

KERR-McGEE CORPORATION



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

JULY - DECEMBER 1995

JANUARY 26, 1996



KERR-MCGEE CHEMICAL CORPORATION

POST OFFICE BOX 55 • HENDERSON, NEVADA 89009

January 24, 1996

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

Dear Mr. Biaggi:

Subject: Second Half 1995 Performance Report
Chromium Mitigation Program

Enclosed are two copies of the Second Half 1995 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,

A handwritten signature in cursive script, appearing to read "Patrick S. Corbett".

Patrick S. Corbett
Plant Manager

PSC:j
biaggi.WPD

cc: SMCrowley
WJGanus
JLivak
RANapier
TWRreed

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

JULY - DECEMBER 1995

Submitted in Accordance with:

Chromium Mitigation Program
Consent Order
September 9, 1986

Prepared by:

Thomas W. Reed
Hydrology Department
Kerr-McGee Corporation

January 26, 1996



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

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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, 1995, 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 June 1993 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 1995, reflecting quarterly groundwater level measurements.

Figure 2 shows the potentiometric surface within the consent order monitoring area for the third quarter of 1995. Groundwater elevation data were recorded on September 28, 1995. 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 1995, based on groundwater elevation data recorded on December 12, 1995. 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 1995. The charts for M-80 display slightly rising water levels in the vicinity of the recharge trench area. These rising water levels demonstrate the proper functioning of the recharge trenches following reconstruction of the trench system.

INTERCEPTOR SYSTEM PERFORMANCE

Figures 2 through 5 show the potentiometric surface configuration in the interceptor area during the second half of 1995. 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 show overlapping drawdown cones along the entire interceptor line, the cross-sections show the majority of interceptor wells are drawn down to 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 almost exclusively for stormwater flow.

In May, 1990, KMCC began monthly analyses for chromium in several other wells located both upgradient and downgradient from the recharge trench. The data are shown in Table 1, and are 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. Both the M-70 series wells and the M-80 series wells exhibit a leveling off or decline in chromium concentrations during the second half of 1995. The exception to this general decline was monitor well M-84, which showed an increase in chromium concentration during the second half of the year. This increase was in response to reduced pumping rates in recovery well I-F due to maintenance problems.

Chromium concentration data from the five Consent Order Appendix J wells (see Figure 8) are contained in Table 3. Figure 9 presents this data graphically. Well M-11 chromium data became available again in July, 1995. The well was bridged by pump and tubing equipment which has been successfully removed.

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. Figure 10 portrays chromium concentration for each interceptor well for the past year. Discharge rates for each well are monitored 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 for the months of December, 1990 through 1994, as compared to December, 1995. The addition of the four new recovery wells has increased total groundwater recovery to near pre-1990 volumes.

IMPACT OF DISPOSAL SYSTEM ON DOWNGRADIENT 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 show 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 have continued to decline.

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

Table 4 updates the treatment plant feed and discharge chromium concentration data with data for the second half of 1995. Total Chromium and Hexavalent Chromium values for the second half of 1995 did not exceed either the monthly permissible average or the maximum composite sample value.

RECOVERY/TREATMENT SYSTEM MAINTENANCE

Approximately every twenty days, the electrodes in the treatment plant's electrolytic cells deteriorate to the point they require replacement. During electrode replacement, a backup cell is placed in active service in the circuit to maintain groundwater treatment.

Engine hour meters are being used to determine the average number of hours per day individual pumps are running. Six of the interceptor wells utilize a time-marking device that shuts the pump off for a pre-determined amount of time if the well runs dry. If a pump spends a significant amount of time shut down, overall recovery can be increased by decreasing the pump rate, allowing a smaller discharge to

occur a greater percentage of the time. Well discharge rates are adjusted periodically, as engine hour meters show either continuous pumping or a low percentage of pumping time.

All interceptor wells are checked for operation each day; flow rates are recorded for each well twice weekly. Flowmeter readings (total volume) are recorded for each time-marking well twice weekly. These records indicate when a pump needs to be replaced or a flow rate adjusted. In addition, other maintenance associated with maintaining treatment plant operations was performed. During the second half of 1995, maintenance work was performed on the pumping systems in recovery wells I-F (7/17), I-C (10/16), and I-G (10/26). On 8/3 repairs were made to the pump feed tank overflow, and a ball valve was replaced on 11/15. Repairs were again made on the pumping system in Well I-F during January, 1996.

CONCLUSIONS

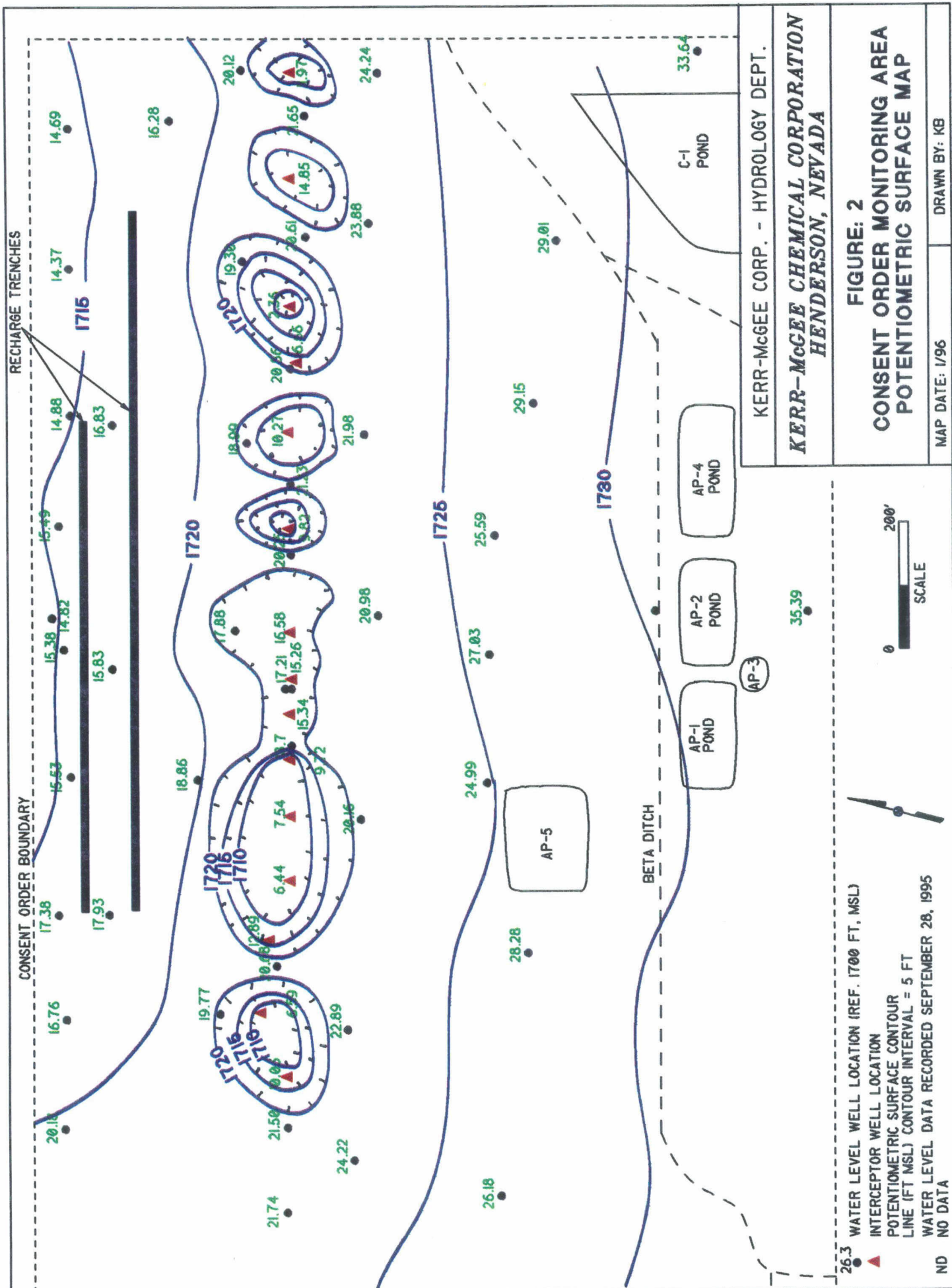
Discharge chromium concentrations for the treatment facility are below established requirements. No adverse impacts to downgradient groundwater levels have been observed as a result of returning treated groundwater to the near-surface aquifer via the recharge galleries. Chromium concentrations in the majority of monitor wells immediately downgradient from the recharge trenches have stabilized or declined indicating that the recharge system is functioning properly. Chromium concentrations in monitor wells immediately downgradient from the groundwater interception wells have also declined or stabilized in response to more efficient capture of the groundwater chromium plume.

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.

FIGURES



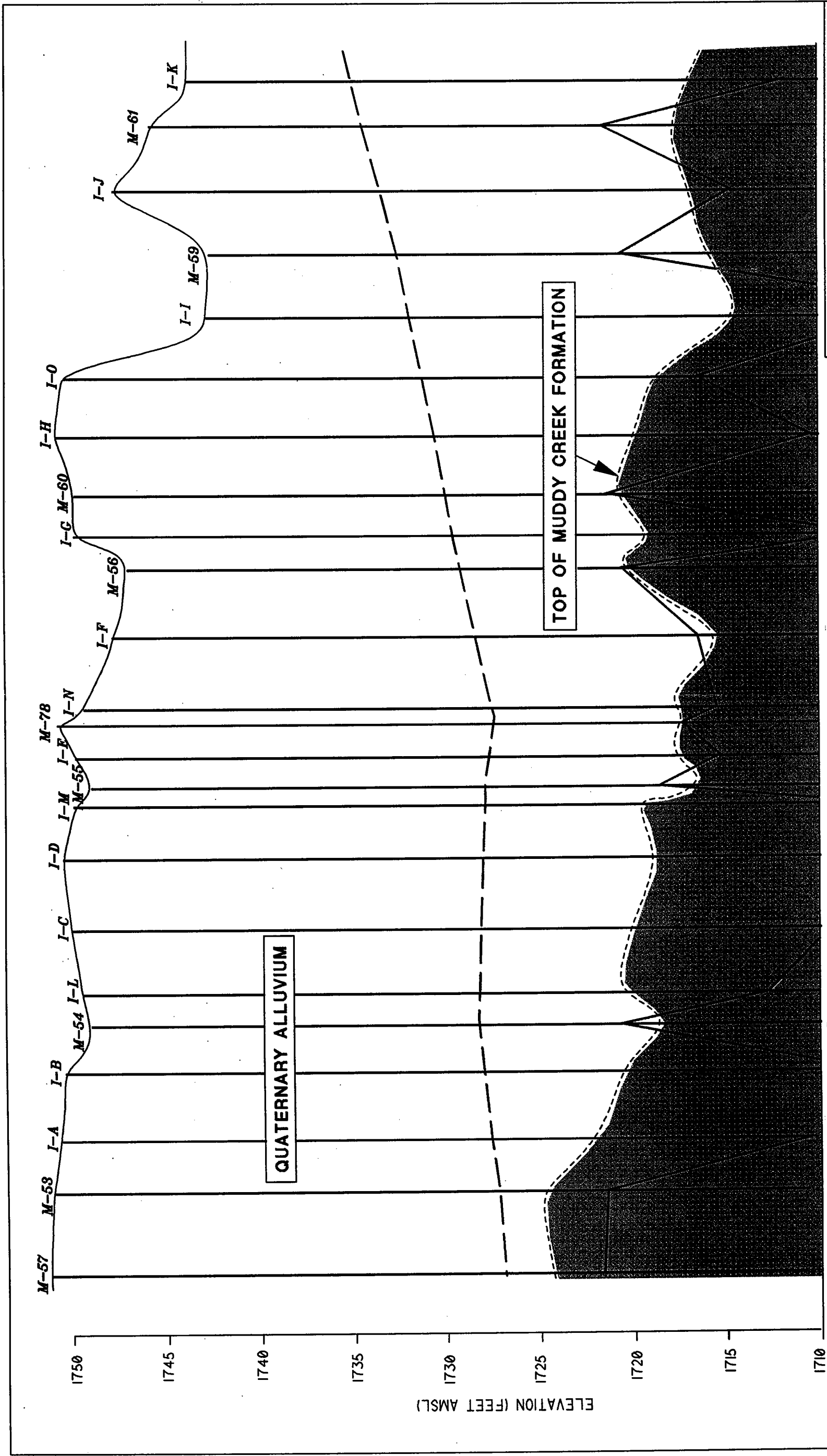


KERR-McGEE CORP. - HYDROLOGY DEPT.
KERR-McGEE CHEMICAL CORPORATION
HENDERSON, NEVADA

FIGURE: 2
CONSENT ORDER MONITORING AREA
POTENTIOMETRIC SURFACE MAP

MAP DATE: 1/96 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 SEPTEMBER 28, 1995
 ND NO DATA



