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**KERR-McGEE CORPORATION**



**SEMI-ANNUAL PERFORMANCE REPORT  
CHROMIUM MITIGATION PROGRAM  
KERR-McGEE CHEMICAL CORPORATION  
HENDERSON, NEVADA**

**July - December 1994**



**KERR-MCGEE CHEMICAL CORPORATION**

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JAN 27 1995

ENVIRONMENTAL PROTECTION

January 18, 1995

Mr. Allen Biaggi  
State of Nevada  
Division of Environmental Protection  
333 West Nye Lane  
Carson City, Nevada 89710

Dear Mr. Biaggi:

Subject: Second Half 1994 Performance Report  
Chromium Mitigation Program

Enclosed are two copies of the second half 1994 Semi-Annual Chromium Mitigation Program for the Kerr-McGee Chemical Corporation, Henderson facility.

This report presents groundwater monitoring and treatment results along with information regarding the upgrading of the groundwater treatment plant and recharge trenches.

If you have questions or comments concerning this information, please contact Susan M. Crowley at (702) 651-2234.

Sincerely,

Patrick S. Corbett  
Plant Manager

PSC:j

cc: SMCrowley  
WJGanus  
RHJones  
TWReed

**SEMI-ANNUAL PERFORMANCE REPORT  
CHROMIUM MITIGATION PROGRAM  
KERR-McGEE CHEMICAL CORPORATION  
HENDERSON, NEVADA**

**JULY - DECEMBER 1994**

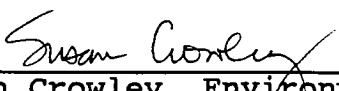
**Submitted in Accordance with:**

**Chromium Mitigation Program  
Consent Order  
September 9, 1986**

**Prepared by:**

**Thomas W. Reed  
Hydrology Department  
Kerr-McGee Corporation**

**January 27, 1995**

  
\_\_\_\_\_  
**Susan Crowley, Environmental Engineer  
Kerr-McGee Chemical Corporation  
Henderson, Nevada**

## TABLE OF CONTENTS

INTRODUCTION . . . . .	1
GROUNDWATER SURFACE CONFIGURATION . . . . .	1
CONTINUOUS WATER LEVEL RECORDERS . . . . .	2
INTERCEPTOR SYSTEM PERFORMANCE . . . . .	3
IMPACT OF DISPOSAL SYSTEM ON DOWNGRAIDENT WATER LEVELS . . . . .	5
CHROMIUM TREATMENT SYSTEM EFFECTIVENESS . . . . .	5
RECOVERY/TREATMENT SYSTEM MAINTENANCE . . . . .	6
ADDITIONAL WORK PERFORMED . . . . .	7
CONCLUSIONS . . . . .	8
PROPOSED FUTURE ACTIVITIES . . . . .	9

## APPENDICES

A- GROUNDWATER ELEVATIONS

B- CONTINUOUS WATER LEVEL RECORDER CHARTS

## LIST OF FIGURES

- FIGURE 1 - CONSENT ORDER MONITORING AREA
- FIGURE 2 - CONSENT ORDER MONITORING AREA - POTENTIOMETRIC SURFACE  
MAP: SEPTEMBER 30, 1994
- FIGURE 3 - GROUNDWATER INTERCEPTOR LINE CROSS-SECTION:  
SEPTEMBER 30, 1994
- FIGURE 4 - CONSENT ORDER MONITORING AREA - POTENTIOMETRIC SURFACE  
MAP: DECEMBER 2, 1994
- FIGURE 5 - GROUNDWATER INTERCEPTOR LINE CROSS-SECTION:  
DECEMBER 2, 1994
- FIGURE 6 - UPGRADIENT MONITOR WELLS GRAPH
- FIGURE 7 - DOWNGRADIENT MONITOR WELLS GRAPH
- FIGURE 8 - LOCATION OF APPENDIX J WELLS
- FIGURE 9 - APPENDIX J WELLS
- FIGURE 10 - INTERCEPTOR LINE GRAPH

## LIST OF TABLES

- TABLE 1- TOTAL CHROMIUM CONCENTRATIONS IN SELECTED  
GROUNDWATER MONITOR WELLS
- TABLE 2- INTERCEPTOR WELL DISCHARGE RATES
- TABLE 3- TOTAL CHROMIUM CONCENTRATIONS IN APPENDIX J WELLS
- TABLE 4- GROUNDWATER TREATMENT ANALYSIS

SEMI-ANNUAL PERFORMANCE REPORT  
CHROMIUM MITIGATION PROGRAM  
KERR-McGEE CHEMICAL CORPORATION  
HENDERSON, NEVADA

## INTRODUCTION

In accordance with the Consent Order for cleanup of chromium contaminated groundwater at the Henderson facility, finalized September 9, 1986, Kerr-McGee Chemical Corporation (KMCC) submits this semi-annual performance report to the Nevada Department of Environmental Protection. This report, covering the period July through December, 1994, summarizes performance data for the groundwater treatment plant and evaluates the effectiveness of the groundwater interception and treatment system installed to carry out the chromium mitigation program.

## GROUNDWATER SURFACE CONFIGURATION

Figure 1 illustrates the Consent Order Monitoring Area as defined in Appendix D of the Consent Order, and shows the locations of all groundwater interceptor and monitor wells installed by KMCC within this area. Appendix A of this report lists monthly groundwater elevations recorded since September, 1992 in wells within the Consent Order area. The water table configuration is presented in two formats, potentiometric surface maps and cross-sections for the second half of 1994, reflecting quarterly groundwater level measurements.

Figure 2 shows the potentiometric surface within the consent order monitoring area for the third quarter of 1994. Groundwater elevation data was recorded on September 30, 1994. Figure 3 presents a cross-section of the groundwater interceptor line for the same date. Figures 4 and 5 present the same type map and cross-section for the fourth quarter of 1994, based on groundwater elevation data recorded on December 2, 1994. The static water level shown on the cross-sections represents the Consent Order reference groundwater elevation, established September 14, 1987, prior to startup of the interception system. Groundwater elevations continue to confirm that water levels in the Consent Order monitoring area have stabilized since the discharge of cooling water to the beta ditch was discontinued in November, 1987.

## CONTINUOUS WATER LEVEL RECORDERS

Wells M-78 and M-80 (Figure 1) are equipped with continuous water level recorders. Appendix B contains copies of the recorder charts generated during the second half of 1994. The charts continue to show the water levels to be stabilized throughout both the interception and recharge areas.

## INTERCEPTOR SYSTEM PERFORMANCE

Figures 2 through 5 show the potentiometric surface configuration in the interceptor area during the second half of 1994. Cross-sections show that drawdown consistently exceeded the one foot below reference water level criterion across the entire interceptor well line.

Although the potentiometric surface maps (Figures 2 and 4) do not generally appear to show overlapping drawdown cones along the entire interceptor line, the cross-sections show that all interceptor wells are drawn down to or below the top of the Muddy Creek Clay. Drawdowns to this degree indicate that the alluvial aquifer is locally being depleted of water and that interception of groundwater has been maximized with this recovery system.

Unrelated to the interception program, groundwater levels have declined across the area due to the discontinuation of upgradient water infiltration from the Beta Ditch. Since 1987, the Beta Ditch has been utilized only for stormwater flow.

Current analytical data indicate that some wells downgradient of interception are experiencing increasing levels of chromium. The altered pattern of groundwater flow through the area of interceptor wells and well efficiency of individual wells was evaluated consistent with the Consent Order Appendix E - Contingency Plan.

In May, 1990, KMCC began monthly analysis for chromium in several other wells located both upgradient and downgradient from the recharge trench. The data is shown in Table 1, and is presented graphically as Figures 6 and 7. The M-70 series wells presented in Figure 6 are located upgradient from the recharge trench. The M-80 series wells presented in Figure 7 are located downgradient from the recharge trench. The gradual increase in chromium concentration in wells M-84 and M-86 is believed to be the result of some groundwater getting past the intercept system and not due to a failure in the treatment system. This interpretation is supported by the matching increase in chromium concentrations seen in the analyses of upgradient monitor wells M-72 and M-73. Chromium concentrations in the five Consent Order Appendix J wells (see Figure 8) are displayed in Table 3. Figure 9 presents this data graphically.

In 1994 KMCC instituted a management program to assure maximization of groundwater removal at the individual well locations along the interceptor line by focusing on those wells showing the highest chromium concentrations. Four additional interceptor wells, I-L, I-M, I-N, and I-O, were installed in these areas and began recovery during the second half of 1994. Figure 10 portrays chromium concentrations for each interceptor well. Discharge rates for each well are monitored closely and adjusted to provide maximum recovery of chromium based on the potentiometric surface configuration,

chromium concentration, and well production capability. Table 2 lists the pumping rate of each interceptor well, as measured in December of each year.

## IMPACT OF DISPOSAL SYSTEM ON DOWNGRAIDENT WATER LEVELS

The Disposal Contingency Plan (Appendix J) of the Consent Order identifies specific monitor wells that are to be utilized to evaluate any water level impact from recharge of treated water into the alluvium. Fifteen wells are monitored monthly for groundwater levels. Figure 8 shows the location of these wells. Data presented in Appendix A shows that groundwater elevations have stabilized in that portion of the facility downgradient from the recharge system (evidenced by wells M-47, M-23, and M- 49), and are lower than in January, 1988.

## CHROMIUM TREATMENT SYSTEM EFFECTIVENESS

The Consent Order specifies the following effluent concentration limits for the treatment plant discharge water:

### Monthly average

Total Chromium	1.7 mg/l
Hexavalent Chromium	0.05 mg/l

### Maximum single value on a composite sample

Total Chromium	3.4 mg/l
Hexavalent Chromium	0.1 mg/l

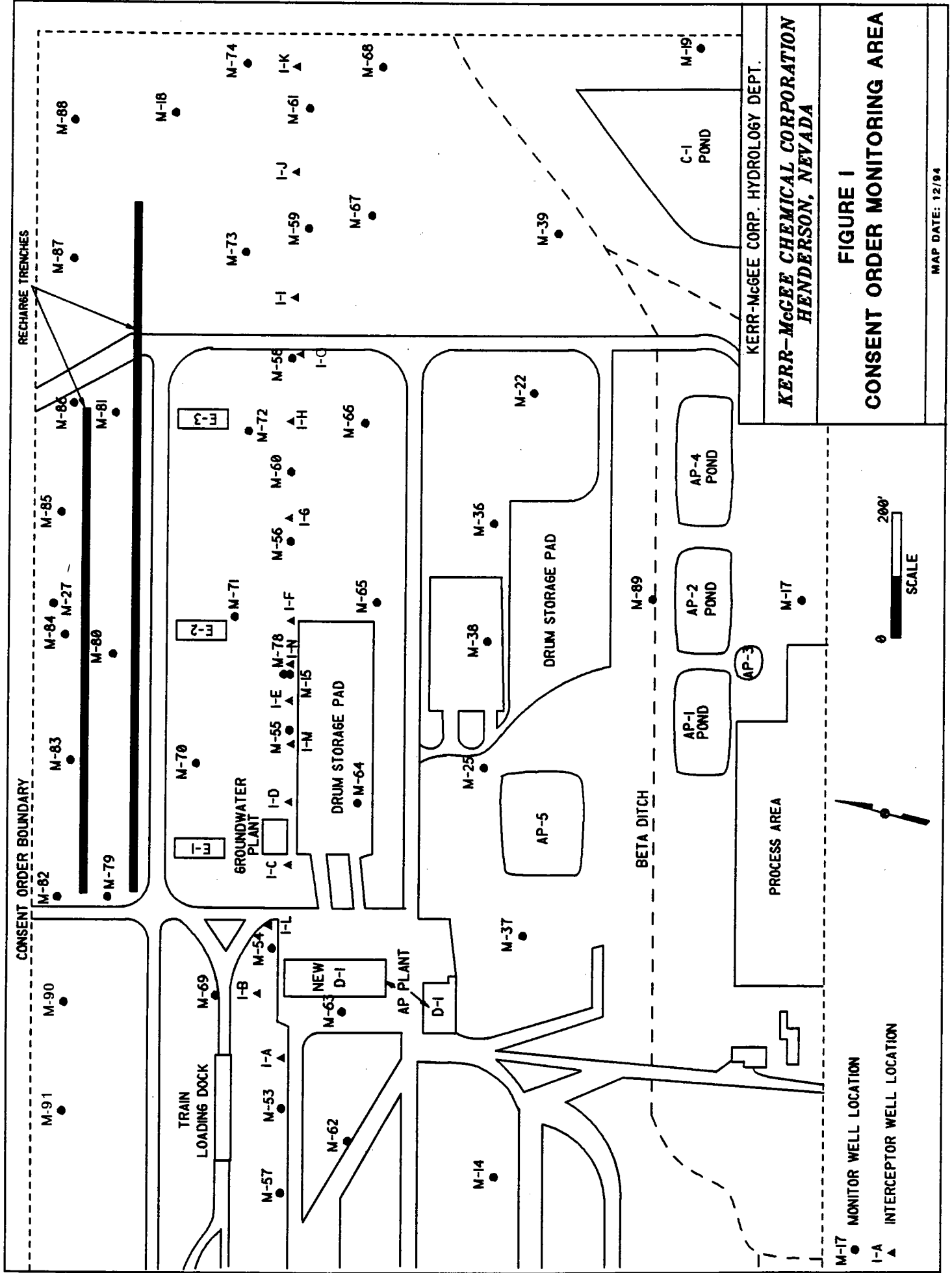
galleries. Elevated chromium concentrations in monitor wells immediately downgradient from the old recharge gallery show that the long-term influence of the new interceptor wells on the groundwater system is not yet complete. The program of new recovery wells and treatment system modifications will be fully operational in 1995 and should show improvement in the overall interception system performance.

