

SIERRA VALLEY

HYDROGEOLOGIC

STUDIES

TAC Committee Visits Nested Monitoring Well Near Beckwourth



Presented By:

The Sierra Valley Groundwater Management District

In Cooperation With The Plumas County Flood Control And Water Conservation District

Funded By The Monterey Settlement Agreement 2003

May 2005

Technical Report Prepared By: Kenneth D. Schmidt & Associates

Project Manager: Judy Dillon

TECHNICAL REPORT ON 2003-2005 HYDROGEOLOGIC
EVALUATION FOR SIERRA VALLEY

Prepared for
Sierra Valley Groundwater Management District
Sierraville, California

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May 2005

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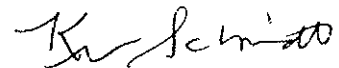
Ms. Judy Dillon
Sierra Valley Groundwater
Management District
P.O. Box 312
Sierra Valley, California 96126

Re: 2003-2005 Hydrogeologic Evaluation

Dear Judy:

Submitted herewith is our report on the 2003-2005 hydrogeologic evaluation for groundwater in Sierra Valley. We appreciate the cooperation of the Groundwater Management District and the Northern District of the California Department of Water Resources in supplying information for this report.

Sincerely yours,



Kenneth D. Schmidt

KDS/pe

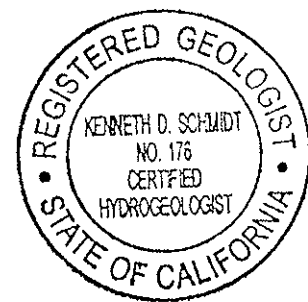
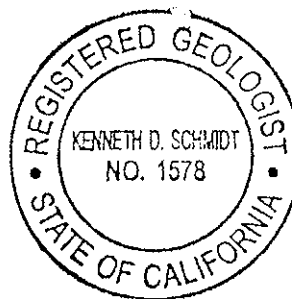


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EXECUTIVE SUMMARY

During 2004, two new nested monitor wells were installed in the Chilcoot and Beckwourth areas. These wells provided new information on subsurface geologic conditions, water levels, and groundwater quality. These and pre-existing District monitor wells are being regularly monitored by the District. As part of this evaluation, three new subsurface geologic cross sections were developed. Two were in the Chilcoot area, primarily to show the relation between alluvial deposits and hardrock, both of which are tapped by water supply wells in the area. The other section was in the Beckwourth area, to supplement previously developed surface cross section in the District. After the new nested monitor wells were developed, water samples were collected for chemical analyses.

Records of metered pumpage and water levels in Sierra Valley were updated for Spring 2003-Spring 2005. Pumpage decreased after 1992 through 1998, which resulted in substantial water-level rises in most pumped wells in the valley. There was also more recharge due to precipitation during this period. Water levels in some wells nearly recovered by 1998 to levels prior to 1979. Pumpage in the valley increased after 1998, and this has resulted in water levels falling to near or below the previous low levels in parts of the valley. Records indicate that the safe yield in the developed part of the valley is about 6,000 acre-feet per year. Pumpage greater than this amount causes water levels to decline.

TECHNICAL REPORT ON 2003-2005 HYDROGEOLOGIC
EVALUATION FOR SIERRA VALLEY

INTRODUCTION

The Sierra Valley Groundwater Management District received funding from Plumas County under the Monterey Settlement Agreement. This technical report describes the hydrogeologic evaluations that were done for this project. The following components of the evaluation are discussed:

1. Nested monitor well installation and testing
2. Subsurface geologic cross sections
3. Water-level hydrographs
4. Update of Sierra Valley pumpage and water-level reports for 2003-2005.

MONITOR WELL INSTALLATION AND TESTING

Well Construction

Bradley and Sons of Del Rey installed two nested monitor wells by the direct rotary method. Welenco ran an electric log in the pilot hole for each well. Kenneth D. Schmidt and Associates logged the drill cuttings and prepared a geologic log for each hole. The electric logs, geologic logs and completion diagrams for these wells are provided in Appendix A. Figure 1 shows the location of the District monitor wells. MW-1 is a previously installed District monitor well near Loyaltan. MW-2, MW-3, and MW-4

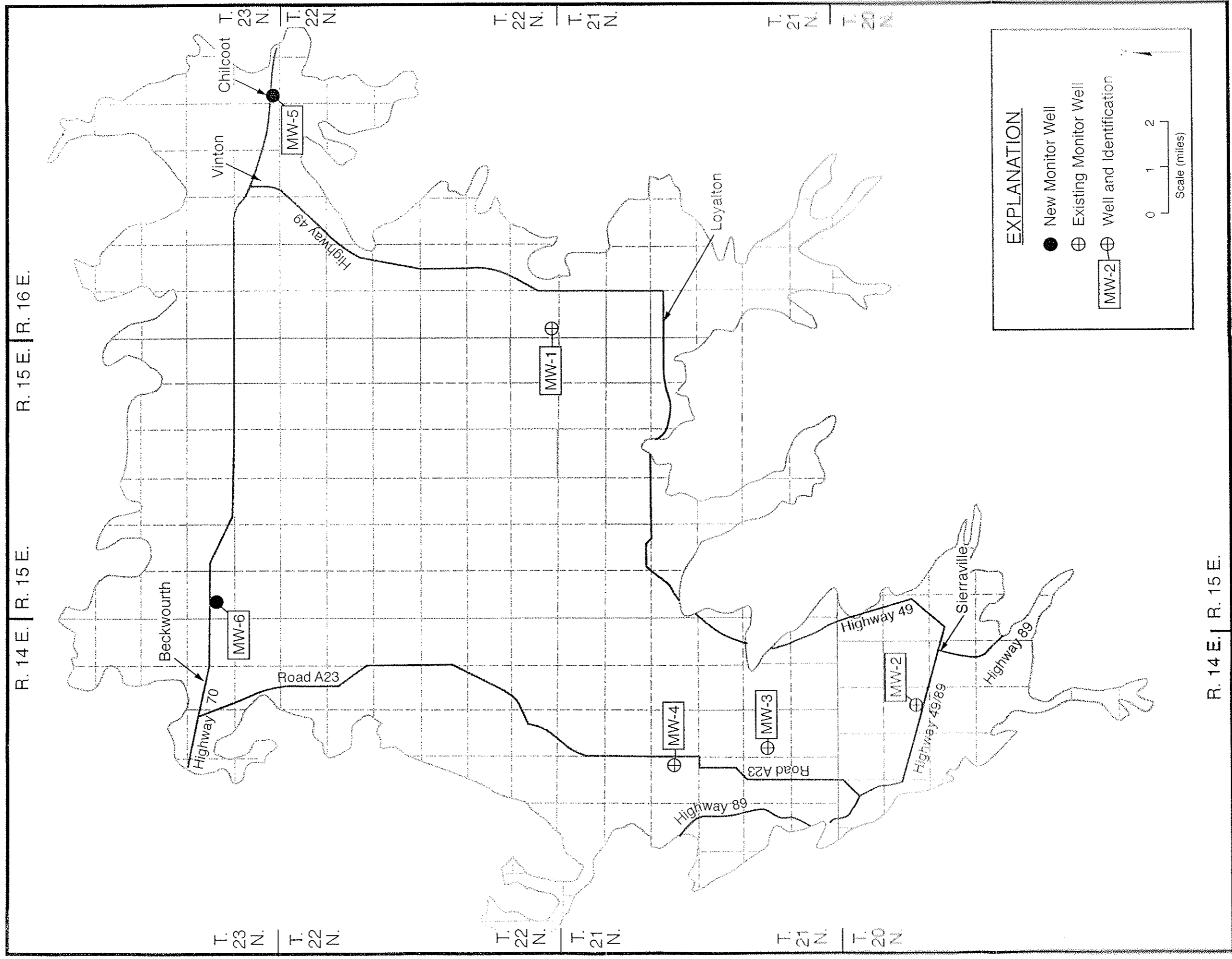


FIGURE 1 - LOCATION OF DISTRICT MONITOR WELLS

were installed in the southwest part of the valley in Summer 2002. As part of this evaluation, MW-5 was installed in Chilcoot, near the deepest part of the alluvial sub-basin, and MW-6 was installed east of Beckwourth in 2004.

For each well, a six-inch pilot hole was first drilled to the total depth. MW-5 bottomed in hardrock at 350 feet in depth. MW-6 was drilled to a depth of 490 feet without encountering hardrock. Three completion zones were selected for MW-5 and two for MW-6. After the completion zones were selected, the upper part of the hole was reamed to 12 inches in diameter and the middle part to 9 inches in diameter. Two-inch diameter Schedule 40 PVC casing was used for the shallow wells, and two-inch diameter Schedule 80 PVC casing was used for the intermediate and deep wells. From 10 to 30 feet of perforated casing (0.03-inch slot size) were installed for each well. After the gravel pack was placed for each zone, a bentonite seal was placed above the gravel. For the uppermost zone, a cement seal was placed above the bentonite. The wells were initially developed by airlifting and then by pumping and surging with a submersible pump. Drillers reports for the wells are provided in Appendix B. Table 1 summarizes construction data for the nested wells.

TABLE 1-CONSTRUCTION DATA FOR NESTED MONITOR WELLS

Well No.	State Location	Date Drilled	Hole Depth (feet)	Perforated Interval (feet)	Annular Seal (feet)
MW-2	T20N/R14E-11Q	06/02	675	85-100 220-250 420-450	0-71 201-210 375-385
MW-3	T21N/R14E-27M	07/02	440	90-100 255-270 340-355	0-80 200-210 295-305
MW-4	T21N/R14E-16J	07/02	720	260-270 530-550 670-690	0-185 485-500 579-589
MW-5	T23N/R16E-36M	10/04	360	75-90 185-195 290-320	0-69 150-160 240-260
MW-6	T23N/R15E-30F	10/04	490	115-130 310-340	0-105 260-270

Wells constructed by Bradley & Sons of Madera and Del Rey, California. Casings are two-inch diameter PVC.

Subsurface Geologic Conditions

At MW-5, sand was predominant to a depth of about 123 feet, and these deposits were tapped by the shallow zone well. The intermediate zone well at the site tapped a sand layer between 184 and 193 feet in depth. The deep zone well tapped a sand layer between 253 and 305 feet in depth, which was indicated to be the most productive strata below a depth of about 130 feet at the site.

At MW-6, coarse-grained strata were predominant above a depth of about 130 feet, and silt or clay was predominant below that depth. The upper coarse-grained strata were tapped by the shallow zone well at the site. Two clayey sand layers from 308 to 336 feet in depth were tapped by the deep zone well at the site.

Water Levels

Measuring point elevations for the new wells were surveyed by Hamby Engineering. Table 2 provides water-level data for these wells. Depth to water in the wells at MW-5 ranged from 12.7 to 15.1 feet on October 27, 2004. The water-level elevation was the highest in the deepest well at the site, indicating an upward direction of groundwater flow. At MW-6, depth to water ranged from 24.0 feet to 31.1 feet below the measuring point on October 27, 2004. The deep well at this location had the deepest water level, indicating a downward direction of groundwater flow. Appendix C

TABLE 2 - WATER-LEVEL DATA FOR NESTED MONITOR WELLS

Well No.	Zone	Measuring Point Elevation (feet)	Depth to Water (feet)	Water-Level Elevation (feet)
MW-5	Shallow	5,002.30	15.1	4,987.2
	Intermediate	5,002.31	14.3	4,988.0
	Deep	5,002.31	12.7	4,989.6
MW-6	Shallow	4,884.61	24.0	4,860.6
	Deep	4,884.60	31.1	4,853.5

Water levels were measured on October 27, 2004.

contains water-level hydrographs for the new nested monitor wells for October 2004-May 2005, and for the pre-existing monitor wells for the periods of record.

Water Sampling and Analyses

Water samples were collected after each of the new monitor wells was developed by pumping about two to six gpm for about one hour. The temperature, electrical conductivity, and pH were measured in the field during pumping. The samples were collected on October 27, 2004 and preserved and shipped to FGL Environmental in Santa Paula for analyses. Appendix C contains the laboratory sheets for the chemical analyses for the new nested monitor wells. Table 3 summarizes the results of the analyses for MW-5. TDS concentrations in the three samples ranged from 129 to 153 mg/l. The groundwater was of the mixed cation bicarbonate type. Manganese concentrations in water from the two deepest wells at the site ranged from 0.05 to 0.16 mg/l, equaling or exceeding the recommended MCL of 0.05 mg/l. The low nitrate concentrations indicate that the groundwater was likely present under reduced conditions.

Table 4 summarizes results of analyses for of water samples from MW-6. TDS concentrations in the two samples ranged from 621 to 705 mg/l. Water from both wells was of the sodium bicarbonate type. Concentrations of sodium, sulfate, and chloride increased

TABLE 3-CHEMICAL ANALYSES OF
WATER FROM MW-5

<u>Constituent (mg/l)</u>	<u>75-90 feet</u>	<u>185-195 feet</u>	<u>290-320 feet</u>
Calcium	25	18	19
Magnesium	9	4	4
Sodium	21	25	25
Potassium	3	4	2
Carbonate	<10	<10	<10
Bicarbonate	150	140	140
Sulfate	10	6	6
Chloride	5	3	3
Nitrate	5	<0.4	<0.4
Boron	<0.1	<0.1	<0.1
Fluoride	0.3	0.3	0.3
pH	7.1	7.5	7.8
Electrical Conductivity (micromhos/cm @ 25°C)	279	229	230
Total Dissolved Solids	153	130	129
Iron	0.15	<0.05	<0.05
Manganese	0.05	0.16	0.07

Samples collected on October 27, 2004 and analyzed by FGL Environmental of Santa Paula.

TABLE 4-CHEMICAL ANALYSES OF
WATER FROM MW-6

<u>Constituent (mg/l)</u>	<u>115-130 feet</u>	<u>310-340 feet</u>
Calcium	32	24
Magnesium	6	3
Sodium	180	223
Potassium	2	1
Carbonate	<10	<10
Bicarbonate	120	130
Sulfate	160	179
Chloride	181	210
Nitrate	<0.4	<0.4
Boron	2.4	4.0
Fluoride	0.4	0.2
pH	7.9	8.2
Electrical Conductivity (micromhos/cm @ 25°C)	1,090	1,240
Total Dissolved Solids	621	705
Iron	<0.05	<0.05
Manganese	0.28	0.08

Samples were collected on October 27, 2004 and analyzed by
FGL Environmental of Santa Paula.

with increasing depth. The manganese concentrations ranged from 0.08 to 0.28 mg/l, exceeding the recommended MCL. Nitrate concentrations were non-detectable, also likely indicative of reduced conditions. Boron concentrations ranged from 2.4 to 4.0 mg/l, exceeding recommended standards for irrigation of most crops.

SUBSURFACE GEOLOGIC CROSS SECTIONS

As part of the previous hydrogeologic evaluation (Kenneth D. Schmidt and Associates, 2003), four subsurface geologic cross sections were prepared. Three of these focused on the area west and southwest of Vinton and the area near and north of Loyalton. This included the area where most of the large capacity wells in the valley are located. A fourth cross section was developed in the Sierraville-Calpine area, based primarily on logs for the nested monitor wells that were installed in 2002. These sections generally focused on deposits tapped by water supply wells in those parts of the valley.

As part of this evaluation, two new subsurface cross sections were developed in the Chilcoot area (Figure 2). Cross Section E-E' extends from the west to the east through MW-5 (the new District nested monitor well). Cross section F-F' extends from north to south along Frenchman Lake Road, also through MW-5.

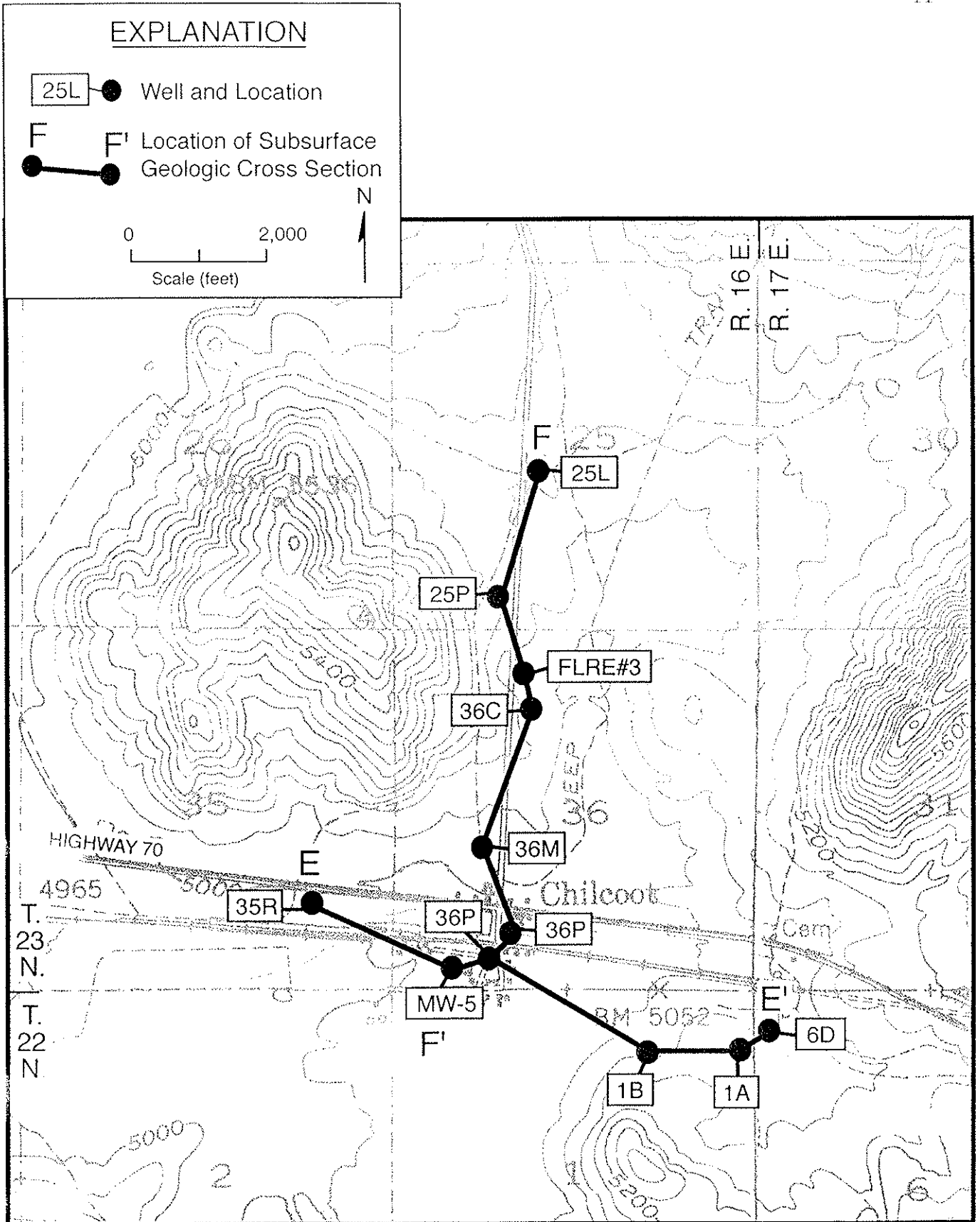


FIGURE 2 - LOCATION OF SUBSURFACE GEOLOGIC CROSS SECTIONS IN CHILCOOT AREA

Chilcoot Area

Subsurface Cross Section E-E' (Figure 3) shows the top of the hardrock, or base of the alluvial deposits, generally along Highway 70 in the Chilcoot area. Shallow coarse deposits are present at Well 35R, MW-5, and 36R above a depth of about 130 feet. Below this depth, the alluvial deposits are primarily fine-grained. MW-5 and Well 36P are believed to be located in the area where the bedrock is the deepest in the Chilcoot area. Depth to the hardrock changes substantially within relatively short distances in the area. The California Department of Water Resources (1983) indicated that a fault passed through the area just east of Well 34R. Depth to hardrock was about 350 feet at MW-5, about 200 feet at Well 1B, and less than 100 feet at Well 6D.

Cross Section F-F' (Figure 4) shows a highly variable depth to bedrock from north to south along the Frenchman Lake Road. The deepest hardrock is at MW-5, however to the north, another area of relatively deep bedrock (about 375 feet) is present at Well 25P. In the north part of the Chilcoot area, a thick weathered zone is present (almost 100 feet thick) above the top of the hardrock and below the alluvial deposits. Fine-grained alluvial deposits are predominant north of Well FLRE No. 3 along this section. A thin coarse-grained zone (boulders) appears to be present near the base of the alluvium in this part of the Chilcoot area. An area of rel-

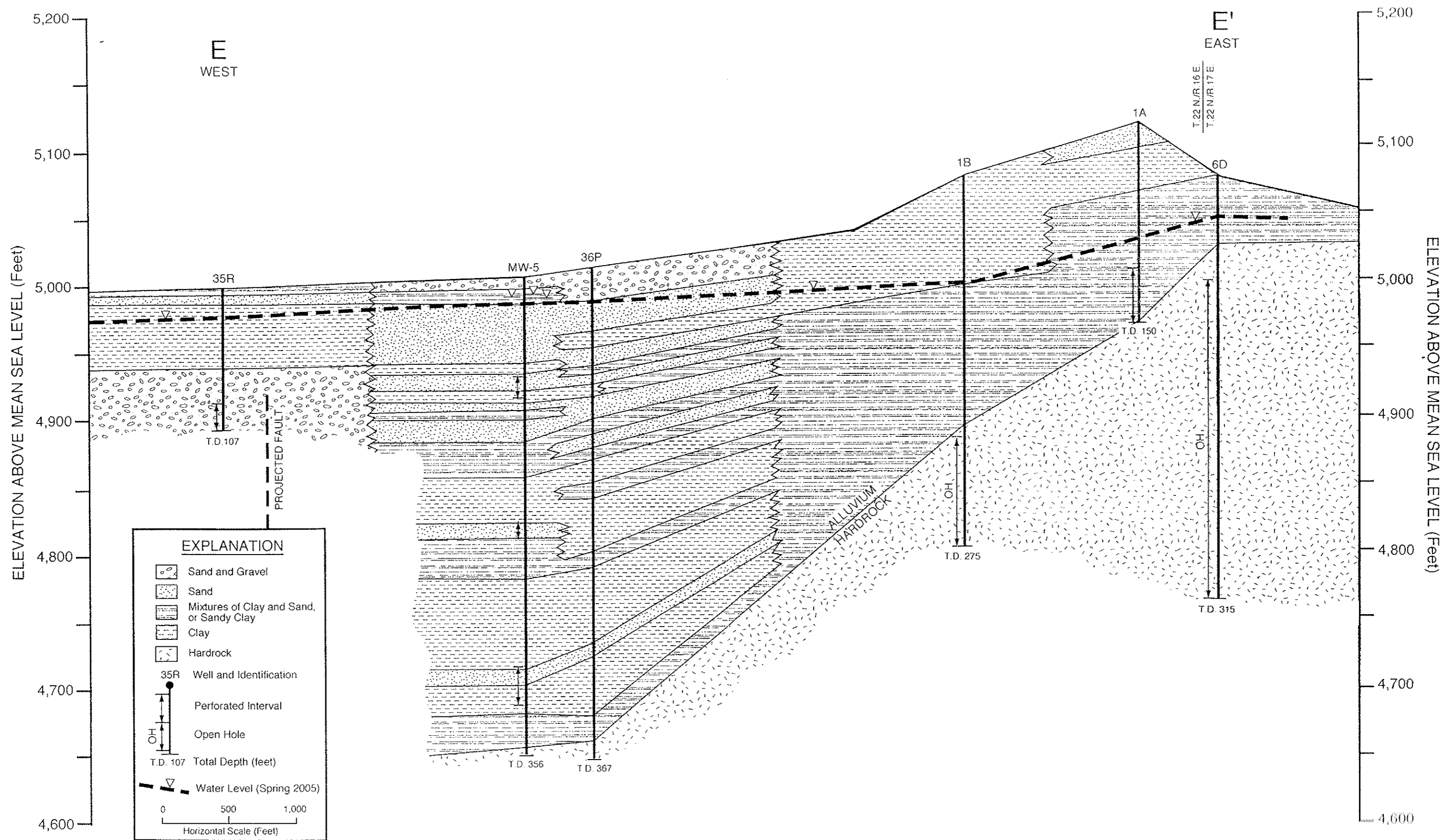


FIGURE 3 - SUBSURFACE GEOLOGIC CROSS SECTION E - E'

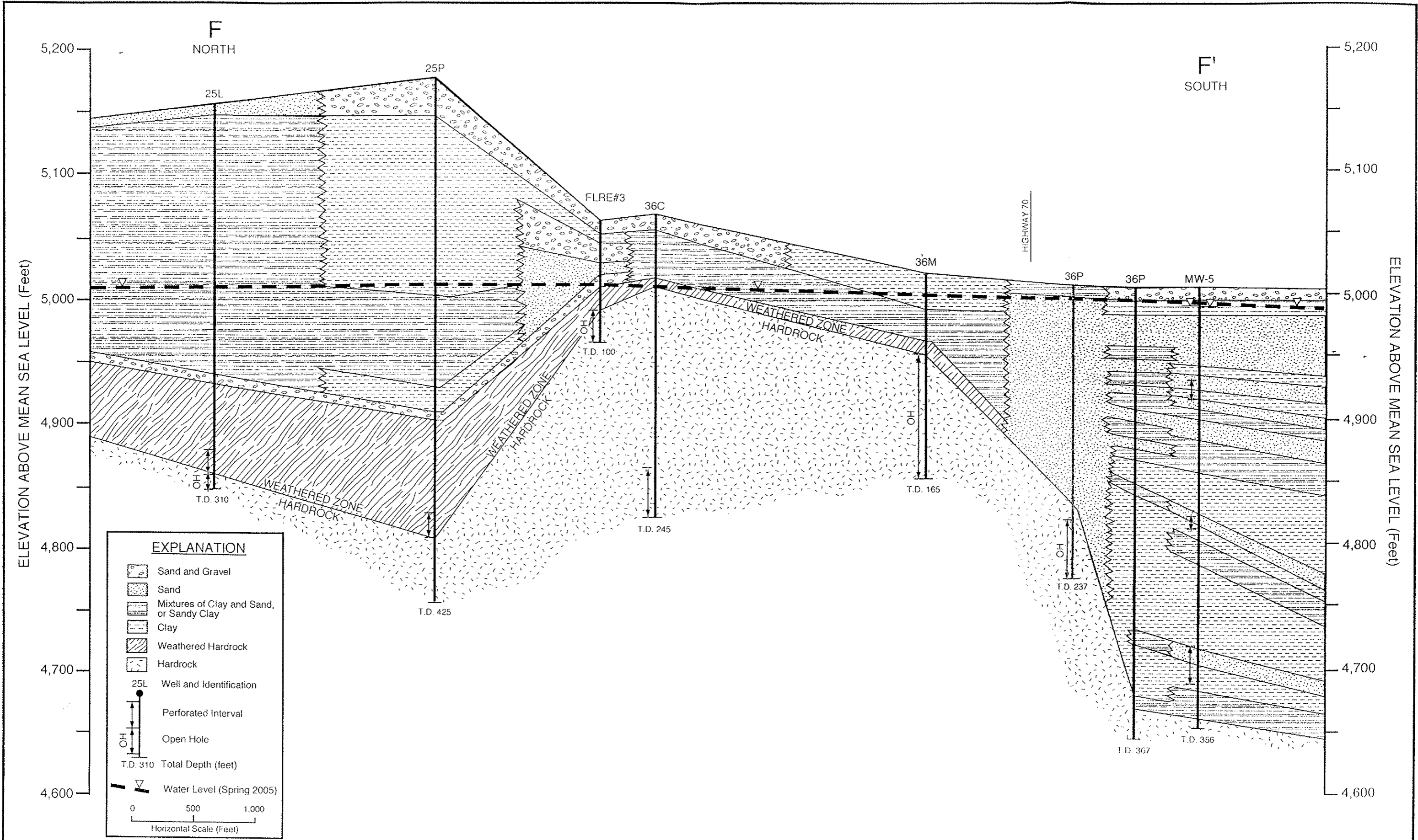


FIGURE 4 - SUBSURFACE GEOLOGIC CROSS SECTION F - F'

atively shallow hardrock (less than about 70 feet deep) was delineated by FLRE No. 3, and Wells 36C and 36M. To the south of that area, the hardrock becomes deeper within a relatively short distance.

Beckwourth Area

Figure 5 shows the location of subsurface geologic cross section G-G', which extends from Beckwourth to the east, through MW-6 (Figure 6). Coarse-grained deposits are predominant within the uppermost 120 feet or so, in the area west of MW-6. East of MW-6, clay is predominant to a depth of about 150 feet. Coarse-grained strata are present at Well 26H2 from about 220 to 240 feet in depth. Coarse-grained strata are present from about 150 to 220 feet in depth at Well 25N. At MW-6, fine-grained deposits are predominant below a depth of about 130 feet.

