NUS-5241

Annual Report for PVNGS Salt Deposition Monitoring Program

January - December 1989

Prepared for

Arizona Nuclear Power Project
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By

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Abstract

The PVNGS salt deposition and impact monitoring program began operation in May 1983. It is intended to meet the commitment to a monitoring program called for in the PVNGS Environmental Report, Construction Permit Stage and required by the operating license. This annual report describes the results of the sampling activities conducted during January through December 1989 and presents an analysis of these data. The media sampled include air, cooling tower basin water, deposited soluble and insoluble minerals (salt), soils, and vegetation (indigenous and cultivated).

Results for the various media sampled in the 1989 PVNGS drift monitoring program have been compared with corresponding preoperational values. There are clear indications of the effects of cooling tower emissions, particularly in the deposition samples from close-in monitoring sites. The 1988 results, as presented in last year's annual report, produced similar findings; 1989 PVNGS operations appear not to have extended the range of influence of PVNGS cooling tower drift emissions beyond that observed in 1988.

Only one cultivated site had significant changes in the same parameter (analyte) for all media sampled: calcium and magnesium at site 25, a control site 19 miles west-northwest of the plant, increased in deposition, soil, and crop tissue samples. The 1989 cooling tower operations at PVNGS had no significant effects on the offsite environment.

As a result of these findings, no significant changes to the current monitoring program are recommended for 1990.

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1 Introduction

NUS Corporation is conducting a salt deposition and impact monitoring program in the vicinity of the Palo Verde Nuclear Generating Station (PVNGS) for the Arizona Nuclear Power Project (ANPP). The objective of this monitoring program is to determine the environmental impact of salt drift emissions from the operation of the PVNGS round mechanical draft cooling towers.

This annual report presents the results of laboratory analyses of samples collected from January through December 1989 and an assessment of their significance. The media sampled include agricultural crops, indigenous vegetation, soil, drift deposition, particulates collected by low-volume air filters, and cooling tower basin water. Also presented is a comparison of the 1989 data collected during plant operation with those collected during a preoperational period (1983 through 1985), as required by the PVNGS Units 1, 2, and 3 Environmental Protection Plans, Sections 4.2.2 and 5.4.1 (Appendix B of Facility Operating Licenses NPF-41, NPF-51, and NPF-74). The preoperational data, which exclude data for sites 16, 20, 80, 81, and 83 for 1985, are derived from a previous study (NUS, 1987a).

Specific assessments in this report include (1) the levels of airborne soluble and insoluble deposits, (2) the chemistry of surficial soils, (3) the salt concentrations in leaf tissue of agricultural crops and indigenous plants, and (4) the yield of cotton crops. Interrelationships observed between the measurements are also presented.

Additionally, this report provides a description, in the form of a climatological summary, of the area meteorology as measured at the PVNGS meteorological tower during the report period, and a modeling assessment of drift deposition during the period using actual cooling tower operating data and site meteorological data. Included as appendixes are tabulations of the plant operating data as well as the data bases upon which the assessments are based. Meteorological data summaries for 1989 are presented in another report (NUS, 1990).

2 Monitoring Program Summary

The salt deposition and impact monitoring program began in May 1983. It is intended to meet the commitment to a monitoring program called for in the Environmental Report, Construction Permit Stage (ER-CP) (PVNGS, 1974, Section 6.2.5), and to satisfy the requirements of the PVNGS Units 1, 2, and 3 Environmental Protection Plans, Sections 4.2.2 and 5.4.1 (Appendix B of Facility Operating Licenses NPF-41, NPF-51, and NPF-74).

As described in Salt Deposition and Impact Monitoring Plan, Revision 5 (NUS, 1987c), the monitoring program was designed to (1) determine levels of airborne salt deposition; (2) define physical and chemical properties of surficial soils; (3) estimate species richness and cover and measure the salt loading of agricultural crops and indigenous plant communities in the vicinity of PVNGS; and (4) estimate cotton crop yield. Several background locations that would not be affected by the operation of the PVNGS cooling towers were established as control sites. These sites were selected to give an indication of any long-term natural changes.

The following sections provide a brief summary of the sampling activities conducted during January through December 1989 that together constitute the PVNGS salt deposition and impact monitoring program. The media sampled included air, cooling tower basin water, deposited soluble and insoluble minerals (salt), soils, and vegetation (indigenous and cultivated). A description of salt emission and deposition modeling of the PVNGS area, which involved the use of actual plant operating and meteorological data for this period, is also presented in Section 2.2 of this report.

2.1 ONSITE METEOROLOGICAL MEASUREMENTS PROGRAM

The onsite meteorological measurements program at the site, which began on August 13, 1973, is described in the Environmental Report, Operating License Stage (ER-OL) (PVNGS, 1979). The measurement instruments are deployed at two heights (35 and 200 feet) on a guyed tower in the northwestern portion of the site.

Digital meteorological data have been recorded by the upgraded PVNGS meteorological system since October 1985. Before October 1985, such data were manually reduced from analog strip charts.

Monthly and annual statistics on all meteorological parameters collected at PVNGS were processed and compared with historical data. The results of these programs for calendar year 1989 are discussed in more detail in Section 3.

2.2 COOLING TOWER EMISSIONS AND MODELING

2.2.1 Cooling Tower Basin Water

Cooling tower basin water was sampled during all months in which cooling towers operated in 1989. The chemical composition of the cooling tower basin water and drift was compared with that of deposits (dustfall jars) and suspended airborne materials (particulates collected on low-volume filters) to identify any changes in salt composition associated with cooling tower operation. A summary of cooling tower operation for the period January through December 1989 is presented in Section 4.

The cooling tower basin water samples were analyzed for the major constituents identified in Table 3.6-1 of the ER-OL to determine the composition of the drift. These constituents include total dissolved solids (TDS), calcium, magnesium, potassium, chloride, sodium, nitrate, sulfate, and silica. Minor constituents were also quantitatively assessed to the extent feasible.

2.2.2 Emissions Modeling

The NUS FOG code was used to calculate the deposition of dissolved solids (salt) emitted as drift by the round mechanical draft cooling towers of PVNGS Units 1, 2, and 3. Input to the FOG code consisted of sequential hourly meteorological data for 1989, which were obtained from the PVNGS meteorological tower system, as well as daily plant operating data--i.e., the number of fans in operation; the circulating water flow rate; the heat release rate; the TDS concentration; and the drift rate and droplet size distribution as determined from emission tests of the towers (ESC, 1983).

2.3 SALT DEPOSITION MEASUREMENTS

The measurement of salt deposition was accomplished through the collection of drift deposition samples, which were then analyzed for dissolved mineral content and suspended solids. Sampling was accomplished by placing, at selected monitoring locations, pairs of open jars containing demineralized water. The jars were 6 inches in diameter and 18 inches deep. The 18-inch-deep jar recommended by the American Society for Testing and Materials (ASTM) was used for drift collection. This jar is regarded as the most suitable vessel for sampling in a desert environment; it requires less frequent checking of the water level than other, shallower jars. Two jars were placed at each sampling location to provide for an estimate of sampling precision.

The jars were elevated approximately 3 feet above the ground surface on stands, and a bird ring was placed around the edge of each jar to prevent birds from perching and contaminating the sample. This height was used instead of the minimum height of 8 feet recommended by the ASTM (1970) so as to permit the collection of drift deposition that occurs at typical plant crown height. A chemically inert 1- to 2-millimeter conical screen was suspended above the maximum water level in the jars to keep out potential contaminants such as those attributable to insects and birds. At least 1 inch of water was maintained in the jars to prevent collected drift from being blown out.

The monthly sampling procedure followed the ASTM method for the collection of dustfall. At the end of each month the jars were collected and a clean set of jars installed. The collected sample from each jar is first transferred to a graduated cylinder. The jar is rinsed to extract any residue, and the rinsate is transferred to the cylinder. The sample is then transferred to a shipping bottle, labeled, and sent to a laboratory for analysis.

Figure 2-1 shows the locations of the 44 sites where drift deposition samples were collected. In addition to the 44 sites committed in the Monitoring

Plan, ANPP established 4 interim drift-deposition-only onsite sampling locations in May 1985. These locations, sites 80-83 (not shown in Figure 2-1), were established close to the cooling towers to provide unambiguous indications of drift deposition above the background level. The data will be collected over a limited period for confirmation of the drift deposition model. Table 2-1 lists the approximate distances (miles) and directions (sectors) from the centroid of the PVNGS Unit 2 cooling tower array of all 48 monitoring sites.

The laboratory analyzed the collected drift deposition samples for total suspended solids and for the most significant dissolved components of the cooling tower drift as identified in Table 3.6-1 of the ER-OL.

2.4 SOILS MEASUREMENTS

At each of the 44 monitoring locations depicted in Figure 2-1, soil samples were collected in April (following the 1989 wet season) and in July (following the dry season). Collections were also made at all 13 agricultural sites after cotton defoliation (November). The samples were drawn from the upper and lower fractions of five cores on each of two transects. Sampling was in accordance with the methods described by the U.S. Department of Energy's Environmental Measurements Laboratory Procedures Manual (DOE, no date). A soil auger was used to collect 8-centimeter-diameter core samples to depths of 30 centimeters, which were divided into upper (0- to 15-centimeter) and lower (15- to 30-centimeter) segments. The upper and lower segments for each transect were separately combined to form four composites, one for each depth segment for each of the two transects. From each composite two samples were taken and labeled. The labeled samples were then taken to the analytical laboratory, where one composite sample was analyzed and the other retained in storage.

Soil samples were each analyzed for soluble sodium, calcium, potassium, magnesium, sulfate, nitrate, chloride, fluoride, carbonate, bicarbonate, ammonium, phosphate, boron, exchangeable sodium, exchangeable calcium, exchangeable potassium, exchangeable magnesium, pH, and electrical conductivity.

