STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
SAN JOAQUIN DISTRICT

# SAN JOAQUIN VALLEY
# DRAINAGE MONITORING PROGRAM
## 1986

DISTRICT REPORT
APRIL 1988

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## FOREWORD

This annual report presents statistical data concerning the quality and quantity of agricultural drainage water in the San Joaquin Valley. These data are collected and interpreted by the California Department of Water Resources' drainage monitoring staff, who use them to identify trends in agricultural drainage problem areas and plan reuse projects and disposal systems.

This year's report contains data collected for the 1986 calendar year and graphs showing trends indicated by these data. The report does not contain data on water within the U. S. Bureau of Reclamation's San Luis service area. Prior reports in this series chronicle similar information from 1963 through 1985.

This report is distributed to Federal, State, and County agencies; local water districts; universities inside and outside California; and various individuals. The Department invites comments or recommendations concerning either the report itself or the conduct of its monitoring program.

Louis A. Beck, Chief
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# INTRODUCTION

Monitoring of agricultural drainage water in the San Joaquin Valley began in 1959 as a cooperative effort between the Department of Water Resources (DWR) and the University of California. In 1963, this monitoring program became part of DWR's ongoing San Joaquin Drainage Investigation. Although the investigation ended in 1970, the monitoring program continued as a separate departmental activity until 1975, when DWR, the U. S. Bureau of Reclamation, and the State Water Resources Control Board formed the San Joaquin Valley Interagency Drainage Program (IDP). The monitoring program was continued from 1975 to 1979 to provide technical assistance to the IDP. When the IDP ended in June 1979, the DWR monitoring program was resumed as a separate activity under the San Joaquin Valley Drainage Program. A detailed history of the program is included in this report.

The northern, central, and southern drainage monitoring areas of the Valley are shown in Figure 1. The central and southern areas and the locations of the monitoring stations contained in these areas are displayed in Figures 2 and 3, respectively.

This report presents and evaluates data from 1980 through 1986 with special emphasis on 1985 and 1986. Data were evaluated for (1) patterns that may be indicative of future trends and (2) correlations between various chemical constituents (to better understand the chemistry of the drainage water and the factors affecting it). Trend analyses were performed for all stations; to keep this report fairly concise, however, only selected stations representative of areas or patterns are included here.

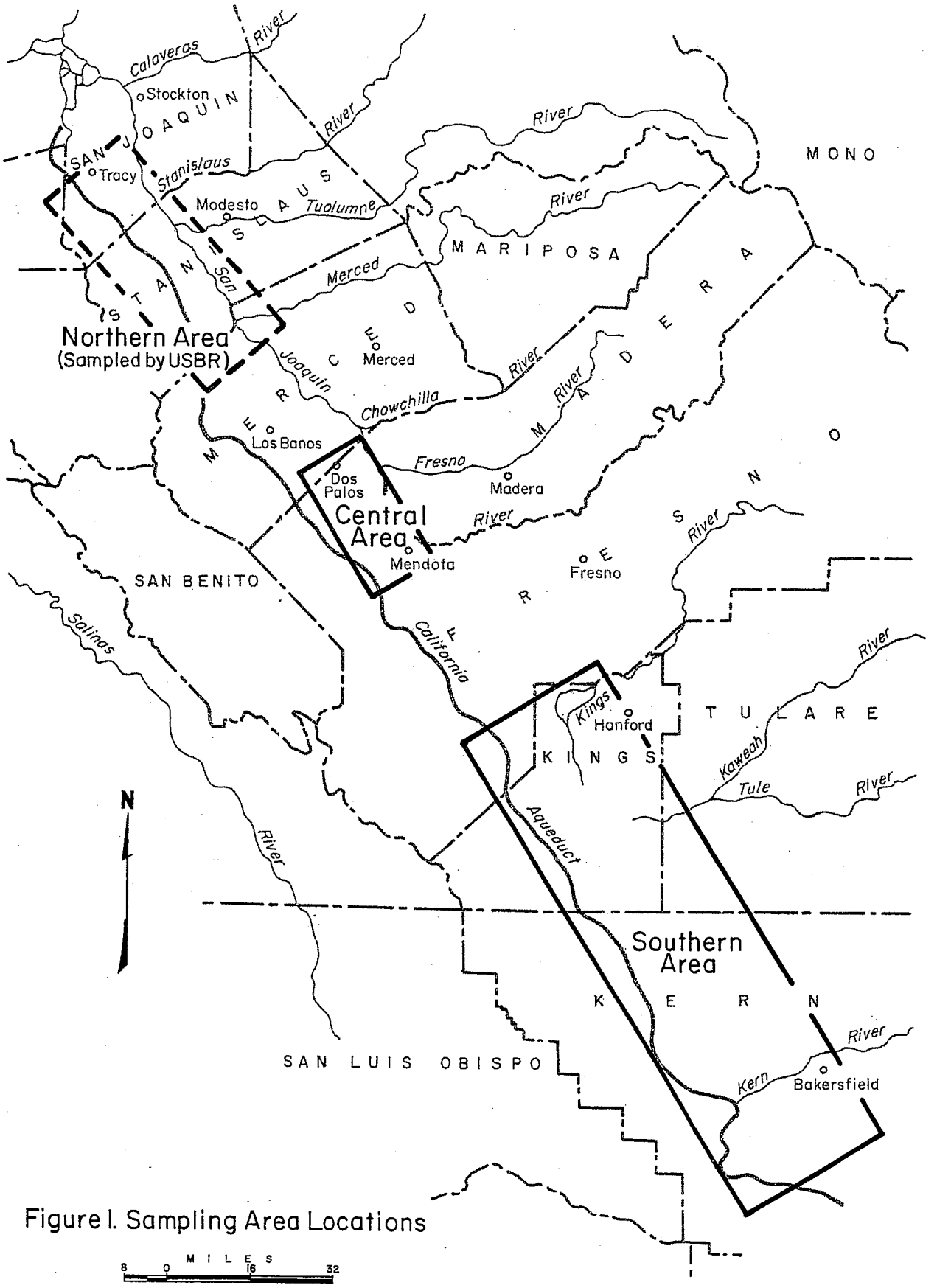



Figure I. Sampling Area Locations

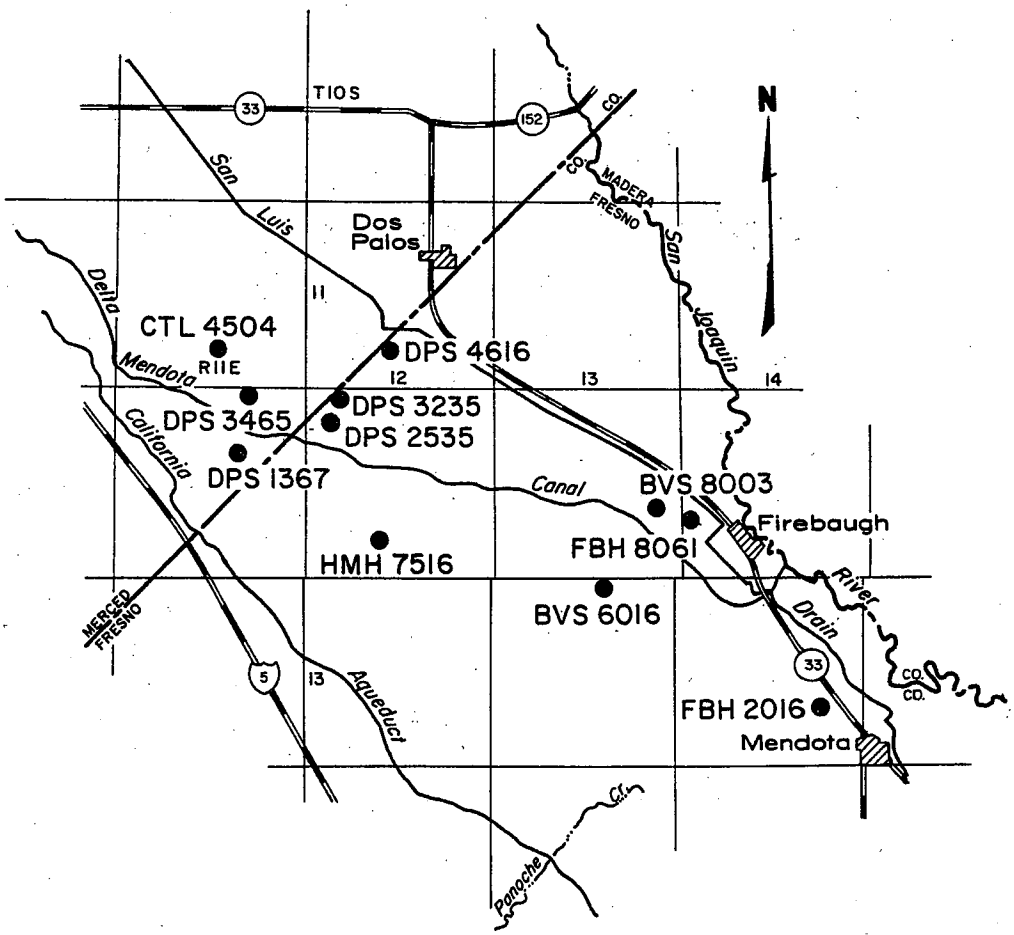
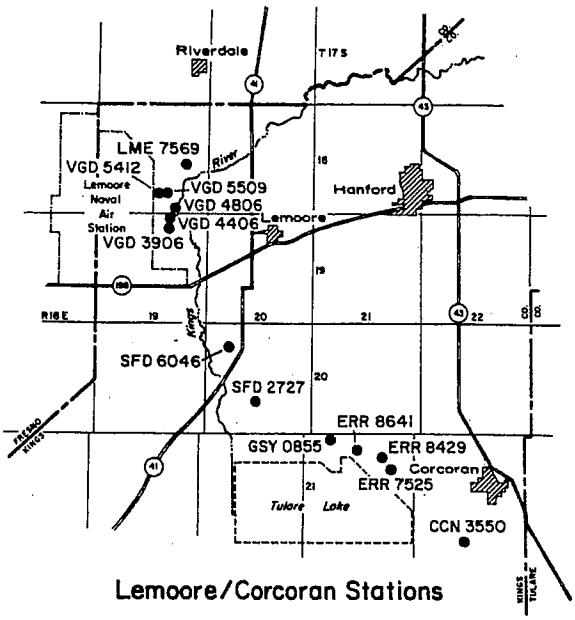
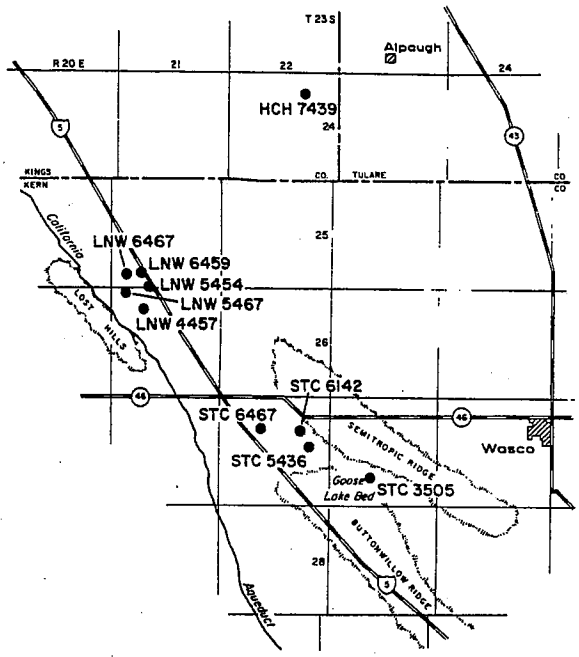


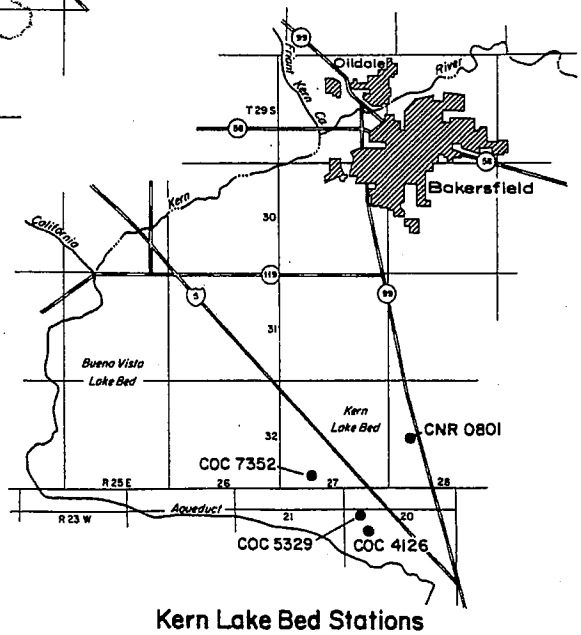

Figure 2. Central Drain Locations




Lemoore/Corcoran Stations




Lost Hills/Semitropic Stations




Kern Lake Bed Stations

Figure 3. Southern Drain Locations

## BACKGROUND SUMMARY

The San Joaquin Valley, one of the world's most productive agricultural regions, has experienced mounting environmental problems as its irrigated acreage has increased. The most significant of these problems concerns disposal of agricultural drainage water.

### The Drainage Problem

The drainage problem is an outgrowth of (1) naturally saline soils and water and (2) the Valley's distinctive geological makeup, which makes natural drainage ineffective in certain areas. Most soils on the Valley's west side have a naturally high saline content, and even more salt is added to them when they are irrigated with imported water. Since evaporation and plant transpiration extract essentially pure water, nearly all the salt in irrigation water remains in the soils. Furthermore, much of the Valley is underlain by a shallow, clay layer that obstructs vertical movement of irrigation water and results in perched water at depths as shallow as a few feet. As irrigation water percolates underground, leaching salts and minerals from surface soils, it sometimes has no place to drain off and the soils become saturated. Unless this water is removed, crops growing in these soils eventually die.

In the late 1940s, farmers began installing subsurface drains in fields with drainage problems. By 1965, 330 miles of subsurface drains and 750 miles of open ditch (tail water) drains were in operation in the Valley -- delivering drainage water to evaporation ponds and other discharge sites. With this drainage network in operation, the main problem became how to dispose of the salty drain water.

Many planners believed the best solution was to construct a master drain to collect the water, route it out of the Valley, and discharge it into the San Joaquin Delta. By 1973, an 87-mile-long section of a federal drainage canal was receiving irrigation runoff and discharging it into Kesterson Regulating Reservoir. The plan was to extend this section (called the San Luis Drain) north to a discharge site in the Delta. That way, the reservoir could be used to regulate discharges to the Delta, remove nutrients from drain water, and provide wetland wildlife habitat.

To date, the extension to the Delta has not been constructed, and drainage discharges have led to a selenium buildup in the reservoir. In 1982, federal studies reported high selenium levels in fish taken from Kesterson, and in 1983, it was determined that the bioaccumulation of selenium was causing deformities in embryos of waterfowl nesting at the reservoir.

In 1985, the U. S. Department of Interior ordered a halt to drainage water discharges into the reservoir, yet irrigation water deliveries to west side agricultural lands continued uninterrupted. Today, though more crucial than ever before, the futures of the San Luis and master drains remain in doubt, so alternative solutions to agricultural drainage discharges continue to be investigated. Federal and State officials are concerned that on-farm evaporation ponds throughout the Valley are still receiving drainage water discharges and that these ponds have the potential to develop problems similar to those at Kesterson.

## The Monitoring Program

State monitoring of agricultural drainage has been conducted for more than 30 years to identify existing and potential drainage problem areas and monitor the chemical composition of agricultural drainage. The Budget Act of 1957 made funds available to DWR to conduct the San Joaquin Valley Drainage Investigation, an inquiry whose twofold purpose was to determine the magnitude of the drainage problem and develop solutions to it. The investigators' recommended solutions were (1) disposal of drainage water into a master drain or evaporation ponds and (2) reuse of drainage water whenever possible.

In 1963, besides continuing to monitor the Valley's drainage water quality conditions, DWR also began studying the benefits and hazards of perpetuating existing drainage conditions and drainage water disposal systems. At that time, salts and boron were considered the primary threats to agricultural production, and pesticides and nutrients the primary threats to the environment. Yet when pesticides were monitored extensively from 1963 through 1967, the resulting data indicated they did not pose a significant threat to the environment.

In the mid-1960s, testing was also conducted for the presence of detergents, grease, and oil in drainage water. However, the amounts detected were insignificant and testing was eventually discontinued.

In the early 1970s increased projected demands for (1) cooling water at proposed inland thermal-electrical and nuclear power plants and (2) irrigation supplies for expanding agricultural areas resulted in the establishment of tighter water quality and waste water management guidelines. Political measures such as the Porter-Cologne Water Quality Control Act and the Federal Water Pollution Control Act amendments of 1972 underscored governmental commitments to protecting the environment from drainage water pollution. By 1975 -- when the San Joaquin Valley Interagency Drainage Program (IDP) was formed by DWR, the U. S. Bureau of Reclamation, and the State Water Resources Control Board -- DWR's drainage monitoring program was providing water quality data to Federal, State, and local agencies as well as the IDP.

After the IDP ended, in 1980, DWR and the U. S. Bureau of Reclamation established the San Joaquin Valley Drainage Monitoring Program (SJVDMP) to analyze surface and subsurface drainage samples for nutrients, minerals, metals, pesticides, and miscellaneous constituents. In 1981, program technicians began testing for selenium; and in 1983, when selenium-related problems at Kesterson began receiving publicity, the focus on this aspect of the SJVDMP was greatly magnified.

Since 1985, with the help of new and sophisticated instrumentation, the SJVDMP has been expanded to include monthly monitoring of subsurface drainage sumps and two surface drains for selenium and other trace elements. Recent SJVDMP reports present summaries of these monthly data, along with seasonal inventories of nitrogen, electrical conductivity, and subsurface flow.

In 1985, the number of subsurface drains in the SJVDMP's southern area was increased, and the program's 1985 and 1986 reports use graphs, maps, and data to chart monthly selenium and arsenic levels at various locations. As more information becomes available on selenium and its distribution, researchers hope to learn more about how widespread this trace element is throughout the Valley, how it affects ground water, and whether it can be neutralized. Moreover, they also want to be able to predict how

agricultural production in the Valley will be impacted by measures designed to inhibit the spread of selenium.

Without question, there is much left to learn about drainage and its effects. Therefore, the comprehensive goal of future reports in this series is to continue presenting data on minerals, trace elements, nutrients, and pesticides to determine the present condition and refine estimates of the future quality of agricultural drainage water.

## DRAINAGE PROBLEM AREAS

The San Joaquin Valley is a rich agricultural region that encompasses large areas with high water tables. The elevations of these tables are influenced by irrigation practices, cropping patterns, and unlined ditches or ponds. DWR defines "problem areas" to be locations where the perched water is within 5 feet of the ground surface any time during the year. Table 1 presents values for present and potential drainage problem areas in 1977, 1982, and 1986. Figure 4 geographically illustrates the Valley's drainage problem areas in 1986. The map shows areas considered to be "present problem areas" where perched water is within 5 feet of the soil surface. Areas where perched water is between 10 and 20 feet of the soil surface are considered to be "potential problem areas".

In preparing the map and table, items such as existing drainage systems, wildlife refuges, urban areas, pasture land, and native vegetation were not taken into account. These factors should be considered when making projections about areas that will require drainage systems in the future.

Significant changes in drainage acreage are shown on the table. Some changes in acreage reflect fluctuations in perched water volumes; however, some of the major changes are due to more complete data. Most of the data used to complete these statistics were obtained from local agencies; the remainder came from test-hole measurements made by DWR.

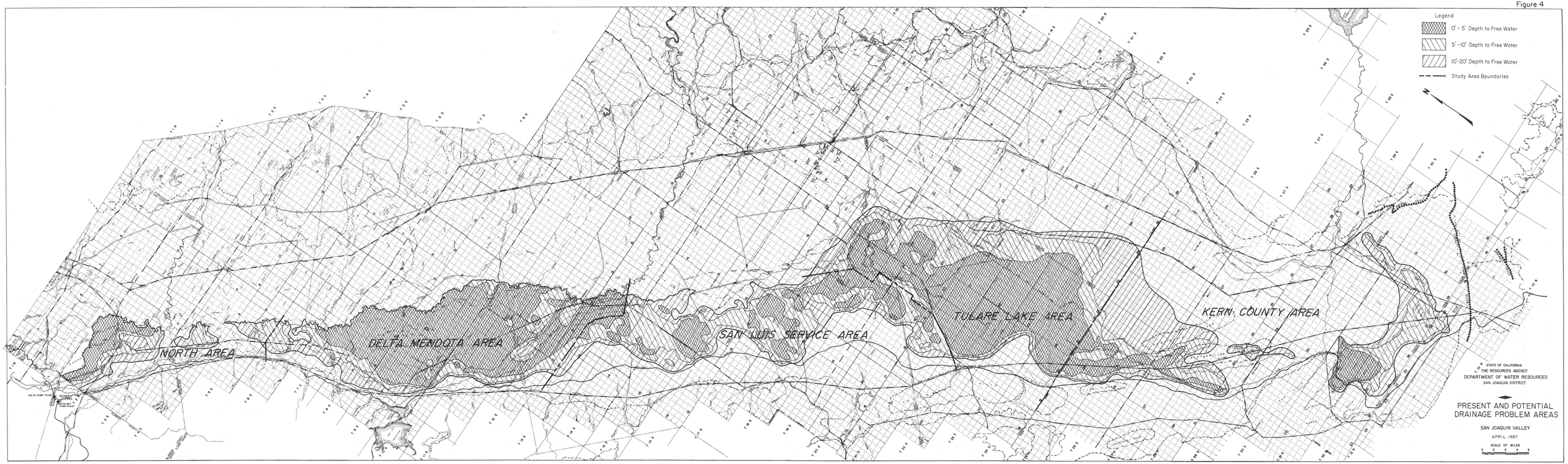
# TABLE 1

## Drainage Problem Areas in San Joaquin Valley

(acres)

| Area | 0- to 5-Foot Depth | 5- to 10-Foot Depth | 10- to 20-Foot Depth | Total |
|---|---|---|---|---|
| | | **1977** | | |
| Northern | 41,000 | 65,000 | -- | 106,000 |
| Delta-Mendota | 266,000 | 167,000 | 4,000 | 437,000 |
| San Luis | 55,000 | 126,000 | 124,000 | 305,000 |
| Tulare Lake | 156,000 | 171,000 | 81,000 | 408,000 |
| Kern County | 31,000 | 93,000 | 145,000 | 269,000 |
| Total | 549,000 | 622,000 | 354,000 | 1,525,000 |
| | | **1982** | | |
| Northern | 34,000 | 43,000 | 27,000 | 104,000 |
| Delta-Mendota | 213,000 | 127,000 | 92,000 | 432,000 |
| San Luis | 53,000 | 145,000 | 126,000 | 324,000 |
| Tulare Lake | 299,000 | 89,000 | 74,000 | 462,000 |
| Kern County | 52,000 | 81,000 | 126,000 | 259,000 |
| Total | 651,000 | 485,000 | 445,000 | 1,581,000 |
| | | **1986** | | |
| Northern | 34,000 | 31,000 | 33,000 | 98,000 |
| Delta-Mendota | 309,000 | 78,000 | 42,000 | 429,000 |
| San Luis | 111,000 | 137,000 | 86,000 | 334,000 |
| Tulare Lake | 322,000 | 135,000 | 92,000 | 549,000 |
| Kern County | 65,000 | 108,000 | 173,000 | 346,000 |
| Total | 841,000 | 489,000 | 426,000 | 1,756,000 |

Figure 4


Legend
0' - 5' Depth to Free Water
5' - 10' Depth to Free Water
10' - 20' Depth to Free Water
Study Area Boundaries
NORTH AREA
DELTA MENDOTA AREA
SAN LUIS SERVICE AREA
TULARE LAKE AREA
KERN COUNTY AREA
DELTA PUMP PLANT
TRACY PUMP PLANT
STATE OF CALIFORNIA
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SAN JOAQUIN DISTRICT
PRESENT AND POTENTIAL
DRAINAGE PROBLEM AREAS
SAN JOAQUIN VALLEY
APRIL 1987
SCALE OF MILES
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## TILE DRAIN SYSTEM STATISTICS

Currently, an effort is being made to complete statistics on tile drain systems that flow into the sumps monitored for this report. When compiled, these statistics will provide factors which may correlate with the efficiency of some systems and possibly help predict what to expect from newly installed or proposed systems.

For example, it appears that recently installed tile drain systems leach increasing amounts of monitored constituents from the soil. In older systems, however, the leaching rates tend to level off and stabilize after six to eight years. Other correlations yet to be studied include the effect of tile density or soil type on the tile drain system's effectiveness.

Table 2 presents the data collected to date. Additional data are forthcoming, though some landowners or operators are unwilling to release such data.

# TABLE 2

## Tile Drain System Statistics

| SUMP NO. | LOCATION | COUNTY | YEAR INST | ACRES | FT OF TILE | AVG DEPTH | LATERAL SPACING | FT/AC[1] | SOIL TYPE | ALKALI[2] | DRAINAGE[3] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Central Area Stations | | | | | | | | | | | |
| BVS 6016 | 13S-13E-3A | FRESNO | 1964 | 640 | 44,880 | | | 70 | PANOCHE LOAM/FINE SANDY LOAM/CLAY LOAM/SILTY CLAY | S | G |
| BVS 8003 | 12S-13E-24N | FRESNO | 1961 | 126 | 11,492 | 5.9-6.0 | 600 | 91 | OXALIS/SILTY CLAY | S & A | I |
| CTL 4504 | 11S-11E-27P | MERCED | | | | | | | SURFACE DRAIN | | |
| DPS 1367 | 12S-11E-15A | MERCED | | 125 | 18,000 | | | 144 | PANHILL SILTY CLAY LOAM | O | O |
| DPS 2535 | 12S-12E-6R | FRESNO | 1967 | 295 | 34,320 | | 400 | 116 | LOST HILLS CLAY LOAM/LETHENT SILTY CLAY | O-M-A | I-P-G |
| DPS 3235 | 12S-12E-5D | MERCED | | | | | | | SURFACE DRAIN | | |
| DPS 3465 | 12S-11E-2D | MERCED | 1963 | 160 | 11,560 | | 800 | 72 | LOST HILLS CLAY LOAM/LETHENT SILTY CLAY | O & A | P |
| DPS 4616 | 11S-12E-28R | FRESNO | 1959 | 120 | 4,500 | 6.6 | 600 | | LETHENT SILTY CLAY/ORESTIMBA CLAY | S-M-MS | P |
| | ADDITION | | 1961 | 160 | 7,880 | 5.2 | 600 | | | | |
| | TOTAL | | | 280 | 12,380 | | | 44 | | | |
| FBH 2016 | 13S-14E-26A | FRESNO | 1959 | 80 | 11,260 | 5.9 | 400 | 141 | OXALIS SILTY CLAY | S & M | I |
| FBH 8061 | 12S-14E-30D | FRESNO | 1955 | 240 | 28,950 | 5.7-5.9 | 400 | 121 | OXALIS SILTY CLAY | M & S | I |
| Southern Area Stations | | | | | | | | | | | |
| CCN 3550 | 21S-22E-33R | KINGS | 1957 | 560 | 33,100 | 6.6-6.7 | 650-800 | 59 | TULARE LOAM/CLAY/FINE SANDY LOAM/HACIENDA LOAMY SAND | S | I-P |
| CNR 0801 | 32S-28E-20D | KERN | 1978 | 68 | 9,100 | | 400 | 134 | SAND | | |
| COC 4126 | 11N-20W-8B | KERN | 1985 | 120 | 37,000 | 7.5-9.0 | 200 | 308 | SAN EMIGDIO FINE SANDY LOAM | | |
| COC 5329 | 11N-20W-6B | KERN | 1981 | 300 | 36,790 | | 260-500 | 123 | SAN EMIGDIO SANDY CLAY LOAM/FINE SANDY LOAM | O | |
| ERR 7525 | 21S-21E-11Q | KINGS | | 265 | 27,034 | | | 102 | TULARE CLAY/LOAM/CLAY LOAM/FOSTER SANDY LOAM | S | I-P |
| ERR 8429 | 21S-21E-11D | KINGS | | | | | | | | | |
| ERR 8641 | 21S-21E-4R | KINGS | 1981 | 258 | 34,956 | | | 135 | TULARE CLAY LOAM/TULARE CLAY | S & A | P |
| GSY 0855 | 21S-21E-5C | KINGS | | 55 | 6,300 | | | 115 | TULARE CLAY LOAM | S & A | I-P |
| HCH 7439 | 24S-22E-11D | KINGS | | | | | | | | | |
| LME 7569 | 18S-19E-23A | KINGS | | | | | | | | | |
| LNW 5454 | 25S-21E-33N | KERN | 1983 | 1513 | 48,070 | | | | NA | | |
| | ADDITION | | 1984 | 320 | 17,900 | | | | | | |
| | TOTAL | | | 1833 | 65,970 | | | 36 | | | |
| LNW 5467 | 26S-21E-6A | KERN | 1983 | 1480 | 81,262 | | | | NA | | |
| | ADDITION | | 1984 | 290 | 49,763 | | | | | | |
| | TOTAL | | | 1770 | 131,025 | | | 74 | | | |
| LNW 6459 | 25S-21E-32A | KERN | 1983 | 581 | 20,000 | | | | NA | | |
| | ADDITION | | 1984 | 0 | 16,060 | | | | | | |
| | TOTAL | | | 581 | 36,060 | | | 62 | | | |
| LNW 6467 | 25S-21E-31A | KERN | | 1420 | 78924 | | 800 | 56 | NA | | |
| SFD 2727 | 20S-20E-28A | KINGS | | | | | | | | | |
| SFD 6046 | 20S-20E-8D | KINGS | | | | | | | | | |
| STC 3505 | 27S-23E-28E | KERN | 1965 | 140 | 14,000 | | | 100 | MERCED CLAY LOAM/POND FINE/MILHAN SANDY LOAM | S,M,A | P |
| STC 5436 | 27S-22E-14J | KERN | 1975 | 153 | 19,500 | | | 127 | MERCED CLAY LOAM/TULARE CLAY LOAM | A | P |
| STC 6467 | 27S-22E-9M | KERN | | 124 | 25,100 | | | 202 | MERCED CLAY LOAM | S & M | P |
| VGD 3906 | 19S-19E-3J | KINGS | 1984 | 870 | 63,770 | | | 73 | MERCED CLAY LOAM/LETHENT SILTY CLAY LOAM | S & A | I-P |
| VGD 4406 | 19S-19E-3A | KINGS | 1984 | 310 | 25,000 | | | 81 | MERCED CLAY LOAM/ADOBE CLAY/LETHENT SILTY CLAY LOAM | S & A | I-P |
| VGD 5412 | 18S-19E-27P | KINGS | 1984 | 275 | 46,080 | | | 168 | MERCED SILTY CLAY LOAM/LETHENT SILTY CLAY LOAM | S & A | I-P |

[1]LINEAR FEET OF TILE DRAINS PER ACRE

[2]ALKALINITY
- O - free
- S - slight
- M - moderate
- MA -moderate to strong
- A - strong

[3]DRAINAGE
- R - good to excessive
- G - good
- I - imperfect
- F - fair
- P - poor
- O - subject to overflow

## 1986 MONITORING PROGRAM

DWR's 1986 San Joaquin Valley drainage monitoring activities consisted of collecting water samples from 36 subsurface drains and 2 surface drains in the area shown in Figure 1. DWR has not monitored the northern area since 1969 because the USBR assumed responsibility for sampling from Tracy to Gustine. The USBR also collects samples on various drainage systems in the central area and publishes these data as they become available.

In 1985, due to an expansion of the program in the southern area, specifically in Kings and Kern counties, the number of subsurface drains included in the monitoring program was increased from 16 to 36.

In 1986, the Department analyzed drainage water samples for nutrients, minerals, pesticides, trace elements (including selenium), and other miscellaneous constituents. Monthly flow volumes for subsurface drains were determined, when practical, on the basis of sump pump electrical energy usage records and flow meter charts when available. A discussion of data evaluated in 1986 follows.

### Flows

The 1986 flow monitoring program involved collecting electric meter readings and calculating the approximate volume of drainage water pumped. Direct readings were recorded at agricultural drainage water sumps that had flow meters.

Flows for the majority of the stations in the central and southern areas remained consistent with 1985 volumes. Several southern area drains lack flow data. Flow data are tabulated in Appendix A.

### Pesticides

Water samples were analyzed for two categories of pesticides: chlorinated hydrocarbons and organic phosphorus. The results are tabulated in Appendix B.

In 1986, chlorinated hydrocarbon pesticide compounds were not tested for at the monitoring sites in the southern areas due to past histories of extremely low concentrations. Pesticides previously identified in the southern area were atrazine/simazine, fenthion, and propanil. Pesticide compounds previously identified in the central area include atrazine/simazine, thiebencarb, dachthal, diazinon, bidrin, phorsulfon, chloropropham, and fenthion. The 1986 testing was conducted only at station DPS 3265, which had shown substantial concentrations of pesticides in the past. The 1986 maximum chlorinated hydrocarbon concentration recorded was 0.00016 milligrams per liter (mg/L) of an unidentified pesticide compound compared with a 1985 maximum chlorinated hydrocarbon concentration of 0.00150 mg/L of atrazine/simazine. The 1986 maximum organic phosphorous concentration was 0.00065 mg/L of an unidentified pesticide compound compared with a 1985 maximum organic phosphorous compound concentration of 0.00007 mg/l of an unidentified pesticide compound.

## Nutrients

Sampling of ten southern area drains for nutrient concentrations was continued in 1986. The samples were analyzed for total ammonia, dissolved orthophosphate, and total phosphorus. Drains sampled prior to 1985, including all central area drains and 13 southern area drains, were analyzed for total phosphorus only. The 1986 data for these drains are included in Appendix B.

The correlation of nutrient values (for the determination of trends) versus sampling periods is difficult to evaluate due to such variables as:

-- Irrigation practices designed to force the salts out of the root zone
-- Application rates of commercial fertilizers
-- Yearly chemical-composition fluctuations
-- Varying soils types

Future sampling programs may include a controlled test area that would eliminate or minimize some of these variables and generate data that would better establish seasonal trends.

## Minerals

In general, during 1986, subsurface drain effluent was of the sodium sulfate type, with sodium being the predominant cation and sulfate the predominant anion. These general conclusions were verified by the high correlation of these two mineral concentrations with electrical conductivity (EC). The EC in the central area ranged from 806 to 11,700 micromhos per centimeter (µmho/cm). Sodium and sulfate concentrations ranged from 85 to 2,000 mg/L and 161 to 4,780 mg/L, respectively. In the southern area, the EC ranged from 1,490 to 54,100 µmho/cm, and the sodium and sulfate ranged from 203 to 16,300 mg/L and 347 to 20,300 mg/L, respectively.

Though boron is an essential element for the growth of plants, a number of plants (such as citrus trees) are very sensitive and can only tolerate concentrations less than 1 mg/L. For the general cropping patterns in the Valley, the recommended maximum concentration of boron for irrigation is 2 mg/L. This limit was exceeded in 163 out of 178 samples (91.6 percent of the time) in 1986 compared with 227 out of 252 samples (90.1 percent of the time) in 1985. Boron concentrations ranged from 0.8 to 38.0 mg/L in the central area and from 0.5 to 68.0 mg/L in the southern area. The central area averaged 11.92 mg/L, and the southern area averaged 19.22 mg/L.

## Trace Elements

The trace elements currently monitored are described in this section. Toxic effects, if any, are discussed and detected concentrations are compared to current standards. A summary of the standards for primary drinking water, livestock, irrigation, and aquatic life is given in Table 3.

### Arsenic (As)

Arsenic toxicity to plants varies widely, ranging from 0.05 mg/l to 12 mg/L. Arsenic is widely distributed in natural waters and its toxic effects are somewhat erratic. To

# TABLE 3

## Concentration Limitations*

(mg/L)

| Trace Element | Drinking Water Standard | Livestock Water Standard | Irrigation Water Standard | Aquatic Life Standard |
|---|---|---|---|---|
| Arsenic | 0.05 | 0.20 | 0.10 | 0.05 |
| Cadmium | 0.01 | 0.05 | 0.01 | 0.01 |
| Chromium | 0.05 | 1.0 | 0.10 | 0.10 |
| Copper | 1.0 | 0.50 | 0.20 | 0.05 |
| Iron | 0.30 | -- | 5.0 | 0.30 |
| Lead | 0.05 | 0.1 | 5.0 | 0.03 |
| Manganese | 0.05 | -- | 0.20 | 0.10 |
| Mercury | 0.002 | 0.01 | -- | 0.0001 |
| Molybdenum | -- | -- | 0.01 | 1.0 |
| Nickel | -- | -- | 0.20 | 0.10 |
| Selenium | 0.01 | 0.05 | 0.02 | 0.01 |
| Silver | 0.05 | -- | -- | 0.005 |
| Strontium | -- | -- | -- | -- |
| Zinc | 5.0 | 25.0 | 2.0 | 0.10 |

*U. S. Environmental Protection Agency. *"Water Quality Criteria, 1972"*

U. S. Geological Survey. *"Study and Interpretation of the Chemical Characteristics of Natural Water"* 1985.

unacclimated individuals, arsenic is quite toxic with doses of as little as 100 mg producing serious health problems. Arsenic has been found in all surface and subsurface drains in the central and southern areas, with concentrations ranging from 0.001 to 1.080 mg/L. The maximum recommended concentration for irrigation is 0.1 mg/L.

Cadmium (Cd)

At extreme levels, cadmium can cause a disease called "Itai-Itai", characterized by brittle bones and intense pain. At low levels of exposure over prolonged periods, cadmium can also cause high blood pressure, sterility among males, kidney damage, and flu-like disorders. Its usual effect on humans is cramping, nausea, vomiting, and diarrhea. Moreover, it is toxic to plants, fish, and other aquatic life forms. Like arsenic, cadmium accumulates in the body and can result in death. Cadmium was not detected in any of the southern or central stations. The maximum recommended concentration for irrigation is 0.01 mg/L.

Chromium (Cr)

In the aquatic environment, chromium exists primarily in the form of chromate. Chromate poisoning causes skin disorders and liver damage. There is some reason to believe that chromates are carcinogenic. For this reason, the permissible level of chromium in drinking waters has been restricted to 0.05 mg/L. In this study, chromium was detected in 102 out of 188 samples with a range of concentration from 0.001 mg/L to 0.14 mg/L. Nine samples exceeded the primary drinking water standard of 0.05 mg/L. The maximum recommended concentration for irrigation is 0.10 mg/L.

Copper (Cu)

Copper is toxic to a number of plants in concentrations ranging from 0.1 to 1.0 mg/L. It is especially toxic to aquatic plants at low concentrations and can be used to control algae in reservoirs. Copper occurs in trace quantities in surface water. Concentrations approaching 1.0 mg/L can be immediately toxic to some aquatic life; thus, the maximum ambient water quality limit is set at 1.0 mg/L. Copper was detected in concentrations ranging from 0.005 to 0.02 mg/L. The maximum recommended concentration for irrigation is 0.20 mg/L.

Iron (Fe)

Iron is nontoxic to plants in aerated soils but can contribute to soil acidification and loss of availability of essential phosphorus and molybdenum. No harmful effects from drinking water containing iron have been recorded, but exposure of water containing iron to air results in iron oxidization and turbidity. Iron also imparts a taste to water which is detectable at very low concentrations. Small quantities of iron are essential for plant growth, but toxicity occurs when levels exceed 5 mg/L. Iron was detected in concentrations ranging from 0.005 to 3.3 mg/L. The maximum recommended concentration for irrigation is 5.00 mg/L.

Lead (Pb)

Lead poisoning has been recognized for many years and is identified as a cause of brain and kidney damage. It can also inhibit plant cell growth at very high concentrations. Lead was detected in 10 out of 70 samples (14.3 percent of the time) in concentrations ranging from 0.004 to 0.016 mg/L, compared with only one detection in 148 samples (0.68 percent) in 1985 at a concentration of 0.01 mg/L. The maximum contaminant level for lead in drinking water is set at 0.05 mg/L. The maximum recommended concentration for irrigation is 5.0 mg/L.

Manganese (Mn)

Manganese is less common than iron in California water supplies, though it is often found with iron in ground waters. It can be leached from soil and frequently occurs in drainage waters in high concentrations. Concentrations of a few milligrams per liter can be toxic to a number of crops in acidic soils, but the application of proper quantities of ground limestone successfully eliminates this problem. Increasing the pH to the 5.5 to 6.0 range usually reduces the active manganese to below the toxic level. Manganese was detected in concentrations ranging from 0.005 to 7.52 mg/L. The recommended maximum concentration for irrigation is 0.2 mg/L.

Mercury (Hg)

California is the source of about 90 percent of the mercury mined in the United States; nearly all the deposits are located along the Coast Range in California. Biological processes, especially under anaerobic conditions, can convert metallic mercury to its toxic, water-soluble (methyl) form. Mercury has a tendency to accumulate in the food chain and is highly toxic to humans and animals. Its salts are used as fumigants to combat plant diseases and insects. Mercury was detected only twice, both times in the central area, at a concentration of 0.001 mg/L. Due to the extreme effects of toxicity, the primary drinking water standard is set at 0.002 mg/L. The maximum recommended concentration for irrigation has not been set.

Molybdenum (Mo)

Molybdenum presents no toxicity problems to plants at normal concentrations in soils and waters and is an essential element in animal nutrition. Through bioaccumulation in forage, soil concentrations of as little as 0.01 mg/L of molybdenum can be toxic to livestock. Molybdenum was detected in concentrations ranging from 0.005 to 6.005 mg/L. The recommended maximum concentration for irrigation is 0.01 mg/L.

Nickel (Ni)

Nickel is toxic to a number of plants at 0.5 to 1.0 mg/L. Toxicity is reduced by soils with neutral or alkaline pH or soils containing approximately 20 percent organic matter. Nickel was detected in concentrations ranging from 0.01 to 1.60 mg/L. Despite its limited dispersal in nature, nickel is a carcinogen so the recommended maximum concentration for irrigation is 0.2 mg/L.

Selenium (Se)

Selenium is toxic to plants at concentrations as low as 0.025 mg/L and toxic to livestock if forage is grown in soils with relatively high levels of selenium. In extremely low concentrations, however, it is an essential element to animal nutrition. Selenium was detected in concentrations ranging from 0.001 to 0.858 mg/L. The primary drinking water standard is set at 0.01 mg/L; the recommended maximum concentration for irrigation is 0.02 mg/L.

Silver (Ag)

Silver chloride and other silver salts are highly insoluble; thus, silver ions do not normally occur in significant concentrations in natural waters. Silver was detected only four times, all in the southern region, in concentrations ranging from 0.01 to 0.03 mg/L. The maximum contaminant level in drinking water for silver is 0.05 mg/L. The recommended maximum concentration for silver in irrigation water has not been set.

Strontium (Sr)

Strontium was detected in all surface and subsurface drains in concentrations ranging from 0.2 to 21.0 mg/L. No maximum contaminant levels have been set.

Zinc (Zn)

Zinc occurs abundantly in rocks and ores and is readily refinable. In mining areas, zinc has been found in natural waters in concentrations ranging up to 50 mg/L. In most areas, it is present only in trace amounts. Zinc is an essential and beneficial nutrient to humans and its salts have very low toxicity to animal life but are toxic to plants at widely varying concentrations. Reduced toxicity occurs at pH greater than 6 and in fine textured or organic soils. Zinc was detected in concentrations ranging from 0.002 to 0.101 mg/L. The drinking water standard of 5.0 mg/L is based primarily on taste considerations. The recommended maximum concentration for irrigation is 2.0 mg/L.

## STATION EVALUATIONS

The water quality data collected in 1986 for the stations monitored are displayed in Appendix B. Linear and multiple regression analyses were performed on all 38 stations to identify relations between the different drainage water constituents. From the results of these analyses, the different characteristics of the central and southern stations could be compared and the possible reasons for their differences identified. Of the 36 subsurface drains sampled, 12 were selected for discussion in this report. Data from the two surface drains are also included for comparison to the subsurface stations.

The central region stations are generally ten to twenty years older than the southern region stations, though a few of the southern stations have existed nearly as long as stations in the central region. Since they have existed the longest, the central region stations should indicate any long-term leaching patterns that have developed over the years. Newer stations which have begun operation in the last three years are located mostly in Kings and Kern counties and should show any short-term leaching patterns.

The stations currently sampled, their locations, and all relevant data pertaining to the tile drain system in use are listed in Table 2.

### Mineral Levels

#### Central Area Surface Drains

These two drains (see Figure 2) are situated approximately 6 miles from each other. DWR has been collecting data from these two surface drains for more than ten years.

It is difficult to determine which area the sample from the surface drain represents because surface drains collect water from large areas which may contain several different crops and soil types. Since the flow in the surface drains consists of a mixture of supply water, tail water, and subsurface drainage water, however, an analysis is presented here for comparison to the subsurface drains.

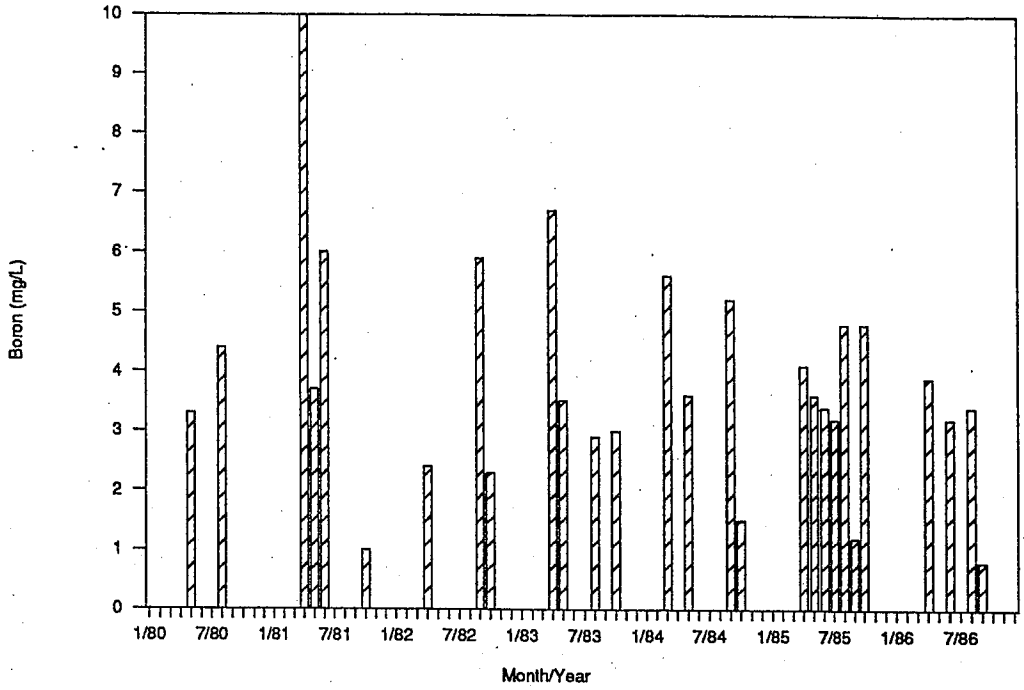
Figures 5 and 6 show the boron levels for the two stations. From the graphs, the mean levels appear to be diminishing from ranges established in the early 1980s. Boron levels are very closely correlated with electrical conductivity levels as indicated by inspection of Figures 7 and 8. As shown in Figures 9 through 12, sodium and sulfate are directly proportional to the electrical conductivity of both stations' levels; therefore, their respective concentrations dictate the resulting electrical conductivity of the drainage waters.

Though the drains are less than 6 miles apart, there are significant differences in the soil types surrounding the drains and the drainage facilities, as well as rates of reapplication of drainage waters. These differences become apparent when the magnitude of the electrical conductivity levels are compared.

Due perhaps to more adequate drainage facilities, less reapplication of drainage water, or less saline native soil, surface drainage waters at CTL 4504 display markedly lower electrical conductivity and boron levels than the surface drainage waters at DPS 3235. This difference, however, is most likely due to a higher percentage of saline subsurface waters present in the DPS 3235 surface drain than in CTL 4504.

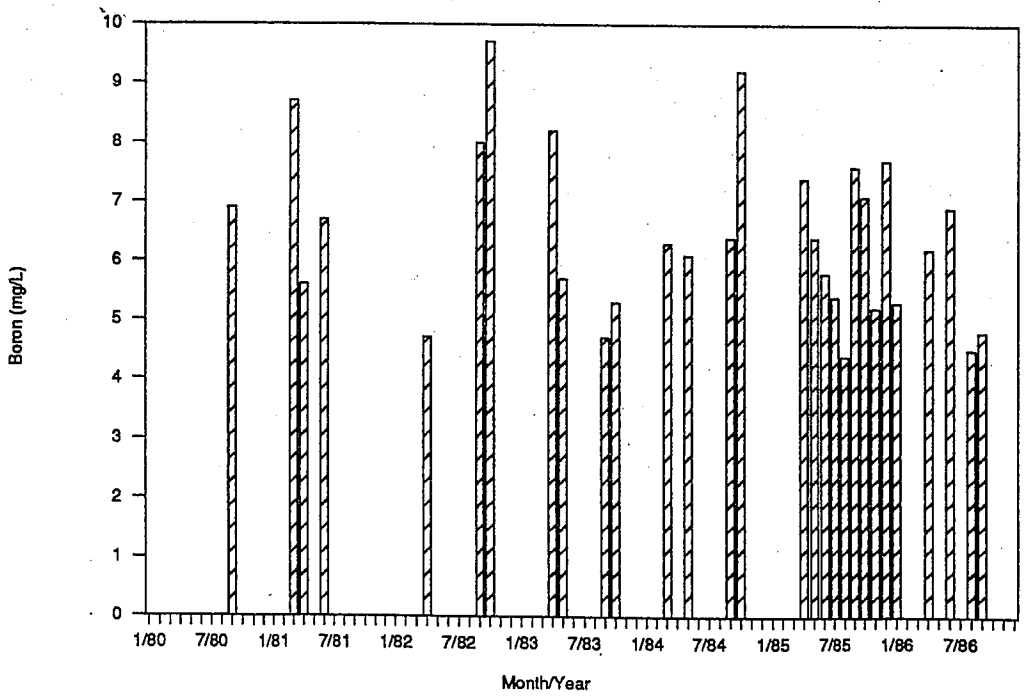
## Figure 5

CTL 4504 -- Boron Levels



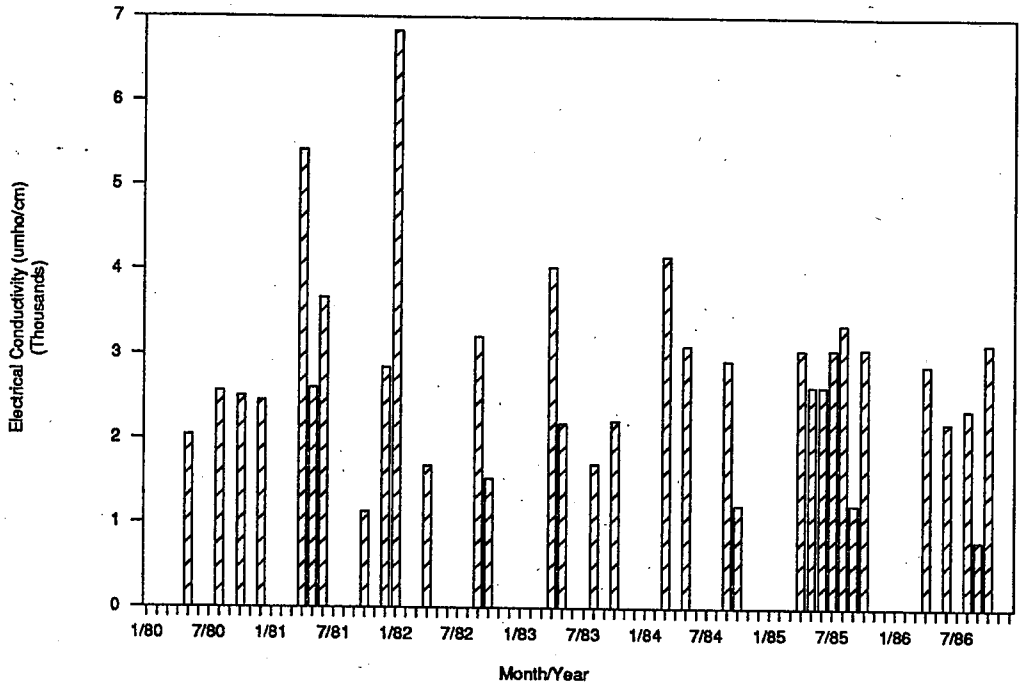

## Figure 6

DPS 3235 -- Boron Levels



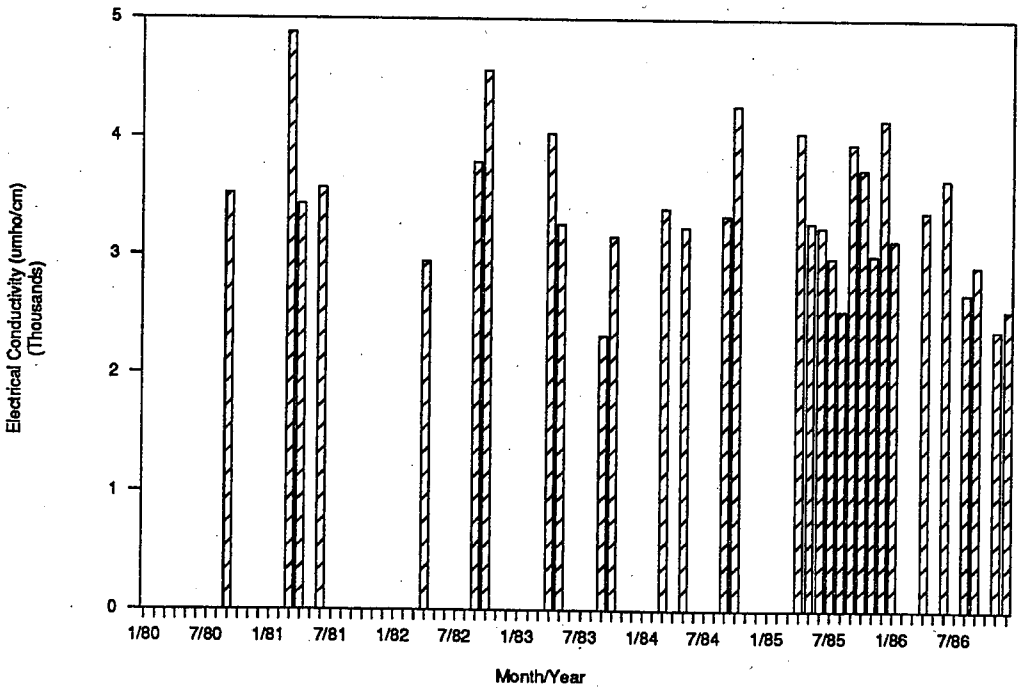
## Figure 7

CTL 4504 -- Electrical Conductivity



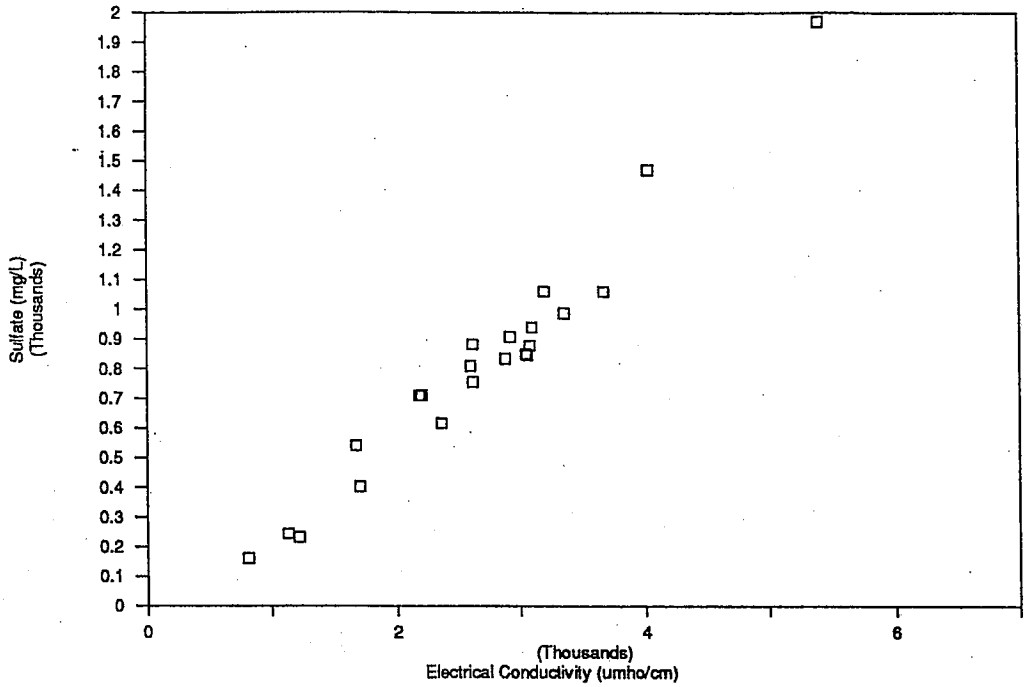

## Figure 8

DPS 3235 -- Electrical Conductivity



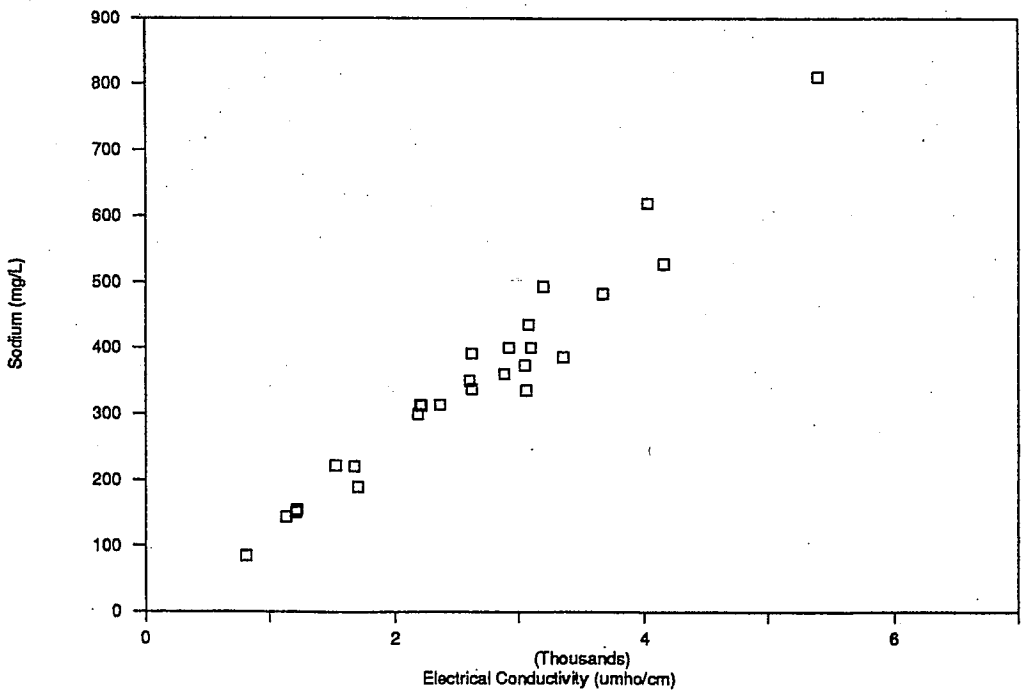
## Figure 9

CTL 4504 -- Sulfate vs. E. C.



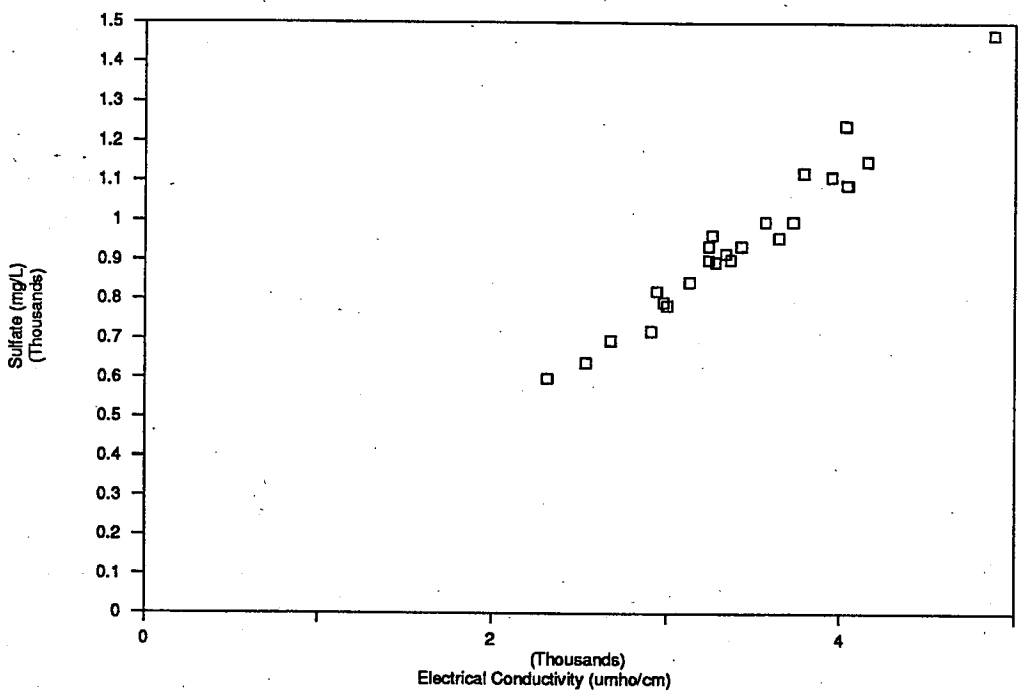

## Figure 10

CTL 4504 -- Sodium vs. E. C.