2003-2005 SIERRA VALLEY GROUNDWATER UPDATE

Background

The California Department of Water Resources (DWR), Northern District, prepared eight annual updates on groundwater conditions in the Sierra Valley Basin, extending through Spring 1991. Kenneth D. Schmidt and Associates prepared a triennial update extending through Spring 1994, a quadrennial update extending through Spring 1998, and a five-year update extending through Spring 2003. As of

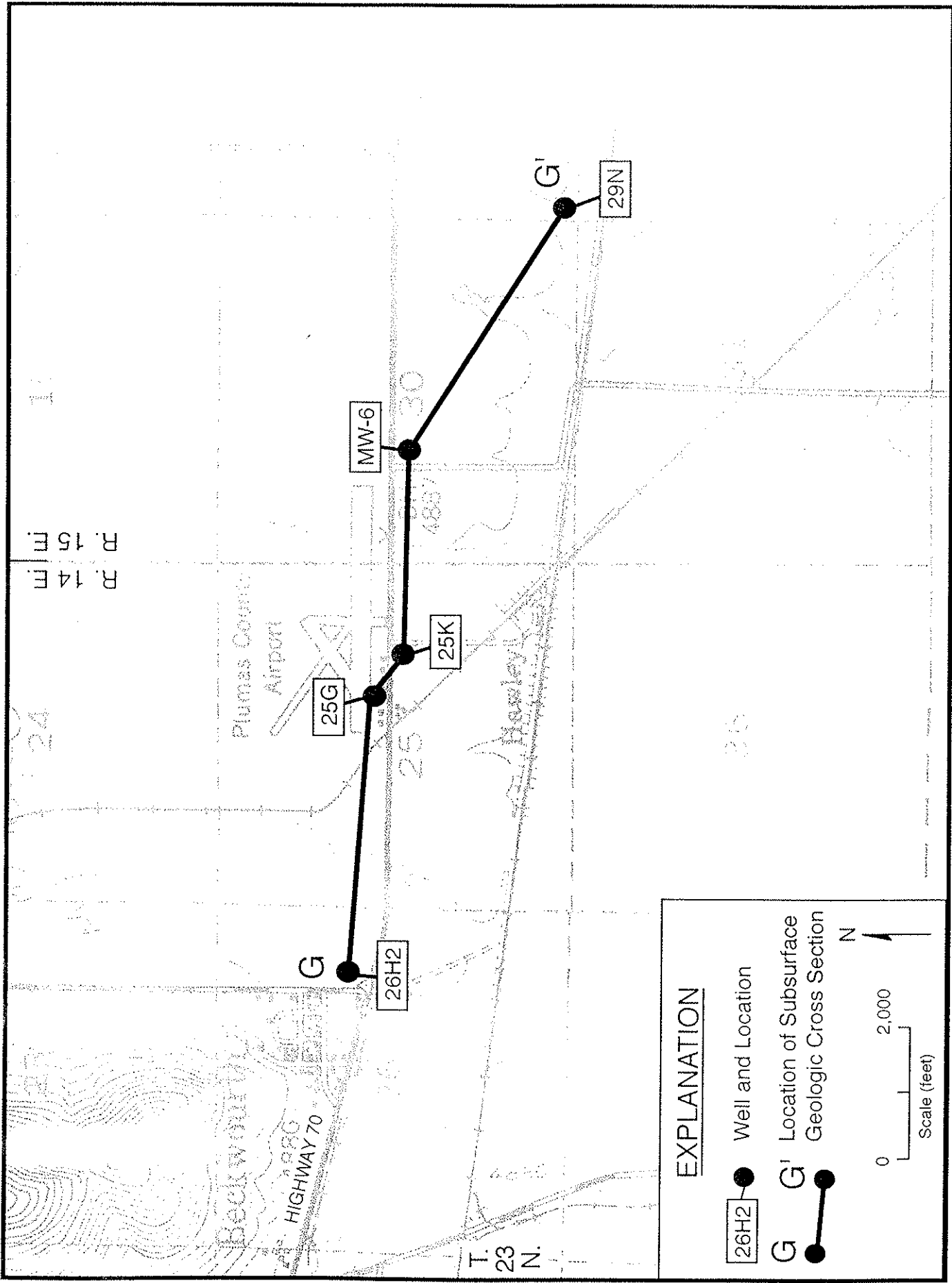


FIGURE 5 - LOCATION OF SUBSURFACE GEOLOGIC CROSS SECTION IN BECKWOURTH AREA

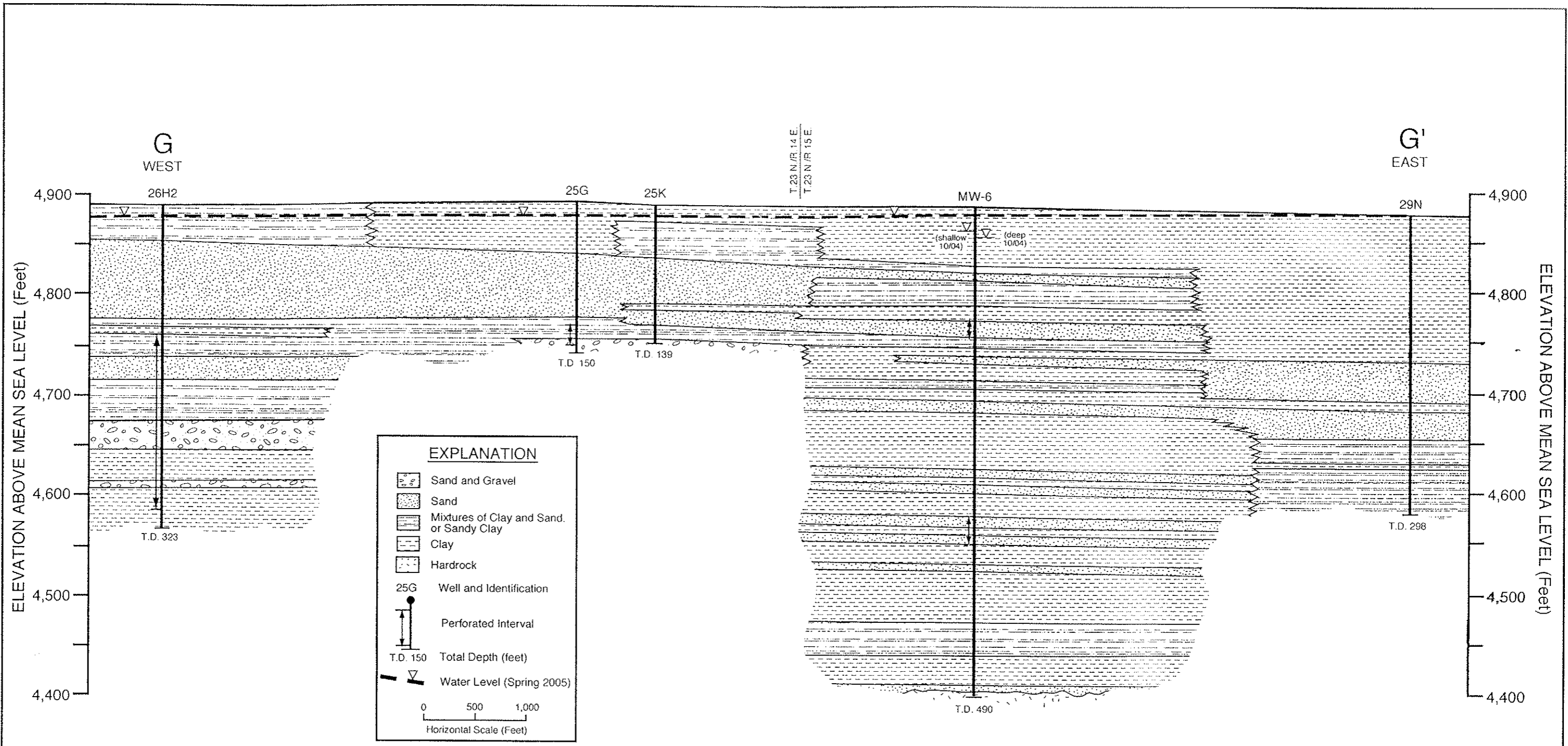


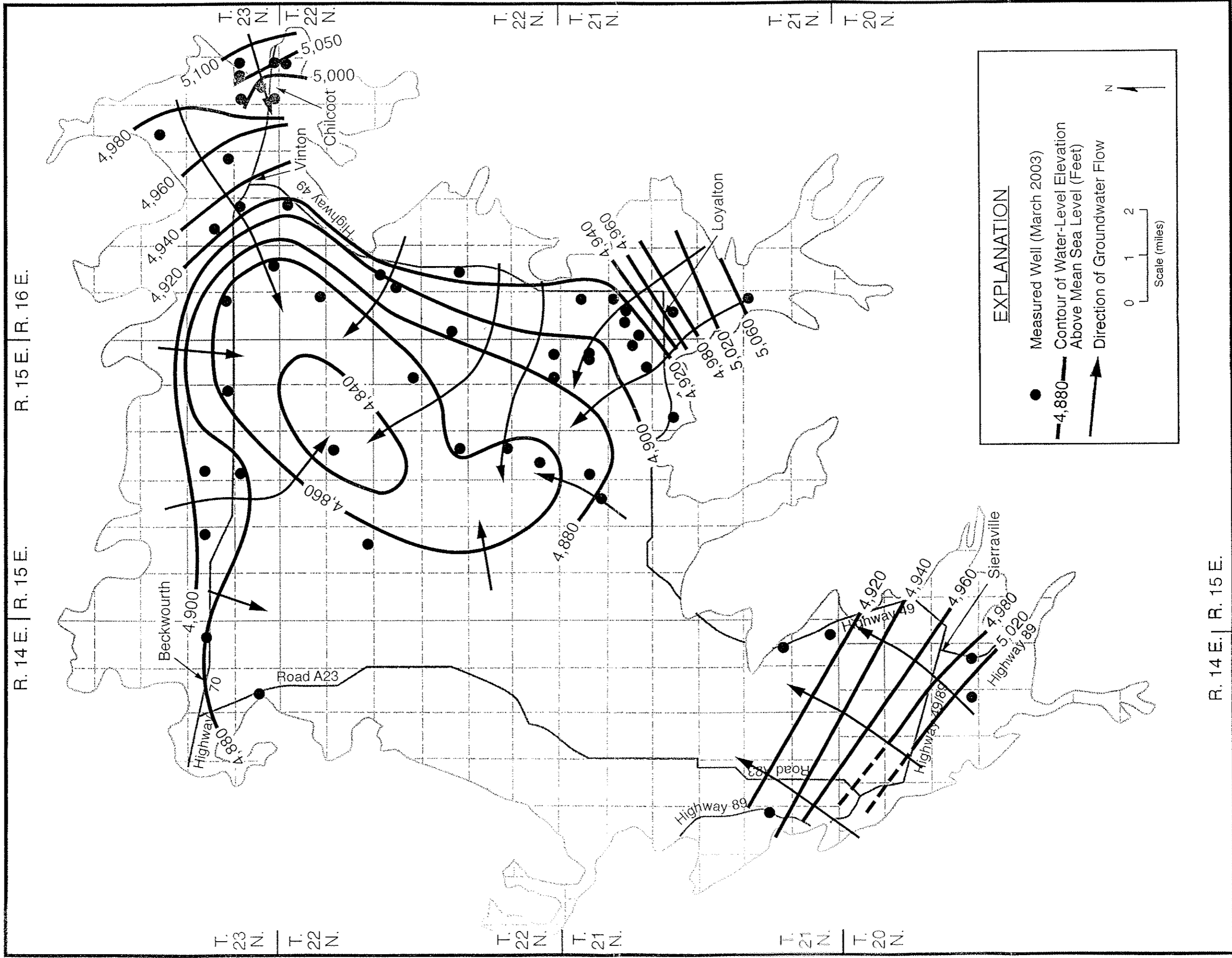
FIGURE 6 - SUBSURFACE GEOLOGIC CROSS SECTION G - G'

2004, pumpage from 39 active wells in 2003 and 38 in 2004 was measured with flowmeters by the Sierra Valley Groundwater Management District. As of 2005, water levels were measured in 29 wells in the main part of Sierra Valley and in 11 wells in the Chilcoot sub-basin, in the northeast part of the valley, by the California Department of Water Resources. This update covers the period from Spring 2003 to Spring 2005. Appendix E contains water-level data for Spring 2003-Spring 2005.

Water-Level Elevation Contours

Figure 7 shows water-level elevation contours and the direction of groundwater flow for Spring 2003. Water-level elevations at that time ranged from about 5,080 feet above mean sea level southeast of Loyalton in Sierra Brooks, to less than 4,860 feet in a large pumping depression located in and southwest of the Vinton area. In Spring 2003, there appeared to be little groundwater outflow from Sierra Valley in the primary pumped zones because of this depression. A smaller cone of depression was present northwest of Loyalton.

Figure 8 shows water-level elevations and the direction of groundwater flow in Spring 2004. Essentially identical conditions were indicated as in Figure 7 for Spring 2003. Figure 9 shows water-level elevations and the direction of groundwater flow for Spring 2005. Again, similar conditions to Spring 2003 and Spring



R. 14 E. | R. 15 E.

FIGURE 7 - WATER-LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW IN SPRING 2003

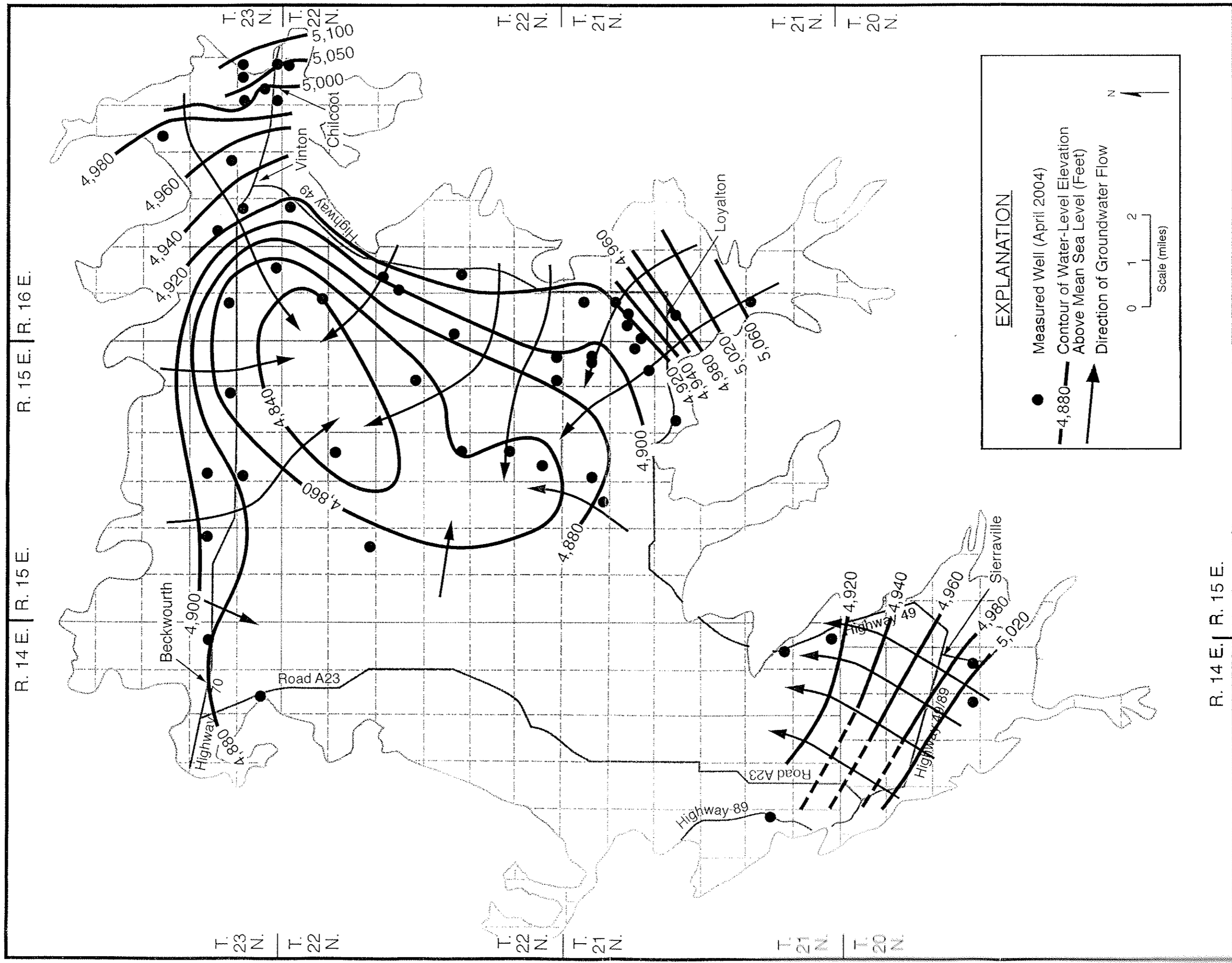


FIGURE 8 - WATER-LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW IN SPRING 2004

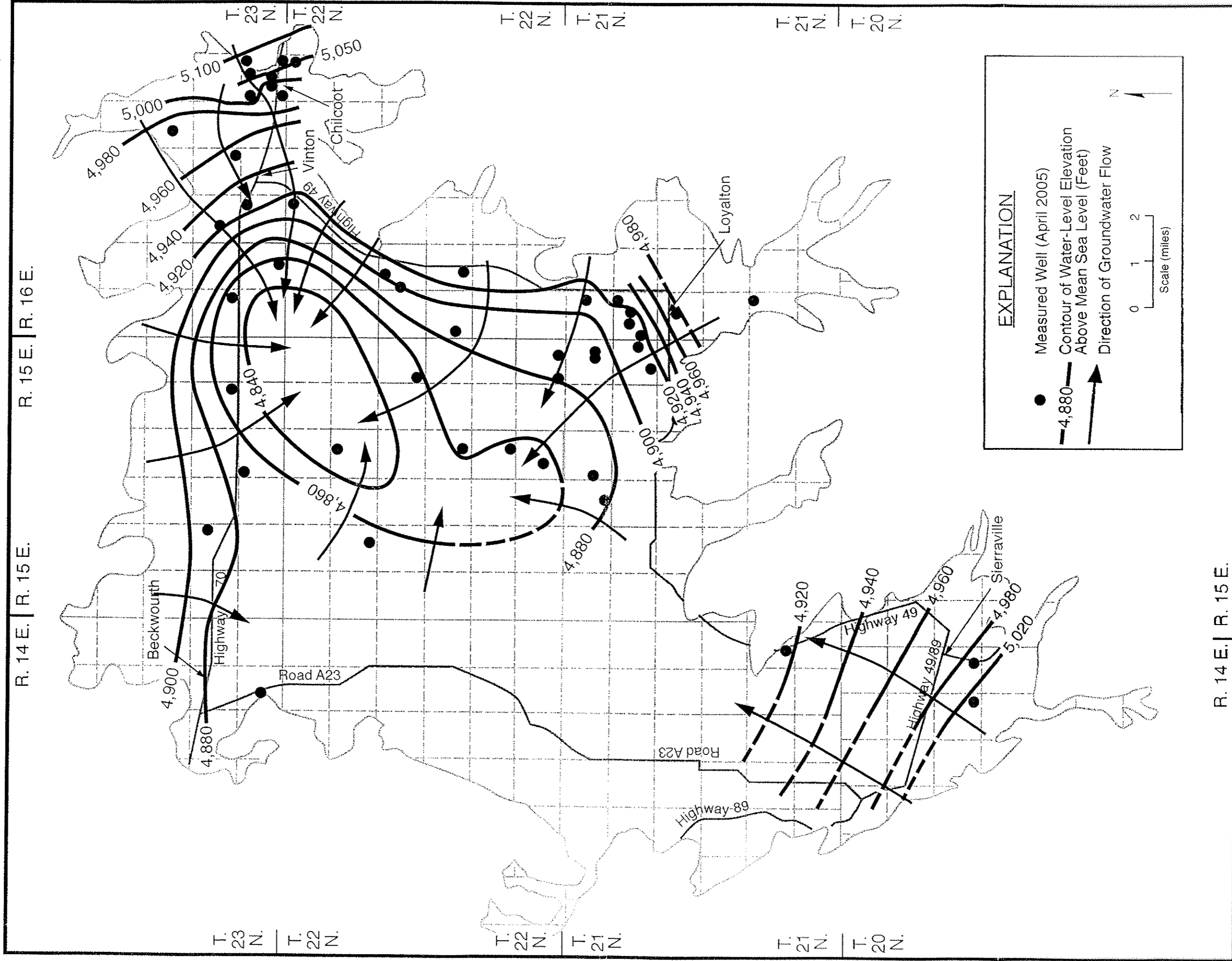


FIGURE 9 - WATER-LEVEL ELEVATIONS AND DIRECTION OF GROUNDWATER FLOW IN SPRING 2005

2004 are indicated.

Water-Level Changes

Figure 10 shows changes in water levels between Spring 1998 and Spring 2003. Water levels in most wells were lower in Spring 2005 than in Spring 1998, because of low precipitation and greater pumpage during most of this period. Water levels fell more than 10 feet in most of the Vinton, Loyaltan, and Chilcoot sub-basins. In the Vinton sub-area, water levels fell more than 20 feet over a fairly large area during this period.

Water-Level Hydrographs

Water-level hydrographs for District monitor wells are provided in Appendix D. Water levels in MW-1s and 1d fell from 1996 through Spring 2005. Measurements for MW-1d show much more seasonal fluctuations, characteristic of confined groundwater. The water levels in MW-2 (all three completions) generally rose or were stable from Fall 2002 through Spring 2005. Water levels in MW-3 (all three completions) were relatively stable from Fall 2002 through Spring 2005, and each completion clearly showed a marked response to summer pumping. The water-levels in MW-4 (all three completions) fell slightly between Fall 2002 and Spring 2005. Water levels in MW-5 (all three completions) rose between October 2004 and Spring 2005. Water levels in MW-6 (two completions) also rose

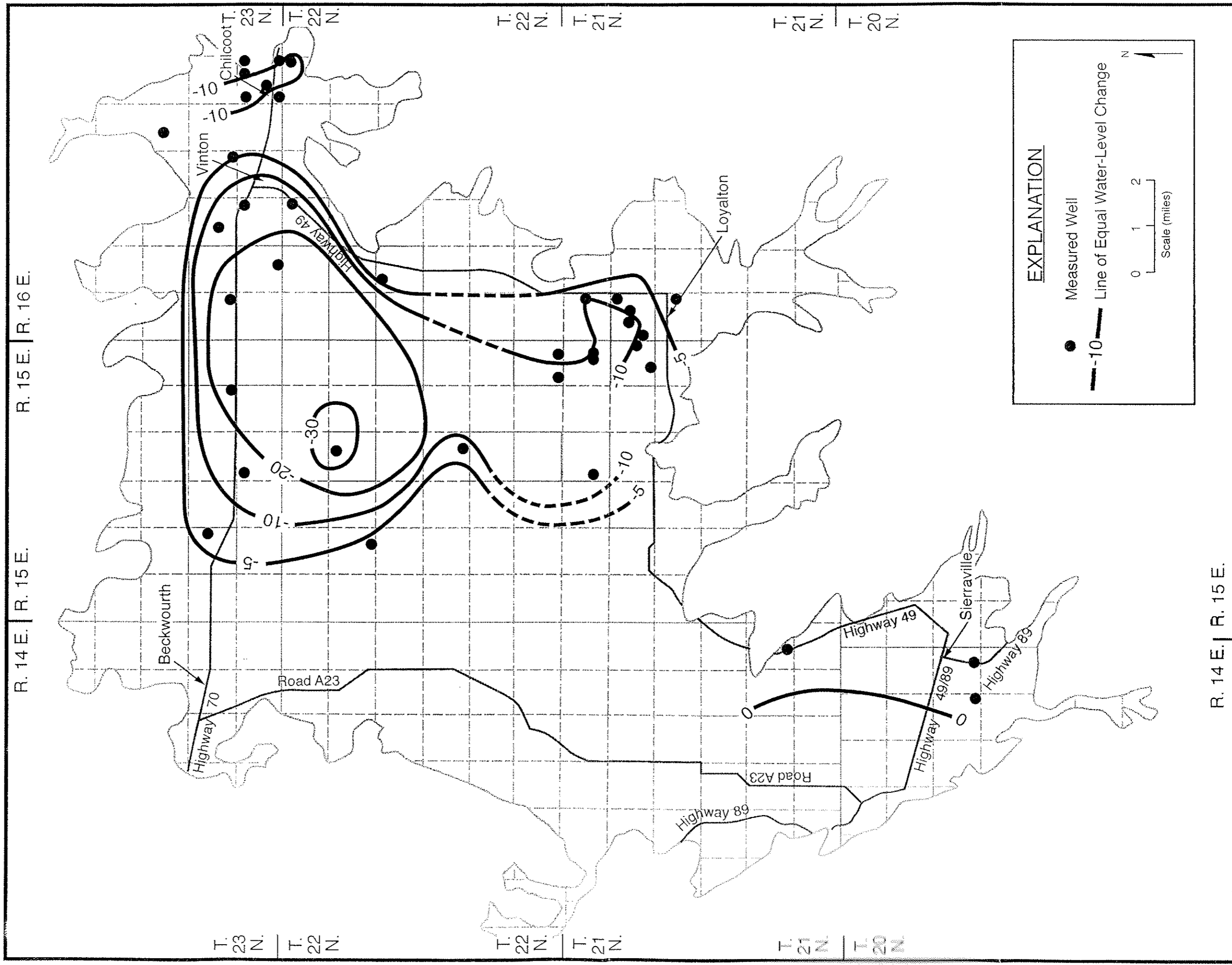


FIGURE 10 - WATER-LEVEL CHANGES FOR SPRING 1998 - SPRING 2005

between Fall 2004 and Spring 2005.

In previous groundwater updates, long-term water-level hydrographs were discussed for three wells in the main part of the valley and two wells in the Chilcoot Sub-basin. The wells in the main part of the valley were:

T22N/R15E-22Q1 (Loyalton)
T22N/R16E-17E2 (between Vinton and Loyalton)
T23N/R14E-25K1 (Beckwourth).

Records for these wells extended back to 1960. Records are also available back to 1966 for one additional well:

T22N/R16E-4A1 (Vinton).

Fairly continuous water-level records are available for 19 other wells in the valley, extending from about 1980 to 1999. This group of wells began to be measured by CDWR as part of Sierra Valley Groundwater Management District activities. Long-term water-level hydrographs for many of these wells are provided in Appendix F. Selected representative water-level hydrographs are provided in the text of this report.

Figure 11 shows long-term water-level hydrographs for two wells in the Vinton area: T22N/R16E-4A1 and 17C1. Well No. 4A1 is reportedly 251 feet deep. The well was flowing prior to 1979. The water level in this well was relatively stable and showed small seasonal fluctuations prior to 1979. The water level then began to decline after 1978, and reached a depth of about 25 feet in Fall

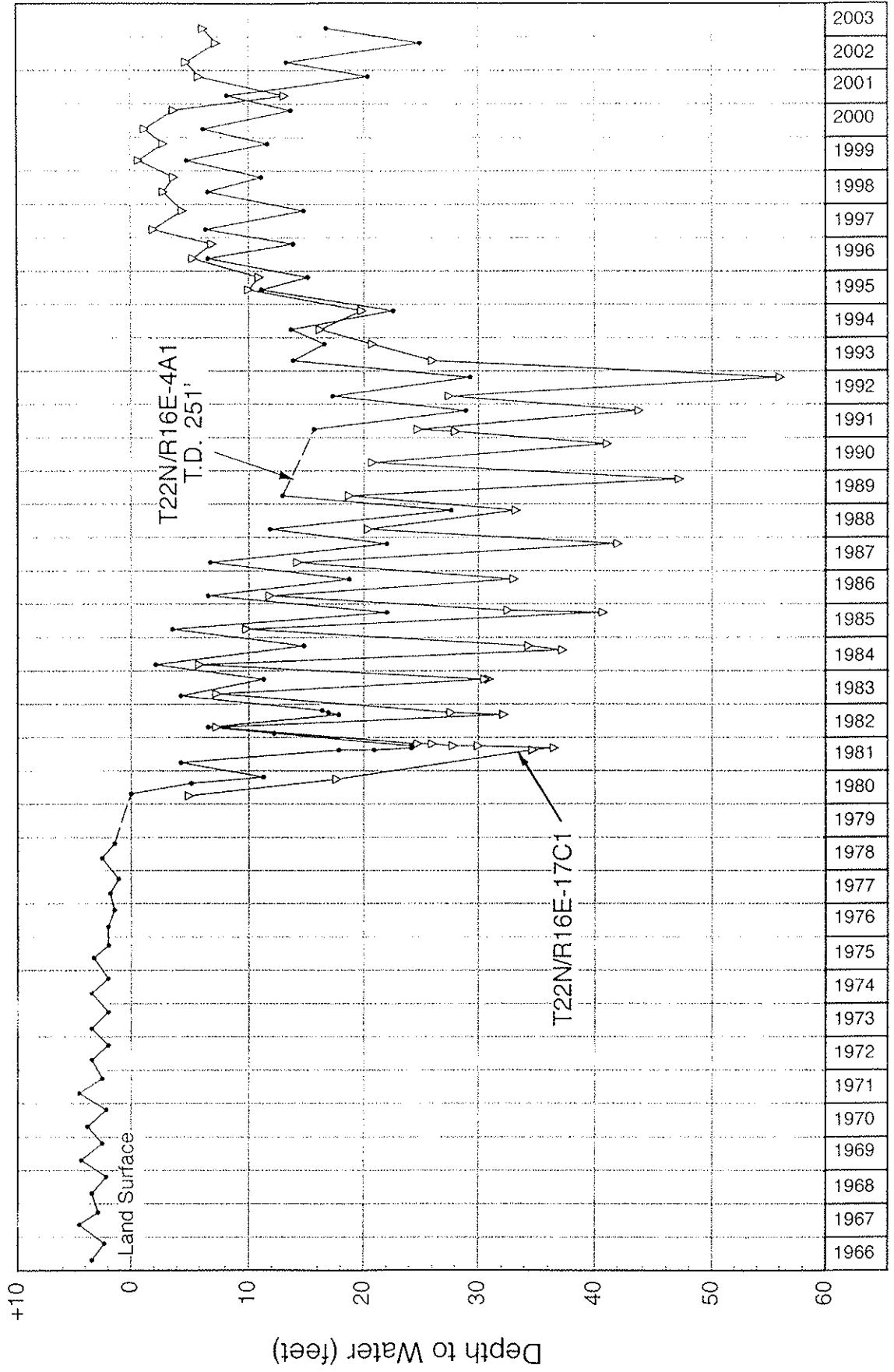


FIGURE 11 - WATER-LEVEL HYDROGRAPHS FOR VINTON AREA

1991-92. After 1992, the water level recovered through Spring 1999 (to about five feet deep). After Spring 1999, the water level fell to about 35 feet by Fall 2004. These water-level trends are directly related to pumping patterns during this period. By Fall 2004, depth to water in Well 4A1 was the deepest of record.