2.5 VEGETATION MEASUREMENTS

2.5.1 Agricultural Crops

At 6 of the 13 agricultural monitoring sites (Figure 2-2), agricultural crops were sampled twice each growing season (July and August) before defoliation (or harvest) for the estimation of leaf tissue salt loading. (Seven of the sites--7, 12, 24, 28, 31, 32, and 45--were fallow during the 1989 growing season.) Cotton yield was estimated by collecting and weighing the seed and fiber (boll) from randomly selected cotton plots. This sampling occurred during the months of September, October, and November 1989.

Agricultural crop samples were sent to a laboratory for chemical analysis. The samples were oven-dried at 70°C for 24 hours, dry-weighed, ground in a blender, and stored in Kraft paper bags. The dried samples were analyzed for total sodium, calcium, potassium, magnesium, phosphate, soluble sulfate, nitrate, chloride, and fluoride.

2.5.2 Indigenous Vegetation

Representative native plant communities, which have been identified and monitored since 1976 to determine baseline conditions, were sampled semi-annually (March and October). The locations of the eight indigenous vegetation sites are depicted in Figure 2-2.

Two indigenous plant communities, one dominated by creosote-bush and the other by salt-bush, occur on and in the vicinity of PVNGS. Associated with these are mesquite and several species of cacti. The indigenous vegetative sampling conducted within each of the existing sites included measurement of species richness and relative cover and measurement of the salt concentration in leaf tissues of the dominant flora (other than cacti).

After collection, native vegetation samples were sent to a laboratory for chemical analysis. These samples were oven-dried at 70°C for 24 hours, dry-weighed, ground, and stored in Kraft paper bags. The dried samples were analyzed for total sodium, phosphate, calcium, potassium, magnesium, soluble sulfate, nitrate, chloride, and fluoride.

2.5.3 Aerial Photography/Remote Sensing

Indigenous vegetation and agricultural crops were monitored by aerial (color infrared) photography. The principal crops grown in a 5-mile radius of PVNGS were photographed near the time of peak productivity (September).

2.6 AIRBORNE SALT MEASUREMENTS

Airborne salt concentrations were measured by collecting particles on a low-volume particulate sampler. Measurements were taken from the existing low-volume samplers at six locations (Figure 2-1) being used as part of the PVNGS radiological monitoring program. The filters were collected weekly for radiological analysis and composited monthly for chemical analysis. The composite filters were analyzed for calcium, chloride, iron, fluoride, potassium, magnesium, sodium, nitrate (as nitrogen), sulfate, and phosphate (as phosphorus). To date, these data have not contributed any valuable information related to understanding and defining the drift deposition at PVNGS.

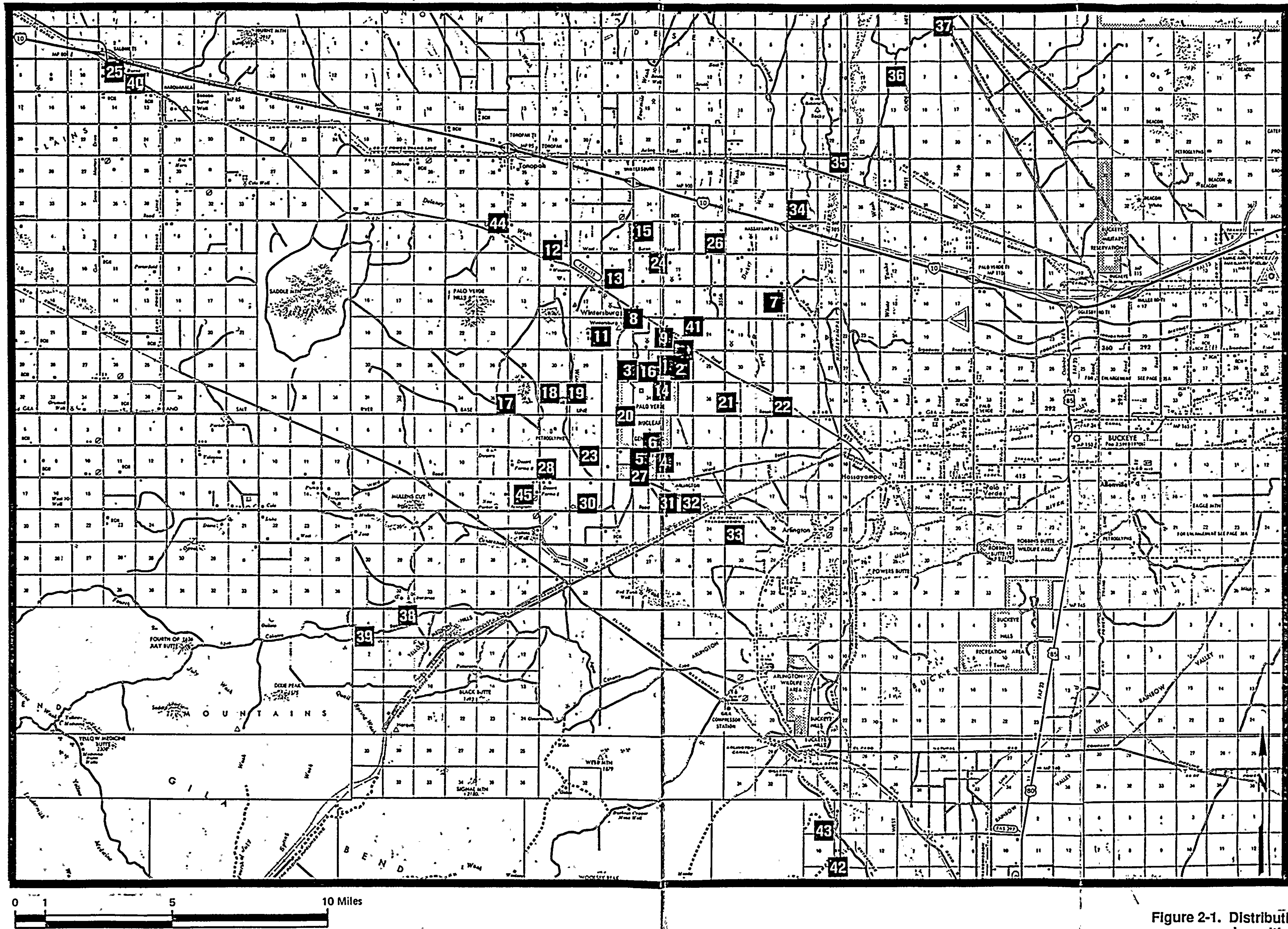
Table 2-1. Distance and direction of 48 drift deposition monitoring sites from centroid of PVNGS Unit 2 cooling towers (sheet 1 of 2)

Site	Distance (miles)	Direction (sector)	Site type	Onsite vs. offsite	Sample
1	1.3	NE	Native	Onsite	DF, S, NV
2	1.5	NE	Native	Onsite	DF, S, NV
3	0.6	NNW	Native	Onsite	DF, S, NV
4	2.2	SSE	Native	Onsite	DF, S, NV
5	2.0	S	Native	Onsite	DF, S
6	1.8	S	Native	Onsite	DF, S, NV
7	5.1	ENE	Agricultural	Offsite	DF, S, AG
8	2.1	N	Native	Offsite	DF, S, LVA
9	1.8	NNE	Native	Offsite	DF, S, LVA
10	1.6	NE	Native	Onsite	DF, S, LVA
11	2.0	NW	Agricultural	Offsite	DF, S, AG
12	4.8	NW	Agricultural	Offsite	DF, S, AG
13	3.2	NNW	Agricultural	Offsite	DF, S, AG
14	1.0	NE	Native	Onsite	DF, S
15	5.0	N	Native	Offsite	DF, S
16	0.6	NNE	Native	Onsite	DF, S
17	4.0	W	Native	Offsite	DF, S
18	2.8	W	Native	Offsite	DF, S
19	2.3	W	Native	Offsite	DF, S
20	0.4	WSW	Native	Onsite	DF, S, LVA
21	3.1	E	Native	Offsite	DF, S, LVA
22	4.8	E	Native	Offsite	DF, S
23	2.3	SW	Agricultural	Offsite	DF, S, AG
24	4.0	N	Agricultural	Offsite	DF, S, AG
25	19.0	WNW	Agricultural control	Offsite	DF, S, AG
26	5.0	NE	Native	Offsite	DF, S
27	2.3	S	Native	Onsite	DF, S, LVA
28	3.7	SW	Agricultural	Offsite	DF, S, AG
30	3.9	SSW	Agricultural	Offsite	DF, S, AG
31	3.5	SSE	Agricultural	Offsite	DF, S, AG

Table 2-1. Distance and direction of 48 drift deposition monitoring sites from centroid of PVNGS Unit 2 cooling towers (sheet 2 of 2)

Site	Distance (miles)	Direction (sector)	Site type	Onsite vs. offsite	Sample
32	3.9	SE	Agricultural	Offsite	DF, S, AG
33	5.3	SE	Native	Offsite	DF, S
34	6.7	NE	Native	Offsite	DF, S
35	9.9	NE	Native	Offsite	DF, S
36	12.8	NE	Native	Offsite	DF, S
37	15.0	NE	Native	Offsite	DF, S
38	10.0	SW	Native	Offsite	DF, S
39	11.5	SW	Native	Offsite	DF, S
40	18.2	WNW	Native control	Offsite	DF, S, NV
41	2.8	NE	Native	Offsite	DF, S
42	16.6	SSE	Native control	Offsite	DF, S, NV
43	15.0	SSE	Agricultural control	Offsite	DF, S, AG
44	6.6	NW	Native	Offsite	DF, S, NV
45	5.1	SW	Agricultural	Offsite	DF, S, AG
80	0.5	NE	Supplemental	Onsite	DF
81	0.2	NNW	Supplemental	Onsite	DF
82	0.5	SSW	Supplemental	Onsite	DF
83	0.3	ESE	Supplemental	Onsite	DF

Key: DF, dustfall; S, soils; NV, native vegetation; AG, agricultural crops; LVA, air by low-volume air sampler.