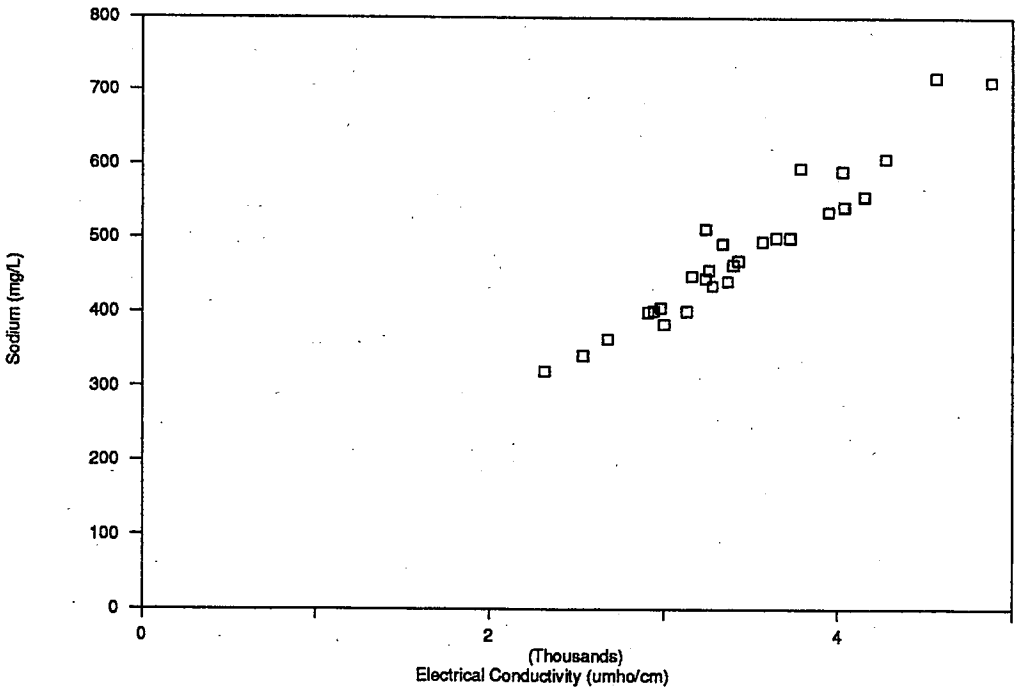
## Figure 11

DPS 3235 -- Sulfate vs. E. C.




## Figure 12

DPS 3235 -- Sodium vs. E. C.



Central Area Subsurface Drains

These drains, located roughly from Mendota to Dos Palos (Figure 2), collect subsurface agricultural water. Unlike surface drains, which collect waters from large and varied areas, subsurface drains serve a specific area and thus provide an accurate history of that particular locale. As a result, should any seasonal or historical patterns develop, they will be displayed by the graphical presentation of the station analyses.

The boron levels for six stations (BVS 6016, BVS 8003, DPS 1367, DPS 4616, FBH 2016, and FBH 8061) are presented in Figures 13 through 18. Boron concentrations correlate well with electrical conductivity levels, as Figures 19 through 24 confirm. Unlike conditions at the surface stations, however, both boron and electrical conductivity concentrations are not decreasing; rather, in most cases, they are increasing at significant rates. Since sodium and sulfate concentrations are highly correlated with electrical conductivity (Figures 25 through 28 and 31 through 36), the levels of these constituents must be increasing at an equal rate. An exception is Station DPS 1367, where the waters are not of the sodium sulfate type. This fact is identified by the lack of correlation between the constituents and electrical conductivity (Figures 29 and 30). In this situation, electrical conductivity levels are the result of ions such as calcium, chloride and nitrate, instead of the normally predominant sodium and sulfate.

The increasing levels of mineral concentrations and electrical conductivity may be attributable to inadequate or nonexistent drainage facilities, such as evaporation ponds, in the central area. The possible practice of reapplying drainage water to tile drained fields, combined with leaching effects on the native minerals in the soil, may result in increasing concentrations of these constituents in subsurface drainage water. Unless these salts are removed, salinity levels high enough to pose toxicity problems for crops may be reached. Even salt-resistant crops such as cotton will suffer yield reduction if the current trend is allowed to continue.

**Figure 13**

BVS 6016 -- Boron Levels

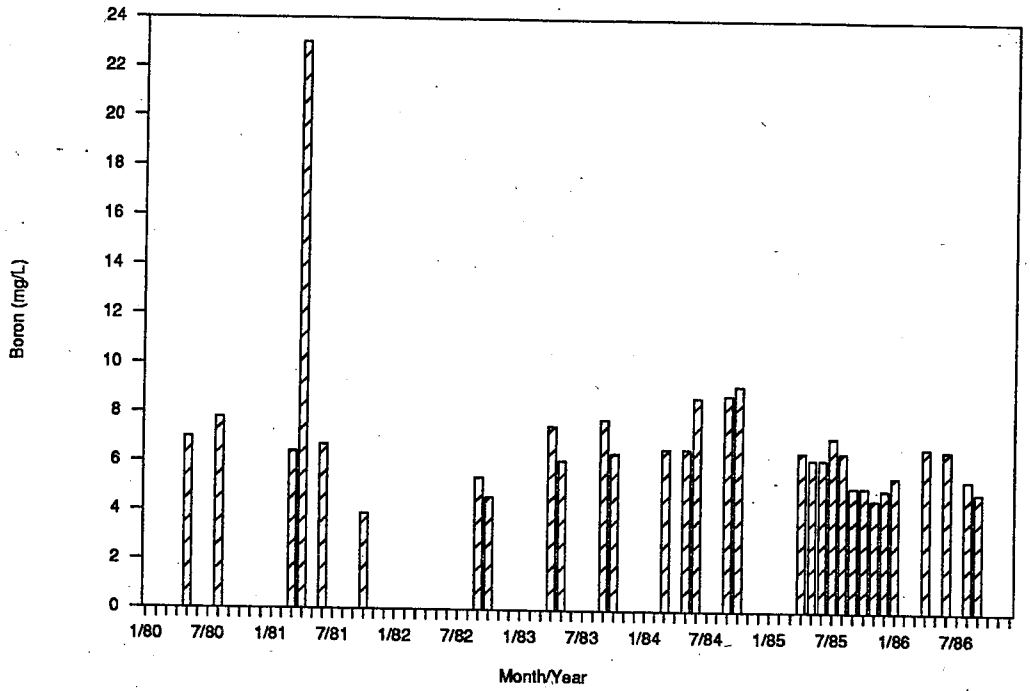
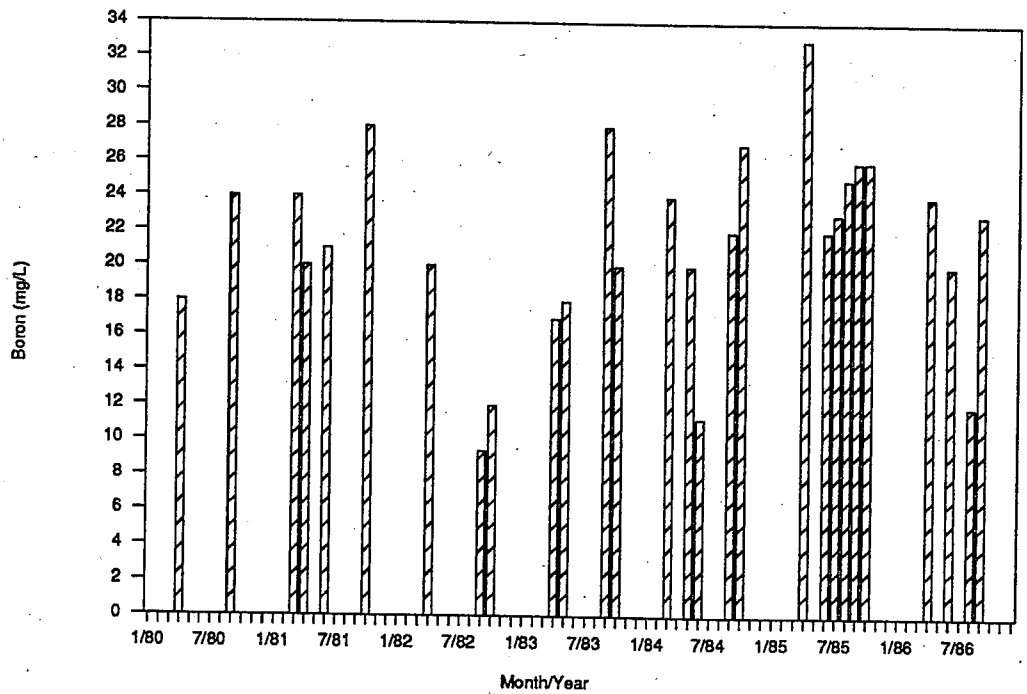


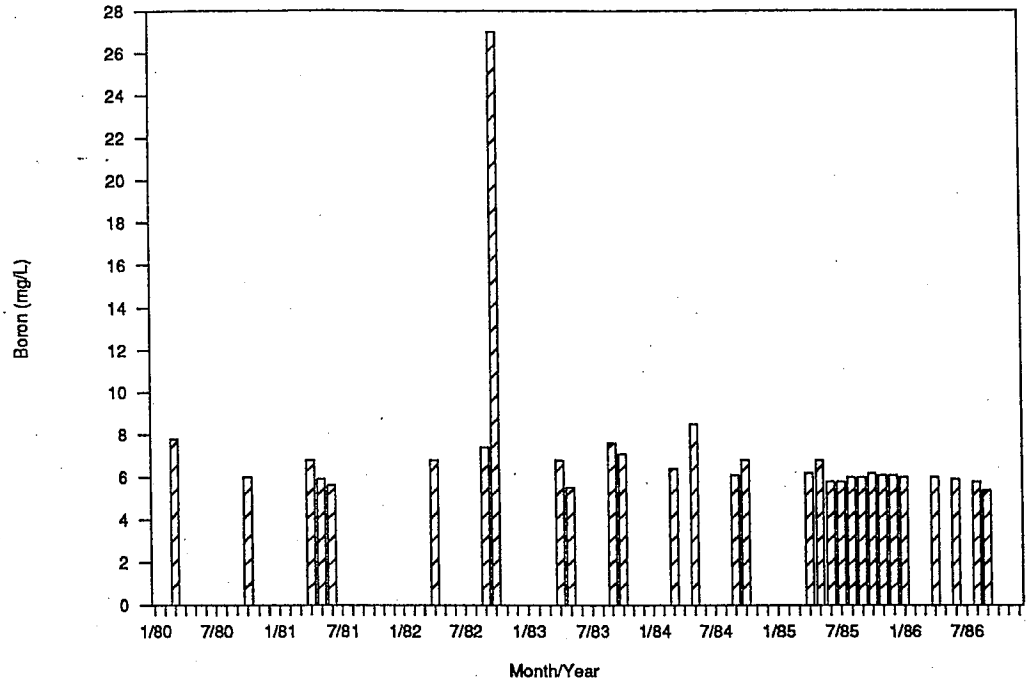

**Figure 14**

BVS 8003 -- Boron Levels



## Figure 15

DPS 1367 -- Boron Levels




## Figure 16

DPS 4616 -- Boron Levels

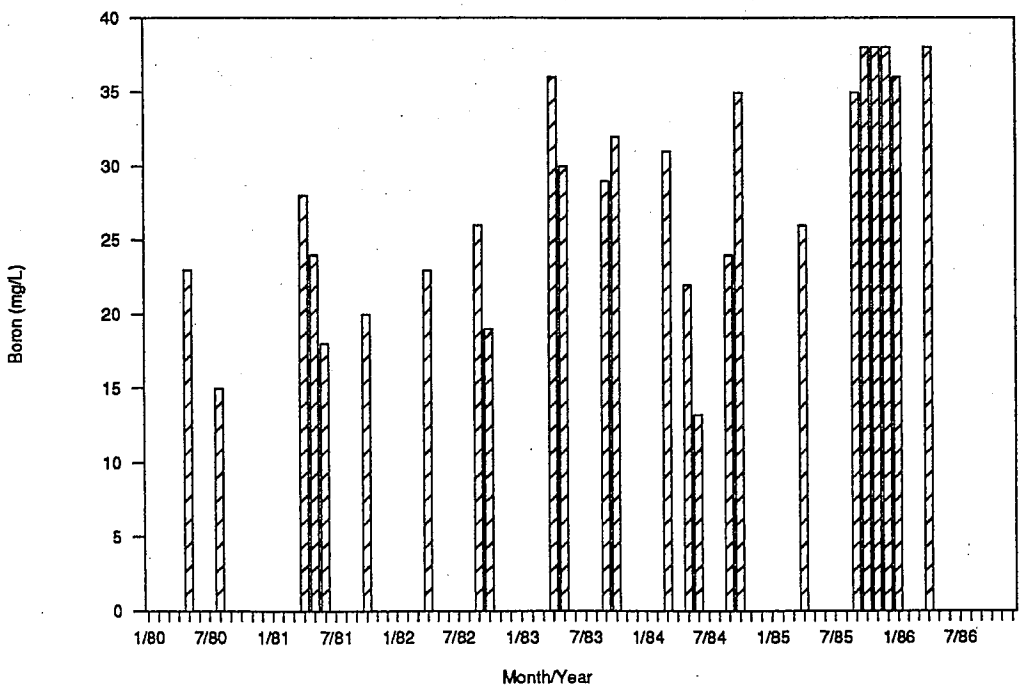


**Figure 17**

FBH 2016 -- Boron Levels

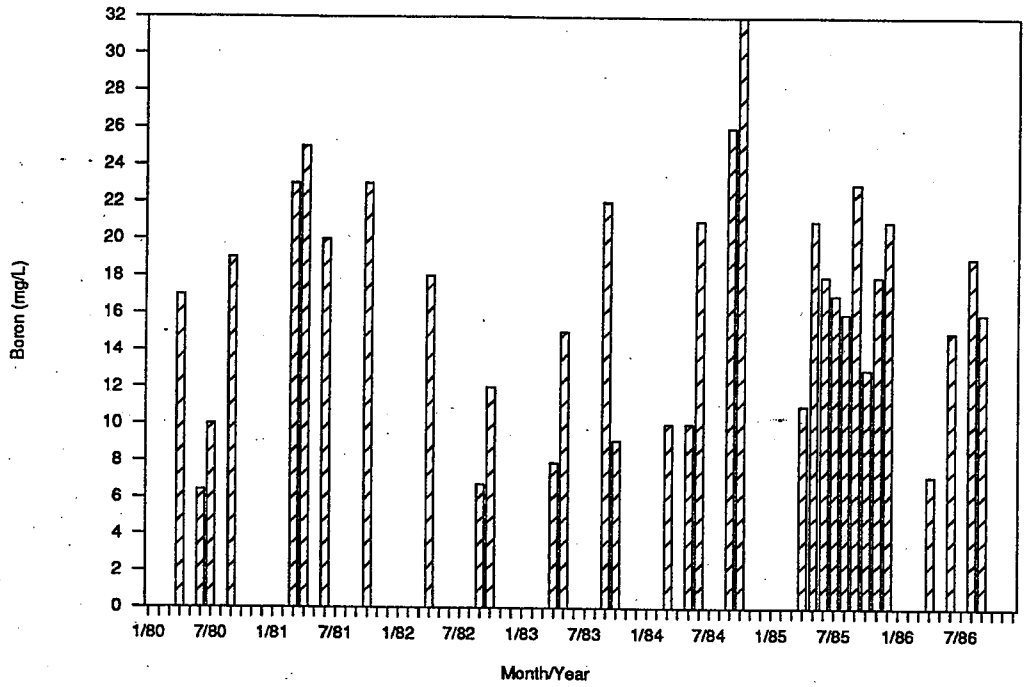
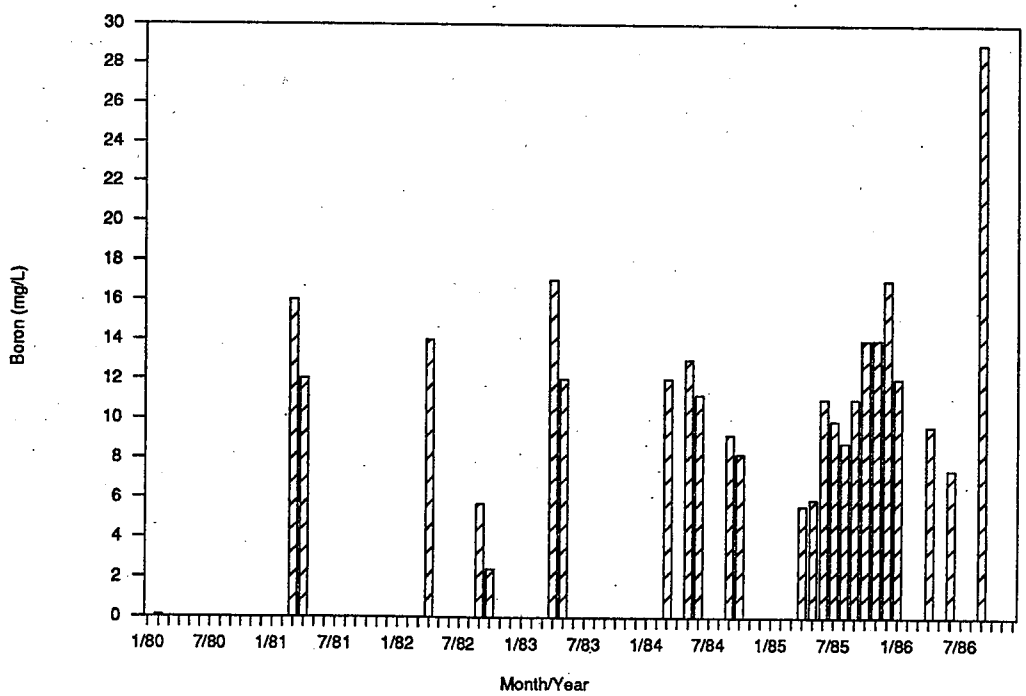


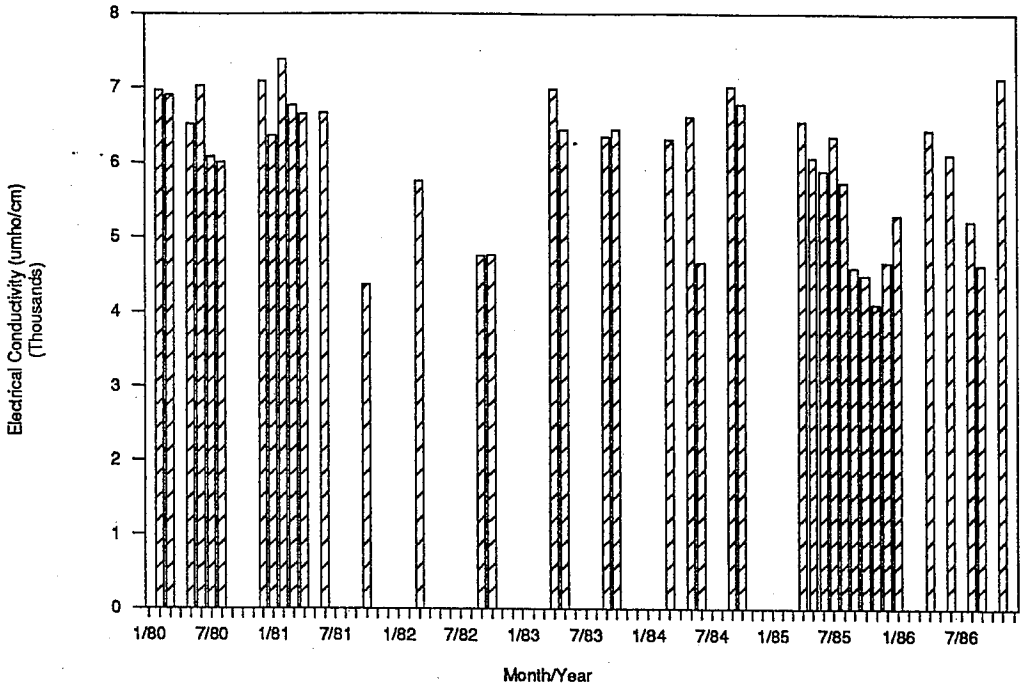

**Figure 18**

FBH 8061 -- Boron Levels



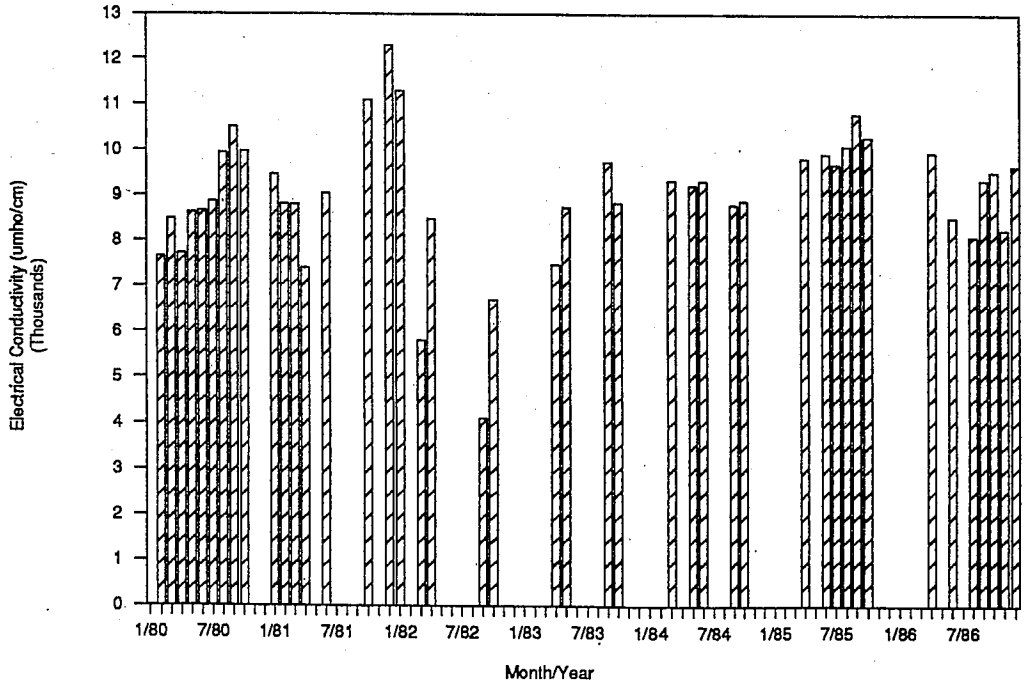
## Figure 19

BVS 6016 -- Electrical Conductivity



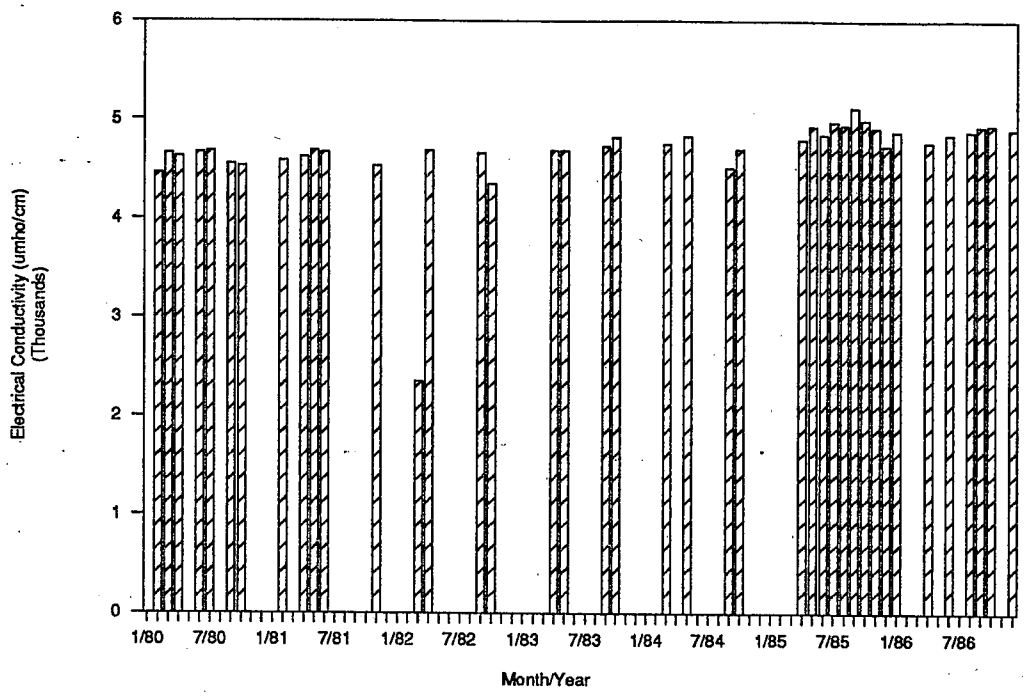

## Figure 20

BVS 8003 -- Electrical Conductivity



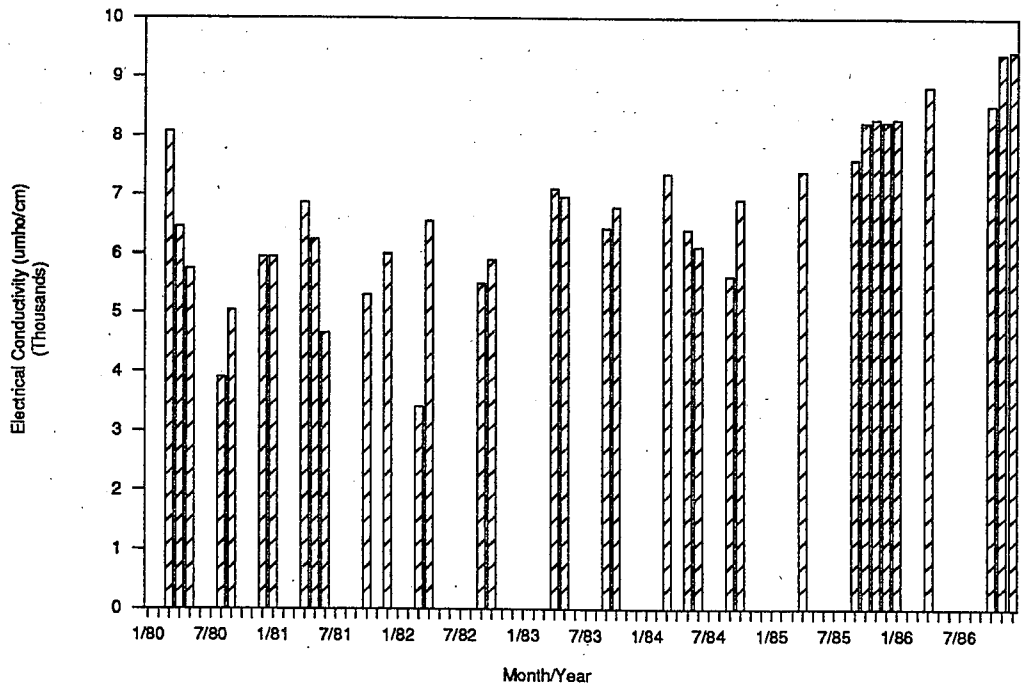
## Figure 21

DPS 1367 -- Electrical Conductivity



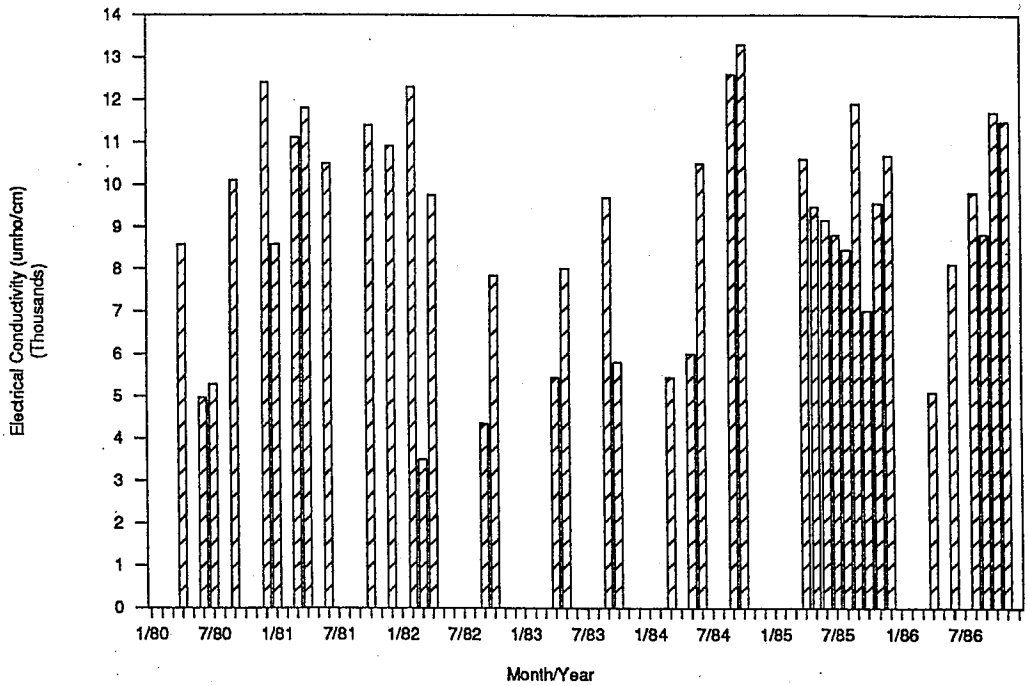

## Figure 22

DPS 4616 -- Electrical Conductivity



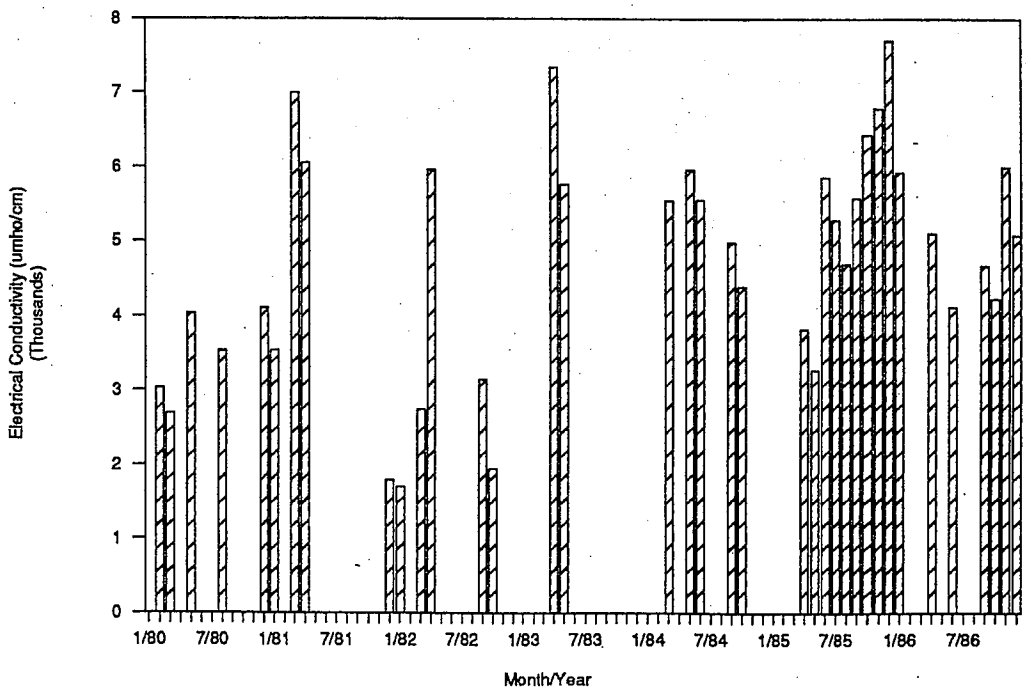
## Figure 23

FBH 2016 -- Electrical Conductivity



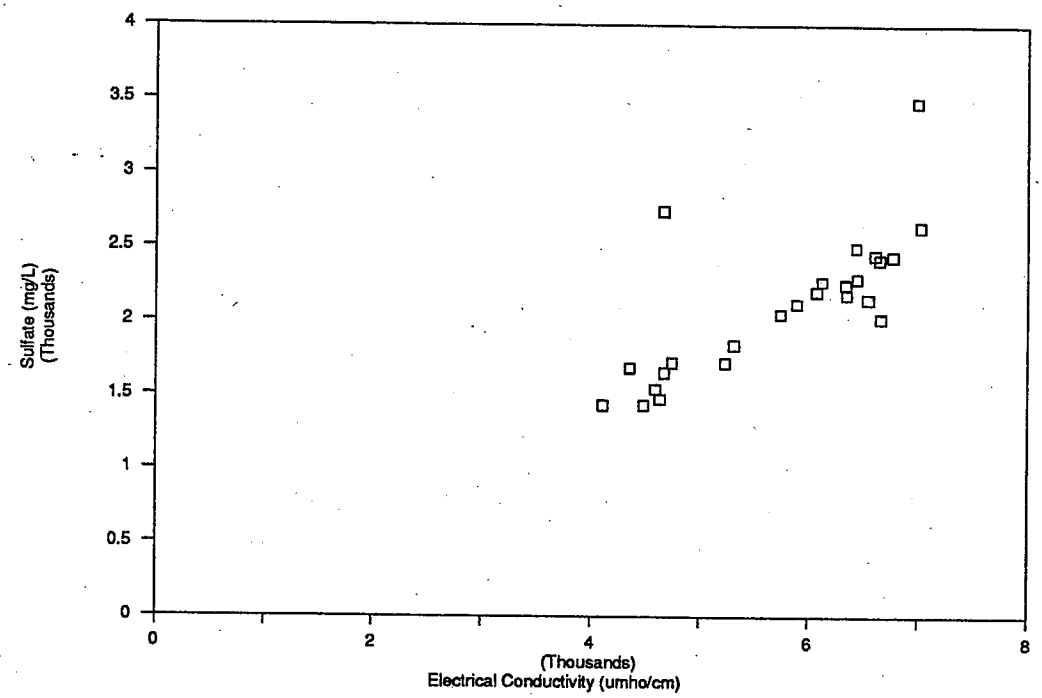

## Figure 24

FBH 8061 -- Electrical Conductivity



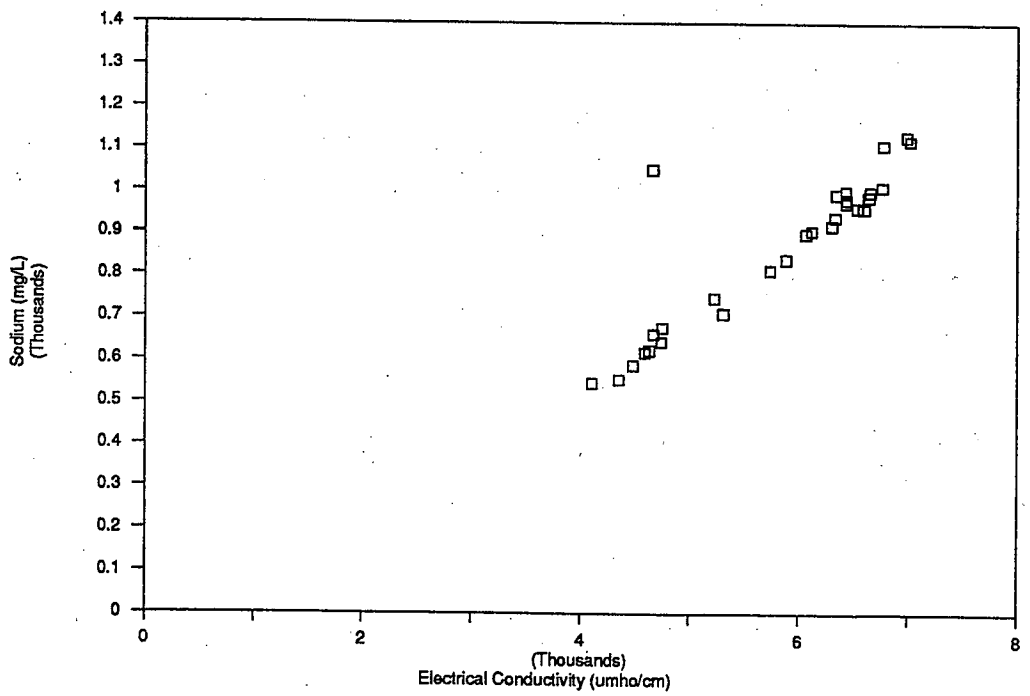
## Figure 25

BVS 6016 -- Sulfate vs. E. C.



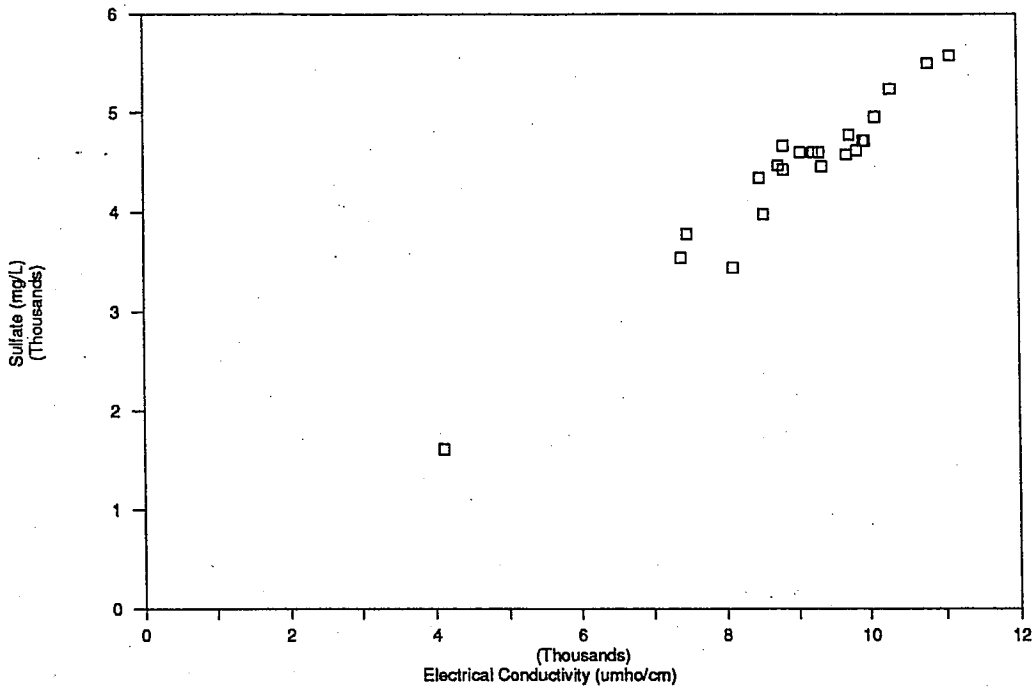

## Figure 26

BVS 6016 -- Sodium vs. E. C.



## Figure 27

BVS 8003 -- Sulfate vs. E. C.




## Figure 28

BVS 8003 -- Sodium vs. E. C.

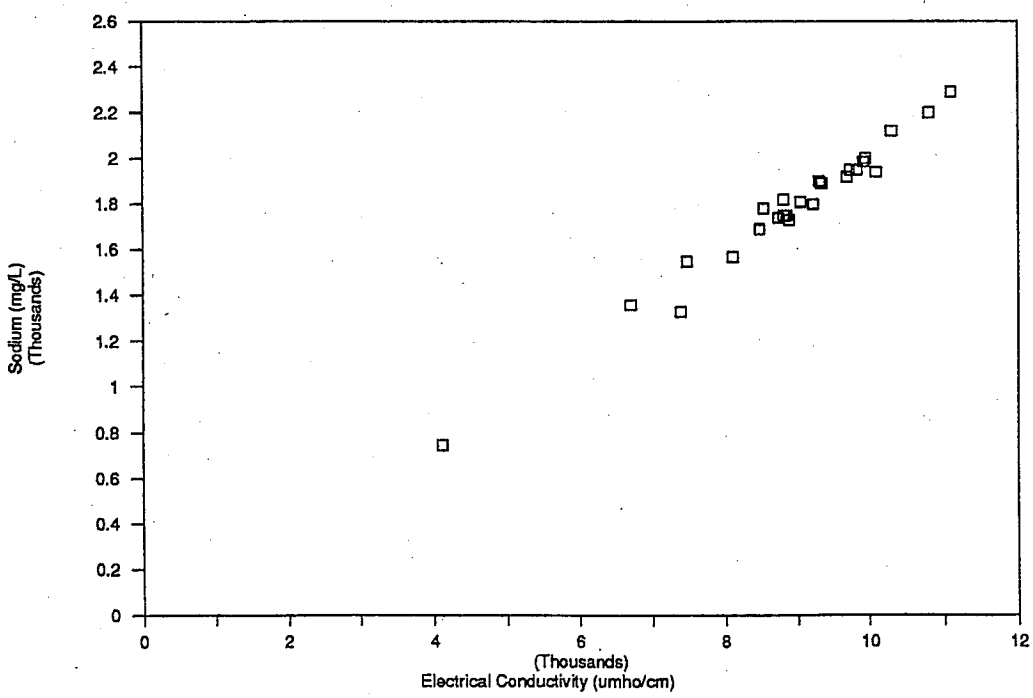


**Figure 29**

DPS 1367 -- Sulfate vs. E. C.

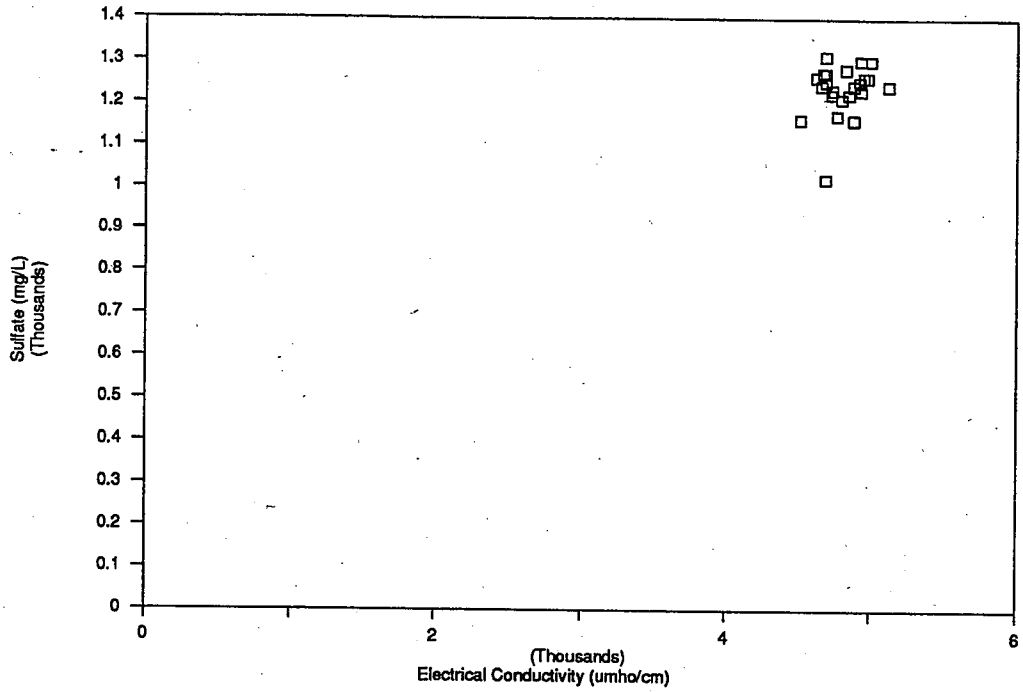
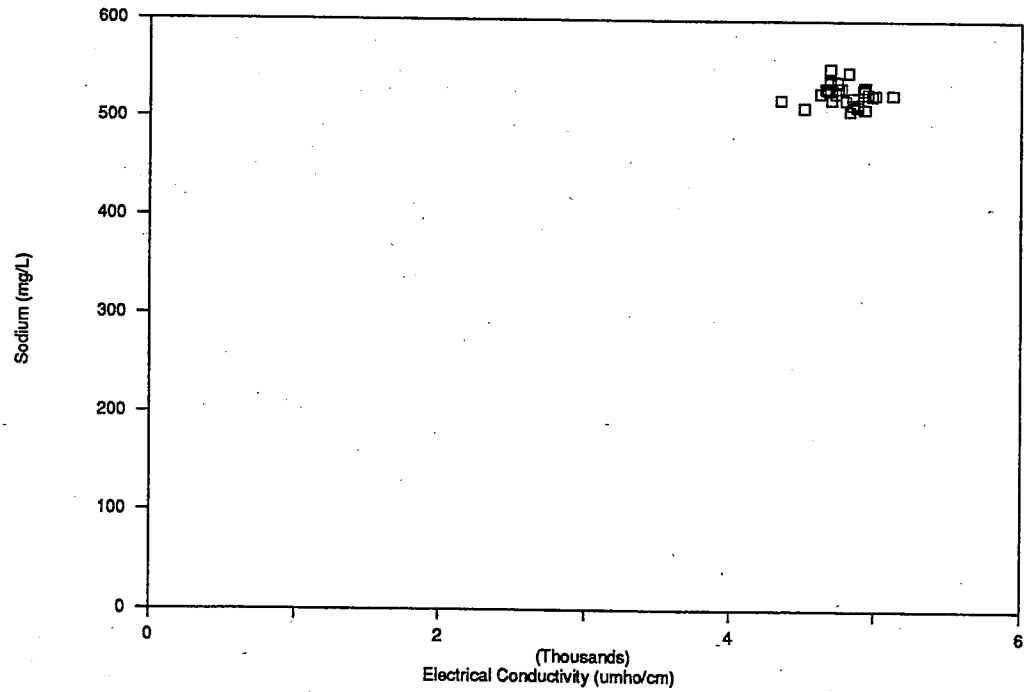


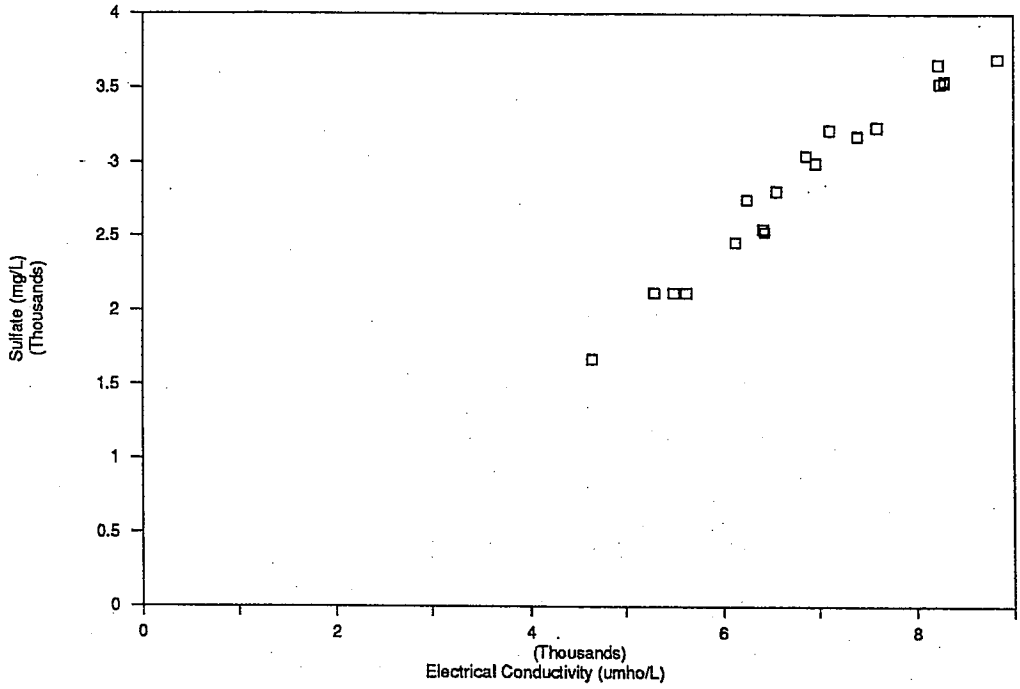

**Figure 30**

DPS 1367 -- Sodium vs. E. C.



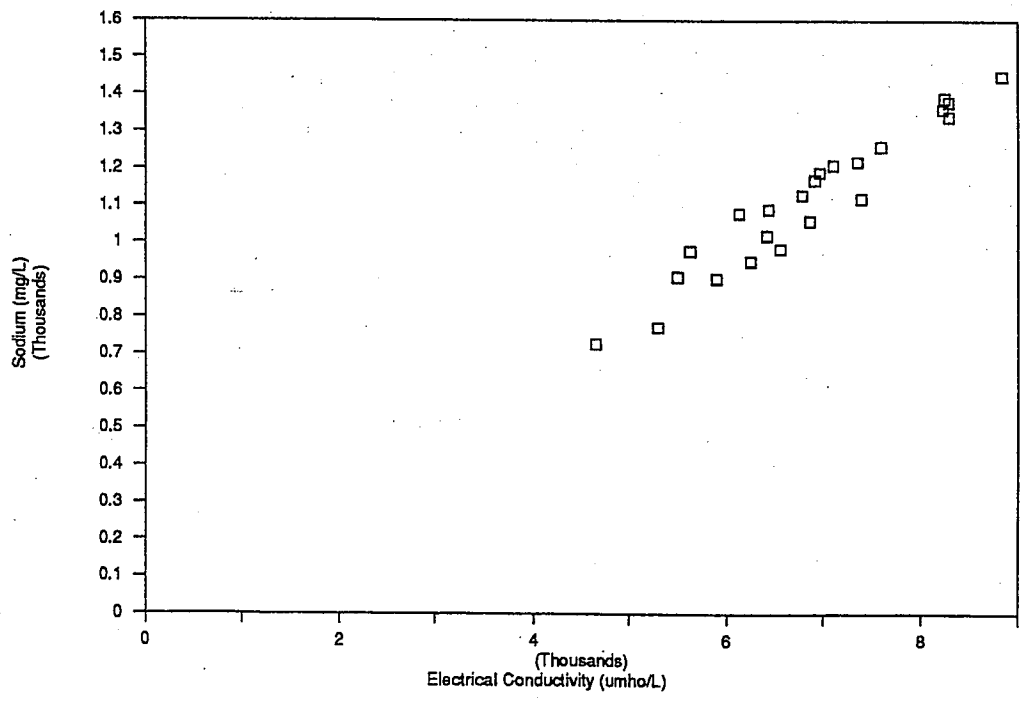
## Figure 31

DPS 4616 -- Sulfate vs. E. C.



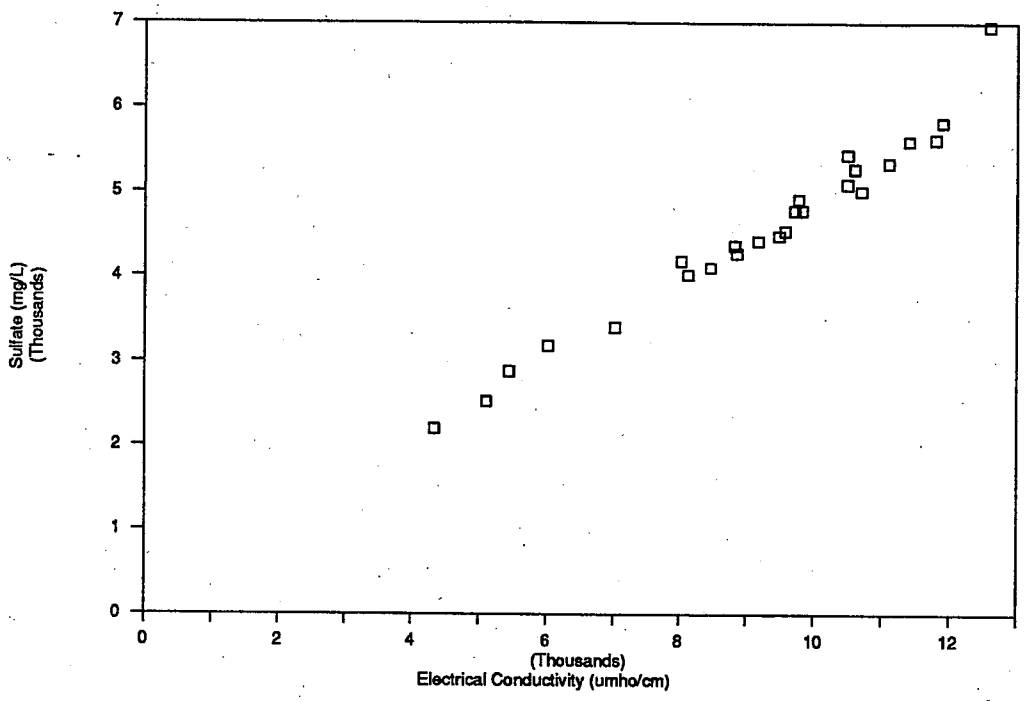

## Figure 32

DPS 4616 -- Sodium vs. E. C.



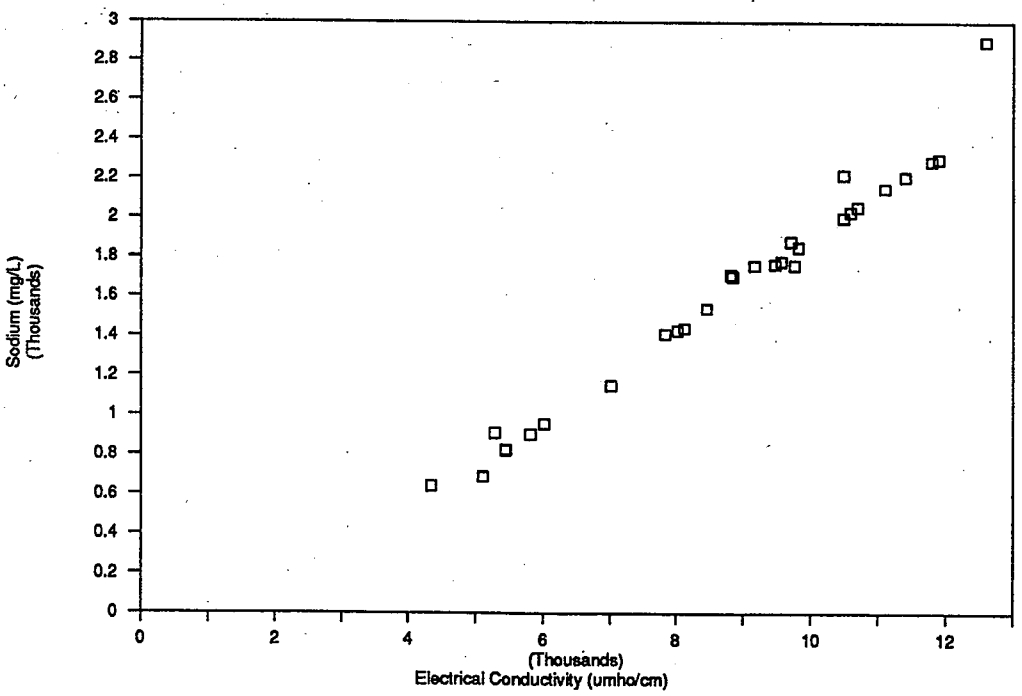
## Figure 33

FBH 2016 -- Sulfate vs. E. C.



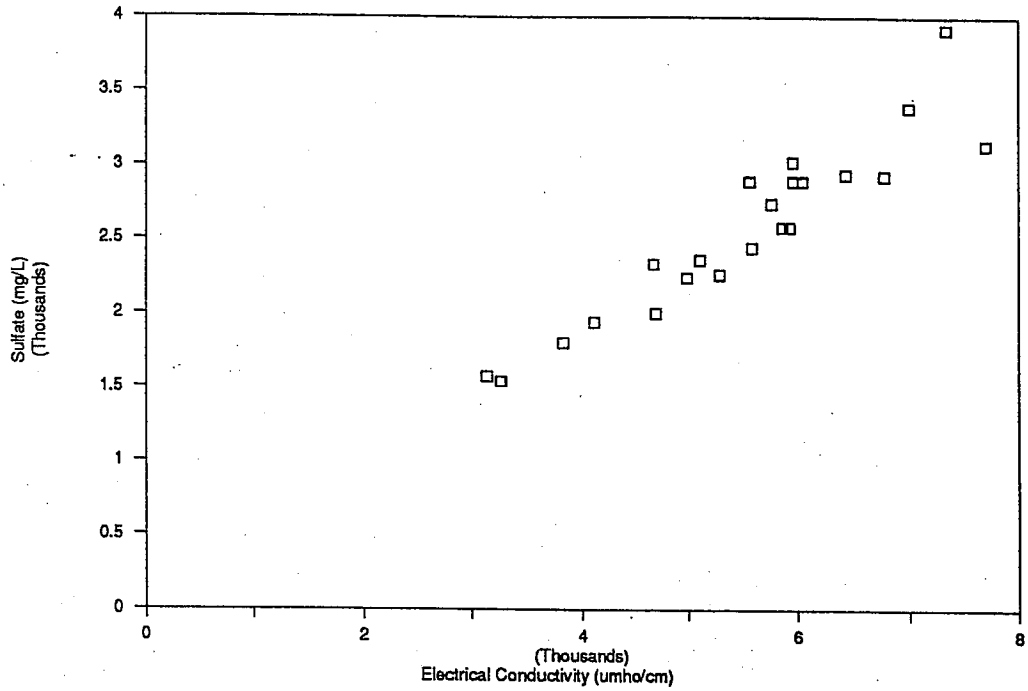

## Figure 34

FBH 2016 -- Sodium vs. E. C.



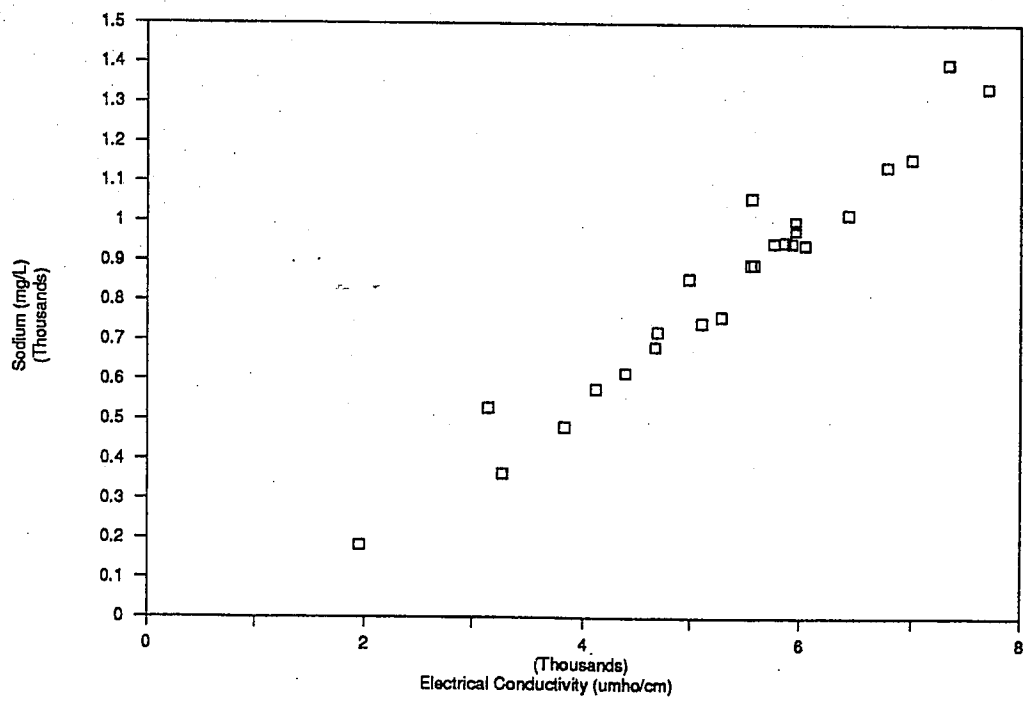
## Figure 35

FBH 8061 -- Sulfate vs. E. C.




## Figure 36

FBH 8061 -- Sodium vs. E. C.



Southern Area Subsurface Drains

Located within Kern County (Figure 3), the southern drains collect drainage water in the same manner as the central subsurface system. The southern region has employed considerably more drainage facilities, including evaporation ponds, than the central region. As a result, any leaching patterns present should be more pronounced.