Well 17C1 is also termed the Dyson Lane recorder, as it has been equipped with a continuous water-level recorder since 1981. This well is indicated to be about 100 feet deep. The well was originally perforated from 73 to 184 feet, but was sanded in to a depth of about 100 feet as of Fall 1980. The water level in this well has also responded highly to pumping of nearby irrigation wells, primarily to the north. Water-level records (Figure 11) started in 1980, when depth to water was about five feet. Water levels fell from 1980 through 1993. The deepest water level in this well was about 56 feet in Fall 1992. By April 1999, the water level in well 17C1 had recovered to a depth of about one foot. By Spring of 2005, the depth to water was about nine feet.

Figure 12 shows long-term water-level hydrographs for two wells in the Loyaltan area: T22N/R15E-22Q1 and 36N1. Well 22Q1 is reportedly about 600 feet deep, and was flowing prior to 1966. The water level then declined slightly through 1981, and more sharply through Fall 1992 (23 feet deep). The water level in this well then recovered to 10 feet deep by Spring 1996. The water level in

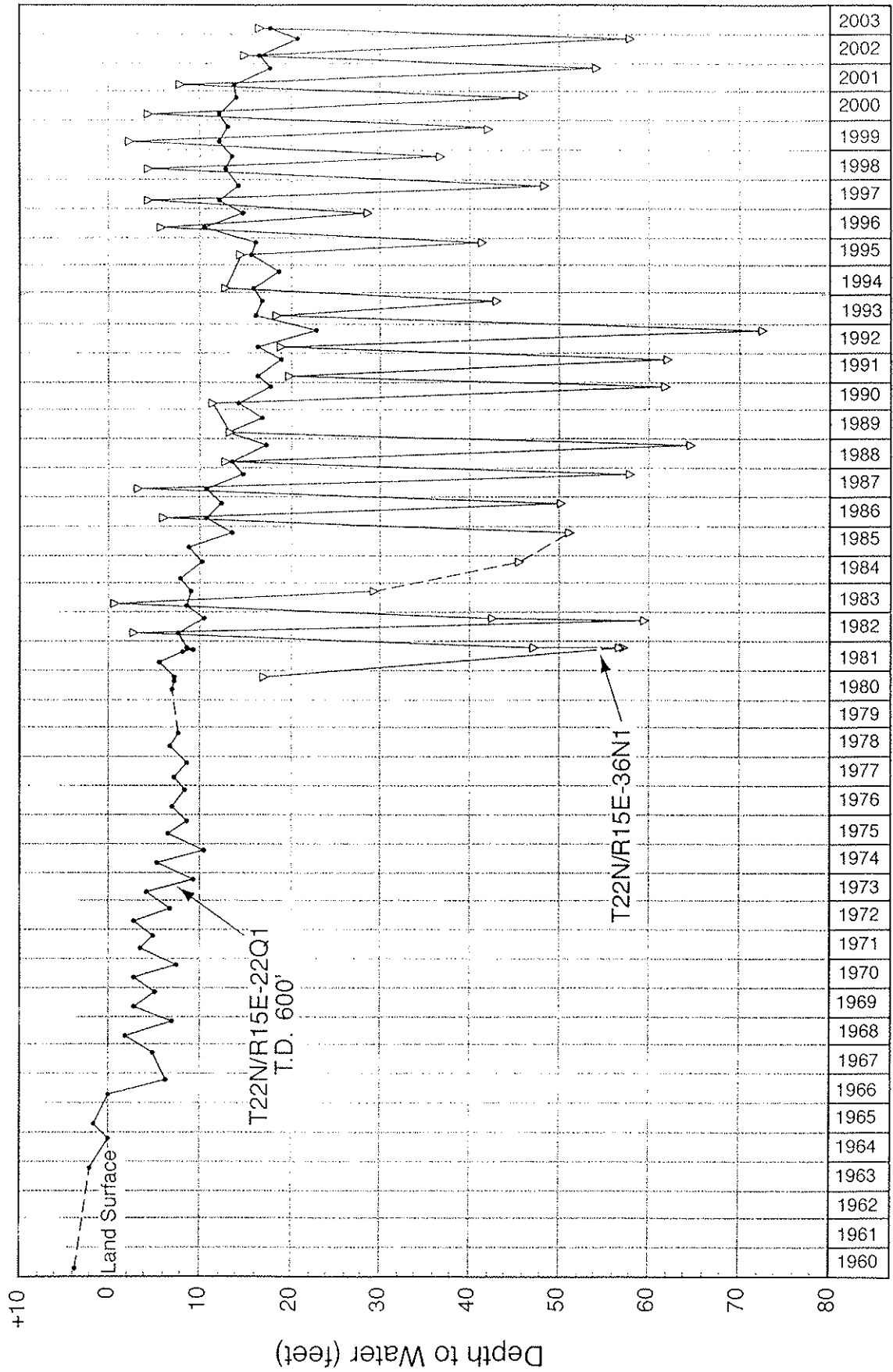


FIGURE 12 - WATER-LEVEL HYDROGRAPHS FOR LOYALTON AREA

Well 22Q1 was relatively stable through early 2000, then fell to a depth of 23 feet by Fall 2005. The water-level trend in this well is related to pumping patterns of wells in the Loyalton sub-area. The small seasonal fluctuations in this well are more typical of the shallow zone.

Well 36N1 is perforated from 268 to 792 feet in depth. The water level in Well 36N1 was near the land surface prior to 1986, then gradually declined to a depth of 62 feet in Fall 1992. From Fall 1992 through Spring 1996, the water level in this well rose to a depth of 7 feet in Spring 1996. The water level in this well was relatively stable from Spring 1991 through Spring 2000, then fell to a depth of 77 feet in Fall 2005. This was the deepest water level of record for this well. The water level in this well also responded primarily to pumping in the sub-area. Seasonal fluctuations in water level are representative of the deep zone.

Figure 13 shows water-level hydrographs for two wells in the Chilcoat sub-basin: T22N/R16E-1A2 and T23N/R16E-36N2. Both of these are shallow wells, tapping alluvial deposits. Water-levels were the shallowest in the mid 1980's, during and following years of high precipitation, and were lowest in later 1992, following years of very low precipitation. By Fall 2004, water levels in both wells were the shallowest of record. Water levels in these wells respond primarily to precipitation patterns and recharge, as

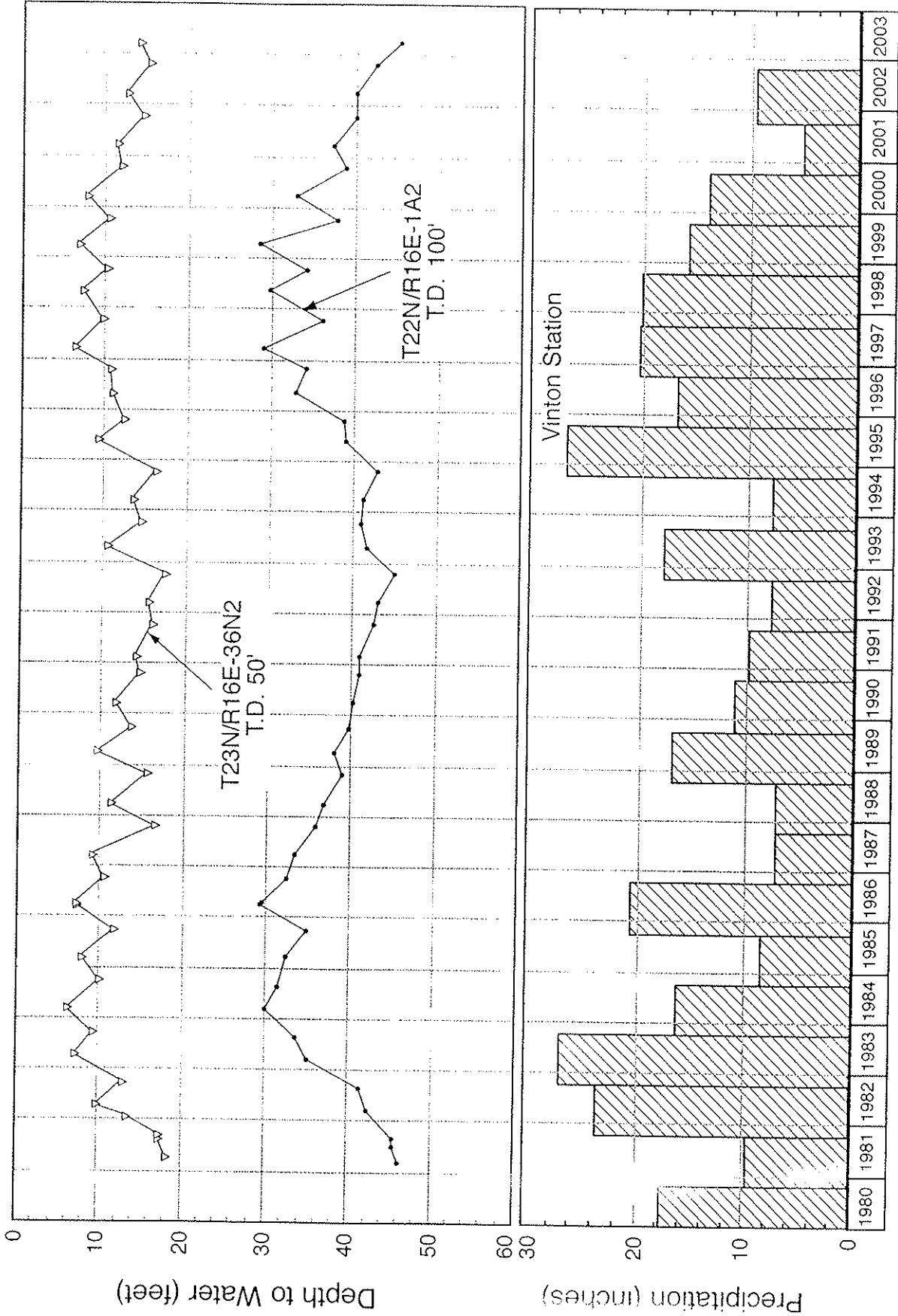


FIGURE 13 - WATER-LEVEL HYDROGRAPHS AND PRECIPITATION FOR CHILCOOT SUB-BASIN

there are no large-capacity wells in the sub-area. Precipitation records were discontinued for the Vinton Station in late 2003.

Long-term water-level hydrographs for other wells are provided in Appendix F. Trends for these are generally similar to those previously discussed.

Pumpage

Pumpage records for the District prior to 2001 are considered to be approximate, because of possible inaccuracies in the flow-meter readings. In 2001 the meters were re-calibrated, and thus subsequent pumpage records are considered more accurate

Figure 14 shows the distribution of metered pumpage for 2003. The total metered pumpage was about 7,200 acre-feet, or about 1,110 feet less than in 2002 (Kenneth D. Schmidt and Associates, 2003).

Figure 15 shows the distribution of metered pumpage for 2004. The total metered pumpage was 8,994 acre-feet, or about 1,800 acre-feet more than in 2003. The 2004 pumpage in the District was the greatest since 1992. The relatively high pumpage during 2001-04 was responsible for the water-level declines in most wells between Spring 1999 and Spring 2005.

Table 5 indicates the distribution of the metered pumpage in the valley sub-areas during 2003-04. Table 6 summarizes metered pumpage for Sierra Valley since 1989. Annual metered pumpage ranged from a low of 3,470 acre-feet in 1988, to a high of 10,130

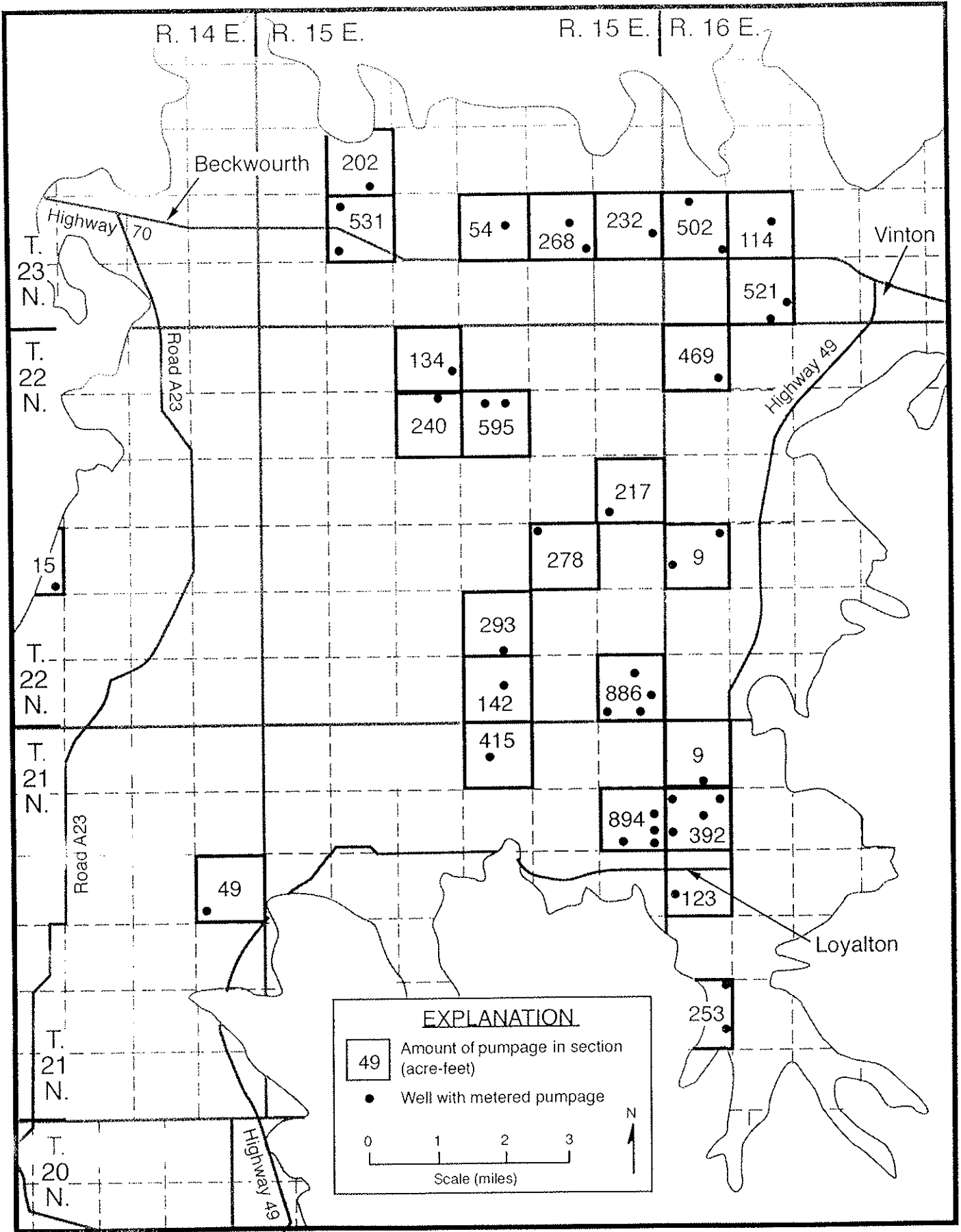


FIGURE 14 - METERED GROUNDWATER PUMPAGE FOR 2003

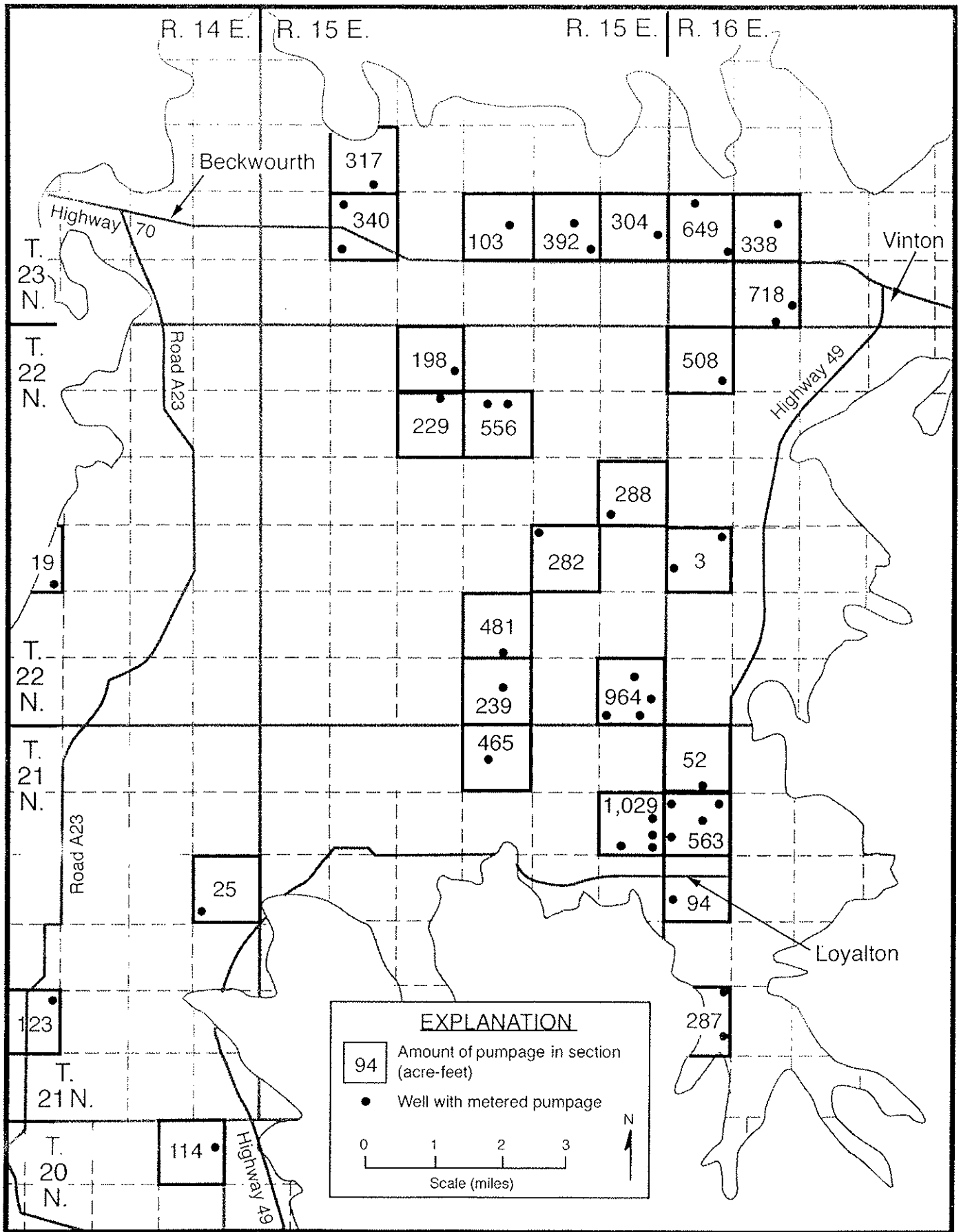


FIGURE 15 - METERED GROUNDWATER PUMPAGE FOR 2004

TABLE 5 - DISTRIBUTION OF METERED PUMPAGE
 BY SUB-AREA FOR 2003-2004 (ACRE-FEET)

<u>Sub-Area</u>	<u>2003</u>	<u>% of Total</u>	<u>2004</u>	<u>% of Total</u>
Near Beckwourth	733	10	657	7
Vinton	2,332	30	3,200	33
Loyalton	3,154	41	3,887	41
Other	1,618	21	1,936	20
Total	7,837		9,680	

TABLE 6 - SUMMARY OF METERED PUMPAGE FOR 1989-2004

	<u>Beckwourth</u>	<u>Vinton</u>	<u>Loyalton</u>	<u>Other</u>	<u>Total</u>
1989	668	3,574	2,798	616	7,656
1990	489	5,139	3,875	628	10,131
1991	289	3,607	3,486	935	8,317
1992	120	3,326	4,548	1,119	9,113
1993	83	1,226	2,066	719	4,094
1994	388	1,558	3,831	1,552	7,329
1995	533	973	1,964	630	4,100
1996	778	1,692	2,457	892	5,819
1997	932	1,685	2,242	457	5,316
1998	212	606	2,336	311	3,465
1999	385	1,350	2,333	797	4,865
2000	417	2,599	1,938	1,015	5,969
2001	809	2,641	2,824	1,217	7,491
2002	1,099	2,393	3,225	1,596	8,313
2003	733	2,332	3,154	1,618	7,837
2004	657	3,200	3,887	1,936	9,680

The "other" sub-area for 2000-2004 includes areas adjacent to the Loyalton or Vinton sub-areas that were previously delineated.

acre-feet in 1990. The period 1989-1994 was one of relatively high metered pumpage (average of about 7,800 acre-feet per year), whereas the period 1995-1999 was one of much lower pumpage (average of about 4,700 acre-feet per year). Metered pumpage during 2001-2005 averaged about 8,300 acre-feet per year, greater than the average during 1988-94. Pumpage in 2004 was the largest annual amount since 1990.

SUMMARY AND CONCLUSIONS

In 2004, two new nested monitor well sites were developed in the District. These provided important data on subsurface geologic conditions, water levels, and groundwater quality. As part of this evaluation, three new subsurface geologic cross sections were developed in the Chilcoot and Beckwourth sub-areas. Groundwater level and quality data were interpreted. In addition, a two-year updated report on metered district pumpage and water levels was prepared.

Records of metered pumpage and water levels in Sierra Valley for the period 1989-2005 were reviewed and trends interpreted. In addition, long-term water-level records extending back to the 1960's were reviewed. The primary influences on water-level changes from year to year are 1) pumping amounts, and 2) recharge from winter precipitation. There was a significant reduction in metered pumpage in the valley during 1993-97, following a severe

drought. Metered pumpage during 1993-1997 averaged about 5,300 acre-feet per year, compared to an average of about 9,200 acre-feet per year during 1990-92. Because of the reductions in pumpage, water levels in many wells in pumped parts of the valley recovered in the late 1990's to near levels prior to the onset of heavy pumping in the late 1970's. Precipitation during 1993-97 was above average except for one year, and the increased recharge also caused water levels to rise. The lowest metered pumpage since 1989 was in 1998. Metered pumpage increased after 1998, and by 2004 was in the range of that for 1991-92. This increased pumpage, along with below average precipitation and less recharge, caused water levels in most wells in pumped parts of the valley to fall after 1998, in some cases to the deepest levels yet measured by Fall 2004.

Metered pumpage records indicate that the "safe yield" (the amount of groundwater that can be pumped without overdraft) is about 6,000 acre-feet per year in the part of the valley now tapped by large-capacity supply wells. Metered pumpage of 8,000 to 10,000 acre-feet per year during dry years has resulted in water-level declines. However, metered pumpage of about 3,500 to 5,000 acre-feet per year during wet years was associated with water-level rises. A metered pumpage of about 6,000 acre-feet per year resulted in near stable water levels.

Groundwater monitoring in the District provides a valuable

data base for future groundwater management activities. Historical records provide a good indication of water-level declines that can occur due to increases in pumpage. Also, the influence of changes in precipitation on recharge and water levels have been determined.

REFERENCES

California Department of Water Resources, 1963, "Northeastern Counties Ground Water Investigation", Bulletin 98, 224 p.

California Department of Water Resources, 1983, "Sierra Valley Ground Water Study", Northern District memorandum report, 79 p.

California Department of Water Resources, 1983, "Sierra Valley Water Quality", Northern District preliminary report, 10 p.

Kenneth D. Schmidt and Associates, 1994, "1991-94 Sierra Valley Groundwater Update", prepared for Sierra Valley Groundwater Management District, Loyalton, California, 23 p.

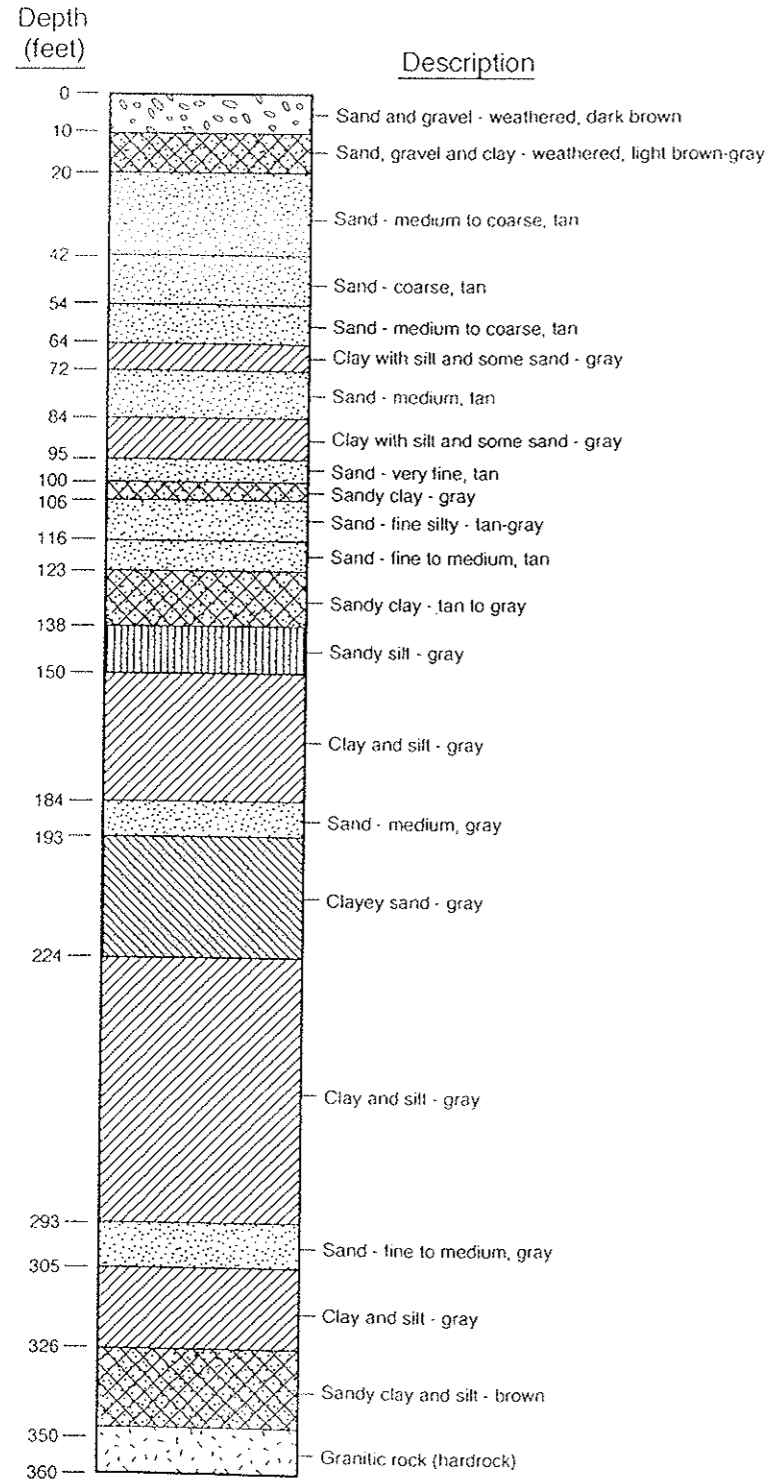
Kenneth D. Schmidt and Associates, 1998, "1994-1998 Sierra Valley Groundwater Update", prepared for Sierra Valley Groundwater Management District, Loyalton, California, 24 p.

Kenneth D. Schmidt and Associates, 2003, "Technical Report on 1998-2003 Hydrogeologic Evaluation for Sierra Valley", prepared for Sierra Valley Groundwater Management District, Sierraville, California, 48p.

