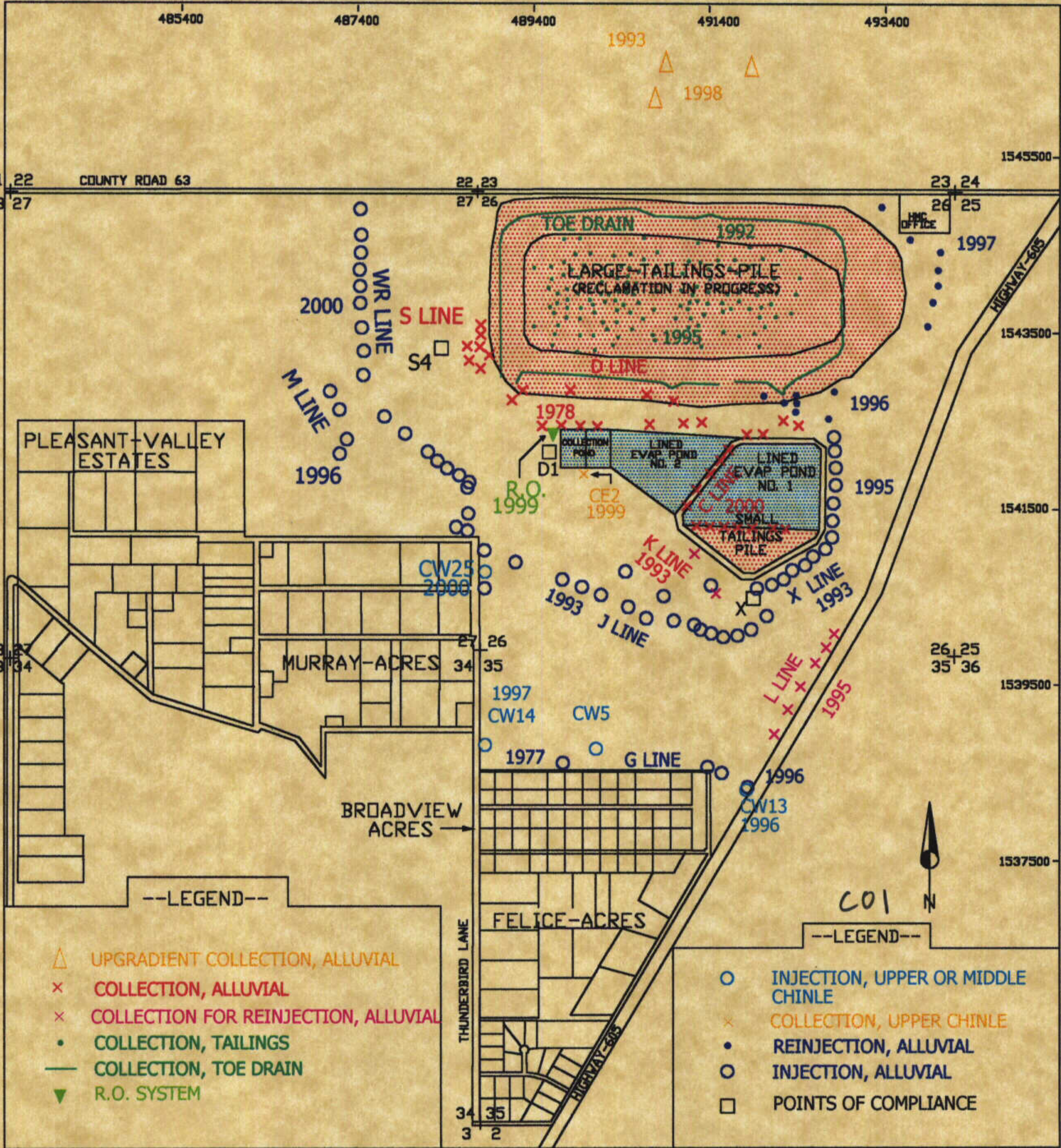


GROUND-WATER MONITORING AND PERFORMANCE REVIEW FOR HOMESTAKE'S GRANTS PROJECT NRC LICENSE SUA-1471 AND DISCHARGE PLAN DP-200, 2001

# GROUND-WATER MONITORING AND PERFORMANCE REVIEW
# FOR
# HOMESTAKE'S GRANTS PROJECT

## NRC LICENSE SUA-1471 AND DISCHARGE PLAN DP-200, 2001

**FOR:**

**HOMESTAKE MINING COMPANY OF CALIFORNIA**

**BY:**

**HYDRO-ENGINEERING, LLC**
**MARCH, 2002**

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## FOR HOMESTAKE'S GRANTS PROJECT



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## FIGURES

# 1.0 EXECUTIVE SUMMARY AND INTRODUCTION

## 1.1 EXECUTIVE SUMMARY

Homestake Mining Company manages a groundwater restoration program as defined by Nuclear Regulatory Commission (NRC) License SUA-1471, and New Mexico Environmental Division (ED), DP-200 permit. The current operating program is a dynamic on-going strategy based on a restoration plan, which began in 1977, and is scheduled to be completed in 2008.

Homestake's long-term goal is to restore the ground-water aquifer to levels as close as possible with respect to the up-stream background levels. A ground-water collection area (see shaded area on Figure 2.1-1, Page 2.1-10) has been established between the northern most line of injection wells and the collection wells. Ground-water flow that enters this area from the tailings areas is within the collection area. All ground water in the alluvial aquifer that is within the collection area is moving to the collection wells and will eventually be collected. Once restoration within the zone is complete and approved by the agencies, the site is to be transferred to the Department of Energy who has the responsibility for long term care and maintenance.

The data reported within this document represents the results of the monitoring program for 2001. This is a yearly reporting requirement. A similar report has been submitted to the agencies for each year since 1983 (see list in Section 1.2).

The restoration program is designed to remove the contaminants from the ground water by flushing the alluvial aquifer with water from the fresh water deep wells or water produced from the reverse osmosis (R.O.) plant. A line of upstream collection wells is used to collect the contaminated water, which is pumped to the R.O. plant or the evaporation ponds.

Historically, the contaminants are found in two different aquifer systems. The primary aquifer is the alluvial system, which averages approximately 100 foot in depth, and extends generally north to south encompassing both the Lobo Creek and San Mateo alluvial aquifers. In addition, the second aquifer system is in the Chinle formation. It is comprised of three separate aquifers, the Upper, Middle and Lower Chinle aquifers. The Upper and Middle Chinle sub-crop to the alluvial system near the project site. Low-level concentrations have been observed in the Upper and Middle Chinle aquifers near their subcrops.

The restoration program, as described above, is made up of injection and collection well systems. R.O. product water or fresh water pumped from deep wells is injected in a continuous line across the site. The injection line forms a water barrier that contains the contaminants within the collection area. The contaminated ground water is pumped and collected from a series of wells from within the collection area. The collected aquifer water is pumped to the R.O. plant or to two large lined evaporation ponds for solar evaporation.

In the years from 1977 to the present, the combination of injection wells and the up-stream collection system has gradually moved the contaminated ground-water plume up-stream leaving the restored portions of the aquifer at or below background levels.

An average of 493 gpm was pumped into the alluvial fresh-water injection systems in 2001. An additional 92 gpm of fresh water was injected into the Upper and Middle Chinle aquifer systems. An average rate of 222 gpm in 2001 of R.O. product water was injected into the alluvial aquifer, which is not included in the fresh-water injection rate for the alluvial aquifer. Significant production of R.O. product started in July of 1999 with consistent operation during 2000 and 2001 except during equipment repair periods and a weeklong power outage.

In 2001, an average collection rate was maintained at 276 gpm for the alluvial aquifer. An additional 41 gpm was pumped from the aquifer and re-injected within the collection area. The Upper Chinle collection averaged 27 gpm in 2001, which consisted of pumping well CE2. The upgradient collection averaged 54 gpm in 2001, while average rates of 18 and 60 gpm were pumped from the toe drains and tailings dewatering, respectively.

The continuing evaluation of the performance of the Grants restoration system, including the 2001 results, show that sulfate, uranium, selenium and molybdenum are still the key parameters at this site. During the restoration of the key parameters, the restoration of other parameters with low levels of concentrations is also completed at the same time. The monitoring program has shown that any low levels of nitrate, radium-226, radium-228, vanadium and thorium-230 are also restored when the key parameters are restored in the area.

Sulfate concentrations exceed the background only near the large and small tailings in the Grants Project area.

Uranium concentrations exceed the significant level of 0.43 mg/l, within the collection area, near the tailings. There are also six wells in Felice Acres, one in southern Broadview Acres, and one well in Murray Acres that contain concentrations of uranium exceeding the background levels. Irrigation is being used to further reduce the low levels of uranium that exceed background levels in a small area southwest of Felice Acres in Section 3.

Selenium concentrations also exceed the background levels in the collection area near the large tailing pile and in portions of Section 3 as mentioned above. None of the subdivision wells contained selenium concentrations above background.

Molybdenum concentrations exist in only one subdivision well in central Felice Acres above 0.1 mg/l. All remaining elevated molybdenum concentrations are near the large and small tailings. Migration of this constituent has been limited due to natural retardation by the alluvial aquifer.

All radium concentrations in the alluvial aquifer outside of the tailings perimeter were less than the NRC site standard. This shows that this parameter should be removed as a site standard for this site.

Vanadium concentrations exceed the site standard in none of the POC wells and in only one well close to the tailings pile. Additional monitoring of this constituent will continue. This parameter is expected to continue to decline to below background levels and should be removed as a site standard in the near future.

The thorium concentration in one well near the tailings exceeded the site standard in 2001 at a level of 0.5 pCi/l. The results of this constituent vary significantly at these low levels. The wells that exceed the standard vary in location each year, giving little confidence in results less than a few pCi/l. The site records for thorium indicate that thorium is a minor parameter at this site and that it should be removed as a site standard.

Observed background concentrations at this site were similar to those in previous years with significant selenium concentration of 0.59 mg/l and uranium concentration of 0.21 mg/l. Background sulfate concentrations also range over similar amounts as in previous years up to 1380 mg/l. No significant molybdenum concentrations were observed in the background concentrations in 2001.

Nitrate background concentrations varied up to 21.1 mg/l in 2001 showing that natural levels exist upgradient from this site above the State site standard. An area between the large and small tailings contains higher nitrate concentrations than the background levels and this small area needs additional restoration. Nitrate concentrations are not important beyond the Homestake Grants Project area and, therefore, this constituent will be easily remediated with the restoration of the remaining parameters.

Fresh-water injection into Upper Chinle well CW13, east of the East Fault, continued in 2001. This injection has resulted in the water-level elevation in the Upper Chinle aquifer, east of the East Fault to be higher than the water-level elevation in the alluvial aquifer, which, therefore, prevents recharge from the alluvial aquifer into the Upper Chinle aquifer.

Fresh-water injection continued in 2001 in Upper Chinle well CW5 just north of Broadview Acres. This injection has resulted in reversal of the Upper Chinle water flowing back to the north toward the tailings piles from this area. Collection from Upper Chinle well CE2 was initiated in 1999 and continued in 2000 and 2001 and is used in conjunction with the CW5 and CW25 injection to restore this area. Injection into CW25 was started in 2000.

All sulfate concentrations in the Upper Chinle aquifer are below background concentrations and, therefore, no restoration of this constituent is needed in the Upper Chinle aquifer.

Five Upper Chinle uranium concentrations exceeded the background concentrations in 2001. Restoration of these elevated values should result from the CE2 collection and the CW5 and CW25 injection.

The selenium concentrations in the Upper Chinle aquifer do not exceed the range in background concentrations. Two selenium values in 2001 exceeded the NRC and

State standards for selenium in the Upper Chinle aquifer near the tailings. The site standard for selenium is considered by HMC to be too low since the background values continue to be higher.

The concentrations for molybdenum exceeded the site standard in six wells in the Upper Chinle aquifer during 2001. Restoration for these locations should occur from the CE2 collection and CW5 and CW25 injection.

The nitrate standard for this site is significantly greater than any of the concentrations observed in 2001 in the Upper Chinle aquifer showing that this parameter is not significant in this aquifer.

None of the radium, vanadium or thorium-230 concentrations exceeded the NRC site standards for these parameters in the Upper Chinle aquifer wells in 2001 showing that these parameters are not important in this aquifer as expected due to their very limited concentrations in the alluvial aquifer.

The ground-water flow in the Middle Chinle aquifer in 2001 is very similar to that observed previously. Fresh-water injection started in December of 1997 into well CW14. The fresh water is building up a mound of ground water in this area, which will result in reversing the flow of Middle Chinle water back toward the alluvial subcrop. Well CW44 is being used for irrigation supply, which will increase the flow from Broadview Acres in the Middle Chinle aquifer to the south.

Water quality in the Middle Chinle aquifer is generally good with all concentrations meeting the background sulfate concentrations. Uranium and selenium concentrations in the western portion of Felice Acres are only slightly above significant levels due to the alluvial recharge to the Middle Chinle aquifer just south of Felice Acres. Irrigation of this water is being used to reduce these slightly elevated concentrations in western Felice Acres. In the Middle Chinle formation both uranium and selenium are naturally occurring elements so it is difficult to evaluate the total impact on the aquifer.

Molybdenum, nitrate, radium, vanadium and thorium-230 concentrations in the Middle Chinle aquifer all meet the site standards for these constituents and show that only uranium and selenium are the important parameters relative to this aquifer system.

## 1.2 INTRODUCTION

This report, as required by the New Mexico Environmental Division (ED) discharge plan DP-200 and the Nuclear Regulatory Commission (NRC) License SUA-1471, presents results of the 2001 annual ground-water monitoring program at Homestake's Grants Project. Homestake Mining Company (HMC) conducted uranium milling operations five miles northeast of Milan, New Mexico from 1958 to 1990 (see Figure 1.2-1). Referred to as the Grants Project, HMC deposited uranium tailings from the alkaline (high pH) Grants mills into two unlined piles (large and small tailings) that overlie San Mateo alluvium. The San Mateo alluvium is simply referred to as the alluvium or alluvial aquifer in this report. In 1977, due to concerns about ground-water selenium levels, HMC installed a system of wells and pumps in order to inject fresh water into the alluvium at the property boundary and to withdraw contaminated water from the alluvium near the tailings.

Previous monitoring reports have been published in quarterly, semi-annual and annual reports[1], which were presented to the ED and the NRC.

Four subdivisions, Broadview, Murray and Felice Acres and Pleasant Valley Estates, are adjacent to the HMC site. These subdivisions are shown on the various figures of the Grants Project area.

Monitoring data for the ground water west of the project site was included in the 1995 through 2001 reports. This area has been designated the "West Area" and it is so labeled on the figures of this report.

The following information outlines the format of this report. The table of contents next to the cover page contains only the major section numbers and titles. A complete table of contents is presented behind the tabs of all of the individual sections, which also includes the list of figures and tables for the section. Figures and tables are numbered by sub-sections and, therefore, located after the text of each sub-section with figures being presented before tables. The "West Area" figures have been printed on the back of the page to enable the west and project areas to be viewed simultaneously.

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[1] See Hydro-Engineering 1983b, 1983c, 1984a, 1984b, 1984c, 1985a, 1985b, 1985c, 1985d, 1986a, 1986b, 1986c, 1987a, 1987b, 1988a, 1988b, 1990, 1991, 1992, 1993a, 1994, 1995, 1996, 1997, 1998, 1999, 2000a and 2001a.

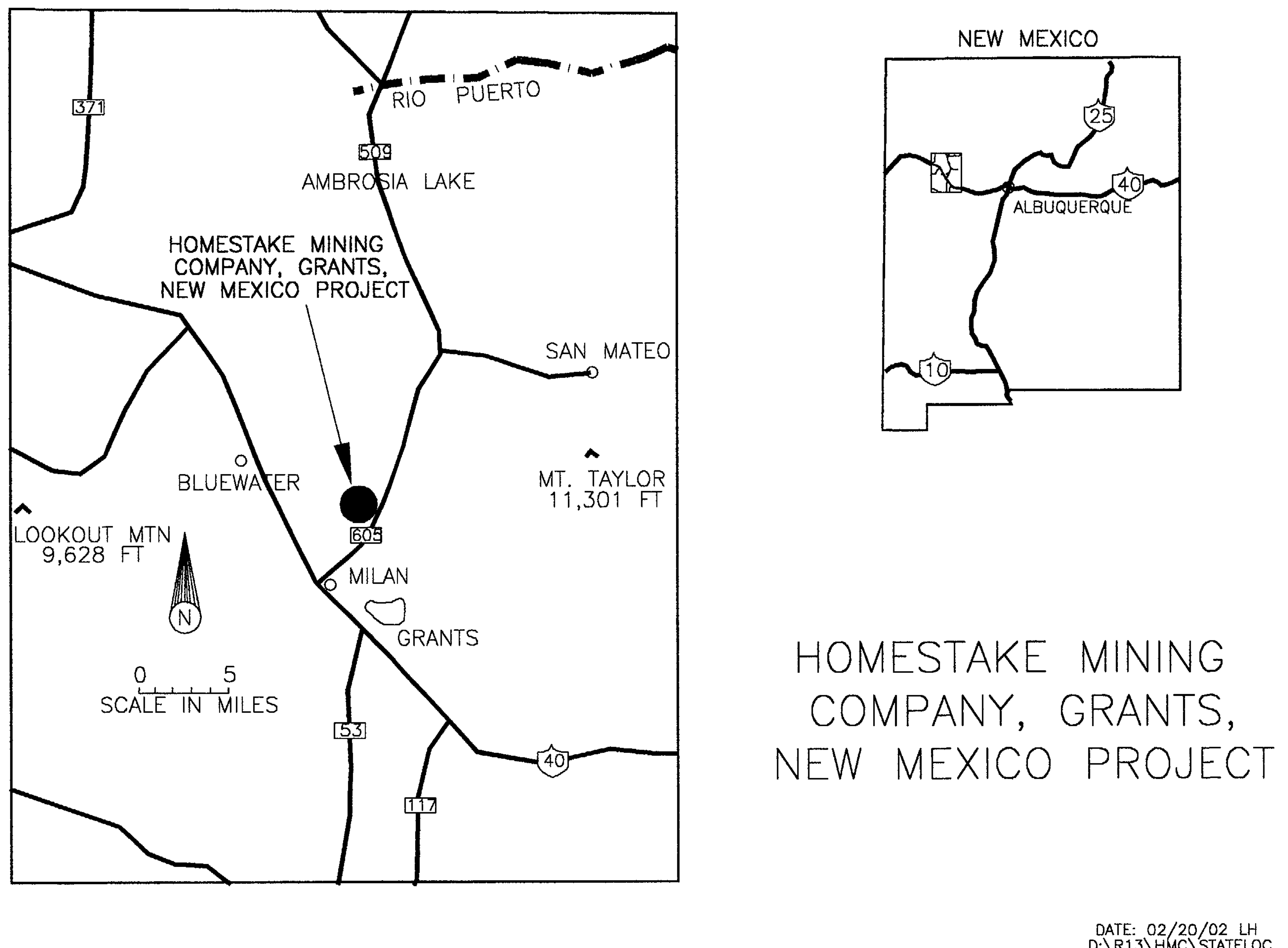


FIGURE 1.2-1. LOCATION OF THE GRANTS PROJECT

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## FIGURES

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**FOR HOMESTAKE'S GRANTS PROJECT**
**(continued)**

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**FIGURES**
**(continued)**



**TABLES**

## 2.0 OPERATIONS

## 2.1 CURRENT OPERATIONS SUMMARY

The Grants Project ground-water remediation system consists of collection of contaminated ground water near the tailings and injection of fresh water and R.O. product water downgradient. These collection and injection systems continued to operate in 2001 along with the reverse osmosis (R.O.) plant to treat the majority of collection. The R.O. produces an R.O. product that is much better quality than the natural alluvial water and it is used for injection in place of some of the fresh water to aid the restoration program. Figure 2.1-1 on page 2.1-10 shows the location of the present (end of 2001) injection and collection systems along with their starting dates of operation. This figure also shows the location of the R.O. plant. The pink areas on Figure 2.1-1 show where the tailings piles have been re-contoured to drain and have interim cover or final reclamation barrier. The red "X" symbols show the location of alluvial collection wells. The green dots depict locations of dewatering wells in the large tailings. The green line around the large tailings indicates the location of the toe drain, which intercepts seepage from the tailings and prevents it from moving into the uppermost part of the alluvial aquifer. The open blue and cyan circles on Figure 2.1-1 show the locations where fresh water or R.O. product is presently being injected, and the solid blue circles show where re-injection is occurring. Collection wells used for re-injection are shown in magenta. The cyan circles indicate fresh-water injection into the Upper (CW5, CW13 and CW25) or Middle (CW14) Chinle aquifers. The three points of compliance (POC) are also shown on this figure as black boxes. Water collected from the site is pumped to the R.O. plant or discharged into lined collection ponds or one of two lined evaporation ponds (light blue areas).

The area where the ground-water flow is controlled by the fresh-water injection and collection system is called the "Collection Area" and is shown by the yellow cross-hatched pattern on Figure 2.1-1. All of the alluvial ground water within the collection area converges to the collection wells.

### 2.1.1 R.O. PLANT

The R.O. plant consists of a pre-treatment unit, which has a discharge to the evaporation ponds and feeds the 300-gpm low-pressure R.O. unit. The R.O. product from the low-pressure unit is discharged to the injection wells, while the brine from the low-pressure unit feeds a 75-gpm high-pressure R.O. unit. The R.O. product from the high-pressure unit also goes to the injection wells, while the brine from the high-pressure R.O. unit is discharged to the evaporation ponds. Some tailings collection water was added to the R.O. plant during the first half of 2001, which averaged only 5.0 gpm based on a yearly average. The R.O. product injection piping has the capability of being discharged to the J and WR injection wells and into the X wells to the south and east of the small tailings pile. Through the end of 2001, R.O. product water was discharged into the X line and injected into wells X1 through X10, X28 through X31 and into wells K6, KE, KD and KM.

The R.O. product water injected into wells K6 and KM has been for testing of restoration of R.O. product water in the K area. The results continued to show that the R.O. product water is much more efficient at reducing the uranium and molybdenum concentrations than the fresh water.

### 2.1.2 COLLECTION

The alluvial aquifer collection rate was very similar to the 2000 rate in 2001 because the R.O. unit was used fulltime in both years. Upgradient collection continues north of County Road 53, collecting background alluvial aquifer water for transfer to the drainage system further west (triangle symbols on Figure 2.1-1). This collection reduces the amount of alluvial water flow into the tailings area. Upper Chinle collection continued from well CE2 as injection water for some of the tailings flushing.

#### 2.1.2.1 ALLUVIAL

The red X's on Figure 2.1-1 show the location of five lines of collection wells. The S and D-lines are adjacent to the large tailings, and the K and C-lines are adjacent to the small tailings. No new wells were added to the collection system in 2001. All of the K line collection wells south of the small tailings had been turned off at the end of 2001. The L-line is south of the small tailings. Alluvial water is pumped from these lines of collection wells to the R.O. plant or it is pumped to the re-injection wells. Figure 2.1-2 on page 2.1-11 presents collection rates for the last six years at the Grants Project. The alluvial collection system rates are shown on this figure as red squares, which was fairly steady in 2001. Alluvial collection averaged 276 gpm in 2001. An additional average rate of 41 gpm was also pumped from the alluvium for re-injection in 2001 (magenta X's).

### 2.1.2.2 UPGRADIENT

Collection of alluvial water upgradient of the tailings piles started in January of 1993 and continued through 2001. Well P1 was not pumped in 2001, while well P2 was pumped continuously throughout the year (triangle symbols on Figure 2.1-1). Well P3 was pumped early in 2001 for approximately one month while well P4 was pumped for approximately ten days. This upgradient water was transferred to the next drainage channel to the west. The transfer of this upgradient water is intended to prevent this alluvial water from entering the Grants Project area at the north side of the large tailings. The upgradient collection rate for this effort averaged 54 gpm during 2001 (see green triangles on Figure 2.1-2). Monthly rates were not collected for the upgradient wells and therefore only the yearly average is presented for 2001 on Figure 2.1-2.

### 2.1.2.3 UPPER CHINLE

Figure 2.1-2 also shows the collection rate for Upper Chinle collection well CE2 (see Figure 5.1-1B for location), which is on the south side of the collection ponds. Upper Chinle collection was started in well CE2 in 1999 and is expected to continue for several years. Well CE2 was used to supply water to the large tailings pile for the tailings flushing for 2001. The yearly average collection rate from the Upper Chinle was 27.5 gpm.

#### 2.1.2.4 QUANTITY OF CONSTITUENTS COLLECTED FROM THE ALLUVIAL AQUIFER

Table 2.1-1 (page 2.1-15) presents the quantities of chemical constituents collected from the ground-water system, the tailings and the toe drains. The ground-water collection system has produced an average pumping rate of 249 gpm between 1978 and 2001. The collection rate that has been re-injected into the alluvial aquifer is not included in the values in Table 2.1-1. The quantity of constituents removed in 2001 was computed by multiplying the average concentration of a particular constituent for each collection well by the volume of water pumped from each well for that year. The average concentration was computed by dividing the total gallons of water pumped from the collection system in the year into the total number of pounds and converting to mg/l.

### 2.1.3 INJECTION

The fresh-water and R.O. injection system, which aids in the reversal of the piezometric surface back toward the collection wells, consists of a line of injection wells which is oriented generally west-northwest from the south side of the small tailings to the north side of Murray Acres and continuation of this line to the northwest and north to the north side of Section 27 (Figure 2.1-1). This injection line also extends on the southeast and east sides of the small tailings and is called the X-line in the small tailings area and consists of wells X1 through X10 and wells X28 through X31. The R.O. product water was injected into the X-line during 2001. The R.O. product water has been injected in the X-line wells starting at well X28 and continuing to the northeast through well X10. R.O. product water was also injected into wells KM, KE, KD and K6 in 2001.

#### 2.1.3.1 BROADVIEW AND MURRAY ACRES

The Broadview Acres injection system started in 1977 with the G line on the north side of this subdivision. Injection into the majority of the G-line was discontinued in mid-April in 2000 in order to supply more water to injection wells near the collection area. The J-line, wells X1 through X10, and wells X28 through X31 are also considered part of the Broadview Acres injection system. The M line of the Murray Acres injection system was initially used in 1983. All wells adjacent to the northeast corner and to the north and west of Murray Acres are included in the Murray Acres injection system. This system includes all of the M and WR injection wells. Injection into the M-line west of well WR1R was discontinued at the end of September of 2000 and injection into the WR-line, north of WR10, began. Figure 2.1-3 (page 2.1-12) presents the combined Broadview and Murray Acres fresh water injection rates for the last six years, which averaged 493 gpm during 2001.

### 2.1.3.2 R.O. PRODUCT

Figure 2.1-3 also shows the rates of R.O. product water injection (see magenta stars) that were included in the total Broadview Acres rates prior to this annual report. The R.O. product injection averaged 222 gpm in 2001.

### 2.1.3.3 UPPER CHINLE

From 1984 through early 1995 the Upper Chinle injection system consisted of injecting fresh water into Upper Chinle well CW5 located on the north side of Broadview Acres. This effort restored most of the area in the Upper Chinle aquifer between the two faults. Injection into well CW5 was resumed in April of 1997 to complete the restoration of this aquifer.

Restoration of the Upper Chinle east of the East Fault started in 1996 by developing a head in the Upper Chinle aquifer that was greater than the alluvial head. Injection of fresh water into well CW13, an Upper Chinle well, started in June, 1996 and has prevented alluvial water from entering the Upper Chinle east of the East Fault. Injection in Upper Chinle well CW25, located on the western edge of the Upper Chinle outcrop east of Murray Acres, began in 2000. Injection into CW25 will develop a head in the Upper Chinle aquifer that forces flow in the Upper Chinle back to collection well CE2. The red squares on Figure 2.1-3 present the monthly average injection rates for 2001 into Upper Chinle wells CW5, CW13 and CW25, which averaged 61 gpm.

#### 2.1.3.4 MIDDLE CHINLE

Injection of fresh water into Middle Chinle well CW14 was started in December of 1997. This injection was started to prevent the alluvial water that recharges the Middle Chinle on the south side of Felice Acres from moving north of Broadview Acres. The injection rate averaged 31 gpm in 2001. This injection has prevented the movement of constituents further to the north.

#### 2.1.3.5 SECTIONS 28 AND 29

A test of fresh-water injection was initiated in late 1999 and conducted through January of 2000 by pumping San Andres well 951, which is located in Section 20, (see Figure 8.0-1A for location of supply well 951) and injection was plumbed to alluvial wells 682, 656, 894, 633 and 655. This fresh-water injection in Sections 28 and 29 is planned to block the low concentrations in Section 28 until irrigation can be used to reduce these low concentrations. This injection did not occur in 2001 but is expected to be started in early 2002.

### 2.1.4 RE-INJECTION

Alluvial water containing low concentrations of contaminants is being collected and is then re-injected into higher concentration alluvial areas in the collection area in order to initiate restoration of those areas. This lower concentration water will be as effective (see sulfate, uranium, selenium and molybdenum concentrations in plots for wells T and TA) as fresh water during the initial stages of restoration and, therefore, this is a beneficial use of this slightly contaminated ground water. Water collected from the K-line on the south side of the small tailings and L-line was re-injected into alluvial wells X11, X12, X21 through X24, X26, X27, 1E, DAA, DAB, DL, DW and DY in 2001 and averaged 41 gpm.

## 2.1.5 TAILINGS CONDITIONS

Tailings wells have been installed from 1994 through 2001. Data collected from these wells has been used to determine the amount of water in the re-contoured, stabilized tailings that is drainable. The tailings wells have also been useful in the evaluation of the tailings dewatering program. No dewatering of the tailings occurred in 1998 and 1999 due to limited capacity in the evaporation ponds except for a small rate in late 1999 for some testing. The complete dewatering program was restarted in 2000 and operated all of 2001.

Figure 2.1-4 presents the locations of tailings wells that were pumped in 2001. The cumulative volume of tailings water pumped from 1995 through 2001 is presented on Figure 2.1-5. A total volume of 80 million gallons of water had been removed from the tailings by the end of 2001. A total of 31 million gallons was pumped from the tailings in 2001. The yearly average collection rate, including down periods, from the tailings was 60 gpm in 2001.

Tables B.1-1 and B.1-2 of Appendix B present chemical analyses of tailings well water for 2001.

## 2.1.6 TOE DRAIN CONDITIONS

A series of toe drains has been installed around the large tailings pile to intercept perched ground water seeping from the tailings into the alluvium. The locations of the toe drains and their associated sumps are also shown on Figure 2.1-4. Ten sumps are located around the perimeter of the large tailings pile with two of these sumps tied to the old tailings decant towers (reclaim sumps). Eight of these sumps are connected to the toe drain systems, which are situated around the perimeter of the tailings.

Figure 2.1-5 shows that greater than 127 million gallons of water has been pumped from the toe drains. Approximately 18 gpm of water was collected in 2001 from the toe drains, which is a 3 gpm increase from the 2000 value.

Table 2.1-1 also presents the 2001 quantity of constituents collected from the toe drains. Samples from the toe drains for 2001 are presented in Tables B.2-1 and B.2-2 of Appendix B.

### 2.1.7 LINED EVAPORATION PONDS

The use of lined evaporation collection ponds began in October of 1986 when the two small collection ponds were constructed. The large evaporation pond, No. 1, on the small tailings began receiving water in November of 1990. The usage of the second large evaporation pond began in March of 1996.

The majority of the water from the collection system, and some water from the tailings dewatering wells and toe drains is pumped to the R.O. plant as feed water. The majority of the tailings water flows directly to the collection ponds. Excess water is transferred from the East Collection pond to the No. 2 evaporation pond. When necessary, water is transferred from the No. 2 evaporation pond to the No. 1 evaporation pond. Both ponds use spray systems to enhance evaporation.

A few water samples have been collected from the No. 1 and No. 2 large evaporation ponds, discharge to the evaporation ponds from the East Collection pond (E COLL POND), and the West Collection pond (W COLL POND). The results of these samples are presented in Tables B.3-1 and B.3-2 of Appendix B.

### 2.1.8 IRRIGATION

Two irrigation systems were operated in 2001. A 150-acre center pivot was installed in the southwest quarter of Section 33 and 120 acres of flood irrigation in the eastern half of Section 34 were developed. Figures 4.1-4A and 4.1-4B show the supply wells for these two irrigation areas. Wells 631, 632, 862, 863, 869, 648, 649, 647, 496, 653, 657, 658 and CW44 were used for the irrigation supply in 2001. These supply wells are piped together and are used on only one irrigation area at a time. These areas were successfully irrigated during the entire 2001 growing season. A total of 695 AC-FT of water was applied to the two irrigation areas in 2001.

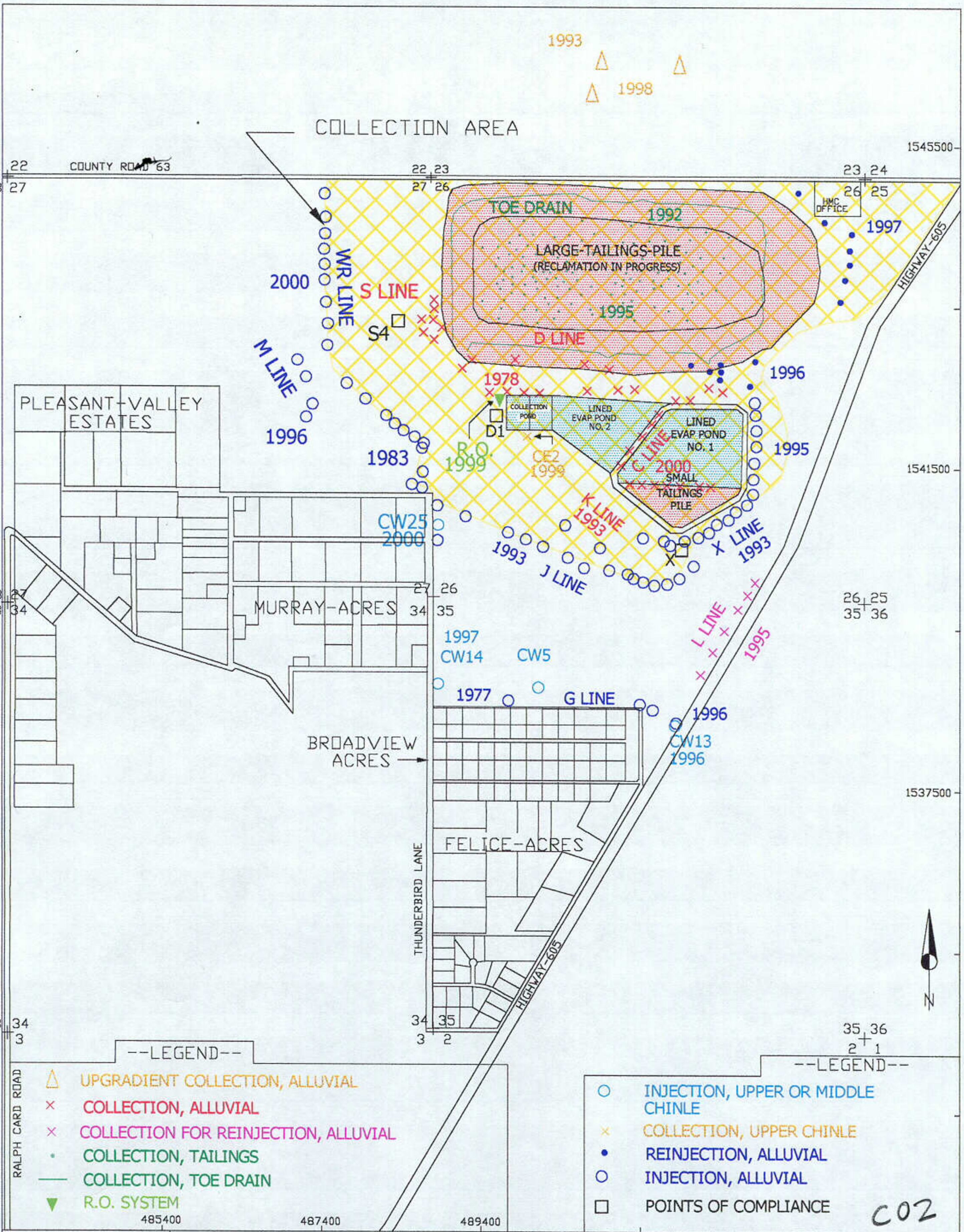


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FIGURE 2.1-1. LOCATIONS OF PRESENT INJECTION AND COLLECTION SYSTEMS WITH START OF OPERATION DATES

PROJECTS\2002-06\DWGS\2002FIGS

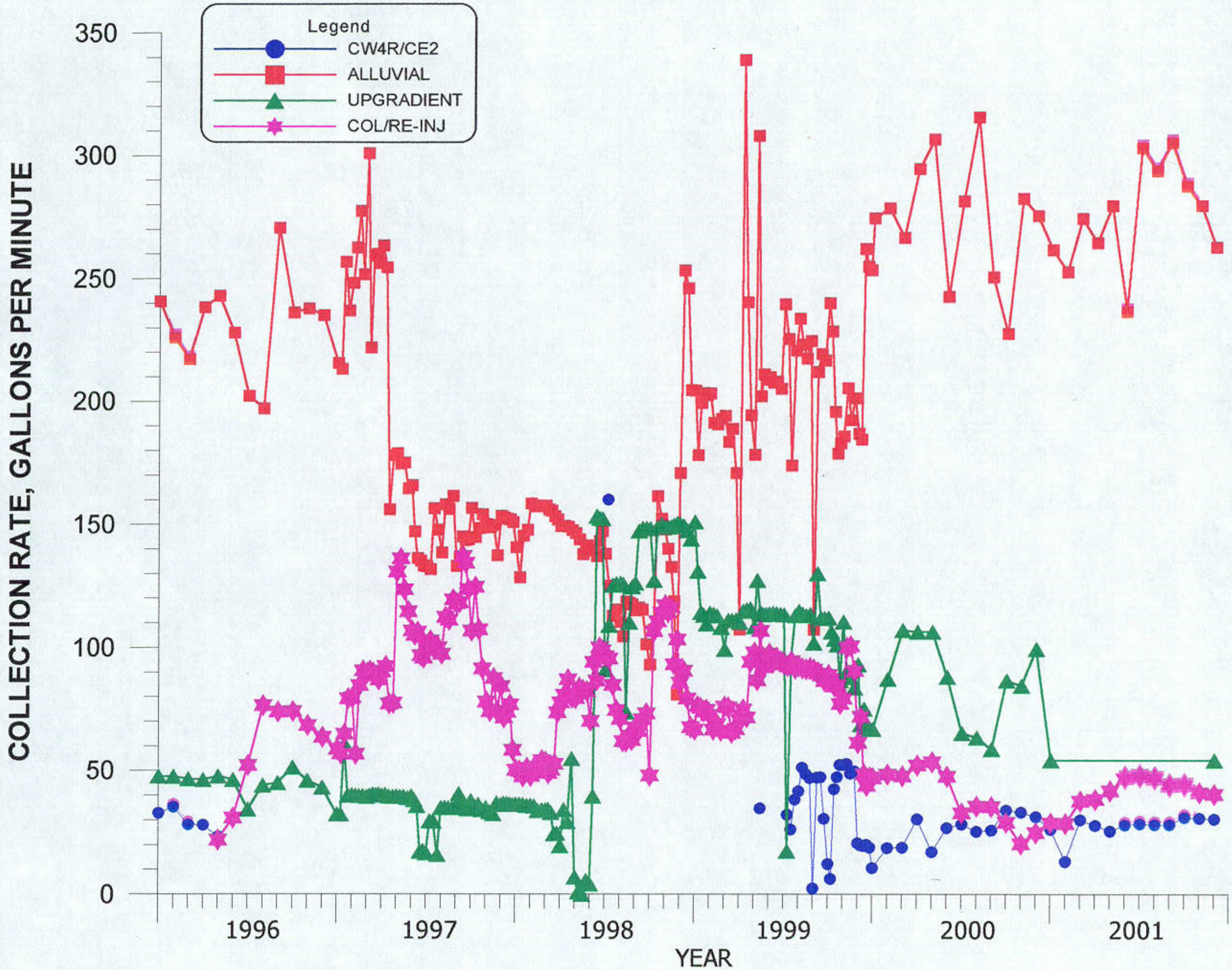


FIGURE 2.1-2. AVERAGE MONTHLY COLLECTION RATES FOR THE ALLUVIAL AND UPPER CHINLE AQUIFERS.

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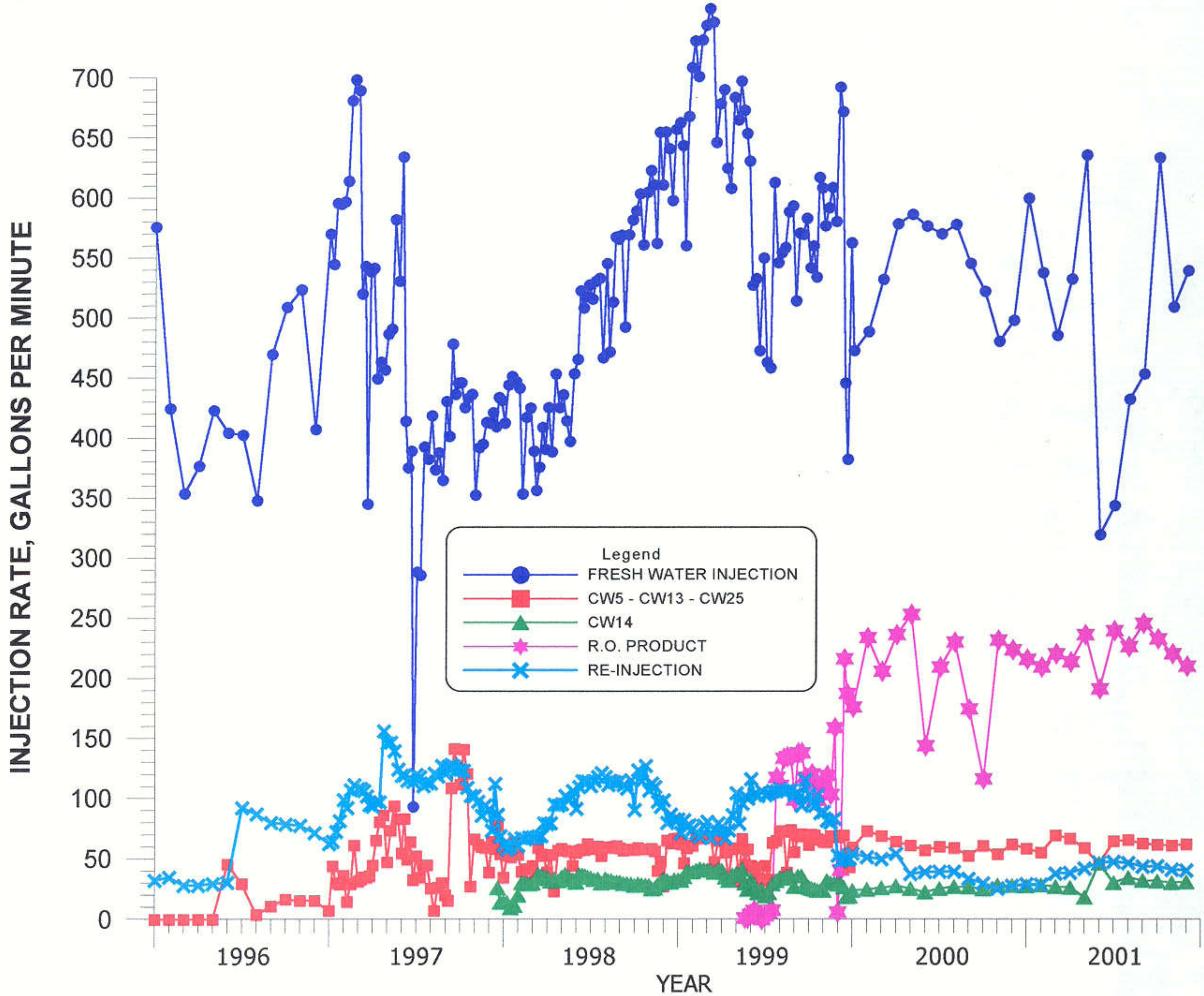


FIGURE 2.1-3. AVERAGE MONTHLY INJECTION RATES FOR THE ALLUVIAL AND UPPER CHINLE AQUIFERS.



C02.2

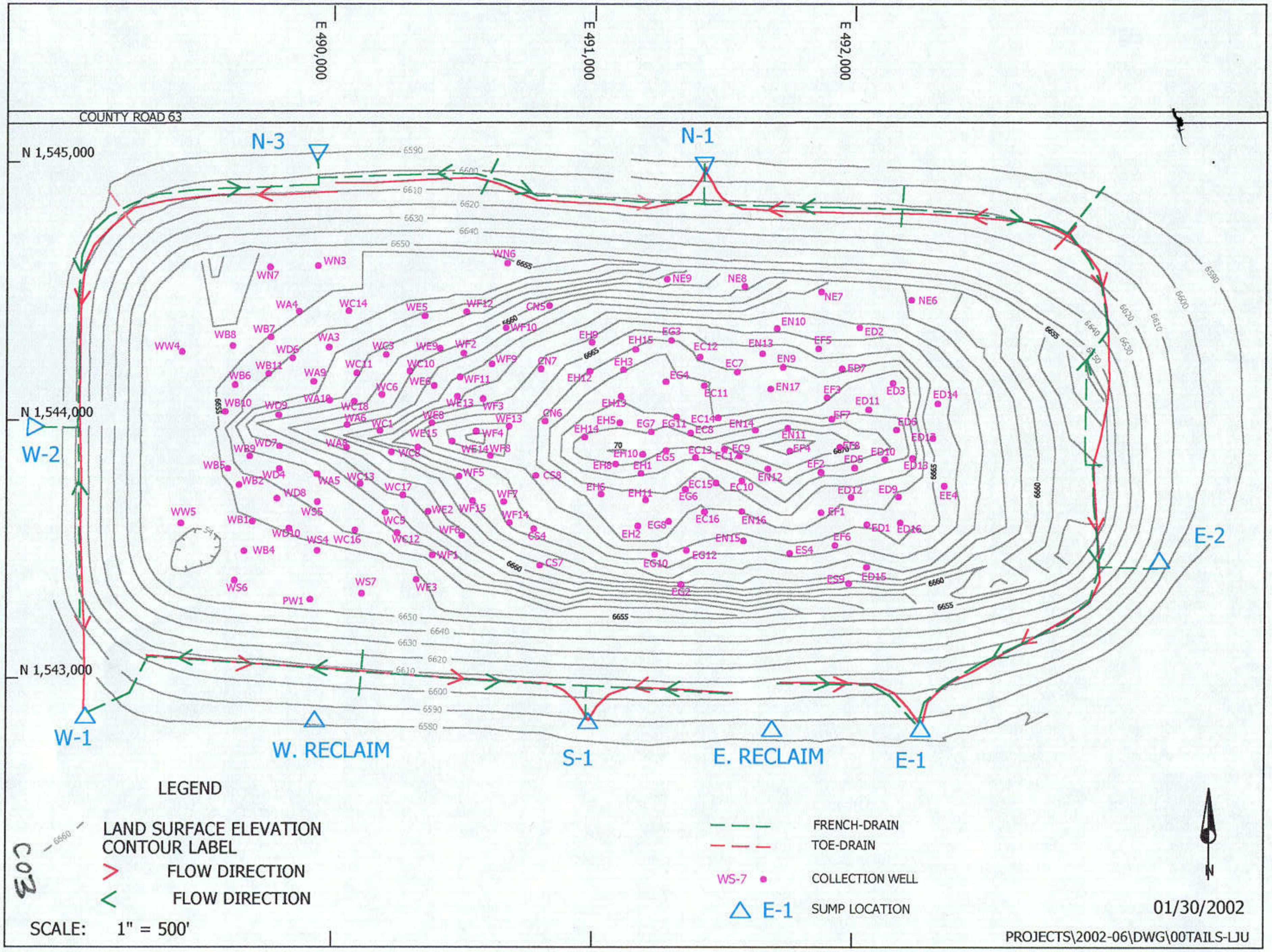


FIGURE 2.1-4. LOCATIONS OF TAILINGS DEWATERING WELLS, TOE DRAINS AND SUMPS

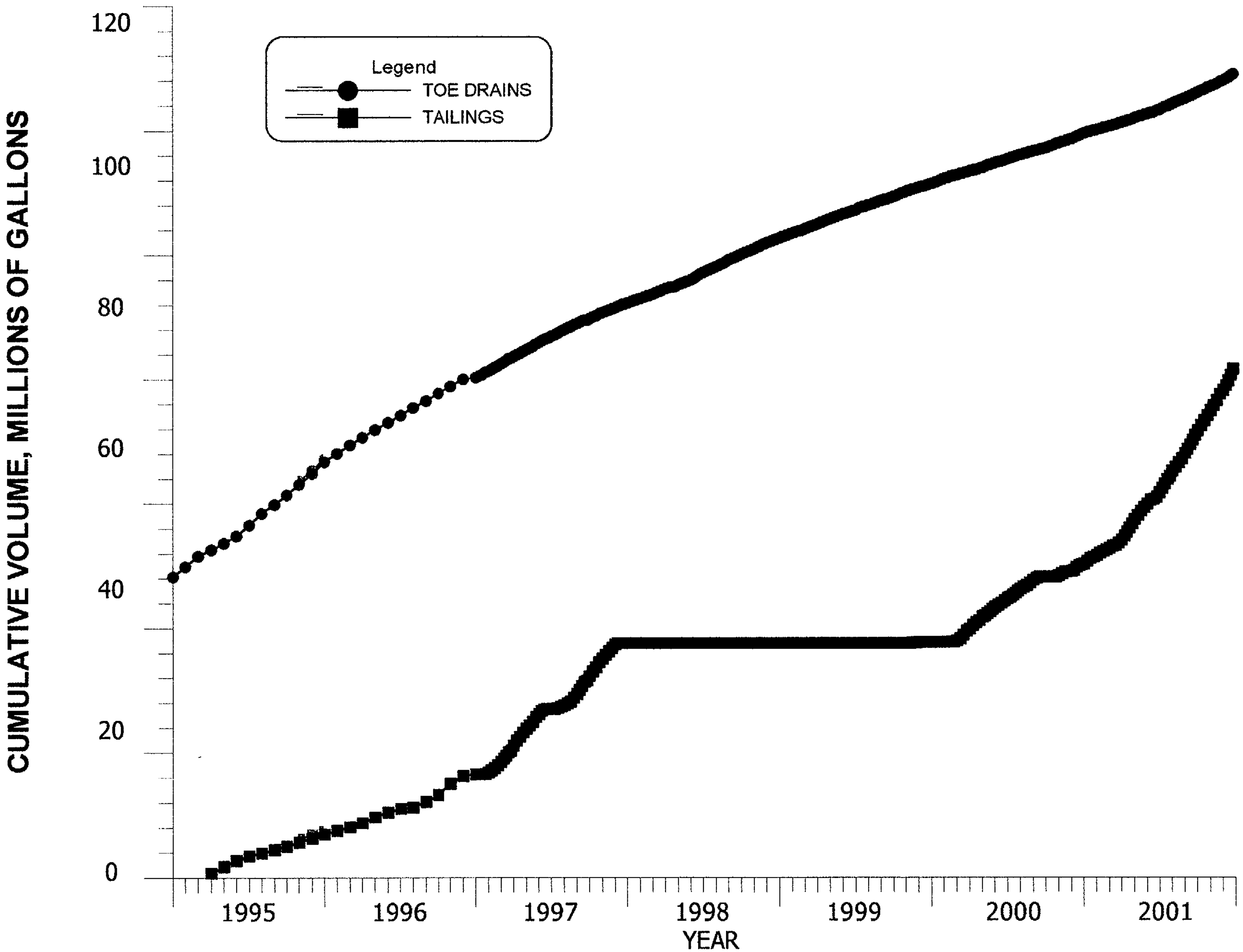


**FIGURE 2.1-5. CUMULATIVE VOLUME OF COLLECTION FROM TAILINGS DEWATERING WELLS AND TOE DRAINS.**

## TABLE 2.1-1. QUANTITIES OF CONSTITUENTS COLLECTED.

| YEAR | SOURCE | TOTAL VOLUME PUMPED (GAL) | SULFATE (SO4) CONC. (MG/L) | SULFATE (SO4) AMT. (LB) | URANIUM (U) CONC. (MG/L) | URANIUM (U) AMT. (LB) | MOLYBDENUM (MO) CONC. (MG/L) | MOLYBDENUM (MO) AMT. (LB) | SELENIUM (SE) CONC. (MG/L) | SELENIUM (SE) AMT. (LB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1978 | G.W. | 27670033 | 5200 | 1200620 | 35 | 8081 | 40 | 9236 | 2 | 462 |
| 1979 | G.W. | 46371629 | 5200 | 2012095 | 35 | 13543 | 40 | 15478 | 2 | 774 |
| 1980 | G.W. | 39385860 | 5200 | 1708978 | 35 | 11503 | 40 | 13146 | 2 | 657 |
| 1981 | G.W. | 91613183 | 5200 | 3975155 | 35 | 26756 | 40 | 30578 | 2 | 1529 |
| 1982 | G.W. | 159848025 | 5200 | 6935910 | 35 | 46684 | 40 | 53353 | 2 | 2668 |
| 1983 | G.W. | 167018540 | 5200 | 7247043 | 35 | 48778 | 40 | 55746 | 2 | 2787 |
| 1984 | G.W. | 203258522 | 5200 | 8819519 | 35 | 59362 | 40 | 67842 | 2 | 3392 |
| 1985 | G.W. | 194074421 | 5200 | 8421015 | 35 | 56680 | 40 | 64777 | 2 | 3239 |
| 1986 | G.W. | 199326030 | 5200 | 8648886 | 35 | 58214 | 40 | 66530 | 2 | 3326 |
| 1987 | G.W. | 180881740 | 5200 | 7848576 | 35 | 52827 | 40 | 60374 | 2 | 3019 |
| 1988 | G.W. | 166460826 | 5200 | 7222843 | 35 | 48615 | 40 | 55560 | 2 | 2778 |
| 1989 | G.W. | 175780800 | 5200 | 7627243 | 35 | 51337 | 40 | 58671 | 2 | 2934 |
| 1990 | G.W. | 164378919 | 5200 | 7132508 | 35 | 48007 | 40 | 54865 | 2 | 2743 |
| 1991 | G.W. | 171497720 | 5200 | 7441397 | 35 | 50086 | 40 | 57242 | 2 | 2862 |
| 1992 | G.W. | 128398849 | 4925 | 5276234 | 27.2 | 29134 | 35.9 | 38419 | 1.60 | 1718 |
| 1992 | TOE | 8544670 | 12117 | 864006 | 53.2 | 3793 | 106.5 | 7595 | 1.73 | 123 |
| 1993 | G.W. | 115795020 | 5011 | 4841203 | 28.1 | 27130 | 45.4 | 43885 | 1.47 | 1425 |
| 1993 | TOE | 18357680 | 12117 | 1856262 | 53.2 | 8150 | 106.5 | 16315 | 1.73 | 265 |
| 1994 | G.W. | 98294087 | 4423 | 3624762 | 26.0 | 21146 | 27.3 | 22349 | 1.42 | 1162 |
| 1994 | TOE | 18337680 | 12117 | 1854240 | 53.2 | 8141 | 106.5 | 16299 | 1.73 | 264 |
| 1995 | G.W. | 108306398 | 3256 | 2942827 | 16.1 | 14553 | 19.2 | 17355 | 1.65 | 1491 |
| 1995 | TOE | 17711370 | 11370 | 1680500 | 54.6 | 8069 | 94.4 | 13952 | 2.25 | 332 |
| 1995 | TAILS | 5905740 | 8191 | 403680 | 36.1 | 1778 | 89.7 | 4420 | 0.15 | 7 |
| 1996 | G.W. | 122064160 | 3899 | 3967919 | 20.9 | 21225 | 26.8 | 27259 | 1.92 | 1950 |
| 1996 | TOE | 15431810 | 11537 | 1484295 | 46.4 | 5970 | 105.0 | 13509 | 1.29 | 166 |
| 1996 | TAILS | 9181390 | 9434 | 722129 | 40.2 | 3077 | 108.0 | 8236 | 0.18 | 14 |
| 1997 | G.W. | 94465562 | 4955 | 3836678 | 26.9 | 20892 | 33.4 | 25887 | 3.17 | 2456 |
| 1997 | TOE | 12029390 | 11094 | 1113808 | 41.8 | 419 | 100.0 | 10040 | 0.81 | 81 |
| 1997 | TAILS | 21292900 | 10284 | 1827575 | 45.8 | 8139 | 92.4 | 16420 | 0.14 | 25 |
| 1998 | G.W. | 74459130 | 5088 | 3161866 | 29.6 | 18385 | 34.8 | 21625 | 1.85 | 1151 |
| 1998 | TOE | 10321780 | 9870 | 850257 | 42.5 | 3665 | 95.2 | 8203 | 0.73 | 63 |
| 1999 | G.W. | 117752408 | 3363 | 3305027 | 16.6 | 16314 | 14.8 | 14545 | 2.06 | 2024 |
| 1999 | TOE | 8809890 | 11560 | 849976 | 54.3 | 3993 | 106.0 | 7794 | 0.46 | 34 |
| 1999 | TAILS | 120550 | 9420 | 9478 | 40.9 | 41 | 111.5 | 112 | 0.19 | 0 |
| 2000 | G.W. | 146609842 | 3358 | 4108868 | 18.8 | 23004 | 20.6 | 25206 | 1.94 | 2374 |
| 2000 | TOE | 8032870 | 9734 | 652590 | 58.6 | 3929 | 118.0 | 7911 | 0.34 | 23 |
| 2000 | TAILS | 12446810 | 9710 | 1008685 | 37.8 | 3927 | 127.0 | 13193 | 0.30 | 31 |
| 2001 | G.W. | 144925056 | 2770 | 3350438 | 19.6 | 23707 | 21.4 | 25884 | 1.65 | 1996 |
| 2001 | TOE | 9606280 | 9935 | 796529 | 43.1 | 3455 | 95.7 | 7673 | 0.78 | 63 |
| 2001 | TAILS | 31465370 | 8688 | 2281555 | 34.6 | 9086 | 89.2 | 23425 | 0.19 | 50 |
| SUM G.W. | | 3,138,636,760 | | 124,657,610 | | 795,962 | | 925,812 | | 50,917 |
| SUM TOE | | 127,183,420 | | 12,002,462 | | 49,584 | | 109,290 | | 1,413 |
| SUM TAILS | | 80,412,760 | | 6,253,103 | | 26,048 | | 65,806 | | 127 |
| COMBINED SUM | | 3,346,232,940 | | 142,913,175 | | 871,595 | | 1,100,908 | | 52,458 |

NOTE: Average concentrations for 1978 to 1991 were used in calculating the quantities of constituents removed.
Concentrations from the collection wells have gradually decreased from 1978 through 1991.
G.W. = Ground water; TOE = Toe drains on edge of tailings; TAILS = Large tailings collection wells

## 2.2 FUTURE OPERATION

Restoration in 2002 is to continue as a combination of fresh-water and R.O. product injection and contaminated water collection to maintain the overall piezometric gradient reversal between the lines of injection (M Line and J Line) and collection near the tailings piles. The reverse osmosis (R.O.) plant will be increased to 600 gpm in 2002. This plant will process 600 gpm of collection water which should result in a discharge to the lined evaporation pond of approximately 160 gpm and approximately 440 gpm of R.O. product injection into the alluvium. The larger collection rate and use of the very good quality R.O. product for injection will continue to increase the progress in restoration.

Water collected from the alluvial and Chinle aquifers, where there are relatively low levels of selenium and uranium, will continue to be used for collection for re-injection in the initial phase of restoration. This re-injection will occur in the alluvium where concentrations are greater than those of the injection water until such time as injection with fresh water or R.O. product water will better complete the restoration. The low concentration re-injection water will be limited to areas within the reversal zone upgradient of the J and M injection lines. For the purpose of this document, the reversal zone is called the collection area. To date, re-injection has occurred in wells X5 through X27, 1A, D2 through D4 and DAA, DAB, DL, DW and DY.

Collection from Upper Chinle well CE2 will continue to intercept concentrations in this aquifer. Injection into Upper Chinle wells CW5, CW13 and CW25 is planned to continue to control flow in these areas of the Upper Chinle aquifer. The injection into well CW14 will be continued to build the head in this area of the Middle Chinle aquifer to prevent alluvial water from flowing into this portion of the Middle Chinle aquifer.

Irrigation with water from Sections 3 and 33 and southern Felice Acres is planned for the entire growing season in 2002. A third irrigation area is planned for Section 28, which, used along with the Sections 28 and Section 29 fresh-water injection, should start restoration of these slightly elevated concentrations.

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## GROUND-WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT



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## 3.0 SITE STANDARDS AND BACKGROUND CONDITIONS

### 3.1 SITE STANDARDS

Six water-quality site standards (U, Se, Mo, Ra226 + Ra228, Th230 and V) have been set for the Homestake site by the United States Nuclear Regulatory Commission (NRC). These site standards are applicable at three points of compliance. Points of compliance wells are S4, D1 and X (see Figure 2.1-1 for locations). Table 3.1-1 presents the six site standards (see Table 3.3-1 for comparison with background). The established site standards are presently exceeded by the full range in background values for many of the constituents. Therefore, naturally occurring concentrations will cause compliance issues at this site. The New Mexico standards for uranium, selenium, molybdenum, radium-226 plus radium-228, sulfate, chloride, TDS and nitrate for this site are also presented in Table 3.1-1. Homestake has recently submitted an updated analysis of the full range of background (see Hydro-Engineering 2001c) which should change several of the site standards.

**TABLE 3.1-1. GRANTS PROJECT WATER-QUALITY STANDARDS.**

| Constituents | Homestake Standards | |
|---|---|---|
| | NRC | New Mexico |
| Uranium | 0.04 | 5 |
| Selenium | 0.1 | 0.12 |
| Molybdenum | 0.03 | 1.0@ |
| Vanadium | 0.02 | ----- |
| RA-226 + Ra-228 | 5 | 30 |
| Thorium-230 | 0.3 | ----- |
| Sulfate | ----- | 976 |
| Chloride | ----- | 250 |
| TDS | ----- | 1770 |
| Nitrate | ----- | 12.4 |

NOTE: All concentrations are in mg/l except: Ra-226 + Ra-228 and Th-230, which are in pCi/l.
@ = Irrigation Standard

## 3.2 GROUND-WATER BACKGROUND WATER QUALITY

The hydrologic background conditions at the Grants site are those that exist upgradient or north of the large tailings pile. These conditions have been monitored since 1976. Ground-water flow in the San Mateo alluvial system is generally from the northeast to the southwest (see Figure 3.2-1). Lobo Creek joins San Mateo Creek at the Homestake site, although neither creek has a well-defined channel at the site. Surface-water flow exists only after extreme precipitation and then generally only within some reaches of the channel.

Hydrographs of upgradient wells that have been used to define the background hydrologic conditions of the alluvial aquifer are presented in Section 4 of this report. Wells DD, P, P1, P2, P3, P4, Q, R and ND, located just north of the large tailings on the Homestake property, have been used for monitoring alluvial background water quality.

Additional alluvial background wells located further north were sampled in 2001 (wells 914, 916, 920, 921, 922 and 950, see Figure 3.2-1 for locations). Information gathered from these wells has been used to further define the piezometric surface and water-quality conditions in the upgradient alluvial aquifer.

Figure 3.2-1 presents the latest 2001 water-quality data for the background wells[1] for six parameters: sulfate, uranium, selenium, chloride, TDS and nitrate. All molybdenum concentrations in these upgradient wells are less than 0.03 mg/l. The sulfate concentrations for these wells upgradient of the large tailings vary from 46 to 1380 mg/l in 2001. Uranium concentrations also vary over a large range, from 0.001 to 0.21 mg/l. Three natural uranium concentrations are nearly four times the NRC site standard of 0.04 mg/l. Selenium concentrations vary over an even larger range, from less than 0.005 to 0.63 mg/l. The largest 2001 background for selenium is six times the NRC site standard.

Chloride concentrations in water sampled from the upgradient wells ranged from a low of 27 mg/l to a high of 136 mg/l. The TDS concentrations varied from 399 to 2690 mg/l. Nitrate concentrations also vary naturally over a large range in the alluvial

[1] Wells P, P3, P4, 914, 916, 920, 921, 922 and 950.

aquifer from 1.9 to 21.1 mg/l in 2001. Time versus concentration plots for upgradient wells P, P3 and P4 are presented in Section 4.3 of this report.

The 95th percentile of the historical background data for this site was defined by ERG (1999a and 1999b). These document with a hydrologic support document (Hydro-Engineering 2001c) were submitted in 2001 to the NRC with a request to adjust some of the site standards based on the full range of natural background. The 95% level is being used to define the upper limit of background. The average background concentration has been used in the past for establishing the standards and discussion of background values. The 95% level is a better value for use in background discussions because it better defines the natural full upper limit of background. Figure 3.2-1 presents the 95% background levels for the Grants constituents.