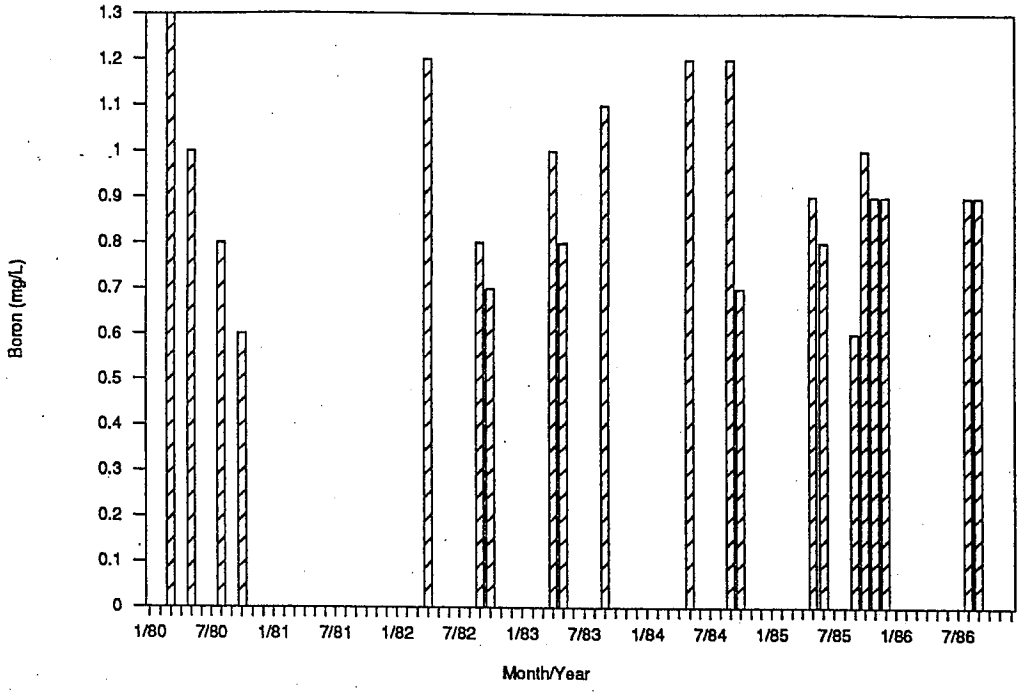
The boron levels for Stations CCN 3550, ERR 8641, SFD 2727, SFD 6046, STC 3505, and STC 6467 are presented in Figures 37 through 42. Like the central surface stations, an extremely high correlation exists between boron concentrations and electrical conductivity levels (Figures 43 through 48). Unlike the central subsurface drains, however, the boron and electrical conductivity levels are remaining constant or decreasing. Since sodium and sulfate are the predominant ions and are highly correlated with electrical conductivity (Figures 49 through 60), their concentrations must also be decreasing.

Station ERR 8641 (Figures 38 and 44) may exemplify how indigenous soils leach after the installation of a tile drain system. The lands draining into this sump were initially tiled in 1981 and DWR commenced water quality sampling in 1985. The rapid reduction in mineral concentrations continues for approximately three to six years after installation of the system, depending upon quantity of irrigation and rainfall. After this, the levels appear to remain relatively constant with small reductions only over extended periods of time.

Comparing the southern stations to the central stations, the importance of evaporation ponds as drainage disposal facilities cannot be overemphasized. Existence of evaporation ponds for drainage disposal reduces or eliminates the practice of reapplying drainage water, thus removing a large source of salts and minerals which concentrate in the root zone of the crop.

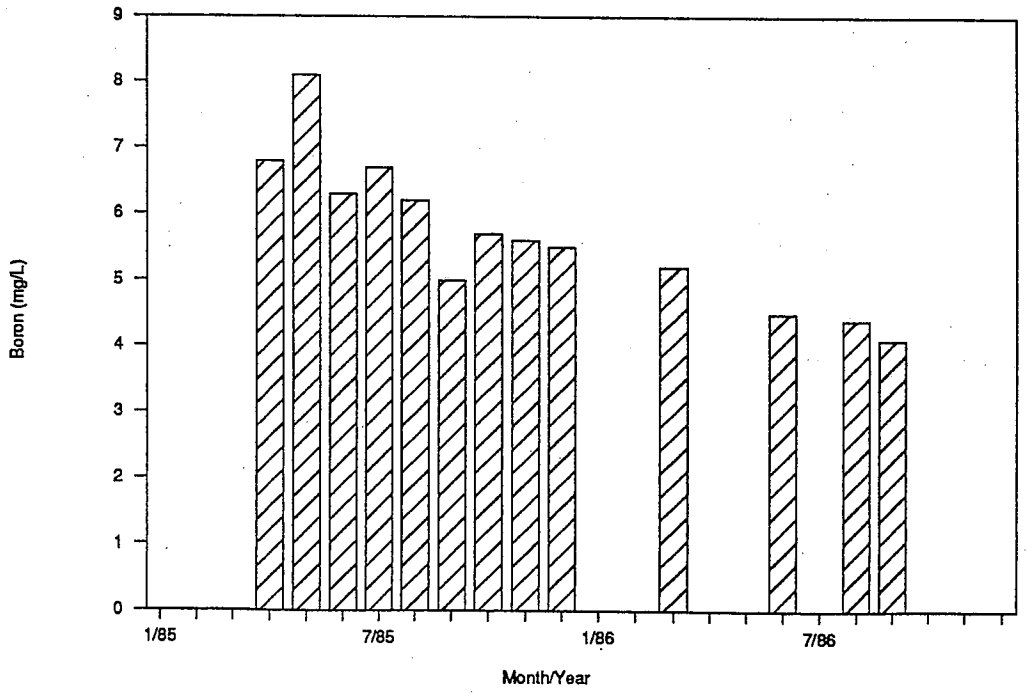
## Figure 37

CCN 3550 -- Boron Levels



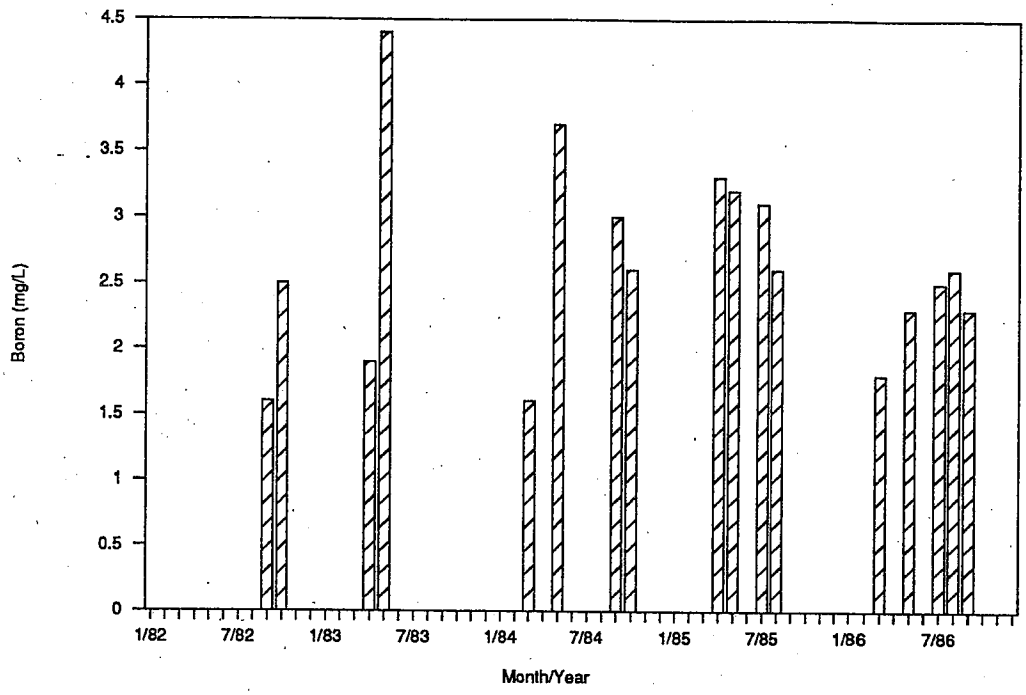

## Figure 38

ERR 8641 -- Boron Levels



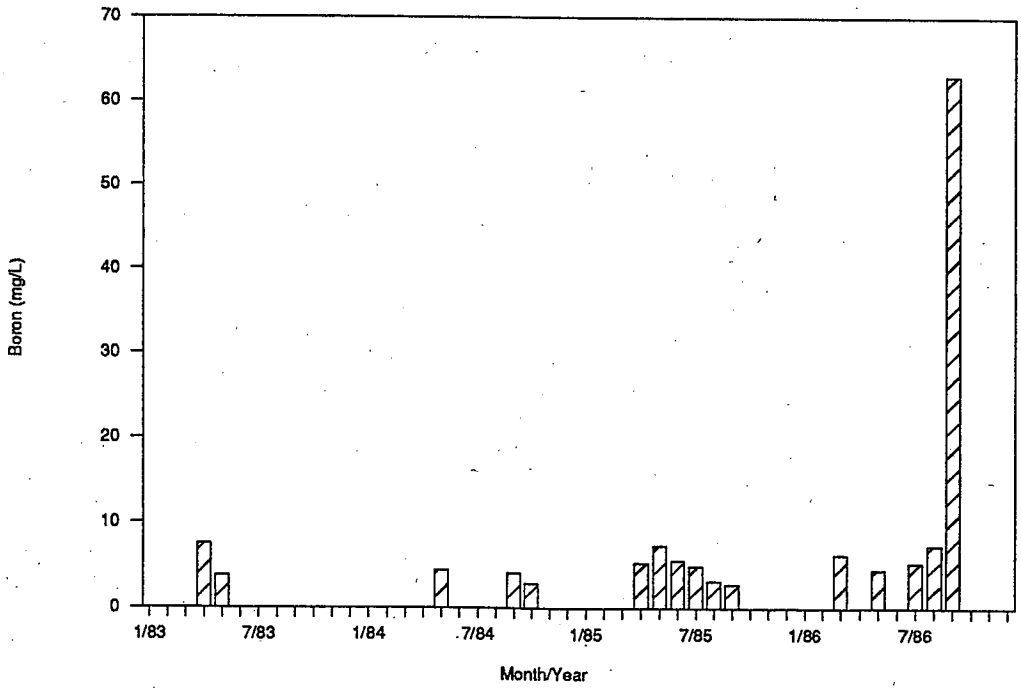
## Figure 39

SFD 2727 -- Boron Levels



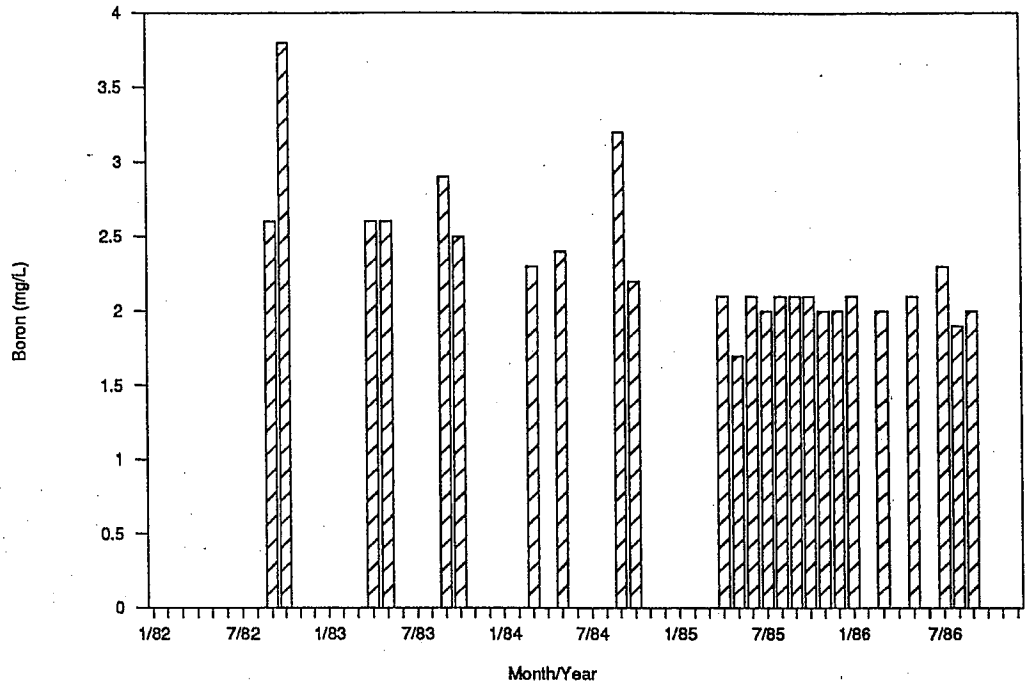

## Figure 40

SFD 6046 -- Boron Levels



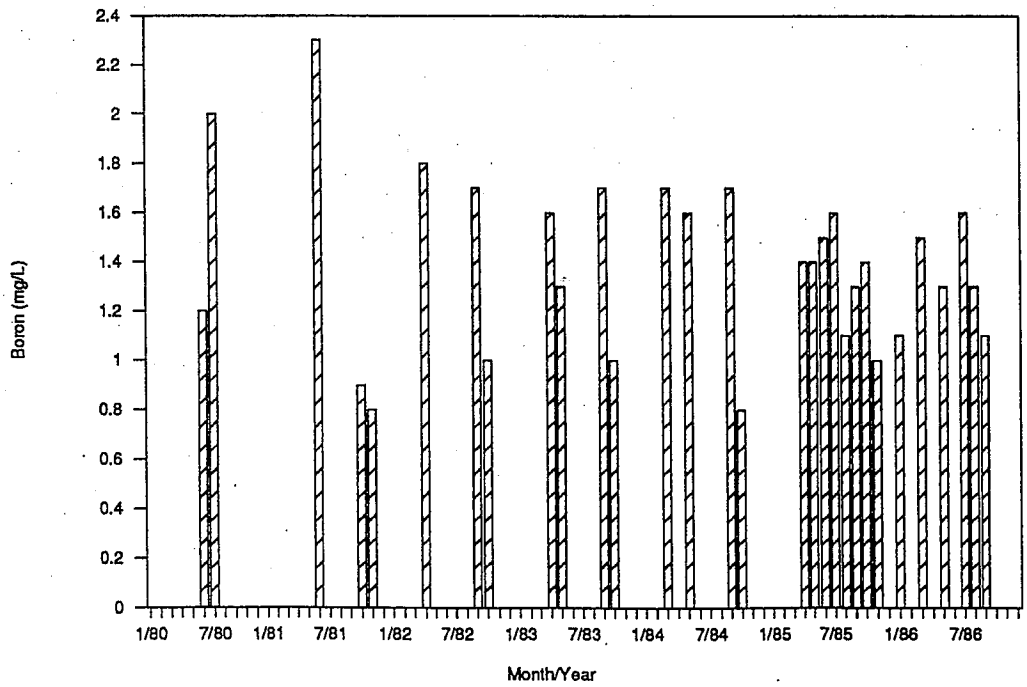
## Figure 41

STC 3505 -- Boron Levels



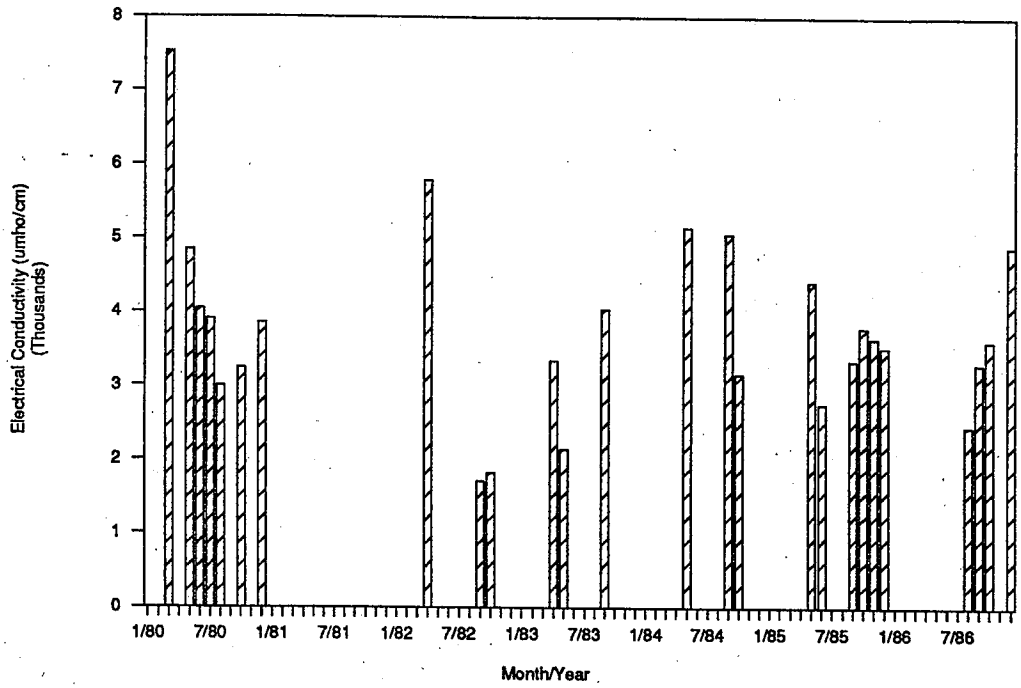

## Figure 42

STC 6467 -- Boron Levels



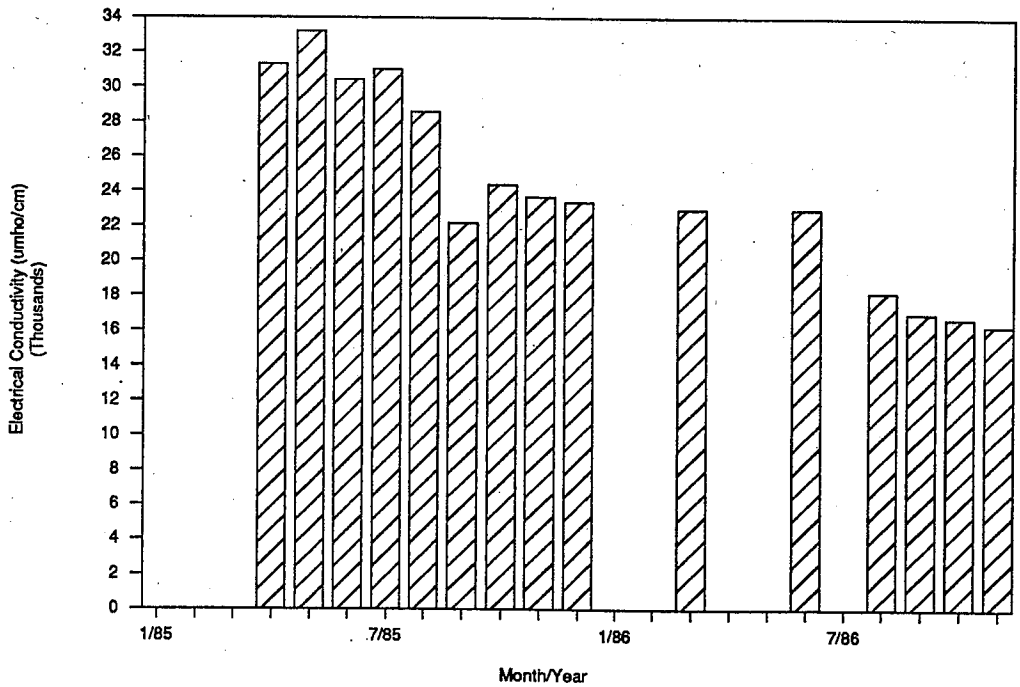
## Figure 43

CCN 3550 -- Electrical Conductivity



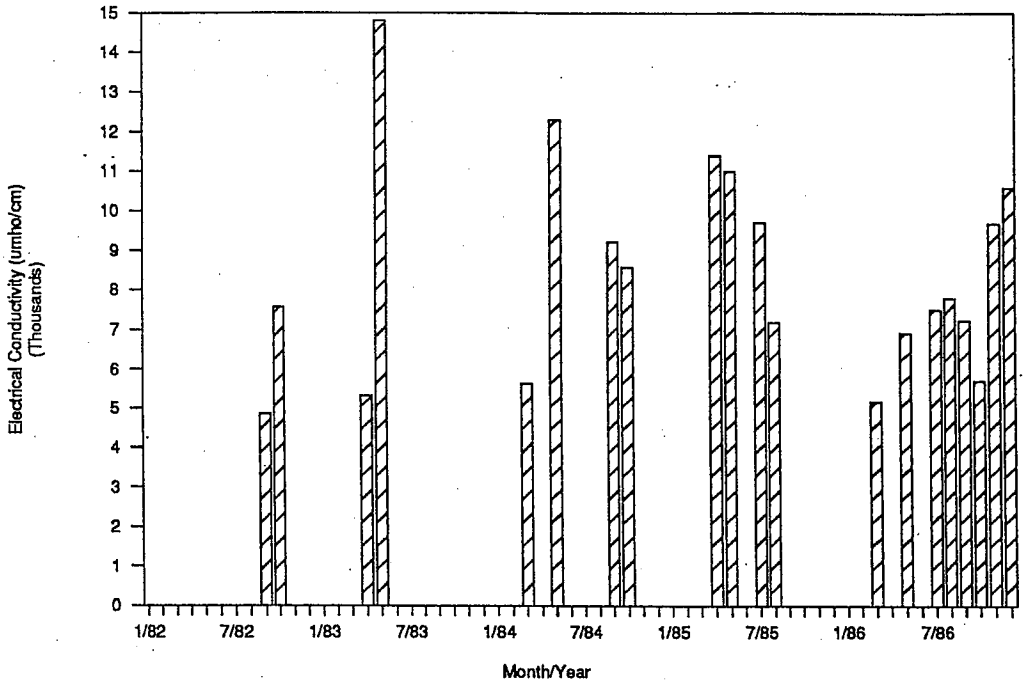

## Figure 44

ERR 8641 -- Electrical Conductivity



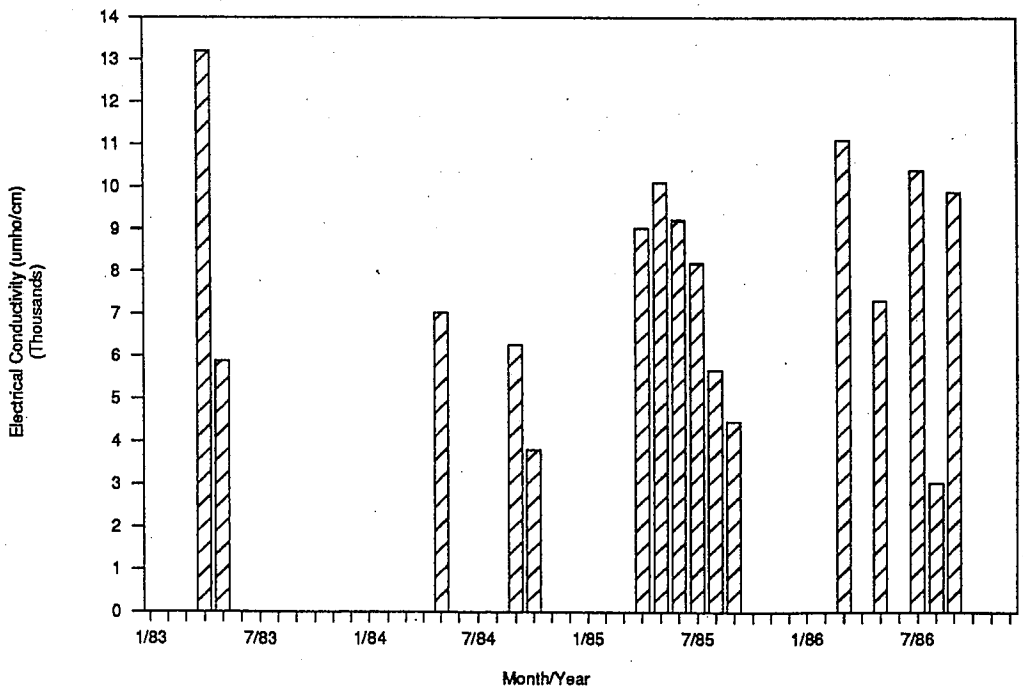
## Figure 45

SFD 2727 -- Electrical Conductivity



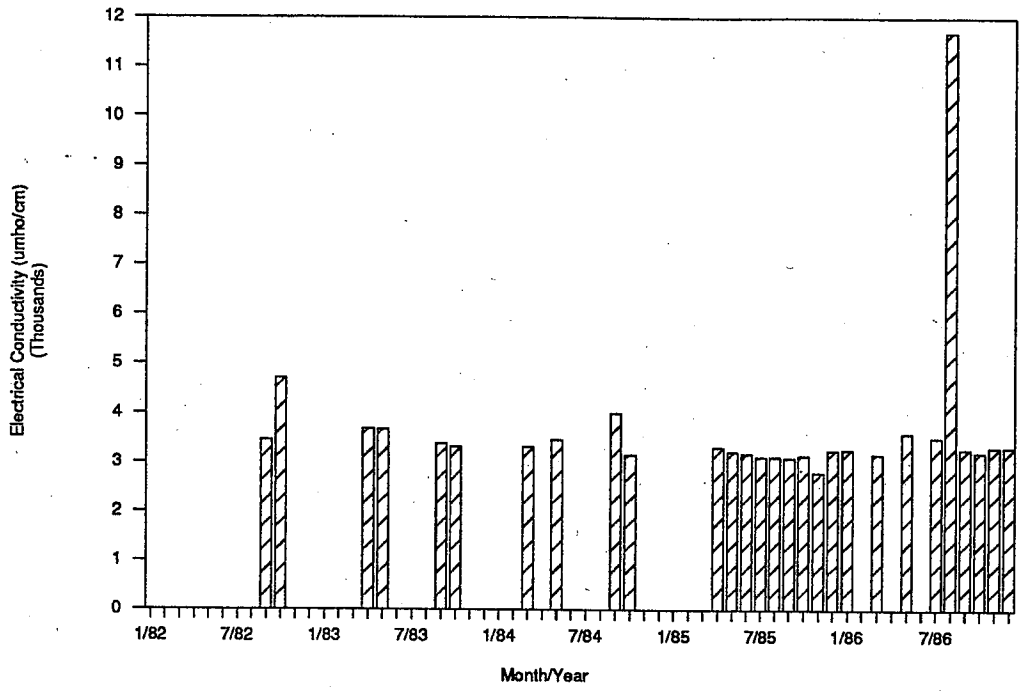

## Figure 46

SFD 6046 -- Electrical Conductivity



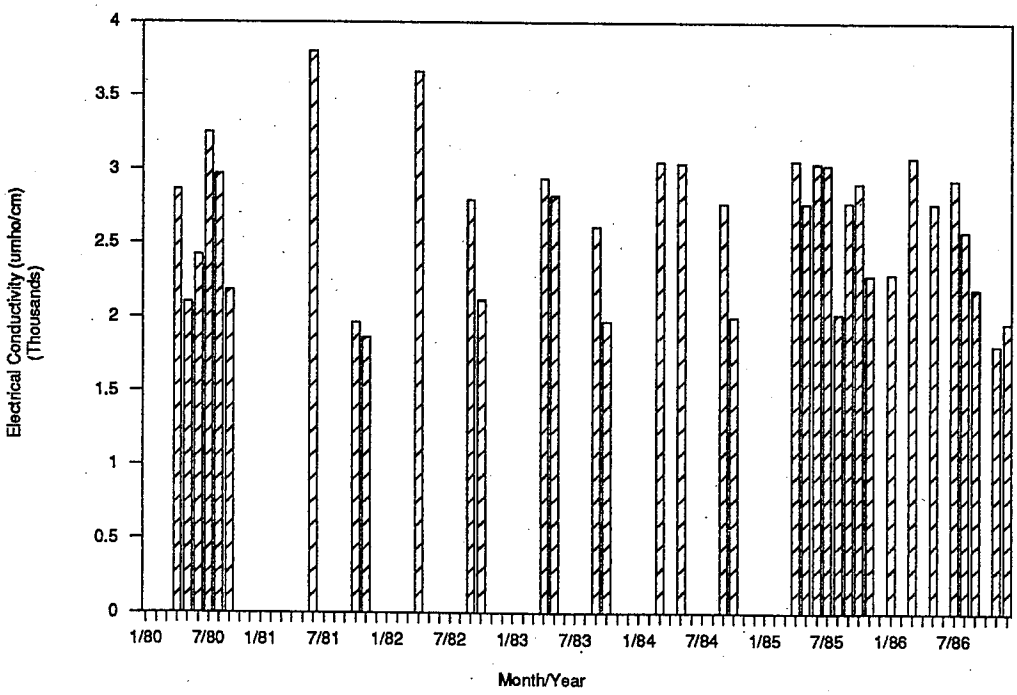
## Figure 47

STC 3505 -- Electrical Conductivity



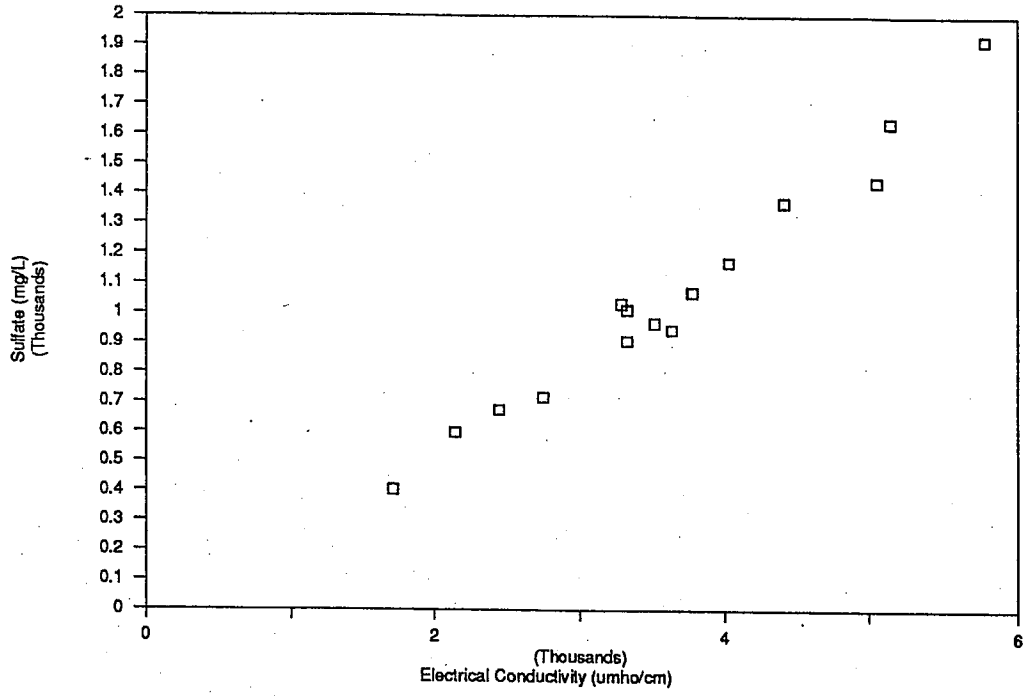

## Figure 48

STC 6467 -- Electrical Conductivity



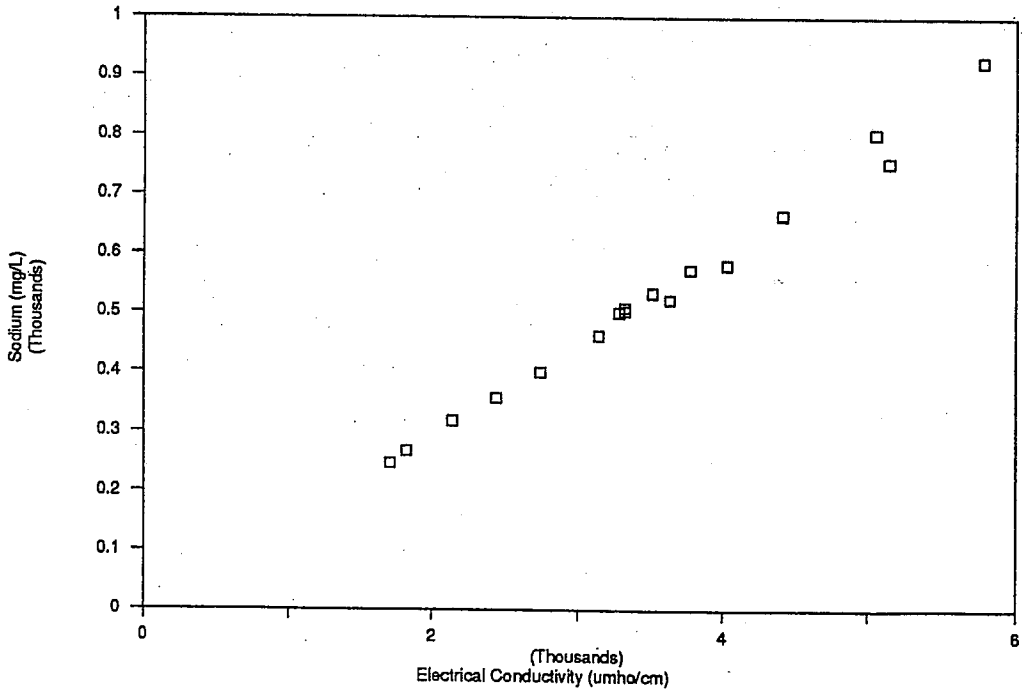
## Figure 49

CCN 3550 -- Sulfate vs. E. C.



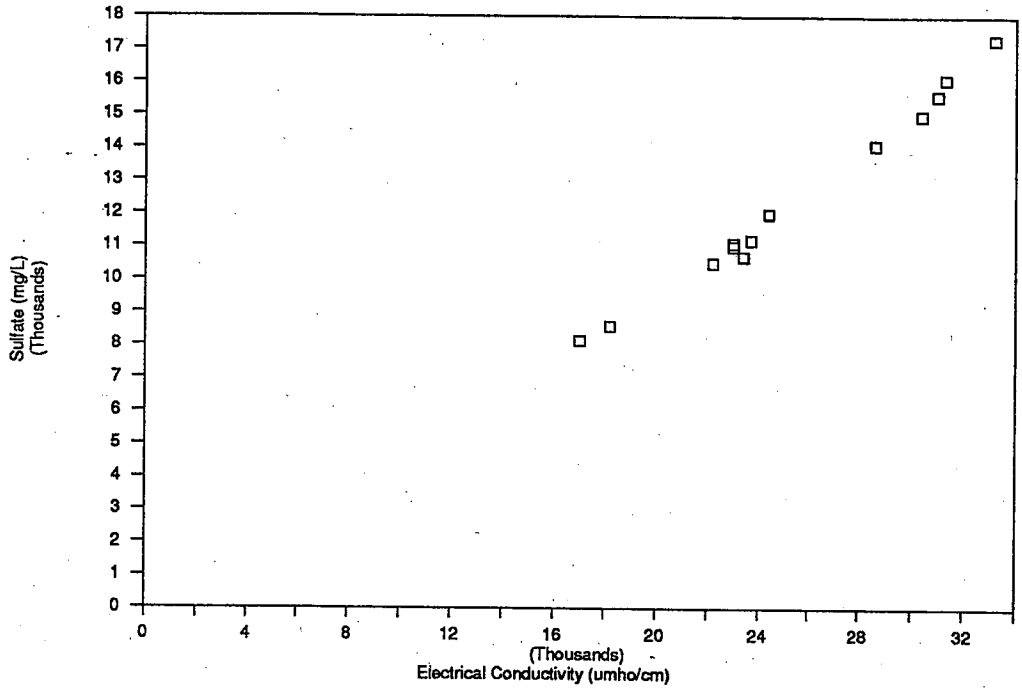

## Figure 50

CCN 3550 -- Sodium vs. E. C.



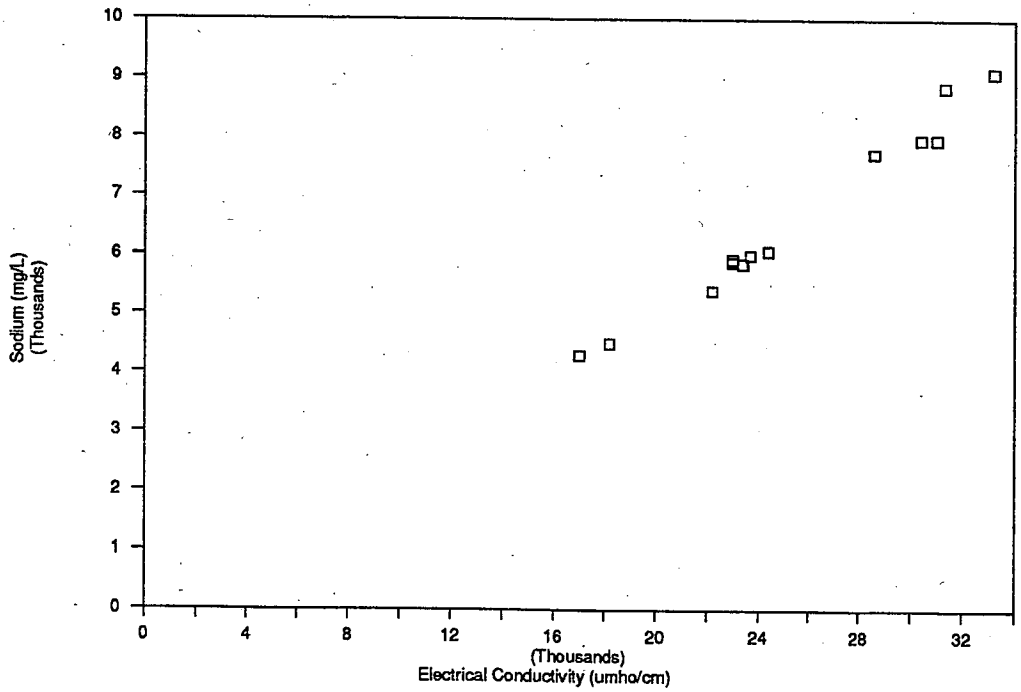
## Figure 51

ERR 8641 -- Sulfate vs. E. C.



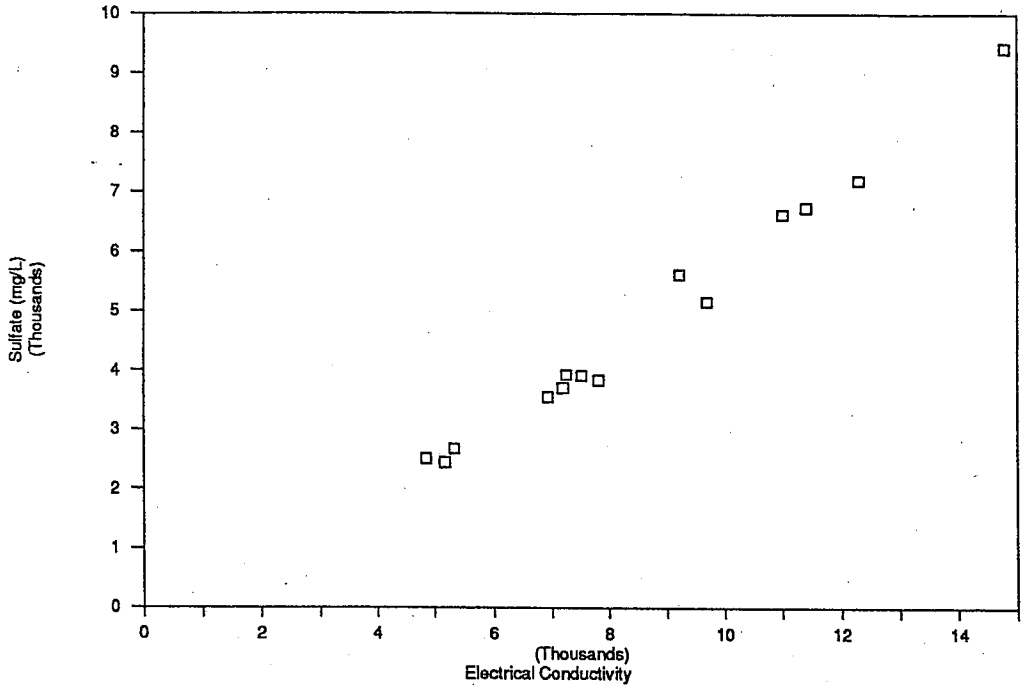

## Figure 52

ERR 8641 -- Sodium vs. E. C.



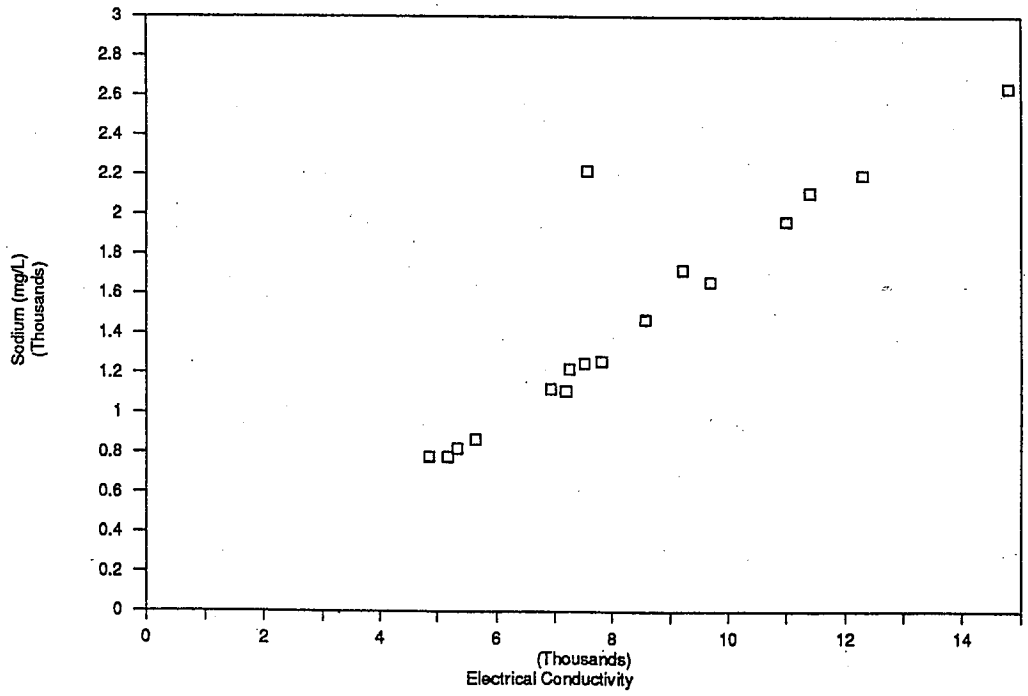
## Figure 53

SFD 2727 -- Sulfate vs. E. C.



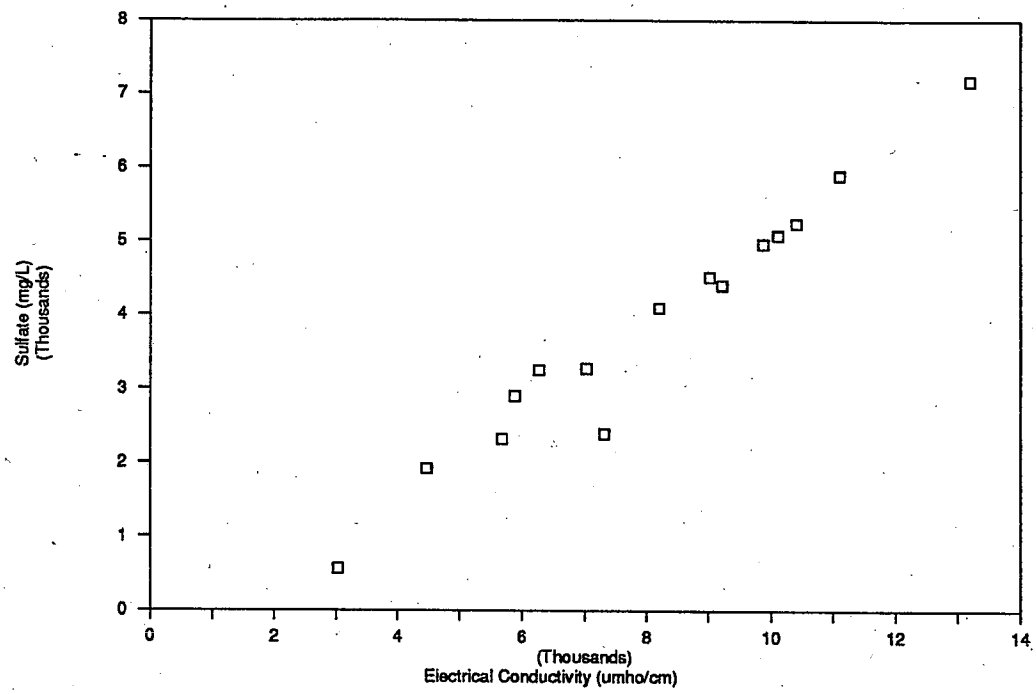

## Figure 54

SFD 2727 -- Sodium vs. E. C.



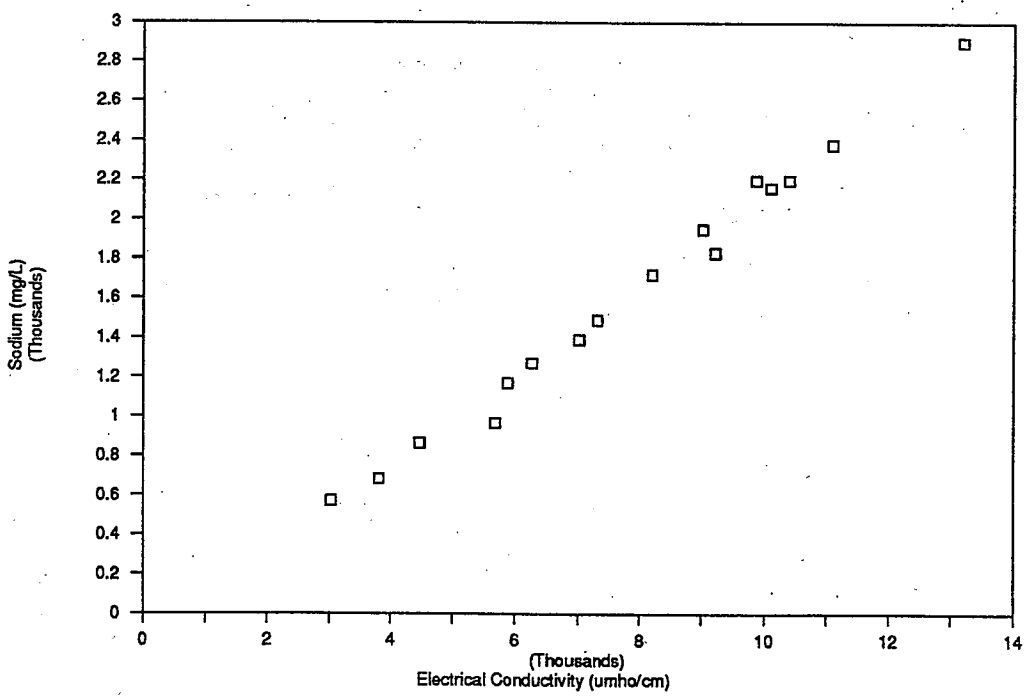
## Figure 55

SFD 6046 -- Sulfate vs. E. C.



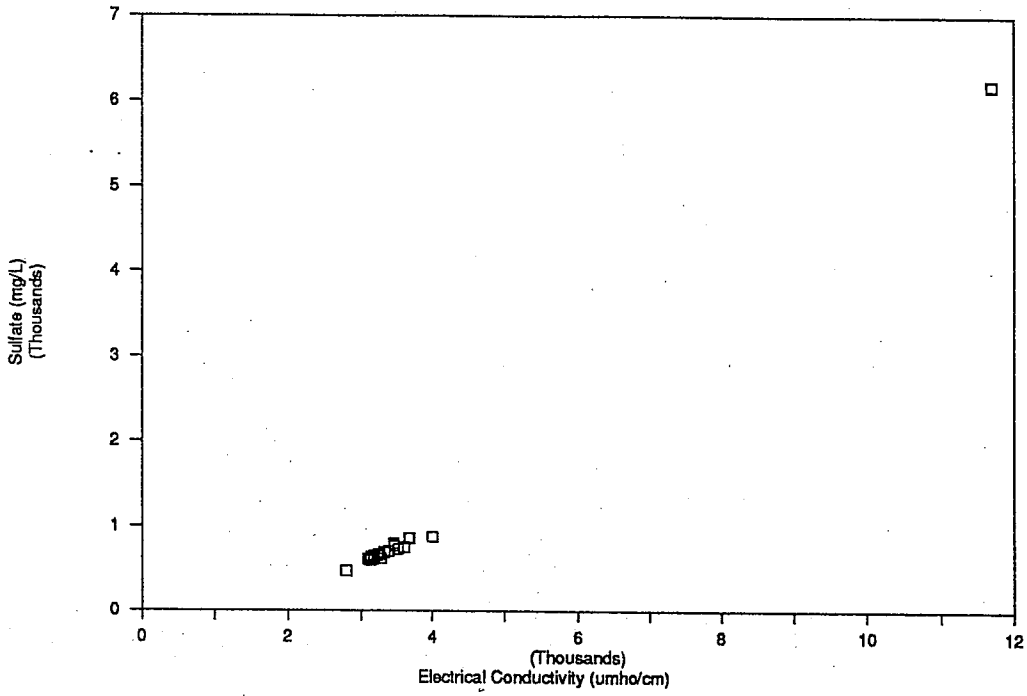

## Figure 56

SFD 6046 -- Sodium vs. E. C.



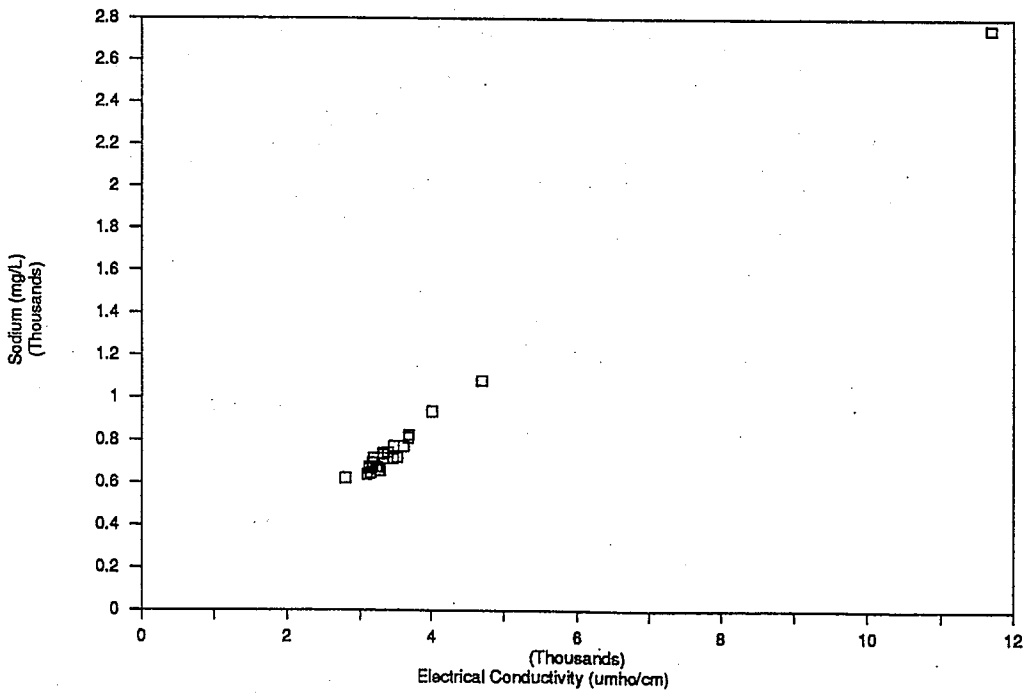
## Figure 57

STC 3505 -- Sulfate vs. E. C.



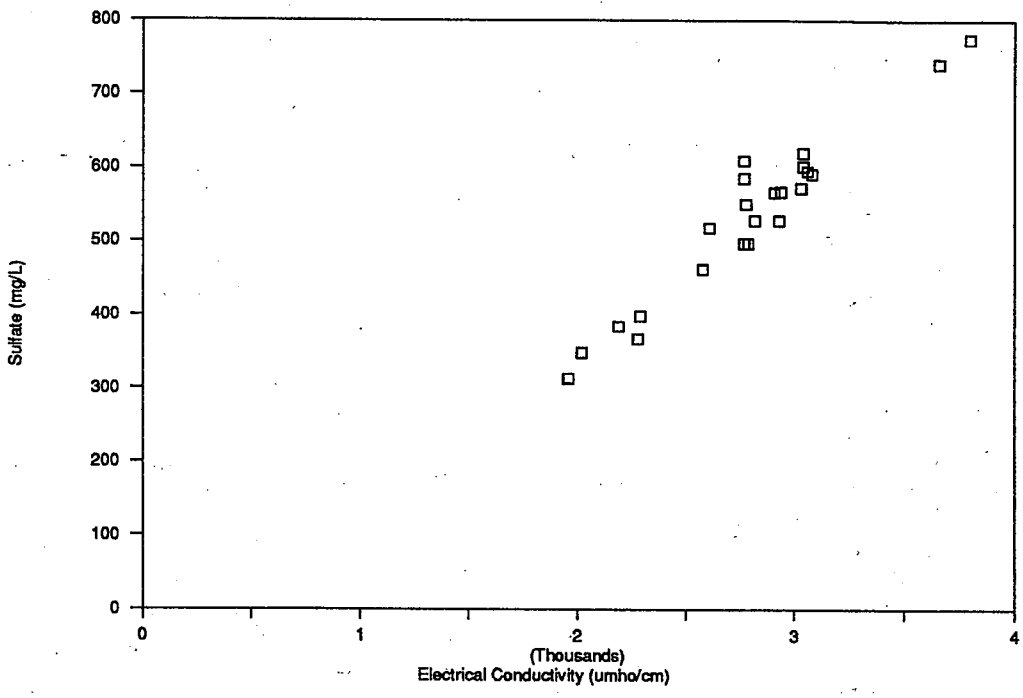

## Figure 58

STC 3505 -- Sodium vs. E. C.



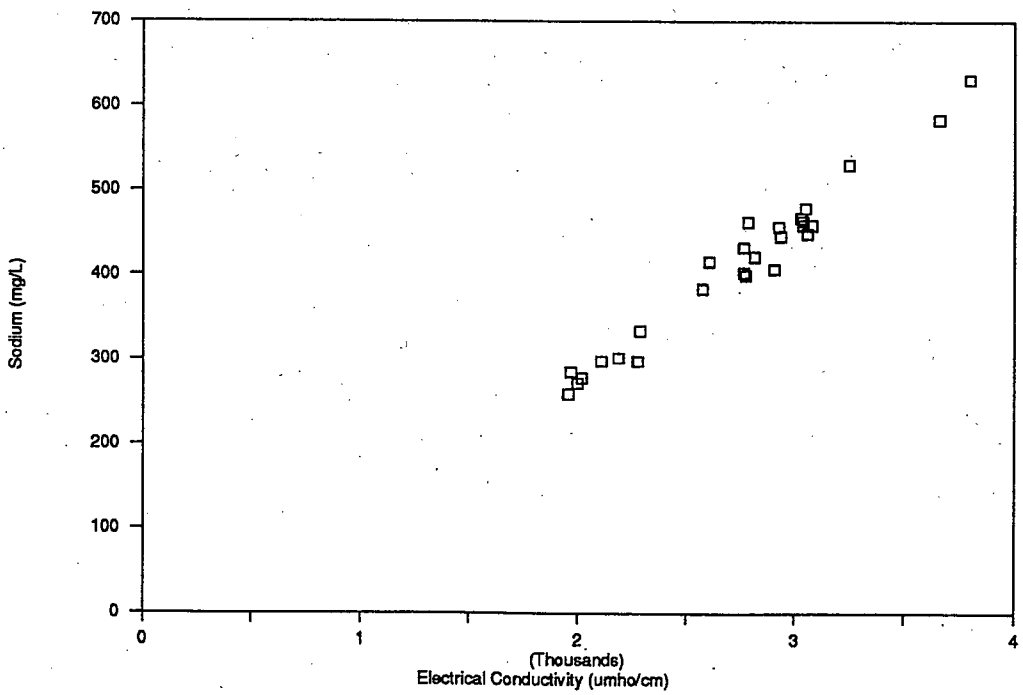
## Figure 59

STC 6467 -- Sulfate vs. E. C.




## Figure 60

STC 6467 -- Sodium vs. E. C.



## Arsenic Levels

In 1986, arsenic was detected in drainage water at more Valley locations and in generally higher concentrations than in 1985. This fact may be misleading, however, since in 1986 new and more sophisticated lab equipment allowed arsenic to be detected in smaller quantities than in the past (as low as 0.001 mg/L in 1986 compared to 0.01 mg/L in 1985). Most likely, some drainage water samples thought to be arsenic-free prior to 1986 actually contained minute quantities of arsenic below the detection limit. Nevertheless, arsenic concentrations in all water samples in 1986 were significantly lower than the 0.1 mg/L recommended maximum level for irrigation water.

Sampling stations with histories of high arsenic concentrations showed little or no concentration reductions in 1986, and in some cases, such as Station ERR 8641, arsenic levels appeared to be increasing. Peak values were most commonly obtained during summer months, particularly June and August.

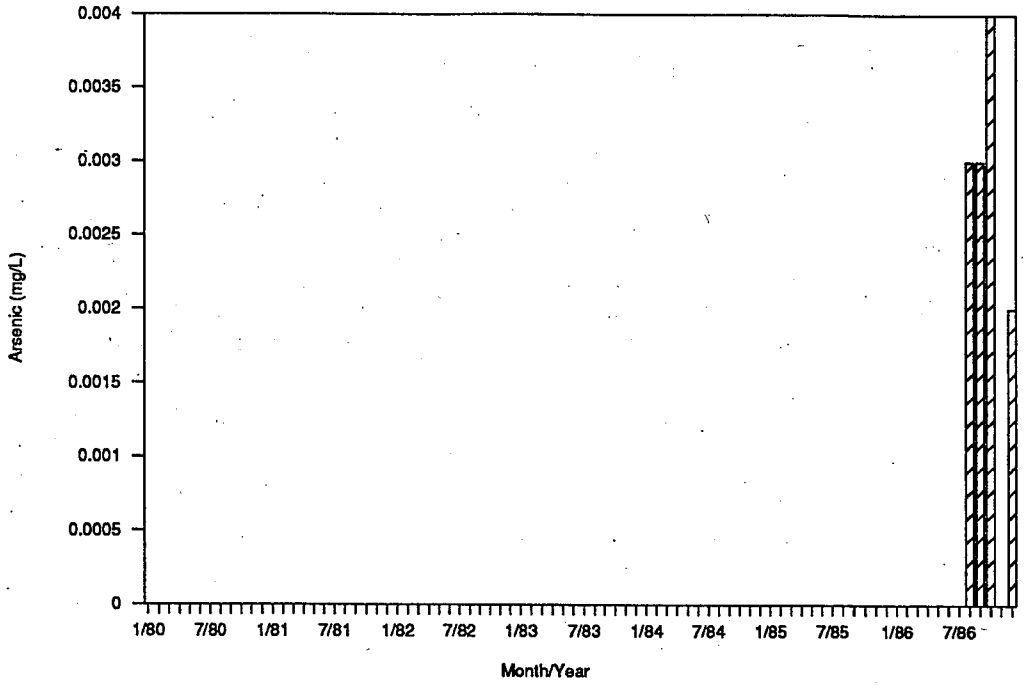
### Central Area Surface Drains

Both central surface drains were found to contain arsenic during 1986 (Figures 61 and 62). Station CTL 4504 has no history of recorded arsenic levels since 1980. This is most likely due to the lower detection limit described above. In 1986, arsenic levels ranging from 0.001 mg/L to 0.004 mg/L were detected.

Station DPS 3235 showed a significant reduction in arsenic concentrations from pre-1986 levels. Since 1981, peak values of 0.01 mg/L have been periodically recorded, usually during summer months. Concentrations less than 0.01 mg/L were recorded as zero. In 1986, the peak concentration was 0.003 mg/L, a substantial reduction from prior levels. None of the 11 samples analyzed for arsenic exceeded the irrigation standard of 0.1 mg/L or the primary drinking water standard of 0.05 mg/L.