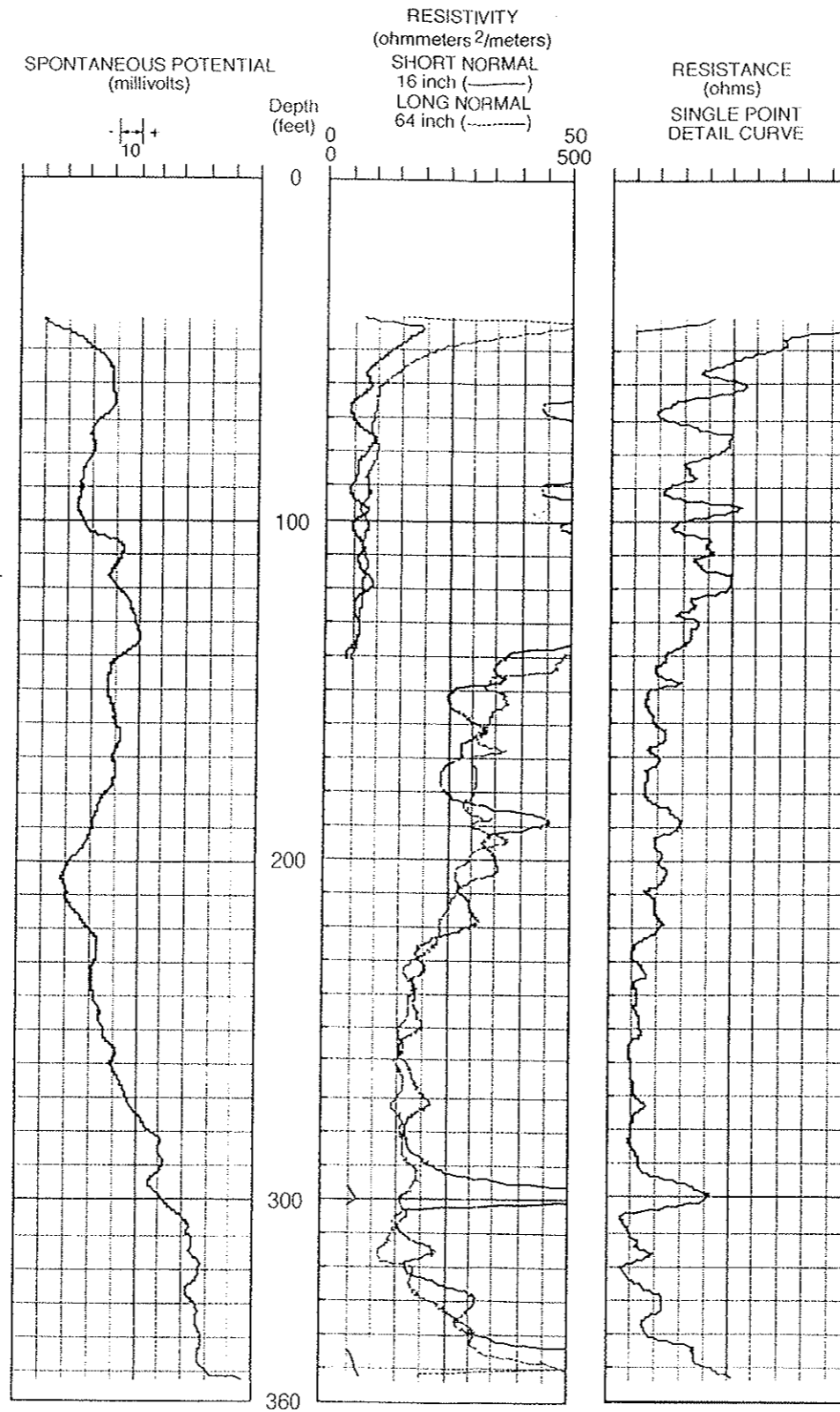
APPENDIX A

ELECTRIC LOGS, GEOLOGIC LOGS, AND COMPLETION
DIAGRAMS FOR NEW NESTED MONITOR WELLS

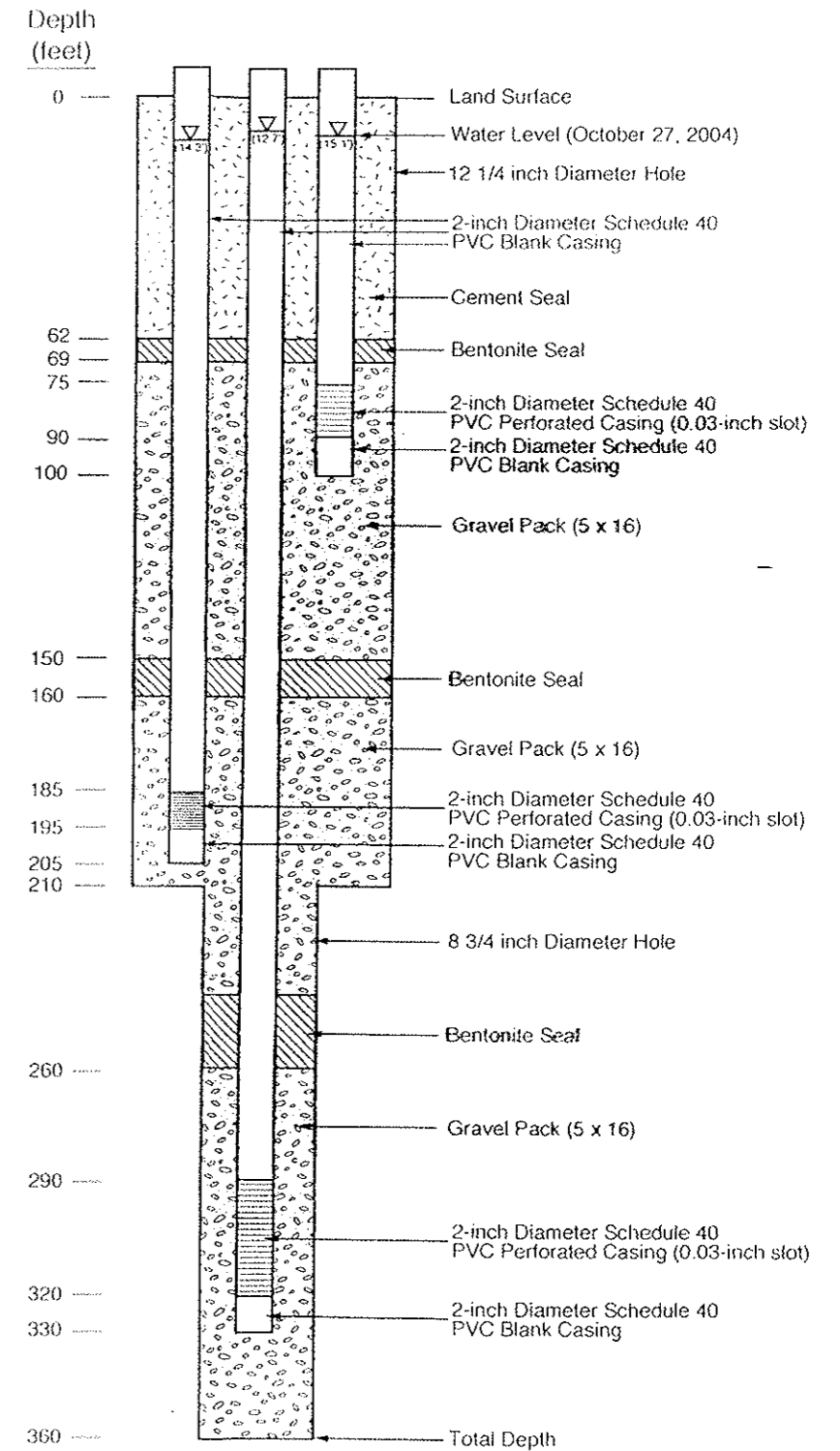
LITHOLOGY TH-5



ELECTRIC LOG



AS-BUILT WELL MW-5

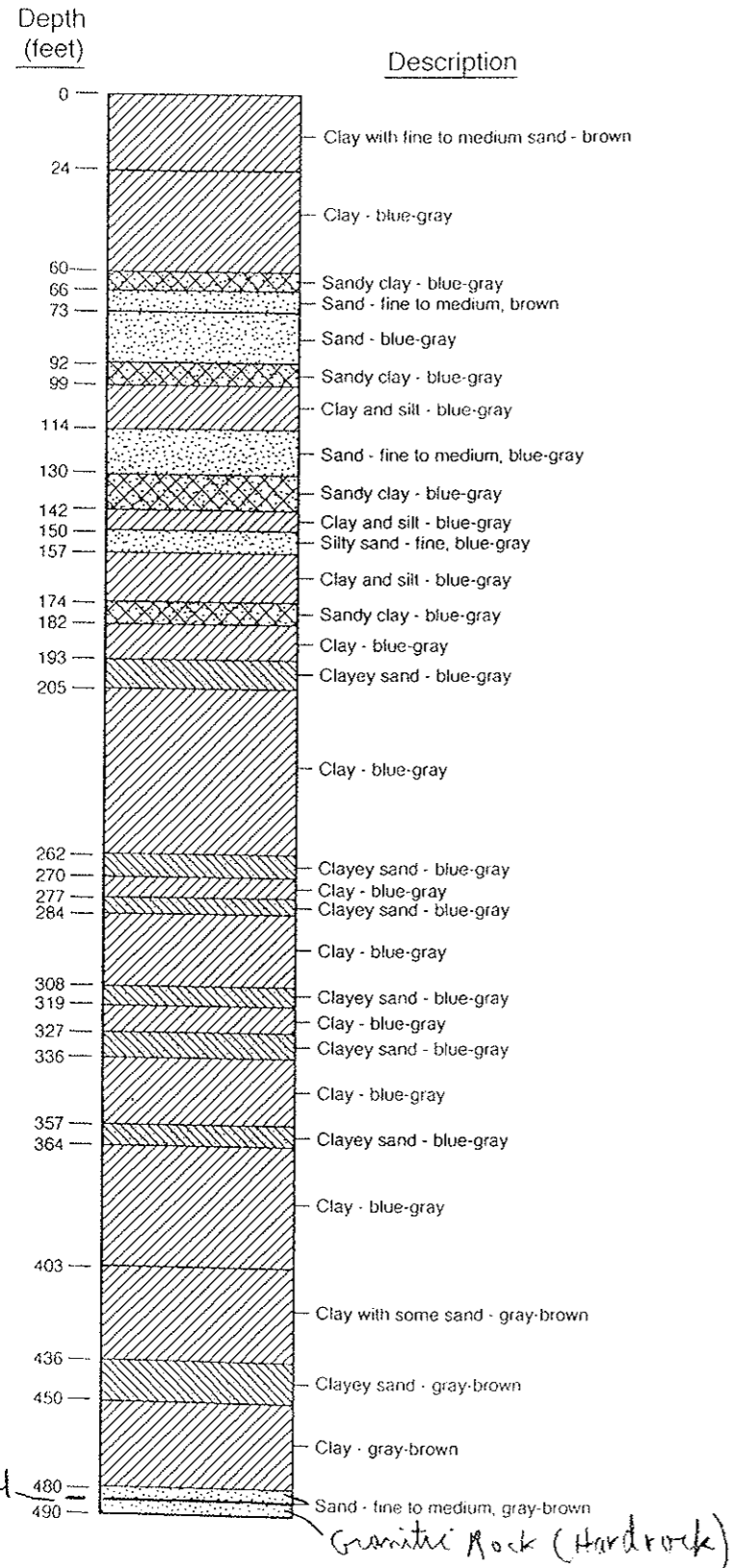


Logged by Welenco, Inc. of Bakersfield (October 13, 2004)

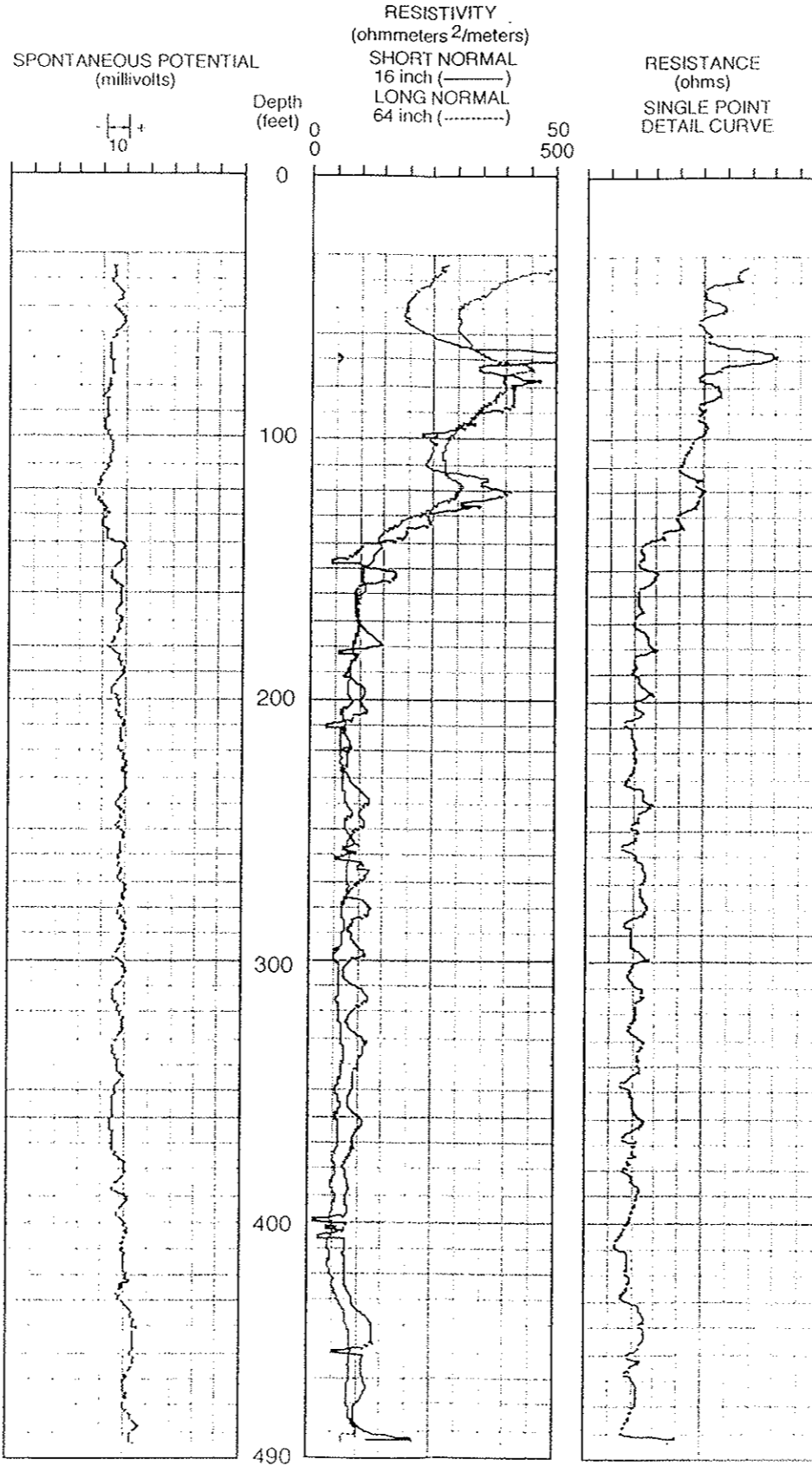
Constructed by Bradley & Sons of Del Ray (October 15, 2004)

Kenneth D. Schmidt and Associates
 January 2005

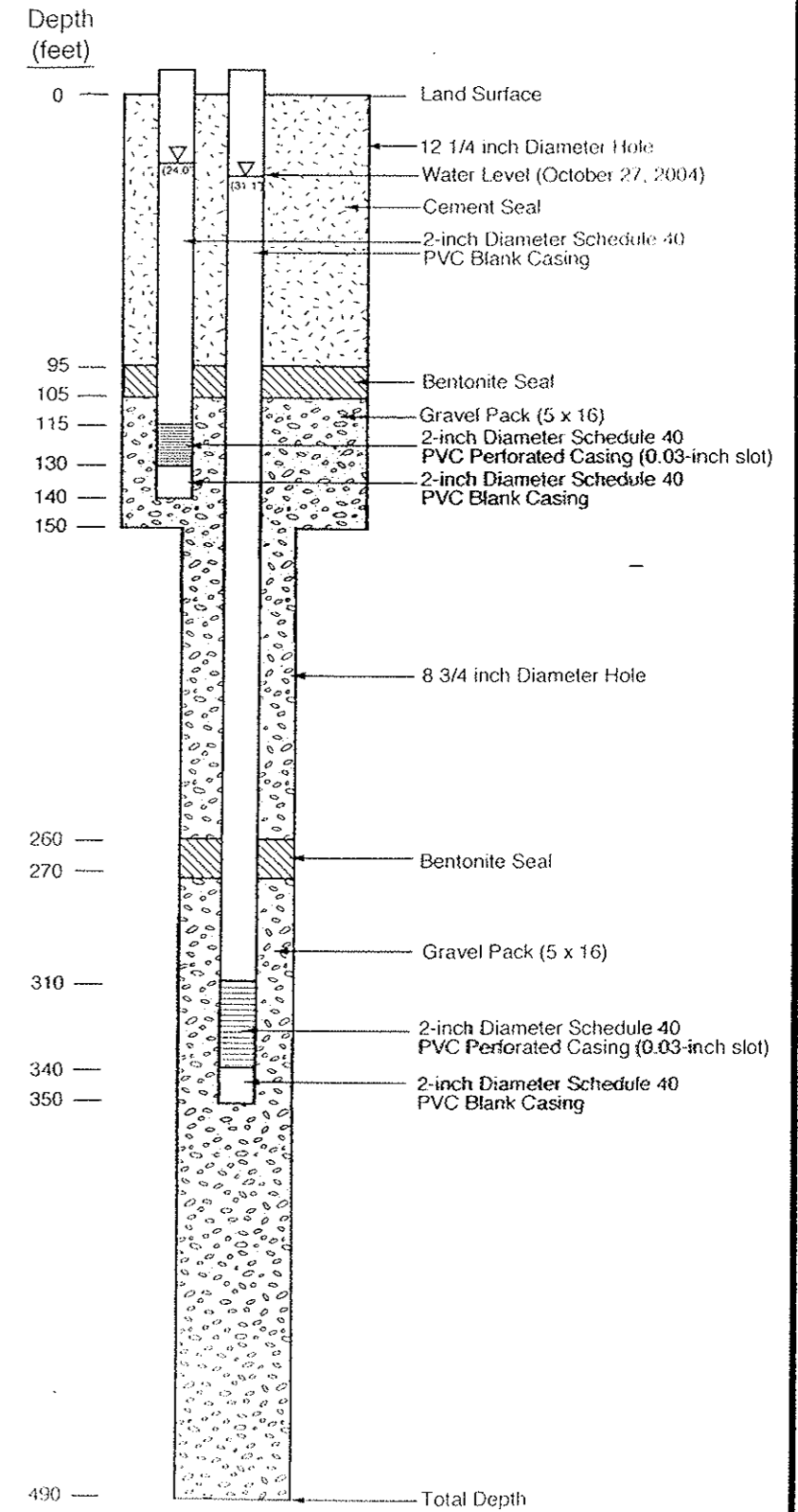
LITHOLOGY TH-6



ELECTRIC LOG



AS-BUILT WELL MW-6



Logged by Welenco, Inc. of Bakersfield (October 19, 2004)

Constructed by Bradley & Sons of Del Ray (October 15, 2004)

Kenneth D. Schmidt and Associates
 January 2005

SIERRA VALLEY GROUNDWATER MANAGEMENT DISTRICT MONITOR WELL NO. 6

GEOLOGIC LOG FOR
SVGWMD MW-5

<u>Depth (feet)</u>	<u>Description</u>
0-10	Dark brown weathered sand and gravel
10-20	Light brown to gray weathered sand, gravel, and clay
20-42	Tan medium to coarse sand
42-54	Tan coarse sand
54-64	Tan medium to coarse sand
64-72	Gray clay with silt and some sand
72-84	Tan medium sand
84-95	Gray clay and silt with some sand
95-100	Tan very fine sand
100-106	Gray sandy clay
106-116	Tan to gray fine silty sand
116-123	Tan fine to medium sand
123-138	Tan to gray sandy clay
138-150	Gray sandy silt
150-184	Gray clay and silt
184-193	Gray medium sand
193-224	Gray clayey sand
224-293	Gray clay and silt
293-305	Gray fine to medium sand
305-326	Gray clay and silt
326-350	Brown sandy clay and silt
350-360	Granitic rock (hardrock)

GEOLOGIC LOG FOR
SVGWMD MW-6

<u>Depth (feet)</u>	<u>Description</u>
0-24	Brown clay with fine to medium sand
24-60	Blue-gray clay
60-66	Blue-gray sandy clay
66-73	Brown fine to medium sand
73-92	Blue-gray clayey sand
92-99	Blue-gray sandy clay
99-114	Blue-gray clay and silt
114-130	Blue-gray fine to medium sand
130-142	Blue-gray sandy clay
142-150	Blue-gray clay and silt
150-157	Blue-gray fine silty sand
157-174	Blue-gray clay and silt
174-182	Blue-gray sandy clay
182-193	Blue-gray clay
193-205	Blue-gray clayey sand
205-262	Blue-gray clay
262-270	Blue-gray clayey sand
270-277	Blue-gray clay
277-284	Blue-gray clayey sand
284-308	Blue-gray clay
308-319	Blue-gray clayey sand
319-327	Blue-gray clay
327-336	Blue-gray clayey sand
336-357	Blue-gray clay
357-364	Blue-gray clayey sand
364-403	Blue-gray clay
403-436	Gray-brown clay with some sand
436-450	Gray-brown sandy clay
450-480	Gray-brown clay
480-484	Gray-brown fine to medium sand
484-490	Gray granitic rock (hardrock)

APPENDIX B

DRILLERS REPORTS FOR NEW NESTED MONITOR WELLS

TRIPPLICATE
Owner's Copy

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

DWR USE ONLY ... DO NOT FILL IN

STATE WELL NO / STATION NO

LATITUDE LONGITUDE

APN/TRS/OTHER

Page 1 of 2

No. **e016555**

Owner's Well No. MW #5

Date Work Began 10/12/2004, Ended 10/15/2004

Local Permit Agency PLUMAS COUNTY ENV. HEALTH

Permit No. 04-JE443 Permit Date 10/7/2004

GEOLOGIC LOG

ORIENTATION (✓)		DRILLING METHOD		FLUID WATER		DESCRIPTION <i>Describe material, grain, size, color, etc.</i>
VERTICAL _____ HORIZONTAL _____ ANGLE _____ (SPECIFY)		ROTARY				
DEPTH FROM SURFACE						
Ft	to Ft					
0	20					FINE SAND AND CLAY
20	40					COARSE SAND
40	60					DECOMPOSED GRANITE, FINE & COARSE SAND
60	80					SILT AND SILTY CLAY
80	100					SILT AND CLAY
100	120					SILTY CLAY
120	140					DECOMPOSED GRANITE & COARSE SAND
140	160					SILTY CLAY
160	180					SILT CLAY AND COARSE SAND
180	200					DECOMPOSED GRANITE & COARSE SAND
200	220					MEDIUM SAND
220	260					SILTY CLAY & DECOMPOSED GRANITE
260	300					SILT
300	320					SILT & DECOMPOSED GRANITE
320	340					SILT & BROWN CLAY
340	360					SILT, DECOMPOSED GRANITE, HARD ROCK

WELL OWNER

Name **SIERRA VALLEY GROUNDWATER**

Mailing Address **P.O. BOX 312** CA **96126**

SIERRAVILLE STATE ZIP

CITY

WELL LOCATION

Address **49 WILKINS ST.**

City **CHILCOOT CA**

County **PLUMAS**

APN Book **Q10** Page **140** Parcel **071**

Township **23 N** Range **16 E** Section **36**

Latitude _____

LOCATION SKETCH

NORTH

WEST EAST

SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

ACTIVITY (✓)

NEW WELL

MODIFICATION/REPAIR

____ Deepen

____ Other (Specify)

____ DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES (✓)

WATER SUPPLY

____ Domestic _____ Public

____ Irrigation _____ Industrial

MONITORING

TEST WELL _____

CATHODIC PROTECTION _____

HEAT EXCHANGE _____

DIRECT PUSH _____

INJECTION _____

VAPOR EXTRACTION _____

SPARGING _____

REMEDICATION _____

OTHER (SPECIFY) _____

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER _____ (Ft.) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL _____ (Ft.) & DATE MEASURED _____

ESTIMATED YIELD * _____ (GPM) & TEST TYPE _____

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

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

DEPTH FROM SURFACE		BORE-HOLE DIA. (Inches)	CASING (S)				ANNULAR MATERIAL					
Ft	to Ft		TYPE (✓)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	DEPTH FROM SURFACE	TYPE	CEN-TMENT (✓)	BEN-TONITE (✓)	FILL (✓)
0	75	12 1/4	✓	PVC	2	SCH 40	0	62	✓			
75	90	12 1/4	✓	PVC	2	SCH 40	62	69		✓		
90	100	12 1/4	✓	PVC	2	SCH 40	69	150			✓	GRAVEL
0	185	12 1/4	✓	PVC	2	SCH 40	150	160		✓		
185	195	12 1/4	✓	PVC	2	SCH 40	160	240			✓	GRAVEL
195	205	12 1/4	✓	PVC	2	SCH 40	240	260		✓		

ATTACHMENTS (✓)

____ Geologic Log

____ Well Construction Diagram

____ Geophysical Log(s)

____ Soil/Water Chemical Analysis

____ 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 **BRADLEY & SONS**

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

3625 S. HIGHLAND DEL REY CA **93616**

ADDRESS CITY STATE ZIP

Signed *Rebecca J. Dunn* DATE SIGNED **05/18/05** C-57 LICENSE NUMBER **414178**

WELL DRILLER/AUTHORIZED REPRESENTATIVE

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

DWR USE ONLY DO NOT FILL IN

STATE WELL NO./STATION NO

LATITUDE LONGITUDE

APN/TRS/OTHER

Owner's Well No. **MW #5**
Date Work Began **10/12/2004**, Ended **10/15/2004**
Local Permit Agency **PLUMAS COUNTY ENV. HEALTH**
Permit No. **04-JE443** Permit Date **10/7/2004**

No. **e016555**

GEOLOGIC LOG

ORIENTATION (✓)		DRILLING METHOD		FLUID WATER		DESCRIPTION <i>Describe material, grain, size, color, etc.</i>
VERTICAL	HORIZONTAL	ANGLE	(SPECIFY)			
0	20					FINE SAND AND CLAY
20	40					COARSE SAND
40	60					DECOMPOSED GRANITE, FINE & COARSE SAND
60	80					SILT AND SILTY CLAY
80	100					SILT AND CLAY
100	120					SILTY CLAY
120	140					DECOMPOSED GRANITE & COARSE SAND
140	160					SILTY CLAY
160	180					SILT CLAY AND COARSE SAND
180	200					DECOMPOSED GRANITE & COARSE SAND
200	220					MEDIUM SAND
220	260					SILTY CLAY & DECOMPOSED GRANITE
260	300					SILT
300	320					SILT & DECOMPOSED GRANITE
320	340					SILT & BROWN CLAY
340	360					SILT, DECOMPOSED GRANITE, HARD ROCK

WELL OWNER

Name **SIERRA VALLEY GROUNDWATER**
Mailing Address **P.O. BOX 312**
SIERRAVILLE CA **96126**
CITY STATE ZIP

WELL LOCATION

Address **49 WILKINS ST.**
City **CHILCOOT CA**
County **PLUMAS**
APN Book **010** Page **140** Parcel **071**
Township **23 N** Range **16 E** Section **36**
Latitude

LOCATION SKETCH

DEG. MIN. SEC. NORTH

WEST EAST

ACTIVITY (✓)

NEW WELL

MODIFICATION/REPAIR

Deepen

Other (Specify)

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

PLANNED USES (✓)

WATER SUPPLY

Domestic Public

Irrigation Industrial

MONITORING

TEST WELL

CATHODIC PROTECTION

HEAT EXCHANGE

DIRECT PUSH

INJECTION

VAPOR EXTRACTION

SPARGING

REMEDICATION

OTHER (SPECIFY)

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER (Ft) BELOW SURFACE

DEPTH OF STATIC WATER LEVEL (Ft) & DATE MEASURED

ESTIMATED YIELD * (GPM) & TEST TYPE

TEST LENGTH (Hrs.) TOTAL DRAWDOWN (Ft)

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

TOTAL DEPTH OF BORING **360** (Feet)

TOTAL DEPTH OF COMPLETED WELL **330** (Feet)

DEPTH FROM SURFACE Ft to Ft	BORE-HOLE DIA. (Inches)	CASING (S)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	ANNULAR MATERIAL TYPE			
		TYPE (✓)	BLANK	SCREEN	CON. DUCTOR					FILL PIPE	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)
0	210	12 1/4	✓			PVC	2	SCH 40					
210	290	8 3/4	✓			PVC	2	SCH 40					
290	320	8 3/4	✓			PVC	2	SCH 40					
320	330	8 3/4	✓			PVC	2	SCH 40					
260	360											GRAVEL	

ATTACHMENTS (✓)

- Geologic Log
 - Well Construction Diagram
 - Geophysical Log(s)
 - Soil/Water Chemical Analysis
 - 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 **BRADLEY & SONS**
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

3625 S. HIGHLAND DEL REY CA 93616
ADDRESS CITY STATE ZIP

Signed *Rebecca A. Dunn* 05/18/05 414178
WELL DRILLER/AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

No. **e016556**

Owner's Well No. MW #
Date Work Began 10/18/2004, Ended 10/22/2004

Local Permit Agency PLUMAS COUNTY ENV. HEALTH
Permit No. 04-JE443B Permit Date 10/7/2004

DWR USE ONLY -- DO NOT FILL IN

STATE WELL NO / STATION NO

LATITUDE LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

WELL OWNER

ORIENTATION (✓)		DRILLING METHOD	FLUID WATER	DESCRIPTION
<input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> HORIZONTAL ANGLE _____ (SPECIFY)		ROTARY		<i>Describe material, grain, size, color, etc.</i>
DEPTH FROM SURFACE	Ft to Ft			
0	20	FINE SAND AND CLAY		
20	60	BLUE CLAY		
60	80	MEDIUM AND FINE SAND		
80	100	FINE SAND, SILT		
100	140	SILTY CLAY		
140	180	SILTY CLAY AND FINE SANDS		
180	200	CLAY		
200	320	SILTY CLAY		
320	340	CLAY & DECOMPOSED GRANITE STREAK		
340	360	CLAY		
360	380	CLAY & DECOMPOSED GRANITE STREAK		
380	420	CLAY		
420	490	HARD CLAY		
TOTAL DEPTH OF BORING 490 (Feet)				
TOTAL DEPTH OF COMPLETED WELL 350 (Feet)				

Name SIERRA VALLEY GROUNDWATE
Mailing Address P.O. BOX 312
SIERRAVILLE CA 96126
CITY STATE ZIP

WELL LOCATION
Address 82414 HIGHWAY 70
City BECKWOURTH CA
County PLUMAS
APN Book 140 Page 070 Parcel 025
Township 23 N Range 15 E Section 30
Latitude _____

LOCATION SKETCH NORTH SOUTH

WEST EAST

ACTIVITY (✓)
 NEW WELL
MODIFICATION/REPAIR
--- Deepen
--- Other (Specify)
--- DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES (✓)
WATER SUPPLY
--- Domestic --- Public
--- Irrigation --- Industrial
MONITORING
TEST WELL ---
CATHODIC PROTECTION ---
HEAT EXCHANGE ---
DIRECT PUSH ---
INJECTION ---
VAPOR EXTRACTION ---
SPARGING ---
REMEDICATION ---
OTHER (SPECIFY) ---

Illustrate or Describe Distance of Well from Roads, Buildings, Fences, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER _____ (Ft.) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL _____ (Ft.) & DATE MEASURED _____
ESTIMATED YIELD _____ (GPM) & TEST TYPE _____
TEST LENGTH _____ (Hrs.) TOTAL DRAWDOWN _____ (Ft.)
May not be representative of a well's long-term yield.