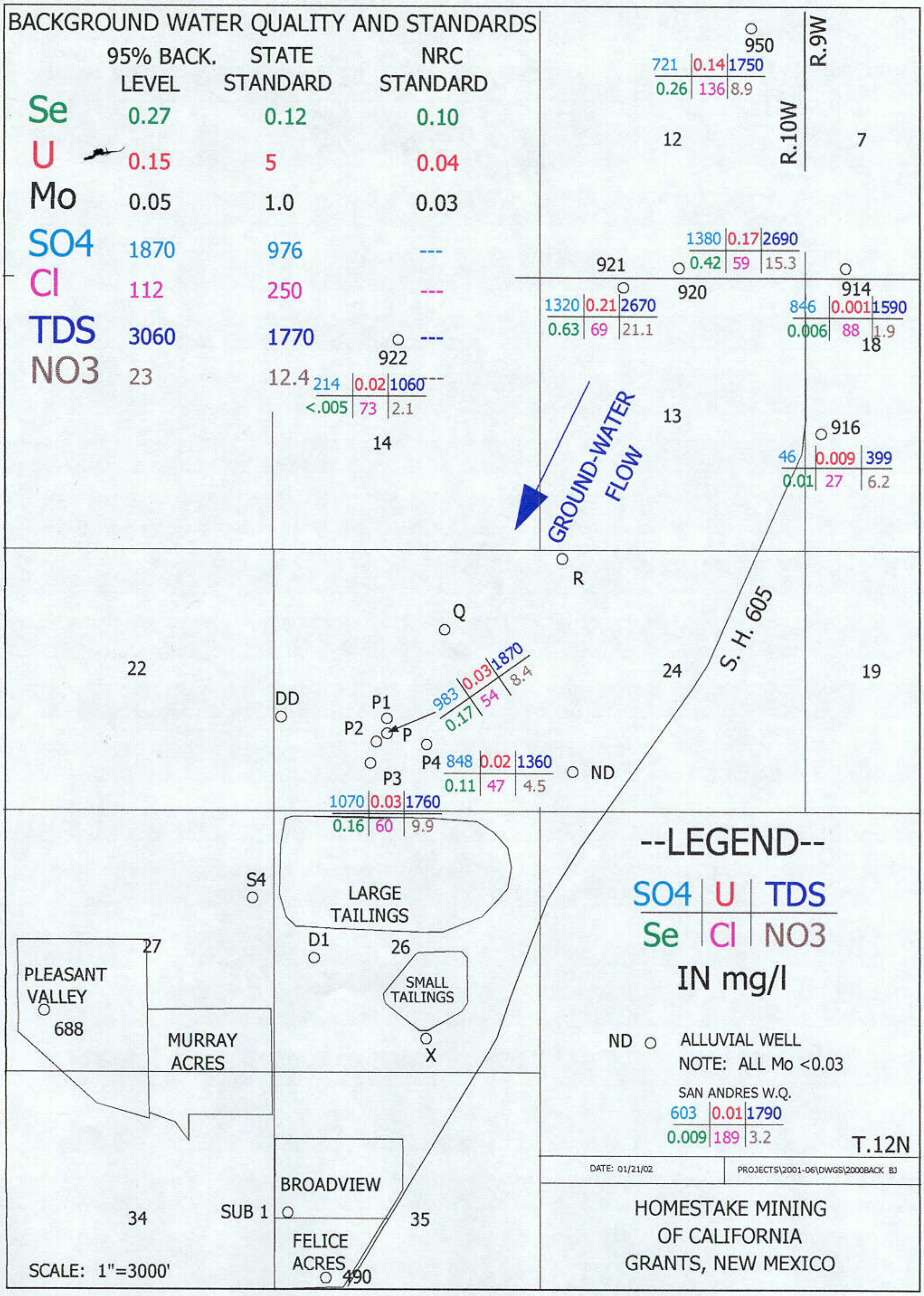


FIGURE 3.2-1. BACKGROUND GROUND-WATER QUALITY



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## 3.3 COMPARISON OF SITE STANDARDS TO BACKGROUND

The range in concentrations (see Section 3.2) in the upgradient wells during 2001 was such that water in 6 out of 9 concentrations in background wells[1] were equal to, or exceeded, the NRC site standards for selenium. Additionally, 3 out of 9 uranium values were equal to, or exceeded, the NRC site standard. These site standards were set based on an average of concentrations in three samples[2] collected from December 1988, January 1989 and February 1989 from upgradient well P. As shown by the present data, there is a large natural areal variability in the background water quality. Therefore, the historical database for all of the background wells more adequately defines background concentrations as used in the two ERG (1999a and 1999b) studies. Naturally occurring background variation is demonstrated by the uranium concentrations, where concentrations in the Fall of 2001 varied from less than 0.001 to 0.21 mg/l (see red values on Figure 3.2-1). The higher values are four times the site standard of 0.04 mg/l.

Table 3.3-1 presents the 95$^{th}$ percentile of background concentrations (see ERG 1999a and 1999b for computation of 95% levels) for selenium, uranium, molybdenum, sulfate, chloride, TDS and nitrate along with the State and NRC standards. The 95% values for selenium and uranium are significantly greater than the NRC standards, while sulfate, TDS and nitrate levels are significantly greater than the State standards.

**TABLE 3.3-1. COMPARISON OF UPPER LIMIT OF BACKGROUND WATER QUALITY AND SITE STANDARDS.**

| Constituents | 95% Background Level | State Standard | NRC Standard |
|---|---|---|---|
| Selenium | 0.27 | 0.12 | 0.1 |
| Uranium | 0.15 | 5 | 0.04 |
| Molybdenum | 0.05 | 1.0@ | 0.03 |
| Sulfate | 1870 | 976 | ----- |
| Chloride | 112 | 250 | ----- |
| TDS | 3060 | 1770 | ----- |
| Nitrate | 23 | 12.4 | ----- |

NOTE: All values are in mg/l
@ = Irrigation Standard

[1]Wells P, P3, P4, 914, 916, 920, 921, 922 and 950.
[2] Average of 3 samples from well P in 1988 and 1989.

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## GROUND-WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT



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**GROUND-WATER MONITORING**
**FOR HOMESTAKE'S GRANTS PROJECT**

**FIGURES**
**(continued)**

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## GROUND-WATER MONITORING FOR HOMESTAKE'S GRANTS PROJECT

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## 4.0 ALLUVIAL AQUIFER MONITORING

This section presents 2001 monitoring results for the alluvial aquifer, the most important ground-water system at the Grants site. Well completions are presented first, with the water levels and water-quality results following.

## 4.1 ALLUVIAL WELL COMPLETIONS

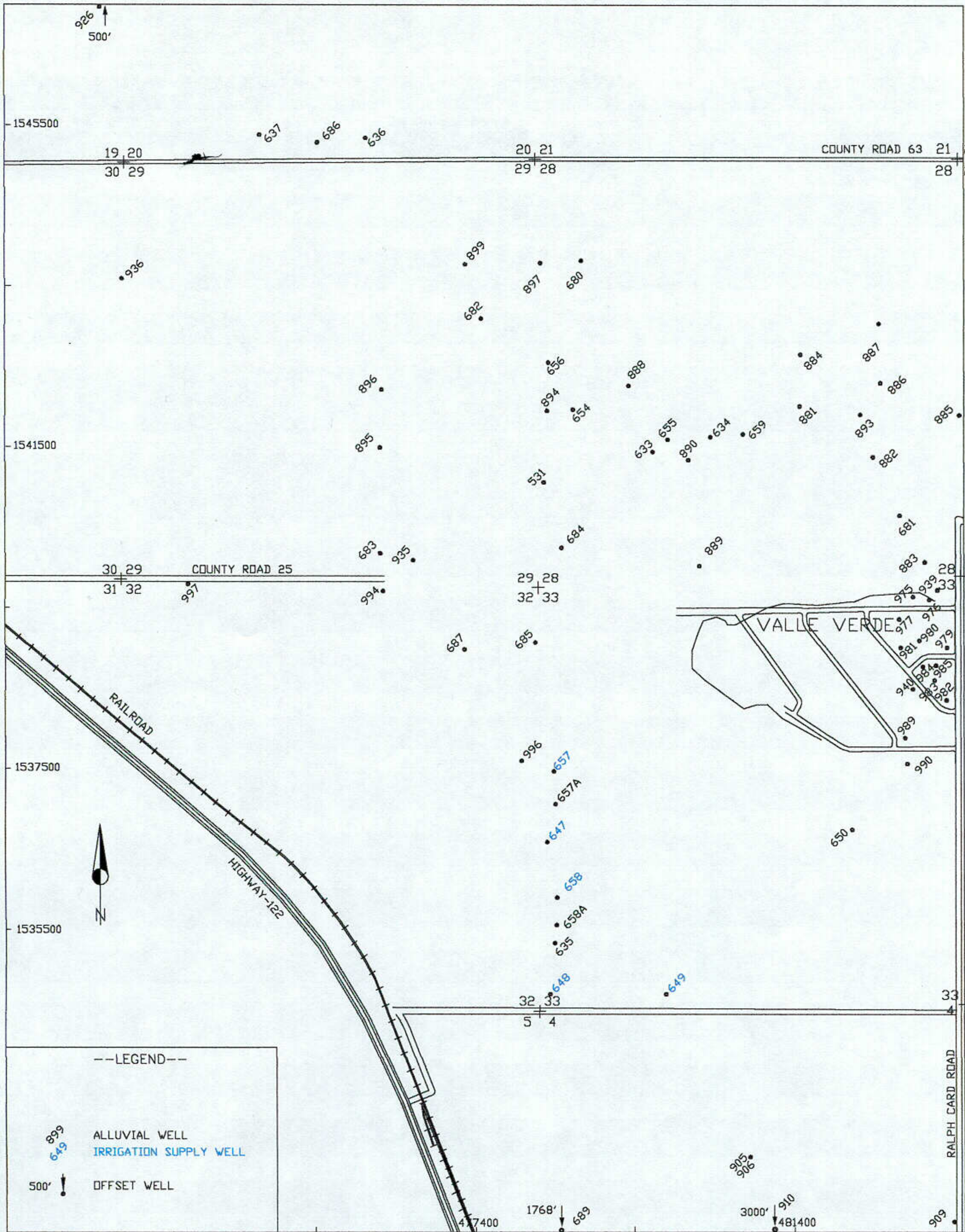
New alluvial wells drilled in 2001 are DA3, DA4, J13 through J15, SUR, 520, 521, 638 and 639. Discussion of the new and previously installed alluvial wells is presented in this section. Wells DA3, DA4 and SUR were drilled for new collection wells near the large tailings with collection planned for early 2002. Wells J13 through J15 were drilled on the southeast side of the small tailings for fresh water injection, planned for 2002, while wells 520, 521, 638 and 639 were drilled on the east side of the highway to the southeast of the small tailings. Initial testing of these wells is being conducted but results will not be available until 2002. Figures 4.1-1A and 4.1-1B show locations of the alluvial wells west of and near the Homestake Grants Project, respectively. These figures are plotted at a scale of 1" = 1600'. Each of the new wells are located on Figure 4.1-1B.

Alluvial wells 532, 914, 916, 920, 921, 922, 950 and 999 contain data but exist outside of Figures 4.1-1A and 4.1-1B. Drawing 1.1-1 of Hydro-Engineering, 1996 shows the wells that exist outside of the figures in this report.

The currently active injection and collection wells are labeled with different colors on Figures 4.1-1A and 4.1-1B so that they can be distinguished from monitoring wells. These figures also show the wells used for irrigation water supply during the 2001 irrigation season. Table 4.1-1 presents basic well data for alluvial wells located on the Homestake property that have been used to define the alluvial ground-water hydrology. Many additional alluvial wells outside of the Homestake property have also been used for that purpose. The basic well data table presents the location, well depth, casing diameter, water-level information, depth to the base of the alluvium and casing perforation intervals for each well.

Table 4.1-2 presents the same type of basic well data for alluvial wells in Broadview and Felice Acres. These two subdivisions are just south of the Homestake property. Figure 4.1-1B also shows the locations of the subdivision wells. Table 4.1-3 presents similar basic data for alluvial wells located in Murray Acres and Pleasant Valley Estates.

Table 4.1-4 presents data for regional wells located outside of the subdivisions and the Homestake property. The limits of the Grants Project site boundary are delineated with a heavy line on Figure 4.1-1B. Wells outside this area are considered to be regional, and data for them are included in the regional water-quality and basic well data tables. The project site boundary includes Broadview, Felice and Murray Acres and Pleasant Valley Estates subdivisions. Slightly greater than 100 alluvial wells have been included on the regional table, which brings the total number of alluvial wells used to characterize this site to greater than 400. The wells are listed in numerical or alphabetic order based on their well names.




| SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02 |
|---|---|---|
| FIGURE 4.1-1A. ALLUVIAL WELL LOCATIONS (WEST AREA) | | D:\R13\HMC\ 01WQAL lh |
| | | page 4.1-3 |

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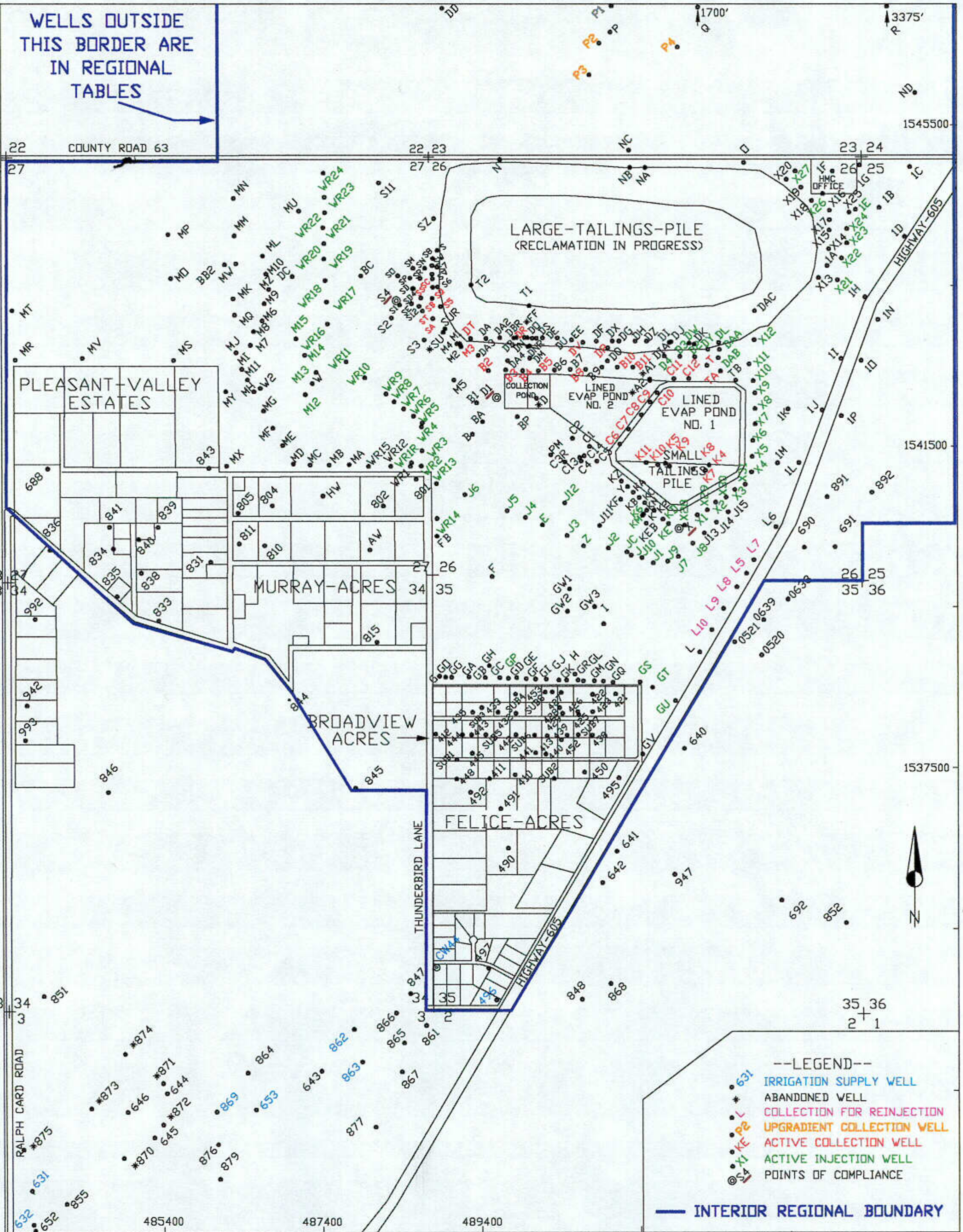


SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02

FIGURE 4-1B. ALLUVIAL WELL LOCATIONS

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## TABLE 4.1-1 BASIC WELL DATA FOR THE ALLUVIAL HOMESTAKE WELLS

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0690 | 1540279 | 493465 | 65.0 | 5.0 | 9/16/98 | 62.50 | 6519.56 | 2.5 | 6582.06 | 55 | 6524.6 A | 25-65 | 0.0 |
| 0691 | 1540276 | 493860 | 66.0 | 5.0 | 9/16/98 | 57.36 | 6531.45 | 2.9 | 6588.81 | 55 | 6530.9 A | 26-66 | 0.5 |
| 0891 | 1540904 | 493751 | 54.0 | 5.0 | 9/16/98 | 54.30 | 6526.82 | 2.1 | 6581.12 | 50 | 6529.0 A | 24-54 | 0.0 |
| 0892 | 1540954 | 494317 | 50.0 | 5.0 | 9/16/98 | 51.00 | 6536.21 | 2.0 | 6587.21 | 42 | 6543.2 A | 30-50 | 0.0 |
| 1A | 1543790 | 493768 | 64.6 | 5.0 | 10/30/01 | 39.08 | 6546.35 | 2.6 | 6585.43 | 47 | 6535.8 A | 39-51 | 10.5 |
| 1B | 1544502 | 494412 | 51.8 | 5.0 | 10/30/01 | 38.70 | 6545.72 | 1.5 | 6584.42 | 50 | 6532.9 A | 20-50 | 12.8 |
| 1C | 1545018 | 494799 | 52.9 | 5.0 | 9/28/00 | 43.26 | 6544.73 | 2.5 | 6587.99 | 43 | 6542.5 A | 34-54 | 2.2 |
| 1D | 1544142 | 494752 | 42.9 | 5.0 | 9/29/00 | 29.00 | 6556.97 | 2.2 | 6585.97 | 40 | 6543.8 A | 22-42 | 13.2 |
| 1E | 1544481 | 494116 | 51.4 | 5.0 | 9/24/01 | 2.00 | 6582.31 | 2.1 | 6584.31 | 43 | 6539.2 A | 34-54 | 43.1 |
| 1F | 1544952 | 493831 | 61.8 | 5.0 | 9/24/01 | 44.63 | 6542.75 | 1.8 | 6587.38 | 54 | 6531.6 A | 30-60 | 11.2 |
| 1G | 1545034 | 494170 | 57.5 | 5.0 | 9/24/01 | 42.71 | 6544.36 | 2.3 | 6587.07 | 48 | 6536.8 A | 35-55 | 7.6 |
| 1H | 1543363 | 494266 | 55.4 | 5.0 | 9/24/01 | 31.16 | 6555.23 | 1.8 | 6586.39 | 43 | 6541.6 A | 25-55 | 13.6 |
| 1I | 1542627 | 493928 | 49.8 | 5.0 | 10/3/00 | 34.26 | 6564.09 | 1.3 | 6598.35 | 35 | 6562.1 A | 27-47 | 2.0 |
| 1J | 1541986 | 493695 | 50.3 | 5.0 | 9/24/01 | 33.04 | 6552.36 | 2.0 | 6585.40 | 40 | 6543.4 A | 30-50 | 9.0 |
| 1K | 1541992 | 493275 | 55.6 | 5.0 | 9/24/01 | 29.86 | 6554.27 | 1.8 | 6584.13 | 47 | 6535.3 A | 30-55 | 18.9 |
| 1L | 1541256 | 493416 | 53.4 | 5.0 | 9/24/01 | 29.31 | 6549.30 | 3.1 | 6578.61 | 40 | 6535.5 A | 35-55 | 13.8 |
| 1M | 1541327 | 493133 | 43.1 | 5.0 | 9/24/01 | 23.48 | 6552.05 | 1.3 | 6575.53 | 33 | 6541.2 A | 25-54 | 10.8 |
| 1N | 1543100 | 494396 | 45.6 | 5.0 | 10/3/00 | 29.60 | 6561.25 | 2.4 | 6590.85 | 25 | 6563.5 A | 15-44 | 0.0 |
| 1O | 1542592 | 494175 | 44.0 | 5.0 | 10/3/00 | 43.88 | 6551.06 | 0.8 | 6594.94 | 29 | 6565.1 A | 14-34 | 0.0 |
| 1P | 1541902 | 493924 | 52.8 | 5.0 | 10/3/00 | 38.14 | 6547.10 | 2.6 | 6585.24 | 35 | 6547.6 A | 20-40 | 0.0 |
| * A1 | 1542365 | 491539 | 55.6 | 4.0 | 1/12/94 | 45.29 | 6527.86 | 1.1 | 6573.15 | 55 | 6517.1 A | 37-57 | 10.8 |
| * A2 | 1542356 | 491539 | 46.4 | 4.0 | 12/23/91 | 47.98 | 6525.42 | 1.1 | 6573.40 | --- | --- A | 27-47 | --- |
| B | 1541684 | 489311 | 68.6 | 4.0 | 3/12/02 | 42.34 | 6528.56 | 2.4 | 6570.90 | 60 | 6508.5 A | 49-69 | 20.1 |
| B1 | 1542071 | 489370 | 90.9 | 5.0 | 7/13/00 | 45.11 | 6526.54 | 0.6 | 6571.65 | 82 | 6489.1 A | 62-82 | 37.5 |
| B2 | 1542475 | 489515 | 83.0 | 5.0 | 12/5/00 | 49.78 | 6524.47 | 2.0 | 6574.25 | 72 | 6500.3 A | 55-75 | 24.2 |
| B3 | 1542480 | 489731 | 87.0 | 5.0 | 12/5/00 | 62.15 | 6512.14 | 2.6 | 6574.29 | 77 | 6494.7 A | 58-78 | 17.4 |
| B4 | 1542471 | 489942 | 88.8 | 5.0 | 12/5/00 | 59.60 | 6515.06 | 7.4 | 6574.66 | 82 | 6485.3 A | 63-83 | 29.8 |
| B5 | 1542474 | 490141 | 91.0 | 5.0 | 12/5/00 | 57.23 | 6516.23 | 1.4 | 6573.46 | 81 | 6491.1 A | 62-82 | 25.2 |
| B6 | 1542478 | 490341 | 90.0 | 5.0 | 12/5/00 | 48.94 | 6528.75 | 2.0 | 6577.69 | 80 | 6495.7 A | 63-83 | 33.1 |
| B7 | 1542488 | 490540 | 87.0 | 5.0 | 9/22/95 | 43.82 | 6530.58 | 2.2 | 6574.40 | 77 | 6495.2 A | 53-78 | 35.4 |
| B8 | 1542488 | 490734 | 87.0 | 5.0 | 12/5/00 | 49.94 | 6525.81 | 2.3 | 6575.75 | 77 | 6496.5 A | 53-78 | 29.4 |
| B9 | 1542514 | 490935 | 86.0 | 5.0 | 12/5/00 | 50.32 | 6525.85 | 2.2 | 6576.17 | 76 | 6498.0 A | 51-78 | 27.9 |
| B10 | 1542517 | 491133 | 84.8 | 5.0 | 12/5/00 | 70.46 | 6506.31 | 2.3 | 6576.77 | 75 | 6499.5 A | 51-78 | 6.8 |
| B11 | 1542517 | 491329 | 84.9 | 5.0 | 9/21/01 | 49.28 | 6528.11 | 2.2 | 6577.39 | 77 | 6498.2 A | 42-80 | 29.9 |
| BA | 1541835 | 489440 | 86.0 | 5.0 | 3/12/02 | 44.58 | 6527.00 | 1.7 | 6571.58 | 76 | 6493.9 A | 64-78 | 33.1 |
| BB2 | 1543791 | 486213 | 56.6 | 4.0 | 12/14/00 | 48.84 | 6524.96 | 0.6 | 6573.80 | --- | --- A | 42-62 | --- |

## TABLE 4.1-1 BASIC WELL DATA FOR THE ALLUVIAL HOMESTAKE WELLS (cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BC | 1543655 | 487910 | 82.8 | 4.0 | 6/4/01 | 47.68 | 6526.93 | 2.6 | 6574.61 | 75 | 6497.0 A | 63-83 | 29.9 |
| BP | 1541882 | 489841 | 85.4 | 4.0 | 7/23/01 | 45.45 | 6526.85 | 3.0 | 6572.30 | 75 | 6494.3 A | 40-85 | 32.5 |
| * C | 1541762 | 490854 | 79.7 | 4.0 | 5/16/94 | 41.50 | 6529.34 | 0.3 | 6570.84 | 75 | 6495.5 A | 59-79 | 33.8 |
| C1 | 1541533 | 490780 | 76.0 | 5.0 | 12/5/00 | 40.50 | 6531.36 | 0.8 | 6571.86 | 67 | 6504.1 A | 41-68 | 27.3 |
| C2 | 1541630 | 490566 | 76.0 | 5.0 | 12/5/00 | 36.10 | 6528.92 | 0.9 | 6565.02 | 66 | 6498.1 A | 42-67 | 30.8 |
| * C3 | 1541344 | 490481 | 75.0 | 5.0 | 6/20/94 | 36.20 | 6532.33 | 0.9 | 6568.53 | 65 | 6502.6 A | 45-67 | 29.7 |
| C3R | 1541338 | 490472 | 75.0 | 5.0 | 12/5/00 | 37.72 | 6531.57 | 2.0 | 6569.29 | 66 | 6501.3 A | 43-68 | 30.3 |
| C4 | 1541348 | 490675 | 75.0 | 5.0 | 10/2/00 | 39.66 | 6531.18 | 1.3 | 6570.84 | 66 | 6503.5 A | 46-66 | 27.6 |
| C5 | 1541344 | 490869 | 72.0 | 5.0 | 10/17/01 | 36.20 | 6533.65 | 0.8 | 6569.85 | 62 | 6507.1 A | 43-63 | 26.6 |
| C6 | 1541533 | 491142 | 80.8 | 5.0 | 12/5/00 | 61.52 | 6523.37 | 1.6 | 6584.89 | 72 | 6511.3 A | 34-74 | 12.1 |
| C7 | 1541734 | 491280 | 72.4 | 5.0 | 12/5/00 | 62.48 | 6521.96 | 1.5 | 6584.44 | 61 | 6521.9 A | 25-65 | 0.0 |
| C8 | 1541906 | 491415 | 78.1 | 5.0 | 12/5/00 | 53.97 | 6530.52 | 1.6 | 6584.49 | 67 | 6515.9 A | 31-71 | 14.6 |
| C9 | 1542075 | 491545 | 77.0 | 5.0 | 12/5/00 | 66.26 | 6518.29 | 1.5 | 6584.55 | 65 | 6518.1 A | 27-67 | 0.2 |
| C10 | 1542182 | 491629 | 71.6 | 5.0 | 12/5/00 | 65.98 | 6519.28 | 2.7 | 6585.26 | 65 | 6517.6 A | 30-70 | 1.7 |
| C11 | 1542376 | 491844 | 68.2 | 5.0 | 12/5/00 | 43.20 | 6538.18 | 2.4 | 6581.38 | 60 | 6519.0 A | 35-65 | 19.2 |
| C12 | 1542375 | 492029 | 63.5 | 5.0 | 12/5/00 | 41.25 | 6539.30 | 2.6 | 6580.55 | 55 | 6523.0 A | 34-64 | 16.4 |
| C13 | 1541394 | 490655 | 63.0 | 5.0 | 10/29/01 | 37.58 | 6532.43 | 2.0 | 6570.01 | 63 | 6505.0 A | 36-70 | 27.4 |
| C14 | 1541413 | 490713 | 63.0 | 5.0 | 10/29/01 | 37.32 | 6532.37 | 2.0 | 6569.69 | 63 | 6504.7 A | 36-70 | 27.7 |
| * D | 1542127 | 490118 | 89.7 | 4.0 | 7/28/86 | 48.04 | 6524.85 | 0.8 | 6572.89 | 90 | 6482.1 A | 71-91 | 42.8 |
| D1 | 1542140 | 489615 | 89.4 | 4.0 | 5/30/01 | 46.05 | 6524.85 | 1.0 | 6570.90 | 80 | 6489.9 A | 58-90 | 35.0 |
| D2 | 1542641 | 492107 | 70.0 | 5.0 | 11/29/99 | 0.50 | 6579.67 | 3.0 | 6580.17 | 62 | 6515.2 A | 40-70 | 64.5 |
| D3 | 1542646 | 491917 | 80.0 | 5.0 | 11/29/99 | 0.50 | 6579.63 | 2.5 | 6580.13 | 72 | 6505.6 A | 40-80 | 74.0 |
| D4 | 1542652 | 491724 | 78.0 | 5.0 | 11/29/99 | 0.50 | 6578.93 | 2.5 | 6579.43 | 70 | 6506.9 A | 48-78 | 72.0 |
| DA | 1542864 | 489488 | 99.1 | 5.0 | 12/4/97 | 61.40 | 6524.15 | 3.0 | 6585.55 | 90 | 6492.6 A | 50-100 | 31.6 |
| DA2 | 1542881 | 489656 | 82.1 | 5.0 | 1/13/95 | 51.11 | 6536.18 | 2.8 | 6587.29 | 83 | 6501.5 A | 64-74 | 34.7 |
| DA3 | 1542664 | 489390 | 81.0 | 5.0 | --- | --- | --- | 2.6 | 6574.36 | 72 | 6499.8 A | 30-81 | --- |
| DA4 | 1542598 | 489756 | 81.0 | 5.0 | --- | --- | --- | 1.7 | 6573.97 | 71 | 6501.3 A | 31-81 | --- |
| DAA | 1542733 | 492411 | 62.7 | 5.0 | 12/5/00 | 2.00 | 6578.60 | 2.2 | 6580.60 | 54 | 6524.4 A | 30-60 | 54.2 |
| DAB | 1542633 | 492399 | 65.1 | 5.0 | 12/5/00 | 0.50 | 6579.38 | 2.3 | 6579.88 | 56 | 6521.6 A | 30-60 | 57.8 |
| DAC | 1543218 | 492851 | 67.7 | 5.0 | --- | --- | --- | 4.1 | 6620.36 | 45 | 6571.3 A | 20-30 | --- |
| DB | 1542874 | 489842 | 73.2 | 5.0 | 9/8/98 | 66.15 | 6523.33 | 0.5 | 6589.48 | --- | --- A | 55-85 | --- |
| DBR | 1542877 | 489855 | 55.6 | 5.0 | 1/25/95 | 52.19 | 6536.97 | 4.8 | 6589.16 | --- | --- A | - | --- |
| DC | 1543646 | 487060 | 64.1 | 4.0 | 6/4/01 | 44.08 | 6527.23 | 2.7 | 6571.31 | --- | --- A | 45-65 | --- |
| DD | 1546989 | 488943 | 78.5 | 4.0 | 4/6/00 | 57.96 | 6534.63 | 1.9 | 6592.59 | 83 | 6507.7 A | 40-80 | 26.9 |
| DE | 1542877 | 490193 | 70.2 | 5.0 | 10/5/98 | 63.70 | 6527.65 | 0.8 | 6591.35 | 80 | 6510.6 A | 60-90 | 17.1 |
| DF | 1542839 | 490869 | 88.5 | 5.0 | 11/2/98 | 60.75 | 6529.84 | 0.6 | 6590.59 | --- | --- A | 65-95 | --- |

## TABLE 4.1-1 BASIC WELL DATA FOR THE ALLUVIAL HOMESTAKE WELLS

(cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DG | 1542839 | 491157 | 88.9 | 5.0 | 2/14/96 | 61.80 | 6529.98 | 0.4 | 6591.78 | --- | --- A | 65-95 | --- |
| DH | 1542835 | 491365 | 61.7 | 5.0 | 12/24/91 | 52.65 | 6538.69 | 4.8 | 6591.34 | --- | --- A | 65-95 | --- |
| DI | 1542821 | 491788 | 86.1 | 5.0 | 12/9/97 | 57.87 | 6531.75 | 2.3 | 6589.62 | 75 | 6512.3 A | 35-85 | 19.4 |
| DIA | 1542821 | 491793 | --- | 4.0 | 12/23/91 | 50.41 | 6543.22 | 1.4 | 6593.63 | --- | --- A | - | --- |
| DJ | 1542821 | 491793 | 85.7 | 5.0 | 8/24/88 | 46.87 | 6542.69 | 0.7 | 6589.56 | 75 | 6513.9 A | 35-85 | 28.8 |
| DK | 1542799 | 492094 | 65.4 | 5.0 | 12/23/91 | 43.58 | 6542.33 | 0.7 | 6585.91 | 55 | 6530.2 A | 35-55 | 12.1 |
| DL | 1542813 | 492398 | 64.4 | 5.0 | 12/5/00 | 2.00 | 6582.87 | 2.9 | 6584.87 | 55 | 6527.0 A | 35-55 | 55.9 |
| DM | 1542628 | 490035 | 62.8 | 5.0 | 12/14/00 | 52.00 | 6523.08 | 3.0 | 6575.08 | --- | --- A | - | --- |
| DN | 1542776 | 490020 | 66.7 | 4.0 | 12/14/00 | 51.52 | 6525.14 | 3.7 | 6576.66 | --- | --- A | - | --- |
| DNR | 1542779 | 490031 | 79.7 | 4.0 | 12/5/00 | 51.80 | 6525.26 | 3.3 | 6577.06 | --- | --- A | - | --- |
| DO | 1542874 | 490049 | 75.8 | 5.0 | 12/5/00 | 65.20 | 6525.13 | 1.6 | 6590.33 | 75 | 6513.7 A | 65-75 | 11.4 |
| DP | 1542754 | 491012 | 79.8 | 5.0 | 12/7/98 | 51.42 | 6528.29 | 3.5 | 6579.71 | --- | --- A | - | --- |
| DQ | 1542592 | 491006 | 85.3 | 5.0 | 7/23/01 | 47.94 | 6528.49 | 2.2 | 6576.43 | --- | --- A | - | --- |
| DR | 1542884 | 489966 | 87.8 | 5.0 | 12/5/00 | 66.05 | 6524.78 | 2.7 | 6590.83 | 85 | 6503.1 A | 65-85 | 21.6 |
| DS | 1542876 | 490118 | --- | 5.0 | 8/2/99 | 65.22 | 6523.59 | 0.9 | 6588.81 | 77 | 6510.9 A | 62-77 | 12.7 |
| DT | 1542871 | 489293 | 72.3 | 5.0 | 12/5/00 | 59.80 | 6524.01 | 2.7 | 6583.81 | 99 | 6482.1 A | 59-99 | 41.9 |
| DU | 1542879 | 490380 | 84.6 | 5.0 | 7/6/88 | 51.56 | 6539.51 | 1.8 | 6591.07 | 81 | 6508.3 A | 61-81 | 31.2 |
| DV | 1542826 | 490702 | 80.0 | 5.0 | 12/5/00 | 58.45 | 6527.15 | 2.9 | 6585.60 | 77 | 6505.7 A | 60-80 | 21.4 |
| DW | 1542818 | 492029 | 73.4 | 5.0 | 12/5/00 | 2.50 | 6586.16 | 3.6 | 6588.66 | 59 | 6526.1 A | 45-60 | 60.1 |
| DX | 1542838 | 491074 | 90.0 | 6.0 | 8/2/99 | 61.80 | 6530.18 | 1.0 | 6591.98 | 80 | 6511.0 A | 60-90 | 19.2 |
| DY | 1542737 | 492271 | 65.7 | 5.0 | 12/5/00 | 1.50 | 6579.11 | 2.3 | 6580.61 | 56 | 6522.3 A | 15-65 | 56.8 |
| DZ | 1542834 | 491501 | 81.8 | 5.0 | 12/14/00 | 59.92 | 6530.61 | 2.2 | 6590.53 | --- | --- A | - | --- |
| E | 1540553 | 490187 | 61.7 | 4.0 | 12/5/00 | 2.00 | 6566.94 | 1.7 | 6568.94 | 60 | 6507.2 A | 44-64 | 59.7 |
| EE | 1542853 | 490523 | 91.2 | 5.0 | 1/31/95 | 45.26 | 6542.85 | 0.6 | 6588.11 | 80 | 6507.5 A | 50-90 | 35.3 |
| F | 1539908 | 489554 | 63.8 | 4.0 | 7/23/01 | 31.80 | 6533.02 | 1.2 | 6564.82 | 62 | 6501.6 A | 45-65 | 31.4 |
| FB | 1540417 | 488857 | 62.0 | 4.0 | 10/9/01 | 35.10 | 6530.56 | 2.0 | 6565.66 | 58 | 6505.7 A | 43-58 | 24.9 |
| * FF | 1542878 | 490017 | --- | 4.0 | 6/21/83 | 41.08 | 6535.46 | 0.2 | 6576.54 | 124 | 6452.3 A | 52-132 | 83.1 |
| G | 1538672 | 488890 | 78.3 | 4.0 | 4/3/00 | 4.00 | 6559.09 | 2.0 | 6563.09 | 75 | 6486.1 A | 50-80 | 73.0 |
| GA | 1538657 | 489255 | --- | 4.0 | 4/3/00 | 4.00 | 6558.79 | 1.8 | 6562.79 | 62 | 6499.0 A | 45-65 | 59.8 |
| GB | 1538654 | 489456 | 65.2 | 4.0 | 4/3/00 | 4.00 | 6558.99 | 1.9 | 6562.99 | 64 | 6497.1 A | 45-65 | 61.9 |
| GC | 1538650 | 489654 | --- | 4.0 | 4/3/00 | 4.00 | 6561.17 | 2.5 | 6565.17 | 78 | 6484.7 A | 60-80 | 76.5 |
| GD | 1538646 | 489855 | --- | 4.0 | 12/4/95 | 0.50 | 6565.12 | 1.8 | 6565.62 | 72 | 6491.8 A | 55-75 | 73.3 |
| GE | 1538637 | 489972 | 117.0 | 4.0 | 4/3/00 | 4.00 | 6562.27 | 2.4 | 6566.27 | 65 | 6498.9 A | 50-120 | 63.4 |
| GF | 1538632 | 490097 | 119.2 | 4.0 | 4/3/00 | 4.00 | 6562.01 | 1.8 | 6566.01 | 67 | 6497.2 A | 50-120 | 64.8 |
| GG | 1538662 | 489055 | 58.7 | 4.0 | 4/3/00 | 4.00 | 6559.13 | 1.8 | 6563.13 | 57 | 6504.3 A | 48-68 | 54.8 |
| GH | 1538807 | 489509 | 69.2 | 4.0 | 3/12/01 | 32.22 | 6530.54 | 1.3 | 6562.76 | 67 | 6494.5 A | 55-65 | 36.1 |

## TABLE 4.1-1 BASIC WELL DATA FOR THE ALLUVIAL HOMESTAKE WELLS (cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GI | 1538631 | 490218 | 119.0 | 4.0 | 4/3/00 | 4.00 | 6561.85 | 1.5 | 6565.85 | 67 | 6497.4 A | 50-120 | 64.5 |
| GJ | 1538629 | 490382 | 119.2 | 4.0 | 4/3/00 | 4.00 | 6562.15 | 2.0 | 6566.15 | 65 | 6499.2 A | 50-120 | 63.0 |
| GK | 1538622 | 490482 | 115.7 | 4.0 | 4/3/00 | 4.00 | 6562.76 | 2.4 | 6566.76 | 67 | 6497.4 A | 50-120 | 65.4 |
| GL | 1538614 | 490701 | 119.3 | 4.0 | 4/3/00 | 4.00 | 6563.15 | 2.1 | 6567.15 | 71 | 6494.1 A | 50-120 | 69.1 |
| GM | 1538605 | 490824 | 118.2 | 4.0 | 4/3/00 | 4.00 | 6563.65 | 2.1 | 6567.65 | 69 | 6496.6 A | 50-120 | 67.1 |
| GN | 1538602 | 490944 | 116.5 | 4.0 | 4/3/00 | 4.00 | 6563.97 | 1.8 | 6567.97 | 70 | 6496.2 A | 50-120 | 67.8 |
| GO | 1538663 | 488973 | 122.3 | 4.0 | 4/3/00 | 4.00 | 6559.00 | 1.6 | 6563.00 | 75 | 6486.4 A | 50-120 | 72.6 |
| GP | 1538649 | 489752 | 121.4 | 4.0 | 12/5/00 | 5.00 | 6559.87 | 2.1 | 6564.87 | 68 | 6494.8 A | 50-120 | 65.1 |
| GQ | 1538599 | 491067 | 70.0 | 4.0 | 12/23/91 | 41.17 | 6526.99 | 0.9 | 6568.16 | 71 | 6496.3 A | 50-70 | 30.7 |
| GR | 1538619 | 490619 | --- | 4.0 | 12/23/91 | 36.55 | 6528.66 | 1.0 | 6565.21 | 75 | 6489.2 A | 50-85 | 39.5 |
| GS | 1538597 | 491408 | 86.4 | 5.0 | 12/5/00 | 33.00 | 6541.31 | 2.0 | 6574.31 | 80 | 6492.3 A | 50-85 | 49.0 |
| GT | 1538534 | 491565 | 84.0 | 5.0 | 12/5/00 | 8.30 | 6567.87 | 2.1 | 6576.17 | 76 | 6498.1 A | 60-84 | 69.8 |
| GU | 1538367 | 491854 | 80.0 | 5.0 | 12/5/00 | 5.00 | 6570.65 | 2.0 | 6575.65 | 73 | 6500.7 A | 60-80 | 70.0 |
| GV | 1537701 | 491428 | 83.0 | 5.0 | 9/24/01 | 50.08 | 6527.30 | 2.5 | 6577.38 | 74 | 6500.9 A | 62-82 | 26.4 |
| GW1 | 1539755 | 490530 | 73.0 | 5.0 | 5/4/93 | 34.17 | 6531.10 | 1.0 | 6565.27 | 65 | 6499.3 A | 48-73 | 31.8 |
| GW2 | 1539471 | 490497 | 75.0 | 5.0 | 5/4/93 | 34.47 | 6531.61 | 1.0 | 6566.08 | 68 | 6497.1 A | 47-75 | 34.5 |
| GW3 | 1539532 | 490835 | 72.0 | 5.0 | 5/4/93 | 34.42 | 6531.86 | 1.0 | 6566.28 | 62 | 6503.3 A | 45-72 | 28.6 |
| H | 1538703 | 490582 | 69.3 | 4.0 | 12/23/91 | 37.93 | 6528.65 | 1.8 | 6566.58 | 69 | 6495.8 A | 50-70 | 32.9 |
| I | 1539319 | 490954 | 70.0 | 4.0 | 5/30/01 | 32.18 | 6535.02 | 1.6 | 6567.20 | 68 | 6497.6 A | 52-72 | 37.4 |
| J | 1540174 | 491302 | 65.6 | 4.0 | 12/5/00 | 6.00 | 6564.19 | 3.4 | 6570.19 | 56 | 6510.8 A | 46-68 | 53.4 |
| J1 | 1540082 | 491585 | 57.0 | 6.0 | 12/5/00 | 18.80 | 6553.05 | 3.8 | 6571.85 | 55 | 6513.1 A | 50-57 | 40.0 |
| J2 | 1540271 | 491013 | 58.0 | 6.0 | 12/5/00 | 26.00 | 6544.19 | 2.9 | 6570.19 | 55 | 6512.3 A | 50-58 | 31.9 |
| J3 | 1540414 | 490499 | 70.0 | 6.0 | 12/5/00 | 27.40 | 6541.74 | 2.6 | 6569.14 | 66 | 6500.5 A | 43-70 | 41.2 |
| J4 | 1540643 | 489974 | 80.0 | 6.0 | 12/5/00 | 18.00 | 6551.52 | 3.9 | 6569.52 | 68 | 6497.6 A | 40-70 | 53.9 |
| J5 | 1540728 | 489747 | 65.0 | 6.0 | 12/5/00 | 10.55 | 6559.24 | 2.8 | 6569.79 | 61 | 6506.0 A | 50-65 | 53.2 |
| J6 | 1540919 | 489221 | 67.0 | 6.0 | 12/5/00 | 7.10 | 6563.00 | 3.7 | 6570.10 | 65 | 6501.4 A | 48-67 | 61.6 |
| J7 | 1540168 | 491892 | 61.9 | 5.0 | 12/5/00 | 19.50 | 6550.88 | 2.1 | 6570.38 | 53 | 6515.3 A | 40-60 | 35.6 |
| J8 | 1540318 | 492064 | 63.2 | 5.0 | 12/5/00 | 23.30 | 6547.49 | 2.4 | 6570.79 | 52 | 6516.4 A | 35-61 | 31.1 |
| J9 | 1540101 | 491759 | 68.0 | 5.0 | 12/5/00 | 24.60 | 6546.60 | 2.0 | 6571.20 | 58 | 6511.2 A | 36-68 | 35.4 |
| J10 | 1540138 | 491436 | 66.0 | 5.0 | 12/5/00 | 18.00 | 6552.91 | 3.5 | 6570.91 | 36 | 6531.4 A | 66- | 21.5 |
| J11 | 1540545 | 490909 | 66.0 | 5.0 | 12/5/00 | 12.00 | 6557.86 | 2.0 | 6569.86 | 55 | 6512.9 A | 36-66 | 45.0 |
| J12 | 1540827 | 490466 | 70.0 | 5.0 | 12/5/00 | 18.44 | 6551.86 | 3.0 | 6570.30 | 60 | 6507.3 A | 40-70 | 44.6 |
| J13 | 1540451 | 492218 | 55.0 | 5.0 | --- | --- | --- | 1.8 | 6568.40 | 46 | 6520.6 A | 15-55 | --- |
| J14 | 1540585 | 492367 | 55.0 | 5.0 | --- | --- | --- | 1.7 | 6568.98 | 44 | 6523.3 A | 15-55 | --- |
| J15 | 1540719 | 492521 | 55.0 | 4.0 | --- | --- | --- | 2.2 | 6569.63 | 46 | 6521.4 A | 15-55 | --- |
| JC | 1540215 | 491240 | 60.0 | 5.0 | 12/5/00 | 22.10 | 6546.34 | 1.8 | 6568.44 | 50 | 6516.6 A | 35-55 | 29.7 |

## TABLE 4.1-1 BASIC WELL DATA FOR THE ALLUVIAL HOMESTAKE WELLS (cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K | 1540730 | 491590 | 61.7 | 4.0 | 10/31/97 | 45.96 | 6527.55 | 3.8 | 6573.51 | 60 | 6509.7 A | 44-64 | 17.8 |
| K2 | 1540736 | 491587 | 58.9 | 4.0 | 9/19/01 | 27.41 | 6544.80 | 2.5 | 6572.21 | 58 | 6511.7 A | 46-56 | 33.1 |
| K3 | 1540744 | 491571 | 56.7 | 2.0 | 10/31/97 | 43.44 | 6527.23 | 1.3 | 6570.67 | --- | --- A | 53-58 | --- |
| K4 | 1541211 | 492371 | 86.2 | 5.0 | 10/24/01 | 76.95 | 6525.07 | 2.5 | 6602.02 | 80 | 6519.5 A | 65-85 | 5.6 |
| K5 | 1541269 | 491935 | 86.4 | 5.0 | 10/24/01 | 82.53 | 6519.20 | 2.8 | 6601.73 | 80 | 6518.9 A | 55-85 | 0.3 |
| K6 | 1540689 | 491459 | 58.0 | 5.0 | 12/5/00 | 18.00 | 6552.07 | 2.0 | 6570.07 | --- | --- A | 33-58 | --- |
| K7 | 1541232 | 492237 | 86.0 | 5.0 | 10/24/01 | 56.57 | 6544.96 | 2.0 | 6601.53 | 79 | 6520.5 A | 56-86 | 24.4 |
| K8 | 1541250 | 492081 | 86.0 | 1.0 | 10/24/01 | 81.73 | 6518.76 | 2.0 | 6600.49 | 78 | 6520.5 A | 66-86 | 0.0 |
| K9 | 1541287 | 491787 | 86.0 | 5.0 | 7/26/01 | 68.54 | 6531.80 | 2.0 | 6600.34 | 79 | 6519.3 A | 56-86 | 12.5 |
| K10 | 1541305 | 491638 | 87.0 | 5.0 | 7/26/01 | 83.70 | 6517.11 | 2.0 | 6600.81 | 81 | 6517.8 A | 47-87 | 0.0 |
| K11 | 1541325 | 491490 | 84.0 | 5.0 | 7/26/01 | 64.45 | 6536.16 | 2.0 | 6600.61 | 78 | 6520.6 A | 64-84 | 15.6 |
| KA | 1540959 | 491331 | 67.8 | 5.0 | 10/18/01 | 32.18 | 6540.01 | 1.9 | 6572.19 | 65 | 6505.3 A | 42-72 | 34.7 |
| KB | 1540893 | 491406 | 61.8 | 5.0 | 9/19/01 | 30.58 | 6541.07 | 0.8 | 6571.65 | 60 | 6510.9 A | 40-70 | 30.2 |
| KC | 1540826 | 491477 | 68.6 | 5.0 | 12/13/01 | 25.92 | 6544.39 | 0.7 | 6570.31 | 59 | 6510.6 A | 42-72 | 33.8 |
| KD | 1540627 | 491701 | 62.1 | 5.0 | 4/16/01 | 25.04 | 6545.18 | 0.6 | 6570.22 | --- | --- A | 40-70 | --- |
| KE | 1540566 | 491776 | 60.8 | 5.0 | 1/22/01 | 25.78 | 6546.50 | 2.5 | 6572.28 | --- | --- A | 40-70 | --- |
| KEB | 1540570 | 491487 | 59.9 | 5.0 | 9/19/01 | 25.00 | 6544.73 | 1.5 | 6569.73 | 50 | 6518.2 A | 40-60 | 26.5 |
| KF | 1540870 | 491169 | 63.5 | 5.0 | 3/12/02 | 24.04 | 6546.17 | 2.2 | 6570.21 | 50 | 6518.0 A | 30-60 | 28.2 |
| KM | 1540671 | 491444 | 52.4 | 5.0 | 12/5/00 | 19.00 | 6550.77 | 2.2 | 6569.77 | --- | --- A | - | --- |
| KN | 1540734 | 491492 | 50.1 | 5.0 | 9/19/01 | 26.72 | 6542.87 | 2.3 | 6569.59 | --- | --- A | - | --- |
| KZ | 1541100 | 491183 | 58.4 | 5.0 | 3/12/02 | 27.71 | 6544.01 | 1.2 | 6571.72 | --- | --- A | - | --- |
| L | 1538970 | 492150 | 67.0 | 4.0 | 4/17/01 | 42.98 | 6531.99 | 0.8 | 6574.97 | 59 | 6515.2 A | 46-66 | 16.8 |
| L5 | 1539946 | 492730 | 60.2 | 5.0 | 9/17/01 | 50.10 | 6525.97 | 1.3 | 6576.07 | 50 | 6524.8 A | 25-55 | 1.2 |
| L6 | 1540526 | 493110 | 51.1 | 5.0 | 9/21/01 | 27.21 | 6547.43 | 2.1 | 6574.64 | 50 | 6522.5 A | 25-55 | 24.9 |
| L7 | 1540113 | 492842 | 67.8 | 5.0 | 9/17/01 | 50.30 | 6526.31 | 2.3 | 6576.61 | 62 | 6512.3 A | 36-66 | 14.0 |
| L8 | 1539773 | 492621 | 73.9 | 5.0 | 9/17/01 | 55.00 | 6521.49 | 2.1 | 6576.49 | 65 | 6509.4 A | 32-72 | 12.1 |
| L9 | 1539509 | 492463 | 74.9 | 5.0 | 9/17/01 | 52.77 | 6524.46 | 2.2 | 6577.23 | 64 | 6511.0 A | 43-73 | 13.4 |
| L10 | 1539250 | 492310 | 74.2 | 5.0 | 9/17/01 | 52.63 | 6524.20 | 2.0 | 6576.83 | 63 | 6511.8 A | 53-73 | 12.4 |
| M1 | 1542797 | 489157 | 103.4 | 4.0 | 1/3/89 | 79.80 | 6505.17 | 1.5 | 6584.97 | 120 | 6463.5 A | 66-106 | 41.7 |
| M2 | 1542785 | 489159 | 40.4 | 4.0 | 1/20/95 | 34.85 | 6541.41 | 1.4 | 6576.26 | --- | --- A | - | --- |
| M3 | 1542805 | 489151 | 105.3 | 4.0 | 5/1/00 | 60.52 | 6515.58 | 1.0 | 6576.10 | --- | --- A | 79-99 | --- |
| M4 | 1542804 | 489134 | 81.8 | 5.0 | 10/31/00 | 56.72 | 6521.54 | 3.7 | 6578.26 | --- | --- A | 78-82 | --- |
| M5 | 1542360 | 489080 | 92.3 | 5.0 | 8/14/01 | 49.16 | 6526.18 | 3.2 | 6575.34 | 84 | 6488.1 A | 60-90 | 38.0 |
| M6 | 1543097 | 486674 | 110.0 | 5.0 | 9/5/00 | 2.16 | 6572.88 | 2.2 | 6575.04 | 65 | 6507.9 A | 60-110 | 65.0 |
| M7 | 1542790 | 486523 | 83.0 | 5.0 | 9/5/00 | 3.28 | 6569.57 | 2.4 | 6572.85 | 71 | 6499.4 A | 63-83 | 70.1 |
| M8 | 1542960 | 486567 | 83.0 | 5.0 | 9/5/00 | 33.71 | 6541.52 | 2.4 | 6575.23 | 57 | 6515.8 A | 53-83 | 25.7 |

## TABLE 4.1-1 BASIC WELL DATA FOR THE ALLUVIAL HOMESTAKE WELLS (cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| M9 | 1543310 | 486699 | 103.0 | 5.0 | 9/5/00 | 37.10 | 6539.71 | 3.2 | 6576.81 | 78 | 6495.6 A | 63-103 | 44.1 |
| M10 | 1543677 | 486723 | 88.0 | 5.0 | 9/5/00 | 52.55 | 6520.81 | 2.4 | 6573.36 | 86 | 6485.0 A | 58-88 | 35.9 |
| M11 | 1542358 | 486486 | 118.0 | 5.0 | 9/5/00 | 48.72 | 6524.50 | 3.0 | 6573.22 | 109 | 6461.2 A | 58-118 | 63.3 |
| M12 | 1542174 | 487209 | 124.0 | 5.0 | 12/5/00 | 3.87 | 6569.64 | 2.5 | 6573.51 | 118 | 6453.0 A | 57-124 | 116.7 |
| M13 | 1542450 | 487336 | 117.0 | 5.0 | 12/5/00 | 29.81 | 6546.35 | 3.0 | 6576.16 | 108 | 6465.2 A | 57-117 | 81.2 |
| M14 | 1542661 | 487216 | 117.0 | 5.0 | 12/5/00 | 29.42 | 6547.75 | 2.7 | 6577.17 | 109 | 6465.5 A | 57-117 | 82.3 |
| M15 | 1542872 | 487094 | 102.0 | 5.0 | 12/5/00 | 3.71 | 6575.37 | 3.5 | 6579.08 | 93 | 6482.6 A | 52-102 | 92.7 |
| MA | 1541290 | 487767 | 85.0 | 4.0 | 10/2/00 | 39.30 | 6532.92 | 1.0 | 6572.22 | 85 | 6486.2 A | 70-85 | 46.7 |
| MB | 1541296 | 487512 | 90.0 | 4.0 | 9/5/00 | 2.05 | 6570.01 | 1.0 | 6572.06 | 85 | 6486.1 A | 60-90 | 84.0 |
| MC | 1541304 | 487264 | 100.0 | 4.0 | 9/5/00 | 2.12 | 6569.94 | 1.0 | 6572.06 | 95 | 6476.1 A | 70-100 | 93.9 |
| MD | 1541311 | 487050 | 105.0 | 4.0 | 9/5/00 | 2.00 | 6569.46 | 1.0 | 6571.46 | 105 | 6465.5 A | 75-105 | 104.0 |
| ME | 1541537 | 486934 | 105.0 | 4.0 | 9/5/00 | 1.61 | 6569.31 | 1.0 | 6570.92 | 105 | 6464.9 A | 75-105 | 104.4 |
| MF | 1541757 | 486808 | 110.0 | 4.0 | 9/5/00 | 2.22 | 6570.06 | 1.0 | 6572.28 | 110 | 6461.3 A | 90-110 | 108.8 |
| MG | 1541972 | 486694 | 110.0 | 4.0 | 9/5/00 | 1.72 | 6571.36 | 1.0 | 6573.08 | 110 | 6462.1 A | 90-110 | 109.3 |
| MH | 1542208 | 486569 | 110.0 | 4.0 | 9/5/00 | 2.13 | 6571.79 | 1.0 | 6573.92 | 110 | 6462.9 A | 90-110 | 108.9 |
| MI | 1542486 | 486413 | 110.0 | 4.0 | 9/5/00 | 2.24 | 6574.03 | 1.0 | 6576.27 | 110 | 6465.3 A | 90-110 | 108.8 |
| MJ | 1542682 | 486350 | 60.0 | 4.0 | 9/5/00 | 47.12 | 6525.82 | 1.8 | 6572.94 | 60 | 6511.1 A | 40-60 | 14.7 |
| MK | 1543373 | 486324 | 57.0 | 4.5 | 9/5/00 | 25.62 | 6548.17 | 1.5 | 6573.79 | 92 | 6480.3 A | - | 67.9 |
| ML | 1543902 | 486691 | 76.0 | 5.0 | 9/5/00 | 3.46 | 6569.24 | 2.3 | 6572.70 | 80 | 6490.4 A | 56-76 | 78.9 |
| MM | 1544154 | 486324 | 63.0 | 5.0 | 9/5/00 | 3.46 | 6573.99 | 2.4 | 6577.45 | 50 | 6525.1 A | 33-63 | 48.9 |
| MN | 1544613 | 486325 | 63.0 | 5.0 | 12/18/96 | 64.15 | 6513.41 | 1.9 | 6577.56 | 42 | 6533.7 A | 23-63 | 0.0 |
| MO | 1543620 | 485518 | 88.0 | 4.5 | 10/9/01 | 64.38 | 6508.51 | 2.0 | 6572.89 | 80 | 6490.9 A | 45-85 | 17.6 |
| MP | 1544164 | 485492 | 80.0 | 5.0 | 12/18/96 | 62.66 | 6511.82 | 2.1 | 6574.48 | 50 | 6522.4 A | 33-63 | 0.0 |
| MQ | 1543173 | 486326 | 98.0 | 5.0 | 10/22/01 | 65.04 | 6509.26 | 1.6 | 6574.30 | 88 | 6484.7 A | 58-98 | 24.6 |
| MR | 1542609 | 483574 | 100.0 | 5.0 | 10/22/01 | 68.58 | 6497.68 | 1.8 | 6566.26 | 100 | 6464.5 A | 54-94 | 33.2 |
| MS | 1542607 | 485570 | 82.0 | 5.0 | 10/22/01 | 62.00 | 6508.67 | 1.5 | 6570.67 | 89 | 6480.2 A | 52-82 | 28.5 |
| MT | 1543221 | 483531 | 98.0 | 4.5 | 10/22/01 | 68.40 | 6499.03 | 2.3 | 6567.43 | 87 | 6478.1 A | 34-94 | 20.9 |
| MU | 1544461 | 487143 | 80.0 | 5.0 | 10/22/01 | 44.19 | 6530.00 | 1.5 | 6574.19 | 72 | 6500.7 A | 50-80 | 29.3 |
| MV | 1542618 | 484418 | 105.0 | 4.5 | 10/22/98 | 65.97 | 6503.81 | 1.3 | 6569.78 | 95 | 6473.5 A | 75-105 | 30.3 |
| MW | 1543802 | 486346 | 85.0 | 5.0 | 9/5/00 | 3.09 | 6571.82 | 1.9 | 6574.91 | 83 | 6490.0 A | 35-85 | 81.8 |
| MX | 1541287 | 486244 | 103.0 | 5.0 | 10/18/01 | 52.07 | 6516.54 | 1.7 | 6568.61 | 94 | 6472.9 A | 63-103 | 43.6 |
| MY | 1542200 | 486213 | 112.0 | 5.0 | 10/18/01 | 58.07 | 6515.49 | 3.0 | 6573.56 | 102 | 6468.6 A | 72-112 | 46.9 |
| MZ | 1543485 | 486757 | 92.0 | 5.0 | 9/5/00 | 22.61 | 6554.03 | 0.0 | 6576.64 | 84 | 6492.6 A | 60-92 | 61.4 |
| N | 1545101 | 489665 | 92.0 | 4.0 | 8/29/01 | 53.41 | 6530.56 | 0.9 | 6583.97 | 80 | 6503.1 A | 54-94 | 27.5 |
| NA | 1545000 | 491488 | 91.4 | 5.0 | 9/9/01 | 57.75 | 6533.23 | 1.1 | 6590.98 | 80 | 6509.9 A | 50-90 | 23.4 |
| NB | 1545000 | 491296 | 96.4 | 5.0 | 9/10/01 | 50.48 | 6542.82 | 3.5 | 6593.30 | 80 | 6509.8 A | 50-90 | 33.0 |

## TABLE 4.1-1 BASIC WELL DATA FOR THE ALLUVIAL HOMESTAKE WELLS (cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NC | 1545220 | 491282 | 95.0 | 4.0 | 8/29/01 | 53.21 | 6532.62 | 0.8 | 6585.83 | 85 | 6500.0 A | 65-95 | 32.6 |
| ND | 1545927 | 494872 | 70.0 | 4.0 | 8/2/00 | 47.67 | 6545.22 | 1.1 | 6592.89 | 65 | 6526.8 A | 50-70 | 18.4 |
| NE5 | 1544279 | 492332 | 156.8 | 5.0 | 2/15/01 | 93.90 | 6573.10 | 3.2 | 6667.00 | 150 | --- T | 50-110 | --- |
| | | | | | | | | | | 150 | 6513.8 A | 135-155 | 59.3 |
| NW5 | 1544408 | 489433 | 149.8 | 5.0 | 2/20/01 | 128.60 | 6528.98 | 2.7 | 6657.58 | 155 | --- T | 39-79 | --- |
| | | | | | | | | | | 155 | 6499.9 A | 119-159 | 29.1 |
| O | 1545060 | 492725 | 69.9 | 4.0 | 8/29/01 | 48.86 | 6538.97 | 1.3 | 6587.83 | 77 | 6509.5 A | 40-70 | 29.4 |
| P | 1546691 | 491058 | 109.1 | 4.0 | 7/23/01 | 56.57 | 6530.69 | 1.7 | 6587.26 | 107 | 6478.6 A | 82-112 | 52.1 |
| P1 | 1547017 | 491060 | 105.0 | 6.0 | 11/28/00 | 55.75 | 6536.72 | 0.8 | 6592.47 | 105 | 6486.7 A | 60-105 | 50.1 |
| P2 | 1546555 | 490912 | 105.0 | 6.0 | 12/4/00 | 61.41 | 6528.38 | 0.9 | 6589.79 | 105 | 6483.9 A | 60-105 | 44.5 |
| P3 | 1546159 | 490785 | 95.0 | 5.0 | 3/8/01 | 66.91 | 6523.04 | 2.2 | 6589.95 | 85 | 6502.8 A | 55-95 | 20.3 |
| P4 | 1546504 | 491899 | 92.0 | 5.0 | 3/8/01 | 85.77 | 6503.75 | 3.6 | 6589.52 | 84 | 6501.9 A | 52-92 | 1.8 |
| PM | 1541426 | 490292 | 81.9 | 4.0 | 8/14/01 | 36.14 | 6531.28 | 1.8 | 6567.42 | --- | --- A | - | --- |
| Q | 1548693 | 492153 | 98.3 | 4.0 | 3/14/00 | 50.11 | 6543.71 | 2.3 | 6593.82 | 100 | 6491.5 A | 72-102 | 52.2 |
| R | 1550372 | 494514 | 85.0 | 4.0 | 5/11/00 | 43.51 | 6560.52 | 0.3 | 6604.03 | 95 | 6508.7 A | 60-90 | 51.8 |
| S | 1543871 | 488816 | 72.2 | 4.0 | 5/10/01 | 55.61 | 6525.56 | 2.0 | 6581.17 | 75 | 6504.2 A | 52-72 | 21.4 |
| S1 | 1543288 | 488401 | 85.0 | 2.0 | 3/12/02 | 51.46 | 6523.73 | 5.3 | 6575.19 | 85 | 6484.9 A | 60-85 | 38.8 |
| S2 | 1543127 | 488299 | 100.0 | 3.0 | 3/12/02 | 48.99 | 6524.73 | 2.0 | 6573.72 | 100 | 6471.7 A | 90-100 | 53.0 |
| S3 | 1542857 | 488714 | 122.6 | 5.0 | 7/23/01 | 50.50 | 6524.28 | 6.2 | 6574.78 | 116 | 6452.6 A | 80-120 | 71.7 |
| S4 | 1543344 | 488359 | 112.4 | 5.0 | 7/23/01 | 51.00 | 6524.29 | 2.3 | 6575.29 | 108 | 6465.0 A | 50-110 | 59.3 |
| S5 | 1543269 | 488923 | 115.0 | 5.0 | 12/5/00 | 60.21 | 6514.48 | 1.0 | 6574.69 | 105 | 6468.7 A | 54-106 | 45.8 |
| S6 | 1543515 | 488874 | 113.2 | 5.0 | 1/3/00 | 55.85 | 6524.22 | 1.3 | 6580.07 | 105 | 6473.8 A | 55-105 | 50.5 |
| S7 | 1543763 | 488874 | 97.0 | 5.0 | 1/4/99 | 57.38 | 6522.51 | 1.0 | 6579.89 | 82 | 6496.9 A | 40-84 | 25.6 |
| S8 | 1543968 | 488879 | 43.8 | 5.0 | 8/22/95 | 43.28 | 6537.06 | 1.0 | 6580.34 | 40 | 6539.3 A | 12-42 | 0.0 |
| S11 | 1544793 | 488150 | 76.2 | 5.0 | 10/17/01 | 51.28 | 6527.11 | 1.9 | 6578.39 | 70 | 6506.5 A | 48-78 | 20.6 |
| S12 | 1543297 | 488628 | 93.0 | 5.0 | 3/19/01 | 56.56 | 6522.29 | 2.1 | 6578.85 | 80 | 6496.7 A | 53-93 | 25.5 |
| SA | 1543122 | 488811 | 123.7 | 5.0 | 12/5/00 | 67.24 | 6513.07 | 1.0 | 6580.31 | 115 | 6464.3 A | 100-130 | 48.8 |
| SB | 1543371 | 488811 | 125.0 | 5.0 | 12/5/00 | 57.43 | 6523.66 | 0.9 | 6581.09 | 115 | 6465.2 A | 100-130 | 58.5 |
| SC | 1543617 | 488815 | 105.4 | 5.0 | 12/5/00 | 57.11 | 6521.69 | 1.2 | 6578.80 | 103 | 6474.6 A | 55-105 | 47.1 |
| SD | 1543490 | 488564 | 90.1 | 5.0 | 12/23/91 | 63.14 | 6515.17 | 0.6 | 6578.31 | 107 | 6470.7 A | 50-110 | 44.5 |
| SD4 | 1543497 | 488556 | 95.0 | 5.0 | 6/1/93 | 61.44 | 6517.33 | 1.1 | 6578.77 | 95 | 6482.7 A | 45-95 | 34.7 |
| SE | 1543301 | 488550 | 111.8 | 5.0 | 3/19/01 | 55.38 | 6522.61 | 0.5 | 6577.99 | 88 | 6489.5 A | 50-90 | 33.1 |
| SE4 | 1543308 | 488560 | 105.3 | 2.0 | 3/19/01 | 53.71 | 6524.29 | --- | 6578.00 | --- | --- A | - | --- |
| SM | 1543748 | 488566 | 86.0 | 5.0 | 12/5/00 | 55.21 | 6523.53 | 0.7 | 6578.74 | --- | --- A | - | --- |
| SN | 1543752 | 488716 | 67.5 | 4.0 | 12/5/00 | 55.48 | 6523.78 | 1.1 | 6579.26 | --- | --- A | - | --- |
| SO | 1543652 | 488381 | 92.3 | 5.0 | 3/12/02 | 54.84 | 6523.95 | 0.6 | 6578.79 | --- | --- A | - | --- |