## PROPOSED FUTURE ACTIVITIES

KMCC will continue to record water levels in the consent order area on a quarterly basis. Quarterly potentiometric surface maps and cross-sections will be developed. The effect of changing the pumping rates of the interceptor wells will be monitored, and appropriate responses (i.e.- future pump rate adjustments) will be taken to assure optimal drawdown and plume interception.

KMCC will continue evaluating the entire mitigation program. The four components of the program - interception, treatment, recharge, and monitoring - will be addressed separately. During the second half, 1994 period, KMCC will complete the modifications to the groundwater treatment system. The results of this work will be reported in the next semi-annual report.





KERR-McGEE CORP. HYDROLOGY DEPT.  
**KERR-McGEE CHEMICAL CORPORATION**  
**HENDERSON, NEVADA**

**FIGURE I**  
**CONSENT ORDER MONITORING AREA**

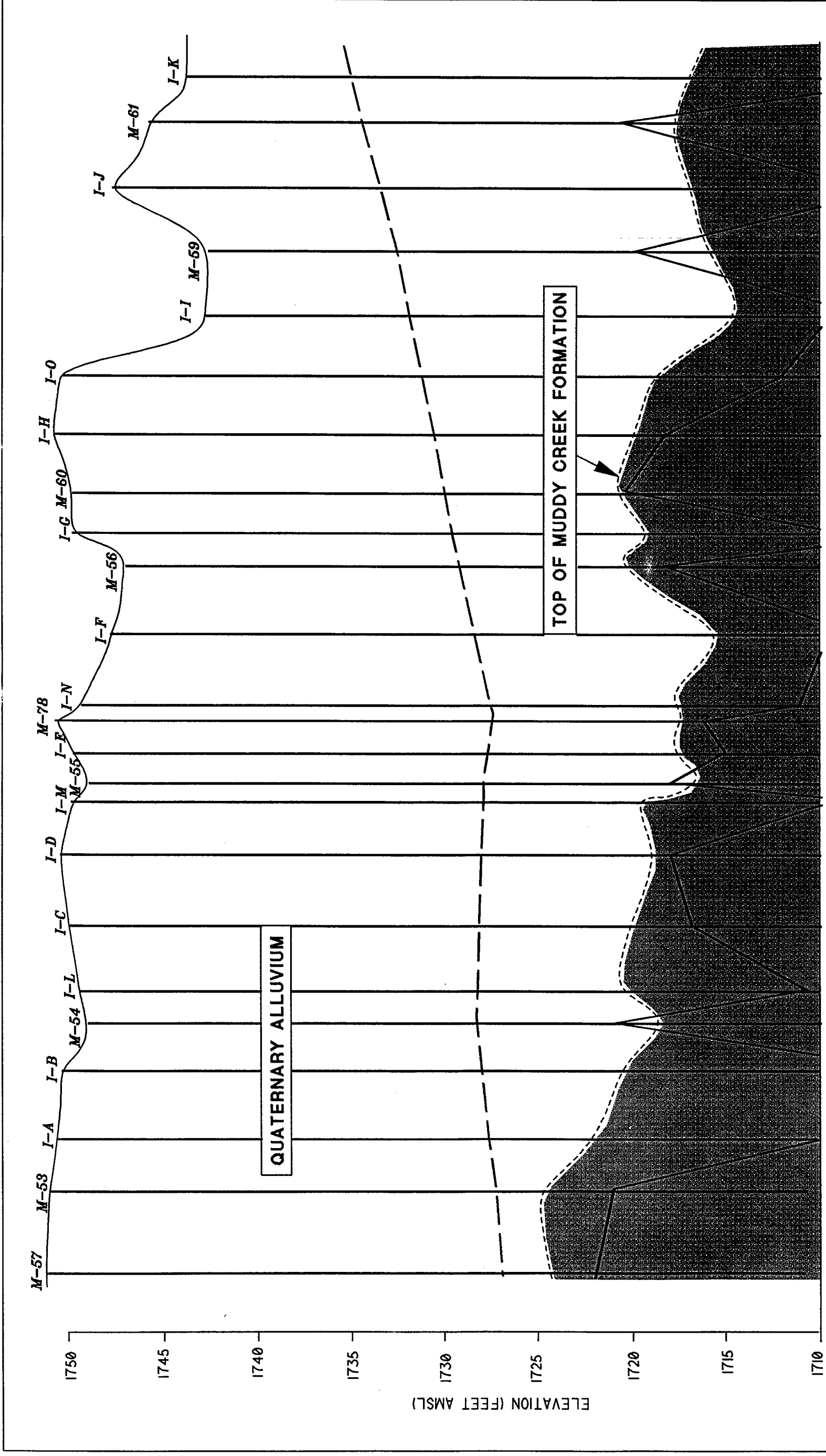
MAP DATE: 12/94

M-17 ● MONITOR WELL LOCATION  
 I-A ▲ INTERCEPTOR WELL LOCATION

0 200' SCALE

▲





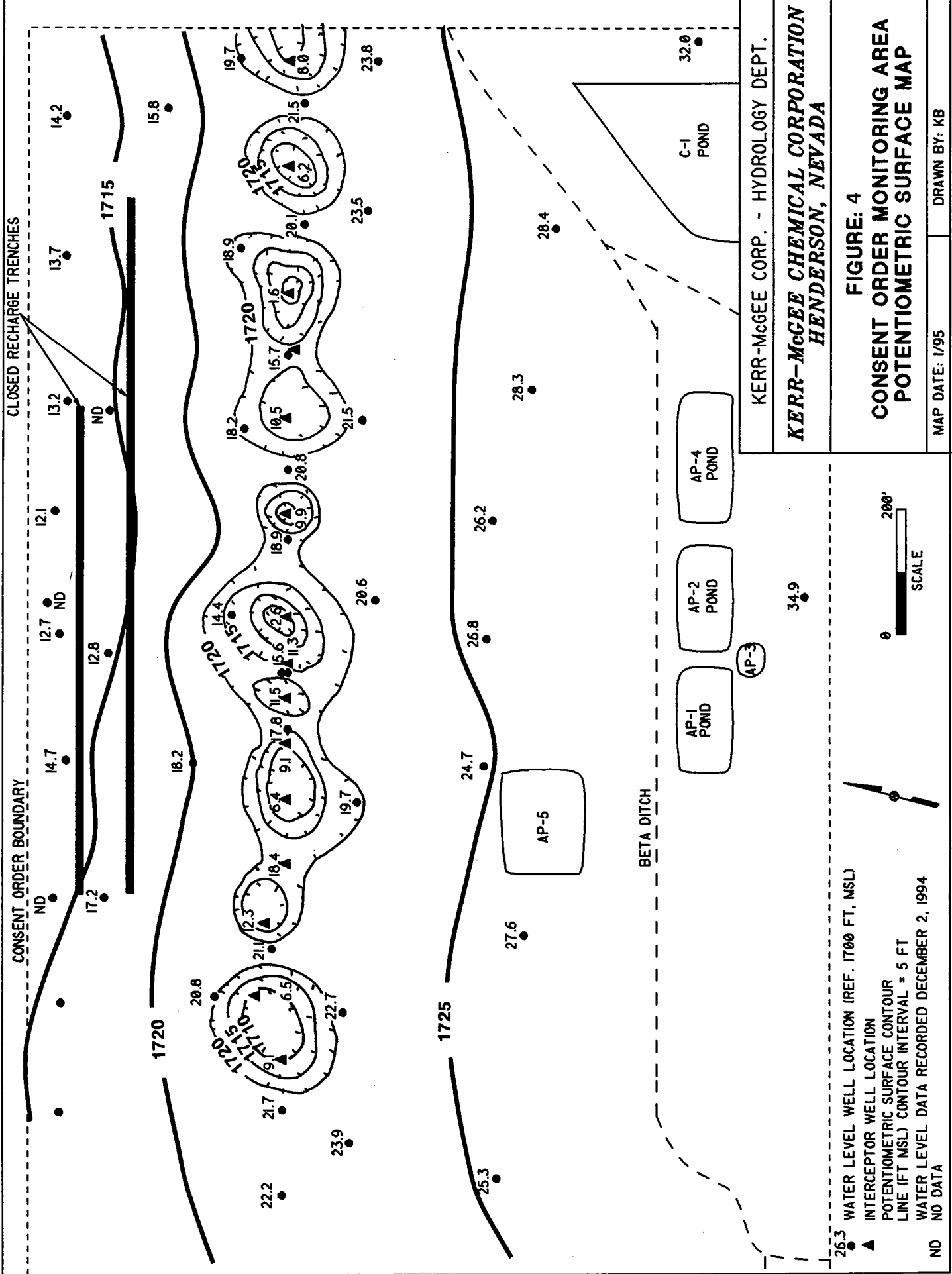
**FIGURE 3:  
GROUNDWATER INTERCEPTOR  
CROSS-SECTION - 9-30-94**

KERR-McGEE CORP. - HYDROLOGY DEPT.  
KERR-McGEE CHEMICAL CORPORATION  
HENDERSON, NEVADA

MAP DATE: 1/95      DRAWN BY: KB

— POTENTIOMETRIC SURFACE  
MEASURED ON 12-2-94  
- - - STATIC WATER LEVEL  
(9/14/87)