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASEING (S)				MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)
		TYPE (✓)	BLANK	SCREEN	CON. DUCTOR				
0	115	12 1/4	✓			PVC	2	SCH 40	
115	130	12 1/4	✓			PVC	2	SCH 40	
130	140	12 1/4	✓			PVC	2	SCH 40	
0	150	12 1/4	✓			PVC	2	SCH 40	
150	310	8 3/4	✓			PVC	2	SCH 40	
310	340	8 3/4	✓			PVC	2	SCH 40	

DEPTH FROM SURFACE	ANNULAR MATERIAL TYPE	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
0	93	✓			
93	105		✓		
105	260			✓	GRAVEL
260	270		✓		
270	490			✓	GRAVEL

ATTACHMENTS (✓)
--- Geologic Log
--- Well Construction Diagram
--- Geophysical Log(s)
--- Soil/Water Chemical Analysis
--- 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 BRADLEY & SONS
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)
3625 S. HIGHLAND DEL REY CA 93616
ADDRESS CITY STATE ZIP
Signed *Rebecca Dunker* DATE SIGNED 05/18/05 C-57 LICENSE NUMBER 414178
WELL DRILLER/AUTHORIZED REPRESENTATIVE

STATE OF CALIFORNIA
WELL COMPLETION REPORT
Refer to Instruction Pamphlet

Owner's Well No. MW #6

No. **e016556**

Date Work Began 10/18/2004, Ended 10/22/2004

Local Permit Agency PLUMAS COUNTY ENV. HEALTH

Permit No. 04-JE443B Permit Date 10/7/2004

DWR USE ONLY ... DO NOT FILL IN

STATE WELL NO / STATION NO

LATITUDE LONGITUDE

APN/TRS/OTHER

GEOLOGIC LOG

ORIENTATION (✓)		DRILLING METHOD	FLUID	WATER
<input checked="" type="checkbox"/> VERTICAL		ROTARY		
<input type="checkbox"/> HORIZONTAL				
ANGLE (SPECIFY)				
DEPTH FROM SURFACE		DESCRIPTION		
Ft	to Ft	Describe material, grain, size, color, etc.		
0	20	FINE SAND AND CLAY		
20	60	BLUE CLAY		
60	80	MEDIUM AND FINE SAND		
80	100	FINE SAND, SILT		
100	140	SILTY CLAY		
140	180	SILTY CLAY AND FINE SANDS		
180	200	CLAY		
200	320	SILTY CLAY		
320	340	CLAY & DECOMPOSED GRANITE STREAK		
340	360	CLAY		
360	380	CLAY & DECOMPOSED GRANITE STREAK		
380	420	CLAY		
420	490	HARD CLAY		

WELL OWNER

Name SIERRA VALLEY GROUNDWATER
Mailing Address P.O. BOX 312
SIERRAVILLE CA 96126
CITY STATE ZIP

WELL LOCATION

Address 82414 HIGHWAY 70
City BECKWOURTH CA
County PLUMAS
APN Book 140 Page 070 Parcel 025
Township 23 N Range 15 E Section 30
Latitude

DEG MIN SEC. LOCATION SKETCH NORTH

DEG MIN SEC. ACTIVITY (✓)

NEW WELL

MODIFICATION/REPAIR
— Deepen
— Other (Specify)

— DESTROY (Describe Procedures and Materials Under "GEOLOGIC LOG")

PLANNED USES (✓)
WATER SUPPLY
— Domestic — Public
— Irrigation — Industrial

MONITORING —
TEST WELL —
CATHODIC PROTECTION —
HEAT EXCHANGE —
DIRECT PUSH —
INJECTION —
VAPOR EXTRACTION —
SPARGING —
REMEDICATION —
OTHER (SPECIFY) —

WEST EAST

— SOUTH

Illustrate or Describe Distance of Well from Roads, Buildings, Pecos, Rivers, etc. and attach a map. Use additional paper if necessary. PLEASE BE ACCURATE & COMPLETE.

WATER LEVEL & YIELD OF COMPLETED WELL

DEPTH TO FIRST WATER (Ft) BELOW SURFACE
DEPTH OF STATIC WATER LEVEL (Ft) & DATE MEASURED
ESTIMATED YIELD * (GPM) & TEST TYPE
TEST LENGTH (Hrs.) TOTAL DRAWDOWN (Ft)
May not be representative of a well's long-term yield.

DEPTH FROM SURFACE	BORE-HOLE DIA. (Inches)	CASING (S)				ANNULAR MATERIAL				
		TYPE (✓)	MATERIAL / GRADE	INTERNAL DIAMETER (Inches)	GAUGE OR WALL THICKNESS	SLOT SIZE IF ANY (Inches)	CE-MENT (✓)	BEN-TONITE (✓)	FILL (✓)	FILTER PACK (TYPE/SIZE)
340	350	8 3/4	PVC	2	SCH 40					
0	93									
93	105									
105	260									GRAVEL
260	270									
270	490									GRAVEL

ATTACHMENTS (✓)

- Geologic Log
- Well Construction Diagram
- Geophysical Log(s)
- Soil/Water Chemical Analysis
- Other

CERTIFICATION STATEMENT

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

NAME **BRADLEY & SONS**
(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

3625 S. HIGHLAND DEL REY CA 93616
ADDRESS CITY STATE ZIP

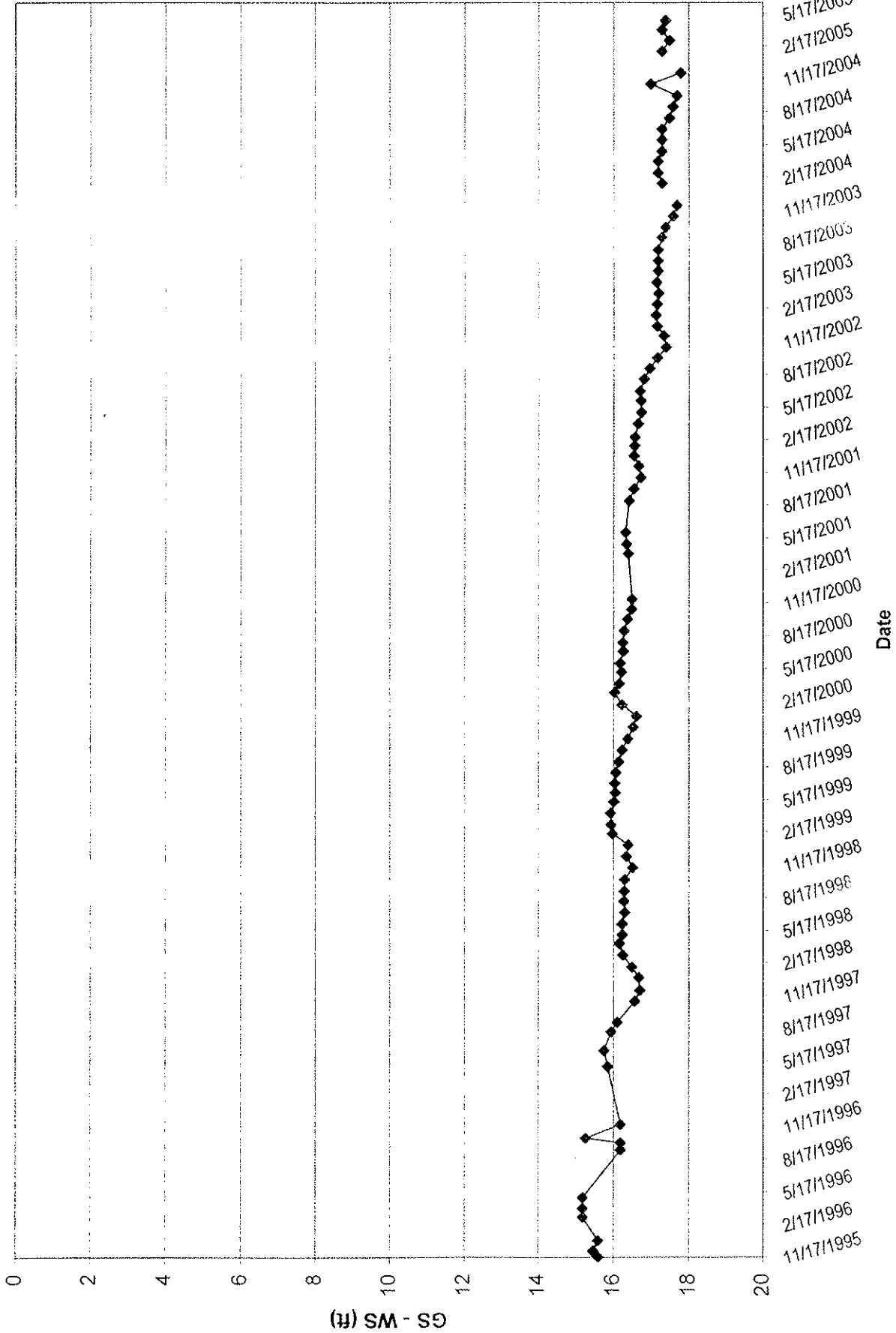
Signed *[Signature]* DATE SIGNED 05/18/05
WELL DRILLER/AUTHORIZED REPRESENTATIVE C-57 LICENSE NUMBER 414178

APPENDIX C

WATER-LEVEL HYDROGRAPHS FOR
DISTRICT MONITOR WELLS

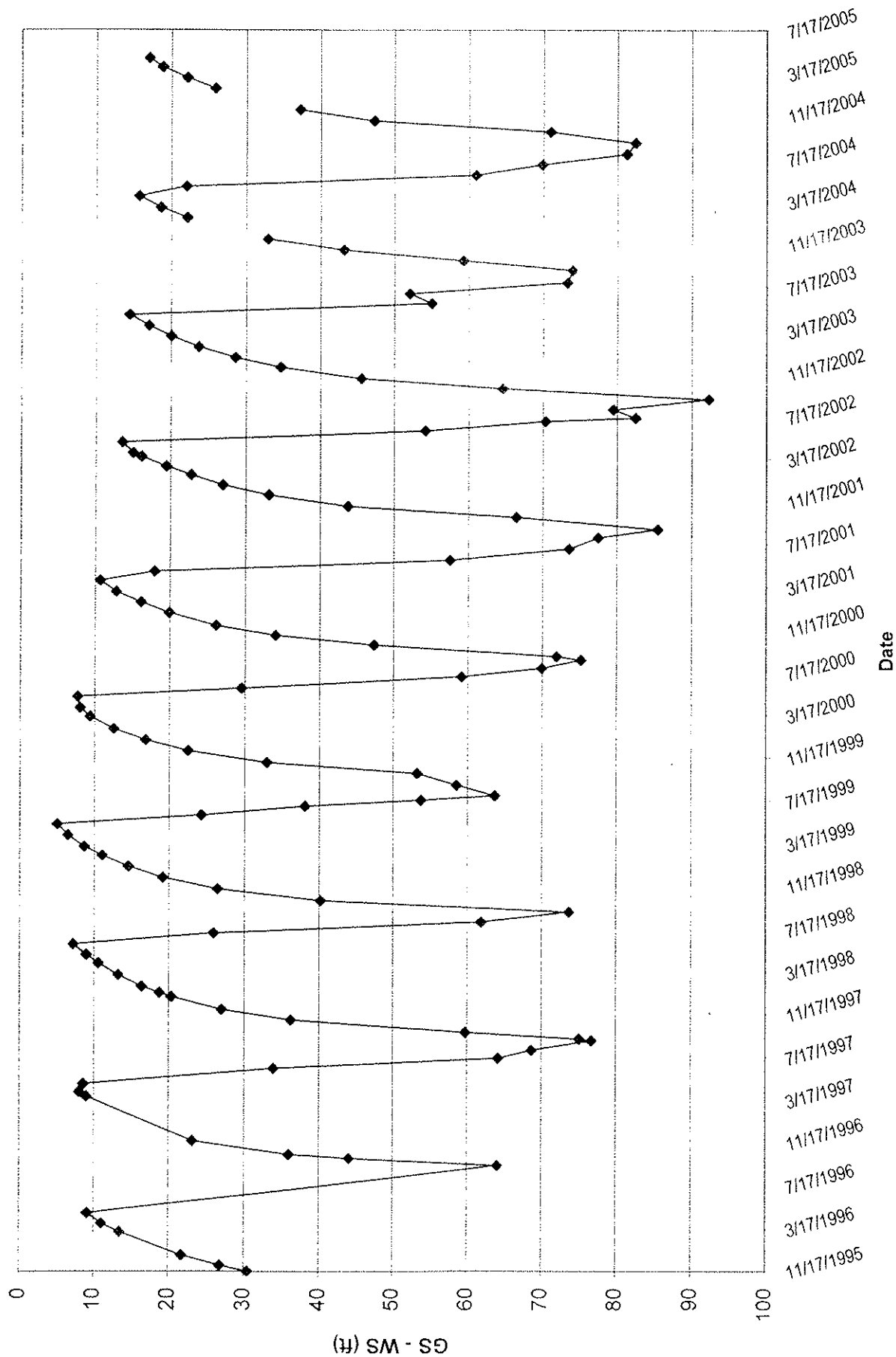
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MW 1s



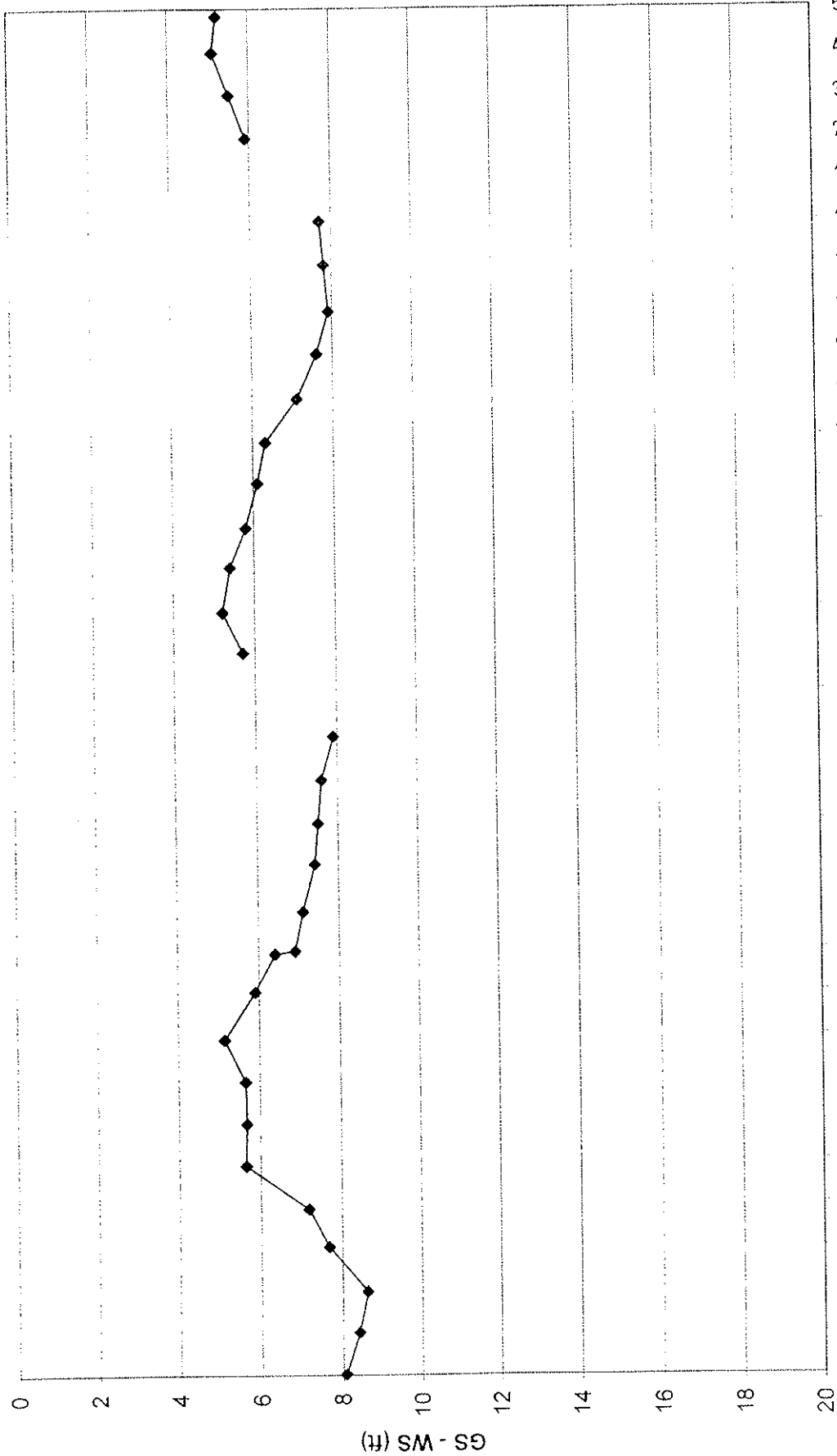
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MW 1d



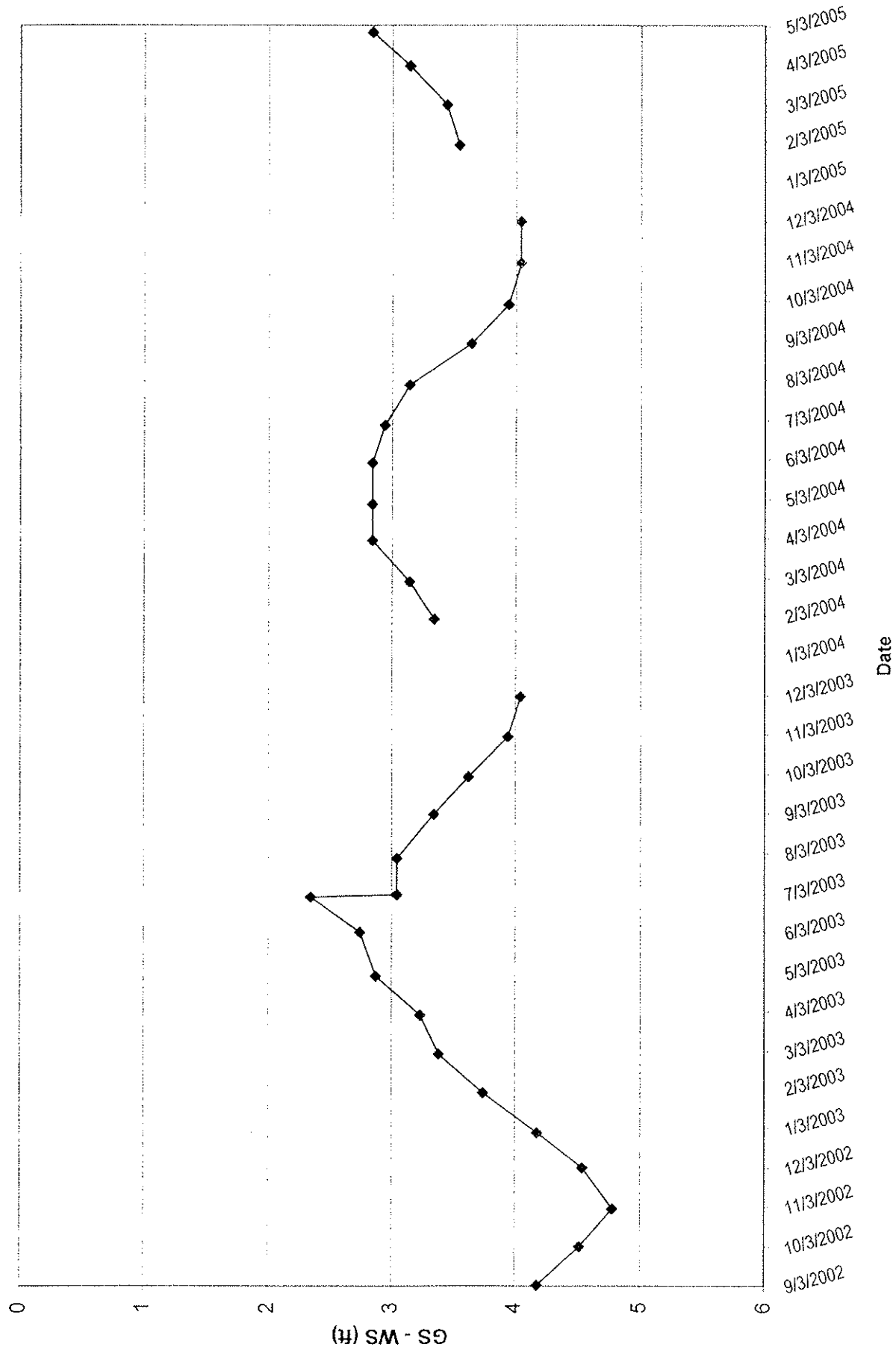
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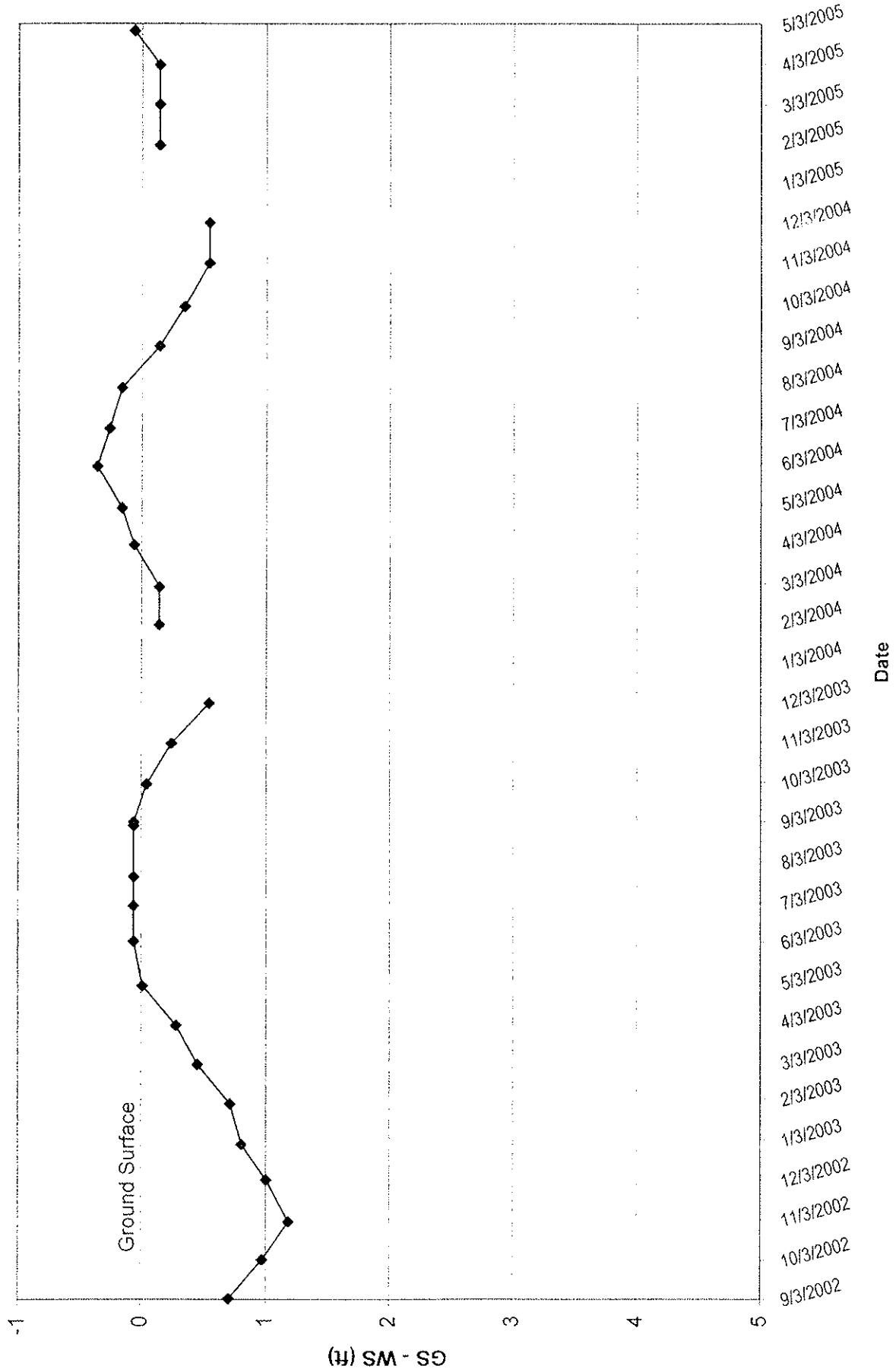
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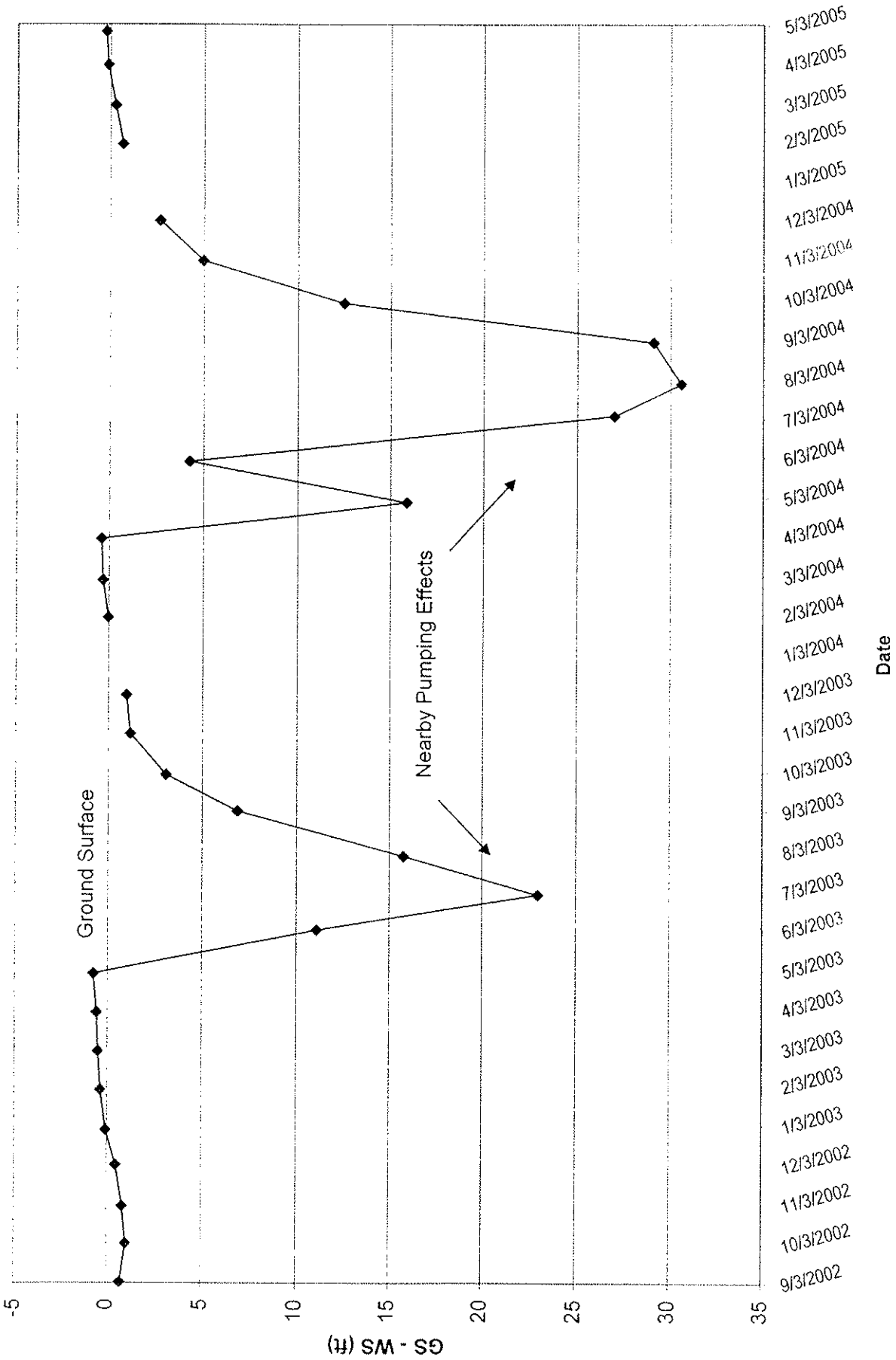
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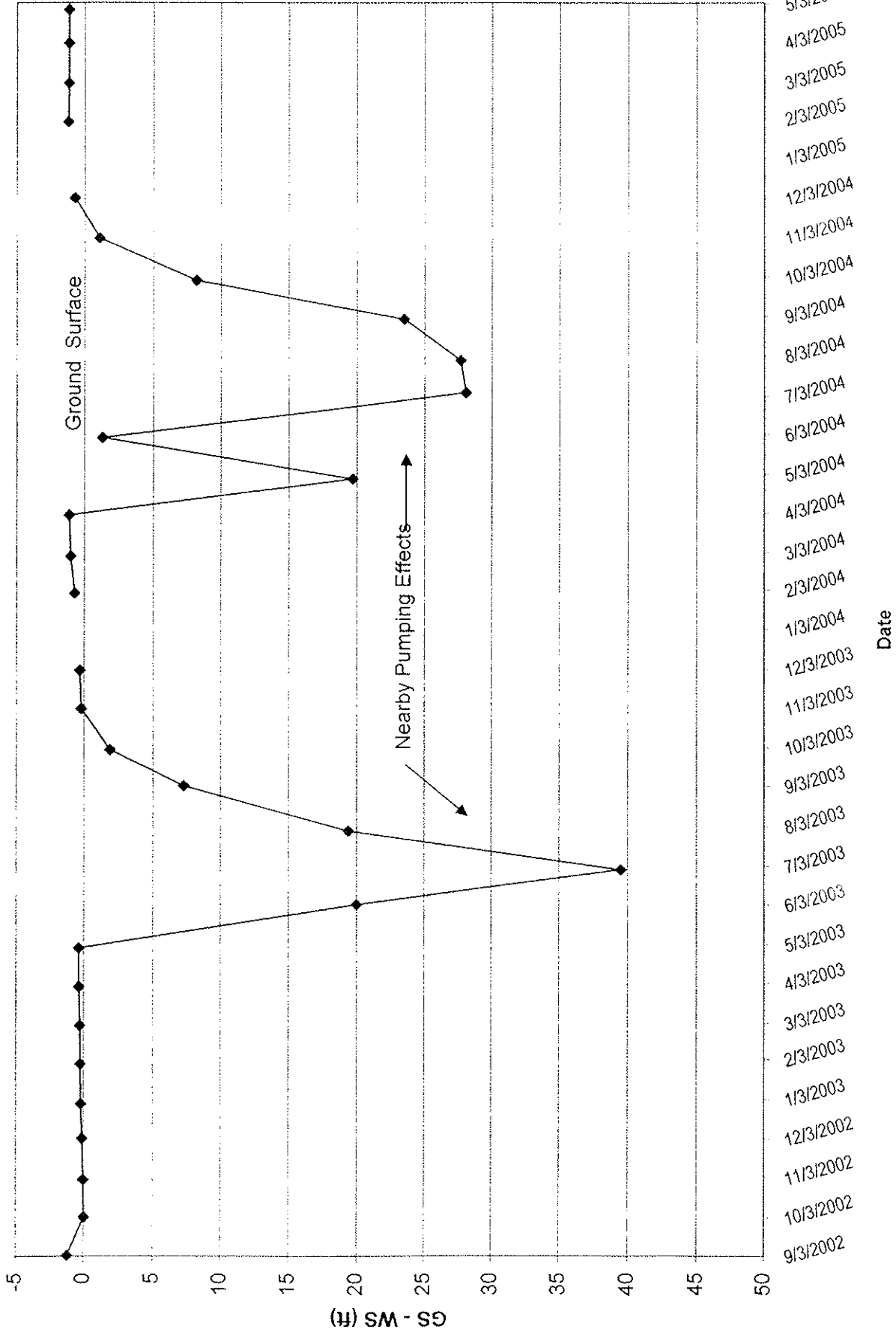
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MW 3s