## TABLE 4.1-1 BASIC WELL DATA FOR THE ALLUVIAL HOMESTAKE WELLS (cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SP | 1543630 | 488531 | 94.4 | 4.0 | 3/12/02 | 55.46 | 6523.20 | 2.0 | 6578.66 | --- | --- A | - | --- |
| SQ | 1543507 | 488814 | 95.0 | 5.0 | 12/5/00 | 55.10 | 6524.10 | 0.9 | 6579.20 | 95 | 6483.3 A | 55-95 | 40.8 |
| SR | 1543611 | 488669 | 95.0 | 5.0 | 11/2/98 | 58.25 | 6520.94 | 0.8 | 6579.19 | 95 | 6483.4 A | 50-90 | 37.6 |
| SS | 1543374 | 488666 | 101.0 | 5.0 | 12/5/00 | 66.88 | 6511.50 | 1.2 | 6578.38 | 90 | 6487.2 A | 51-101 | 24.3 |
| ST | 1543215 | 488688 | 97.0 | 5.0 | 12/5/00 | 57.62 | 6521.69 | 2.2 | 6579.31 | 96 | 6481.1 A | 55-97 | 40.6 |
| * SU | 1542946 | 488953 | 110.0 | 5.0 | 9/5/95 | 35.60 | 6542.50 | 0.7 | 6578.10 | 110 | 6467.4 A | 50-110 | 75.1 |
| SUR | 1542991 | 488968 | 115.0 | 5.0 | --- | --- | --- | 2.6 | 6580.72 | 106 | 6472.1 A | 35-115 | --- |
| SV | 1543676 | 488813 | 78.2 | 6.0 | 7/18/00 | 55.70 | 6523.55 | 1.7 | 6579.25 | 100 | 6477.6 A | 55-105 | 46.0 |
| SW | 1543783 | 488812 | 81.9 | 6.0 | 7/3/94 | 60.70 | 6520.59 | 2.9 | 6581.29 | 75 | 6503.4 A | 35-80 | 17.2 |
| SX | 1544510 | 489025 | 45.0 | 5.0 | --- | --- | --- | 1.0 | 6581.49 | 40 | 6540.5 A | 20-40 | --- |
| SZ | 1544367 | 488833 | 62.6 | 5.0 | 12/5/00 | 49.63 | 6531.84 | 0.4 | 6581.47 | 60 | 6521.1 A | 40-70 | 10.8 |
| T | 1542536 | 492260 | 70.2 | 4.0 | 9/21/01 | 53.00 | 6526.23 | 2.4 | 6579.23 | 68 | 6508.8 A | 61-71 | 17.4 |
| T1 | 1543285 | 490027 | --- | 5.0 | 12/12/86 | 146.13 | 6517.78 | 1.0 | 6663.91 | 161 | 6501.9 A | 121-171 | 15.9 |
| T2 | 1543538 | 489303 | 186.0 | 5.0 | 3/13/01 | 134.88 | 6529.94 | 5.0 | 6664.82 | 180 | 6479.8 A | 100-186 | 50.1 |
| TA | 1542471 | 492426 | 62.4 | 5.0 | 9/21/01 | 34.90 | 6545.40 | 2.4 | 6580.30 | 55 | 6522.9 A | 35-65 | 22.5 |
| TB | 1542351 | 492616 | 64.4 | 5.0 | 9/19/01 | 31.55 | 6552.02 | 1.9 | 6583.57 | 55 | 6526.7 A | 35-65 | 25.4 |
| W | 1542302 | 487297 | 99.3 | 4.0 | 10/17/01 | 46.90 | 6525.24 | 0.3 | 6572.14 | 117 | 6454.8 A | 58-118 | 70.4 |
| W2 | 1542251 | 486654 | 79.1 | 4.0 | 3/2/98 | 56.21 | 6515.29 | 0.9 | 6571.50 | --- | --- A | - | --- |
| WN4 | 1543958 | 489961 | 142.4 | 5.0 | 2/20/01 | 124.40 | 6538.38 | 2.7 | 6662.78 | 165 | --- T | 40-100 | --- |
| | | | | | | | | | | 165 | 6495.1 A | 50-190 | 43.3 |
| WR1 | 1541280 | 488529 | --- | 5.0 | 6/27/89 | 46.54 | 6521.86 | 0.8 | 6568.40 | --- | --- A | - | --- |
| WR1R | 1541302 | 488536 | 85.0 | 5.0 | 12/5/00 | 28.62 | 6539.85 | 0.0 | 6568.47 | 85 | 6483.5 A | - | 56.4 |
| WR2 | 1541290 | 488678 | 94.1 | 5.0 | 12/5/00 | 2.52 | 6566.07 | 0.9 | 6568.59 | 85 | 6482.7 A | 65-95 | 83.4 |
| WR3 | 1541490 | 488671 | 82.3 | 5.0 | 12/5/00 | 32.96 | 6536.58 | 2.7 | 6569.54 | 83 | 6483.8 A | 63-93 | 52.7 |
| WR4 | 1541788 | 488678 | 62.0 | 5.0 | 12/5/00 | 1.92 | 6570.89 | 0.0 | 6572.81 | --- | --- A | - | --- |
| WR5 | 1541813 | 488683 | 72.4 | 5.0 | 12/5/00 | 38.69 | 6532.54 | 0.6 | 6571.23 | 80 | 6490.6 A | 60-80 | 41.9 |
| WR6 | 1541902 | 488566 | 96.8 | 5.0 | 12/5/00 | 3.04 | 6569.99 | 1.3 | 6573.03 | 84 | 6487.7 A | 55-85 | 82.3 |
| WR7 | 1541997 | 488456 | 97.3 | 5.0 | 12/5/00 | 38.91 | 6534.82 | 2.0 | 6573.73 | 84 | 6487.8 A | 55-85 | 47.0 |
| WR8 | 1542095 | 488328 | 110.2 | 5.0 | 12/5/00 | 38.72 | 6533.88 | 0.4 | 6572.60 | 100 | 6472.2 A | 50-100 | 61.7 |
| WR9 | 1542185 | 488217 | 111.3 | 5.0 | 12/5/00 | 46.82 | 6526.23 | 0.8 | 6573.05 | 100 | 6472.3 A | 50-100 | 54.0 |
| WR10 | 1542389 | 487961 | 120.6 | 5.0 | 12/5/00 | 48.52 | 6524.67 | 0.7 | 6573.19 | 110 | 6462.5 A | 60-110 | 62.2 |
| WR11 | 1542586 | 487728 | 120.5 | 5.0 | 12/5/00 | 48.29 | 6526.20 | 0.3 | 6574.49 | 110 | 6464.2 A | 60-110 | 62.0 |
| WR12 | 1541280 | 488277 | 96.7 | 4.0 | 10/2/00 | 12.70 | 6555.49 | 1.1 | 6568.19 | 85 | 6482.1 A | 55-85 | 73.4 |
| WR13 | 1541068 | 488861 | 70.0 | 5.0 | 12/5/00 | 18.98 | 6550.19 | 3.2 | 6569.17 | 60 | 6506.0 A | 50-60 | 44.2 |
| WR14 | 1540638 | 488863 | 70.0 | 5.0 | 12/5/00 | 17.75 | 6549.16 | 2.3 | 6566.91 | 61 | 6503.6 A | 50-60 | 45.6 |
| WR15 | 1541280 | 488016 | 70.0 | 4.0 | 10/2/00 | 2.20 | 6568.99 | 0.0 | 6571.19 | 75 | 6496.2 A | 60-75 | 72.8 |

## TABLE 4.1-1 BASIC WELL DATA FOR THE ALLUVIAL HOMESTAKE WELLS

(cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WR16 | 1543051 | 487495 | 122.3 | 5.0 | 12/5/00 | 44.22 | 6528.56 | 1.9 | 6572.78 | 100 | 6470.9 A | 40-120 | 57.7 |
| WR17 | 1543328 | 487485 | 124.4 | 5.0 | 12/5/00 | 4.71 | 6568.38 | 2.2 | 6573.09 | 75 | 6495.9 A | 40-120 | 72.5 |
| WR18 | 1543597 | 487465 | 73.6 | 5.0 | 12/5/00 | 2.43 | 6570.48 | 2.2 | 6572.91 | 70 | 6500.7 A | 20-70 | 69.8 |
| WR19 | 1543873 | 487458 | 87.8 | 5.0 | 12/5/00 | 3.91 | 6571.02 | 2.2 | 6574.93 | 74 | 6498.7 A | 25-85 | 72.3 |
| WR20 | 1544059 | 487449 | 102.3 | 5.0 | 12/5/00 | 8.26 | 6566.21 | 2.1 | 6574.47 | 80 | 6492.4 A | 42-102 | 73.8 |
| WR21 | 1544241 | 487449 | 88.9 | 5.0 | 12/5/00 | 24.00 | 6552.05 | 2.1 | 6576.05 | 77 | 6497.0 A | 28-88 | 55.1 |
| WR22 | 1544434 | 487462 | 91.5 | 5.0 | 12/5/00 | 35.65 | 6542.24 | 2.4 | 6577.89 | 86 | 6489.5 A | 30-90 | 52.7 |
| WR23 | 1544632 | 487445 | 94.3 | 5.0 | 12/5/00 | 3.30 | 6573.17 | 2.2 | 6576.47 | 77 | 6497.3 A | 32-92 | 75.9 |
| WR24 | 1544938 | 487438 | 89.2 | 5.0 | 12/5/00 | 32.00 | 6556.67 | 3.0 | 6588.67 | 82 | 6503.7 A | 50-90 | 53.0 |
| X | 1540512 | 491892 | 50.7 | 4.0 | 10/10/01 | 21.98 | 6549.63 | 1.7 | 6571.61 | --- | ---A | - | --- |
| X1 | 1540671 | 492129 | 54.0 | 5.0 | 12/5/00 | 8.45 | 6565.09 | 3.9 | 6573.54 | 47 | 6522.6 A | 37-47 | 42.5 |
| X2 | 1540836 | 492363 | 53.0 | 6.0 | 12/5/00 | 10.13 | 6561.80 | 1.9 | 6571.93 | 45 | 6525.0 A | 40-45 | 36.8 |
| X3 | 1540992 | 492599 | 52.0 | 5.0 | 12/5/00 | 6.00 | 6567.28 | 2.0 | 6573.28 | 42 | 6529.3 A | 32-42 | 38.0 |
| X4 | 1541210 | 492814 | 54.0 | 5.0 | 12/5/00 | 21.70 | 6555.24 | 3.2 | 6576.94 | 45 | 6528.7 A | 37-45 | 26.5 |
| X5 | 1541408 | 492821 | 44.0 | 6.0 | 12/5/00 | 16.40 | 6561.21 | 3.6 | 6577.61 | 35 | 6539.0 A | 24-36 | 22.2 |
| X6 | 1541609 | 492828 | 46.0 | 6.0 | 12/5/00 | 9.10 | 6569.62 | 3.5 | 6578.72 | 35 | 6540.2 A | 22-37 | 29.4 |
| X7 | 1541808 | 492851 | 56.0 | 6.0 | 12/5/00 | 8.60 | 6571.83 | 3.4 | 6580.43 | 45 | 6532.0 A | 32-46 | 39.8 |
| X8 | 1542007 | 492852 | 61.0 | 5.0 | 12/5/00 | 13.00 | 6568.76 | 3.4 | 6581.76 | 51 | 6527.4 A | 32-52 | 41.4 |
| X9 | 1542194 | 492852 | 61.0 | 5.0 | 12/5/00 | 27.00 | 6555.92 | 3.6 | 6582.92 | 51 | 6528.3 A | 24-52 | 27.6 |
| X10 | 1542352 | 492835 | 61.0 | 5.0 | 12/5/00 | 27.00 | 6555.43 | 3.6 | 6582.43 | 53 | 6525.8 A | 30-55 | 29.6 |
| X11 | 1542553 | 492782 | 57.0 | 5.0 | 12/5/00 | 0.50 | 6581.50 | 3.0 | 6582.00 | 53 | 6526.0 A | 17-57 | 55.5 |
| X12 | 1542861 | 492852 | 57.0 | 5.0 | 12/5/00 | 0.50 | 6582.83 | 3.0 | 6583.33 | 53 | 6527.3 A | 17-57 | 55.5 |
| X13 | 1543640 | 493665 | 56.0 | 5.0 | 10/30/01 | 40.35 | 6546.59 | 2.5 | 6586.94 | 51 | 6533.4 A | 16-56 | 13.2 |
| X14 | 1544002 | 493777 | 56.0 | 5.0 | 10/30/01 | 39.22 | 6546.98 | 2.1 | 6586.20 | 49 | 6535.1 A | 16-56 | 11.9 |
| X15 | 1544222 | 493800 | 57.0 | 5.0 | 10/30/01 | 40.05 | 6542.86 | 2.3 | 6582.91 | 51 | 6529.6 A | 17-57 | 13.3 |
| X16 | 1544473 | 493795 | 47.0 | 5.0 | 10/30/01 | 40.20 | 6544.59 | 2.3 | 6584.79 | 47 | 6535.5 A | 22-47 | 9.1 |
| X17 | 1544356 | 493793 | 55.0 | 5.0 | 10/20/01 | 40.60 | 6545.24 | 3.3 | 6585.84 | 48 | 6534.6 A | 35-55 | 10.7 |
| X18 | 1544593 | 493569 | 57.0 | 5.0 | 10/30/01 | 28.80 | 6557.28 | 3.8 | 6586.08 | 49 | 6533.3 A | 37-57 | 24.0 |
| X19 | 1544753 | 493437 | 63.0 | 5.0 | 10/30/01 | 43.55 | 6541.65 | 4.5 | 6585.20 | 56 | 6524.8 A | 33-63 | 16.9 |
| X20 | 1544855 | 493256 | 71.0 | 5.0 | 12/5/00 | 46.31 | 6539.42 | 3.5 | 6585.73 | 64 | 6518.2 A | 31-71 | 21.2 |
| X21 | 1543606 | 493894 | 55.0 | 5.0 | 12/5/00 | 38.99 | 6547.34 | 2.7 | 6586.33 | 51 | 6532.6 A | 35-55 | 14.7 |
| X22 | 1543874 | 493946 | 56.0 | 5.0 | 12/5/00 | 39.21 | 6546.49 | 2.6 | 6585.70 | 50 | 6533.1 A | 36-56 | 13.4 |
| X23 | 1544064 | 494012 | 56.0 | 5.0 | 12/5/00 | 38.96 | 6546.98 | 2.8 | 6585.94 | 47 | 6536.1 A | 36-56 | 10.8 |
| X24 | 1544244 | 494011 | 56.0 | 5.0 | 12/5/00 | 39.94 | 6545.78 | 2.6 | 6585.72 | 46 | 6537.1 A | 36-56 | 8.7 |
| X25 | 1544445 | 494042 | 53.0 | 5.0 | 12/5/00 | 39.41 | 6546.22 | 2.8 | 6585.63 | 46 | 6536.9 A | 33-53 | 9.3 |
| X26 | 1544693 | 493702 | 53.0 | 5.0 | 12/5/00 | 35.34 | 6552.30 | 2.8 | 6587.64 | 43 | 6541.8 A | 33-53 | 10.5 |

## TABLE 4.1-1 BASIC WELL DATA FOR THE ALLUVIAL HOMESTAKE WELLS
## (cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| X27 | 1544953 | 493374 | 71.0 | 5.0 | 12/5/00 | 46.27 | 6539.03 | 5.1 | 6585.30 | 64 | 6516.2A | 31-71 | 22.8 |
| X28 | 1540545 | 491971 | 56.0 | 5.0 | 12/5/00 | 16.80 | 6553.16 | 2.0 | 6569.96 | 48 | 6520.0A | 16-56 | 33.2 |
| X29 | 1540735 | 492256 | 51.0 | 5.0 | 12/5/00 | 8.00 | 6562.03 | 2.0 | 6570.03 | 43 | 6525.0A | 11-51 | 37.0 |
| X30 | 1540897 | 492493 | 51.0 | 5.0 | 12/5/00 | 8.00 | 6564.53 | 2.0 | 6572.53 | 43 | 6527.5A | 11-51 | 37.0 |
| X31 | 1541052 | 492731 | 51.0 | 5.0 | 12/5/00 | 16.50 | 6557.63 | 2.0 | 6574.13 | 44 | 6528.1A | 11-51 | 29.5 |
| Y | 1541025 | 491256 | 60.8 | 4.0 | 10/10/01 | 39.47 | 6533.41 | 2.4 | 6572.88 | 57 | 6513.5A | 54-59 | 19.9 |
| Z | 1540290 | 490701 | 73.9 | 4.0 | 12/5/00 | 5.00 | 6564.22 | 0.6 | 6569.22 | 68 | 6500.6A | 60-70 | 63.6 |

Note: A = Alluvial Aquifer
M = Middle Chinle Aquifer
T = Tailings Aquifer
* = Well Abandoned
? = Uncertain Identity

## TABLE 4.1-2 BASIC WELL DATA FOR THE ALLUVIAL AQUIFER BROADVIEW AND FELICE ACRES WELLS

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | **Broadview** | | | | | | | | |
| 0410 | 1537440 | 489840 | 105.0 | 6.0 | 12/6/94 | 33.36 | 6526.30 | 0.0 | 6559.66 | 75 | 6484.7 A | 90-105 | 41.6 |
| 0411 | 1537400 | 489510 | 70.0 | 6.0 | 8/7/96 | 35.10 | 6524.90 | 0.0 | 6560.00 | 70 | 6490.0 A | 65-70 | 34.9 |
| 0412 | 1537940 | 488830 | --- | 6.0 | --- | --- | --- | 0.0 | 6561.00 | --- | --- A | - | --- |
| 0413 | 1537900 | 490100 | --- | --- | 4/27/94 | 35.25 | 6530.75 | 0.0 | 6566.00 | --- | --- A | - | --- |
| 0421 | 1538450 | 491100 | 88.0 | 5.0 | 1/30/96 | 37.58 | 6534.42 | 0.9 | 6572.00 | 92 | 6479.1 A | 72-102 | 55.3 |
| 0422 | 1538440 | 490810 | 80.0 | 4.0 | 4/6/94 | 32.82 | 6537.18 | 0.0 | 6570.00 | 75 | 6495.0 A | 60-80 | 42.2 |
| 0423 | 1538230 | 490800 | --- | --- | --- | --- | --- | 0.0 | 6570.00 | --- | --- A | - | --- |
| 0425 | 1538430 | 490630 | 90.0 | 6.0 | 4/7/94 | 32.42 | 6534.58 | 0.0 | 6567.00 | 71 | 6496.0 A | 50-90 | 38.6 |
| 0426 | 1538230 | 490620 | 100.0 | --- | 11/10/81 | 30.65 | 6534.35 | 0.0 | 6565.00 | 80 | 6485.0 A | 80-100 | 49.4 |
| 0427 | 1538450 | 490410 | 121.0 | 6.0 | 4/12/94 | 35.00 | 6535.00 | 0.0 | 6570.00 | 81 | 6489.0 A | 62-120 | 46.0 |
| 0428 | 1538280 | 490390 | 110.0 | 4.0 | --- | --- | --- | 0.0 | 6570.00 | 66 | 6504.0 A | 83-104 | --- |
| 0429 | 1538210 | 490430 | 100.0 | 6.0 | 9/1/95 | 37.21 | 6532.79 | 0.0 | 6570.00 | 74 | 6496.0 A | 58-75 | 36.8 |
| 0430 | 1538469 | 490300 | 145.0 | --- | --- | --- | --- | 0.0 | 6568.00 | --- | --- A | - | --- |
| | | | | | | | | | | 114 | 6454.0 U | - | --- |
| 0431 | 1538045 | 490090 | 130.0 | 6.0 | 4/12/94 | 35.00 | 6533.00 | 0.0 | 6568.00 | 60 | 6508.0 A | 125-130 | 25.0 |
| | | | | | | | | | | 60 | 6450.0 U | 125-130 | 83.0 |
| 0432 | 1538210 | 489840 | --- | --- | --- | --- | --- | 0.0 | 6565.00 | --- | --- A | - | --- |
| 0433 | 1538220 | 489620 | 90.0 | 4.0 | 5/2/97 | 36.05 | 6527.95 | 1.5 | 6564.00 | 75 | 6487.5 A | 58-84 | 40.5 |
| 0435 | 1538220 | 489300 | 85.0 | 6.0 | 8/7/96 | 34.75 | 6526.25 | 1.3 | 6561.00 | 85 | 6474.7 A | - | 51.6 |
| 0438 | 1537940 | 490810 | 120.0 | 4.0 | --- | --- | --- | 0.0 | 6571.00 | 105 | 6466.0 A | 70-100 | --- |
| 0439 | 1537940 | 490490 | 97.0 | 4.0 | 8/7/96 | 39.80 | 6527.20 | 0.0 | 6567.00 | 75 | 6492.0 A | 77-97 | 35.2 |
| 0440 | 1537700 | 490230 | --- | --- | --- | --- | --- | 0.0 | 6566.00 | --- | --- A | - | --- |
| 0441 | 1537720 | 490090 | 116.0 | 6.0 | 1/30/95 | 35.19 | 6530.81 | 0.0 | 6566.00 | 78 | 6488.0 A | 106-116 | 42.8 |
| 0442 | 1537940 | 489840 | 100.0 | 4.0 | 8/7/96 | 37.15 | 6527.85 | 0.0 | 6565.00 | 80 | 6485.0 A | 70-100 | 42.8 |
| 0443 | 1537940 | 489280 | --- | 4.0 | --- | --- | --- | 0.0 | 6561.00 | 75 | 6486.0 A | 60-80 | --- |
| 0444 | 1537940 | 489180 | 80.0 | --- | 5/18/94 | 28.84 | 6532.16 | 0.0 | 6561.00 | --- | --- A | - | --- |
| 0445 | 1537720 | 489300 | 108.0 | 6.0 | --- | --- | --- | 0.0 | 6561.00 | 79 | 6482.0 A | 75-105 | --- |
| 0446 | 1537720 | 488850 | 110.0 | 6.0 | 9/8/83 | 41.28 | 6518.72 | 0.0 | 6560.00 | 60 | 6500.0 U | 60-95 | 18.7 |
| | | | | | | | | | | 60 | 6500.0 A | 60-95 | 18.7 |
| 0447 | 1537490 | 490480 | 142.0 | 6.0 | 4/11/85 | 41.18 | 6526.82 | 0.0 | 6568.00 | --- | --- A | 120-142 | --- |
| | | | | | | | | | | 80 | 6488.0 U | 120-142 | 38.8 |
| 0448 | 1537400 | 489100 | --- | --- | --- | --- | --- | 0.0 | 6561.00 | --- | --- A | - | --- |
| 0450 | 1537480 | 490710 | --- | 6.0 | 1/25/95 | 42.29 | 6528.71 | 0.0 | 6571.00 | 85 | 6486.0 A | 70-105 | 42.7 |
| * 0451 | 1537700 | 490600 | --- | --- | --- | --- | --- | 0.0 | 0.00 | --- | --- A | - | --- |
| 0452 | 1537880 | 490420 | 100.0 | 4.0 | 8/7/96 | 41.20 | 6525.80 | 0.8 | 6567.00 | 85 | 6481.2 A | 40-100 | 44.6 |

## TABLE 4.1-2 BASIC WELL DATA FOR THE ALLUVIAL AQUIFER BROADVIEW AND FELICE ACRES WELLS (cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0453 | 1538375 | 490300 | 110.0 | 4.0 | 6/5/01 | 34.50 | 6533.50 | 0.9 | 6568.00 | 80 | 6487.1 A | 60-110 | 46.4 |
| * 0454 | 1537920 | 489025 | --- | 4.0 | --- | --- | --- | 0.0 | 0.00 | --- | --- A | - | --- |
| SUB1 | 1537620 | 489100 | --- | 4.0 | 4/16/01 | 33.68 | 6527.32 | 0.0 | 6561.00 | --- | --- A | - | --- |
| SUB2 | 1537395 | 490320 | --- | 4.0 | 7/17/98 | 40.92 | 6526.65 | 0.0 | 6567.57 | --- | --- A | - | --- |
| SUB3 | 1538280 | 489420 | 84.0 | 6.0 | 5/2/01 | 28.28 | 6528.79 | 0.0 | 6557.07 | 72 | 6485.1 A | 56-72 | 43.7 |
| SUB4 | 1538440 | 489840 | 100.0 | 4.0 | 9/21/78 | 49.11 | 6515.89 | 0.0 | 6565.00 | 78 | 6487.0 A | 60-85 | 28.9 |
| SUB5 | 1537940 | 489470 | 86.0 | 4.0 | --- | --- | --- | 0.0 | 6562.31 | 66 | 6496.3 A | 55-80 | --- |
| SUB6 | 1537940 | 490090 | 82.0 | 4.0 | --- | --- | --- | 0.0 | 6566.00 | 80 | 6486.0 A | 52-82 | --- |
| SUB7 | 1537940 | 490630 | 98.0 | 4.0 | --- | --- | --- | 0.0 | 6568.00 | 85 | 6483.0 A | 78-98 | --- |
| SUB8 | 1538450 | 490210 | 150.0 | 5.0 | --- | --- | --- | 0.0 | 6568.00 | 72 | 6496.0 A | 60-90 | --- |
| SUB9 | --- | --- | --- | --- | --- | --- | --- | 0.0 | 0.00 | --- | --- A | - | --- |
| | | | | | | **Felice Acres** | | | | | | | |
| 0481 | 1538350 | 490180 | 320.0 | 4.0 | --- | --- | --- | 0.0 | 6568.00 | 110 | 6458.0 A | 270-310 | --- |
| | | | | | | | | | | 110 | 6298.0 M | 270-310 | --- |
| 0482 | 1536985 | 489604 | 260.0 | 5.0 | 4/11/96 | 35.85 | 6526.81 | 0.0 | 6562.66 | 80 | 6482.7 A | 220-260 | 44.2 |
| | | | | | | | | | | 80 | 6352.7 M | 220-260 | 174.2 |
| 0483 | 1536586 | 489753 | 280.0 | --- | 7/24/96 | 36.93 | 6525.73 | 0.0 | 6562.66 | --- | --- A | - | --- |
| | | | | | | | | | | --- | --- M | - | --- |
| 0490 | 1536540 | 489756 | 63.0 | 4.0 | 6/5/01 | 37.80 | 6524.62 | 0.0 | 6562.42 | 75 | 6487.4 A | 20-80 | 37.2 |
| 0491 | 1537025 | 489662 | 63.0 | 4.0 | 8/22/01 | 39.32 | 6523.30 | 0.0 | 6562.62 | 40 | 6522.6 A | 30-63 | 0.7 |
| 0492 | 1537220 | 489280 | 60.0 | 4.0 | 3/3/99 | 32.13 | 6528.55 | 1.2 | 6560.68 | 55 | 6504.5 A | 40-60 | 24.1 |
| 0495 | 1537400 | 497100 | --- | --- | --- | --- | --- | 0.0 | 6571.00 | --- | --- A | - | --- |
| 0496 | 1534650 | 489603 | 94.4 | 5.0 | 8/20/01 | 74.51 | 6488.01 | 1.6 | 6562.52 | 86 | 6474.9 A | 53-93 | 13.1 |
| 0497 | 1535039 | 489503 | 94.0 | 5.0 | 8/20/01 | 55.71 | 6506.91 | 2.0 | 6562.62 | 89 | 6471.6 A | 64-94 | 35.3 |
| CW44 | 1535048 | 488891 | 208.0 | 6.0 | 12/12/01 | 60.07 | 6500.67 | 2.5 | 6560.74 | 94 | 6464.2 A | - | 36.4 |
| | | | | | | | | | | 94 | 6428.2 M | 69-208 | 72.4 |

Note: A = Alluvial Aquifer
M = Middle Chinle Aquifer
T = Tailings Aquifer
* = Well Abandoned
? = Uncertain Identity

## TABLE 4.1-3 BASIC WELL DATA FOR THE ALLUVIAL AQUIFER MURRAY ACRES AND PLEASANT VALLEY WELLS

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **Murray** | | | | | | | |
| 0801 | 1541020 | 488600 | 100.0 | 4.0 | 12/21/94 | 36.85 | 6530.88 | 0.0 | 6567.73 | 85 | 6482.7 A | 80-100 | 48.2 |
| 0802 | 1540790 | 488190 | 98.0 | 6.0 | 5/22/97 | 40.20 | 6522.52 | 0.0 | 6562.72 | 81 | 6481.7 A | 75-81 | 40.8 |
| 0803 | 1540800 | 487430 | --- | 6.0 | 9/19/83 | 84.86 | 6476.14 | 0.0 | 6561.00 | 85 | --- C | 85-180 | --- |
| | | | | | | | | | | 85 | 6476.0 A | 85-180 | 0.1 |
| 0804 | 1540790 | 486790 | 137.0 | 6.0 | 5/10/01 | 45.80 | 6516.20 | 0.0 | 6562.00 | 85 | 6477.0 A | 125-136 | 39.2 |
| 0805 | 1540695 | 486373 | 140.0 | 5.0 | 10/6/94 | 59.34 | 6507.66 | 0.0 | 6567.00 | 110 | 6457.0 A | 100-140 | 50.7 |
| 0810 | 1540290 | 486700 | 105.0 | 6.0 | --- | --- | --- | 0.0 | 6562.00 | 81 | 6481.0 A | 75-101 | --- |
| 0811 | 1540320 | 486373 | 140.0 | 4.0 | --- | --- | --- | 0.0 | 6563.00 | 110 | 6453.0 A | 100-140 | --- |
| 0815 | 1539090 | 488100 | 255.0 | 4.0 | 5/22/91 | 29.14 | 6526.12 | 0.0 | 6555.26 | --- | --- A | - | --- |
| 0844 | 1538376 | 487002 | 75.0 | 4.0 | 7/24/01 | 34.26 | 6521.87 | 1.2 | 6556.13 | 70 | 6484.9 A | 35-75 | 36.9 |
| 0845 | 1537280 | 487833 | 65.0 | 4.0 | 7/24/01 | 34.50 | 6522.55 | 1.7 | 6557.05 | 55 | 6500.4 A | 45-65 | 22.2 |
| AW | 1540235 | 488015 | 156.0 | 6.0 | 1/5/98 | 15.00 | 6548.43 | 0.1 | 6563.43 | 63 | 6500.3 A | - | 48.1 |
| | | | | | | | | | | 63 | 6463.3 U | 66-155 | 85.1 |
| HW | 1540900 | 487430 | 115.0 | 6.0 | 11/9/94 | 40.00 | 6517.00 | 0.0 | 6557.00 | 95 | 6462.0 A | 60-94 | 55.0 |
| | | | | | | **Pleasant Valley** | | | | | | | |
| 0688 | 1541257 | 483955 | 105.0 | 5.0 | 6/5/01 | 60.51 | 6502.11 | 2.9 | 6562.62 | 95 | 6464.7 A | 65-105 | 37.4 |
| 0831 | 1540090 | 486030 | --- | --- | 9/6/83 | 54.95 | 6506.05 | 0.0 | 6561.00 | --- | --- A | - | --- |
| 0833 | 1539250 | 485350 | 110.0 | 6.0 | 12/10/96 | 46.61 | 6511.39 | 0.0 | 6558.00 | 103 | 6455.0 A | 60-90 | 56.4 |
| 0834 | 1540260 | 484800 | 100.0 | 4.0 | --- | --- | --- | 0.0 | 6560.00 | 80 | 6480.0 A | 60-80 | --- |
| 0835 | 1539610 | 484795 | 98.0 | 5.0 | 5/2/00 | 49.74 | 6509.26 | 0.0 | 6559.00 | 94 | 6465.0 A | 73-94 | 44.3 |
| 0836 | 1540250 | 484010 | 90.0 | 4.0 | --- | --- | --- | 0.0 | 6558.00 | 80 | 6478.0 A | 65-80 | --- |
| 0838 | 1540600 | 485640 | 100.0 | --- | 7/22/95 | 49.03 | 6513.97 | 0.0 | 6563.00 | --- | --- A | - | --- |
| 0839 | 1541120 | 485465 | 100.0 | 5.0 | 12/19/94 | 50.00 | 6510.00 | 0.0 | 6560.00 | 94 | 6466.0 A | 80-96 | 44.0 |
| 0840 | 1540440 | 485360 | 98.0 | 6.0 | 9/8/83 | 47.32 | 6513.68 | 0.0 | 6561.00 | 94 | 6467.0 A | 73-94 | 46.7 |
| 0841 | 1540835 | 485020 | 100.0 | --- | 7/22/95 | 54.66 | 6506.34 | 0.0 | 6561.00 | --- | --- A | - | --- |
| 0843 | 1541265 | 485995 | 120.0 | 4.0 | 6/27/89 | 52.40 | 6517.60 | 0.0 | 6570.00 | 112 | 6458.0 A | 100-110 | 59.6 |

Note: A = Alluvial Aquifer
M = Middle Chinle Aquifer
T = Tailings Aquifer
* = Well Abandoned
? = Uncertain Identity

## TABLE 4.1-4 BASIC WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0520 | 1538934 | 492935 | 75.0 | 5.0 | 12/10/01 | 56.70 | 6529.32 | 0.3 | 6586.02 | 68 | 6517.7 A | 35-75 | 11.6 |
| 0521 | 1539105 | 492588 | 75.0 | 5.0 | 12/10/01 | 53.81 | 6530.63 | 2.5 | 6584.44 | 65 | 6516.9 A | 35-75 | 13.7 |
| 0531 | 1541086 | 478262 | --- | --- | 10/30/96 | 79.24 | 6474.55 | 2.0 | 6553.79 | --- | --- A | - | --- |
| 0532 | 1518700 | 482400 | 214.0 | --- | --- | --- | --- | 0.0 | 6515.00 | --- | --- A | - | --- |
| 0533 | --- | --- | 195.0 | --- | --- | --- | --- | 0.0 | 6520.00 | --- | --- A | - | --- |
| 0631 | 1532234 | 483756 | 118.0 | 6.0 | 9/17/01 | 102.28 | 6438.82 | 2.2 | 6541.10 | 109 | 6429.9 A | 58-118 | 8.9 |
| 0632 | 1531850 | 483767 | 110.0 | 6.0 | 9/17/01 | 103.00 | 6438.30 | 3.0 | 6541.30 | 102 | 6436.3 A | 70-110 | 2.0 |
| 0633 | 1541467 | 479642 | 83.0 | 8.0 | 5/2/00 | 74.83 | 6482.73 | 0.0 | 6557.56 | 95 | 6462.6 A | 11-83 | 20.2 |
| 0634 | 1541652 | 4803625 | 103.0 | 4.5 | 9/20/01 | 72.39 | 6487.68 | 2.8 | 6560.07 | 95 | 6462.3 A | 80-100 | 25.4 |
| 0635 | 1535363 | 478401 | 63.0 | 12.0 | --- | --- | --- | --- | 6546.25 | --- | --- A | 4-63 | --- |
| 0636 | 1545374 | 476038 | 123.0 | 4.5 | 9/18/01 | 98.40 | 6475.04 | 2.3 | 6573.44 | 119 | 6452.1 A | 103-123 | 22.9 |
| 0637 | 1545409 | 474710 | 124.0 | 4.5 | 9/18/01 | 102.40 | 6472.80 | 2.5 | 6575.20 | 118 | 6454.7 A | 104-124 | 18.1 |
| 0638 | 1539628 | 493264 | 75.0 | 5.0 | 12/10/01 | 59.21 | 6526.35 | 0.0 | 6585.56 | 65 | 6520.6 A | 35-75 | 5.8 |
| 0639 | 1539370 | 492960 | 80.0 | 5.0 | 12/10/01 | 57.46 | 6530.42 | 2.5 | 6587.88 | 71 | 6514.4 A | 35-80 | 16.0 |
| 0640 | 1537790 | 491961 | 84.0 | 5.0 | 7/24/01 | 52.51 | 6527.46 | 2.2 | 6579.97 | 77 | 6500.8 A | 64-84 | 26.7 |
| 0641 | 1536494 | 491110 | 95.0 | 5.0 | 7/25/01 | 50.99 | 6522.37 | 2.5 | 6573.36 | 87 | 6483.9 A | 65-95 | 38.5 |
| 0642 | 1536104 | 490932 | 95.0 | 5.0 | 7/25/01 | 51.63 | 6520.25 | 2.4 | 6571.88 | 89 | 6480.5 A | 65-95 | 39.8 |
| 0643 | 1533760 | 487386 | 108.0 | 5.0 | 10/15/01 | 71.70 | 6479.63 | 1.5 | 6551.33 | 93 | 6456.8 A | 58-108 | 22.8 |
| 0644 | 1533481 | 485450 | 110.0 | 5.0 | 10/15/01 | 71.53 | 6472.37 | 2.2 | 6543.90 | 102 | 6439.7 A | 55-110 | 32.7 |
| 0645 | 1532924 | 485282 | 80.0 | 5.0 | 10/19/98 | 66.48 | 6477.31 | 2.5 | 6543.79 | 70 | 6471.3 A | 60-80 | 6.0 |
| 0646 | 1533246 | 484953 | 100.0 | 5.0 | 10/23/01 | 73.40 | 6469.95 | 1.5 | 6543.35 | 91 | 6450.9 A | 60-100 | 19.1 |
| 0647 | 1536623 | 478308 | 140.0 | 4.5 | 8/15/01 | 89.84 | 6462.07 | 1.4 | 6551.91 | 132 | 6418.5 A | 80-140 | 43.6 |
| 0648 | 1534730 | 478343 | 120.0 | 4.5 | 8/15/01 | 91.86 | 6455.93 | 0.5 | 6547.79 | 120 | 6427.3 A | 80-120 | 28.6 |
| 0649 | 1534730 | 479798 | 124.0 | 4.5 | 8/15/01 | 85.52 | 6457.77 | 0.3 | 6543.29 | 115 | 6428.0 A | 84-124 | 29.8 |
| 0650 | 1536779 | 482135 | 109.0 | 4.5 | 4/14/98 | 71.10 | 6476.01 | 2.2 | 6547.11 | 103 | 6441.9 A | 89-109 | 34.1 |
| 0652 | 1531170 | 483779 | 88.0 | 5.0 | 10/23/01 | 81.03 | 6457.12 | 1.5 | 6538.15 | 79 | 6457.7 A | 60-88 | 0.0 |
| 0653 | 1533283 | 486570 | 206.0 | 6.0 | 9/17/01 | 171.44 | 6373.53 | 1.3 | 6544.97 | 97 | 6446.7 A | 69-206 | 0.0 |
| | | | | | | | | | | 97 | 6408.7 L | - | 0.0 |
| 0654 | 1541994 | 478636 | 120.0 | 4.5 | 9/18/01 | 74.69 | 6475.81 | 1.4 | 6550.50 | 106 | 6443.1 A | 60-120 | 32.7 |
| 0655 | 1541620 | 479830 | 96.0 | 8.0 | 5/2/00 | 75.15 | 6483.03 | --- | 6558.18 | 88 | --- A | 21-84 | --- |
| 0656 | 1542578 | 478333 | 88.0 | 8.0 | 5/2/00 | 77.32 | 6476.75 | --- | 6554.07 | 88 | --- A | 6-88 | --- |
| 0657 | 1537497 | 478392 | 128.0 | 6.0 | 9/17/01 | 100.00 | 6451.81 | 2.2 | 6551.81 | 120 | 6429.6 A | 87-128 | 22.2 |
| 0657A | 1537083 | 478412 | 35.0 | 12.0 | 4/13/99 | 37.00 | 6512.00 | --- | 6549.00 | --- | --- A | 17-35 | --- |
| 0658 | 1535922 | 478436 | 130.0 | 6.0 | 9/17/01 | 105.50 | 6444.68 | 0.4 | 6550.18 | 129 | 6420.8 A | 89-130 | 23.9 |
| 0658A | 1535589 | 478423 | 30.6 | --- | --- | --- | --- | --- | 6546.10 | --- | --- A | 14-31 | --- |
| 0659 | 1541689 | 480772 | 101.0 | 4.5 | 9/20/01 | 71.34 | 6488.83 | 2.0 | 6560.17 | 97 | 6461.2 A | 61-101 | 27.7 |

## TABLE 4.1-4 BASIC WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS (cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0680 | 1543850 | 478746 | 80.0 | 4.5 | 10/25/96 | 77.39 | 6481.48 | 2.0 | 6558.87 | 75 | 6481.9 A | 50-80 | 0.0 |
| 0681 | 1540676 | 482734 | 117.0 | 6.0 | 9/24/98 | 64.18 | 6496.34 | 2.1 | 6560.52 | 111 | 6447.4 A | 67-117 | 48.9 |
| 0682 | 1543125 | 477489 | 94.0 | 4.0 | 4/3/01 | 80.80 | 6473.17 | 2.8 | 6553.97 | 102 | 6449.2 A | 54-94 | 24.0 |
| 0683 | 1540198 | 476217 | 120.0 | 6.0 | 9/18/01 | 86.41 | 6469.63 | 2.0 | 6556.04 | 140 | 6414.0 A | 80-120 | 55.6 |
| 0684 | 1540273 | 478499 | 143.0 | 6.0 | 9/25/01 | 83.78 | 6469.50 | 2.0 | 6553.28 | 118 | 6433.3 A | 83-143 | 36.2 |
| 0685 | 1539098 | 478170 | 100.0 | 4.5 | 12/23/01 | 91.03 | 6465.54 | 1.7 | 6556.57 | 116 | 6438.9 A | 60-100 | 26.7 |
| 0686 | 1545319 | 475438 | 115.0 | 4.5 | 9/18/01 | 105.96 | 6472.84 | 1.8 | 6578.80 | 136 | 6441.0 A | 75-115 | 31.8 |
| 0687 | 1539011 | 477276 | 102.0 | 6.0 | 12/23/01 | 90.20 | 6465.76 | 2.2 | 6555.96 | 120 | 6433.8 A | 62-102 | 32.0 |
| 0689 | 1530024 | 478478 | 80.0 | 4.5 | 7/25/01 | 69.78 | 6472.24 | 2.6 | 6542.02 | 75 | 6464.4 A | 60-80 | 7.8 |
| 0692 | 1535892 | 493175 | 90.0 | 5.0 | 7/25/01 | 65.87 | 6518.95 | 2.5 | 6584.82 | 80 | 6502.3 A | 58-90 | 16.6 |
| 0846 | 1537219 | 484730 | 75.0 | 4.0 | 7/24/01 | 43.90 | 6505.02 | 1.1 | 6548.92 | 65 | 6482.8 A | 40-65 | 22.2 |
| 0847 | 1534736 | 488508 | 92.0 | 5.0 | 11/22/96 | 53.88 | 6504.39 | 2.6 | 6558.27 | 80 | 6475.7 A | 52-92 | 28.7 |
| 0848 | 1534634 | 490660 | 92.0 | 5.0 | 7/24/01 | 59.34 | 6513.15 | 2.7 | 6572.49 | 91 | 6478.8 A | 52-92 | 34.3 |
| 0851 | 1534692 | 483909 | 91.0 | 5.0 | 8/23/01 | 73.84 | 6472.60 | 3.3 | 6546.44 | 80 | 6463.1 A | 41-91 | 9.5 |
| 0852 | 1535610 | 493989 | 74.0 | 5.0 | 11/22/96 | 73.26 | 6516.88 | 2.5 | 6590.14 | 70 | 6517.7 A | 54-74 | 0.0 |
| 0855 | 1532111 | 484184 | 105.0 | 5.0 | 8/23/01 | 80.53 | 6460.58 | 2.1 | 6541.11 | 97 | 6442.0 A | 70-105 | 18.6 |
| 0861 | 1534332 | 488702 | 100.0 | 5.0 | 8/29/01 | 70.24 | 6489.61 | 2.3 | 6559.85 | 65 | 6492.6 A | 50-100 | 0.0 |
| 0862 | 1534265 | 487800 | 110.0 | 5.0 | 8/20/01 | 90.72 | 6465.46 | 3.3 | 6556.18 | 97 | 6455.9 A | 63-103 | 9.6 |
| 0863 | 1533867 | 487912 | 110.0 | 5.0 | 8/20/01 | 89.55 | 6467.01 | 2.5 | 6556.56 | 94 | 6460.1 A | 63-103 | 6.9 |
| 0864 | 1533735 | 486464 | 95.0 | 5.0 | 8/29/01 | 69.68 | 6477.04 | 1.9 | 6546.72 | 78 | 6466.9 A | 44-84 | 10.2 |
| 0865 | 1534123 | 488429 | 97.0 | 5.0 | 8/20/01 | 67.84 | 6488.94 | 2.2 | 6556.78 | 88 | 6466.6 A | 37-97 | 22.4 |
| 0866 | 1534494 | 488340 | 120.0 | 5.0 | 8/23/01 | 63.67 | 6494.45 | 1.8 | 6558.12 | 80 | 6476.3 A | 33-113 | 18.1 |
| 0867 | 1533762 | 488409 | 88.0 | 5.0 | 8/23/01 | 68.00 | 6487.90 | 2.0 | 6555.90 | 86 | 6467.9 A | 48-88 | 20.0 |
| 0868 | 1534848 | 491033 | 103.0 | 5.0 | 8/29/01 | 60.78 | 6513.96 | 2.2 | 6574.74 | 94 | 6478.5 A | 53-103 | 35.4 |
| 0869 | 1533251 | 486073 | 94.0 | 5.0 | 8/20/01 | 84.53 | 6459.96 | 2.0 | 6544.49 | 99 | 6443.5 A | 44-94 | 16.4 |
| * 0870 | 1532680 | 484906 | 93.0 | 5.0 | 1/11/96 | 68.56 | 6475.60 | 1.9 | 6544.16 | 95 | 6447.3 A | 69-89 | 28.3 |
| 0871 | 1533603 | 485400 | 100.0 | 5.0 | 1/11/96 | 66.86 | 6477.85 | 2.4 | 6544.71 | 93 | 6449.3 A | 60-100 | 28.5 |
| * 0872 | 1533092 | 485407 | 100.0 | 5.0 | 1/11/96 | 65.80 | 6477.51 | 1.8 | 6543.31 | 96 | 6445.5 A | 55-100 | 32.0 |
| * 0873 | 1533286 | 484505 | 100.0 | 5.0 | 1/11/96 | 67.55 | 6475.46 | 1.9 | 6543.01 | 96 | 6445.1 A | 60-100 | 30.3 |
| * 0874 | 1533968 | 484925 | 105.0 | 5.0 | 1/11/96 | 68.68 | 6476.66 | 2.2 | 6545.34 | 110 | 6433.1 A | 55-105 | 43.5 |
| * 0875 | 1532785 | 483634 | 125.0 | 5.0 | 1/11/96 | 69.85 | 6472.99 | 1.7 | 6542.84 | 116 | 6425.1 A | 65-125 | 47.9 |
| 0876 | 1532853 | 486088 | 95.0 | 5.0 | 8/20/01 | 69.24 | 6475.02 | 1.9 | 6544.26 | 85 | 6457.4 A | 58-88 | 17.7 |
| 0877 | 1533068 | 488067 | 70.0 | 5.0 | 8/18/98 | 63.58 | 6489.50 | 1.9 | 6553.08 | 65 | 6486.2 A | 58-68 | 3.3 |
| 0879 | 1532401 | 486104 | 70.0 | 5.0 | 8/18/97 | 64.68 | 6479.87 | 2.2 | 6544.55 | 62 | 6480.4 A | 48-68 | 0.0 |
| 0881 | 1542034 | 481478 | 96.0 | 4.5 | 9/20/01 | 74.60 | 6490.44 | 2.0 | 6565.04 | 103 | 6460.0 A | 76-96 | 30.4 |
| 0882 | 1541404 | 482396 | 110.0 | 4.5 | 9/20/01 | 66.55 | 6494.61 | 2.0 | 6561.16 | 98 | 6461.2 A | 70-110 | 33.4 |

# TABLE 4.1-4 BASIC WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS (cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0883 | 1540097 | 483039 | 100.0 | 5.0 | 9/20/01 | 59.85 | 6497.28 | 1.9 | 6557.13 | 96 | 6459.3 A | 60-90 | 38.0 |
| 0884 | 1542677 | 481498 | 90.0 | 5.0 | 9/21/01 | 75.16 | 6490.94 | 1.0 | 6566.10 | 85 | 6480.2 A | 58-88 | 10.8 |
| 0885 | 1541919 | 483474 | 100.0 | 5.0 | 9/20/01 | 67.00 | 6497.64 | 1.5 | 6564.64 | 95 | 6468.1 A | 70-100 | 29.5 |
| 0886 | 1542327 | 482487 | 90.0 | 5.0 | 9/20/01 | 70.52 | 6494.03 | 1.5 | 6564.55 | 87 | 6476.1 A | 60-90 | 18.0 |
| 0887 | 1543063 | 482469 | 67.0 | 5.0 | 3/12/98 | 69.21 | 6498.52 | 1.5 | 6567.73 | 60 | 6506.2 A | 42-67 | 0.0 |
| 0888 | 1542285 | 479335 | 105.0 | 5.0 | 9/18/01 | 78.26 | 6479.07 | 1.1 | 6557.33 | 90 | 6466.2 A | 75-105 | 12.8 |
| 0889 | 1540047 | 480222 | 65.0 | 5.0 | 10/24/96 | 63.31 | 6486.32 | 1.5 | 6549.63 | 60 | 6488.2 A | 35-65 | 0.0 |
| 0890 | 1541365 | 480088 | 101.0 | 5.0 | 9/20/01 | 74.76 | 6483.67 | 1.7 | 6558.43 | 93 | 6463.7 A | 81-101 | 19.9 |
| 0893 | 1541934 | 482244 | 98.0 | 4.5 | 9/20/01 | 70.68 | 6493.29 | 2.1 | 6563.97 | 93 | 6468.9 A | 78-98 | 24.4 |
| 0894 | 1541976 | 478317 | 78.0 | 4.5 | 9/18/01 | 78.00 | 6476.29 | 3.0 | 6554.29 | 97 | 6454.3 A | 58-78 | 22.0 |
| 0895 | 1541521 | 476222 | 104.0 | 5.0 | 9/18/01 | 82.00 | 6471.84 | 2.4 | 6553.84 | 116 | 6435.4 A | 61-101 | 36.4 |
| 0896 | 1542246 | 476237 | 113.0 | 5.0 | 9/18/01 | 83.11 | 6472.50 | 2.0 | 6555.61 | 117 | 6436.6 A | 73-113 | 35.9 |
| 0897 | 1543819 | 478237 | 93.0 | 4.0 | 9/27/98 | 83.28 | 6478.97 | 2.0 | 6562.25 | 70 | 6490.3 A | 63-93 | 0.0 |
| 0899 | 1543801 | 477288 | 110.0 | 4.0 | 9/18/01 | 97.32 | 6473.52 | 2.0 | 6570.84 | 120 | 6448.8 A | 70-110 | 24.7 |
| 0905 | 1532700 | 489450 | 120.0 | 5.0 | --- | --- | --- | 0.0 | 6545.00 | 120 | 6425.0 A | 100-120 | --- |
| 0906 | 1532900 | 489450 | --- | --- | 8/29/95 | 74.65 | 6462.75 | 0.0 | 6537.40 | --- | --- A | - | --- |
| 0909 | 1531900 | 483400 | 140.0 | 4.0 | 11/19/82 | 77.45 | 6461.45 | 0.0 | 6538.90 | 112 | 6426.9 L | 80-135 | 34.6 |
| | | | | | | | | | | 112 | 6426.9 A | 80-135 | 34.6 |
| 0910 | 1528800 | 481150 | 138.0 | 5.0 | --- | --- | --- | 0.0 | 6535.00 | 132 | 6403.0 A | 120-134 | --- |
| 0912 | 1471000 | 478250 | --- | --- | --- | --- | --- | 0.0 | 6530.00 | --- | --- A | - | --- |
| 0913 | 1555800 | 500950 | --- | 8.0 | 1/24/96 | 38.40 | 6604.60 | 0.3 | 6643.00 | --- | --- A | - | --- |
| 0914 | 1555500 | 500850 | --- | 6.0 | 5/8/01 | 40.25 | 6601.75 | 1.4 | 6642.00 | --- | --- A | - | --- |
| 0915 | 1552650 | 499650 | 100.0 | 4.0 | --- | --- | --- | 0.0 | 6625.00 | 70 | 6555.0 A | 55-85 | --- |
| 0916 | 1552350 | 499600 | 160.0 | 4.0 | 4/26/94 | 40.00 | 6585.00 | 0.0 | 6625.00 | --- | --- A | 45-70 | --- |
| 0917 | 1542200 | 514600 | --- | --- | --- | --- | --- | 0.0 | 6800.00 | --- | --- A | - | --- |
| 0920 | 1555800 | 496900 | --- | 7.0 | 5/11/94 | 33.40 | 6594.20 | 0.7 | 6627.60 | --- | --- A | - | --- |
| 0921 | 1555400 | 495800 | --- | 5.0 | 5/8/01 | 38.58 | 6585.42 | 1.9 | 6624.00 | --- | --- A | - | --- |
| 0922 | 1555200 | 492500 | --- | 6.0 | 5/8/01 | 52.68 | 6569.02 | 1.7 | 6621.70 | --- | --- A | - | --- |
| 0924 | 1547500 | 438900 | 135.0 | 4.0 | --- | --- | --- | 0.0 | 6592.90 | 112 | 6480.9 A | 94-114 | --- |
| 0925 | 1548600 | 480800 | 150.0 | 4.0 | --- | --- | --- | 0.0 | 6601.40 | 140 | 6461.4 A | 126-141 | --- |
| 0926 | 1547500 | 472700 | 134.0 | 4.0 | --- | --- | --- | 0.0 | 6596.90 | 132 | 6464.9 A | 123-132 | --- |
| 0935 | 1540115 | 476629 | 300.0 | 16.0 | 9/25/01 | 88.66 | 6469.46 | 2.6 | 6558.12 | 125 | 6430.5 A | 95-132 | 38.9 |
| 0936 | 1543621 | 472978 | 160.0 | 5.0 | --- | --- | --- | 0.0 | 6573.38 | 160 | 6413.4 A | 100-160 | --- |
| 0939 | 1539750 | 483200 | 97.0 | 8.0 | 7/25/96 | 59.31 | 6497.69 | 2.3 | 6557.00 | --- | --- A | - | --- |
| 0940 | 1537750 | 482850 | 70.0 | --- | 7/24/96 | 57.30 | 6495.70 | 8.8 | 6553.00 | --- | --- A | - | --- |
| 0942 | 1538300 | 483710 | 102.0 | --- | --- | --- | --- | 0.0 | 6550.20 | 95 | 6455.2 A | 85-95 | --- |

## TABLE 4.1-4 BASIC WELL DATA FOR THE ALLUVIAL AQUIFER REGIONAL WELLS (cont'd.)

| WELL NAME | NORTH. COORD. | EAST. COORD. | WELL DEPTH (FT-MP) | CASING DIAM (IN) | WATER LEVEL DATE | WATER LEVEL DEPTH (FT-MP) | WATER LEVEL ELEV. (FT-MSL) | MP ABOVE LSD (FT) | MP ELEV. (FT-MSL) | DEPTH TO BASE OF ALLUVIUM (FT-LSD) | ELEV. TO BASE OF ALLUVIUM (FT-MSL) | CASING PERFOR-ATIONS (FT-LSD) | SATURATED THICKNESS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0947 | 1536206 | 491841 | 100.0 | 4.0 | 7/27/94 | 54.63 | 6520.55 | 0.0 | 6575.18 | 95 | 6480.2 A | 70-100 | 40.4 |
| 0950 | 1560400 | 498300 | 81.0 | 5.0 | 7/12/00 | 25.70 | 6631.30 | 0.5 | 6657.00 | --- | --- A | - | --- |
| 0952 | 1534550 | 477800 | 140.0 | --- | --- | --- | --- | 0.0 | 6550.00 | --- | --- A | - | --- |
| 0975 | 1539640 | 482880 | --- | --- | --- | --- | --- | 0.0 | 6556.00 | --- | --- A | - | --- |
| 0976 | 1539630 | 483100 | 115.0 | --- | --- | --- | --- | 0.0 | 0.00 | --- | --- A | - | --- |
| 0977 | 1539400 | 482730 | --- | --- | 12/9/95 | 61.47 | 6495.53 | 1.0 | 6557.00 | --- | --- A | - | --- |
| 0979 | 1539010 | 483280 | 105.0 | 5.0 | --- | --- | --- | 0.0 | 6651.00 | 100 | 6551.0 A | 90-100 | --- |
| 0980 | 1539040 | 483080 | --- | --- | 11/8/95 | 57.70 | 6497.30 | 0.0 | 6555.00 | --- | --- A | - | --- |
| 0981 | 1538970 | 482820 | --- | --- | --- | --- | --- | 0.0 | 6554.00 | --- | --- A | - | --- |
| 0982 | 1538370 | 483290 | 110.0 | 5.0 | --- | --- | --- | 0.0 | 6651.00 | 105 | 6546.0 A | 90-105 | --- |
| 0983 | 1538590 | 483100 | --- | --- | --- | --- | --- | 0.0 | 6552.00 | --- | --- A | - | --- |
| 0984 | 1538750 | 482950 | 103.0 | 5.0 | --- | --- | --- | 0.0 | 6651.00 | 98 | 6553.0 A | 88-98 | --- |
| 0985 | 1538820 | 483180 | 115.0 | 5.0 | 7/18/96 | 58.75 | 6592.25 | 0.0 | 6651.00 | 102 | 6549.0 A | 90-110 | 43.3 |
| 0989 | 1537890 | 482760 | --- | --- | 11/2/95 | 58.10 | 6494.90 | 1.0 | 6553.00 | --- | --- A | - | --- |
| 0992 | 1539340 | 483780 | 100.0 | 5.0 | --- | --- | --- | 0.0 | 6652.00 | 95 | 6557.0 A | 85-95 | --- |
| 0993 | 1537860 | 483680 | 102.0 | 5.0 | --- | --- | --- | 0.0 | 6650.00 | 98 | 6552.0 A | 85-98 | --- |
| 0994 | 1539700 | 476240 | 144.0 | 6.0 | 12/23/01 | 89.25 | 6465.75 | 0.0 | 6555.00 | --- | --- L | 95-110 | --- |
| | | | | | | | | | | --- | --- A | 95-110 | --- |
| 0996 | 1537621 | 477989 | 138.0 | 5.0 | 12/11/01 | 90.25 | 6462.27 | 1.7 | 6552.52 | 136 | 6414.8 A | 126-136 | 47.5 |
| 0997 | 1539821 | 473807 | --- | --- | 3/12/96 | 76.90 | 6491.40 | 0.0 | 6568.30 | --- | --- A | - | --- |
| 0999 | 1524230 | 480187 | 185.0 | --- | --- | --- | --- | 0.0 | 6527.00 | --- | --- A | - | --- |
| 1012 | --- | --- | --- | 6.0 | --- | --- | --- | 0.0 | 0.00 | --- | --- A | - | --- |
| 1013 | --- | --- | --- | 4.0 | --- | --- | --- | 0.0 | 0.00 | --- | --- A | - | --- |
| 1014 | --- | --- | --- | 9.0 | --- | --- | --- | 0.0 | 0.00 | --- | --- A | - | --- |
| 1015 | --- | --- | --- | 6.0 | --- | --- | --- | 0.0 | 0.00 | --- | --- A | - | --- |
| 1018 | --- | --- | --- | 5.0 | --- | --- | --- | 0.0 | 0.00 | --- | --- A | - | --- |
| 1020 | --- | --- | --- | 5.0 | 1/18/96 | 15.17 | -15.17 | 0.0 | 0.00 | --- | --- A | - | --- |
| 1021 | --- | --- | --- | --- | 1/18/96 | 18.00 | -18.00 | 0.0 | 0.00 | --- | --- A | - | --- |

Note: A = Alluvial Aquifer
M = Middle Chinle Aquifer
T = Tailings Aquifer
* = Well Abandoned
? = Uncertain Identity

## 4.2 ALLUVIAL WATER LEVELS

### 4.2.1 WATER-LEVEL ELEVATION - ALLUVIAL

This section presents information necessary to define the direction that ground water moves in the alluvial aquifer. Water-level elevations are used to define the gradient of the alluvial water table, which in turn can be used to define the direction of ground-water flow.

Figures 4.2-1A and 4.2-1B present Fall of 2001 alluvial aquifer water-level elevations for what has been termed the west area and the Grants Project area near Homestake's tailings, respectively. Additionally, these figures show, with patterned areas, where the alluvial aquifer is absent due to lack of saturation. These areas were defined based on the 1998 water-level elevation map and base of the alluvium map. Adjustments in the alluvial aquifer limits using 2001 water-level elevation data were not done, because the differences were very small. These unsaturated areas exist where the elevation of the base of the alluvium is equal to or greater than the water-level elevation. Locations of the alluvial wells, with their respective well names listed adjacent to the well symbol, are plotted on Figures 4.1-1A and 4.1-1B. The 2001 ground-water flow patterns in the alluvial aquifer are very similar to those observed in the Fall of 2000, with a similar depression on the south side of the large tailings due to the collection system (see Figures 4.2-1A and 4.2-1B of Hydro-Engineering, L.L.C., 2001a). The ridge of water on the southeast side of the small tailings was increased in 2001. One-foot water-level elevation contour intervals were drawn near the collection wells where space allowed. Water-level elevations define the area of collection and a pattern outlines this area on Figure 2.1-1. The area of collection is between the fresh-water injection and the collection wells where water is flowing back to the collection wells. The area of the large tailings is also within the collection area because alluvial ground water in this area flows to the collection wells.

The water-level contours declined in Section 3 due to the irrigation supply from six wells in this section (see Figure 4.2-1B). The main changes in water levels in Figure 4.2-1A are in Section 33 due to the five irrigation supply wells in this area and the below natural recharge level in 2001.

Several wells have been drilled in the area of the zero saturation boundaries to better define the limits of the alluvial aquifer. Water was observed in some of these wells in the Chinle shale below the alluvium, indicating that there may be zones of perched water in the upper part of the Chinle shale. These wells have been used to help define where the zero saturation of the alluvium occurs and their water levels should be used with caution.

Figure 4.2-1A shows the direction of alluvial ground-water flow in the area immediately west of the Grants Project area with red flow arrows. Flow in the San Mateo alluvium is forced to flow through the western portion of Section 28 due to the zero saturation limits to the north and south of this area. The San Mateo alluvial water then mixes with the Rio San Jose alluvial water, which continues to flow to the south. The gradient has been increased due to the irrigation but is still very flat in the Rio San Jose alluvium due to its large transmitting ability. Alluvial ground water that flows through the northern portion of Section 3 (see Figure 4.2-1B) joins the Rio San Jose ground-water system in the eastern portion of Section 4.

Water-level data for the HMC alluvial wells are presented in Table A.1-1 of Appendix A. Table A.1-2 presents alluvial water-level data measured in wells located in Murray Acres, Broadview Acres, Felice Acres, and Pleasant Valley Estates. The water levels from the four subdivisions are presented in numeric and alphabetical order, with wells 453, Sub1 and Sub3 from Broadview Acres and wells 490, 491, 496, 497 and CW44 from Felice Acres. Water levels from wells 804, 844 and 845 are from Murray Acres, while well 688 is located in Pleasant Valley. The alluvial water-level data for the regional wells are presented in Table A.1-3 of Appendix A.

### 4.2.2 WATER-LEVEL CHANGE - ALLUVIAL

Figure 4.2-2 presents wells that were grouped together on water-level elevation versus time plots. The figure number of the water-level elevation plots for each group of wells is shown by the well groupings. The colors used for the well name and well symbol on Figure 4.2-2 are the same as those used on the water-level elevation plots. Water-level elevation data considered to be inaccurate were removed from the plots for better visual presentation of trends, but the excluded data remains in the Appendix A tabulations. These time plots present only the last six years of data to better show the 2001 trends.

Water levels in the alluvial aquifer have been fairly stable during the last year. Figure 4.2-3 presents water-level elevation data for upgradient wells N, NC, O and P. A very gradual decreasing trend has been observed in these upgradient wells in 2001. The larger decline in well P is probably caused by the upgradient alluvial pumping.

Water-level elevation data are presented for two sets of gradient reversal wells located near the S line of the collection system. Reversal wells SP and SO are located just northeast of the majority of the S line of collection wells. Figure 4.2-4 presents water-level elevation data for these two wells and shows that the alluvial hydraulic gradient is reversed between wells SO and SP. Water levels rose in these two wells in 2001. An adequate reversal was maintained during this rise. Wells S1 and S2 are the two reversal wells downgradient of the S line of collection wells (see Figures 4.1-1B and 4.2-2 for location). Recent data from these two wells show reversal of the ground-water surface downgradient of the S collection wells (see Figure 4.2-5) with a water level rise in 2001.

Figure 4.2-6 presents water-level elevation data for a group of wells located west of the S line of collection wells. Water-level elevations in wells DC, S4 and MU increased in 2001, while the level dropped in wells BC and MO.