SI APERTURE CARD

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Figure 2-1. Distribution of PVNGS drift deposition and soil sampling locations

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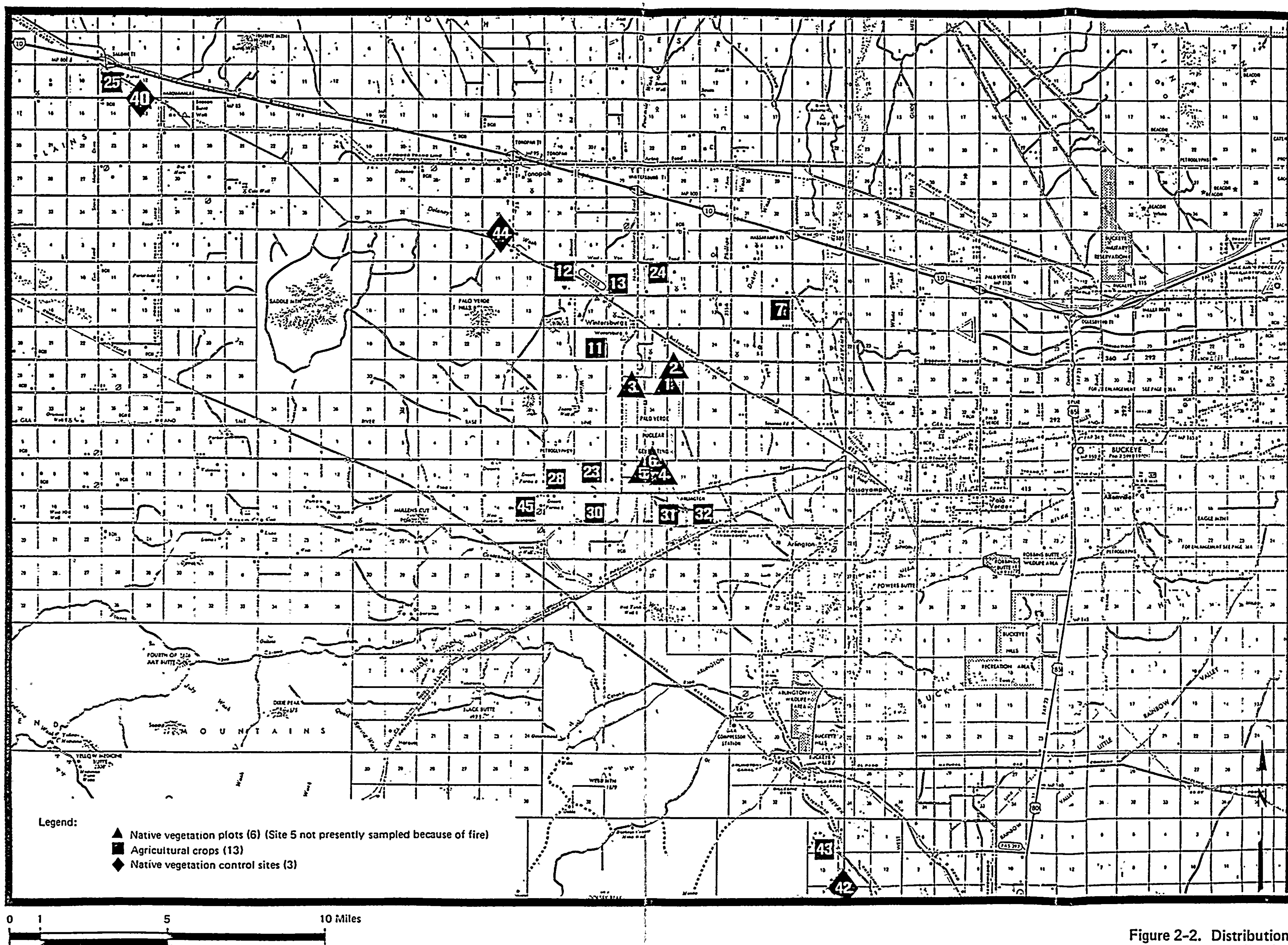

Figure 2-2. Distribution of PVNGS vegetation sampling locations

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3 Climatological Summary

3.1 GENERAL CLIMATOLOGY

The PVNGS site is in southwestern Arizona approximately 50 miles west-southwest of the Phoenix National Weather Service Station (NWS Phoenix) at Sky Harbor International Airport. The site area is part of the Inter-Mountain Plateau Climatic Zone, the driest region of the United States (Baldwin, 1973). This large, arid region is typified by abundant sunshine, infrequent precipitation, low relative humidities, large diurnal temperature ranges, moderate wind speeds, and an occasional intense summer thunderstorm (NOAA, 1984). The summers are hot and the winters are mild. A more detailed description of the climatology of the PVNGS site is provided in the ER-OL (PVNGS, 1979, Section 2.3).

3.2 METEOROLOGICAL SUMMARY

Presented in Table 3-1 are monthly averages of temperature, dew point, and wind speed and monthly totals of precipitation for the PVNGS site and NWS Phoenix for 1989. The PVNGS data on temperature and dew point compare reasonably well with those for NWS Phoenix. They show, for example, that NWS Phoenix is, on average, about 4°F warmer than the PVNGS site. They also indicate, however, that on average, NWS Phoenix received 0.11 inch less precipitation than PVNGS in 1989. This variation in annual precipitation is likely attributable to the highly variable and localized convective storms. Table 3-2 lists the number of days each month in 1989 when precipitation was recorded at the PVNGS site and NWS Phoenix. Most of the precipitation occurred in the summer, fall, and winter; dry periods occurred primarily in the spring.

Comparisons of 1989 data and long-term averages for both PVNGS and NWS Phoenix are presented in Section 9.1.

Monthly, quarterly, and annual wind roses for the 35- and 200-foot levels of the meteorological tower at PVNGS for 1989 are presented as Figures 3-1 through 3-7. As seen in Figure 3-7, annual average wind directions for both levels are similar in that they reflect peak frequencies for winds from the southwest. However, a secondary peak from the north is evident only for the 35-foot level. This secondary peak is a reflection of the nighttime cold air drainage flow from the higher terrain just north of the PVNGS site. The highest average wind speeds at both levels are for winds from the east. Also presented on the wind roses is the frequency of calm winds, 0.0 and 0.1 percent for the 35- and 200-foot levels, respectively, for the year. The quarterly wind roses (Figures 3-5 and 3-6) reflect a similarity between the first and fourth quarters with respect to the drainage effect at the 35-foot level. Lighter wind speeds, lower temperatures, and a high occurrence of stable conditions produce a higher frequency of nighttime cold air drainage flow during these quarters. The second and third quarter wind roses for both the 35- and 200-foot levels show peak frequencies for winds from the southwest.

Table 3-3 shows the occurrence of wind gusts in excess of 50 miles per hour at the 35- and 200-foot levels at PVNGS for 1989. Most of the occurrences were in the summer months and were associated with thunderstorm activity in and around the PVNGS area.

Table 3-4 presents monthly distributions of atmospheric stability classes for PVNGS for 1989 based on the delta T (i.e., the difference between the temperature at 200 feet and that at 35 feet). The distributions show that stable classes (E, F, and G) dominate throughout the year. The unstable classes (A, B, and C) have a higher frequency of occurrence in the spring and summer months. Analyses of PVNGS meteorological data since 1974 reveal that this is a normal pattern for the PVNGS site area. A more detailed description of the meteorological conditions at PVNGS during 1989 is presented in NUS-5254 (NUS, 1990).

3.3 METEOROLOGICAL DATA RECOVERY

PVNGS meteorological data recovery for 1989 are indicated in Table 3-5. Annual data recovery for each parameter averaged 99 percent, and at no time did monthly data recovery for any parameter drop below 96 percent. These high recovery rates are attributable in part to the upgraded meteorological system installed at PVNGS in mid-October 1985 and in part to limited hours of power outages.

Table 3-1. Monthly averages of meteorological data for PVNGS and NWS Phoenix, 1989

Month	Temperature (°F)		Dew point (°F)		Precipitation (in.)		Wind speed (mph)	
	PVNGS	NWS Phoenix*	PVNGS	NWS Phoenix*	PVNGS	NWS Phoenix*	PVNGS	NWS Phoenix†
January	50	54	32	30	2.36	1.19	5.7	5.3
February	57	62	30	31	0.00	T‡	6.2	5.9
March	67	70	30	31	1.16	1.25	6.0	6.2
April	77	80	31	32	0.00	0.00	6.0	6.5
May	80	83	33	34	0.00	T‡	7.3	6.9
June	89	92	38	37	0.00	0.00	7.5	6.9
July	94	97	55	55	0.10	0.13	7.6	7.4
August	90	94	54	56	0.36	1.11	7.7	7.3
September	86	90	42	46	0.21	0.47	6.8	6.6
October	73	77	38	43	0.66	0.46	6.1	5.9
November	61	66	26	32	0.02	0.14	4.6	5.3
December	52	57	18	24	0.18	0.19	4.4	4.6
Annual	73	77	36	38	5.05	4.94	6.3	6.2

*Based on measurement at 5 feet.

†Based on measurement at 33 feet.

‡Trace of precipitation.

Table 3-2. Number of days with precipitation events of ≥0.01 inch at PVNGS and NWS Phoenix, 1989

Month	PVNGS	NWS Phoenix
January	6	3
February	0	0
March	2	3
April	0	0
May	0	0
June	0	0
July	3	5
August	2	3
September	2	2
October	1	4
November	1	2
December	2	2
Average (month)	1.5	2.0

Table 3-3. Occurrences of wind gusts in excess of 50 miles per hour at PVNGS, 1989

Date	Hour ending	Occurrences during hour	Wind speed level (ft)	Probable cause
3/25	2000	2	35	Thunderstorm
3/25	2000	>10	200	Thunderstorm
7/21	1900	2	200	Gust front *
7/25	2100	3	200	Gust front *
7/25	2100	1	35	Gust front *
8/16	2200	2†	35	Thunderstorm
8/16	2200	17†	200	Thunderstorm

*Large outflow winds produced by intense thunderstorms within 75 miles of the PVNGS site, but not occurring at the site.

†Number may be higher. Power failure may have compromised detection capability.