**FIGURE 3
GROUNDWATER INTERCEPTOR
CROSS-SECTION - 9-28-95**

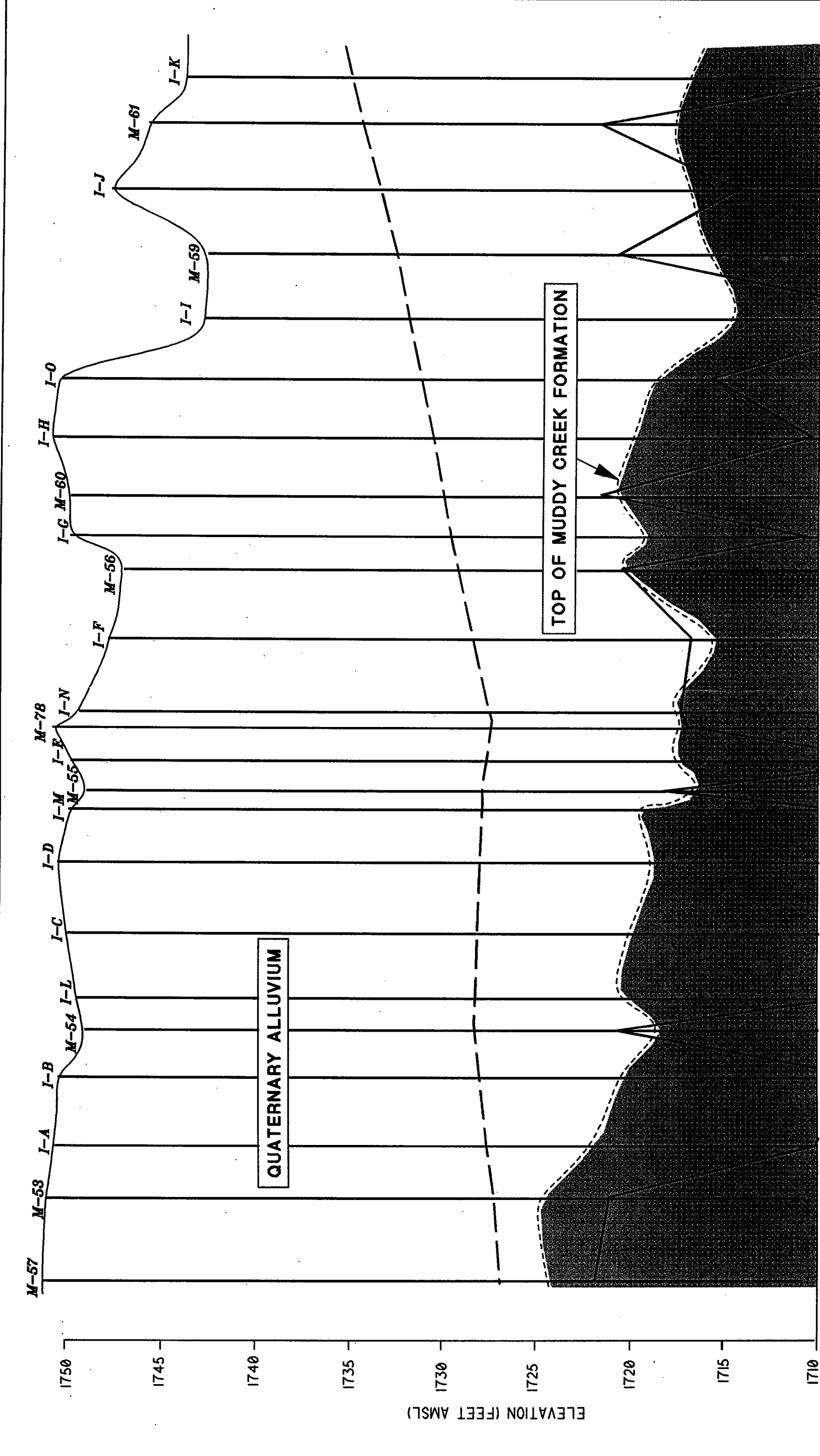
KERR-McGEE CORP. - HYDROLOGY DEPT.

**KERR-McGEE CHEMICAL CORPORATION
HENDERSON, NEVADA**

MAP DATE: 1/96 DRAWN BY: KB

0 150 FT
HORIZONTAL SCALE
VERTICAL EX. = 30

— POTENTIOMETRIC SURFACE
MEASURED ON 9-28-95
- - - STATIC WATER LEVEL
(9/14/87)



