ANNUAL REPORT ON RESULTS OF MAMMOTH COUNTY WATER DISTRICT GROUNDWATER MONITORING PROGRAM FOR OCTOBER 1992-SEPTEMBER 1993

Prepared for
Mammoth County Water District
Mammoth Lakes, California

By
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Groundwater Quality Consultants
Fresno, California

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ANNUAL REPORT ON RESULTS OF MAMMOTH COUNTY WATER DISTRICT GROUNDWATER MONITORING PROGRAM FOR OCTOBER 1992-SEPTEMBER 1993

INTRODUCTION

In Summer 1992, the Mammoth County Water District contracted for the drilling of five new water-supply wells in Mammoth Lakes. Pumping of one of these (Well No. 15) began in Summer 1992. In December 1992, the California Department of Fish and Game filed an action against the District in Superior Court. Concerns were expressed by the Department about the potential impact of pumping of these wells on wildlife, vegetation and fishery resources of Mammoth Creek and the Hot Creek headsprings, which is located downstream of the District wells. Kenneth D. Schmidt and Associates completed a hydrogeologic evaluation (July 6, 1993) on behalf of the District, to respond to these concerns. In August 1993, a settlement agreement was made between the Department and the District. As part of this agreement, the District was to:

1. Conduct routine monitoring in all District supply and monitor wells.
2. Install a new monitor well tapping consolidated rock at a location south of the District office.
3. Conduct monitoring in the new monitor well.
4. Prepare an annual interpretive report on the results of groundwater monitoring for the 1993 water year (October 1, 1992-September 30, 1993).

Data available to the District from Wells SC-1 and SC-2 (part of the Long Valley monitoring program) were to be included in this

evaluation. This report comprises the first annual report pursuant to the settlement agreement.

During Summer 1993, a month-long aquifer test was conducted on Well No. 15, pursuant to a settlement agreement between the District and the University of California. This test focused on the potential impact of pumping the new District wells on springs and seeps at the Valentine Ecological Reserve, which is located west of the District wells. Kenneth D. Schmidt and Associates provided a report on the results of this test on November 9, 1993. That report is incorporated herein by reference.

SUMMARY AND CONCLUSIONS

The District pumped 2,306 acre-feet of water from four supply wells during the 1993 water year. A comprehensive water-level monitoring program was conducted for District supply wells and monitor wells. In addition, water-level measurements were available for two monitor wells east of the District wells. During late Summer 1993, an aquifer test was conducted on District Well No. 15, in order to determine the potential impact of pumping on springs and seeps at the Valentine Reserve.

A new monitor well was installed in consolidated rock southwest of the well field. A revised subsurface geologic cross section was prepared, and indicated that the volcanic rock and glacial till tapped by District wells extend east to SC-1 and SC-2. As one progresses easterly from the well field, however, water levels become deeper and the upper strata are not saturated.

Water levels in shallow wells tapping the uppermost glacial till strata rose during 1993, during and following significant runoff in the watershed. Groundwater is generally present in only these strata in the westerly part of the area, in the meadow and near Mammoth Creek. Water levels in monitor wells tapping the underlying consolidated rock generally stayed the same or slightly rose during the 1993 water year. In general, wells tapping shallower groundwater responded better to recharge in 1993 than those tapping deeper groundwater. A water-level elevation contour map was prepared for September 1993. This map indicates that the extent of the cone of depression due to pumping of District wells was limited in size, and did not extend beyond the well field.

The results of water quality monitoring indicate no significant changes during the water year, compared to previously.

The results of the 1992-93 monitoring indicate that District pumping did not influence Mammoth Creek streamflow or springs or seeps at the Valentine Reserve. In addition, water-level declines due to pumping did not extend beyond the well field. Thus there could be no influence on the Hot Creek headsprings, which are much more distant then the monitor wells utilized for the District monitoring program.

NEW AND MODIFIED MONITOR WELLS

Well No. 5

The driller's log for unused Well No. 5 indicated that the casing in this well was perforated both in the glacial till and

underlying fractured volcanic rock. It thus was considered to be possibly a composite well, and of questionable value for monitoring. In August 1993, Johnson Drilling Co., Inc. of Reedley modified Well No. 5 by sealing the annular space and perforations in this well opposite the uppermost glacial till. This was done by installing gravel inside the well from the bottom (357 feet) up to a depth of 112 feet. The blank casing was perforated with a down-the-hole perforator from 57 to 60 feet, and the well was pressure-grouted from 112 feet to the land surface. The cement was allowed to set up for one day. A five and one-half inch diameter hole was then drilled through the cement, and the gravel removed from the remainder of the well. The modified well (No. 5A) was then redeveloped by air-lifting.

Well No. 5M was drilled near Well No. 5A to a depth of 80 feet, in order to tap groundwater in the glacial till. Glacial till was encountered by this well to a depth of 58 feet, but no water production was indicated. Thus the hole was deepened to 80 feet. Fractured volcanic rock containing groundwater was found from 58 to 75 feet in depth. The lowest five feet of the hole encountered unfractured volcanic rock. Casing was installed to 80 feet in depth. Perforations extended from 20 to 75 feet in depth. This well was thus constructed so as to tap the shallowest groundwater at the site. It was also developed by air-lifting. Driller's logs for these wells are provided in Appendix A.

Well No. 24

During August 23-30, 1993, Johnson Drilling Co., Inc. of Reedley, constructed Monitor Well No. 24 using the casing hammer method. We logged the drill cuttings. A geologic log and the driller's log for this well are provided in Appendix A. Unconsolidated deposits (glacial till) were encountered to a depth of 68 feet, and no water production was indicated. Volcanic rock was encountered to the total depth of 450 feet. Water was encountered in fractured scoria in the interval from 415 to 436 feet in depth. The interval from 327 to 377 feet in depth was above the water table at the time of drilling, but was indicated to be a potential thief zone. The water level at the end of development (380 feet deep) was near the base of this zone. An 80-foot deep conductor casing was placed in the well. The well was cased to a depth of 430 feet, with perforations extending from 300 to 430 feet in depth. The well was also developed by air-lifting.

WELL CONSTRUCTION DATA

Figure 1 shows locations of District wells and SC-1 and SC-2. Table 1 summarizes construction data for the District supply wells. All of these wells tap consolidated rock, primarily basalt and scoria layers, and some also tap interbedded glacial till and conglomerate. Well No. 1 has been in operation the longest. Wells No. 6 and 10 have been in service since 1988, and Well No. 15 was first put in service in July 1992 on an emergency basis. None of the other District wells are in service. Wells No. 2, 3, 4, 5, and

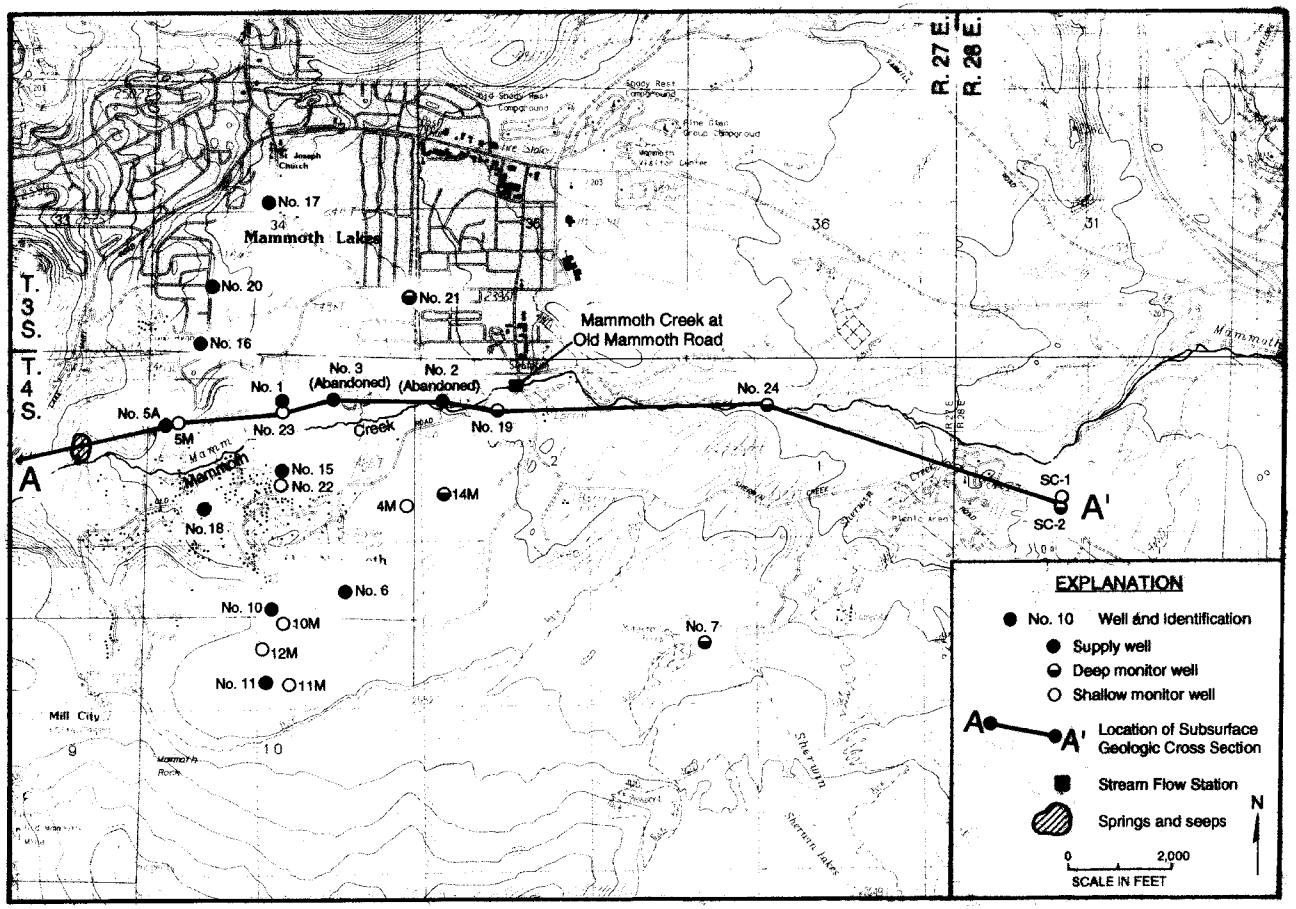


FIGURE 1 - LOCATION OF WELLS AND SUBSURFACE GEOLOGIC CROSS SECTION A-A'

TABLE 1 - CONSTRUCTION DATA FOR DISTRICT SUPPLY WELLS

Well No.	Drilled Depth (feet)	Cased Depth (feet)	Perforated or Open Interval (feet)	Annular Seal (feet)	Date Drilled
1	382	370	200-370	0-90	1976
6	670	670	146-670	0-52	11/87
10	700	700	136-700	0-52	10/87
15	720	407	407-720	0-135	8/92
16	710	156	156-710	None	8/92
17	710	513	400-710	None	7/92
18	710	60	60-710	None	8/92
20	710	147	147-710	None	9/92

7 (shown in Figure 1) were never put in service because of low well yields.

Table 2 summarizes construction data for District monitor wells. Five of these wells (No. 5A, 14M, 19, 21, and 24) are deep and primarily tap water in fractured volcanic rock. Well No. 7 is a deep well located south of the basalt flow and taps water in a glacial morraine. Well No. 11 is a deep well located south of the basalt flow and taps water in glacial till and granitic rocks. Well No. 5M taps water in the shallow fractured volcanic rock, just below the glacial till. The remaining monitor wells are shallow and tap groundwater in the uppermost glacial till.

SUBSURFACE GEOLOGIC SECTION A-A'

Cross Section A-A' was developed during a previous evaluation, and was updated (Figure 2) by adding information from Well No. 24 and more recent water-level data. The locations of wells used for this section are shown in Figure 1. Cross Section A-A' shows that the uppermost till layer and volcanic rocks are continuous along the section. Groundwater has only been found in the uppermost glacial till layer in the vicinity of District Wells No. 1, 4, 6, 10, 11, 12, and 15. Most of these wells are either in the meadow or near Mammoth Creek. Water production in most wells is from highly fractured rock, often scoria layers, and sometimes from interbedded glacial till. The intervening less fractured rock probably acts as local confining layers. At Well No. 24, water was not found in the upper part of the basalt or either of the till

TABLE 2 - CONSTRUCTION DATA FOR DISTRICT MONITOR WELLS

Well No.	Drilled Depth (feet)	Cased Depth (feet)	Perforated or Open Interval (feet)	Annular Seal (feet)	Date Drilled
4M	89	89	69-89	0-50	1984
5A	357	357	112-357	0-112	7/82 (8/93)
5M	80	80	20-75	0-20	8/93
7	480	480	290-480	0-50	8/87
10M	27	27	7-27	0-5	6/88
11	600	600	170-360	0-50	7/88
11M	43	43	5-43	0-5	6/88
12M	27	27	7-27	0-5	9/88
14M	520	501	100-310	0-100	9/88
19	700	344	200-700	0-140	8/92
21	640	145	145-640	-	10/92
22	85	85	55-85	0-25	9/92
23	65	65	30-65	0-25	9/92
24	450	430	300-450	0-20	8/93

Well No. 5 was modified in August 1983, so as to be sealed off opposite the glacial till and be perforated only opposite the volcanic rock, and re-designated Well No. 5A.

FIGURE 2 -

SUBSURFACE GEOLOGIC CROSS SECTION A-A'

(In Pocket)

layers. Water in this well was in a fractured scoria layer. The lost circulation zone just above the water level may prevent the water level from being shallower, if a thief zone is present. In September 1993, there was a fairly uniform water-level slope from Well No. 23 to No. 19 to No. 24. The water-level in Well No. 24 coincided well with that in SC-2 farther east, and indicated a relatively flat water-level slope between these two wells.

DISTRICT PUMPAGE

Pumpage records for District wells are provided in Appendix B. Table 3 shows monthly pumpage from District Wells during the 1993 water year. The total pumpage was 2,306 acre-feet. Of this, 222 acre-feet were from Well No. 1, 1,477 acre-feet were from Wells No. 6 and 10, and 606 acre-feet were from Well No. 15.

WATER LEVELS

Pumped Wells

Water-level measurements (static and pumping) for District supply wells that are in service are provided in Appendix B. Water-level hydrographs for Wells No. 1 and 6, and 10 are provided in Appendix C. Figure 3 shows a water-level and pumpage hydrograph for Well No. 15, extending back to when it was initially put in service in July 1992. The static water level fell about 80 feet after several months of pumping, and normally ranged from about 260 to 280 feet during periods when the well was being pumped.