Table 3-4. Monthly percent frequency distributions of stability classes based on delta T for PVNGS, 1989

Month	Stability category						
	A	B	C	D	E	F	G
January	0.13	0.67	2.69	25.40	18.28	15.59	37.23
February	0.00	2.83	6.85	28.13	13.69	19.94	28.57
March	3.36	3.36	7.26	26.08	12.90	15.19	31.85
April	4.44	5.83	9.31	23.47	11.11	16.94	28.89
May	10.89	8.47	9.41	21.91	16.80	14.38	18.15
June	12.50	8.89	8.61	18.47	19.03	18.47	14.03
July	9.02	12.25	11.04	22.21	25.17	11.84	8.48
August	6.45	12.37	11.29	26.61	23.52	10.62	9.14
September	3.76	8.34	9.04	20.86	18.92	11.54	27.54
October	1.62	3.23	6.73	28.13	15.34	13.19	31.76
November	0.83	0.69	1.67	27.50	8.33	12.92	48.06
December	0.27	0.27	1.75	26.01	10.38	11.59	49.73
Annual	4.47	5.62	7.14	24.56	16.16	14.30	27.76

Notes:

1. Delta T is defined as difference between temperatures at 200- and 35-foot levels of meteorological tower.
2. Averages are based on joint recovery of stability and 35-foot wind data.

Table 3-5. Percentages of meteorological data recovery for PVNGS, 1989

Month	35-Ft wind Speed	35-Ft wind Direction	200-Ft wind Speed	200-Ft wind Direction	ΔT*	Joint (ΔT and 35-ft wind data)	35-Ft dew point	35-Ft temperature	Precipitation
January	100	100	100	100	100	100	100	100	100
February	100	100	100	100	100	100	100	100	100
March	100	100	100	100	100	100	100	100	100
April	100	100	100	100	100	100	100	100	100
May	100	100	100	100	100	100	100	100	100
June	100	100	100	100	100	100	100	100	100
July	99	99	99	99	99	99	99	99	99
August	100	100	100	100	100	100	100	100	100
September	99	99	99	99	100	99	99	99	99
October	99	99	99	99	99	99	99	99	99
November	100	100	100	100	100	100	100	100	100
December	99	99	99	99	99	99	96	99	99
Annual	99	99	99	99	99	99	99	99	99

*Difference between temperatures at 200- and 35-foot levels of meteorological tower.