The alluvial water levels north of the Murray Acres declined in 2001 in wells MQ, MY and W. Water level was steady in well S3 in 2001 (see Figure 4.2-7).

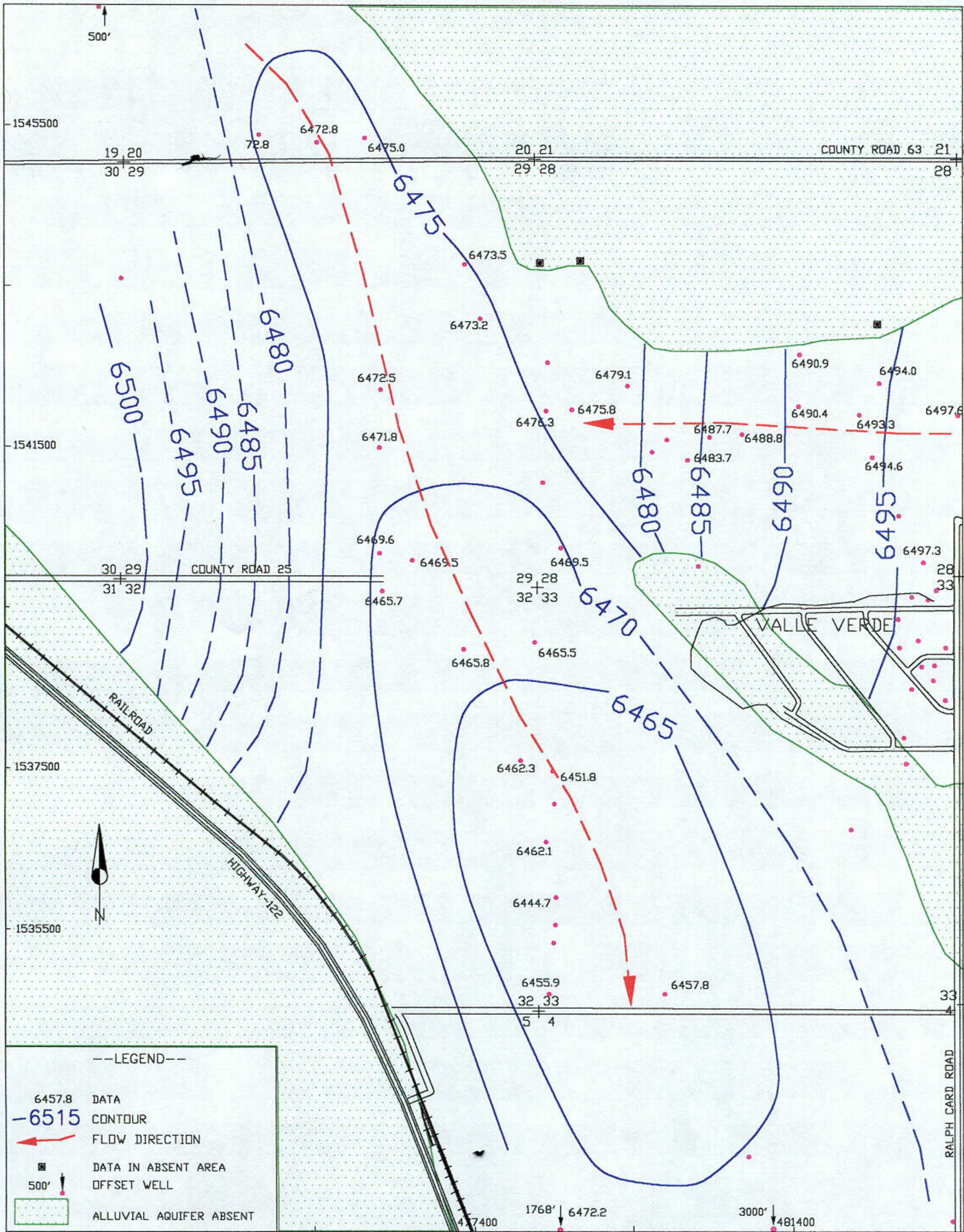
The pair of reversal wells B and BA is used to define the gradient between the M and J injection lines and the D collection line. Figure 4.2-8 presents water-level elevation data for wells B and BA. Well B is downgradient of well BA, and a ground-water reversal is demonstrated when its water-level elevation is greater than that in well BA. A ground-water gradient from the south to the north exists in this area and the gradient reversal was maintained in 2001. Water levels in this area overall were steady in 2001.

Figure 4.2-9 presents water-level elevation plots for alluvial wells BP, D1, M5 and PM, which are located near the collection ponds (lined). This plot shows that the water levels gradually increased in 2001 in all of these wells.

Water-level elevations in the alluvial aquifer near the small tailings collection system, at reversal wells KF and KZ, are presented on Figure 4.2-10. Well KF is further south and closer to the J injection line and, therefore, naturally downgradient of well KZ. This plot shows that during 2001 a reversal of the ground-water gradient was maintained. This pair of reversal wells will be adequate to define the ground-water gradient between the major zone of fresh-water injection and the collection system until the injected fresh water moves to the north of these wells. Injection between these two wells is planned for 2002, which makes these two wells unusable as a pair of reversal wells. Water levels in well KZ will continue to be used to define the head of the injection mound in this area.

Figure 4.2-11 presents water-level elevation data for wells B11, DQ, L6 and TB. This data demonstrates the changes in water levels near the north and east sides of the small tailings. The variable water levels in well B11 are due to the collection from this well. The R.O. injection to the east of well TB has caused the higher water-level elevations in this area and in the area of well L6. Figure 4.2-12 shows the water-level elevation plots for wells I, KN, X and Y. Water levels were maintained high in wells KN, X and Y in 2001 except for one low value from well X, which is thought to be in error.

Water-level elevations in the alluvial aquifer south of the Broadview Acres injection system were fairly steady during 2001 (see water levels for wells Sub1, 453 and 490 on Figure 4.2-13). Some decline in water level was observed in alluvial well 497 with one of the 2001 water levels being an outlier. Water levels were fairly steady in alluvial wells FB, 844, 846, 688 and MX during 2001 (see Figure 4.2-14).



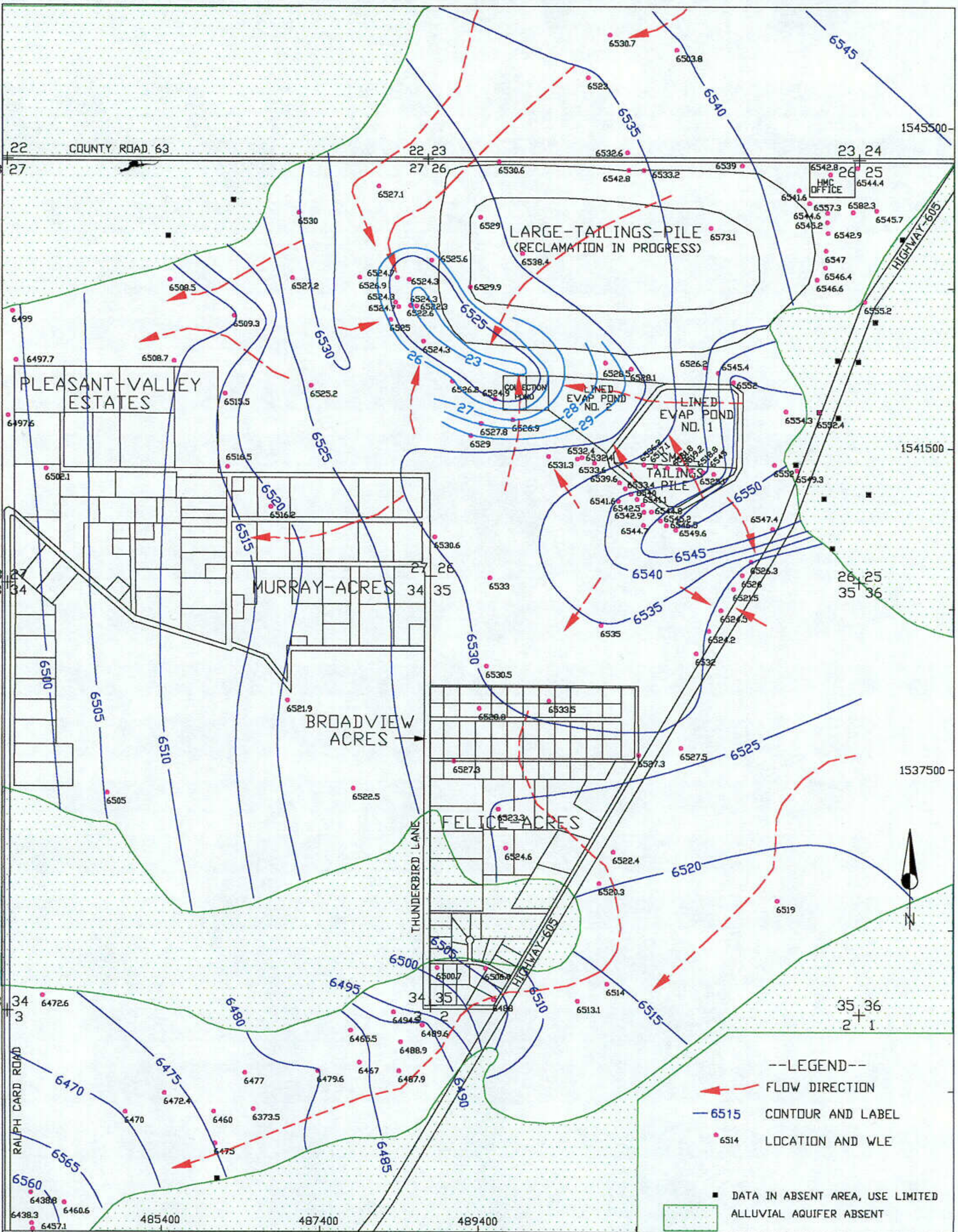

| SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02 |
|---|---|---|

FIGURE 4.2-1A. WATER-LEVEL ELEVATION FOR THE ALLUVIAL AQUIFER (WEST AREA), FALL 2001, FT-MSL

D:\R13\HMC\01WQAL lh



C07



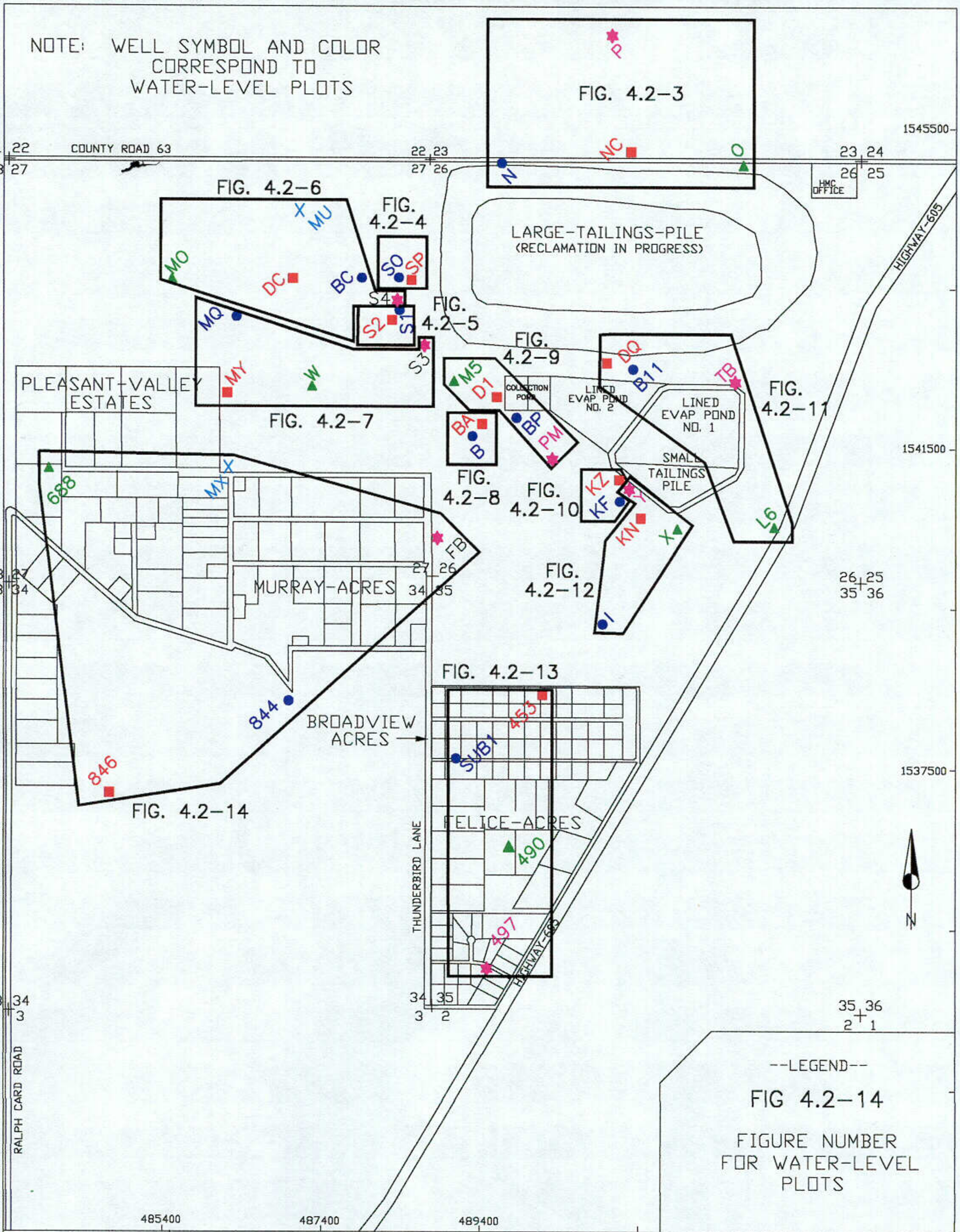

| SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/14/02 |
|---|---|---|

FIGURE 4.2-1B. WATER-LEVEL ELEVATION FOR THE ALLUVIAL AQUIFER, FALL 2001, FT-MSL

D:\R13\HMC\
01EQAL lh



C08




SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/14/02

FIGURE 4.2-2. LOCATIONS OF ALLUVIAL WELLS WITH WATER-LEVEL PLOTS

D:\R13\HMC\ 01EQAL lh



C09

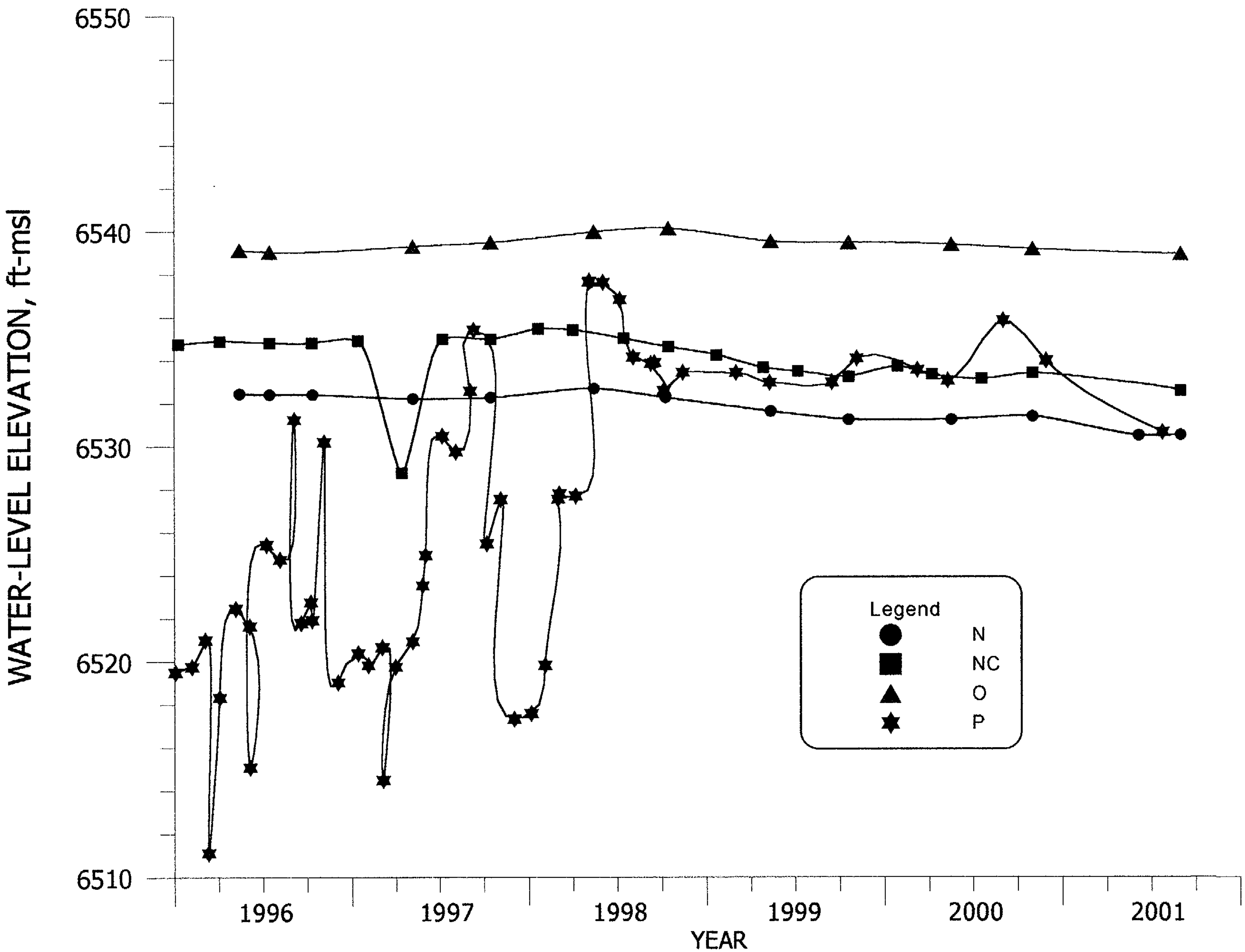



**FIGURE 4.2-3. WATER-LEVEL ELEVATION FOR WELLS N, NC, O AND P.**

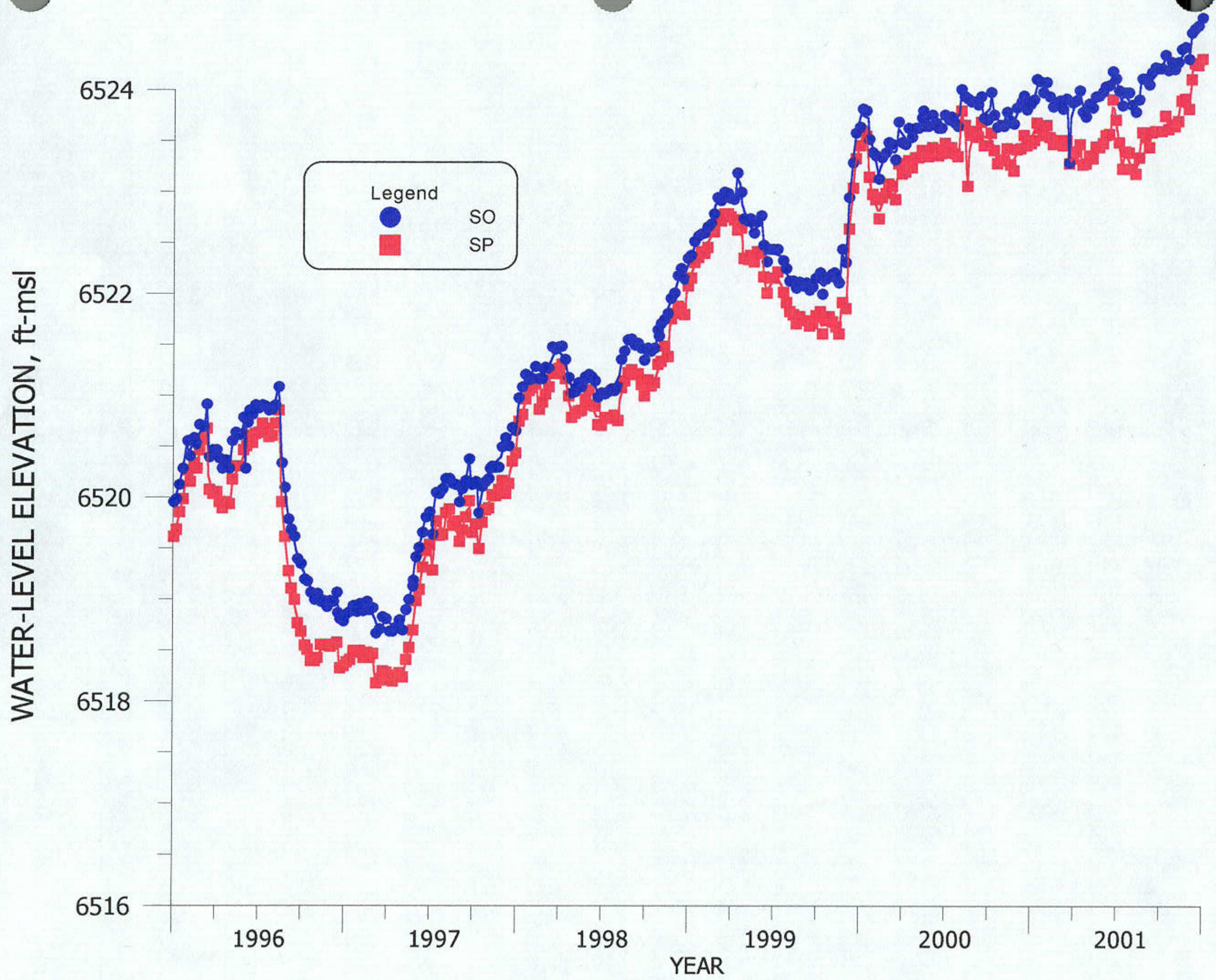



**FIGURE 4.2-4. WATER-LEVEL ELEVATION FOR WELLS SO AND SP.**



C09.1

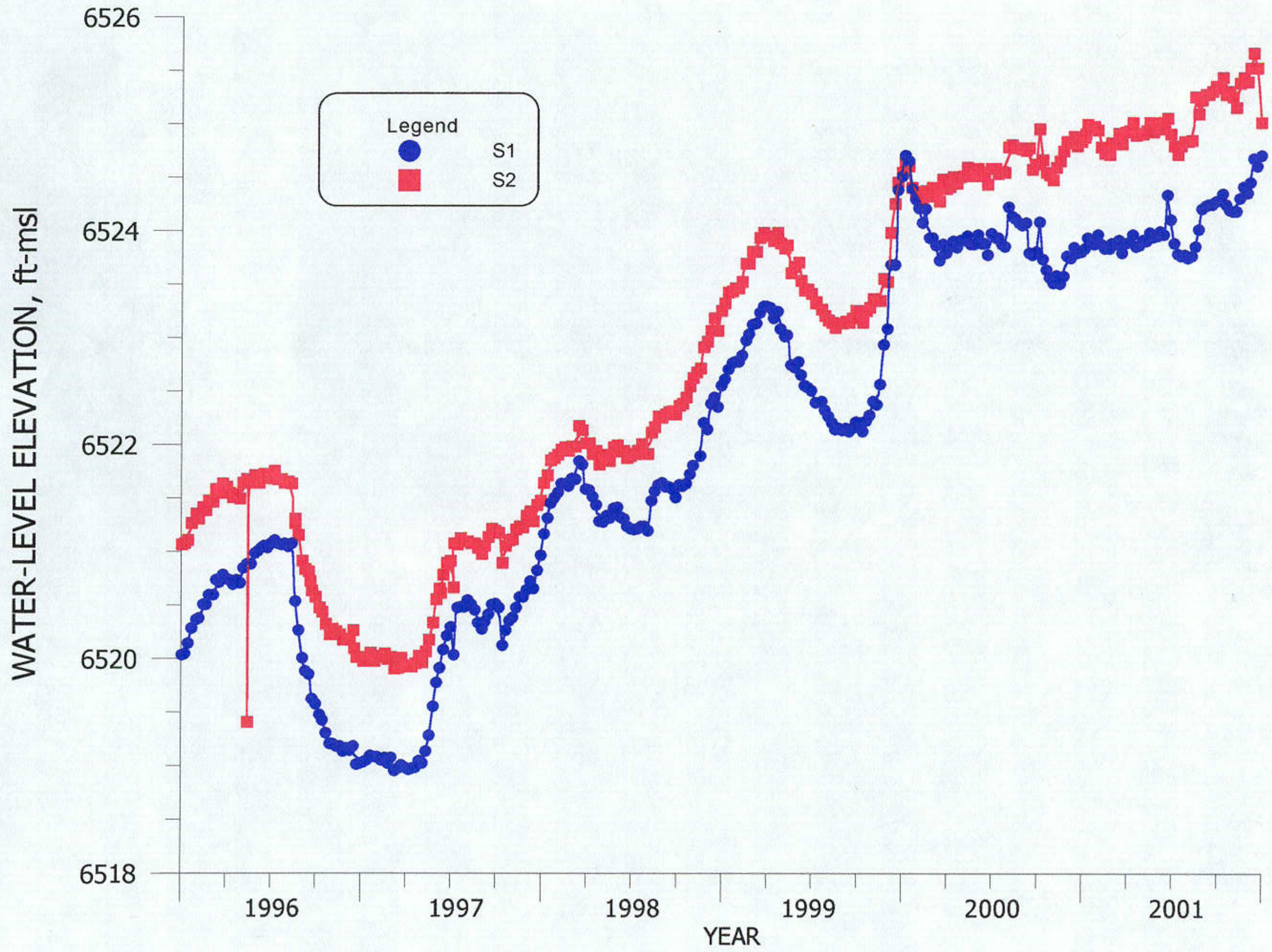



FIGURE 4.2-5. WATER-LEVEL ELEVATION FOR WELLS S1 AND S2.



C09.2

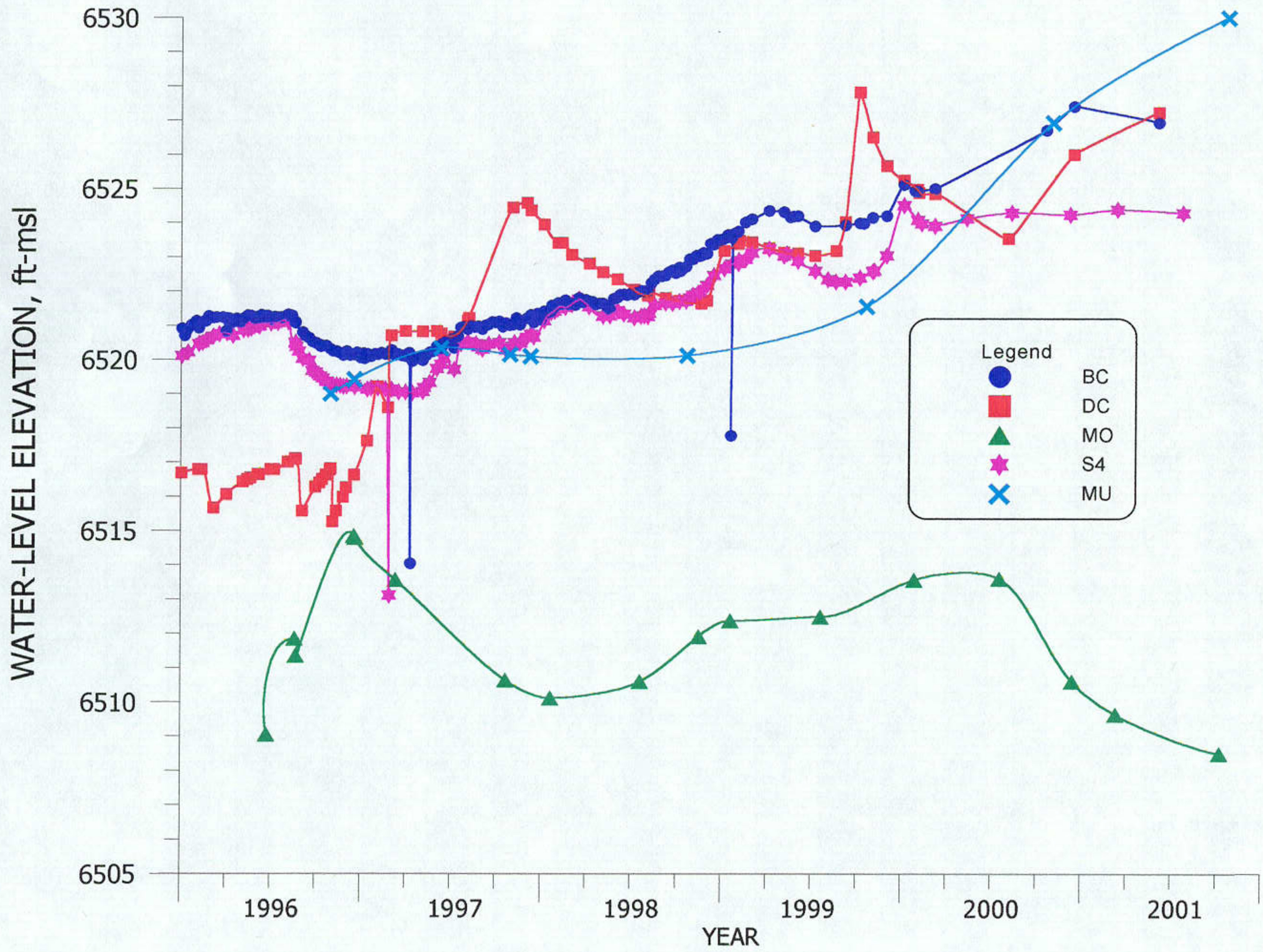



**FIGURE 4.2-6. WATER-LEVEL ELEVATION FOR WELLS BC, DC, MO, S4 AND MU.**



C09.3

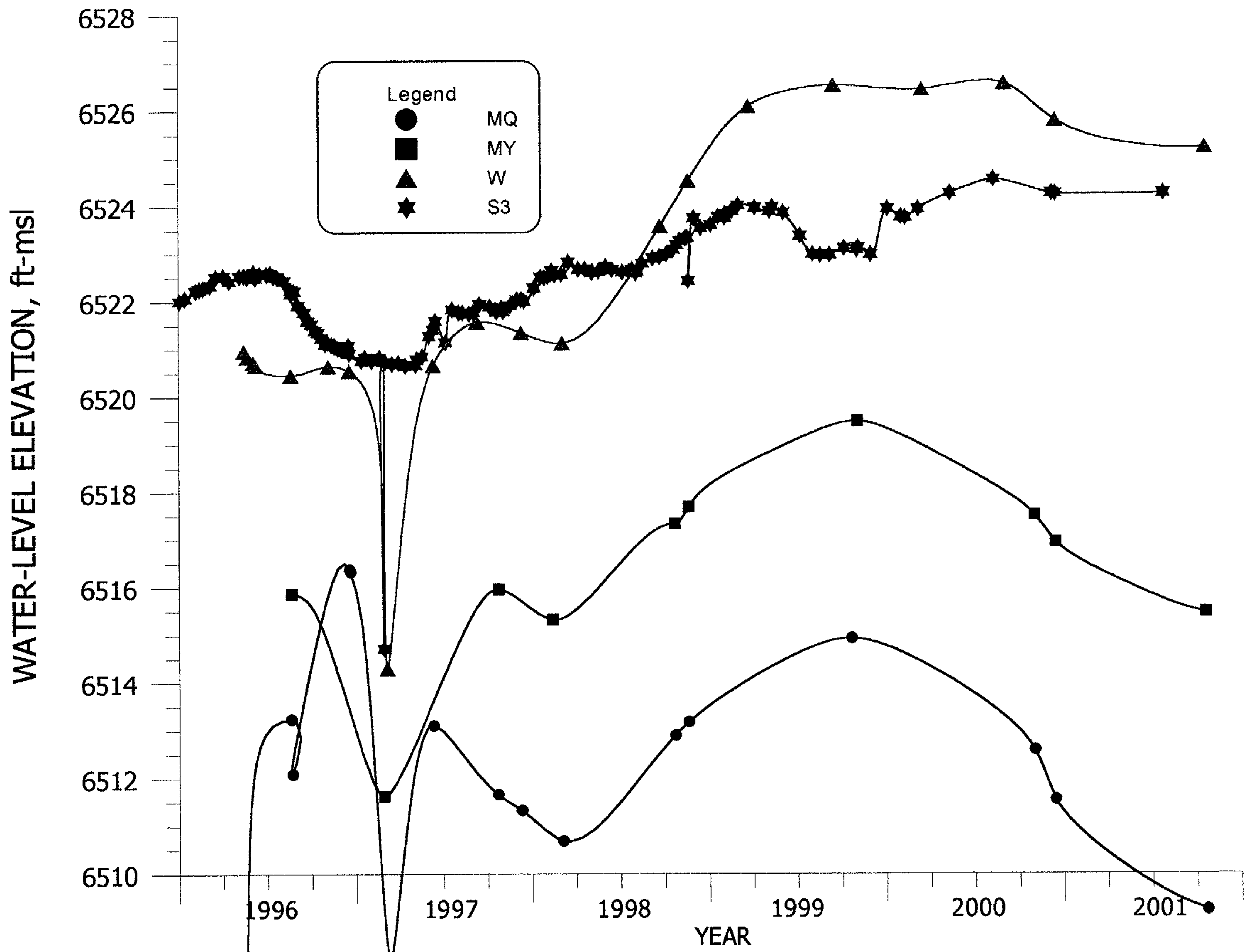



**FIGURE 4.2-7. WATER-LEVEL ELEVATION FOR WELLS MQ, MY, W AND S3.**

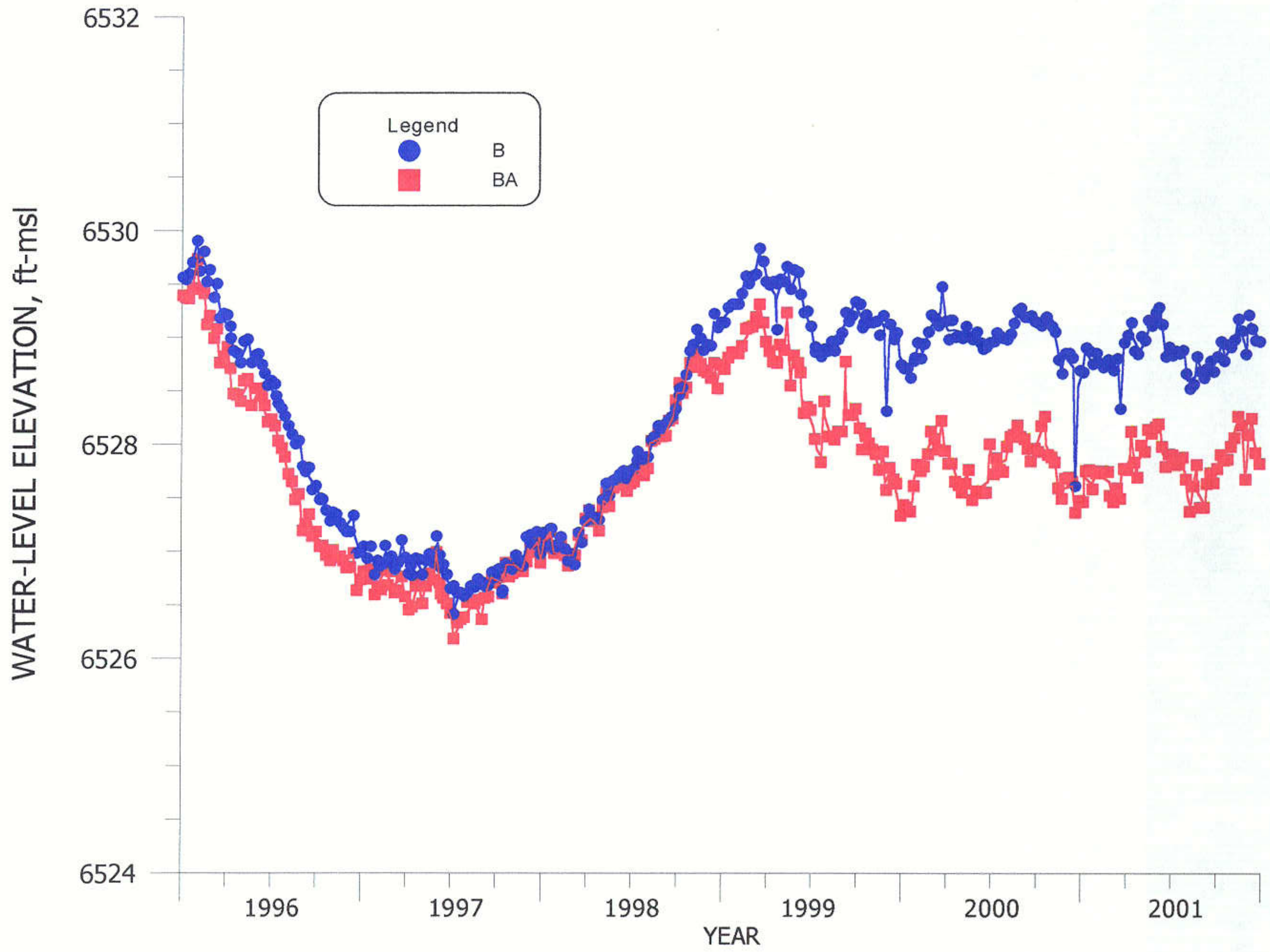



**FIGURE 4.2-8. WATER-LEVEL ELEVATION FOR WELLS B AND BA.**



C09.4

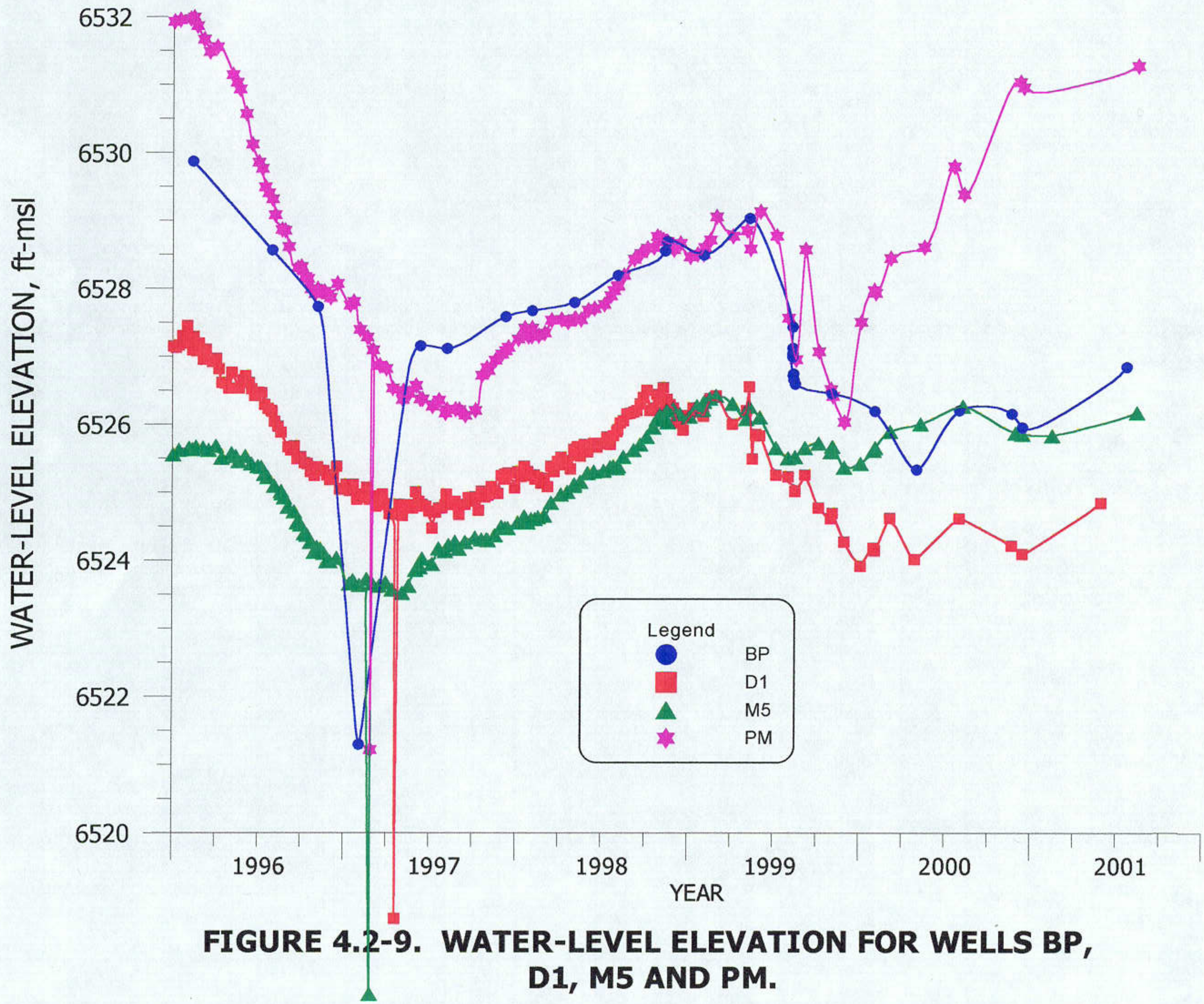



FIGURE 4.2-9. WATER-LEVEL ELEVATION FOR WELLS BP, D1, M5 AND PM.



C09.5

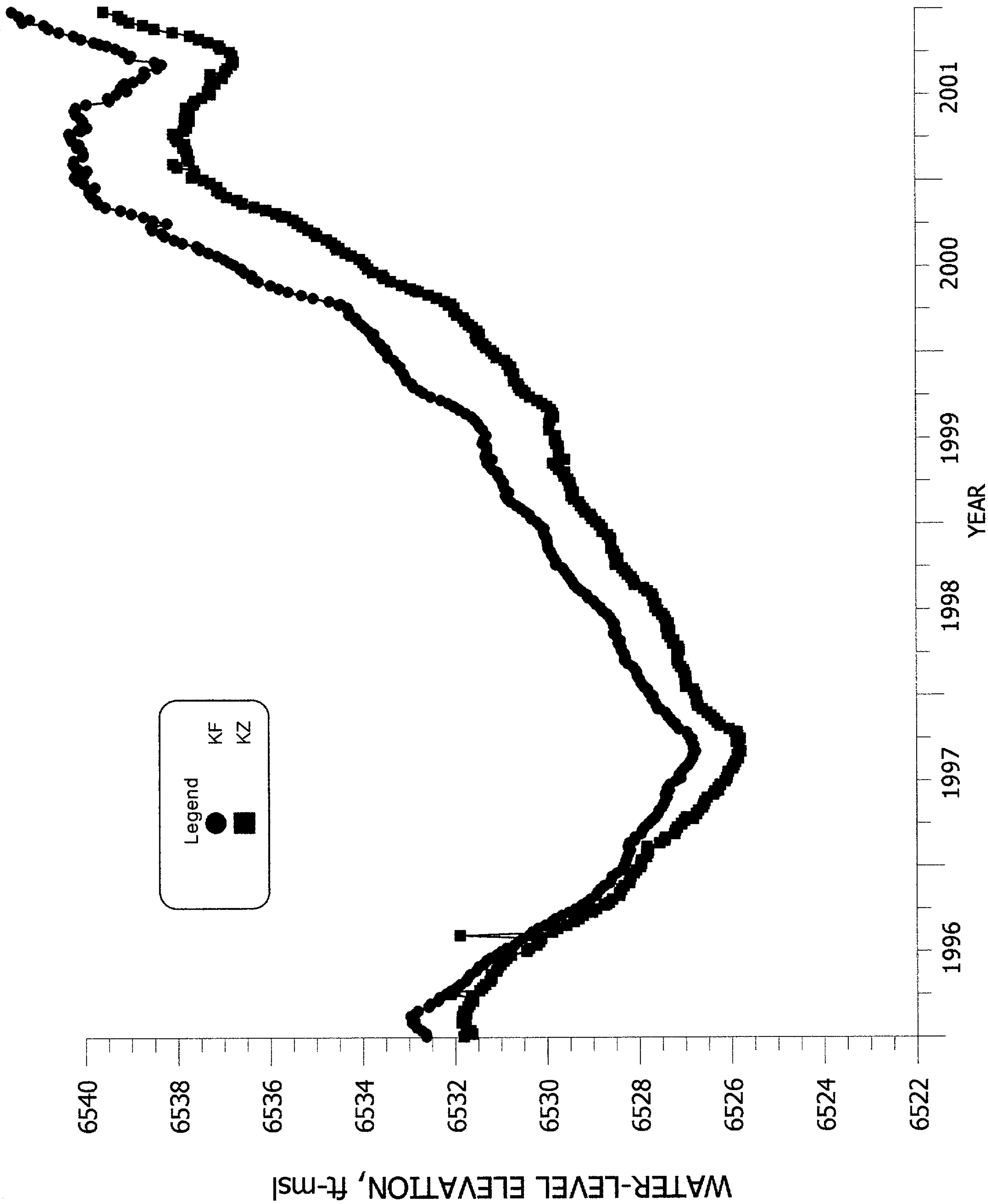



**FIGURE 4.2-10. WATER-LEVEL ELEVATION FOR WELLS KF AND KZ.**

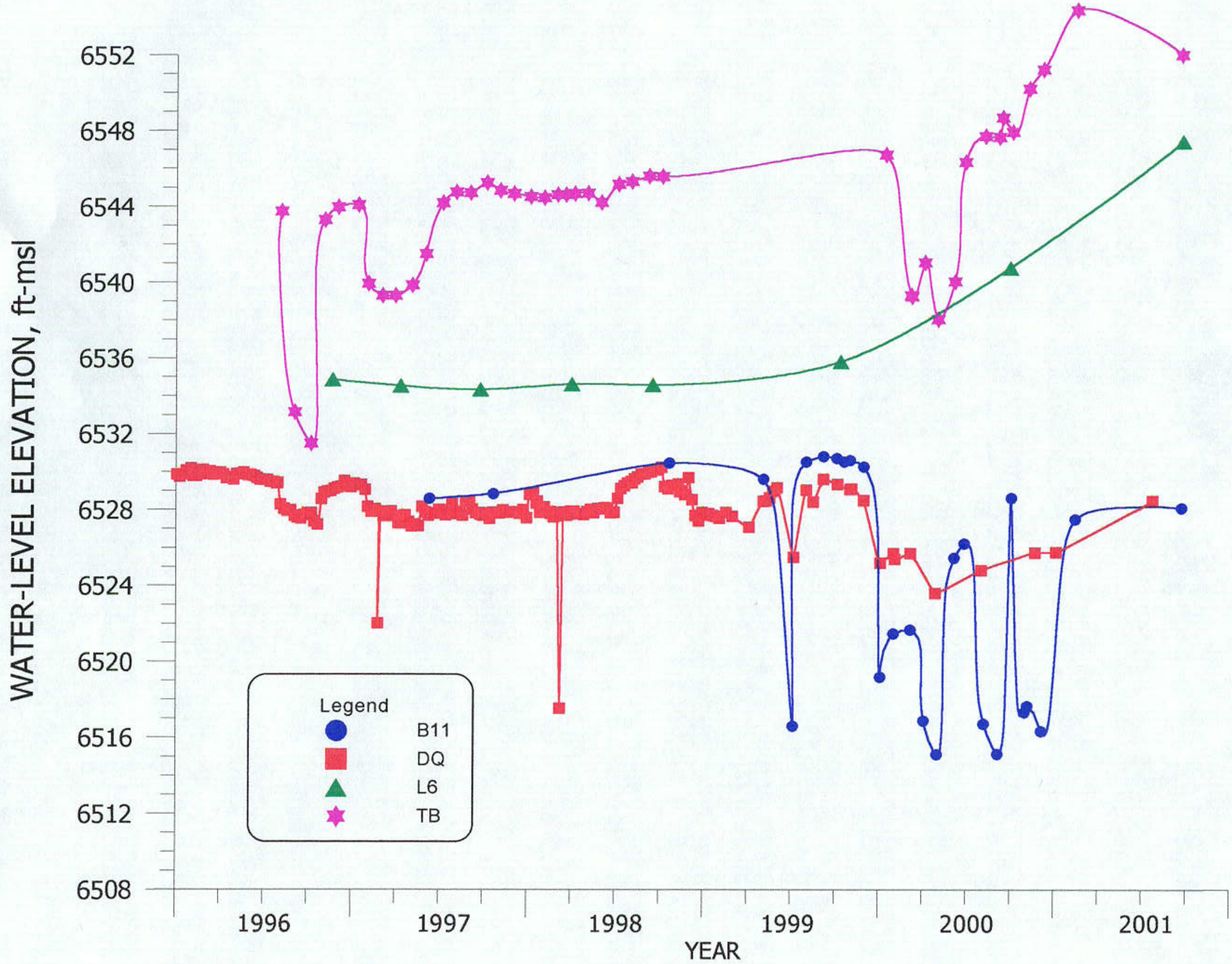



**FIGURE 4.2-11. WATER-LEVEL ELEVATION FOR WELLS B11, DQ, L6 AND TB.**



C09.6


FIGURE 4.2-12. WATER-LEVEL ELEVATION FOR WELLS I, KN, X AND Y.



C09.7

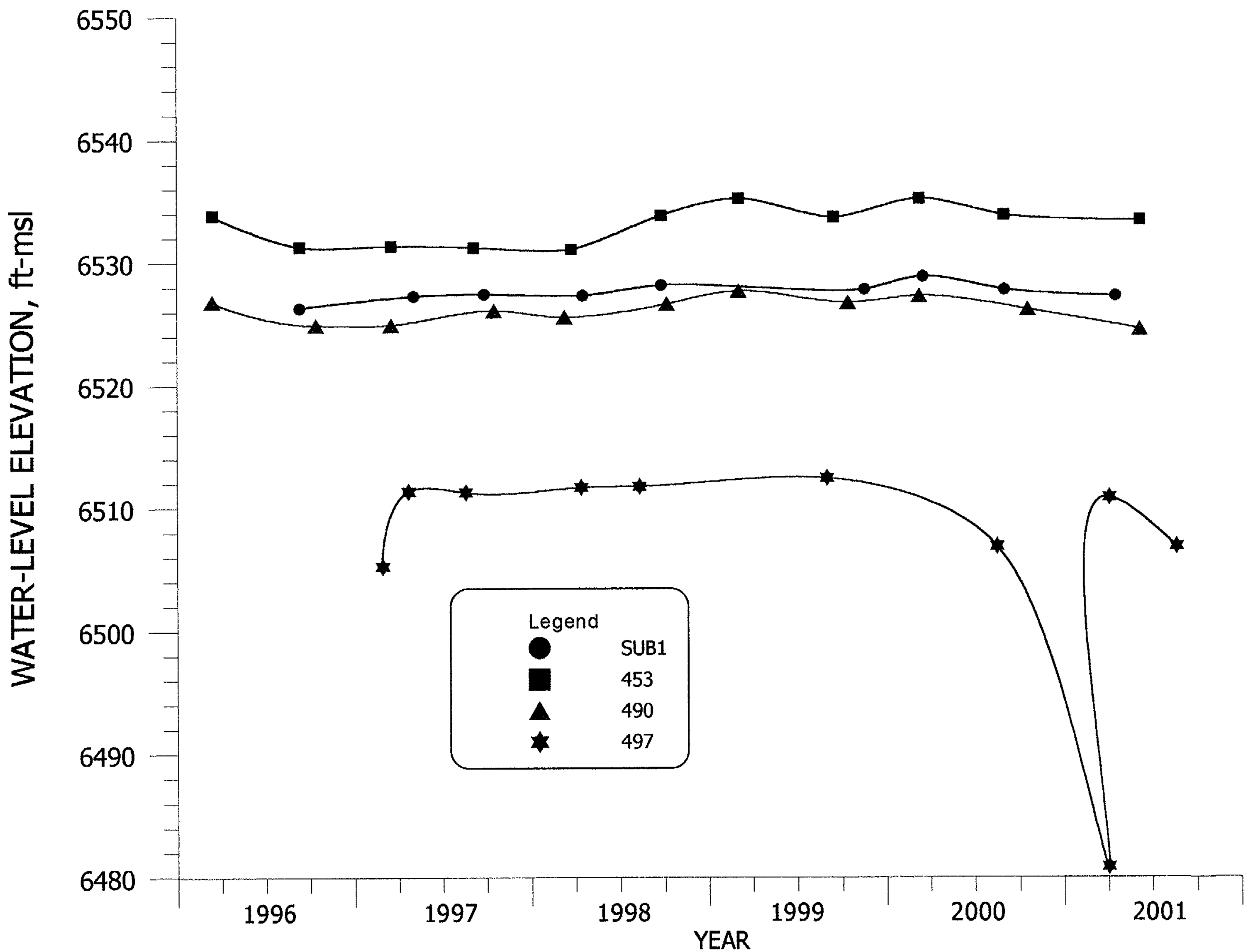



**FIGURE 4.2-13. WATER-LEVEL ELEVATION FOR WELLS SUB1, 453, 490 AND 497.**

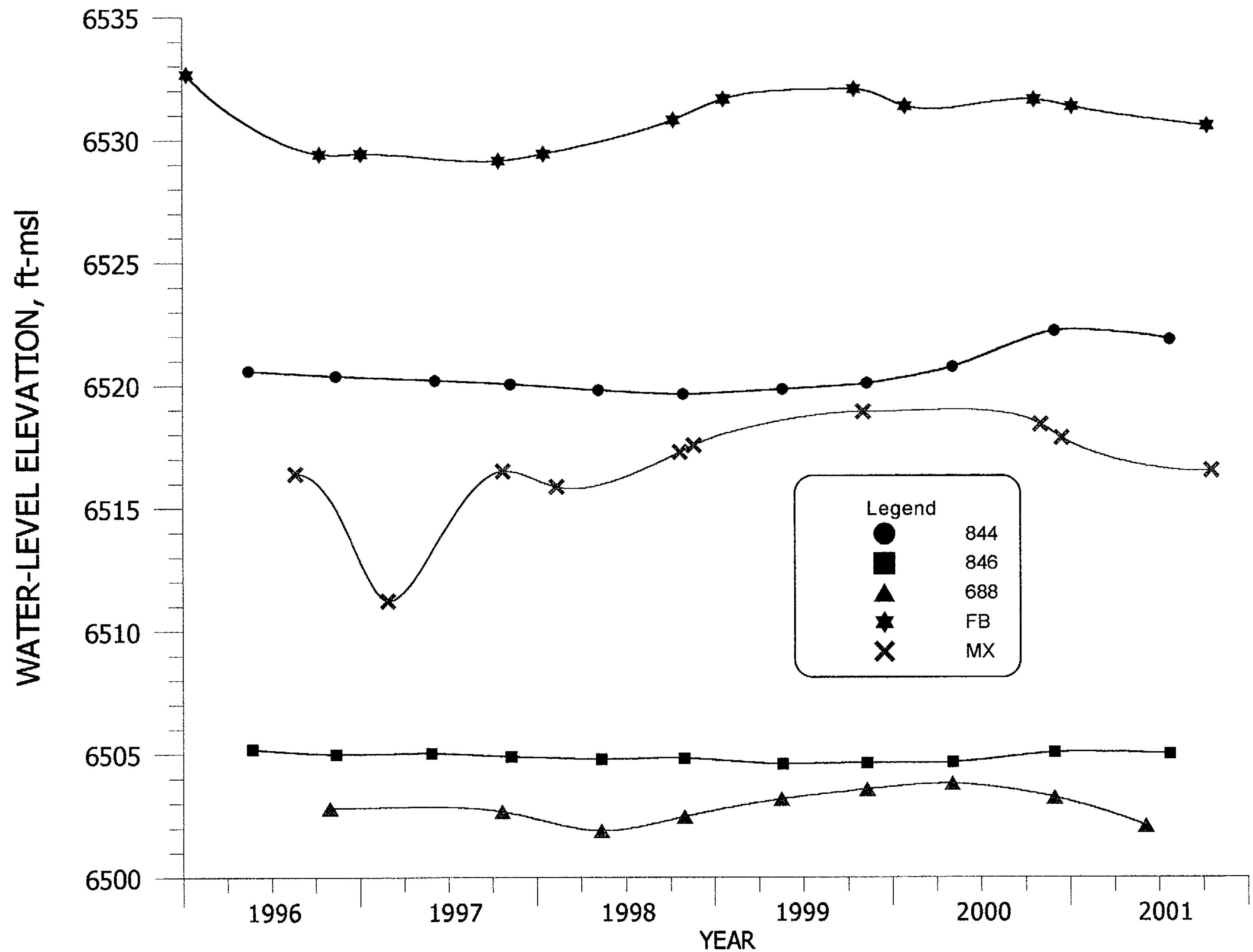



**FIGURE 4.2-14. WATER-LEVEL ELEVATION FOR WELLS 844, 846, 688, FB AND MX.**

## 4.3 ALLUVIAL WATER QUALITY

This section presents the 2001 water-quality data for the alluvial aquifer. The major constituents that are typically measured at this site are sulfate, chloride and TDS, with sulfate concentrations being the most important indication for contaminant remediation. Selenium, uranium and molybdenum are the hazardous constituents of most concern at this site. Nitrate, radium, chromium, vanadium and thorium are also discussed in the monitoring report but are not very important at this site. Tables B.4-1 through B.4-6 of Appendix B present the 2001 alluvial water-quality data for each well. The most recent value observed during the monitoring in 2001 was used for the concentration contour figures. The basic well data tables are presented in Section 4.1 for the alluvial wells.

Colored patterns are used on some of the figures to delineate important concentration limits for each of the constituents. Wells located near the unsaturated portion of the alluvial aquifer are depicted with a square symbol and water-quality data from these sources are potentially unreliable.

### 4.3.1 SULFATE - ALLUVIAL

Sulfate concentrations have been used as the main indicator constituent for this site because concentrations are large in the tailings solution. Concentrations of sulfate in the alluvial aquifer for the Fall of 2001 are presented on Figures 4.3-1A and 4.3-1B. Background concentrations observed in 2001 range from 46 to 1380 mg/l. The background and standard information is presented in the left upper corner on the east area figure for each parameter. The New Mexico sulfate standard for this site is 976 mg/l. An updated statistical evaluation of the background sulfate concentration with data through 1998 showed that concentrations as great as 1870 mg/l could be naturally occurring at this site. Therefore, this concentration has been used to show a blue pattern where significant sulfate concentrations exist. This information is presented in a box in the upper left side of Figure 4.3-1B for sulfate. No sulfate concentrations in the alluvial aquifer exceed 1870 mg/l on the west map (see Figure 4.3-1A). The areas that exceed this concentration and, therefore, contain the blue shading on Figure 4.3-1B are primarily adjacent to the two tailings piles. Sulfate concentrations in an area of the large tailings pile still exceed 10,000 mg/l. A significant amount of additional reduction in sulfate concentration has existed along the restoration zone, south and east of the small tailings pile, in 2001. The sulfate concentrations observed in Broadview and Felice Acres were less than 1000 mg/l in 2001, except for values of 1440 and 1200 mg/l from wells Sub3 and 491 respectively. Sulfate concentrations have declined in Section 3 and are all less than 850 mg/l in 2001. Sulfate concentrations exceed 1000 mg/l in the southwest portion of Murray and Pleasant Valley. Sulfate concentrations exceed 1000 mg/l adjacent to the zero saturation boundary in the northern portion of Section 27 (see Figure 4.3-1B) and continuing into Section 28 (see Figure 4.3-1A). Downgradient of the Grants Project site, the sulfate concentrations are all within natural range of background and, therefore, no restoration of sulfate is needed beyond the Grants Project area.

Water-quality concentrations versus time have been developed for the alluvial aquifer for sulfate, uranium, selenium and molybdenum. The groupings of wells used for these plots are shown on Figure 4.3-2. This figure shows the sulfate figure numbers for each of these groupings. The color and symbol used for each well are the same as those used in the time plots for each constituent. The sulfate figure number is shown on Figure 4.3-2 near each group of wells. Figure numbers for other water-quality parameters are not shown on this map but the location map should be useful for the other time concentration plots because the color, symbol and well groupings are the same.

Figure 4.3-3 presents the sulfate concentrations plotted versus time for upgradient wells NC, P, P3 and P4. This plot shows that an overall, gradual increasing trend is possibly occurring in the upgradient wells P and P3. The historical values for well P shows similar periods of short term increasing period for the alluvial aquifer. The changes in sulfate concentration in these wells are well within the range observed for sulfate in the upgradient wells. The increases could be due to higher concentrations upgradient of Homestake's background wells flowing into this area.

Sulfate concentrations in alluvial well S3 were fairly steady in 2001 with an overall declining trend since 1995 (see Figure 4.3-4). The sulfate concentration for well S2 declined in 2001 to a value similar to those in wells S3 and S4. Overall steady sulfate concentrations were observed in well S4 in 2001. Concentrations have been steady to the northwest of the large tailings at well S11.

Figure 4.3-5 presents the sulfate concentrations versus time for alluvial wells BC, DC, MO, MU and W. The sulfate concentrations declined in alluvial wells MO and MU in 2001, while concentrations slightly increased in wells BC and DC. Concentrations stayed small in well W in 2001.

The fourth sulfate concentration plot for the alluvial wells is presented for wells B, BP, D1, M5 and PM (see Figure 4.3-6). This figure shows that the overall sulfate concentrations in each of these wells declined in 2001 with the exception of fairly gradual rise in concentrations in BP.

Figure 4.3-7 presents the sulfate concentrations versus time for wells B11, DQ, S5, T, TA and TB. The sulfate concentrations in collection wells B11 and DQ have decreased during 2001, while sulfate concentrations in well S5 gradually increased. Values in wells T, TA and TB have decreased, showing the influence of the R.O. injection.

Figure 4.3-8 presents the sulfate concentrations versus time for alluvial wells on the west side of the small tailings. This plot shows fairly steady sulfate concentrations in wells C5 and C6 in 2001, while concentrations in wells C9 and C12 declined in 2001.

Figure 4.3-9 presents the sulfate concentrations versus time for alluvial wells on the south side of the small tailings. This figure shows that the sulfate concentrations in these wells varied with time in 2001 due to variations in the amount of the R.O. product injection flowing to these wells. Figure 4.3-10 shows the sulfate concentrations for the small tailings collection wells K4, K5, K7 and K10. Some increase in 2001 was observed in wells K4 and K5, while sulfate concentrations declined in wells K7 and K10.

Sulfate concentrations in collection wells to the southeast of the small tailings are presented in Figure 4.3-11. This figure shows fairly steady concentrations in 2001 after a significant decrease in sulfate concentrations. Concentrations are low and very similar in these four L wells.

Figure 4.3-12 presents the sulfate concentration time plots for Broadview Acres alluvial wells 453, Sub1, Sub2 and Sub3. Small variations were observed in three of these Broadview wells in 2001 and their concentrations are all near the injection concentration. Concentrations in well Sub3 in 2001 were similar to the 1997 and 1998 higher values.

Figure 4.3-13 presents sulfate concentrations versus time for Felice Acres alluvial wells 490, 492, 496 and 497. The sulfate concentrations in these four wells were fairly steady in 2001.

Figure 4.3-14 shows sulfate concentrations for Murray Acres and Pleasant Valley alluvial wells 802, 844, 846, 688 and FB. This plot shows that sulfate concentrations for alluvial wells 802 and 844 gradually declined in 2001. Concentrations were fairly steady in alluvial wells 688, 846 and FB in 2001.

### 4.3.2 TOTAL DISSOLVED SOLIDS - ALLUVIAL

Total dissolved solids (TDS) concentration contours for the alluvial aquifer during the Fall of 2001 are presented on Figures 4.3-15A and 4.3-15B. The background TDS concentrations measured upgradient of the large tailings in the Fall of 2001 varied from 399 to 2690 mg/l. Based on our updated statistical analysis, a TDS concentration of 3060 mg/l or larger is needed to be confident that the concentrations are not naturally occurring. A light blue pattern is shown on Figure 4.3-15B to indicate where the TDS concentrations exist above 3060 mg/l. None of the concentrations in the west area exceed this level. The TDS concentrations near the tailings exceed 3060 mg/l for approximately 800 feet to the west of the large tailings. Some TDS concentrations in the large tailings area exceed 20,000 mg/l. A zone of 2000 mg/l extends to the west of the large tailings to the west side of Section 28 (see Figure 4.3-15A). An additional area of TDS concentrations greater than 2000 mg/l exists in the southern portion of Pleasant Valley and the southwest portion of Murray Acres and to the south of this area. A small area of TDS concentrations above 2000 mg/l extends into the southeast corner of Section 28. The only other areas of TDS concentrations above 2000 is a small area of TDS concentrations slightly above 2000 mg/l in western Broadview Acres, two wells in Felice Acres and one well in Section 3. Only the areas adjacent to the two tailings piles need restoration based on TDS.

### 4.3.3 CHLORIDE - ALLUVIAL

Chloride concentrations are important in defining tailings seepage due to the conservative nature of this constituent and low concentrations upgradient. The 2001 chloride concentration figure for the alluvial aquifer near the tailings is presented in

Figures 4.3-16. Upgradient chloride concentrations in the alluvial aquifer varied from 27 to 136 mg/l in the Fall of 2001. The fresh-water injection systems have used water with chloride concentrations of approximately 200 mg/l. A significant portion of the alluvial aquifer around the large and small tailings contained chloride concentrations in excess of the State drinking water standard of 250 mg/l. A light blue pattern is shown to define where concentrations exceed 250 mg/l. This figure shows that restoration is only needed near the tailings for chloride. No chloride concentrations have existed in the past in the west area above 250 mg/l.

### 4.3.4 URANIUM - ALLUVIAL

Uranium is also a very important parameter to this site due to the significant levels in the tailings seepage. Uranium data for the Fall of 2001 are presented on Figures 4.3-17A and 4.3-17B. Background uranium concentrations during the Fall of 2001 varied from 0.001 to 0.21 mg/l and the site standard is 0.04 mg/l (see notes in upper left corner of Figure 4.3-17B). A uranium concentration of 0.43 mg/l has been chosen as the important uranium value at this site. The light blue pattern on Figures 4.3-17A and 4.3-17B shows where uranium concentrations exceed 0.43 mg/l. Uranium concentrations exceed this level in the area of the large and small tailings pond and extend approximately 1300 feet to the west of the large tailings pile. Uranium concentrations above 0.43 mg/l also extend down to the L collection wells to the south of the small tailings. Uranium concentrations also exceed 0.43 mg/l in two small areas in the central and western portions of Section 27 and a narrow band through the central portion of Section 28. These uranium concentrations only slightly exceed the 0.43 mg/l value. Lower uranium concentrations extend further to the west, joining the Rio San Jose alluvial system in the eastern portion of Section 29. Uranium concentrations are also input to this area from the Rio San Jose alluvial system from Section 20. These lower concentrations have joined together and extend down to the southwest corner of Section 33.