TABLE 3 - MONTHLY PUMPAGE FROM DISTRICT WELLS (ACRE-FEET)

Month	No. 1	No. 6	No. 10	No. 15	Total
Oct 92	38.1	50.8	132.0	39.8	261
Nov	31.9	33.6	92.4	0	158
Dec	15.6	38.1	89.7	107.5	251
Jan 93	5.2	55.6	77.9	86.2	225
Feb	18.3	21.1	34.2	28.5	102
Mar	10.9	21.2	100.7	78.5	211
Apr	13.4	33.5	58.9	24.9	131
May	9.8	24.9	41.5	27.7	104
June	4.9	65.1	100.5	38.7	209
July	12.6	65.8	85.1	76.9	240
Aug	34.9	44.5	129.1	23.8	232
Sept	26.7	29.1	52.4	73.8	182
Total	222	483	994	606	2,306

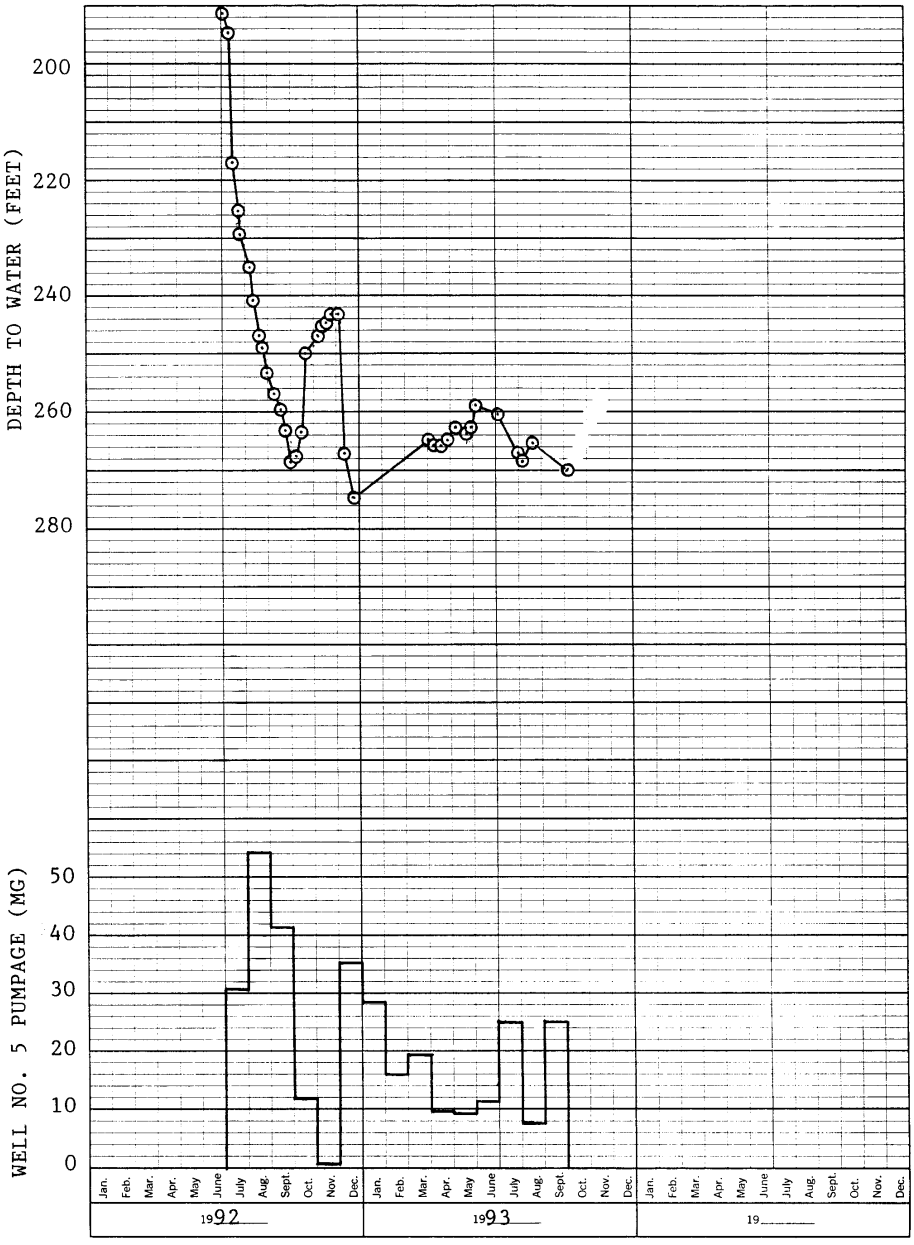


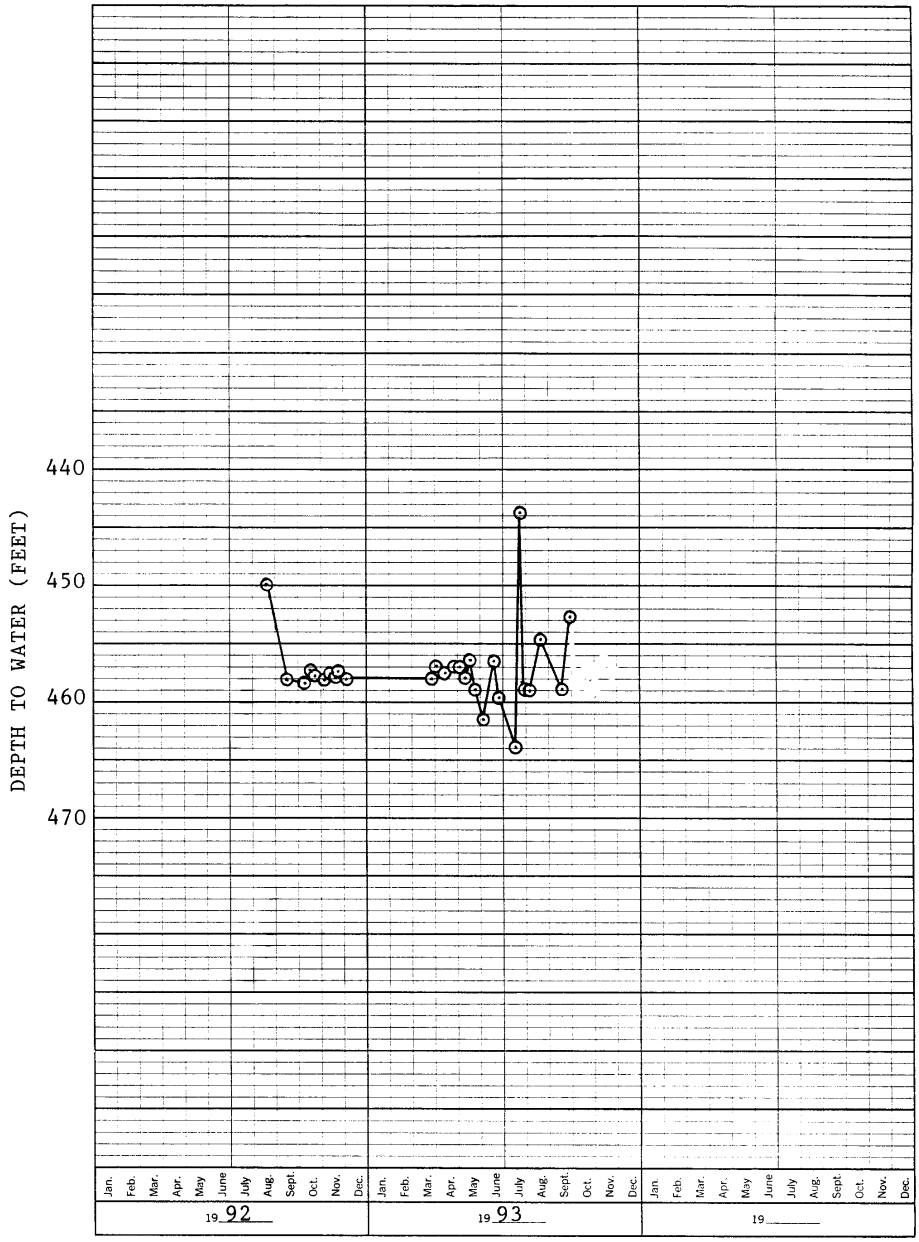
FIGURE 3 - WATER-LEVEL AND PUMPAGE HYDROGRAPH FOR WELL NO. 15

The static water level in Well No. 1 ranged from about 220 feet during low pumping periods to about 270 feet during heavy pumping periods (August 1993). The static water level in Well No. 6 ranged from about 120 feet during low pumping periods (May 1993) to more than 150 feet during heavy pumping periods (October 1992). The static water level in Well No. 10 ranged from about 140 feet during low pumping periods (October 1992) to more than 190 feet during heavy pumping periods (Summer 1993).

Deep Non-Pumped Wells

Water-level measurements for monitor wells and non-active supply wells are provided in Appendix D. Records for Well No. 5A are not yet of sufficient duration to determine long-term trends. However, trends for Well No. 5 (before it was modified) indicated depth to water ranging from about 4 to 9 feet during October 1992-August 1993. Records for Well No. 14M indicate depth to water normally ranging from about 340 to 360 during the 1993 water year, with no significant change during the period. Water-level hydrographs for these wells are provided in Appendix E.

The water level in Well No. 16 (Figure 4) has normally ranged from 453 to 462 feet deep, and has not significantly changed during the period of record. The water level in Well No. 17 (Figure 5) has normally ranged from about 377 to 381 feet deep, and fell slightly during the period of record. The water level in Well No. 18 (Figure 6) has normally ranged from about 80 to 90 feet deep and has slightly risen during the period of record. The water level in



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K&E 3 YEARS BY MONTHS X 100 DIVISIONS
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FIGURE 4 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 16

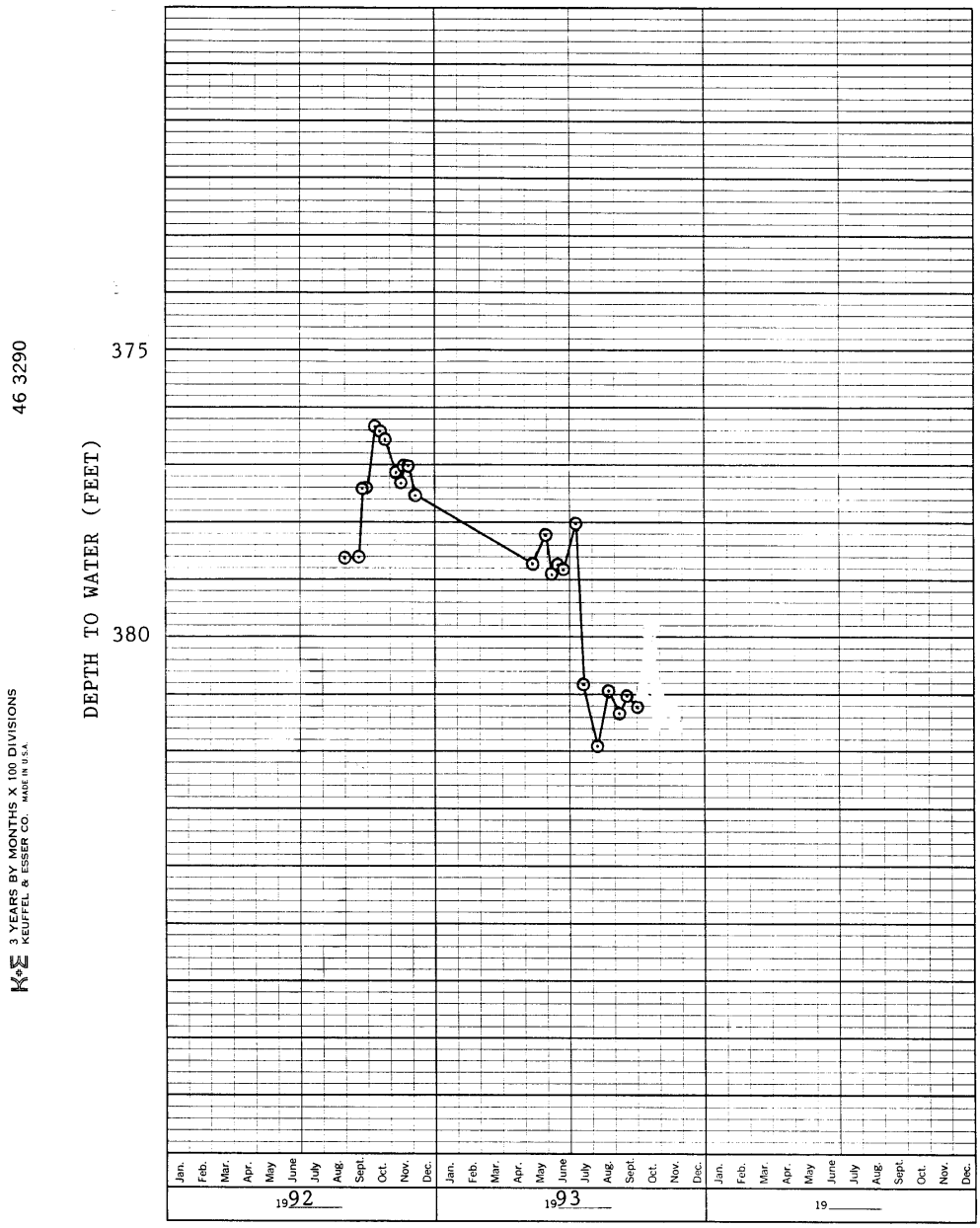

FIGURE 5 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 17

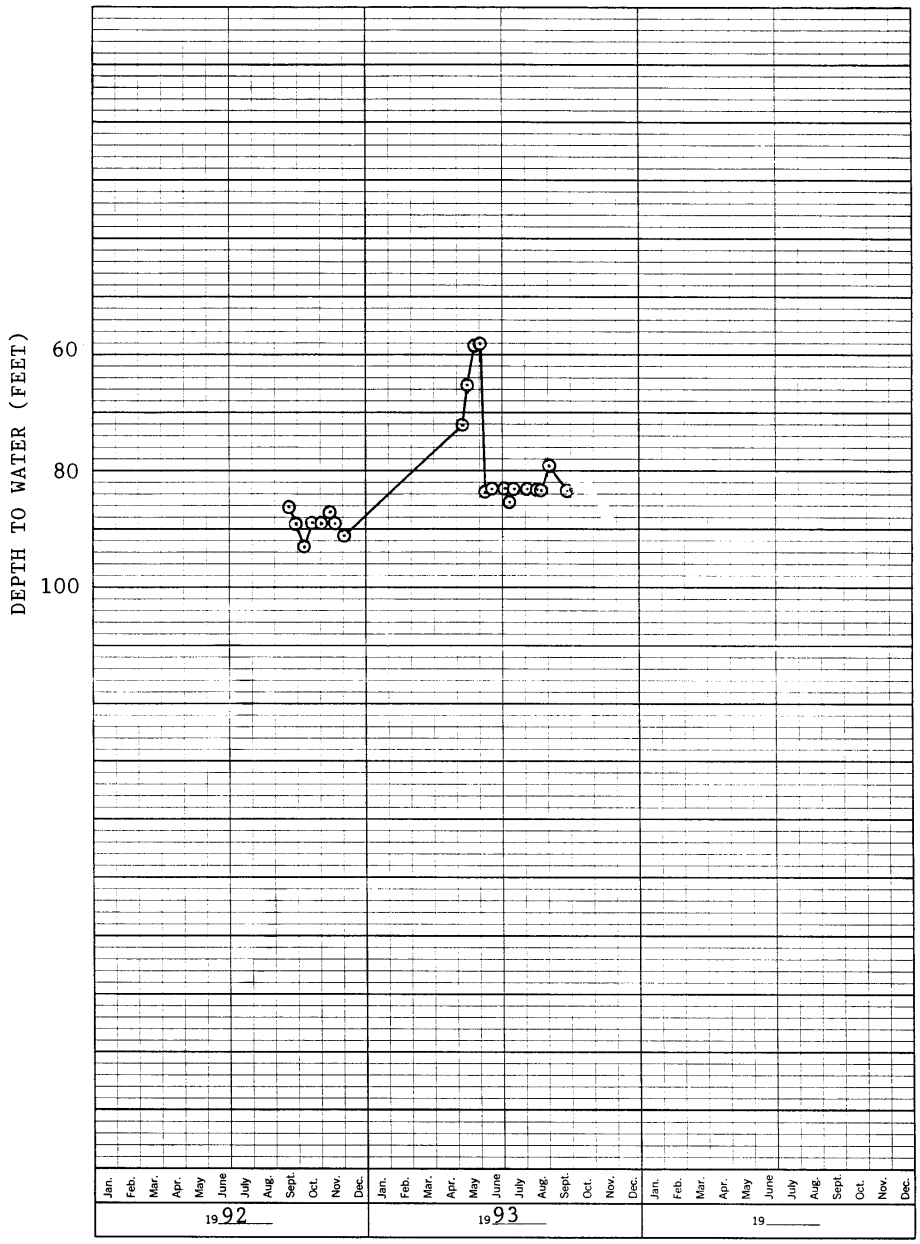

FIGURE 6 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 18

Well No. 19 (Figure 7) has normally ranged from about 333 to 340 feet deep and slightly fell during the relatively short period of record. The water level in this well could not be routinely measured until June 1993. The water level in Well No. 20 (Figure 8) ranged from about 410 to 414 feet deep and did not significantly change during the period of record. The water level in Well No. 21 (Figure 9) ranged from about 350 to 370 feet, and rose substantially during the period of record.