**FIGURE 5:
 GROUNDWATER INTERCEPTOR
 CROSS-SECTION - 12-12-95**

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

MAP DATE: 1/96
 DRAWN BY: KB

0 150 FT
 HORIZONTAL SCALE
 VERTICAL EX. = 30

FIGURE 6: UPGRADIENT MONITOR WELLS
KMCC HENDERSON, NEVADA FACILITY

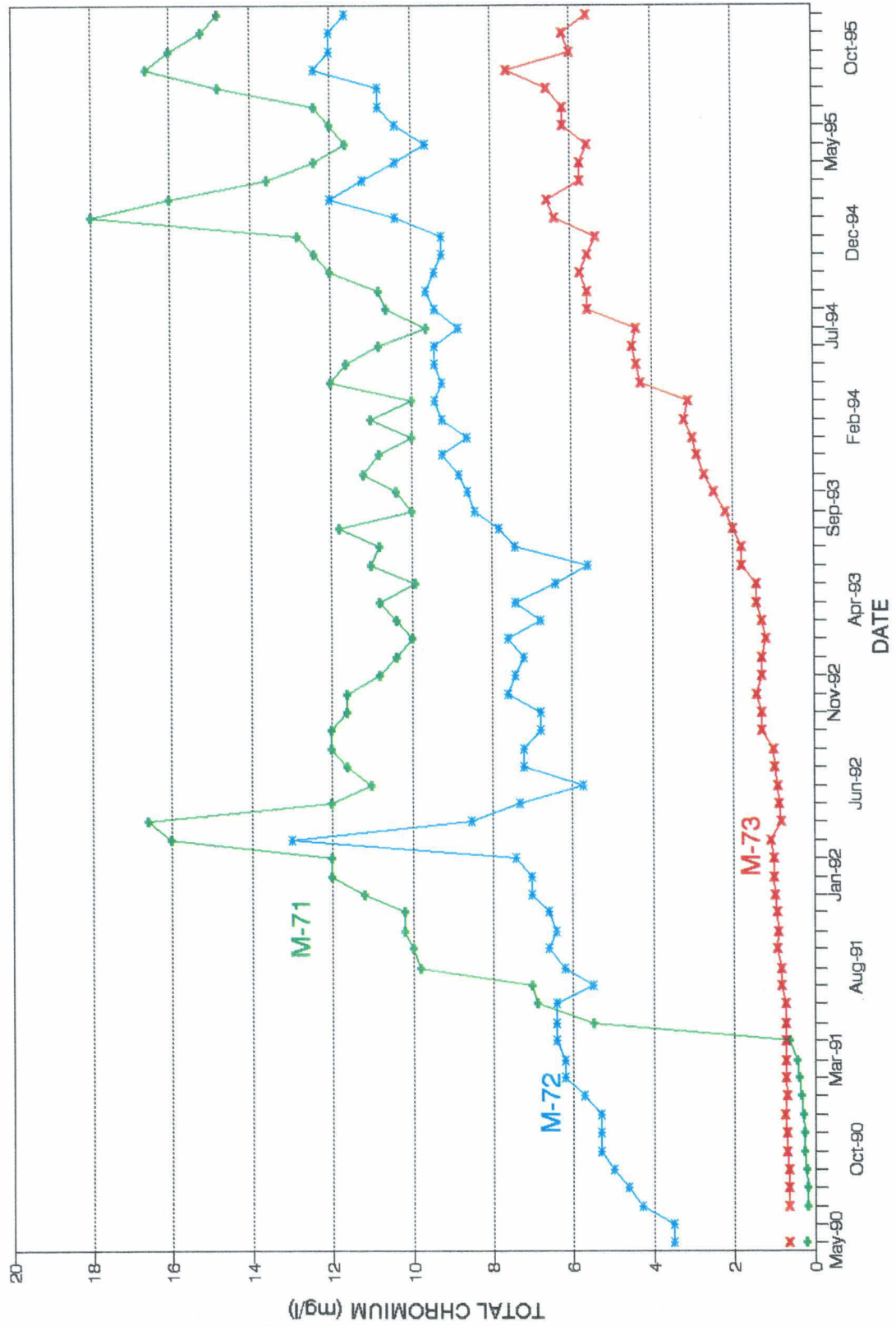


FIGURE 7: DOWNGRADIENT MONITOR WELLS
KMCC HENDERSON, NEVADA FACILITY

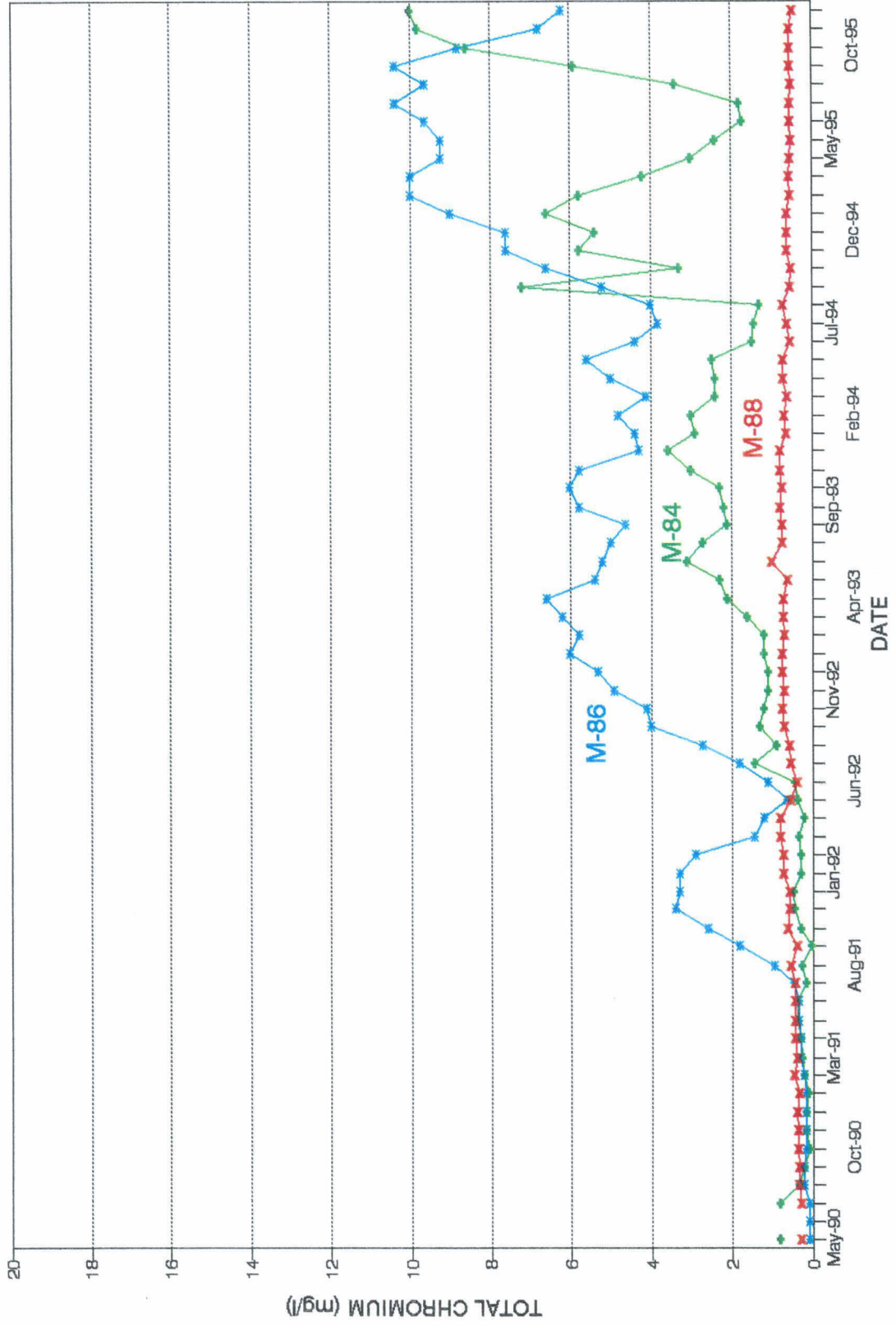


FIGURE 8
 KERR-McGEE CHEMICAL CORPORATION
 HENDERSON, NEVADA
 LOCATION OF APPENDIX J WELLS

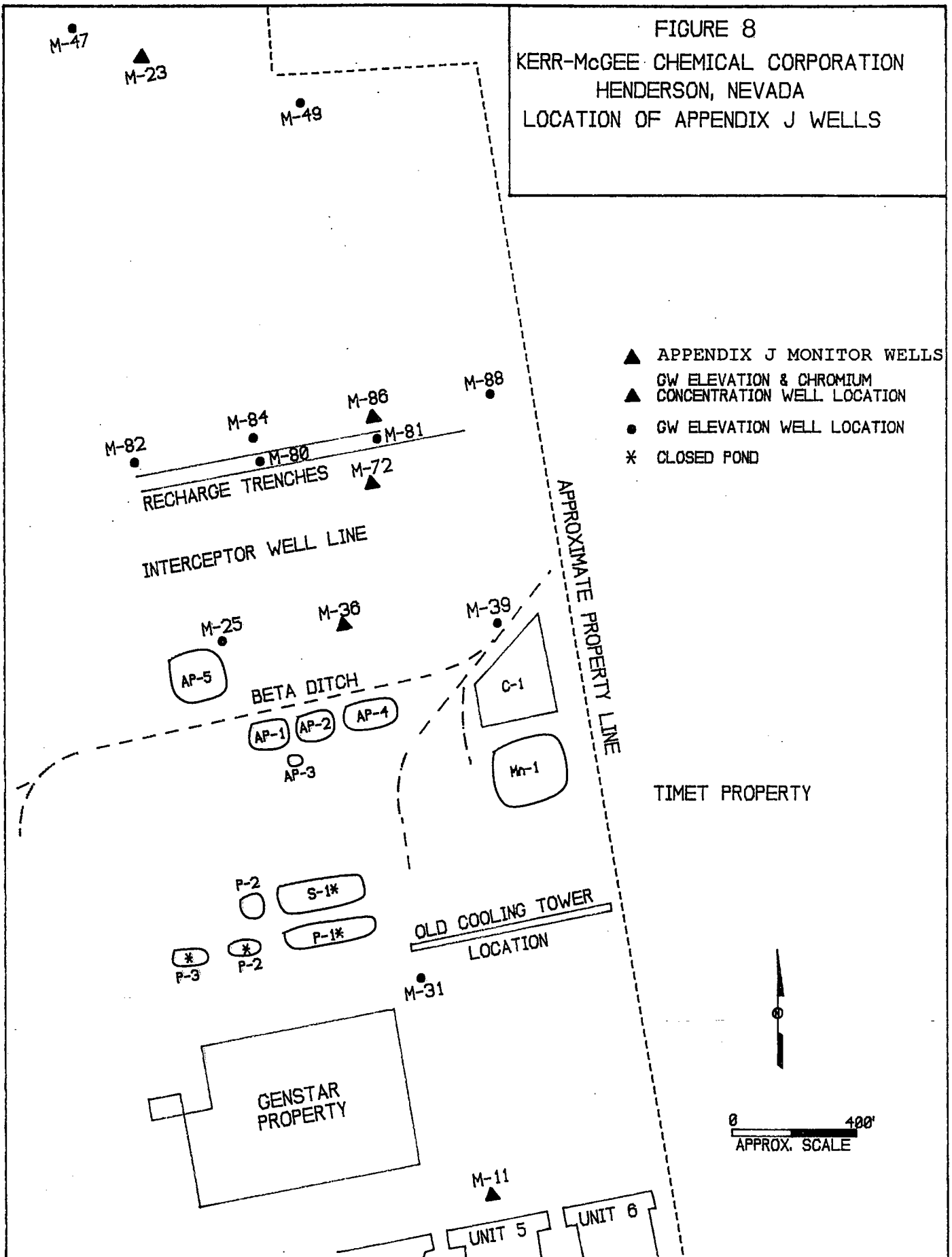


FIGURE 9: APPENDIX J WELLS
KMCC HENDERSON, NEVADA FACILITY

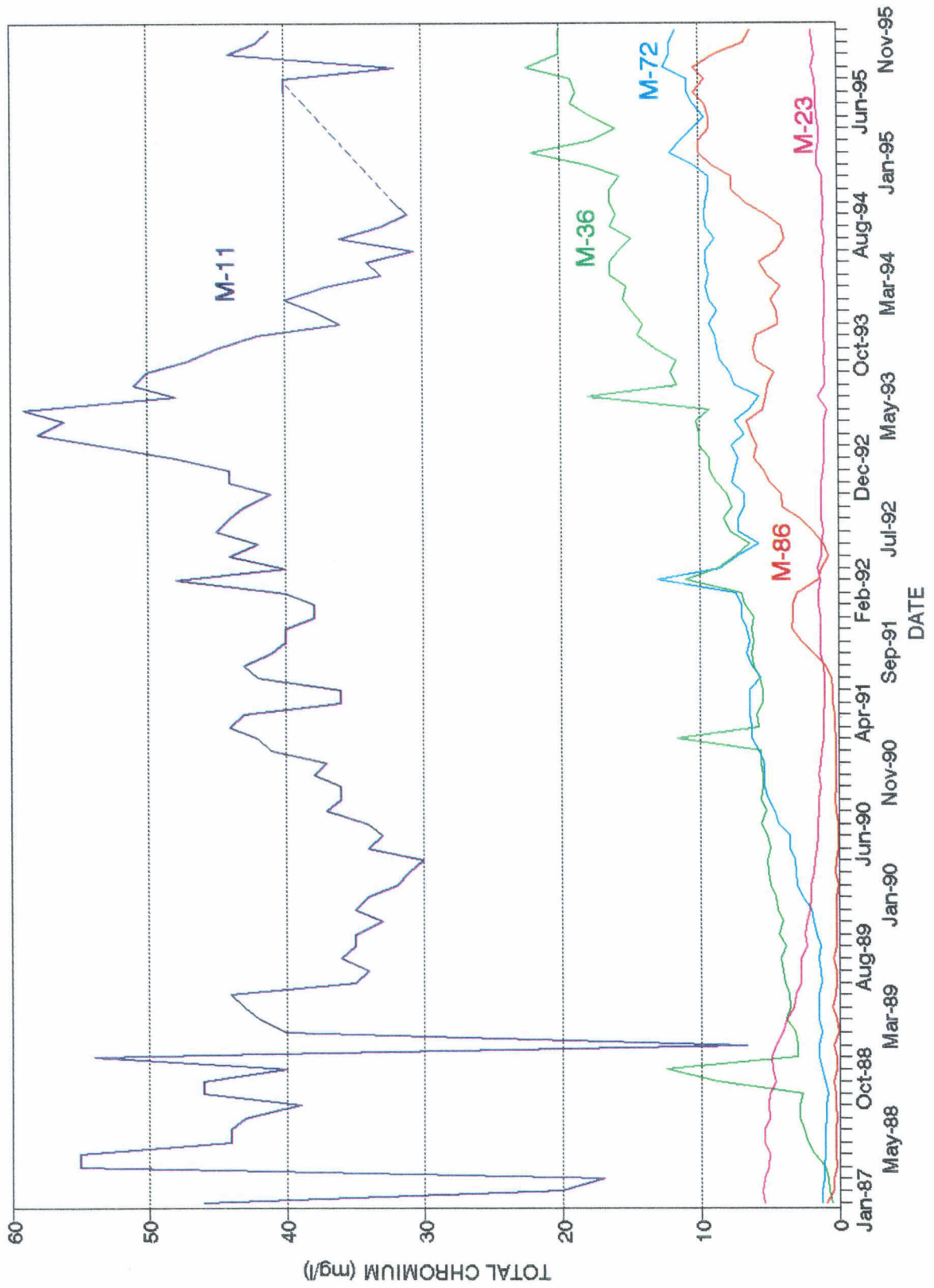
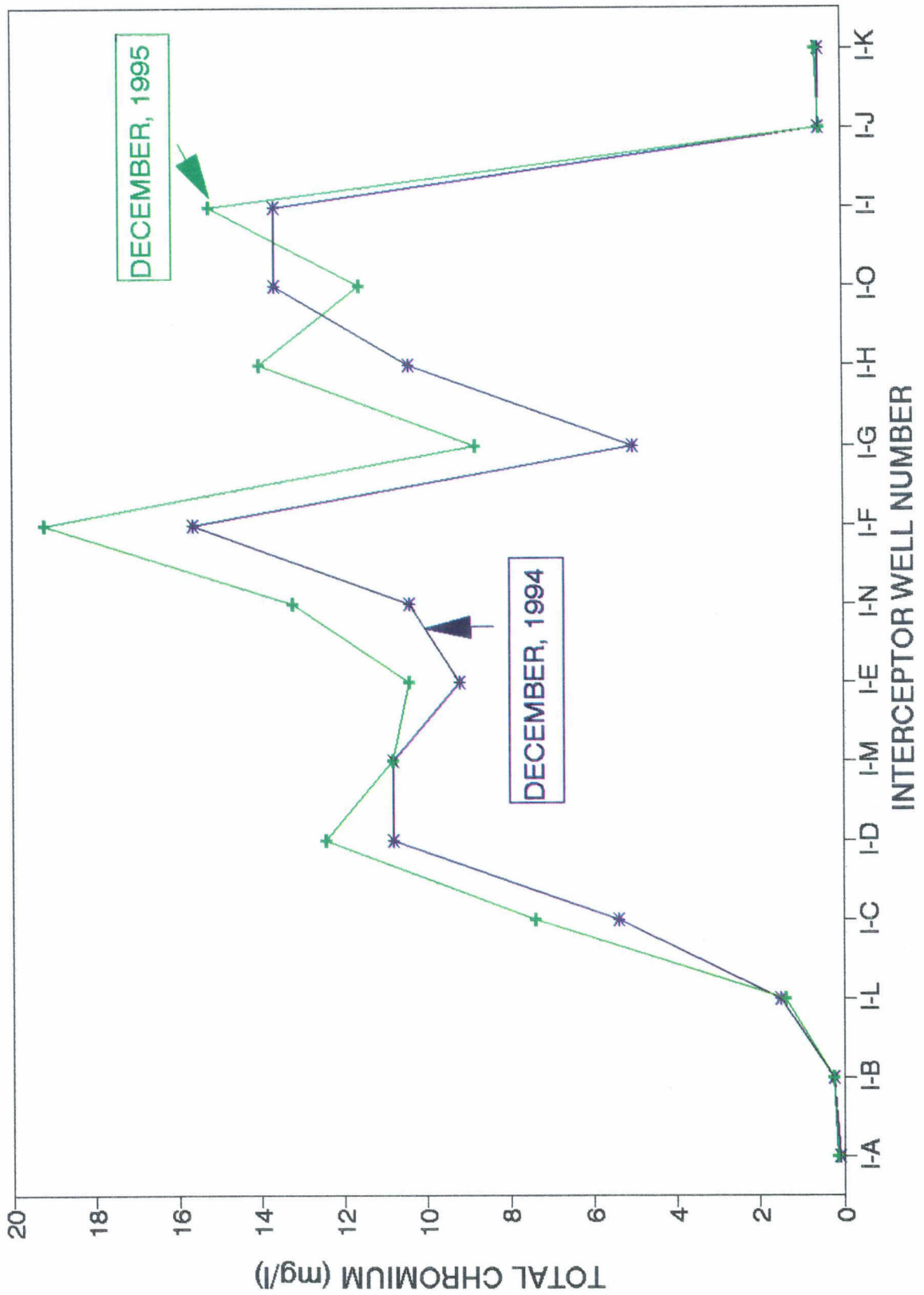


FIGURE 10: INTERCEPTOR LINE GRAPH
KMCC HENDERSON, NEVADA FACILITY



TABLES

TABLE 1

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

DATE	WELL #			
	M-71	M-73	M-84	M-88
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
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

TABLE 1(cont.)

