087
723 AMC	0188	<0.26	<0.087
723 AMD	0190	<0.26	<0.087
723 PMA	0192	<0.26	<0.087
723 PMB	0193	<0.26	<0.087
723 PMC	0195	<0.26	<0.087
723 PMD	0194	<0.26	<0.087
Trip Blank 8	0196	<0.26	<0.087
Field Blank 8	0197	<0.26	<0.087

Table 17. Results of analysis for fluoride in air samples collected on 29 and 30 May 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
529 AMA	4158	<0.20	<0.067
529 AMB	4159	<0.20	<0.067
529 AMC	4160	<0.20	<0.067
529 AMD	4161	<0.20	<0.067
529 PMA	4162	<0.20	<0.067
529 PMB	4163	<0.20	<0.067
529 PMC	4164	<0.20	<0.067
529 PMD	4165	<0.20	<0.067
530 AMA	4166	<0.20	<0.067
530 AMB	4167	<0.20	<0.067
530 AMC	4168	<0.20	<0.067
530 AMD	4169	<0.20	<0.067
530 PMA	4170	<0.20	<0.067
530 PMB	4171	<0.20	<0.067
530 PMC	4172	<0.20	<0.067
530 PMD	4173	<0.20	<0.067
Trip Blank 1	4174	<0.20	<0.067
Field Blank 1	4175	<0.20	<0.067

Table 18. Results of analysis for fluoride in air samples collected on 2 and 4 June 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
62 AMA	4412	<0.20	<0.067
62 AMB	4414	<0.20	<0.067
62 AMC	4415	<0.20	<0.067
62 AMD	4413	<0.20	<0.067
62 PMA	4409	<0.20	<0.067
62 PMB	4408	<0.20	<0.067
62 PMC	4411	<0.20	<0.067
62 PMD	4410	<0.20	<0.067
64 AMA	4419	<0.20	<0.067
64 AMB	4416	<0.20	<0.067
64 AMC	4417	<0.20	<0.067
64 AMD	4418	<0.20	<0.067
64 PMA	4420	<0.20	<0.067
64 PMB	4422	<0.20	<0.067
64 PMC	4421	<0.20	<0.067
64 PMD	4423	<0.20	<0.067
Trip Blank 2	4424	<0.20	<0.067
Field Blank 2	4425	<0.20	<0.067

Table 19. Results of analysis for fluoride in air samples collected on 9 and 11 June 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
69 AMA	4836	<0.20	<0.067
69 AMB	4834	<0.20	<0.067
69 AMC	4835	0.22	0.073
69 AMD	4833	0.24	0.080
69 PMA	4838	<0.20	<0.067
69 PMB	4840	<0.20	<0.067
69 PMC	4839	<0.20	<0.067
69 PMD	4837	<0.20	<0.067
611 AMA	4842	<0.20	<0.067
611 AMB	4841	<0.20	<0.067
611 AMC	4844	<0.20	<0.067
611 AMD	4843	<0.20	<0.067
611 PMA	4845	<0.20	<0.067
611 PMB	4848	<0.20	<0.067
611 PMC	4846	<0.20	<0.067
611 PMD	4847	<0.20	<0.067
Field Blank 3	4849	<0.20	<0.067
Trip Blank 3	4850	<0.20	<0.067

Table 20. Results of analysis for fluoride in air samples collected on 16 and 18 June 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
616 AMA	4937	<0.20	<0.067
616 AMB	4938	<0.20	<0.067
616 AMC	4935	<0.20	<0.067
616 AMD	4936	<0.20	<0.067
616 PMA	4940	<0.20	<0.067
616 PMB	4941	<0.20	<0.067
616 PMC	4942	<0.20	<0.067
616 PMD	4939	<0.20	<0.067
618 AMA	4943	<0.20	<0.067
618 AMB	4944	<0.20	<0.067
618 AMC	4946	<0.20	<0.067
618 AMD	4945	<0.20	<0.067
618 PMA	4947	<0.20	<0.067
618 PMB	4950	<0.20	<0.067
618 PMC	4948	<0.20	<0.067
618 PMD	4949	<0.20	<0.067
Field Blank 4	4951	<0.20	<0.067
Trip Blank 4	4952	<0.20	<0.067