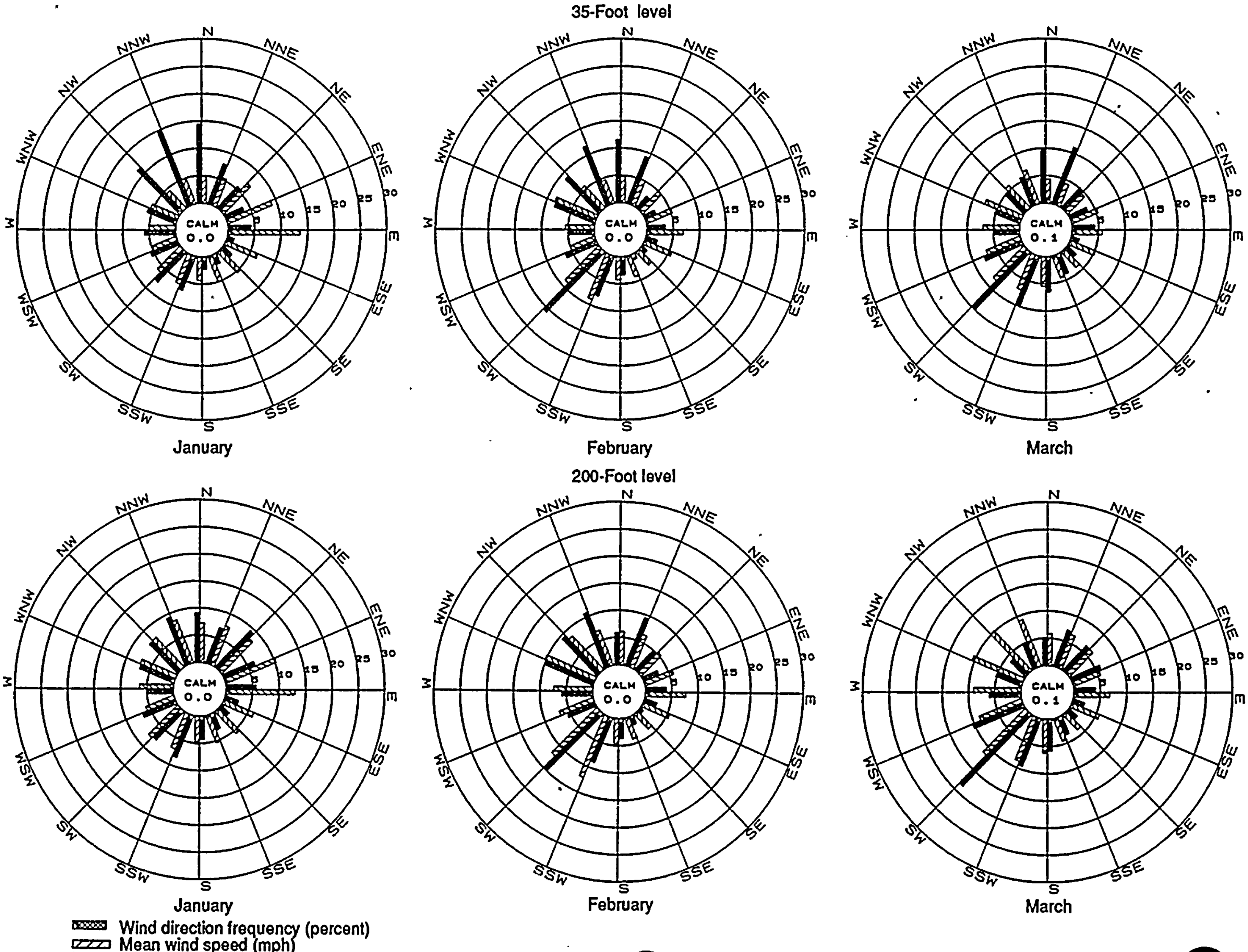


Figure 3-1. Gross wind roses for PVN[illegible]anuary, February, and March 1989

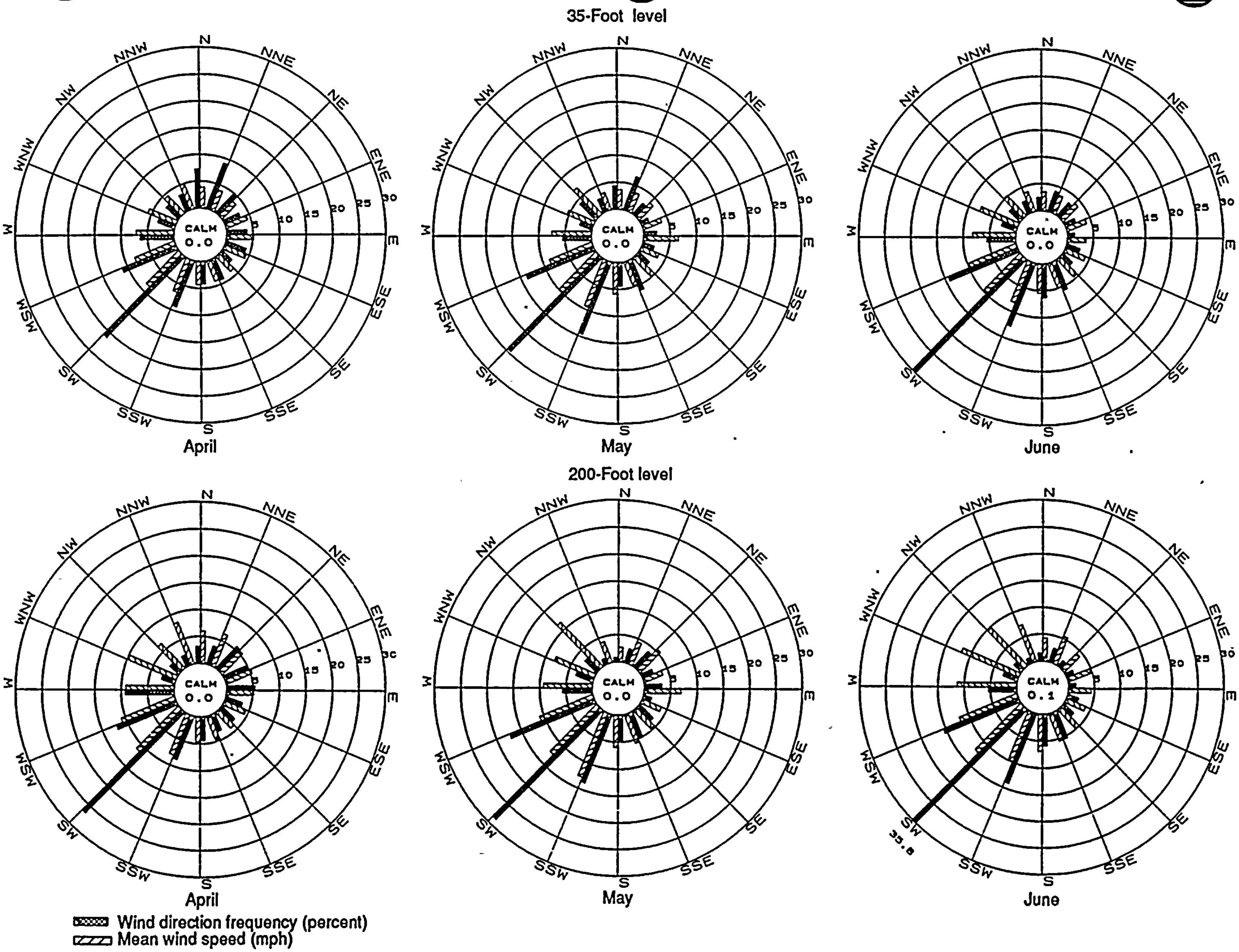


Figure 3-2. Gross wind roses for PVNGS, April, May, and June 1989

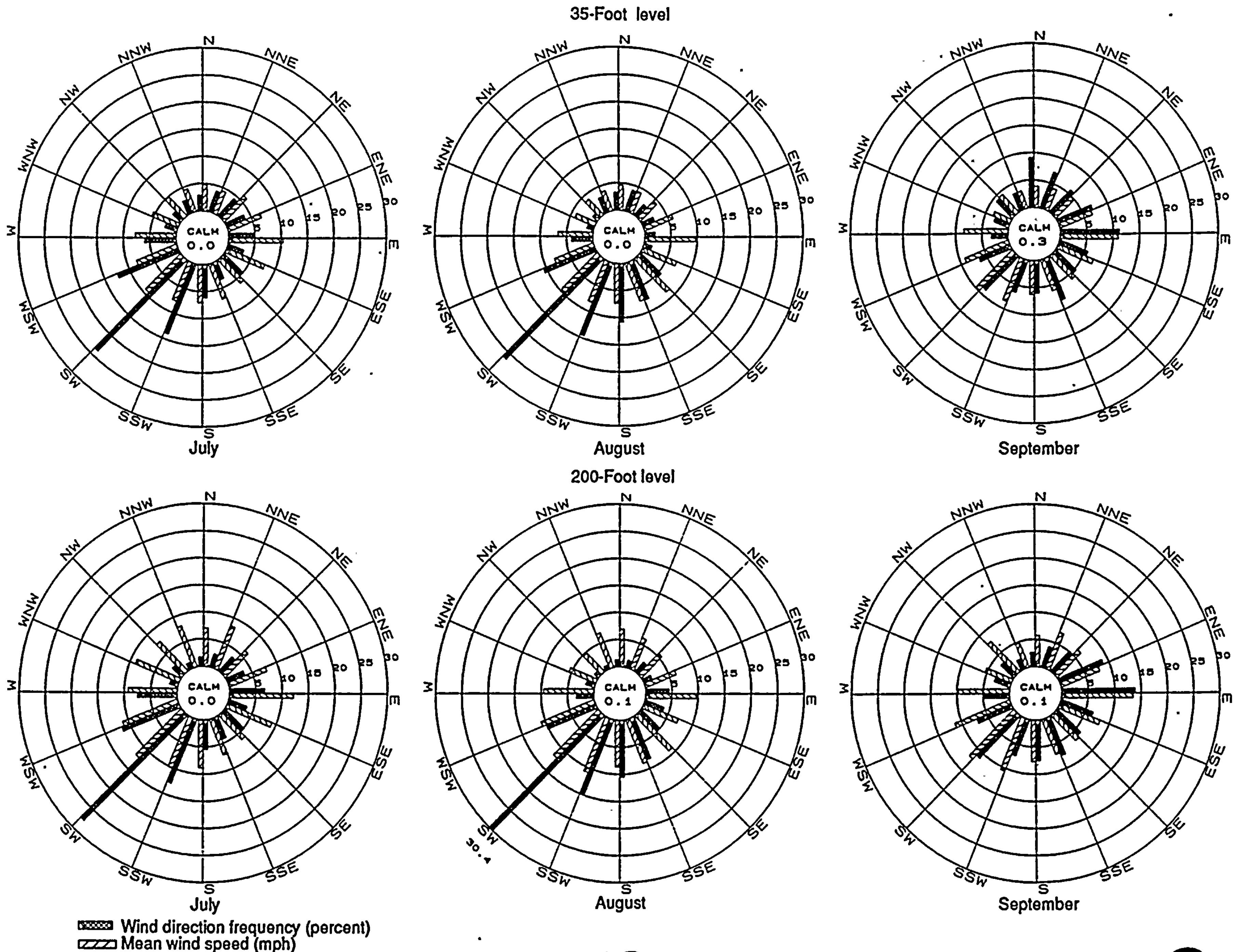


Figure 3-3. Gross wind roses for P[illegible], July, August, and September 1989

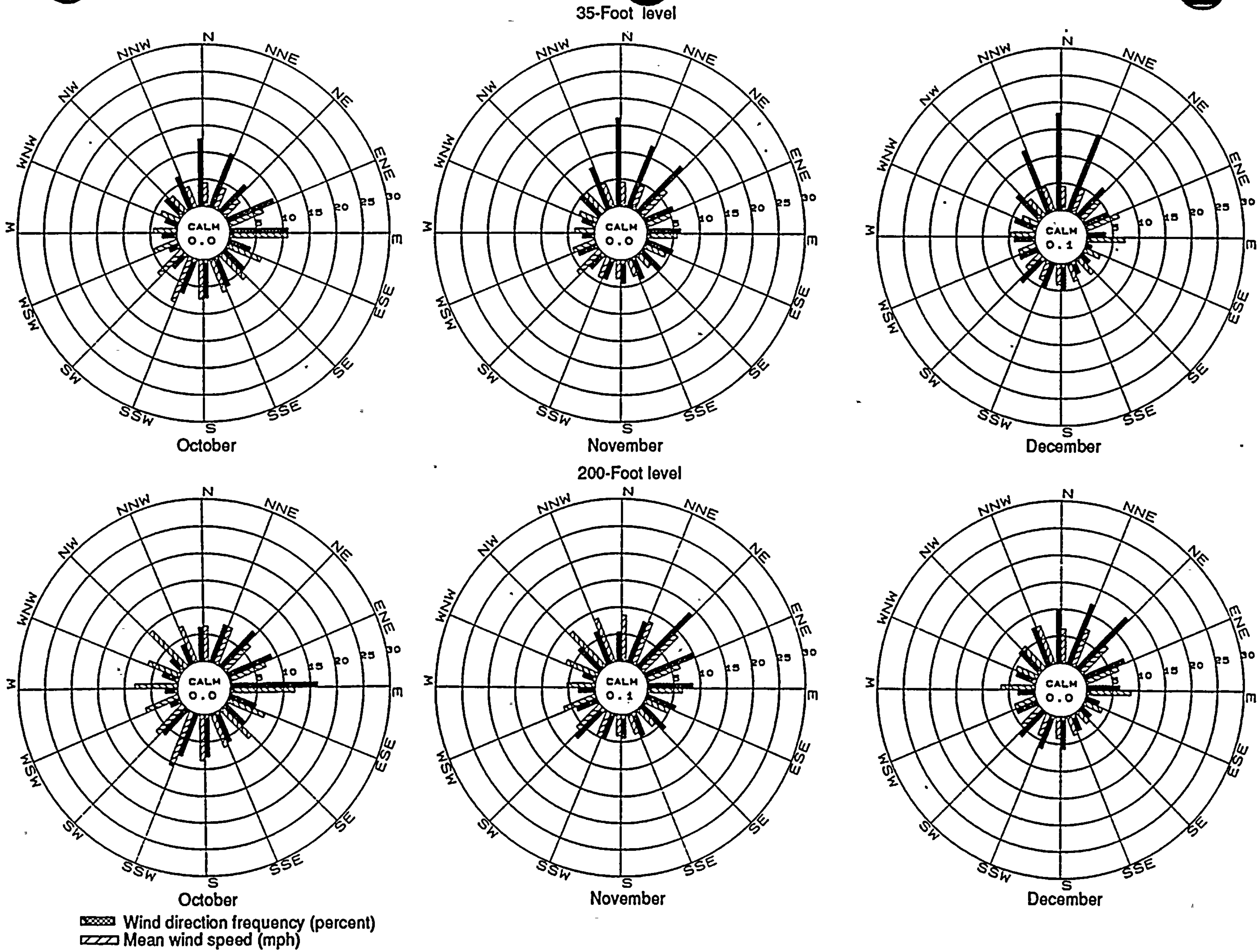


Figure 3-4. Gross wind roses for PVNGS, October, November, and December 1989

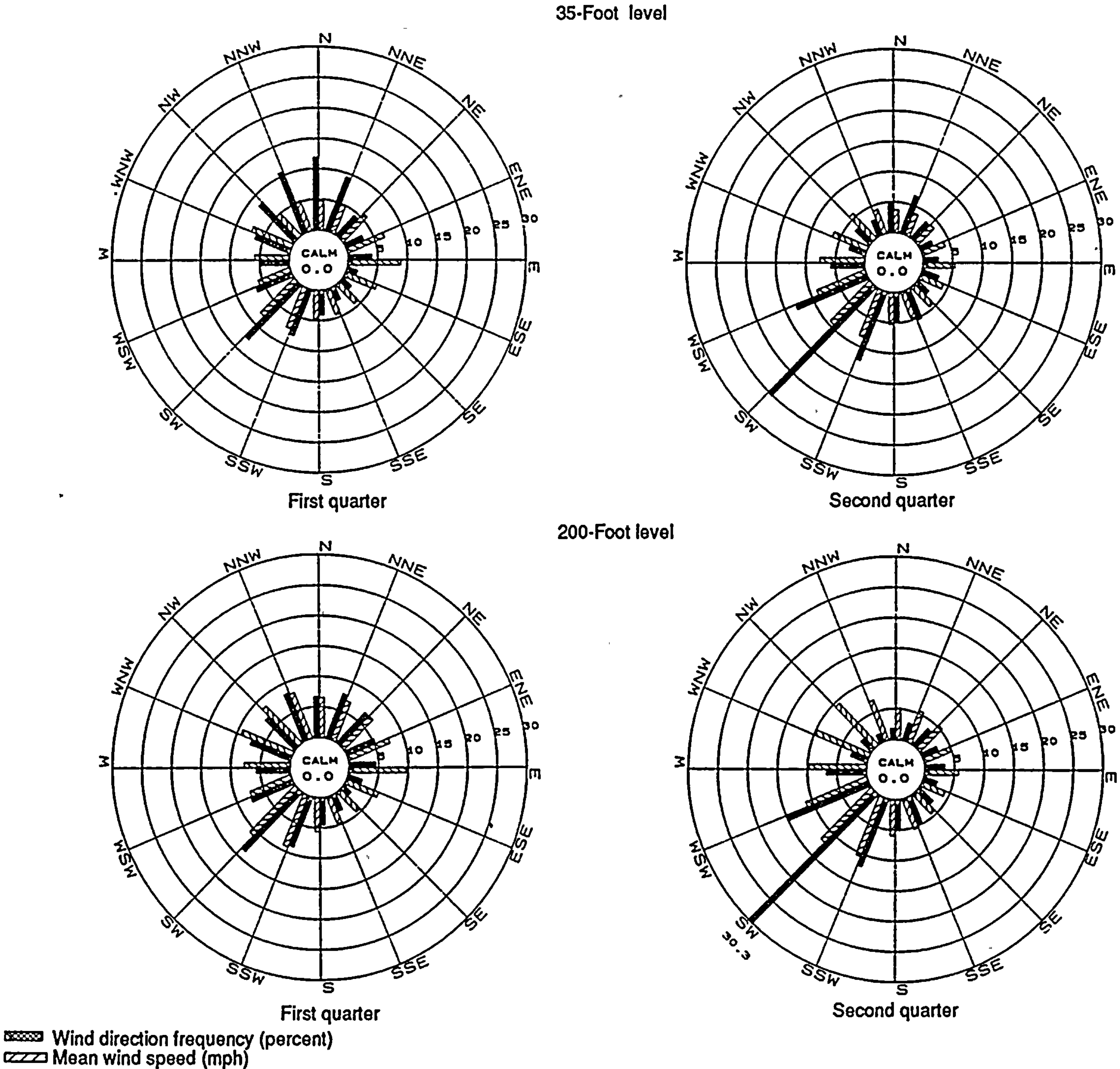
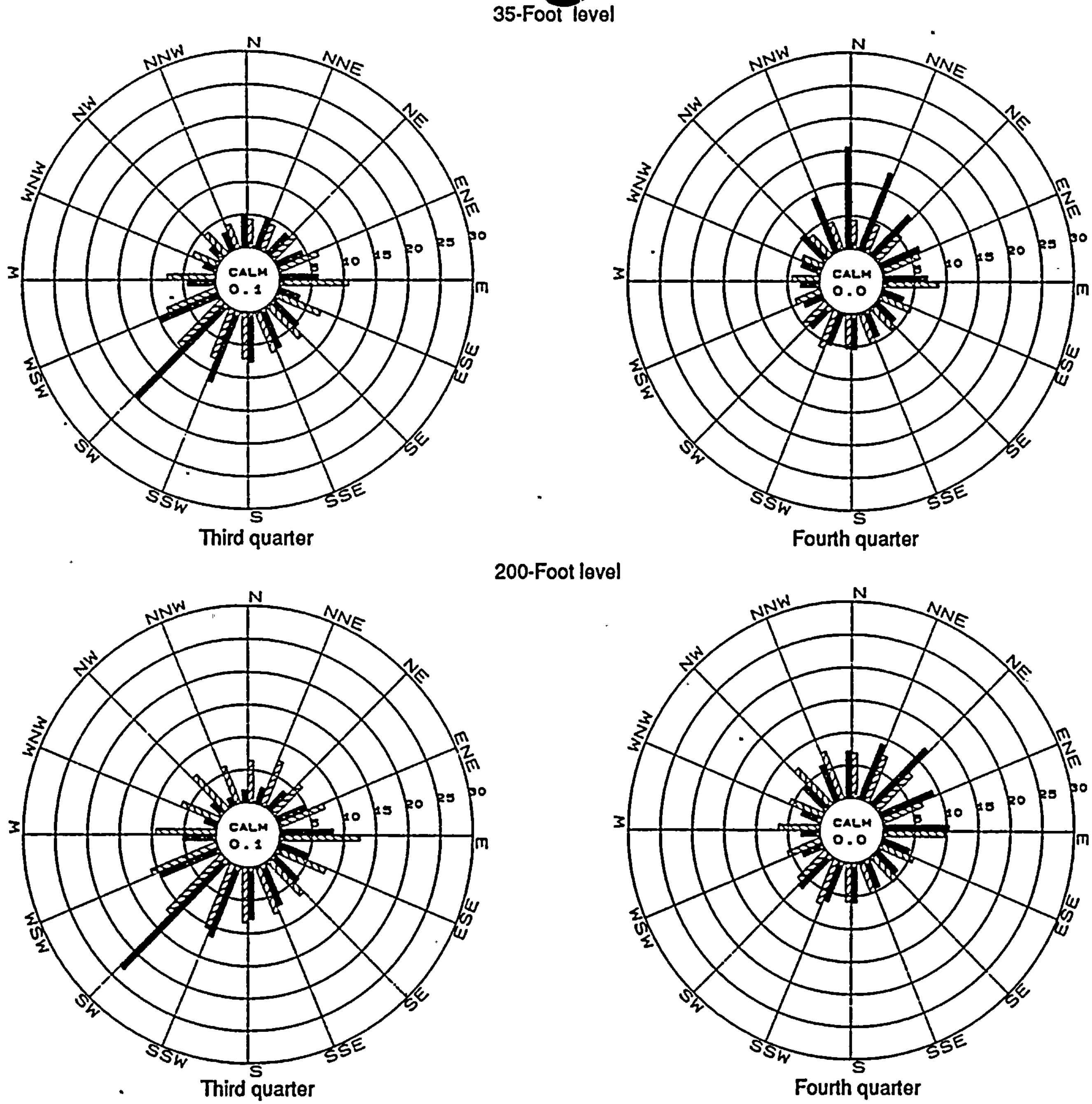


Figure 3-5. Gross wind roses for PV[illegible] first and second quarters 1989



Wind direction frequency (percent)
Mean wind speed (mph)