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

DATE	WELL #			
	M-71	M-73	M-84	M-88
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
Jan-95	18.00	6.40	6.60	0.60
Feb-95	16.00	6.60	5.80	0.52
Mar-95	13.60	5.80	4.20	0.57
Apr-95	12.40	5.80	3.00	0.52
May-95	11.60	5.60	2.40	0.48
Jun-95	12.00	6.20	1.70	0.52
Jul-95	12.40	6.20	1.80	0.52
Aug-95	14.80	6.60	3.40	0.51
Sep-95	16.60	7.60	5.90	0.52
Oct-95	16.00	6.00	8.60	0.52
Nov-95	15.20	6.20	9.80	0.53
Dec-95	14.80	5.60	10.00	0.47

TABLE 2
INTERCEPTOR WELL DISCHARGE RATES
DISCHARGE RATE (GPM)

WELL #	DEC. 1990	DEC. 1991	DEC. 1992	DEC. 1993	DEC. 1994	DEC. 1995
I-A	2.1	2.5	2.4	2.7	2.7	2.2
I-B	2.0	2.0	1.9	2.2	2.3	1.6
I-C	3.8	3.8	3.8	4.0	1.1	3.1
I-D	1.2	1.0	1.0	1.0	0.7	0.9
I-E	1.2	1.4	1.0	2.0	0.8	0.8
I-F	12.6	11.7	6.2	6.3	4.2	5.2
I-G	3.1	1.1	0.3	0.3	0.2	0.5
I-H	2.0	1.4	1.2	2.1	0.7	1.0
I-I	9.5	7.1	6.7	6.5	5.8	7.0
I-J	5.8	4.6	4.5	4.5	3.9	3.8
I-K	<u>4.9</u>	<u>4.3</u>	<u>3.9</u>	<u>3.9</u>	3.0	2.4
I-L					1.7	1.4
I-M					2.7	2.8
I-N					1.7	2.9
I-O					<u>0.3</u>	<u>1.8</u>
TOTAL	48.2	40.9	32.9	35.5	31.5	40.4

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
Dec-91	38.00	1.30	6.00	7.00	3.30
Jan-92	38.00	1.40	6.80	7.00	3.30
Feb-92	40.00	1.40	7.00	7.40	2.90
Mar-92	48.00	1.30	11.00	13.00	1.40
Apr-92	40.00	1.50	8.60	8.50	1.20
May-92	44.00	1.20	7.40	7.30	0.62
Jun-92	42.00	1.20	6.40	5.70	1.10
Jul-92	45.00	1.10	7.80	7.20	1.80
Aug-92	44.00	1.20	8.20	7.20	2.70
Sep-92	43.00	1.20	7.60	6.80	4.00
Oct-92	41.00	1.20	8.00	6.80	4.10
Nov-92	44.00	1.20	8.70	7.60	4.90
Dec-92	44.00	1.10	9.20	7.40	5.30
Jan-93	48.00	1.00	9.20	7.20	6.00
Feb-93	53.00	0.99	10.00	7.60	5.80
Mar-93	58.00	0.97	10.00	6.80	6.20
Apr-93	56.00	0.98	10.20	7.40	6.60
May-93	59.00	0.82	9.20	6.40	5.40
Jun-93	48.00	1.40	18.00	5.60	5.20
Jul-93	51.00	0.87	11.60	7.40	5.00
Aug-93	50.00	0.89	12.00	7.80	4.60
Sep-93	47.00	0.93	11.60	8.40	5.80
Oct-93	45.00	0.89	13.20	8.60	6.00
Nov-93	42.00	0.98	14.40	8.80	5.80

TABLE 3(cont.)

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
Dec-93	36.00	0.94	14.00	9.20	4.30
Jan-94	38.00	0.90	14.80	8.60	4.40
Feb-94	40.00	0.88	15.40	9.20	4.80
Mar-94	37.00	0.91	15.20	9.40	4.10
Apr-94	33.00	1.00	16.40	9.20	5.00
May-94	34.00	1.10	16.40	9.40	5.60
Jun-94	30.60	1.00	15.80	9.40	4.40
Jul-94	36.00	0.90	14.80	8.80	3.80
Aug-94	33.00	1.08	16.40	9.40	4.00
Sep-94	31.00	0.96	16.00	9.60	5.20
Oct-94	32.00	1.00	16.40	9.40	6.60
Nov-94		1.10	16.40	9.20	7.60
Dec-94		1.10	15.60	9.20	7.60
Jan-95		1.40	18.00	10.40	9.00
Feb-95		1.40	22.00	12.00	10.00
Mar-95		1.30	17.60	11.20	10.00
Apr-95		1.30	16.00	10.40	9.20
May-95		1.40	17.60	9.60	9.20
Jun-95		1.50	19.20	10.40	9.60
Jul-95	40.00	1.50	18.80	10.80	10.40
Aug-95	40.00	1.60	19.20	10.80	9.60
Sep-95	32.00	1.80	22.40	12.40	10.40
Oct-95	44.00	1.60	20.00	12.00	8.80
Nov-95	42.00	1.70	20.00	12.00	6.80
Dec-95	41.00	1.80	20.00	11.60	6.20

TABLE 4
GROUNDWATER CHROMIUM TREATMENT ANALYSIS

WEEK OF	VOLUME TREATED (M gal)	TREATED TOTAL (mg/l)	EFFLUENT HEXAVALENT (mg/l)
Jan. 2 - Jan. 8	342	0.01	0.002
Jan. 9 - Jan. 15	300	0.23	0.03
Jan. 16 - Jan. 22	355	0.74	0.01
Jan. 23 - Jan. 29	351	0.18	0.03
Jan. 1995 Average	337	0.29	0.02
Jan. 30 - Feb. 5	385	0.03	0.01
Feb. 6 - Feb. 12	405	0.12	0.01
Feb. 13 - Feb. 19	471	0.61	0.03
Feb. 20 - Feb. 26	359	0.05	0.01
Feb. 27 - Mar. 6	398	0.44	0.02
Feb. 1995 Average	404	0.25	0.02
Mar. 7 - Mar. 12	444	0.21	0.03
Mar. 13 - Mar. 19	413	0.40	0.01
Mar. 20 - Mar. 26	412	0.29	0.02
Mar. 27 - Apr. 2	426	0.08	0.01
Mar. 1995 Average	424	0.25	0.02
Apr. 3 - Apr. 9	329	0.16	0.01
Apr. 10 - Apr. 16	430	0.02	0.01
Apr. 17 - Apr. 23	397	0.26	0.05
Apr. 24 - Apr. 30	471	0.06	0.01
Apr. 1995 Average	407	0.13	0.02
May 1 - May 7	434	0.81	0.05
May 8 - May 14	425	0.78	0.05
May 15 - May 21	432	0.29	0.02
May 22 - May 28	509	0.07	0.01
May 1995 Average	450	0.49	0.03
May 29 - Jun. 4	377	0.22	0.03
Jun. 5 - Jun. 11	419	0.19	0.04
Jun. 12 - Jun. 18	411	0.59	0.04
Jun. 19 - Jun. 25	407	0.74	0.02
Jun. 26 - Jul. 2	421	0.14	0.04
Jun. 1995 Average	407	0.38	0.03

(Note: average feed chromium to treatment system January - June, 1995: 8.2 mg/l)

TABLE 4 (cont.)
GROUNDWATER CHROMIUM TREATMENT ANALYSIS

WEEK OF	VOLUME TREATED (M gal)	TREATED TOTAL (mg/l)	EFFLUENT HEXAVALENT (mg/l)
Jul. 2 - Jul. 8	423	0.16	0.002
Jul. 9 - Jul. 15	394	0.19	0.05
Jul. 16 - Jul. 22	372	0.02	0.003
Jul. 23 - Jul. 29	398	0.01	0.006
Jul. 1995 Average	396	0.10	0.02
Jul. 30 - Aug. 5	331	0.02	0.002
Aug. 6 - Aug. 12	398	1.02	0.05
Aug. 13 - Aug. 19	381	0.04	0.03
Aug. 20 - Aug. 26	396	0.46	0.03
Aug. 27 - Sep. 2	451	0.35	0.03
Aug. 1995 Average	391	0.38	0.03
Sep. 3 - Sep. 9	367	1.70	0.01
Sep. 10 - Sep. 16	426	0.32	0.002
Sep. 17 - Sep. 23	386	0.19	0.02
Sep. 24 - Sep. 30	399	0.09	0.02
Sep. 1995 Average	394	0.16	0.01
Oct. 1 - Oct. 7	380	0.12	0.02
Oct. 8 - Oct. 14	376	1.69	0.003
Oct. 15 - Oct. 21	362	0.12	0.01
Oct. 22 - Oct. 28	335	0.16	0.01
Oct. 29 - Nov. 4	401	0.01	0.001
Oct. 1995 Average	370	0.42	0.01
Nov. 5 - Nov. 11	428	0.03	0.03
Nov. 12 - Nov. 18	310	0.04	0.01
Nov. 19 - Nov. 25	405	0.06	0.01
Nov. 26 - Dec. 2	400	0.05	0.003
Nov. 1995 Average	385	0.05	0.01
Dec. 3 - Dec. 9	378	0.04	0.01
Dec. 10 - Dec. 16	384	0.04	0.002
Dec. 17 - Dec. 23	459	0.47	0.03
Dec. 24 - Dec. 30	387	0.05	0.004
Dec. 1995 Average	402	0.15	0.01

(Note: average feed chromium to treatment system July - December, 1995: 9.9 mg/l)

APPENDICES

APPENDIX A
GROUNDWATER ELEVATIONS

KERR-McGEE CHEMICAL CORPORATION
 HENDERSON, NEVADA FACILITY
 GROUNDWATER ELEVATIONS

TOC-->	M-11 1813.46 DTW ELEV.	M-14 1758.83 DTW ELEV.	M-15 1749.69 DTW ELEV.	M-17 1769.54 DTW ELEV.	M-18 1738.28 DTW ELEV.	M-19 1766.55 DTW ELEV.	M-22R 1758.68 DTW ELEV.	M-23 1712.78 DTW ELEV.	M-25 1758.15 DTW ELEV.	M-27 1740.16 DTW ELEV.								
22-Jun-93	44.45	1769.01	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	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	32.95	1717.34	35.05	1734.49	21.85	1716.43	32.90	1733.64	30.00	1728.35	20.90	1691.88	33.45	1724.70	25.70	1714.77
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			32.80	1733.74	29.85	1728.50	21.15	1691.63	33.30	1724.85		
21-Mar-94	42.45	1771.01	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		
23-Jun-94	42.50	1770.96	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	-DRY-	
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	out	
30-Sep-94	42.90	1770.56	32.15	1717.54	34.65	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	out	
16-Nov-94	out				34.80	1734.74			34.00	1732.54	out	out	22.00	1690.78	33.80	1724.35		
02-Dec-94	42.65	1770.81	33.55	1716.14	34.65	1734.89	22.50	1715.78	34.50	1732.04	30.10	1728.25	22.00	1690.78	33.45	1724.70		
27-Jan-95	out				34.20	1735.34			33.90	1732.64	29.15	1729.20	21.90	1690.88	33.00	1725.15		
16-Feb-95	out				33.60	1735.94			34.00	1732.54	28.80	1729.55	21.75	1691.03	33.50	1724.65	25.90	1714.57
22-Mar-95	42.65	1770.81	32.00	1717.69	33.50	1736.04	22.15	1716.13	34.00	1732.54	28.75	1729.60	21.80	1690.98	32.75	1725.40		
25-Apr-95	out				33.50	1736.04			33.30	1733.24	28.75	1729.60	21.85	1690.93	32.65	1725.50		
18-May-95	out				33.40	1736.14			33.25	1733.29	28.75	1729.60	21.90	1690.88	32.80	1725.35		
29-Jun-95	41.65	1771.81	31.60	1718.09	33.55	1735.99	22.00	1716.28	33.40	1733.14	28.75	1729.60	21.85	1690.93	32.80	1725.35		
19-Jul-95	42.05	1771.41			33.95	1735.59			34.00	1732.54	28.95	1729.40	21.90	1690.88	32.95	1725.20		
24-Aug-95	42.25	1771.21			34.10	1735.44			34.00	1732.54	29.05	1729.30	21.95	1690.83	33.00	1725.15		
28-Sep-95	42.20	1771.26	31.95	1717.74	34.15	1735.39	22.00	1716.28	32.90	1733.64	29.20	1729.15	22.00	1690.78	33.16	1724.99	25.65	1714.82
19-Oct-95	42.15	1771.31			34.30	1735.24			34.00	1732.54	29.30	1729.05	22.20	1690.58	33.00	1725.15		
21-Nov-95	41.90	1771.56			34.15	1735.39			34.00	1732.54	29.15	1729.20	22.00	1690.78	33.05	1725.10		
12-Dec-95	41.40	1772.06	31.60	1718.09	34.15	1735.39	21.90	1716.38	34.00	1732.54	29.15	1729.20	22.00	1690.78	33.05	1725.10	25.80	1714.36