Table 21. Results of analysis for fluoride in air samples collected on 23 and 25 June 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
623 AMA	4989	<0.20	<0.067
623 AMB	4991	<0.20	<0.067
623 AMC	4992	<0.20	<0.067
623 AMD	4990	<0.20	<0.067
623 PMA	4995	<0.20	<0.067
623 PMB	4996	<0.20	<0.067
623 PMC	4994	<0.20	<0.067
623 PMD	4993	<0.20	<0.067
625 AMA	4999	<0.20	<0.067
625 AMB	4997	<0.20	<0.067
625 AMC	4998	<0.20	<0.067
625 AMD	0001	<0.20	<0.067
625 PMA	0002	<0.20	<0.067
625 PMB	0004	<0.20	<0.067
625 PMC	0003	<0.20	<0.067
625 PMD	0005	<0.20	<0.067
Trip Blank 5	0006	<0.20	<0.067
Field Blank 5	0007	<0.20	<0.067

Table 22. Results of analysis for fluoride in air samples collected on 7 and 9 July 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
77 AMA	0094	<0.20	<0.067
77 AMB	0097	<0.20	<0.067
77 AMC	0095	<0.20	<0.067
77 AMD	0096	<0.20	<0.067
77 PMA	0099	<0.20	<0.067
77 PMB	0100	<0.20	<0.067
77 PMC	0098	<0.20	<0.067
77 PMD	0101	<0.20	<0.067
79 AMA	0102	<0.20	<0.067
79 AMB	0103	<0.20	<0.067
79 AMC	0104	<0.20	<0.067
79 AMD	0105	<0.20	<0.067
79 PMA	0108	<0.20	<0.067
79 PMB	0107	<0.20	<0.067
79 PMC	0109	<0.20	<0.067
79 PMD	0106	<0.20	<0.067
Trip Blank 6	0110	<0.20	<0.067
Field Blank 6	0111	<0.20	<0.067

Table 23. Results of analysis for fluoride in air samples collected on 14 and 16 July 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
714 AMA	0118	<0.20	<0.067
714 AMB	0119	<0.20	<0.067
714 AMC	0120	<0.20	<0.067
714 AMD	0121	<0.20	<0.067
714 PMA	0122	<0.20	<0.067
714 PMB	0123	<0.20	<0.067
714 PMC	0124	<0.20	<0.067
714 PMD	0125	<0.20	<0.067
716 AMA	0126	<0.20	<0.067
716 AMB	0128	<0.20	<0.067
716 AMC	0129	<0.20	<0.067
716 AMD	0127	<0.20	<0.067
716 PMA	0130	<0.20	<0.067
716 PMB	0131	<0.20	<0.067
716 PMC	0132	<0.20	<0.067
716 PMD	0133	<0.20	<0.067
Trip Blank	0134	<0.20	<0.067
Field Blank 7	0135	<0.20	<0.067

Table 24. Results of analysis for fluoride in air samples collected on 21 and 23 July 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility	Martin Marietta Environmental Systems	Result	
		Impinger	Air
Sample ID	Lab ID	(mg/L)	(mg/m^3)
721 AMA	0183	0.28	<0.093
721 AMB	0182	0.30	0.10
721 AMC	0181	<0.20	<0.067
721 AMD	0180	<0.20	<0.067
721 PMA	0185	0.265*	0.088*
721 PMB	0186	<0.20	<0.067
721 PMC	0184	0.26	0.087
721 PMD	0187	<0.20	<0.067
723 AMA	0189	<0.20	<0.067
723 AMB	0191	<0.20	<0.067
723 AMC	0188	<0.20	<0.067
723 AMD	0190	<0.20	<0.067
723 PMA	0192	<0.20	<0.067
723 PMB	0193	<0.20	<0.067
723 PMC	0195	<0.20	<0.067
723 PMD	0194	<0.20	<0.067
Trip Blank 8	0196	<0.20	<0.067
Field Blank 8	0197	<0.20	<0.067