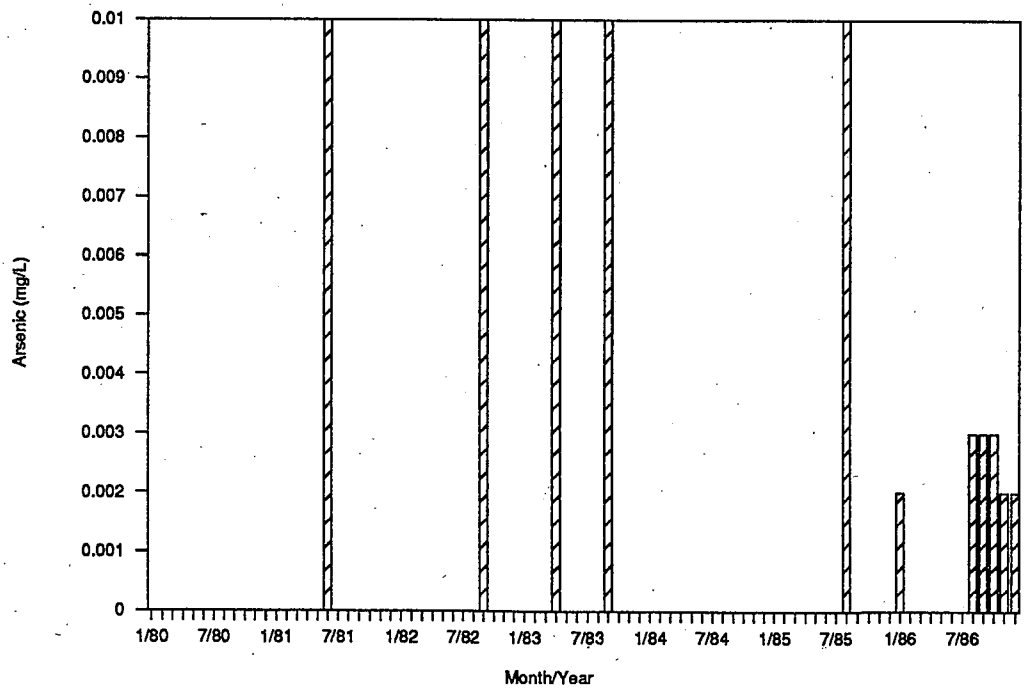
## Figure 61

CTL 4504 -- Arsenic Levels




## Figure 62

DPS 3235 -- Arsenic Levels



Central Area Subsurface Drains

Arsenic was detected in all of the central subsurface drains in concentrations ranging from 0.001 to 0.02 mg/L (Figures 63 through 68). Of the six peak values, five were detected during October. None of the 40 samples analyzed for arsenic exceeded the primary drinking water standard of 0.05 mg/L.

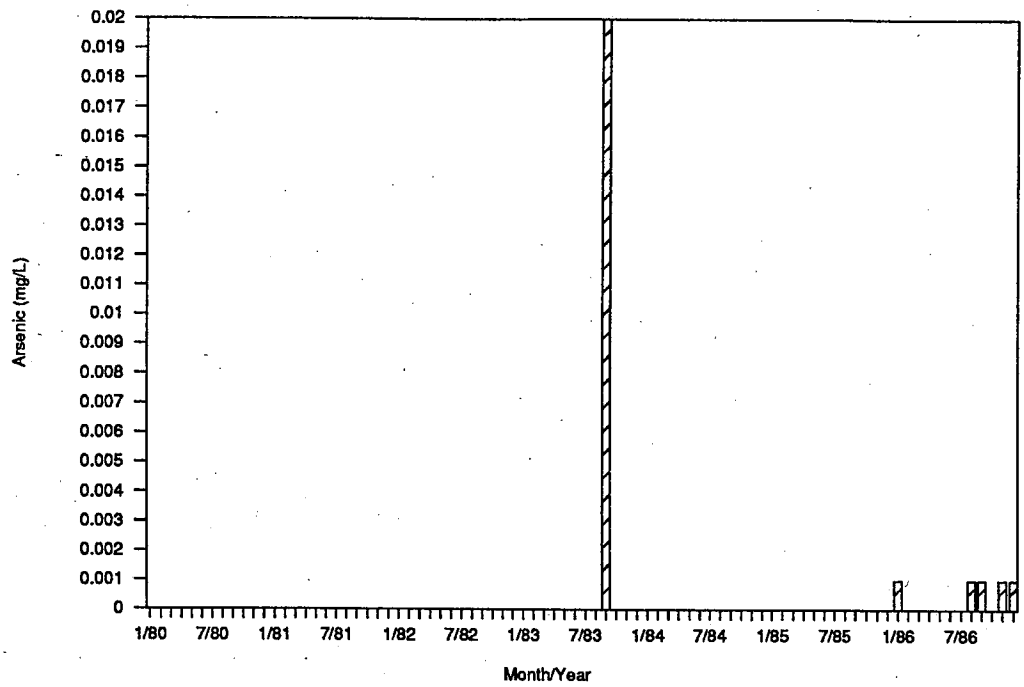
As was true for central surface stations, zero values prior to 1986 are most likely concentrations less than 0.01 mg/L and thus are recorded as zero.

There does not appear to be any correlation between arsenic levels and rainfall, flow rates, or any other constituent concentrations.

Figure 69 graphically illustrates arsenic concentrations in the central area's surface and subsurface stations for 1986. The 1985 values are presented for comparison purposes.

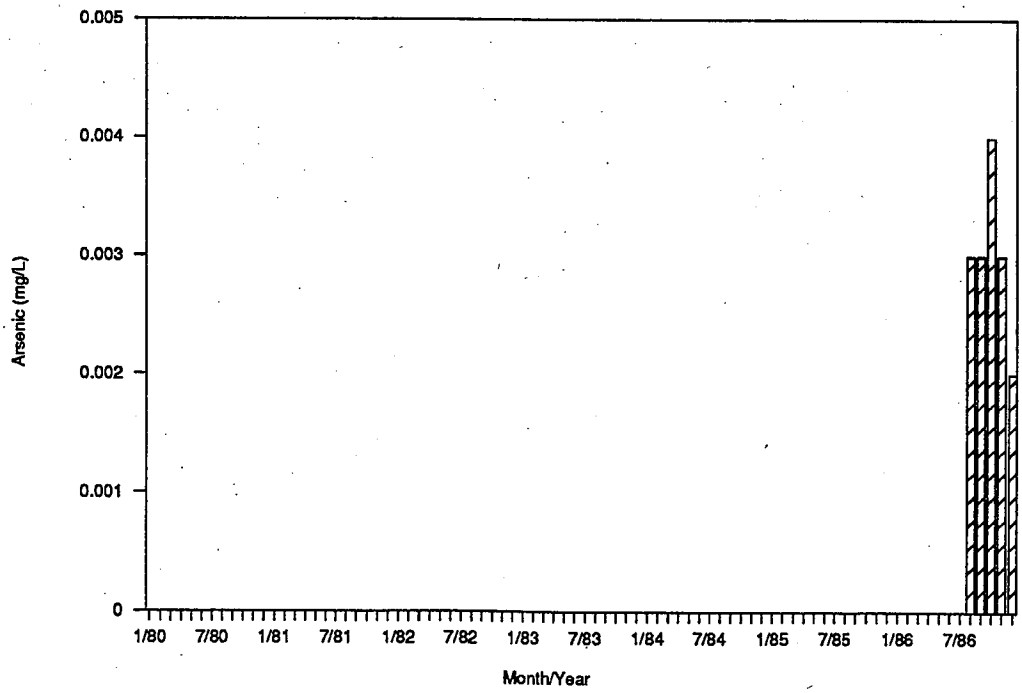
## Figure 63

BVS 6016 -- Arsenic Levels



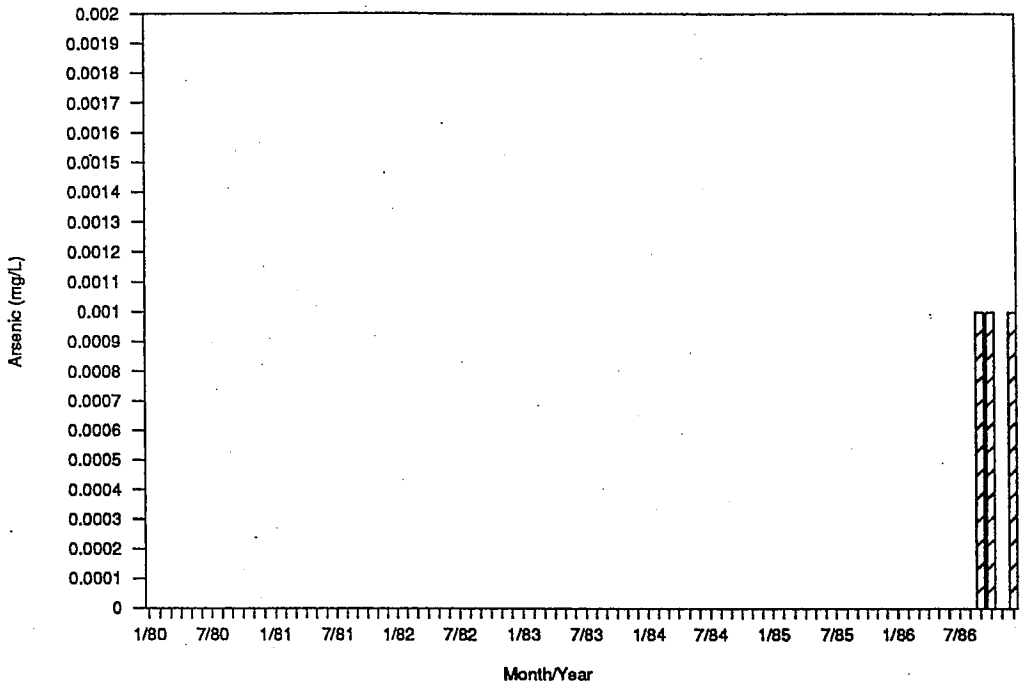

## Figure 64

BVS 8003 -- Arsenic Levels



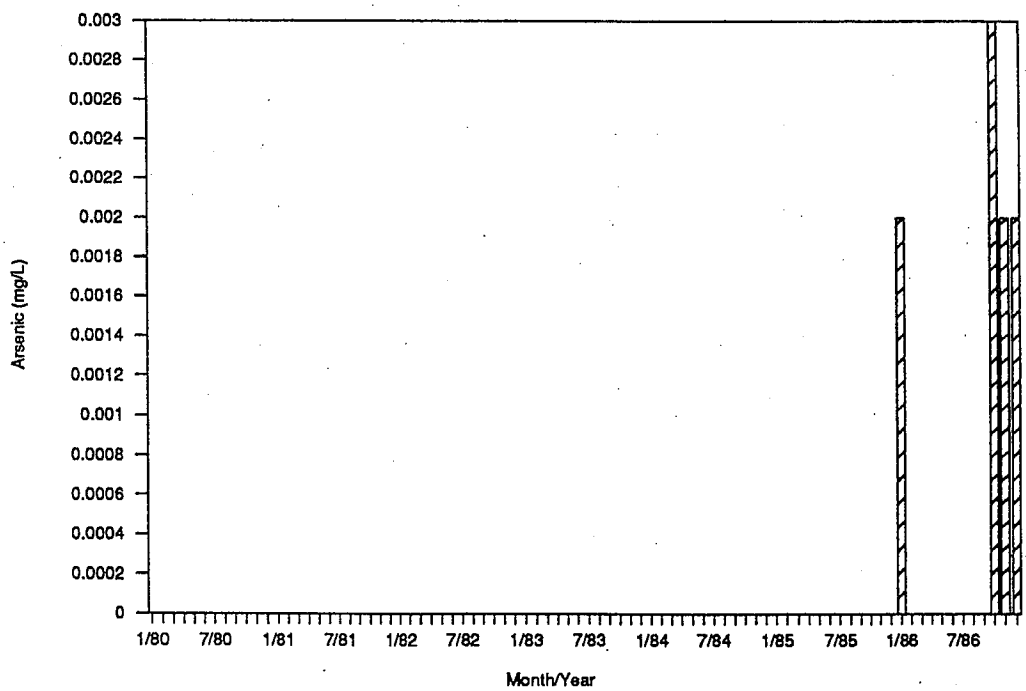
## Figure 65

DPS 1367 -- Arsenic Levels



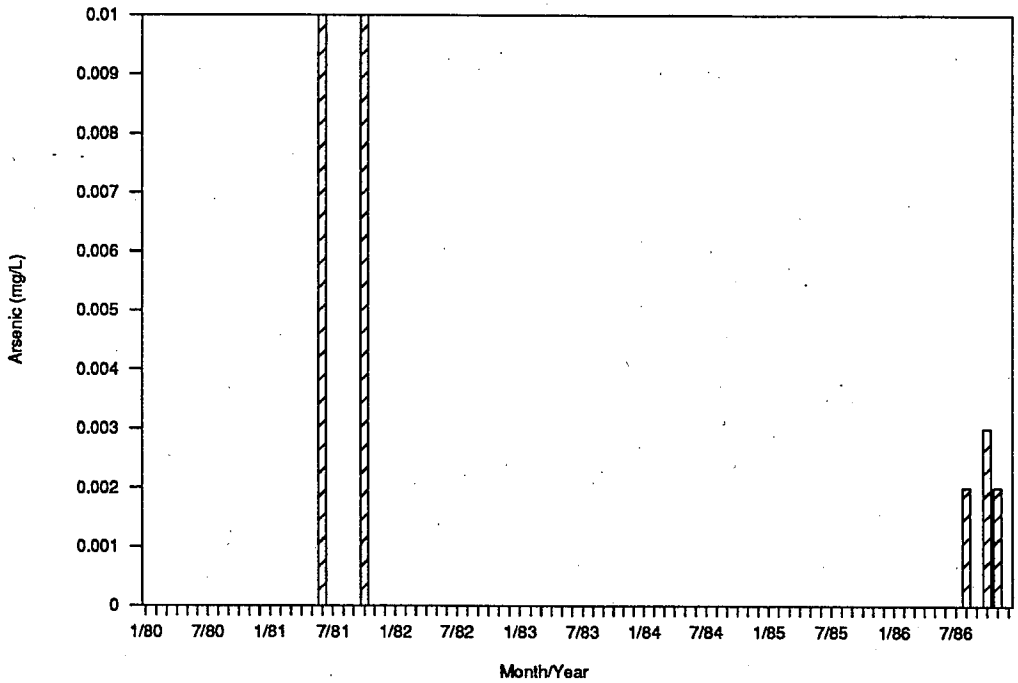

## Figure 66

DPS 4616 -- Arsenic Levels



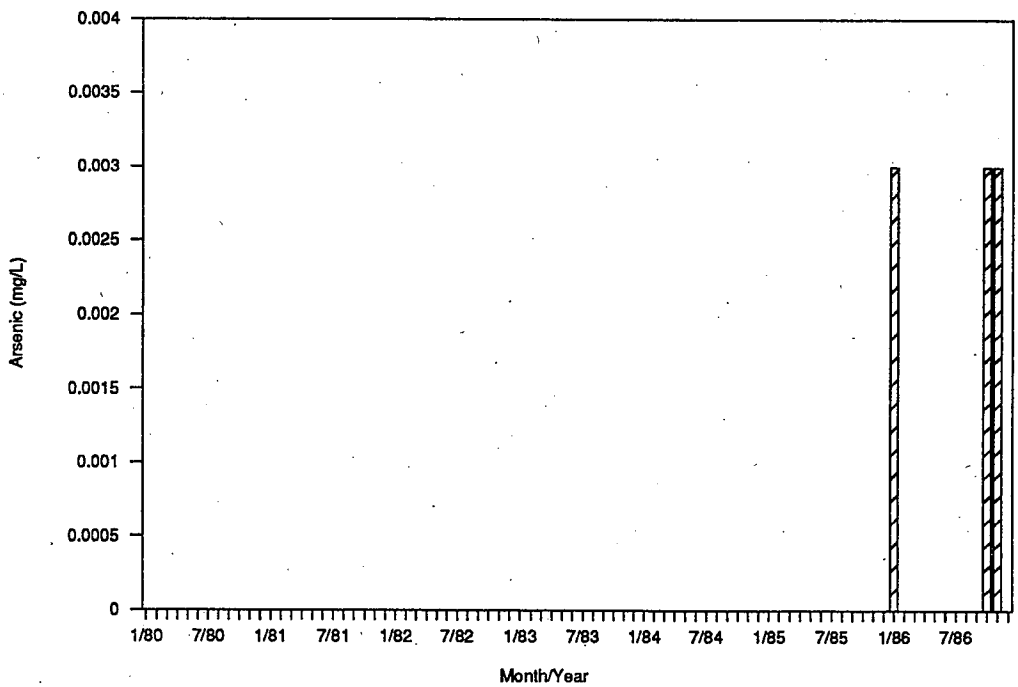
## Figure 67

FBH 2016 -- Arsenic Levels




## Figure 68

FBH 8061 -- Arsenic Levels



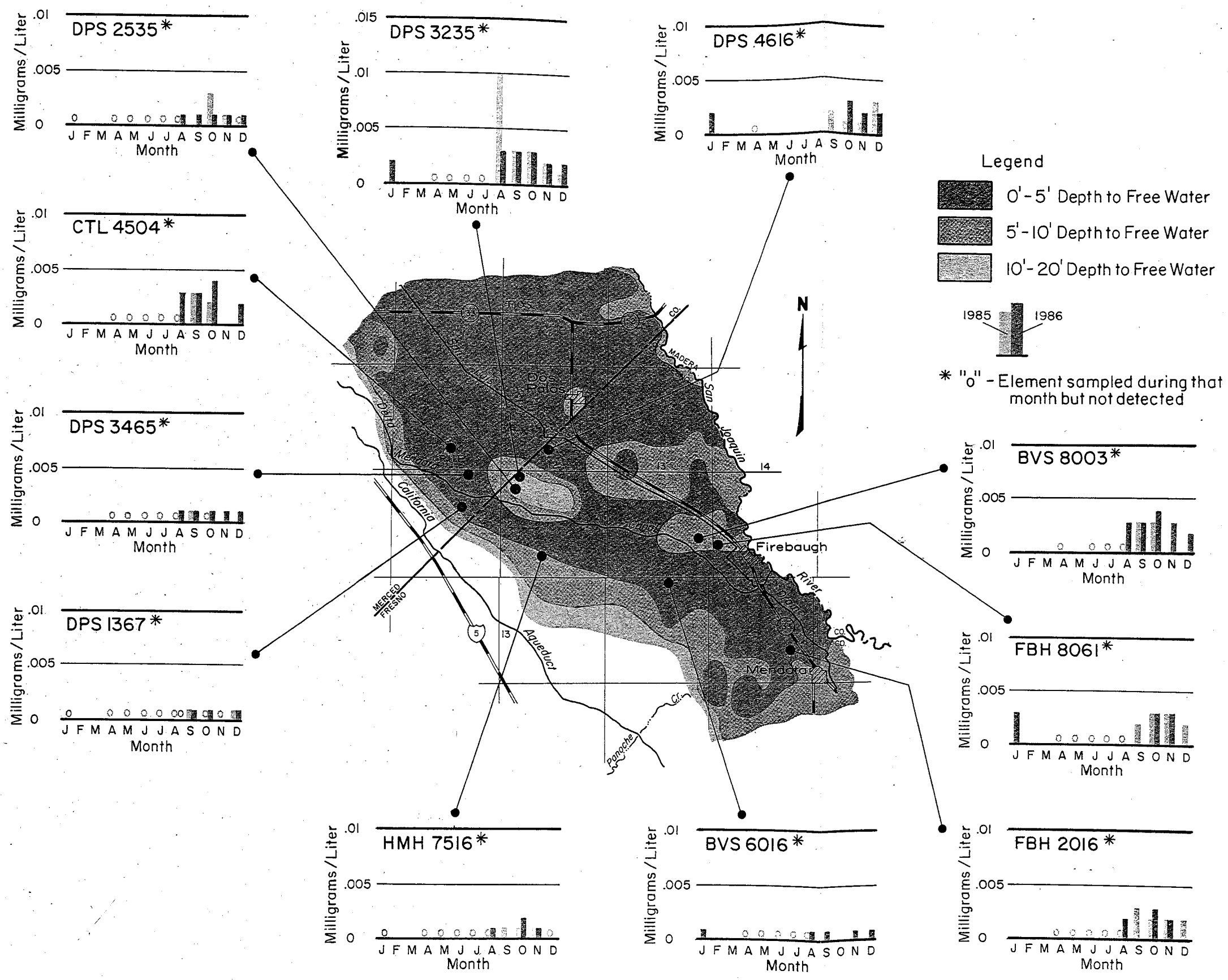



Figure 69. Arsenic Levels, 1985-1986 for San Joaquin Valley, Central Area Stations

Southern Area Subsurface Drains

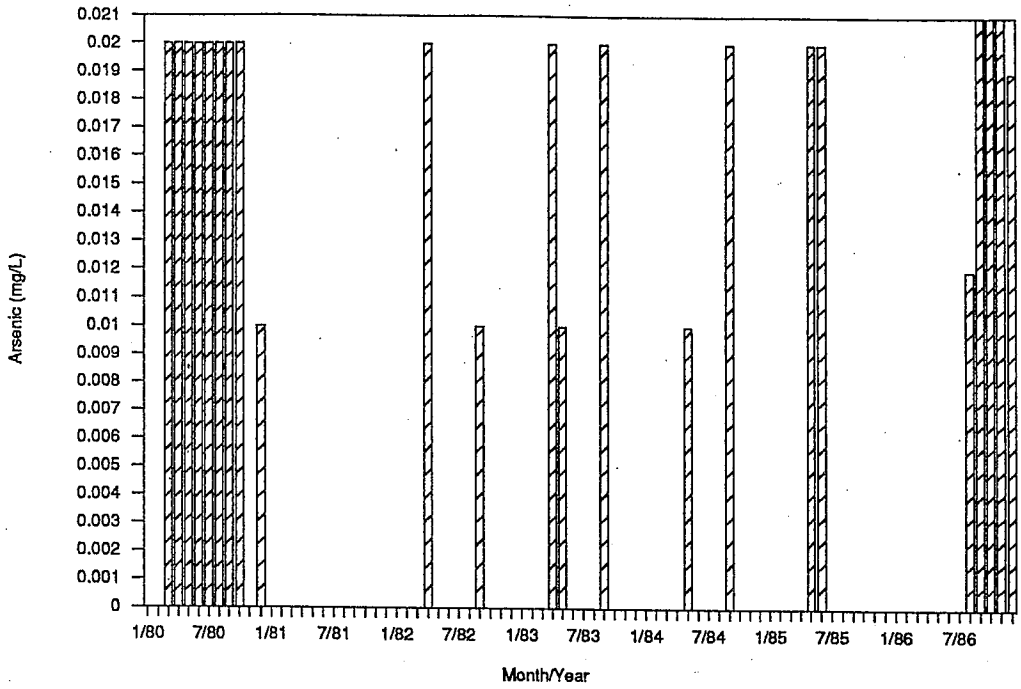
Arsenic was detected in all of the southern subsurface drains in concentrations ranging from 0.002 to 1.08 mg/L (Figures 70 through 75). Though no correlations between arsenic levels and rainfall, flow data, or any other constituent concentrations have been determined, the majority of peak values recorded in the southern region occurred between August and November.

Unlike the central region, where arsenic levels have been extremely low, the southern region had arsenic concentrations that exceeded the primary drinking water standard of 0.05 mg/L in 36 out of 56 samples (64.3 percent of the time). As yet, no leaching patterns, characterized by reductions in detected concentrations, have been identified.

Figures 76A, 76B, and 76C present 1985 and 1986 arsenic concentrations for the southern area stations. From these figures, arsenic concentrations do not appear to be decreasing.

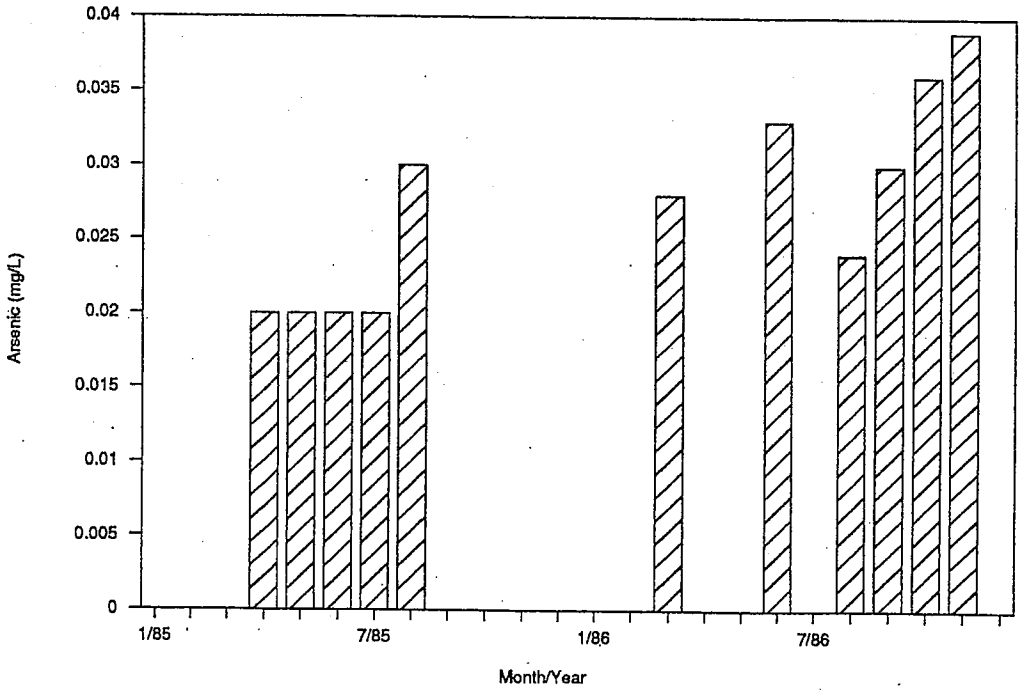
## Figure 70

CCN 3550 -- Arsenic Levels



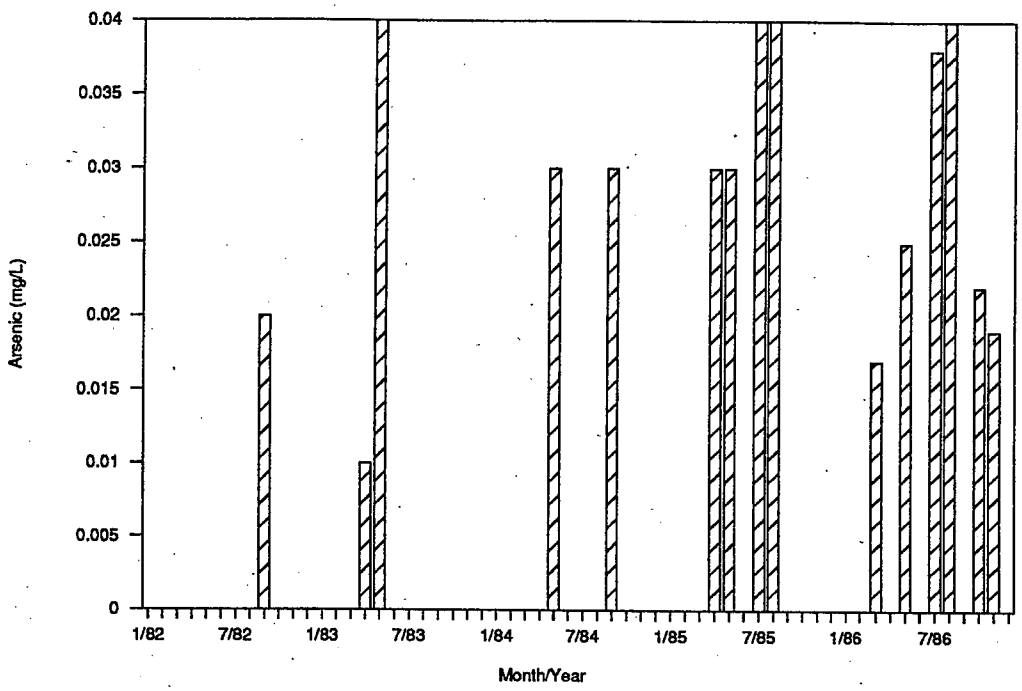

## Figure 71

ERR 8641 -- Arsenic Levels



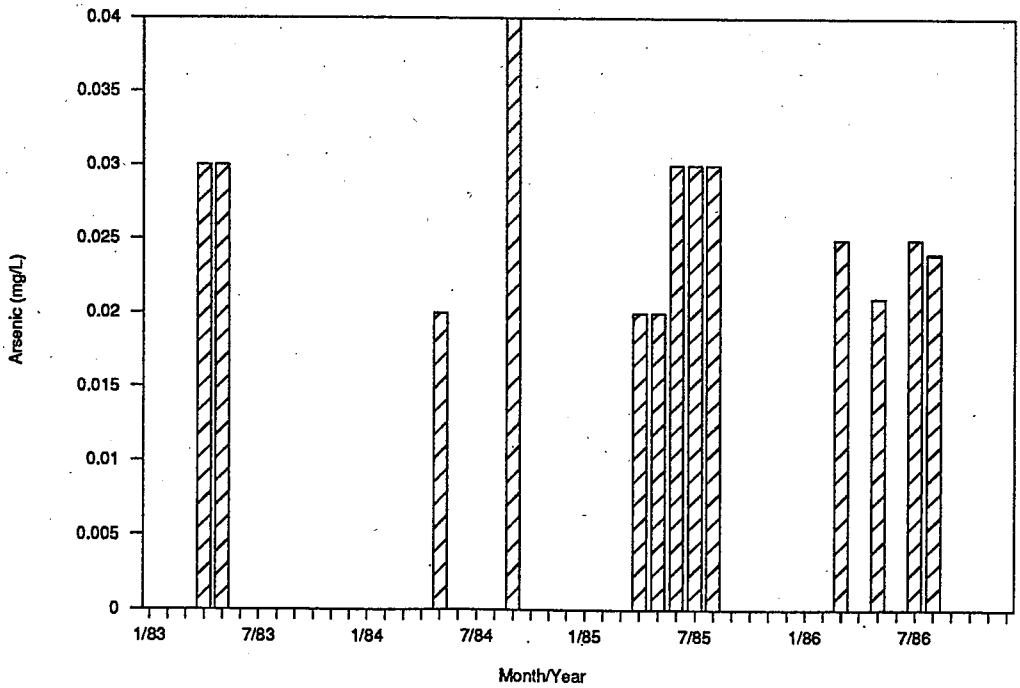
## Figure 72

SFD 2727 -- Arsenic Levels



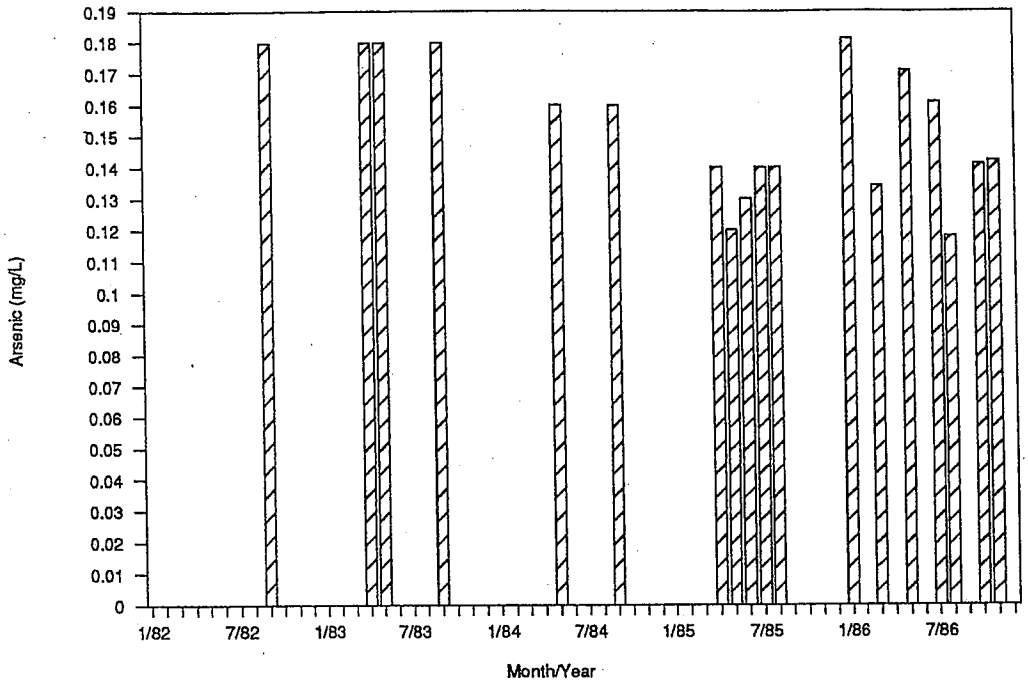

## Figure 73

SFD 6046 -- Arsenic Levels



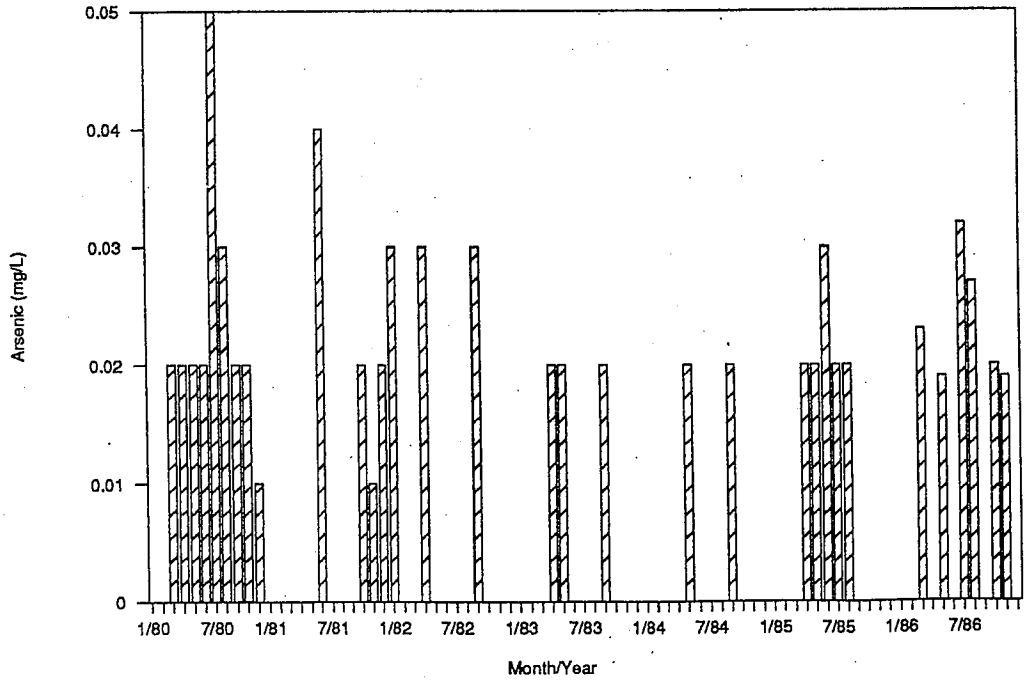
## Figure 74

STC 3505 -- Arsenic Levels




## Figure 75

STC 6467 -- Arsenic Levels



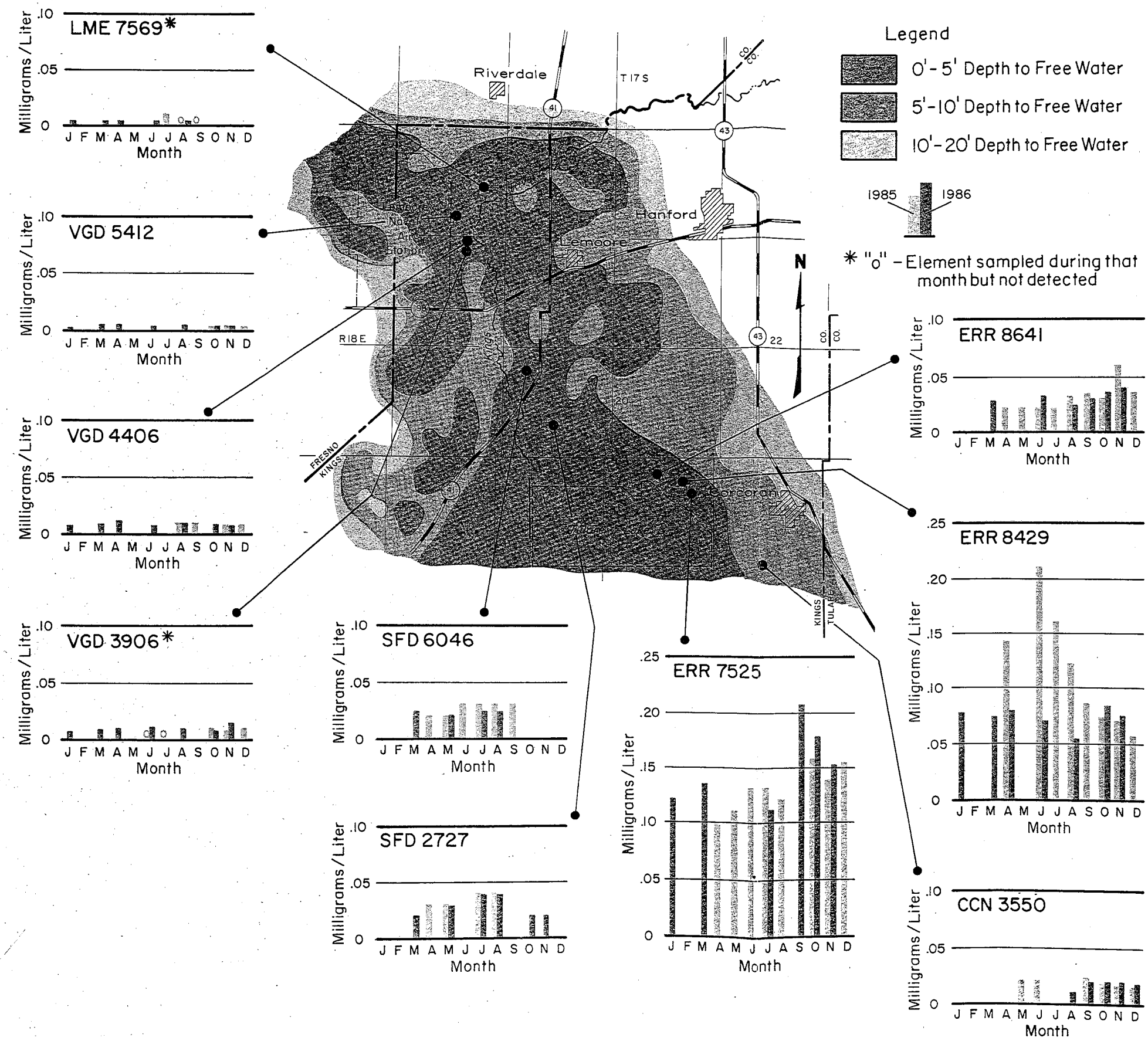



Figure 76A. Arsenic Levels, 1985-1986 for San Joaquin Valley, Southern Area--
Lemoore/Corcoran Stations

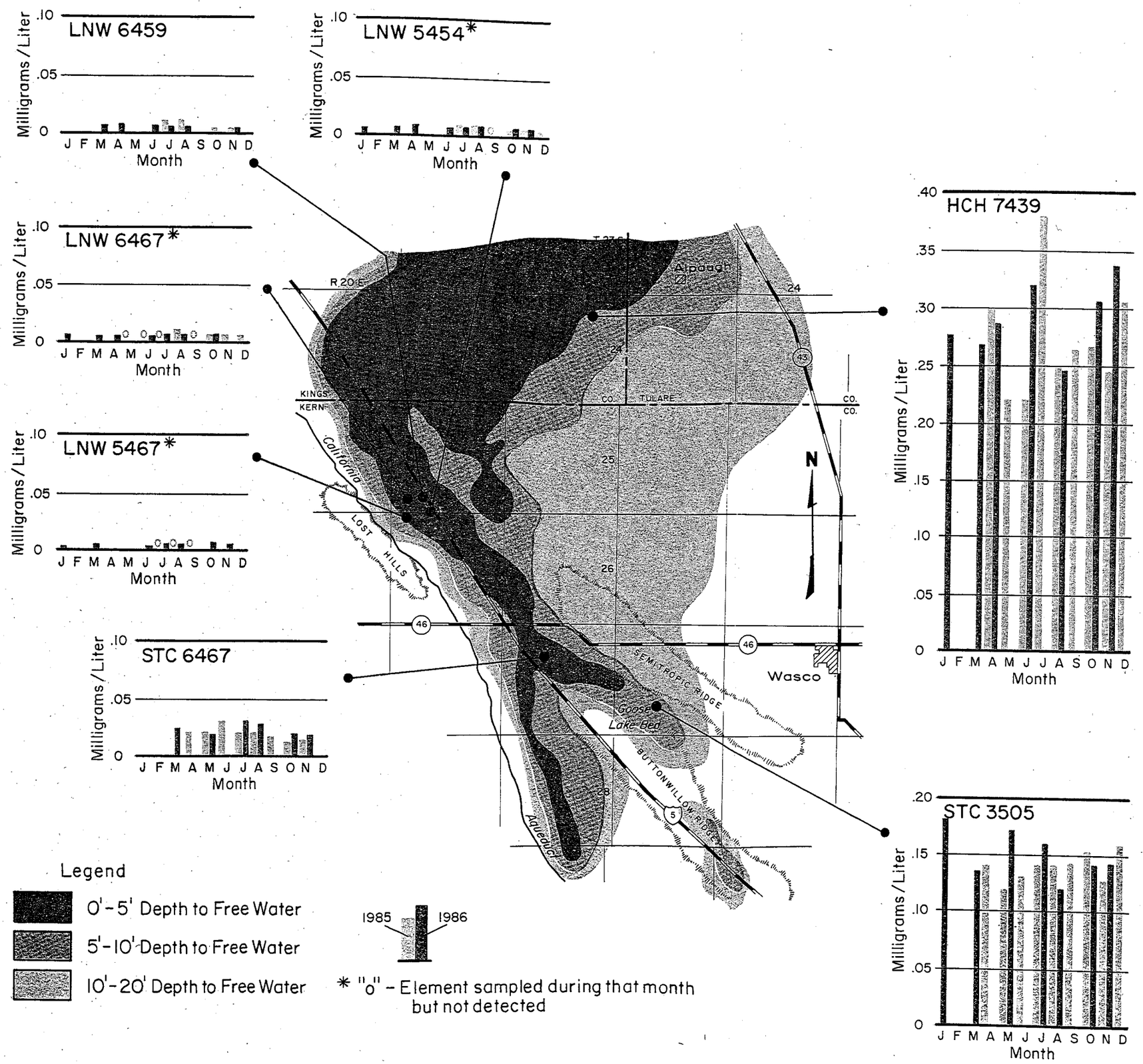



Figure 76B. Arsenic Levels, 1985-1986 for San Joaquin Valley, Southern Area -- Lost Hills / Semitropic Stations

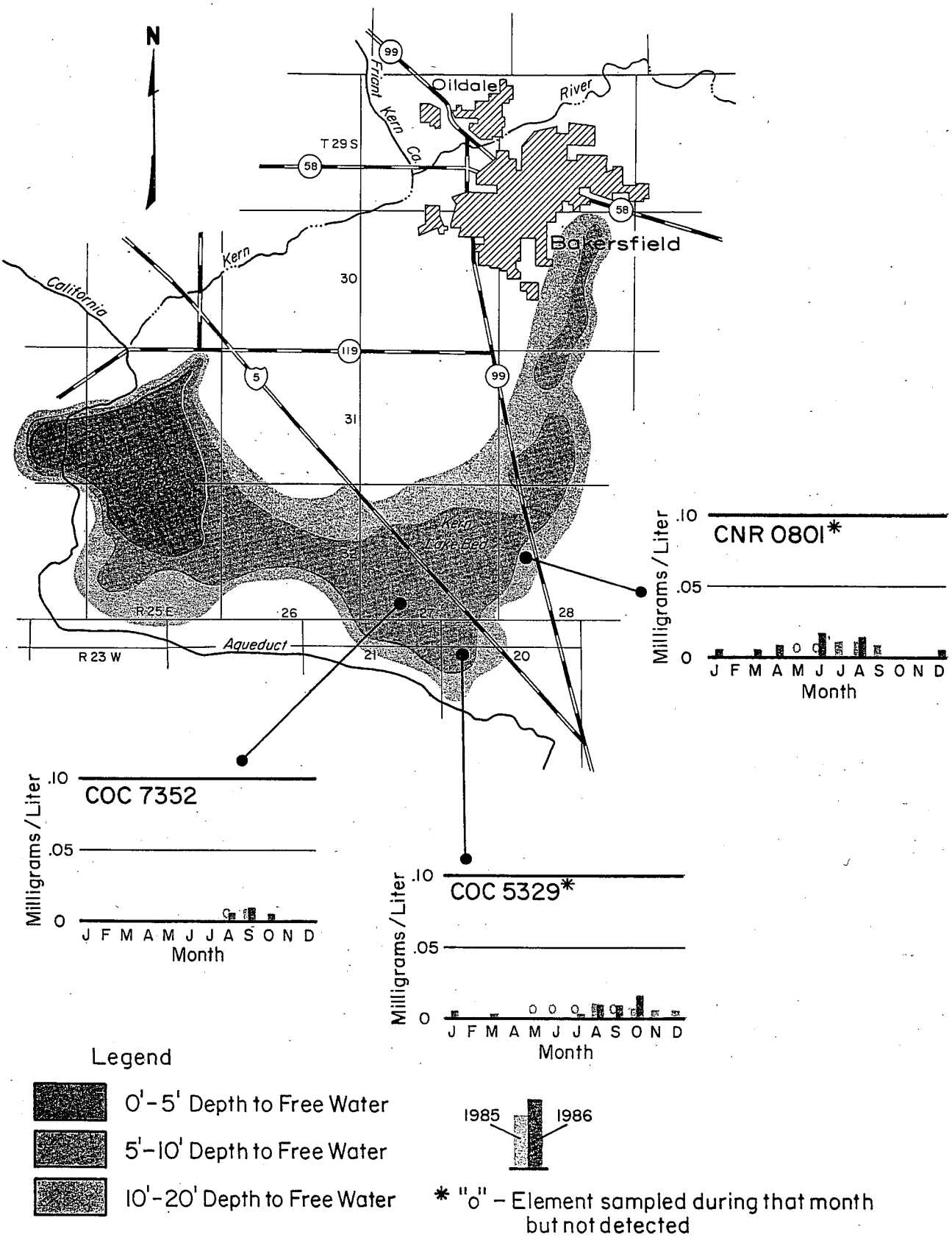



Figure 76C. Arsenic Levels, 1985-1986 for San Joaquin Valley, Southern Area--Kern Lake Bed Stations

## Selenium Levels

Selenium occurs naturally in soils and is a vital nutrient for animals and people in trace amounts, yet it can also be toxic in certain forms at high concentrations.

People consume selenium regularly in vitamin supplements and it is added to cattle feed in areas with selenium-deficient soils. In parts of China, a form of congestive heart failure in children and young women has been associated with selenium deficiency.

Selenium is not unique as a vital nutrient in small amounts and a toxin in high concentrations: many elements share that distinction. However, with selenium, the difference between deficiency and toxicity is very small, making it essential that enough is known about the element to set rational environmental standards regarding safe exposure to it.

In the San Joaquin Valley, selenium levels do not appear to be influenced by drainage flow or rainfall, though some instances of high drainage flows have been associated with high selenium concentrations. The Valley's southern area has relatively few sampling stations recording selenium level increases. If selenium concentrations in the Valley's central area continue to increase at the current rate, toxic levels could be reached or surpassed by 1990 -- which could result in taking agricultural land out of production.

### Central Area Surface Drains

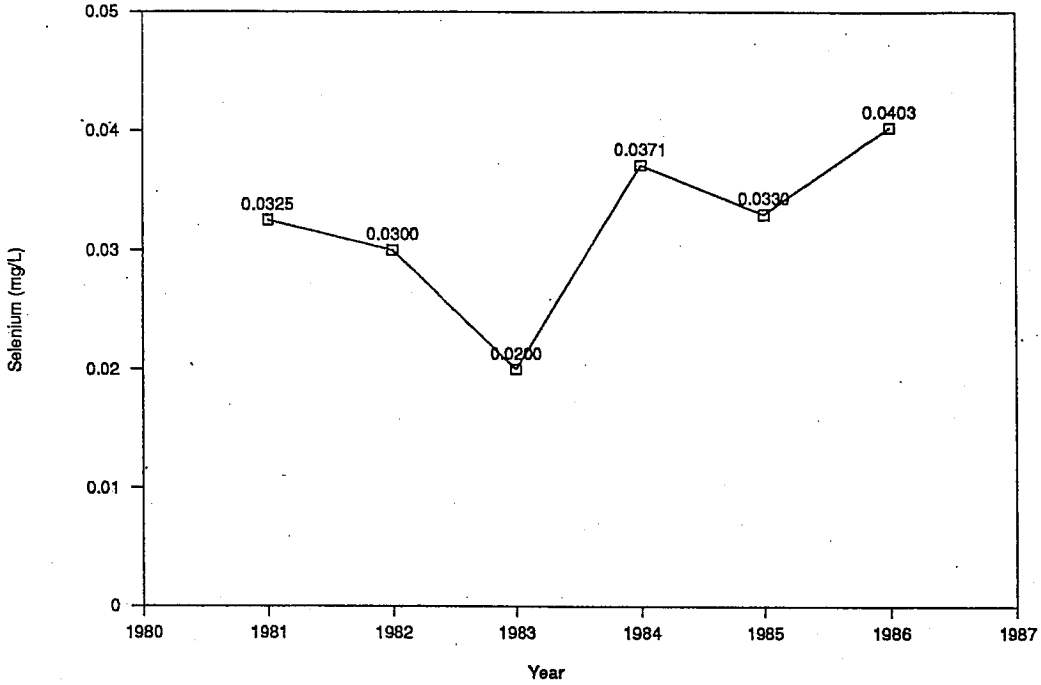
Both of the central surface drains have shown increasing annual average selenium levels (Figures 77 and 79) over the last four years. Prior to 1983, analytic methods with disputable results were in use; thus, these values are shown for speculative purposes only. The monthly selenium levels from which the annual averages were derived are shown in Figures 78 and 80.

As was the case with arsenic, peak selenium values are usually detected during October. The selenium levels have not been found to correlate to either rainfall, flow rates, or any other constituent concentrations.

The increasing annual averages are most likely due to higher reapplication rates of drainage water.

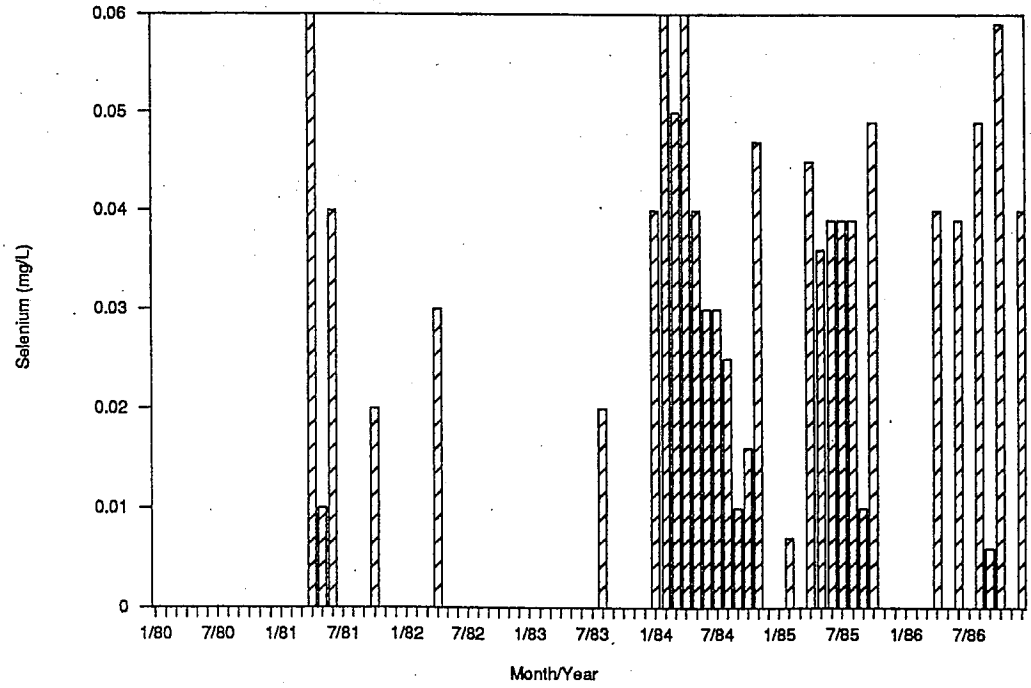
## Figure 77

CTL 4504 -- Average Selenium Levels



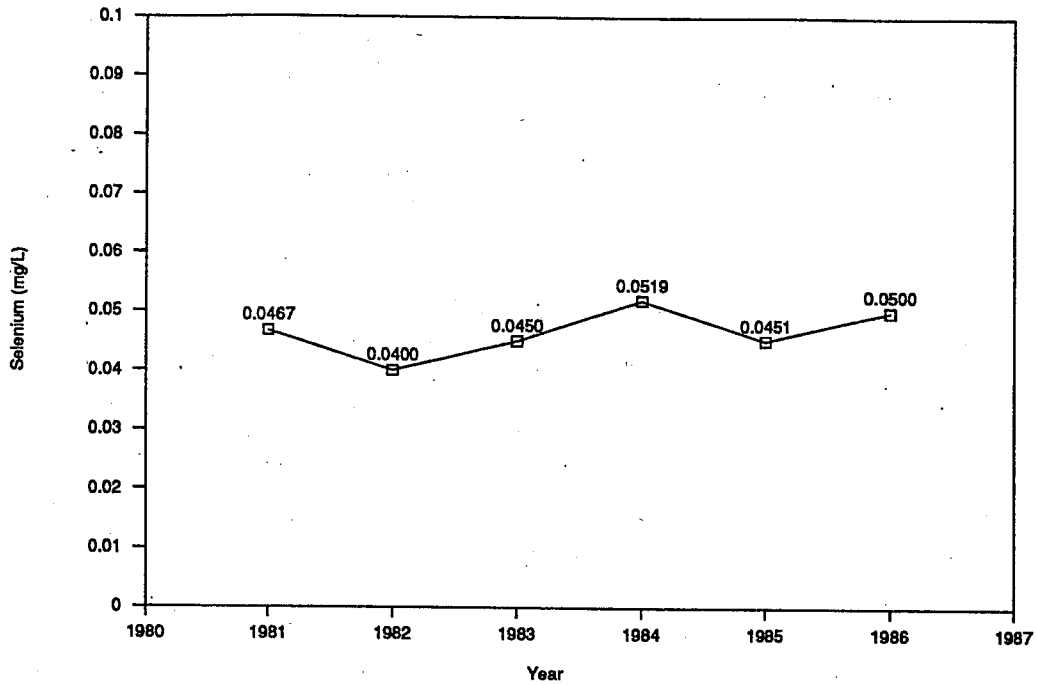

## Figure 78

CTL 4504 -- Selenium Levels



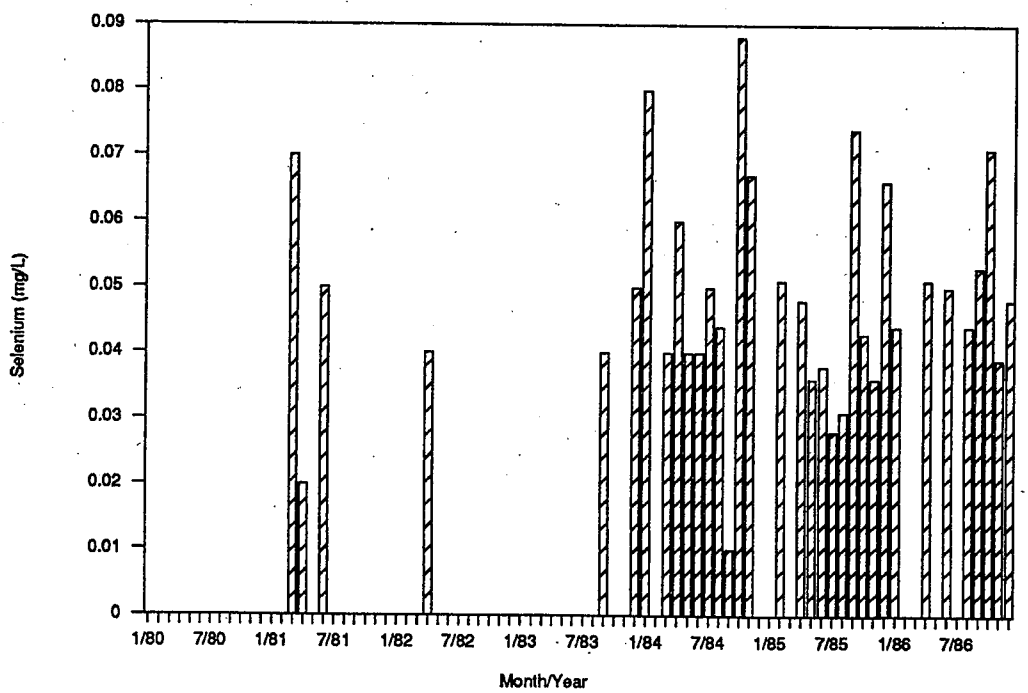
## Figure 79

DPS 3235 -- Average Selenium Levels




## Figure 80

DPS 3235 -- Selenium Levels



Central Area Subsurface Drains

The majority of central subsurface stations have shown steady increases in annual average selenium concentrations (Figures 81, 83, 85, and 87), with the exception of the stations near Firebaugh (Figures 89 and 91), which have displayed significant decreases in 1986 from 1985 levels. The monthly selenium levels from which the annual averages were derived are displayed in Figures 82, 84, 86, 88, 90, and 92.

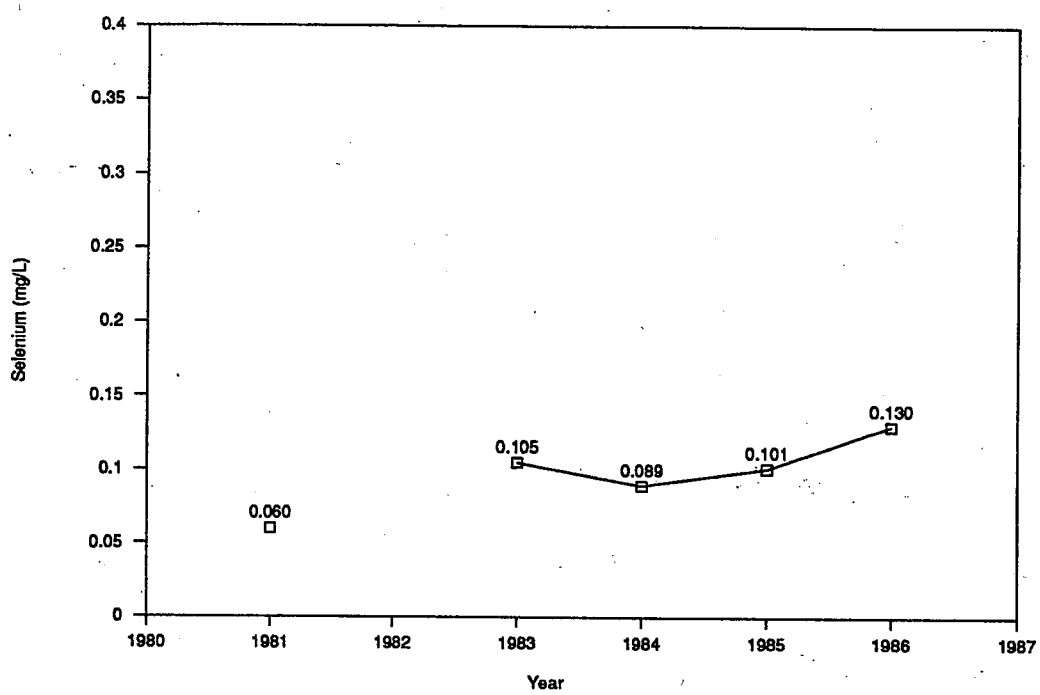
Unlike conditions at the central surface stations, peak selenium values recorded at central subsurface drainage monitoring stations do not appear to be restricted to certain months of the year. The selenium levels have not been found to correlate with either rainfall, flow rates, or any other constituent concentrations.

As was the case at central surface stations, the increasing annual selenium averages are possibly due to higher reapplication rates of drainage water.

Figure 93 graphically illustrates selenium concentrations for central area surface and subsurface stations for 1985 and 1986. Although there is no clear correlation between the data for the two years, subsurface station DPS 2535 appears to show similar monthly trends between 1985 and 1986 selenium concentrations. As yet, the reasons for this pattern have not been identified.