KERR-McGEE CHEMICAL CORPORATION
HENDERSON, NEVADA FACILITY
GROUNDWATER ELEVATIONS

TOC ->	M-31 DTW ELEV.	M-36 1757.94 DTW ELEV.	M-37 1759.28 DTW ELEV.	M-38 1757.88 DTW ELEV.	M-39 1759.31 DTW ELEV.	M-47 1716.51 DTW ELEV.	M-49 1718.78 DTW ELEV.	M-53 1751.56 DTW ELEV.	M-54 1748.93 DTW ELEV.	M-55 1749.35 DTW ELEV.
01-Jun-93	41.10	32.20	31.09	30.88	30.45	18.33	18.43	29.56	26.69	29.30
28-Jul-93	40.70	32.20			30.70	18.65				
31-Aug-93	41.20	32.40			31.10	18.80				
23-Sep-93	41.15	32.20	31.20	31.20	30.95	18.90	19.00	28.85	26.80	30.45
27-Oct-93	41.20	32.25			31.10	19.00				
18-Nov-93	41.20	32.20	31.50	31.25	31.65	19.10	19.40	30.00	27.80	30.50
15-Dec-93	40.15	32.30			31.15	19.35	19.55			
14-Jan-94	40.00	32.30			31.20	19.35				
22-Feb-94	39.65	32.10			31.10	19.55				
21-Mar-94	39.70	32.40	31.45	31.00	31.00	19.60	19.85	30.50	28.00	30.75
26-Apr-94	39.35	32.40			31.00	19.75				
19-May-94	39.55	32.50			30.70	19.80	20.00	30.50	28.00	30.70
23-Jun-94	39.70	32.50	31.00	30.65	30.45	19.80				
20-Jul-94	39.30	32.80			30.95	19.95				
23-Aug-94	39.00	32.80			31.05	20.00				
30-Sep-94	38.55	32.90	31.10	30.65	31.15	20.20	20.00	30.50	28.00	30.75
18-Oct-94	38.00	32.00			31.00	20.30				
16-Nov-94	37.95	32.00			31.00	20.40				
02-Dec-94	37.40	31.75	31.67	31.10	30.95	20.35	20.45	29.85	27.85	31.60
27-Jan-95	36.30	32.50			30.30	20.20				
16-Feb-95	36.30	32.60			29.80	20.00				
22-Mar-95	36.50	32.60	30.70	30.60	29.90	19.15	20.30	29.80	27.30	30.10
25-Apr-95	33.60	32.60			29.80	20.25				
18-May-95	33.60	32.60			29.75	20.30				
29-Jun-95	37.75	31.30	31.00	30.70	29.85	20.30	20.20	29.75	26.80	29.60
19-Jul-95	38.70	31.90			30.00	20.35				
24-Aug-95	38.60	38.60			30.15	20.40	20.30	30.06	28.25	30.65
28-Sep-95	38.90	38.90	31.00	30.85	30.30	20.50	20.30	30.06	28.25	30.65
19-Oct-95	39.20	31.35			30.40	20.60				
21-Nov-95	37.20	31.35	31.20	30.80	30.25	20.80	20.30	30.50	28.15	31.00
12-Dec-95	37.60	31.35			30.30	20.65				

KERR-McGEE CHEMICAL CORPORATION
HENDERSON, NEVADA FACILITY
GROUNDWATER ELEVATIONS

TOC-->	M-66	M-67	M-68	M-69	M-70	M-71	M-72	M-73	M-74	M-78
	1752.33	1744.98	1747.44	1748.77	1746.96	1745.88	1745.49	1740.05	1743.42	1751.01
	DTW	DTW	DTW	DTW	DTW	DTW	DTW	DTW	DTW	DTW
	ELEV.	ELEV.	ELEV.	ELEV.	ELEV.	ELEV.	ELEV.	ELEV.	ELEV.	ELEV.
01-Jun-93	30.12	20.70	23.58	27.49	26.34	29.20	25.72	20.07	22.52	30.33
28-Jul-93		20.85	23.00			29.70	26.90	19.95		
31-Aug-93		21.10	24.00			29.85	27.10	20.30		
27-Sep-93	30.65	21.15	23.20	26.35	27.95	30.00	26.10	20.40	23.15	34.30
23-Oct-93		21.40	23.80			30.35	26.30	20.60		
18-Nov-93		22.65	23.55			30.20	27.20	20.60		
15-Dec-93	30.80	21.40	23.50	28.70	28.10	30.40	26.35	20.75	24.40	34.40
14-Jan-94		21.50	23.60			30.45	27.60	20.80		
22-Feb-94		21.45	23.70			30.70	26.60	20.80		
21-Mar-94	30.70	21.40	23.30	29.45	28.50	30.50	26.55	20.80	23.50	34.70
26-Apr-94		21.40	23.50			30.35	26.55	20.85		
19-May-94		21.35	23.50			31.55	26.65	20.95		
23-Jun-94	30.40	21.15	23.45	29.70	28.70	30.40	26.40	20.80	23.45	34.40
20-Jul-94		21.40	23.65			30.50	26.55	21.00		
23-Aug-94		21.70	23.75			30.50	26.65	21.00		
30-Sep-94	30.50	21.55	23.65	29.70	28.70	31.10	27.40	21.10	23.50	34.60
18-Oct-94		21.60	23.55			31.40	26.95	21.20		
16-Nov-94		21.50	23.65			31.40	26.90	21.20		
02-Dec-94	30.80	21.50	23.65	27.95	28.80	31.50	27.05	21.20	23.75	35.40
27-Jan-95		21.05	22.65			31.35	26.65	21.00		
16-Feb-95		21.00	22.90			30.90	26.75	20.85		
22-Mar-95	30.10	20.90	23.00	28.55	26.80	30.00	26.40	20.50	23.25	34.00
25-Apr-95		20.75	22.70			29.15	26.30	20.70		
18-May-95		20.80	22.80			29.75	26.15	20.60		
29-Jun-95	30.00	20.85	22.90	27.35	26.60	29.40	26.25	20.70	23.20	33.80
19-Jul-95		21.00	22.90			30.00	26.30	20.70		
24-Aug-95		21.00	23.00			28.60	26.00	20.65		
28-Sep-95	30.35	21.10	23.20	29.00	28.10	28.00	26.30	20.75	23.30	33.80
19-Oct-95		21.10	23.30			27.90	26.40	20.65		
21-Nov-95		21.50	23.40			27.80	25.90	20.55		
12-Dec-95	30.30	21.60	23.20	29.80	28.50	28.00	25.30	20.50	23.15	34.00

KERR-McGEE CHEMICAL CORPORATION
HENDERSON, NEVADA FACILITY
GROUNDWATER ELEVATIONS

TOC-->	M-79 1742.93 DTW ELEV.	M-80 1745.73 DTW ELEV.	M-81 1743.73 DTW ELEV.	M-82 1739.38 DTW ELEV.	M-83 1740.83 DTW ELEV.	M-84 1739.63 DTW ELEV.	M-85 1741.19 DTW ELEV.	M-86 1742.73 DTW ELEV.	M-87 1742.27 DTW ELEV.	M-88 1737.99 DTW ELEV.
01-Jun-93	24.27	30.55	27.60	21.59	23.36	24.61	26.07	27.10	26.67	22.12
28-Jul-93	1718.66	1715.18	1716.13	1717.79	1717.47	1715.02	1715.12	1715.63	1715.60	1715.87
31-Aug-93						25.25		28.00		22.10
27-Sep-93	24.25	31.10	28.00	21.50	28.40	24.75	27.45	27.60	27.55	22.45
23-Oct-93	1718.68	1714.63	1715.73	1717.88	1712.43	1714.88	1713.74	1714.93	1714.72	1715.54
18-Nov-93						25.00		27.80		22.55
15-Dec-93	25.55	31.20	29.00	22.80	25.35	25.45	27.50	28.20	27.60	22.85
14-Jan-94	1717.38	1714.53	1714.73	1716.58	1715.48	1713.78	1713.69	1714.53	1714.67	1715.14
22-Feb-94						25.85		27.00		22.85
21-Mar-94	26.20	OUT	29.35	23.35	25.90	25.68	28.00	27.80	28.00	23.00
26-Apr-94	1716.73		1714.38	1716.03	1714.93	1713.95	1713.19	1714.23	1714.27	1714.74
19-May-94						25.70		28.50		
23-Jun-94	26.60	31.50	29.00	23.75	26.20	25.25	27.55	28.20	28.00	23.40
20-Jul-94	1716.33	1714.23	1714.73	1715.63	1714.63	1714.38	1713.64	1714.53	1714.27	1714.59
23-Aug-94						25.50		28.10		23.45
30-Sep-94	26.80	31.70	29.50	23.90	26.60	25.55	27.80	27.80	28.00	23.45
18-Oct-94	1716.13	1714.03	1714.23	1715.48	1714.23	1714.08	1713.39	1714.93	1714.27	1714.54
16-Nov-94						26.90		29.90		23.60
02-Dec-94	25.70	32.90	out	out	26.15	26.90	29.10	29.50	28.60	23.70
27-Jan-95	1717.23	1712.83	out	out	1712.53	1712.73	1712.09	1713.23	1713.67	1714.29
16-Feb-95						26.10		29.55		23.75
22-Mar-95	24.70	1716.13	out	out	1713.53	1715.08	1713.49	1713.38	1713.97	1714.34
25-Apr-95						25.70		29.35		23.55
18-May-95	21.75	1721.18	out	out	1715.33	1714.68	1714.18	1713.68	1714.27	1714.69
29-Jun-95						24.30		29.05		23.30
19-Jul-95						24.95		28.55		23.30
24-Aug-95						24.20		28.60		23.30
28-Sep-95	25.00	1717.93	26.90	22.00	25.30	24.25	25.70	28.50	27.90	23.30
19-Oct-95						1715.28		1714.13		1714.69
21-Nov-95						24.35		28.10		23.30
12-Dec-95	25.00	1716.18	25.90	22.30	25.70	24.60	25.35	27.85	27.60	23.30
	1717.93	1715.43	1716.18	1716.05	1715.13	1715.03	1715.84	1715.38	1714.67	1714.89
						24.50		26.55		23.10
						24.60		26.80		23.10