0 150 FT  
HORIZONTAL SCALE  
VERTICAL EX. = 30

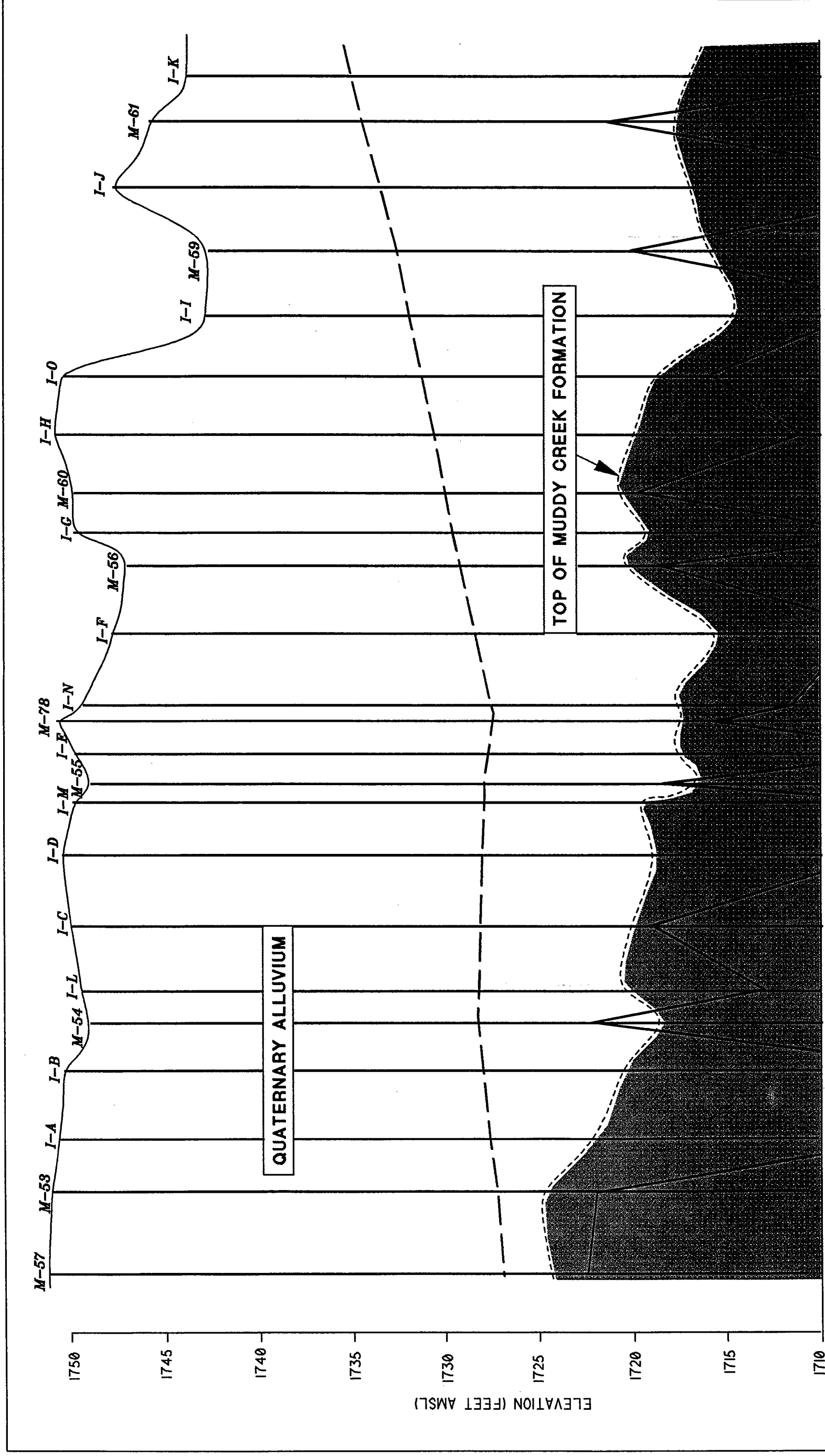


KERR-McGEE CORP. - HYDROLOGY DEPT.  
**KERR-McCEE CHEMICAL CORPORATION**  
**HENDERSON, NEVADA**

**FIGURE: 4**  
**CONSENT ORDER MONITORING AREA**  
**POTENTIOMETRIC SURFACE MAP**

MAP DATE: 1/95  
 DRAWN BY: KB

26.3 WATER LEVEL WELL LOCATION (REF. 1700 FT, MSL)  
 ▲ INTERCEPTOR WELL LOCATION  
 --- POTENTIOMETRIC SURFACE CONTOUR  
 --- LINE (FT MSL) CONTOUR INTERVAL = 5 FT  
 --- WATER LEVEL DATA RECORDED DECEMBER 2, 1994  
 ND NO DATA



**FIGURE 5:  
GROUNDWATER INTERCEPTOR  
CROSS-SECTION - 12-2-94**

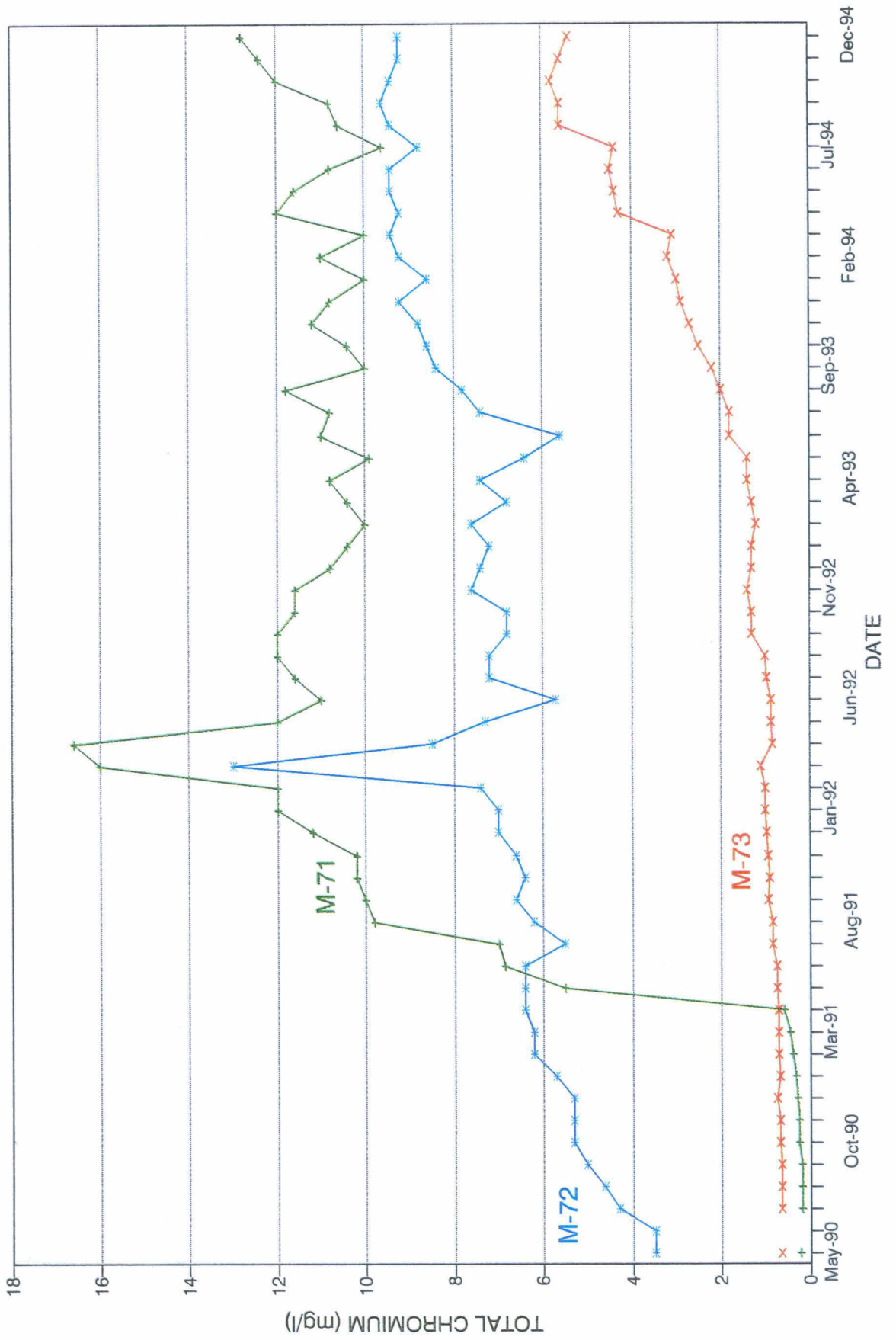
KERR-McGEE CORP. - HYDROLOGY DEPT.  
KERR-McGEE CHEMICAL CORPORATION  
HENDERSON, NEVADA

MAP DATE: 1/95. DRAWN BY: KB

— POTENTIOMETRIC SURFACE  
MEASURED ON 12-2-94  
- - - STATIC WATER LEVEL  
(9/14/87)

0 150 FT  
HORIZONTAL SCALE  
VERTICAL EX. = 30

FIGURE 6: UPGRADIENT MONITOR WELLS  
KMCC HENDERSON, NEVADA FACILITY



**FIGURE 7: DOWNGRADIENT MONITOR WELLS**  
**KMCC HENDERSON, NEVADA FACILITY**

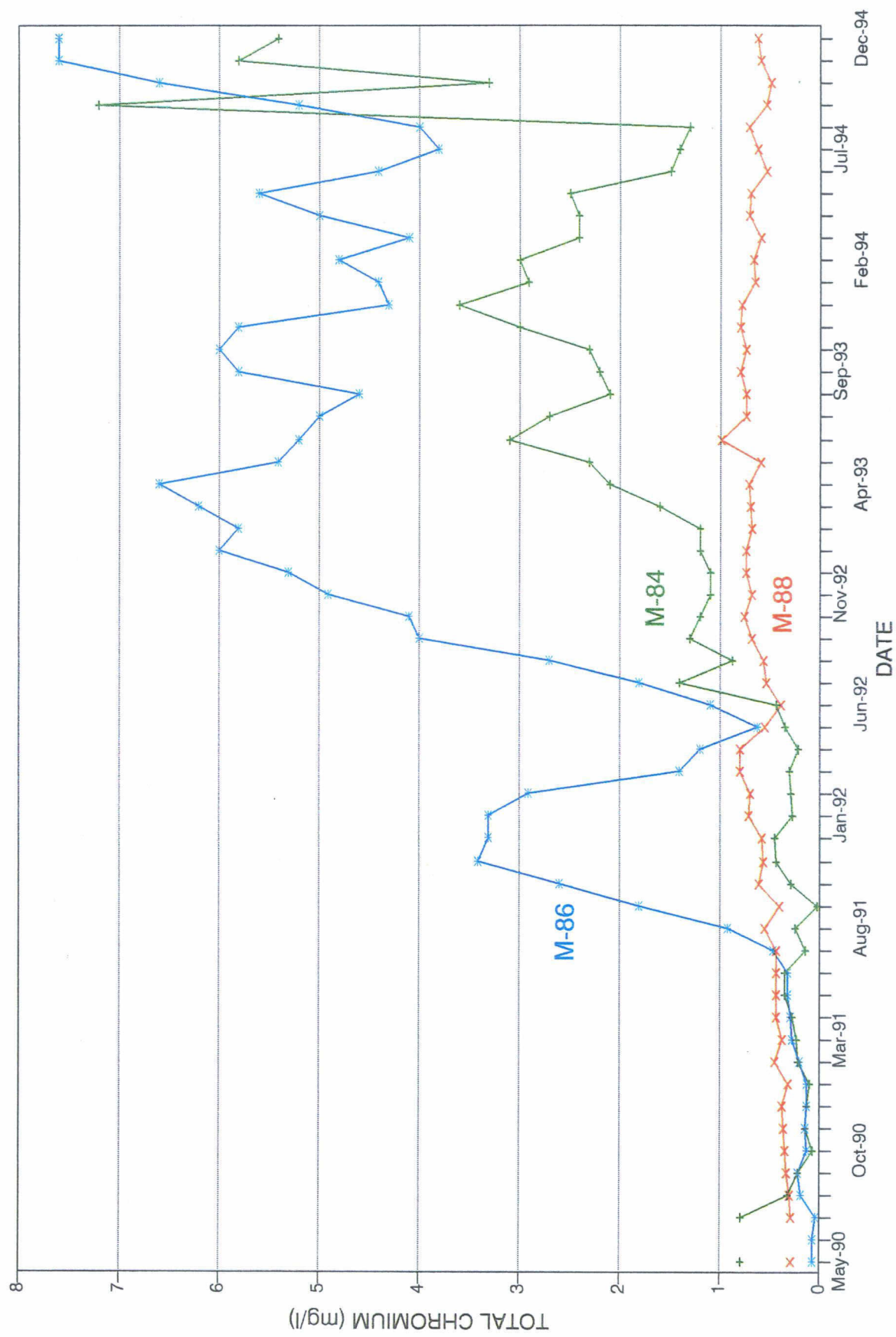
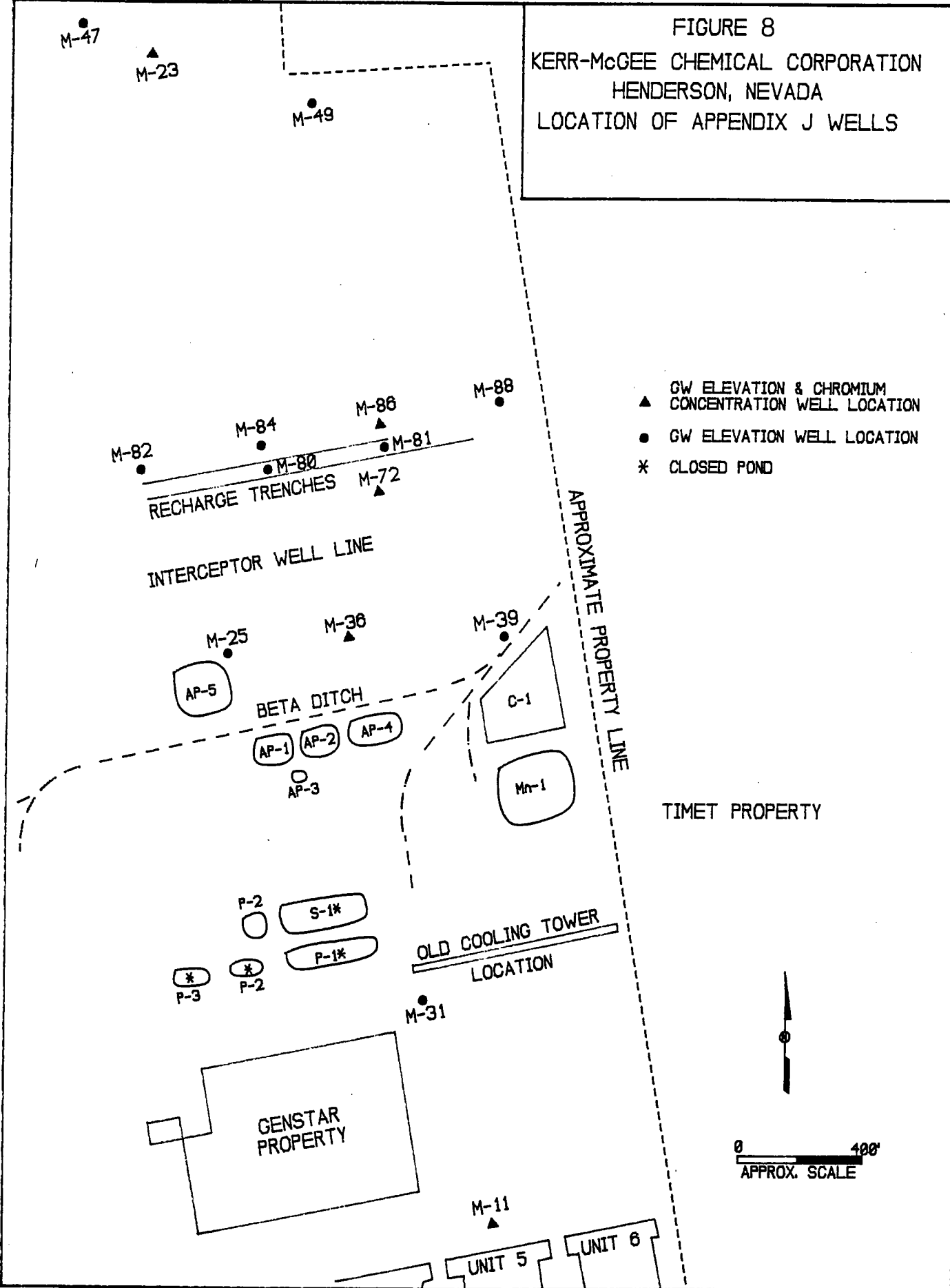