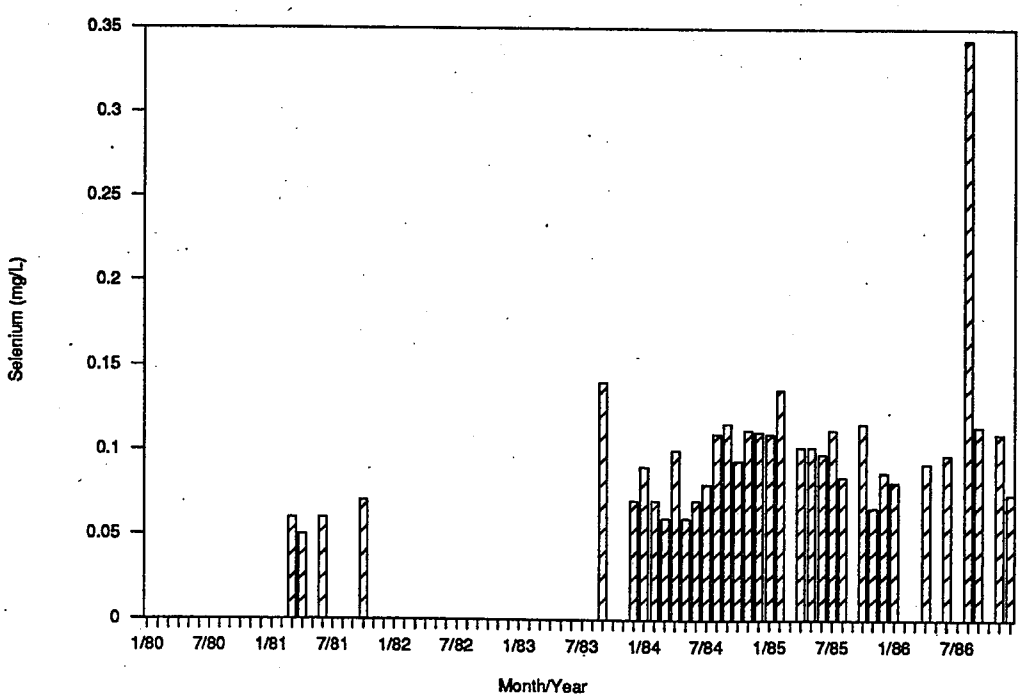
## Figure 81

BVS 6016 -- Average Selenium Levels



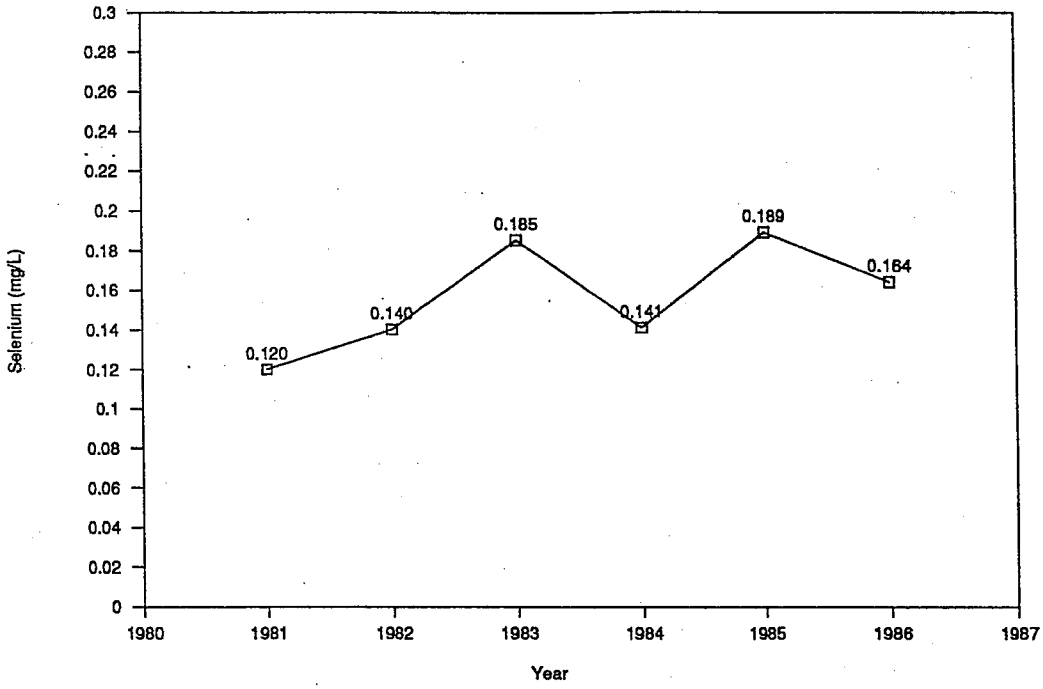

## Figure 82

BVS 6016 -- Selenium Levels



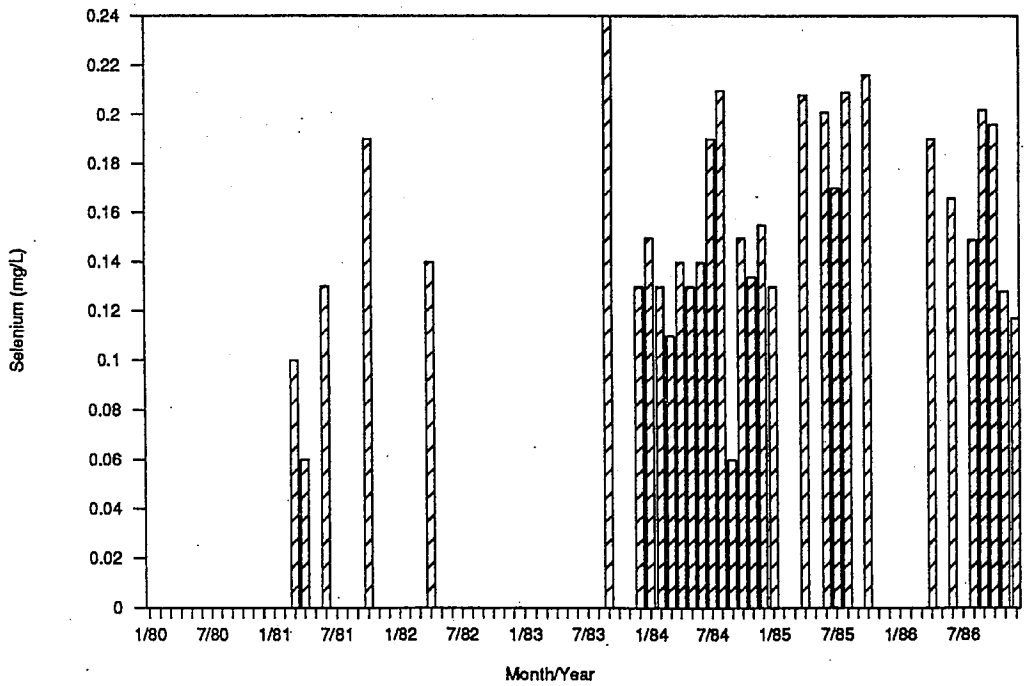
## Figure 83

BVS 8003 -- Average Selenium Levels



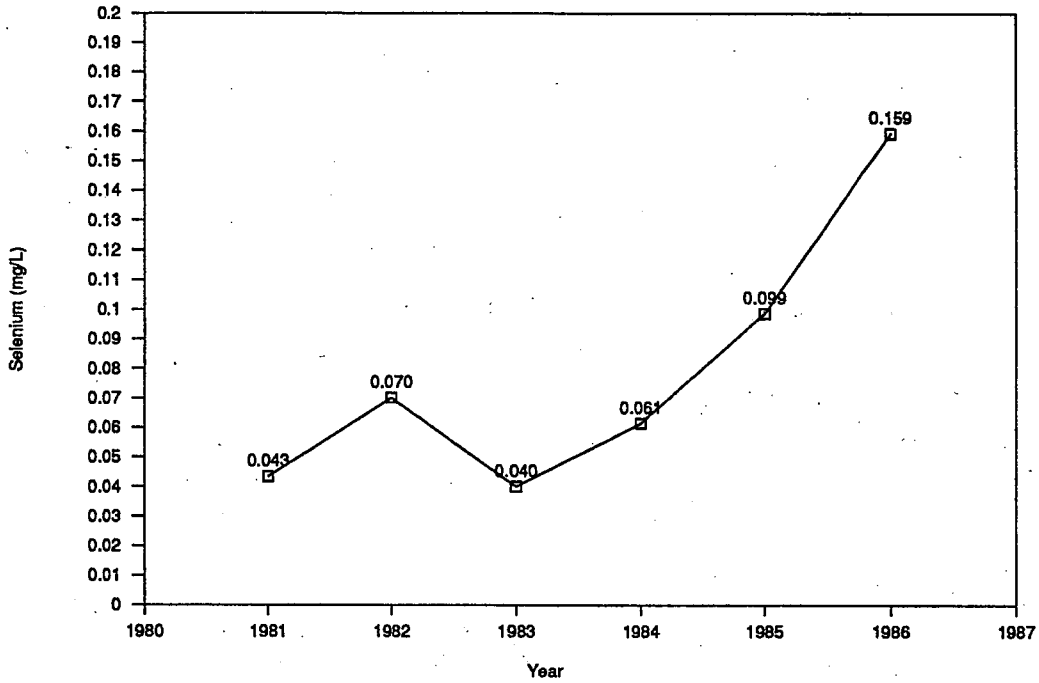

## Figure 84

BVS 8003 -- Selenium Levels



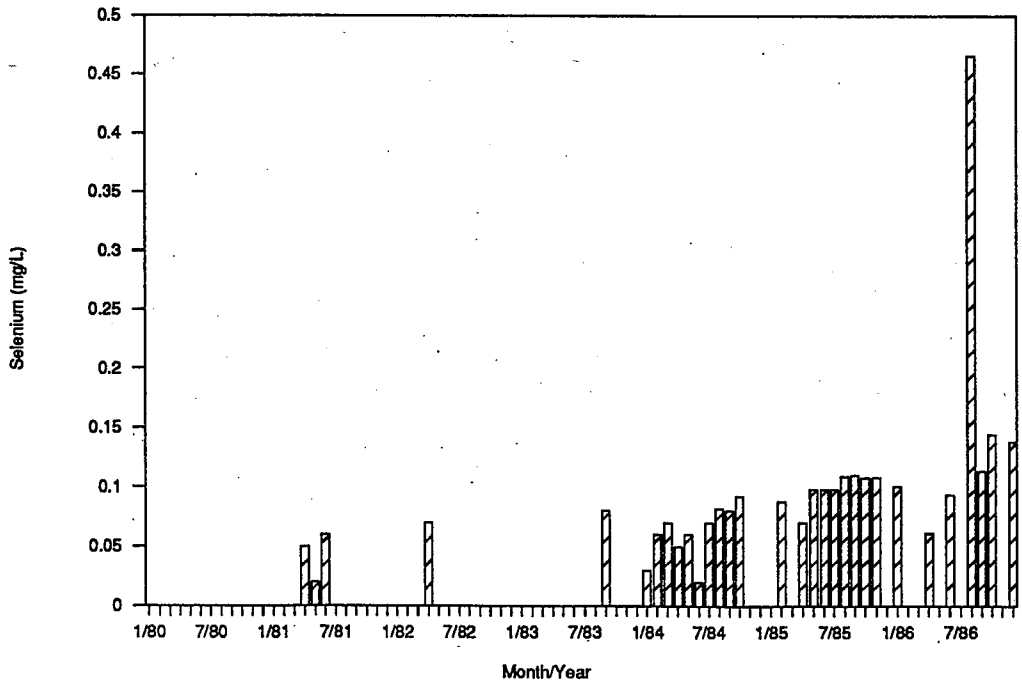
## Figure 85

DPS 1367 -- Average Selenium Levels



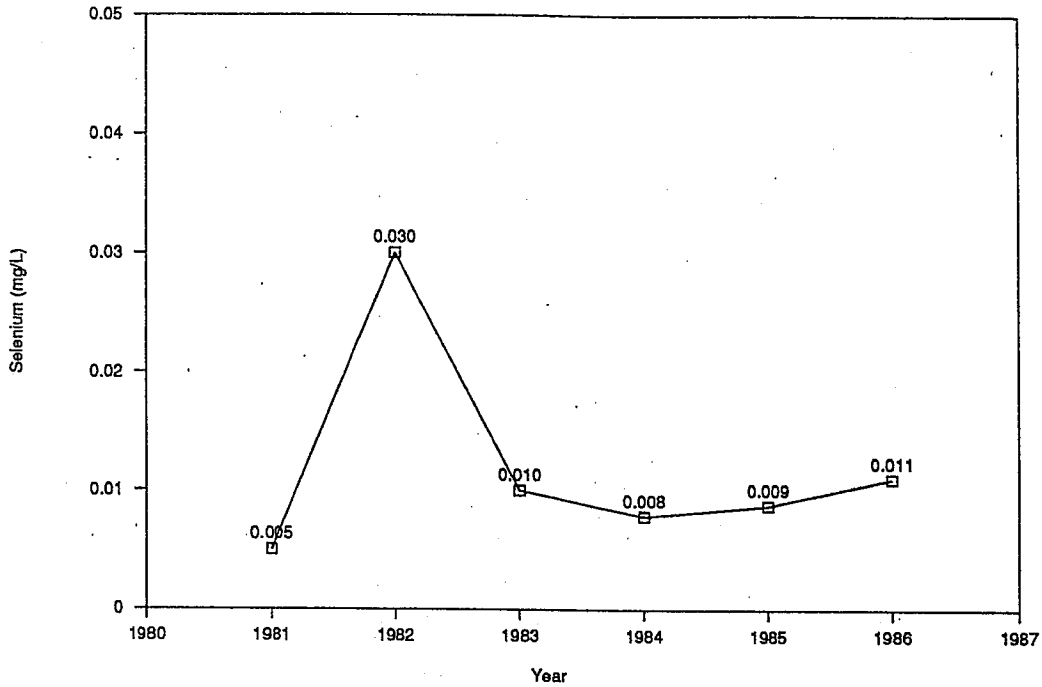

## Figure 86

DPS 1367 -- Selenium Levels



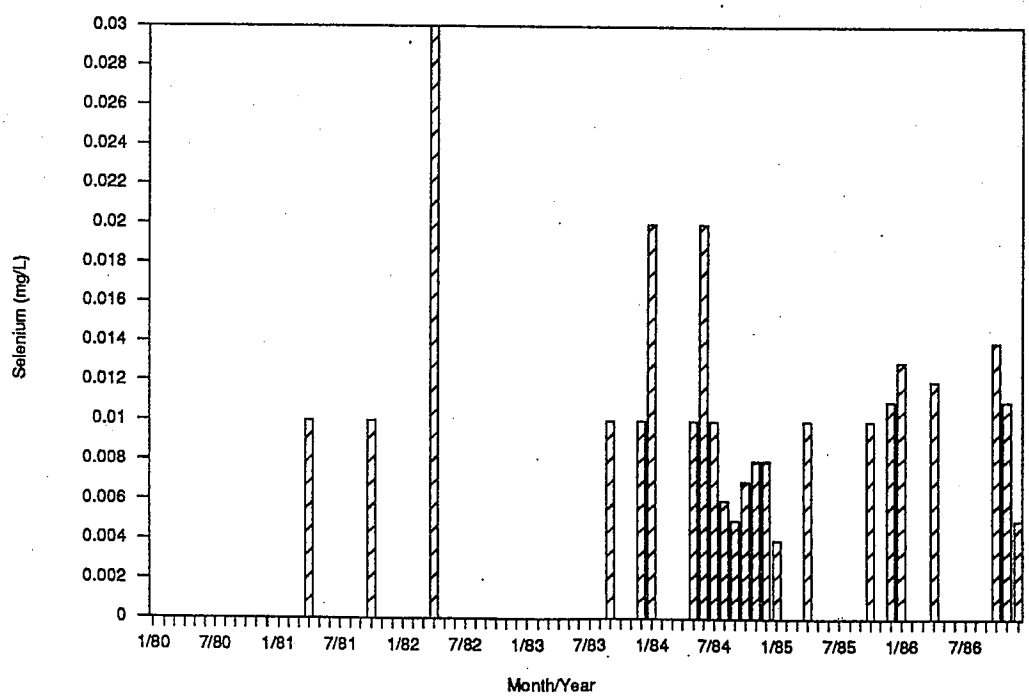
## Figure 87

DPS 4616 -- Average Selenium Levels



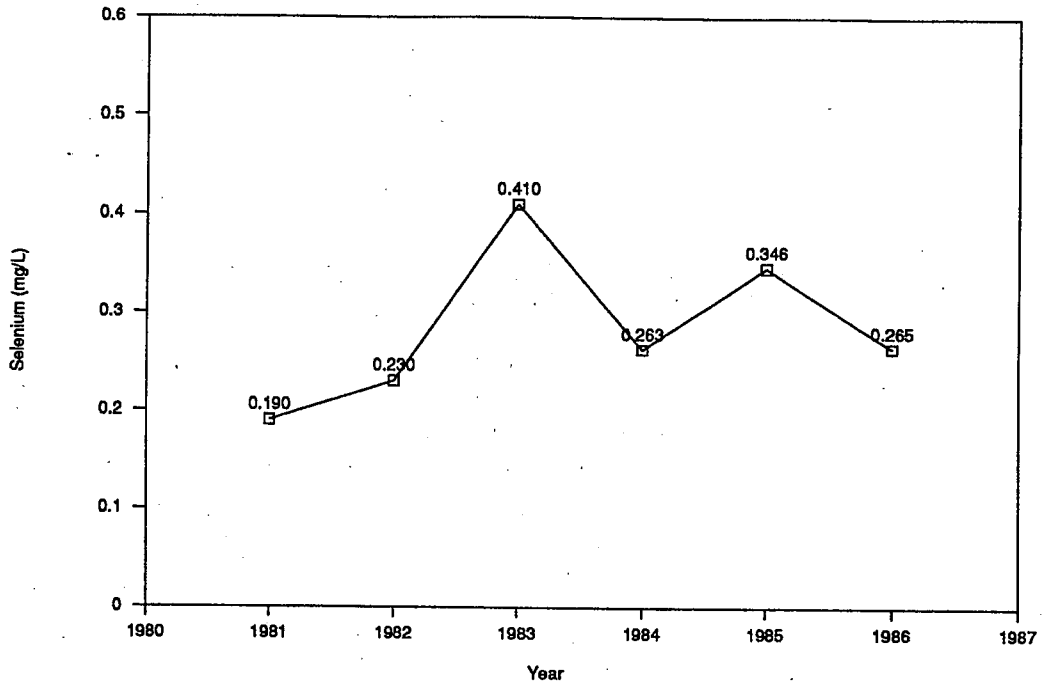

## Figure 88

DPS 4616 -- Selenium Levels



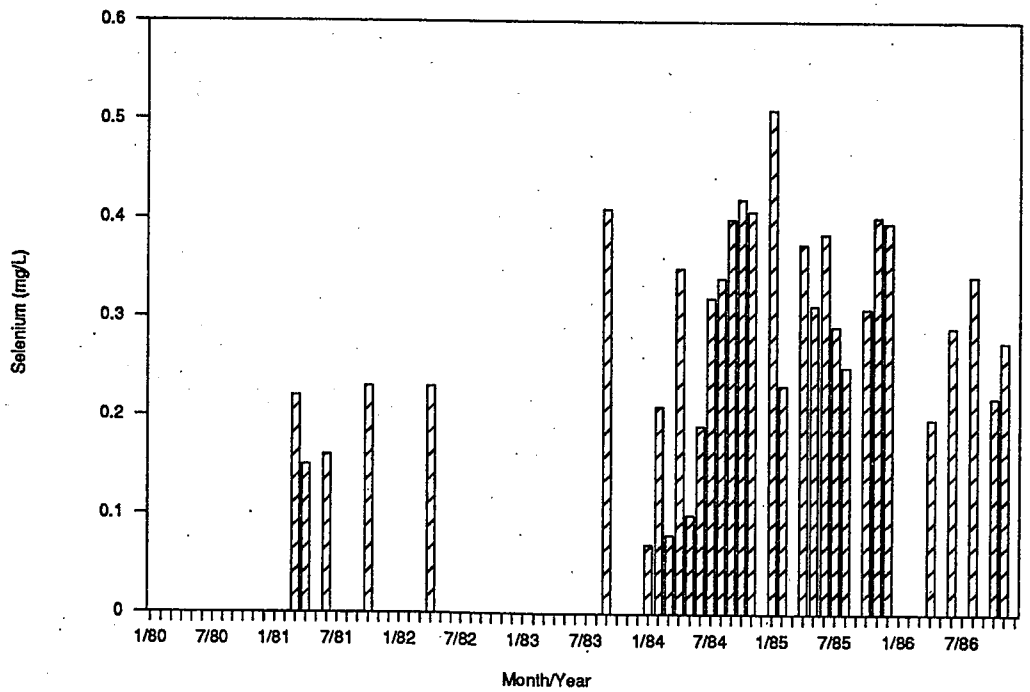
## Figure 89

FBH 2016 -- Average Selenium Levels



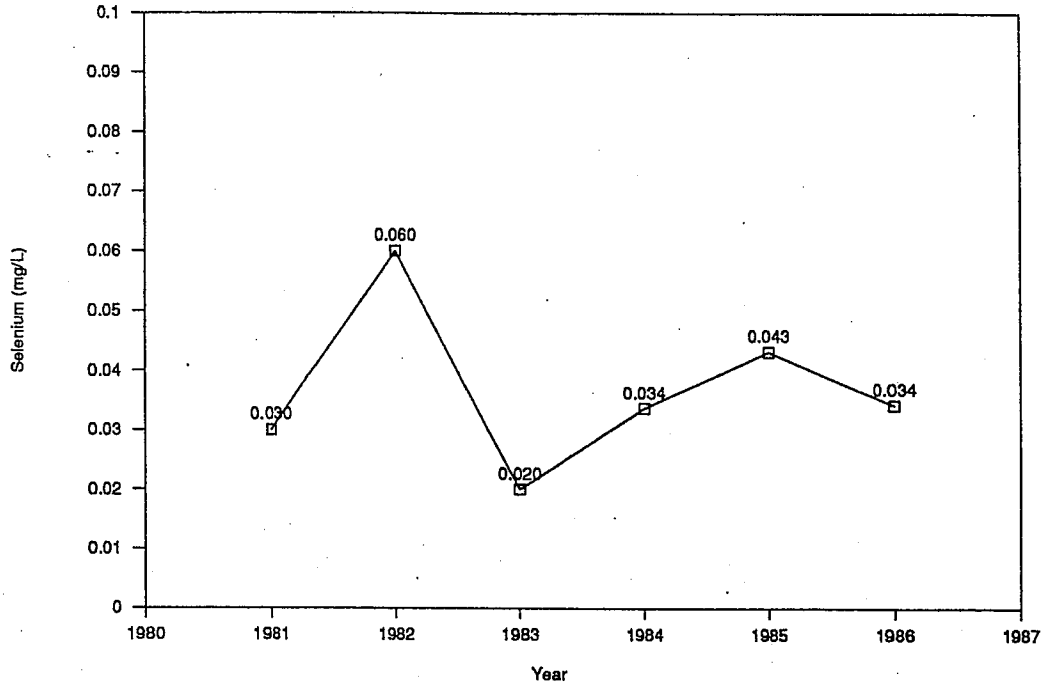

## Figure 90

FBH 2016 -- Selenium Levels



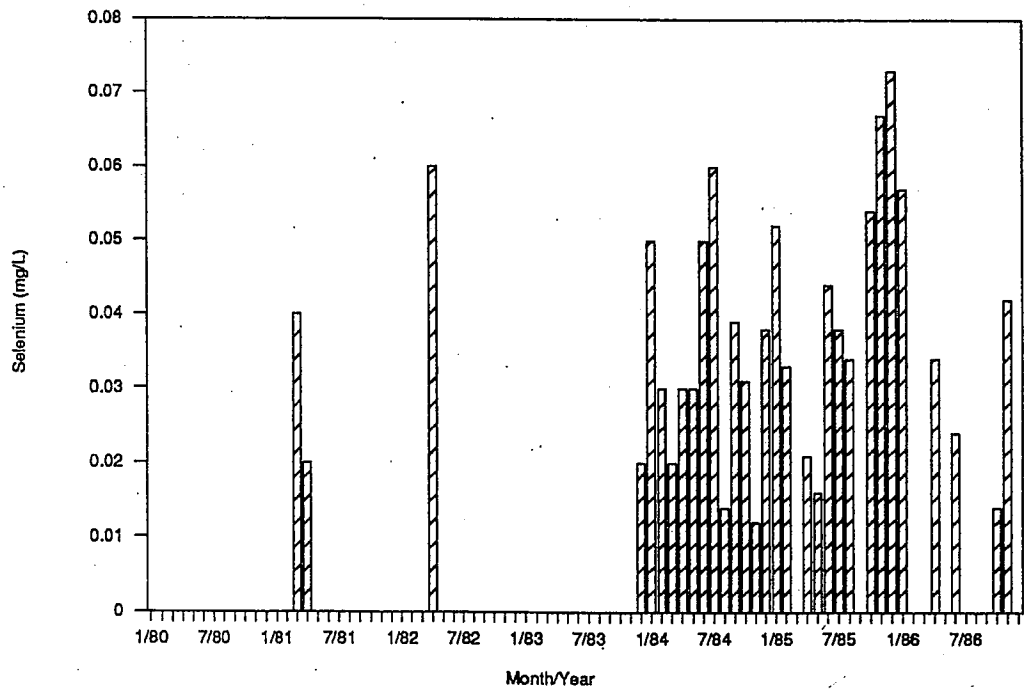
## Figure 91

FBH 8061 -- Average Selenium Levels




## Figure 92

FBH 8061 -- Selenium Levels



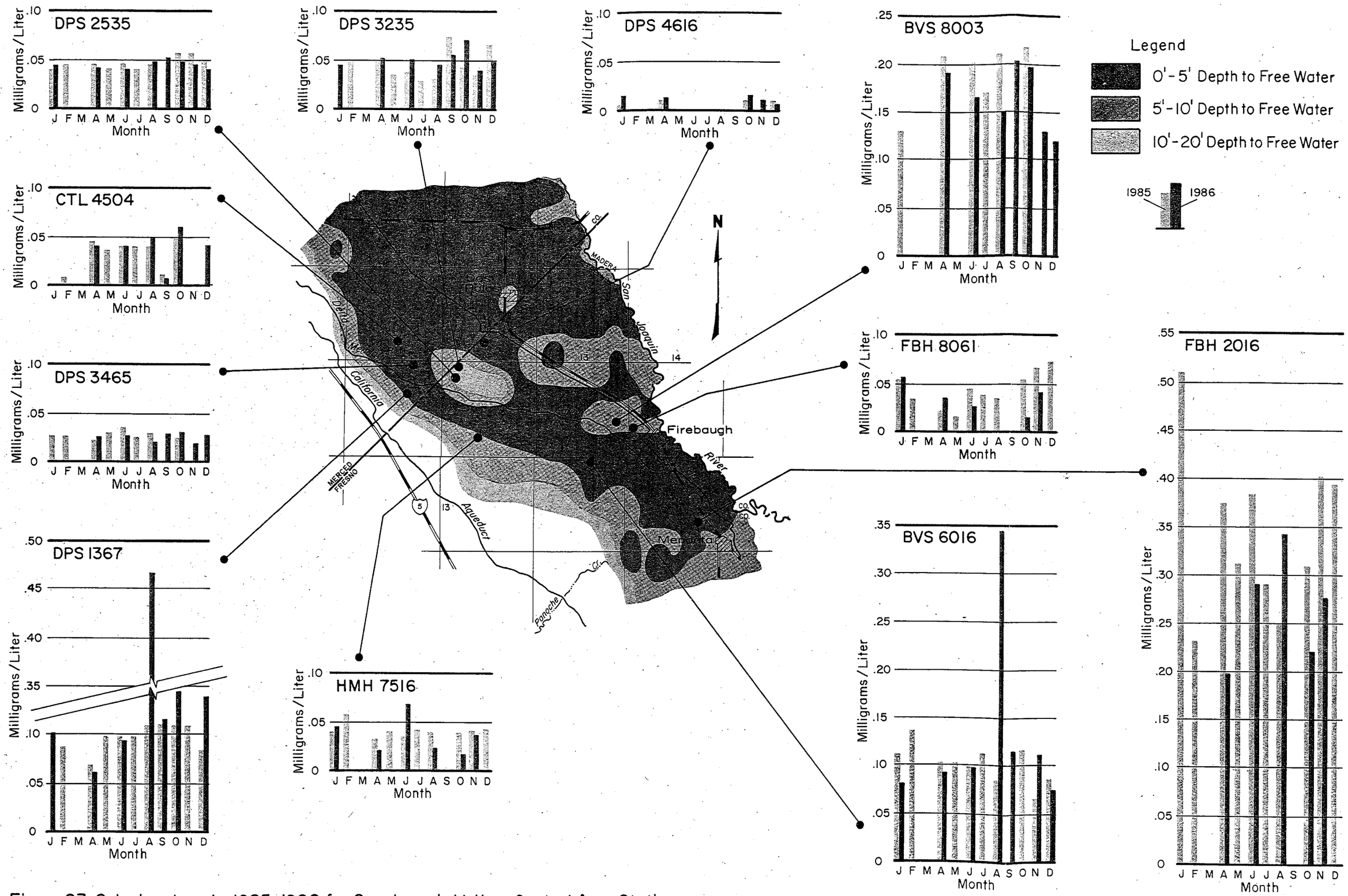



Figure 93. Selenium Levels, 1985-1986 for San Joaquin Valley, Central Area Stations

Southern Area Subsurface Drains

Most of the southern drainage monitoring stations are relatively new (Table 2); thus less data are available to identify trends. Widespread use of evaporation ponds, however, has minimized the practice of drainage water reapplication. Without this source of salts and minerals, leaching patterns become readily apparent.

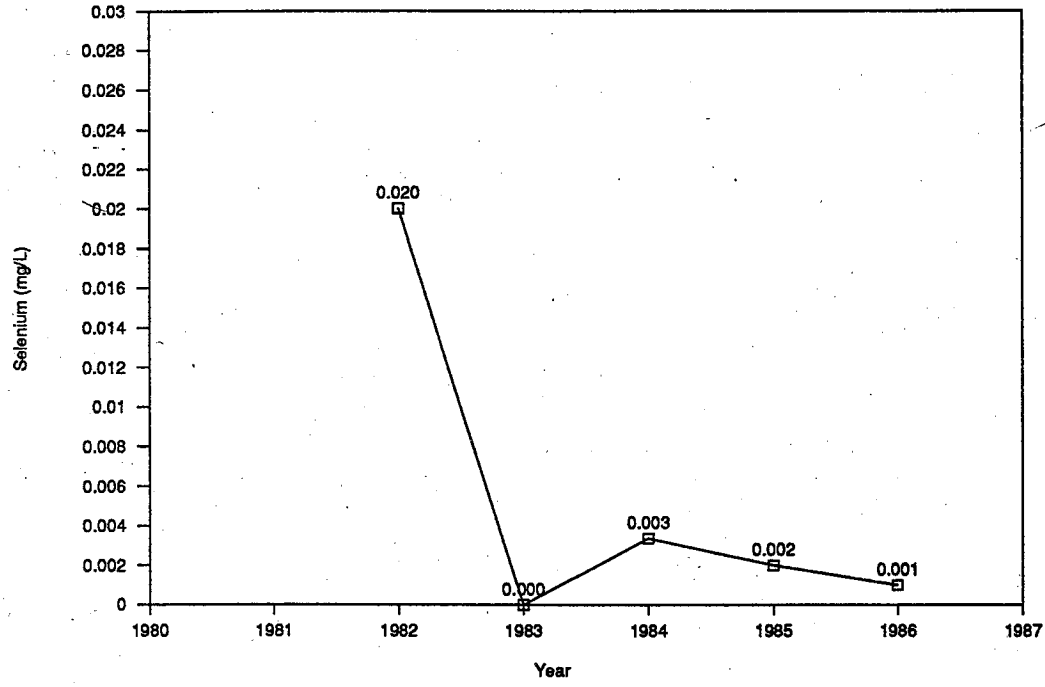
The annual selenium averages at the majority of southern stations have steadily decreased (Figures 94, 96, 98, 100, and 102). The monthly selenium levels from which the annual averages were derived are displayed in Figures 95, 97, 99, 101, and 103. In instances where annual averages have increased (Figure 104), increases are invariably due to one high month (Figure 105) which raises the annual average for that particular year.

Peak values do not appear to be restricted to certain months of the year but are more commonly (though not necessarily) recorded during early summer. The selenium levels have not been found to correlate with either rainfall, flow rates, or any other constituent concentrations.

Figures 106A, 106B, and 106C present the 1985 and 1986 selenium concentrations for the southern area subsurface stations. Like the central subsurface stations, there are no apparent correlations between the two years for these stations. A few stations, however, such as ERR 8641 and SFD 2727 (Figure 106A) and STC 3505 (Figure 106B), show possible trends. Stations SFD 2727 and STC 3505 seem to indicate more low, consistent monthly levels found in older systems. Station ERR 8641, however, indicates an overall decrease in selenium levels from 1985 values -- a decrease commonly associated with the rapid initial leaching which occurs in newly installed drains.

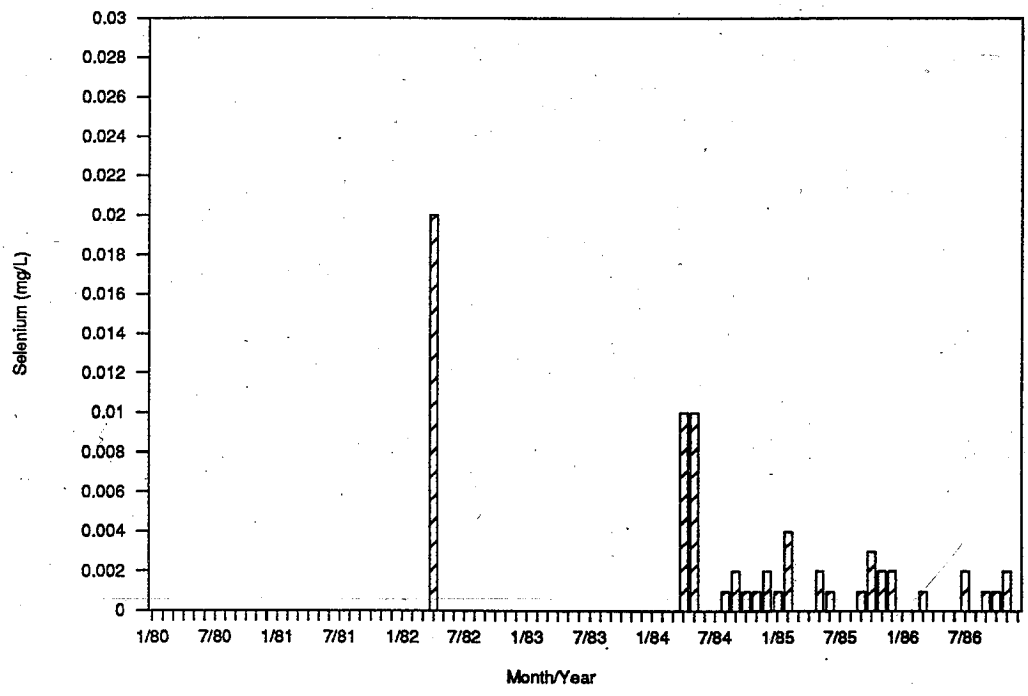
## Figure 94

CCN 3550 -- Average Selenium Levels



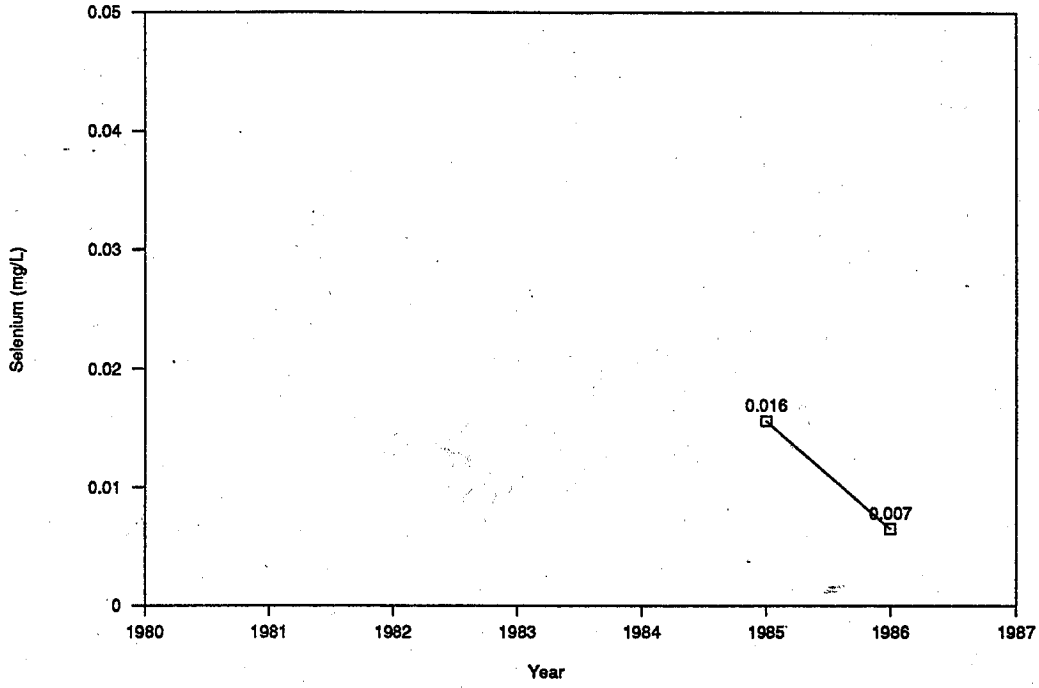

## Figure 95

CCN 3550 -- Selenium Levels



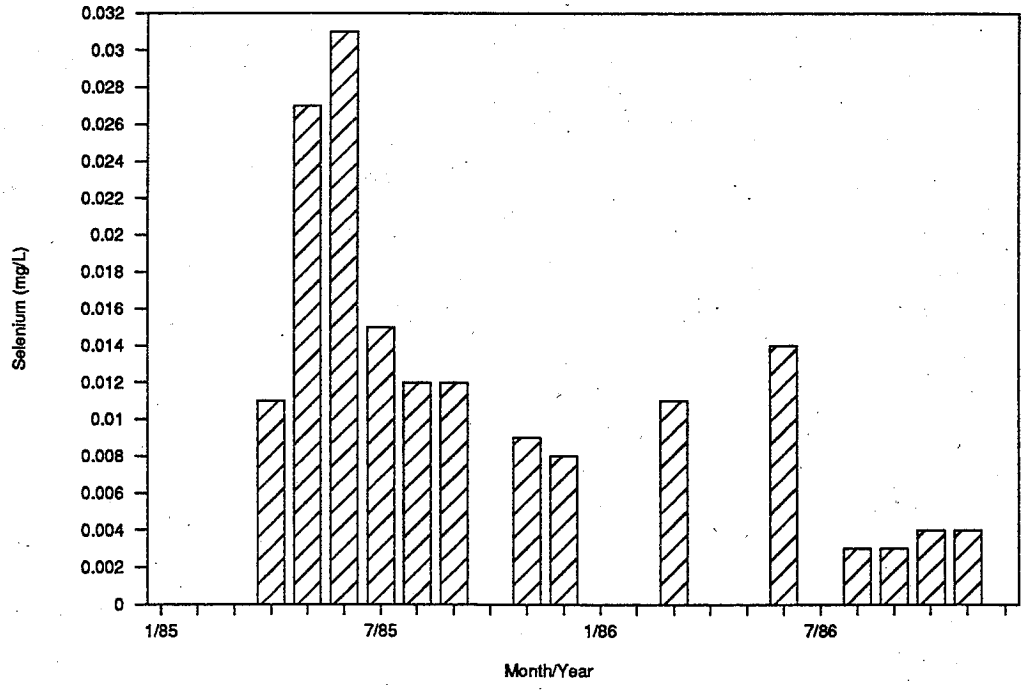
## Figure 96

ERR 8641 -- Average Selenium Levels



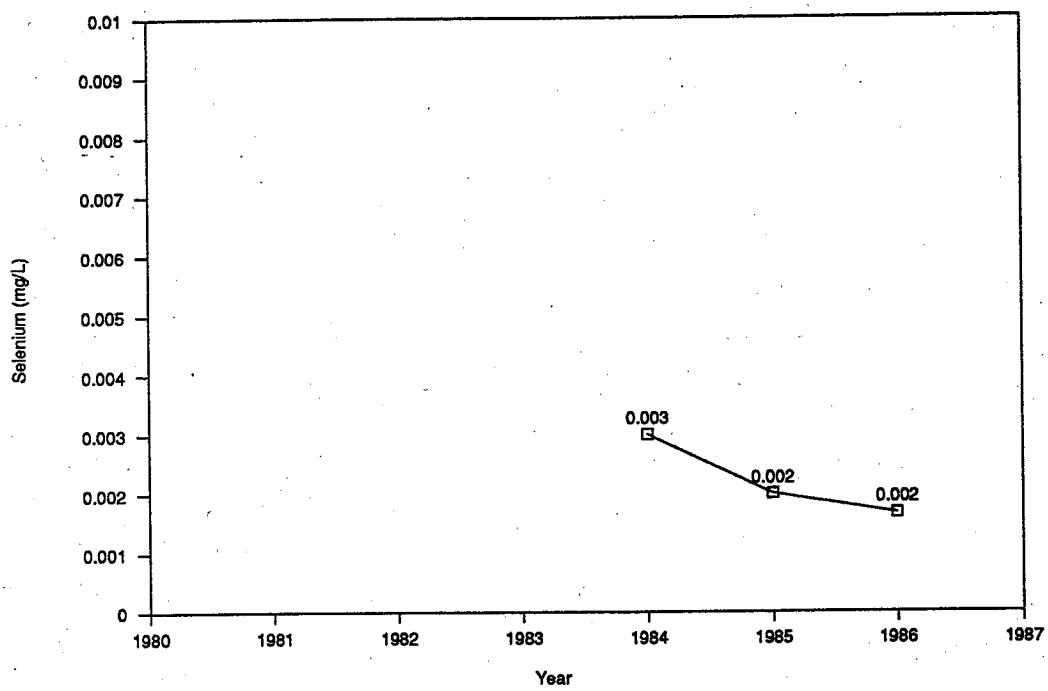

## Figure 97

ERR 8641 -- Selenium Levels



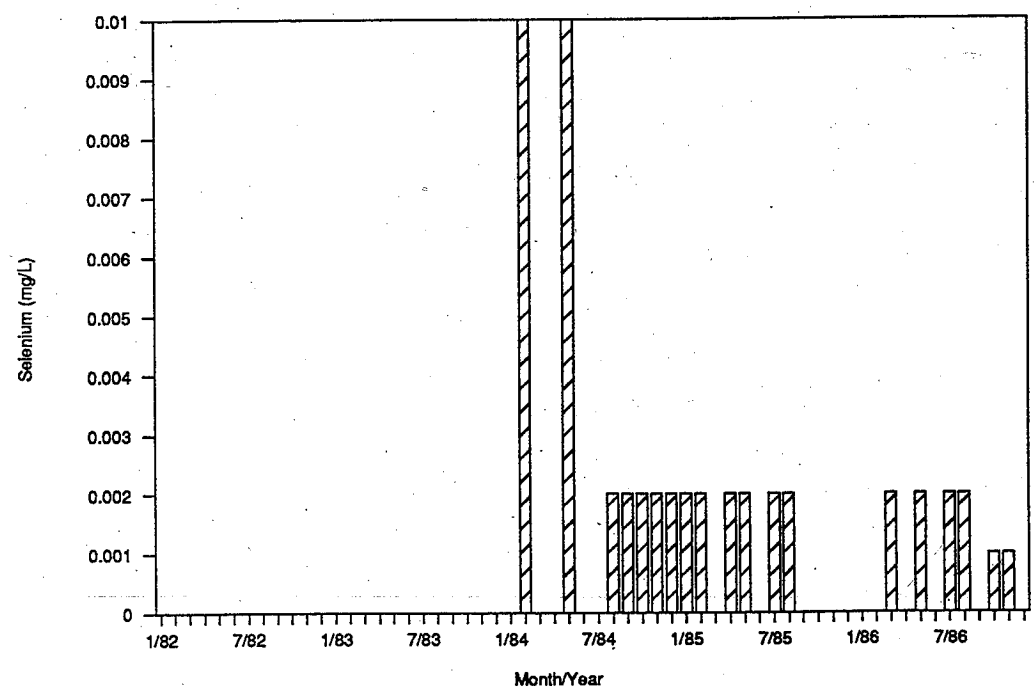
## Figure 98

SFD 2727 -- Average Selenium Levels



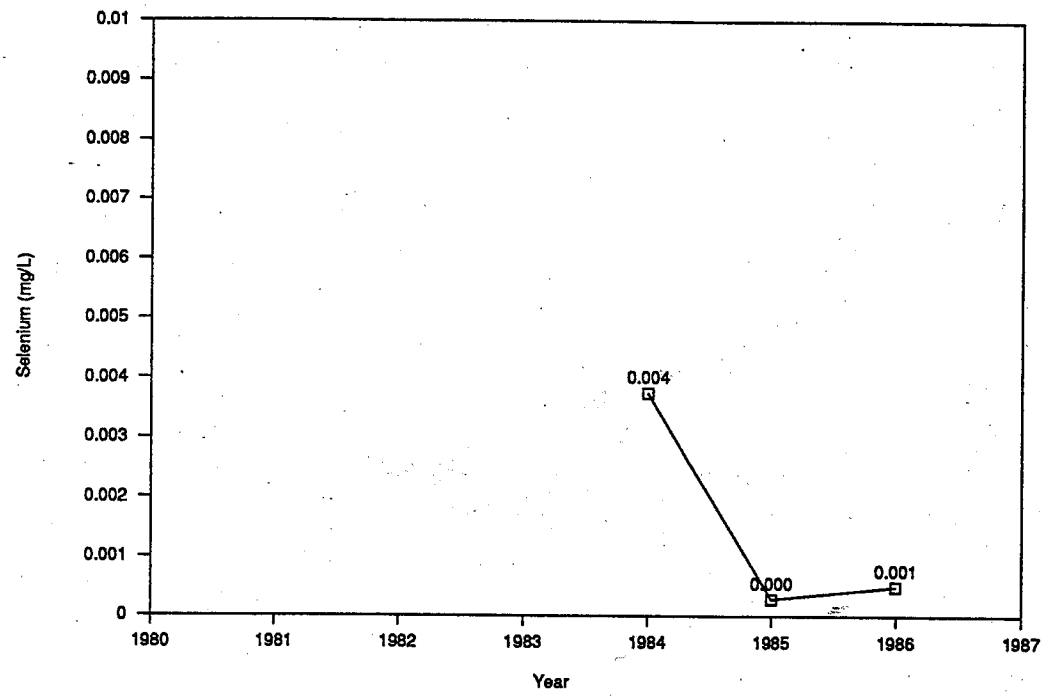

## Figure 99

SFD 2727 -- Selenium Levels



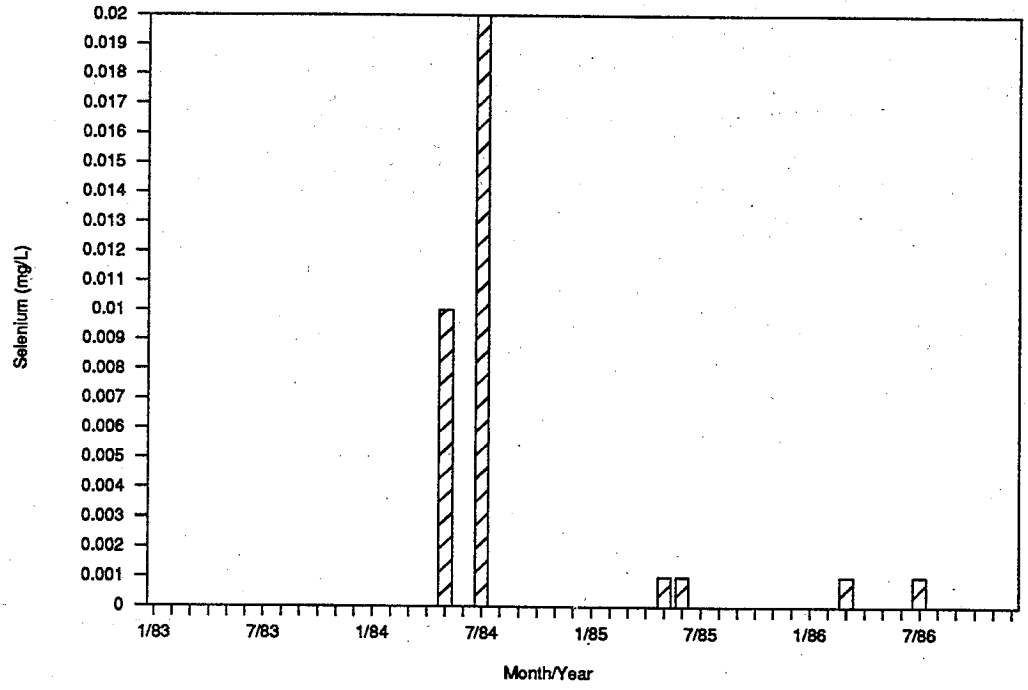
## Figure 100

SFD 6046 -- Average Selenium Levels



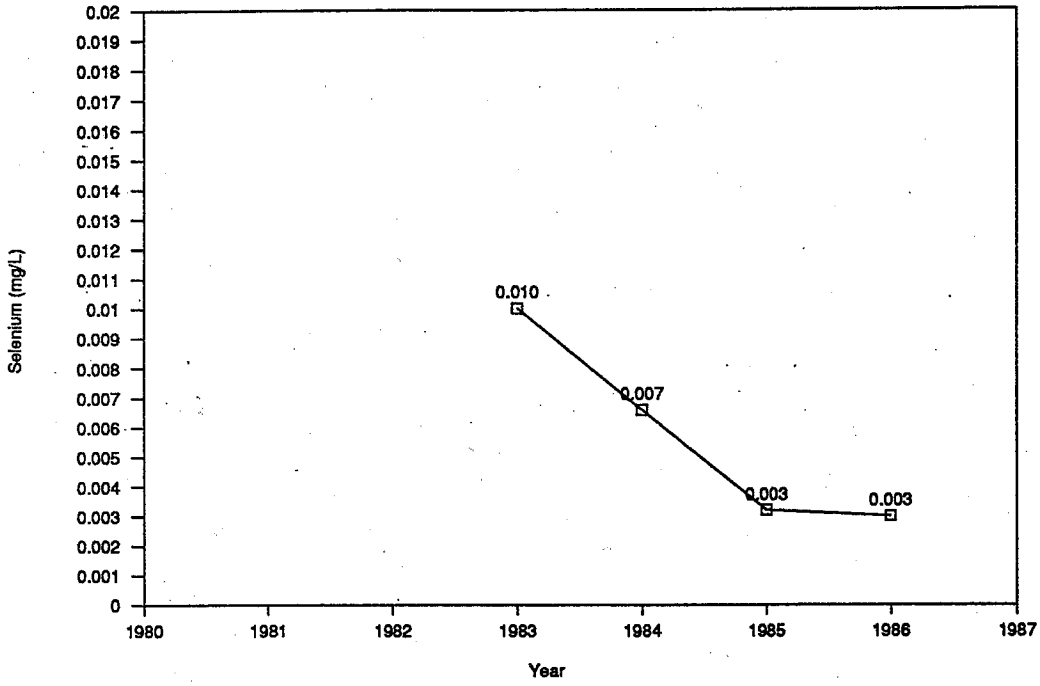

## Figure 101

SFD 6046 -- Selenium Levels



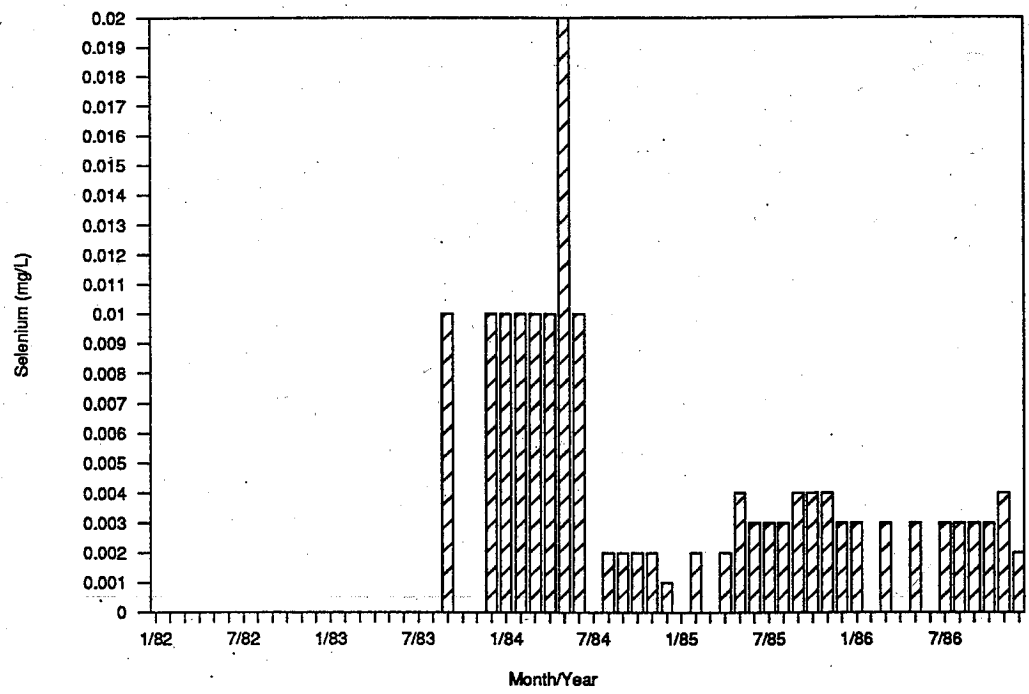
## Figure 102

STC 3505 -- Average Selenium Levels



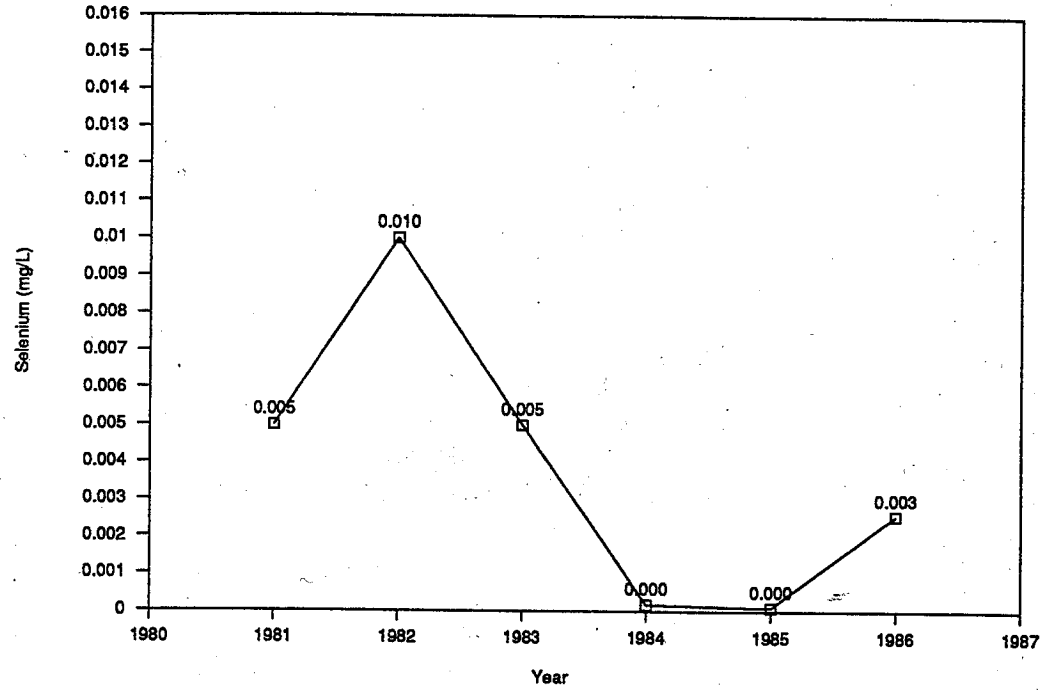

## Figure 103

STC 3505 -- Selenium Levels



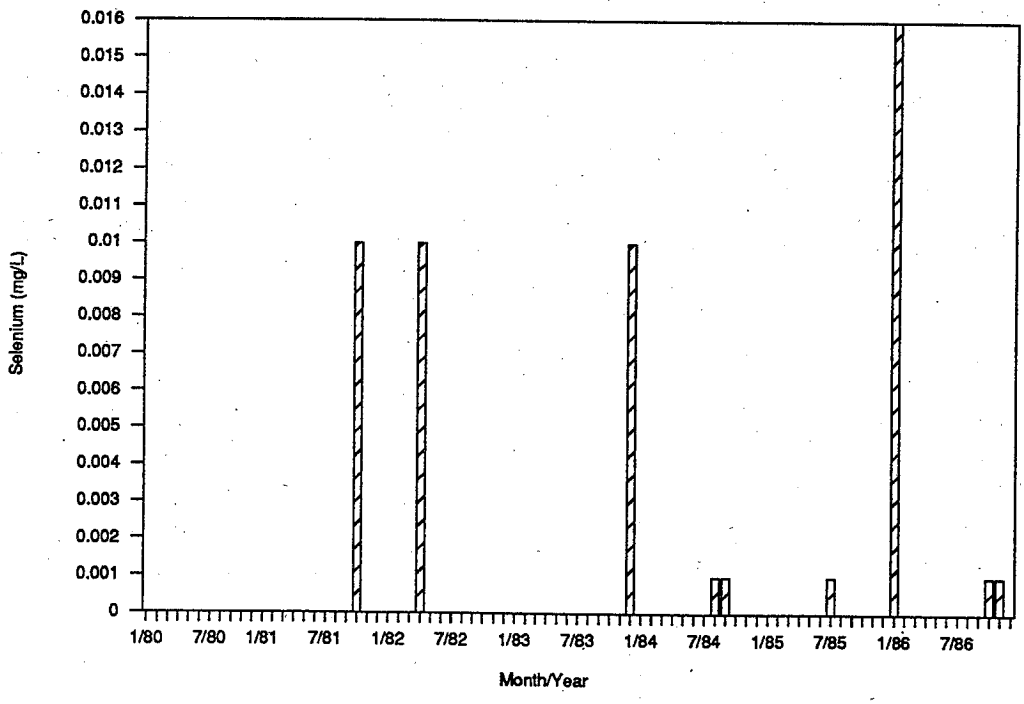
## Figure 104

STC 6467 -- Average Selenium Levels




## Figure 105

STC 6467 -- Selenium Levels



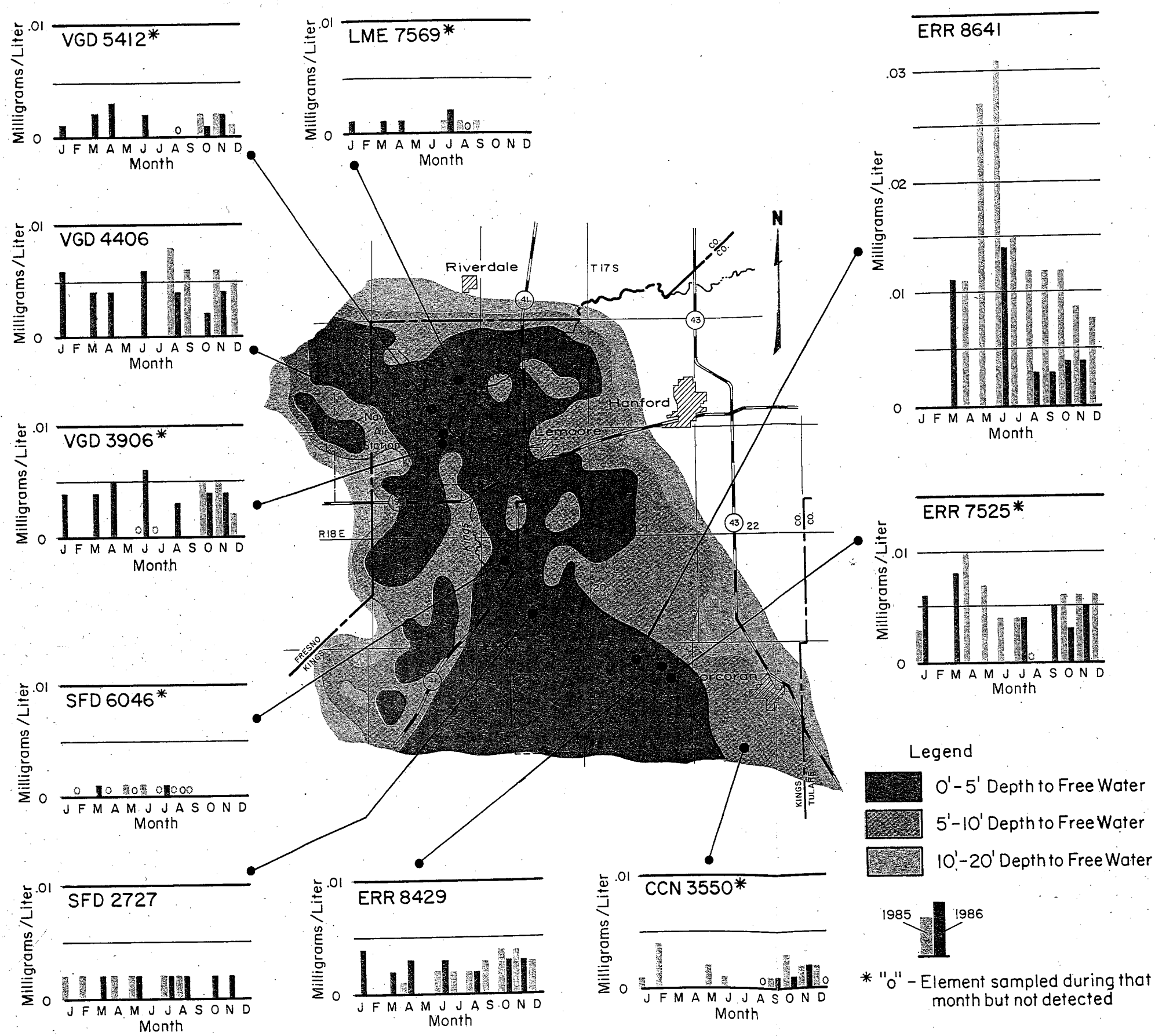



Figure 106A. Selenium Levels, 1985-1986 for San Joaquin Valley, Southern Area--Lemoore/Corcoran Stations

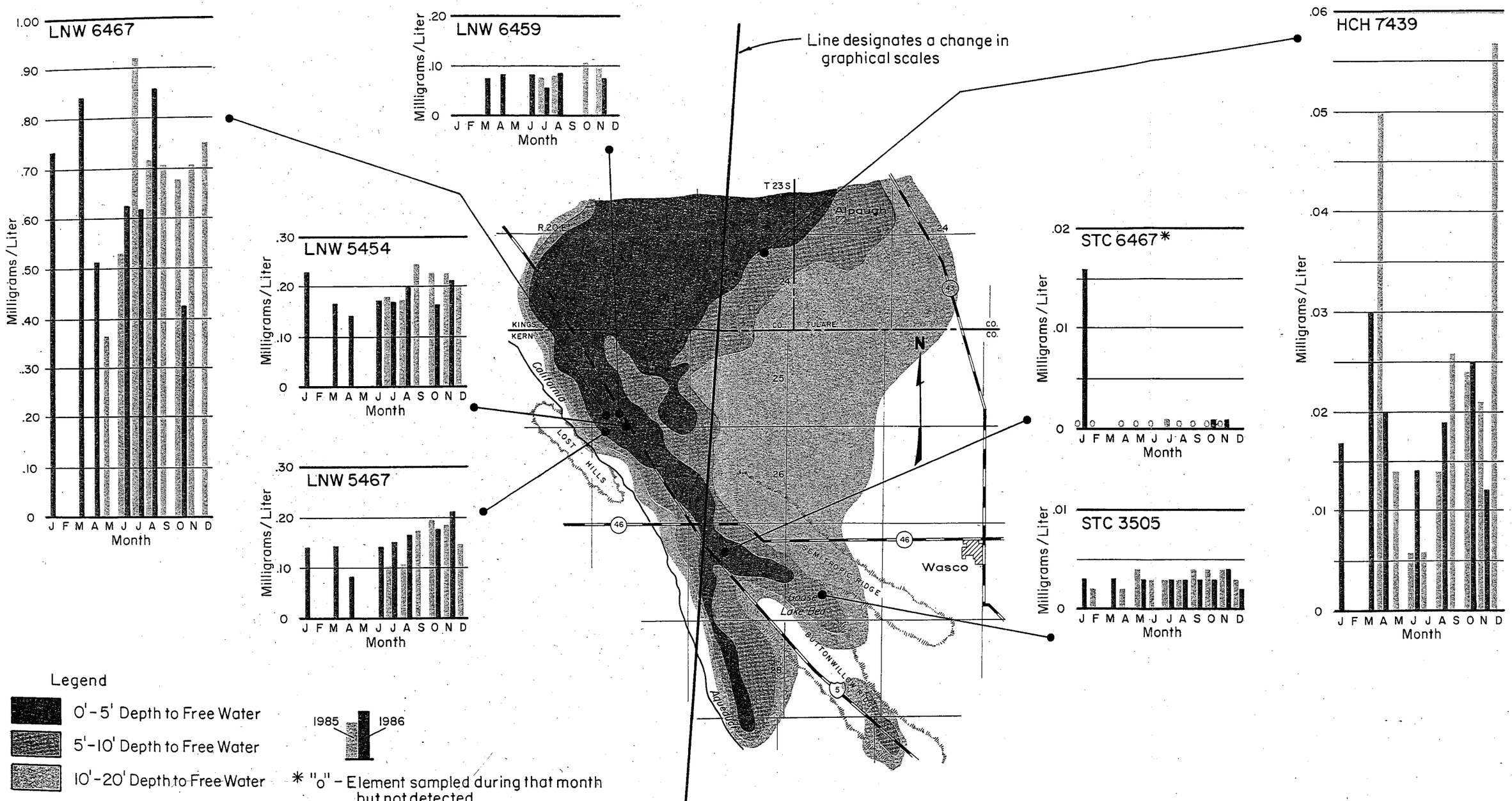



Figure 106B. Selenium Levels, 1985-1986 for San Joaquin Valley, Southern Area -- Lost Hills/Semitropic Stations

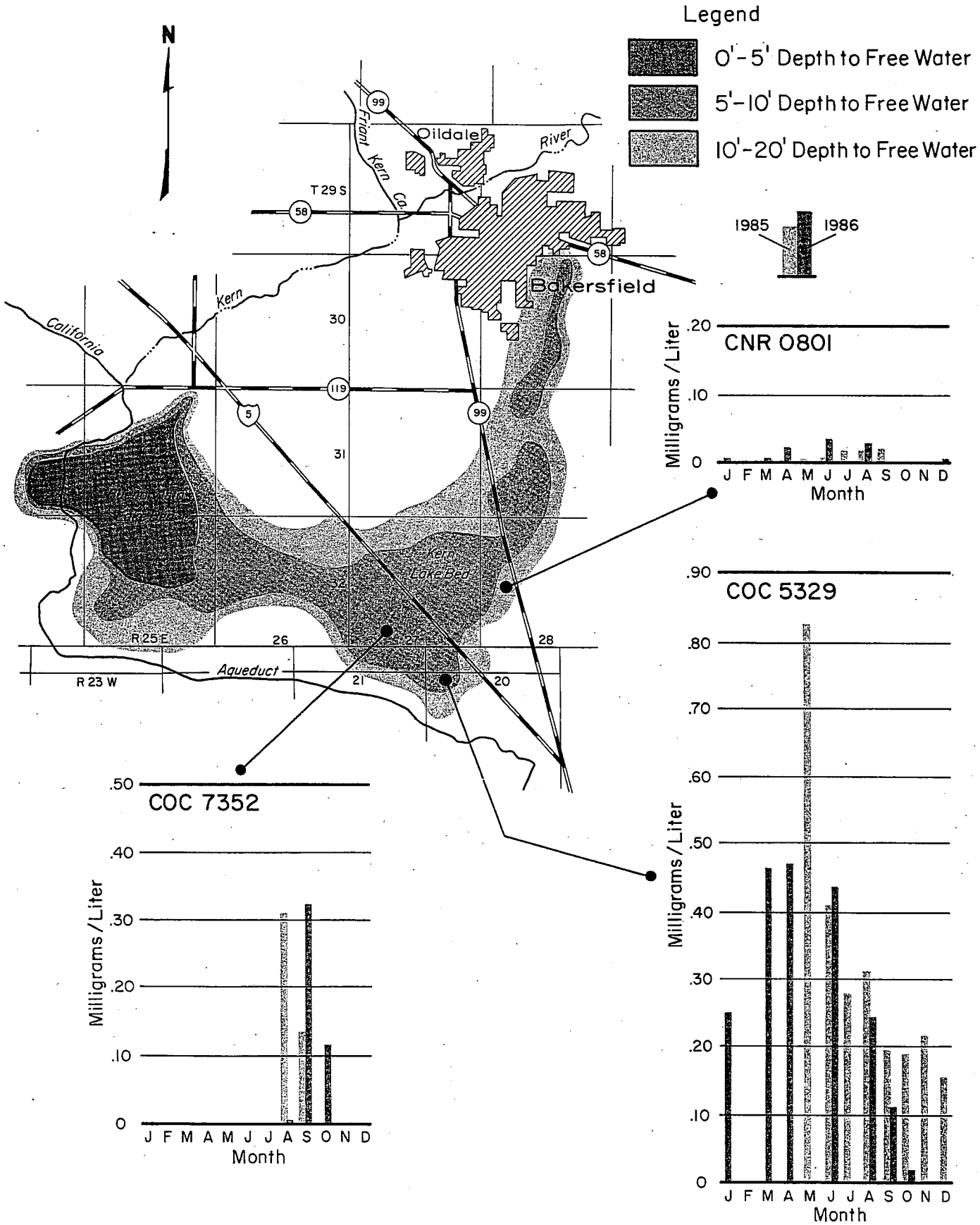



Figure 106C. Selenium Levels, 1985-1986 for San Joaquin Valley, Southern Area--Kern Lake Bed Stations

## 1987 MONITORING PROGRAM

The 1987 program will be a continuation of the existing program. Pesticide analysis will be performed on a quarterly basis to provide a view of current pesticide use and residue concentrations. Besides placing special emphasis on arsenic and selenium, the monitoring program will attempt to produce complete monthly analyses of all minerals and trace elements of concern.