An additional area of uranium concentrations above 0.43 mg/l exists in the southern portion of Felice Acres and to the southwest into Section 3 (see Figure 4.3-17B). These concentrations extend for approximately one-half mile to the southwest of the southwest corner of Felice Acres. A small area also exists in the northern portion of

Felice Acres. One small additional area in the northeast portion of Murray Acres at well 802 exceeds the 0.43 mg/l concentration. Some additional restoration is needed in each of these areas based on uranium concentrations.

Uranium versus time plots are presented for this constituent to demonstrate the variations observed with time. Figure 4.3-2 shows the location of the alluvial wells used for the uranium time plots. The figure numbers shown on Figure 4.3-2 correspond to the sulfate time plots. The same grouping of wells was used for the uranium plots and their symbols and colors are the same as the sulfate plots. Figure 4.3-18 presents the uranium concentrations versus time for upgradient wells NC, P, P3 and P4. The uranium concentrations in these four wells have been fairly steady for the last four years. The range in background uranium concentration for 2001 and the NRC site standard are shown on Figure 4.3-17B.

A decrease in uranium concentrations was observed in 2001 for well S4 (see Figure 4.3-19). Uranium concentrations in wells S2 and S3 also are showing an overall decline with time, while concentrations stayed low in well S11.

Figure 4.3-20 presents the uranium concentration plots for alluvial wells west of the large tailings pile. This plot shows that uranium concentrations are low and gradually declining in wells BC and MO, while concentrations were low in wells DC, MU and W.

Figure 4.3-21 presents the uranium concentrations for alluvial wells B, BP, D1, M5 and PM. Fairly steady 2001 concentrations have been observed in each of these wells except for a gradual decline in well D1.

Uranium concentrations versus time for alluvial wells B11, DQ, S5, T, TA and TB are presented in Figure 4.3-22. This figure shows that overall concentrations in collection well B11, T and TA and monitoring wells DQ and TB were declining in 2001. Fairly steady concentrations are observed in 2001 in well S5.

Figure 4.3-23 presents the uranium concentrations for collection wells on the west side of the small tailings. This plot shows that uranium concentrations in collection wells C6, C9 and C12 show an overall decline in concentration. Uranium concentrations stayed low in well C5.

Figure 4.3-24 presents uranium concentrations for wells on the south side of the small tailings. Uranium concentrations are low in each of these wells, due to the

R.O. product injection into this area. The rate of decline in uranium concentrations in wells K5, K7 and K10 decreased in 2001 (see Figure 4.3-25). An increasing trend was observed in collection well K4.

Uranium concentrations for alluvial wells L5, L6, L9 and L10 are presented on Figure 4.3-26. This plot shows a large decrease in uranium concentrations in 2001 in wells L5 and L6. The uranium concentrations in collection wells L9 and L10 show a gradual decline in 2001.

Figure 4.3-27 presents uranium concentrations versus time for four Broadview Acres alluvial wells: Sub1, 453, Sub2 and Sub3. Uranium concentrations in wells Sub1 and Sub2 have been similar and fairly steady in 2001. Uranium concentrations to the north in wells 453 and Sub3 have been small for several years.

Figure 4.3-28 presents the uranium concentrations for Felice Acres wells 490, 492, 496 and 497. Uranium concentrations in these four alluvial wells have also been fairly steady for the last four years, except for a small decline in uranium in wells 496 and 497.

Figure 4.3-29 presents the uranium concentrations for wells in the Murray and Pleasant Valley subdivision areas. Uranium concentrations peaked in late 1998 in well 802 with a small increase in 2001. Uranium concentrations in the remaining alluvial wells in this area are low and concentrations in alluvial well 802 would be expected to gradually decrease with time.

### 4.3.5 SELENIUM - ALLUVIAL

Selenium is one of the important parameters at the Grants site due to significant levels of this constituent historically in the tailings. Figures 4.3-30A and 4.3-30B present the selenium concentrations for the west and east sides. Although the selenium site standard is 0.1 mg/l, only values equaling or exceeding 0.27 mg/l can be considered non-naturally occurring, based on statistical analysis. The important selenium concentration at this site has been selected to be greater than 0.27 mg/l. A blue pattern on the concentration contour figures is used to show where concentrations exceed 0.27 mg/l. No areas of selenium concentrations above 0.27 exist in the west area (see Figure 4.3-30A). A 0.1 mg/l contour extends approximately one mile into the west area in the central portion of Section 28 and also extends slightly into Section 4 from the Section 3 area.

Concentrations exceeding 0.27 mg/l exist around the large and small tailings pile (see Figure 4.3-30B). The 0.27 mg/l concentrations extend approximately 1200 feet to the west of the large tailings and extends down to the south of the small tailings in the area of the L collection wells. An additional two areas of concentrations that exceed 0.27 mg/l exists in Section 3, southwest of Felice Acres. None of the concentrations in the subdivisions exceed 0.1 mg/l. This shows that the area near the tailings and portions of Section 3 need additional restoration based on selenium.

The time concentration plots for selenium are presented to define the variations with time for this constituent in the alluvial aquifer. Figure 4.3-2 should be used to determine the location of wells in each of the groups of plots. The symbols and colors used on Figure 4.3-2 are the same on each constituent time plot. Figure 4.3-31 presents the selenium concentrations for upgradient wells NC, P, P3 and P4. This plot shows variable concentrations for four years in upgradient wells P, P3 and P4. The average selenium concentration from well P has been higher since well P has not been continuously pumped as part of the upgradient collection in early 1998. Selenium concentrations in upgradient well NC have been fairly steady in 2001. The NRC and State site standards and the 2001 range in selenium values for all upgradient wells are also shown on Figure 4.3-30B.

Figure 4.3-32 shows an overall declining trend in well S4. An overall gradual decreasing trend has been observed in well S3 for the last few years. A significant decrease has been observed in well S2 during 2001. Steady concentrations have been observed in well S11 for the last three years.

Figure 4.3-33 presents the selenium concentrations for wells BC, DC, MO, MU and W. Selenium concentrations have stayed low in these wells.

The selenium concentrations for alluvial wells to the southwest of the large tailings are presented in Figure 4.3-34. This figure shows an overall decrease in selenium concentrations in wells B, D1, M5 and PM during 2001. Overall steady concentrations were observed in well BP.

Figure 4.3-35 presents the selenium concentrations for wells B11, DQ, S5, T, TA and TB. A decreasing trend in selenium is being observed in well B11 in 2001, while selenium concentrations in well DQ were fairly steady in 2001. A decline in selenium concentrations in wells TA and TB occurred in 2001, while fairly steady concentrations were observed in well S5.

The selenium concentrations versus time for collection wells on the west side of the small tailings pile are presented in Figure 4.3-36. This plot shows that the selenium concentrations in wells C9 and C12 exhibit a general decline the last few years. Fairly steady concentrations are being observed in wells C5 and C6.

Figure 4.3-37 presents selenium concentrations versus time for wells on the south side of the small tailings. This figure presents values for wells KC, K2, X and Y. This plot shows small concentrations in 2001 in each of these wells due to the R.O. product injection in this area. Selenium concentrations in wells K5 and K10 declined in 2001 (see Figure 4.3-38). Concentrations in 2001 in collection well K7 were steady while levels increased in well K4.

Figure 4.3-39 presents the selenium concentrations for wells L5, L6, L9 and L10. A large decreasing trend is indicated by the data for well L6. Fairly steady selenium concentrations with time are being observed in collection wells L5, L9 and L10 in 2001.

Figures 4.3-40 and 4.3-41 present the selenium concentrations for the Broadview and Felice Acres alluvial wells. These plots show that the selenium concentrations have been reduced and maintained at low levels for the last several years in these two subdivisions, except for the slightly higher values in southern Felice wells 496 and 497. Selenium concentrations slightly declined in 2001 in well 496. Selenium concentrations are presented for the Murray Acres and Pleasant Valley areas in Figure 4.3-42. This plot shows low selenium concentrations in these monitoring wells in this area of the alluvial aquifer. A very gradual increasing trend within the background range has been observed in well 846.

### 4.3.6 MOLYBDENUM - ALLUVIAL

This section discusses the molybdenum concentrations in the alluvial aquifer at the Grants Project during the Fall of 2001. Figure 4.3-43 presents the concentration contours. Molybdenum concentrations in the west area have been less than 0.03 mg/l and therefore are not routinely measured. Therefore, no molybdenum figure for the west area was developed for 2001. The extent of movement of molybdenum is significantly less than that of selenium and uranium. Molybdenum concentrations exceed 100 mg/l near the large tailings and a 10 mg/l contour extends around both the small and large tailings. Significant molybdenum concentrations extend approximately 800 feet west of the large tailings pile and also to the southeast of the small tailings pile to the L collection wells. One alluvial well in Felice Acres slightly exceeds 0.1 mg/l of molybdenum.

The light blue patterned area on Figure 4.3-43 shows the area where molybdenum concentrations exceed 0.73 mg/l. This concentration has been chosen as the significant level of this constituent at this site. This shows that molybdenum concentrations need to be restored only adjacent to the tailings and near the L collection line.

Molybdenum concentrations versus time plots have been developed for the alluvial aquifer because this parameter is significant to this aquifer. Figure 4.3-44 presents the molybdenum concentrations for the upgradient wells NC, P, P3 and P4. This plot shows that the concentrations have remained low in these four wells. The color and symbol used on the molybdenum plots are shown on Figure 4.3-2.

A decreasing trend with time is being observed in wells S2 and S3 in 2001, while the molybdenum concentrations in well S4 were fairly steady in 2001 (see Figure 4.3-45). Molybdenum concentrations in well S11 were not detected prior to dropping this constituent from this well.

Figure 4.3-46 presents the molybdenum concentrations for wells BC, DC, MO, MU and W. Molybdenum concentrations in each of these wells are low and steady.

Figure 4.3-47 presents the molybdenum concentrations for wells B, BP, D1, M5 and PM. Molybdenum concentrations in well M5 were fairly steady in 2001 after significantly declining prior to 2000. A fairly steady concentration will time is being observed in wells B, BP, D1 and PM.

Figure 4.3-48 presents the molybdenum concentrations for wells B11, DQ, S5, T, TA and TB. A sharp decline in the molybdenum concentration in well DQ was observed in 2000 and 2001 after an overall increase during the previous few years. Molybdenum concentrations in well S5 were steady in 2001. Molybdenum concentrations in wells B11, TA and TB gradually declined in 2001.

Molybdenum concentrations for wells on the west side of the small tailings are presented in Figure 4.3-49. This figure shows large molybdenum concentrations in wells C6, C9 and C12 with each declining in 2001. Small concentrations were maintained in well C5.

Figure 4.3-50 presents the molybdenum concentrations for the wells on the south side of the small tailings. This plot shows small molybdenum concentrations in wells KC, K2, X and Y during the last year. Figure 4.3-51 shows a decline in concentrations in well K10, fairly steady levels in wells K5 and K7 and an increase in well K4 in 2001.

Figure 4.3-52 presents molybdenum concentrations further to the southeast in wells L5, L6, L9 and L10. A significant decreasing trend was observed in wells L5, L6 and L9 during 2001. Fairly steady molybdenum concentrations in well L10 were observed.

Molybdenum concentrations for alluvial wells in Broadview and Felice Acres are presented in Figure 4.3-53 and 4.3-54. The molybdenum concentrations in Broadview wells Sub1, Sub2, 453 and Sub3 have been low for the last several years. A slightly higher molybdenum concentration exists in well 490 in Felice Acres with a small declining trend with time during the last three years.

Figure 4.3-55 shows the molybdenum concentration in wells in the Murray Acres and Pleasant Valley area. This plot shows that molybdenum concentrations have remained low in these alluvial wells except for the first value in 2001 for well FB. This value is thought to be an outlier.

### 4.3.7 NITRATE - ALLUVIAL

Some of the nitrate concentrations upgradient of the Grants site generally exceed the State drinking water standard of 12.4 mg/l of nitrate for this site (see Table 3.1-1). A statistical analysis of the upgradient data through 1998 shows that a nitrate concentration of 23 mg/l is needed to be 95% confident that it is not from natural upgradient levels. Figures 4.3-56A and 4.3-56B present the nitrate concentrations during the Fall of 2001 for the alluvial aquifer. The nitrate concentrations north and upgradient of the tailings at this site have affected the nitrate concentrations downgradient of the large tailings in the northern portion of Sections 27 and 28. It is difficult to determine whether the tailings has affected the nitrate concentrations in this area due to the naturally higher concentrations upgradient. The nitrate concentrations in the northeast portion of Section 27 that exceed 23 mg/l are likely natural levels due to the ground-water flow in this area. Figure 4.3-56A shows that higher nitrate concentrations exist in Section 20 and extend down into Section 29. These higher nitrate concentrations in the Rio San Jose alluvial system are also upgradient and enter the combination San Mateo and Rio San Jose system upgradient of where the Homestake site alluvial water meets the Rio San Jose. Therefore, none of these nitrate concentrations can be attributed to the Homestake tailings seepage.

Nitrate concentrations exceed 10 mg/l in an area between the large and small tailings but none of these values exceed 23 mg/l. This parameter has been adequately restored. Time plots for nitrate concentrations in the alluvial aquifer have not been developed because this parameter is not very important to this site.

### 4.3.8 RADIUM-226 AND RADIUM-228 - ALLUVIAL

Figure 4.3-57 presents radium concentrations in the Grants Project area. The radium concentrations are very small in the alluvial aquifer. A figure for radium for the west area was not developed. Monitoring of radium concentrations have been reduced due to the insignificant concentrations in the alluvial aquifer. The radium-226 concentrations are presented horizontally, while the radium-228 values are shown at a 45$^{\circ}$ angle and in a magenta color. The State standard for radium-226 plus radium-228 is 30 pCi/l, while the NRC site standard is 5 pCi/l (see upper left corner of Figure 4.3-57 for this information). Three radium-226 concentrations in the three vertical drains in the large tailings exceeded the site standard in 2001. No radium concentrations outside of the tailings exceeded the standard. Past data has shown that radium is not mobile at this site in the alluvial aquifer. Radium concentrations at the Grants Site are, therefore, not significant, and these parameters should be dropped as a site standard. Radium-226 should be monitored annually at the three POC wells to demonstrate that concentrations are not increasing.

### 4.3.9 CHROMIUM - ALLUVIAL

Chromium has been removed as a standard for this site. The few chromium concentrations measured during the Fall of 2001 show that concentrations of this constituent are not increasing at the POC wells.

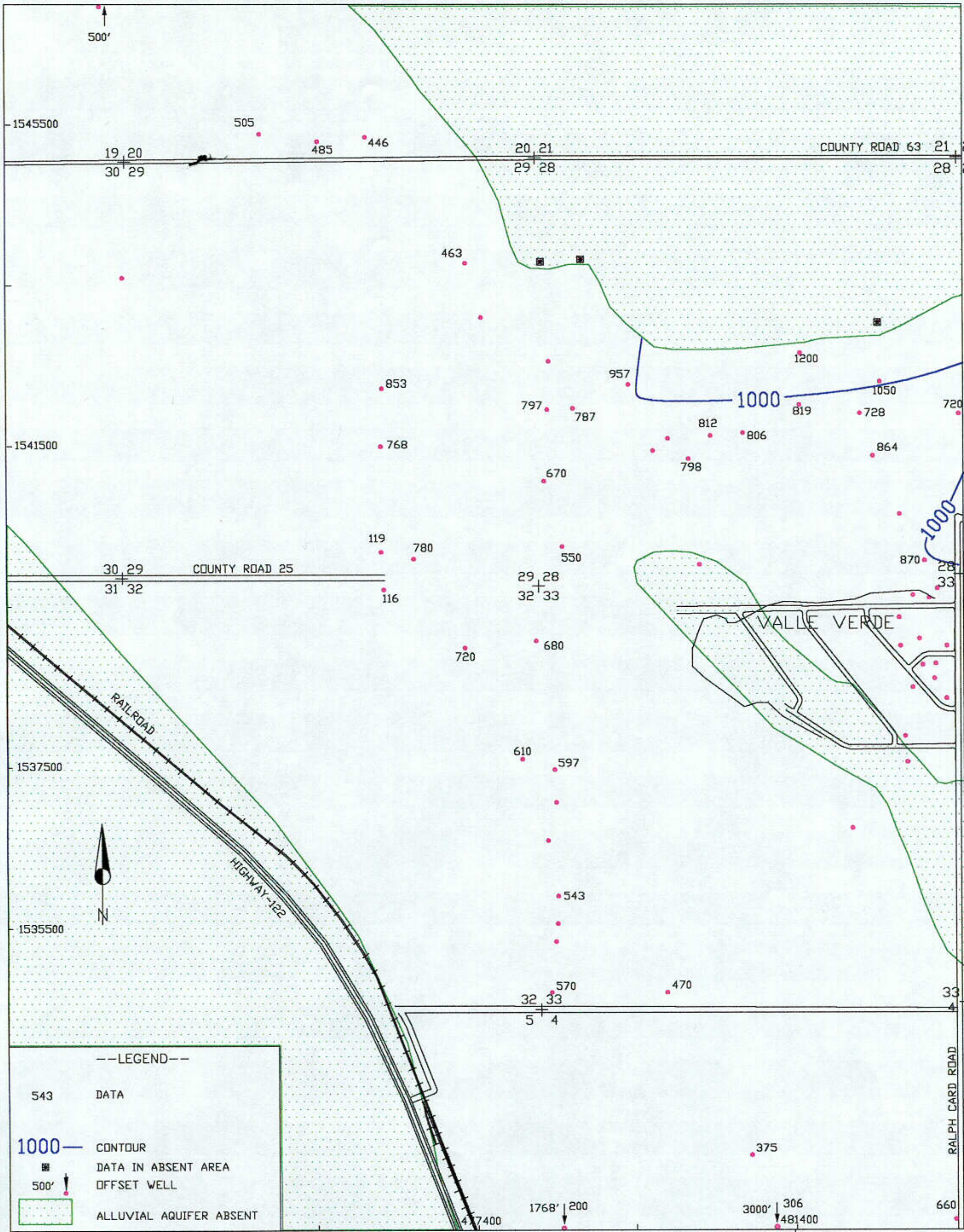
### 4.3.10 VANADIUM - ALLUVIAL

Vanadium concentrations are shown on Figure 4.3-58 for 2001. None of the vanadium concentrations in the POC wells exceeded the site standard of 0.02 mg/l. POC well X with the last 2001 value of 0.01 mg/l was the only POC well that routinely contained a vanadium concentration above the site standard prior to restoration of the area. Therefore, none of the POC wells are expected to contain vanadium concentrations above the site standard of 0.02 mg/l in the future. The R.O. product injection has effectively restored the area near well X.

One well near the large tailings contained vanadium concentrations above the site standard in 2001. Vanadium values for well DQ of 0.03 mg/l was measured in 2001. This parameter will easily restore with the restoration of the key parameters.

### 4.3.11 THORIUM-230 - ALLUVIAL

Figure 4.3-59 presents the 2001 thorium concentrations for the alluvial aquifer. Thorium concentrations are low at this site. The very low site standard of 0.3 pCi/l is due to the low background concentrations and no drinking water standard has been established for this constituent. The maximum thorium-230 concentration in the Fall of 2001 from a POC well was 0.5 pCi/l for well D1 with a split of 0.4 pCi/l. Thorium-230 should be removed as a site standard and only monitored at the three POC wells annually.