Figure 10 is a water-level hydrograph for SC-1, which taps groundwater in the upper part of the basalt east of the District wells. The water level in this well rose during 1993, to a depth of 104.7 feet on July 20. The water level in this well clearly responded to recharge during 1993. Examination of Figure 10 indicates that there was very little overall change in water level in this well during 1989-93.

Figure 11 is a water-level hydrograph for SC-2, which taps groundwater in deeper basalt near SC-1. The water level also rose in this well during 1993. The shallowest level was 158.2 feet on July 20, 1993. Comparison of the hydrographs for SC-1 and SC-2 indicates that water levels in the two wells respond similarly to recharge events. However, the resulting water-level rises are less in the deeper monitor well than in the shallower monitor well, as would be expected if the source of recharge is from near the land surface.

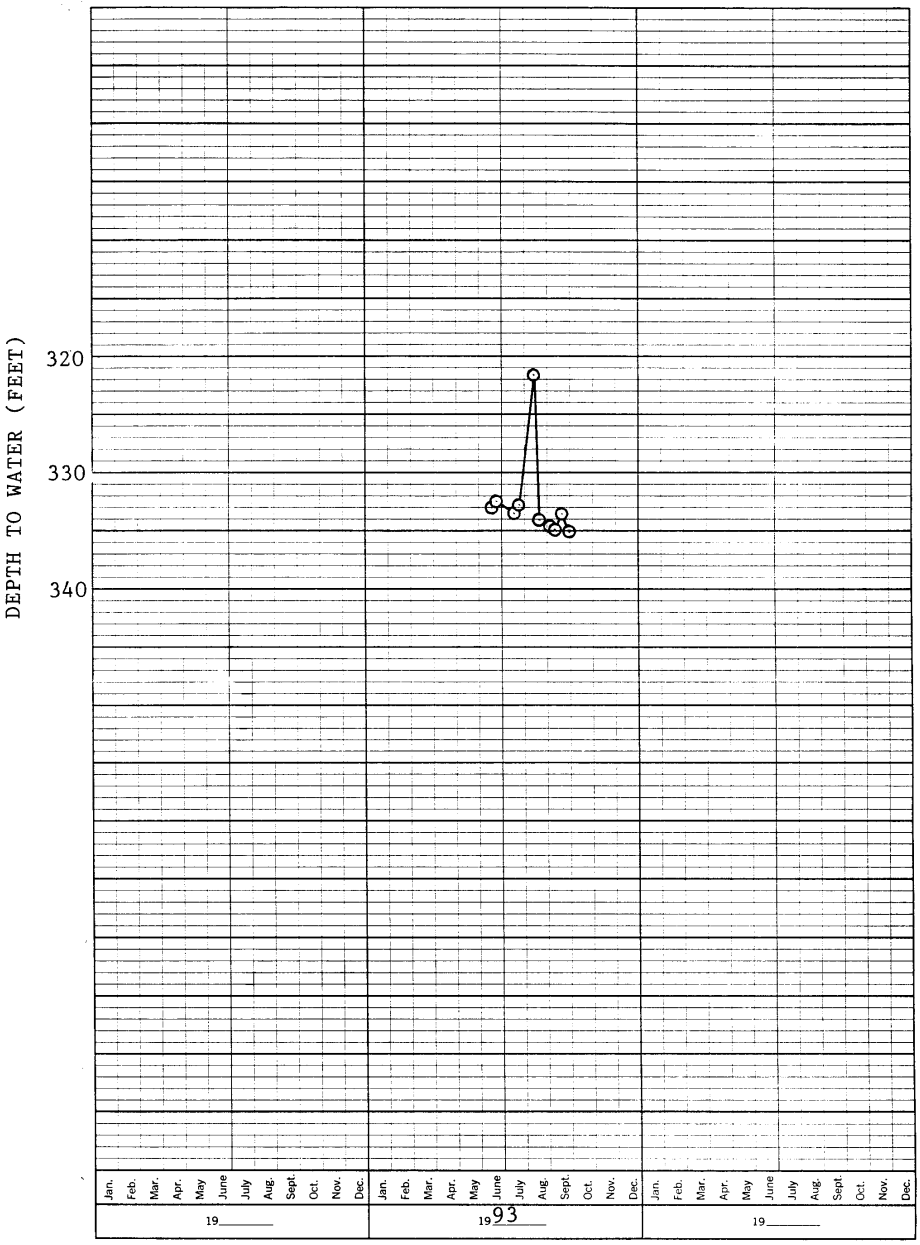

FIGURE 7 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 19

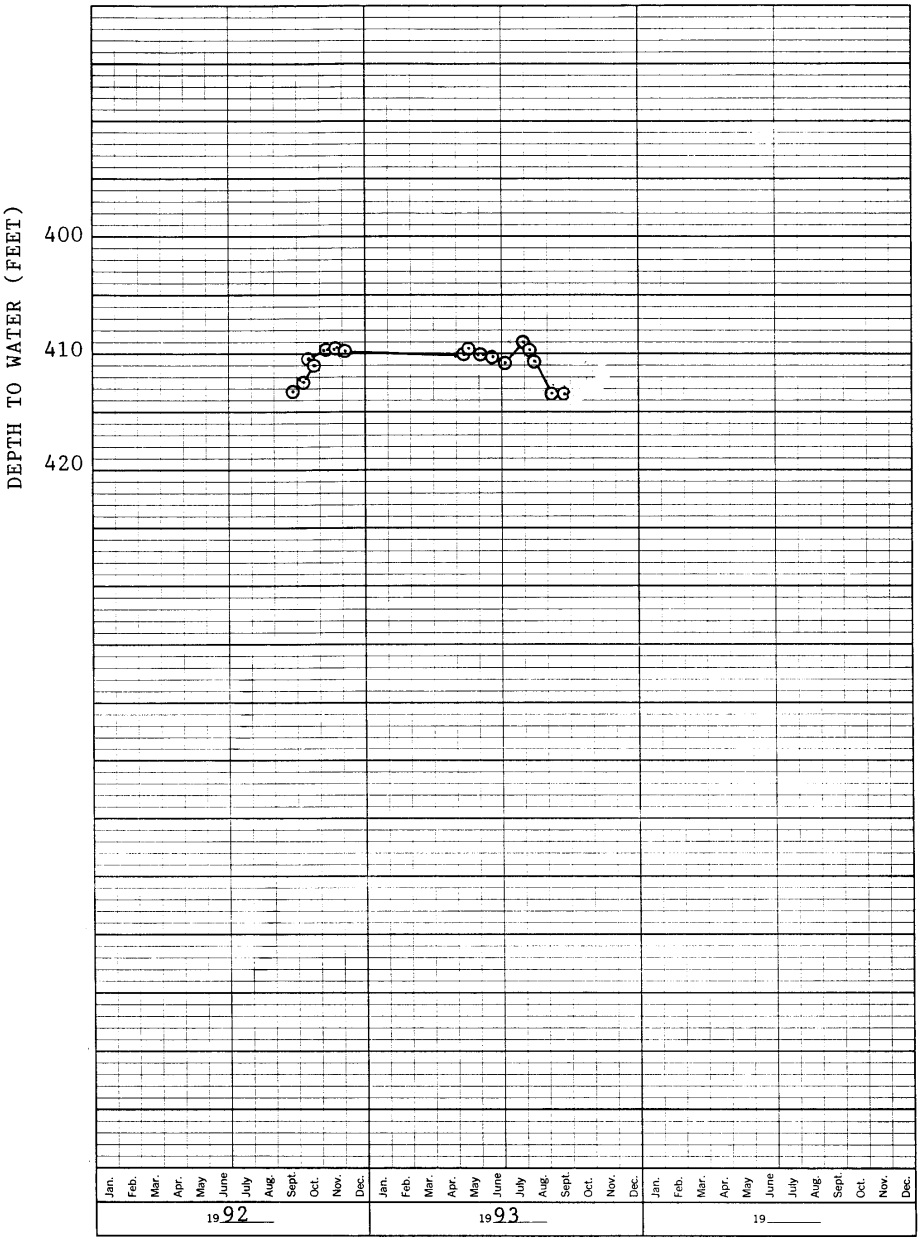

FIGURE 8 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 20

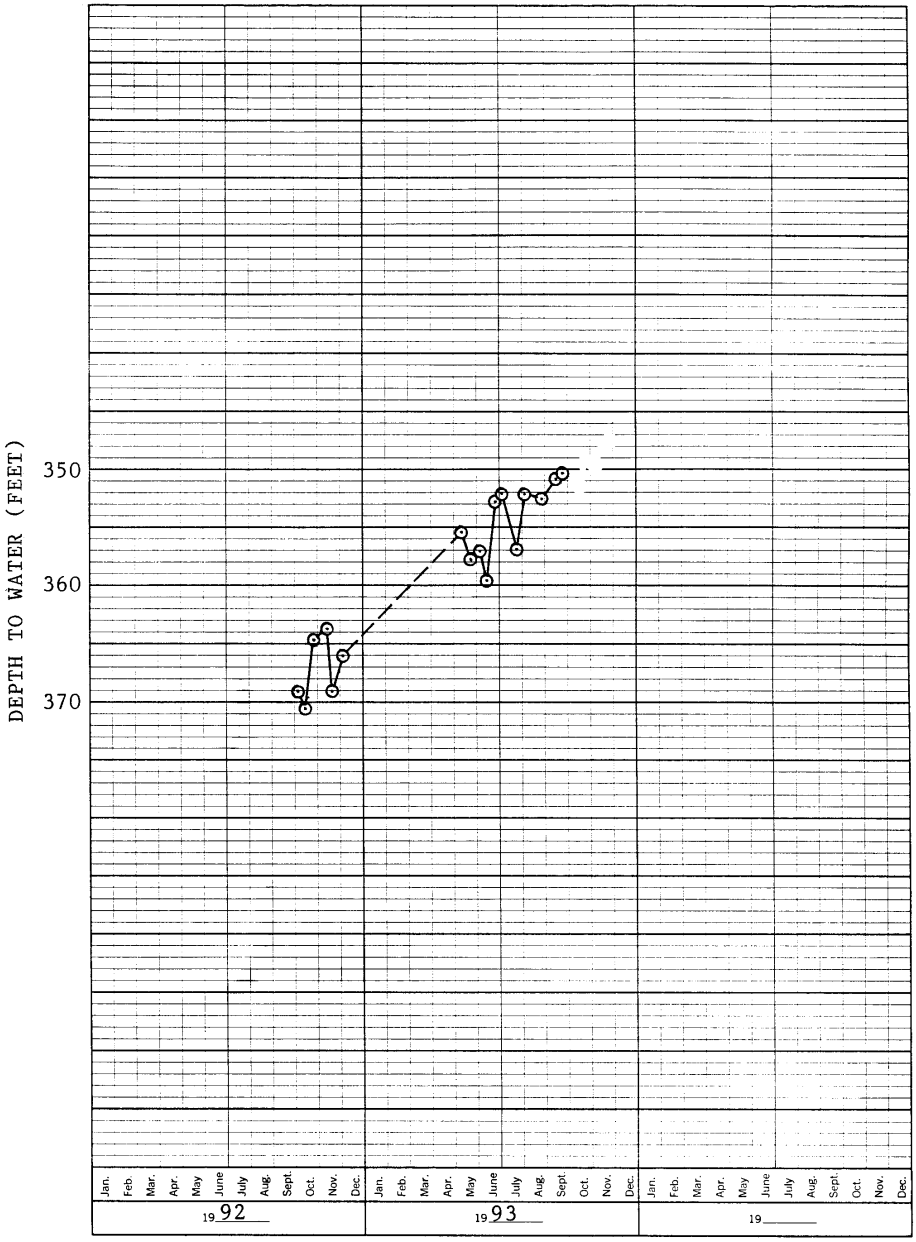

FIGURE 9 - WATER-LEVEL HYDROGRAPH FOR DISTRICT WELL NO. 21

FIGURE 10 - WATER-LEVEL HYDROGRAPH FOR SC-1

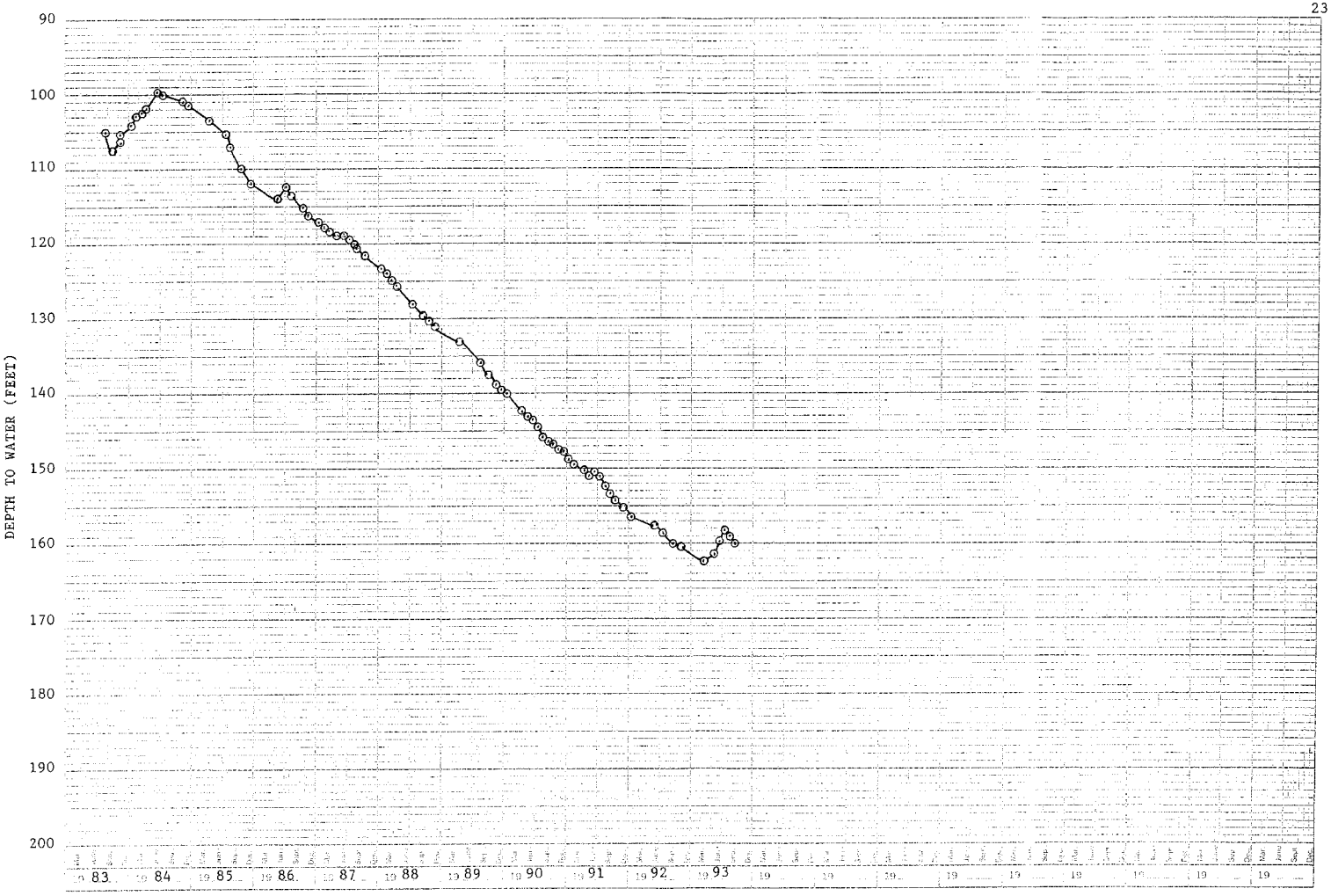

FIGURE 11 - WATER-LEVEL HYDROGRAPH FOR SC-2

Shallow Wells

A water-level hydrograph for Well No. 22 is provided in Figure 12. This well is located adjacent to District Well No. 15. This well was dry until June 17, 1993. Depth to water in this well gradually rose during June-September, 1993. Depth to water ranged from about 80.5 to 84.2 feet. A water-level hydrograph for Well No. 23 is shown in Figure 13. This well is located adjacent to District Well No. 1. Depth to water ranged from about 5 to 16 feet during the period of record. This well is located close to Mammoth Creek and appears to be influenced by streamflow. The shallowest water levels were in the Spring and early Summer of 1993.