An evaluation of the 1986 analyses of the 36 sumps and 2 surface drains indicated that the trace elements cadmium, copper, iron, lead, mercury, silver, and zinc were either not present in the drainage water or that their concentrations were well below drinking water, aquatic life, irrigation, and livestock standards. Consequently, these elements will be deleted from the analysis schedule. In addition, analysis will no longer be performed for nutrients. Due to cropping patterns, some stations may be dropped from the 1986 schedule and new stations added.

Nitrate ($NO_3$), if not already analyzed for at each site, will be added to the list of monthly analyses. Standard mineral analyses will continue on the current monthly schedule.

Additional efforts will be spent on analysis and data evaluation. Furthermore, historical sump information, physical characteristics of the drainage systems, flows, cropping patterns, and rainfall will be examined in detail to determine what role, if any, these factors play in the chemical composition of agricultural drainage waters.

# *APPENDIX A*

## *1986 Monthly Drain Flows*

# 1986 MONTHLY DRAIN FLOWS

(acre-feet)

| | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Central Surface Stations** | | | | | | | | | | | | | |
| CTL 4504 | 1188 | -- | -- | 1188 | -- | 1188 | -- | 5940 | 1782 | 1188 | 2673 | 297 | 15444 |
| DPS 3235 | 1478 | 2233 | 2594 | 3618 | 3852 | 4225 | 4378 | 3973 | 2079 | 1210 | 1993 | 1624 | 33257 |
| **Central Subsurface Stations** | | | | | | | | | | | | | |
| BVS 6016 | 8.3 | -- | -- | 350 | -- | 82.5 | -- | 167 | 22.8 | -- | 26.6 | 58.8 | 716 |
| BVS 8003 | 2.1 | -- | -- | 10.5 | -- | 15.1 | -- | 18.3 | 7.5 | 5.1 | 14.1 | 2.8 | 75.5 |
| DPS 1367 | 16.8 | -- | -- | 60.5 | -- | 68.0 | -- | 52.8 | 15.1 | 8.8 | 14.0 | 11.8 | 247.8 |
| DPS 2535 | 9.0 | -- | -- | 47.4 | -- | 54.4 | -- | 102.3 | 28.7 | 15.0 | 43.3 | 9.5 | 309.6 |
| DPS 3465 | 0.0 | -- | -- | 21.3 | -- | 30.1 | -- | 33.3 | 11.9 | 8.7 | 6.9 | 1.6 | 113.8 |
| DPS 4616 | 3.6 | -- | -- | 13.0 | -- | 2.5 | -- | 0.0 | 0.0 | 9.9 | 7.3 | 0.4 | 36.7 |
| FBH 2016 | 1.2 | -- | -- | 11.0 | -- | 23.6 | -- | 39.7 | 10.3 | 10.9 | 7.5 | 2.1 | 106.3 |
| FBH 8061 | 8.5 | -- | -- | 81.0 | -- | 16.4 | -- | 33.1 | 11.7 | 8.9 | 37.0 | 4.2 | 200.8 |
| **Southern Subsurface Stations** | | | | | | | | | | | | | |
| CCN 3350 | 3.7 | -- | 28.8 | -- | 9.4 | -- | 25.2 | 11.0 | 7.4 | 2.9 | 11.3 | 3.6 | 103.0 |
| CNR 0801 | | | | | | no flow data available | | | | | | | |
| COC 4126 | -- | -- | 7.1 | 2.6 | -- | 6.6 | -- | 3.2 | 0.7 | 0.5 | 0.7 | 0.4 | 21.8 |
| COC 5329 | 7.9 | -- | 23.9 | 3.7 | -- | 14.3 | -- | 11.6 | 1.8 | 0.2 | 0.1 | 0.2 | 63.7 |
| ERR 7525 | 13.2 | -- | -- | -- | 44.1 | -- | 92.2 | 11.4 | 14.2 | 3.4 | 8.7 | 5.0 | 186.2 |
| ERR 8429 | | | | | | no flow data available | | | | | | | |
| ERR 8641 | 8.4 | -- | 23.4 | 2.4 | -- | 30.3 | -- | 15.6 | 3.9 | 4.4 | 9.1 | 4.4 | 101.9 |
| GSY 0855 | 0.0 | 0.0 | 0.0 | -- | 1.8 | 0.0 | 0.0 | 0.0 | 0.0 | 1.3 | 0.0 | 0.0 | 3.1 |
| HCH 7439 | 0.5 | -- | 5.0 | 17.9 | -- | 22.4 | -- | 30.4 | 10.0 | 19.3 | 25.4 | 9.4 | 134.8 |
| LME 7569 | | | | | | no flow data available | | | | | | | |
| LNW 5454 | 10.7 | -- | 73.3 | 14.1 | -- | 95.4 | 81.0 | 26.3 | 55.2 | 36.6 | 29.3 | 12 | 433.9 |
| LNW 5467 | | | | | | no flow data avaliable | | | | | | | |
| LNW 6459 | 7.9 | -- | 77.3 | 26.7 | -- | 84.0 | 88.0 | 28.2 | 47.6 | 30.7 | 32.4 | 5.0 | 427.8 |
| LNW 6467 | 2.3 | -- | 42.7 | 18.4 | -- | 87.3 | -- | 118 | 30.3 | 7.4 | 1.9 | 11.8 | 320.1 |
| SFD 2727 | 0.0 | -- | 6.4 | -- | 10.6 | -- | 20.6 | 15.4 | 9.1 | 3.2 | 1.9 | 0.8 | 68.0 |
| SFD 6046 | 0.0 | -- | 22.9 | -- | 16.2 | -- | 22.7 | 16.7 | 13.4 | 4.9 | 0.0 | 0.0 | 96.8 |
| STC 3505 | 133 | -- | 174 | -- | 177 | -- | 252 | 102 | 123 | 101 | 154 | 51.5 | 1267.5 |
| STC 5436 | 7.0 | -- | 65.5 | -- | 24.0 | -- | 55.4 | 43.9 | 27.9 | 6.2 | 7.1 | -- | 237.0 |
| STC 6467 | 9.2 | -- | 78.9 | -- | 45.6 | -- | 98.4 | 45.9 | 36.9 | 12.7 | 15.1 | 1.8 | 344.5 |
| VGD 3906 | 5.9 | -- | 49.0 | 9.2 | -- | 33.1 | -- | 28.3 | 14.9 | 12.6 | 11.8 | -- | 164.8 |
| VGD 4406 | 5.1 | -- | 62.0 | 12.4 | -- | 49.0 | -- | 55.5 | 18.8 | 11.6 | 14.0 | 16.6 | 245.0 |
| VGD 5412 | 10.8 | -- | 84.4 | 20.8 | -- | 59.1 | -- | 55.1 | 18.8 | 16.2 | 24.6 | 10.2 | 300.0 |

# *APPENDIX B*

## *1986 Monitoring Station Data*

# DEFINITIONS OF ABBREVIATIONS AND UNITS USED IN APPENDIX B

## Location and Identification

CO - county

10 - Fresno
15 - Kern
16 - Kings
24 - Merced
39 - San Joaquin
50 - Stanislaus

LN - laboratory number

DATE - sampling date

TIME - time sampled

## Constituents (in milligrams per liter unless otherwise noted)

Ag - silver
Al - aluminum
As - arsenic
B - boron
Ba - barium
Ca - calcium
Cd - cadmium
Cl - chloride
Co - cobalt
COD - chemical oxygen demand
Cr - chromium (all valences)
Cu - copper
D-NH3 - dissolved ammonia
D-ORTHO - dissolved orthophosphate
Fe - iron
FEC - field electrical conductivity (micromhos per centimeter)
FpH - field pH (pH units)
HARD - total hardness
Hg - mercury
K - potassium
LEC - laboratory electrical conductivity (micromhos per centimeter)
LpH - laboratory pH (pH units)
Mg - magnesium
Mn - manganese
Mo - molybdenum
Na - sodium
NH3-ORG - total ammonia and organic nitrogen as nitrogen
Ni - nickel
NO3 - dissolved nitrate as nitrogen
NO3+NO2 - dissolved nitrate and dissolved nitrite as nitrogen
Pb - lead
Se - selenium
SO4 - sulfate
Sr - strontium
SS - suspended solids
TALK - total alkalinity (as CaCO3)
TDS - total dissolved solids
Temp - temperature (degrees Celsius)
T-P - total phosphorus
V - vanadium
Zn - zinc

## Pesticides (in milligrams per liter)

Type1 and Type2 - types of pesticides

A - no sample taken
C - chlorinated hydrocarbon
P - organic phosphorus
X - combinations of chlorinated hydrocarbon, organic phosphorus, and organic nitrogen

Name1 and Name2 - names of pesticides

Unknown - unidentified pesticide
NA - not applicable

Conc1 and Conc2 - concentrations of pesticides

# *Central Surface Stations*

# 1986 Monitoring Station Data

## Central Surface Stations

| STATION | LN | DATE | TIME | CO | TEMP | FEC | FpH | HARD | Ca | Mg | Na | K | TALK | LpH | SO4 | Cl | NO3 | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Central Surface Stations** | | | | | | | | | | | | | | | | | | |
| DPS 3235 | 2284 | 14-Jan-86 | 1145 | 10 | 9 | -- | 8 | 791 | 226 | 55 | 402 | 6.1 | 132 | 8 | 844 | 404 | 114 | 5.3 |
| | 2466 | 09-Apr-86 | 1130 | 10 | 17 | -- | 8 | 793 | 220 | 59 | 442 | 4.5 | 148 | 8 | 901 | 445 | 108 | 6.2 |
| | 2613 | 11-Jun-86 | 1000 | 10 | 20 | -- | 7.9 | 887 | 238 | 71 | 501 | 4 | 164 | 8.1 | 956 | 481 | 90 | 6.9 |
| | 2699 | 12-Aug-86 | 1100 | 10 | 24 | -- | 7.8 | 600 | 158 | 50 | 364 | 5.5 | 151 | 7.9 | 694 | 317 | -- | 4.5 |
| | 2783 | 09-Sep-86 | 1115 | 10 | 20 | -- | 8.1 | 675 | 168 | 62 | 400 | 3.5 | 216 | 8.2 | 719 | 377 | -- | 4.8 |
| | 2897 | 06-Oct-86 | 1045 | 10 | 19 | -- | 8 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 2935 | 12-Nov-86 | 1220 | 10 | 14 | -- | 7.7 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 3025 | 01-Dec-86 | 1230 | 10 | 9 | -- | 7.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| CTL 4505 | 2283 | 14-Jan-86 | 930 | 24 | 9 | -- | 8.2 | 759 | 215 | 54 | 405 | 5 | 132 | 8 | 829 | 412 | 88 | 5.1 |
| | 2463 | 09-Apr-86 | 935 | 24 | 17 | -- | 7.9 | 684 | 180 | 57 | 361 | 5.2 | 112 | 7.9 | 834 | 354 | 58 | 3.9 |
| | 2610 | 11-Jun-86 | 835 | 24 | 22 | -- | 7.9 | 471 | 116 | 44 | 314 | 4.4 | 112 | 8 | 710 | 187 | 37 | 3.2 |
| | 2696 | 12-Aug-86 | 845 | 24 | 25 | -- | 7.8 | 529 | 131 | 49 | 314 | 4.9 | 138 | 8.2 | 616 | 254 | -- | 3.4 |
| | 2780 | 09-Sep-86 | 845 | 24 | 21 | -- | 8.4 | 195 | 47 | 19 | 85 | 2.7 | 84 | 8.4 | 161 | 96 | -- | 0.8 |
| | 2894 | 06-Oct-86 | 815 | 24 | 23 | -- | 8 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 2932 | 12-Nov-86 | 945 | 24 | 11 | -- | 8 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 3022 | 01-Dec-86 | 1030 | 24 | 8 | -- | 7.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# 1986 Monitoring Station Data

## Central Surface Stations (continued)

| STATION | LN | DATE | Fe | Pb | Mn | Hg | Se | Ag | Zn | Al | Co | Mo | Ni | Sr | V | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Central Surface Stations | | | | | | | | | | | | | | | | |
| DPS 3235 | 2284 | 14-Jan-86 | 0.03 | 0 | 0.02 | -- | 0.044 | -- | -- | -- | 0 | -- | -- | 2.7 | -- | -- |
| | 2466 | 09-Apr-86 | -- | -- | -- | -- | 0.051 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2613 | 11-Jun-86 | -- | -- | -- | -- | 0.05 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2699 | 12-Aug-86 | 0.01 | 0 | 0.08 | 0 | 0.044 | 0 | 0 | 0 | 0 | -- | 0 | 2.4 | -- | -- |
| | 2783 | 09-Sep-86 | 0.02 | -- | 0.08 | -- | 0.053 | -- | 0.01 | -- | -- | -- | -- | 2.6 | -- | -- |
| | 2897 | 06-Oct-86 | 0.03 | -- | 0.13 | -- | 0.071 | -- | 0 | -- | -- | 0.007 | -- | 5.1 | -- | -- |
| | 2935 | 12-Nov-86 | 0.516 | -- | 0.089 | -- | 0.039 | -- | 0.002 | -- | -- | 0.005 | -- | 1.4 | -- | -- |
| | 3025 | 01-Dec-86 | 0.005 | -- | 0.027 | -- | 0.048 | -- | 0.005 | -- | -- | 0.006 | -- | 1.5 | -- | -- |
| CTL 4505 | 2283 | 14-Jan-86 | 0.04 | 0 | 0.1 | -- | 0.046 | -- | -- | -- | -- | -- | -- | 2.7 | -- | -- |
| | 2463 | 09-Apr-86 | -- | -- | -- | -- | 0.041 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2610 | 11-Jun-86 | -- | -- | -- | -- | 0.039 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2696 | 12-Aug-86 | 0.01 | 0 | 0.04 | 0 | 0.049 | 0 | 0 | 0 | 0 | -- | 0 | 1.9 | -- | -- |
| | 2780 | 09-Sep-86 | 0.01 | -- | 0.01 | -- | 0.006 | -- | 0 | -- | -- | -- | -- | 0.6 | -- | -- |
| | 2894 | 06-Oct-86 | 0.1 | -- | 0.1 | -- | 0.059 | -- | 0 | -- | -- | 0.017 | -- | 2.9 | -- | -- |
| | 2932 | 12-Nov-86 | 2.13 | -- | 0.095 | -- | 0.032 | -- | 0.014 | -- | -- | 0.01 | -- | 1.6 | -- | -- |
| | 3022 | 01-Dec-86 | 0.005 | -- | 0.19 | -- | 0.04 | -- | 0.005 | -- | -- | 0.01 | -- | 1.5 | -- | -- |

# 1986 Monitoring Station Data

## Central Surface Stations (continued)

| STATION | LN | DATE | TDS | LEC | COD | NH3-ORG | NO3+NO2 | D-NH3 | D-ORTHO | T-P | As | Ba | Cd | Cr | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Central Surface Stations** | | | | | | | | | | | | | | | |
| DPS 3235 | 2284 | 14-Jan-86 | 2220 | 3130 | -- | -- | -- | -- | -- | 0.3 | 0.002 | 0 | -- | 0.02 | 0 |
| | 2466 | 09-Apr-86 | 2420 | 3370 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2613 | 11-Jun-86 | 2650 | 3650 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2699 | 12-Aug-86 | 1810 | 2680 | -- | 2.1 | 13 | 0.26 | 0.04 | 0.51 | 0.003 | 0 | 0 | 0 | 0 |
| | 2783 | 09-Sep-86 | 2110 | 2910 | -- | 3 | 13 | 0.41 | 0.01 | 0.17 | 0.003 | -- | -- | 0.008 | 0 |
| | 2897 | 06-Oct-86 | 3420 | 4460 | -- | 1 | 23 | 0.03 | 0 | 0.08 | 0.003 | -- | -- | 0.014 | 0 |
| | 2935 | 12-Nov-86 | 1620 | 2370 | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | 0.005 | 0.005 |
| | 3025 | 01-Dec-86 | -- | 2540 | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | 0.015 | 0.005 |
| CTL 4505 | 2283 | 14-Jan-86 | 2200 | 3160 | -- | -- | -- | -- | -- | 0.51 | 0.002 | 0 | -- | 0 | 0.01 |
| | 2463 | 09-Apr-86 | 2060 | 2880 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2610 | 11-Jun-86 | 1550 | 2200 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2696 | 12-Aug-86 | 1620 | 2360 | -- | 1.1 | 9.1 | 0.07 | 0.06 | 0.16 | 0.003 | 0 | 0 | 0 | 0 |
| | 2780 | 09-Sep-86 | 527 | 806 | -- | 1.1 | 2.3 | 0.01 | 0.04 | 0.2 | 0.003 | -- | -- | 0.005 | 0 |
| | 2894 | 06-Oct-86 | 2340 | 3140 | -- | 1.5 | 11 | 0.07 | 0.02 | 0.15 | 0.004 | -- | -- | 0.005 | 0 |
| | 2932 | 12-Nov-86 | 1670 | 2410 | -- | -- | -- | -- | -- | -- | 0.003 | -- | -- | 0.01 | 0.006 |
| | 3022 | 01-Dec-86 | -- | 2740 | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | 0.009 | 0.005 |

# 1986 Monitoring Station Data

## Central Surface Stations (continued)

| STATION | LN | DATE | TYPE1 | NAME1 | CONC1 | TYPE2 | NAME2 | CONC2 |
|---|---|---|---|---|---|---|---|---|
| Central Surface Stations | | | | | | | | |
| DPS 3235 | 2284 | 14-Jan-86 | C | UNKNOWNS | 0.00016 | P | UNKNOWNS | 0.00065 |
| | 2466 | 09-Apr-86 | A | NA | -- | A | NA | -- |
| | 2613 | 11-Jun-86 | A | NA | -- | A | NA | -- |
| | 2699 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2783 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2897 | 06-Oct-86 | A | NA | -- | A | NA | -- |
| | 2935 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3025 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| CTL 4505 | 2283 | 14-Jan-86 | X | ATRAZSIMAZ | 0.00016 | P | UNKNOWNS | 0.00043 |
| | 2463 | 09-Apr-86 | A | NA | -- | A | NA | -- |
| | 2610 | 11-Jun-86 | A | NA | -- | A | NA | -- |
| | 2696 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2780 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2894 | 06-Oct-86 | A | NA | -- | A | NA | -- |
| | 2932 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3022 | 01-Dec-86 | A | NA | -- | A | NA | -- |

# *Central Subsurface Stations*

# 1986 Monitoring Station Data

## Central Subsurface Stations

| STATION | LN | DATE | TIME | CO | TEMP | FEC | FpH | HARD | Ca | Mg | Na | K | TALK | LpH | SO4 | Cl | NO3 | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Central Subsurface Stations** | | | | | | | | | | | | | | | | | | |
| BVS 6016 | 2285 | 14-Jan-86 | 1300 | 10 | 16 | -- | 7 | 1550 | 374 | 149 | 709 | 4.5 | 168 | 7.8 | 1840 | 646 | 103 | 5.5 |
| | 2461 | 02-Apr-86 | 1210 | 10 | 17 | -- | 7.3 | 1870 | 449 | 183 | 980 | 6 | 186 | 7.8 | 2290 | 825 | 134 | 6.7 |
| | 2608 | 11-Jun-86 | 1040 | 10 | 19 | -- | 7.3 | 1780 | 432 | 171 | 905 | 6.1 | 187 | 7.9 | 2270 | 778 | 121 | 6.6 |
| | 2725 | 12-Aug-86 | 1215 | 10 | 22 | -- | 8 | 1370 | 322 | 137 | 746 | 5.2 | 207 | 8 | 1720 | 593 | -- | 5.4 |
| | 2778 | 09-Sep-86 | 1230 | 10 | 20 | -- | 7 | 1240 | 306 | 115 | 621 | 4.6 | 169 | 8 | 1470 | 583 | -- | 4.9 |
| | 2930 | 12-Nov-86 | 1330 | 10 | 18 | -- | 7.3 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 3020 | 01-Dec-86 | 1330 | 10 | 18 | -- | 7.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| BVS 8003 | 2462 | 09-Apr-86 | 1230 | 10 | 16 | -- | 7.4 | 2090 | 368 | 285 | 2000 | 3.1 | 243 | 7.8 | 4720 | 745 | 24 | 24 |
| | 2609 | 11-Jun-86 | 1100 | 10 | 19 | -- | 7.4 | 1640 | 309 | 212 | 1780 | 3 | 277 | 7.9 | 3980 | 642 | 26 | 20 |
| | 2695 | 12-Aug-86 | 1245 | 10 | 23 | -- | 7.2 | 1160 | 310 | 214 | 1570 | 3.1 | 281 | 8.1 | 3440 | 598 | -- | 12 |
| | 2779 | 09-Sep-86 | 1300 | 10 | 23 | -- | 7.3 | 1840 | 348 | 237 | 1890 | 2.9 | 287 | 8 | 4460 | 703 | -- | 23 |
| | 2893 | 06-Oct-86 | 1130 | 10 | 21 | -- | 7.3 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 2931 | 12-Nov-86 | 1350 | 10 | 18 | -- | 7.2 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 3021 | 01-Dec-86 | 1400 | 10 | 17 | -- | 7.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| DPS 1367 | 2288 | 14-Jan-86 | 1015 | 24 | 16 | -- | 7.3 | 1580 | 468 | 101 | 515 | 2 | 122 | 7.9 | 1240 | 838 | 185 | 6 |
| | 2464 | 09-Apr-86 | 1015 | 24 | 17.4 | -- | 7.2 | 1460 | 417 | 101 | 531 | 2.2 | 144 | 7.8 | 1170 | 804 | 186 | 6 |
| | 2611 | 11-Jun-86 | 905 | 24 | 19 | -- | 7.4 | 1650 | 476 | 113 | 514 | 2.4 | 127 | 7.9 | 1220 | 829 | 174 | 5.9 |
| | 2697 | 12-Aug-86 | 930 | 24 | 22 | -- | 7.2 | 1570 | 444 | 112 | 512 | 2.5 | 122 | 8.1 | 1160 | 848 | -- | 5.8 |
| | 2781 | 09-Sep-86 | 935 | 24 | 20 | -- | 7.3 | 1660 | 477 | 114 | 510 | 2.1 | 118 | 8 | 1230 | 875 | -- | 5.4 |
| | 2895 | 06-Oct-86 | 845 | 24 | 20 | -- | 7.4 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 3023 | 01-Dec-86 | 1000 | 24 | 18 | -- | 7.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| DPS 2535 | 2289 | 14-Jan-86 | 1100 | 10 | 15 | -- | 7 | 1940 | 444 | 202 | 1670 | 2 | 210 | 7.7 | 2750 | 1760 | 85 | 21 |
| | 2465 | 09-Apr-86 | 1055 | 10 | 16 | -- | 7.2 | 2170 | 472 | 240 | 1760 | 2.4 | 206 | 7.6 | 2850 | 1900 | 90 | 21 |
| | 2612 | 11-Jun-86 | 935 | 10 | 18 | -- | 7.2 | 2230 | 508 | 233 | 1800 | 3 | 216 | 7.8 | 3050 | 1860 | 88 | 23 |
| | 2698 | 12-Aug-86 | 1030 | 10 | 21 | -- | 7.1 | 2140 | 465 | 238 | 1780 | 2.9 | 207 | 8 | 2810 | 1900 | -- | 22 |
| | 2782 | 09-Sep-86 | 1030 | 10 | 20 | -- | 7.3 | 2150 | 465 | 240 | 1780 | 2.5 | 197 | 8 | 2990 | 1950 | -- | 23 |
| | 2896 | 06-Oct-86 | 945 | 10 | 21 | -- | 7.2 | -- | -- | -- | -- | -- | -- | 7.9 | -- | -- | -- | -- |
| | 2934 | 12-Nov-86 | 1130 | 10 | 18 | -- | 7.3 | -- | -- | -- | -- | -- | -- | 7.8 | -- | -- | -- | -- |
| | 3024 | 01-Dec-86 | 1130 | 10 | 18 | -- | 7.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| DPS 3465 | 2467 | 09-Apr-86 | 1035 | 10 | 16 | -- | 7 | 2100 | 508 | 202 | 1180 | 2.8 | 240 | 7.5 | 2160 | 1410 | 108 | 16 |
| | 2614 | 11-Jun-86 | 920 | 10 | 18 | -- | 7 | 2100 | 519 | 196 | 1170 | 3.4 | 303 | 7.8 | 2110 | 1410 | 99 | 17 |
| | 2700 | 12-Aug-86 | 1000 | 10 | 21 | -- | 7 | 1740 | 394 | 183 | 1140 | 3.3 | 359 | 7.9 | 1940 | 1260 | -- | 17 |
| | 2784 | 09-Sep-86 | 1000 | 10 | 20 | -- | 7.3 | -- | 463 | 197 | 1180 | 3.1 | 242 | 7.8 | 1180 | 1440 | -- | 17 |
| | 2898 | 06-Oct-86 | 915 | 10 | 21 | -- | 7.2 | -- | -- | -- | -- | -- | -- | 7.9 | -- | -- | -- | -- |
| | 2936 | 12-Nov-86 | 1100 | 10 | 18 | -- | 7.2 | -- | -- | -- | -- | -- | -- | 7.9 | -- | -- | -- | -- |
| | 3026 | 01-Dec-86 | 1100 | 10 | 18 | -- | 7.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| DPS 4616 | 2291 | 14-Jan-86 | 1115 | 10 | 14 | -- | 7.2 | 2280 | 454 | 278 | 1340 | 2.8 | 312 | 7.9 | 3550 | 859 | 30 | 36 |
| | 2468 | 09-Apr-86 | 1115 | 10 | 15 | -- | 7.2 | 2350 | 415 | 318 | 1450 | 3.2 | 306 | 7.7 | 3700 | 1070 | 29 | 38 |
| | 2899 | 06-Oct-86 | 1015 | 10 | 20 | -- | 7.2 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 2937 | 12-Nov-86 | 1200 | 10 | 16 | -- | 7.5 | -- | -- | -- | -- | -- | -- | 7.9 | -- | -- | -- | -- |
| | 3027 | 01-Dec-86 | 1200 | 10 | 16 | -- | 7.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# 1986 Monitoring Station Data

## Central Subsurface Stations (continued)

| STATION | LN | DATE | TDS | LEC | COD | NH3-ORG | NO3+NO2 | D-NH3 | D-ORTHO | T-P | As | Ba | Cd | Cr | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Central Subsurface Stations** | | | | | | | | | | | | | | | |
| BVS 6016 | 2285 | 14-Jan-86 | 4220 | 5310 | -- | -- | -- | -- | -- | 0.04 | 0.001 | 0 | -- | 0.01 | 0 |
| | 2461 | 02-Apr-86 | 5270 | 6450 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2608 | 11-Jun-86 | 5020 | 6120 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2725 | 12-Aug-86 | 4110 | 5230 | -- | 0.7 | 24 | 0 | 0.02 | 0.02 | 0.001 | 0 | 0 | 0 | 0 |
| | 2778 | 09-Sep-86 | 3760 | 4640 | -- | 0.5 | 34 | 0 | 0.03 | 0.04 | 0.001 | -- | -- | 0.012 | 0 |
| | 2930 | 12-Nov-86 | 5900 | 7140 | -- | -- | -- | -- | -- | -- | 0.001 | -- | -- | 0.005 | 0.005 |
| | 3020 | 01-Dec-86 | -- | 5730 | -- | -- | -- | -- | -- | -- | 0.001 | -- | -- | 0.024 | 0.005 |
| BVS 8003 | 2462 | 09-Apr-86 | 8970 | 9960 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2609 | 11-Jun-86 | 7440 | 8530 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2695 | 12-Aug-86 | 7020 | 8110 | -- | 0.6 | 7.6 | 0 | 0.06 | -- | 0.003 | 0 | 0 | 0.01 | 0 |
| | 2779 | 09-Sep-86 | 8490 | 9350 | -- | 0.6 | 7.4 | 0 | 0.07 | 0.08 | 0.003 | -- | -- | 0.02 | 0 |
| | 2893 | 06-Oct-86 | 8710 | 9540 | -- | 0.6 | 2 | 0.01 | 0.07 | 0.08 | 0.004 | -- | -- | 0.017 | 0 |
| | 2931 | 12-Nov-86 | 7050 | 8250 | -- | -- | -- | -- | -- | -- | 0.003 | -- | 0 | 0.021 | 0.005 |
| | 3021 | 01-Dec-86 | -- | 9660 | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | 0.022 | 0.005 |
| DPS 1367 | 2288 | 14-Jan-86 | 3600 | 4880 | -- | -- | -- | -- | -- | 0.02 | 0 | 0 | -- | 0.02 | 0 |
| | 2464 | 09-Apr-86 | 3600 | 4770 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2611 | 11-Jun-86 | 3690 | 4850 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2697 | 12-Aug-86 | 3680 | 4880 | -- | 0.2 | 41 | 0 | 0.01 | 0.01 | 0 | 0 | 0 | 0.01 | 0 |
| | 2781 | 09-Sep-86 | 3930 | 4930 | -- | 0.4 | 43 | 0 | 0.02 | 0.02 | 0.001 | -- | -- | 0.025 | 0 |
| | 2895 | 06-Oct-86 | 3870 | 4950 | -- | 0.4 | 38 | 0 | 0.01 | 0.02 | 0.001 | -- | -- | 0.023 | 0 |
| | 3023 | 01-Dec-86 | -- | 4900 | -- | -- | -- | -- | -- | -- | 0.001 | -- | -- | 0.027 | 0.005 |
| DPS 2535 | 2289 | 14-Jan-86 | 7480 | 9660 | -- | -- | -- | -- | -- | 0.02 | 0 | 0 | -- | 0.08 | 0 |
| | 2465 | 09-Apr-86 | 7840 | 9860 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2612 | 11-Jun-86 | 8220 | 10100 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2698 | 12-Aug-86 | 8030 | 10200 | -- | 0.4 | 23 | 0 | 0.02 | 0.02 | 0.001 | 0 | 0 | 0.08 | 0 |
| | 2782 | 09-Sep-86 | 8410 | 10100 | -- | 0.4 | 23 | 0 | 0.02 | 0.02 | 0.001 | -- | -- | 0.128 | 0 |
| | 2896 | 06-Oct-86 | 8430 | 10200 | -- | 0.5 | 19 | 0.01 | 0.02 | 0.02 | 0.001 | -- | -- | 0.13 | 0 |
| | 2934 | 12-Nov-86 | 8090 | 10100 | -- | -- | -- | -- | -- | -- | 0.001 | -- | -- | 0.122 | 0.005 |
| | 3024 | 01-Dec-86 | -- | 9790 | -- | -- | -- | -- | -- | -- | 0.001 | -- | -- | 0.14 | 0.005 |
| DPS 3465 | 2467 | 09-Apr-86 | 6100 | 7740 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2614 | 11-Jun-86 | 6080 | 7910 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2700 | 12-Aug-86 | 5600 | 7340 | -- | 0.8 | 24 | 0 | 0 | 0.04 | 0.001 | 0 | 0 | 0.03 | 0 |
| | 2784 | 09-Sep-86 | 6360 | 7880 | -- | 0.8 | 25 | 0 | 0.02 | 0.03 | 0.001 | -- | -- | 0.027 | 0 |
| | 2898 | 06-Oct-86 | 6810 | 8340 | -- | 0.8 | 24 | 0.2 | 0.02 | 0.02 | 0.001 | -- | -- | 0.063 | 0 |
| | 2936 | 12-Nov-86 | 6560 | 8260 | -- | -- | -- | -- | -- | -- | 0.001 | -- | -- | 0.058 | 0.005 |
| | 3026 | 01-Dec-86 | -- | 7430 | -- | -- | -- | -- | -- | -- | 0.001 | -- | -- | 0.049 | 0.005 |
| DPS 4616 | 2291 | 14-Jan-86 | 7320 | 8290 | -- | -- | -- | -- | -- | 0.08 | 0.002 | 0 | -- | 0.01 | 0 |
| | 2468 | 09-Apr-86 | 7920 | 8840 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2899 | 06-Oct-86 | 7900 | 8530 | -- | 0.5 | 7.6 | 0.02 | -- | 0.08 | 0.003 | -- | -- | 0.017 | 0 |
| | 2937 | 12-Nov-86 | 8520 | 9390 | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | 0.018 | 0.005 |
| | 3027 | 01-Dec-86 | -- | 9440 | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | 0.019 | 0.005 |

# 1986 Monitoring Station Data

## Central Subsurface Stations (continued)

| STATION | LN | DATE | Fe | Pb | Mn | Hg | Se | Ag | Zn | Al | Co | Mo | Ni | Sr | V | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Central Subsurface Stations** | | | | | | | | | | | | | | | | |
| BVS 6016 | 2285 | 14-Jan-86 | 0.02 | 0 | 0 | -- | 0.081 | -- | -- | -- | 0 | -- | -- | 3.9 | -- | -- |
| | 2461 | 02-Apr-86 | -- | -- | -- | -- | 0.092 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2608 | 11-Jun-86 | -- | -- | -- | -- | 0.097 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2725 | 12-Aug-86 | 0 | 0 | 0.01 | 0 | 0.343 | 0 | 0 | 0 | 0 | -- | 0 | 3.9 | -- | -- |
| | 2778 | 09-Sep-86 | 0.01 | -- | 0 | -- | 0.114 | -- | 0 | -- | -- | -- | -- | 3.2 | -- | -- |
| | 2930 | 12-Nov-86 | 0.035 | -- | 0.016 | -- | 0.11 | -- | 0.005 | -- | -- | 0.018 | -- | 4.4 | -- | -- |
| | 3020 | 01-Dec-86 | 0.006 | -- | 0.005 | -- | 0.074 | -- | 0.005 | -- | -- | 0.019 | -- | 2.8 | -- | -- |
| BVS 8003 | 2462 | 09-Apr-86 | -- | -- | -- | -- | 0.19 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2609 | 11-Jun-86 | -- | -- | -- | -- | 0.166 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2695 | 12-Aug-86 | 0 | 0 | 0.02 | 0 | 0.149 | 0 | 0 | 0 | 0 | -- | 0 | 4.5 | -- | -- |
| | 2779 | 09-Sep-86 | 0 | -- | 0 | -- | 0.202 | -- | 0 | -- | -- | -- | -- | 4.4 | -- | -- |
| | 2893 | 06-Oct-86 | 0 | -- | 0 | -- | 0.196 | -- | 0 | -- | -- | 0.078 | -- | 5.2 | -- | -- |
| | 2931 | 12-Nov-86 | 0.006 | -- | 0.005 | -- | 0.128 | -- | 0.005 | -- | -- | 0.021 | -- | 3.5 | -- | -- |
| | 3021 | 01-Dec-86 | 0.005 | -- | 0.005 | -- | 0.117 | -- | 0.005 | -- | -- | 0.13 | -- | 3.4 | -- | -- |
| DPS 1367 | 2288 | 14-Jan-86 | 0.02 | 0 | 0 | -- | 0.1 | -- | -- | -- | 0 | 0 | -- | 5.4 | -- | -- |
| | 2464 | 09-Apr-86 | -- | -- | -- | -- | 0.061 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2611 | 11-Jun-86 | -- | -- | -- | -- | 0.093 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2697 | 12-Aug-86 | 0 | 0 | 0 | 0 | 0.466 | 0 | 0 | 0 | 0 | -- | 0 | 5.7 | -- | -- |
| | 2781 | 09-Sep-86 | 0.01 | -- | 0 | -- | 0.113 | -- | 0 | -- | -- | -- | -- | 6.2 | -- | -- |
| | 2895 | 06-Oct-86 | 0.01 | -- | 0 | -- | 0.144 | -- | 0.01 | -- | -- | 0.008 | -- | 6.1 | -- | -- |
| | 3023 | 01-Dec-86 | 0.005 | -- | 0.005 | -- | 0.138 | -- | 0.005 | -- | -- | 0.005 | -- | 4.2 | -- | -- |
| DPS 2535 | 2289 | 14-Jan-86 | 0.02 | 0 | 0 | -- | 0.043 | -- | -- | -- | 0 | -- | 0 | 9.9 | -- | -- |
| | 2465 | 09-Apr-86 | -- | -- | -- | -- | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2612 | 11-Jun-86 | -- | -- | -- | -- | 0.04 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2698 | 12-Aug-86 | 0 | 0 | 0 | 0.001 | 0.048 | 0 | 0 | 0 | 0 | -- | 0 | 12 | -- | -- |
| | 2782 | 09-Sep-86 | 0 | -- | 0 | -- | 0.051 | -- | 0 | -- | -- | -- | -- | 11 | -- | -- |
| | 2896 | 06-Oct-86 | 0.03 | -- | 0 | -- | 0.048 | -- | 0 | -- | -- | 0.015 | -- | 12 | -- | -- |
| | 2934 | 12-Nov-86 | 0.005 | -- | 0.005 | -- | 0.044 | -- | 0.005 | -- | -- | 0.022 | -- | 11 | -- | -- |
| | 3024 | 01-Dec-86 | 0.0005 | -- | 0.005 | -- | 0.04 | -- | 0.005 | -- | -- | 0.011 | -- | 7.9 | -- | -- |
| DPS 3465 | 2467 | 09-Apr-86 | -- | -- | -- | -- | 0.025 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2614 | 11-Jun-86 | -- | -- | -- | -- | 0.026 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2700 | 12-Aug-86 | 0 | 0 | 0.06 | 0.001 | 0.02 | 0 | 0 | 0 | 0 | -- | 0 | 9.5 | -- | -- |
| | 2784 | 09-Sep-86 | 0 | -- | 0.08 | -- | 0.028 | -- | 0 | -- | -- | -- | -- | 11 | -- | -- |
| | 2898 | 06-Oct-86 | 0.02 | -- | 0.07 | -- | 0.029 | -- | 0 | -- | -- | 0.008 | -- | 13 | -- | -- |
| | 2936 | 12-Nov-86 | 0.005 | -- | 0.102 | -- | 0.018 | -- | 0.005 | -- | -- | 0.005 | -- | 11 | -- | -- |
| | 3026 | 01-Dec-86 | 0.005 | -- | 0.185 | -- | 0.026 | -- | 0.005 | -- | -- | 0.006 | -- | 7.2 | -- | -- |
| DPS 4616 | 2291 | 14-Jan-86 | 0.01 | 0 | 0.03 | -- | 0.013 | -- | -- | -- | 0 | -- | -- | 5.4 | -- | -- |
| | 2468 | 09-Apr-86 | -- | -- | -- | -- | 0.012 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2899 | 06-Oct-86 | 0.02 | -- | 0.07 | -- | 0.014 | -- | 0 | -- | -- | 0.046 | -- | 5.6 | -- | -- |
| | 2937 | 12-Nov-86 | 0.005 | -- | 0.054 | -- | 0.011 | -- | 0.005 | -- | -- | 0.014 | -- | 4.4 | -- | -- |
| | 3027 | 01-Dec-86 | 0.005 | -- | 0.061 | -- | 0.005 | -- | 0.005 | -- | -- | 0.045 | -- | 3.8 | -- | -- |

# 1986 Monitoring Station Data

## Central Subsurface Stations (continued)

| STATION | LN | DATE | TYPE1 | NAME1 | CONC1 | TYPE2 | NAME2 | CONC2 |
|---|---|---|---|---|---|---|---|---|
| **Central Subsurface Stations** | | | | | | | | |
| **BVS 6016** | 2285 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2461 | 02-Apr-86 | A | NA | -- | A | NA | -- |
| | 2608 | 11-Jun-86 | A | NA | -- | A | NA | -- |
| | 2725 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2778 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2930 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3020 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| **BVS 8003** | 2462 | 09-Apr-86 | A | NA | -- | A | NA | -- |
| | 2609 | 11-Jun-86 | A | NA | -- | A | NA | -- |
| | 2695 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2779 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2893 | 06-Oct-86 | A | NA | -- | A | NA | -- |
| | 2931 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3021 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| **DPS 1367** | 2288 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2464 | 09-Apr-86 | A | NA | -- | A | NA | -- |
| | 2611 | 11-Jun-86 | A | NA | -- | A | NA | -- |
| | 2697 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2781 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2895 | 06-Oct-86 | A | NA | -- | A | NA | -- |
| | 3023 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| **DPS 2535** | 2289 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2465 | 09-Apr-86 | A | NA | -- | A | NA | -- |
| | 2612 | 11-Jun-86 | A | NA | -- | A | NA | -- |
| | 2698 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2782 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2896 | 06-Oct-86 | A | NA | -- | A | NA | -- |
| | 2934 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3024 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| **DPS 3465** | 2467 | 09-Apr-86 | A | NA | -- | A | NA | -- |
| | 2614 | 11-Jun-86 | A | NA | -- | A | NA | -- |
| | 2700 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2784 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2898 | 06-Oct-86 | A | NA | -- | A | NA | -- |
| | 2936 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3026 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| **DPS 4616** | 2291 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2468 | 09-Apr-86 | A | NA | -- | A | NA | -- |
| | 2899 | 06-Oct-86 | A | NA | -- | A | NA | -- |
| | 2937 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3027 | 01-Dec-86 | A | NA | -- | A | NA | -- |

# 1986 Monitoring Station Data

## Central Subsurface Stations (continued)

| STATION | LN | DATE | TIME | CO | TEMP | FEC | FpH | HARD | Ca | Mg | Na | K | TALK | LpH | SO4 | Cl | NO3 | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Central Subsurface Stations** | | | | | | | | | | | | | | | | | | |
| FBH 2016 | 2469 | 09-Apr-86 | 1320 | 10 | 16 | -- | 7.5 | 1700 | 405 | 168 | 688 | 2.3 | 134 | 7.9 | 2520 | 349 | 39 | 7.2 |
| | 2616 | 11-Jun-86 | 1145 | 10 | 18 | -- | 7.5 | 2130 | 428 | 258 | 1440 | 2.7 | 143 | 8 | 4020 | 637 | 59 | 15 |
| | 2702 | 12-Aug-86 | 1330 | 10 | 23 | -- | 7.4 | 2300 | 379 | 328 | 1850 | 3.2 | 169 | 8.1 | 4780 | 862 | -- | 19 |
| | 2786 | 09-Sep-86 | 1400 | 10 | 20 | -- | 7.4 | 1970 | 357 | 262 | 1700 | 2.7 | 202 | 8.2 | 4270 | 739 | -- | 16 |
| | 2900 | 06-Oct-86 | 1230 | 10 | 21 | -- | 7.4 | -- | -- | -- | -- | -- | -- | 7.9 | -- | -- | -- | -- |
| | 2938 | 12-Nov-86 | 1510 | 10 | 18 | -- | 7.9 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| FBH 8061 | 2297 | 14-Jan-86 | 1330 | 10 | 14 | -- | 7.4 | 1560 | 364 | 158 | 947 | 2 | 249 | 7.9 | 2580 | 444 | 30 | 12 |
| | 2470 | 09-Apr-86 | 1245 | 10 | 16 | -- | 7.3 | 1420 | 324 | 149 | 745 | 1.2 | 222 | 7.7 | 2360 | 258 | 23 | 9.6 |
| | 2617 | 11-Jun-86 | 1115 | 10 | 18 | -- | 7.3 | 1360 | 342 | 123 | 578 | 1.7 | 165 | 8.1 | 1940 | 264 | 16 | 7.4 |
| | 2787 | 09-Sep-86 | 1320 | 10 | 20 | -- | 7.3 | 1440 | 361 | 130 | 684 | 1.8 | 160 | 8.2 | 2330 | 220 | -- | 29 |
| | 2901 | 06-Oct-86 | 1200 | 10 | 22 | -- | 7.2 | -- | -- | -- | -- | -- | -- | 8.1 | -- | -- | -- | -- |
| | 2939 | 12-Nov-86 | 1430 | 10 | 18 | -- | 7.3 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 3029 | 01-Dec-86 | 1415 | 10 | 17 | -- | 7.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| HMH 7516 | 2300 | 14-Jan-86 | 1215 | 10 | 17 | -- | 7.2 | 996 | 300 | 60 | 501 | 3.6 | 151 | 7.9 | 971 | 502 | 172 | 7.2 |
| | 2471 | 09-Apr-86 | 1150 | 10 | 17 | -- | 7.3 | 721 | 213 | 46 | 372 | 3.2 | 156 | 7.8 | 689 | 383 | 129 | 5.5 |
| | 2618 | 11-Jun-86 | 1020 | 10 | 19 | -- | 7.2 | 1740 | 526 | 104 | 610 | 3.2 | 154 | 8 | 1760 | 673 | 170 | 9 |
| | 2704 | 12-Aug-86 | 1145 | 10 | 21 | -- | 7 | 1040 | 312 | 63 | 447 | 4.2 | 161 | 8.1 | 1070 | 476 | -- | 6.9 |
| | 2788 | 09-Sep-86 | 1155 | 10 | 21 | -- | 7.4 | 696 | 206 | 44 | 311 | 13 | 117 | 8 | 680 | 322 | -- | 4.4 |
| | 2902 | 06-Oct-86 | 1100 | 10 | 20 | -- | 7.2 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 2940 | 12-Nov-86 | 1300 | 10 | 19 | -- | 7.3 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 3030 | 01-Dec-86 | 1300 | 10 | 18 | -- | 7.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# 1986 Monitoring Station Data

## Central Subsurface Stations (continued)

| STATION | LN | DATE | TDS | LEC | COD | NH3-ORG | NO3+NO2 | D-NH3 | D-ORTHO | T-P | As | Ba | Cd | Cr | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Central Subsurface Stations** | | | | | | | | | | | | | | | |
| FBH 2016 | 2469 | 09-Apr-86 | 4520 | 5110 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2616 | 11-Jun-86 | 7140 | 8130 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2702 | 12-Aug-86 | 8840 | 9820 | -- | 0.6 | 18 | 0.01 | 0.05 | 0.05 | 0.002 | 0 | 0 | 0 | 0 |
| | 2786 | 09-Sep-86 | 7870 | 8850 | -- | 0.6 | 15 | 0.15 | 0.05 | 0.06 | 0.002 | -- | -- | 0.006 | 0 |
| | 2900 | 06-Oct-86 | 11200 | 11700 | -- | 0.7 | 15 | 0.02 | 0.05 | 0.05 | 0.003 | -- | -- | 0.006 | 0 |
| | 2938 | 12-Nov-86 | 10800 | 11500 | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | 0.01 | 0.005 |
| FBH 8061 | 2297 | 14-Jan-86 | 5070 | 5930 | -- | -- | -- | -- | -- | 0.07 | 0.003 | 0 | -- | 0.01 | 0 |
| | 2470 | 09-Apr-86 | 4390 | 5110 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2617 | 11-Jun-86 | 3670 | 4120 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2787 | 09-Sep-86 | 4150 | 4680 | -- | 0.3 | 4 | 0 | 0.04 | 0.04 | 0.002 | -- | -- | 0.012 | 0 |
| | 2901 | 06-Oct-86 | 3760 | 4230 | -- | 0.3 | 2.4 | 0.04 | 0.03 | 0.04 | 0.003 | -- | -- | 0.007 | 0 |
| | 2939 | 12-Nov-86 | 5230 | 6000 | -- | -- | -- | -- | -- | -- | 0.003 | -- | -- | 0.023 | 0.005 |
| | 3029 | 01-Dec-86 | -- | 5080 | -- | -- | -- | -- | -- | -- | 0.003 | -- | -- | 0.015 | 0.005 |
| HMH 7516 | 2300 | 14-Jan-86 | 2680 | 3700 | -- | -- | -- | -- | -- | 0.02 | 0 | 0 | -- | 0.05 | 0 |
| | 2471 | 09-Apr-86 | 2050 | 2890 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2618 | 11-Jun-86 | 4180 | 5110 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2704 | 12-Aug-86 | 2730 | 3710 | -- | 0.6 | 30 | 0.02 | 0.04 | 0.14 | 0.001 | 0 | 0 | 0.02 | 0 |
| | 2788 | 09-Sep-86 | 1880 | 2660 | -- | 11 | 24 | 2.4 | 0.12 | 0.32 | 0.002 | -- | -- | 0.034 | 0 |
| | 2902 | 06-Oct-86 | 1720 | 2380 | -- | 1.2 | 23 | 0.06 | 0.07 | 0.17 | 0.002 | -- | -- | 0.035 | 0.005 |
| | 2940 | 12-Nov-86 | 2590 | 3500 | -- | -- | -- | -- | -- | -- | 0.001 | -- | -- | 0.074 | 0.005 |
| | 3030 | 01-Dec-86 | -- | 3400 | -- | -- | -- | -- | -- | -- | 0 | -- | -- | 0.069 | 0.005 |

# 1986 Monitoring Station Data

## Central Subsurface Stations (continued)

| STATION | LN | DATE | Fe | Pb | Mn | Hg | Se | Ag | Zn | Al | Co | Mo | Ni | Sr | V | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Central Subsurface Stations** | | | | | | | | | | | | | | | | |
| **FBH 2016** | 2469 | 09-Apr-86 | -- | -- | -- | -- | 0.197 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2616 | 11-Jun-86 | -- | -- | -- | -- | 0.29 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2702 | 12-Aug-86 | 0 | 0 | 0 | 0 | 0.342 | 0 | 0 | 0 | 0 | -- | 0 | 5.9 | -- | -- |
| | 2786 | 09-Sep-86 | 0 | -- | 0 | -- | 0.275 | -- | -- | -- | -- | -- | -- | 5.4 | -- | -- |
| | 2900 | 06-Oct-86 | 0 | -- | 0 | -- | 0.219 | -- | 0.01 | -- | -- | 0.191 | -- | 6.3 | -- | -- |
| | 2938 | 12-Nov-86 | 0.005 | -- | 0.005 | -- | 0.275 | -- | 0.005 | -- | -- | 0.043 | -- | 5.6 | -- | -- |
| **FBH 8061** | 2297 | 14-Jan-86 | 0.01 | 0 | 0 | -- | 0.057 | -- | -- | -- | 0 | -- | -- | 4.8 | -- | -- |
| | 2470 | 09-Apr-86 | -- | -- | -- | -- | 0.034 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2617 | 11-Jun-86 | -- | -- | -- | -- | 0.024 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2787 | 09-Sep-86 | 0 | -- | 0 | -- | 0.027 | -- | 0 | -- | -- | -- | -- | 4 | -- | -- |
| | 2901 | 06-Oct-86 | 0 | -- | 0 | -- | 0.014 | -- | 0.01 | -- | -- | 0.096 | -- | 3.9 | -- | -- |
| | 2939 | 12-Nov-86 | 0.005 | -- | 0.006 | -- | 0.042 | -- | 0.005 | -- | -- | 0.043 | -- | 3.9 | -- | -- |
| | 3029 | 01-Dec-86 | 0.005 | -- | 0.005 | -- | 0.032 | -- | 0.005 | -- | -- | 0.07 | -- | 3 | -- | -- |
| **HMH 7516** | 2300 | 14-Jan-86 | 0.01 | 0 | 0 | -- | 0.045 | -- | -- | -- | 0 | -- | -- | 4.1 | -- | -- |
| | 2471 | 09-Apr-86 | -- | -- | -- | -- | 0.02 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2618 | 11-Jun-86 | -- | -- | -- | -- | 0.068 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2704 | 12-Aug-86 | 0 | 0 | 0 | 0 | 0.022 | 0 | 0 | 0 | 0 | -- | 0 | 4 | -- | -- |
| | 2788 | 09-Sep-86 | 0.01 | -- | 0.01 | -- | 0.022 | -- | 0 | -- | -- | -- | -- | 2.7 | -- | -- |
| | 2902 | 06-Oct-86 | 0.03 | -- | 0.008 | -- | 0.016 | -- | 0.007 | -- | -- | 0.005 | -- | 2 | -- | -- |
| | 2940 | 12-Nov-86 | 0.005 | -- | 0.005 | -- | 0.036 | -- | 0.005 | -- | -- | 0.005 | -- | 3.4 | -- | -- |
| | 3030 | 01-Dec-86 | 0.008 | -- | 0.005 | -- | 0.033 | -- | 0.005 | -- | -- | 0.005 | -- | 2.4 | -- | -- |