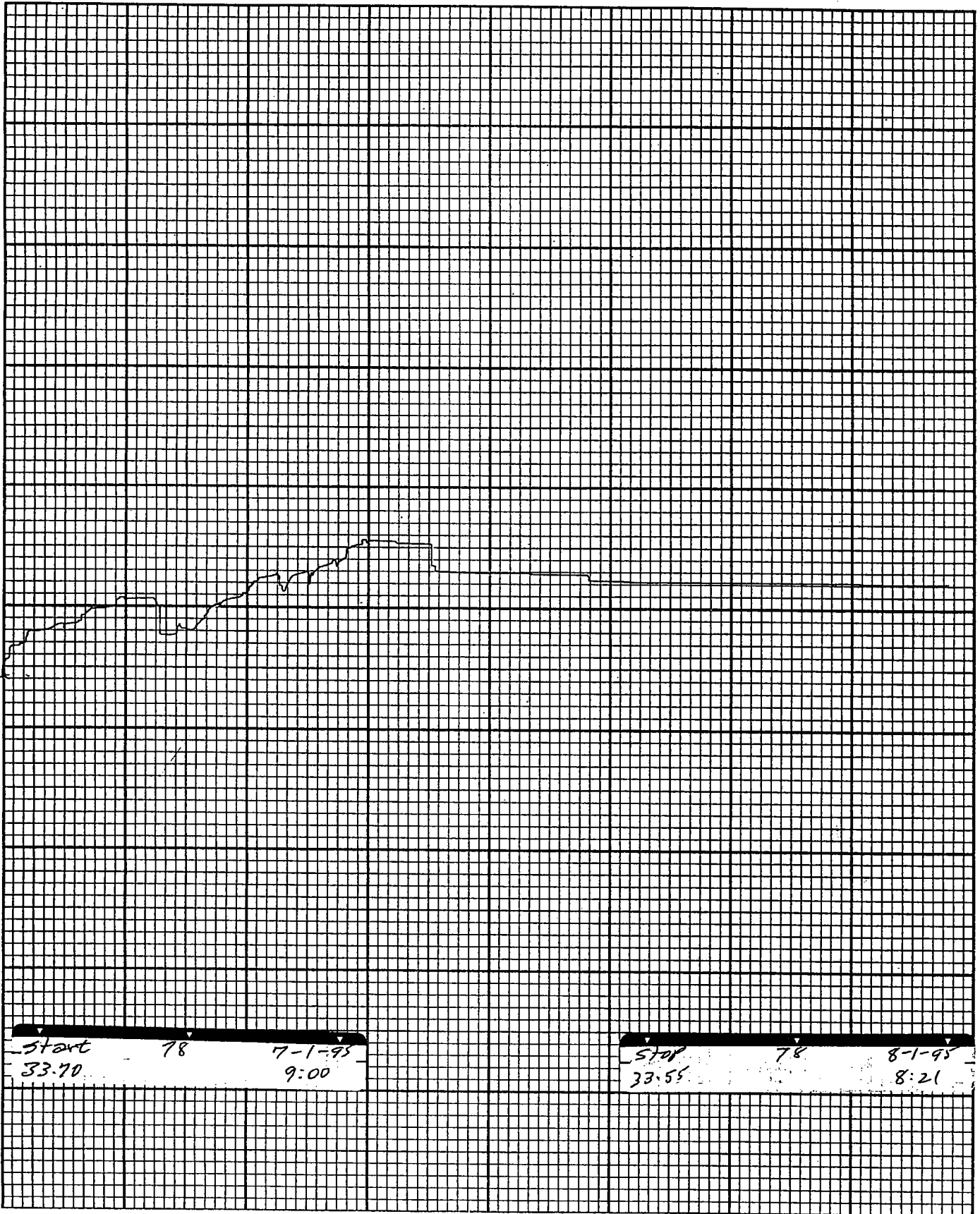
KERR-McGEE CHEMICAL CORPORATION
 HENDERSON, NEVADA FACILITY
 GROUNDWATER ELEVATIONS

TOC-->	I-A		I-B		I-C		I-D		I-E		I-F		I-G		I-H	
	DTW	ELEV.	DTW	ELEV.	DTW	ELEV.	DTW	ELEV.	DTW	ELEV.	DTW	ELEV.	DTW	ELEV.	DTW	ELEV.
22-Jun-93	36.11	1714.95	33.62	1717.07	30.35	1720.09	44.10	1706.44	32.80	1717.42	44.72	1702.86	40.10	1710.32	35.25	1715.82
28-Jul-93	40.10	1710.96	38.60	1712.09	40.40	1710.04	44.10	1706.44	39.00	1711.22	40.70	1706.88	40.10	1710.32	38.50	1712.57
31-Aug-93	42.00	1709.06	44.10	1706.59	43.90	1706.54	44.10	1706.44	37.30	1712.92	45.00	1702.58	40.60	1709.82	45.00	1706.07
23-Sep-93	41.00	1710.06	44.00	1706.69	38.10	1712.34	44.20	1706.34	37.40	1712.82	45.15	1702.43	40.55	1709.87	42.80	1708.27
27-Oct-93	41.00	1710.06	43.60	1707.09	38.90	1711.54	44.10	1706.44	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	30.60	1719.84	44.10	1706.44	32.20	1718.02	45.00	1702.58	40.60	1709.82	44.00	1707.07
15-Dec-93	42.00	1709.06	44.00	1706.69	42.00	1708.44	44.30	1706.24	44.20	1706.02	45.00	1702.58	40.00	1710.42	43.00	1708.07
14-Jan-94	41.10	1709.96	44.00	1706.69	36.00	1714.44	44.10	1706.44	43.85	1706.37	45.00	1702.58	39.00	1711.42	39.30	1711.77
22-Feb-94	32.60	1718.46	42.80	1707.89	43.30	1707.14	44.10	1706.44	44.10	1706.12	45.00	1702.58	40.60	1709.82	41.40	1709.67
21-Mar-94	41.00	1710.06	43.00	1707.69	31.20	1719.24	44.10	1706.44	42.90	1707.32	45.00	1702.58	40.60	1709.82	31.70	1719.37
26-Apr-94	41.00	1710.06	43.80	1706.89	41.80	1708.64	44.20	1706.34	44.30	1705.92	45.00	1702.58	40.60	1709.82	31.80	1719.27
19-May-94	43.00	1708.06	44.15	1706.54	33.70	1716.74	44.10	1706.44	45.15	1705.07	45.05	1702.53	40.55	1709.87	39.70	1711.37
23-Jun-94	42.00	1709.06	42.00	1708.69	36.00	1714.44	44.00	1706.54	38.30	1711.92	45.00	1702.58	40.50	1709.92	31.75	1719.32
20-Jul-94	41.10	1709.96	40.30	1710.39	38.20	1712.24	44.10	1706.44	44.00	1706.22	44.90	1702.68	40.10	1710.32	33.10	1717.97
23-Aug-94	42.10	1708.96	43.60	1707.09	44.00	1706.44	44.15	1706.39	45.10	1705.12	45.00	1702.58	40.55	1709.87	39.50	1711.57
30-Sep-94	41.00	1710.06	43.00	1707.69	33.40	1717.04	32.70	1717.84	34.60	1715.62	45.00	1702.58	40.50	1709.92	32.30	1718.77
18-Oct-94	42.00	1709.06	43.00	1707.69	32.40	1718.04	36.00	1714.54	40.00	1710.22	45.00	1702.58	41.90	1708.52	32.20	1718.87
16-Nov-94	41.00	1710.06	44.00	1706.69	32.70	1717.74	42.50	1708.04	40.00	1710.22	44.60	1702.98	39.00	1711.42	43.00	1708.07
02-Dec-94	42.00	1709.06	44.20	1706.49	32.00	1718.44	44.10	1706.44	38.70	1711.52	45.00	1702.58	40.50	1709.92	40.55	1710.52
27-Jan-95	42.00	1709.06	44.20	1706.49	36.00	1714.44	44.15	1706.39	43.40	1706.82	35.60	1711.98	42.00	1708.42	39.40	1711.67
16-Feb-95	42.00	1709.06	44.10	1706.59	35.40	1715.04	44.15	1706.39	42.50	1707.72	44.80	1702.78	39.90	1710.52	38.50	1712.57
22-Mar-95	42.00	1709.06	44.00	1706.69	43.80	1706.64	44.10	1706.44	40.40	1709.82	40.00	1707.58	40.80	1709.62	41.50	1709.57
25-Apr-95	42.00	1709.06	43.00	1707.69	31.00	1719.44	44.10	1706.44	33.00	1717.22	30.80	1716.78	30.60	1719.82	39.70	1711.37
18-May-95	42.00	1709.06	43.10	1707.59	43.90	1706.54	44.10	1706.44	32.90	1717.32	44.25	1708.33	30.85	1719.57	44.50	1706.57
29-Jun-95	40.50	1710.56	30.00	1720.69	43.10	1707.34	44.10	1706.44	32.40	1717.82	44.00	1708.58	30.85	1719.57	39.25	1711.82
19-Jul-95	41.00	1710.06	43.50	1707.19	43.90	1706.54	44.10	1706.44	34.50	1715.72	44.00	1705.58	30.80	1719.62	43.15	1707.92
24-Aug-95	41.00	1710.06	43.30	1707.39	43.85	1706.59	43.80	1706.74	33.10	1717.12	31.50	1716.08	30.85	1719.57	38.60	1712.47
28-Sep-95	41.00	1710.06	44.10	1706.59	44.00	1706.44	43.00	1707.54	34.90	1715.42	31.00	1716.58	40.60	1709.82	40.80	1710.27
19-Oct-95	42.00	1709.06	42.80	1707.89	30.90	1719.54	43.80	1706.74	34.75	1715.47	31.20	1716.38	40.10	1710.32	39.70	1711.37
21-Nov-95	41.95	1709.11	43.70	1706.99	43.70	1706.74	43.80	1706.74	34.00	1716.22	31.00	1716.58	37.70	1712.72	41.80	1709.27
12-Dec-95	41.00	1710.06	42.95	1707.74	43.80	1706.64	44.00	1706.54	44.80	1705.42	30.70	1716.88	39.80	1710.62	41.00	1710.07

APPENDIX B

CONTINUOUS WATER LEVEL RECORDER CHARTS

Stevens Water Level Recorder — Type F

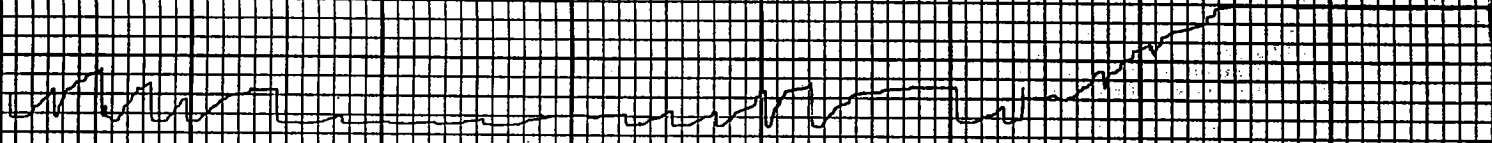


Start 78 7-1-95
33.70 9:00

Stop 78 8-1-95
33.55 8:21

Chart P-1

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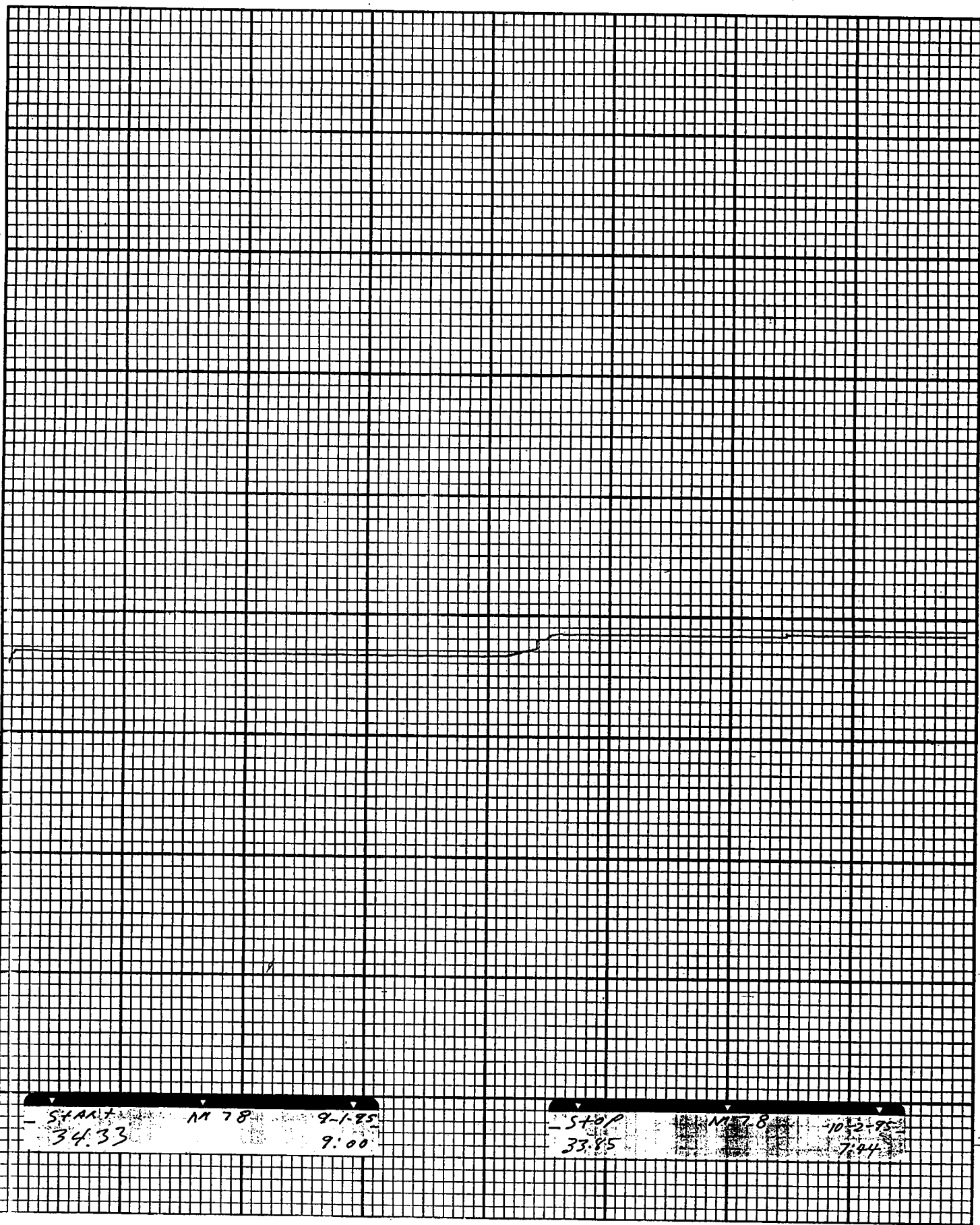
stop
33.55
M-78
8-1-95
8:22