*Average of duplicate analyses

Table 25. Results of analysis for free cyanide in drilling fluid samples collected on 18 June 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Martin Marietta Reduction Facility Sample ID	Martin Marietta Environmental Systems Lab ID	Results Water (mg/L)	
16D #1	4953	<0.020	
16D #4	4956	<0.020	
16D #5	4957	<0.020	
16D #6	4958	<0.020	
16D #7	4959	<0.020	
16D #8	4960	<0.020	
16D #9	4961	<0.020	
16D #10	4962	<0.020	
Trip Blank	4963	<0.020	
		Soil (mg/kg) dry wt.	% Solids
16D #2	4954	<1.1	22
16D #3	4955	<0.82 (<0.80)*	30.6 (31.4)*

*Duplicate analysis

Table 26. Results of chemical analysis of tank truck water samples collected on 12 June 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

Parameter	Result (mg/L)
Total cyanide	<0.010
Free cyanide	<0.010
Fluoride	<1.0

Table 27. Results of analysis for volatile organic compounds in a tank truck water sample collected on 12 June 1986 from the Martin Marietta Reduction Facility, The Dalles, Oregon

	1	2	3	4	5	6
SAMPLE DATE:	6/16/86	6/12/86				
ANALYSIS DATE:	6/16/86	6/16/86				
MMES SAMPLE ID:	LAB BLANK	TANK TRUCK				
CLIENT SAMPLE ID:						
NOTE:						
COMPOUNDS	FINAL CONCENTRATION = ppb (ug/L)					
acrolein	<10	<10				
acrylonitrile	<10	<10				
benzene	<5	<5				
bromodichloromethane	<5	<5				
bromoform	<5	<5				
bromomethane	<5	<5				
carbon tetrachloride	<5	<5				
chlorobenzene	<5	<5				
chloroethane	<5	<5				
chloroform	<5	<5				
chloromethane	<5	<5				
2-chloroethylvinyl ether	<10	<10				
cis-1,3-dichloropropene	<5	<5				
dibromochloromethane	<5	<5				
1,1-dichloroethane	<5	<5				
1,2-dichloroethane	<5	<5				
1,1-dichloroethylene	<5	<5				
1,2-dichloropropane	<5	<5				
ethylbenzene	<5	<5				
methylene chloride	<10	<10				
1,1,2,2-tetrachloroethane	<5	<5				
tetrachloroethylene	<5	<5				
toluene	<5	<5				
trans-1,2-dichloroethylene	<5	<5				
trans-1,3-dichloropropene	<5	<5				
1,1,1-trichloroethane	<5	<5				
1,1,2-trichloroethane	<5	<5				
trichloroethylene	<5	<5				
vinyl chloride *	<5	<5				
cis-1,2-dichloroethylene	<5	<5				

*Any value detected between the instrument detection level (IDL = 1 ppb) and the level of quantitation (LOQ = 5 ppb) is reported with a qualifying *.

Soil Sieve Analysis

IA - 0345

Interoffice Memo

MARTIN MARIETTA

MARTIN MARIETTA LABORATORIES

cc GRABOWSKI
KUBAL
JESSUP

DATE 24 June 1987

TO J. Bou

CC C. Matthews, B. Turnham, J. Green

FROM R.D. Huntington

SUBJECT Soil Seive Analysis - The Dalles

As per your request, the Center for Occupational Health Engineering conducted soil sieve analysis at three selected sites at The Dalles Reduction Plant during the week of June 15, 1987. M. Gross, on-site EPA coordinator, participated in all soil collections.