Water-level hydrographs for the remaining shallow monitor wells discussed are provided in Appendix E. Well No. 5M taps shallow volcanic rocks and no water was observed in the overlying glacial till at the time of drilling. From late August through the end of September the water level in this well gradually fell, from 3.5 to 5.1 feet. Based on historical data for Well No. 5, this trend is well within normal seasonal variations to be expected.

Well No. 4M is located in the meadow area east of District Wells No. 6 and 10. The water level in this well rose during 1993, apparently due to significant recharge in the vicinity of the meadow.

Well No. 10M was dry from October 1992 through June 10, 1993. Some water appeared in this well during June 17-August 19, 1993, but the well was dry thereafter. This well is adjacent to District Well No. 10 and the water level is partly influenced by pumping of

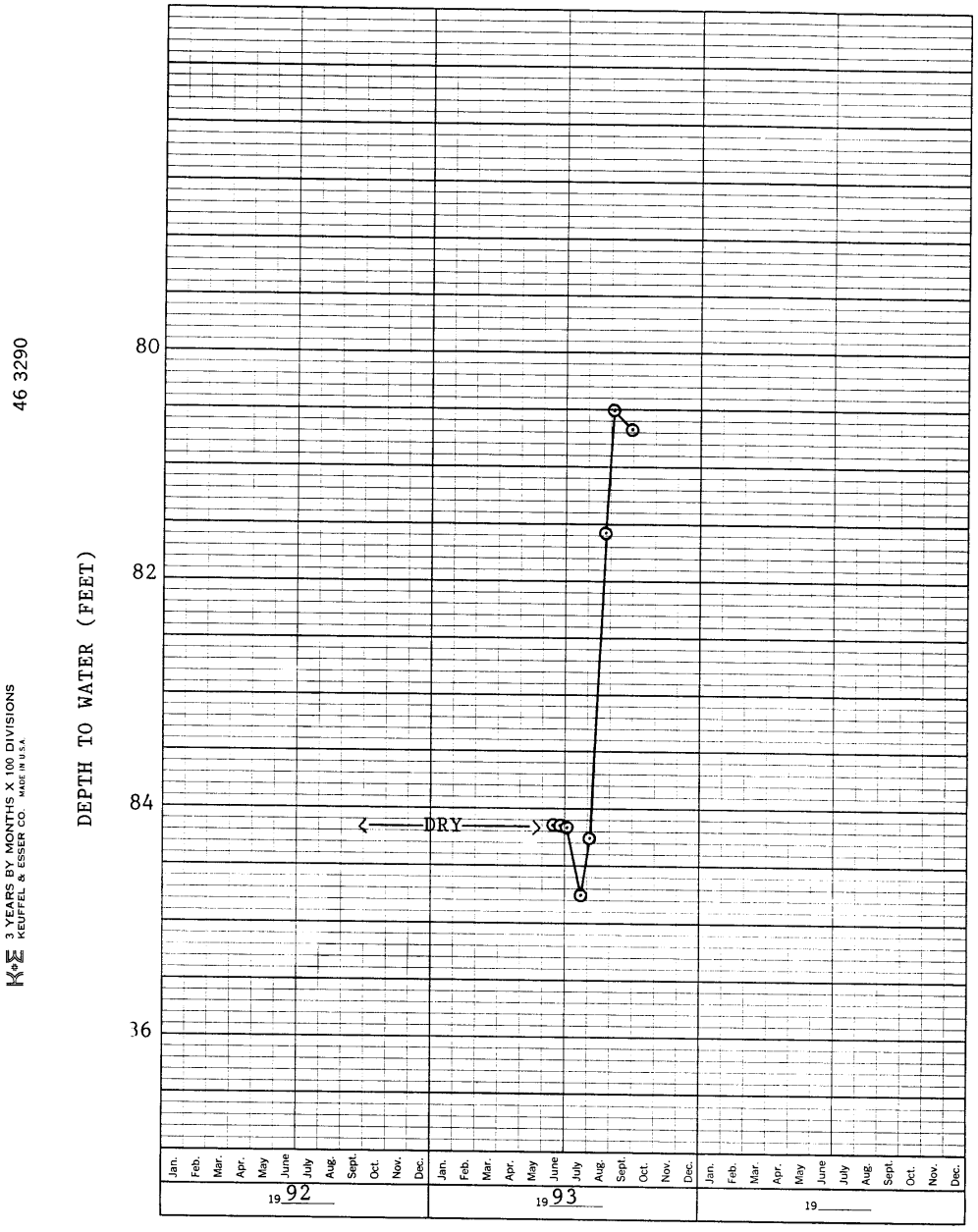

FIGURE 12 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 22

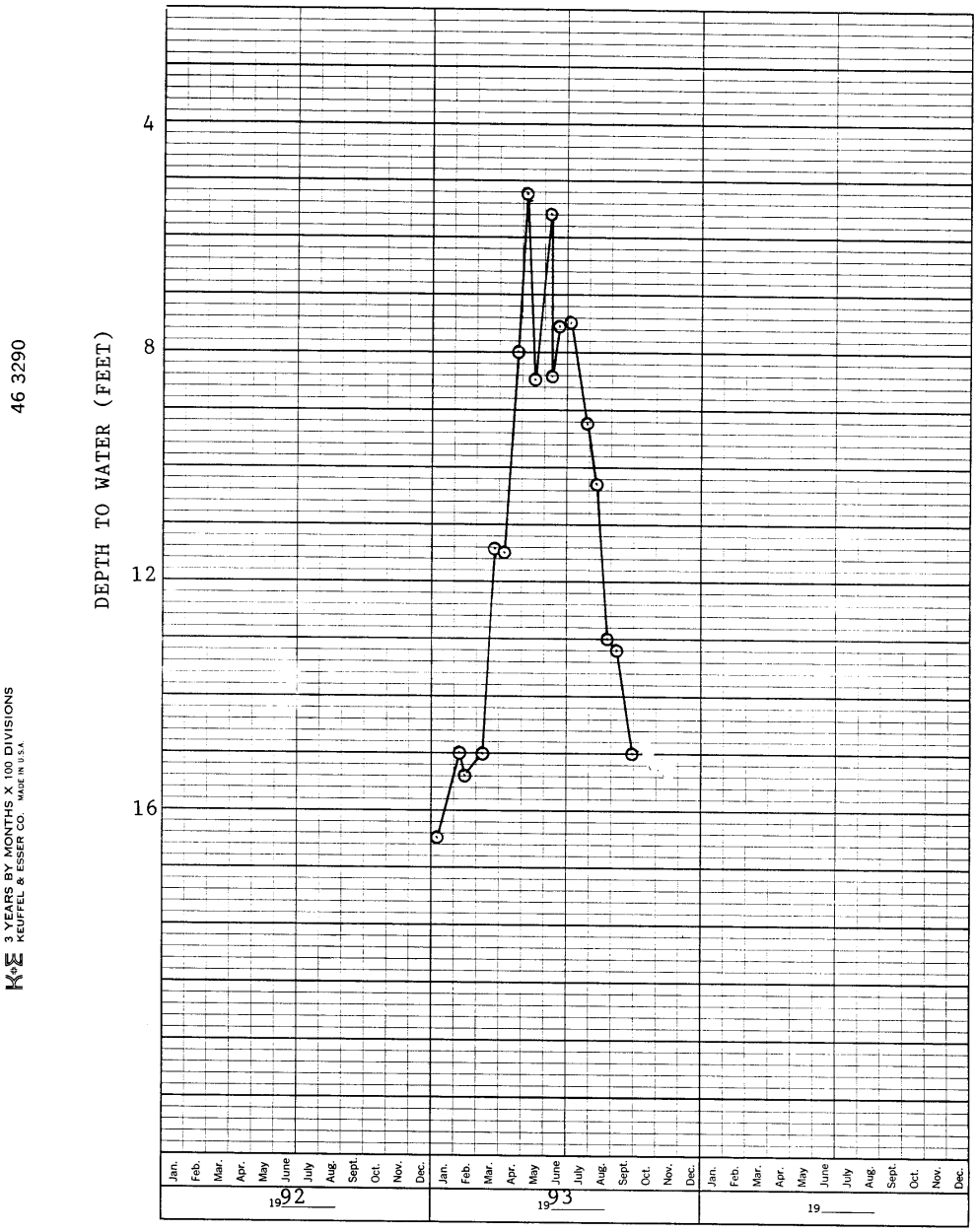

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FIGURE 13 - WATER-LEVEL HYDROGRAPH FOR WELL NO. 23

Well No. 10 and also by local recharge.

Well No. 12M is located in the western part of the meadow area. The water level in this well was below the bottom of the well from October 1992 through June 10, 1993. By July 15, 1993, the water level had risen to 10.2 feet, following significant recharge. The water levels in all three of the shallow wells referenced thus respond significantly to precipitation and recharge.

Water-Level Elevation Contours

Figure 14 shows water-level elevation contours for late September 1993. The hydrologic boundary that was previously identified has been further defined, and is shown north of Wells No. 1 and 5A and south of Wells No. 16, 17, and 20. The hydrologic boundary is believed to be present only west of a line connecting Wells No. 14M and 21. The direction of groundwater flow in September 1993 was essentially the same as identified in the data submittal of July 6, 1993 for non-pumping conditions. A cone of depression was evident due to pumping of District Wells No. 1, 6, 10, and 15. This cone of depression does not extend east of Wells No. 14M and 19. This map shows only the horizontal component of groundwater flow in the basalt and interbedded glacial till. Other evidence indicates that there is also significant downward flow in the area.

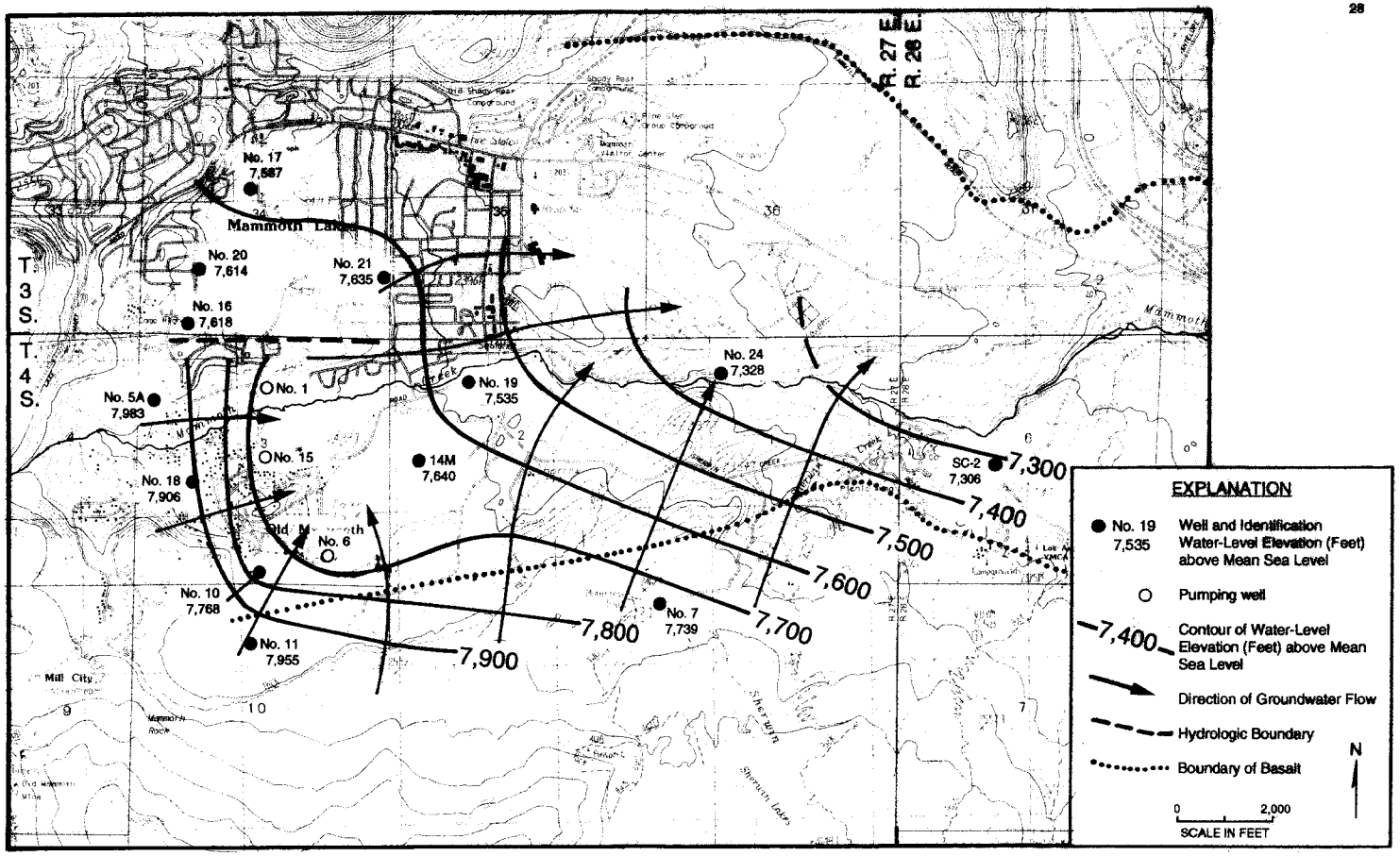


FIGURE 14 - WATER-LEVEL ELEVATIONS IN LATE SEPTEMBER 1993

GROUNDWATER QUALITY

The results of chemical analyses of water from the supply wells that were in service and Well No. 24 are provided in Appendix F. The analyses for the supply wells are for water samples collected on April 28, 1993. The analysis for Well No. 24 is for a sample collected on September 29, 1993. Temperatures are shown in the tabulations. There is no evidence of significant changes in chemical quality or temperature of well water during water year 1993, compared to previous information in the July 6, 1993 submittal.

MAMMOTH CREEK STREAMFLOW

Records of streamflow at the Old Mammoth Road crossing are provided in Appendix G. The mean monthly flow ranged from 5.4 cfs in October 1992 to 92.0 cfs in June 1993. The highest flows were during May-July, 1993. This period coincides with noticeable water level rises in wells tapping the uppermost glacial till and some wells tapping the basalt.