FIGURE 8  
 KERR-McGEE CHEMICAL CORPORATION  
 HENDERSON, NEVADA  
 LOCATION OF APPENDIX J WELLS



- ▲ GW ELEVATION & CHROMIUM CONCENTRATION WELL LOCATION
- GW ELEVATION WELL LOCATION
- \* CLOSED POND

TIMET PROPERTY

GENSTAR PROPERTY

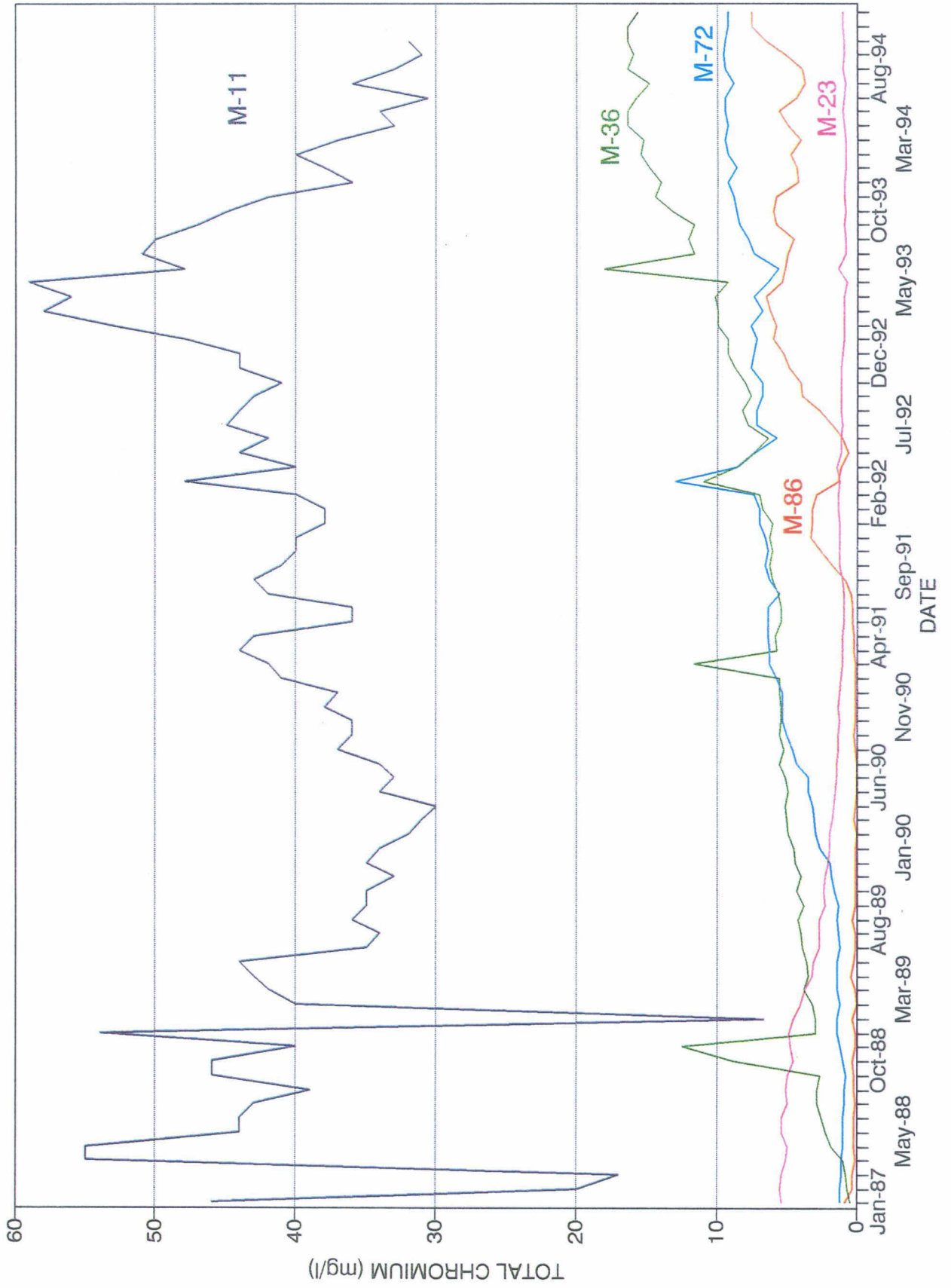
OLD COOLING TOWER LOCATION

0 100'  
 APPROX. SCALE

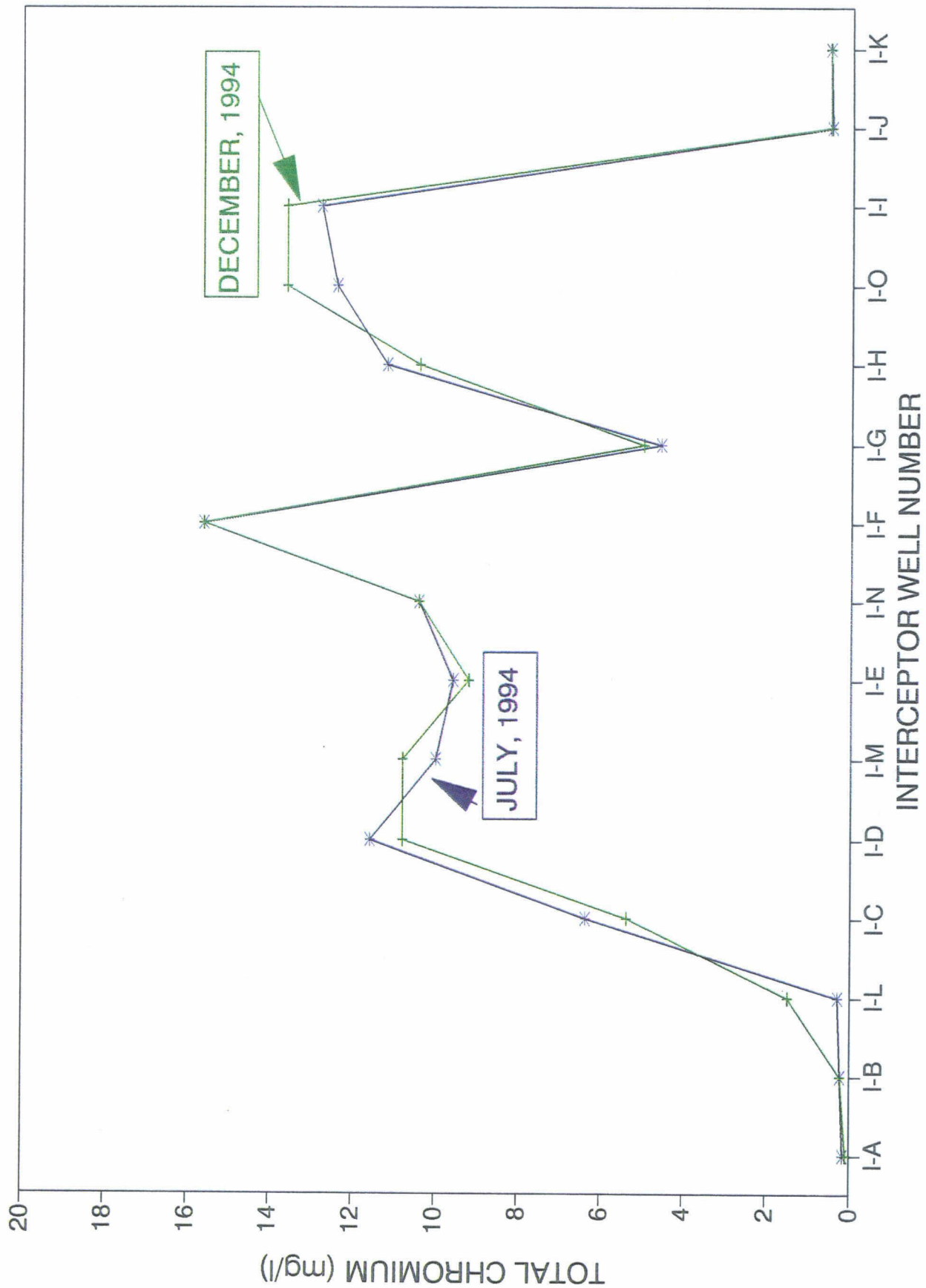
UNIT 5

UNIT 6

FIGURE 9: APPENDIX J WELLS  
KMCC HENDERSON, NEVADA FACILITY



**FIGURE 10: INTERCEPTOR LINE GRAPH**  
 KMCC HENDERSON, NEVADA FACILITY



**TABLES**

2

TABLE 1

TOTAL CHROMIUM (mg/l)  
IN SELECTED MONITOR WELLS  
KMCC HENDERSON NEVADA

DATE	WELL #			
	M-71	M-73	M-84	M-88
Jan-91	0.30	0.67	0.09	0.32
Feb-91	0.39	0.71	0.22	0.45
Mar-91	0.44	0.71	0.23	0.38
Apr-91	0.59	0.72	0.27	0.43
May-91	5.50	0.73	0.34	0.43
Jun-91	6.88	0.73	0.34	0.43
Jul-91	7.00	0.83	0.14	0.43
Aug-91	9.80	0.84	0.24	0.55
Sep-91	10.00	0.94	0.02	0.40
Oct-91	10.20	0.90	0.29	0.61
Nov-91	10.20	0.94	0.44	0.56
Dec-91	11.20	0.97	0.45	0.58
Jan-92	12.00	1.00	0.27	0.72
Feb-92	12.00	1.00	0.29	0.70
Mar-92	16.00	1.10	0.30	0.80
Apr-92	16.60	0.84	0.21	0.80
May-92	12.00	0.87	0.34	0.55
Jun-92	11.00	0.89	0.43	0.39
Jul-92	11.60	0.96	1.40	0.53
Aug-92	12.00	1.00	0.87	0.56
Sep-92	12.00	1.30	1.30	0.69
Oct-92	11.60	1.30	1.20	0.76
Nov-92	11.60	1.40	1.10	0.68
Dec-92	10.80	1.30	1.10	0.75

TABLE 1 (cont.)