Figure 3-6. Gross wind roses for PVNGS, third and fourth quarters 1989

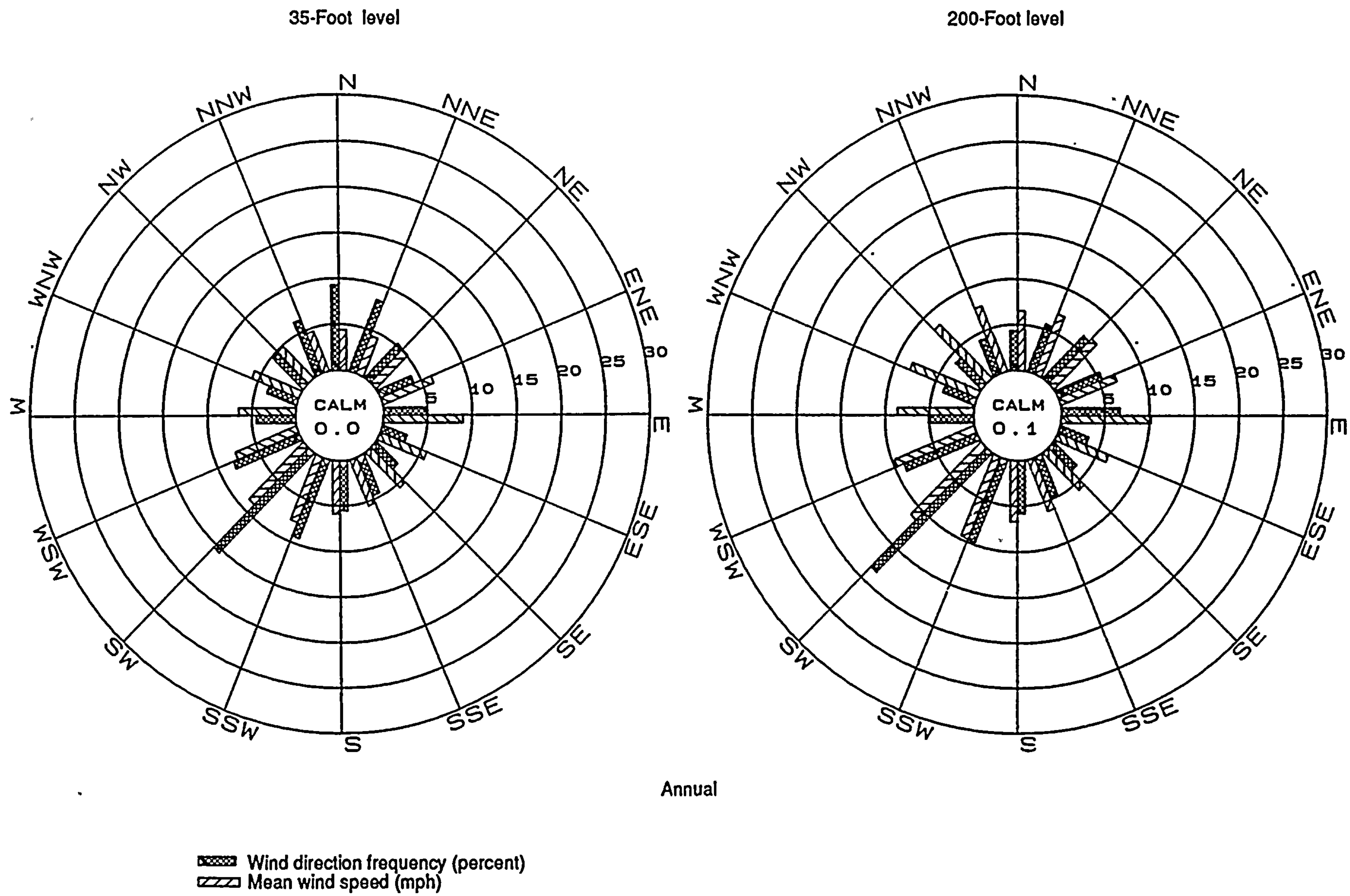


Figure 3-7. Gross annual wind roses for PVNGS, 1989

4 Plant Operation

4.1 COOLING TOWER OPERATION

During 1989, Units 1, 2, and 3 of PVNGS continued commercial operation, although on a limited basis. Operating data for all three units were analyzed to provide estimates of drift emissions from each unit for the year. Such data included the dissolved solids content of the circulating water as indicated by daily conductivity measurements (see Section 4.3), the number of circulating water pumps and the number of cooling tower fans in operation on each shift, and the thermal energy generated per day.