DATA EVALUATION AND INTERPRETATION

Water-level hydrographs for monitor wells and inactive supply wells tapping consolidated rocks in the District well field primarily indicate relatively constant or rising water levels during 1992-93. There was a slight water-level decline in Well No. 17, but this well is the northernmost well and distant from the District wells that were pumped. The water-level decline in this

well indicates a lack of influence of recharge during 1993. Water-level hydrographs for wells tapping the uppermost glacial till strata and shallow basalt indicate recharge during Spring and early Summer 1993, coincident with high runoff in the watershed. Water-level hydrographs for SC-1 and SC-2, east of the District well field and monitor wells, indicate some influence of recharge and a stabilization for the most recent measurements.

The water-level elevation contour map confirms that the cone of depression due to pumping of District wells is localized, and does not extend east to Well No. 24. Because the water levels in the basalt are well below the channel of Mammoth Creek, there is no apparent impact of District pumping on streamflow. Significant water-level declines due to pumping have only been observed in or near the pumped wells themselves. There has thus been no effect on the flow of the Hot Creek headsprings. The aquifer test on Well No. 15 in late Summer 1993 indicated no effect of pumping on the springs and seeps at the Valentine Reserve. It is recommended that the monitoring for the next water year be continued at the same location and frequencies as for the 1993 water year.

APPENDIX A

GEOLOGIC LOGS AND DRILLERS LOGS FOR NEW MONITOR WELLS

TRIPLICATE
Owner's Copy

Page 1 of 1

Owner's Well No. 24

Date Work Began 08/23/93, Ended 08/30/93

Local Permit Agency

Permit No. Permit Date

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. 457688

DWR USE ONLY — DO NOT FILL IN
STATE WELL NO./STATION NO.
LATITUDE LONGITUDE
APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓) X VERTICAL ___ HORIZONTAL ___ ANGLE ___ (SPECIFY)

DEPTH TO FIRST WATER ___ (Ft.) BELOW SURFACE.

DEPTH FROM SURFACE Ft.	to Ft.	DESCRIPTION *Describe material, grain size, color etc.*
0	68	Gray glacial till (fine to coarse sand, clay & gravel)
68	76	Unfractured black volcanic rock
76	124	Fractured red-brown volcanic rock
124	135	Unfractured red-brown volcanic rock
135	168	Fractured red volcanic rock
168	217	Unfractured black volcanic rock
217	306	Reddish-brown glacial till (sandy silt, clay, and angular gravel)
306	327	Unfractured black volcanic rock
327	377	Fractured red volcanic rock
377	415	Unfractured red-brown volcanic rock
415	436	Fractured red volcanic rock
436	450	Unfractured black and red volcanic rock
		Location: 1/2 mile SW of Mammoth Co. Water Dist. office & north of the creek

TOTAL DEPTH OF BORING 450 (Feet)

TOTAL DEPTH OF COMPLETED WELL 450 (Feet)

WELL OWNER

Name Mammoth County Water District

Mailing Address P.O. Box 597

City Mammoth Lakes State CA Zip 9355[illegible]

WELL LOCATION

Address

City Mammoth Lakes

County Mono

APN Book ___ Page ___ Parcel

or Township 4 S Range 27 E Section 1 NW¼

or Latitude ___ DEG. ___ MIN. ___ SEC. NORTH Longitude ___ DEG. ___ MIN. ___ SEC. WEST

LOCATION SKETCH

NORTH / WEST / EAST / SOUTH

Illustrate or Describe Distance of Well from Landmarks such as Roads, Buildings, Fences, Rivers, etc. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

X NEW WELL

MODIFICATION/REPAIR

___ Deepen

___ Other (Specify)

___ DESTROY *(Describe Procedures and Materials Under "GEOLOGIC LOG")*

PLANNED USE(S) (✓)

X MONITORING

WATER SUPPLY

___ Domestic

___ Public

___ Irrigation

___ Industrial

___ "TEST WELL"

___ CATHODIC PROTECTION

___ OTHER (Specify)

DRILLING METHOD ODEX FLUID

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH OF STATIC WATER LEVEL 380 (Ft.) & DATE MEASURED 08/30/93

ESTIMATED YIELD* ___ (GPM) & TEST TYPE

TEST LENGTH ___ (Hrs.) TOTAL DRAWDOWN ___ (Ft.)

* *May not be representative of a well's long-term yield.*

CASING(S)

DEPTH FROM SURFACE Ft.	to Ft.	BORE-HOLE DIA. (Inches)	TYPE (✓) BLANK	SCREEN	CONDUCTOR	FILL PIPE	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
-10	36	12-3/4	X				STEEL	12.250	.250	
+1	80	10-3/4	X				STEEL	10.250	.250	
+2	130	9.5	X				STEEL	6.125	.250	
130	300	9.5	X				STEEL	6.249	.188	
300	430	9.5		X			STEEL	6.249	.188	1/4
430	450	9.5	X				STEEL	6.249	.188	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	to Ft.	TYPE CEMENT (✓)	BENTONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	20		X		ENVIROGROUT

ATTACHMENTS (✓)

___ Geologic Log

___ Well Construction Diagram

___ Geophysical Log(s)

___ Soil/Water Chemical Analyses

___ Other

ATTACH ADDITIONAL INFORMATION, IF IT EXISTS.

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME JOHNSON DRILLING CO (PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

ADDRESS 23489 E. Kings Canyon City Reedley State CA Zip 93654

Signed [signature] (WELL DRILLER/AUTHORIZED REPRESENTATIVE) Date Signed 09/22/93 C-57 License Number 245802

DWR 188 REV. 7-90

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

GEOLOGIC LOG OF DRILL CUTTINGS
MAMMOTH COUNTY WATER DISTRICT NO. 24

Depth (feet)	Description
0-68	Gray glacial till (fine to coarse sand, clay and angular gravel
68-76	Unfractured black volcanic rock
76-124	Fractured red-brown volcanic rock
124-135	Unfractured red-brown volcanic rock
135-168	Fractured red volcanic rock
168-217	Unfractured black volcanic rock
217-306	Reddish-brown glacial till (sandy silt, clay, and angular gravel)
306-327	Unfractured black volcanic rock
327-377	Fractured red volcanic rock
377-415	Unfractured red-brown volcanic rock
415-436	Fractured red volcanic rock
436-450	Unfractured black and red volcanic rock

APPENDIX B

PUMPAGE AND WATER-LEVEL DATA FOR DISTRICT SUPPLY WELLS

OKANOGAN COUNTY WATER DISTRICT WELL LEVEL AND PUMPING DATA
OCTOBER, 1992 THROUGH SEPTEMBER, 1993

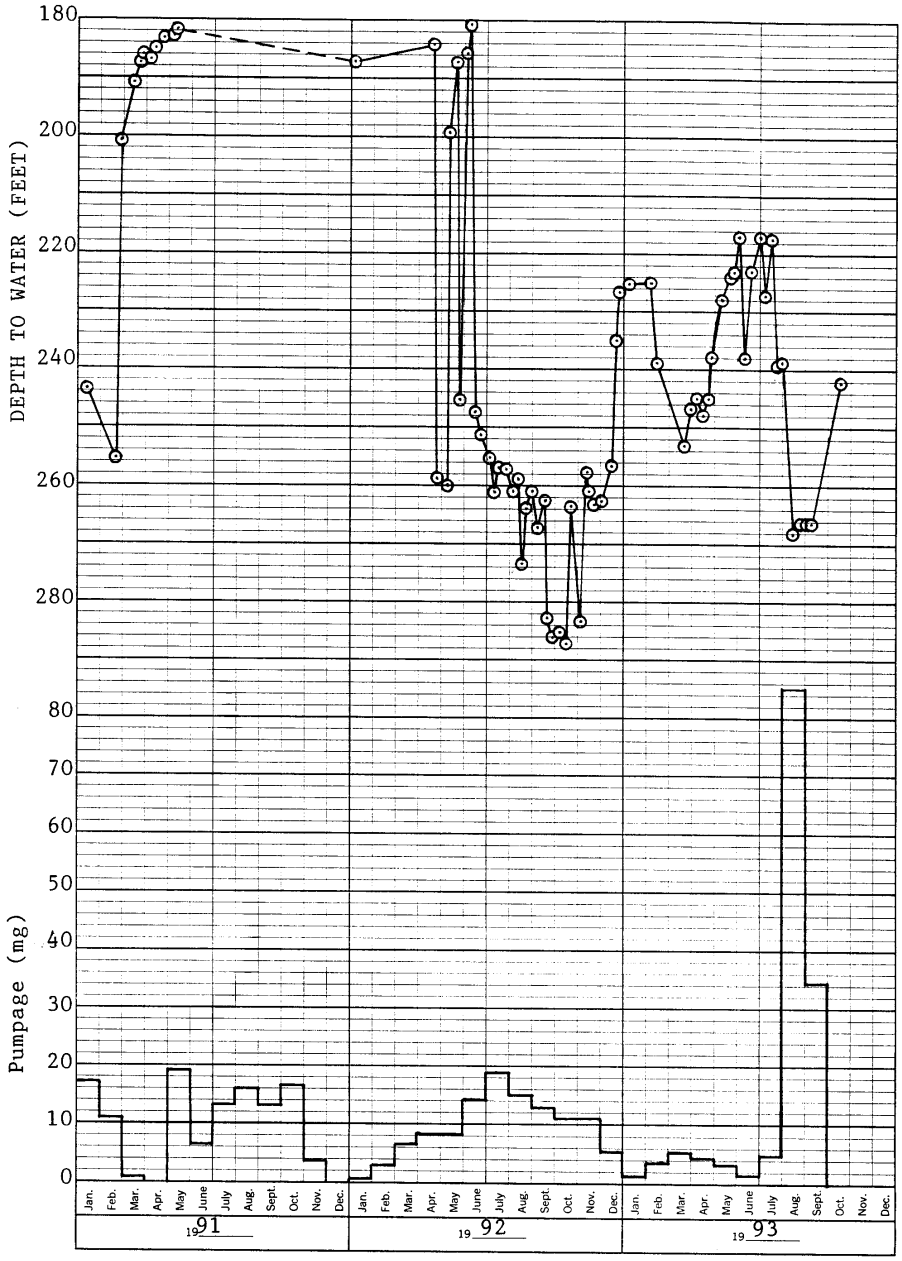
		WELL 1			WELL 6			WELL 10			WELL 15	
	STATIC	PUMPING	1000	STATIC	PUMPING	1000	STATIC	PUMPING	1000	STATIC	PUMPING	1000
DATE	LEVEL	LEVEL	GALLONS	LEVEL	LEVEL	GALLONS	LEVEL	LEVEL	GALLONS	LEVEL	LEVEL	GALLONS
10/06/92		286.00	2742	139.00		3249	143.00		7604		268.00	10080
10/13		288.00	2570	141.00		3525		175.00	8666		264.00	2880
10/20		264.00	2620	144.00		3548		175.00	9556	250.00		0
11/03		284.00	4522	152.00		6235		145.00	17227	247.00		0
11/10		258.00	2514		189.00	2790		177.00	6693	245.00		0
11/16		261.00	2009		184.00	2216		178.00	6047	245.00		0
11/24		263.00	2890		191.00	3320	153.00		9665	244.00		0
12/01		262.00	2968		193.00	2637		183.00	7709	243.00		0
12/16		257.00	5067			7592		184.00	22377		254.00	19440
12/28	226.00		0			4835		188.00	6855		262.00	15552
01/05/93		248.00	344			5431		188.00	7290		266.00	5912
01/11		237.00	404			2610		190.00	4282		267.00	5383
01/26		247.00	724	146.13		6949		186.79	10169		275.00	12898
02/01		277.81	235		200.00	3142		190.42	3632		273.00	3897
02/11	225.00		150			4691			7388		275.00	6819
02/16	239.00		981			2183			3742		265.00	2450
03/09	253.00	263.00	4839	130.00		3191		173.00	17124		267.00	11129
03/18	253.00	270.00	1537		161.00	80			5896		278.00	6891
03/25	247.00	258.00	841	138.00		978		161.00	4866		277.00	5020
04/01	247.00	258.00	1180		197.00	2642	164.00	173.00	4971	265.00	274.00	2542
04/08	245.00	260.00	968	142.00	197.00	3234	160.00	190.00	5618	266.00	280.00	2169
04/15	248.33	264.08	1387	142.00	196.33	2964	164.00	190.00	5075	265.75	275.50	2156
04/22	245.33	265.17	1120	142.00	186.00	2667	162.67	190.00	4687	265.50	275.33	2038
04/29	238.00		882	136.75		2057	161.33	190.00	3796	265.08	274.50	1762
05/06	228.83		0	129.83		0	159.67	193.00	4167	263.92	273.92	2564
05/13		267.50	1379	122.00		0	161.00	193.00	4421	264.00	272.67	2011
05/20	224.42		1793		189.00	2517		193.00	3942	264.00		3703
05/27	223.00		5	126.00		721	143.00		999	264.92		744
06/03	217.09		0	126.66		4885	143.84		5088	258.84		3126
06/10	238.00		274	138.75		4660		188.29	6124		269.38	4067
06/17	223.25		1156		197.67	5173		186.75	6535		270.08	5374
06/24			10		197.58	4516		185.50	5752		261.00	19
07/02	216.83		139	146.75		6857		188.75	9241	260.83		31
07/08	227.67		282		182.92	4712		182.83	6296		272.33	5881
07/15	217.83		0		198.17	5328		183.00	6326		276.75	6984
07/22	239.50		2594	131.74		6195	140.28		8216		278.00	6434
07/29	239.00		1232		186.16	5179		170.00	6884	267.00		5772
08/05		274.40	2288		186.20	3509		176.40	8879	268.50		0
08/12	268.10		2171		182.80	3438			10413		278.00	4400
08/19	266.35		4192		199.00	3500	141.33		10413	265.30		751
09/02	266.37		2710		198.50	4054		173.50	12354		273.00	2592
09/09		285.60	2433	125.10		2258	128.90		6313		278.10	6048
09/16		288.25	2521	122.75		2155		164.16	4480		280.00	6048
09/23		286.50	2080	116.20		2576	119.33		3278		282.50	6134
09/30		280.92	1675	110.83		2503		159.50	2987		284.33	5813
TOTAL	5962.90	6954.23	72428	2949.49	3812.33	157502	2245.35	5964.89	324043	5178.64	8720.39	197514
MEAN	238.52	267.47	1610	134.07	190.62	3500	149.69	180.75	7201	258.93	272.51	4389
MAX	268.10	288.25	5067	152.00	200.00	7592	164.00	193.00	22377	268.50	284.33	19440
MIN	216.83	237.00	0	110.83	161.00	0	119.33	145.00	999	243.00	254.00	0