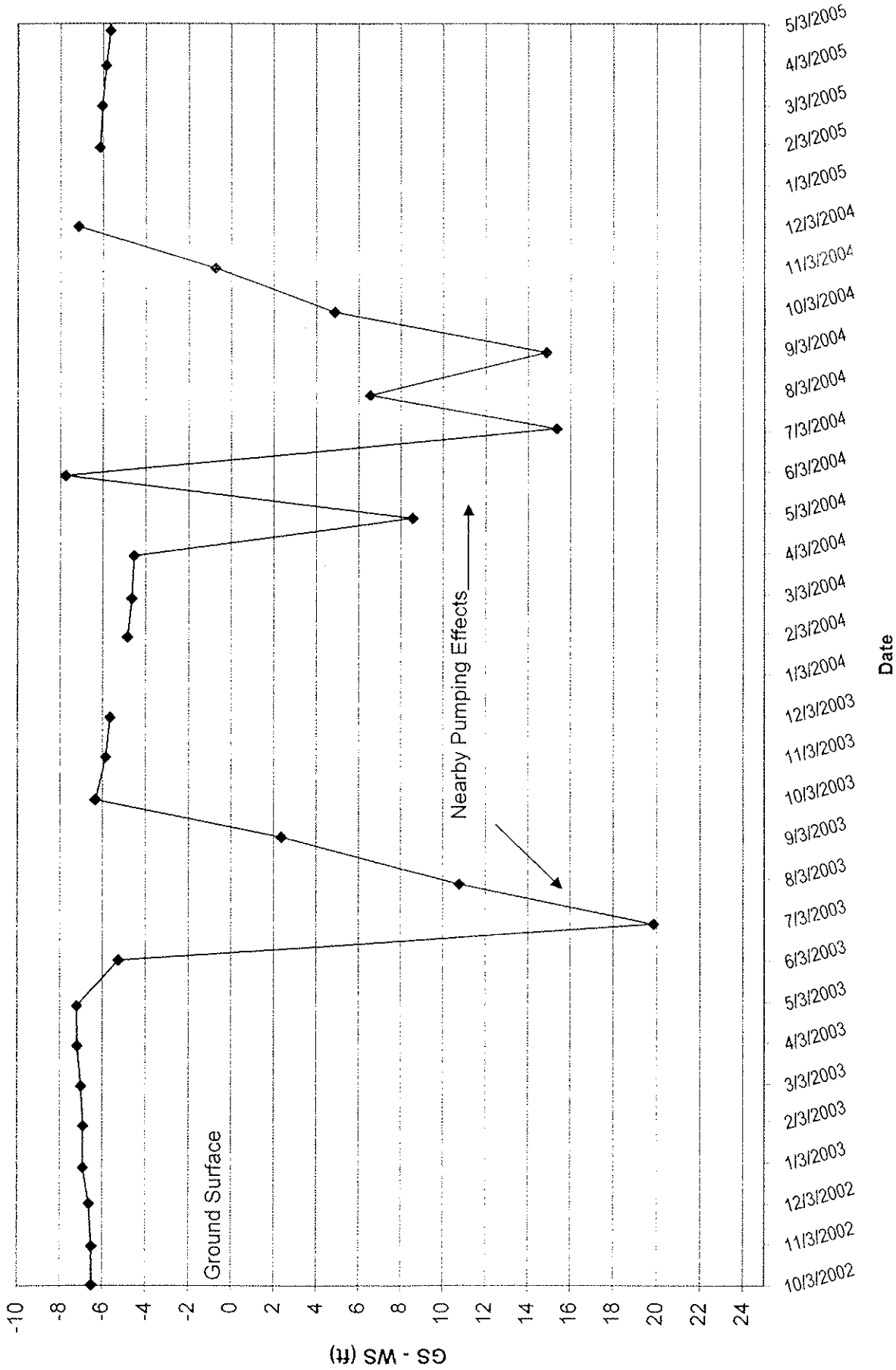
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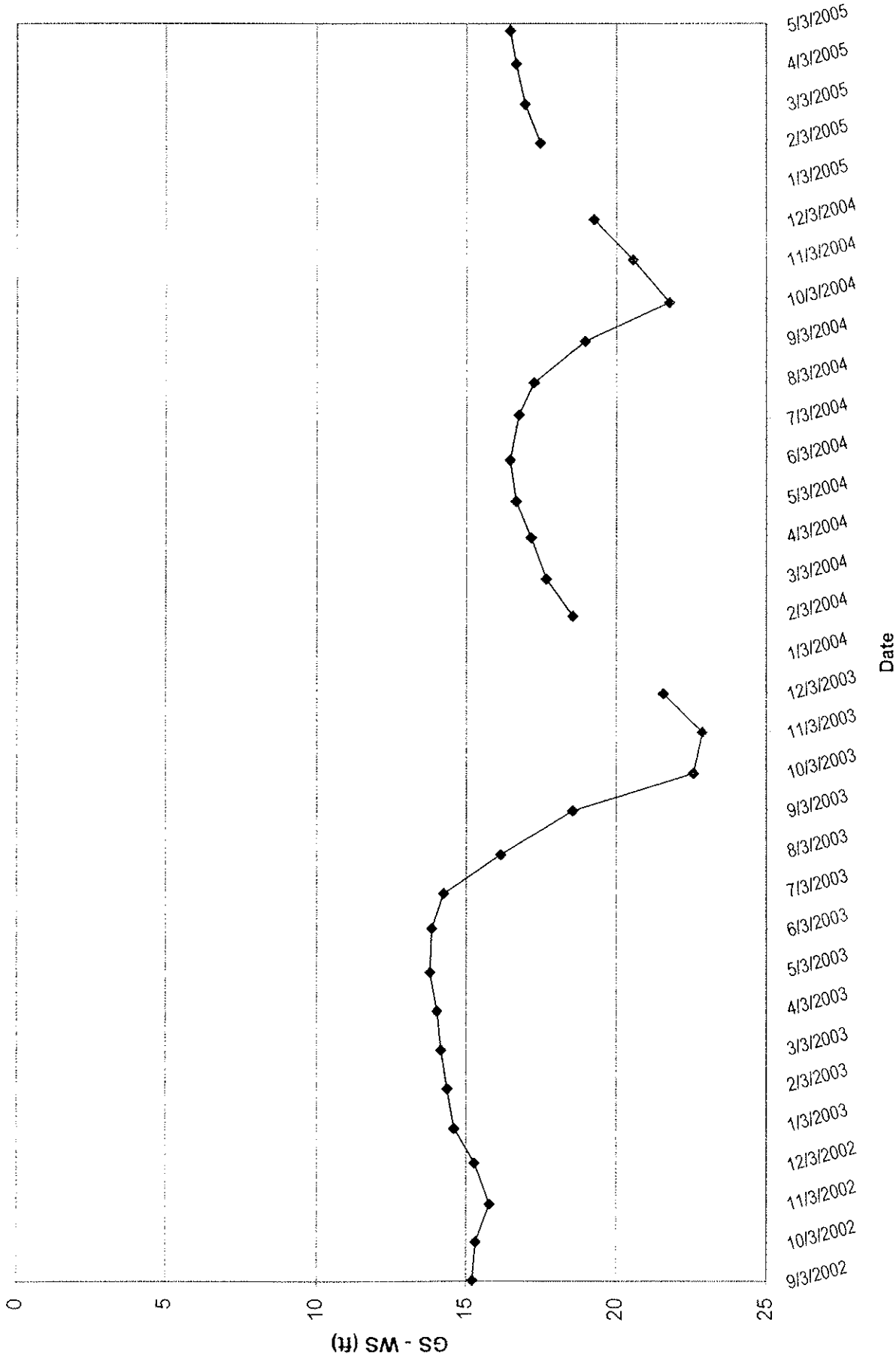
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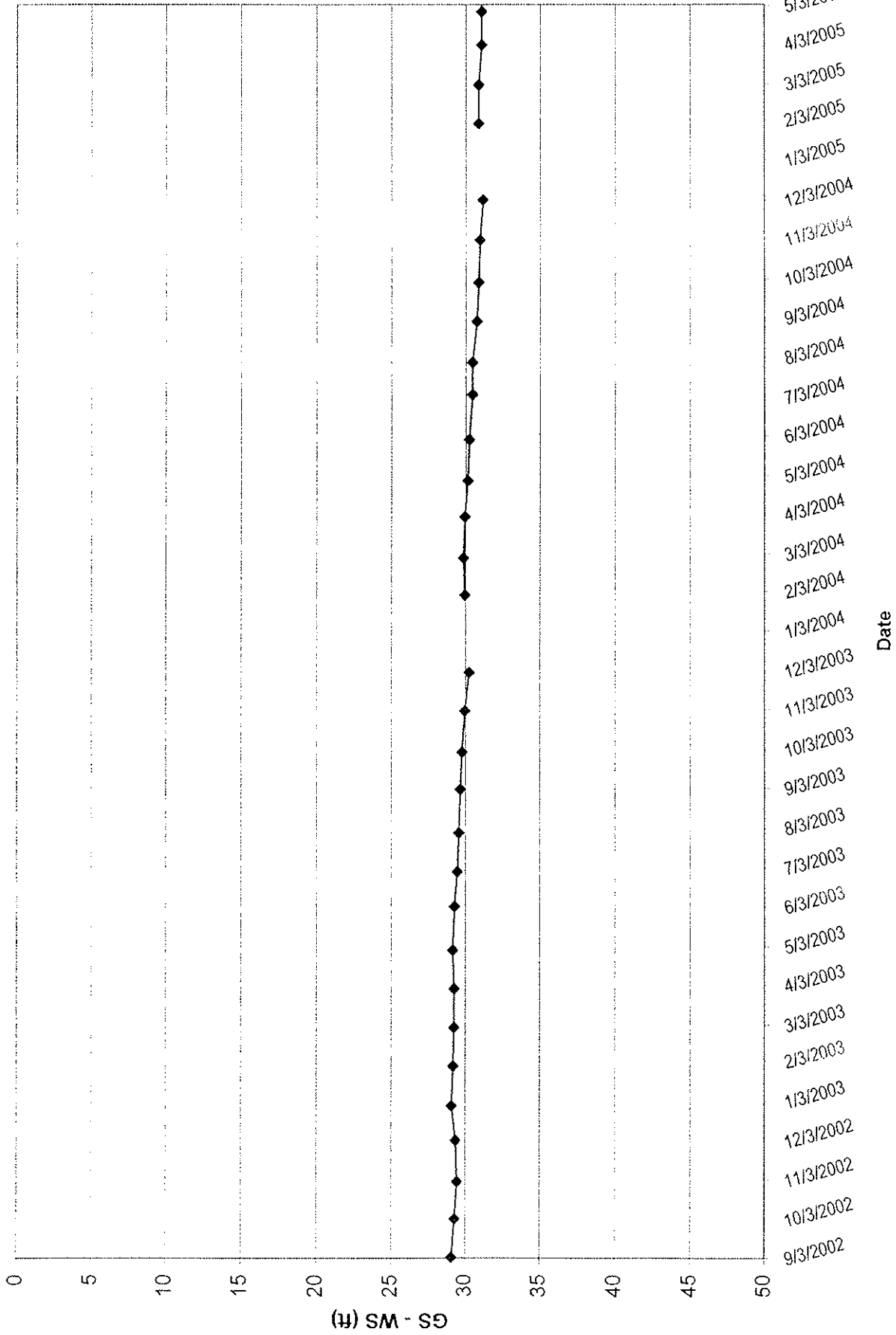
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MW 4s



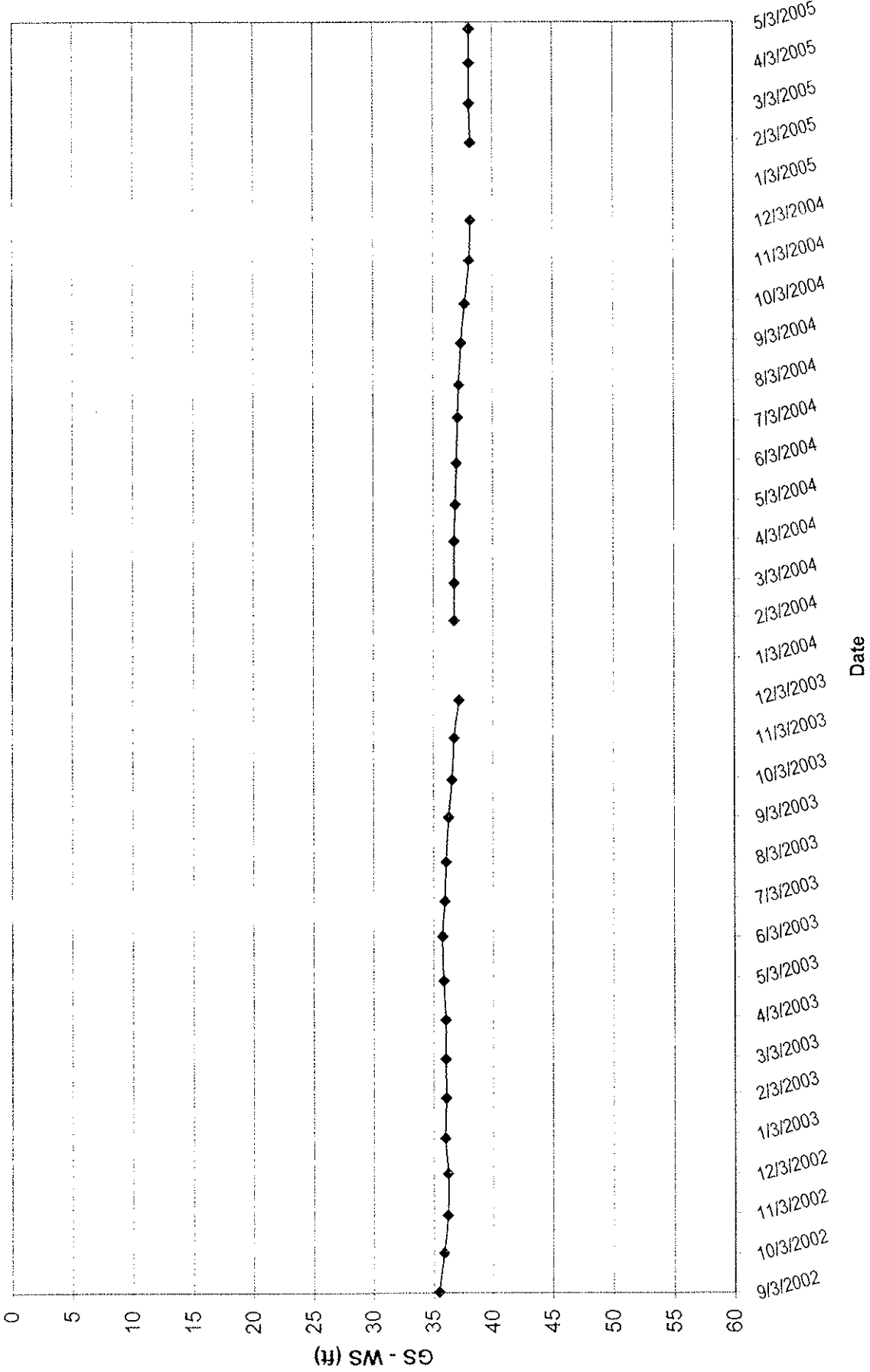
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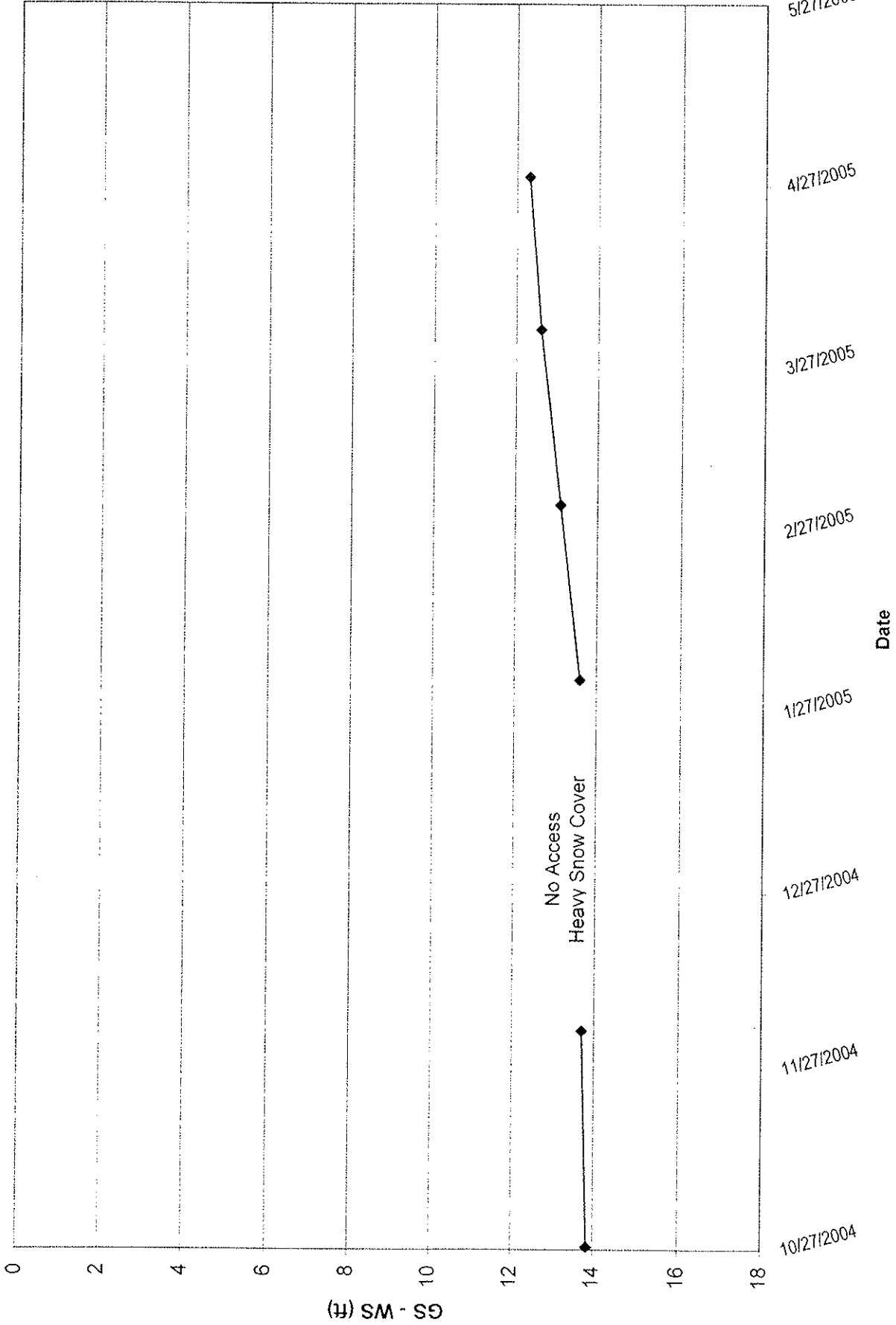
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MW 4d



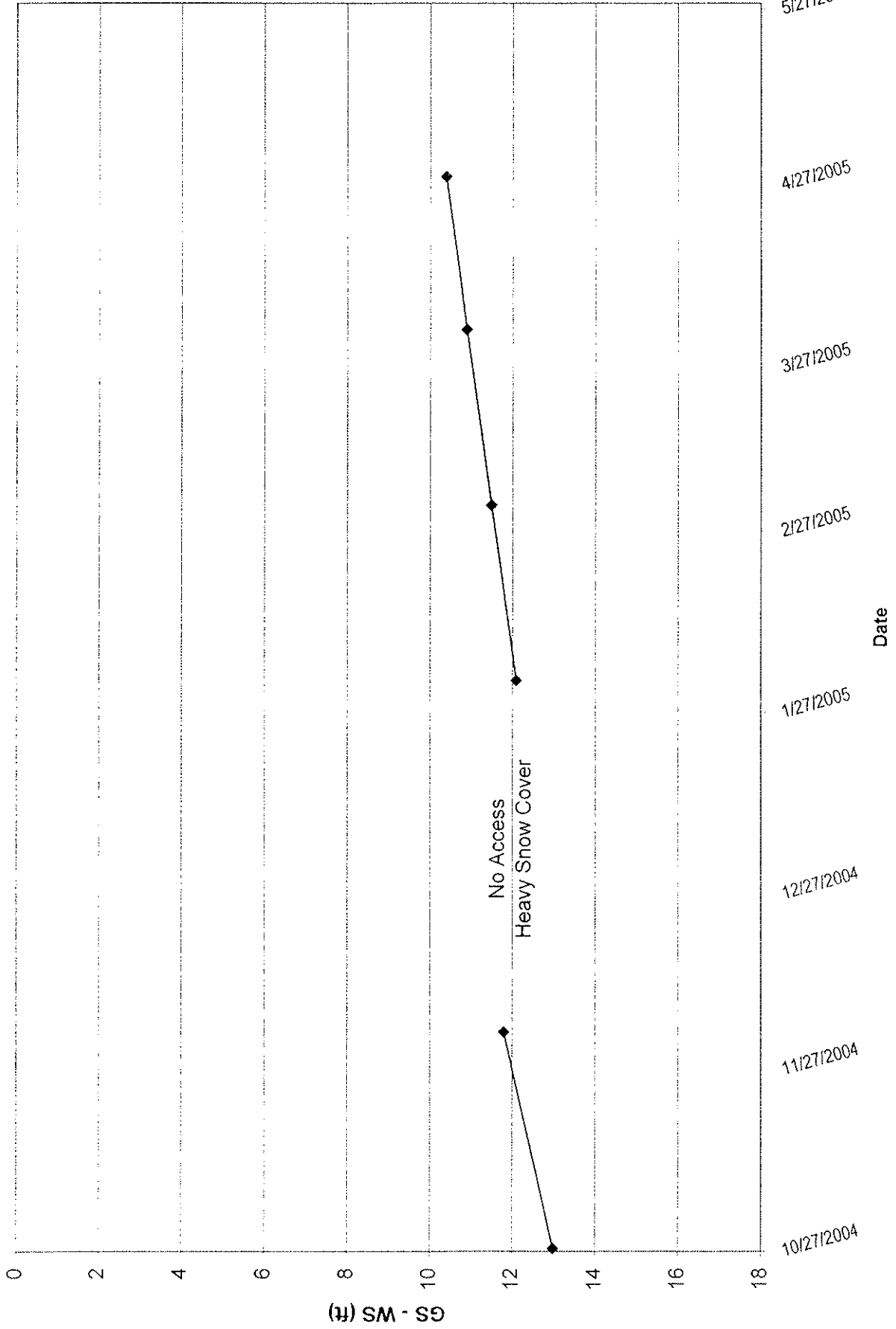
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MW 5s



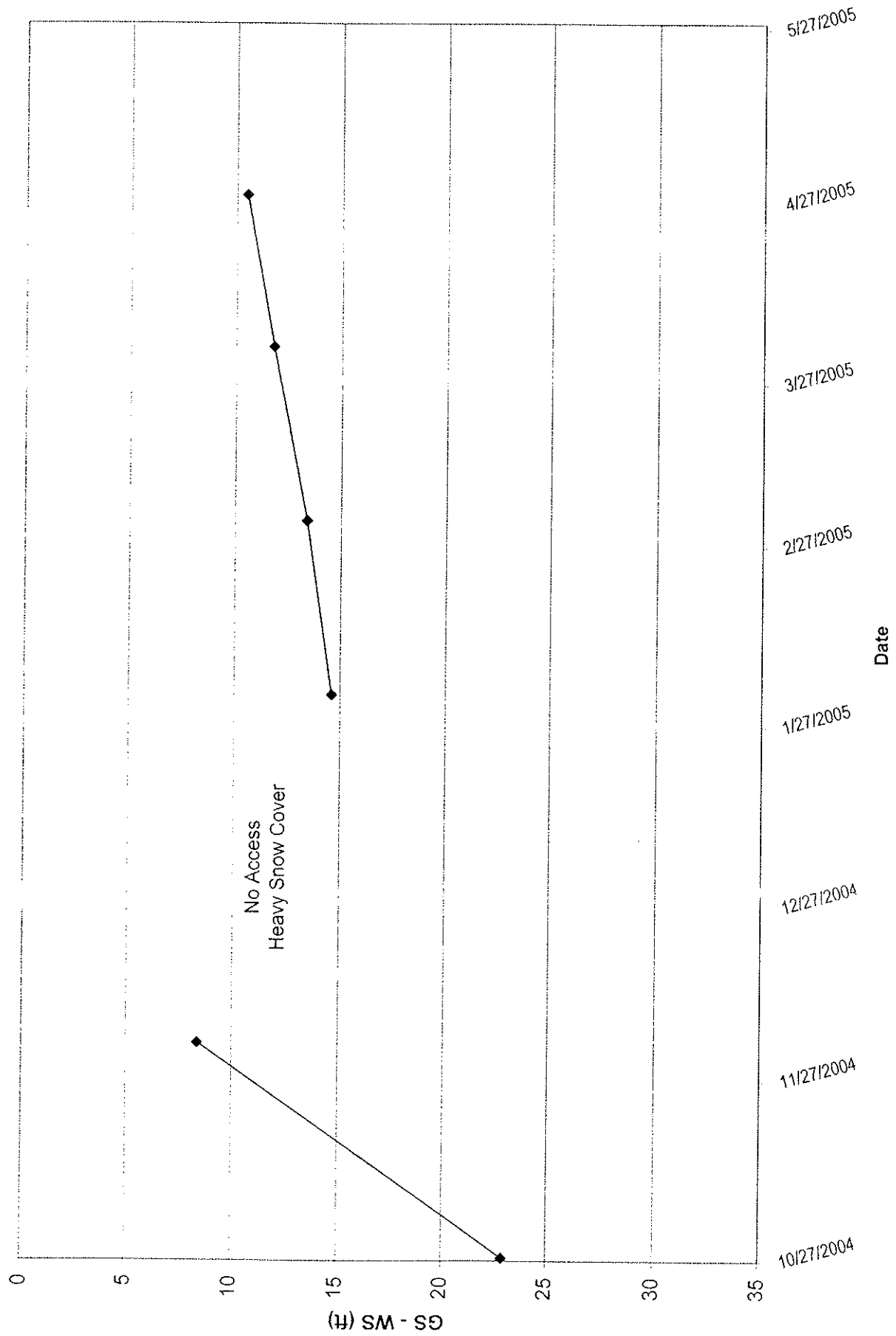
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MW 5i