TOTAL CHROMIUM (mg/l)  
IN SELECTED MONITOR WELLS  
KMCC HENDERSON NEVADA

DATE	WELL #			
	M-71	M-73	M-84	M-88
Jan-93	10.40	1.30	1.20	0.74
Feb-93	10.00	1.20	1.20	0.69
Mar-93	10.40	1.30	1.60	0.70
Apr-93	10.80	1.40	2.10	0.72
May-93	9.90	1.40	2.30	0.59
Jun-93	11.00	1.80	3.10	1.00
Jul-93	10.80	1.80	2.70	0.74
Aug-93	11.80	2.00	2.10	0.75
Sep-93	10.00	2.20	2.20	0.80
Oct-93	10.40	2.50	2.30	0.74
Nov-93	11.20	2.70	3.00	0.80
Dec-93	10.80	2.90	3.60	0.79
Jan-94	10.00	3.00	2.90	0.65
Feb-94	11.00	3.20	3.00	0.67
Mar-94	10.00	3.10	2.40	0.59
Apr-94	12.00	4.30	2.40	0.71
May-94	11.60	4.40	2.50	0.70
Jun-94	10.80	4.50	1.50	0.54
Jul-94	9.60	4.40	1.40	0.62
Aug-94	10.60	5.60	1.30	0.71
Sep-94	10.80	5.60	7.20	0.53
Oct-94	12.00	5.80	3.30	0.50
Nov-94	12.40	5.60	5.80	0.60
Dec-94	12.80	5.40	5.40	0.62

**TABLE 2**  
**INTERCEPTOR WELL DISCHARGE RATES**  
**DISCHARGE RATE (GPM)**

WELL #	DEC. 1989	DEC. 1990	DEC. 1991	DEC. 1992	DEC. 1993	DEC. 1994
I-A	3.0	2.1	2.5	2.4	2.7	2.7
I-B	2.9	2.0	2.0	1.9	2.2	2.3
I-C	5.5	3.8	3.8	3.8	4.0	1.1
I-D	8.0	1.2	1.0	1.0	1.0	0.7
I-E	5.2	1.2	1.4	1.0	2.0	0.8
I-F	13.4	12.6	11.7	6.2	6.3	4.2
I-G	4.0	3.1	1.1	0.3	0.3	0.2
I-H*	7.8	2.0	1.4	1.2	2.1	0.7
I-I	16.0	9.5	7.1	6.7	6.5	5.8
I-J	8.0	5.8	4.6	4.5	4.5	3.9
I-K	<u>7.5</u>	<u>4.9</u>	<u>4.3</u>	<u>3.9</u>	<u>3.9</u>	3.0
I-L						1.7
I-M						2.7
I-N						1.7
I-O						<u>0.3</u>
<b>TOTAL</b>	<b>81.3</b>	<b>48.2</b>	<b>40.9</b>	<b>32.9</b>	<b>35.5</b>	<b>31.5</b>

TABLE 3

TOTAL CHROMIUM CONCENTRATION (mg/l)  
 IN APPENDIX J WELLS  
 KERR-McGEE CHEMICAL CORPORATION  
 HENDERSON, NEVADA

DATE	WELL #				
	M-11	M-23	M-36	M-72	M-86
Jan-89	6.70	4.60	2.90	1.40	0.31
Feb-89	40.00	4.10	3.10	1.20	0.06
Mar-89	42.00	3.80	3.80	1.40	0.19
Apr-89	43.00	3.30	3.50	1.40	0.42
May-89	44.00	3.20	3.60	1.40	0.27
Jun-89	35.00	2.70	3.90	1.16	0.20
Jul-89	34.00	2.70	4.00	1.28	0.13
Aug-89	36.00	2.70	4.20	1.40	0.38
Sep-89	35.00	2.30	3.80	1.30	0.17
Oct-89	35.00	2.40	4.30	1.60	0.12
Nov-89	33.00	2.30	4.00	1.80	0.13
Dec-89	35.00	2.10	4.40	1.90	0.14
Jan-90	34.00	2.00	4.50	2.60	0.14
Feb-90	32.00	2.00	4.90	2.90	0.10
Mar-90	31.00	1.80	5.00	3.00	0.25
Apr-90	30.00	1.70	5.10	3.20	0.12
May-90	34.00	1.60	4.90	3.50	0.07
Jun-90	33.00	1.50	5.10	3.50	0.06
Jul-90	34.00	1.50	5.50	4.30	0.04
Aug-90	37.00	1.40	5.20	4.60	0.19
Sep-90	36.00	1.40	5.50	5.00	0.21
Oct-90	36.00	1.30	5.40	5.30	0.12
Nov-90	38.00	1.40	5.40	5.30	0.14
Dec-90	37.00	1.30	5.50	5.30	0.13
Jan-91	41.00	1.20	5.50	5.70	0.13
Feb-91	42.00	1.10	11.60	6.20	0.20
Mar-91	44.00	1.10	5.70	6.20	0.27
Apr-91	43.00	1.10	5.80	6.40	0.29
May-91	36.00	1.00	5.40	6.40	0.32
Jun-91	36.00	1.00	5.40	6.40	0.32
Jul-91	42.00	0.94	5.60	5.50	0.46
Aug-91	43.00	1.10	6.00	6.20	0.92
Sep-91	41.00	1.30	6.20	6.60	1.80
Oct-91	40.00	1.30	6.00	6.40	2.60
Nov-91	40.00	1.30	6.20	6.60	3.40
Dec-91	38.00	1.30	6.00	7.00	3.30

TABLE 4 cont'd  
GROUNDWATER TREATMENT ANALYSES

WEEK OF	VOLUME TREATED (M gal.)	FEED CHROMIUM (mg/l)	TREATED TOTAL (mg/l)	EFFLUENT HEXAVALENT (mg/l)
Jun. 28 - Jul.4	316	5.50	0.150	0.0070
Jul. 5 - Jul.11	277	5.70	0.009	0.0020
Jul. 12 - Jul.18	347	5.00	0.024	0.0030
Jul. 19 - Jul.25	358	5.00	0.025	0.0030
Jul. 26 - Aug.1	436	5.30	0.270	0.0500
July 1993 Average	347	5.30	0.096	0.0130
Aug. 2 - Aug.8	351	5.70	0.240	0.0330
Aug. 9 - Aug.15	365	5.20	0.026	0.0020
Aug. 16 - Aug.22	341	5.70	0.058	0.0030
Aug. 23 - Aug.29	285	5.60	0.120	0.0120
August 1993 Average	336	5.60	0.110	0.0130
Aug. 30 - Sept. 5	343	5.10	0.110	0.0110
Sept. 6 - Sept. 12	326	4.80	0.170	0.0040
Sept. 13 - Sept 19	331	5.00	0.023	0.0010
Sept. 20 - Sept 26	317	5.00	0.068	0.0080
Sept. 27 - Oct. 3	362	4.90	0.014	0.0020
Sept. 1993 Average	336	5.00	0.077	0.0050
Oct. 4 - Oct. 10	509	5.00	0.032	0.0020
Oct. 11 - Oct. 17	352	5.60	0.024	0.0110
Oct. 18 - Oct. 24	337	5.30	0.014	0.0010
Oct. 25 - Oct. 31	322	5.20	0.022	0.0050
October 1993 Average	380	5.28	0.023	0.0050
Nov. 1 - Nov. 7	278	6.00	0.051	0.0050
Nov. 8 - Nov. 14	274	6.60	0.560	0.0500
Nov. 15 - Nov. 21	294	6.30	0.028	0.0090
Nov. 22 - Nov. 28	256	5.00	0.025	0.0020
November 1993 Average	276	5.90	0.170	0.0170
Nov. 29 - Dec. 5	280	5.60	0.063	0.0050
Dec. 6 - Dec. 12	257	6.20	0.020	0.0070
Dec. 13 - Dec. 19	215	6.80	0.990	0.0050
Dec. 20 - Dec. 26	265	6.20	0.260	0.0210
Dec. 27 - Jan. 2	245	6.20	0.050	0.0080
Dec. 1993 Average	252	6.20	0.280	0.0090

TABLE 4 cont'd  
GROUNDWATER TREATMENT ANALYSES

WEEK OF	VOLUME TREATED (M gal.)	FEED CHROMIUM (mg/l)	TREATED TOTAL (mg/l)	EFFLUENT HEXAVALENT (mg/l)
Jan. 3 - Jan. 9	259	9.3	0.01	0.002
Jan. 10 - Jan. 16	273	5.7	0.03	0.005
Jan. 17 - Jan. 23	298	5.8	0.06	0.01
Jan. 24 - Jan. 30	287	5.9	0.09	0.03
Jan. 1994 Average	279	6.7	0.05	0.011
Jan. 31 - Feb. 6	294	5.8	0.53	0.05
Feb. 7 - Feb. 13	266	6.1	0.06	0.02
Feb. 14 - Feb. 20	276	5.9	0.03	0.006
Feb. 21 - Feb. 27	285	5.7	0.019	0.008
Feb. 28 - Mar. 6	252	5.7	0.024	0.003
Feb. 1994 Average	275	5.8	0.13	0.017
Mar. 7 - Mar. 13	273	5.3	0.14	0.045
Mar. 14 - Mar. 20	243	5.3	0.06	0.024
Mar. 21 - Mar. 27	212	5.3	0.02	0.005
Mar. 28 - Apr. 3	232	5.1	0.03	0.01
Mar. 1994 Average	240	5.3	0.06	0.021
Apr. 4 - Apr. 10	253	6.5	0.075	0.028
Apr. 11 - Apr. 17	257	6.4	0.046	0.021
Apr. 18 - Apr. 24	254	6.6	0.020	0.005
Apr. 25 - May 1	271	6.6	0.038	0.018
Apr. 1994 Average	259	6.5	0.045	0.018
May 2 - May 8	270	6.6	0.065	0.008
May 9 - May 15	287	7.1	0.13	0.045
May 16 - May 22	296	6.8	0.47	0.027
May 23 - May 29	294	7.1	0.099	0.018
May 1994 Average	287	6.9	0.19	0.025
May 30 - Jun. 5	288	7.3	0.23	0.048
Jun. 6 - Jun. 12	294	7.9	0.06	0.008
Jun. 13 - Jun. 19	296	7.2	0.34	0.032
Jun. 20 - Jun. 26	288	6.9	0.018	0.009
Jun. 1994 Average	292	7.3	0.16	0.024

TABLE 4 cont'd  
GROUNDWATER TREATMENT ANALYSES

WEEK OF	VOLUME TREATED (M gal.)	FEED CHROMIUM (mg/l)	TREATED TOTAL (mg/l)	EFFLUENT HEXAVALENT (mg/l)
Jun. 27 - Jul.3	289	7.60	0.090	0.050
Jul. 4 - Jul.10	301	6.40	0.020	0.010
Jul. 11 - Jul.17	271	7.60	0.030	0.010
Jul. 18 - Jul.24	340	7.60	0.010	0.010
Jul. 25 - Jul.31	319	7.90	0.040	0.010
July 1994 Average	304	7.40	0.038	0.018
Aug. 1 - Aug.7	317	10.60	0.070	0.040
Aug. 8 - Aug.14	340	8.20	0.150	0.020
Aug. 15 - Aug.21	327	7.40	0.010	0.010
Aug. 22 - Aug.28	312	8.90	0.170	0.010
Aug. 29 - Sept.4	300	6.80	0.040	0.010
August 1994 Average	319	8.38	0.088	0.018
Sept. 5 - Sept 11	301	7.20	0.490	0.030
Sept. 12 - Sept 18	267	8.70	0.020	0.010
Sept. 19 - Sept 25	277	8.60	0.020	0.010
Sept. 26 - Oct. 2	264	7.40	0.220	0.040
Sept. 1994 Average	277	7.97	0.188	0.022
Oct. 3 - Oct. 9	256	4.10	0.180	0.040
Oct. 10 - Oct. 16	316	6.50	0.150	0.020
Oct. 17 - Oct. 23	297	6.00	0.120	0.030
Oct. 24 - Oct. 30	282	8.20	0.040	0.010
October 1994 Average	288	6.20	0.123	0.025
Oct. 31 - Nov. 6	274	7.60	0.020	0.010
Nov. 7 - Nov. 13	287	7.90	0.030	0.010
Nov. 14 - Nov. 20	330	6.70	0.220	0.030
Nov. 21 - Nov. 27	308	7.20	0.700	0.040
November 1994 Average	300	7.40	0.242	0.022
Nov. 28 - Dec. 4	326	6.70	0.020	0.010
Dec. 5 - Dec. 11	245	7.40	0.020	0.010
Dec. 12 - Dec. 18	267	7.30	0.110	0.020
Dec. 19 - Dec. 25	245	5.90	0.020	0.010
Dec. 26 - Jan. 1	180	4.20	0.020	0.010
Dec. 1994 Average	252	6.30	0.030	0.010