From these data, the emissions of dissolved salts per day as drift were calculated assuming a drift rate at full fan flow of 0.0002 percent of the circulating water flow rate. This drift rate was measured in a previous study (ESC, 1983). The drift rate under natural draft (no fans in operation) in these towers was assumed to be zero.

Table 4-1 shows the monthly average operating parameters and calculated drift emissions for each unit at PVNGS for 1989. Figure 4-1 presents the thermal energy produced per month by each of the units as well as the average monthly combined drift emission rate from all of the units. This figure indicates the general correspondence of energy generation and drift rate. The daily plant data summaries and the calculated parameters from which the monthly values were derived for this period are presented by month in Appendix A.

4.2 COOLING TOWER BASIN WATER QUALITY

Cooling tower basin water was sampled monthly throughout 1989 for all units operating on the day the samples were collected. Thus, Units 1 and 3 were not sampled in April through December and Unit 2 was not sampled in April through July. The objective of the sampling was to determine the concentration of dissolved solids and selected trace elements in the circulating water.

The results of the individual basin water analyses are presented in Appendix B. A summary of these individual analyses for each of the units is presented in Table 4-2. This table presents, for each analyte, the average of the measured concentrations, the range of values observed over the period, and the coefficient of variation (the standard deviation of the monthly values divided by their mean). For those analytes reported as below the laboratory detection limit, a value equal to one-half the laboratory detection limit is used to calculate the mean. The minimum range value reported represents the laboratory detection limit preceded by a less than symbol.

The coefficients of variation, although relatively large for some minor constituents (ammonium, alkalinity, and silver in Unit 1; phosphate, iron, silver, and phenol in Unit 2; silver and mercury in Unit 3), are generally smaller for the major constituents than they were in 1988, probably due to the small sample size. TDS concentrations ranged from 10,000 to 26,000 milligrams per liter over the year; the mean values were 19,333, 15,250, and 20,000 milligrams per liter for Units 1, 2, and 3, respectively.

The annual average concentrations of 9 of the 30 analytes exceeded the average ER-OL values (PVNGS, 1979) for Units 1, 2, or 3. These nine included sodium, chloride, sulfate, phosphate, potassium, iron, boron, TDS, and selenium. Moreover, eleven analytes (the nine listed above plus calcium and barium) exceeded the maximum ER-OL values in one or more months of 1989.

Table 4-2 also presents the annual average ratios of the concentration of sodium to that of potassium, calcium, magnesium, nitrate, chloride, and sulfate, as well as the coefficients of variation for these ion ratios. For Unit 1, with the exception of the sodium-to-sulfate ratio, the coefficients of variation are generally greater than for the individual ions. Except for the sodium-to-potassium ratios for Units 2 and 3, the coefficients of variation are generally smaller than those for the individual ions, indicating a greater consistency in the relationship of these concentrations to one another than in the concentrations themselves.

During 1989, cooling tower makeup water was obtained from treated Phoenix waste water, after treatment by the PVNGS water reclamation plant. The average annual effective concentration factors achieved by the cooling tower operations for Units 1, 2, and 3 in 1989, calculated in reference to an annual mean value for TDS in the reservoir water of 948 milligrams per liter, were determined to be 20.4, 16.1, and 21.1 for Units 1, 2, and 3, respectively.

As in the analysis of 1986 operations, to minimize the influences of water chemistry control and biocide additives on TDS values, the annual average calcium concentration in the reservoir (55.5 milligrams per liter) was used as a basis for determining effective cooling tower concentration factors. This approach yielded apparent concentration factors relative to the reservoir water of 7.2, 6.2, and 7.5 for Units 1, 2, and 3, respectively.

A third determination of the effective cycles of concentration was made using potassium as tracer. This element should not be influenced either by water chemistry control additions or by the water reclamation plant processes. With a mean annual value of 18.2 milligrams per liter in the reservoir water, the mean annual concentrations of potassium in the cooling tower basin water (109, 164, and 208 milligrams per liter in Units 1, 2, and 3, respectively) would yield a mean annual concentration factor in the range of 6 to 11.4.

Ratios of TDS to conductivity for each unit were determined from cooling tower basin water monthly sample TDS values and mean plant operating data conductivity values measured on the same day. The samples from Units 1, 2, and 3 displayed a consistent pattern of variation during 1989, ranging from a low of 0.74 in September to a high of 1.10 in January (for Unit 2 and Unit 3, respectively), as shown in Figure 4-2. Because of this variation, TDS concentrations were determined by applying the Unit 1, Unit 2, and Unit 3 ratios for each month to the monthly mean of daily conductivity measurements for each unit. For those months for which samples or analyses were missing and some operation occurred, the annual mean of all ratio values for each unit (0.90, 0.82, and 0.95 for Units 1, 2, and 3, respectively) were used. These values are indicated in the footnotes to the monthly plant operating data sheets presented in Appendix A.

4.3 DRIFT DEPOSITION MODELING

The NUS computer code FOG was used to calculate the deposition of dissolved salts emitted as drift by the cooling towers of each of the three PVNGS units for the entire year, each quarter, and each month of 1989 when the units and their cooling towers were in operation. PVNGS Units 1, 2, and 3 were in operation for the entire first quarter (January, February, and March 1989), and Unit 2 operated during the months of July, August, September, October, and December. However, it should be noted that during shutdown, one or more of the cooling towers for each unit operate on a limited basis.

The FOG code used sequential hourly meteorological data for 1989 obtained from the PVNGS meteorological tower system. The deposition calculations were performed for each unit in operation with daily plant operating data (Appendix A) and hourly onsite meteorological data. The combined drift deposition for Units 1, 2, and 3 was calculated by summing the individual drift contributions from each of these units.

Figures 4-3 and 4-4 reflect the results of this drift deposition modeling for the year in onsite and offsite areas, respectively. As seen in Figure 4-3, the maximum calculated offsite deposition was about more than 20 pounds per acre per year along the site boundary west and southwest of Unit 3 and north of Unit 1. This maximum occurred mostly due to the operation of all three units during the first quarter. The general deposition patterns remain unchanged from 1988; however, the area within each isopleth has decreased as a result of the limited operation of the units after the first quarter. Therefore, the maximum calculated deposition is lower for 1989 than for 1988. Figure 4-4 indicates that the maximum drift deposition calculated at an agricultural site in 1989 was much less than 2 pounds per acre at site 11, 2 miles northwest of the power block.

The calculated monthly and annual drift deposition at each of the onsite monitoring sites is summarized in Table 4-3. The highest predicted monthly deposition occurs in the months of July and August at site 81, 0.2 mile north-northwest of the Unit 2 cooling towers and about the same distance west of those for Unit 1. This deposition pattern is consistent with the predominant wind directions for this season, as depicted in Figures 3-1 through 3-6. Overall, the highest predicted monthly deposition is 102 lb/acre at site 81 in August.

The influence of PVNGS meteorology can be seen in the deposition isopleths for the first, third and fourth quarters of 1989 presented as Figures 4-5 through 4-7. The drift emission rates during these months were quite similar. The isopleths defining the higher deposition rates (100 pounds per acre per quarter and higher) were all in the vicinity of the PVNGS cooling towers. A comparison of the predicted and measured deposition rates for 1989 is presented in Section 9.3.

Table 4-1. Power operation and cooling tower parameters for PVNGS, 1989 (sheet 1 of 2)

Month	Heat generation		Airflow (m^3/sec)			Circulating water		Calculated drift*	
	Btu/min	MWt/d	Tower 1	Tower 2	Tower 3	Flow (gpm)	TDS (ppm)	Gpm	Lb/min
				Unit 1					
January	2.12E+08†	89,546	9,951	9,583	9,794	578,462	22,631	1.117	0.211
February	1.94E+08	81,935	10,083	9,593	8,448	579,000	19,224	1.082	0.173
March	3.09E+07	13,059	1,416	1,416	1,375	122,333	18,891	0.159	0.031
April	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
May	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
June	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
July	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
August	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
September	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
October	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
November	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
December	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
				Unit 2					
January	2.14E+08	90,350	9,917	8,937	8,774	589,000	20,551	1.071	0.184
February	1.17E+08	49,170	5,200	4,959	5,215	352,333	17,025	0.594	0.094
March	9.97E+07	42,050	4,574	4,417	4,206	330,075	20,141	0.512	0.086
April	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
May	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
June	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
July	1.27E+08	53,473	6,493	6,575	5,806	536,312	21,106	0.725	0.135
August	1.97E+08	83,109	9,515	9,441	8,835	589,000	17,951	1.077	0.161
September	9.53E+07	40,230	4,656	4,677	4,276	435,000	13,012	0.519	0.062
October	9.22E+07	38,888	4,356	4,356	4,097	589,000	12,336	0.497	0.064
November	0.00E+00	0	0	0	0	164,333	10,627	0.000	0.000
December	1.95E+08	82,153	6,956	8,569	8,406	567,925	13,091	0.927	0.104

Table 4-1. Power operation and cooling tower parameters for PVNGS, 1989 (sheet 2 of 2)

	Heat generation		Airflow (m^3/sec)			Circulating water		Calculated drift*	
Month	Btu/min	MWt/d	Tower 1	Tower 2	Tower 3	Flow (gpm)	TDS (ppm)	Gpm	Lb/min
				Unit 3					
January	1.07E+08	44,950	4,955	4,928	4,608	310,505	24,544	0.517	0.122
February	2.13E+08	89,849	8,380	9,427	10,083	589,000	24,794	1.081	0.225
March	1.38E+07	5,835	626	762	701	83,194	15,928	0.078	0.017
April	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
May	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
June	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
July	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
August	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
September	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
October	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
November	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
December	0.00E+00	0	0	0	0	29,000	0	0.000	0.000

*Based on drift rate at full fan flow of 0.0002 percent of circulating water flow.

†2.12E+08 = 2.12 X 10^8.