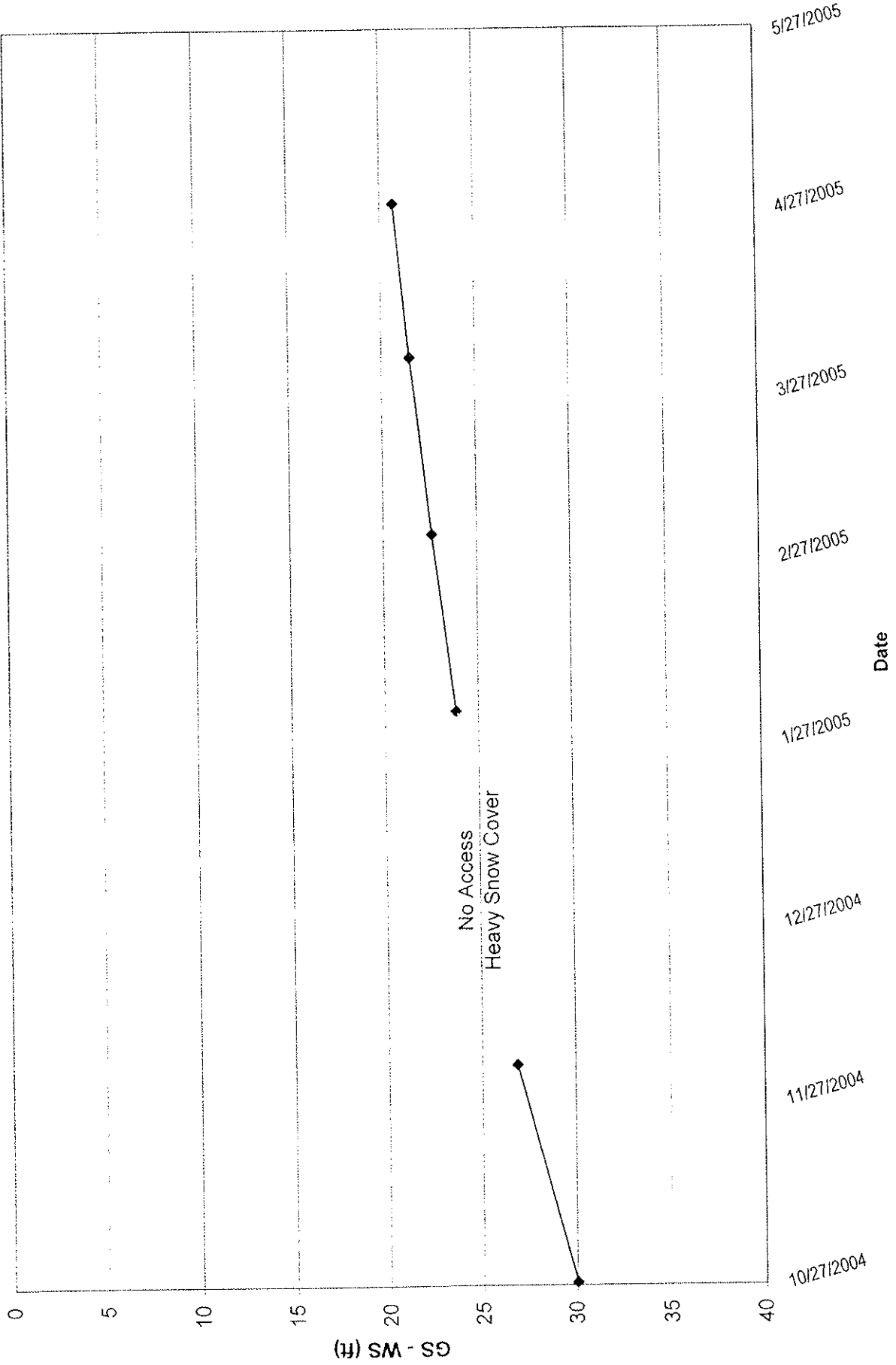
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MW 6s



23N15E30M01M

MW 6d



APPENDIX D

CHEMICAL ANALYSES OF WATER FROM
NEW NESTED MONITOR WELLS



ANALYTICAL CHEMISTS

December 8, 2004

Lab ID : SP 411235-01

Customer ID: 2-6051

Kenneth D. Schmidt & Associates

600 West Shaw Avenue, #250

Fresno, CA 93704

Sampled On : October 27, 2004-11:45

Sampled By : Ken Elliott

Received On : October 29, 2004-10:00

Matrix : Ground Water

(75'-90')

Description : MW-5,

Project : Sierra Valley Monitor Wells

Sample Results - Inorganic

Constituent	Results	PQL	Units	Note	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
Irrigation Suit P:1								
Total Hardness	99.4	2.5	mg/L		Calculation		Calculation	
Calcium	25	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Magnesium	9	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Potassium	3	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Sodium	21	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Total Cations	3.0	--	meq/L		Calculation		Calculation	
Boron	ND	0.1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Copper	ND	10	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Iron	150	50	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Manganese	50	10	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Zinc	ND	20	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Gypsum Requirement	0.2	--	mg/L		Calculation		Calculation	
SAR	0.9	0.1	mg/L		Calculation		Calculation	
Total Alkalinity	120	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Hydroxide	ND	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Carbonate	ND	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Bicarbonate	150	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Sulfate	10	1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Chloride	5	1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Nitrate	4.8	0.4	mg/L		4500NO3F	11/03/04:A220	4500NO3F	11/04/2004:C01
						12:30		11:36
Fluoride	0.3	0.1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Total Anions	2.9	--	meq/L		Calculation		Calculation	
pH	7.1	--	units		4500-H B	10/29/04:A246	4500-H B	10/29/2004:A01
								18:13
E. C.	279	1	umhos/cm		2510B	10/31/04:A212	2510B	10/31/2004:A01
TDS by Summation	153	--	mg/L		Calculation		Calculation	

ND=Non-Detect. PQL=Practical Quantitation Limit. ♦ PQL adjusted for dilutions, concentrations, dry weight reporting, or limited sample.

Containers: (P) Plastic Preservatives: (1) Cool 4°C



ANALYTICAL CHEMISTS

December 8, 2004

Lab ID : SP 411235-03

Customer ID: 2-6051

Kenneth D. Schmidt & Associates

600 West Shaw Avenue, #250

Fresno, CA 93704

Sampled On : October 27, 2004-16:10

Sampled By : Ken Elliott

Received On: October 29, 2004-10:00

Matrix : Ground Water

Description : MW-5,

Project : Sierra Valley Monitor Wells

(290'-320')

Sample Results - Inorganic

Constituent	Results	PQL	Units	Note	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
Irrigation Suit P:1								
Total Hardness	63.9	2.5	mg/L		Calculation		Calculation	
Calcium	19	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Magnesium	4	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Potassium	2	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Sodium	25	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Total Cations	2.4	--	meq/L		Calculation		Calculation	
Boron	ND	0.1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Copper	ND	10	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Iron	ND	50	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Manganese	70	10	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Zinc	ND	20	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Gypsum Requirement	0.3	--	mg/L		Calculation		Calculation	
SAR	1.4	0.1	mg/L		Calculation		Calculation	
Total Alkalinity	110	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Hydroxide	ND	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Carbonate	ND	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Bicarbonate	140	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Sulfate	6	1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Chloride	3	1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Nitrate	ND	0.4	mg/L		4500NO3F	11/03/04:A220 12:30	4500NO3F	11/04/2004:C01 11:40
Fluoride	0.3	0.1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Total Anions	2.5	--	meq/L		Calculation		Calculation	
pH	7.8	--	units		4500-H B	10/29/04:A246	4500-H B	10/29/2004:A01 18:15
E. C.	230	1	umhos/cm		2510B	10/31/04:B212	2510B	10/31/2004:A01
TDS by Summation	129	--	mg/L		Calculation		Calculation	

ND=Non-Detect. PQL=Practical Quantitation Limit. ♦ PQL adjusted for dilutions, concentrations, dry weight reporting, or limited sample.

Containers: (P) Plastic Preservatives: (1) Cool 4°C



ANALYTICAL CHEMISTS

December 8, 2004

Lab ID : SP 411235-02

Customer ID: 2-6051

Kenneth D. Schmidt & Associates

600 West Shaw Avenue, #250
Fresno, CA 93704

Sampled On : October 27, 2004-14:00

Sampled By : Ken Elliott

Received On : October 29, 2004-10:00

Matrix : Ground Water

Description : MW-5, (185'-195')
Project : Sierra Valley Monitor Wells

Sample Results - Inorganic

Constituent	Results	PQL	Units	Note	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
Irrigation Suit P:1								
Total Hardness	61.4	2.5	mg/L		Calculation		Calculation	
Calcium	18	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Magnesium	4	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Potassium	4	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Sodium	25	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Total Cations	2.4	--	meq/L		Calculation		Calculation	
Boron	ND	0.1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Copper	ND	10	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Iron	ND	50	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Manganese	160	10	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Zinc	ND	20	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Gypsum Requirement	0.3	--	mg/L		Calculation		Calculation	
SAR	1.4	0.1	mg/L		Calculation		Calculation	
Total Alkalinity	110	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Hydroxide	ND	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Carbonate	ND	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Bicarbonate	140	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Sulfate	6	1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Chloride	3	1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Nitrate	ND	0.4	mg/L		4500NO3F	11/03/04:A220 12:30	4500NO3F	11/04/2004:C01 11:38
Fluoride	0.3	0.1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Total Anions	2.5	--	meq/L		Calculation		Calculation	
pH	7.5	--	units		4500-H B	10/29/04:A246	4500-H B	10/29/2004:A01 18:14
E. C.	229	1	umhos/cm		2510B	10/31/04:A212	2510B	10/31/2004:A01
TDS by Summation	130	--	mg/L		Calculation		Calculation	

ND=Non-Detect. PQL=Practical Quantitation Limit. ♦ PQL adjusted for dilutions, concentrations, dry weight reporting, or limited sample.
Containers: (P) Plastic Preservatives: (I) Cool 4°C



ANALYTICAL CHEMISTS

December 8, 2004

Lab ID : SP 411235-04

Customer ID: 2-6051

Kenneth D. Schmidt & Associates

600 West Shaw Avenue, #250

Fresno, CA 93704

Sampled On : October 27, 2004-19:05

Sampled By : Ken Elliott

Received On : October 29, 2004-10:00

Matrix : Ground Water

(115'-130')

Description : MW-6,

Project : Sierra Valley Monitor Wells

Sample Results - Inorganic

Constituent	Results	PQL	Units	Note	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
Irrigation Suit P:1								
Total Hardness	105	2.5	mg/L		Calculation		Calculation	
Calcium	32	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Magnesium	6	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Potassium	2	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Sodium	180	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Total Cations	10.0	--	meq/L		Calculation		Calculation	
Boron	2.4	0.1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Copper	ND	10	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Iron	ND	50	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Manganese	280	10	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Zinc	ND	20	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Gypsum Requirement	0.9	--	mg/L		Calculation		Calculation	
SAR	7.7	0.1	mg/L		Calculation		Calculation	
Total Alkalinity	100	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Hydroxide	ND	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Carbonate	ND	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Bicarbonate	120	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Sulfate	160	1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Chloride	181	5*	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Nitrate	ND	0.4	mg/L		4500NO3F	11/03/04:A220 12:30	4500NO3F	11/04/2004:C01 11:42
Fluoride	0.4	0.1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Total Anions	10.4	--	meq/L		Calculation		Calculation	
pH	7.9	--	units		4500-H B	10/29/04:A246	4500-H B	10/29/2004:A01 18:16
E. C.	1090	1	umhos/cm		2510B	10/31/04:A212	2510B	10/31/2004:A01
TDS by Summation	621	--	mg/L		Calculation		Calculation	

ND=Non-Detect. PQL=Practical Quantitation Limit. ♦ PQL adjusted for dilutions, concentrations, dry weight reporting, or limited sample.

Containers: (P) Plastic Preservatives: (1) Cool 4°C



ANALYTICAL CHEMISTS

December 8, 2004

Lab ID : SP 411235-05
Customer ID: 2-6051

Kenneth D. Schmidt & Associates
600 West Shaw Avenue, #250
Fresno, CA 93704

Sampled On : October 27, 2004-21:15
Sampled By : Ken Elliott
Received On: October 29, 2004-10:00
Matrix : Ground Water

(310' - 340')

Description : MW-6,
Project : Sierra Valley Monitor Wells

Sample Results - Inorganic

Constituent	Results	PQL	Units	Note	Sample Preparation		Sample Analysis	
					Method	Date/ID	Method	Date/ID
Irrigation Suit ^{P:1}								
Total Hardness	72.2	2.5	mg/L		Calculation		Calculation	
Calcium	24	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Magnesium	3	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Potassium	1	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Sodium	223	1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Total Cations	11.2	--	meq/L		Calculation		Calculation	
Boron	4.0	0.1	mg/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Copper	ND	10	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Iron	ND	50	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Manganese	80	10	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Zinc	ND	20	ug/L		200.7	11/02/04:A203	200.7	11/02/2004:A01
Gypsum Requirement	1.2	--	mg/L		Calculation		Calculation	
SAR	11.4	0.1	mg/L		Calculation		Calculation	
Total Alkalinity	110	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Hydroxide	ND	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Carbonate	ND	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Bicarbonate	130	10	mg/L		2320B	11/01/04:A202	2320B	11/01/2004:B01
Sulfate	179	1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Chloride	210	5*	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Nitrate	ND	0.4	mg/L		4500NO3F	11/03/04:A220 12:30	4500NO3F	11/03/2004:C01 11:44
Fluoride	0.2	0.1	mg/L		300.0	10/29/04:C215	300.0	10/30/2004:A09
Total Anions	11.8	--	meq/L		Calculation		Calculation	
pH	8.2	--	units		4500-H B	10/29/04:A246	4500-H B	10/29/2004:A01 18:17
E. C.	1240	1	umhos/cm		2510B	10/31/04:A212	2510B	10/31/2004:A01
TDS by Summation	705	--	mg/L		Calculation		Calculation	

ND=Non-Detect. PQL=Practical Quantitation Limit. ♦ PQL adjusted for dilutions, concentrations, dry weight reporting, or limited sample.
Containers: (P) Plastic Preservatives: (1) Cool 4°C

APPENDIX E

WATER-LEVEL MEASUREMENTS FOR FALL 2003,
SPRING AND FALL, 2004, AND SPRING 2005



Data Retrieval by Season

DPLA Home

WDL Home

- ◆ Water Quality
- ◆ Air Ambience

The period of retrieval is from **01-01-2003** to **06-30-2003**. Wells in the Department of Water Resources monitoring network are identified by State Well Number, which is based on the Public Land Grid System. The table headings and records contain several codes and abbreviations. Note that in some areas, especially the coastal basins, our electronic data set is not yet complete. If you do not see what you are looking for, send us an e-mail or give us a call. Press the **New Search** button to begin a new Data Retrieval by Season.

Sierra Valley Groundwater Basin Seasonal Data Retrieval

SWN	Meas. Date	WSE	GSWS	NM Code	QM Code	Agency
20N14E13Q002M	03/29/2003	4,983.8	1.8			5050
20N14E14R001M	03/27/2003	5,034.2	0.8			5050
21N14E25P003M	03/27/2003	4,914.5	20.5			5050
21N14E29J001M	03/27/2003			7		5050
21N14E36Q002M	03/27/2003	4,917.7	2.3			5050
21N15E01K001M	03/28/2003	4,895.4	17.6			5050
21N15E01K002M	03/28/2003	4,895.5	17.5			5050
21N15E03M003M	03/27/2003	4,866.2	25.8			5050
21N15E04Q001M	03/27/2003	4,885.0	8.0			5050
21N15E09N006M	03/28/2003			0		5050
21N15E12J001M	03/28/2003	4,907.6	34.4			5050
21N15E12P003M	03/28/2003	4,909.8	17.2			5050
21N15E14L001M	03/28/2003	4,907.4	92.6			5050
21N16E06H003M	03/28/2003			9		5050
21N16E07A001M	03/28/2003	4,918.1	47.9			5050
21N16E07F004M	03/28/2003	4,940.6	20.4			5050
21N16E07G001M	03/28/2003	4,916.4	43.6			5050
21N16E07M001M	03/28/2003	4,905.1	32.9			5050
21N16E18G002M	03/28/2003	4,975.2	19.8			5050
21N16E30A001M	03/28/2003	5,067.3	22.7			5050
22N15E08Q001M	03/28/2003	4,873.1	3.9			5050
22N15E10B001M	03/28/2003	4,827.2	63.8			5050
22N15E13N001M	03/28/2003	4,850.6	42.4		8	5050

22N15E22Q001M	03/28/2003	4,863.3	17.6		5050
22N15E26K003M	03/28/2003			0	5050
22N15E27Q001M	03/28/2003	4,851.9	30.1	8	5050
22N15E34L006M	03/28/2003	4,854.0	31.0	2	5050
22N15E36N001M	03/28/2003	4,880.4	16.6	8	5050
22N15E36Q001M	03/28/2003	4,898.3	9.7		5050
22N16E04A001M	03/28/2003	4,915.2	16.8		5050
22N16E06R002M	03/28/2003	4,847.9	60.1		5050
22N16E17C001M	03/28/2003	4,900.7	6.3		5050
22N16E17E002M	03/28/2003	4,897.7	3.6		5050
22N16E19M001M	03/28/2003			9	5050
22N16E20P002M	03/28/2003	4,927.3	7.3		5050
23N14E25G001M	03/27/2003			0	5050
23N14E35L001M	03/27/2003	4,868.3	9.2		5050
23N15E26R001M	03/29/2003	4,854.4	42.6		5050
23N15E27E001M	03/29/2003	4,894.5	5.5		5050
23N15E29H001M	03/29/2003	4,893.1	3.3		5050
23N15E34D001M	03/29/2003	4,884.7	3.6		5050
23N16E23F001M	03/28/2003	4,974.3	15.7		5050
23N16E27R001M	03/28/2003	4,955.1	8.1		5050
23N16E28L001M	03/28/2003	4,931.1	7.4		5050
23N16E30R001M	03/27/2003	4,852.9	62.1		5050
23N16E32Q001M	03/28/2003	4,854.0	66.0	8	5050

Your selection returned a total of **46** records.

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Data Retrieval by Season

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◆ Water Quality

◆ Groundwater

The period of retrieval is from **01-01-2003** to **06-30-2003**. Wells in the Department of Water Resources monitoring network are identified by State Well Number, which is based on the Public Land Grid System. The table headings and records contain several codes and abbreviations. Note that in some areas, especially the coastal basins, our electronic data set is not yet complete. If you do not see what you are looking for, send us an e-mail or give us a call. Press the **New Search** button to begin a new Data Retrieval by Season.

Chilcoot Sub-bas of Sierra Vly Groundwater Basin Seasonal Data Retrieval

SWN	Meas. Date	WSE	GSWS	NM Code	QM Code	Agency
22N16E01A002M	03/29/2003	5,044.8	45.2			5050
23N16E25J001M	03/29/2003			7		5050
23N16E33A002M	03/27/2003	4,931.2	8.8		2	5050
23N16E36A001M	03/29/2003	5,092.9	62.1			5050
23N16E36B001M	03/29/2003	5,067.0	58.0			5050
23N16E36D002M	03/29/2003	5,027.1	84.9			5050
23N16E36H001M	03/29/2003			4		5050
23N16E36L003M	03/29/2003	4,995.5	14.5			5050
23N16E36L004M	03/29/2003	4,986.2	43.8			5050
23N16E36N002M	03/29/2003	4,995.9	14.1			5050
23N16E36R001M	03/29/2003	5,017.8	17.2			5050
23N17E31P001M	03/29/2003	5,061.0	109.0			5050
23N17E31Q001M	03/29/2003	5,089.3	150.7			5050
23N17E31Q002M	03/29/2003	5,079.0	131.0			5050

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Data Retrieval by Season

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- ◆ Water Quality
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Sierra Valley Groundwater Basin Seasonal Data Retrieval

SWN	Meas. Date	WSE	GSWS	NM Code	QM Code	Agency
20N14E13Q002M	10/30/2003	4,980.7	4.9			5050
20N14E14R001M	10/30/2003	5,020.5	14.5			5050
21N14E25P003M	10/30/2003	4,910.0	25.0			5050
21N14E29J001M	10/30/2003			7		5050
21N14E36Q002M	10/30/2003			9		5050
21N15E01K001M	10/29/2003	4,865.1	47.9			5050
21N15E01K002M	10/29/2003	4,894.1	18.9			5050
21N15E03M003M	10/29/2003	4,832.4	59.6			5050
21N15E04Q001M	10/29/2003	4,884.3	8.7			5050
21N15E12J001M	10/29/2003	4,884.2	57.8			5050
21N15E12P003M	10/29/2003	4,881.2	45.8			5050
21N15E14L001M	10/29/2003	4,912.1	87.9			5050
21N16E06H003M	10/29/2003	4,895.4	54.6			5050
21N16E07A001M	10/29/2003	4,917.0	49.0			5050
21N16E07F004M	10/29/2003	4,932.2	28.8			5050
21N16E07G001M	10/29/2003	4,893.0	67.0			5050
21N16E07M001M	10/29/2003	4,883.2	54.8			5050
21N16E18G002M	10/29/2003	4,974.5	20.5			5050
21N16E30A001M	10/29/2003	5,063.2	26.8			5050
22N15E08Q001M	10/29/2003	4,869.6	7.4			5050
22N15E10B001M	10/29/2003	4,782.7	108.3			5050
22N15E13N001M	10/29/2003	4,817.9	75.1		8	5050
22N15E22Q001M	10/29/2003	4,867.0	13.9			5050

22N15E26K003M	10/29/2003	4,827.9	58.1		8	5050
22N15E27Q001M	10/29/2003			S		5050
22N15E34L006M	10/29/2003	4,843.1	41.9			5050
22N15E36N001M	10/29/2003	4,820.6	76.4		8	5050
22N15E36Q001M	10/29/2003	4,871.5	36.5			5050
22N16E04A001M	10/29/2003	4,903.8	28.2			5050
22N16E06R002M	10/29/2003	4,796.2	111.8		8	5050
22N16E17C001M	10/29/2003	4,899.0	8.0			5050
22N16E17E002M	10/29/2003	4,895.2	6.1			5050
22N16E19M001M	10/29/2003	4,872.2	20.9			5050
22N16E20P002M	10/29/2003	4,934.0	0.6			5050
23N14E35L001M	10/30/2003	4,864.7	12.8			5050
23N15E26R001M	10/28/2003	4,808.9	88.1			5050
23N15E27E001M	10/28/2003	4,892.1	7.9			5050
23N15E29H001M	10/28/2003	4,886.5	9.9			5050
23N15E34D001M	10/28/2003	4,871.7	16.6			5050
23N16E23F001M	10/28/2003	4,972.7	17.3			5050
23N16E27R001M	10/28/2003	4,951.7	11.5			5050
23N16E28L001M	10/28/2003	4,919.8	18.7			5050
23N16E30R001M	10/28/2003	4,784.3	130.7			5050
23N16E32Q001M	10/28/2003	4,807.4	112.6		8	5050

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Data Retrieval by Season

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- Groundwater

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Chilcoot Sub-bas of Sierra Vly Groundwater Basin Seasonal Data Retrieval

SWN	Meas. Date	WSE	GSWS	NM Code	QM Code	Agency
22N16E01A002M	10/28/2003	5,039.9	50.1			5050
23N16E25J001M	10/28/2003	5,078.5	1.5			5050
23N16E33A002M	10/28/2003	4,919.4	20.6			5050
23N16E36A001M	10/28/2003			5		5050
23N16E36B001M	10/28/2003	5,068.1	56.9			5050
23N16E36D002M	10/28/2003	5,022.5	89.5			5050
23N16E36H001M	10/28/2003			4		5050
23N16E36L003M	10/28/2003	4,989.4	20.6			5050
23N16E36L004M	10/28/2003	4,978.0	52.0			5050
23N16E36N002M	10/28/2003	4,992.4	17.6			5050
23N16E36R001M	10/28/2003	5,015.6	19.4			5050
23N17E31P001M	10/28/2003	5,064.6	105.4			5050
23N17E31Q001M	10/28/2003	5,086.4	153.6			5050
23N17E31Q002M	10/28/2003	5,066.8	143.2			5050

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Data Retrieval by Season

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- ◆ Water Quality
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The period of retrieval is from **01-01-2004** to **06-30-2004**. Wells in the Department of Water Resources monitoring network are identified by State Well Number, which is based on the Public Land Grid System. The table headings and records contain several codes and abbreviations. Note that in some areas, especially the coastal basins, our electronic data set is not yet complete. If you do not see what you are looking for, send us an e-mail or give us a call. Press the **New Search** button to begin a new Data Retrieval by Season.

Sierra Valley Groundwater Basin Seasonal Data Retrieval

SWN	Meas. Date	WSE	GSWS	NM Code	QM Code	Agency
20N14E13Q002M	04/07/2004	4,983.1	2.5			5050
20N14E14R001M	04/07/2004	5,033.8	1.2			5050
21N14E25P003M	04/07/2004	4,916.9	18.1			5050
21N14E29J001M	04/06/2004			7		5050
21N14E36Q002M	04/07/2004	4,917.3	2.7			5050
21N15E01K001M	04/07/2004	4,897.5	15.5			5050
21N15E01K002M	04/07/2004	4,895.3	17.7			5050
21N15E03M003M	04/07/2004	4,868.3	23.7			5050
21N15E04Q001M	04/07/2004	4,887.4	5.6			5050
21N15E12J001M	04/07/2004	4,913.7	28.3			5050
21N15E12P003M	04/07/2004	4,911.7	15.3			5050
21N15E14L001M	04/07/2004	4,915.4	84.6			5050
21N16E06H003M	04/07/2004	4,905.6	44.4			5050
21N16E07A001M	04/07/2004	4,926.1	39.9			5050
21N16E07F004M	04/07/2004	4,939.7	21.3			5050
21N16E07G001M	04/07/2004	4,917.9	42.1			5050
21N16E07M001M	04/07/2004	4,906.9	31.1			5050
21N16E18G002M	04/07/2004	4,977.3	17.7			5050
21N16E30A001M	04/07/2004			2		5050
22N15E08Q001M	04/05/2004	4,873.8	3.2			5050
22N15E10B001M	04/07/2004			9		5050
22N15E13N001M	04/07/2004	4,848.7	44.3		8	5050
22N15E22Q001M	04/07/2004	4,863.2	17.7			5050

22N15E26K003M	04/07/2004		0		5050
22N15E27Q001M	04/07/2004		3		5050
22N15E34L006M	04/07/2004	4,855.9	29.1		5050
22N15E36N001M	04/07/2004	4,882.6	14.4	8	5050
22N15E36Q001M	04/07/2004	4,899.7	8.3		5050
22N16E04A001M	04/07/2004	4,911.4	20.6		5050
22N16E06R002M	04/07/2004	4,839.0	69.0	8	5050
22N16E17C001M	04/07/2004	4,900.3	6.7		5050
22N16E17E002M	04/07/2004	4,897.2	4.1		5050
22N16E19M001M	04/07/2004			9	5050
22N16E20P002M	04/07/2004	4,928.6	6.0	4	5050
23N14E35L001M	04/08/2004	4,868.3	9.2		5050
23N15E26R001M	04/08/2004	4,851.7	45.3		5050
23N15E27E001M	04/06/2004	4,895.7	4.3		5050
23N15E29H001M	04/06/2004	4,892.1	4.3		5050
23N15E34D001M	04/06/2004	4,878.2	10.1		5050
23N16E23F001M	04/08/2004	4,973.7	16.3		5050
23N16E27R001M	04/08/2004	4,953.3	9.9		5050
23N16E28L001M	04/08/2004	4,927.5	11.0		5050
23N16E30R001M	04/08/2004	4,843.7	71.3	8	5050
23N16E32Q001M	04/07/2004	4,852.5	67.5	8	5050

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Data Retrieval by Season

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- ◆ Water Quality
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Chilcoot Sub-bas of Sierra Vly Groundwater Basin Seasonal Data Retrieval

SWN	Meas. Date	WSE	GSWS	NM Code	QM Code	Agency
22N16E01A002M	04/08/2004	5,041.5	48.5			5050
23N16E25J001M	04/08/2004			7		5050
23N16E33A002M	04/08/2004	4,928.1	11.9			5050
23N16E36A001M	04/08/2004			2		5050
23N16E36B001M	04/08/2004	5,066.4	58.6			5050
23N16E36D002M	04/08/2004	5,022.3	89.7		6	5050
23N16E36H001M	04/08/2004			4		5050
23N16E36L003M	04/08/2004	4,992.6	17.4			5050
23N16E36L004M	04/08/2004	4,985.5	44.5			5050
23N16E36N002M	04/08/2004	4,994.6	15.4			5050
23N16E36R001M	04/08/2004	5,001.1	33.9			5050
23N17E31P001M	04/08/2004	5,060.9	109.1			5050
23N17E31Q001M	04/08/2004	5,080.5	159.5			5050
23N17E31Q002M	04/08/2004	5,064.5	145.5			5050

Your selection returned a total of **14** records.