stop
33.55
M-78

Ch

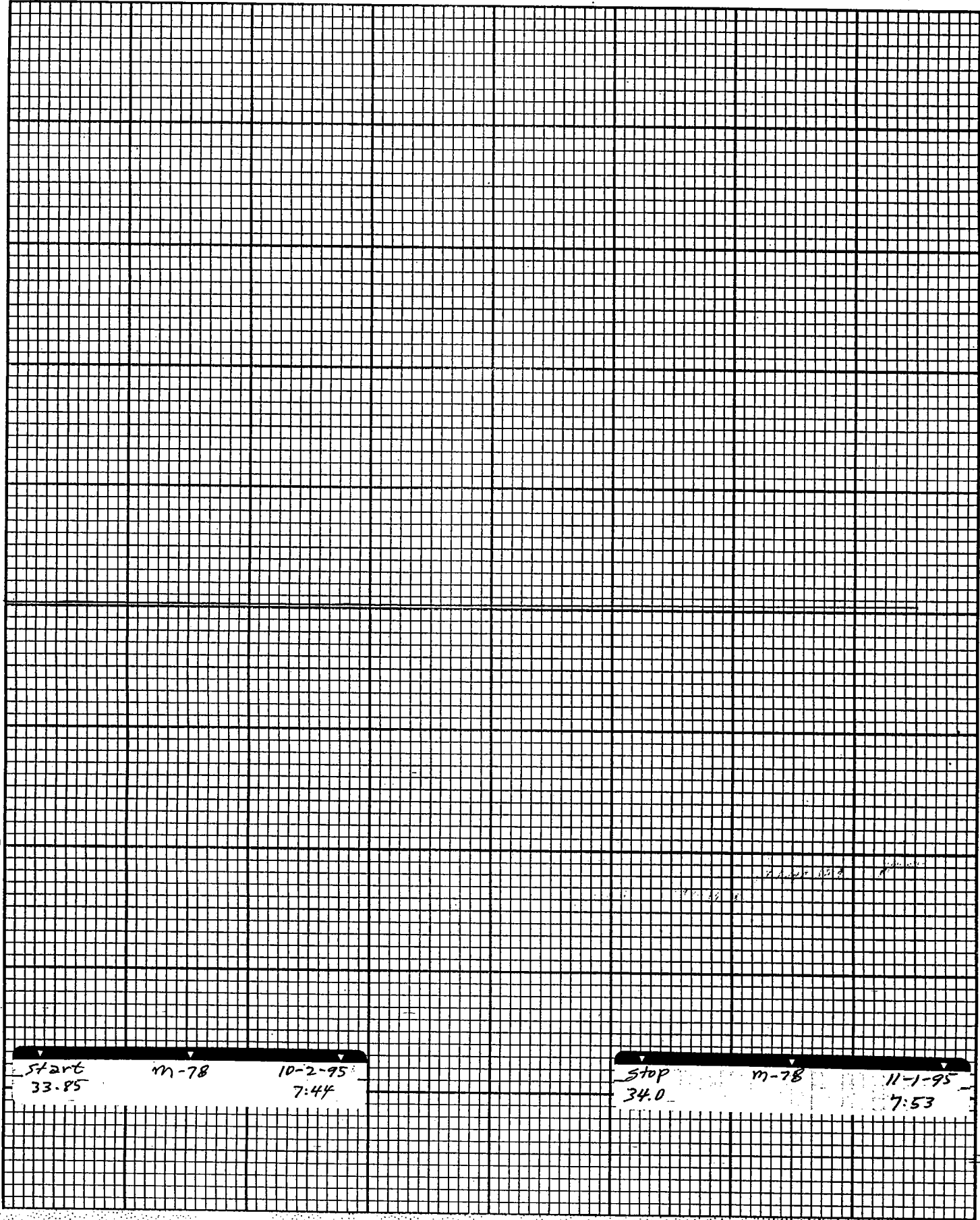
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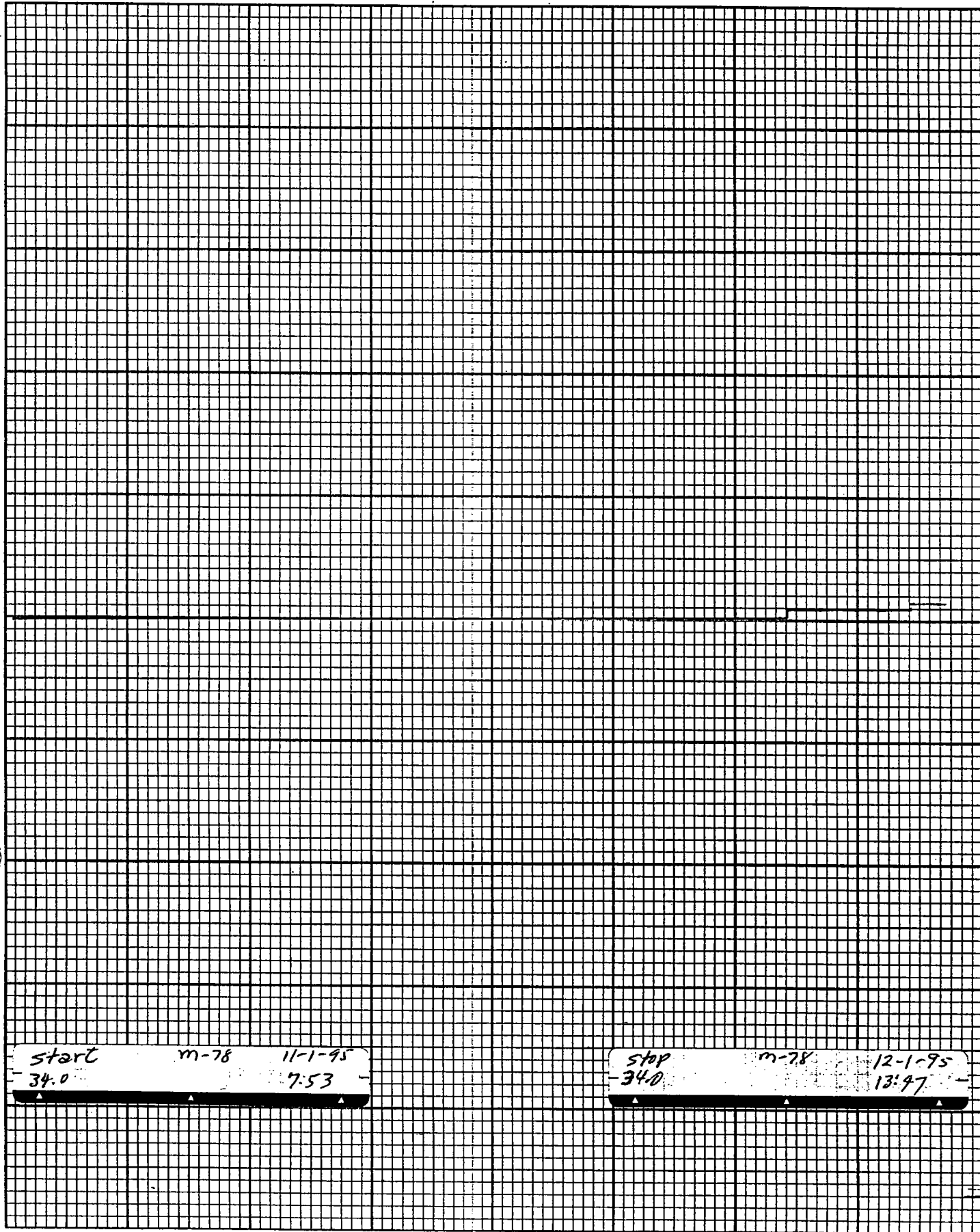
START M 78 9-1-95 9:00
34.33

STOP M 78 10-2-95 7:44
33.85



Start m-78 10-2-95
33.85 7:44

stop m-78 11-1-95
34.0 7:53



Stevens Water Level Recorder — Type F



Chart F-1

start m-78 11-1-95
34.0 7.53

stop m-78 12-1-95
34.0 13.47

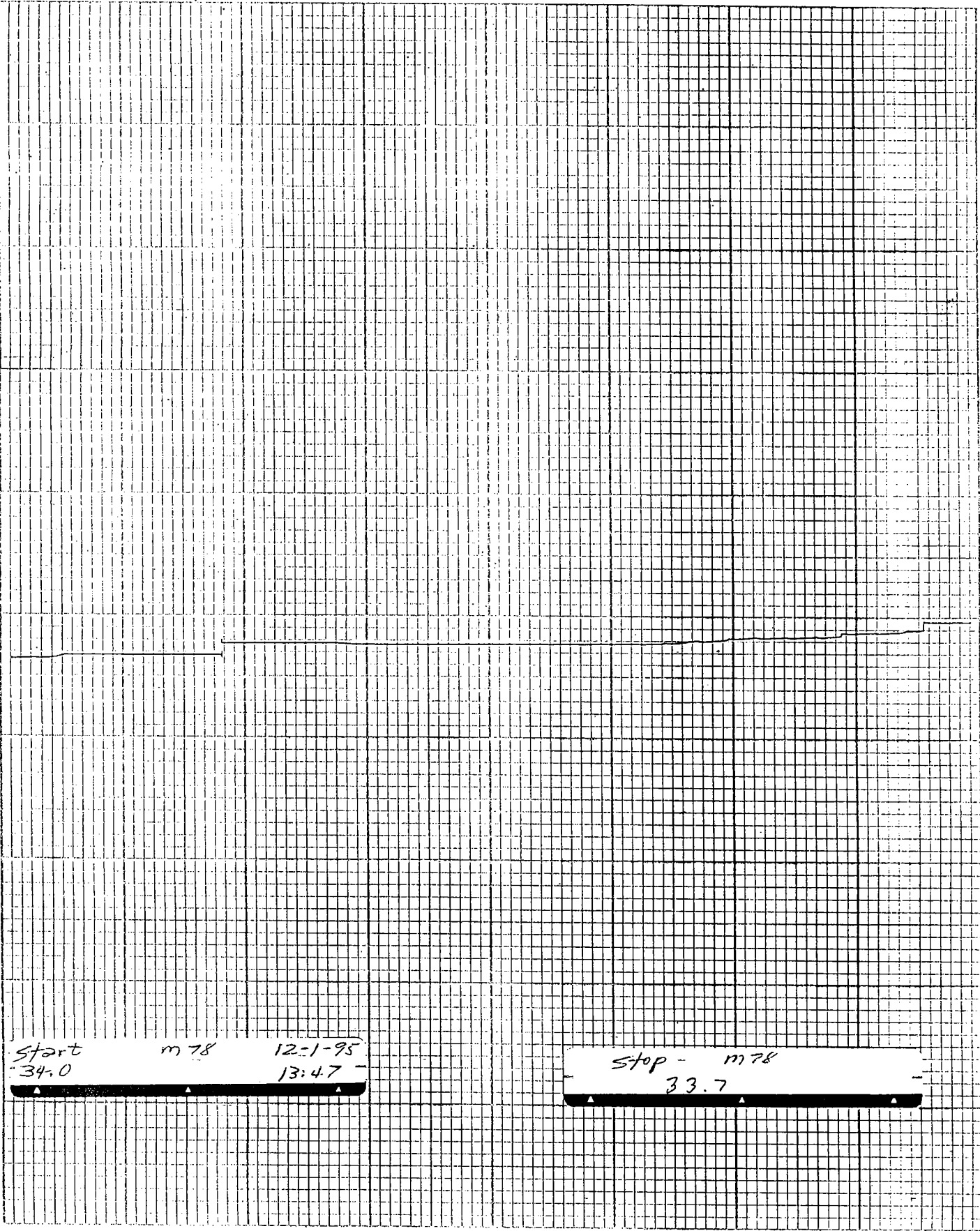
Stations West Level Barometer - Type F

(5)