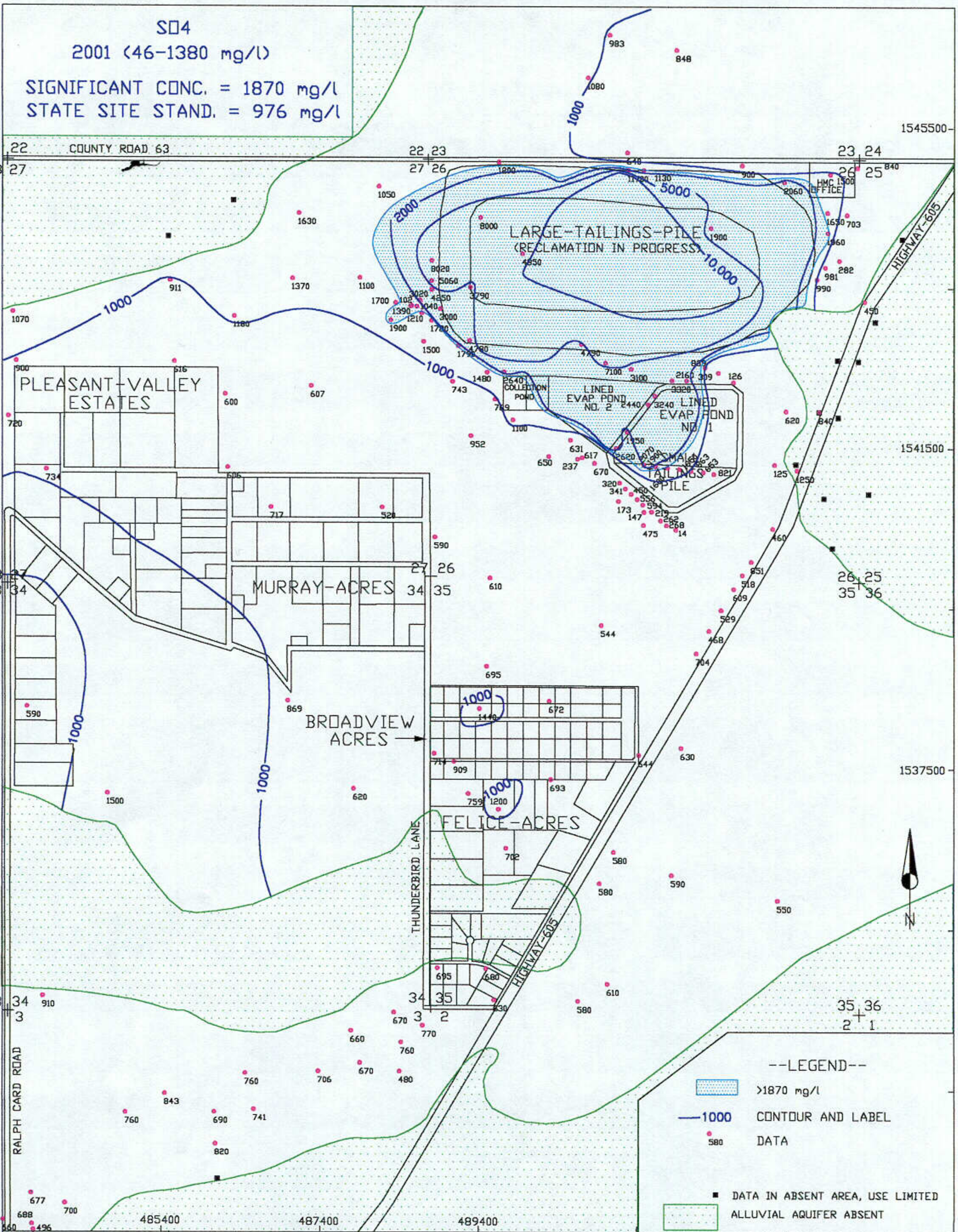

| SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02 |
|---|---|---|

FIGURE 4.3-1A. SULFATE CONCENTRATIONS FOR THE ALLUVIAL AQUIFER (WEST AREA), FALL 2001, mg/l

D:\R13\HMC\ 01WQAL lh



C10



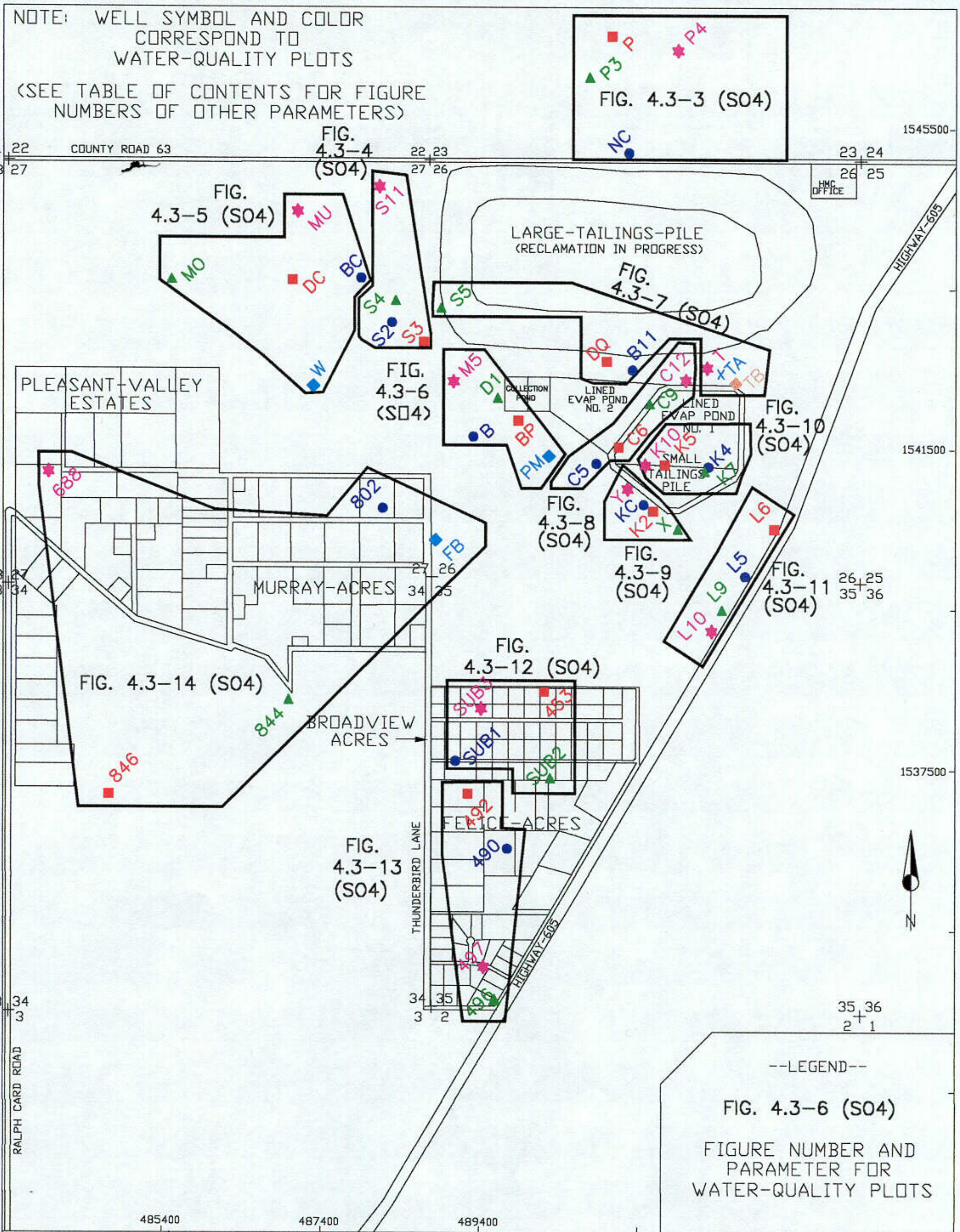

SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02

FIGURE 4.3-1B. SULFATE CONCENTRATIONS FOR THE ALLUVIAL AQUIFER, FALL 2001, mg/l

D:\R13\HMC\ 01EQAL lh



C11




SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/14/02

FIGURE 4.3-2. LOCATION OF ALLUVIAL WELLS WITH WATER-QUALITY PLOTS

D:\R13\HMC\ 01EQAL lh



C12

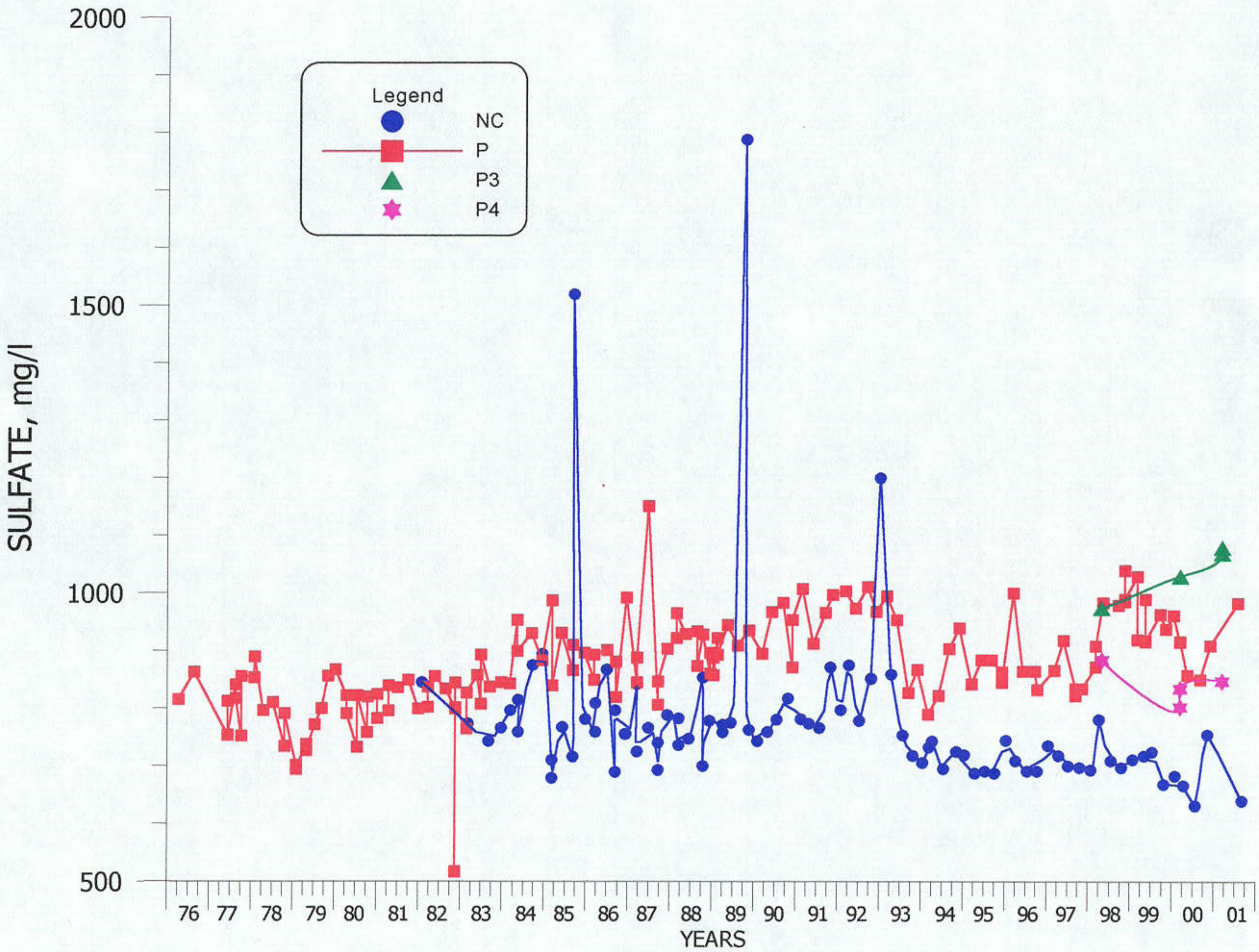



**FIGURE 4.3-3. SULFATE CONCENTRATIONS FOR WELLS NC, P, P3 AND P4.**



C12.1

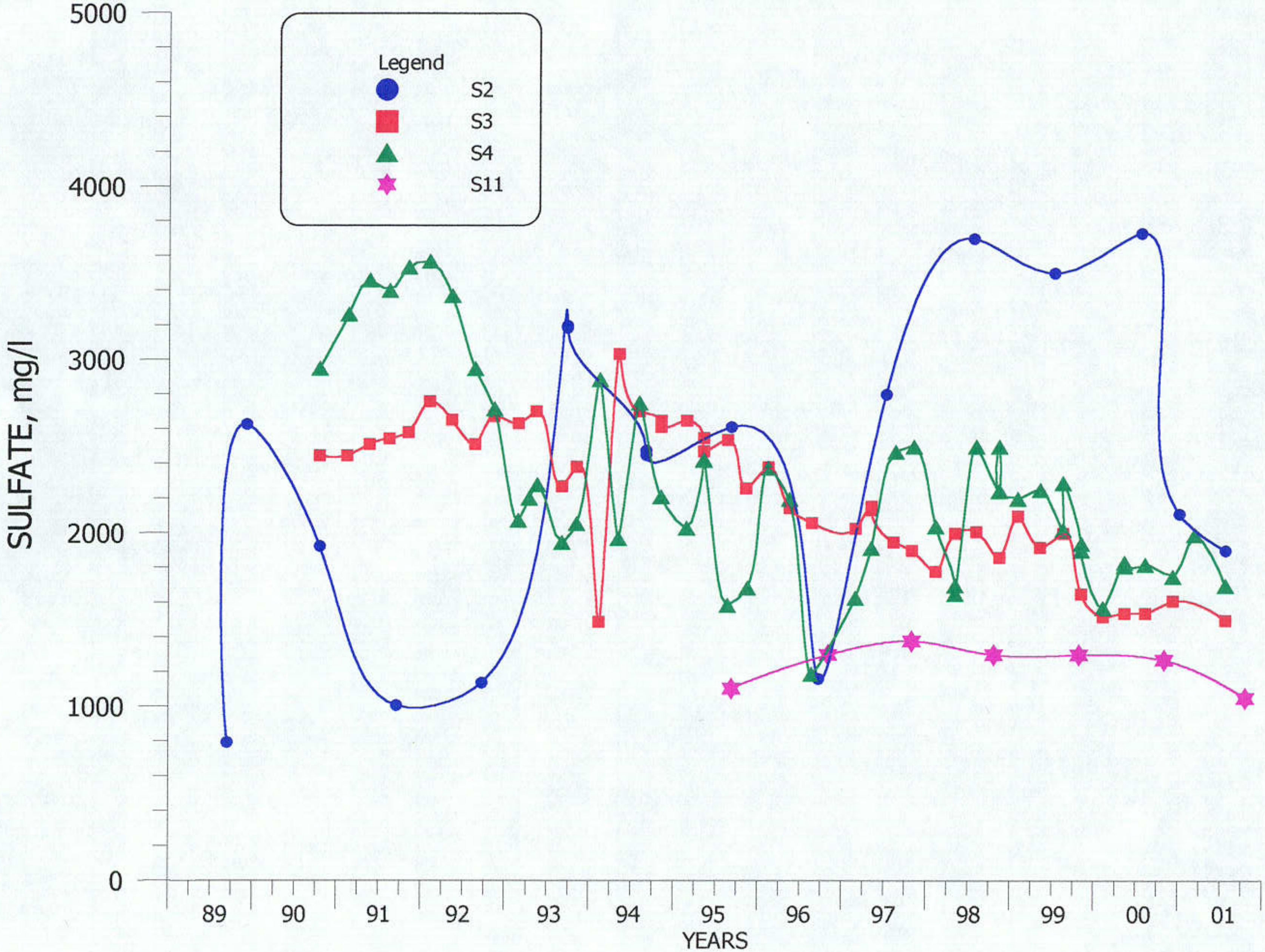



**FIGURE 4.3-4. SULFATE CONCENTRATIONS FOR WELLS S2, S3, S4 AND S11.**



C12.2

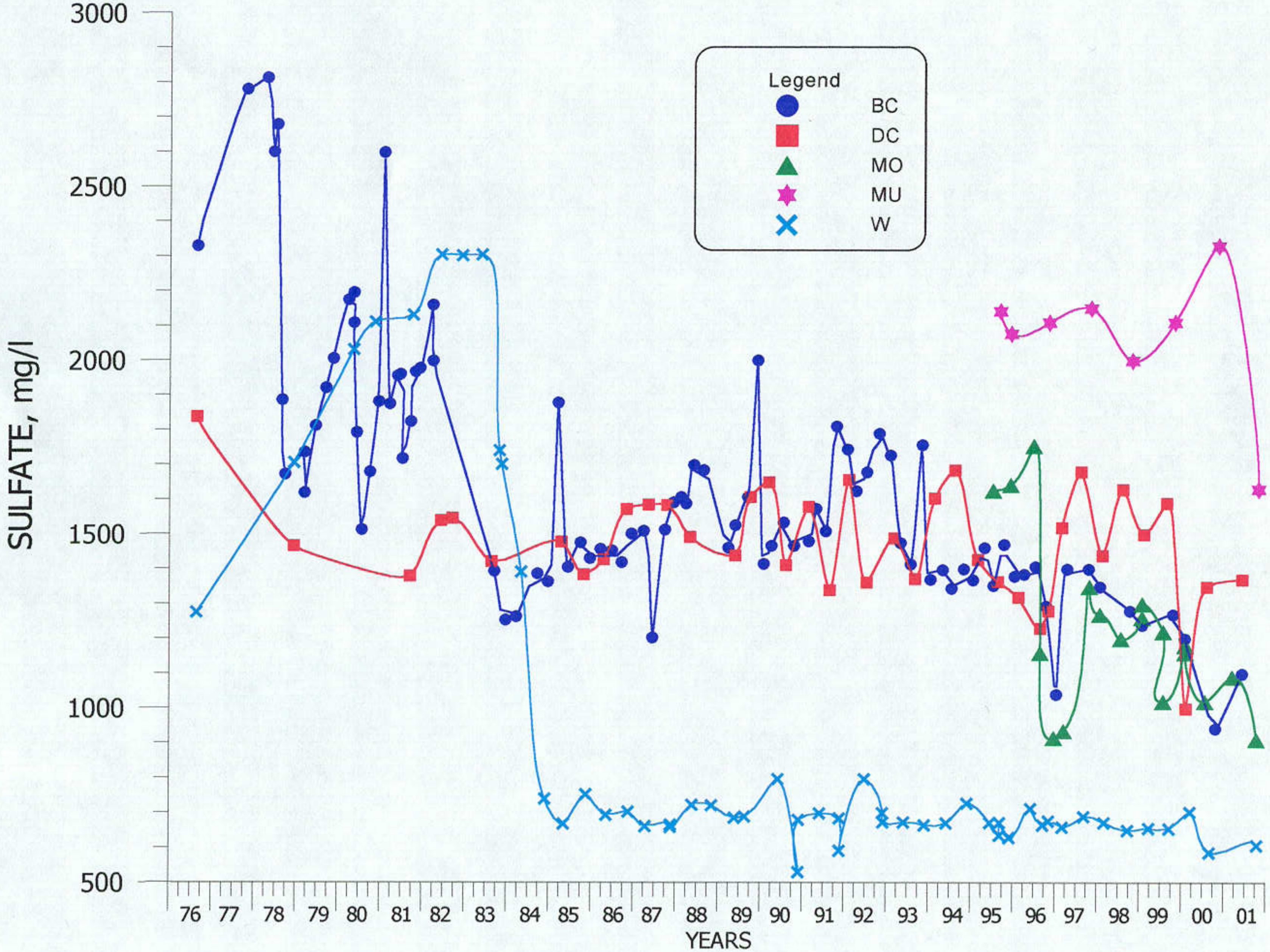



**FIGURE 4.3-5. SULFATE CONCENTRATIONS FOR WELLS BC, DC, MO, MU AND W.**



C12.3

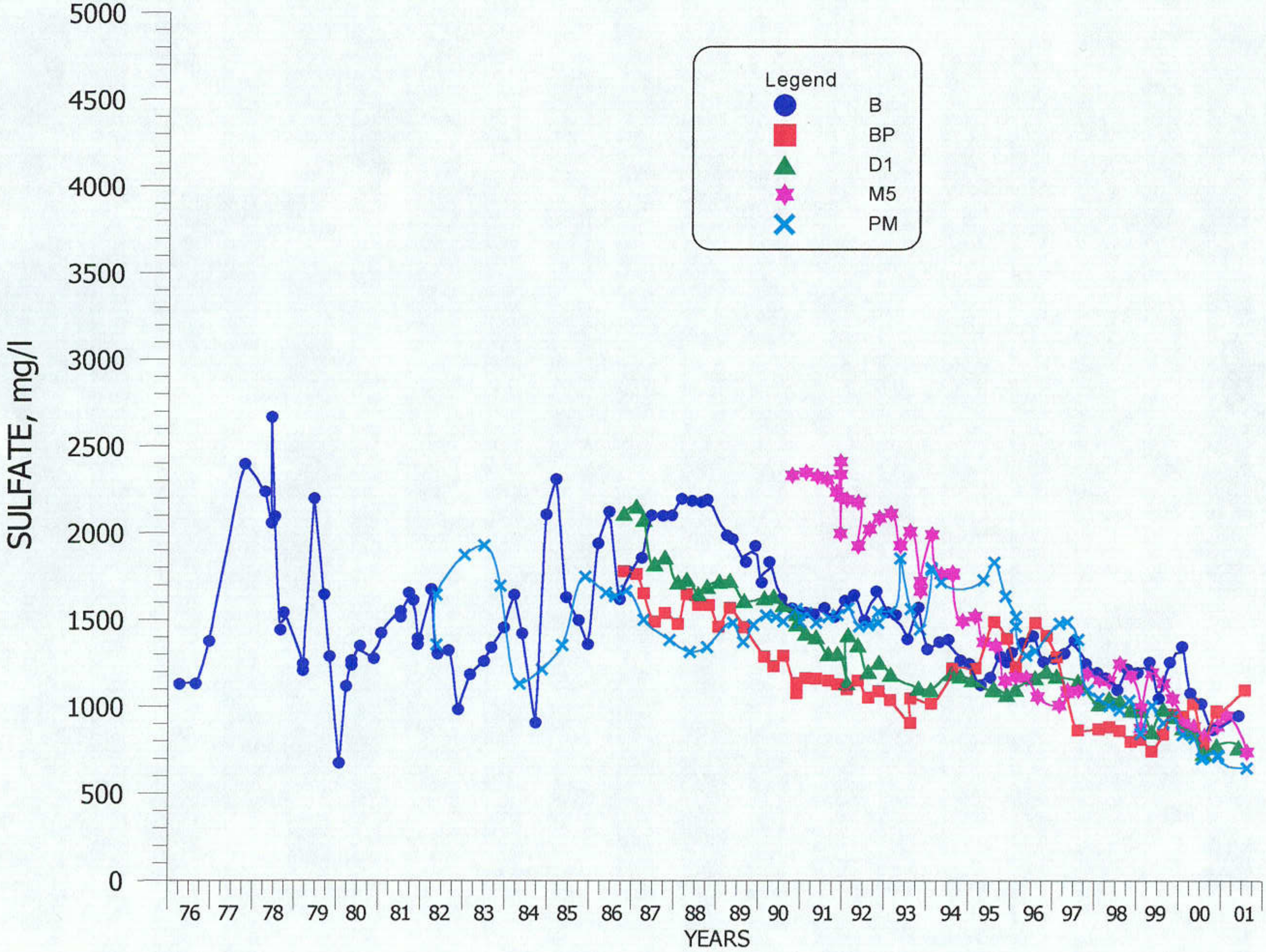



**FIGURE 4.3-6. SULFATE CONCENTRATIONS FOR WELLS B, BP, D1, M5 AND PM.**



C12.4

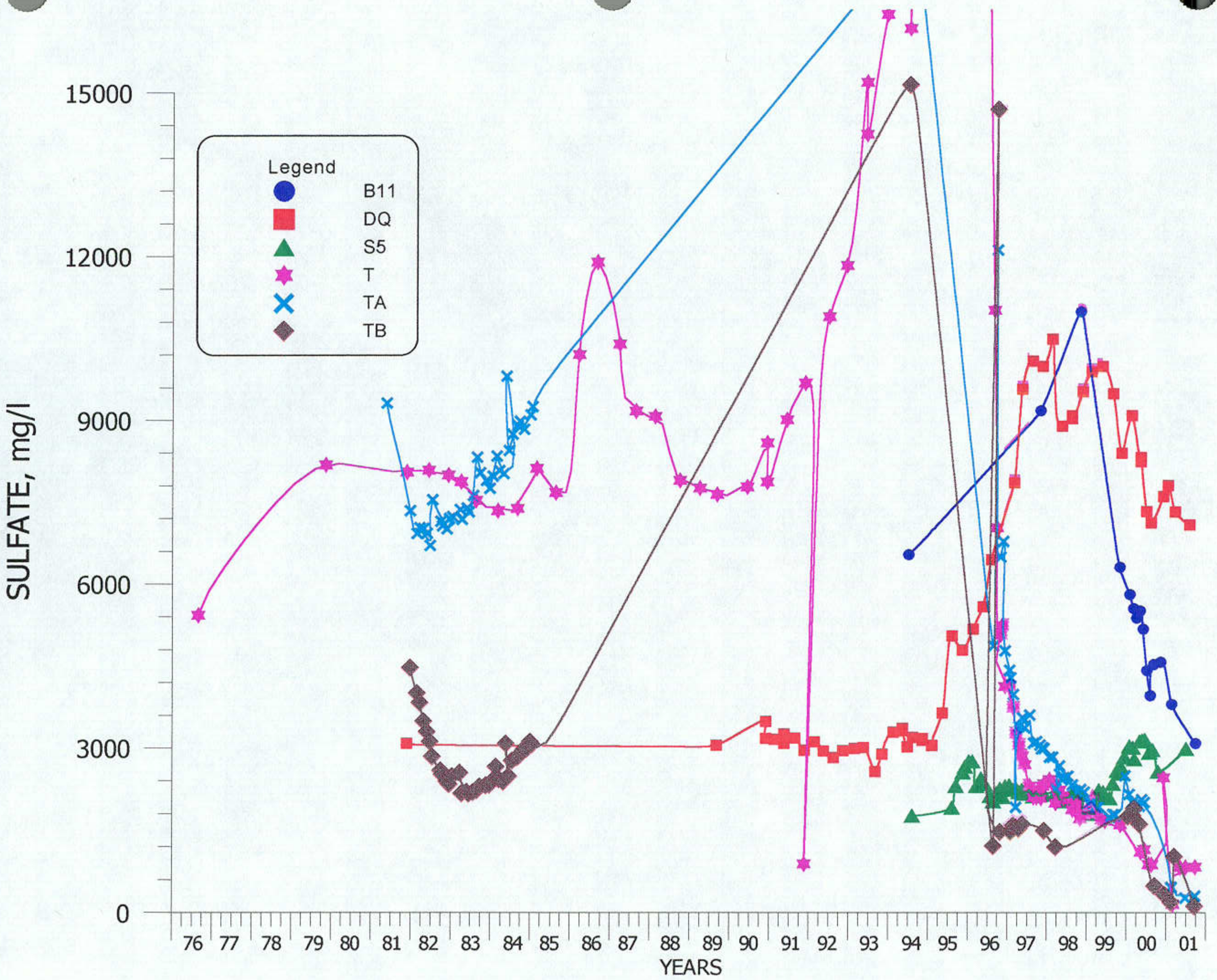



**FIGURE 4.3-7. SULFATE CONCENTRATIONS FOR WELLS B11, DQ, S5, T, TA AND TB.**



C12.5

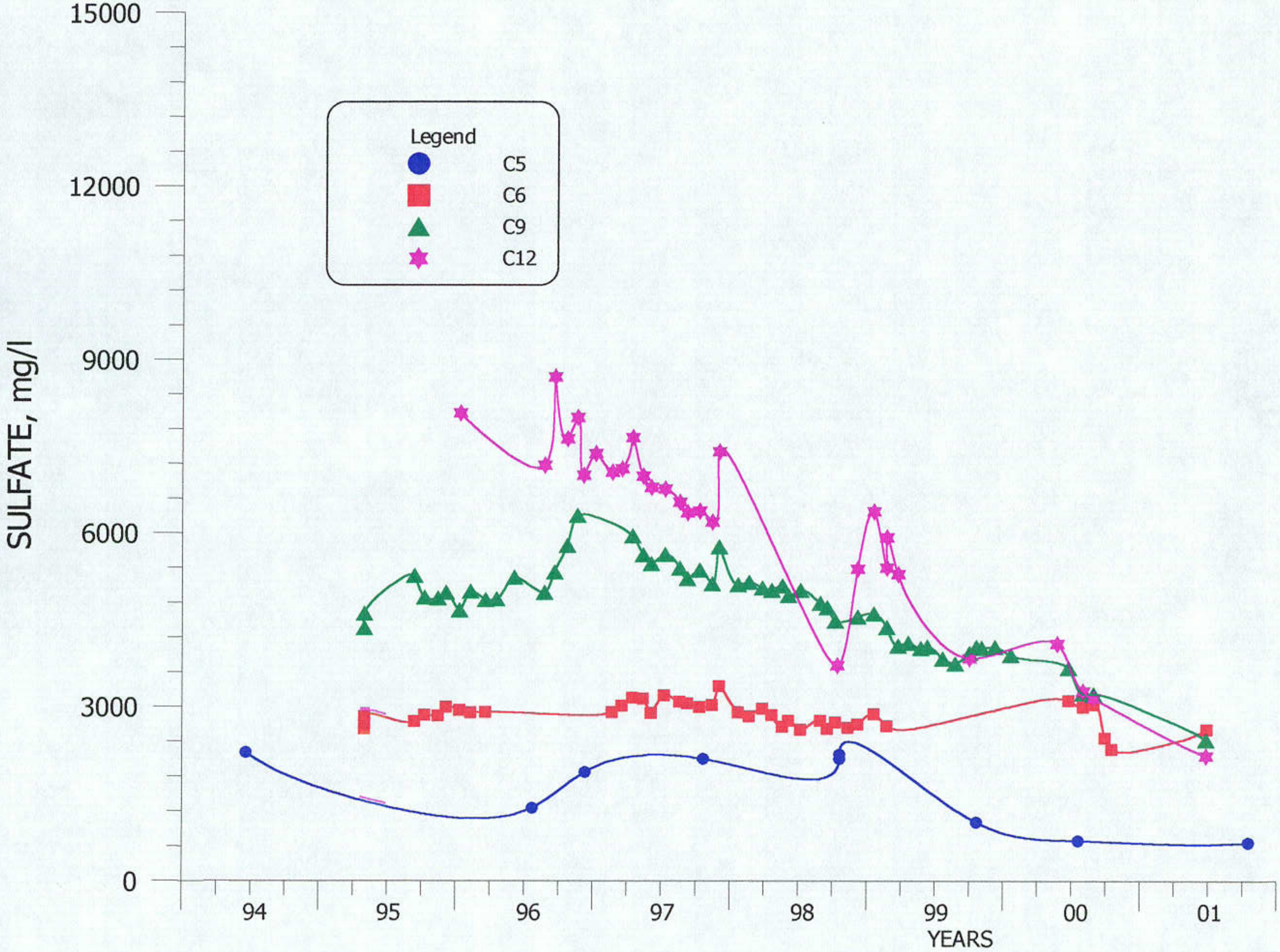



**FIGURE 4.3-8. SULFATE CONCENTRATIONS FOR WELLS C5, C6, C9 AND C12.**



C12.6

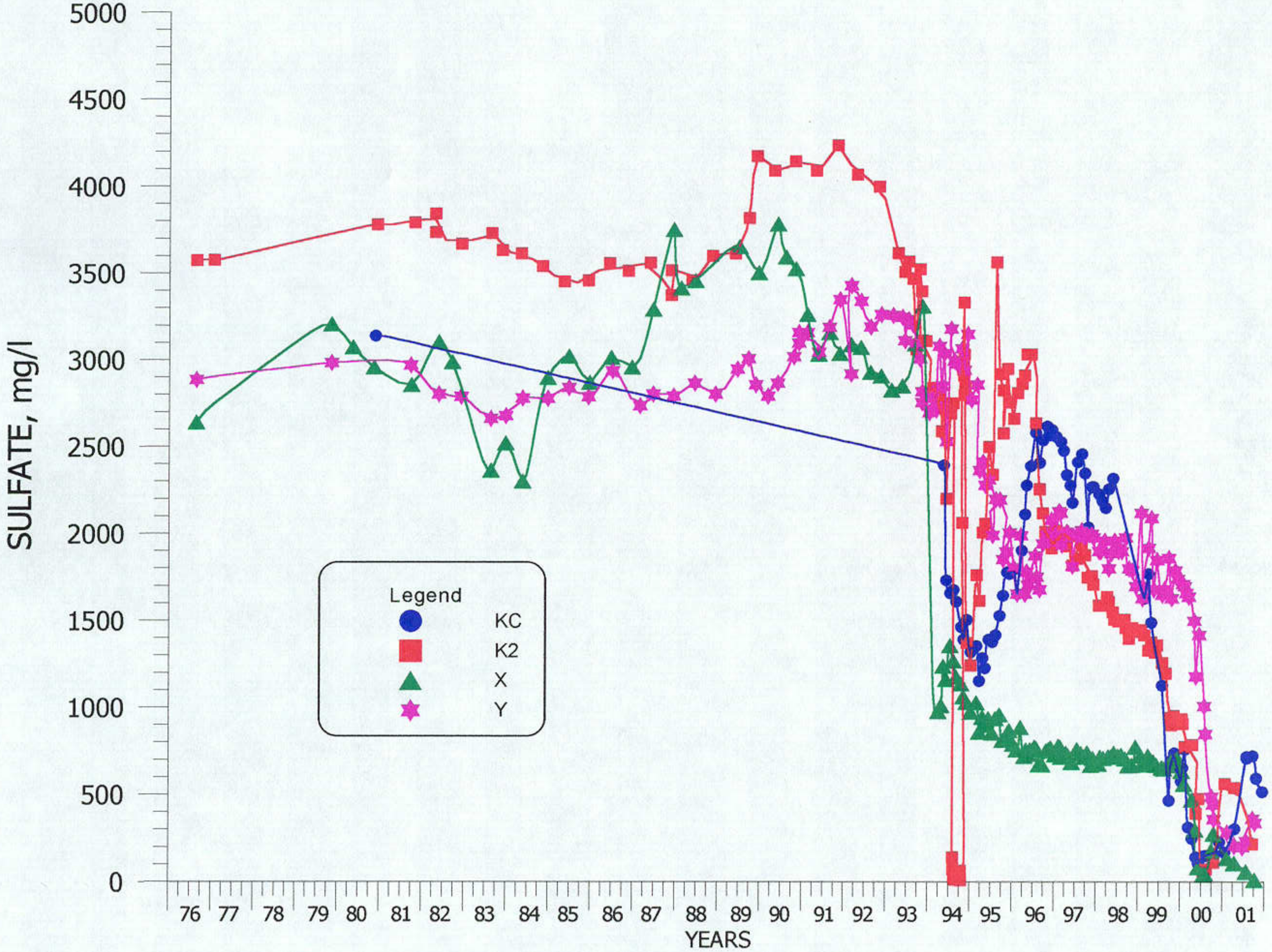



**FIGURE 4.3-9. SULFATE CONCENTRATIONS FOR WELLS KC, K2, X AND Y.**



C12.7

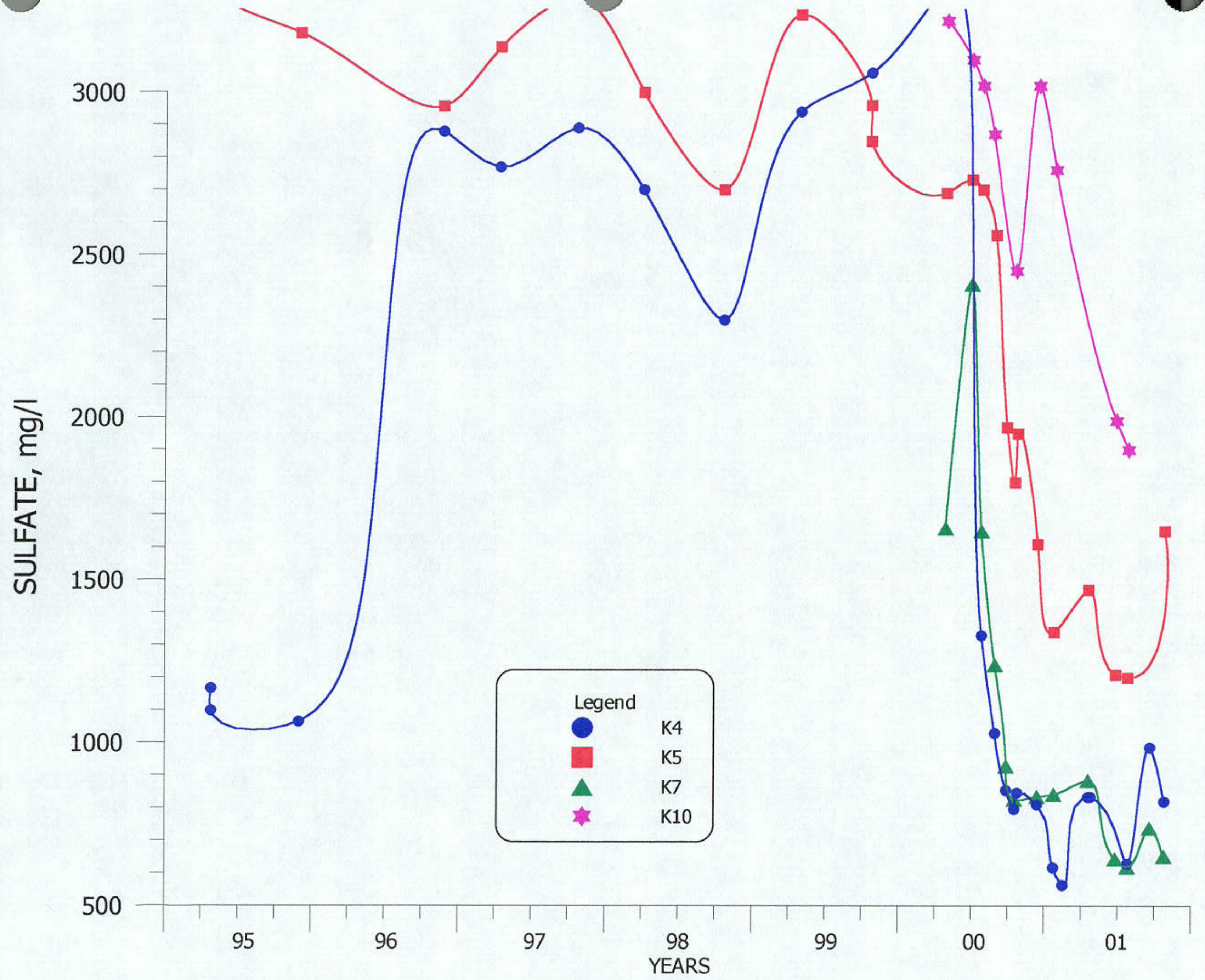



**FIGURE 4.3-10. SULFATE CONCENTRATIONS FOR WELLS K4, K5, K7 AND K10.**



C12.8

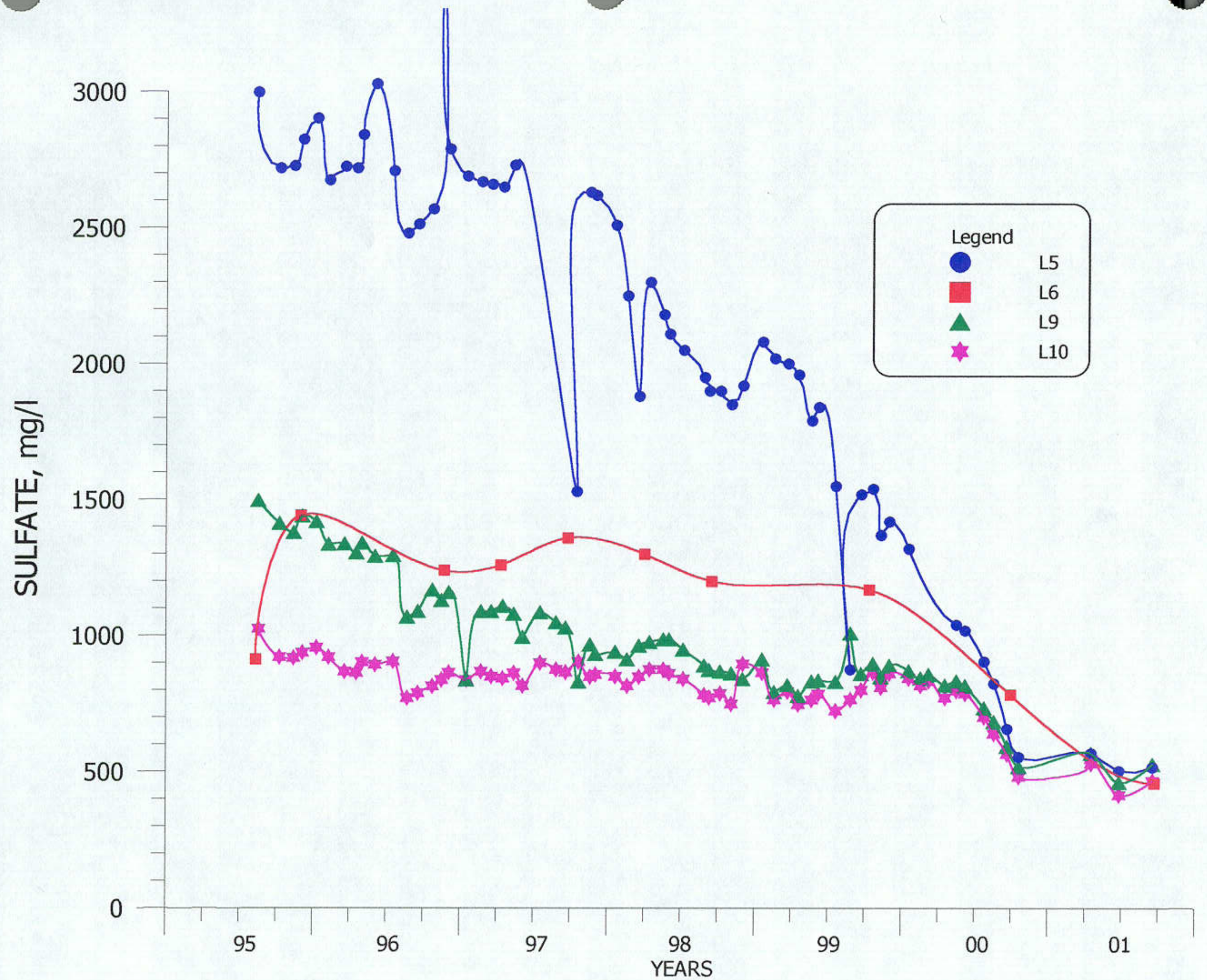



**FIGURE 4.3-11. SULFATE CONCENTRATIONS FOR WELLS L5, L6, L9 AND L10.**



C12.9

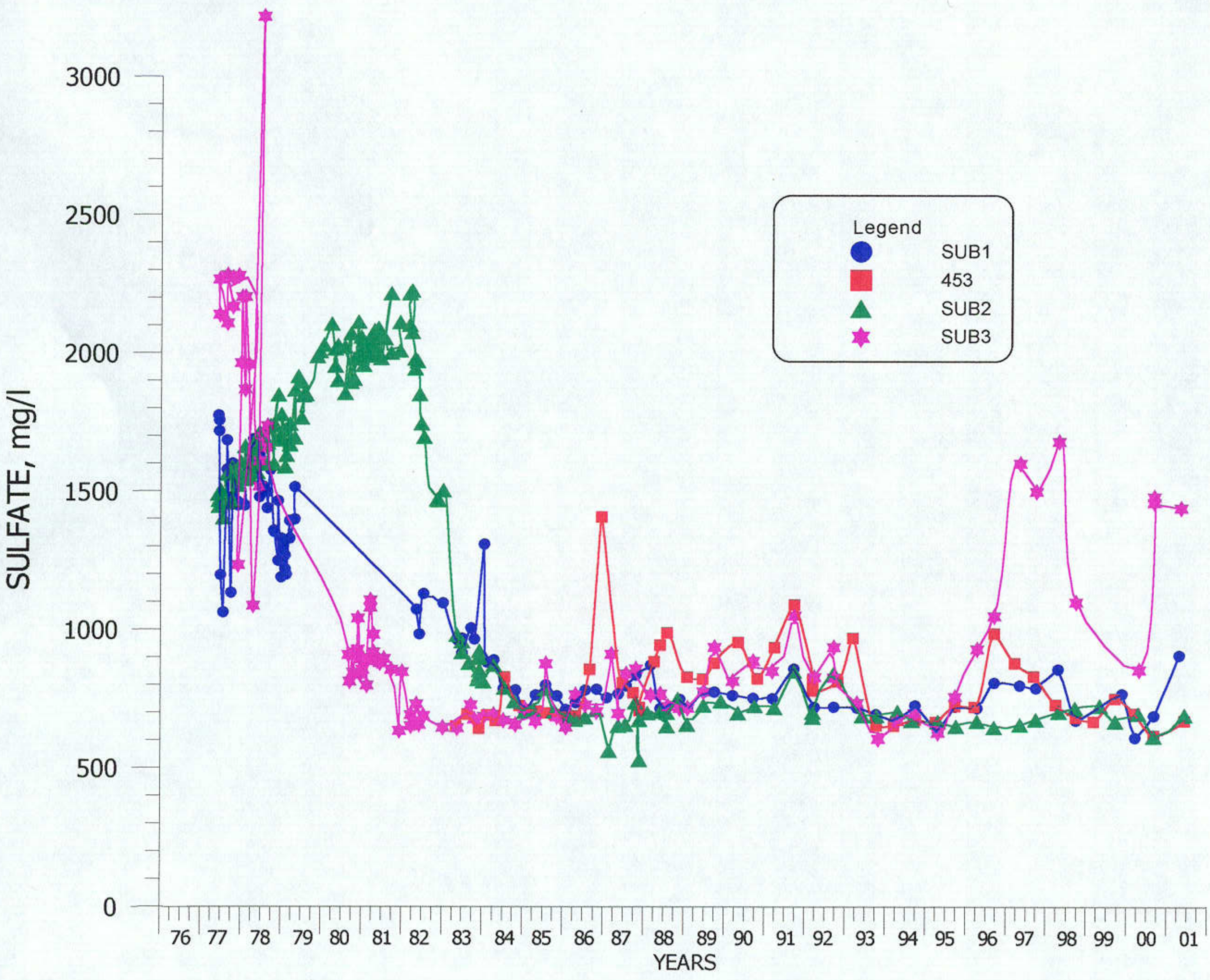



**FIGURE 4.3-12. SULFATE CONCENTRATIONS FOR WELLS SUB1, 453, SUB2 AND SUB3.**



C12.10

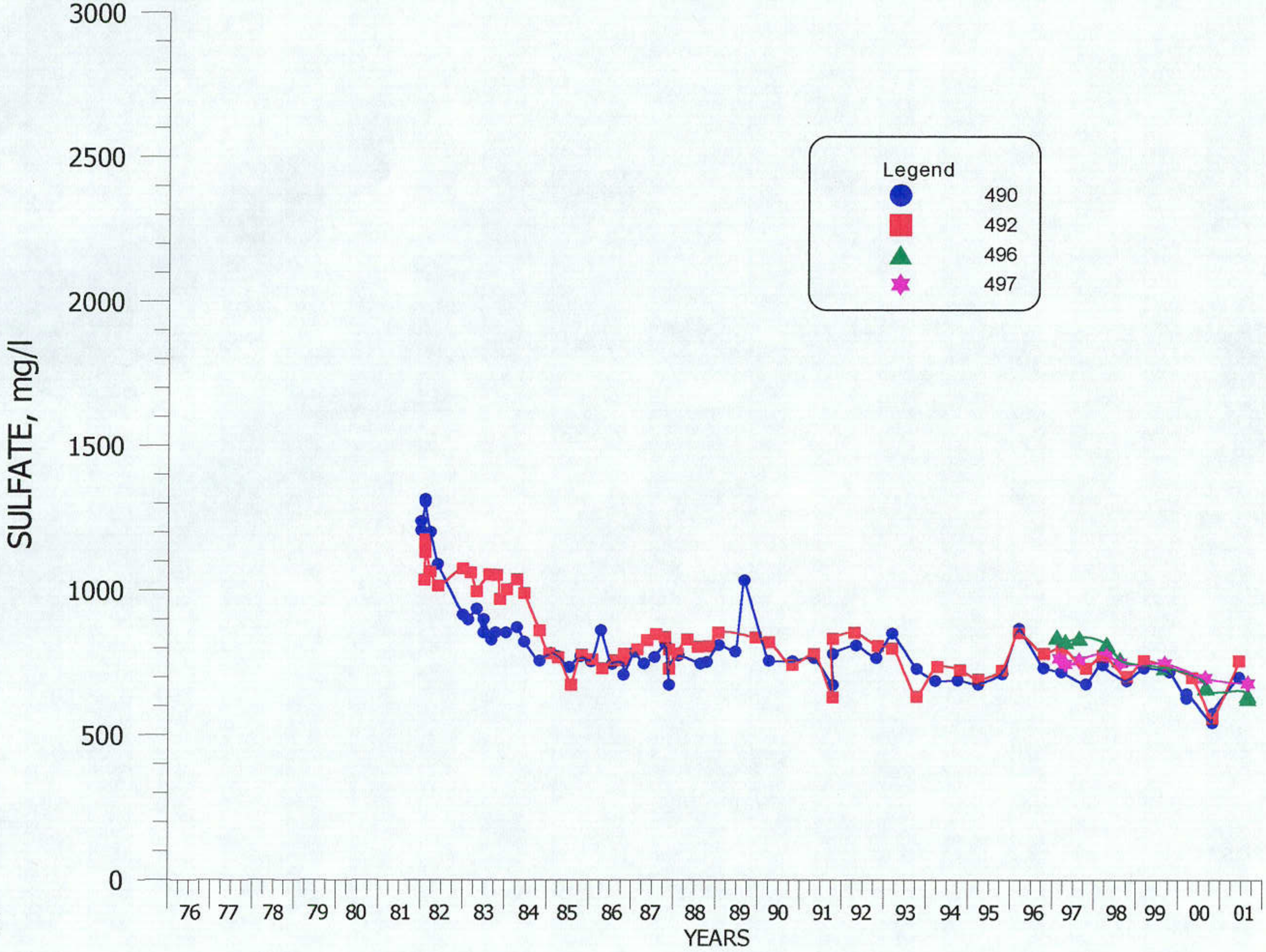



**FIGURE 4.3-13. SULFATE CONCENTRATIONS FOR WELLS 490, 492, 496 AND 497.**



C12.11

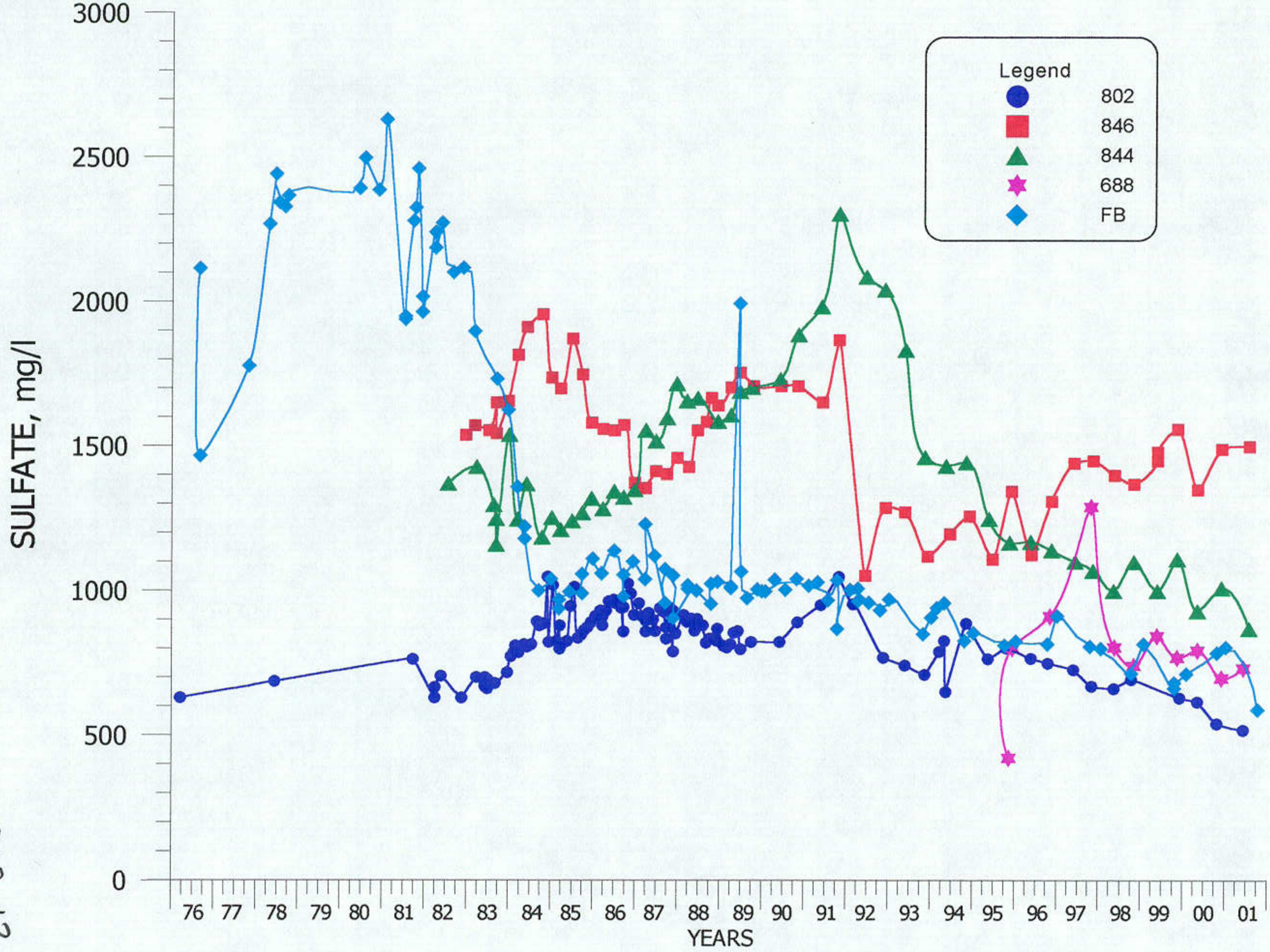
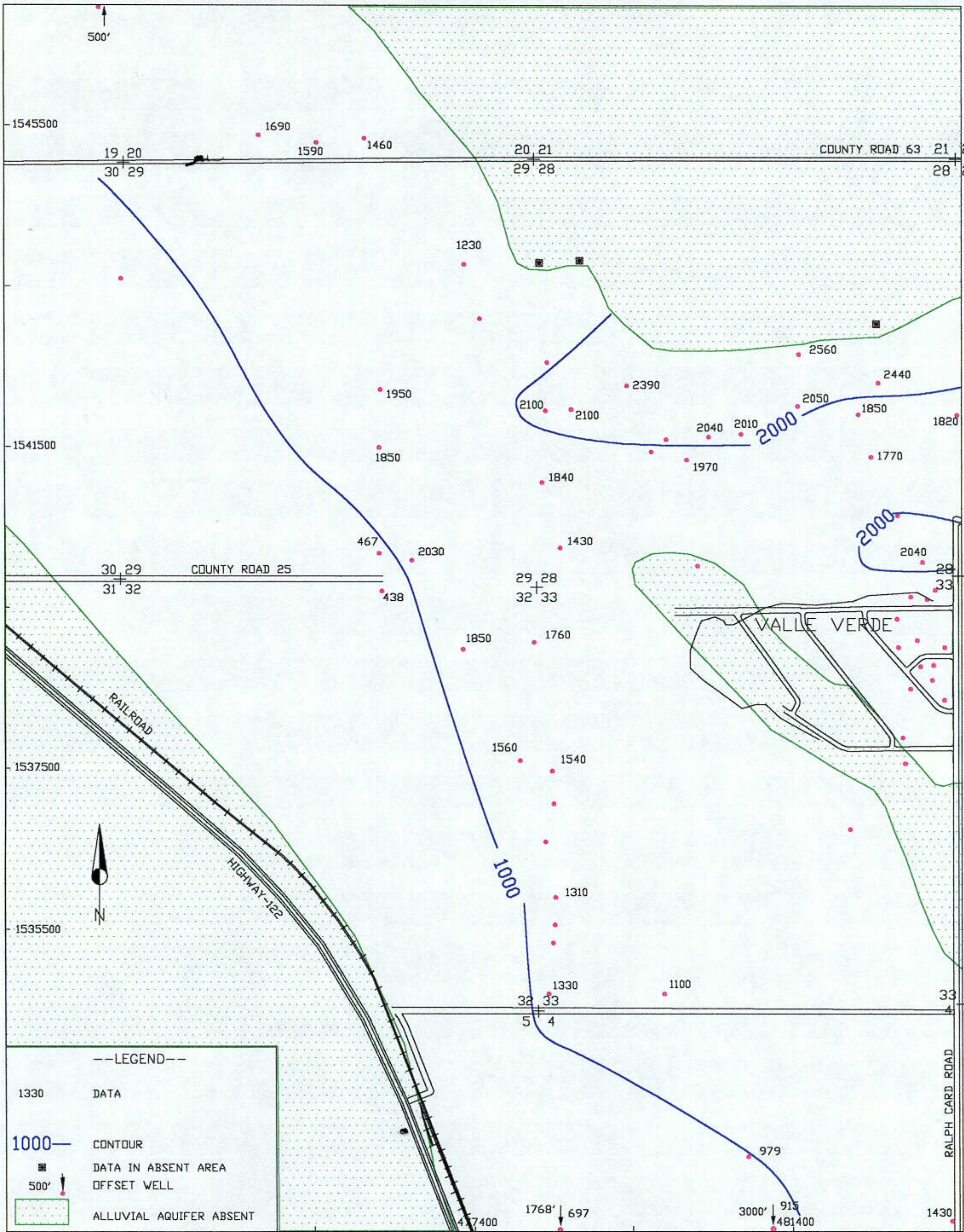



**FIGURE 4.3-14. SULFATE CONCENTRATIONS FOR WELLS 802, 846, 844, 688 AND FB.**

C12.12




| SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02 |
|---|---|---|
| | FIGURE 4.3-15A. TDS CONCENTRATIONS FOR THE ALLUVIAL AQUIFER (WEST AREA), FALL 2001, mg/l | D:\R13\HMC\ 01WQAL lh |
| | | page 4.3-29 |

C13

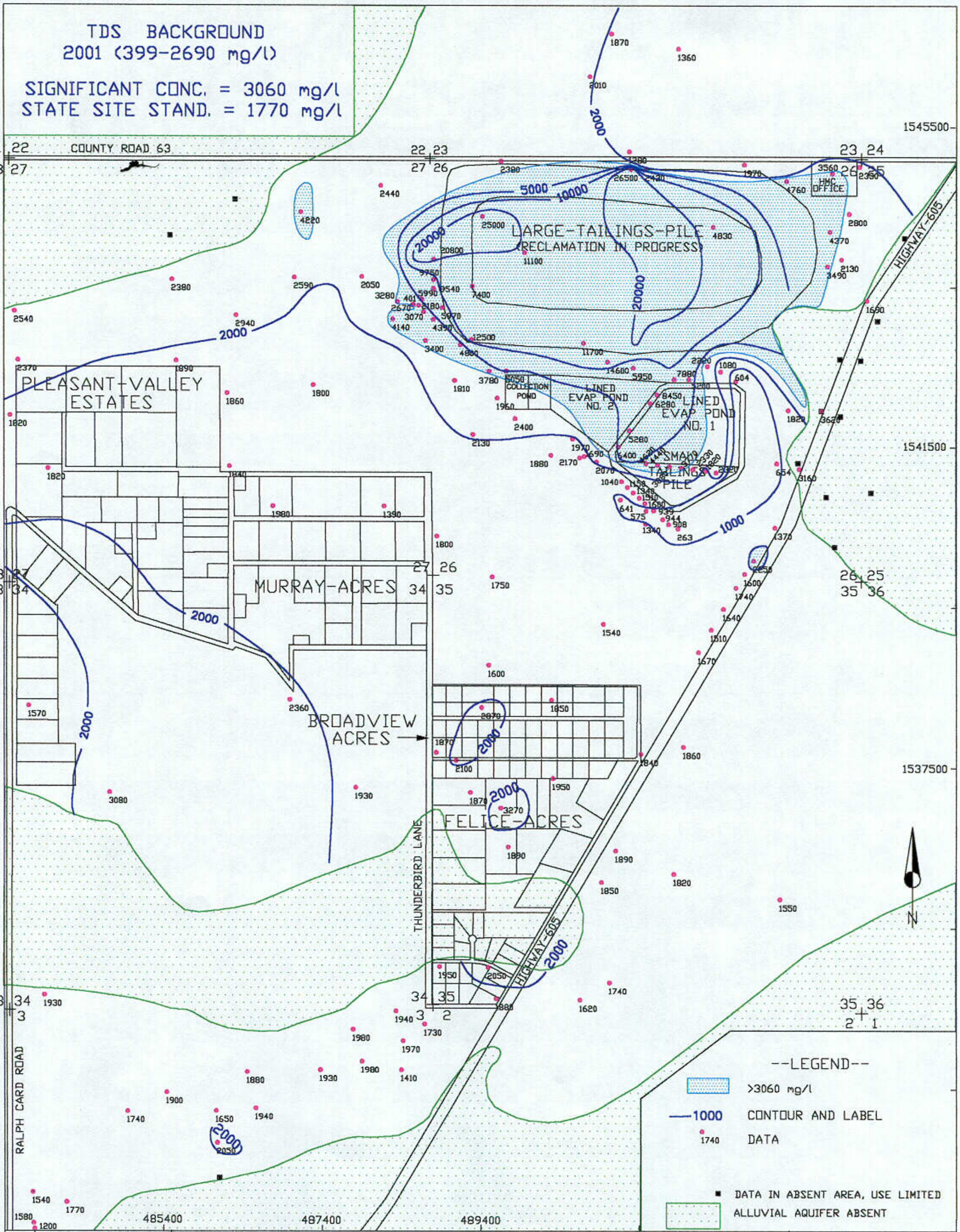



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FIGURE 4.3-15B. TDS CONCENTRATIONS FOR THE ALLUVIAL AQUIFER, FALL 2001, mg/l

D:\R13\HMC\ 01EQAL lh

page 4.3-30

C17

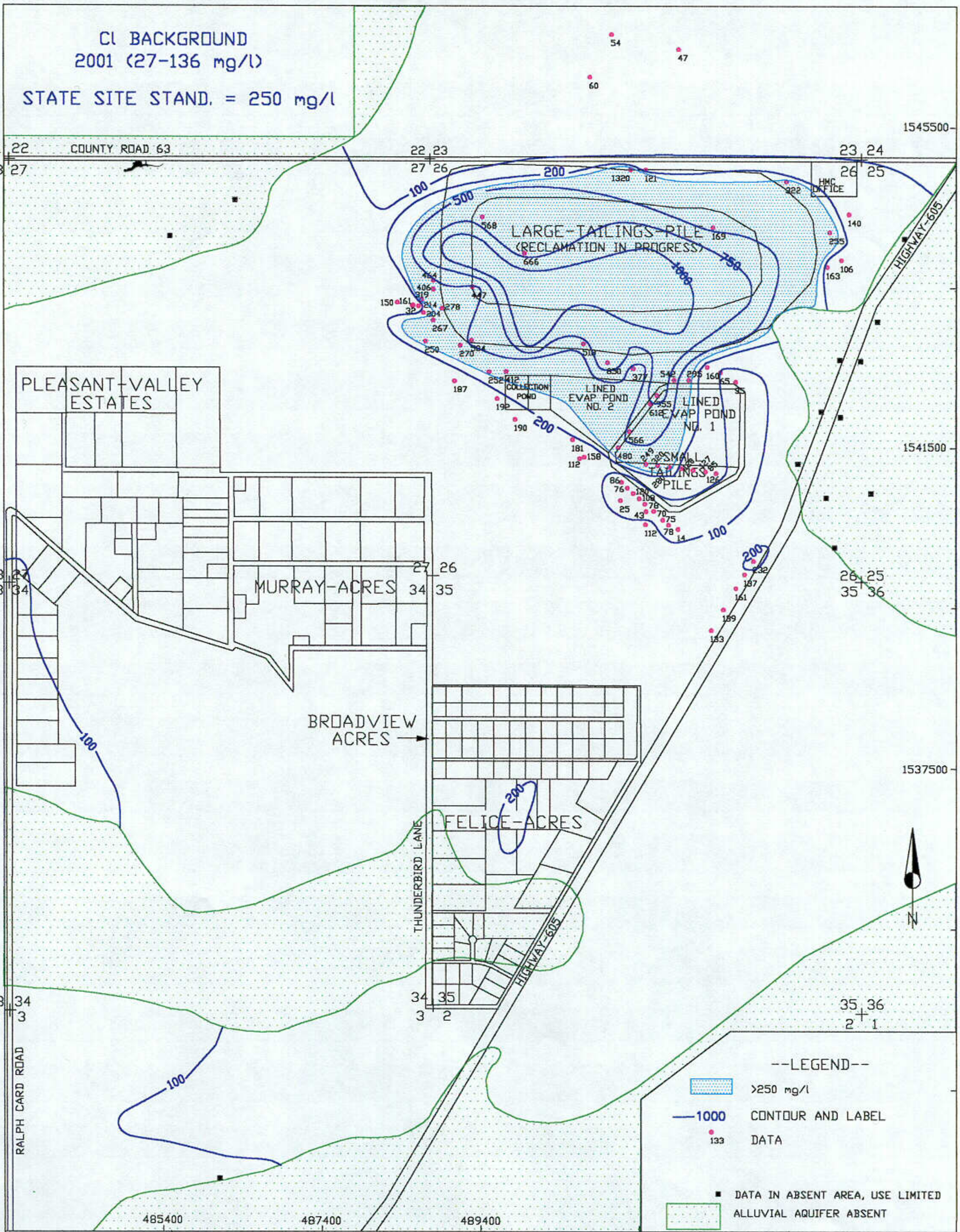


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FIGURE 4.3-16. CHLORIDE CONCENTRATIONS FOR THE ALLUVIAL AQUIFER, FALL 2001, mg/l

D:\R13\HMC\ 01EQAL lh



C15

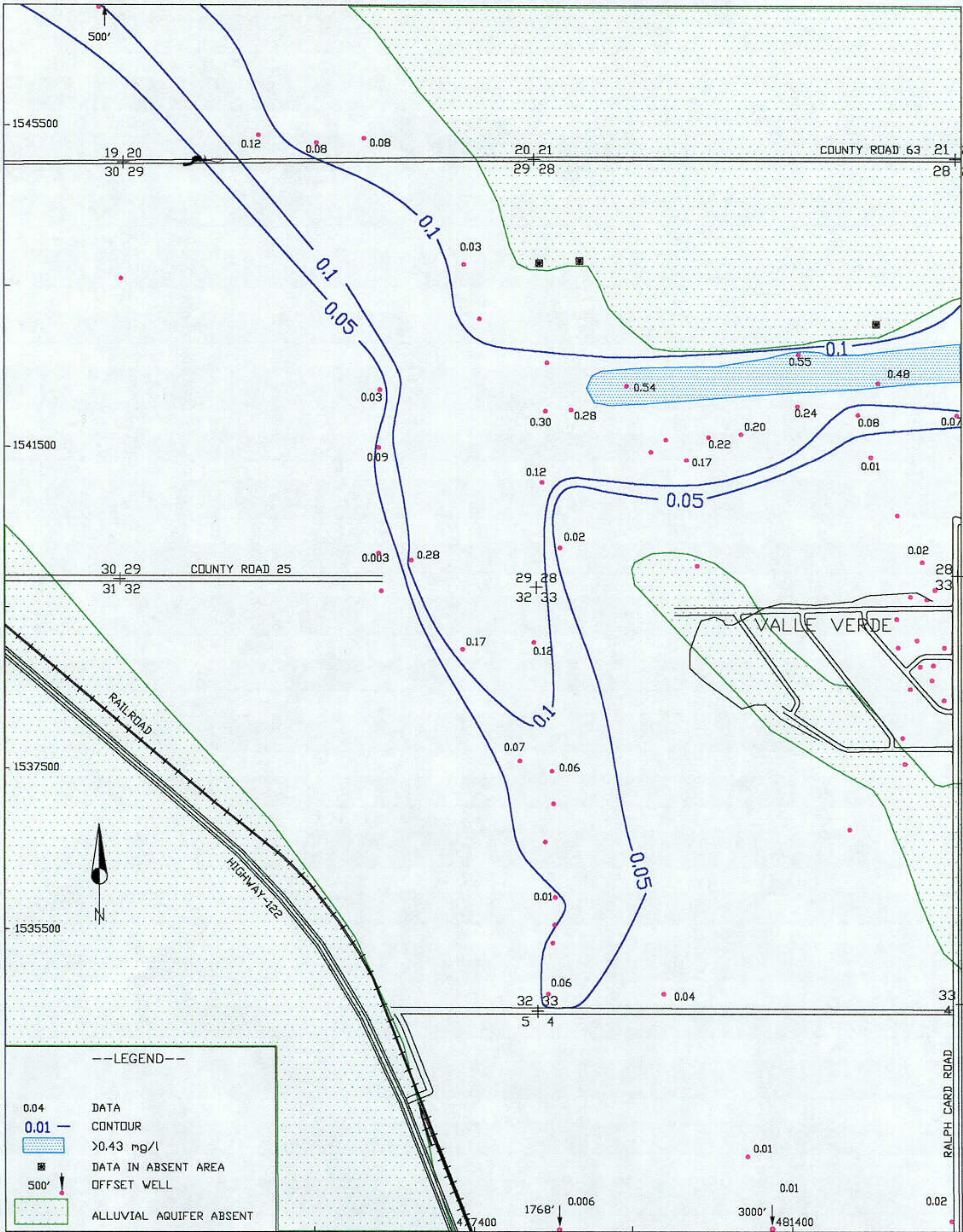


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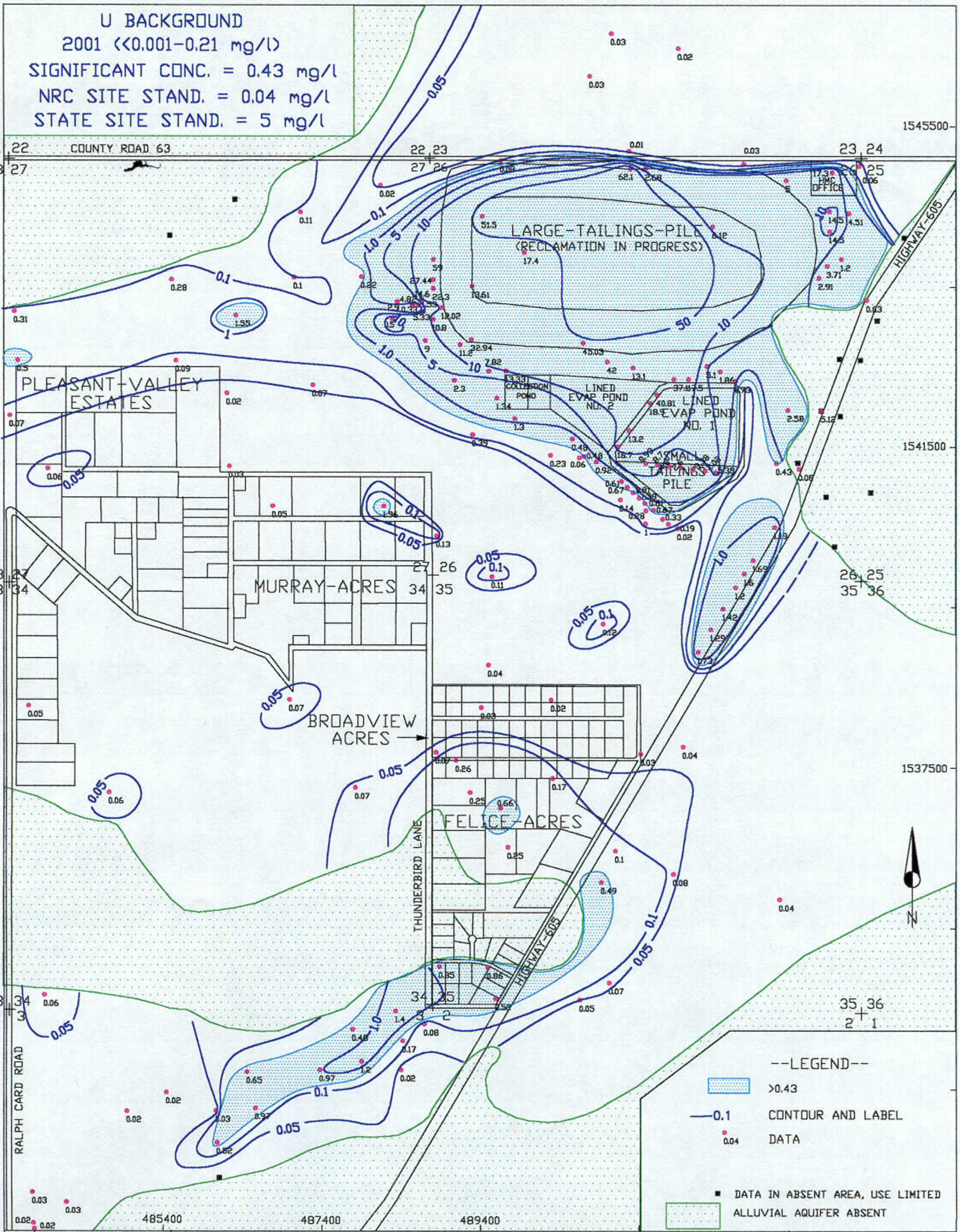
FIGURE 4.3-17A. URANIUM CONCENTRATIONS FOR THE ALLUVIAL AQUIFER (WEST AREA), FALL 2001, mg/l

D:\R13\HMC\ 01WQAL lh



C16




SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02

FIGURE 4.3-17B. URANIUM CONCENTRATIONS FOR THE ALLUVIAL AQUIFER, FALL 2001, mg/l

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C17

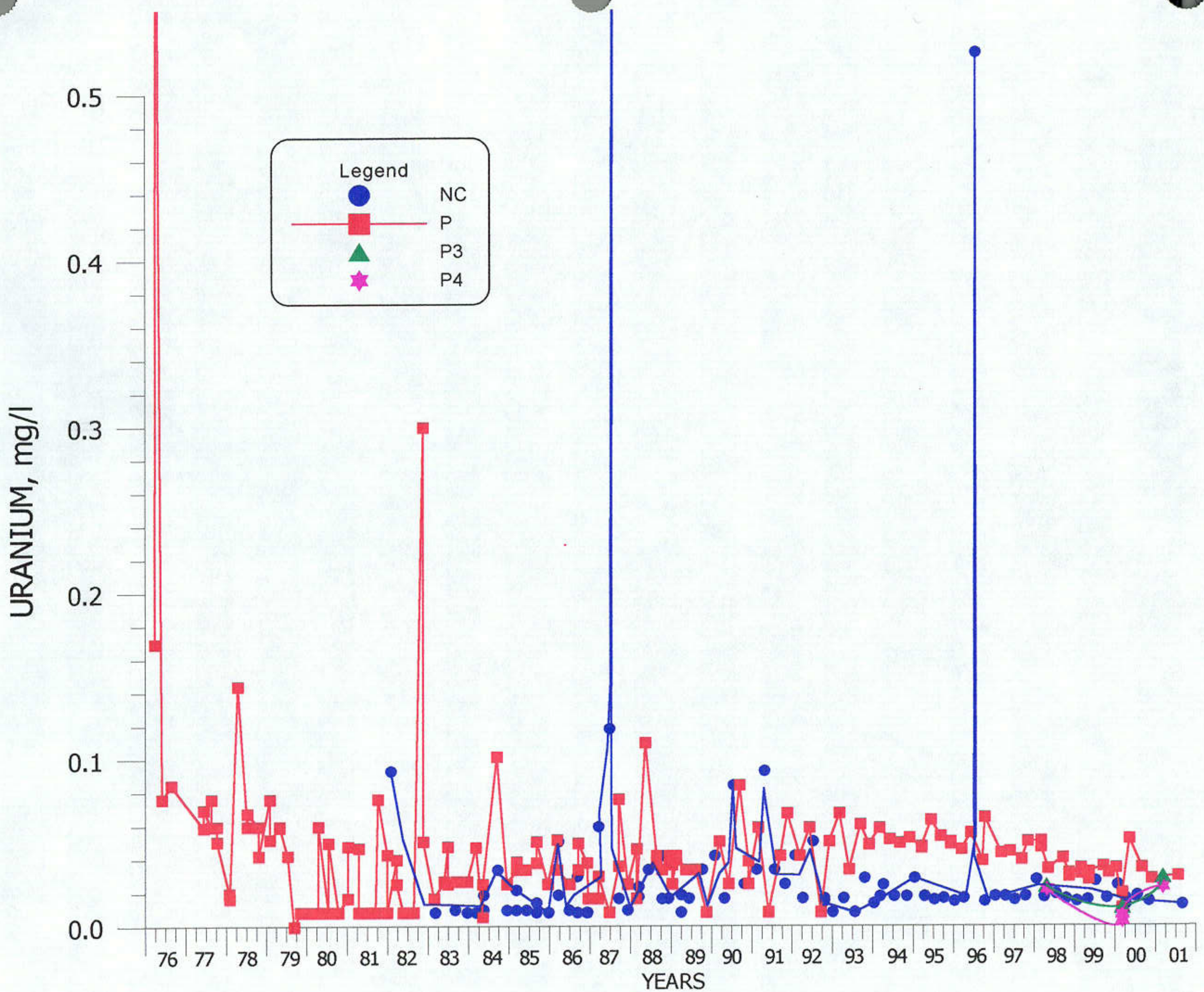



FIGURE 4.3-18. URANIUM CONCENTRATIONS FOR WELLS NC, P, P3 AND P4.