MAMMOTH COUNTY WATER DISTRICT
UNIVERSITY OF CALIFORNIA SETTLEMENT AGREEMENT MONITORING DATA
GALLONS PUMPED

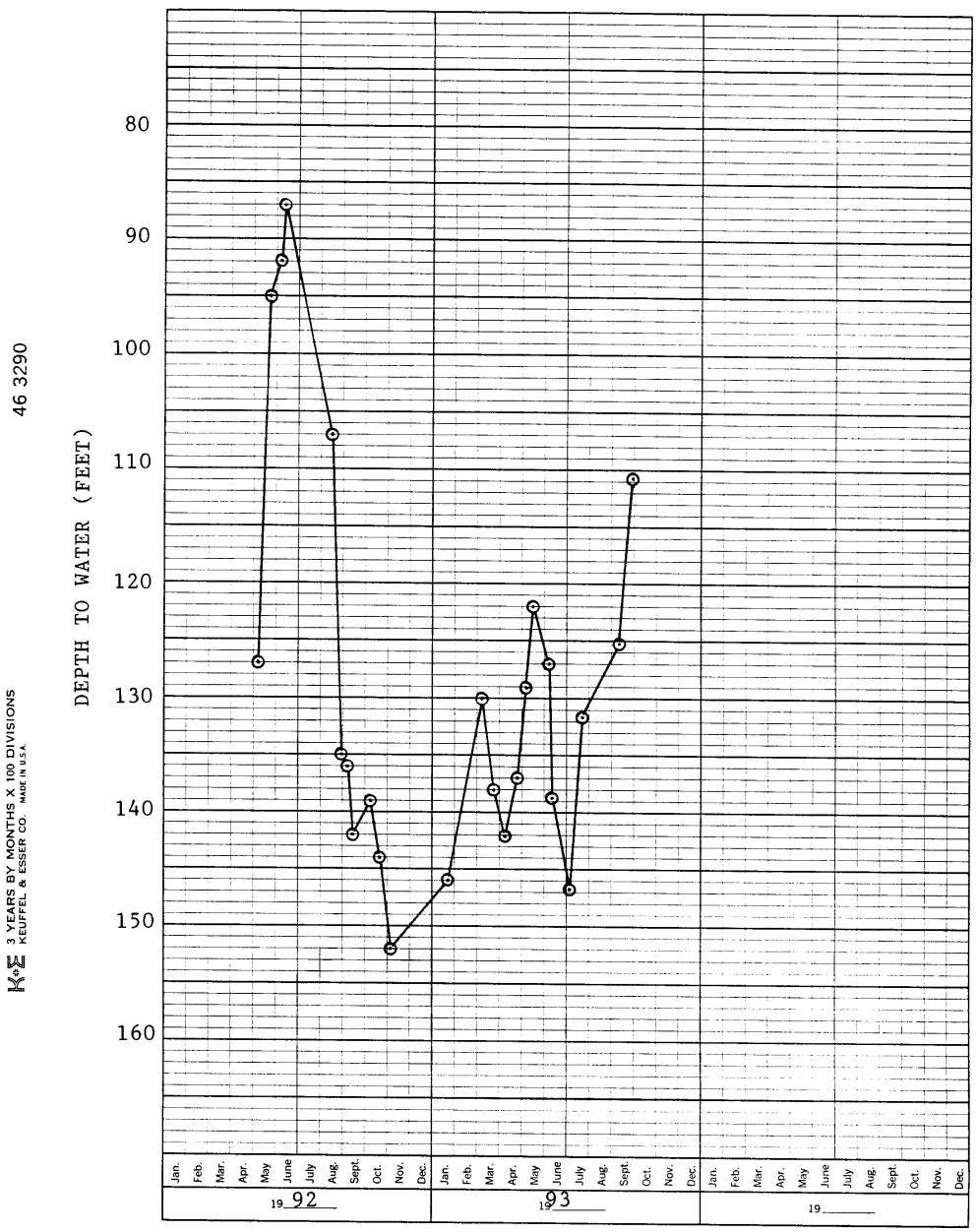
DATE	WELL 1	WELL 6	WELL 10	WELL 15
09/01/93	59000	525000	989000	864000 (600 GPM)
09/02/93	321000	317000	1012000	864000
09/03/93	69000	529000	865000	864000
09/04/93	431000	348000	1183000	864000
09/05/93	402000	218000	1016000	864000
09/06/93	371000	293000	725000	864000
09/07/93	421000	339000	729000	864000
09/08/93	368000	348000	716000	864000
09/09/93	406000	238000	854000	864000
09/10/93	395000	359000	619000	864000
09/11/93	388000	226000	871000	864000
09/12/93	389000	372000	554000	864000
09/13/93	320000	284000	675000	864000
09/14/93	338000	335000	582000	864000
09/15/93	312000	400000	432000	864000 (INSTALL METER)
09/16/93	338000	400000	431000	859000
09/17/93	314000	288000	516000	858000
09/18/93	298000	348000	451000	863000
09/19/93	289000	241000	605000	860000
09/20/93	284000	472000	271000	866000
09/21/93	275000	366000	470000	857000
09/22/93	291000	341000	510000	859000
09/23/93	165000	365000	290000	852000
09/24/93	209000	240000	532000	856000
09/25/93	206000	431000	429000	850000
09/26/93	351000	413000	352000	850000
09/27/93	238000	408000	343000	842000
09/28/93	268000	310000	386000	850000
09/29/93	252000	324000	447000	821000
09/30/93	246000	473000	1412000	0
10/01/93	159000	507000	1292000	0
10/02/93	208000	537000	1309000	0
10/03/93	242000	604000	1376000	0
10/04/93	26000	477000	1357000	0
10/05/93	3000	669000	111000	0
10/06/93	533000	618000	4000	0
10/07/93	173000	653000	10000	0
10/08/93	0	604000	1000	0
10/09/93	0	631000	0	0
10/10/93	0	641000	0	0
10/11/93	0	105000	2000	0
10/12/93	0	0	0	0
10/13/93	0	0	0	0
10/14/93	0	0	0	0
10/15/93	0	0	0	0
10/16/93	0	0	0	0
10/17/93	0	0	0	0
10/18/93	0	0	0	0
10/21/93	320000	0	0	0
TOTAL	10678000	16597000	24729000	24903000

APPENDIX C

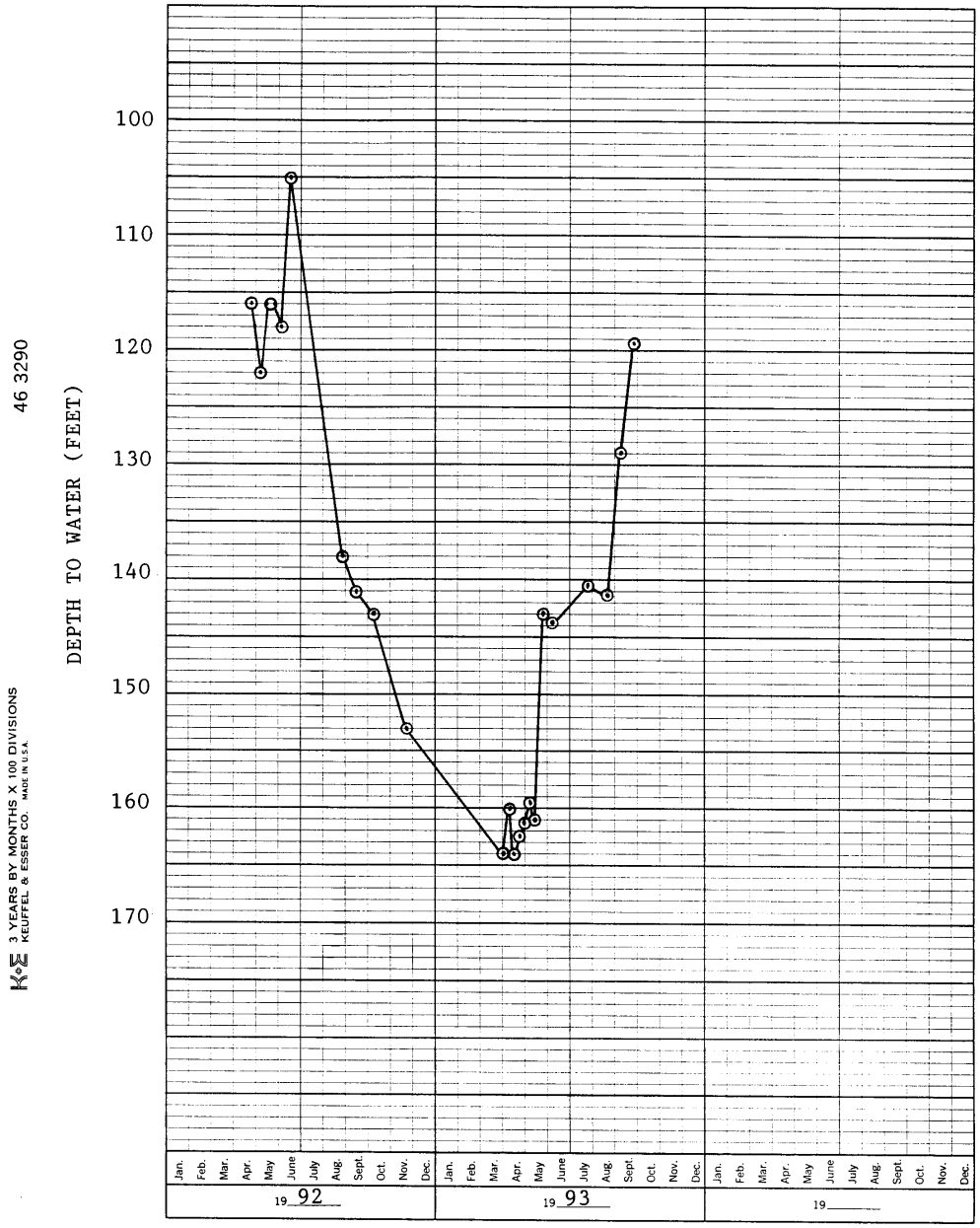
SUPPLEMENTARY WATER-LEVEL HYDROGRAPHS FOR SUPPLY WELLS



WATER-LEVEL AND PUMPAGE HYDROGRAPH FOR DISTRICT WELL NO. 1



WATER-LEVEL HYDROGRAPH FOR DISTRICT WELL NO. 6



WATER-LEVEL HYDROGRAPH FOR WELL NO. 10

APPENDIX D

WATER-LEVEL MEASUREMENTS FOR MONITOR WELLS

MAMMOTH COUNTY WATER DISTRICT MONITOR WELL LEVEL DATA
OCTOBER, 1992 THROUGH SEPTEMBER, 1993

DATE	WELL 4	WELL 5	WELL 5A	WELL 5M	WELL 10M	WELL 11	WELL 11M	WELL 12	WELL 14
10/06/92	-40.29	-9.54				-38.08	-34.08		-357.38
10/13/92	-39.75	-9.33				-40.33	-34.58		-357.25
10/20/92	-39.63	-9.38				-40.83	-35.00		-357.67
10/27/92	-39.58	-9.08				-41.83	-35.58		-357.63
11/10/92	-39.33	-9.00				-42.33	-38.17		
11/16/92	-39.25	-9.00				-41.50	-38.50		
11/24/92	-39.25	-9.00				-43.00			
12/01/92	-39.42	-9.17				-45.37	-39.17		-358.00
01/05/93	-40.00	-8.92							
01/11/93									
01/26/93	-42.50	-9.08				-41.92	-39.13		
02/08/93		-8.83							
02/09/93									
02/11/93									
02/16/93									
02/17/93	-41.21								
03/09/93									
03/15/93									
03/24/93									
03/29/93	-41.00								-360.00
04/05/93	-40.29								-360.00
04/12/93	-39.00								-360.33
04/19/93	-34.92								-360.71
04/27/93	-32.00								-360.50
05/04/93	-31.33								-359.63
05/10/93	-29.88				DRY	-50.50	-28.00	DRY	-359.67
05/17/93	-29.75	-4.13			DRY	-49.27	-24.00	DRY	-359.83
05/27/93	-27.67	-4.17			DRY	-44.50	-17.67	DRY	-358.00
06/03/93	-28.50	-4.16			DRY	-43.00	-17.91	DRY	-358.00
06/10/93	-30.50	-3.75			DRY	-43.83		DRY	-357.50
06/17/93	-30.50	-4.00			-29.58	-42.25	-16.33	-28.91	-357.00
06/18/93									
06/24/93	-30.50	-4.17			-29.58	-41.25	-12.58	-17.92	
06/25/93									
06/28/93									-355.75
07/02/93	-30.25	-4.58			-29.42	-39.75	-6.50	-11.42	-358.83
07/08/93	-30.17	-4.67			-29.50	-38.50	-7.33		-353.50
07/15/93	-30.42	-5.08			-30.00	-37.83	-6.33	-10.17	-352.17
07/22/93	-30.48	-5.12			-30.00	-37.80	-6.39	-12.33	-348.00
07/29/93	-30.60	-5.50			-29.61	-36.00	-11.33	-16.65	-347.50
08/05/93	-30.50	-5.60			-29.60	-36.20	-13.00	-20.10	-346.00
08/12/93	-30.80	-5.70			-29.60	-35.30	-14.00	-20.20	-344.10
08/19/93	-32.15				-29.60	-33.40	-13.70		-344.15
08/26/93			-3.67						
09/02/93	-33.30		-4.00	-8.00	DRY	-33.75	-15.80	-21.10	-345.40
09/09/93	-33.60		-4.20	-8.25	DRY	-33.40	-17.35	-22.80	
09/16/93	-33.80		-4.33	-8.60	DRY	-32.28	-16.60	-22.74	-347.40
09/23/93	-34.15		-4.70	-8.80	DRY	-31.90	-16.70	-22.50	-347.70
09/30/93	-34.30		-5.04	-8.83	DRY	-31.52	-17.58	-23.10	-348.90
MAXIMUM	-42.50	-9.08	-5.04	-8.83	DRY	-50.50	-39.13	-28.91	-360.71
MINIMUM	-27.67	-3.75	-3.67	-8.00	29.42	-31.52	-6.33	0.00	-344.10

08/17/93 - Well 5 modified to create deep monitor well (Well 5A)
09/18/93 - Shallow monitor well 5M drilled

MAMMOTH COUNTY WATER DISTRICT MONITOR WELL LEVEL DATA
OCTOBER, 1992 THROUGH SEPTEMBER, 1993

DATE	WELL 16	WELL 17	WELL 18	WELL 19	WELL 20	WELL 21	WELL 22	WELL 23	WELL 24
10/06/92	-458.33	-376.33	-93.38	-206.67	-412.25	-364.91			
10/13/92	-457.33	-376.38	-89.56	-207.08	-410.25	-369.83			
10/20/92	-457.71	-376.50	-88.92		-410.92	-365.42			
11/03/92	-458.00	-377.08	-88.92		-409.75	-364.67			
11/10/92	-457.58	-377.33	-88.58		-409.75	-363.83			
11/16/92	-457.75	-377.00	-87.17		-409.58	-369.00			
11/24/92	-457.33	-377.00	-88.67		-409.50	-362.50			
12/01/92	-458.00	-377.50	-91.00		-409.75	-366.00			
01/05/93									
01/11/93							DRY	-16.50	
01/26/93									
02/08/93									
02/09/93							DRY	-15.00	
02/11/93							DRY	-15.00	
02/16/93							DRY	-15.35	
02/17/93									
03/09/93							DRY	-15.00	
03/15/93							DRY	-14.76	
03/24/93							DRY	-11.42	
03/29/93	-457.50						DRY	-12.46	
04/05/93	-457.00						DRY	-11.50	
04/12/93	-457.42						DRY	-10.33	
04/19/93							DRY	-8.04	
04/27/93	-457.04						DRY	-7.96	
05/04/93	-457.00						DRY		
05/10/93	-458.08	-378.67			-410.00	-355.42	DRY	-8.50	
05/17/93	-456.63	-378.67			-409.75		DRY	-8.25	
05/27/93	-458.83	-378.17			-409.92	-356.42	DRY		
06/03/93		-378.92			-410.08		DRY		
06/10/93	-456.50	-378.67	-83.67		-410.25		DRY	-8.42	
06/17/93	-456.50	-378.83	-83.08		-410.25	-353.67	-84.15	-7.58	
06/18/93				-332.75					
06/24/93			-83.33				-84.15	-8.00	
06/25/93	-459.58								
06/28/93				-332.33	-410.08	-352.88			
07/02/93	-459.83	-379.00	-82.75	-333.00	-410.83	-352.33	-84.17	-7.50	
07/08/93	-460.25			-332.50	-409.83	-355.00	-84.50	-7.50	
07/15/93	-463.92	-380.83	-83.00	-333.33	-410.67	-352.92	-84.75	-8.33	
07/22/93		-378.81	-83.30	-332.51	-409.17	-356.91	-84.75	-8.73	
07/29/93	-459.00	-380.66	-83.08	-332.75	-409.00	-353.00	-84.25	-9.25	
08/05/93	-459.00	-381.85	-83.30	-333.50	-409.60	-352.10	-84.25	-10.33	
08/12/93	-458.80	-381.45	-83.30		-410.70	-352.10	-83.20	-11.50	
08/19/93	-454.60	-380.90	-83.11	-333.90		-352.40	-81.95	-12.25	
08/26/93			-83.29				-81.58	-13.04	
09/02/93	-458.30	-381.30		-334.40			-80.50	-13.20	-385.40
09/09/93	-458.80	-381.10	-83.20	-334.80	-413.30		-80.65	-13.70	-385.80
09/16/93	-458.90	-381.00	-82.90	-334.40		-350.70	-80.50	-13.96	-386.00
09/23/93	-458.00	-381.30	-82.90	-333.30	-413.30	-350.50	-80.55	-14.30	-386.00
09/30/93	-452.60	-381.20	-83.33	-334.80			-80.67	-15.00	-386.30
MAXIMUM	-463.92	-381.85	-83.67	-334.80	-413.30	-356.91	DRY	-16.50	-386.30
MINIMUM	-452.60	-378.17	-82.75	-332.33	-409.00	-350.50	-80.50	-7.50	-385.40