The sites included:

- Old cathode waste pile
- Landfill
- Sludge pond #3
- Sludge pond #3 (Berm)(1)

The method of collection for determination of the Soils Threshold Friction Velocity followed the protocol as prescribed in EPA Publication #600 (Rapid Assessment of Exposure to Particulate Emission from Surface Contaminant Sites). The only deviation was the makeup of the screen sizes. The method calls for a #18 sieve (1.0 mm) to be included, however, that screen was unavailable and was substituted with the addition of a #16 screen. The final set of screens used was:

- #5 - 4 mm opening
- #10 - 2 mm
- #16 - 1.19 mm
- #20 - 0.84 mm
- #35 - 0.5 mm
- #60 - 0.25 mm

(1)This sample was obtained in the wrong area, i.e., on the Berm rather than the pond. However it may be of value in the Risk Assessment.

All areas selected were dry and slightly "crusted". Each soil sample was collected from a 33 cm x 33 cm x 1 cm surface area.

Although the method calls for an inspection of the relative quantity of each size fraction, COHE weighed each fraction on a Mettler PM-600 Pan Balance (calibrated 5/28/87) for an accurate determination. At the conclusion of the determinations, all samples were returned to their original site.

Attached is all pertinent data and graphs of each sites particle size distribution.

If you have any question regarding this information, please let me know.