# 1986 Monitoring Station Data

## Central Subsurface Stations (continued)

| STATION | LN | DATE | TYPE1 | NAME1 | CONC1 | TYPE2 | NAME2 | CONC2 |
|---|---|---|---|---|---|---|---|---|
| **Central Subsurface Stations** | | | | | | | | |
| **FBH 2016** | 2469 | 09-Apr-86 | A | NA | -- | A | NA | -- |
| | 2616 | 11-Jun-86 | A | NA | -- | A | NA | -- |
| | 2702 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2786 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2900 | 06-Oct-86 | A | NA | -- | A | NA | -- |
| | 2938 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| **FBH 8061** | 2297 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2470 | 09-Apr-86 | A | NA | -- | A | NA | -- |
| | 2617 | 11-Jun-86 | A | NA | -- | A | NA | -- |
| | 2787 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2901 | 06-Oct-86 | A | NA | -- | A | NA | -- |
| | 2939 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3029 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| **HMH 7516** | 2300 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2471 | 09-Apr-86 | A | NA | -- | A | NA | -- |
| | 2618 | 11-Jun-86 | A | NA | -- | A | NA | -- |
| | 2704 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2788 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2902 | 06-Oct-86 | A | NA | -- | A | NA | -- |
| | 2940 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3030 | 01-Dec-86 | A | NA | -- | A | NA | -- |

# *Southern Subsurface Stations*

# 1986 Monitoring Station Data

## Southern Subsurface Stations

| STATION | LN | DATE | TIME | CO | TEMP | FEC | FpH | HARD | Ca | Mg | Na | K | TALK | LpH | SO4 | Cl | NO3 | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | | | | |
| CCN 3550 | 2377 | 26-Mar-86 | 1230 | 16 | 17 | -- | 7.1 | 892 | 207 | 91 | 561 | 5.8 | 358 | 7.6 | 1060 | 368 | 89 | 1 |
| | 2650 | 09-Jul-86 | 900 | 16 | 21 | -- | 7 | 1070 | 223 | 125 | 743 | 6.6 | 374 | 8.3 | 1440 | 609 | 25 | 1.2 |
| | 2705 | 13-Aug-86 | 1015 | 16 | 23 | -- | 7.3 | 487 | 116 | 48 | 357 | 11 | 338 | 8.3 | 672 | 174 | -- | 0.9 |
| | 2789 | 10-Sep-86 | 1000 | 16 | 21 | -- | 7.1 | 769 | 181 | 77 | 501 | 9.8 | 331 | 8.4 | 1030 | 310 | -- | 0.9 |
| | 2903 | 08-Oct-86 | 845 | 16 | 22 | -- | 7.2 | -- | -- | -- | -- | -- | -- | 8.2 | -- | -- | -- | -- |
| | 2941 | 13-Nov-86 | 945 | 16 | 19 | -- | 6.9 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 3031 | 02-Dec-86 | 920 | 16 | 19 | -- | 7.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| CNR 0801 | 2265 | 14-Jan-86 | 1240 | 15 | 17 | -- | 7.6 | 1800 | 307 | 252 | 2660 | 67 | 395 | 7.9 | 6250 | 466 | 37 | 34 |
| | 2378 | 25-Mar-86 | 1230 | 15 | 17 | -- | 7.3 | 2400 | 358 | 365 | 2600 | 72 | 382 | 7.6 | 6520 | 498 | 23 | 31 |
| | 2445 | 08-Apr-86 | 830 | 15 | 17 | -- | 7.6 | 2530 | 355 | 400 | 2880 | 70 | 397 | 7.8 | 7160 | 496 | 100 | 31 |
| | 2592 | 10-Jun-86 | 720 | 15 | 20 | -- | 7.6 | 2670 | 365 | 427 | 3020 | 70 | 407 | 8 | 7250 | 571 | 136 | 38 |
| | 2706 | 12-Aug-86 | 1415 | 15 | 22 | -- | 7.4 | 2260 | 264 | 388 | 2680 | 65 | 434 | 8.1 | 6690 | 410 | -- | 2 |
| | 3032 | 01-Dec-86 | 1350 | 15 | 21 | -- | 7.7 | 2330 | 372 | 340 | 3080 | 67 | 402 | 8 | 7380 | 541 | -- | 36 |
| COC 4126 | 2262 | 14-Jan-86 | 1410 | 15 | 15 | -- | 7.8 | 1960 | 568 | 132 | 438 | 7.7 | 173 | 7.8 | 2030 | 194 | 303 | 2.7 |
| | 2379 | 25-Mar-86 | 1315 | 15 | 18 | -- | 7.2 | 1940 | 520 | 155 | 662 | 7.7 | 186 | 7.6 | 2290 | 290 | 543 | 3.2 |
| | 2446 | 08-Apr-86 | 905 | 15 | 17 | -- | 7.3 | 1990 | 528 | 164 | 662 | 7.7 | 228 | 7.7 | 2310 | 288 | 540 | 3 |
| | 2593 | 10-Jun-86 | 750 | 15 | 20 | -- | 7.2 | 2140 | 598 | 158 | 637 | 7.7 | 286 | 7.8 | 2290 | 259 | 464 | 3.2 |
| | 2707 | 12-Aug-86 | 1215 | 15 | 23 | -- | 7 | 1890 | 501 | 155 | 505 | 7 | 282 | 8.2 | 2180 | 207 | -- | 2.9 |
| | 2791 | 09-Sep-86 | 1300 | 15 | 23 | -- | 7.2 | 1980 | 546 | 149 | 480 | 7 | 158 | 7.9 | 2290 | 207 | -- | 2.8 |
| | 2905 | 07-Oct-86 | 1330 | 15 | 23 | -- | 7.3 | 1990 | 549 | 151 | 467 | 6.3 | 128 | 7.9 | 2280 | 269 | -- | 2.9 |
| | 3033 | 01-Dec-86 | 1520 | 15 | 20 | -- | 8.1 | 2000 | 563 | 145 | 412 | 6.6 | 192 | 7.8 | 2090 | 175 | -- | 2.4 |
| COC 5329 | 2263 | 14-Jan-86 | 1205 | 15 | 14 | -- | 7.3 | 1870 | 531 | 131 | 882 | 5.6 | 192 | 8 | 2610 | 454 | 236 | 4.5 |
| | 2380 | 25-Mar-86 | 1345 | 15 | 17 | -- | 7.2 | 2050 | 505 | 192 | 1240 | 5.4 | 211 | 7.6 | 3330 | 544 | 223 | 6.9 |
| | 2447 | 08-Apr-86 | 930 | 15 | 17 | -- | 7.3 | 1860 | 475 | 165 | 1120 | 5.4 | 234 | 7.7 | 3310 | 280 | 216 | 6.5 |
| | 2594 | 10-Jun-86 | 815 | 15 | 21 | -- | 7.3 | 2060 | 559 | 161 | 1130 | 5.7 | 283 | 7.9 | 3350 | 498 | 249 | 6.8 |
| | 2708 | 12-Aug-86 | 1320 | 15 | 24 | -- | 7.2 | 1790 | 478 | 144 | 882 | 5.5 | 300 | 8.1 | 2700 | 393 | -- | 5.1 |
| | 2792 | 09-Sep-86 | 1230 | 15 | 23 | -- | 6.8 | 1390 | 399 | 95 | 484 | 4.7 | 165 | 8.2 | 1910 | 205 | -- | 3 |
| | 2906 | 07-Oct-86 | 1300 | 15 | 23 | -- | 6.8 | 865 | 254 | 56 | 203 | 3.8 | 146 | 8.2 | 960 | 99 | -- | 1.4 |
| | 3034 | 01-Dec-86 | 1500 | 15 | 20 | -- | 7.1 | 1980 | 566 | 137 | 726 | 3.5 | 191 | 7.9 | 2960 | 142 | -- | 3.4 |
| COC 7352 | 2730 | 12-Aug-86 | 1345 | 15 | 24 | -- | 7.3 | 2470 | 425 | 342 | 3890 | 14 | 322 | 8.1 | 8900 | 989 | -- | 28 |
| | 2793 | 09-Sep-86 | 1200 | 15 | 24 | -- | 7.4 | 3430 | 387 | 599 | 7100 | 23 | 333 | 8.1 | 15300 | 1660 | -- | 40 |
| | 2907 | 07-Oct-86 | 1230 | 15 | 25 | -- | 8.1 | 4040 | 464 | 700 | 8170 | 34 | 399 | 8.1 | 17100 | 2050 | -- | 53 |
| ERR 7525 | 2292 | 15-Jan-86 | 1000 | 16 | 16 | -- | 7.5 | 1080 | 200 | 142 | 1730 | 12 | 659 | 8 | 3160 | 693 | 18 | 4.8 |
| | 2381 | 24-Mar-86 | 1230 | 16 | 17 | -- | 7.4 | 1280 | 215 | 180 | 1800 | 13 | 655 | 7.8 | 3420 | 668 | 34 | 4.8 |
| | 2651 | 09-Jul-86 | 1015 | 16 | 20 | -- | 7.4 | 775 | 152 | 96 | 1040 | 8.2 | 553 | 8.4 | 1800 | 417 | 35 | 2.9 |
| | 2709 | 13-Aug-86 | 1125 | 16 | 21 | -- | 7.5 | 951 | 173 | 126 | 1300 | 10 | 513 | 8.3 | 2450 | 548 | -- | 3.4 |
| | 2794 | 10-Sep-86 | 1030 | 16 | 21 | -- | 7.4 | 1010 | 174 | 139 | 1580 | 12 | 561 | 8.4 | 2920 | 505 | -- | 4.2 |
| | 2908 | 08-Oct-86 | 930 | 16 | 21 | -- | 7.4 | -- | -- | -- | -- | -- | -- | 8.3 | -- | -- | -- | -- |
| | 2946 | 13-Nov-86 | 1030 | 16 | 20 | -- | 6.8 | -- | -- | -- | -- | -- | -- | 8.2 | -- | -- | -- | -- |
| | 3036 | 02-Dec-86 | 1015 | 16 | 19 | -- | 7.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TDS | LEC | COD | NH3-ORG | NO3+NO2 | D-NH3 | D-ORTHO | T-P | As | Ba | Cd | Cr | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | |
| CCN 3550 | 2377 | 26-Mar-86 | 2730 | 3710 | -- | -- | -- | -- | -- | -- | 0.015 | -- | -- | 0 | 0.01 |
| | 2650 | 09-Jul-86 | 3780 | 4980 | -- | -- | -- | -- | -- | -- | 0.018 | -- | -- | -- | -- |
| | 2705 | 13-Aug-86 | 1720 | 2440 | -- | 0.8 | 27 | 0 | -- | 0.21 | 0.012 | 0 | 0 | 0 | 0 |
| | 2789 | 10-Sep-86 | 2410 | 3290 | -- | 0.8 | 20 | 0.02 | 0.31 | 0.36 | 0.021 | -- | -- | 0.005 | 0 |
| | 2903 | 08-Oct-86 | 2690 | 3600 | -- | 1.1 | 16 | 0.1 | 0.4 | 0.42 | 0.021 | -- | -- | 0.005 | 0.005 |
| | 2941 | 13-Nov-86 | 3560 | 4660 | -- | -- | -- | -- | -- | -- | 0.021 | -- | -- | 0.005 | 0.005 |
| | 3031 | 02-Dec-86 | -- | 4880 | -- | -- | -- | -- | -- | -- | 0.019 | -- | -- | 0.005 | 0.005 |
| CNR 0801 | 2265 | 14-Jan-86 | 10700 | 11900 | -- | -- | -- | -- | -- | -- | 0.004 | 0 | 0 | 0 | 0 |
| | 2378 | 25-Mar-86 | 11200 | 12000 | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | 0 | 0.01 |
| | 2445 | 08-Apr-86 | 11900 | 13100 | -- | -- | -- | -- | -- | -- | 0.007 | -- | -- | 0 | 0.01 |
| | 2592 | 10-Jun-86 | 12800 | 13200 | -- | -- | -- | -- | -- | -- | 0.017 | -- | -- | 0 | 0.01 |
| | 2706 | 12-Aug-86 | 11500 | 12000 | -- | 0.7 | 21 | 0.02 | 0.01 | 0.02 | 0.013 | 0 | 0 | 0 | 0.01 |
| | 3032 | 01-Dec-86 | 12300 | 12700 | -- | 0.8 | 5.4 | 0 | 0 | 0.02 | 0.004 | -- | -- | 0.005 | 0.005 |
| COC 4126 | 2262 | 14-Jan-86 | 4160 | 4490 | -- | -- | -- | -- | -- | -- | 0.003 | 0 | 0 | 0 | 0 |
| | 2379 | 25-Mar-86 | 5190 | 5610 | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | 0 | 0.01 |
| | 2446 | 08-Apr-86 | 5180 | 5600 | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | 0 | 0 |
| | 2593 | 10-Jun-86 | 4890 | 5350 | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | 0 | 0.01 |
| | 2707 | 12-Aug-86 | 4380 | 4870 | -- | 1.2 | 80 | 0.02 | 0 | 0.03 | 0.003 | 0 | 0 | 0 | 0 |
| | 2791 | 09-Sep-86 | 4430 | 4630 | -- | 0.9 | 69 | 0.02 | 0.02 | 0.04 | 0.004 | -- | -- | 0 | 0 |
| | 2905 | 07-Oct-86 | 4200 | 4380 | -- | 0.8 | 56 | 0.02 | 0.02 | 0.02 | 0.003 | -- | -- | 0.005 | 0.005 |
| | 3033 | 01-Dec-86 | 4070 | 4240 | -- | 0.5 | 46 | 0.01 | 0 | 0.02 | 0.002 | -- | -- | 0.005 | 0.005 |
| COC 5329 | 2263 | 14-Jan-86 | 5330 | 6040 | -- | -- | -- | -- | -- | -- | 0.004 | 0 | 0 | 0 | 0 |
| | 2380 | 25-Mar-86 | 6600 | 7380 | -- | -- | -- | -- | -- | -- | 0.002 | -- | -- | 0 | 0.01 |
| | 2447 | 08-Apr-86 | 6476 | 7220 | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | 0 | 0 |
| | 2594 | 10-Jun-86 | 6160 | 7020 | -- | -- | -- | -- | -- | -- | 0.003 | -- | -- | 0 | 0.01 |
| | 2708 | 12-Aug-86 | 5230 | 5980 | -- | 1.1 | 45 | 0 | 0 | 0.04 | 0.01 | 0 | 0 | 0 | 0.01 |
| | 2792 | 09-Sep-86 | 3380 | 3900 | -- | 0.6 | 19 | 0.01 | 0.04 | 0.06 | 0.009 | -- | -- | 0.005 | 0 |
| | 2906 | 07-Oct-86 | 1770 | 2130 | -- | 0.6 | 5.4 | 0.02 | 0.07 | 0.08 | 0.016 | -- | -- | 0.005 | 0.005 |
| | 3034 | 01-Dec-86 | 4970 | 5100 | -- | 0.3 | 5.8 | 0 | 0.01 | 0.04 | 0.003 | -- | -- | 0.005 | 0.005 |
| COC 7352 | 2730 | 12-Aug-86 | 16000 | 16400 | -- | 0.8 | 26 | 0 | 0.05 | 0.05 | 0.006 | 0 | 0 | 0.007 | 0.01 |
| | 2793 | 09-Sep-86 | 26600 | 25100 | -- | 1.5 | 31 | 0.02 | 0.06 | 0.08 | 0.009 | -- | -- | 0.007 | 0.02 |
| | 2907 | 07-Oct-86 | 29300 | 26900 | -- | 2.1 | 17 | 0.02 | 0.09 | 0.1 | 0.005 | -- | -- | 0.005 | 0.006 |
| ERR 7525 | 2292 | 15-Jan-86 | 6540 | 8290 | -- | -- | -- | -- | -- | 2.5 | 0.122 | 0 | -- | 0 | 0.02 |
| | 2381 | 24-Mar-86 | 6770 | 8390 | -- | -- | -- | -- | -- | -- | 0.134 | -- | -- | 0 | 0.01 |
| | 2651 | 09-Jul-86 | 4050 | 5300 | -- | -- | -- | -- | -- | -- | 0.112 | -- | -- | -- | -- |
| | 2709 | 13-Aug-86 | 5060 | 6480 | -- | 1.4 | 4.2 | 0.15 | 1.8 | 2 | 0.1 | 0 | 0 | 0 | 0.01 |
| | 2794 | 10-Sep-86 | 5920 | 7330 | -- | 1 | 5.6 | 0.13 | 2.2 | 2.3 | 0.208 | -- | -- | 0.005 | 0.01 |
| | 2908 | 08-Oct-86 | 3620 | 4690 | -- | 1.3 | 6.4 | 0.08 | 2.7 | 2.8 | 0.18 | -- | -- | 0.005 | 0.008 |
| | 2946 | 13-Nov-86 | 4890 | 6110 | -- | -- | -- | -- | -- | -- | 0.153 | -- | -- | 0.005 | 0.008 |
| | 3036 | 02-Dec-86 | -- | 6370 | -- | -- | -- | -- | -- | -- | 0.126 | -- | -- | 0.005 | 0.007 |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | Fe | Pb | Mn | Hg | Se | Ag | Zn | Al | Co | Mo | Ni | Sr | V | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | | |
| CCN 3550 | 2377 | 26-Mar-86 | 0.01 | -- | 0.4 | -- | 0.001 | -- | 0 | -- | -- | -- | 0 | 1.6 | -- | -- |
| | 2650 | 09-Jul-86 | -- | -- | -- | -- | 0.002 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2705 | 13-Aug-86 | -- | 0 | 0.05 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 | 1.4 | -- | -- |
| | 2789 | 10-Sep-86 | 0.02 | -- | 0.57 | -- | 0.001 | -- | 0 | -- | -- | -- | -- | 1.4 | -- | -- |
| | 2903 | 08-Oct-86 | 0.013 | -- | 0.552 | -- | 0.001 | -- | -- | -- | -- | 0.168 | -- | 1.2 | -- | -- |
| | 2941 | 13-Nov-86 | 0.012 | -- | 1 | -- | 0.002 | -- | 0.005 | -- | -- | 0.168 | -- | 1.6 | -- | -- |
| | 3031 | 02-Dec-86 | 0.007 | -- | 1.38 | -- | 0 | -- | 0 | -- | -- | 0.144 | -- | 1.7 | -- | -- |
| CNR 0801 | 2265 | 14-Jan-86 | 0 | 0 | 0 | -- | 0.006 | 0 | 0 | 0 | 0 | -- | 0 | 6.5 | -- | -- |
| | 2378 | 25-Mar-86 | 0.01 | 0 | 0.18 | -- | 0.004 | -- | 0 | -- | -- | -- | 0 | 8.6 | -- | -- |
| | 2445 | 08-Apr-86 | 0.03 | -- | 0.11 | -- | 0.022 | -- | 0.01 | 0 | -- | -- | 0.01 | 8 | -- | -- |
| | 2592 | 10-Jun-86 | 0.02 | 0 | 0.01 | -- | 0.033 | -- | 0.01 | -- | -- | -- | 0 | 8 | -- | -- |
| | 2706 | 12-Aug-86 | 0.01 | 0 | 0.01 | 0 | 0.028 | 0 | 0 | 0 | 0 | -- | 0 | 6.6 | -- | -- |
| | 3032 | 01-Dec-86 | 0.005 | -- | 0.048 | -- | 0.003 | -- | 0.005 | -- | -- | 0.9 | -- | 6.8 | -- | -- |
| COC 4126 | 2262 | 14-Jan-86 | 0.04 | 0.01 | 0.09 | -- | 0.018 | 0 | 0.03 | 0 | 0 | -- | 0 | 4.8 | -- | -- |
| | 2379 | 25-Mar-86 | 0.01 | -- | 0.04 | -- | 0.031 | -- | 0.01 | -- | -- | -- | 0 | 5.9 | -- | -- |
| | 2446 | 08-Apr-86 | 0.01 | -- | 0.03 | -- | 0.029 | -- | 0.01 | -- | -- | -- | 0 | 5.9 | -- | -- |
| | 2593 | 10-Jun-86 | 0.01 | 0 | 0.04 | -- | 0.032 | -- | 0.01 | -- | -- | -- | 0 | 5.8 | -- | -- |
| | 2707 | 12-Aug-86 | 0 | 0 | 0.06 | 0 | 0.022 | 0 | 0.02 | 0 | 0 | -- | 0 | 5.2 | -- | -- |
| | 2791 | 09-Sep-86 | 0.01 | -- | 0.02 | -- | 0.021 | -- | 0 | -- | -- | -- | -- | 5 | -- | -- |
| | 2905 | 07-Oct-86 | 0.013 | -- | 0.074 | -- | 0.014 | -- | 0.008 | -- | -- | 0.137 | -- | 3.8 | -- | -- |
| | 3033 | 01-Dec-86 | 0.005 | -- | 0.145 | -- | 0.002 | -- | 0.005 | -- | -- | 0.086 | -- | 4.1 | -- | -- |
| COC 5329 | 2263 | 14-Jan-86 | 0 | 0 | 0.05 | -- | 0.248 | 0 | 0.01 | 0 | 0 | -- | 0 | 21 | -- | -- |
| | 2380 | 25-Mar-86 | 0.01 | -- | 0 | -- | 0.466 | -- | 0 | -- | -- | -- | 0 | 5.6 | -- | -- |
| | 2447 | 08-Apr-86 | 0.01 | -- | 0 | -- | 0.473 | -- | -- | -- | -- | -- | 0 | 5.3 | -- | -- |
| | 2594 | 10-Jun-86 | 0.02 | -- | 0 | -- | 0.438 | -- | 0.01 | -- | -- | -- | 0 | 5.4 | -- | -- |
| | 2708 | 12-Aug-86 | 0.02 | 0 | 0 | 0 | 0.246 | 0 | 0 | 0 | 0 | -- | 0 | 4.9 | -- | -- |
| | 2792 | 09-Sep-86 | 0.05 | -- | 0 | -- | 0.112 | -- | 0 | -- | -- | -- | -- | 3.3 | -- | -- |
| | 2906 | 07-Oct-86 | 0.008 | -- | 0.009 | -- | 0.017 | -- | 0.013 | -- | -- | 0.08 | -- | 1.4 | -- | -- |
| | 3034 | 01-Dec-86 | 0.005 | -- | 0.005 | -- | 0.045 | -- | 0.005 | -- | -- | 0.201 | -- | 4.7 | -- | -- |
| COC 7352 | 2730 | 12-Aug-86 | 0.01 | 0 | 0.01 | 0 | 0.006 | 0 | 0.04 | 0 | 0 | -- | 0 | 6.7 | -- | -- |
| | 2793 | 09-Sep-86 | 0.01 | -- | 0 | -- | 0.323 | -- | 0.04 | -- | -- | -- | -- | 8.7 | -- | -- |
| | 2907 | 07-Oct-86 | 0.038 | -- | 0.005 | -- | 0.115 | -- | 0.101 | -- | -- | 0.324 | -- | 10 | -- | -- |
| ERR 7525 | 2292 | 15-Jan-86 | 0.03 | 0 | 0.51 | -- | 0.006 | -- | -- | -- | 0 | -- | -- | 1.8 | -- | -- |
| | 2381 | 24-Mar-86 | 0.01 | -- | 0.25 | -- | 0.008 | -- | 0 | -- | -- | -- | 0.01 | 2 | -- | -- |
| | 2651 | 09-Jul-86 | -- | -- | -- | -- | 0.004 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2709 | 13-Aug-86 | 0.01 | 0 | 0.23 | 0 | 0.004 | 0 | 0 | 0 | 0.02 | -- | 0.02 | 1.5 | -- | -- |
| | 2794 | 10-Sep-86 | 0.02 | -- | 0.17 | -- | 0.005 | -- | 0 | -- | -- | -- | -- | 1.6 | -- | -- |
| | 2908 | 08-Oct-86 | 0.013 | -- | 0.22 | -- | 0.003 | -- | 0.005 | -- | -- | 0.62 | -- | 0.9 | -- | -- |
| | 2946 | 13-Nov-86 | 0.014 | -- | 0.338 | -- | 0.005 | -- | 0.005 | -- | -- | 0.304 | -- | 1.2 | -- | -- |
| | 3036 | 02-Dec-86 | 0.012 | -- | 0.426 | -- | 0.003 | -- | 0.005 | -- | -- | 0.565 | -- | 1.2 | -- | -- |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TYPE1 | NAME1 | CONC1 | TYPE2 | NAME2 | CONC2 |
|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | |
| CCN 3550 | 2377 | 26-Mar-86 | A | NA | -- | A | NA | -- |
| | 2650 | 09-Jul-86 | A | NA | -- | A | NA | -- |
| | 2705 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2789 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2903 | 08-Oct-86 | A | NA | -- | A | NA | -- |
| | 2941 | 13-Nov-86 | A | NA | -- | A | NA | -- |
| | 3031 | 02-Dec-86 | A | NA | -- | A | NA | -- |
| CNR 0801 | 2265 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2378 | 25-Mar-86 | A | NA | -- | A | NA | -- |
| | 2445 | 08-Apr-86 | A | NA | -- | A | NA | -- |
| | 2592 | 10-Jun-86 | A | NA | -- | A | NA | -- |
| | 2706 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 3032 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| COC 4126 | 2262 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2379 | 25-Mar-86 | A | NA | -- | A | NA | -- |
| | 2446 | 08-Apr-86 | A | NA | -- | A | NA | -- |
| | 2593 | 10-Jun-86 | A | NA | -- | A | NA | -- |
| | 2707 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2791 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2905 | 07-Oct-86 | A | NA | -- | A | NA | -- |
| | 3033 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| COC 5329 | 2263 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2380 | 25-Mar-86 | A | NA | -- | A | NA | -- |
| | 2447 | 08-Apr-86 | A | NA | -- | A | NA | -- |
| | 2594 | 10-Jun-86 | A | NA | -- | A | NA | -- |
| | 2708 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2792 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2906 | 07-Oct-86 | A | NA | -- | A | NA | -- |
| | 3034 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| COC 7352 | 2730 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2793 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2907 | 07-Oct-86 | A | NA | -- | A | NA | -- |
| ERR 7525 | 2292 | 15-Jan-86 | A | NA | -- | A | NA | -- |
| | 2381 | 24-Mar-86 | A | NA | -- | A | NA | -- |
| | 2651 | 09-Jul-86 | A | NA | -- | A | NA | -- |
| | 2709 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2794 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2908 | 08-Oct-86 | A | NA | -- | A | NA | -- |
| | 2946 | 13-Nov-86 | A | NA | -- | A | NA | -- |
| | 3036 | 02-Dec-86 | A | NA | -- | A | NA | -- |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TIME | CO | TEMP | FEC | FpH | HARD | Ca | Mg | Na | K | TALK | LpH | SO4 | Cl | NO3 | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | | | | |
| ERR 8429 | 2293 | 15-Jan-86 | 1015 | 16 | 17 | -- | 7.4 | 461 | 84 | 61 | 1120 | 3.8 | 755 | 8.1 | 1370 | 550 | 38 | 2.5 |
| | 2382 | 24-Mar-86 | 1200 | 16 | 17 | -- | 7.4 | 789 | 103 | 129 | 1910 | 6 | 804 | 7.8 | 2510 | 1010 | 42 | 3.2 |
| | 2448 | 07-Apr-86 | 1145 | 16 | 17 | -- | 7.6 | 734 | 106 | 114 | 1940 | 6.2 | 794 | 7.8 | 2500 | 1010 | 45 | 3.4 |
| | 2595 | 10-Jun-86 | 1045 | 16 | 19 | -- | 7.5 | 607 | 98 | 88 | 1500 | 5 | 720 | 8.1 | 1900 | 737 | 41 | 2.7 |
| | 2710 | 13-Aug-86 | 1145 | 16 | 22 | -- | 7.4 | 490 | 84 | 68 | 1020 | 4.3 | 687 | 8.3 | 1200 | 536 | -- | 2.2 |
| | 2795 | 10-Sep-86 | 1045 | 16 | 22 | -- | 7.3 | 537 | 88 | 77 | 1250 | 4.6 | 697 | 8.6 | 1550 | 643 | -- | 2.3 |
| | 2909 | 08-Oct-86 | 1000 | 16 | 21 | -- | 7.4 | -- | -- | -- | -- | -- | -- | 8.3 | -- | -- | -- | -- |
| | 2947 | 13-Nov-86 | 1100 | 16 | 21 | -- | 7.4 | -- | -- | -- | -- | -- | -- | 8.2 | -- | -- | -- | -- |
| | 3037 | 02-Dec-86 | 1045 | 16 | 20 | -- | 7.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| ERR 8641 | 2383 | 24-Mar-86 | 1130 | 16 | 17 | -- | 7.2 | 3960 | 335 | 758 | 5870 | 38 | 626 | 7.3 | 11000 | 2760 | 43 | 5.2 |
| | 2449 | 07-Apr-86 | 1130 | 16 | 16 | -- | 7.3 | 4160 | 372 | 785 | 6890 | 42 | 701 | 7.4 | 12500 | 3200 | 53 | 5.8 |
| | 2596 | 10-Jun-86 | 1105 | 16 | 18 | -- | 7.3 | 3610 | 338 | 671 | 5920 | 36 | 659 | 7.4 | 11100 | 2770 | 14 | 4.5 |
| | 2711 | 13-Aug-86 | 1205 | 16 | 20 | -- | 7.2 | 2930 | 260 | 555 | 4480 | 30 | 537 | 7.6 | 8580 | 2210 | -- | 4.4 |
| | 2796 | 10-Sep-86 | 1100 | 16 | 21 | -- | 7.3 | 2690 | 234 | 512 | 4280 | 29 | 471 | 8.2 | 8130 | 2120 | -- | 4.1 |
| | 2910 | 08-Oct-86 | 1015 | 16 | 20 | -- | 7.4 | -- | -- | -- | -- | -- | -- | 7.9 | -- | -- | -- | -- |
| | 2948 | 13-Nov-86 | 1130 | 16 | 20 | -- | 7.3 | -- | -- | -- | -- | -- | -- | 7.8 | -- | -- | -- | -- |
| | 3038 | 02-Dec-86 | 1100 | 16 | 19 | -- | 7.4 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| GSY 0855 | 2911 | 08-Oct-86 | 1030 | 16 | 20 | -- | 7 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| HCH 7439 | 2299 | 15-Jan-86 | 900 | 16 | 17 | -- | 8.2 | 2050 | 207 | 373 | 6640 | 12 | 525 | 8.2 | 9330 | 4300 | 9.7 | 13 |
| | 2385 | 26-Mar-86 | 1130 | 16 | 18 | -- | 8.1 | 2380 | 230 | 438 | 7380 | 14 | 507 | 8 | 10400 | 4840 | 9.3 | 14 |
| | 2450 | 07-Apr-86 | 1235 | 16 | 17 | -- | 8.1 | 2560 | 242 | 474 | 7980 | 15 | 526 | 8.1 | 11000 | 5260 | 9.1 | 15 |
| | 2597 | 10-Jun-86 | 1000 | 16 | 19 | -- | 8.2 | 2110 | 220 | 380 | 6340 | 12 | 475 | 8.1 | 9190 | 4090 | 18 | 12 |
| | 2713 | 13-Aug-86 | 935 | 16 | 21 | -- | 8.1 | -- | 186 | 385 | 6060 | 14 | 481 | 8.3 | 7720 | 4330 | -- | 12 |
| | 2798 | 10-Sep-86 | 915 | 16 | 21 | -- | 8.1 | 1830 | 181 | 334 | 5570 | 12 | 466 | 8.3 | 7530 | 3630 | -- | 22 |
| | 2912 | 08-Oct-86 | 745 | 16 | 22 | -- | 8.2 | -- | -- | -- | -- | -- | -- | 8.3 | -- | -- | -- | -- |
| | 2950 | 13-Nov-86 | 845 | 16 | 20 | -- | 8.2 | -- | -- | -- | -- | -- | -- | 8.2 | -- | -- | -- | -- |
| | 3040 | 02-Dec-86 | 825 | 16 | 20 | -- | 8.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| LME 7569 | 2266 | 13-Jan-86 | 1110 | 16 | 16 | -- | 7 | 541 | 139 | 47 | 547 | 2.2 | 487 | 7.7 | 969 | 173 | 16 | 0.7 |
| | 2386 | 24-Mar-86 | 830 | 16 | 16 | -- | 7 | 382 | 92 | 37 | 391 | 3.5 | 316 | 7.8 | 700 | 84 | 73 | 0.6 |
| | 2451 | 08-Apr-86 | 1520 | 16 | 17 | -- | 7.1 | 370 | 92 | 34 | 387 | 3.6 | 325 | 7.8 | 665 | 81 | 74 | 0.6 |
| | 2598 | 09-Jun-86 | 820 | 16 | 19 | -- | 7.1 | 293 | 76 | 25 | 309 | 2.6 | 296 | 8 | 504 | 64 | 53 | 0.5 |
| | 2714 | 13-Aug-86 | 800 | 16 | 24 | -- | 7 | 204 | 52 | 18 | 238 | 2.2 | 223 | 8.4 | 347 | 37 | -- | 0.5 |
| | 2799 | 10-Sep-86 | 800 | 16 | 22 | -- | 7.1 | 259 | 66 | 23 | 290 | 2.5 | 281 | 8.6 | 463 | 51 | -- | 0.6 |
| | 2914 | 07-Oct-86 | 845 | 15 | 21 | -- | 7.8 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2952 | 12-Nov-86 | 950 | 15 | 20 | -- | 7.7 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| LNW 4457 | 2682 | 30-Jul-86 | 1115 | 15 | 21 | -- | -- | 2080 | 615 | 132 | 2920 | 2.1 | 150 | 8 | 4030 | 2710 | -- | 21 |
| LNW 5454 | 2269 | 13-Jan-86 | 1605 | 15 | 18 | -- | 7.6 | 2590 | 486 | 334 | 8290 | 5.5 | 191 | 7.7 | 11200 | 6460 | 84 | 58 |
| | 2412 | 07-Mar-86 | 1140 | 15 | 18 | 24000 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2387 | 25-Mar-86 | 1000 | 15 | 17 | -- | 8 | 2600 | 480 | 340 | 8290 | 6.5 | 221 | 7.8 | 11500 | 5420 | 142 | 65 |
| | 2452 | 08-Apr-86 | 1145 | 15 | 18 | -- | 8 | 2520 | 490 | 315 | 8250 | 6.7 | 222 | 7.9 | 11400 | 5650 | 135 | 65 |
| | 2599 | 09-Jun-86 | 1210 | 15 | 20 | -- | 7.9 | 2530 | 492 | 317 | 8540 | 5.7 | 199 | 7.8 | 12000 | 6050 | 120 | 65 |
| | 2678 | 30-Jul-86 | 1030 | 15 | 21 | -- | -- | 2690 | 508 | 345 | 8190 | 4.5 | 205 | 8 | 11400 | 6000 | -- | 68 |
| | 2715 | 12-Aug-86 | 1000 | 15 | 21 | -- | 7 | 2440 | 443 | 320 | 8300 | 5.4 | 204 | 7.9 | 10800 | 5980 | -- | 68 |
| | 2800 | 09-Sep-86 | 900 | 15 | 22 | -- | 7.8 | 2500 | 473 | 321 | 8278 | 5.7 | 201 | 7.9 | 11000 | 6250 | -- | 63 |
| | 2914 | 07-Oct-86 | 845 | 15 | 21 | -- | 7.8 | 2820 | 546 | 354 | 8360 | 3.6 | 197 | 7.8 | 11800 | 6060 | -- | 63 |
| | 2952 | 12-Nov-86 | 950 | 15 | 20 | -- | 7.7 | 2960 | 554 | 382 | 8950 | 3.5 | 198 | 7.8 | 12300 | 6790 | -- | 56 |
| | 3042 | 01-Dec-86 | 1000 | 15 | 20 | -- | 7.7 | 2940 | 546 | 384 | 8910 | 2.8 | 199 | 7.8 | 11800 | 6570 | -- | 60 |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TDS | LEC | COD | NH3-ORG | NO3+NO2 | D-NH3 | D-ORTHO | T-P | As | Ba | Cd | Cr | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | |
| ERR 8429 | 2293 | 15-Jan-86 | 3810 | 5290 | -- | -- | -- | -- | -- | 2.7 | 0.078 | 0 | -- | 0 | 0.01 |
| | 2382 | 24-Mar-86 | 6280 | 8430 | -- | -- | -- | -- | -- | -- | 0.074 | -- | -- | 0 | 0.01 |
| | 2448 | 07-Apr-86 | 6330 | 8420 | -- | -- | -- | -- | -- | -- | 0.08 | -- | -- | 0 | 0.02 |
| | 2595 | 10-Jun-86 | 4870 | 6790 | -- | -- | -- | -- | -- | -- | 0.071 | -- | -- | 0 | 0.01 |
| | 2710 | 13-Aug-86 | 3660 | 5180 | -- | 2.3 | 10 | 0.18 | 1.9 | 2.3 | 0.055 | 0 | 0 | 0.005 | 0.01 |
| | 2795 | 10-Sep-86 | 4270 | 5910 | -- | 1.2 | 9.4 | 0.36 | 2.2 | 2.3 | 0.062 | -- | -- | 0.005 | 0.01 |
| | 2909 | 08-Oct-86 | 4350 | 5910 | -- | 2.2 | 11 | 0.31 | 2.2 | 2.4 | 0.084 | -- | -- | 0.005 | 0.008 |
| | 2947 | 13-Nov-86 | 5020 | 6890 | -- | -- | -- | -- | -- | -- | 0.075 | -- | -- | 0.005 | 0.01 |
| | 3037 | 02-Dec-86 | -- | 9260 | -- | -- | -- | -- | -- | -- | 0.07 | -- | -- | 0.005 | 0.009 |
| ERR 8641 | 2383 | 24-Mar-86 | 21800 | 23000 | -- | -- | -- | -- | -- | -- | 0.028 | -- | -- | 0 | 0.01 |
| | 2449 | 07-Apr-86 | 25300 | 25900 | -- | -- | -- | -- | -- | -- | 0.035 | -- | -- | 0 | 0.02 |
| | 2596 | 10-Jun-86 | 21700 | 23000 | -- | -- | -- | -- | -- | -- | 0.033 | -- | -- | 0 | 0.02 |
| | 2711 | 13-Aug-86 | 16800 | 18200 | -- | 15 | 2.2 | 1.7 | 1.5 | 2.5 | 0.024 | 0 | 0 | 0.005 | 0.01 |
| | 2796 | 10-Sep-86 | 15700 | 17000 | -- | 10 | 1.1 | 6.6 | 1.7 | 1.9 | 0.03 | -- | -- | 0.005 | 0.01 |
| | 2910 | 08-Oct-86 | 15500 | 16700 | -- | 10 | 2.6 | 5.7 | 1.7 | 2.1 | 0.036 | -- | -- | 0.005 | 0.005 |
| | 2948 | 13-Nov-86 | 14600 | 16300 | -- | -- | -- | -- | -- | -- | 0.039 | -- | -- | 0.005 | 0.007 |
| | 3038 | 02-Dec-86 | -- | 15900 | -- | -- | -- | -- | -- | -- | 0.047 | -- | -- | 0.05 | 0.007 |
| GSY 0855 | 2911 | 08-Oct-86 | 17000 | 17200 | -- | 7.3 | 2.2 | 2.8 | 1 | 1.1 | 0.039 | -- | -- | 0.005 | 0.007 |
| HCH 7439 | 2299 | 15-Jan-86 | 21700 | 25500 | -- | -- | -- | -- | -- | 0.7 | 0.276 | 0 | -- | 0 | 0.01 |
| | 2385 | 26-Mar-86 | 24100 | 27500 | -- | -- | -- | -- | -- | -- | 0.267 | -- | -- | 0 | 0.01 |
| | 2450 | 07-Apr-86 | 26200 | 28900 | -- | -- | -- | -- | -- | -- | 0.286 | -- | -- | 0 | 0.01 |
| | 2597 | 10-Jun-86 | 21000 | 24300 | -- | -- | -- | -- | -- | -- | 0.319 | -- | -- | 0 | 0.01 |
| | 2713 | 13-Aug-86 | 20400 | 23400 | -- | 1.9 | 9.7 | 0 | 0.52 | 0.56 | 0.247 | 0 | 0 | 0.005 | 0.01 |
| | 2798 | 10-Sep-86 | 18300 | 21100 | -- | 1.9 | 3.8 | 0.01 | 0.6 | 0.62 | 0.336 | -- | -- | 0.005 | 0.01 |
| | 2912 | 08-Oct-86 | 19300 | 21800 | -- | 2.9 | 5.5 | 0.02 | 0.6 | 0.62 | 0.306 | -- | -- | 0.005 | 0.005 |
| | 2950 | 13-Nov-86 | 17400 | 20700 | -- | -- | -- | -- | -- | -- | 0.337 | -- | -- | 0.005 | 0.006 |
| | 3040 | 02-Dec-86 | -- | 19200 | -- | -- | -- | -- | -- | -- | 0.284 | -- | -- | 0.005 | 0.007 |
| LME 7569 | 2266 | 13-Jan-86 | 2230 | 3110 | -- | -- | -- | -- | -- | -- | 0.003 | 0 | 0 | 0 | 0 |
| | 2386 | 24-Mar-86 | 1580 | 2260 | -- | -- | -- | -- | -- | -- | 0.003 | -- | -- | 0 | 0 |
| | 2451 | 08-Apr-86 | 1560 | 2220 | -- | -- | -- | -- | -- | -- | 0.003 | -- | -- | 0 | 0.01 |
| | 2598 | 09-Jun-86 | 1270 | 1820 | -- | -- | -- | -- | -- | -- | 0.003 | -- | -- | 0 | 0 |
| | 2714 | 13-Aug-86 | 947 | 1490 | -- | 0.8 | 19 | 0.02 | 0.31 | 0.36 | 0.003 | 0 | 0 | 0.005 | 0.01 |
| | 2799 | 10-Sep-86 | 1200 | 1730 | -- | 0.7 | 16 | 0 | 0.33 | 0.4 | 0.003 | -- | -- | 0.005 | 0 |
| | 2914 | 07-Oct-86 | -- | -- | -- | -- | -- | -- | -- | -- | 0.007 | -- | -- | 0.011 | 0.005 |
| | 2952 | 12-Nov-86 | -- | -- | -- | -- | -- | -- | -- | -- | 0.006 | -- | -- | 0.011 | 0.007 |
| LNW 4457 | 2682 | 30-Jul-86 | 11000 | 14000 | -- | 0.7 | 38 | 0 | 0.02 | 0.02 | 0.006 | -- | -- | 0 | 0 |
| LNW 5454 | 2269 | 13-Jan-86 | 28000 | 32200 | -- | -- | -- | -- | -- | -- | 0.006 | 0 | 0 | 0 | 0.01 |
| | 2412 | 07-Mar-86 | -- | -- | -- | -- | 22 | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2387 | 25-Mar-86 | 27000 | 29900 | -- | -- | -- | -- | -- | -- | 0.007 | -- | -- | 0 | 0.01 |
| | 2452 | 08-Apr-86 | 27200 | 30000 | -- | -- | -- | -- | -- | -- | 0.008 | -- | -- | 0 | 0.01 |
| | 2599 | 09-Jun-86 | 28100 | 30100 | -- | -- | -- | -- | -- | -- | 0.007 | -- | -- | 0 | 0.01 |
| | 2678 | 30-Jul-86 | 27600 | 30100 | -- | 1.4 | 30 | 0 | -- | 0.08 | 0.008 | -- | -- | 0 | 0.01 |
| | 2715 | 12-Aug-86 | 28000 | 30100 | -- | 1.2 | 27 | 0.01 | 0.08 | 0.09 | 0.009 | 0 | 0 | 0.013 | 0.01 |
| | 2800 | 09-Sep-86 | 27400 | 29300 | -- | 1.3 | 28 | 0.01 | 0.07 | 0.1 | 0.008 | -- | -- | 0.011 | 0.01 |
| | 2914 | 07-Oct-86 | 28400 | 30200 | -- | 1.2 | 24 | 0.01 | 0.08 | 0.08 | 0.007 | -- | -- | 0.011 | 0.005 |
| | 2952 | 12-Nov-86 | 29400 | 32000 | -- | 1.2 | 26 | 0.02 | 0.09 | 0.09 | 0.006 | -- | -- | 0.011 | 0.007 |
| | 3042 | 01-Dec-86 | 28800 | 30900 | -- | 1.2 | 22 | 0 | 0.02 | 0.14 | 0.002 | -- | -- | 0.01 | 0.007 |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | Fe | Pb | Mn | Hg | Se | Ag | Zn | Al | Co | Mo | Ni | Sr | V | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | | |
| ERR 8429 | 2293 | 15-Jan-86 | 0.09 | 0 | 0.22 | -- | 0.004 | -- | -- | -- | 0 | -- | -- | 1 | -- | -- |
| | 2382 | 24-Mar-86 | 0.05 | -- | 0.26 | -- | 0.002 | -- | 0 | -- | -- | -- | 0.01 | 1 | -- | -- |
| | 2448 | 07-Apr-86 | 0.1 | -- | 0.41 | -- | 0.003 | -- | 0 | -- | -- | -- | 0.01 | 1.3 | -- | -- |
| | 2595 | 10-Jun-86 | 0.03 | -- | 0.26 | -- | 0.003 | -- | 0.01 | -- | -- | -- | 0.01 | 1.2 | -- | -- |
| | 2710 | 13-Aug-86 | 0.02 | 0.005 | 0.13 | 0 | 0.002 | 0 | 0 | 0 | 0 | -- | 0.01 | 0.9 | -- | -- |
| | 2795 | 10-Sep-86 | 0.06 | 3 | 0.27 | -- | 0.02 | -- | 0 | -- | -- | -- | -- | 0.9 | -- | -- |
| | 2909 | 08-Oct-86 | 0.01 | -- | 0.182 | -- | 0.003 | -- | 0.005 | -- | -- | 0.276 | -- | 0.5 | -- | -- |
| | 2947 | 13-Nov-86 | 0.169 | -- | 0.388 | -- | 0.003 | -- | 0.006 | -- | -- | 0.37 | -- | 0.8 | -- | -- |
| | 3037 | 02-Dec-86 | 0.056 | -- | 0.253 | -- | 0.002 | -- | 0.005 | -- | -- | 0.47 | -- | 1.1 | -- | -- |
| ERR 8641 | 2383 | 24-Mar-86 | 0.84 | -- | 3 | -- | 0.011 | -- | 0 | -- | -- | -- | 0.02 | 4.5 | -- | -- |
| | 2449 | 07-Apr-86 | 0.45 | -- | 3 | -- | 0.015 | -- | 0.01 | -- | -- | -- | 0.02 | 5.4 | -- | -- |
| | 2596 | 10-Jun-86 | 0.8 | -- | 2.9 | -- | 0.014 | -- | 0.01 | -- | -- | -- | 0.02 | 4.7 | -- | -- |
| | 2711 | 13-Aug-86 | 0.83 | 0.005 | 2.2 | 0 | 0.003 | 0 | 0.01 | 0 | 0 | -- | 0.01 | 3.4 | -- | -- |
| | 2796 | 10-Sep-86 | 0.62 | -- | 2 | -- | 0.003 | -- | 0 | -- | -- | -- | -- | 3.1 | -- | -- |
| | 2910 | 08-Oct-86 | 0.041 | -- | 2.11 | -- | 0.004 | -- | 0.005 | -- | -- | 0.376 | -- | 2.3 | -- | -- |
| | 2948 | 13-Nov-86 | 0.36 | -- | 1.86 | -- | 0.004 | -- | 0.005 | -- | -- | 0.358 | -- | 2.7 | -- | -- |
| | 3038 | 02-Dec-86 | 0.912 | -- | 1.98 | -- | 0.003 | -- | 0.005 | -- | -- | 0.525 | -- | 2.7 | -- | -- |
| GSY 0855 | 2911 | 08-Oct-86 | 0.011 | -- | 7.52 | -- | 0.011 | -- | 0.005 | -- | -- | 0.366 | -- | 2.4 | -- | -- |
| HCH 7439 | 2299 | 15-Jan-86 | 0.07 | 0 | 0 | -- | 0.017 | -- | -- | -- | 0 | -- | -- | 5.6 | -- | -- |
| | 2385 | 26-Mar-86 | 0.06 | -- | 0.01 | -- | 0.03 | -- | 0 | -- | -- | -- | 0 | 6.5 | -- | -- |
| | 2450 | 07-Apr-86 | 0.13 | -- | 0.01 | -- | 0.02 | -- | 0 | -- | -- | -- | 0 | 5.9 | -- | -- |
| | 2597 | 10-Jun-86 | 0.04 | -- | 0.01 | 0 | 0.014 | -- | 0.01 | -- | -- | -- | 0 | 5.2 | -- | -- |
| | 2713 | 13-Aug-86 | 0.01 | 0.005 | 0.02 | 0 | 0.019 | 0 | 0 | 0 | 0 | -- | 0 | 5.3 | -- | -- |
| | 2798 | 10-Sep-86 | 0.04 | -- | 0.01 | -- | 0.017 | -- | 0 | -- | -- | -- | -- | 4.5 | -- | -- |
| | 2912 | 08-Oct-86 | 0.011 | -- | 0.018 | -- | 0.025 | -- | 0.005 | -- | -- | 6.05 | -- | 4.4 | -- | -- |
| | 2950 | 13-Nov-86 | 0.005 | -- | 0.018 | -- | 0.012 | -- | 0.005 | -- | -- | 4.06 | -- | 4.2 | -- | -- |
| | 3040 | 02-Dec-86 | 0.009 | -- | 0.011 | -- | 0.003 | -- | 0.005 | -- | -- | 3.95 | -- | 4 | -- | -- |
| LME 7569 | 2266 | 13-Jan-86 | 0.04 | 0 | 0.01 | -- | 0.001 | 0 | 0.04 | 0 | 0 | -- | 0 | 0.8 | -- | -- |
| | 2386 | 24-Mar-86 | 0.02 | -- | 0.02 | -- | 0.001 | -- | 0 | -- | -- | -- | 0 | 0.7 | -- | -- |
| | 2451 | 08-Apr-86 | 0.02 | -- | 0.02 | -- | 0.001 | -- | 0 | -- | -- | -- | 0 | 0.7 | -- | -- |
| | 2598 | 09-Jun-86 | 0.02 | -- | 0.02 | -- | 0.002 | -- | 0.01 | -- | -- | -- | 0 | 0.5 | -- | -- |
| | 2714 | 13-Aug-86 | 0.01 | 0.005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 | 0.4 | -- | -- |
| | 2799 | 10-Sep-86 | 0 | -- | 0.01 | -- | 0.002 | -- | 0 | -- | -- | -- | -- | 0.5 | -- | -- |
| | 2914 | 07-Oct-86 | 0.006 | -- | 0.005 | -- | 0.163 | -- | 0.005 | -- | -- | 0.94 | -- | 9.7 | -- | -- |
| | 2952 | 12-Nov-86 | 0.005 | -- | 0.005 | -- | 0.21 | -- | 0.005 | -- | -- | 1.71 | -- | 10 | -- | -- |
| LNW 4457 | 2682 | 30-Jul-86 | 0.01 | 0 | -- | -- | 0.133 | -- | 0.01 | -- | -- | -- | -- | 7.2 | -- | -- |
| LNW 5454 | 2269 | 13-Jan-86 | 0.01 | 0 | 0 | -- | 0.228 | 0 | 0 | 0 | 0 | -- | 0 | 10 | -- | -- |
| | 2412 | 07-Mar-86 | -- | -- | -- | -- | 0.169 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2387 | 25-Mar-86 | 0 | -- | 0 | -- | 0.168 | -- | 0 | -- | -- | -- | 0 | 9.1 | -- | -- |
| | 2452 | 08-Apr-86 | 0.01 | -- | 0 | -- | 0.142 | -- | 0 | -- | -- | -- | 0 | 9 | -- | -- |
| | 2599 | 09-Jun-86 | 0.01 | -- | 0 | -- | 0.172 | -- | -- | -- | -- | -- | 0 | 9.4 | -- | -- |
| | 2678 | 30-Jul-86 | 0 | 0 | -- | -- | 0.168 | -- | 0.01 | -- | -- | -- | -- | 8.6 | -- | -- |
| | 2715 | 12-Aug-86 | 0.04 | 0.005 | 0 | 0 | 0.199 | 0.01 | 0.01 | 0 | 0 | -- | 0 | 11 | -- | -- |
| | 2800 | 09-Sep-86 | 0.01 | -- | 0 | -- | 0.206 | -- | 0 | -- | -- | -- | -- | 9.7 | -- | -- |
| | 2914 | 07-Oct-86 | 0.006 | -- | 0.005 | -- | 0.163 | -- | 0.005 | -- | -- | 0.94 | -- | 9.7 | -- | -- |
| | 2952 | 12-Nov-86 | 0.005 | -- | 0.005 | -- | 0.21 | -- | 0.005 | -- | -- | 1.71 | -- | 10 | -- | -- |
| | 3042 | 01-Dec-86 | 0.012 | -- | 0.005 | -- | 0.194 | -- | 0.005 | -- | -- | 1.64 | -- | 10 | -- | -- |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TYPE1 | NAME1 | CONC1 | TYPE2 | NAME2 | CONC2 |
|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | |
| ERR 8429 | 2293 | 15-Jan-86 | A | NA | -- | A | NA | -- |
| | 2382 | 24-Mar-86 | A | NA | -- | A | NA | -- |
| | 2448 | 07-Apr-86 | A | NA | -- | A | NA | -- |
| | 2595 | 10-Jun-86 | A | NA | -- | A | NA | -- |
| | 2710 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2795 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2909 | 08-Oct-86 | A | NA | -- | A | NA | -- |
| | 2947 | 13-Nov-86 | A | NA | -- | A | NA | -- |
| | 3037 | 02-Dec-86 | A | NA | -- | A | NA | -- |
| ERR 8641 | 2383 | 24-Mar-86 | A | NA | -- | A | NA | -- |
| | 2449 | 07-Apr-86 | A | NA | -- | A | NA | -- |
| | 2596 | 10-Jun-86 | A | NA | -- | A | NA | -- |
| | 2711 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2796 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2910 | 08-Oct-86 | A | NA | -- | A | NA | -- |
| | 2948 | 13-Nov-86 | A | NA | -- | A | NA | -- |
| | 3038 | 02-Dec-86 | A | NA | -- | A | NA | -- |
| GSY 0855 | 2911 | 08-Oct-86 | A | NA | -- | A | NA | -- |
| HCH 7439 | 2299 | 15-Jan-86 | A | NA | -- | A | NA | -- |
| | 2385 | 26-Mar-86 | A | NA | -- | A | NA | -- |
| | 2450 | 07-Apr-86 | A | NA | -- | A | NA | -- |
| | 2597 | 10-Jun-86 | A | NA | -- | A | NA | -- |
| | 2713 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2798 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2912 | 08-Oct-86 | A | NA | -- | A | NA | -- |
| | 2950 | 13-Nov-86 | A | NA | -- | A | NA | -- |
| | 3040 | 02-Dec-86 | A | NA | -- | A | NA | -- |
| LME 7569 | 2266 | 13-Jan-86 | A | NA | -- | A | NA | -- |
| | 2386 | 24-Mar-86 | A | NA | -- | A | NA | -- |
| | 2451 | 08-Apr-86 | A | NA | -- | A | NA | -- |
| | 2598 | 09-Jun-86 | A | NA | -- | A | NA | -- |
| | 2714 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2799 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2914 | 07-Oct-86 | A | NA | -- | A | NA | -- |
| | 2952 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| LNW 4457 | 2682 | 30-Jul-86 | A | NA | -- | A | NA | -- |
| LNW 5454 | 2269 | 13-Jan-86 | A | NA | -- | A | NA | -- |
| | 2412 | 07-Mar-86 | A | NA | -- | A | NA | -- |
| | 2387 | 25-Mar-86 | A | NA | -- | A | NA | -- |
| | 2452 | 08-Apr-86 | A | NA | -- | A | NA | -- |
| | 2599 | 09-Jun-86 | A | NA | -- | A | NA | -- |
| | 2678 | 30-Jul-86 | A | NA | -- | A | NA | -- |
| | 2715 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2800 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2914 | 07-Oct-86 | A | NA | -- | A | NA | -- |
| | 2952 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3042 | 01-Dec-86 | A | NA | -- | A | NA | -- |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TIME | CO | TEMP | FEC | FpH | HARD | Ca | Mg | Na | K | TALK | LpH | SO4 | Cl | NO3 | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | | | | |
| LNW 5467 | 2270 | 13-Jan-86 | 1520 | 15 | 17 | -- | 7.5 | 1910 | 568 | 120 | 2340 | 1.8 | 154 | 7.7 | 4110 | 1770 | 206 | 19 |
| | 2416 | 07-Mar-86 | 1220 | 15 | 17.8 | 7000 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2388 | 25-Mar-86 | 1030 | 15 | 18 | -- | 7.3 | 1960 | 562 | 134 | 2380 | 2.2 | 175 | 7.7 | 3980 | 1710 | 210 | 17 |
| | 2453 | 08-Apr-86 | 1210 | 15 | 18 | -- | 7.3 | 1780 | 575 | 84 | 1420 | 2.1 | 157 | 7.7 | 3160 | 901 | 161 | 11 |
| | 2600 | 09-Jun-86 | 1220 | 15 | 20 | -- | 7.3 | 2110 | 572 | 165 | 3020 | 2.4 | 164 | 7.8 | 4640 | 2710 | 212 | 22 |
| | 2683 | 30-Jul-86 | 1430 | 15 | 22 | -- | -- | 2140 | 583 | 166 | 3070 | 2.2 | 160 | 8.1 | 4610 | 2440 | -- | 22 |
| | 2716 | 12-Aug-86 | 1020 | 15 | 22 | -- | 7.3 | 2020 | 525 | 171 | 3130 | 2.3 | 163 | 8 | 4400 | 2460 | -- | 35 |
| | 2801 | 09-Sep-86 | 945 | 15 | 23 | -- | 7.2 | 2050 | 554 | 162 | 2940 | 2.2 | 162 | 8.1 | 4600 | 2390 | -- | 22 |
| | 2915 | 07-Oct-86 | 900 | 15 | 22 | -- | 7.3 | 2300 | 608 | 190 | 3360 | 1.4 | 165 | 7.9 | 5420 | 2470 | -- | 28 |
| | 2953 | 12-Nov-86 | 1020 | 15 | 21 | -- | 7.4 | 2210 | 574 | 188 | 3500 | 1.5 | 160 | 7.9 | 5350 | 2670 | -- | 25 |
| | 3043 | 01-Dec-86 | 1020 | 15 | 19 | -- | 7.7 | 2230 | 580 | 189 | 3340 | 1.1 | 163 | 8 | 5220 | 2600 | -- | 25 |
| LNW 6459 | 2403 | 07-Mar-86 | 1000 | 15 | 17.8 | 42000 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2389 | 25-Mar-86 | 930 | 15 | 17 | -- | 8 | 3610 | 588 | 520 | 14900 | 8.8 | 232 | 7.7 | 12700 | 15600 | 109 | 56 |
| | 2454 | 08-Apr-86 | 1130 | 15 | 18 | -- | 7.9 | 3780 | 600 | 555 | 15500 | 8.4 | 218 | 7.7 | 12800 | 16900 | 128 | 59 |
| | 2601 | 09-Jun-86 | 1155 | 15 | 19 | -- | 7.9 | 3580 | 588 | 512 | 15000 | 8 | 221 | 7.8 | 12900 | 16300 | 145 | 60 |
| | 2668 | 30-Jul-86 | 830 | 15 | 21 | -- | -- | 3710 | 575 | 552 | 15100 | 7.2 | 210 | 7.8 | 11900 | 17000 | -- | 55 |
| | 2717 | 12-Aug-86 | 930 | 15 | 21 | -- | 7.9 | 3350 | 507 | 506 | 14300 | 7.8 | 204 | 7.9 | 11300 | 15800 | -- | 53 |
| | 2802 | 09-Sep-86 | 845 | 15 | 20 | -- | 7.8 | 3460 | 531 | 517 | 16300 | 7.3 | 210 | 7.8 | 12500 | 16800 | -- | 58 |
| | 2917 | 07-Oct-86 | 815 | 15 | 21 | -- | 7.2 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2954 | 12-Nov-86 | 915 | 15 | 20 | -- | 7.6 | 4190 | 634 | 632 | 20900 | 4.3 | 199 | 7.7 | 12600 | 21200 | -- | 51 |
| | 3044 | 01-Dec-86 | 935 | 15 | 21 | -- | 7.8 | 3920 | 608 | 582 | 16200 | 2.4 | 196 | 7.8 | 11800 | 19100 | -- | 50 |
| LNW 6467 | 2272 | 13-Jan-86 | 1630 | 15 | 18 | -- | 7.6 | 3470 | 618 | 468 | 10700 | 4.2 | 180 | 7.7 | 10600 | 11200 | 343 | 58 |
| | 2402 | 07-Mar-86 | 915 | 15 | 18 | 14200 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2390 | 25-Mar-86 | 900 | 15 | 17 | -- | 7.5 | 2860 | 630 | 313 | 5980 | 3.7 | 212 | 7.7 | 6790 | 5770 | 246 | 38 |
| | 2455 | 08-Apr-86 | 1230 | 15 | 17 | -- | 7.4 | 2770 | 600 | 308 | 5500 | 3.3 | 209 | 7.8 | 6740 | 5670 | 227 | 39 |
| | 2602 | 09-Jun-86 | 1140 | 15 | 20 | -- | 7.5 | 2670 | 589 | 292 | 5590 | 4.6 | 218 | 7.7 | 6860 | 5400 | 215 | 40 |
| | 2665 | 23-Jul-86 | 940 | 15 | 22 | -- | -- | 2810 | 550 | 350 | 7610 | 4.4 | 225 | 7.8 | 10300 | 6570 | -- | 56 |
| | 2718 | 12-Aug-86 | 905 | 15 | 22 | -- | 7.5 | 2460 | 523 | 279 | 5430 | 3.7 | 216 | 8 | 7190 | 5010 | -- | 44 |
| | 2803 | 09-Sep-86 | 815 | 15 | 21 | -- | 7.4 | 2950 | 612 | 346 | 7130 | 4.2 | 201 | 7.9 | 8480 | 6350 | -- | 48 |
| | 2917 | 07-Oct-86 | 815 | 15 | 21 | -- | 7.2 | 3260 | 684 | 378 | 7450 | 2.5 | 198 | 7.9 | 8970 | 7330 | -- | 49 |
| SFD 2727 | 2391 | 24-Mar-86 | 1045 | 16 | 17 | -- | 7 | 1630 | 207 | 271 | 778 | 4.6 | 311 | 7.6 | 2440 | 229 | 62 | 1.8 |
| | 2517 | 07-May-86 | 1200 | 16 | 18 | -- | 7 | 2280 | 240 | 409 | 1120 | 3.8 | 338 | 7.4 | 3550 | 295 | 63 | 2.3 |
| | 2653 | 09-Jul-86 | 1130 | 16 | 21 | -- | 7.1 | 2480 | 222 | 468 | 1250 | 3.4 | 316 | 8.2 | 3910 | 370 | 49 | 2.5 |
| | 2719 | 13-Aug-86 | 1245 | 16 | 22 | -- | 7.1 | 2510 | 205 | 486 | 1260 | 3.6 | 307 | 8.1 | 3830 | 350 | -- | 2.6 |
| | 2804 | 10-Sep-86 | 1145 | 16 | 21 | -- | 7 | 2360 | 193 | 455 | 1220 | 3.7 | 289 | 8.2 | 3920 | 342 | -- | 2.3 |
| | 2918 | 08-Oct-86 | 1100 | 16 | 21 | -- | 6.9 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 2956 | 13-Nov-86 | 1200 | 16 | 20 | -- | 7 | -- | -- | -- | -- | -- | -- | 7.8 | -- | -- | -- | -- |
| | 3046 | 02-Dec-86 | 1200 | 16 | 20 | -- | 7.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| SFD 6046 | 2392 | 24-Mar-86 | 1015 | 16 | 17 | -- | 7.2 | 2000 | 218 | 354 | 2380 | 3.9 | 286 | 7.6 | 5890 | 580 | 50 | 6.3 |
| | 2518 | 07-May-86 | 1230 | 16 | 19 | -- | 7.2 | 1180 | 132 | 207 | 1490 | 2.7 | 246 | 7.5 | 2390 | 337 | 32 | 4.5 |
| | 2654 | 09-Jul-86 | 1200 | 16 | 22 | -- | 7.1 | 1910 | 204 | 340 | 2200 | 3.5 | 277 | 8.2 | 5240 | 574 | 49 | 5.3 |
| | 2720 | 13-Aug-86 | 1310 | 16 | 23 | -- | 7.2 | 2120 | 219 | 381 | 2750 | 4.2 | 302 | 8.2 | 6190 | 672 | -- | 1.9 |
| | 2805 | 10-Sep-86 | 1215 | 16 | 22 | -- | 7 | 1670 | 188 | 291 | 2200 | 4.8 | 296 | 8.2 | 4960 | 532 | -- | 63 |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TDS | LEC | COD | NH3-ORG | NO3+NO2 | D-NH3 | D-ORTHO | T-P | As | Ba | Cd | Cr | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Southern Subsurface Stations | | | | | | | | | | | | | | | |
| LNW 5467 | 2270 | 13-Jan-86 | 9560 | 11800 | -- | -- | -- | -- | -- | -- | 0.003 | 0 | 0 | 0 | 0.01 |
| | 2416 | 07-Mar-86 | -- | -- | -- | -- | 40 | -- | -- | -- | -- | -- | 0 | -- | -- |
| | 2388 | 25-Mar-86 | 9390 | 11400 | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | 0 | 0 |
| | 2453 | 08-Apr-86 | 6730 | 7970 | -- | -- | -- | -- | -- | -- | 0.003 | -- | -- | 0 | 0 |
| | 2600 | 09-Jun-86 | 11300 | 13000 | -- | -- | -- | -- | -- | -- | 0.003 | -- | -- | 0 | 0.01 |
| | 2683 | 30-Jul-86 | 11200 | 13500 | -- | 0.8 | 52 | 0 | 0.01 | 0.01 | 0.004 | -- | -- | 0 | 0 |
| | 2716 | 12-Aug-86 | 11400 | 13800 | -- | 0.8 | 55 | 0 | 0.02 | 0.02 | 0.004 | 0 | 0 | 0.005 | 0.01 |
| | 2801 | 09-Sep-86 | 11000 | 13200 | -- | 0 | 51 | 0.02 | 0.01 | 0.02 | 0.004 | -- | -- | 0.005 | 0 |
| | 2915 | 07-Oct-86 | 12400 | 14400 | -- | 0.8 | 57 | 0 | 0.02 | 0.02 | 0.006 | -- | -- | 0.005 | 0.005 |
| | 2953 | 12-Nov-86 | 12600 | 15000 | -- | 0.8 | 59 | 0.01 | 0.02 | 0.02 | 0.005 | -- | -- | 0.005 | 0.005 |
| | 3043 | 01-Dec-86 | 12600 | 14700 | -- | 0.4 | 60 | 0 | 0.01 | 0.02 | 0.004 | -- | -- | 0.005 | 0.005 |
| LNW 6459 | 2403 | 07-Mar-86 | -- | -- | -- | -- | 23.1 | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2389 | 25-Mar-86 | 45100 | 52200 | -- | -- | -- | -- | -- | -- | 0.007 | -- | -- | 0 | 0.01 |
| | 2454 | 08-Apr-86 | 47500 | 54100 | -- | -- | -- | -- | -- | -- | 0.008 | -- | -- | 0 | 0.01 |
| | 2601 | 09-Jun-86 | 45900 | 51100 | -- | -- | -- | -- | -- | -- | 0.007 | -- | -- | 0 | 0 |
| | 2668 | 30-Jul-86 | 46900 | 52000 | -- | 0.6 | 31.1 | 0 | -- | 0.06 | 0.006 | -- | -- | 0 | 0.01 |
| | 2717 | 12-Aug-86 | 44400 | 49300 | -- | 0.3 | 31 | 0.01 | 0.07 | 0.07 | 0.006 | 0 | 0 | 0.007 | 0.01 |
| | 2802 | 09-Sep-86 | 47900 | 52000 | -- | 0.6 | 32 | 0.01 | 0.06 | 0.07 | 0.007 | -- | -- | 0.008 | 0.01 |
| | 2917 | 07-Oct-86 | -- | -- | -- | -- | -- | -- | -- | -- | 0.006 | -- | -- | 0.011 | 0.005 |
| | 2954 | 12-Nov-86 | 54000 | 60400 | -- | 0.2 | 31 | 0.02 | 0.09 | 0.13 | 0.005 | -- | -- | 0.008 | 0.008 |
| | 3044 | 01-Dec-86 | 49200 | 55100 | -- | 0.4 | 32 | 0 | 0.03 | 0.06 | 0.004 | -- | -- | 0.006 | 0.005 |
| LNW 6467 | 2272 | 13-Jan-86 | 35000 | 41700 | -- | -- | -- | -- | -- | -- | 0.006 | 0 | 0 | 0 | 0.01 |
| | 2402 | 07-Mar-86 | -- | -- | -- | -- | 23 | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2390 | 25-Mar-86 | 20100 | 24600 | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | 0 | 0.01 |
| | 2455 | 08-Apr-86 | 19600 | 23800 | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | 0.01 | 0.01 |
| | 2602 | 09-Jun-86 | 19700 | 23000 | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | 0.01 | 0.01 |
| | 2665 | 23-Jul-86 | 25600 | 29000 | -- | 1.4 | 63 | 0 | -- | 0.07 | 0.006 | -- | -- | 0 | 0.01 |
| | 2718 | 12-Aug-86 | 20000 | 23400 | -- | 1 | 58 | 0 | -- | 0.06 | 0.006 | 0 | 0 | 0.012 | 0.01 |
| | 2803 | 09-Sep-86 | 24400 | 27600 | -- | 1.1 | 63 | 0.01 | 0.04 | 0.05 | 0.004 | -- | -- | 0.011 | 0.01 |
| | 2917 | 07-Oct-86 | 25000 | 28100 | -- | 1.3 | 66 | 0 | 0.06 | 0.06 | 0.006 | -- | -- | 0.011 | 0.005 |
| SFD 2727 | 2391 | 24-Mar-86 | 4540 | 5170 | -- | -- | -- | -- | -- | -- | 0.017 | -- | -- | 0 | 0 |
| | 2517 | 07-May-86 | 6500 | 6930 | -- | -- | -- | -- | -- | -- | 0.025 | -- | -- | -- | -- |
| | 2653 | 09-Jul-86 | 7140 | 7520 | -- | -- | -- | -- | -- | -- | 0.038 | -- | -- | -- | -- |
| | 2719 | 13-Aug-86 | 7300 | 7810 | -- | 1 | 15 | 0.05 | 0.88 | 0.88 | 0.04 | 0 | 0 | 0.005 | 0.01 |
| | 2804 | 10-Sep-86 | 6830 | 7250 | -- | 0.9 | 19 | 0.13 | 0.83 | 0.88 | 0.031 | -- | -- | 0.005 | 0.01 |
| | 2918 | 08-Oct-86 | 5310 | 5720 | -- | 2 | 9.7 | 0.26 | 1.1 | 1.1 | 0.022 | -- | -- | 0.005 | 0.005 |
| | 2956 | 13-Nov-86 | 9550 | 9690 | -- | -- | -- | -- | -- | -- | 0.019 | -- | -- | 0.005 | 0.005 |
| | 3046 | 02-Dec-86 | -- | 10600 | -- | -- | -- | -- | -- | -- | 0.018 | -- | -- | 0.005 | 0.005 |
| SFD 6046 | 2392 | 24-Mar-86 | 9980 | 11100 | -- | -- | -- | -- | -- | -- | 0.025 | -- | -- | 0 | 0.01 |
| | 2518 | 07-May-86 | 6020 | 7320 | -- | -- | -- | -- | -- | -- | 0.021 | -- | -- | -- | -- |
| | 2654 | 09-Jul-86 | 9460 | 10400 | -- | -- | -- | -- | -- | -- | 0.025 | -- | -- | -- | -- |
| | 2720 | 13-Aug-86 | 10700 | 11700 | -- | 0.9 | 12 | 0.13 | 0.45 | 0.45 | 0.024 | 0 | 0 | 0.005 | 0 |
| | 2805 | 10-Sep-86 | 8710 | 9870 | -- | 0.9 | 9.7 | 0.05 | 0.48 | 0.5 | 0.026 | -- | -- | 0.039 | 0.01 |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | Fe | Pb | Mn | Hg | Se | Ag | Zn | Al | Co | Mo | Ni | Sr | V | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | | |
| LNW 5467 | 2270 | 13-Jan-86 | 0.04 | 0 | 0 | -- | 0.141 | 0 | 0.01 | 0 | 0 | -- | 0 | 8.4 | -- | -- |
| | 2416 | 07-Mar-86 | -- | -- | -- | -- | 0.08 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2388 | 25-Mar-86 | 0 | -- | 0 | -- | 0.144 | -- | 0 | -- | -- | -- | 0 | 8.4 | -- | -- |
| | 2453 | 08-Apr-86 | 0.01 | -- | 0 | -- | 0.08 | -- | 0 | -- | -- | -- | 0 | 7.2 | -- | -- |
| | 2600 | 09-Jun-86 | 0 | -- | 0 | -- | 0.144 | -- | 0.01 | -- | -- | -- | 0 | 8.4 | -- | -- |
| | 2683 | 30-Jul-86 | 0 | 0 | -- | -- | 0.151 | -- | 0.01 | -- | -- | -- | -- | 7.7 | -- | -- |
| | 2716 | 12-Aug-86 | 0 | 0.005 | 0 | 0 | 0.167 | 0 | 0.01 | 0 | 0 | -- | 0 | 10 | -- | -- |
| | 2801 | 09-Sep-86 | 0 | -- | 0 | -- | 0.167 | -- | 0 | -- | -- | -- | -- | 8.4 | -- | -- |
| | 2915 | 07-Oct-86 | 0.014 | -- | 0.005 | -- | 0.178 | -- | 0.005 | -- | -- | 0.772 | -- | 8.2 | -- | -- |
| | 2953 | 12-Nov-86 | 0.005 | -- | 0.005 | -- | 0.211 | -- | 0.005 | -- | -- | 0.785 | -- | 9.2 | -- | -- |
| | 3043 | 01-Dec-86 | 0.005 | -- | 0.005 | -- | 0.19 | -- | 0.005 | -- | -- | 0.69 | -- | 8.8 | -- | -- |
| LNW 6459 | 2403 | 07-Mar-86 | -- | -- | -- | -- | 0.074 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2389 | 25-Mar-86 | 0.01 | -- | 0 | -- | 0.075 | -- | 0 | -- | -- | -- | 0 | 12 | -- | -- |
| | 2454 | 08-Apr-86 | 0.01 | -- | 0 | -- | 0.08 | -- | 0 | -- | -- | -- | 0 | 12 | -- | -- |
| | 2601 | 09-Jun-86 | 0.02 | -- | 0 | -- | 0.08 | -- | 0.01 | -- | -- | -- | 0 | 12 | -- | -- |
| | 2668 | 30-Jul-86 | 0.01 | 0 | -- | -- | 0.055 | -- | -- | -- | -- | -- | -- | 13 | -- | -- |
| | 2717 | 12-Aug-86 | 0 | 0.005 | 0 | 0 | 0.086 | 0.01 | 0 | 0 | -- | -- | 0.02 | 14 | -- | -- |
| | 2802 | 09-Sep-86 | 0.01 | -- | 0 | -- | 0.08 | -- | 0 | -- | -- | -- | -- | 12 | -- | -- |
| | 2917 | 07-Oct-86 | 0.005 | -- | 0.005 | -- | 0.425 | -- | 0.005 | -- | -- | 1.07 | -- | 12 | -- | -- |
| | 2954 | 12-Nov-86 | 0.014 | -- | 0.008 | -- | 0.074 | -- | 0.009 | -- | -- | 0.93 | -- | 14 | -- | -- |
| | 3044 | 01-Dec-86 | 0.018 | -- | 0.005 | -- | 0.076 | -- | 0.005 | -- | -- | 1.1 | -- | 13 | -- | -- |
| LNW 6467 | 2272 | 13-Jan-86 | 0.01 | 0 | 0 | -- | 0.735 | 0.03 | 0.01 | 0 | 0 | -- | 0 | 13 | -- | -- |
| | 2402 | 07-Mar-86 | -- | -- | -- | -- | 0.226 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2390 | 25-Mar-86 | 0.01 | -- | 0 | -- | 0.842 | -- | 0 | -- | -- | -- | 0 | 12 | -- | -- |
| | 2455 | 08-Apr-86 | 0 | -- | 0 | -- | 0.512 | -- | 0 | -- | -- | -- | 0 | 9.9 | -- | -- |
| | 2602 | 09-Jun-86 | 0.01 | -- | 0 | -- | 0.625 | -- | 0.02 | -- | -- | -- | 0 | 10 | -- | -- |
| | 2665 | 23-Jul-86 | 0.01 | 0 | -- | -- | 0.615 | -- | 0 | -- | -- | -- | -- | 11 | -- | -- |
| | 2718 | 12-Aug-86 | 0.02 | 0 | 0 | 0 | 0.858 | 0.01 | 0.01 | 0 | 0 | -- | 0 | 11 | -- | -- |
| | 2803 | 09-Sep-86 | 0.01 | -- | 0 | -- | 0.72 | -- | -- | -- | -- | -- | -- | 11 | -- | -- |
| | 2917 | 07-Oct-86 | 0.005 | -- | 0.005 | -- | 0.425 | -- | 0.005 | -- | -- | 1.07 | -- | 12 | -- | -- |
| SFD 2727 | 2391 | 24-Mar-86 | 0.31 | -- | 0.26 | -- | 0.002 | -- | 0 | -- | -- | -- | 0.02 | 1.4 | -- | -- |
| | 2517 | 07-May-86 | -- | -- | -- | -- | 0.002 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2653 | 09-Jul-86 | -- | -- | -- | -- | 0.002 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2719 | 13-Aug-86 | 0.15 | 0 | 0.38 | 0 | 0.002 | 0 | 0 | 0 | 0 | -- | 0.03 | 1.8 | -- | -- |
| | 2804 | 10-Sep-86 | 0.28 | -- | 0.3 | -- | 0.002 | -- | 0.02 | -- | -- | -- | -- | 1.5 | -- | -- |
| | 2918 | 08-Oct-86 | 0.556 | -- | 0.3 | -- | 0.001 | -- | 0.007 | -- | -- | 0.105 | -- | 1 | -- | -- |
| | 2956 | 13-Nov-86 | 0.708 | -- | 0.38 | -- | 0.001 | -- | 0.008 | -- | -- | 0.085 | -- | 1.8 | -- | -- |
| | 3046 | 02-Dec-86 | 1.29 | -- | 0.552 | -- | 0.002 | -- | 0.005 | -- | -- | 0.169 | -- | 2.1 | -- | -- |
| SFD 6046 | 2392 | 24-Mar-86 | 0.02 | -- | 0.63 | -- | 0.001 | -- | 0.01 | -- | -- | -- | 0.01 | 3.2 | -- | -- |
| | 2518 | 07-May-86 | -- | -- | -- | -- | 0 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2654 | 09-Jul-86 | -- | -- | -- | -- | 0.001 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2720 | 13-Aug-86 | 0.05 | 0 | 0.88 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0.02 | 3 | -- | -- |
| | 2805 | 10-Sep-86 | 0.03 | -- | 0.71 | -- | 0 | -- | 0.01 | -- | -- | -- | -- | 2.2 | -- | -- |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TYPE1 | NAME1 | CONC1 | TYPE2 | NAME2 | CONC2 |
|---|---|---|---|---|---|---|---|---|
| Southern Subsurface Stations | | | | | | | | |
| LNW 5467 | 2270 | 13-Jan-86 | A | NA | -- | A | NA | -- |
| | 2416 | 07-Mar-86 | A | NA | -- | A | NA | -- |
| | 2388 | 25-Mar-86 | A | NA | -- | A | NA | -- |
| | 2453 | 08-Apr-86 | A | NA | -- | A | NA | -- |
| | 2600 | 09-Jun-86 | A | NA | -- | A | NA | -- |
| | 2683 | 30-Jul-86 | A | NA | -- | A | NA | -- |
| | 2716 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2801 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2915 | 07-Oct-86 | A | NA | -- | A | NA | -- |
| | 2953 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3043 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| LNW 6459 | 2403 | 07-Mar-86 | A | NA | -- | A | NA | -- |
| | 2389 | 25-Mar-86 | A | NA | -- | A | NA | -- |
| | 2454 | 08-Apr-86 | A | NA | -- | A | NA | -- |
| | 2601 | 09-Jun-86 | A | NA | -- | A | NA | -- |
| | 2668 | 30-Jul-86 | A | NA | -- | A | NA | -- |
| | 2717 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2802 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2917 | 07-Oct-86 | A | NA | -- | A | NA | -- |
| | 2954 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3044 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| LNW 6467 | 2272 | 13-Jan-86 | A | NA | -- | A | NA | -- |
| | 2402 | 07-Mar-86 | A | NA | -- | A | NA | -- |
| | 2390 | 25-Mar-86 | A | NA | -- | A | NA | -- |
| | 2455 | 08-Apr-86 | A | NA | -- | A | NA | -- |
| | 2602 | 09-Jun-86 | A | NA | -- | A | NA | -- |
| | 2665 | 23-Jul-86 | A | NA | -- | A | NA | -- |
| | 2718 | 12-Aug-86 | A | NA | -- | A | NA | -- |
| | 2803 | 09-Sep-86 | A | NA | -- | A | NA | -- |
| | 2917 | 07-Oct-86 | A | NA | -- | A | NA | -- |
| SFD 2727 | 2391 | 24-Mar-86 | A | NA | -- | A | NA | -- |
| | 2517 | 07-May-86 | A | NA | -- | A | NA | -- |
| | 2653 | 09-Jul-86 | A | NA | -- | A | NA | -- |
| | 2719 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2804 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2918 | 08-Oct-86 | A | NA | -- | A | NA | -- |
| | 2956 | 13-Nov-86 | A | NA | -- | A | NA | -- |
| | 3046 | 02-Dec-86 | A | NA | -- | A | NA | -- |
| SFD 6046 | 2392 | 24-Mar-86 | A | NA | -- | A | NA | -- |
| | 2518 | 07-May-86 | A | NA | -- | A | NA | -- |
| | 2654 | 09-Jul-86 | A | NA | -- | A | NA | -- |
| | 2720 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2805 | 10-Sep-86 | A | NA | -- | A | NA | -- |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TIME | CO | TEMP | FEC | FpH | HARD | Ca | Mg | Na | K | TALK | LpH | SO4 | Cl | NO3 | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | | | | |
| STC 3505 | 2303 | 14-Jan-86 | 955 | 15 | 16 | -- | 7.8 | 159 | 52 | 7 | 658 | 0.5 | 390 | 8.3 | 666 | 341 | 84 | 2.1 |
| | 2393 | 26-Mar-86 | 830 | 15 | 17 | -- | 7.8 | 141 | 45 | 7 | 677 | 0.6 | 373 | 8.1 | 607 | 337 | 84 | 2 |
| | 2519 | 07-May-86 | 800 | 15 | 18 | -- | 7.8 | 182 | 58 | 9 | 773 | 0.6 | 391 | 8 | 751 | 390 | 89 | 2.1 |
| | 2655 | 09-Jul-86 | 600 | 15 | 20 | -- | 7.8 | 123 | 56 | 8 | 721 | 0.7 | 433 | 8.6 | 726 | 399 | 80 | 2.3 |
| | 2721 | 13-Aug-86 | 740 | 15 | 21 | -- | 7.9 | 154 | 50 | 7 | 571 | 0.5 | 398 | 8.5 | 566 | 324 | -- | 7.4 |
| | 2806 | 10-Sep-86 | 730 | 15 | 22 | -- | 7.8 | 136 | 43 | 7 | 657 | 0.5 | 378 | 8.6 | 617 | 345 | -- | 2 |
| | 2920 | 07-Oct-86 | 1000 | 15 | 22 | -- | 7.7 | -- | -- | -- | -- | -- | -- | 8.4 | -- | -- | -- | -- |
| | 2958 | 12-Nov-86 | 1115 | 15 | 21 | -- | 7.7 | -- | -- | -- | -- | -- | -- | 8.4 | -- | -- | -- | -- |
| | 3048 | 01-Dec-86 | 1120 | 15 | 19 | -- | 7.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| STC 5436 | 2304 | 14-Jan-86 | 925 | 15 | 16 | -- | 8 | 298 | 70 | 30 | 3980 | 12 | 572 | 8.1 | 4680 | 2650 | 35 | 16 |
| | 2394 | 26-Mar-86 | 930 | 15 | 17 | -- | 8 | 598 | 142 | 59 | 4030 | 12 | 593 | 8 | 4570 | 2870 | 45 | 15 |
| | 2520 | 07-May-86 | 830 | 15 | 17 | -- | 8 | 662 | 163 | 62 | 5300 | 12 | 656 | 7.9 | 5910 | 3740 | 37 | 20 |
| | 2656 | 09-Jul-86 | 645 | 15 | 21 | -- | 8 | 538 | 100 | 70 | 4390 | 9.8 | 696 | 8.4 | 4770 | 3330 | 58 | 17 |
| | 2722 | 13-Aug-86 | 825 | 15 | 21 | -- | 8.1 | 467 | 62 | 76 | 2820 | 8.2 | 637 | 8.3 | 2840 | 1940 | -- | 10 |
| | 2807 | 10-Sep-86 | 800 | 15 | 21 | -- | 8.2 | 436 | 69 | 64 | 3680 | 8.7 | 612 | 8.4 | 3840 | 2690 | -- | 15 |
| | 2921 | 07-Oct-86 | 1030 | 15 | 22 | -- | 8.2 | -- | -- | -- | -- | -- | -- | 8.2 | -- | -- | -- | -- |
| | 2959 | 12-Nov-86 | 1145 | 15 | 20 | -- | 8.2 | -- | -- | -- | -- | -- | -- | 8.3 | -- | -- | -- | -- |
| | 3049 | 01-Dec-86 | 1155 | 15 | 19 | -- | 8.1 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| STC 6142 | 2305 | 14-Jan-86 | 900 | 15 | 16 | -- | 7.3 | 482 | 147 | 28 | 3080 | 2 | 343 | 7.8 | 3270 | 2320 | 84 | 10 |
| STC 6467 | 2306 | 14-Jan-86 | 835 | 15 | 18 | -- | 7 | 474 | 144 | 28 | 334 | 4.7 | 207 | 7.7 | 398 | 372 | 9.7 | 1.1 |
| | 2396 | 26-Mar-86 | 1030 | 15 | 17 | -- | 6.9 | 590 | 159 | 47 | 459 | 5.8 | 270 | 7.5 | 591 | 484 | 16 | 1.5 |
| | 2522 | 07-May-86 | 900 | 15 | 18 | -- | 7 | 473 | 125 | 39 | 403 | 4.8 | 248 | 7.4 | 497 | 439 | 13 | 1.3 |
| | 2658 | 09-Jul-86 | 745 | 15 | 21 | -- | 7 | 536 | 144 | 43 | 457 | 4.4 | 264 | 8.3 | 528 | 461 | 25 | 1.6 |
| | 2724 | 13-Aug-86 | 900 | 15 | 22 | -- | 7.1 | 477 | 130 | 37 | 384 | 4.1 | 241 | 8.3 | 462 | 397 | -- | 1.3 |
| | 2809 | 10-Sep-86 | 830 | 15 | 21 | -- | 6.8 | 418 | 118 | 30 | 302 | 4 | 208 | 8.4 | 384 | 333 | -- | 1.1 |
| | 2923 | 07-Oct-86 | 1100 | 15 | 22 | -- | 7 | 334 | 99 | 21 | 224 | 4.2 | 177 | 8.2 | 258 | 237 | -- | 0.8 |
| | 2961 | 12-Nov-86 | 1215 | 15 | 22 | -- | 6.9 | -- | -- | -- | -- | -- | -- | 8 | -- | -- | -- | -- |
| | 3051 | 01-Dec-86 | 1230 | 15 | 19 | -- | 6.9 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| VGD 3906 | 2276 | 13-Jan-86 | 1220 | 16 | 17 | -- | 7.3 | 5370 | 418 | 1050 | 8420 | 8.5 | 404 | 7.6 | 19300 | 2330 | 27 | 31 |
| | 2397 | 24-Mar-86 | 1000 | 16 | 17 | -- | 7.4 | 5870 | 405 | 1180 | 9390 | 11 | 399 | 7.6 | 20300 | 2490 | 36 | 34 |
| | 2456 | 08-Apr-86 | 1450 | 16 | 17 | -- | 7.5 | 5230 | 412 | 1020 | 8780 | 7.4 | 402 | 7.8 | 19200 | 2210 | 26 | 30 |
| | 2603 | 09-Jun-86 | 915 | 16 | 19 | -- | 7.4 | 5470 | 410 | 1080 | 8560 | 7.4 | 389 | 7.7 | 19700 | 2240 | 31 | 33 |
| | 2725 | 13-Aug-86 | 900 | 16 | 21 | -- | 7.4 | 5330 | 388 | 1060 | 8480 | 7.2 | 377 | 8.1 | 18900 | 2870 | -- | 36 |
| | 2810 | 10-Sep-86 | 900 | 16 | 19 | -- | 7.5 | 4900 | 282 | 1020 | 7990 | 6.2 | 368 | 8 | 18700 | 1300 | -- | 34 |
| | 2924 | 08-Oct-86 | 900 | 16 | 19 | -- | 7.7 | 3480 | 297 | 665 | 5330 | 4.5 | 318 | 8 | 12300 | 1310 | -- | 22 |
| | 2962 | 13-Nov-86 | 950 | 16 | 17 | -- | 7.5 | 5650 | 366 | 1150 | 9080 | 4.2 | 377 | 7.8 | 26600 | 2360 | -- | 33 |
| | 3052 | 02-Dec-86 | 1130 | 16 | 19 | -- | 7.3 | 6390 | 416 | 1300 | 9950 | 3.1 | 383 | 7.9 | 23400 | 2580 | -- | 36 |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TDS | LEC | COD | NH3-ORG | NO3+NO2 | D-NH3 | D-ORTHO | T-P | As | Ba | Cd | Cr | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | |
| STC 3505 | 2303 | 14-Jan-86 | 2140 | 3260 | -- | -- | -- | -- | -- | 0.25 | 0.181 | 0 | -- | 0 | 0.01 |
| | 2393 | 26-Mar-86 | 2070 | 3170 | -- | -- | -- | -- | -- | -- | 0.134 | -- | -- | 0 | 0 |
| | 2519 | 07-May-86 | 2360 | 3600 | -- | -- | -- | -- | -- | -- | 0.171 | -- | -- | -- | -- |
| | 2655 | 09-Jul-86 | 2370 | 3510 | -- | -- | -- | -- | -- | -- | 0.161 | -- | -- | -- | -- |
| | 2721 | 13-Aug-86 | 1960 | 3030 | -- | -- | 16 | 0.02 | -- | 0.24 | 0.118 | 0 | 0 | 0.005 | 0 |
| | 2806 | 10-Sep-86 | 2110 | 3270 | -- | 0.3 | 16 | 0 | 0.18 | 0.22 | 0.126 | -- | -- | 0.005 | 0.01 |
| | 2920 | 07-Oct-86 | 2160 | 3210 | -- | 0.5 | 17 | 0.01 | -- | 0.24 | 0.141 | -- | -- | 0.005 | 0.005 |
| | 2958 | 12-Nov-86 | 2180 | 3310 | -- | -- | -- | -- | -- | -- | 0.142 | -- | -- | 0.005 | 0.005 |
| | 3048 | 01-Dec-86 | -- | 3310 | -- | -- | -- | -- | -- | -- | 0.13 | -- | -- | 0.005 | 0.005 |
| STC 5436 | 2304 | 14-Jan-86 | 12100 | 16200 | -- | -- | -- | -- | -- | 0.19 | 0.85 | 0 | -- | 0 | 0.01 |
| | 2394 | 26-Mar-86 | 12400 | 16400 | -- | -- | -- | -- | -- | -- | 0.715 | -- | -- | 0 | 0.01 |
| | 2520 | 07-May-86 | 15900 | 20300 | -- | -- | -- | -- | -- | -- | 0.79 | -- | -- | -- | -- |
| | 2656 | 09-Jul-86 | 13700 | 17400 | -- | -- | -- | -- | -- | -- | 0.81 | -- | -- | -- | -- |
| | 2722 | 13-Aug-86 | 8580 | 11600 | -- | 0.7 | 14 | 0.04 | -- | 0.17 | 0.945 | 0 | 0 | 0.005 | 0.01 |
| | 2807 | 10-Sep-86 | 10800 | 14500 | -- | 0.8 | 10 | 0.04 | -- | 0.17 | 0.825 | -- | -- | 0.005 | 0.01 |
| | 2921 | 07-Oct-86 | 11600 | 15300 | -- | 1.1 | 5.8 | 0.1 | -- | 0.23 | 0.772 | -- | -- | 0.005 | 0.005 |
| | 2959 | 12-Nov-86 | 11900 | 16000 | -- | 1.1 | 7.5 | 0.05 | -- | 0.23 | 1.08 | -- | -- | 0.005 | 0.005 |
| | 3049 | 01-Dec-86 | -- | 28700 | -- | -- | -- | -- | -- | -- | 1.1 | -- | -- | 0.005 | 0.007 |
| STC 6142 | 2305 | 14-Jan-86 | 9420 | 12800 | -- | -- | -- | -- | -- | 0.05 | 0.302 | 0 | 0 | 0 | 0.01 |
| STC 6467 | 2306 | 14-Jan-86 | 1480 | 2290 | -- | -- | -- | -- | -- | 0.19 | -- | 0.1 | -- | 0 | 0 |
| | 2396 | 26-Mar-86 | 2040 | 3080 | -- | -- | -- | -- | -- | -- | 0.023 | -- | -- | 0 | 0 |
| | 2522 | 07-May-86 | 1790 | 2770 | -- | -- | -- | -- | -- | -- | 0.019 | -- | -- | -- | -- |
| | 2658 | 09-Jul-86 | 1930 | 2930 | -- | -- | -- | -- | -- | -- | 0.032 | -- | -- | -- | -- |
| | 2724 | 13-Aug-86 | 1660 | 2580 | -- | 0.3 | 2.8 | 0.02 | 0.2 | 0.2 | 0.027 | 0 | 0 | 0.005 | 0 |
| | 2809 | 10-Sep-86 | 1390 | 2190 | -- | 0.3 | 2.3 | 0.06 | 0.2 | 0.22 | 0.028 | -- | -- | 0.005 | 0 |
| | 2923 | 07-Oct-86 | 1010 | 1590 | -- | 0.5 | 2.5 | 0.04 | 0.24 | 0.26 | 0.02 | -- | -- | 0.005 | 0.005 |
| | 2961 | 12-Nov-86 | 1130 | 1810 | -- | -- | -- | -- | -- | -- | 0.019 | -- | -- | 0.005 | 0.005 |
| | 3051 | 01-Dec-86 | -- | 1960 | -- | -- | -- | -- | -- | -- | 0.019 | -- | -- | 0.005 | 0.005 |
| VGD 3906 | 2276 | 13-Jan-86 | 33800 | 31200 | -- | -- | -- | -- | -- | -- | 0.007 | 0 | 0 | 0 | 0 |
| | 2397 | 24-Mar-86 | 35500 | 32100 | -- | -- | -- | -- | -- | -- | 0.009 | -- | -- | 0 | 0 |
| | 2456 | 08-Apr-86 | 33800 | 30600 | -- | -- | -- | -- | -- | -- | 0.01 | -- | -- | 0.01 | 0 |
| | 2603 | 09-Jun-86 | 33400 | 29600 | -- | -- | -- | -- | -- | -- | 0.012 | -- | -- | 0 | 0 |
| | 2725 | 13-Aug-86 | 33000 | 29200 | -- | 0.4 | 8.4 | 0.26 | 0.09 | 0.2 | 0.01 | 0 | 0 | 0.007 | 0 |
| | 2810 | 10-Sep-86 | 32200 | 28400 | -- | 0.6 | 7.4 | 0.24 | 0.12 | 0.3 | 0.011 | -- | -- | 0.005 | 0 |
| | 2924 | 08-Oct-86 | 20500 | 19600 | -- | 0.6 | 4.6 | 0.15 | 0.17 | 0.27 | 0.008 | -- | -- | 0.005 | 0.005 |
| | 2962 | 13-Nov-86 | 34900 | 30900 | -- | 0.9 | 6.1 | 0.42 | 0.08 | 0.26 | 0.014 | -- | -- | 0.005 | 0.005 |
| | 3052 | 02-Dec-86 | 38800 | 32900 | -- | 1.1 | 3.9 | 0.54 | 0.06 | 0.3 | 0.008 | -- | -- | 0.005 | 0.005 |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | Fe | Pb | Mn | Hg | Se | Ag | Zn | Al | Co | Mo | Ni | Sr | V | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | | |
| STC 3505 | 2303 | 14-Jan-86 | -- | 0 | 0 | -- | 0.003 | -- | -- | -- | 0 | -- | -- | 0.5 | -- | -- |
| | 2393 | 26-Mar-86 | 0.01 | -- | 0 | -- | 0.003 | -- | 0.01 | -- | -- | -- | 0 | 0.2 | -- | -- |
| | 2519 | 07-May-86 | -- | -- | -- | -- | 0.003 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2655 | 09-Jul-86 | -- | -- | -- | -- | 0.003 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2721 | 13-Aug-86 | 0.01 | 0 | 0.01 | 0 | 0.003 | 0 | 0 | 0 | 0 | -- | 0 | 0.5 | -- | -- |
| | 2806 | 10-Sep-86 | 0.02 | -- | 0 | -- | 0.003 | -- | 0 | -- | -- | -- | -- | 0.4 | -- | -- |
| | 2920 | 07-Oct-86 | 0.006 | -- | 0.005 | -- | 0.003 | -- | 0.005 | -- | -- | 0.216 | -- | 0.3 | -- | -- |
| | 2958 | 12-Nov-86 | 0.005 | -- | 0.005 | -- | 0.004 | -- | 0.035 | -- | -- | 0.131 | -- | 0.3 | -- | -- |
| | 3048 | 01-Dec-86 | 0.005 | -- | 0.005 | -- | 0.002 | -- | 0.005 | -- | -- | 0.14 | -- | 0.4 | -- | -- |
| STC 5436 | 2304 | 14-Jan-86 | 0.04 | 0 | 0.45 | -- | 0 | 0 | -- | -- | 0 | -- | -- | 3.3 | -- | -- |
| | 2394 | 26-Mar-86 | 0.02 | -- | 0.31 | -- | 0 | -- | 0.01 | -- | -- | -- | 0.01 | 3.4 | -- | -- |
| | 2520 | 07-May-86 | -- | -- | -- | -- | 0.001 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2656 | 09-Jul-86 | -- | -- | -- | -- | 0.001 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2722 | 13-Aug-86 | 0.03 | 0 | 0.32 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 | 4.2 | -- | -- |
| | 2807 | 10-Sep-86 | 0.03 | -- | 0.36 | -- | 0.001 | -- | 0 | -- | -- | -- | -- | 3.1 | -- | -- |
| | 2921 | 07-Oct-86 | 0.039 | -- | 0.752 | -- | 0.001 | -- | 0.005 | -- | -- | 0.584 | -- | 2.2 | -- | -- |
| | 2959 | 12-Nov-86 | 0.018 | -- | 0.576 | -- | 0.001 | -- | 0.006 | -- | -- | 1.63 | -- | 1.8 | -- | -- |
| | 3049 | 01-Dec-86 | 0.028 | -- | 0.656 | -- | 0.001 | -- | 0.005 | -- | -- | 1.99 | -- | 4.4 | -- | -- |
| STC 6142 | 2305 | 14-Jan-86 | 0.03 | 0 | 0 | -- | 0.001 | -- | -- | -- | 0 | -- | -- | 3.4 | -- | -- |
| STC 6467 | 2306 | 14-Jan-86 | 0.03 | 0 | 0.27 | -- | 0.016 | -- | -- | -- | 0 | -- | 0 | 1.1 | -- | -- |
| | 2396 | 26-Mar-86 | 0.02 | -- | 0.22 | -- | 0 | -- | 0 | -- | -- | -- | 0 | 1.7 | -- | -- |
| | 2522 | 07-May-86 | -- | -- | -- | -- | 0 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2658 | 09-Jul-86 | -- | -- | -- | -- | 0 | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | 2724 | 13-Aug-86 | 0.01 | 0 | 0.18 | 0 | 0 | 0 | 0.01 | 0 | 0 | -- | 0 | 1.3 | -- | -- |
| | 2809 | 10-Sep-86 | 0.02 | -- | 0.21 | -- | 0.001 | -- | 0 | -- | -- | -- | -- | 1 | -- | -- |
| | 2923 | 07-Oct-86 | 0.008 | -- | 0.15 | -- | 0.001 | -- | 0.005 | -- | -- | 0.105 | -- | 0.5 | -- | -- |
| | 2961 | 12-Nov-86 | 0.006 | -- | 0.154 | -- | 0.001 | -- | 0.005 | -- | -- | 0.097 | -- | 0.6 | -- | -- |
| | 3051 | 01-Dec-86 | 0.007 | -- | 0.254 | -- | 0.001 | -- | 0.005 | -- | -- | 0.104 | -- | 0.8 | -- | -- |
| VGD 3906 | 2276 | 13-Jan-86 | 3.3 | 0 | 1.6 | -- | 0.004 | 0 | 0 | 0 | 0 | -- | 0 | 9.1 | -- | -- |
| | 2397 | 24-Mar-86 | 1.7 | 0 | 1.4 | -- | 0.004 | -- | 0.01 | -- | -- | -- | 0 | 9 | -- | -- |
| | 2456 | 08-Apr-86 | 1.6 | -- | 1 | -- | 0.005 | -- | 0 | -- | -- | -- | 0 | 7.5 | -- | -- |
| | 2603 | 09-Jun-86 | 1.4 | -- | 0.92 | -- | 0.006 | -- | 0.01 | -- | -- | -- | 0 | 8.3 | -- | -- |
| | 2725 | 13-Aug-86 | 1.1 | 0 | 0.76 | 0 | 0.003 | 0 | 0 | 0 | 0 | -- | 0 | 8.8 | -- | -- |
| | 2810 | 10-Sep-86 | 0.94 | -- | 0.8 | -- | 0.004 | -- | 0 | -- | -- | -- | -- | 7.3 | -- | -- |
| | 2924 | 08-Oct-86 | 0.256 | -- | 0.9 | -- | 0.004 | -- | 0.02 | -- | -- | 0.047 | -- | 5 | -- | -- |
| | 2962 | 13-Nov-86 | 2.02 | -- | 1.2 | -- | 0.004 | -- | 0.005 | -- | -- | 0.67 | -- | 7.2 | -- | -- |
| | 3052 | 02-Dec-86 | 3.25 | -- | 0.035 | -- | 0.002 | -- | 0.006 | -- | -- | 0.67 | -- | 8.2 | -- | -- |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TYPE1 | NAME1 | CONC1 | TYPE2 | NAME2 | CONC2 |
|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | |
| STC 3505 | 2303 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2393 | 26-Mar-86 | A | NA | -- | A | NA | -- |
| | 2519 | 07-May-86 | A | NA | -- | A | NA | -- |
| | 2655 | 09-Jul-86 | A | NA | -- | A | NA | -- |
| | 2721 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2806 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2920 | 07-Oct-86 | A | NA | -- | A | NA | -- |
| | 2958 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3048 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| STC 5436 | 2304 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2394 | 26-Mar-86 | A | NA | -- | A | NA | -- |
| | 2520 | 07-May-86 | A | NA | -- | A | NA | -- |
| | 2656 | 09-Jul-86 | A | NA | -- | A | NA | -- |
| | 2722 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2807 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2921 | 07-Oct-86 | A | NA | -- | A | NA | -- |
| | 2959 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3049 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| STC 6142 | 2305 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| STC 6467 | 2306 | 14-Jan-86 | A | NA | -- | A | NA | -- |
| | 2396 | 26-Mar-86 | A | NA | -- | A | NA | -- |
| | 2522 | 07-May-86 | A | NA | -- | A | NA | -- |
| | 2658 | 09-Jul-86 | A | NA | -- | A | NA | -- |
| | 2724 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2809 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2923 | 07-Oct-86 | A | NA | -- | A | NA | -- |
| | 2961 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3051 | 01-Dec-86 | A | NA | -- | A | NA | -- |
| VGD 3906 | 2276 | 13-Jan-86 | A | NA | -- | A | NA | -- |
| | 2397 | 24-Mar-86 | A | NA | -- | A | NA | -- |
| | 2456 | 08-Apr-86 | A | NA | -- | A | NA | -- |
| | 2603 | 09-Jun-86 | A | NA | -- | A | NA | -- |
| | 2725 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2810 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2924 | 08-Oct-86 | A | NA | -- | A | NA | -- |
| | 2962 | 13-Nov-86 | A | NA | -- | A | NA | -- |
| | 3052 | 02-Dec-86 | A | NA | -- | A | NA | -- |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TIME | CO | TEMP | FEC | FpH | HARD | Ca | Mg | Na | K | TALK | LpH | SO4 | Cl | NO3 | B |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | | | | |
| VGD 4406 | 2277 | 13-Jan-86 | 1210 | 16 | 17 | -- | 7.4 | 4340 | 448 | 782 | 6480 | 5.2 | 449 | 7.9 | 15100 | 1720 | 24 | 25 |
| | 2398 | 24-Mar-86 | 930 | 16 | 17 | -- | 7.5 | 4000 | 438 | 705 | 6360 | 7.1 | 413 | 7.8 | 14500 | 1420 | 50 | 36 |
| | 2457 | 08-Apr-86 | 1425 | 16 | 17 | -- | 7.3 | 3620 | 415 | 628 | 5640 | 4.8 | 384 | 7.8 | 12800 | 1120 | 27 | 26 |
| | 2604 | 09-Jun-86 | 900 | 16 | 18 | -- | 7.4 | 4490 | 364 | 870 | 6930 | 6.9 | 421 | 7.8 | 16000 | 1710 | 34 | 28 |
| | 2726 | 13-Aug-86 | 845 | 16 | 21 | -- | 7.4 | 4570 | 408 | 862 | 6930 | 6.3 | 421 | 8 | 16500 | 1620 | -- | 35 |
| | 2811 | 10-Sep-86 | 845 | 16 | 20 | -- | 7.4 | 4270 | 334 | 835 | 7130 | 5.9 | 404 | 8 | 16200 | 1690 | -- | 37 |
| | 2925 | 08-Oct-86 | 840 | 16 | 20 | -- | 7.4 | 4960 | 444 | 934 | 7900 | 3.9 | 409 | 8 | 17300 | 2160 | -- | 32 |
| | 2963 | 13-Nov-86 | 925 | 16 | 17 | -- | 7.5 | 4810 | 446 | 898 | 7430 | 2.3 | 416 | 7.9 | 17100 | 1750 | -- | 30 |
| | 3053 | 02-Dec-86 | 1045 | 16 | 19 | -- | 7.4 | 4680 | 430 | 875 | 7380 | 3.5 | 420 | 8 | 15900 | 1770 | -- | 28 |
| VGD 4806 | 2278 | 13-Jan-86 | 1200 | 16 | 16 | -- | 7.2 | 4530 | 338 | 895 | 6710 | 8.1 | 409 | 7.5 | 15800 | 1820 | 4.9 | 24 |
| VGD 5412 | 2279 | 13-Jan-86 | 1145 | 16 | 17 | -- | 7.3 | 3140 | 392 | 525 | 3080 | 5.2 | 455 | 7.7 | 7800 | 943 | 13 | 12 |
| | 2399 | 24-Mar-86 | 900 | 16 | 17 | -- | 7.6 | 3110 | 375 | 528 | 3760 | 7.5 | 464 | 7.7 | 9020 | 908 | 30 | 20 |
| | 2458 | 08-Apr-86 | 1405 | 16 | 17 | -- | 7.3 | 2900 | 362 | 485 | 3600 | 6.5 | 479 | 7.8 | 8300 | 849 | 24 | 20 |
| | 2605 | 09-Jun-86 | 845 | 16 | 18 | -- | 7.3 | 3460 | 398 | 598 | 4010 | 7 | 451 | 7.9 | 9810 | 1000 | 24 | 19 |
| | 2727 | 13-Aug-86 | 830 | 16 | 20 | -- | 7.3 | 3390 | 380 | 592 | 4410 | 6.7 | 457 | 8 | 10100 | 1020 | -- | 22 |
| | 2812 | 10-Sep-86 | 825 | 16 | 20 | -- | 7.4 | 3330 | 378 | 579 | 4040 | 6.7 | 442 | 8.2 | 9860 | 1020 | -- | 21 |
| | 2926 | 08-Oct-86 | 820 | 16 | 20 | -- | 7.3 | 3570 | 400 | 624 | 4470 | 4.4 | 389 | 8.1 | 10700 | 1220 | -- | 19 |
| | 2964 | 12-Nov-86 | 900 | 16 | 17 | -- | 7.5 | 3840 | 430 | 672 | 4280 | 3.2 | 450 | 7.8 | 9700 | 1110 | -- | 17 |
| | 3054 | 02-Dec-86 | 1000 | 16 | 19 | -- | 7.3 | 3690 | 401 | 650 | 3980 | 4.4 | 457 | 7.9 | 9750 | 1140 | -- | 16 |
| VGD 5509 | 2280 | 13-Jan-86 | 1130 | 16 | 16 | -- | 7 | 1590 | 257 | 231 | 610 | 3.9 | 267 | 8.1 | 2150 | 274 | 3.1 | 2.3 |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TDS | LEC | COD | NH3-ORG | NO3+NO2 | D-NH3 | D-ORTHO | T-P | As | Ba | Cd | Cr | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | |
| VGD 4406 | 2277 | 13-Jan-86 | 25900 | 25200 | -- | -- | -- | -- | -- | -- | 0.007 | 0 | 0 | 0 | 0 |
| | 2398 | 24-Mar-86 | 25200 | 24100 | -- | -- | -- | -- | -- | -- | 0.01 | -- | -- | 0 | 0 |
| | 2457 | 08-Apr-86 | 21900 | 21300 | -- | -- | -- | -- | -- | -- | 0.012 | -- | -- | 0 | 0 |
| | 2604 | 09-Jun-86 | 27900 | 25500 | -- | -- | -- | -- | -- | -- | 0.008 | -- | -- | 0 | 0 |
| | 2726 | 13-Aug-86 | 28700 | 26100 | -- | 0.4 | 8.3 | 0.23 | 0.06 | 0.14 | 0.01 | 0 | 0 | 0.005 | 0 |
| | 2811 | 10-Sep-86 | 29000 | 26300 | -- | 0.5 | 8 | 0.24 | 0.07 | 0.15 | 0.008 | -- | -- | 0.005 | 0 |
| | 2925 | 08-Oct-86 | 29900 | 26700 | -- | 0.8 | 6.9 | 0.26 | 0.1 | 0.13 | 0.008 | -- | -- | 0.005 | 0.005 |
| | 2963 | 13-Nov-86 | 28400 | 26400 | -- | 0.7 | 6.7 | 0.17 | 0.06 | 0.15 | 0.007 | -- | -- | 0.005 | 0.005 |
| | 3053 | 02-Dec-86 | 28300 | 25500 | -- | 0.7 | 5.7 | 0.18 | 0.05 | 0.12 | 0.005 | -- | -- | 0.005 | 0.005 |
| VGD 4806 | 2278 | 13-Jan-86 | 27100 | 26000 | -- | -- | -- | -- | -- | -- | 0.002 | 0 | 0 | 0 | 0 |
| VGD 5412 | 2279 | 13-Jan-86 | 13800 | 14400 | -- | -- | -- | -- | -- | -- | 0.002 | 0 | 0 | 0 | 0 |
| | 2399 | 24-Mar-86 | 15800 | 16200 | -- | -- | -- | -- | -- | -- | 0.004 | -- | -- | 0 | 0 |
| | 2458 | 08-Apr-86 | 14600 | 15000 | -- | -- | -- | -- | -- | -- | 0.006 | -- | -- | 0 | 0 |
| | 2605 | 09-Jun-86 | 16600 | 16800 | -- | -- | -- | -- | -- | -- | 0.003 | -- | -- | 0 | 0 |
| | 2727 | 13-Aug-86 | 17500 | 17300 | -- | 0.1 | 6.5 | 0.14 | 0.02 | 0.1 | 0.004 | 0 | 0 | 0.005 | 0 |
| | 2812 | 10-Sep-86 | 17100 | 16900 | -- | 0.4 | 6.1 | 0.14 | 0.03 | 0.1 | 0.003 | -- | -- | 0.005 | 0 |
| | 2926 | 08-Oct-86 | 17240 | 16800 | -- | 0.7 | 6.1 | 0.16 | 0.06 | 0.09 | 0.003 | -- | -- | 0.005 | 0.006 |
| | 2964 | 12-Nov-86 | 17200 | 17100 | -- | 0.7 | 4.4 | 0.2 | 0.03 | 0.11 | 0.003 | -- | -- | 0.005 | 0.005 |
| | 3054 | 02-Dec-86 | 17400 | 16800 | -- | 0.6 | 4.3 | 0.16 | 0.01 | 0.08 | 0.003 | -- | -- | 0.005 | 0.005 |
| VGD 5509 | 2280 | 13-Jan-86 | 4130 | 4650 | -- | -- | -- | -- | -- | -- | 0.003 | 0 | 0 | 0 | 0 |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | Fe | Pb | Mn | Hg | Se | Ag | Zn | Al | Co | Mo | Ni | Sr | V | SS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Southern Subsurface Stations** | | | | | | | | | | | | | | | | |
| VGD 4406 | 2277 | 13-Jan-86 | 0.73 | 0 | 1.2 | -- | 0.006 | 0 | 0.01 | 0 | 0 | -- | 0 | 8.2 | -- | -- |
| | 2398 | 24-Mar-86 | 0.8 | -- | 0.53 | -- | 0.004 | -- | 0 | -- | -- | -- | 0 | 8 | -- | -- |
| | 2457 | 08-Apr-86 | 0.71 | -- | 0.48 | -- | 0.004 | -- | 0 | -- | -- | -- | 0 | 6 | -- | -- |
| | 2604 | 09-Jun-86 | 1.4 | -- | 0.91 | -- | 0.006 | -- | 0.01 | -- | -- | -- | 0 | 7.9 | -- | -- |
| | 2726 | 13-Aug-86 | 1.3 | 0 | 0.8 | 0 | 0.004 | 0 | 0 | 0 | 0 | -- | 0 | 9.1 | -- | -- |
| | 2811 | 10-Sep-86 | 1.2 | -- | 0.89 | -- | 0.007 | -- | 0 | -- | -- | -- | -- | 2 | -- | -- |
| | 2925 | 08-Oct-86 | 1.17 | -- | 1.01 | -- | 0.002 | -- | 0.005 | -- | -- | 0.048 | -- | 7.2 | -- | -- |
| | 2963 | 13-Nov-86 | 0.74 | -- | 0.82 | -- | 0.004 | -- | 0.005 | -- | -- | 0.74 | -- | 6.8 | -- | -- |
| | 3053 | 02-Dec-86 | 0.832 | -- | 1.01 | -- | 0.004 | -- | 0.005 | -- | -- | 0.705 | -- | 8.1 | -- | -- |
| VGD 4806 | 2278 | 13-Jan-86 | 1.8 | 0 | 2.9 | -- | 0 | 0 | 0 | 0 | 0 | -- | 0.01 | 6.2 | -- | -- |
| VGD 5412 | 2279 | 13-Jan-86 | 2.3 | 0 | 1.4 | -- | 0.001 | 0 | 0.01 | 0 | 0 | -- | 0 | 18 | -- | -- |
| | 2399 | 24-Mar-86 | 0.86 | -- | 0.76 | -- | 0.002 | -- | 0.01 | -- | -- | -- | 0 | 6.1 | -- | -- |
| | 2458 | 08-Apr-86 | 0.4 | -- | 0.71 | -- | 0.003 | -- | 0 | -- | -- | -- | 0.01 | 4.8 | -- | -- |
| | 2605 | 09-Jun-86 | 1.6 | -- | 1.2 | -- | 0.002 | -- | 0.01 | -- | -- | -- | 0.01 | 5.7 | -- | -- |
| | 2727 | 13-Aug-86 | 1.3 | 0 | 0.97 | 0 | 0 | 0 | 0 | 0 | 0 | -- | 0 | 6.3 | -- | -- |
| | 2812 | 10-Sep-86 | 1 | 0 | 1 | -- | 0.001 | -- | 0 | -- | -- | -- | -- | 6.3 | -- | -- |
| | 2926 | 08-Oct-86 | 1.11 | -- | 1.29 | -- | 0.001 | -- | 0.005 | -- | -- | 0.043 | -- | 4.6 | -- | -- |
| | 2964 | 12-Nov-86 | 1.29 | -- | 1.42 | -- | 0.002 | -- | 0.005 | -- | -- | 0.266 | -- | 4.7 | -- | -- |
| | 3054 | 02-Dec-86 | 0.808 | -- | 1.29 | -- | 0.001 | -- | 0.005 | -- | -- | 0.21 | -- | 5.2 | -- | -- |
| VGD 5509 | 2280 | 13-Jan-86 | 0.91 | 0 | 4.2 | -- | 0 | 0 | 0 | 0 | 0 | -- | 0.01 | 2.2 | -- | -- |