**APPENDIX A**  
**GROUNDWATER ELEVATIONS**

KERR-McGEE CHEMICAL CORPORATION  
 HENDERSON, NEVADA FACILITY  
 GROUNDWATER ELEVATIONS

TOC-->	M-11 DTW ELEV.	M-14 DTW ELEV.	M-15 DTW ELEV.	M-17 DTW ELEV.	M-18 DTW ELEV.	M-19 DTW ELEV.	M-22R DTW ELEV.	M-23 DTW ELEV.	M-25 DTW ELEV.	M-27 DTW ELEV.										
16-Sep-92	44.25	1769.21	32.95	1725.88	31.60	1718.09	36.00	1733.54	21.00	1717.28	34.50	1732.04	29.70	1728.65	19.7	1693.08	33.10	1725.05	25.60	1714.87
01-Dec-92	44.15	1769.31	33.30	1725.53	32.25	1717.44	36.15	1733.39	21.10	1717.18	34.00	1732.54	29.90	1728.45	20.15	1692.63	33.40	1724.75	26.00	1714.47
28-Jan-93	43.60	1769.86					36.00	1733.54			34.50	1732.04	29.95	1728.40	20.20	1692.58	33.35	1724.80		
19-Feb-93	47.30	1766.16					35.80	1733.74			33.20	1733.34	29.60	1728.75	19.10	1693.68	33.15	1725.00		
03-Mar-93	43.75	1769.71	32.90	1725.93			35.60	1733.94	20.40	1717.88	34.00	1732.54	29.50	1728.85	20.65	1692.13	33.00	1725.15	26.10	1714.37
29-Apr-93	44.00	1769.46					35.70	1733.84			34.50	1732.04	29.55	1728.80	19.50	1693.28	32.90	1725.25		
28-May-93	44.05	1769.41					35.75	1733.79			35.00	1731.54	29.65	1728.70	19.70	1693.08	33.00	1725.15		
22-Jun-93	44.45	1769.01	31.77	1727.06	31.27	1718.42	34.79	1734.75	21.10	1717.18	33.20	1733.34	22.70	1735.65	19.94	1692.84	33.26	1724.89	25.57	1714.90
28-Jul-93	44.40	1769.06					35.00	1734.54			33.00	1733.54	29.50	1728.85	20.02	1692.76	33.05	1725.10		
31-Aug-93	44.20	1769.26					36.00	1733.54			33.80	1732.74	29.70	1728.65	20.40	1692.38	33.20	1724.95		
23-Sep-93	44.15	1769.31	31.70	1727.13	32.20	1717.49	35.15	1734.39	21.70	1716.58	33.00	1733.54	29.80	1728.55	20.50	1692.28	33.20	1724.95	25.80	1714.67
27-Oct-93	43.95	1769.51					35.20	1734.34			32.50	1734.04	29.90	1728.45	20.65	1692.13	32.20	1725.95		
18-Nov-93	43.75	1769.71					35.70	1733.84			32.80	1733.74	30.75	1727.60	20.75	1692.03	33.00	1725.15		
15-Dec-93	43.20	1770.26	32.45	1726.38	32.35	1717.34	35.05	1734.49	21.85	1716.43	32.90	1733.64	30.00	1728.85	20.90	1691.88	33.45	1724.75		
14-Jan-94	43.00	1770.46					35.00	1734.54			33.00	1733.54	29.95	1728.40	21.00	1691.78	33.40	1724.75		
22-Feb-94	42.65	1770.81					34.70	1734.84			33.80	1733.74	29.85	1728.50	21.15	1691.63	33.30	1724.85		
21-Mar-94	42.45	1771.01	33.50	1725.33	32.90	1716.79	34.65	1734.89	22.15	1716.13	34.00	1732.54	29.80	1728.55	21.20	1691.58	33.30	1724.85	25.80	1714.67
26-Apr-94	42.40	1771.06					34.65	1734.89			34.00	1732.54	29.70	1728.65	21.35	1691.43	33.30	1724.85		
19-May-94	42.45	1771.01					34.40	1735.14			30.70	1735.84	29.50	1728.85	21.40	1691.38	33.10	1725.05		-DRY-
23-Jun-94	42.50	1770.96	32.40	1726.43	32.15	1717.54	34.10	1735.44	22.20	1716.08	34.80	1731.74	29.35	1729.00	21.55	1691.23	33.30	1724.85		
20-Jul-94	42.85	1770.61					34.45	1735.09			34.80	1731.74	29.70	1728.65	21.65	1691.13	33.25	1724.90		
23-Aug-94	42.95	1770.51					33.65	1735.89			34.00	1732.54	29.70	1728.65	21.70	1691.08	33.20	1724.95		
30-Sep-94	42.90	1770.56	32.60	1726.23	32.15	1717.54	34.85	1734.69	22.20	1716.08	34.00	1732.54	29.85	1728.50	22.40	1690.38	33.30	1724.85		out
18-Oct-94	42.85	1770.61					34.90	1734.64			34.00	1732.54	29.85	1728.50	21.85	1690.93	33.45	1724.70		
16-Nov-94	out						34.80	1734.74			34.00	1732.54	out							
02-Dec-94	42.65	1770.81	33.50	1725.33	33.55	1716.14	34.65	1734.89	22.50	1715.78	34.50	1732.04	30.10	1728.25	22.00	1690.78	33.80	1724.70		out



KERR-McGEE CHEMICAL CORPORATION  
 HENDERSON, NEVADA FACILITY  
 GROUNDWATER ELEVATIONS

TOC-->	M-56 1749.60 DTW ELEV.	M-57 1752.29 DTW ELEV.	M-58 1749.25 DTW ELEV.	M-59 1743.01 DTW ELEV.	M-60 1750.13 DTW ELEV.	M-61 1745.55 DTW ELEV.	M-62 1752.92 DTW ELEV.	M-63 1750.59 DTW ELEV.	M-64 1749.76 DTW ELEV.	M-65 1752.88 DTW ELEV.
16-Sep-92	30.90	30.45	28.90	22.45	30.00	24.30	30.00	27.60	28.85	33.25
01-Dec-92	31.30	30.80	29.15	22.60	30.30	24.40	30.35	28.00	29.35	33.50
03-Mar-93	31.05	30.40	28.65	22.10	29.85	23.70	29.90	27.50	29.15	33.25
01-Jun-93	29.91	29.52	28.81	21.96	28.67	23.39	28.34	27.51	28.71	32.00
28-Jul-93										
31-Aug-93	30.60	29.10	29.35	22.50	29.25	24.05	28.10	27.10	29.40	32.45
23-Sep-93										
27-Oct-93										
18-Nov-93										
15-Dec-93	30.65	30.00	29.45	22.60	29.40	24.10	28.60	27.85	29.70	32.50
14-Jan-94										
22-Feb-94										
21-Mar-94	30.80	30.50	29.50	22.75	29.30	24.30	29.30	28.10	29.70	32.45
26-Apr-94										
19-May-94										
23-Jun-94	30.65	30.50	29.35	22.55	29.10	24.00	29.20	28.00	29.60	32.20
20-Jul-94										
23-Aug-94										
30-Sep-94	30.60	30.10	29.40	22.55	29.20	24.10	29.30	28.00	29.60	32.30
18-Oct-94										
16-Nov-94										
02-Dec-94	30.75	30.10	30.00	22.90	29.30	24.10	29.00	27.90	30.10	32.30

KERR-McGEE CHEMICAL CORPORATION  
 HENDERSON, NEVADA FACILITY  
 GROUNDWATER ELEVATIONS

TOC-->	M-66 1752.33 DTW	ELEV.	M-67 1744.98 DTW	ELEV.	M-68 1747.44 DTW	ELEV.	M-69 1748.77 DTW	ELEV.	M-70 1746.96 DTW	ELEV.	M-71 1745.88 DTW	ELEV.	M-72 1745.49 DTW	ELEV.	M-73 1740.05 DTW	ELEV.	M-74 1743.42 DTW	ELEV.	M-78 1751.01 DTW	ELEV.
16-Sep-92	30.00	1722.33	22.00	1722.98	23.70	1723.74	29.60	1719.17	27.55	1719.41	30.00	1715.88	26.70	1718.59	21.00	1719.05	23.70	1719.72	33.15	1717.86
01-Dec-92	30.10	1722.23	22.15	1722.83	23.70	1723.79	30.20	1718.57	28.40	1718.56	30.60	1715.28	27.00	1718.29	21.20	1718.85	23.70	1719.72	33.85	1717.16
28-Jan-93			22.10	1722.88	23.65	1723.79							27.35	1717.94						
19-Feb-93			21.50	1723.48	22.60	1724.84							26.55	1718.74						
03-Mar-93	29.80	1722.53	21.60	1723.38	22.90	1724.54	28.80	1719.97	28.65	1718.31	30.35	1715.53	26.50	1718.79	21.00	1719.05	22.95	1720.47	33.45	1717.56
29-Apr-93			22.00	1722.98	23.55	1723.89							26.90	1718.39						
08-May-93			22.00	1722.98	23.75	1723.69							26.70	1718.59						
21-Jun-93	30.12	1722.21	20.70	1724.28	23.58	1723.86	27.49	1721.28	26.34	1720.62	29.20	1716.68	25.72	1719.57	20.07	1719.98	22.52	1720.90	30.33	1720.68
28-Jul-93			20.85	1724.13	23.00	1724.44							26.90	1718.39						
31-Aug-93			21.10	1723.88	24.00	1723.44							27.10	1718.19						
23-Sep-93	30.65	1721.68	21.15	1723.83	23.20	1724.24	26.35	1722.42	27.95	1719.01	30.00	1715.88	26.10	1719.19	20.40	1719.65	23.15	1720.27	34.30	1716.71
27-Oct-93			21.40	1723.58	23.80	1723.64							26.30	1718.99	20.60	1719.45				
18-Nov-93			22.65	1722.33	23.55	1723.89							27.20	1718.09	20.60	1719.45				
15-Dec-93	30.80	1721.53	21.40	1723.58	23.50	1723.94	28.70	1720.07	28.10	1718.86	30.40	1715.48	26.35	1718.94	20.75	1719.30	24.40	1719.02	34.40	1716.61
14-Jan-94			21.50	1723.48	23.60	1723.84							27.60	1717.69	20.80	1719.25				
22-Feb-94			21.45	1723.53	23.70	1723.74							26.60	1718.69	20.80	1719.25				
21-Mar-94	30.70	1721.63	21.40	1723.58	23.30	1724.14	29.45	1719.32	28.50	1718.46	30.50	1715.38	26.55	1718.74	20.80	1719.25	23.50	1719.92	34.70	1716.31
26-Apr-94			21.40	1723.58	23.50	1723.94							26.55	1718.74	20.85	1719.20				
19-May-94			21.35	1723.63	23.50	1723.94							26.65	1718.64	20.95	1719.10				
23-Jun-94	30.40	1721.93	21.15	1723.83	23.45	1723.99	29.70	1719.07	28.70	1718.26	30.40	1715.48	26.40	1718.89	20.80	1719.25	23.45	1719.97	34.40	1716.61
20-Jul-94			21.40	1723.58	23.65	1723.79							26.55	1718.74	21.00	1719.05				
23-Aug-94			21.70	1723.28	23.75	1723.69							26.65	1718.64	21.00	1719.05				
30-Sep-94	30.50	1721.83	21.55	1723.43	23.65	1723.79	29.70	1719.07	28.70	1718.26	31.10	1714.78	27.40	1717.89	21.10	1718.95	23.50	1719.92	34.60	1716.41
18-Oct-94			21.60	1723.38	23.55	1723.89							26.95	1718.34	21.20	1718.85				
16-Nov-94			21.50	1723.48	23.65	1723.79							26.90	1718.39	21.20	1718.85				
02-Dec-94	30.80	1721.53	21.50	1723.48	23.65	1723.79	27.95	1720.82	28.80	1718.16	31.50	1714.38	27.05	1718.24	21.20	1718.85	23.75	1719.67	35.40	1715.61