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Data Retrieval by Season

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- Water Quality
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Sierra Valley Groundwater Basin Seasonal Data Retrieval

SWN	Meas. Date	WSE	GSWS	NM Code	QM Code	Agency
20N14E13Q002M	10/15/2004	4,980.3	5.3			5050
20N14E14R001M	10/15/2004	5,022.3	12.7			5050
21N14E25P003M	10/15/2004	4,911.5	23.5			5050
21N14E29J001M	10/15/2004			7		5050
21N14E36Q002M	10/15/2004	4,915.8	4.2			5050
21N15E01K001M	10/15/2004	4,855.3	57.7			5050
21N15E01K002M	10/15/2004	4,894.8	18.2			5050
21N15E03M003M	10/15/2004	4,823.4	68.6			5050
21N15E04Q001M	10/15/2004			9		5050
21N15E12J001M	10/15/2004	4,880.2	61.8			5050
21N15E12P003M	10/15/2004	4,876.9	50.1			5050
21N15E14L001M	10/15/2004	4,909.7	90.3			5050
21N16E06H003M	10/14/2004	4,893.0	57.0			5050
21N16E07A001M	10/14/2004	4,913.1	52.9			5050
21N16E07F004M	10/14/2004	4,932.8	28.2			5050
21N16E07G001M	10/14/2004	4,888.2	71.8			5050
21N16E07M001M	10/14/2004	4,872.1	65.9			5050
21N16E18G002M	10/14/2004	4,972.8	22.2			5050
21N16E30A001M	10/14/2004			2		5050
22N15E08Q001M	10/15/2004	4,868.8	8.2			5050
22N15E10B001M	10/15/2004			9		5050
22N15E13N001M	10/15/2004			9		5050
22N15E22Q001M	10/15/2004	4,858.2	22.7			5050

22N15E26K003M	10/15/2004		0	5050
22N15E27Q001M	10/15/2004		9	5050
22N15E34L006M	10/15/2004		9	5050
22N15E36N001M	10/15/2004		9	5050
22N15E36Q001M	10/15/2004		9	5050
22N16E04A001M	10/14/2004	4,896.6	35.4	5050
22N16E06R002M	10/14/2004	4,783.4	124.6	5050
22N16E17C001M	10/14/2004	4,898.0	9.0	5050
22N16E17E002M	10/14/2004	4,894.4	6.9	5050
22N16E19M001M	10/15/2004		9	5050
22N16E20P002M	10/14/2004	4,932.6	2.0	5050
23N14E35L001M	10/15/2004	4,863.3	14.2	5050
23N15E26R001M	10/14/2004	4,798.1	98.9	5050
23N15E27E001M	10/14/2004		3	5050
23N15E29H001M	10/14/2004	4,883.4	13.0	5050
23N15E34D001M	10/14/2004	4,865.4	22.9	5050
23N16E23F001M	10/14/2004	4,971.9	18.1	5050
23N16E27R001M	10/14/2004	4,950.7	12.5	5050
23N16E28L001M	10/14/2004	4,918.9	19.6	6 5050
23N16E30R001M	10/14/2004	4,783.8	131.2	5050
23N16E32Q001M	10/14/2004		9	5050

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- ◆ Water Quality
- ◆ Groundwater

The period of retrieval is from **07-01-2004** to **12-31-2004**. Wells in the Department of Water Resources monitoring network are identified by State Well Number, which is based on the Public Land Grid System. The table headings and records contain several codes and abbreviations. Note that in some areas, especially the coastal basins, our electronic data set is not yet complete. If you do not see what you are looking for, send us an e-mail or give us a call. Press the **New Search** button to begin a new Data Retrieval by Season.

Chilcoot Sub-bas of Sierra Vly Groundwater Basin Seasonal Data Retrieval

SWN	Meas. Date	WSE	GSWS	NM Code	QM Code	Agency
22N16E01A002M	10/14/2004	5,039.8	50.2			5050
23N16E25J001M	10/14/2004			9		5050
23N16E33A002M	10/14/2004	4,918.0	22.0			5050
23N16E36A001M	10/14/2004			2		5050
23N16E36B001M	10/14/2004	5,062.8	62.2			5050
23N16E36D002M	10/14/2004	5,015.6	96.4			5050
23N16E36H001M	10/14/2004			4		5050
23N16E36L003M	10/14/2004	4,985.1	24.9			5050
23N16E36L004M	10/14/2004	4,974.8	55.2			5050
23N16E36N002M	10/14/2004	4,990.1	19.9		1	5050
23N16E36R001M	10/14/2004	5,015.8	19.2			5050
23N17E31P001M	10/14/2004	5,065.2	104.8			5050
23N17E31Q001M	10/14/2004	5,080.4	159.6			5050
23N17E31Q002M	10/14/2004	5,065.5	144.5			5050

Your selection returned a total of **14** records.

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Data Retrieval by Season

DPLA Home

WDL Home

- Water Quality
- Groundwater

The period of retrieval is from **01-01-2005** to **06-30-2005**. Wells in the Department of Water Resources monitoring network are identified by State Well Number, which is based on the Public Land Grid System. The table headings and records contain several codes and abbreviations. Note that in some areas, especially the coastal basins, our electronic data set is not yet complete. If you do not see what you are looking for, send us an e-mail or give us a call. Press the **New Search** button to begin a new Data Retrieval by Season.

Sierra Valley Groundwater Basin Seasonal Data Retrieval

SWN	Meas. Date	WSE	GSWS	NM Code	QM Code	Agency
20N14E13Q002M	04/06/2005	4,984.0	1.6			5050
20N14E14R001M	04/06/2005	5,033.8	1.2			5050
21N14E25P003M	04/06/2005	4,918.5	16.5			5050
21N14E29J001M	04/06/2005			7		5050
21N14E36Q002M	04/06/2005			9		5050
21N15E01K001M	04/05/2005	4,894.3	18.7			5050
21N15E01K002M	04/05/2005	4,894.7	18.3			5050
21N15E03M003M	04/05/2005	4,862.6	29.4			5050
21N15E04Q001M	04/05/2005			4		5050
21N15E12J001M	04/05/2005	4,910.2	31.8			5050
21N15E12P003M	04/05/2005	4,908.9	18.1			5050
21N15E14L001M	04/05/2005			2		5050
21N16E06H003M	04/05/2005	4,901.5	48.5			5050
21N16E07A001M	04/05/2005	4,926.4	39.6			5050
21N16E07F004M	04/05/2005	4,945.8	15.2			5050
21N16E07G001M	04/05/2005	4,912.2	47.8			5050
21N16E07M001M	04/05/2005	4,901.7	36.3			5050
21N16E18G002M	04/05/2005	4,977.3	17.7			5050
21N16E30A001M	04/05/2005			2		5050
22N15E08Q001M	04/05/2005	4,874.1	2.9			5050
22N15E10B001M	04/05/2005	4,822.4	68.6			5050
22N15E13N001M	04/05/2005			3		5050
22N15E22Q001M	04/05/2005	4,862.3	18.6			5050

22N15E26K003M	04/05/2005	0	5050	
22N15E27Q001M	04/05/2005	9	5050	
22N15E34L006M	04/05/2005	9	5050	
22N15E36N001M	04/05/2005	4,878.5	18.5	5050
22N15E36Q001M	04/05/2005	4,896.7	11.3	5050
22N16E04A001M	04/05/2005	4,908.4	23.6	5050
22N16E06R002M	04/05/2005	9	5050	
22N16E17C001M	04/05/2005	4,899.8	7.2	5050
23N14E35L001M	04/06/2005	9	5050	
23N15E26R001M	04/05/2005	4,849.3	47.7	5050
23N15E27E001M	04/05/2005	3	5050	
23N15E29H001M	04/05/2005	4,890.5	5.9	5050
23N15E34D001M	04/05/2005	4,873.9	14.4	5050
23N16E23F001M	04/05/2005	4,974.3	15.7	5050
23N16E27R001M	04/05/2005	4,953.7	9.5	5050
23N16E28L001M	04/05/2005	4,925.0	13.5	5050
23N16E30R001M	04/05/2005	4,847.1	67.9	5050
23N16E32Q001M	04/05/2005	4,854.6	65.4	5050

Your selection returned a total of **41** records.

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Data Retrieval by Season

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- ◆ [Groundwater](#)

The period of retrieval is from **01-01-2005** to **06-30-2005**. Wells in the Department of Water Resources monitoring network are identified by State Well Number, which is based on the Public Land Grid System. The table headings and records contain several codes and abbreviations. Note that in some areas, especially the coastal basins, our electronic data set is not yet complete. If you do not see what you are looking for, send us an e-mail or give us a call. Press the **New Search** button to begin a new Data Retrieval by Season.

Chilcoot Sub-bas of Sierra Vly Groundwater Basin Seasonal Data Retrieval

SWN	Meas. Date	WSE	GSWS	NM Code	QM Code	Agency
22N16E01A002M	04/05/2005	5,044.6	45.4			5050
23N16E25J001M	04/06/2005			9		5050
23N16E33A002M	04/05/2005	4,925.6	14.4			5050
23N16E36A001M	04/06/2005			2		5050
23N16E36B001M	04/06/2005	5,068.1	56.9			5050
23N16E36D002M	04/06/2005	5,012.8	99.2			5050
23N16E36H001M	04/06/2005			4		5050
23N16E36L003M	04/06/2005	4,991.5	18.5			5050
23N16E36L004M	04/06/2005	4,983.7	46.3			5050
23N16E36N002M	04/06/2005	4,994.3	15.7			5050
23N16E36R001M	04/06/2005	5,016.9	18.1			5050
23N17E31P001M	04/06/2005	5,049.6	120.4		4	5050
23N17E31Q001M	04/06/2005	5,079.0	161.0			5050
23N17E31Q002M	04/06/2005	5,063.1	146.9			5050

Your selection returned a total of **14** records.

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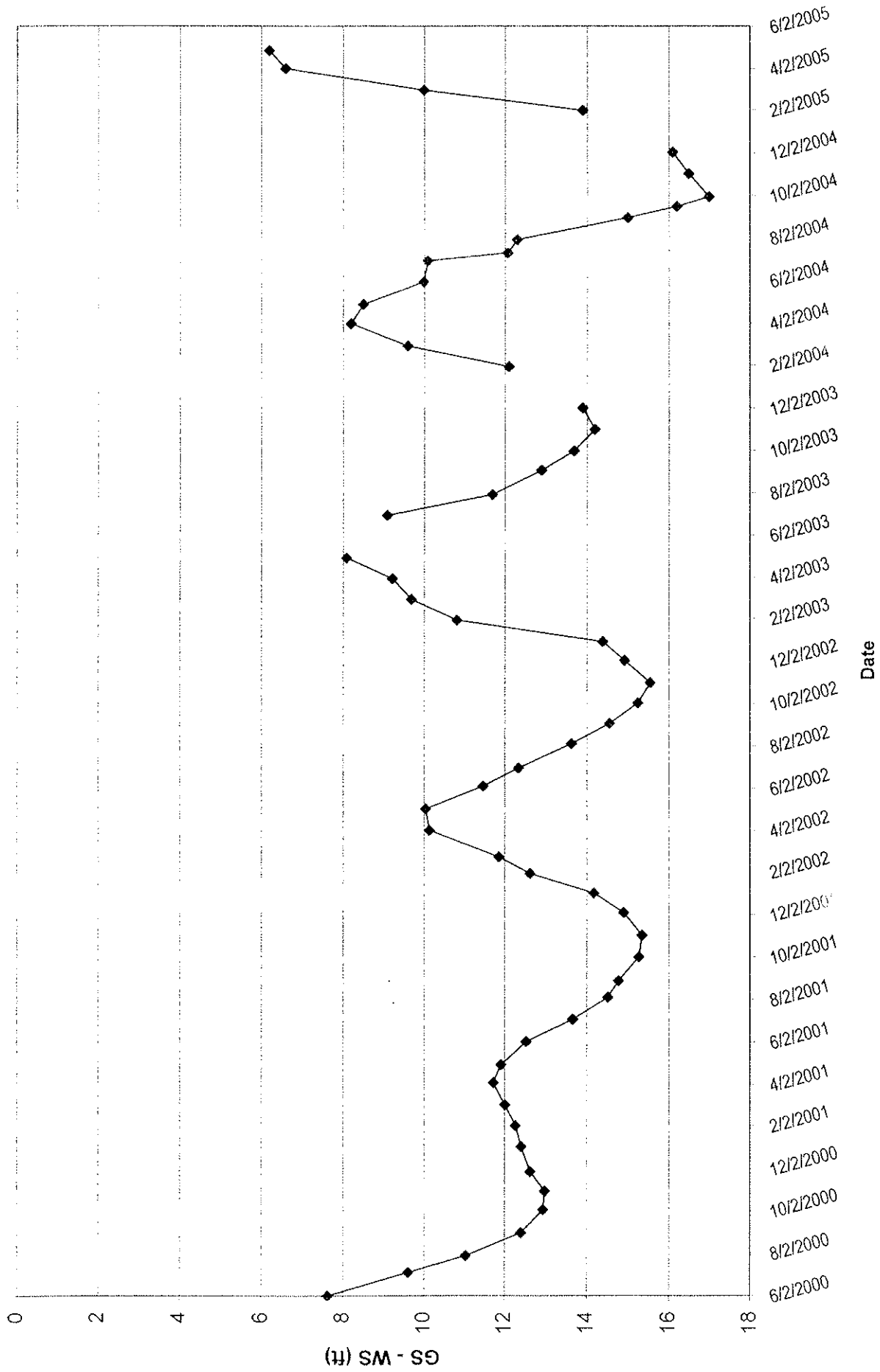


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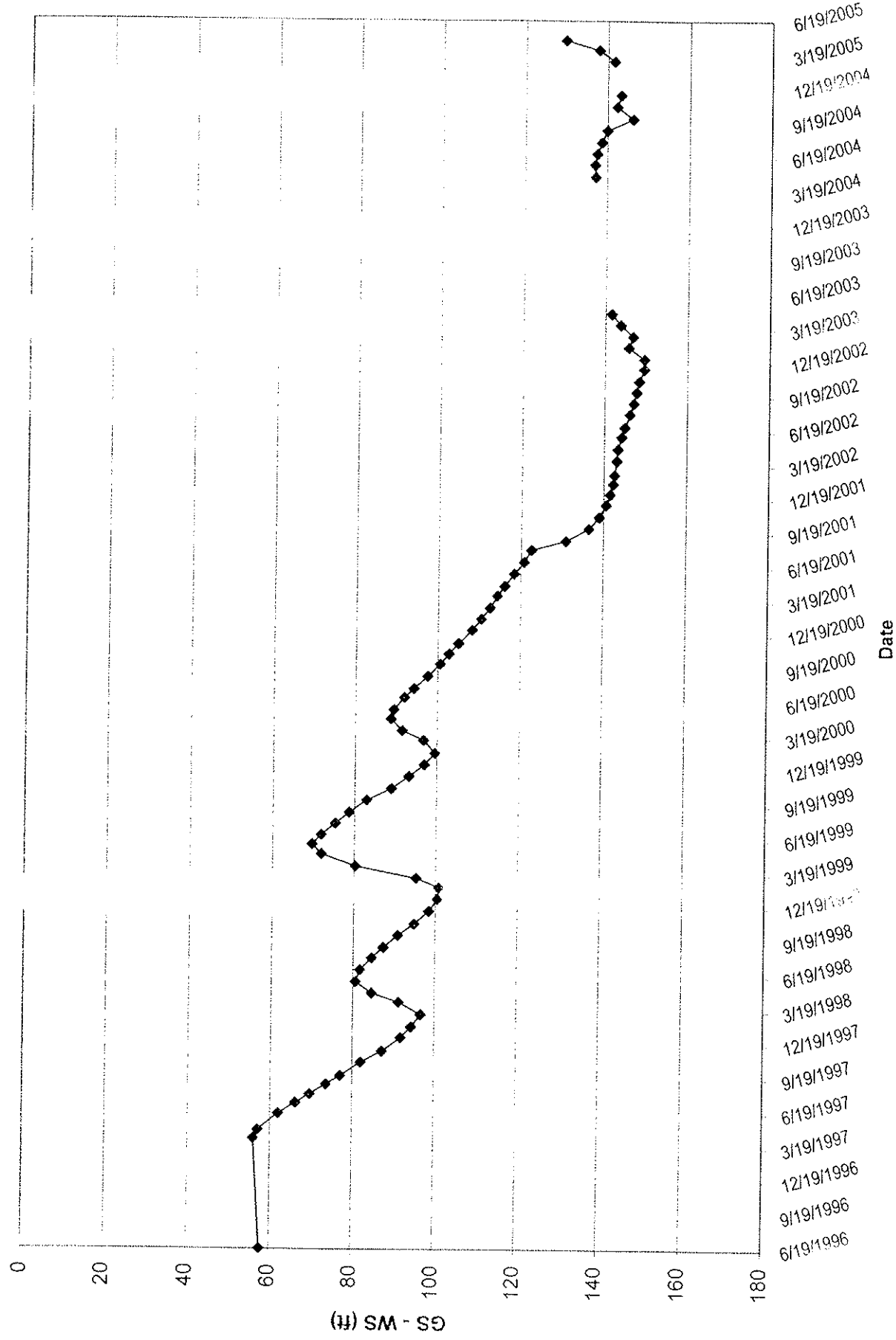
APPENDIX F

LONG-TERM WATER-LEVEL HYDROGRAPHS

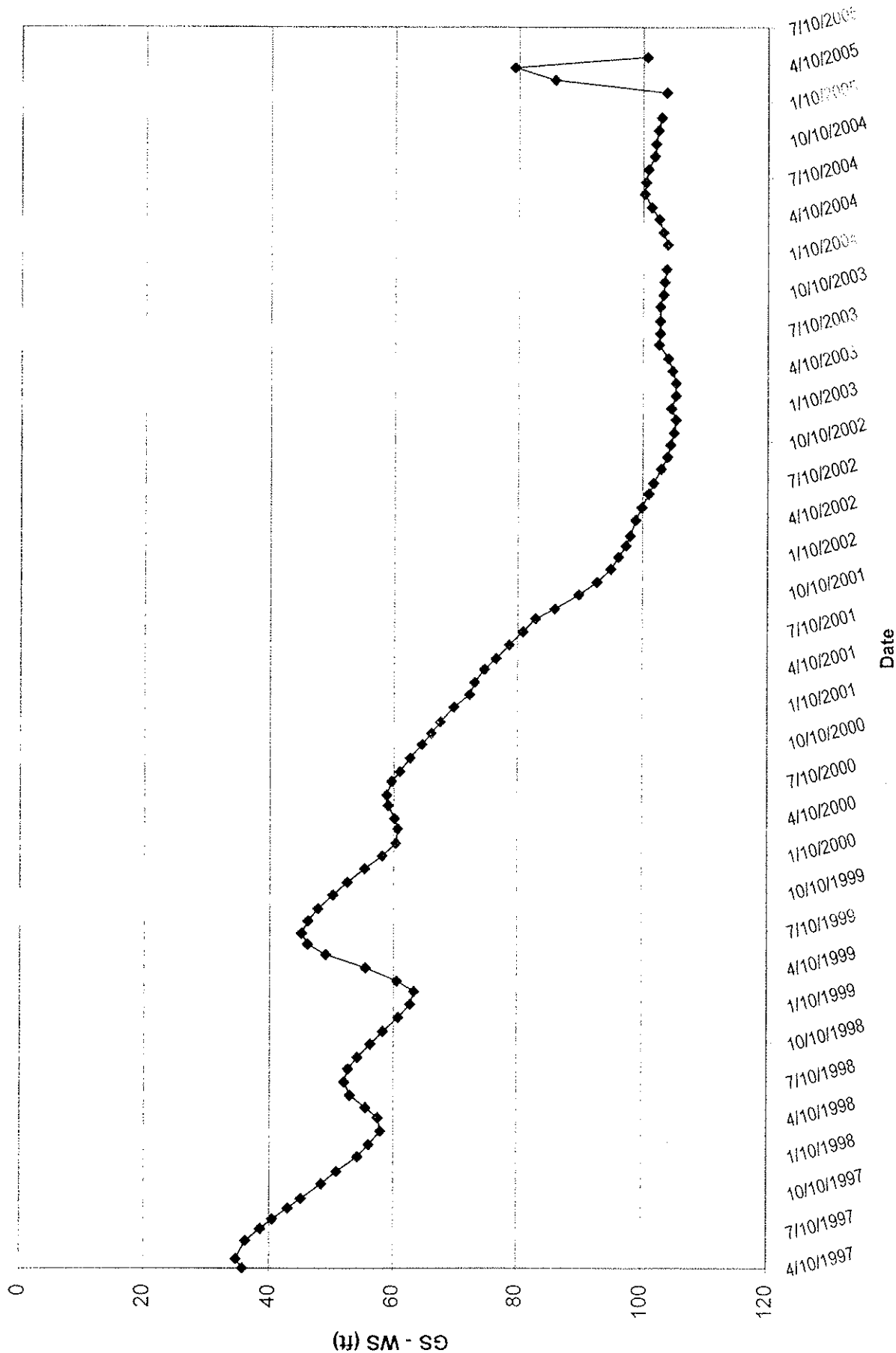
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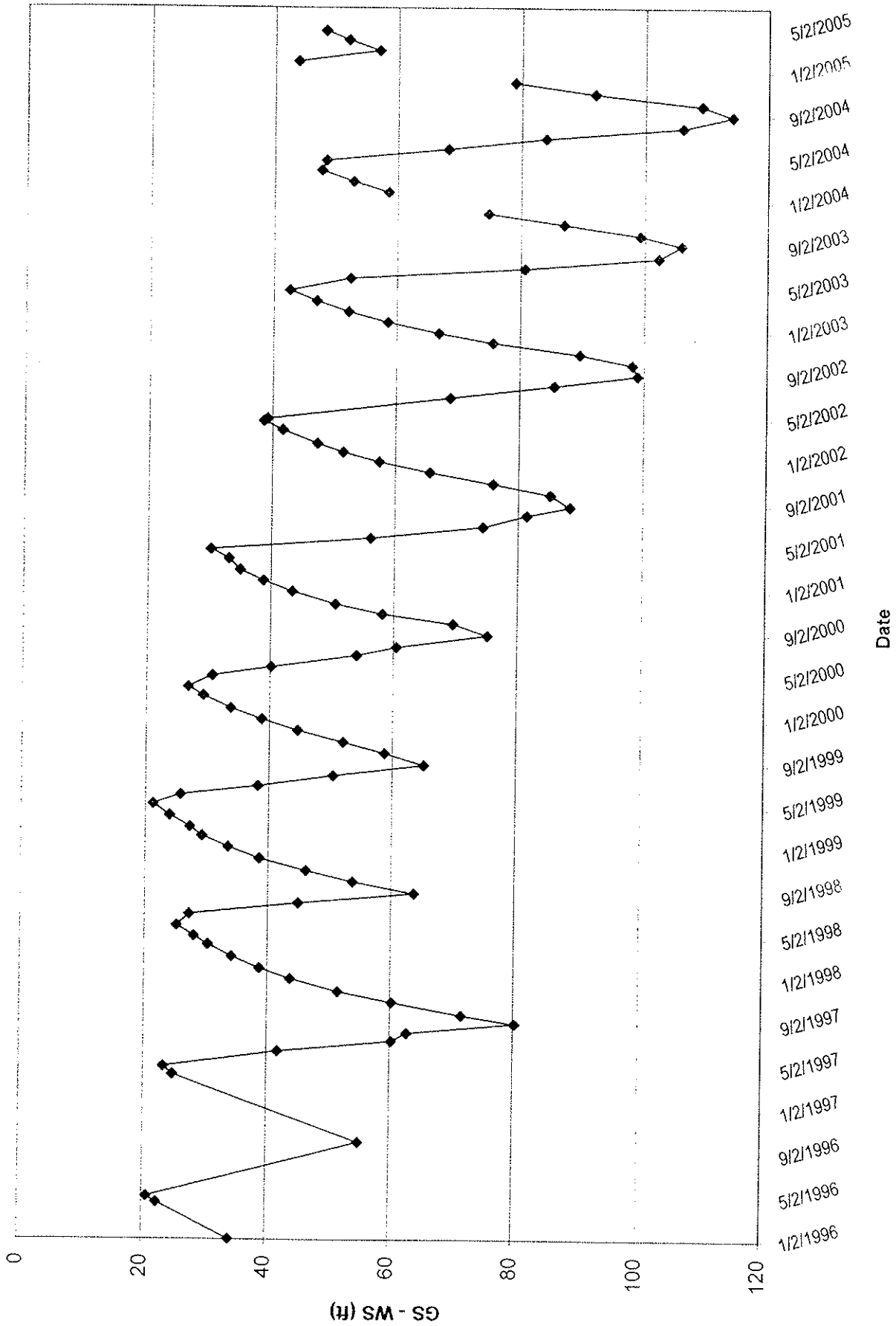
23N14E22G05M



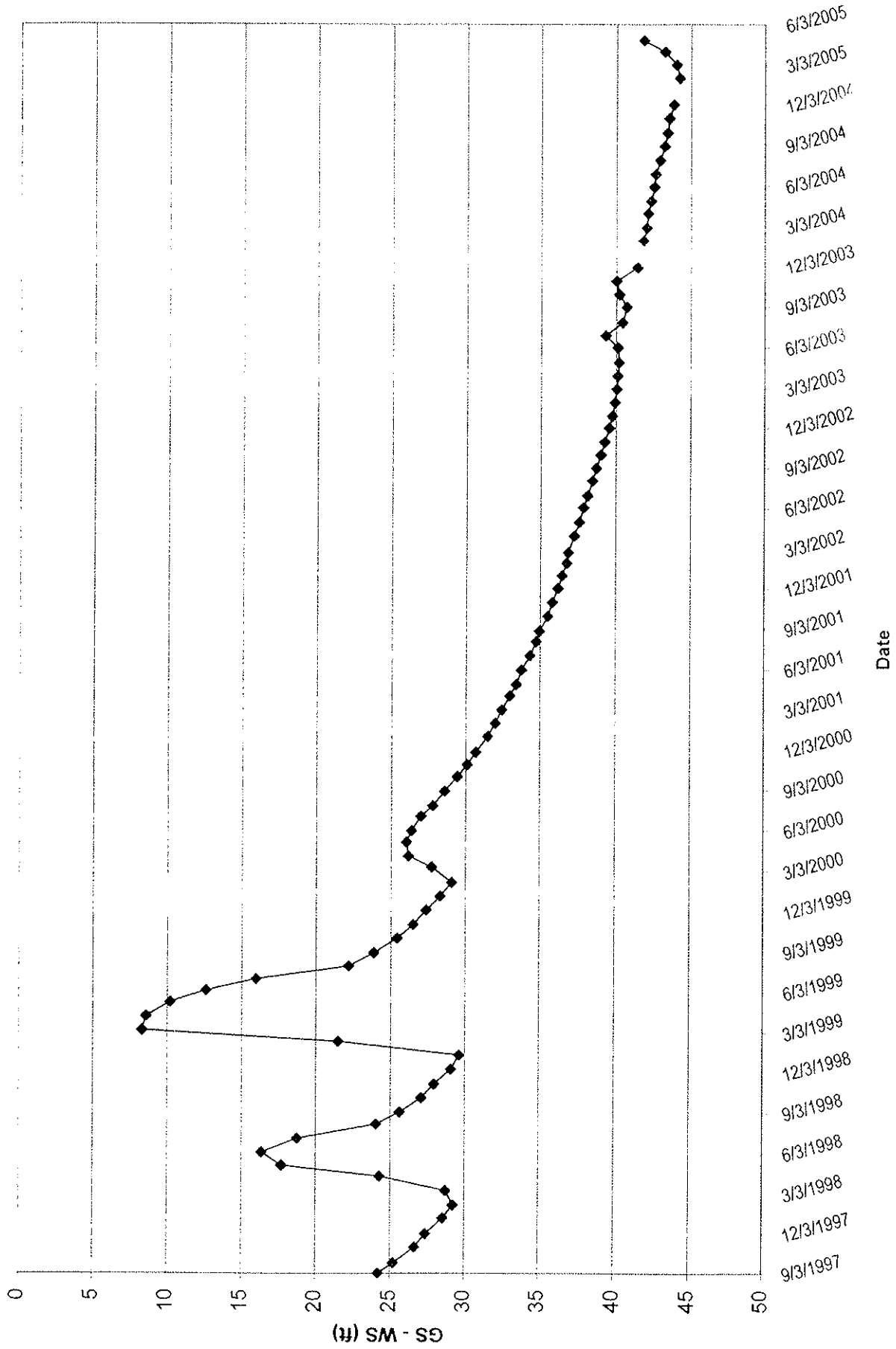
23N14E22M02M



23N15E36H02M



23N16E36H02M



ADDENDUM

Submitted By:

The Sierra Valley Groundwater Management District

May 2005

ADDENDUM

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SCOPE OF WORK

The original proposal for the grant project was accepted to complete the construction of two nested monitoring well which were to include three completions each for a total of six wells. Because of the subsurface geology encountered at the Beckwourth well site, two completions were finalized instead of three. This necessary adjustment served to eliminate one well completion from the original project proposal which resulted in a budget surplus.

A proposal was submitted to the Monterey Agreement Technical Advisory Committee to rollover the surplus funds, estimated at \$30,000, to complete an aquifer testing project in Sierra Valley followed by a report to include graphical plots and a discussion of well interference in the valley.

The proposal for aquifer testing received administrative approval and the project will begin in the Fall of 2005. The final report will be presented prior to January 1.

The initial grant proposal submittal included an estimated completion date of April 1, but the date was extended to May to include the Spring 2005 water level measurements in the final technical report. All of the construction and other elements of the project were initiated and completed on schedule.

MONTEREY GRANT AGREEMENT DISTRIBUTION OF FUNDS

GRANT ALLOCATION \$151,700.00

<u>FUNCTION</u>	<u>PAYMENT</u>
Well Construction/Permits/Easements	77,645.95
Well Fencing	1,124.00
Survey/Elevations/Well Monitoring	1,858.60
Chemical Analyses/Water Quality	475.00
Equipment Purchase/Data Loggers	10,185.04
Legal Counsel	100.00
District Labor	6,938.00
District Expenses	2,122.23
Hydrologist	17,980.31
Hydrologist Expenses	2,519.11
TOTAL	\$120,948.24
REMAINING BALANCE	\$30,751.76