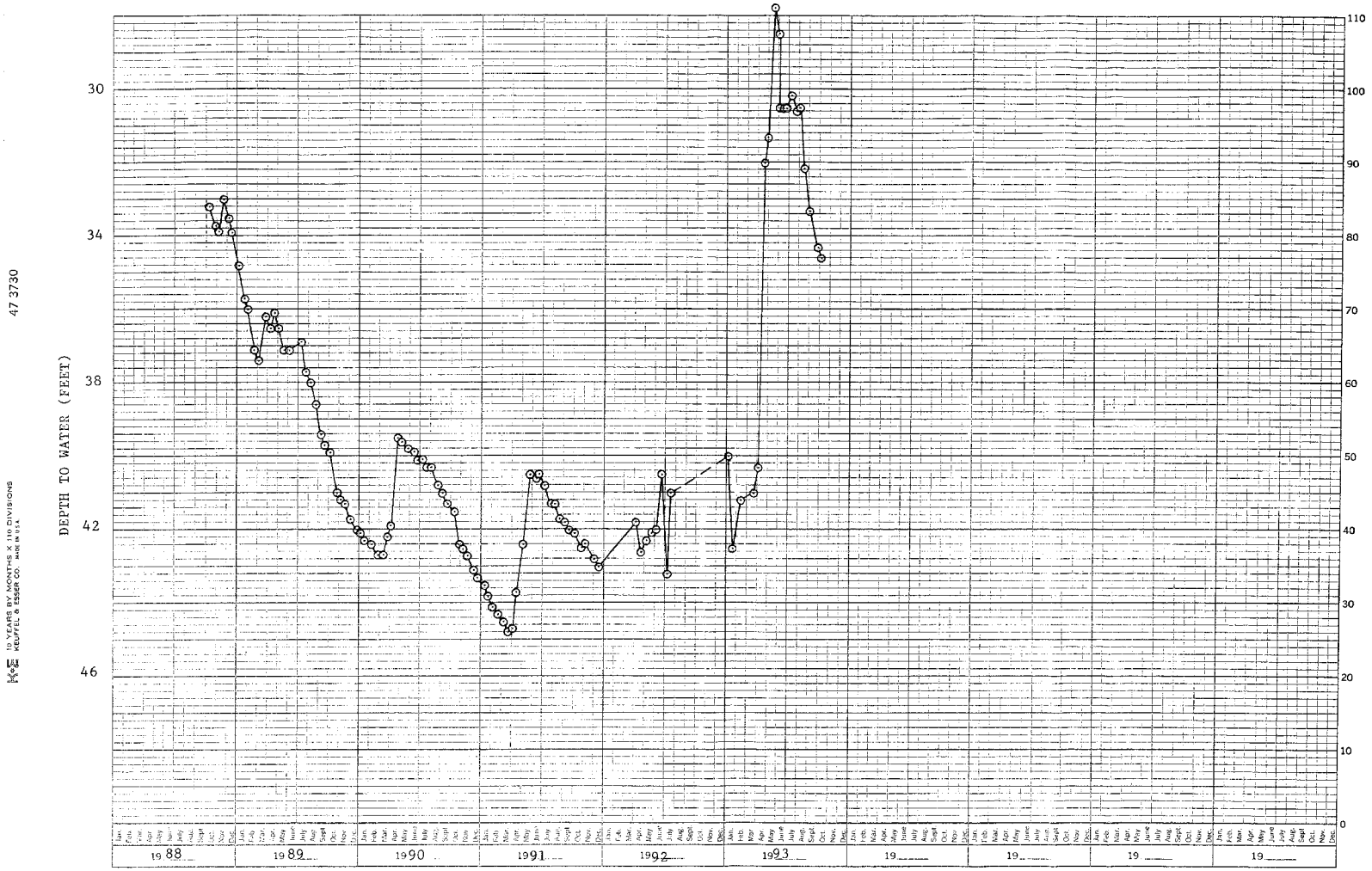
MMOTH COUNTY WATER DISTRICT
IVERSITY OF CALIFORNIA SETTLEMENT AGREEMENT MONITORING DATA

DATE	TIME	WELL 5A	TIME	WELL 5M	TIME	WELL 18	TIME	WELL 15	TIME	WELL 22	TIME	WELL 23	TIME	WELL 1
3/24/93	0751	-3.50	0750	-8.13	0759	-83.38	0811	-263.96	0804	-81.75	0822	-12.92		
3/24/93	1503	-3.50	1505	-8.08	1511	-83.17	1522	-263.75	1515	-81.75	1531	-12.83		
3/25/93	0745	-3.54	0747	-8.08	0753	-83.25	0802	-263.54	0757	-81.75	0812	-12.92		
3/25/93	1524	-3.54	1526	-8.00	1533	-83.29	1543	-263.58	1538	-81.67	1553	-13.00		
3/26/93	0809	-3.67	0813	-8.04	0819	-83.29	0828	-263.67	0823	-81.67	0838	-13.04		
3/26/93	1529	-3.63	1531	-8.08	1537	-83.29	1550	-263.58	1542	-81.67	1601	-13.08		
8/27/93	0800	-3.75	0802	-8.08	0809	-83.29	0821	-263.41	0813	-81.67	0831	-13.17		
8/27/93	1544	-3.71	1546	-8.04	1552	-83.29	1602	-263.33	1557	-81.58	1616	-13.17		
8/28/93	0710	-3.71	0712	-8.08	0719	-83.29	0730	-263.33	0725	-81.58	0747	-13.17		
8/28/93	1710	-3.71	1713	-8.08	1718	-83.29	1730	-263.25	1725	-81.58	1744	-13.17		
8/29/93	0705	-3.67	0707	-8.04	0713	-83.29	0724	-263.25	0719	-81.58	0739	-13.17		
8/29/93	1546	-3.67	1548	-8.08	1553	-83.29	1606	-263.25	1600	-81.58	1620	-13.25		
8/30/93	1050	-3.92	1054	-8.08	1101	-83.29	1112	-262.92	1106	-81.50	1127	-13.25		
8/31/93	0738	-3.96	0740	-8.09	0750	-82.66	0759	-262.47	0815	-81.43	0722	-13.13	0728	-278.48
8/31/93	1655	-3.97	1659	-8.08	1558	-83.15	1500	-272.71	1623	-81.30	1623	-13.11	1625	-275.91
9/01/93	0730	-3.99	0732	-8.06	0736	-83.26	0743	-273.61	0741	-81.15	0715	-13.13	0718	-279.95
9/01/93	1634	-4.04	1632	-8.08	1639	-83.18	1700	-274.13	1713	-80.39	1615	-13.17	1619	-277.40
9/02/93	0733	-4.05	0732	-8.11	0739	-83.23	0742	-274.75	0755	-80.44	0716	-13.17	0720	-269.20
9/02/93	1312	-4.02	1300	-8.12	1317	-83.36	1220	-274.85	1322	-80.85	1330	-13.21	1328	-266.40
9/03/93	0844	-4.00	0848	-8.13	0855	-83.46	0903	-274.17	0900	-80.83	0913	-13.29	0921	-279.08
9/03/93	1625	-4.00	1628	-8.13	1636	-83.54	1643	-274.42	1640	-80.83				
9/04/93	0752	-4.00	0757	-8.10	0807	-83.15	0823	-274.60	0816	-80.70	0738	-13.30	0730	-264.00
9/04/93	1720	-4.00	1725	-8.10	1734	-83.20	1743	-275.00						
9/05/93	0755	-4.00	0758	-8.10	0805	-83.10	0816	-275.40	0811	-80.70	0737	-13.40	0730	-262.80
9/05/93	1703	-4.00	1708	-8.10	1715	-83.00	1723	-275.70						
9/06/93	0730	-4.00	0735	-8.10	0745	-83.00	0757	-275.80	0753	-80.70	0812	-13.50	0821	-262.00
9/06/93	1640	-4.00	1647	-8.10	1655	-83.10	1704	-276.80						
9/07/93	0815	-4.10	0822	-8.15	0829	-83.20	0840	-277.10	0835	-80.70	0943	-13.60	0855	-264.20
9/07/93	1530	-4.00	1533	-8.13	1540	-83.21	1545	-277.50						
9/08/93	0820	-4.10	0825	-8.20	0833	-83.30	0845	-277.90	0840	-80.70	0855	-13.70	0911	-284.60
9/08/93	1652	-4.08	1654	-8.17	1700	-83.29	1704	-277.33						
9/09/93	1109	-4.20	1111	-8.25	1255	-83.20	1244	-278.10	1240	-80.65	1217	-13.70	1220	-285.60
9/09/93	1553	-4.13	1555	-8.25	1601	-83.25	1604	-277.92						
9/10/93	0935	-4.20	0936	-8.20	0942	-83.20	0923	-278.00	0927	-80.70	0910	-13.70	0905	-286.68
9/10/93	1530	-4.20	1535	-8.20	1537	-83.20	1555	-278.40						
9/11/93	0809	-4.25	0812	-8.30	0818	-83.20	0833	-278.80	0825	-80.70	0754	-13.85	0744	-287.80
9/11/93	1622	-4.20	1628	-8.30	1615	-83.20	1605	-279.20						
9/12/93	0740	-4.20	0745	-8.30	0755	-82.90	0809	-279.00	0804	-80.50	0817	-13.90	0823	-288.30
9/12/93	1605	-4.20	1610	-8.30	1621	-82.95	1633	-279.30						

DATE	TIME	5A	TIME	5M	TIME	18	TIME	15	TIME	22	TIME	23	TIME	1
9/13/93	0820	-4.25	0826	-8.35	0836	-82.90	0846	-279.30	0841	-80.50	0900	-13.90	0856	-289.00
9/13/93	1524	-4.25	1526	-8.38	1535	-83.29	1539	-279.63						
9/14/93	0855	-4.30	0900	-8.40	0907	-83.00	0840	-279.80	0833	-80.50	0815	-13.90	0808	-288.00
9/14/93	1516	-4.29	1520	-8.50	1526	-83.25	1529	-279.92						
9/15/93	0807	-4.35	0813	-8.50	0821	-83.00	0840	-280.00	0833	-80.50	0849	-13.95	0854	-288.00
9/15/93	1550	-4.29	1553	-8.58	1600	-83.08	1604	-281.33						
9/16/93	0850	-4.33	0850	-8.60	0905	-82.90	0940	-280.00	0937	-80.50	1107	-13.96	1106	-288.25
9/16/93	1531	-4.33	1533	-8.58	1539	-83.00	1542	-280.50						
9/17/93	0937	-4.38	0940	-8.60	0947	-83.00	0952	-281.21	0952	-80.67	0900	-14.08	0903	-288.00
9/17/93	1543	-4.38	1545	-8.63	1550	-83.00	1554	-280.58						
9/18/93	0745	-4.45	0753	-8.65	0802	-83.00	0814	-281.00	0810	-80.50	0826	-14.00	0823	-288.00
9/18/93	1555	-4.45	1600	-8.70	1612	-83.00	1619	-281.20						
9/19/93	0730	-4.50	0736	-8.65	0746	-82.95	0800	-281.30	0756	-80.50	0812	-14.00	0816	-287.30
9/19/93	1610	-4.50	1616	-8.65	1625	-82.90	1635	-281.50						
9/20/93	1030	-4.50	1033	-8.65	1036	-82.90	1100	-281.75	1014	-80.50	0951	-14.10	0945	-287.00
9/20/93	1623	-4.50	1625	-8.67	1631	-82.95	1636	-281.90						
9/21/93	1552	-4.50	1554	-8.71			1601	-281.92						
9/22/93	1539	-4.52	1541	-8.69	1547	-82.90	1554	-282.25	1551	-80.53	1526	-14.35	1528	-280.71
9/23/93	1736	-4.60	1738	-8.79			1751	-282.50						
9/24/93	1536	-4.66	1538	-8.78	1544	-83.10	1550	-283.00	1548	-80.53	1524	-14.57	1526	-276.20
9/25/93	1405	-4.80	1400	-8.80			1415	-283.33						
9/26/93	1812	-4.89	1810	-8.81	1815	-83.22	1825	-283.75	1820	-80.50	1835	-14.80	1840	-278.33
9/27/93	1513	-4.92	1515	-8.81			1522	-284.08						
9/28/93	1537	-4.97	1538	-8.82	1544	-83.15	1550	-283.96	1548	-80.52	1514	-14.90	1516	-282.25
9/29/93	1514	-5.01	1516	-8.80			1523	-284.25						
9/30/93	0825	-5.04	0829	-8.83	0846	-83.33	0854	-284.33	0850	-80.67	0810	-15.00	0812	-280.92
9/30/93	1444	-5.11	1446	-8.87	1452	-83.18	1458	-275.08	1456	-80.53	1430	-15.01	1432	-280.42
10/01/93	0909	-5.15	0912	-8.87	0921	-83.21	0927	-274.17	0925	-80.53	0847	-15.04	0849	-281.25
10/01/93	1508	-5.15	1510	-8.88	1516	-83.13	1522	-273.75	1519	-80.51	1455	-15.05	1457	-277.08
10/02/93	0749	-5.15	0754	-8.90	0807	-83.20	0816	-273.20	0811	-80.50	0737	-15.00	0730	-276.20
10/02/93	1623	-5.20	1629	-8.90	1633	-83.10	1646	-273.00	1641	-80.50	1607	-15.00	1601	-280.10
10/03/93	0732	-5.20	0740	-8.90	0751	-83.20	0804	-272.90	0759	-80.50	0819	-15.00	0815	-273.00
10/03/93	1619	-5.20	1622	-8.85	1628	-83.10	1643	-272.40	1635	-80.50	1606	-14.90	1557	-277.40
10/04/93	0830	-5.11	0832	-8.85	0838	-83.03	0845	-271.75	0842	-80.51	0817	-14.92	0819	-277.54
10/04/93	1525	-5.11	1527	-8.88	1533	-82.96	1539	-271.58	1537	-80.51	1552	-14.91	1554	-273.42
10/05/93	0828	-5.08	0830	-8.79	0836	-82.89	0843	-271.17	0840	-80.51	0814	-14.90	0816	-267.04
10/05/93	1645	-5.08	1647	-8.80	1653	-82.88	1658	-271.00	1656	-80.51	1707	-14.90	1709	-264.75
10/06/93	0839	-5.09	0841	-8.80	0846	-82.93	0852	-270.92	0850	-80.51	0826	-14.91	0828	-261.70
10/06/93	1547	-5.10	1548	-8.80	1554	-82.92	1559	-270.50	1557	-80.51	1532	-14.92	1536	-274.33
10/07/93	0823	-5.09	0824	-8.80	0831	-82.92	0836	-270.33	0834	-80.51	0806	-14.92	0809	-281.42
10/07/93	1526	-5.10	1528	-8.79	1533	-82.91	1538	-270.21	1536	-80.51	1546	-14.93	1548	-283.46
10/08/93	1007	-5.10	1017	-8.75	1025	-82.90	0953	-269.80	0947	-80.50	0935	-15.00	0930	-270.20
10/08/93	1636	-5.10	1642	-8.75	1647	-82.85	1628	-269.60	1623	-80.50	1610	-14.95	1605	-267.80
10/09/93	0704	-5.10	0709	-8.80	0717	-82.90	0735	-269.80	0728	-80.50	0750	-15.00	0746	-263.80
10/09/93	1635	-5.10	1640	-8.75	1646	-82.95	1627	-269.50	1621	-80.50	1608	-15.00	1603	-260.90