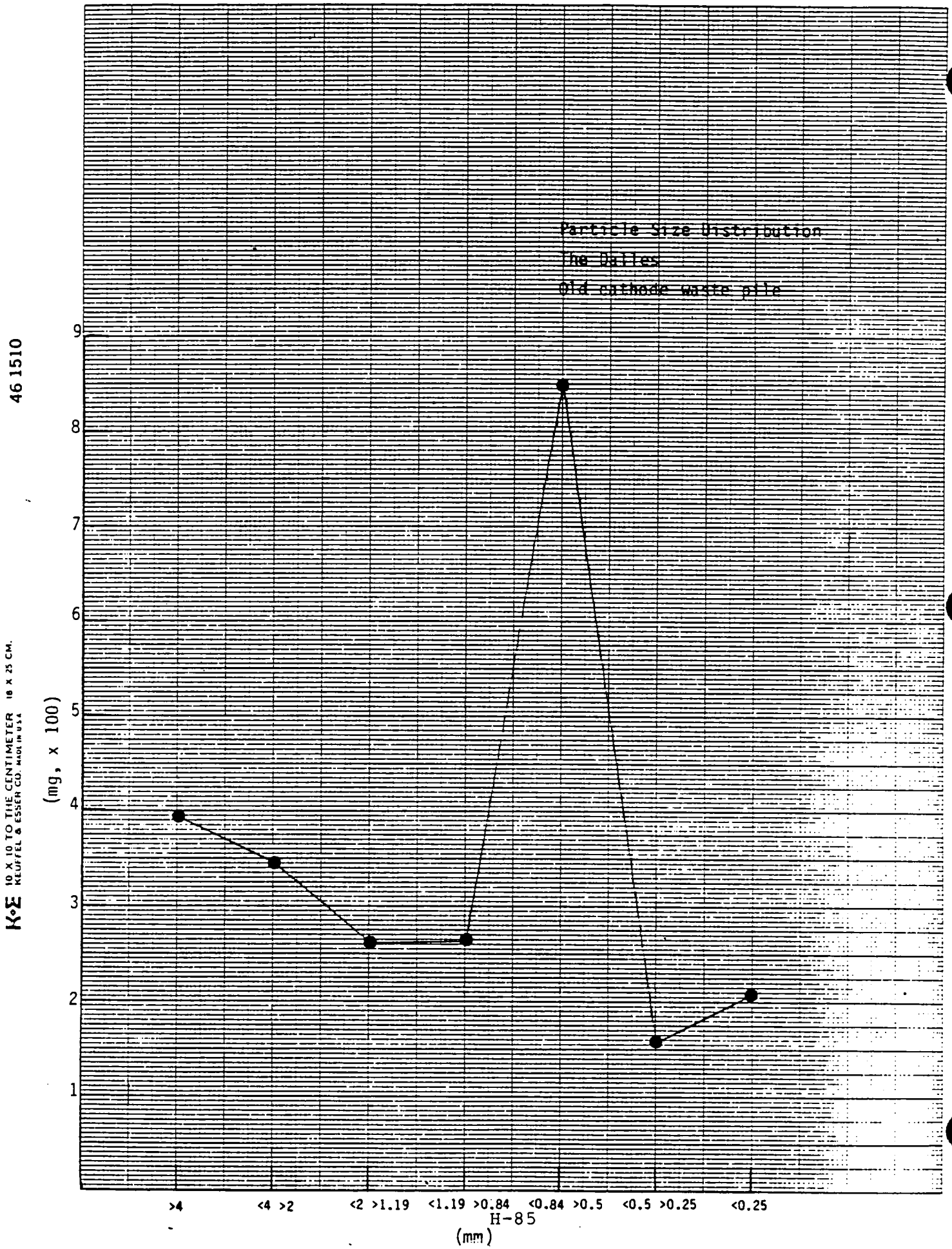
Site 1 - Old Cathode Waste Pile

~ 200 feet SW of MW9

Taken ~ 1400 6/16/87

Collected by R. Huntington

Screen #	Size Opening (mm)	Weight (mg)	
5	>4	395.440	16
10	<4 >2	345.670	14
16	<2 >1.19	260.110	10.6
20	<1.19 >0.84	262.520	10.7
35	<0.84 >0.5	846.090	34.3
60	<0.5 >0.25	153.480	6.2
<60	<0.25	201.980	8.2
	TOTAL	2465.290	100.0



46 1510

K&E 10 X 10 TO THE CENTIMETER 16 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.