# 1986 Monitoring Station Data

## Southern Subsurface Stations (continued)

| STATION | LN | DATE | TYPE1 | NAME1 | CONC1 | TYPE2 | NAME2 | CONC2 |
|---|---|---|---|---|---|---|---|---|
| Southern Subsurface Stations | | | | | | | | |
| VGD 4406 | 2277 | 13-Jan-86 | A | NA | -- | A | NA | -- |
| | 2398 | 24-Mar-86 | A | NA | -- | A | NA | -- |
| | 2457 | 08-Apr-86 | A | NA | -- | A | NA | -- |
| | 2604 | 09-Jun-86 | A | NA | -- | A | NA | -- |
| | 2726 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2811 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2925 | 08-Oct-86 | A | NA | -- | A | NA | -- |
| | 2963 | 13-Nov-86 | A | NA | -- | A | NA | -- |
| | 3053 | 02-Dec-86 | A | NA | -- | A | NA | -- |
| VGD 4806 | 2278 | 13-Jan-86 | A | NA | -- | A | NA | -- |
| VGD 5412 | 2279 | 13-Jan-86 | A | NA | -- | A | NA | -- |
| | 2399 | 24-Mar-86 | A | NA | -- | A | NA | -- |
| | 2458 | 08-Apr-86 | A | NA | -- | A | NA | -- |
| | 2605 | 09-Jun-86 | A | NA | -- | A | NA | -- |
| | 2727 | 13-Aug-86 | A | NA | -- | A | NA | -- |
| | 2812 | 10-Sep-86 | A | NA | -- | A | NA | -- |
| | 2926 | 08-Oct-86 | A | NA | -- | A | NA | -- |
| | 2964 | 12-Nov-86 | A | NA | -- | A | NA | -- |
| | 3054 | 02-Dec-86 | A | NA | -- | A | NA | -- |
| VGD 5509 | 2280 | 13-Jan-86 | A | NA | -- | A | NA | -- |

# *APPENDIX C*

## *Works Consulted*

## WORKS CONSULTED


Boyle Engineering Corporation. *Evaluation of On-Farm Agricultural Management Alternatives* April 1986.

California Department of Water Resources. *Field Evaluation of Anaerobic Denitrification in Simulated Deep Ponds.* Bulletin 174-3. May 1969.

----. *Progress Report: San Joaquin Valley Drainage Investigation -- Quality and Treatment Studies Through December 31, 1976 (Bio-Engineering Aspects of Agricultural Drainage).* Bulletin 174-2. August 1968.

----. *San Joaquin Valley Drainage Investigation: San Joaquin Master Drain.* Bulletin 127. January 1965.

----. *San Joaquin Valley Drainage Investigation: Waste Water Quality, Treatment, and Disposal.* Bulletin 127, Appendix D. April 1969.

----. *Status of San Joaquin Valley Drainage Problems.* Bulletin 127-74. December 1974.

California Department of Water Resources, San Joaquin District. *San Joaquin Valley Drainage Investigation: Interim Report, Agricultural Drainage Disposal Requirements, Southern Portion of the Valley.* August 1962.

----. *San Joaquin Valley Drainage Monitoring Program, 1984.* April 1986.

----. *San Joaquin Valley Drainage Monitoring Program, 1985.* December 1986.

Letey, J., et al, *An Agricultural Dilemma: Drainage Water and Toxics Disposal in the San Joaquin Valley.* University of California, Riverside, Division of Agriculture and Natural Resources. 1986.

National Academy of Sciences and National Academy of Engineering. *Water Quality Criteria: 1972.*

San Joaquin Valley Interagency Drainage Program. *Agricultural Drainage and Salt Management in the San Joaquin Valley: Final Report.* June 1979.

----. *Program Review Report.* March 1976.

United States Bureau of Reclamation. *Central Valley Project, San Luis Unit: Drainage Appendix.* August 1962.

----. *Plan for Disposal of Subsurface Agricultural Drainage.* June 1969.

United States Bureau of Reclamation and California Department of Water Resources. *Agreement Between the United States of America and the State of California for the Construction and Operation of the Master Drain Serving the San Joaquin Valley.* 1966.

United States Bureau of Reclamation, United States Fish and Wildlife Service, and United States Army Corps of Engineers. *Final Environmental Impact Statement: Kesterson Program.* 2 vols. October 1986.

Utah State University Foundation. *Characteristics and Pollution Problems of Irrigation Return Flow.* May 1969.