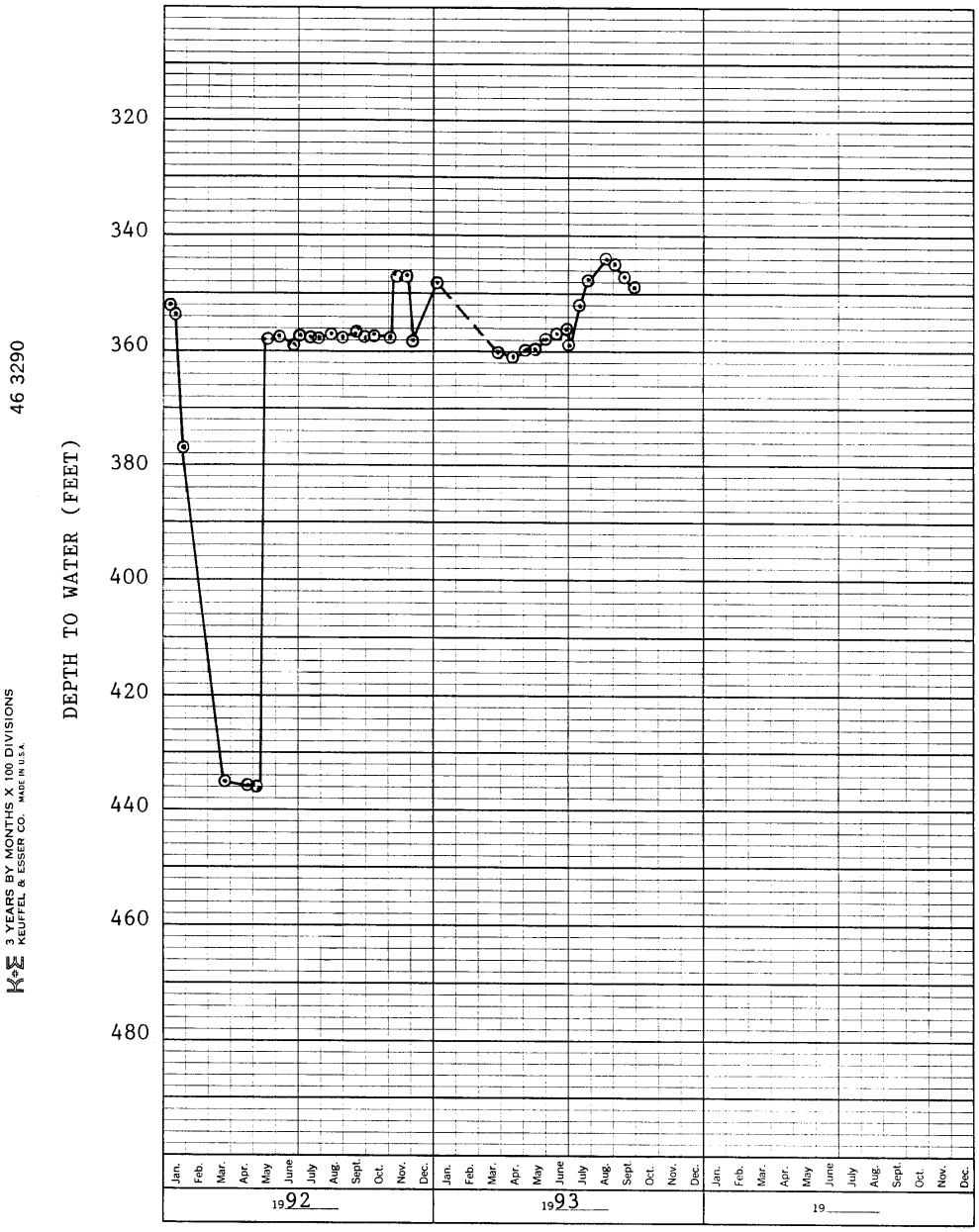
APPENDIX E

SUPPLEMENTARY WATER-LEVEL HYDROGRAPHS FOR MONITOR WELLS



WATER-LEVEL HYDROGRAPH FOR DISTRICT WELL 4M

WATER-LEVEL HYDROGRAPH FOR WELL 12M



46 3290

K+E 3 YEARS BY MONTHS X 100 DIVISIONS
KEUFFEL & ESSER CO. MADE IN U.S.A.

WATER-LEVEL HYDROGRAPH FOR WELL NO. 14M

APPENDIX F

CHEMICAL ANALYSES OF WATER FROM SELECTED WELLS

MAMMOTH COUNTY WATER DISTRICT GROUNDWATER QUALITY DATA
OCTOBER, 1992 THROUGH SEPTEMBER, 1993

RESULTS (mg/L)

PARAMETER	WELL 1	WELL 6	WELL 10	WELL 15
Nitrate Nitrogen	<0.1	<0.1	<0.1	<0.1
Fluoride	0.5	0.3	0.3	0.5
Nitrite Nitrogen	<0.1	<0.1	<0.1	<0.1
Aluminum	<0.1	<0.1	<0.1	<0.1
Arsenic	<0.01	0.02	0.04	0.01
Barium	<0.1	<0.1	<0.1	<0.1
Cadmium	<0.001	<0.001	<0.001	<0.001
Total Chromium	<0.01	<0.01	<0.01	<0.01
Lead	<0.005	<0.005	<0.005	<0.005
Murcury	<0.001	<0.001	<0.001	<0.001
Selenium	<0.005	<0.005	<0.005	<0.005
Silver	<0.01	<0.01	<0.01	<0.01
Temperature (Fahrenheit)	52	55	55	54

Analyses by E.S. Babcock &
Sons of Riverside

Collected Samples on 4/28/93

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CA DHS CERTIFICATION E756

LABORATORIES
6100 QUAIL VALLEY COURT, RIVERSIDE

E.S. BABCOCK & SONS, INC.
ESTABLISHED 1906

909/653-3351
FAX 909/653-1662

P.O. BOX 432
RIVERSIDE, CA 92502

EX

GENERAL MINERAL & PHYSICAL, & INORGANIC ANALYSIS (8/93)

Date of Report: 10/22/93 — Sample ID No. 931011-674

Laboratory Name: E.S. BABCOCK & SONS — Signature Lab Director:

Name of Sampler: G. S. — Employed By: Mammoth Co. Water Dist.

Date/Time Sample Collected: 93/09/29/1000 — Date/Time Sample Received @ Lab: 93/10/11/1110 — Date Analyses Completed: 93/10/22

System Name: MAMMOTH CWD — System Number: 2610001

Name or Number of Sample Source: WELL 24

User ID: TAN — Station Number:

Date/Time of Sample: 93 09 29 1000 (YY MM DD TTTT) — Laboratory Code: 4790

Date Analysis Completed: 93 10 22 (YY MM DD)

Submitted by:_____ Phone #:_____

MCL	REPORTING UNITS	CONSTITUENT	ENTRY #	ANALYSES RESULTS	DLR
	mg/L	Total Hardness (as CaCO3)	00900	46	
	mg/L	Calcium (Ca)	00916	10	
	mg/L	Magnesium (Mg)	00927	5	
	mg/L	Sodium (NA)	00929	9	
	mg/L	Potassium (K)	00937	4	
Total Cations	Meq/L	Value: 1.4			
	mg/L	Total Alkalinity (AS CaCO3)	00410	65	
	mg/L	Hydroxide (OH)	71830	< 1	
	mg/L	Carbonate (CO3)	00445	< 1	
	mg/L	Bicarbonate (HCO3)	00440	79	
*	mg/L*	Sulfate (SO4)	00945	4	0.5
*	mg/L*	Chloride (Cl)	00940	< 1	
45	mg/L	Nitrate (as NO3)	71850	< 1	
****	mg/L	Fluoride (F) Temp. Depend.	00951	0.3	0.1
Total Anions	Meq/L	Value: 1.4			
	Std. Units	PH (Laboratory)	00403	7.0	
**	umho/cm**	Specific Conductance (E.C.)	00095	130	
***	mg/L***	Total Filterable Residue at 180C (TDS)	70300	130	
	Units	Apparent Color (Unfiltered)	00081		
	TON	Odor Threshold at 60 C	00086		
	NTU	Lab Turbidity	82079		
0.5	mg/L	MBAS	38260	< 0.05	

* 250-500-600 ** 900-1600-2200 *** 500-1000-1500 **** 1.4-2.4

BACTERIOLOGY
WATER TESTING
HAZARDOUS WASTE TESTING
CA DHS CERTIFICATION E756

LABORATORIES
6100 QUAIL VALLEY COURT, RIVERSIDE

E.S. BABCOCK & SONS, INC.
ESTABLISHED 1906

909/653-3351
FAX 909/653-1662

P.O. BOX 432
RIVERSIDE, CA 92502

INORGANIC CHEMICALS 931011-674

MCL	REPORTING UNITS	CONSTITUENT	ENTRY #	ANALYSES RESULTS		DLR
1000	ug/L	Aluminum (Al)	01105	<	50	50.0
50	ug/L	Arsenic (As)	01002	<	5	5.0
1000	ug/L	Barium (Ba)	01007	<	100	100.0
***** 10	ug/L	Cadmium (Cd)	01027	<	1	1.0
50	ug/L	Chromium (Total Cr)	01034	<	10	10.0
1000	ug/L	Copper (Cu)	01042	<	50	50.0
300	ug/L	Iron (Fe)	01045		200	100.0
50	ug/L	Lead (Pb)	01051	<	5	5.0
50	ug/L	Manganese (Mn)	01055		30	30.0
2	ug/L	Mercury (Hg)	71900	<	1	1.0
***** 10	ug/L	Selenium (Se)	01147	<	5	5.0
50	ug/L	Silver (Ag)	01077	<	10	10.0
5000	ug/L	Zinc (Zn)	01092	<	50	50.0
		ADDITIONAL ANALYSES				
*****	ug/L	Nitrite as Nitrogen(N)	00620	<	400	400

***** New or revised MCL pending

Laboratory comments and description of any additional compounds found:

Invoice No. 96518 Lab No. 931011-674

APPENDIX G

MAMMOTH CREEK STREAMFLOW

MAMMOTH COUNTY WATER DISTRICT
MAMMOTH CREEK @ OLD MAMMOTH ROAD

DAILY DISCHARGES IN CUBIC FEET PER SECOND

	1992			1993								
DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	4.6	8.4	3.8	5.4	7.3	19.2	9.2	17.2	85.2	77.9	31.5	12.3
2	4.9	8.2	4.4	6.0	7.1	14.9	8.4	15.2	80.1	85.2	28.0	13.3
3	4.9	8.0	3.3	9.0	6.9	13.0	9.0	15.2	75.1	100.6	26.1	11.9
4	4.9	7.6	3.2	7.8	7.5	10.5	9.9	17.6	75.8	99.8	26.1	10.2
5	4.9	7.4	3.1	6.7	6.5	7.4	8.8	18.9	73.6	86.7	30.0	9.5
6	4.9	7.3	2.6	6.9	6.5	7.4	7.8	18.5	62.7	73.6	27.0	9.8
7	4.9	12.5		7.4	6.1	7.1	7.8	19.3	59.4	95.9	26.1	9.5
8	4.9	8.6	5.4	8.2	6.1	6.5	8.6	19.3	58.1	102.2	23.3	9.5
9	4.9	7.4	5.4	7.1	6.7	6.1	9.2	20.6	49.4	93.6	21.9	9.8
10	4.4	4.8	7.3	9.9	6.3	6.0	9.7	23.3	36.0	90.5	18.5	9.8
11	4.6	13.4	3.5	7.8	6.1	6.1	9.0	24.2	44.0	70.2	17.2	9.2
12	4.1	15.3	6.1	8.4	5.8	5.8	9.2	26.5	60.1	62.0	16.0	9.5
13	3.7	9.0	7.4	6.9	5.6	5.6	8.8	26.5	76.5	61.4	18.0	10.2
14	6.9	7.1	7.3	6.1	5.3	6.7	9.0	24.2	89.7	62.7	18.0	10.5
15	5.8	6.3	7.6	8.2	4.7	6.5	9.9	36.8	136.8	59.4	18.5	10.2
16	5.1	5.8	5.8	8.4	4.3	6.0	9.9	41.2	114.4	50.0	18.0	10.2
17	5.1	6.0	6.5	9.0	4.1	13.9	10.7	51.2	120.3	45.8	17.6	9.8
18	5.3	5.4		9.2	4.4	10.7	11.6	75.1	115.2	39.5	16.4	9.8
19	5.1	5.4	17.3	9.4		9.6	9.4	90.5	102.2	36.8	15.2	9.8
20	5.1	3.9	8.2	9.6	7.8	9.0	9.9	105.4	113.6	35.1	14.1	9.8
21	5.4	3.1	7.4	9.7	7.8	9.0	10.9	97.4	138.6	35.1	13.3	8.3
22	5.1	5.3	5.8	8.6	7.3	8.6	14.9	103.0	131.5	31.5	13.0	8.9
23	5.1	2.1	6.9	9.2		9.0	14.4	99.0	57.5	30.5	13.7	7.9
24	5.1	2.8	6.9	9.4		10.7	13.4	95.9	85.2	33.6	13.0	7.3
25	4.9	4.1	1.7	8.6	13.2	8.8	13.0	108.6	105.4	37.3	12.6	6.8
26	4.8	3.6	1.7	8.4	11.8	9.4	14.9	103.0	94.3	40.6	12.3	6.2
27	5.1	4.6	3.1	8.2	4.3	8.6	14.5	98.2	125.4	43.5	11.9	6.2
28	4.8	3.5	3.6	7.8	16.3	8.2	14.9	92.0	137.7	40.1	13.3	6.5
29	6.7	1.7	3.2	7.6		7.8	15.6	83.7	139.5	38.4	11.5	6.7
30	13.7	1.9	4.4	7.4		8.0	17.2	70.8	116.9	33.6	11.9	6.5
31	9.2		6.1	7.4		8.0		77.2		33.6	14.5	
MEAN	5.4	6.4	5.5	8.1	7.0	8.8	11.0	55.3	92.0	58.9	18.3	9.2
MAX	13.7	15.3	17.3	9.9	16.3	19.2	17.2	108.6	139.5	102.2	31.5	13.3
MIN	3.7	1.7	1.7	5.4	4.1	5.6	7.8	15.2	36.0	30.5	11.5	6.2