Site 2 - Landfill on Road North Lower Level

~ 100 feet south of test pit #5

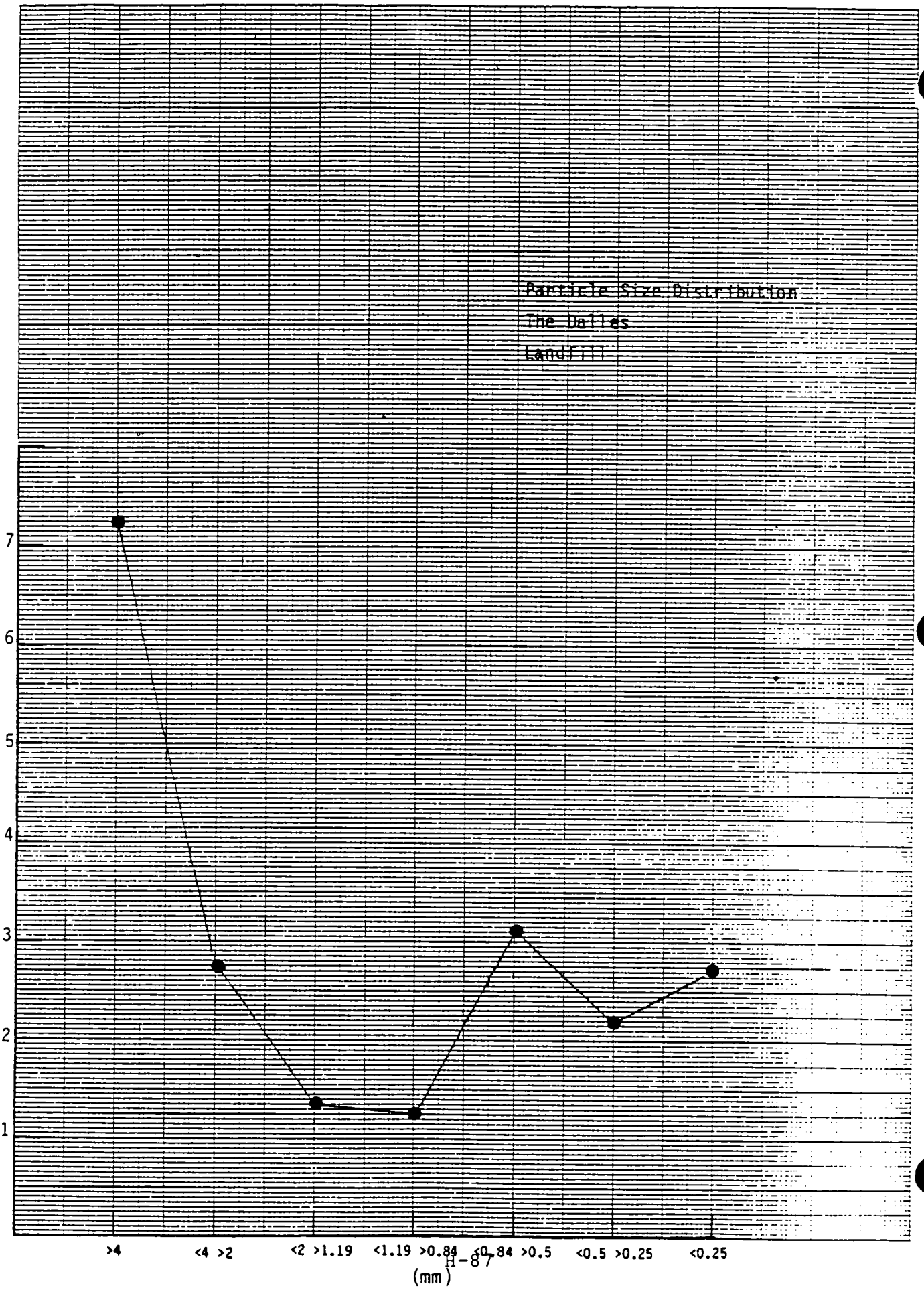
Collected 10:00 6/16/87

Collected by R. Huntington

Screen #	Size Opening (mm)	Weight (mg)
5	>4	720.760
10	<4 >2	273.790
16	<2 >1.19	133.900
20	<1.19 >0.84	125.930
35	<0.84 >0.5	312.080
60	<0.5 >0.25	217.070
<60	<0.25	269.170
	TOTAL	2052.700

46 1510

K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.