Chart F-1

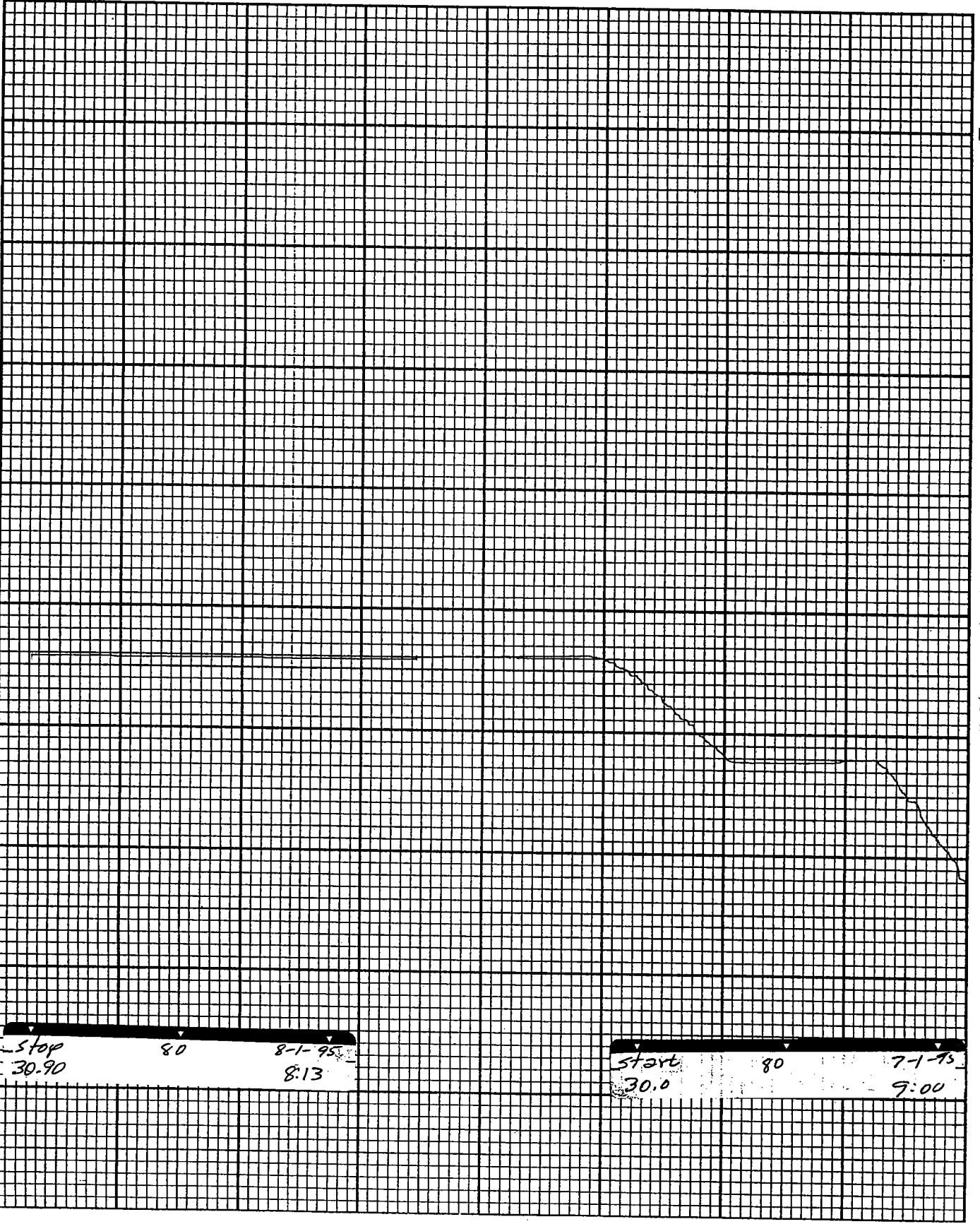
Joseph A. Stevens, Inc., Devonport, Ont.

Model No. 117



start m 78 12-1-95
34.0 13:47

stop - m 78
33.7

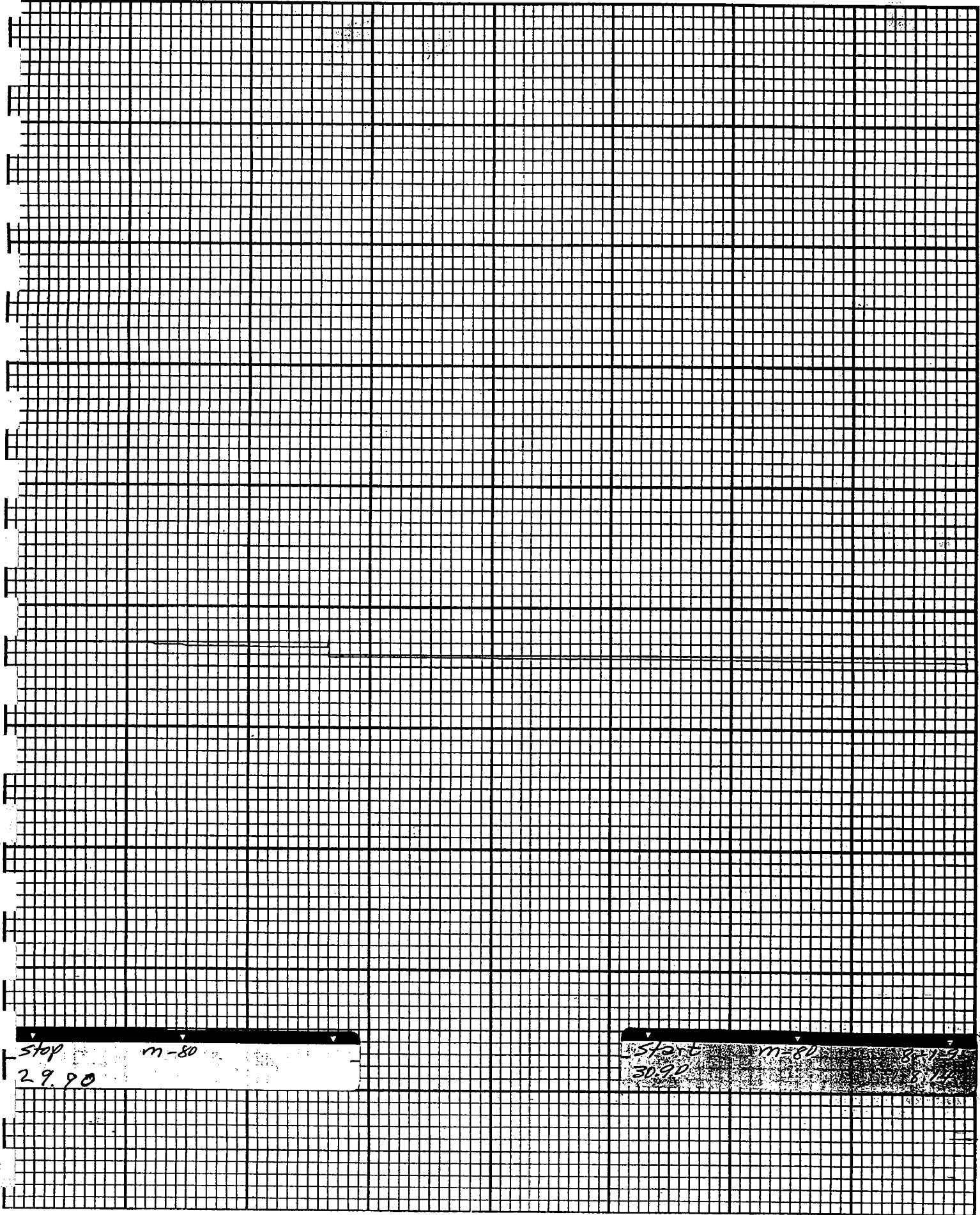


stop 80 8-1-95
30.90 8.13

start 80 7-1-95
30.0 9:00

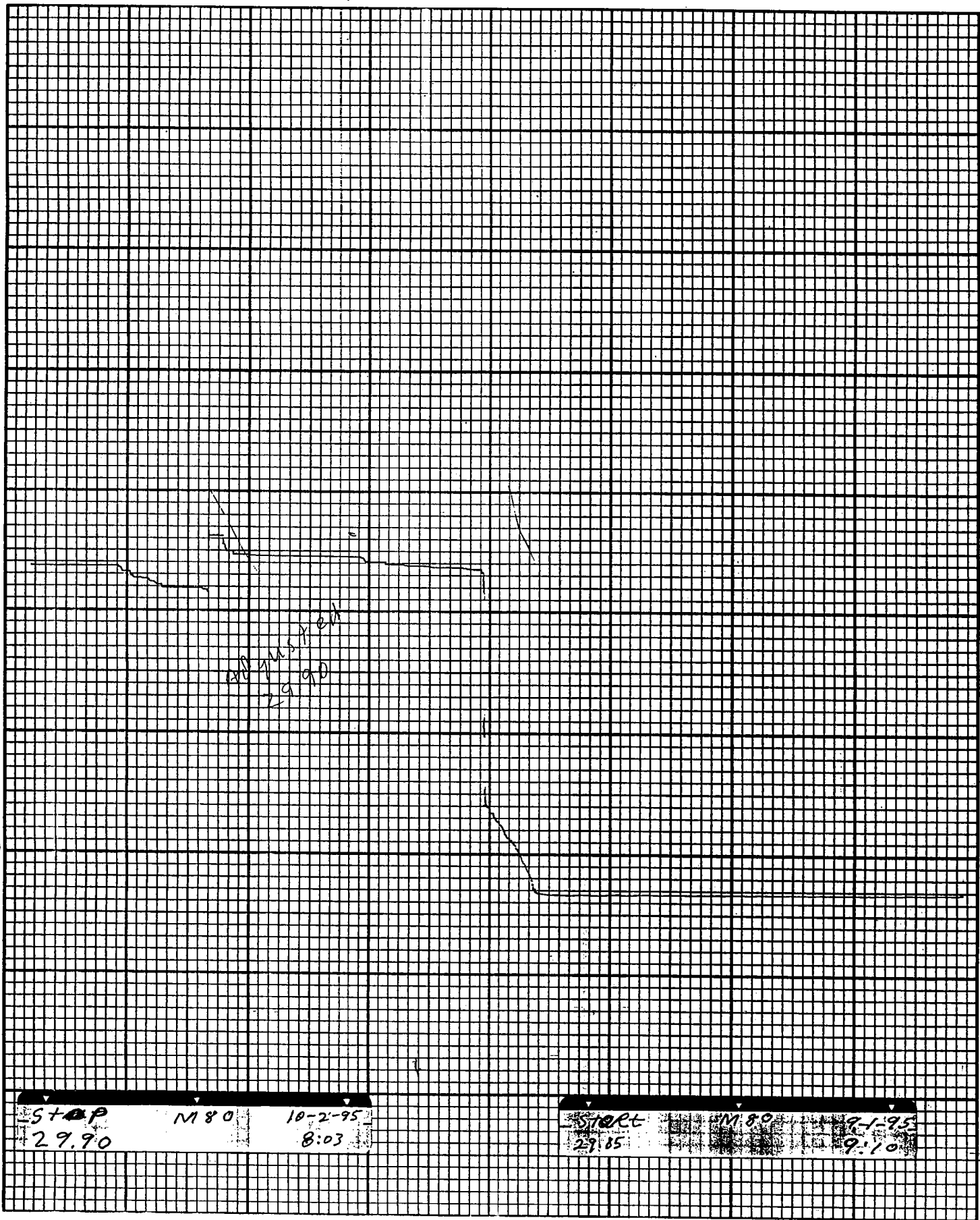
Stevens, Inc. Leupold & Stevens, Inc. Beaverton, Ore.

Printed in U.S.A.



stop m-80
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start m-80 30.90



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STOP M 80 10-2-95
 29.90 8:03

START M 80 9-1-95
 29.85 9:10



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stop m-80 10-1-95
30.0 8:03

start m-80 10-2-95
29.90 8:03

1 F.

stop	m-80	12-1-95
30.30	manual Reading/	1:55 water out

start	m-80	11-1-95
30.0		8:03

Open
30.50

stop m-80
29.9 14:00

start m-80 12-1-95
No float
30.30 manual Reading 1:55