C17.1

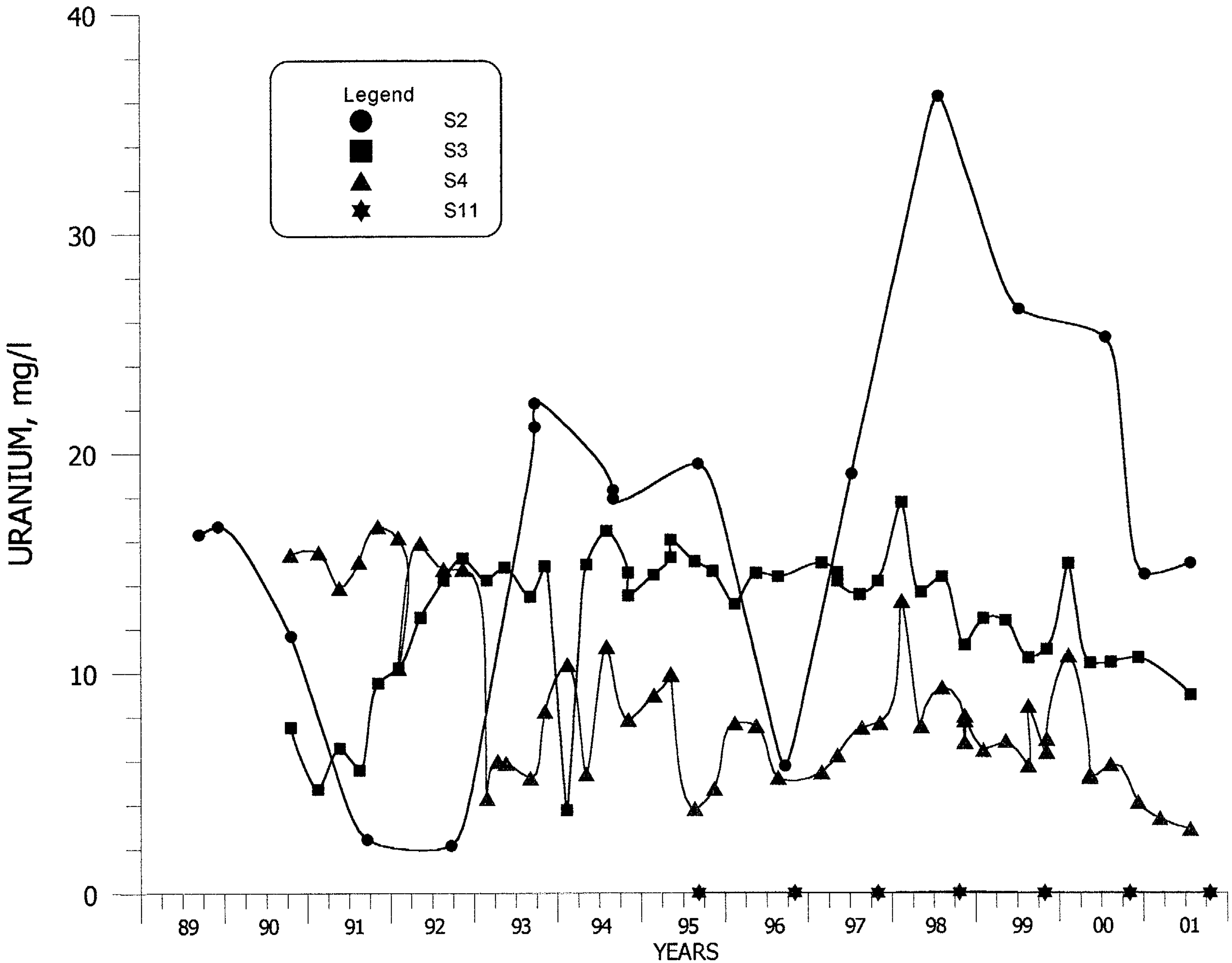



**FIGURE 4.3-19. URANIUM CONCENTRATIONS FOR WELLS S2, S3, S4 AND S11.**

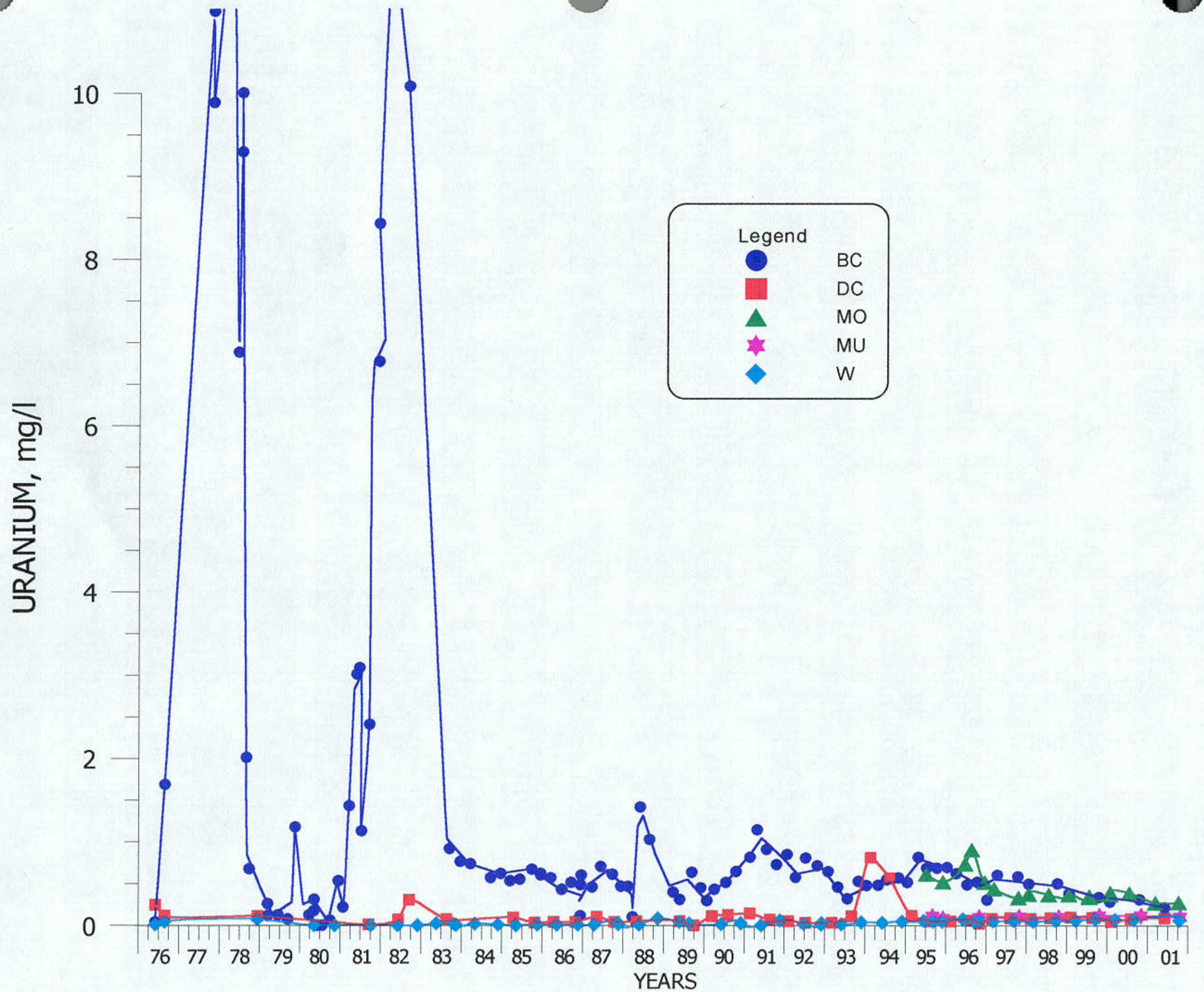



**FIGURE 4.3-20. URANIUM CONCENTRATIONS FOR WELLS BC, DC, MO, MU AND W.**



C17.2

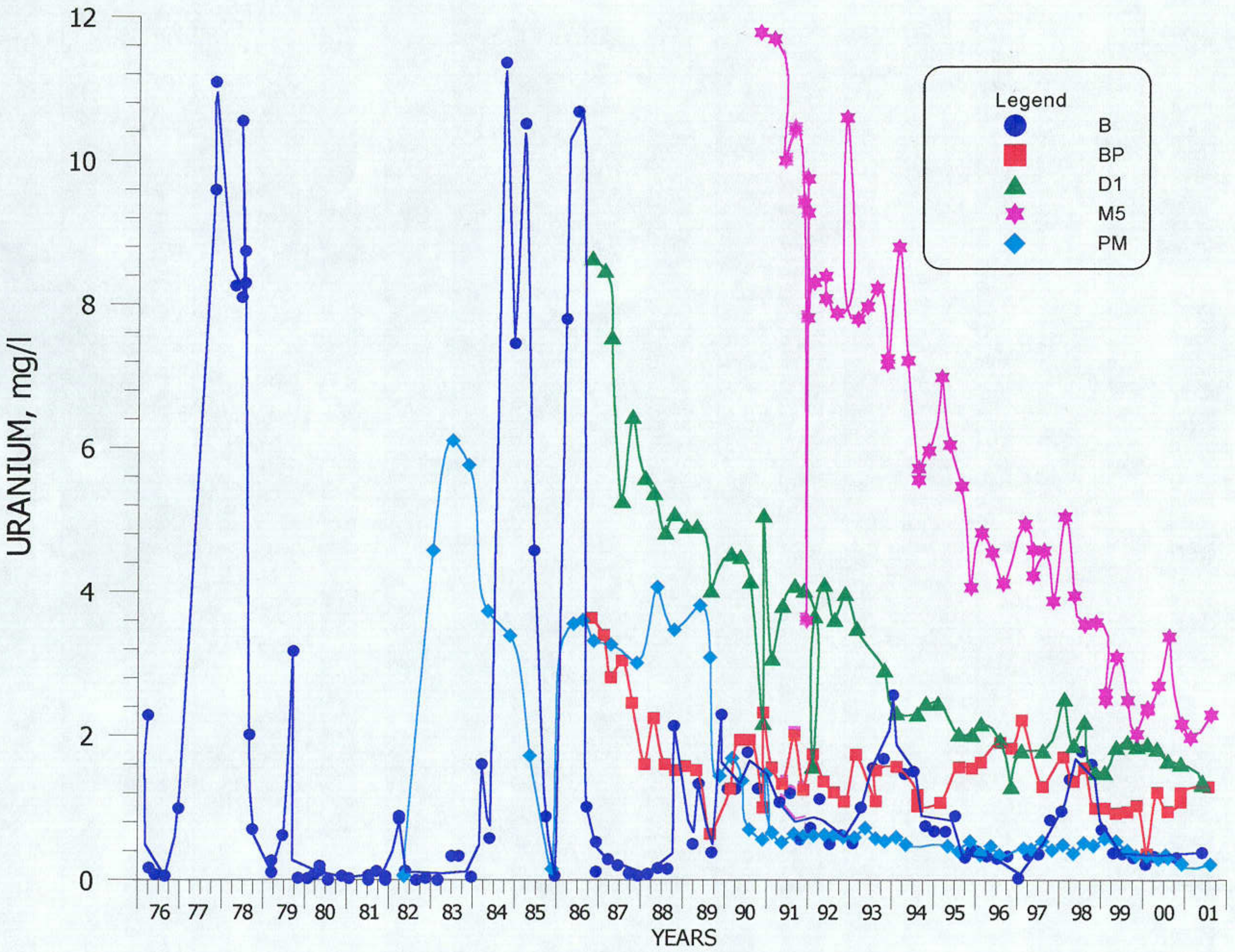



**FIGURE 4.3-21. URANIUM CONCENTRATIONS FOR WELLS B, BP, D1, M5 AND PM.**



C17.3

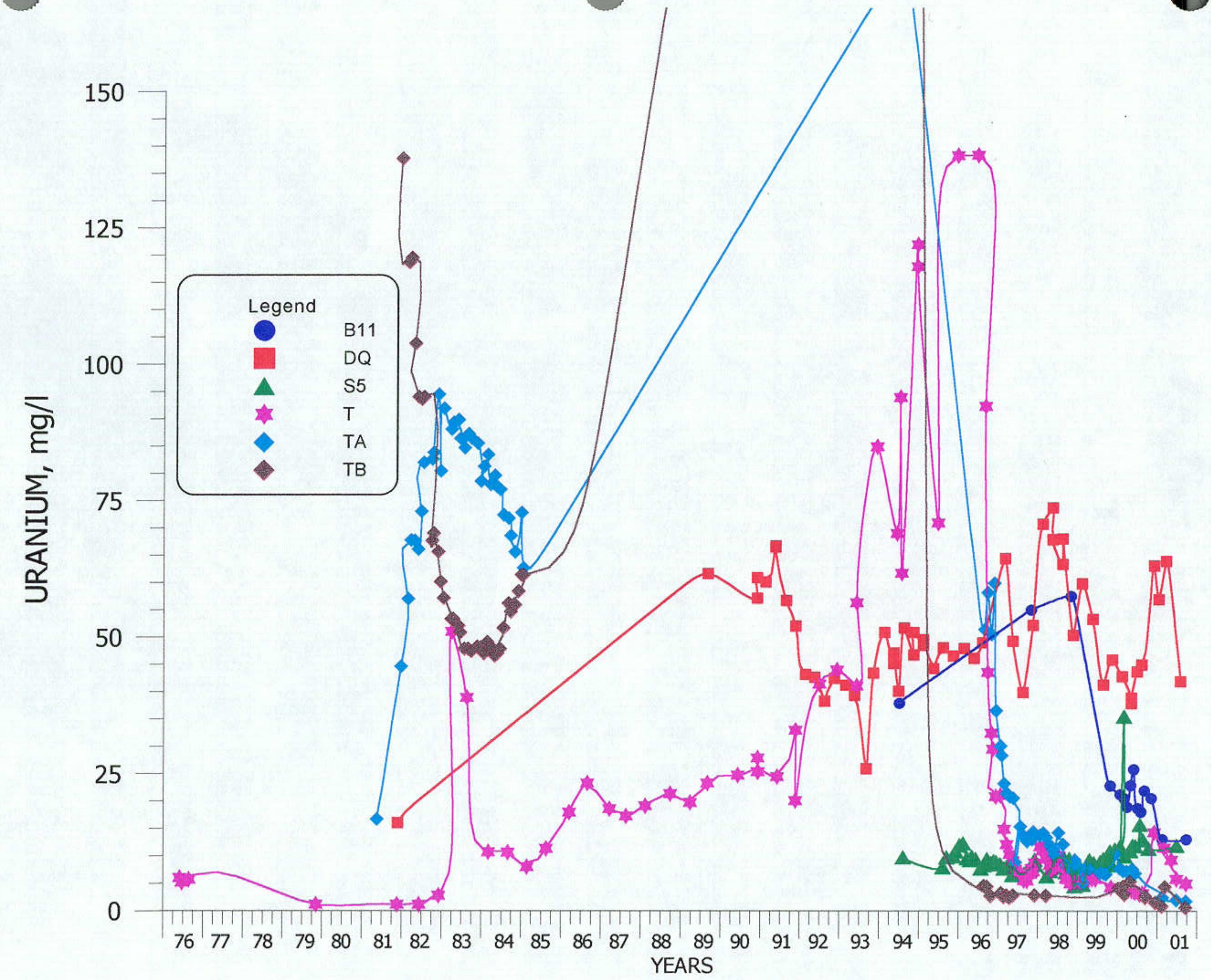



**FIGURE 4.3-22. URANIUM CONCENTRATIONS FOR WELLS B11, DQ, S5, T, TA AND TB.**



C17.4

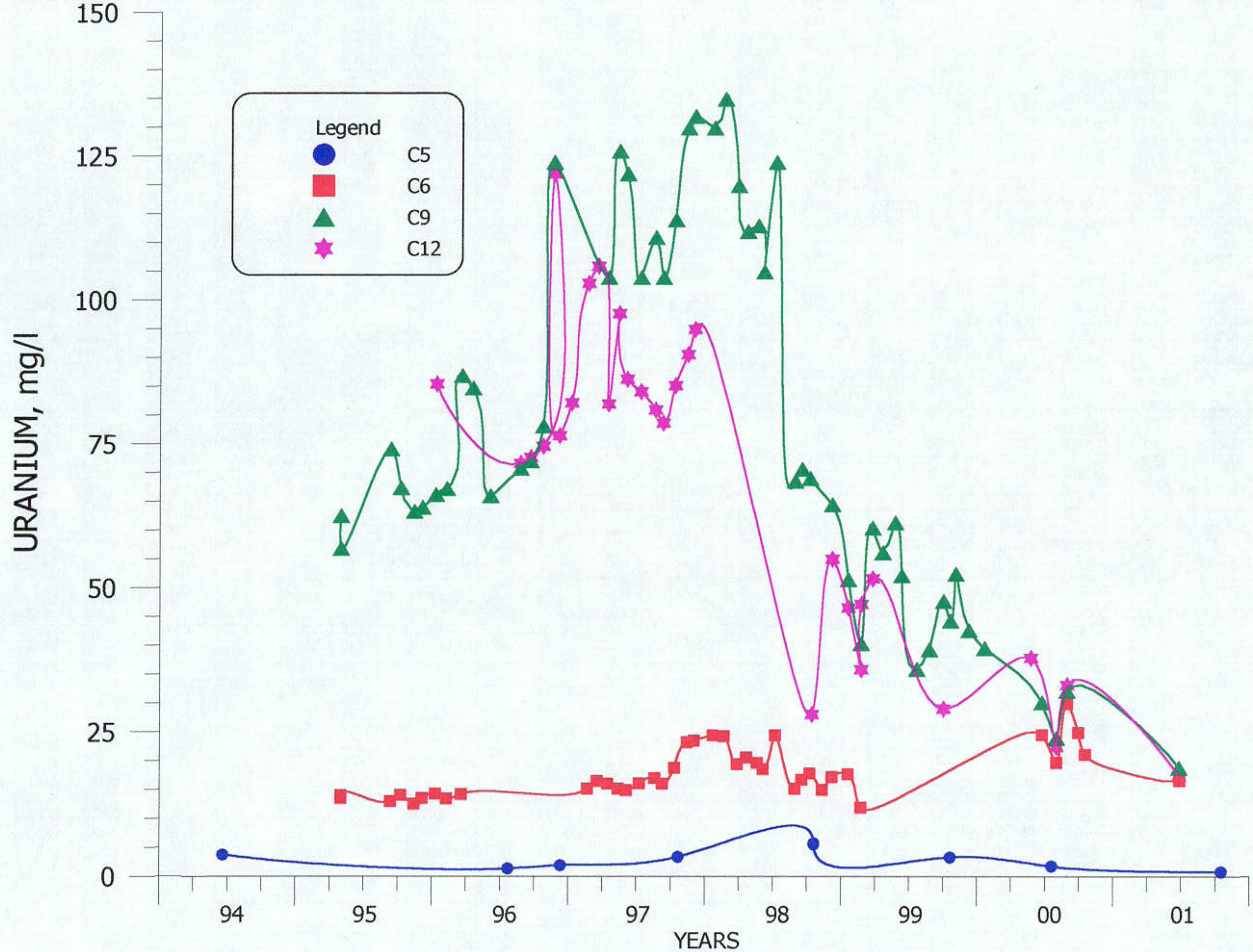



**FIGURE 4.3-23. URANIUM CONCENTRATIONS FOR WELLS C5, C6, C9 AND C12.**



C17.5

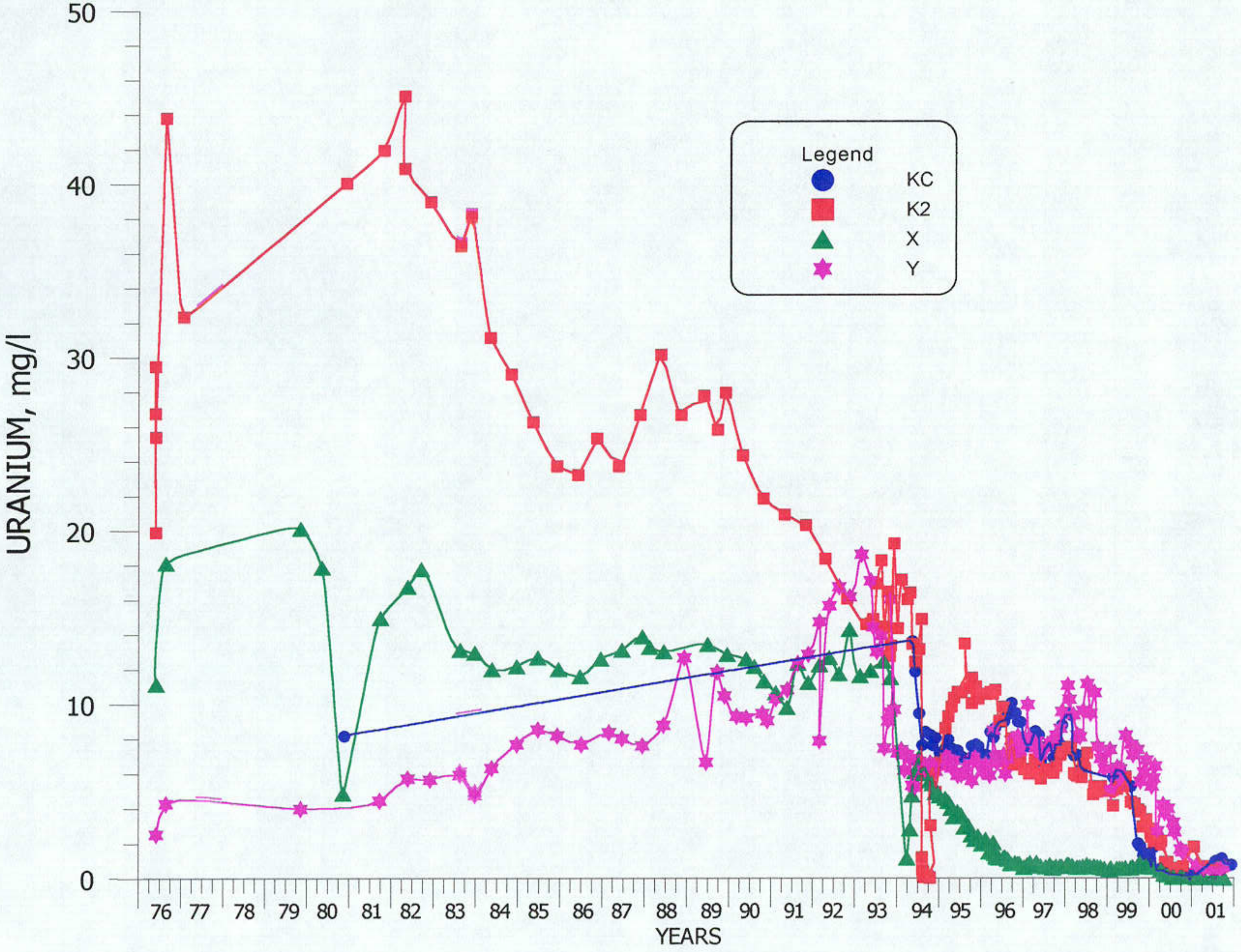



**FIGURE 4.3-24. URANIUM CONCENTRATIONS FOR WELLS KC, K2, X AND Y.**



C17.6

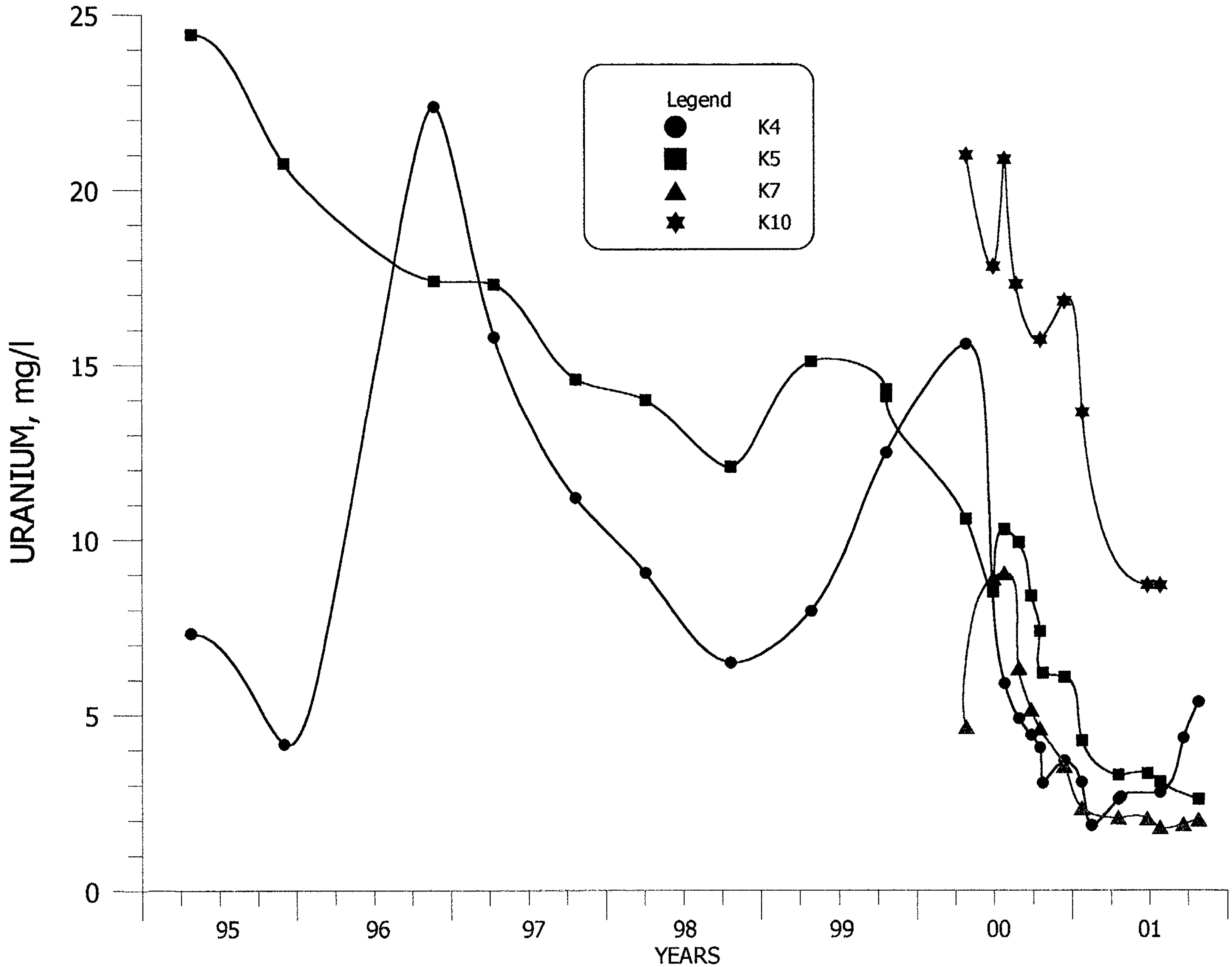



**FIGURE 4.3-25. URANIUM CONCENTRATIONS FOR WELLS K4, K5, K7 AND K10.**

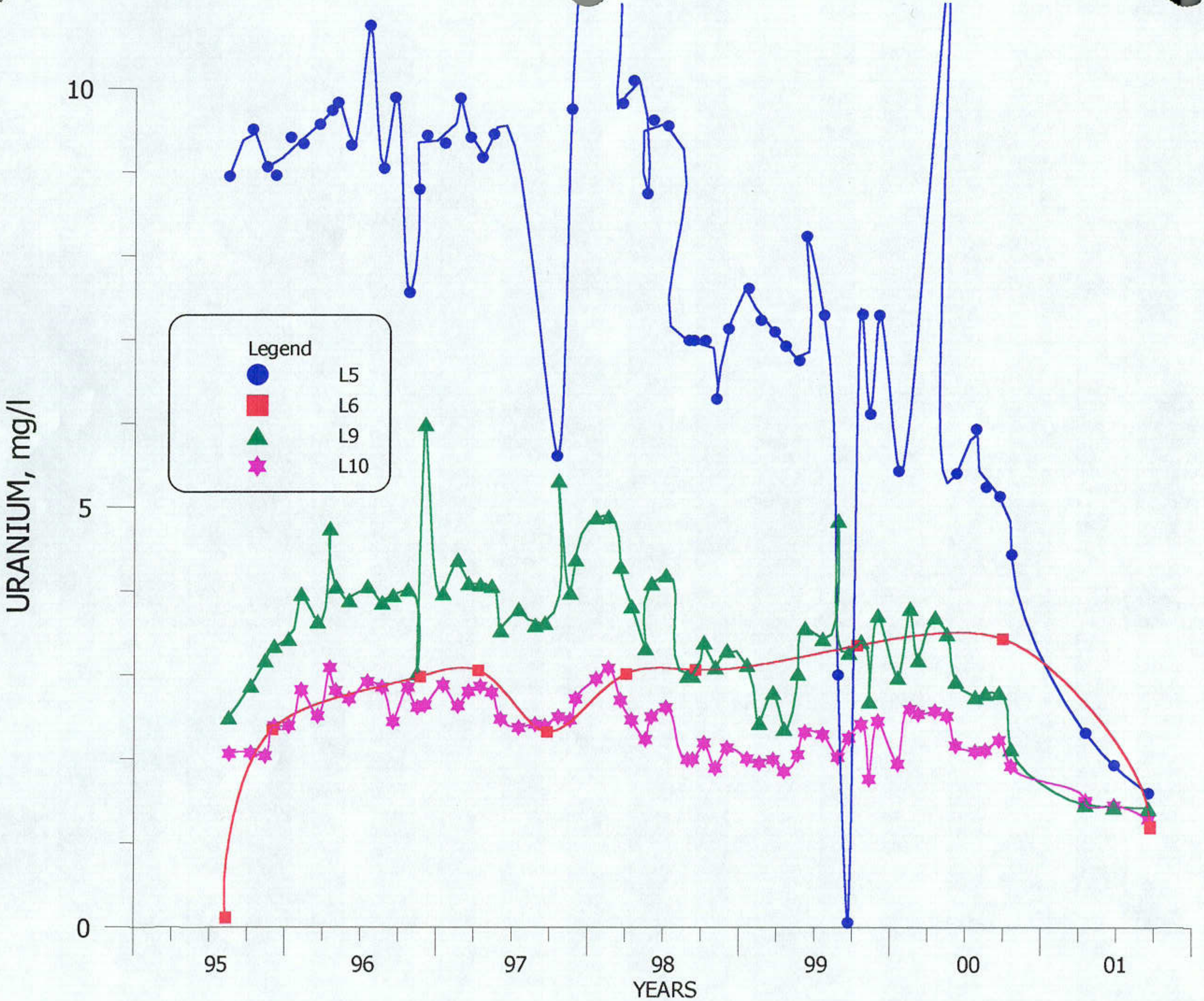



**FIGURE 4.3-26. URANIUM CONCENTRATIONS FOR WELLS L5, L6, L9 AND L10.**



C17.7

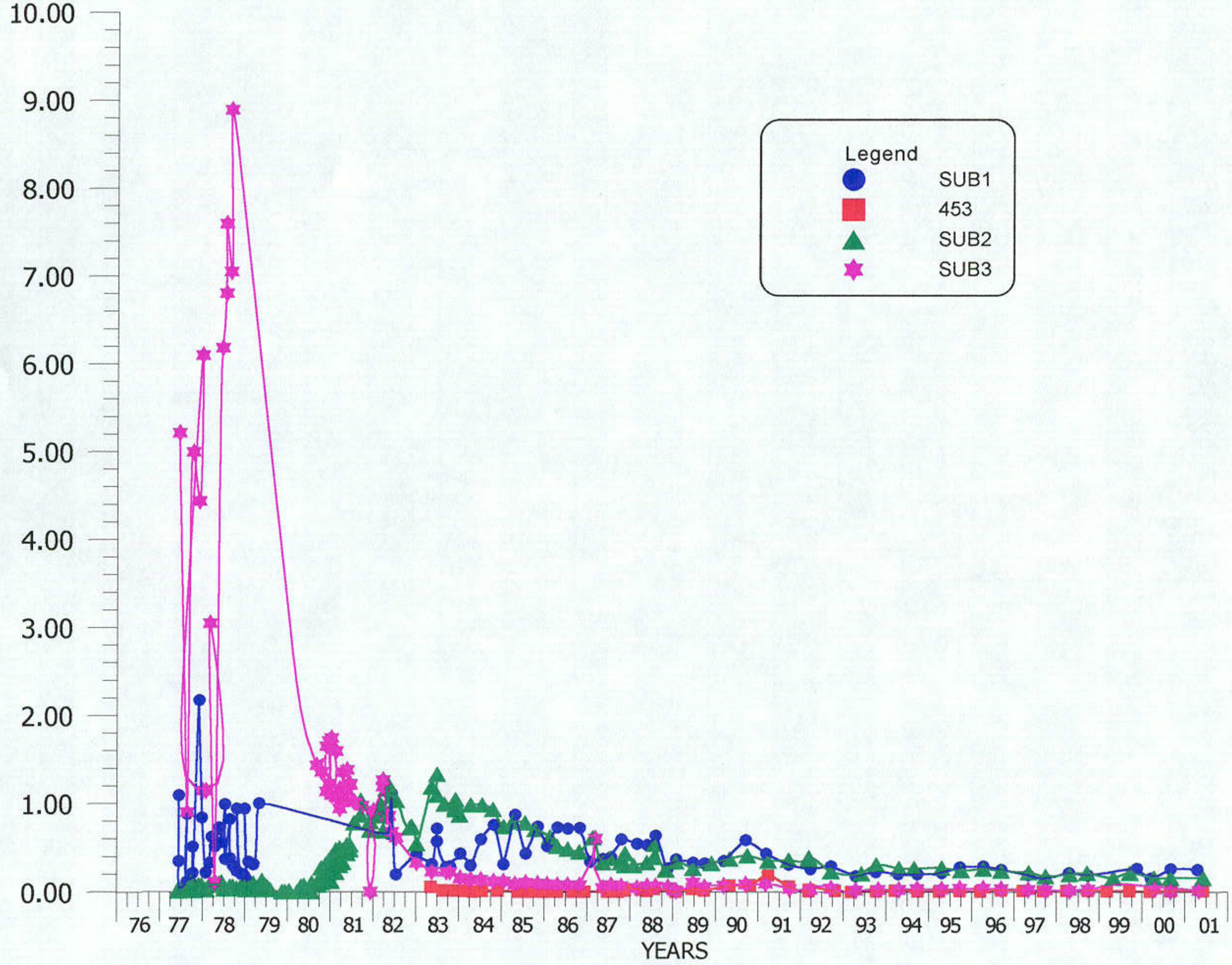



**FIGURE 4.3-27. URANIUM CONCENTRATIONS FOR WELLS SUB1, 453, SUB2 AND SUB3.**



C17.8

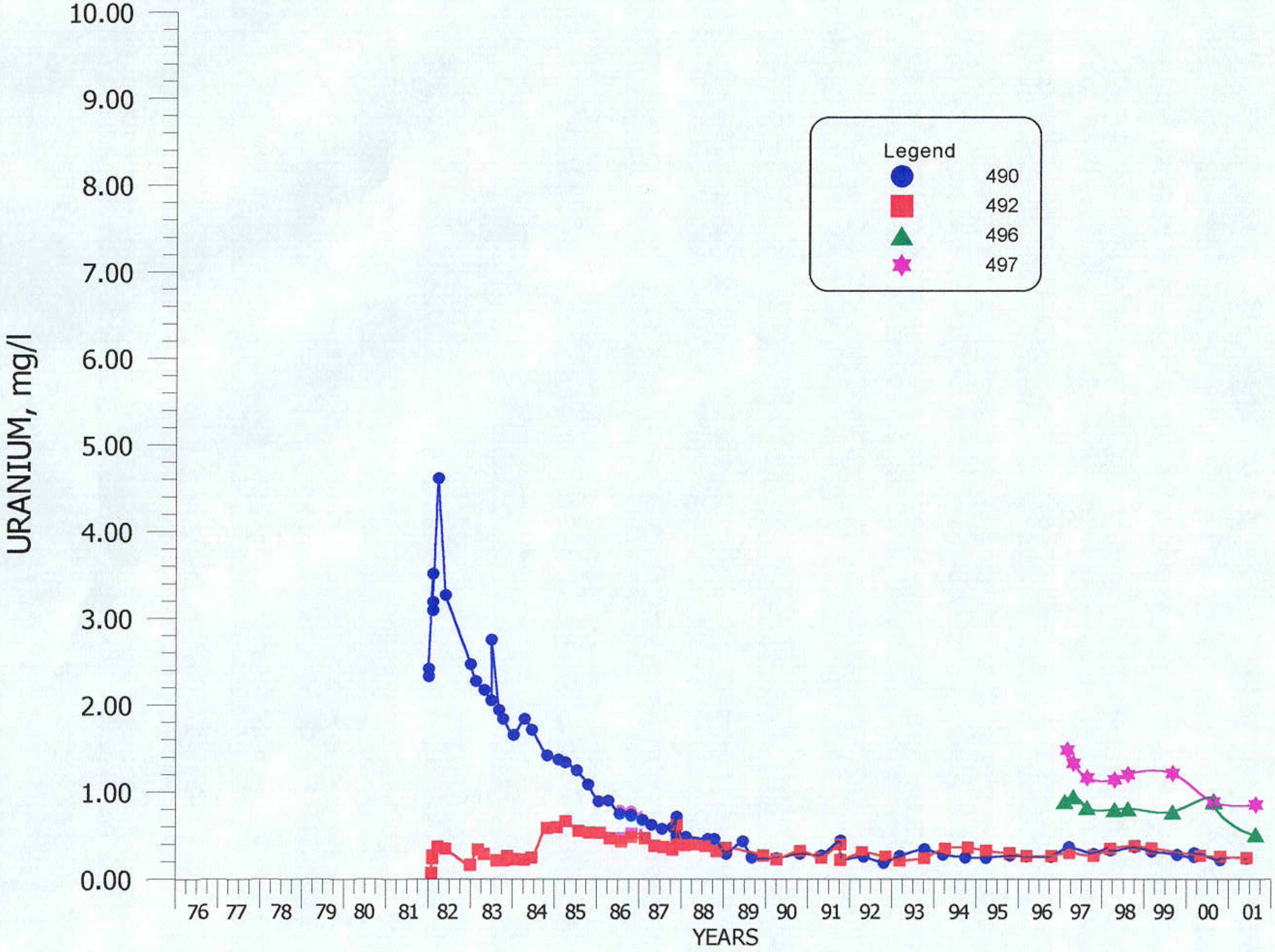



**FIGURE 4.3-28. URANIUM CONCENTRATIONS FOR WELLS 490, 492, 496 AND 497.**



C17.9

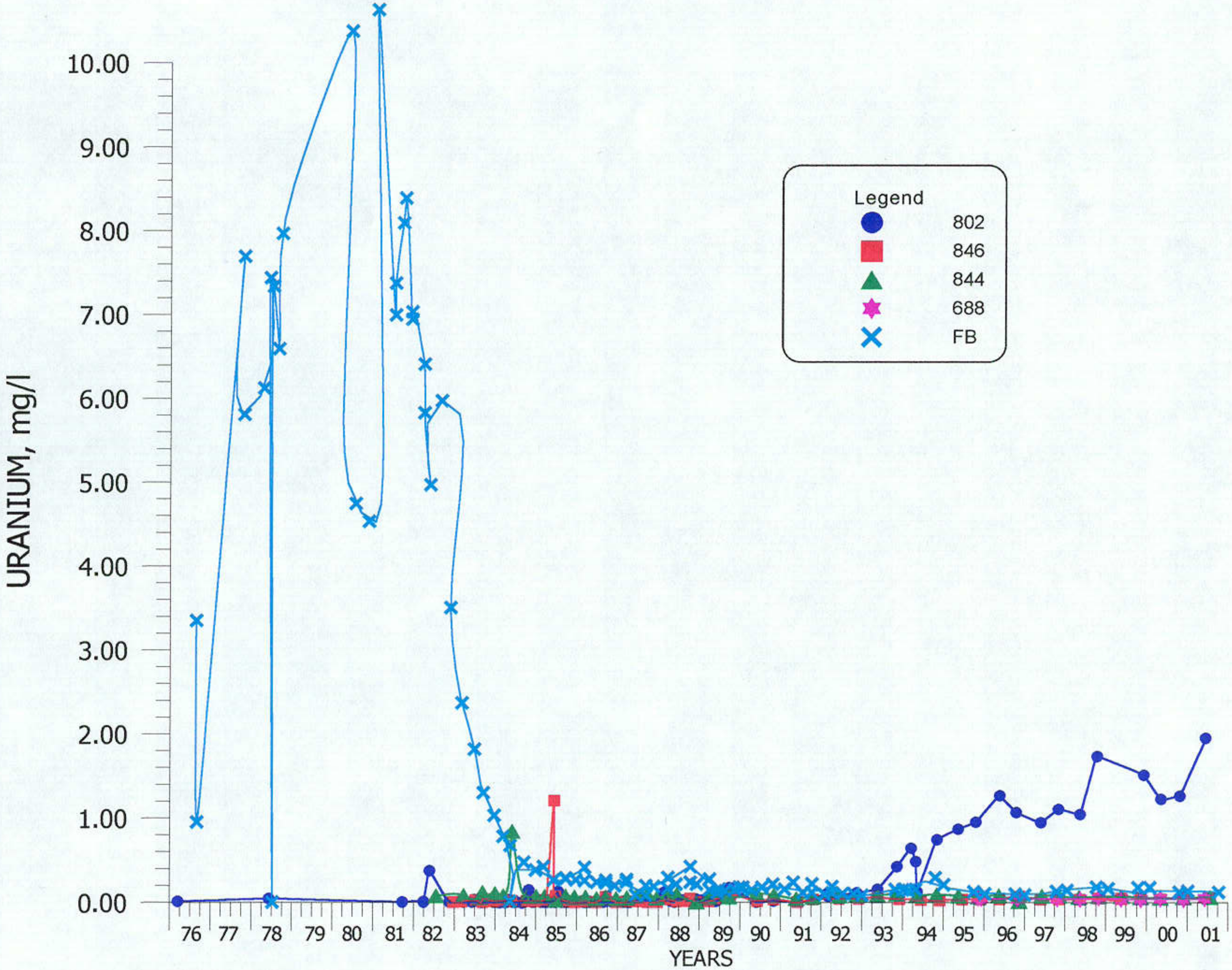
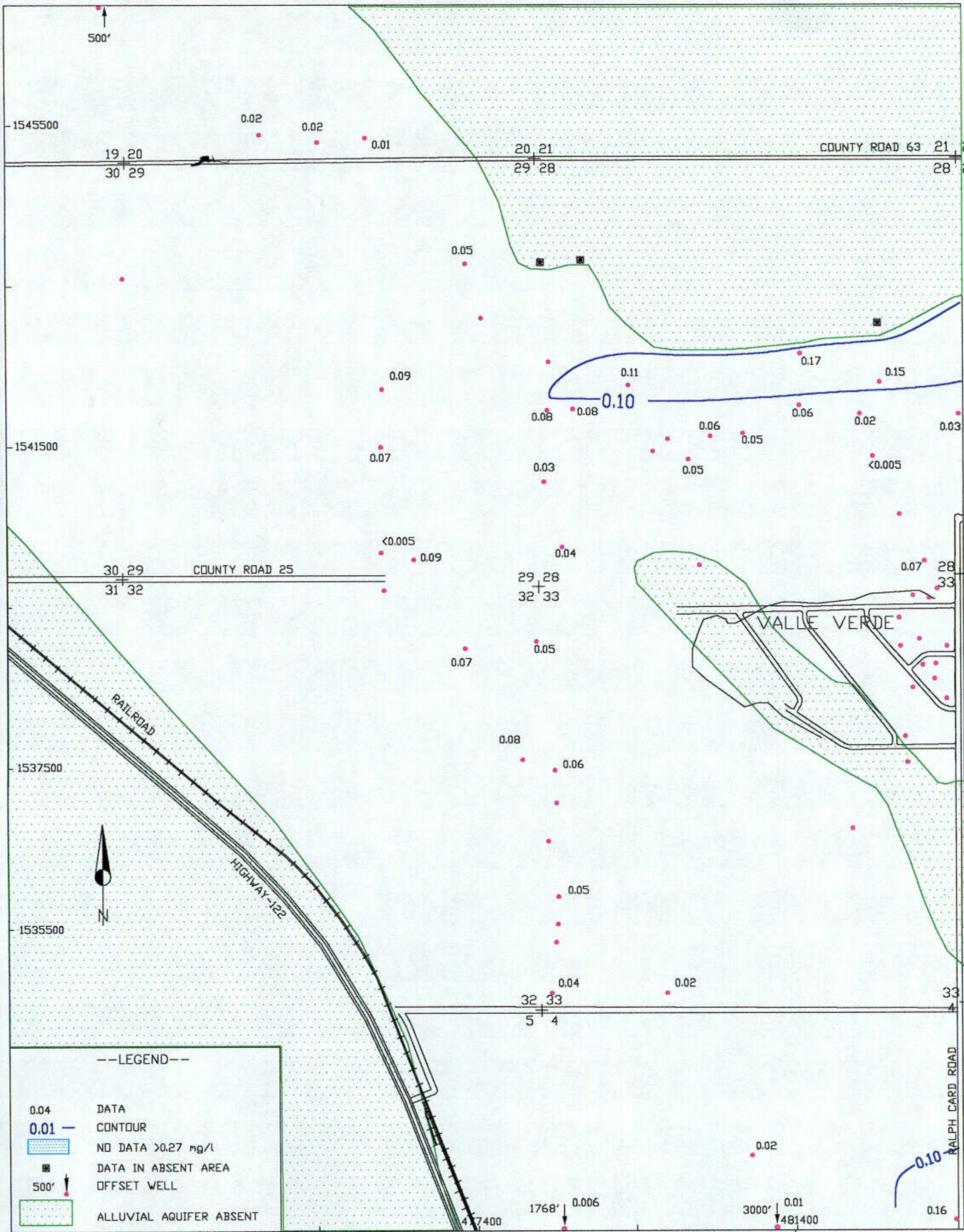



**FIGURE 4.3-29. URANIUM CONCENTRATIONS FOR WELLS 802, 846, 844, 688 AND FB.**

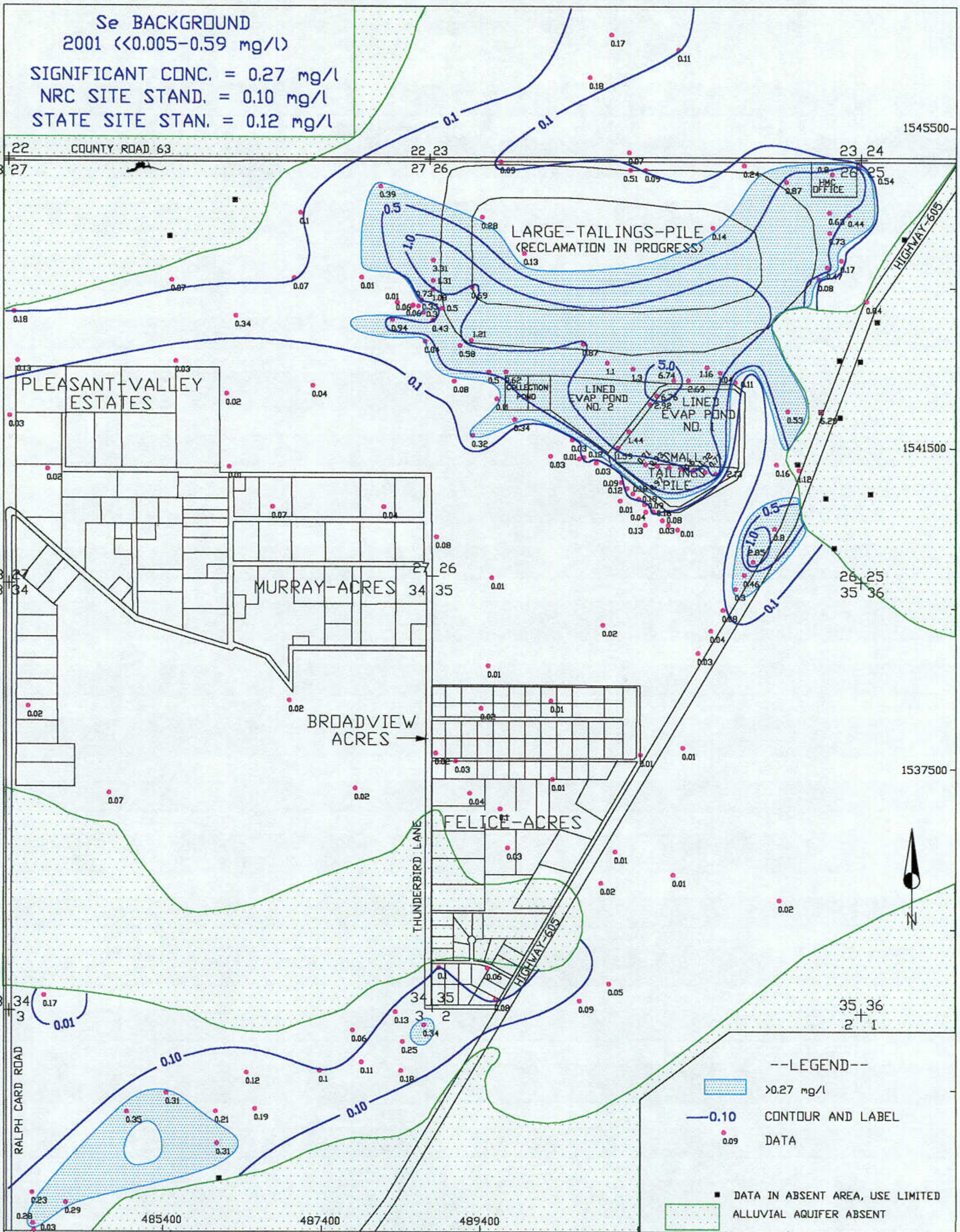


C17.10




| SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02 |
|---|---|---|
| | FIGURE 4.3-30A. SELENIUM CONCENTRATIONS FOR THE ALLUVIAL AQUIFER (WEST AREA), FALL 2001, mg/l | D:\R13\HMC\ 01WQAL lh |
| | | page 4.3-46 |

C18




SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02

FIGURE 4.3-30B. SELENIUM CONCENTRATIONS FOR THE ALLUVIAL AQUIFER, FALL 2001, mg/l

D:\R13\HMC\ 01EQAL lh



C19

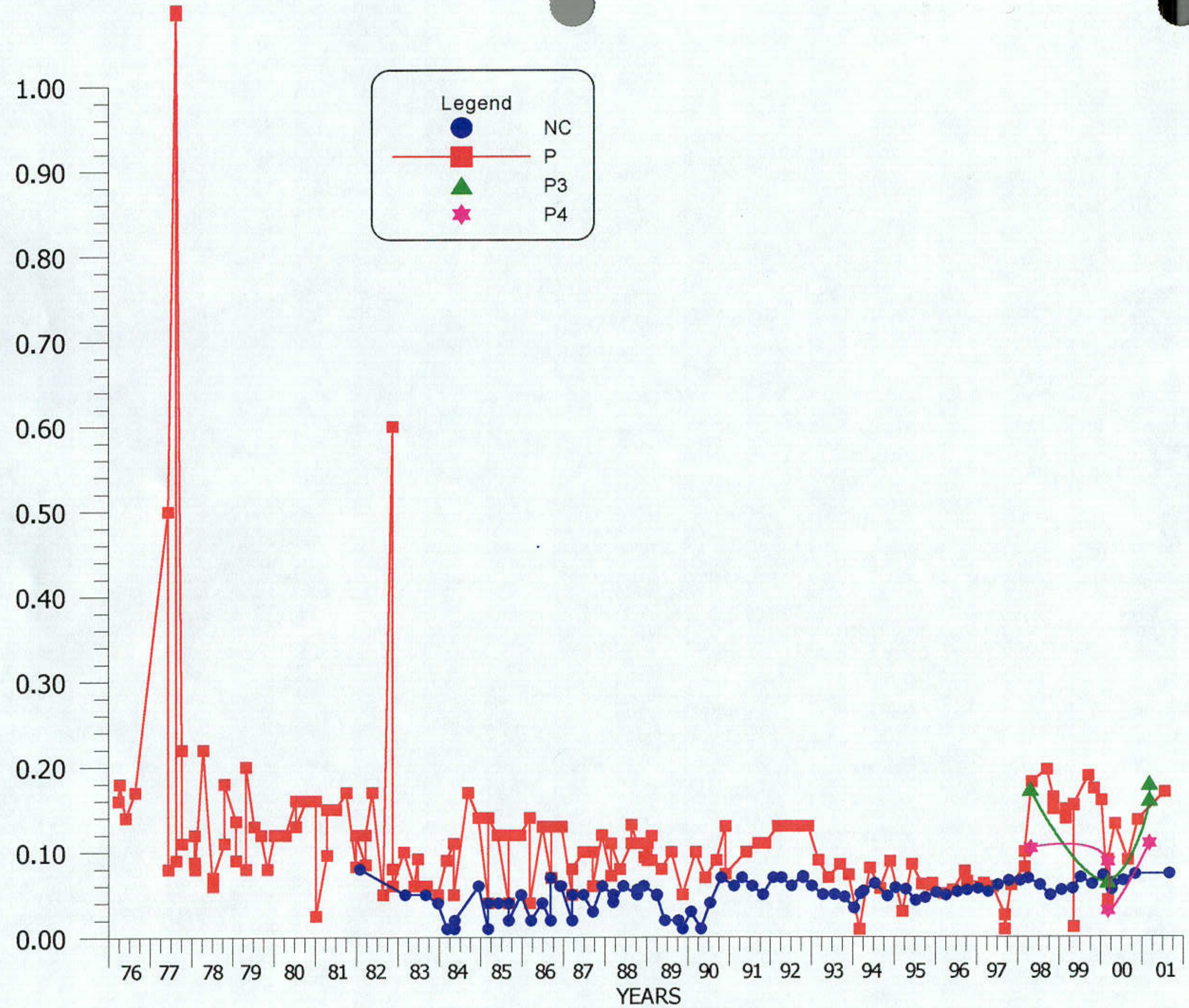



**FIGURE 4.3-31. SELENIUM CONCENTRATIONS FOR WELLS NC, P, P3 AND P4.**



C19.1

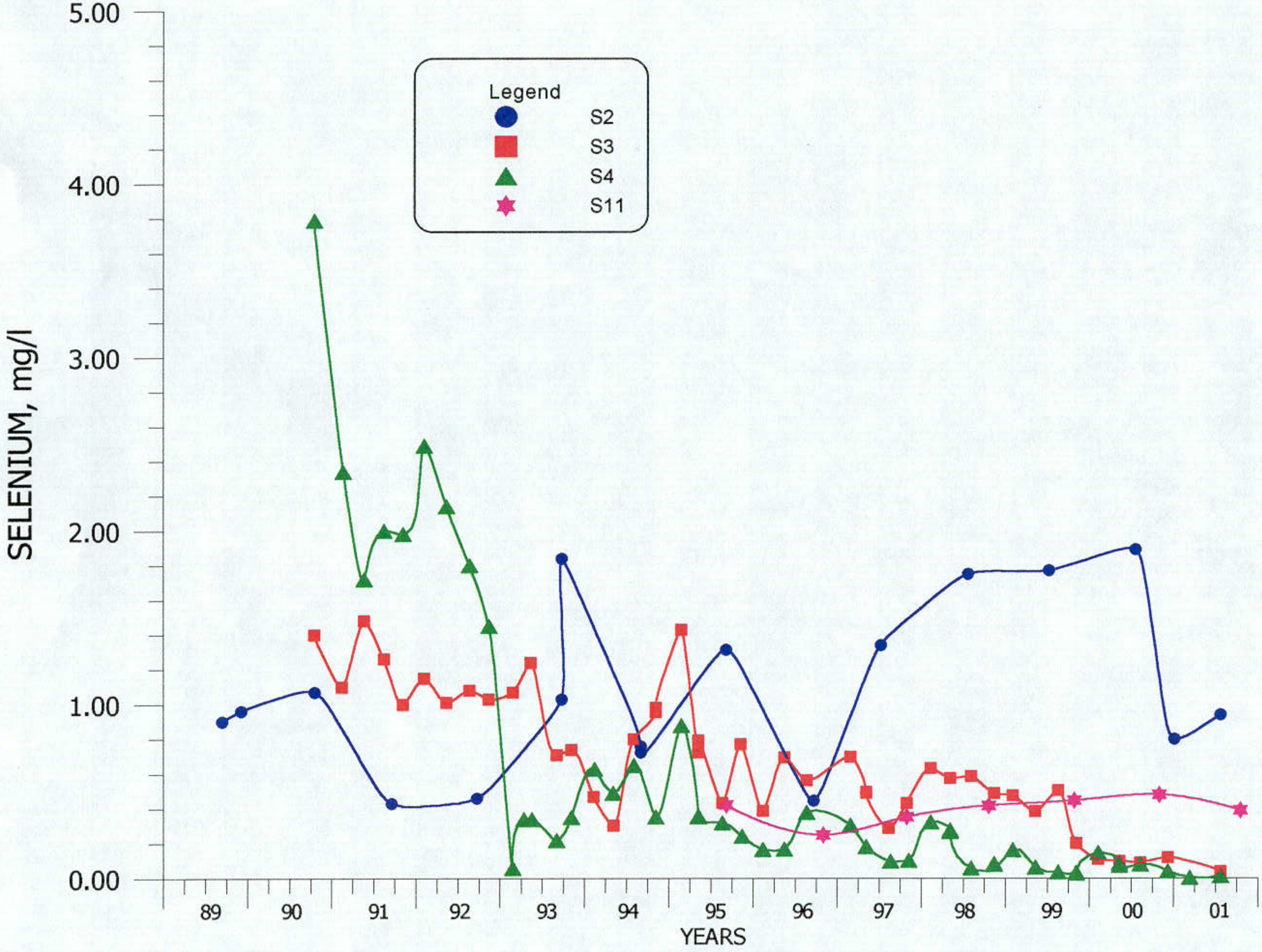



**FIGURE 4.3-32. SELENIUM CONCENTRATIONS FOR WELLS S2, S3, S4 AND S11.**



C19.2

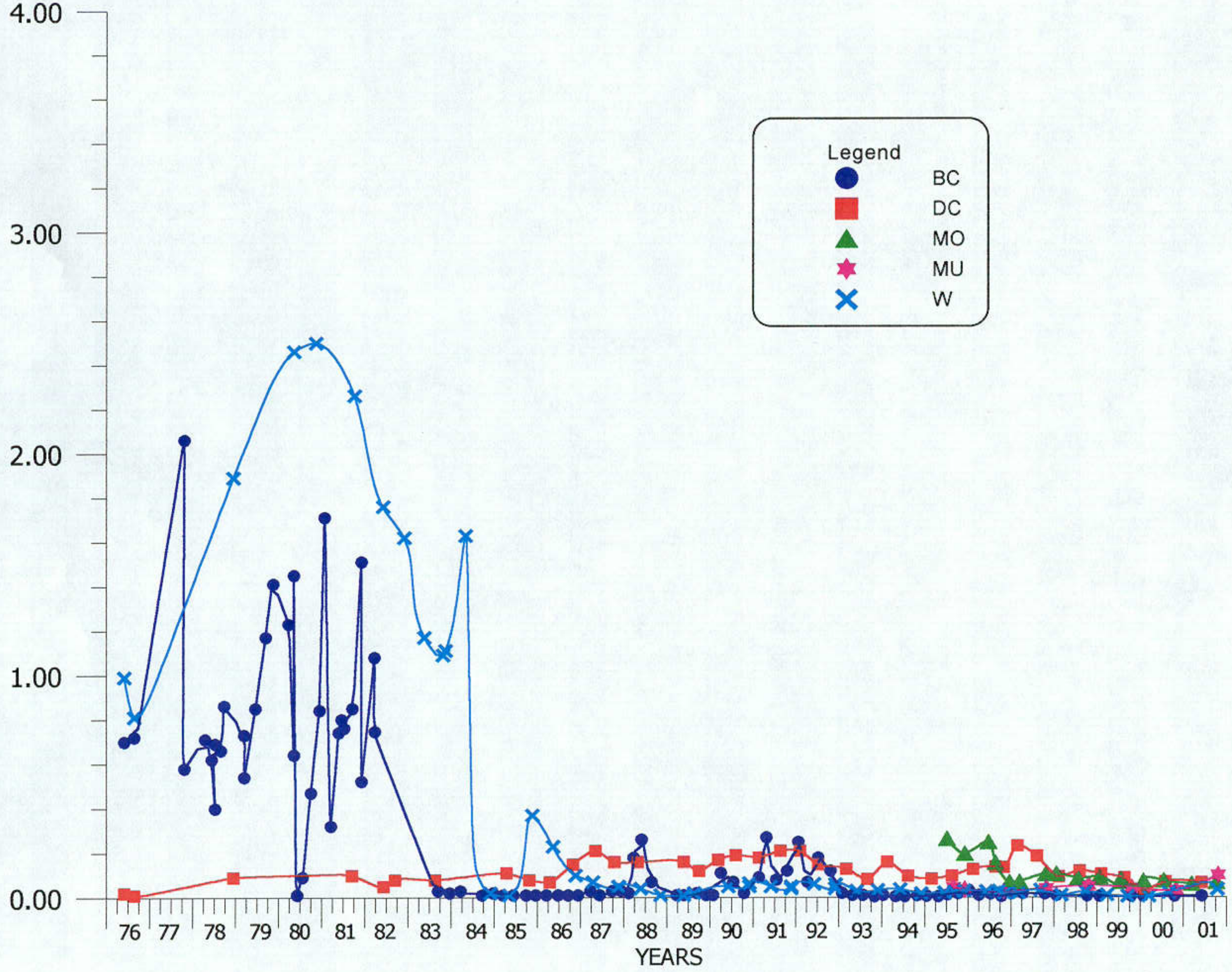



**FIGURE 4.3-33. SELENIUM CONCENTRATIONS FOR WELLS BC, DC, MO, MU AND W.**



C19.3

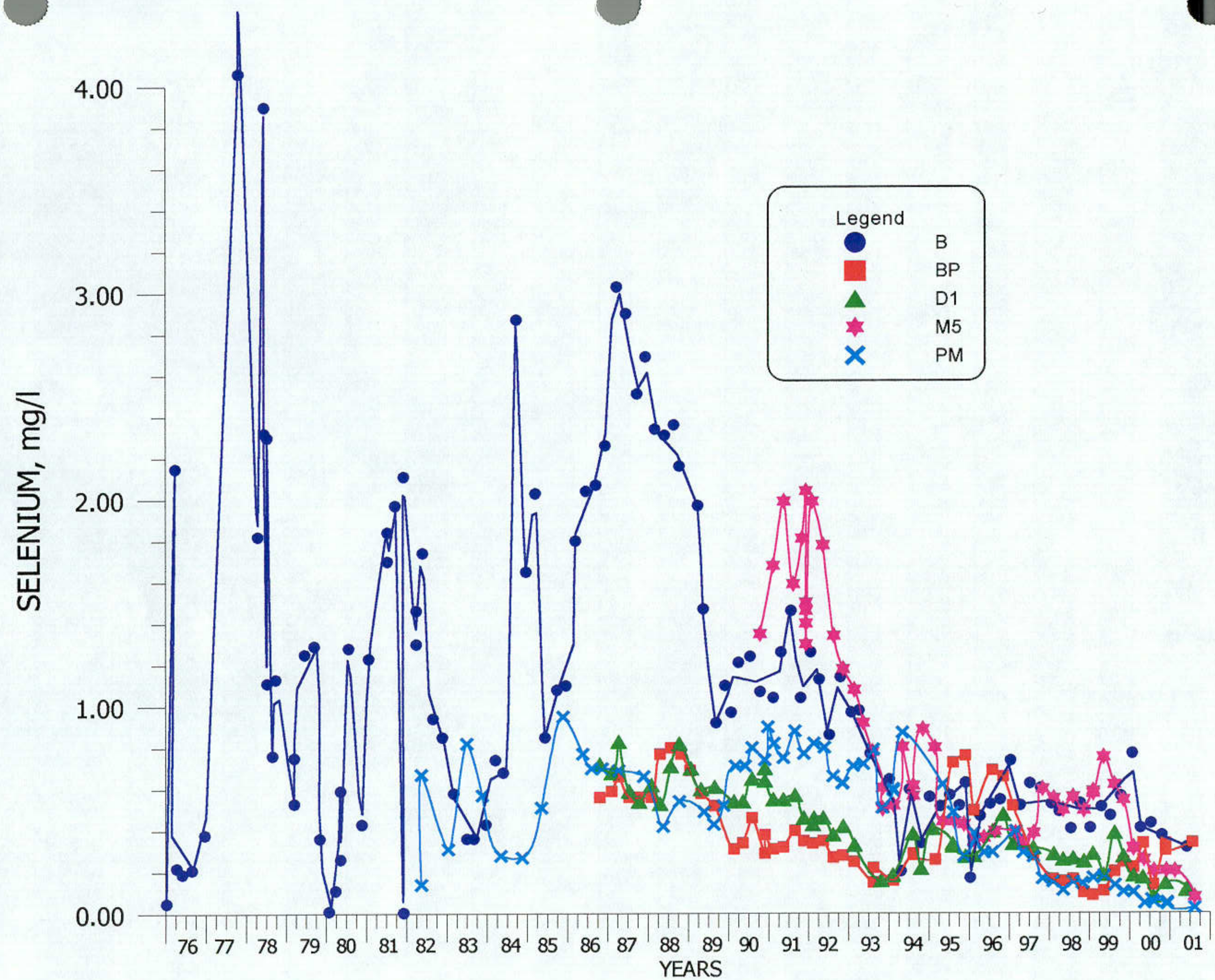



**FIGURE 4.3-34. SELENIUM CONCENTRATIONS FOR WELLS B, BP, D1, M5 AND PM.**



C19.4

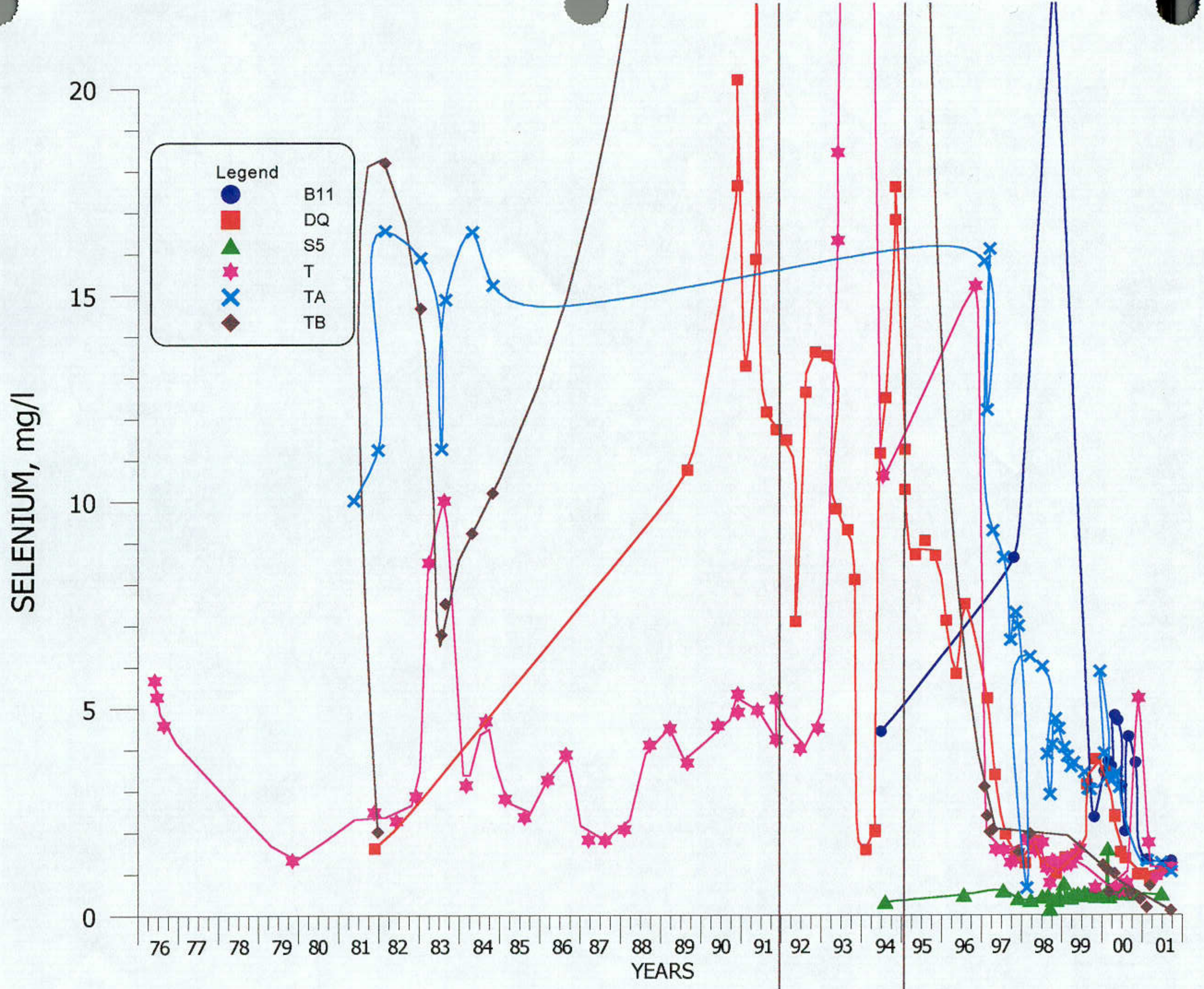



FIGURE 4.3-35. SELENIUM CONCENTRATIONS FOR WELLS B11, DQ, S5, T, TA AND TB.



C19.5

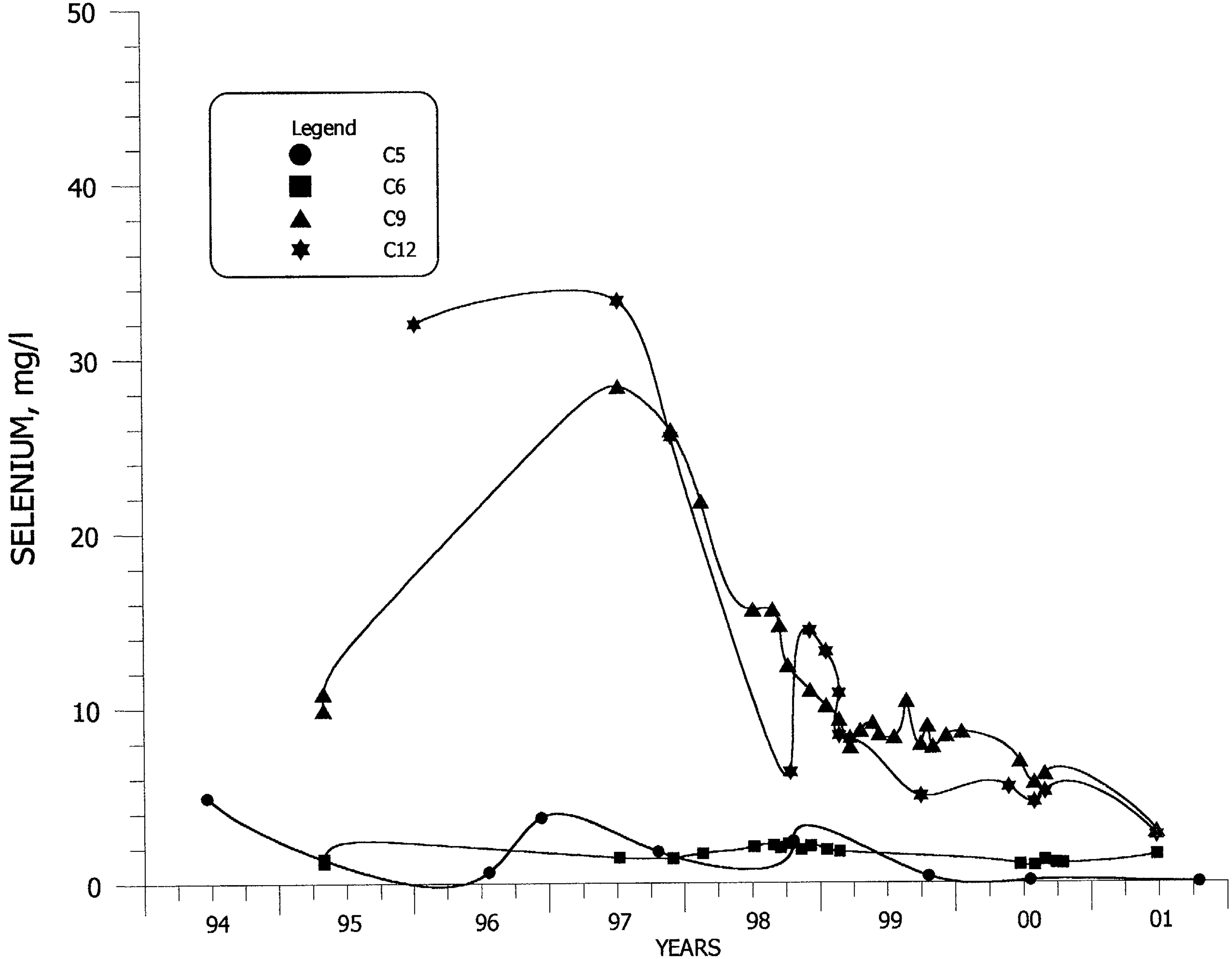



**FIGURE 4.3-36. SELENIUM CONCENTRATIONS FOR WELLS C5, C6, C9 AND C12.**

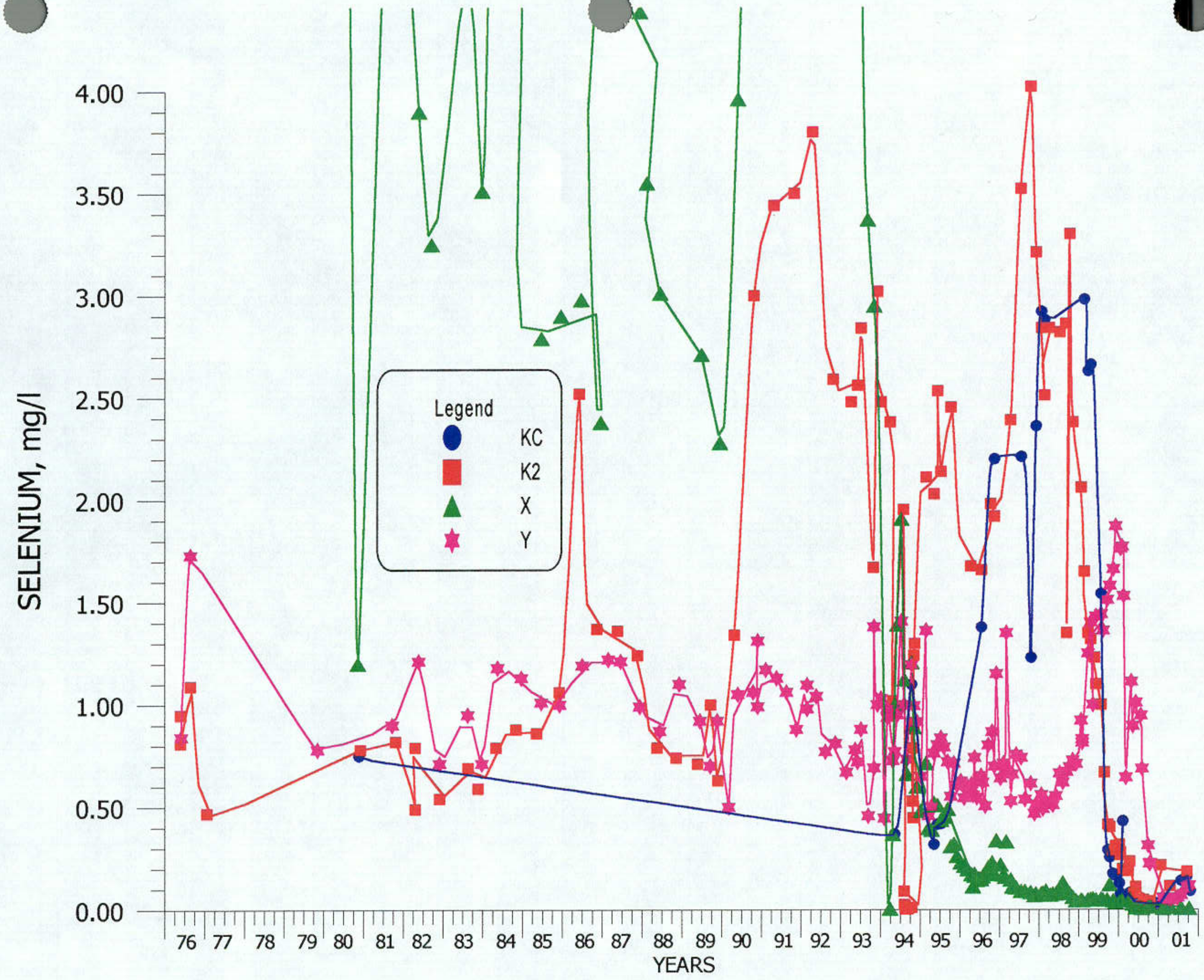



FIGURE 4.3-37. SELENIUM CONCENTRATIONS FOR WELLS KC, K2, X AND Y.



C19.6

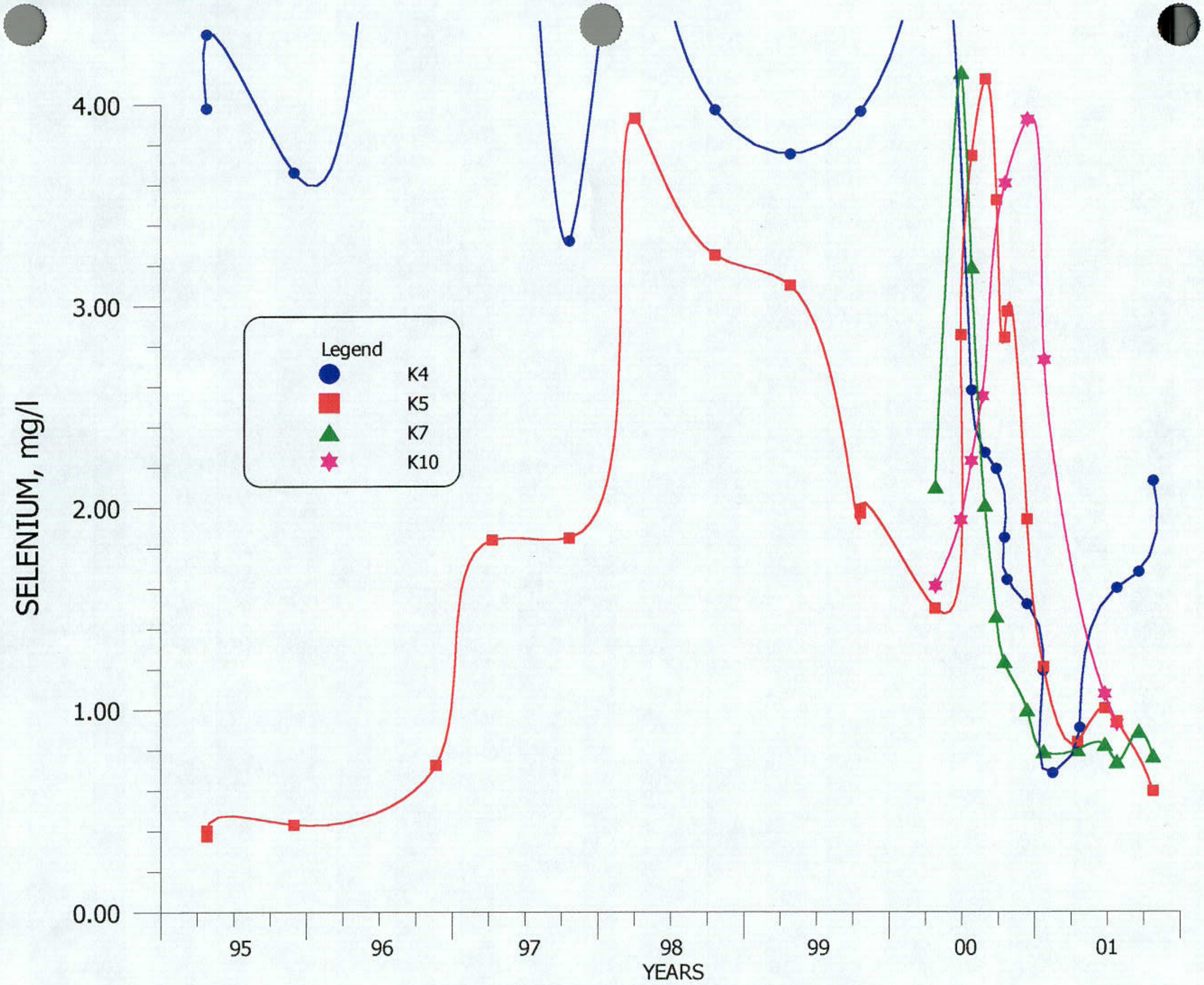



**FIGURE 4.3-38. SELENIUM CONCENTRATIONS FOR WELLS K4, K5, K7 AND K10.**



C19.7

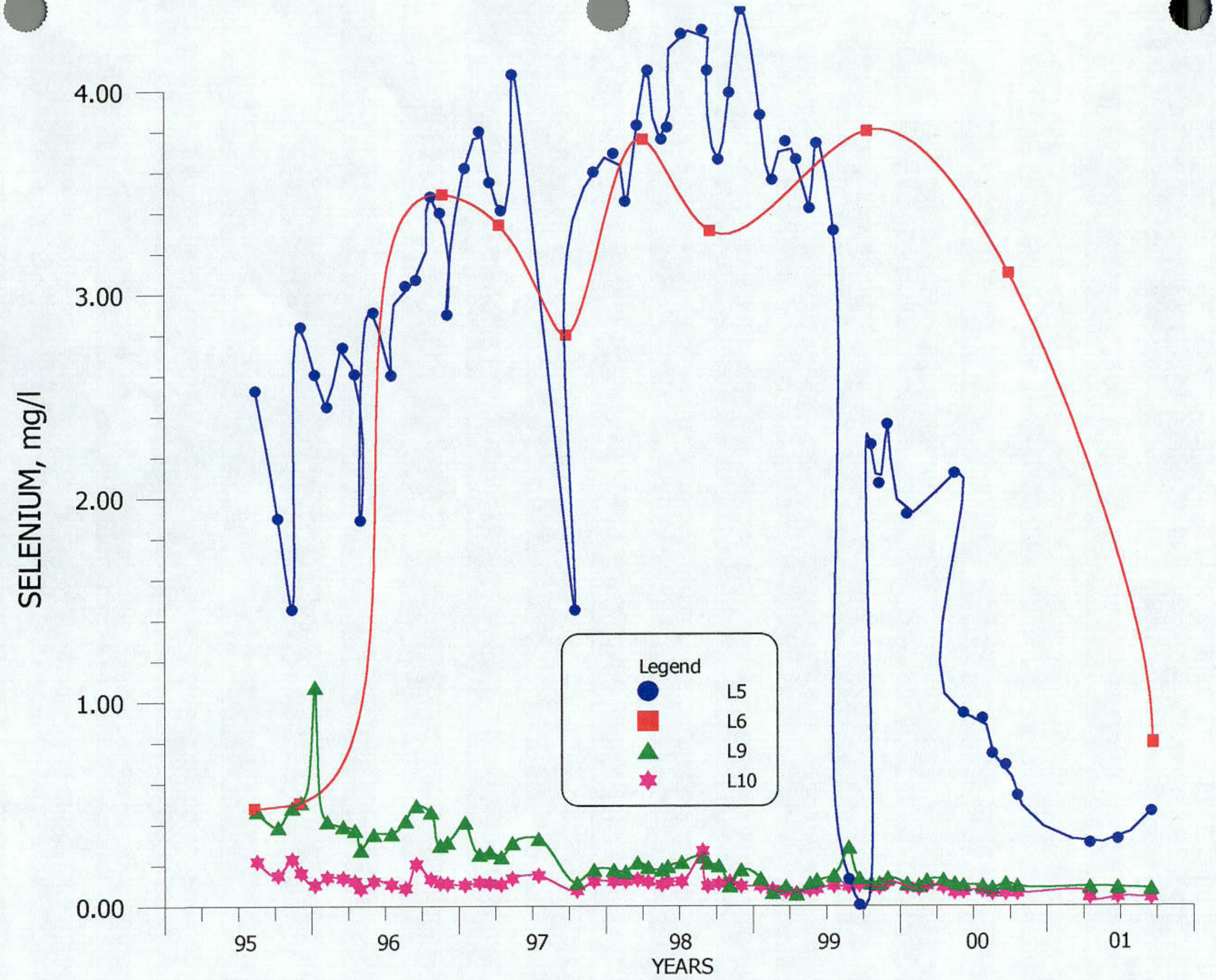



**FIGURE 4.3-39. SELENIUM CONCENTRATIONS FOR WELLS L5, L6, L9 AND L10.**



C19.8

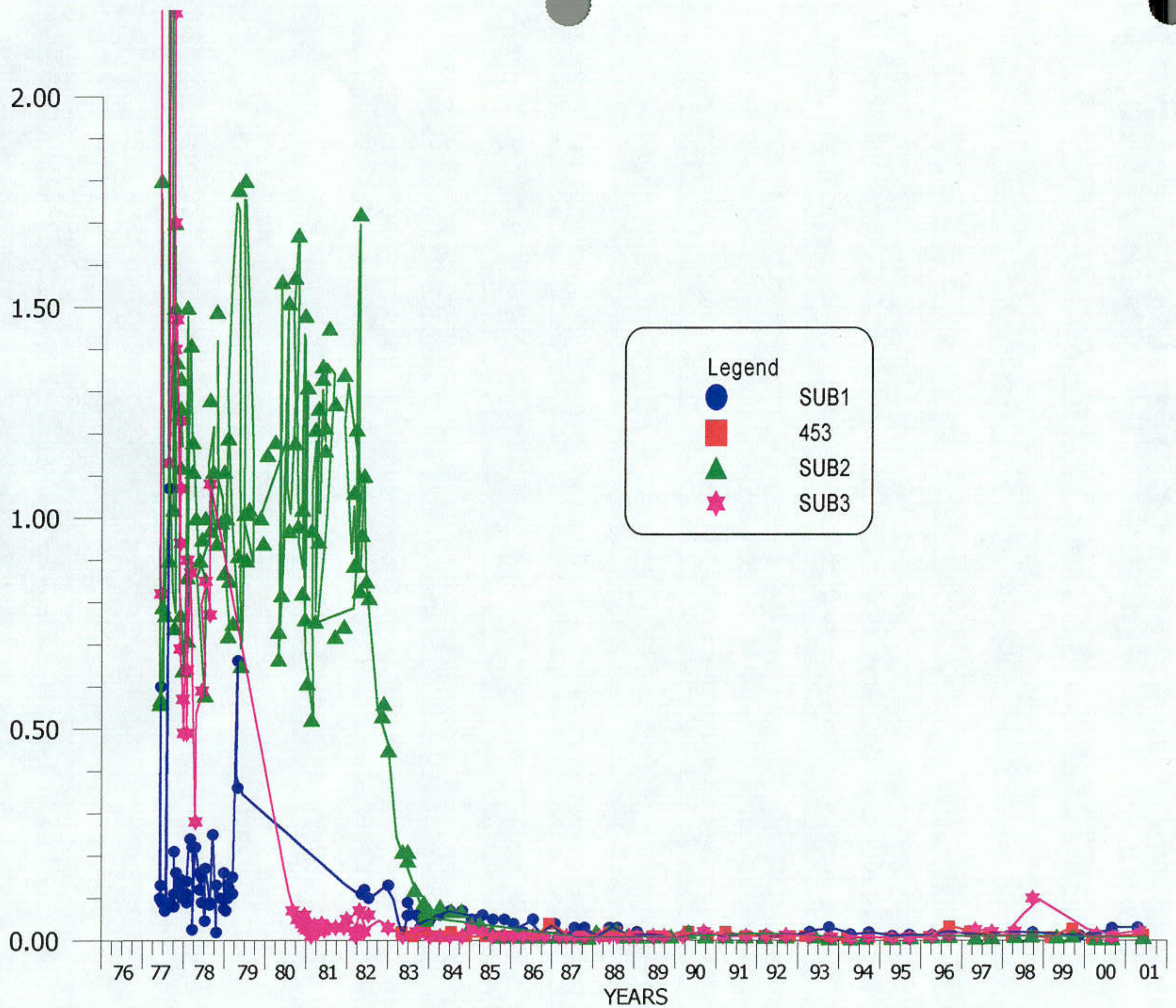



**FIGURE 4.3-40. SELENIUM CONCENTRATIONS FOR WELLS SUB1, 453, SUB2 AND SUB3.**



C19.9

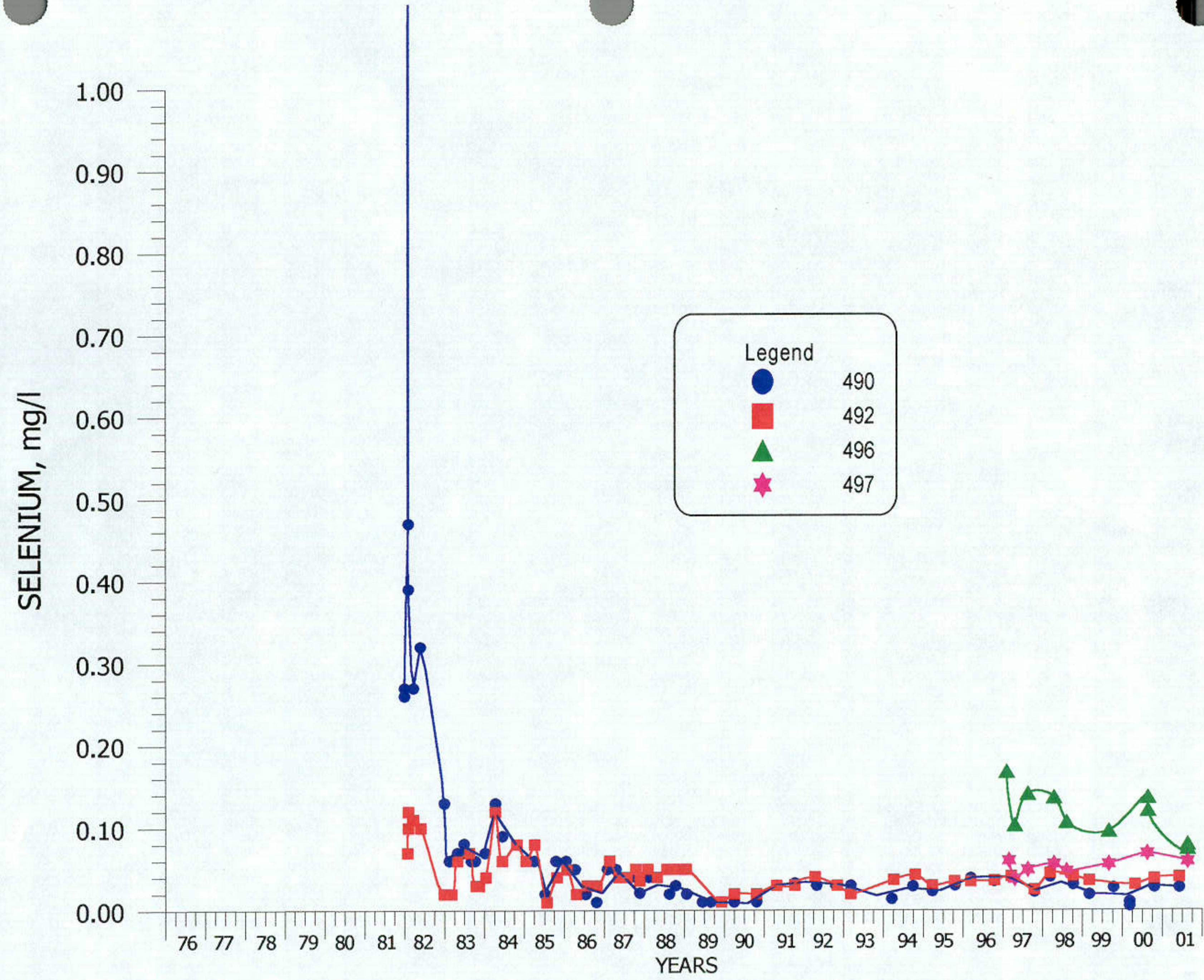



FIGURE 4.3-41. SELENIUM CONCENTRATIONS FOR WELLS 490, 492, 496 AND 497.