KERR-McGEE CHEMICAL CORPORATION  
HENDERSON, NEVADA FACILITY  
GROUNDWATER ELEVATIONS

TOC-->	I-A 1751.06 DTW ELEV.	I-B 1750.69 DTW ELEV.	I-C 1750.44 DTW ELEV.	I-D 1750.54 DTW ELEV.	I-E 1750.22 DTW ELEV.	I-F 1747.58 DTW	I-G 1750.42 DTW ELEV.	I-H 1751.07 DTW ELEV.				
16-Sep-92	41.00	1710.06	32.85	1717.59	38.00	1712.22	40.00	1707.58	41.00	1709.42	44.40	1706.67
01-Dec-92	41.00	1710.06	37.20	1713.24	43.80	1706.42	44.70	1702.88	38.80	1711.62	44.50	1706.57
28-Jan-93	42.00	1709.06	43.20	1707.24	40.00	1710.22	45.10	1702.48	42.00	1708.42	44.55	1706.52
19-Feb-93	41.00	1710.06	43.90	1706.54	44.00	1706.22	45.00	1702.58	41.00	1709.42	32.90	1718.17
03-Mar-93	40.80	1710.26	40.10	1710.34	33.20	1717.02	44.20	1703.38	42.00	1708.42	44.60	1706.47
29-Apr-93	35.50	1715.56	39.80	1717.89	32.40	1717.82	45.00	1702.58	40.00	1710.42	42.00	1709.07
28-May-93	38.00	1713.06	33.80	1717.69	32.00	1718.22	44.40	1703.18	30.80	1719.62	36.90	1714.17
22-Jun-93	36.11	1714.95	30.35	1720.09	32.80	1717.42	44.72	1702.86	40.10	1710.32	35.25	1715.82
28-Jul-93	40.10	1710.96	40.40	1710.04	39.00	1711.22	40.70	1706.88	40.10	1710.32	38.50	1712.57
31-Aug-93	42.00	1709.06	43.90	1706.54	37.30	1712.92	45.00	1702.58	40.60	1709.82	45.00	1706.07
23-Sep-93	41.00	1710.06	38.10	1712.34	37.40	1712.82	45.15	1702.43	40.55	1709.87	42.80	1708.27
27-Oct-93	41.00	1710.06	38.90	1711.54	43.00	1707.22	45.00	1702.58	40.70	1709.72	38.00	1713.07
18-Nov-93	42.20	1708.86	43.30	1707.39	32.20	1718.02	45.00	1702.58	40.60	1709.82	44.00	1707.07
15-Dec-93	42.00	1709.06	42.00	1708.44	44.20	1706.02	45.00	1702.58	40.00	1710.42	43.00	1708.07
14-Jan-94	41.10	1709.96	36.00	1714.44	43.85	1706.37	45.00	1702.58	39.00	1711.42	39.30	1711.77
22-Feb-94	32.60	1718.46	43.30	1707.14	44.10	1706.12	45.00	1702.58	40.60	1709.82	41.40	1709.67
21-Mar-94	41.00	1710.06	31.20	1719.24	42.90	1707.32	44.00	1703.58	40.60	1709.82	31.70	1719.37
26-Apr-94	41.00	1710.06	41.80	1708.64	44.30	1705.92	45.00	1702.58	40.60	1709.82	31.80	1719.27
19-May-94	43.00	1708.06	33.70	1716.74	45.15	1705.07	45.05	1702.53	40.55	1709.87	39.70	1711.37
23-Jun-94	42.00	1709.06	36.00	1714.44	38.30	1711.92	45.00	1702.58	40.50	1709.92	31.75	1719.32
20-Jul-94	41.10	1709.96	38.20	1712.24	44.00	1706.22	44.90	1702.68	40.10	1710.32	33.10	1717.97
23-Aug-94	42.10	1708.96	44.00	1706.44	45.10	1705.12	45.00	1702.58	40.55	1709.87	39.50	1711.57
30-Sep-94	41.00	1710.06	33.40	1717.04	34.60	1715.62	45.00	1702.58	40.50	1709.92	32.30	1718.77
18-Oct-94	42.00	1709.06	32.40	1718.04	40.00	1710.22	45.00	1702.58	41.90	1708.52	32.20	1718.87
16-Nov-94	41.00	1710.06	32.70	1717.74	40.00	1710.22	44.60	1702.98	39.00	1711.42	43.00	1708.07
02-Dec-94	42.00	1709.06	32.00	1718.44	38.70	1711.52	45.00	1702.58	40.50	1709.92	40.55	1710.52

KERR-McGEE CHEMICAL CORPORATION  
 HENDERSON, NEVADA FACILITY  
 GROUNDWATER ELEVATIONS

TOC--->	I-I 1743.36 DTW ELEV.	I-J 1747.95 DTW ELEV.	I-K 1743.97 DTW ELEV.	I-L 1749.49 DTW ELEV.	I-M 1750.72 DTW ELEV.	I-N 1749.26 DTW ELEV.	I-O 1750.66 DTW ELEV.
16-Sep-92	28.00 1715.36	40.00 1707.95	34.00 1709.97				
01-Dec-92	39.70 1703.66	38.90 1709.05	36.00 1707.97				
28-Jan-93	38.80 1704.56	42.00 1705.95	38.00 1705.97				
19-Feb-93	40.10 1703.26	38.90 1709.05	33.95 1710.02				
03-Mar-93	28.00 1715.36	37.75 1710.20	30.00 1713.97				
29-Apr-93	41.70 1701.66	40.40 1707.55	37.30 1706.67				
28-May-93	41.00 1702.36	42.10 1705.85	36.60 1707.37				
22-Jun-93	32.78 1710.58	33.60 1714.35	34.20 1709.77				
28-Jul-93	38.00 1705.36	36.00 1711.95	35.60 1708.37				
31-Aug-93	41.00 1702.36	42.00 1705.95	36.20 1707.77				
23-Sep-93	39.90 1703.46	41.20 1706.75	36.40 1707.57				
27-Oct-93	41.65 1701.71	42.00 1705.95	36.85 1707.12				
18-Nov-93	42.00 1701.36	42.00 1705.95	30.55 1713.42				
15-Dec-93	41.80 1701.56	42.00 1705.95	36.00 1707.97				
14-Jan-94	41.70 1701.66	42.00 1705.95	33.00 1710.97				
22-Feb-94	41.80 1701.56	41.80 1706.15	31.00 1712.97				
21-Mar-94	41.70 1701.66	42.00 1705.95	36.00 1707.97				
26-Apr-94	41.70 1701.66	42.20 1705.75	42.00 1701.97				
19-May-94	41.75 1701.61	41.95 1706.00	36.80 1707.17				
23-Jun-94	42.10 1701.26	40.10 1707.85	36.80 1707.17				
20-Jul-94	42.10 1701.26	42.00 1705.95	36.60 1707.37	30.35 1719.14	33.30 1717.42	31.20 1718.06	34.10 1716.56
23-Aug-94	41.70 1701.66	42.00 1705.95	36.80 1707.17	30.30 1719.19	36.20 1714.52	33.20 1716.06	41.50 1709.16
30-Sep-94	41.70 1701.66	41.00 1706.95	36.80 1707.17	39.00 1710.49	41.60 1709.12	38.00 1711.26	38.50 1712.16
18-Oct-94	40.00 1703.36	42.00 1705.95	36.80 1707.17	38.00 1711.49	41.40 1709.32	39.00 1710.26	31.40 1719.26
16-Nov-94	41.70 1701.66	40.00 1707.95	35.00 1708.97	38.70 1710.79	41.60 1709.12	38.00 1711.26	40.40 1710.26
02-Dec-94	41.80 1701.56	41.80 1706.15	36.00 1707.97	37.20 1712.29	41.60 1709.12	38.00 1711.26	35.00 1715.66

**APPENDIX B**

**CONTINUOUS WATER LEVEL RECORDER CHARTS**



Stevens Water Level Recorder — Type F



Chart F-1

CONTINUOUS WATER LEVEL  
RECORDER CHART  
WELL M-80

DEPTH TO WATER AT 10:39 - 32.80 ft  
DECEMBER 1, 1994

DEPTH TO WATER AT 10:24 - 33.00 ft  
NOVEMBER 1, 1994

Stevens Water Level Recorder — Type F



Chart F-1

CONTINUOUS WATER LEVEL  
RECORDER CHART  
WELL M-80

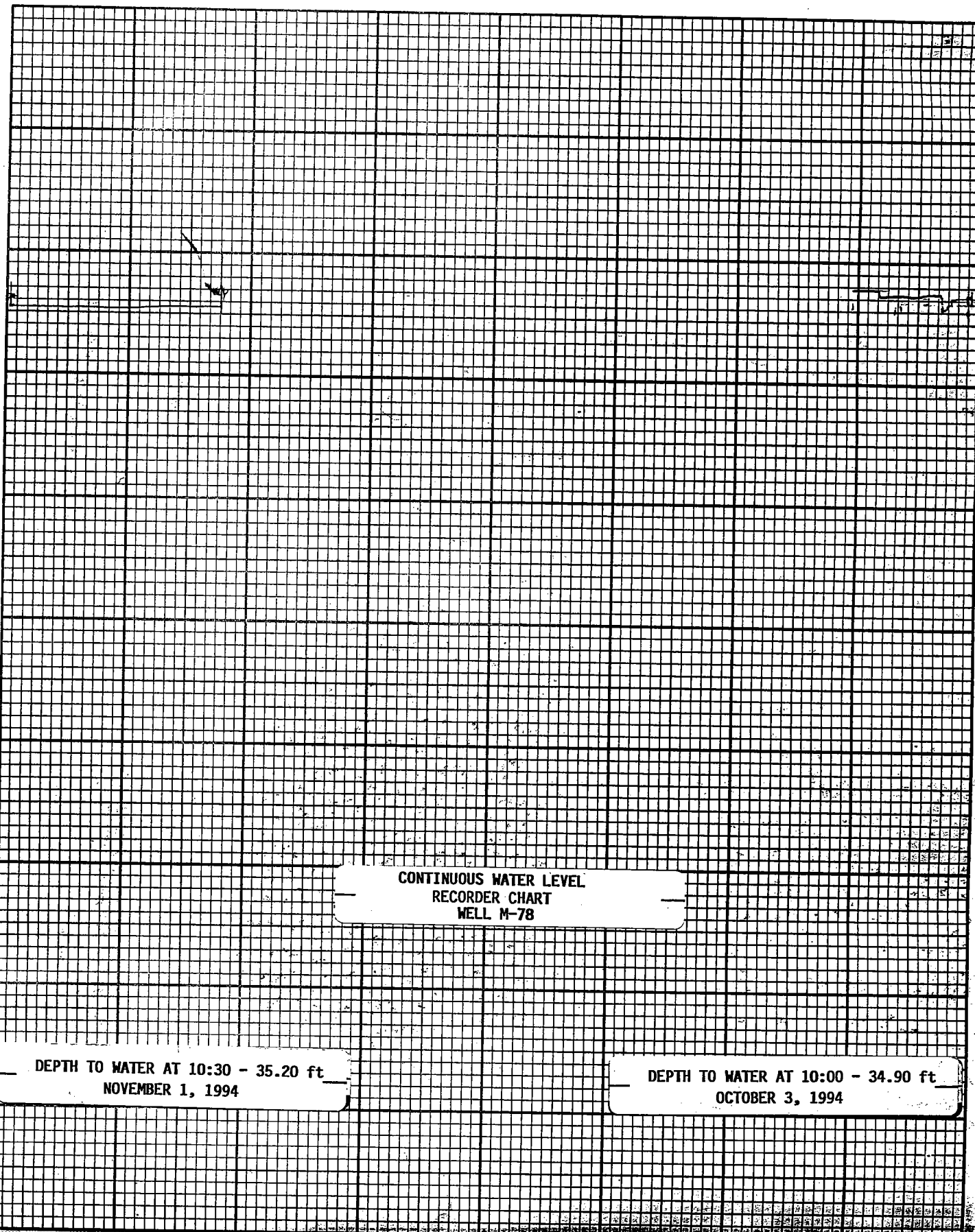
DEPTH TO WATER AT 10:24 - 33.00 ft  
NOVEMBER 1, 1994