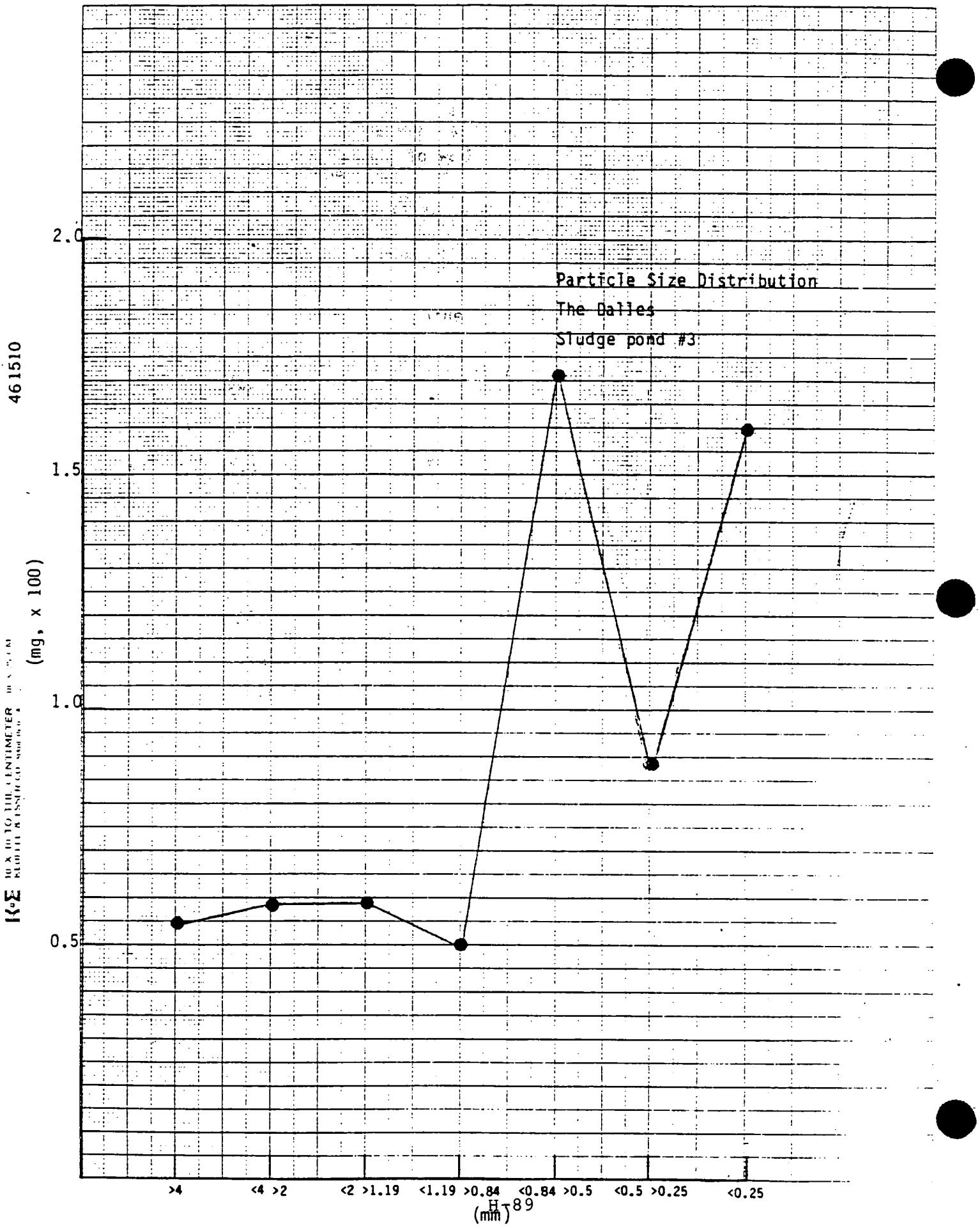
Site 3 - Sludge Pond

15 feet NE of Bern

Collected ~ 1530 6/18/87

Collected by B. Mason

Screen #	Size Opening (mm)	Weight (mg)
5	>4	53.85
10	<4 >2	58.92
16	<2 >1.19	59.20
20	<1.19 >0.84	49.86
35	<0.84 >0.5	171.67
60	<0.5 >0.25	88.72
<60	<0.25	158.66
	TOTAL	640.88


Particle Size Distribution
The Dalles
Sludge pond #3
2.0
1.5
1.0
0.5
(mg. x 100)
>4
<4 >2
<2 >1.19
<1.19 >0.84
<0.84 >0.5
<0.5 >0.25
<0.25
(mm)