C19.10

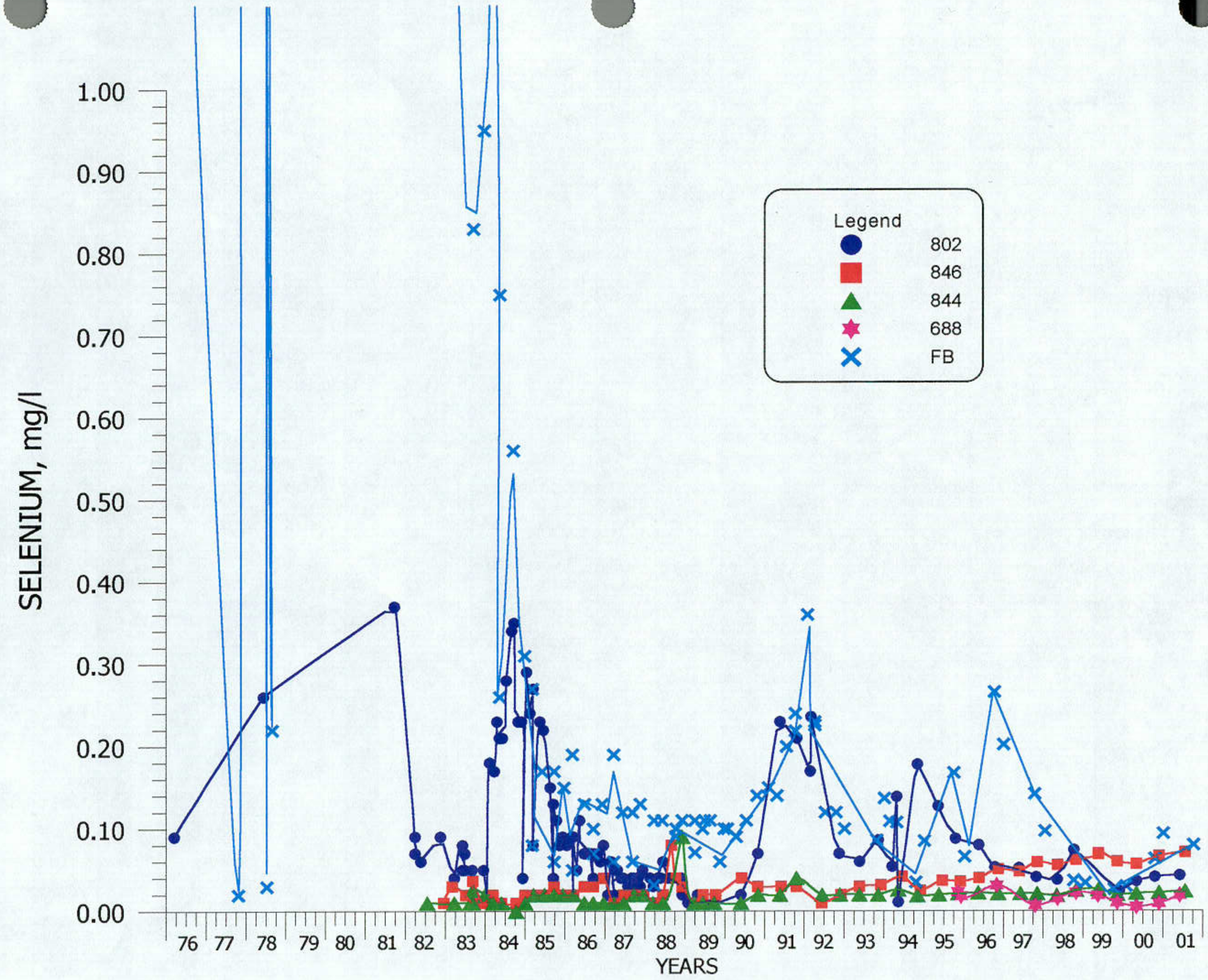
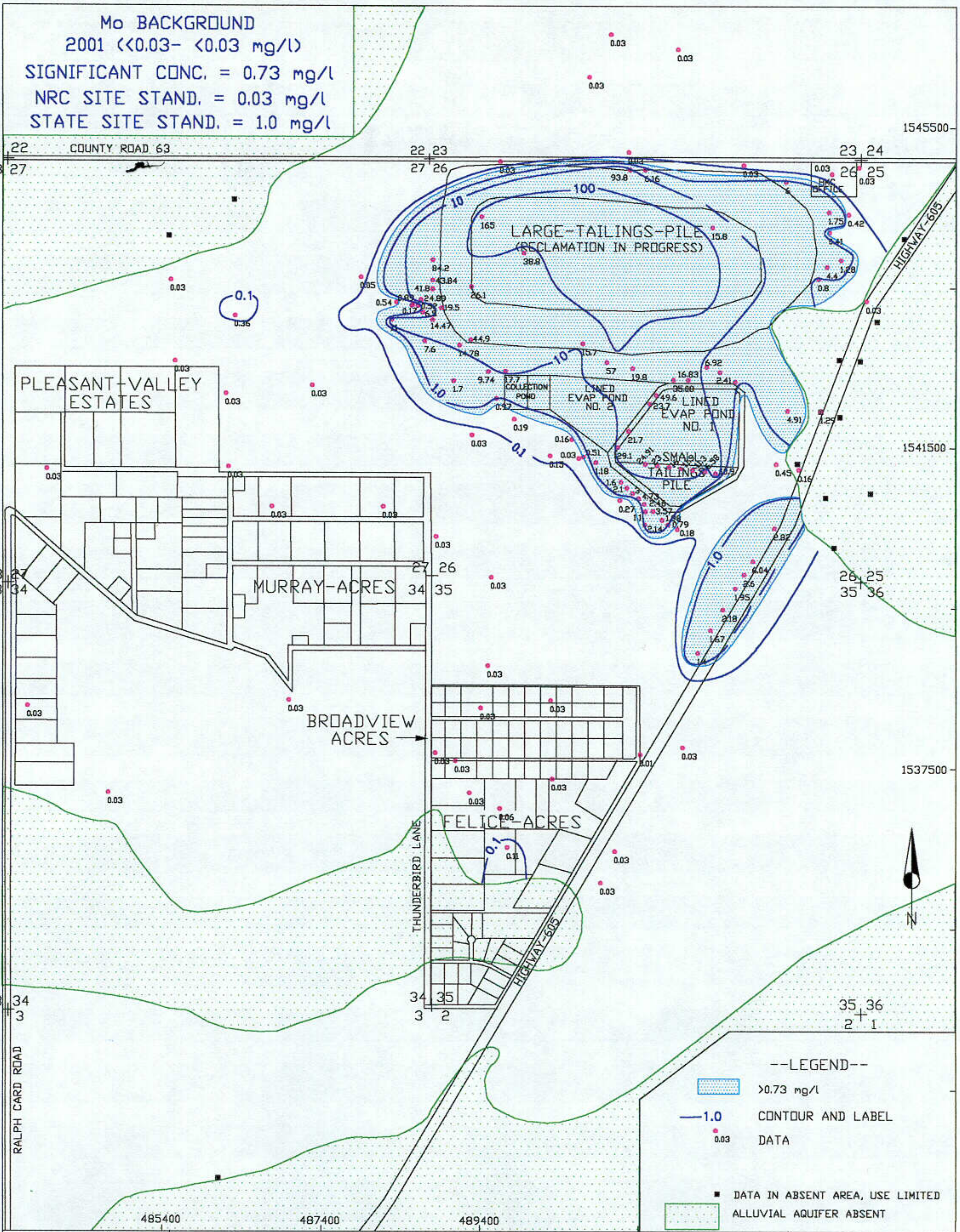



**FIGURE 4.3-42. SELENIUM CONCENTRATIONS FOR WELLS 802, 846, 844, 688 AND FB.**



C19.11




| SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02 |
|---|---|---|
| | FIGURE 4.3-43. MOLYBDENUM CONCENTRATIONS FOR THE ALLUVIAL AQUIFER, FALL 2001, mg/l | D:\R13\HMC\ 01EQAL lh<br>page 4.3-60 |

C20

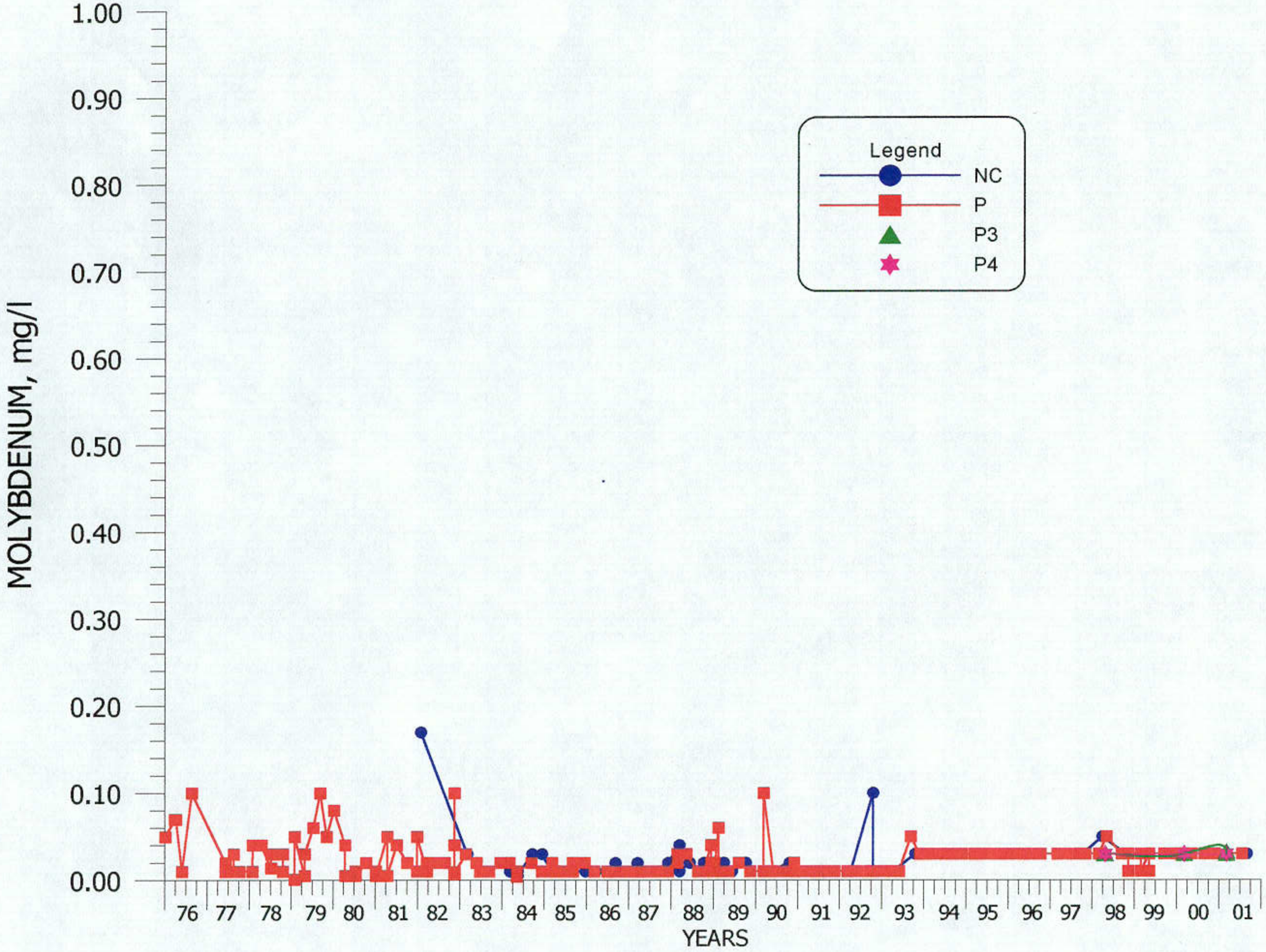



**FIGURE 4.3-44. MOLYBDENUM CONCENTRATIONS FOR WELLS NC, P, P3 AND P4.**



C20.1

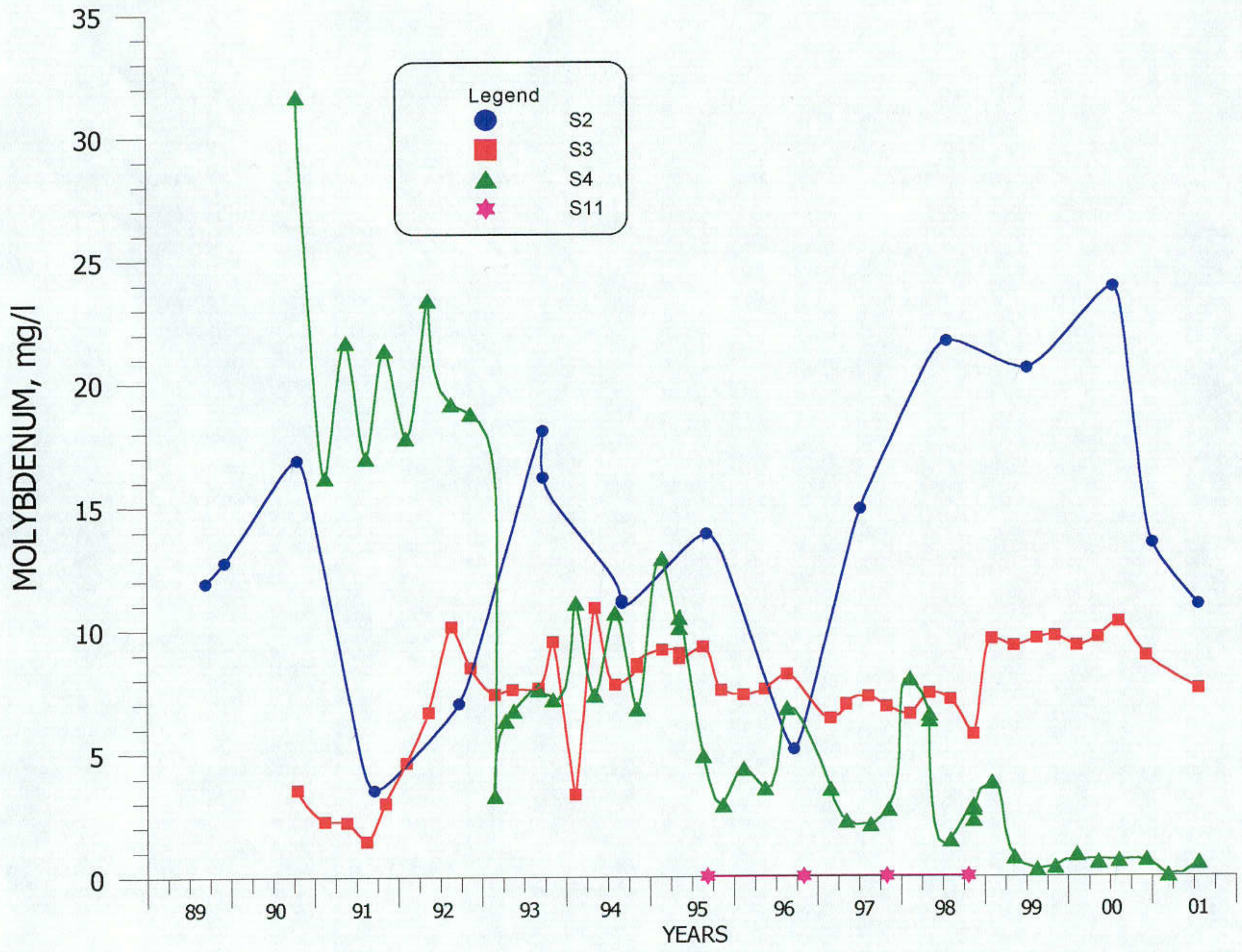



**FIGURE 4.3-45. MOLYBDENUM CONCENTRATIONS FOR WELLS S2, S3, S4 AND S11.**



C20.2

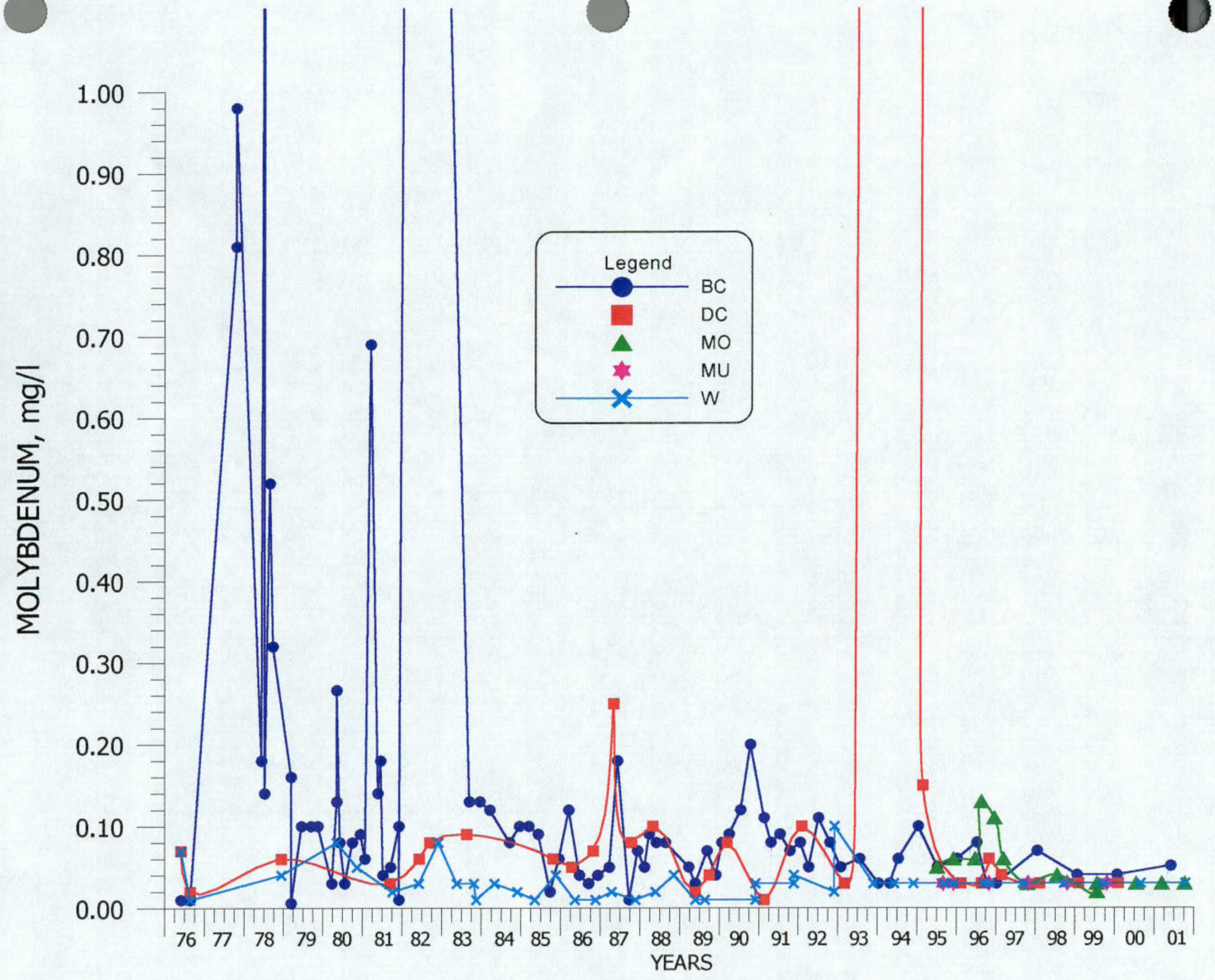



**FIGURE 4.3-46. MOLYBDENUM CONCENTRATIONS FOR WELLS BC, DC, MO, MU AND W.**



C20.3

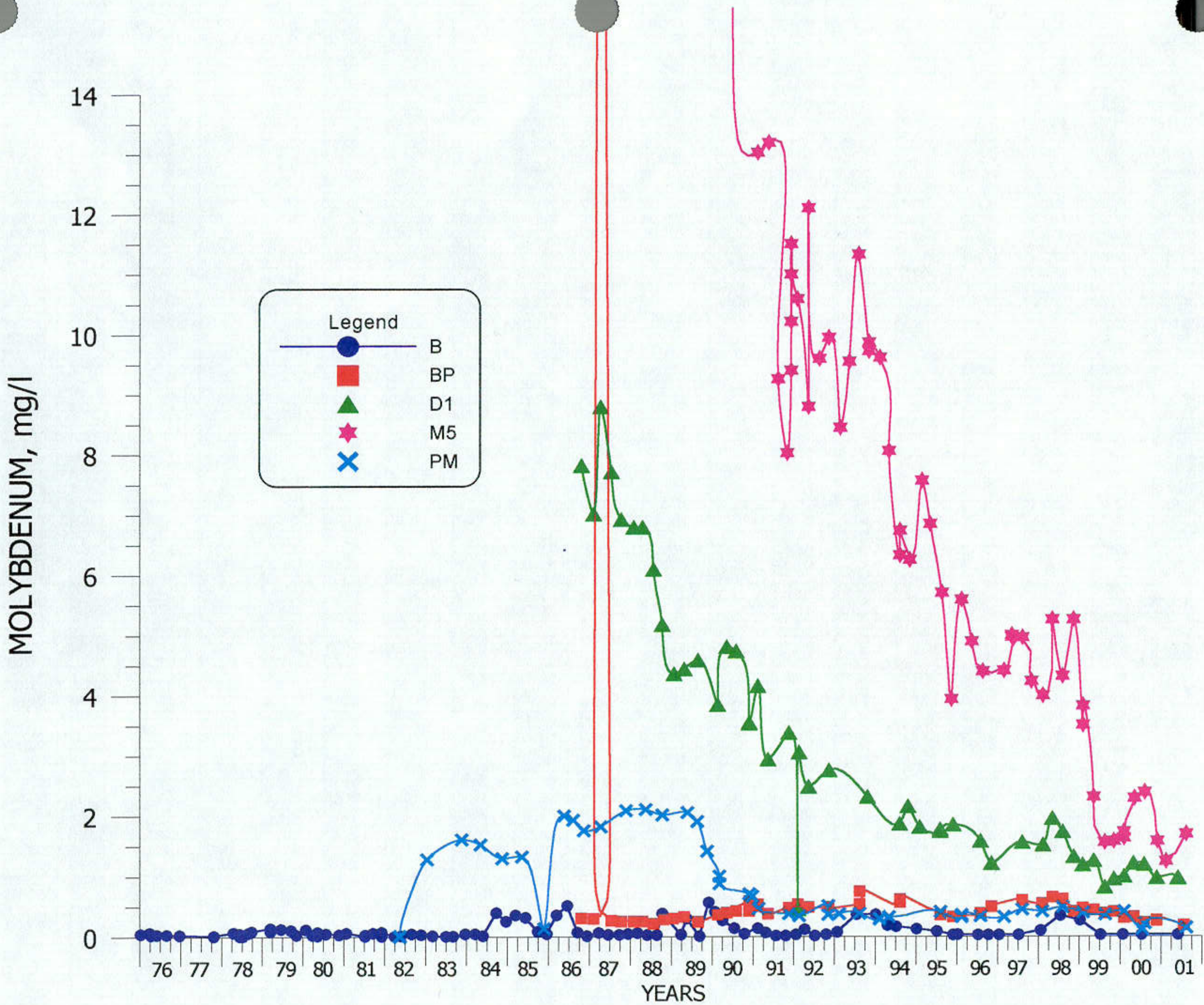



**FIGURE 4.3-47. MOLYBDENUM CONCENTRATIONS FOR WELLS B, BP, D1, M5 AND PM.**



C20.4

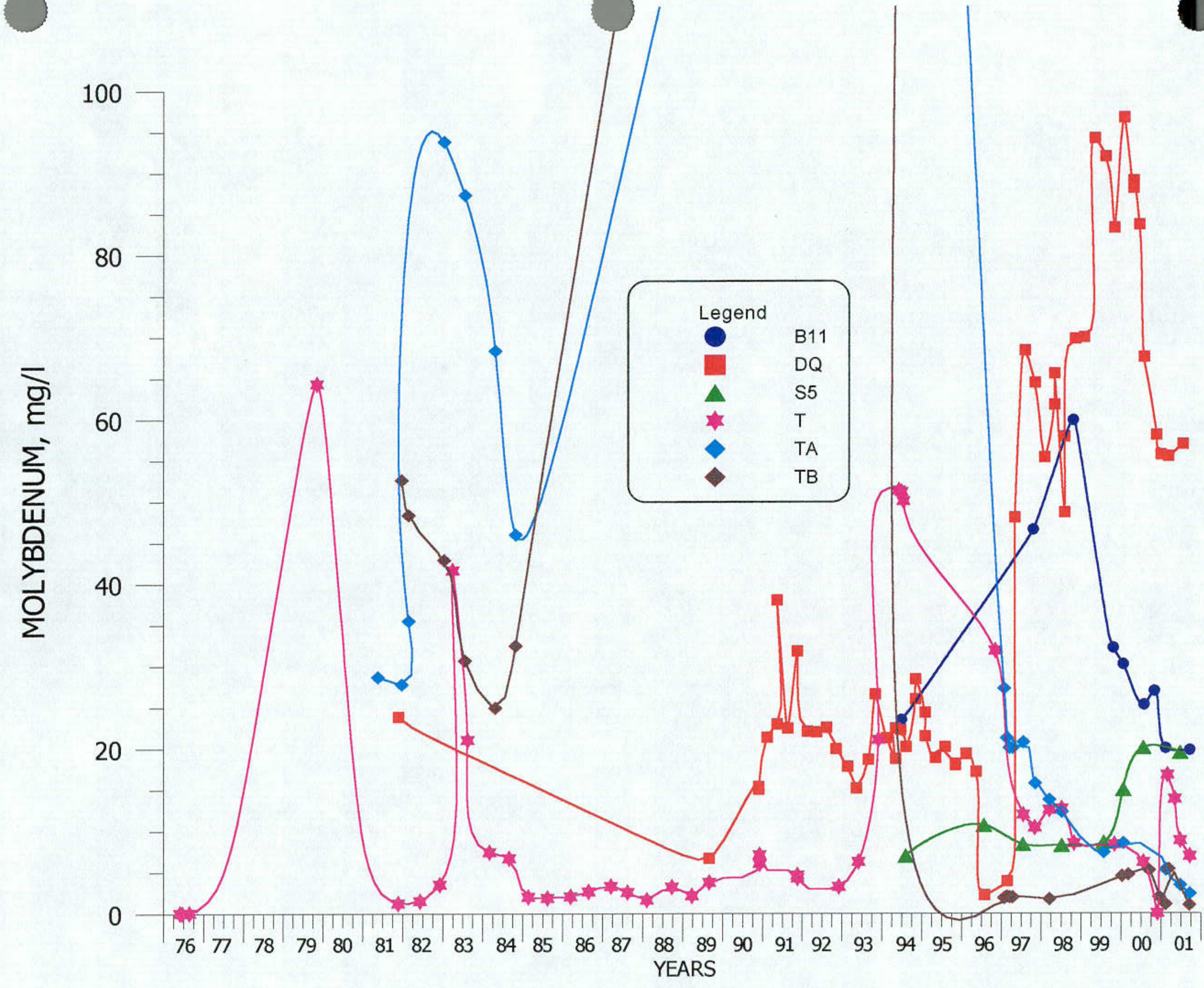



**FIGURE 4.3-48. MOLYBDENUM CONCENTRATIONS FOR WELLS B11, DQ, S5, T, TA AND TB.**



C20.5

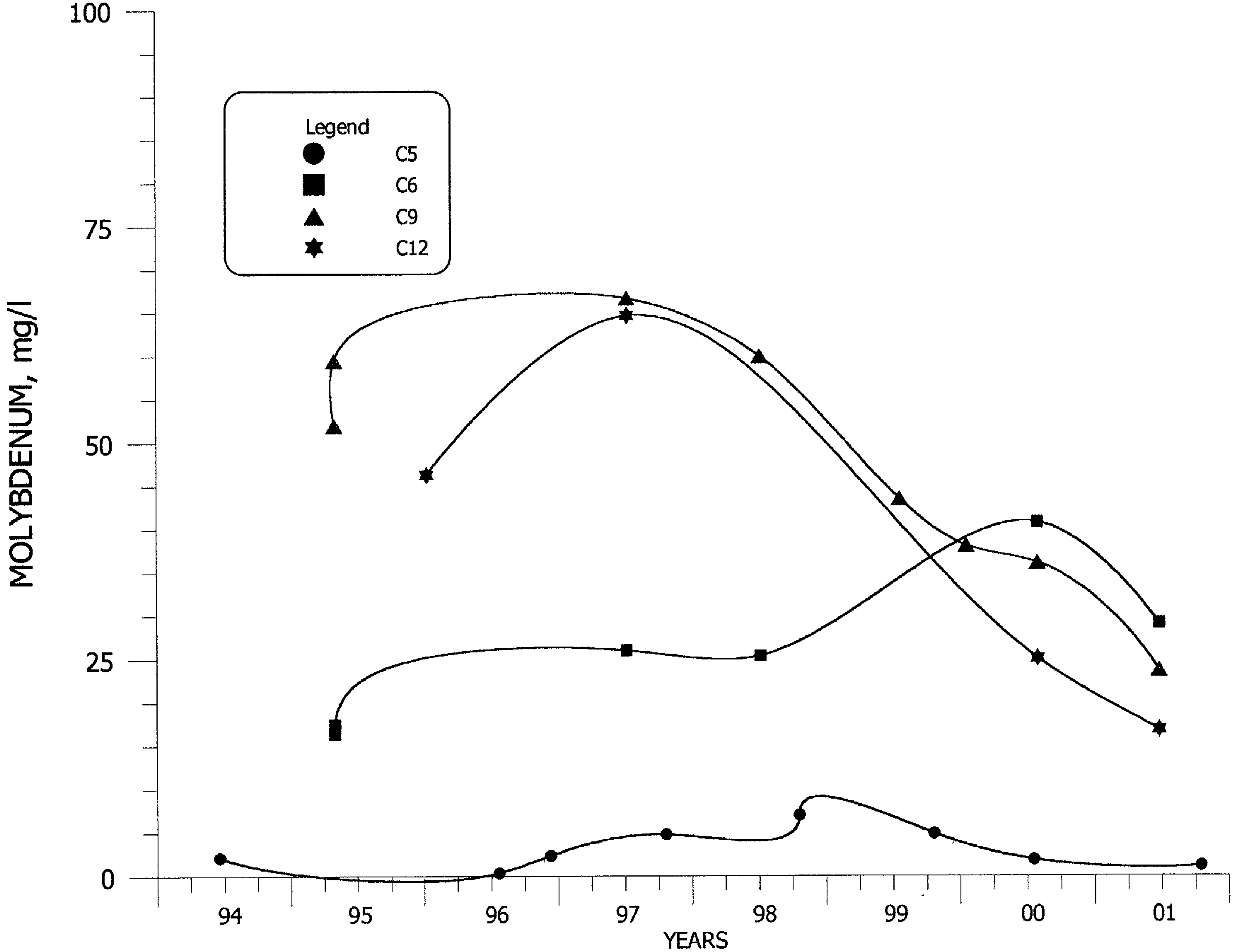



**FIGURE 4.3-49. MOLYBDENUM CONCENTRATIONS FOR WELLS C5, C6, C9 AND C12.**

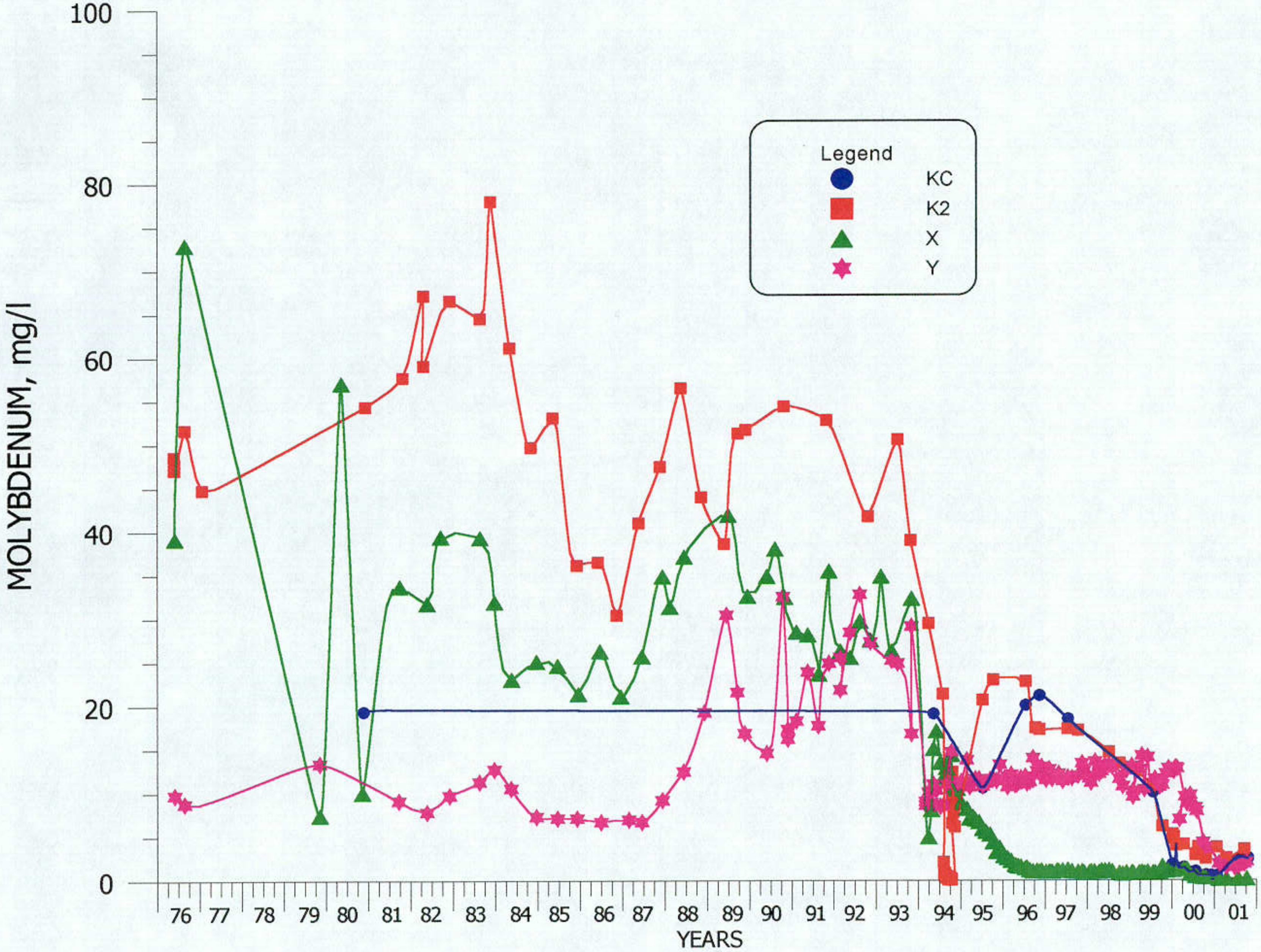



**FIGURE 4.3-50. MOLYBDENUM CONCENTRATIONS FOR WELLS KC, K2, X AND Y.**



C20.6

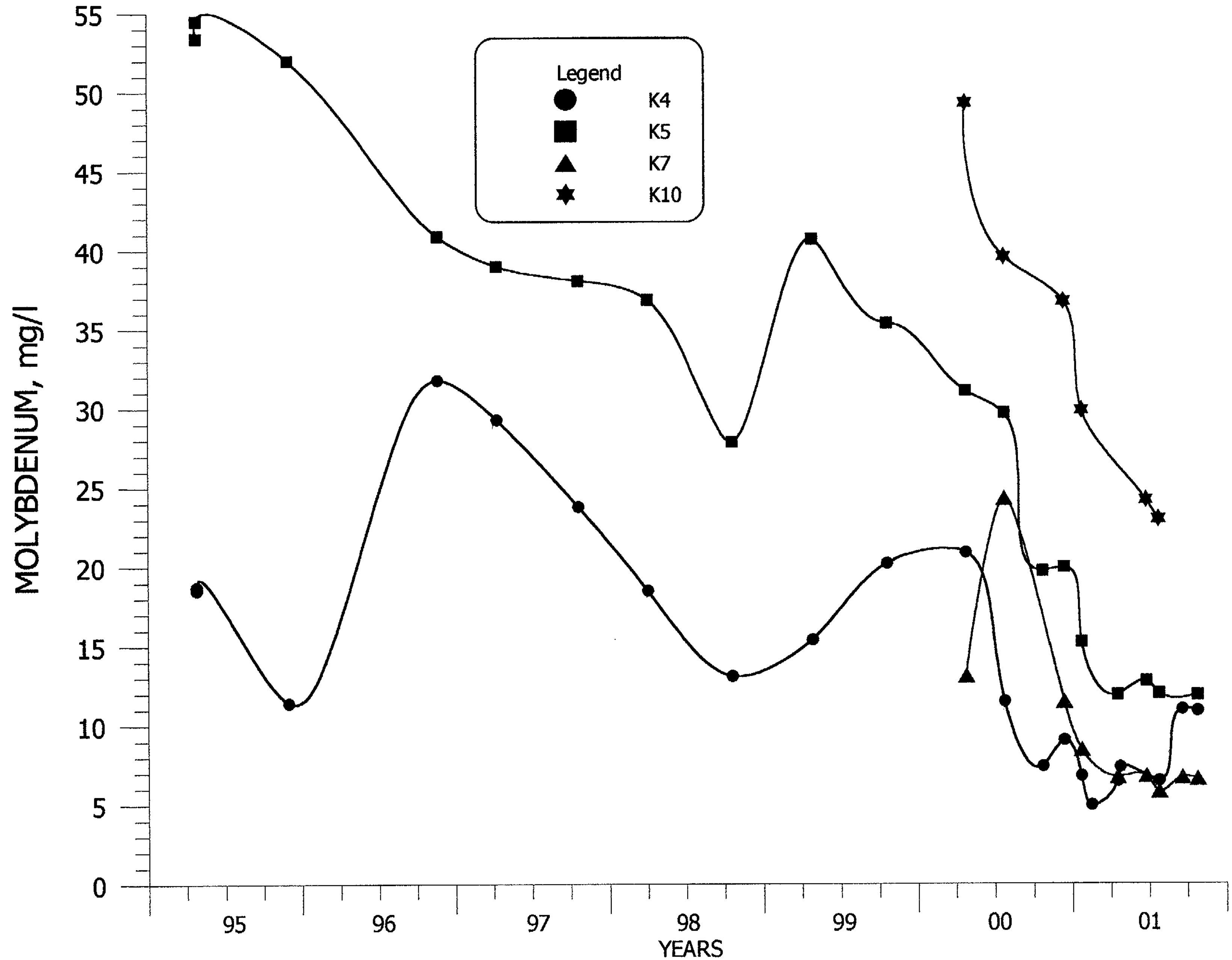



**FIGURE 4.3-51. MOLYBDENUM CONCENTRATIONS FOR WELLS K4, K5, K7 AND K10.**

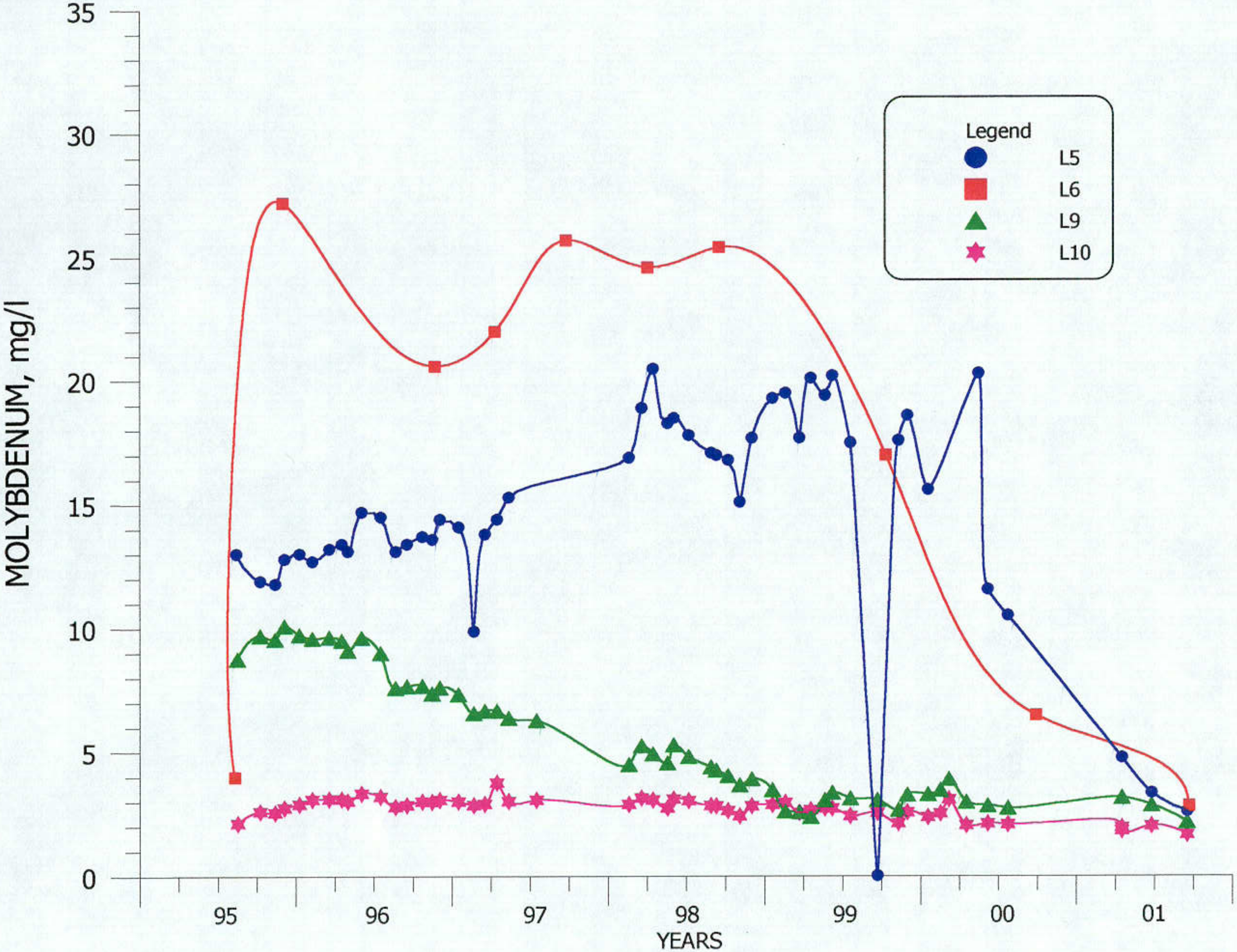



**FIGURE 4.3-52. MOLYBDENUM CONCENTRATIONS FOR WELLS L5, L6, L9 AND L10.**



C20.7

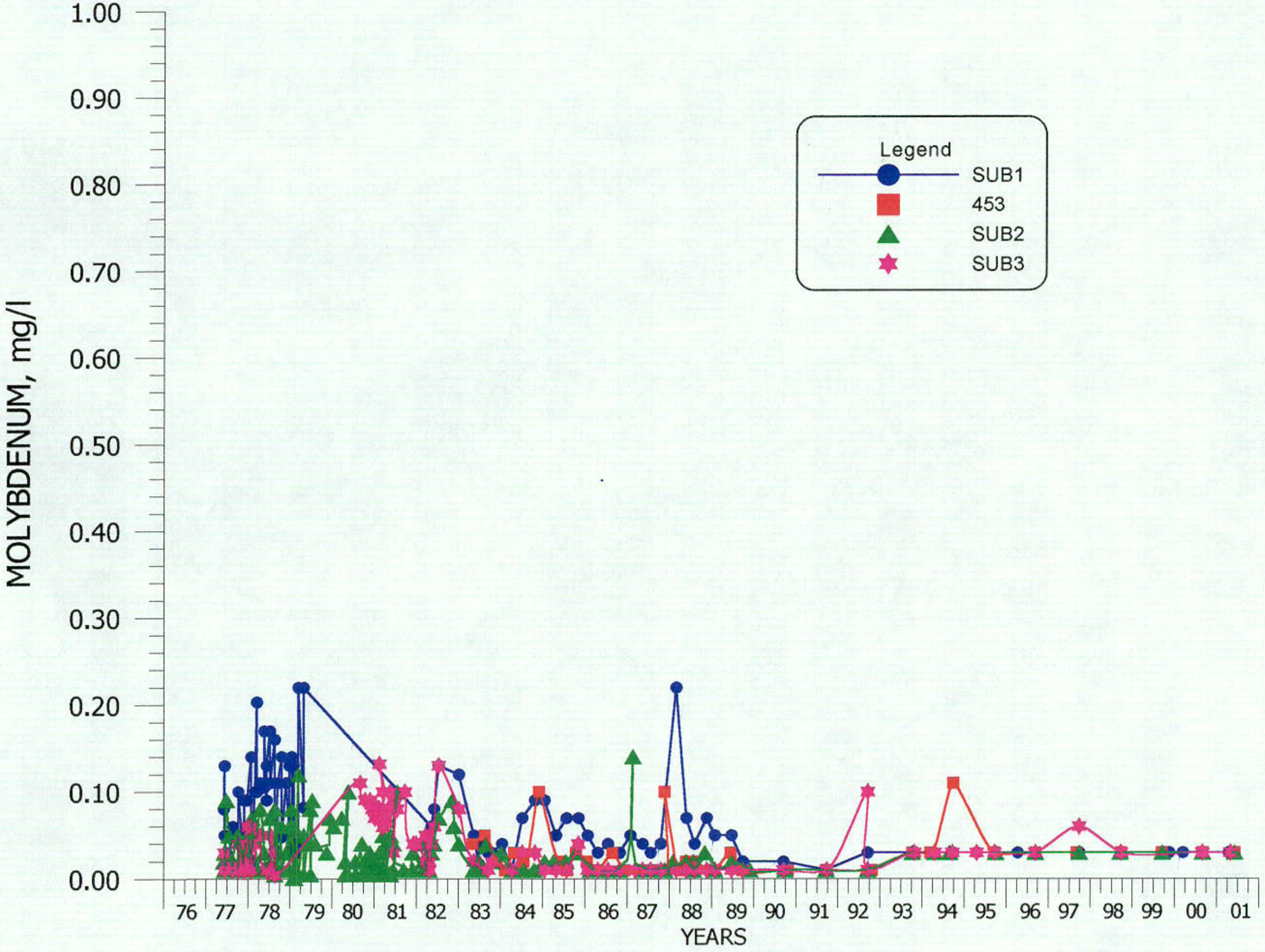



**FIGURE 4.3-53. MOLYBDENUM CONCENTRATIONS FOR WELLS SUB1, 453, SUB2 AND SUB3.**



C20.8

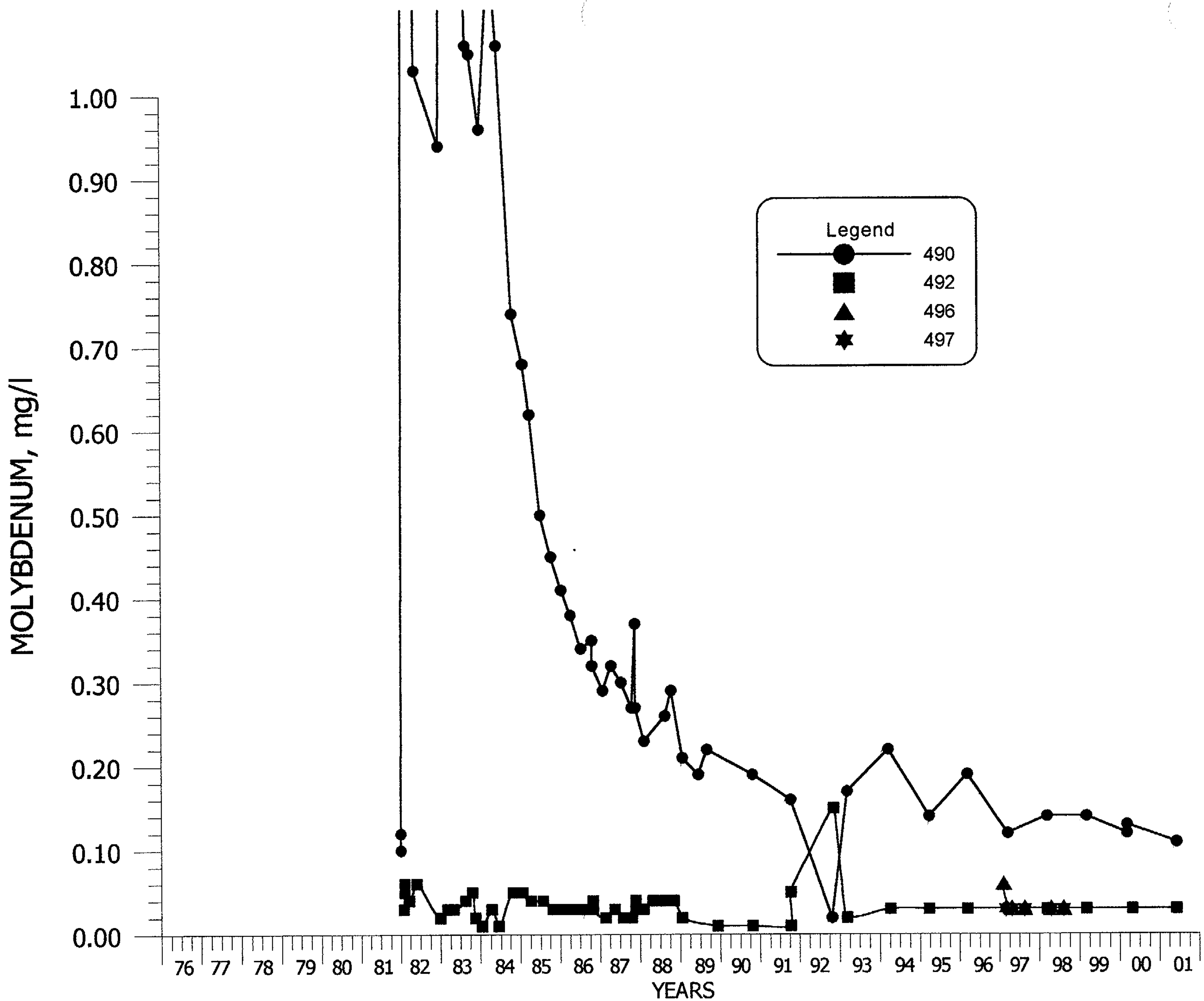



**FIGURE 4.3-54. MOLYBDENUM CONCENTRATIONS FOR WELLS 490, 492, 496 AND 497.**

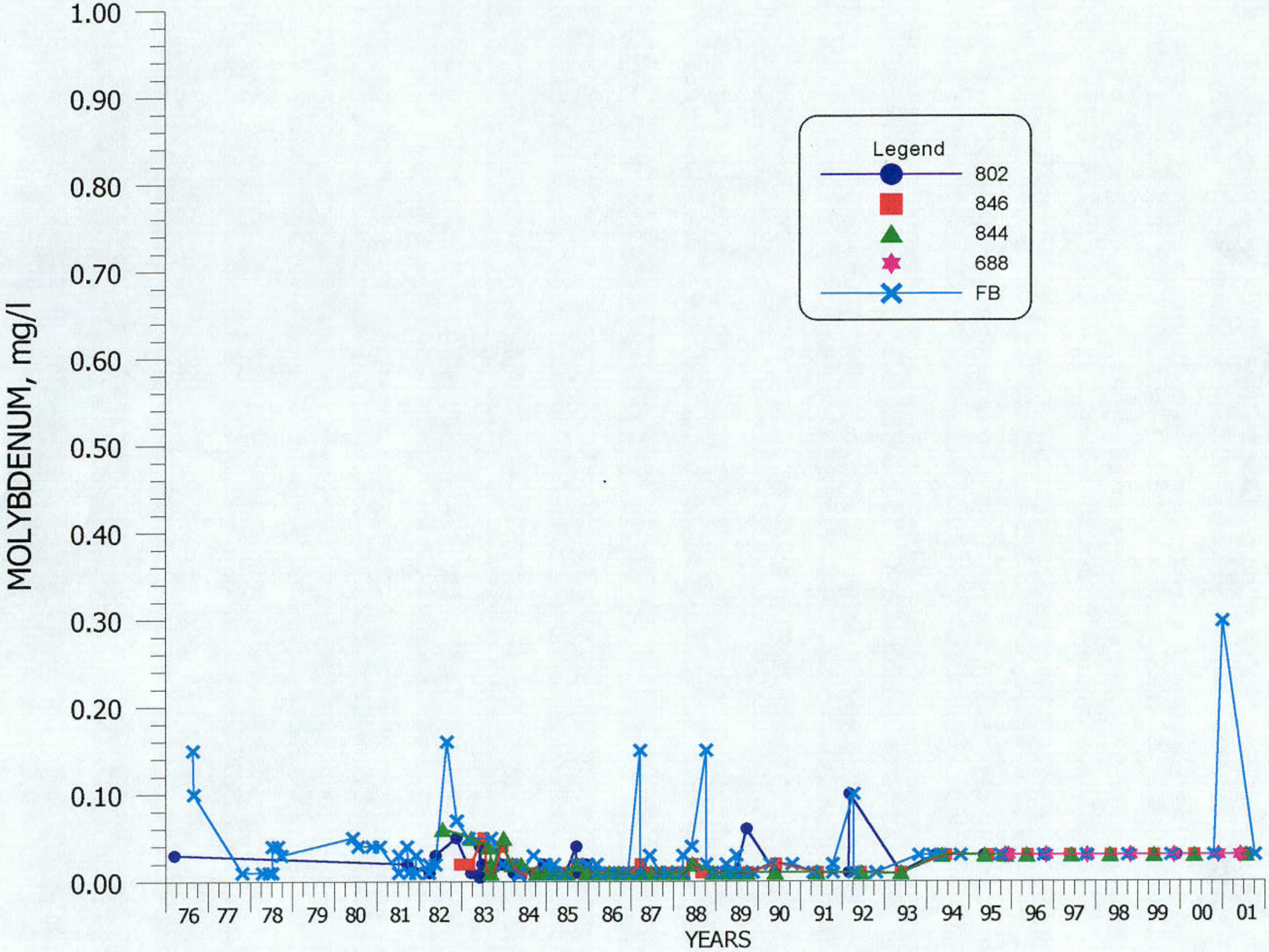
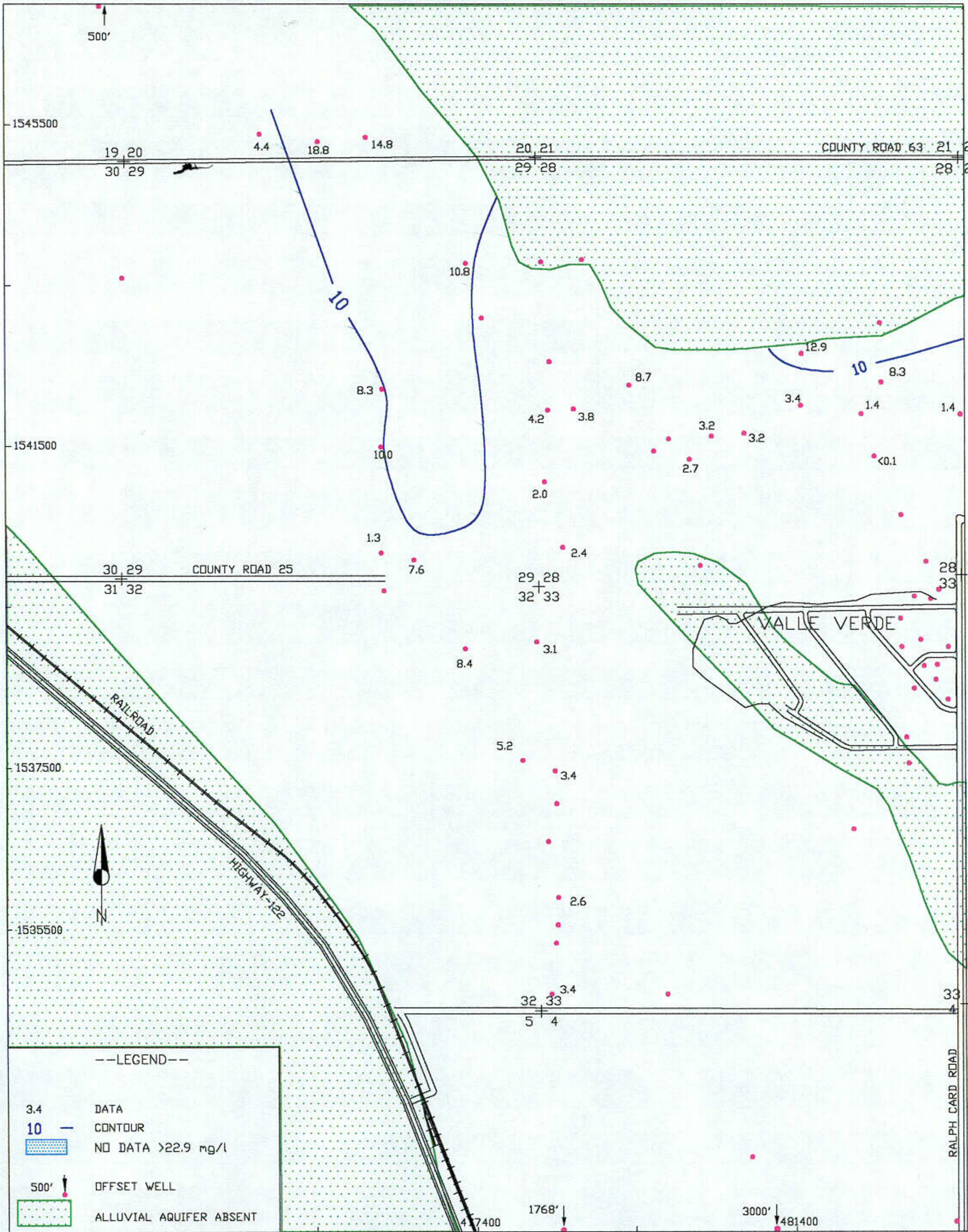



**FIGURE 4.3-55. MOLYBDENUM CONCENTRATIONS FOR WELLS 802, 846, 844, 688 AND FB.**

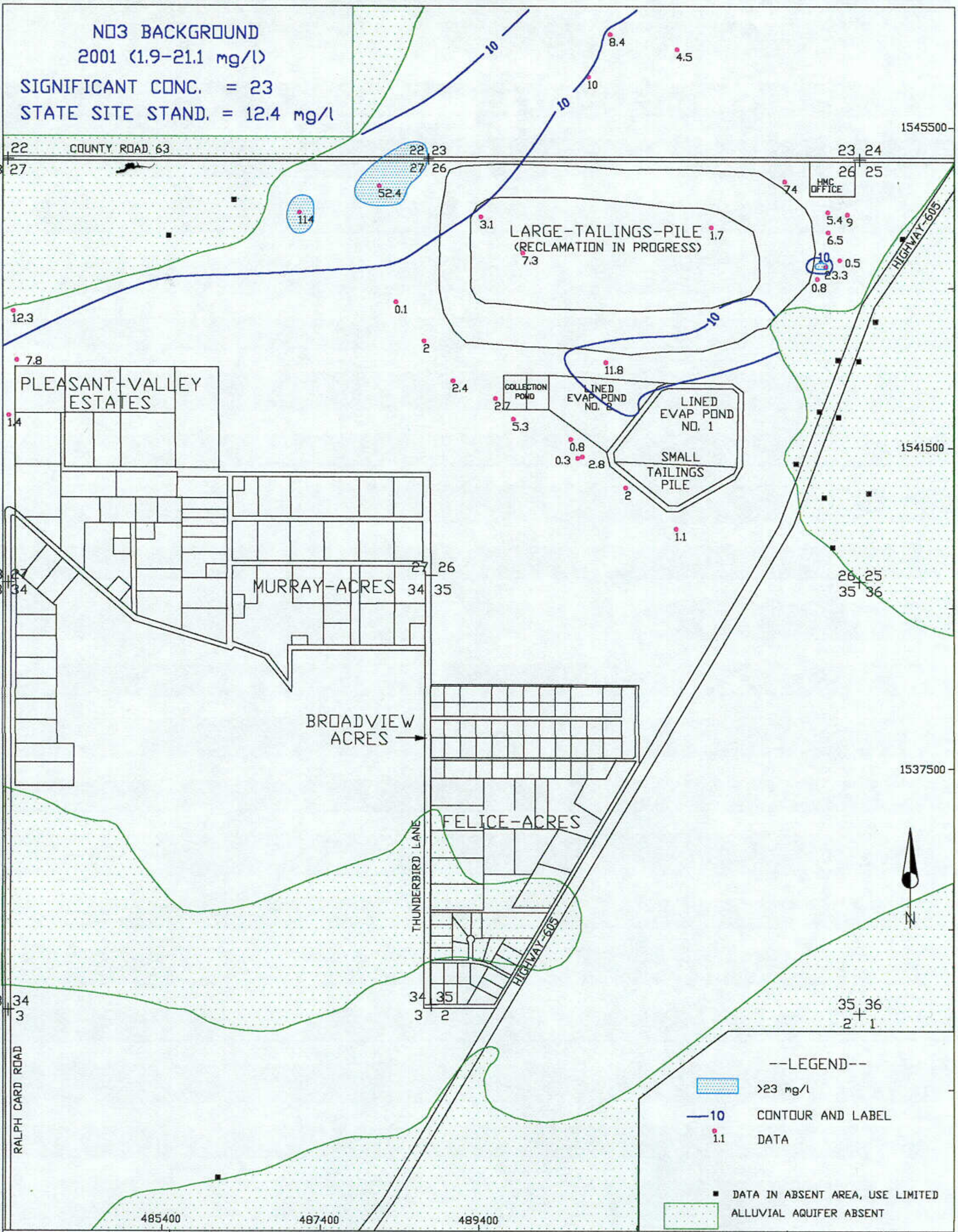


C 20.9




| SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02 |
|---|---|---|
| FIGURE 4.3-56A. NITRATE CONCENTRATIONS FOR THE ALLUVIAL AQUIFER (WEST AREA), FALL 2001, mg/l | | D:\R13\HMC\ 01WQAL lh |
| | | page 4.3-73 |

C21



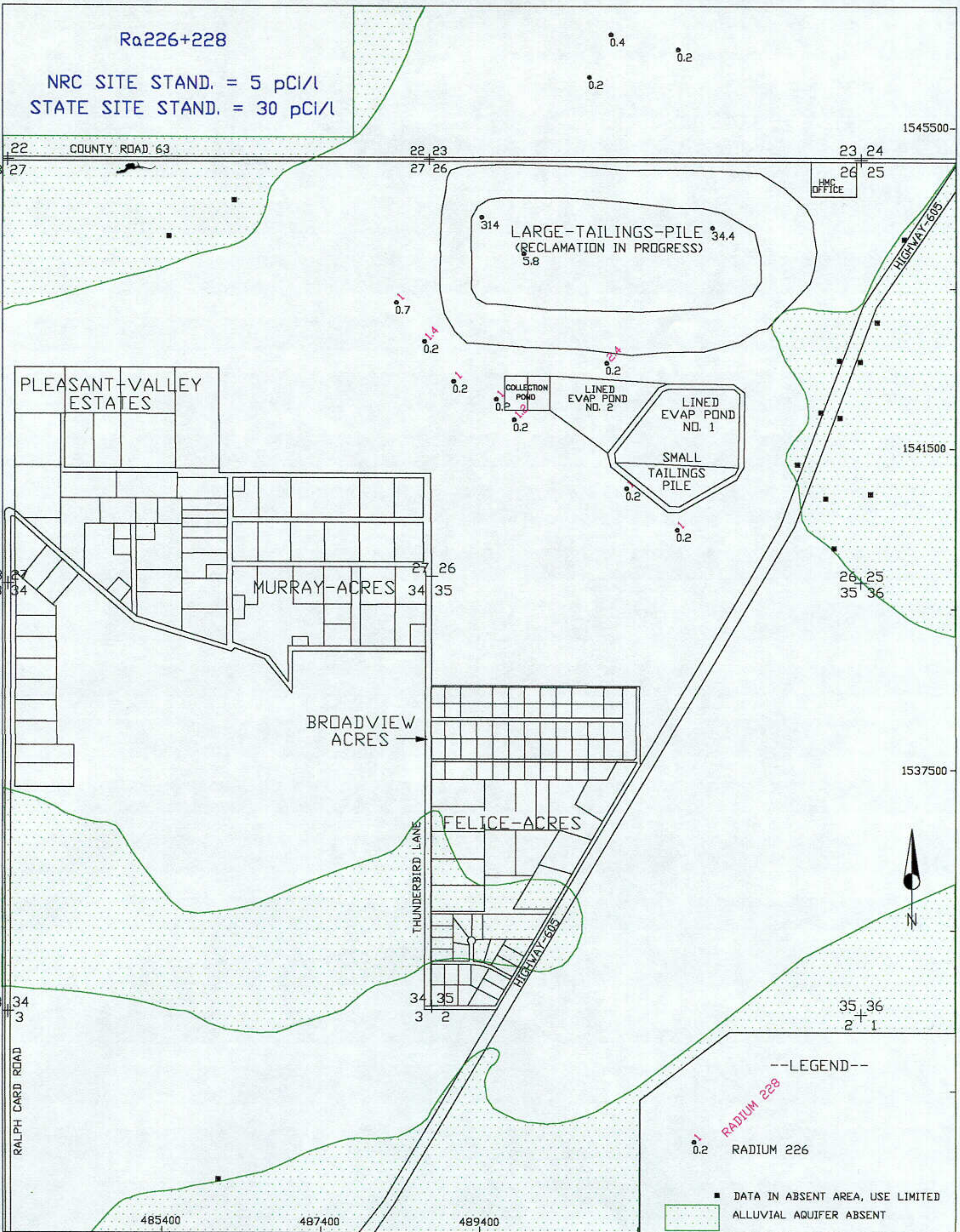

SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02

FIGURE 4.3-56B. NITRATE CONCENTRATIONS FOR THE ALLUVIAL AQUIFER, FALL 2001, mg/l

D:\R13\HMC\ 01EQAL lh



C22




SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02

FIGURE 4.3-57. RADIUM-226 AND RADIUM-228 CONCENTRATIONS FOR THE ALLUVIAL AQUIFER, FALL 2001, pCi/l

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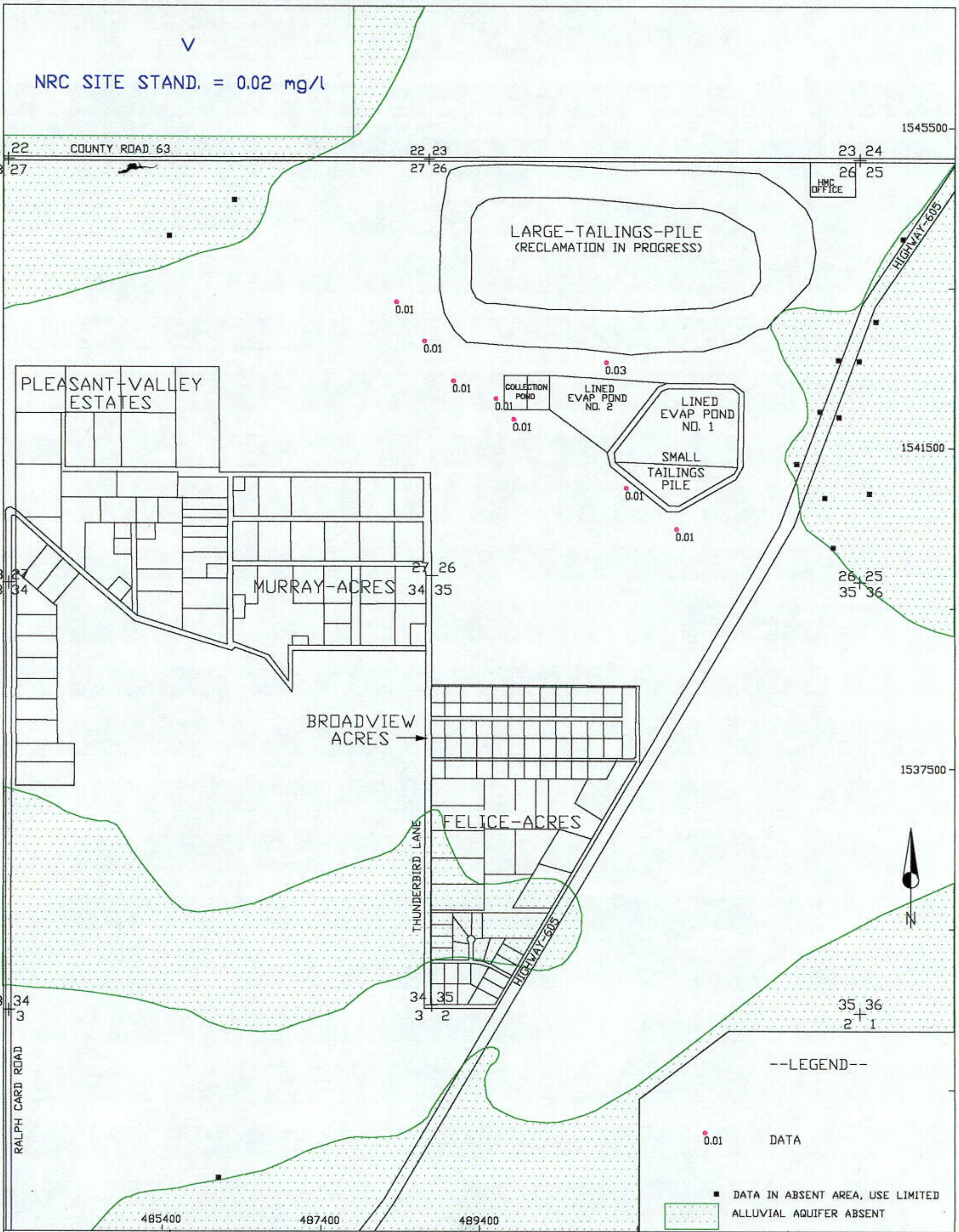
C23




SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02

FIGURE 4.3-58. VANADIUM CONCENTRATIONS FOR THE ALLUVIAL AQUIFER, 2001, mg/l

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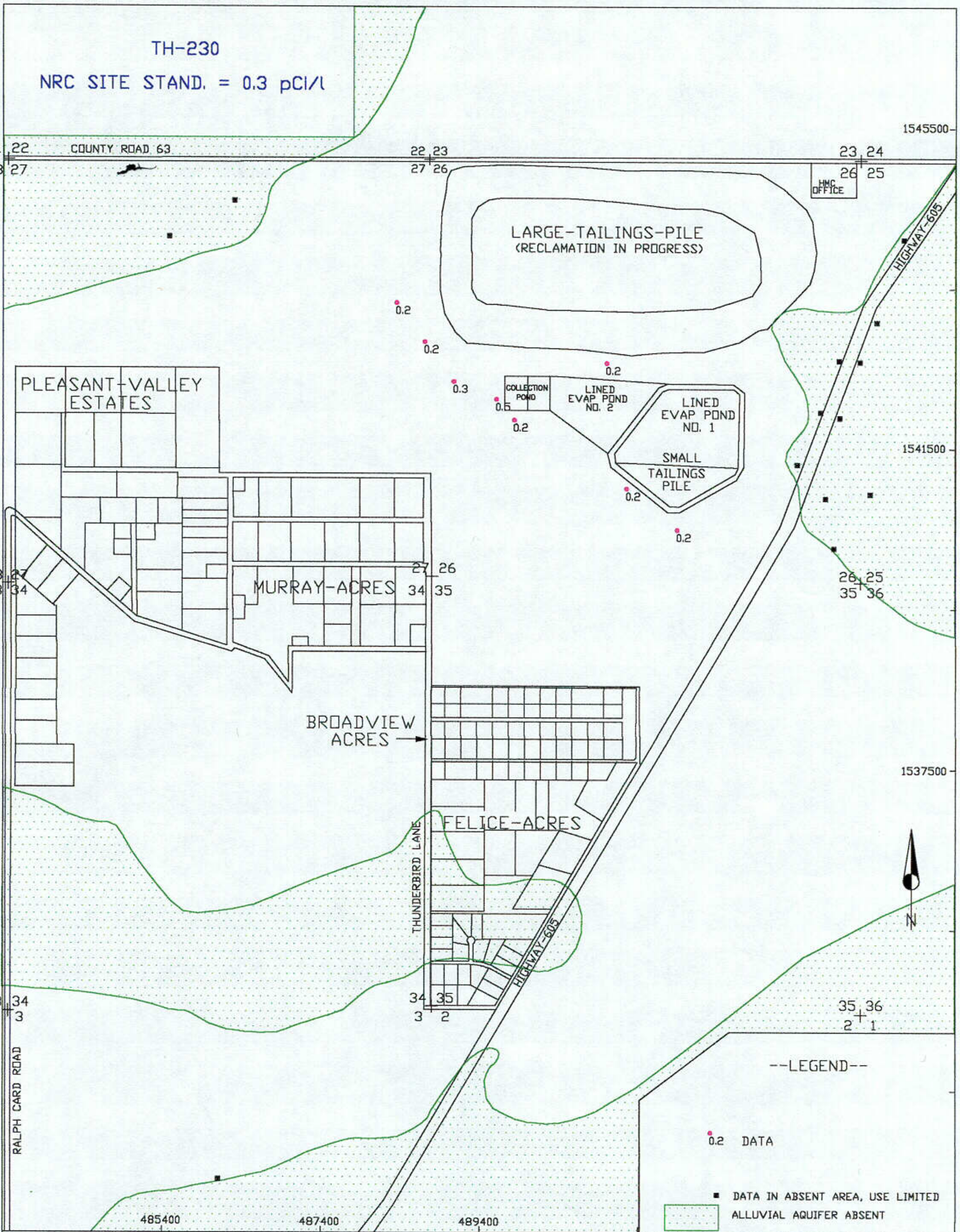
C24




SCALE: 1"=1600' | HOMESTAKE-MILL-AND-ADJACENT-PROPERTIES GRANTS-NM-TOWNSHIP-11&12-N-RANGE-10-W | DATE: 02/15/02

FIGURE 4.3-59. THORIUM-230 CONCENTRATIONS FOR THE ALLUVIAL AQUIFER, FALL 2001, pCi/l

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C25