DEPTH TO WATER AT 10:30 - 32.65 ft  
OCTOBER 3, 1994

Stevens Water Level Recorder — Type F



Chart F-1



CONTINUOUS WATER LEVEL  
RECORDER CHART  
WELL M-78

DEPTH TO WATER AT 10:30 - 35.20 ft  
NOVEMBER 1, 1994

DEPTH TO WATER AT 10:00 - 34.90 ft  
OCTOBER 3, 1994

Stevens Water Level Recorder — Type F



Chart F-1

CONTINUOUS WATER LEVEL  
RECORDER CHART  
WELL M-80

DEPTH TO WATER AT 10:30 - 32.65 ft  
OCTOBER 3, 1994

DEPTH TO WATER AT 9:00 - 31.70 ft  
SEPTEMBER 1, 1994

Stevens Water Level Recorder — Type F



Chart F-1

CONTINUOUS WATER LEVEL  
RECORDER CHART  
WELL M-78

DEPTH TO WATER AT 10:00 - 34.90 ft  
OCTOBER 3, 1994

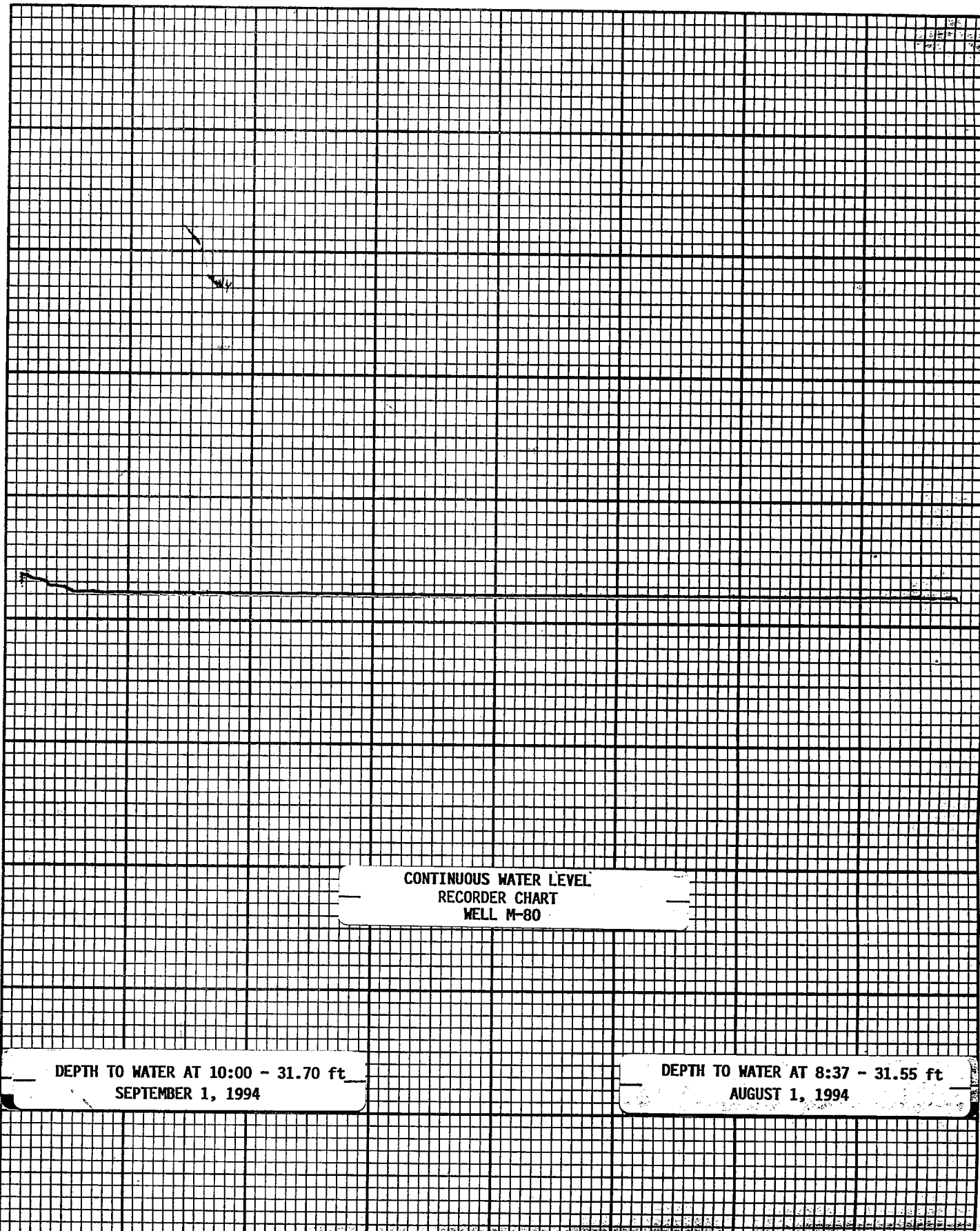
DEPTH TO WATER AT 9:00 - 34.60 ft  
SEPTEMBER 1, 1994

Pen did not record  
9:00  
10:00

Stevens Water Level Recorder — Type R



Chart R-1



CONTINUOUS WATER LEVEL  
RECORDER CHART  
WELL M-80

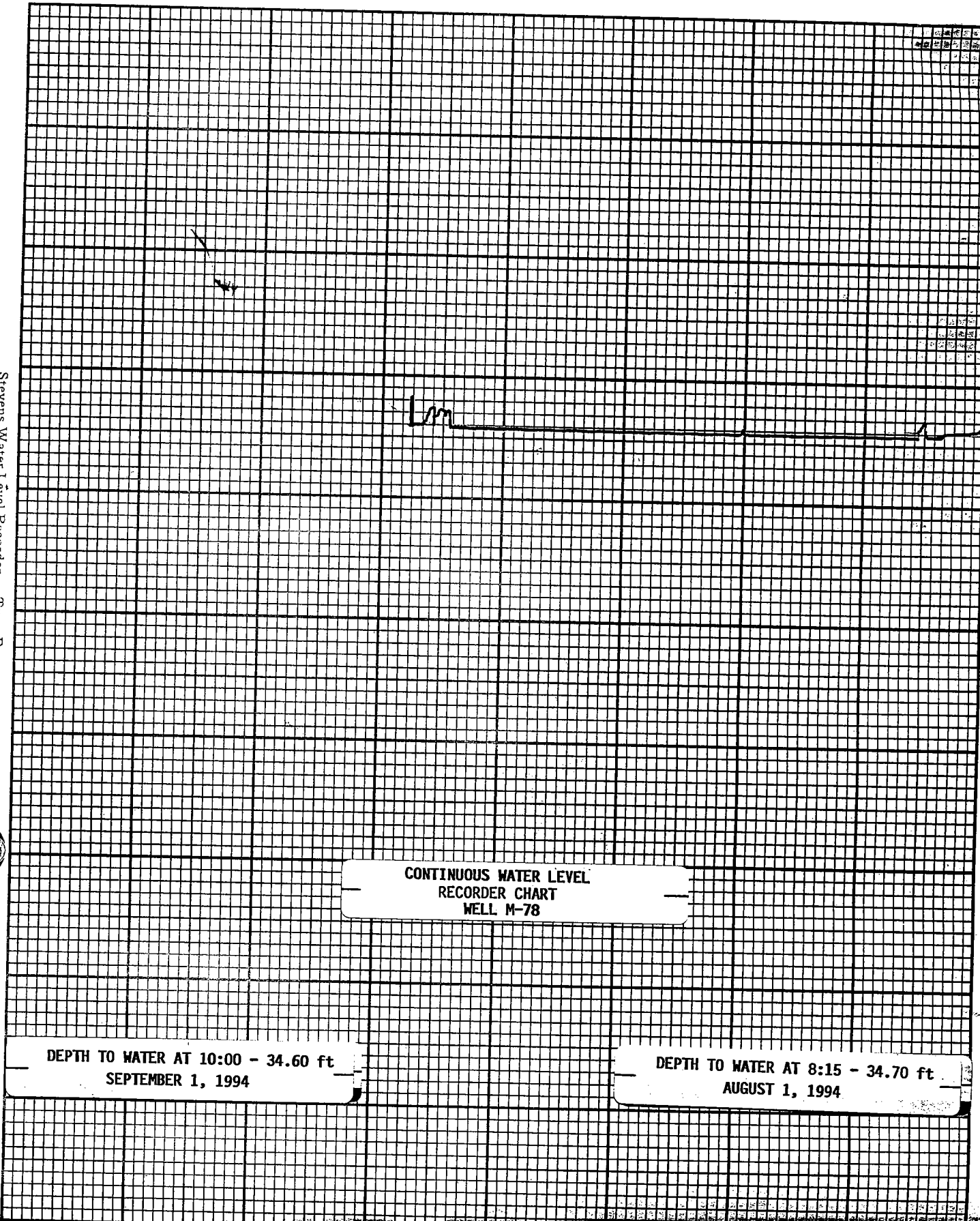
DEPTH TO WATER AT 10:00 - 31.70 ft  
SEPTEMBER 1, 1994

DEPTH TO WATER AT 8:37 - 31.55 ft  
AUGUST 1, 1994

Stevens Water Level Recorder — Type F



Chart F-1



CONTINUOUS WATER LEVEL  
RECORDER CHART  
WELL M-78

DEPTH TO WATER AT 10:00 - 34.60 ft  
SEPTEMBER 1, 1994

DEPTH TO WATER AT 8:15 - 34.70 ft  
AUGUST 1, 1994

Stevens Water Level Recorder — Type R



CONTINUOUS WATER LEVEL  
RECORDER CHART  
WELL M-80

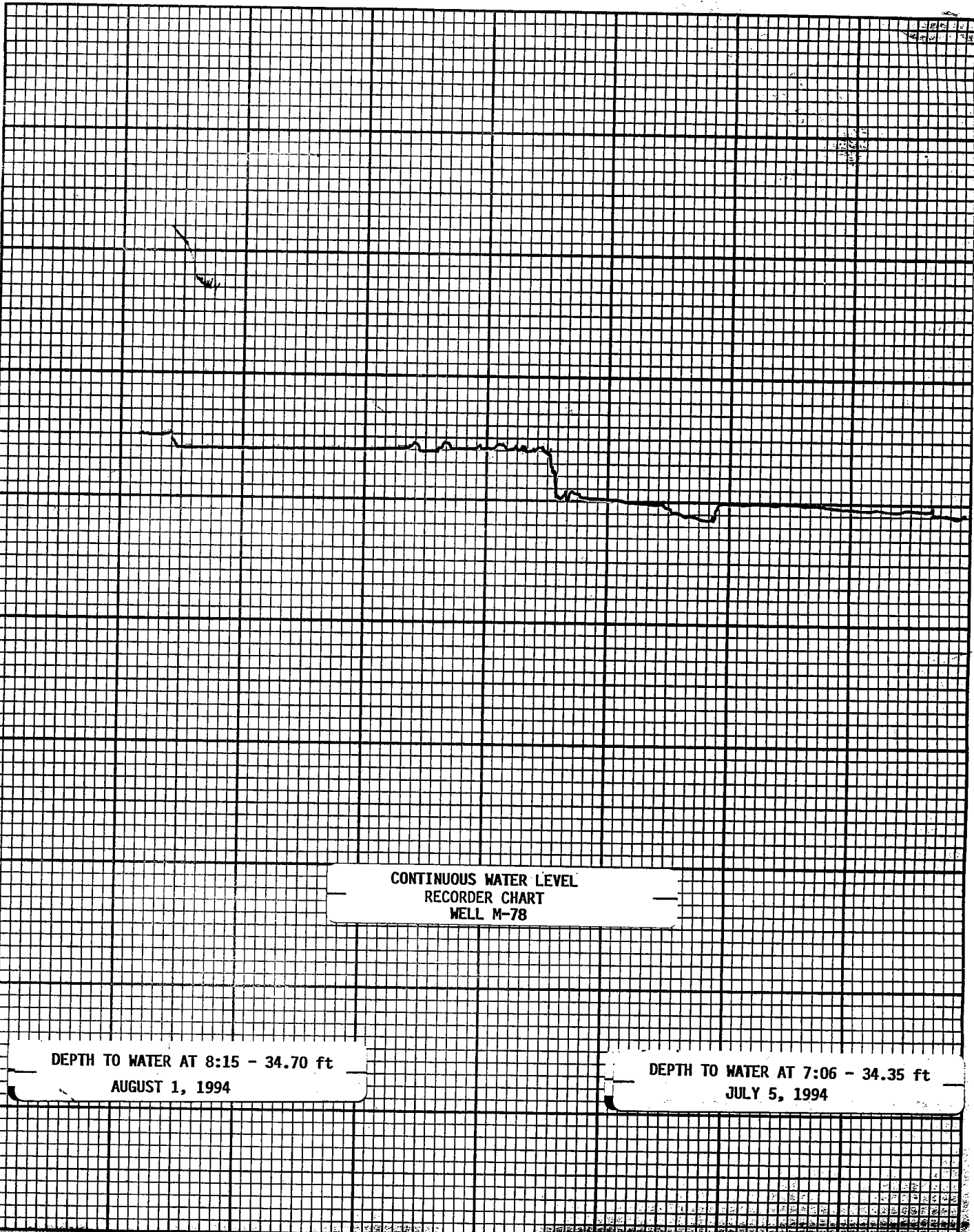
DEPTH TO WATER AT 8:37 - 31.55 ft  
AUGUST 1, 1994

DEPTH TO WATER AT 7:14 - 31.34 ft  
JULY 5, 1994

Stevens Water Level Recorder — Type F



Chart F-1



Stevens Water Level Recorder — Type F



Chart F-1

CONTINUOUS WATER LEVEL  
RECORDER CHART  
WELL M-80

DEPTH TO WATER AT 9:50 - 32.75 ft  
JANUARY 2, 1995

DEPTH TO WATER AT 10:39 - 32.80 ft  
DECEMBER 1, 1994

Stevens Water Level Recorder — Type F

Pen too making  
wrong way  
supposed to be going  
this way  
Jalk

CONTINUOUS WATER LEVEL  
RECORDER CHART  
WELL M-78

DEPTH TO WATER AT 9:38 - 35.25 ft  
JANUARY 2, 1995

DEPTH TO WATER AT 10:03 - 35.15 ft  
DECEMBER 1, 1994

Chart F-1