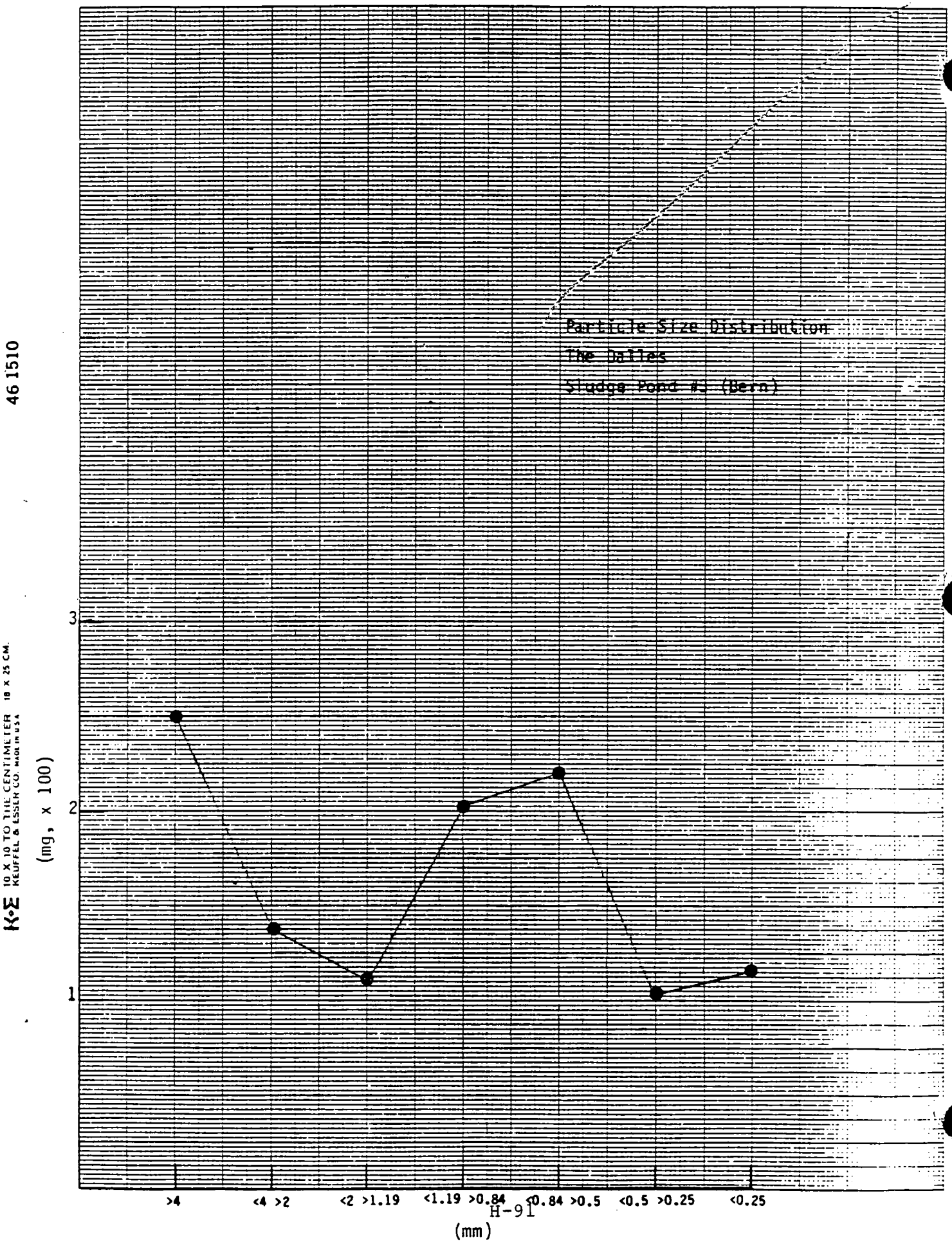
Site 3A - Sludge Pond #3 (Bern)

~ 30 feet SW of pond edge

Collected 10:45 6/17/87

Collected by R. Huntington

Screen #	Size Opening (mm)	Weight (mg)
5	>4	251.050
10	<4 >2	138.450
16	<2 >1.19	112.600
20	<1.19 >0.84	201.900
35	<0.84 >0.5	218.470
60	<0.5 >0.25	101.360
<60	<0.25	115.080
	TOTAL	1138.910


Particle Size Distribution
The Dalles
Sludge Pond #3 (Bern)
3
2
1
(mg, x 100)
>4
<4 >2
<2 >1.19
<1.19 >0.84
<0.84 >0.5
<0.5 >0.25
<0.25
(mm)
46 1510
K&E 10 X 10 TO THE CENTIMETER 18 X 25 CM.
KEUFFEL & ESSER CO. MADE IN U.S.A.