Table 4-2. Chemical composition of cooling tower basin water at PVNGS, 1989 (sheet 1 of 3)

Analyte	Average	Range	COV*	Design-basis value (ER-OL Table 3.6-1)
		Unit 1: Concentrations†		
Calcium, total	397	380-410	0.039	420.0
Magnesium, total	37.3	36.0-39.0	0.041	150.0
Sodium, total	6,533	6,300-7,000	0.062	3,375.0
Chloride	5,500	4,900-6,000	0.101	2,400.0
Sulfate (as SO_4)	6,033	5,600-6,300	0.063	2,250.0
Nitrate (as N)	347	310.0-400.0	0.136	1,650.0
Silica (as SiO_2)	55	38-64	0.268	150.0
Phosphate	4.4	3.70-4.80	0.134	1.5
Fluoride	18	16-20	0.111	52.5
Potassium, total	109	98-120	0.101	207.0
Copper, total	0.117	0.090-0.140	0.214	0.3
Zinc, total	0.086	0.064-0.110	0.267	1.0
Iron, total	0.41	0.30-0.52	0.270	0.075
Arsenic, total	0.018	<0.050	0.389	0.12
Boron	6.7	6.4-7.0	0.045	0.56
Ammonium (as N)	1.6	0.3-4.2	1.361	75.0
TSS (at 105°C)	18	12-26	0.401	150.0
COD	527	510-550	0.040	1,305.0
Alkalinity, total	89	36-190	0.990	1,500.0
TDS (at 180°C)	19,333	18,000-20,000	0.060	12,000.0
Silver, total	0.006	<0.005-0.012	0.833	0.05
Barium, total	0.100	0.1-0.1	N/A	0.15
Cadmium, total	0.003	<0.005	N/A	0.015
Chromium, total	0.017	0.016-0.019	0.118	0.06
Lead, total	0.020	<0.050	0.450	0.3
Mercury, total	0.0002	<0.0001-0.0003	N/A	0.0015
Beryllium, total	0.003	<0.005	N/A	0.3
Selenium, total	0.033	<0.050	0.424	0.015
Manganese, total	0.029	0.022-0.038	0.276	0.75
Phenol	0.009	0.008-0.010	0.111	0.14
Conductivity (µmhos/cm)	35,000	32,000-39,000	0.103	--
		Unit 1: Ion Ratios		
Sodium/potassium	60.1	--	0.11	--
Sodium/calcium	16.5	--	0.10	--
Sodium/magnesium	175.4	--	0.10	--
Sodium/nitrate	19.1	--	0.18	--
Sodium/chloride	1.2	--	0.11	--
Sodium/sulfate	1.1	--	0.05	--

Table 4-2. Chemical composition of cooling tower basin water at PVNGS, 1989 (sheet 2 of 3)

Analyte	Average	Range	COV*	Design-basis value (ER-OL Table 3.6-1)
		Unit 2: Concentrations†		
Calcium, total	340	210-480	0.268	420.0
Magnesium, total	29.1	17.0-42.0	0.311	150.0
Sodium, total	4,950	2,700-6,800	0.281	3,375.0
Chloride	4,875	3,400-7,000	0.264	2,400.0
Sulfate (as SO_4)	4,400	2,500-6,700	0.345	2,250.0
Nitrate (as N)	216.3	100.0-490.0	0.610	1,650.0
Silica (as SiO_2)	62	37-110	0.414	150.0
Phosphate	1.96	0.32-4.90	0.931	1.5
Fluoride	17.1	13.0-21.0	0.191	52.5
Potassium, total	164	100-280	0.412	207.0
Copper, total	0.079	0.056-0.120	0.291	0.3
Zinc, total	0.068	0.039-0.130	0.412	1.0
Iron, total	0.599	0.31-1.90	0.890	0.075
Arsenic, total	0.018	<0.050	0.333	0.12
Boron	5.1	3.4-7.1	0.259	0.56
Ammonium (as N)	0.388	<0.2-0.7	0.637	75.0
TSS (at 105°C)	27.3	<5-52	0.726	150.0
COD	352.5	260-590	0.320	1,305.0
Alkalinity, total	31.6	21-45	0.282	1,500.0
TDS (at 180°C)	15,250	10,000-22,000	0.278	12,000.0
Silver, total	0.010	<0.005-0.030	1.000	0.05
Barium, total	0.113	≤0.2	0.310	0.15
Cadmium, total	0.003	<0.005	N/A	0.015
Chromium, total	0.022	0.011-0.046	0.500	0.06
Lead, total	0.013	<0.05	0.769	0.3
Mercury, total	0.001	<0.0001-0.0012	N/A	0.0015
Beryllium, total	0.003	<0.005	N/A	0.3
Selenium, total	0.029	<0.1	0.483	0.015
Manganese, total	0.026	0.012-0.057	0.538	0.75
Phenol	0.004	<0.002-0.010	1.000	0.14
Conductivity (µmhos/cm)	26,125	15,000-38,000	0.339	--
		Unit 2: Ion Ratios		
Sodium/potassium	34.3	--	0.45	--
Sodium/calcium	14.6	--	0.16	--
Sodium/magnesium	172.0	--	0.11	--
Sodium/nitrate	26.5	--	0.29	--
Sodium/chloride	1.02	--	0.16	--
Sodium/sulfate	1.15	--	0.18	--

Table 4-2. Chemical composition of cooling tower basin water at PVNGS, 1989 (sheet 3 of 3)

Analyte	Average	Range	COV*	Design-basis value (ER-OL Table 3.6-1)
		Unit 3: Concentrations†		
Calcium, total	410	280-540	0.317	420.0
Magnesium, total	38	27.0-50.0	0.304	150.0
Sodium, total	6,367	3,900-8,600	0.370	3,375.0
Chloride	5,400	4,000-6,500	0.236	2,400.0
Sulfate (as SO_4)	6,333	4,100-8,400	0.340	2,250.0
Nitrate (as N)	373	310.0-460.0	0.208	1,650.0
Silica (as SiO_2)	73	36-130	0.680	150.0
Phosphate	4.9	3.40-7.50	0.469	1.5
Fluoride	19	13.0-23.0	0.279	52.5
Potassium, total	208	94-360	0.659	207.0
Copper, total	0.103	0.078-0.130	0.252	0.3
Zinc, total	0.074	0.068-0.082	0.095	1.0
Iron, total	0.537	0.46-0.60	0.132	0.075
Arsenic, total	0.016	<0.05	0.500	0.12
Boron	6.6	4.3-8.7	0.333	0.56
Ammonium (as N)	1.067	0.2-2.0	0.845	75.0
TSS (at 105°C)	21	12-30	0.436	150.0
COD	657	430-1,000	0.460	1,305.0
Alkalinity, total	64	53-82	0.246	1,500.0
TDS (at 180°C)	20,000	14,000-26,000	0.300	12,000.0
Silver, total	0.007	<0.005-0.016	1.143	0.05
Barium, total	0.100	0.1-0.1	N/A	0.15
Cadmium, total	0.003	<0.005	N/A	0.015
Chromium, total	0.018	0.013-0.022	0.278	0.06
Lead, total	0.020	<0.050	0.450	0.3
Mercury, total	0.001	<0.0002-0.0014	1.000	0.0015
Beryllium, total	0.003	<0.005	N/A	0.3
Selenium, total	0.050	<0.1	N/A	0.015
Manganese, total	0.031	0.020-0.049	0.516	0.75
Phenol	0.006	0.003-0.009	0.500	0.14
Conductivity (µmhos/cm)	35,667	4,000-44,000	0.292	--
		Unit 3: Ion Ratios		
Sodium/potassium	39.0	--	0.69	--
Sodium/calcium	15.3	--	0.08	--
Sodium/magnesium	164.9	--	0.11	--
Sodium/nitrate	16.7	--	0.21	--
Sodium/chloride	1.15	--	0.15	--
Sodium/sulfate	1.00	--	0.04	--

Key: COV, coefficient of variation; N/A, not applicable; TSS, total suspended solids; COD, chemical oxygen demand; TDS, total dissolved solids.

*Standard deviation/mean.

†In milligrams per liter except where otherwise indicated.

NOTE: Statistics based on a sample size of 3 for Unit 1 and Unit 3, and 8 for Unit 2.

NOTE: Averages computed using 1/2 the detection limit for values reported below the detection limit.

Table 4-3. Predicted drift deposition at PVNGS onsite monitoring locations, 1989

Site	Monthly deposition (lb/(acre)(yr))												Annual deposition (lb/(acre)(yr))
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	1.94	1.91	0.564	down	down	down	0.239	0.242	0.0444	0.0381	down	0.108	5.08
2	0.956	0.837	0.442	down	down	down	0.135	0.176	0.0190	0.0333	down	0.0833	2.70
3	2.83	0.915	0.443	down	down	down	0.402	0.753	0.181	0.391	down	0.621	6.37
4	0.571	0.513	0.0227	down	down	down	0.00376	0.00305	0.00107	0.00811	down	0.0194	1.15
5	0.218	0.214	0.0211	down	down	down	0.0161	0.00831	0.00228	0.00962	down	0.0340	0.533
6	0.402	0.455	0.0159	down	down	down	0.0107	0.0101	0.00249	0.0160	down	0.0993	1.01
10	0.399	0.464	0.233	down	down	down	0.0922	0.183	0.0215	0.0110	down	0.0549	1.47
14	6.04	6.30	2.02	down	down	down	1.050	1.14	0.103	0.109	down	0.372	17.3
16	7.88	4.34	3.32	down	down	down	4.050	9.33	1.31	2.82	down	2.37	35.6
20	8.09	4.76	1.44	down	down	down	1.83	1.44	2.34	2.03	down	2.67	23.9
27	0.505	0.380	0.0346	down	down	down	0.0066	0.00483	0.0000528	0.0136	down	0.0222	0.976
80	10.7	17.300	5.840	down	down	down	5.44	7.000	0.577	0.966	down	1.58	47.7
81	31.2	27.9	20.100	down	down	down	52.9	102.0	10.9	12.2	down	6.41	277.0
82	18.8	16.6	2.49	down	down	down	2.21	1.24	0.951	2.34	down	4.38	48.3
83	14.4	12.7	3.20	down	down	down	1.81	1.90	0.684	0.371	down	1.65	35.9

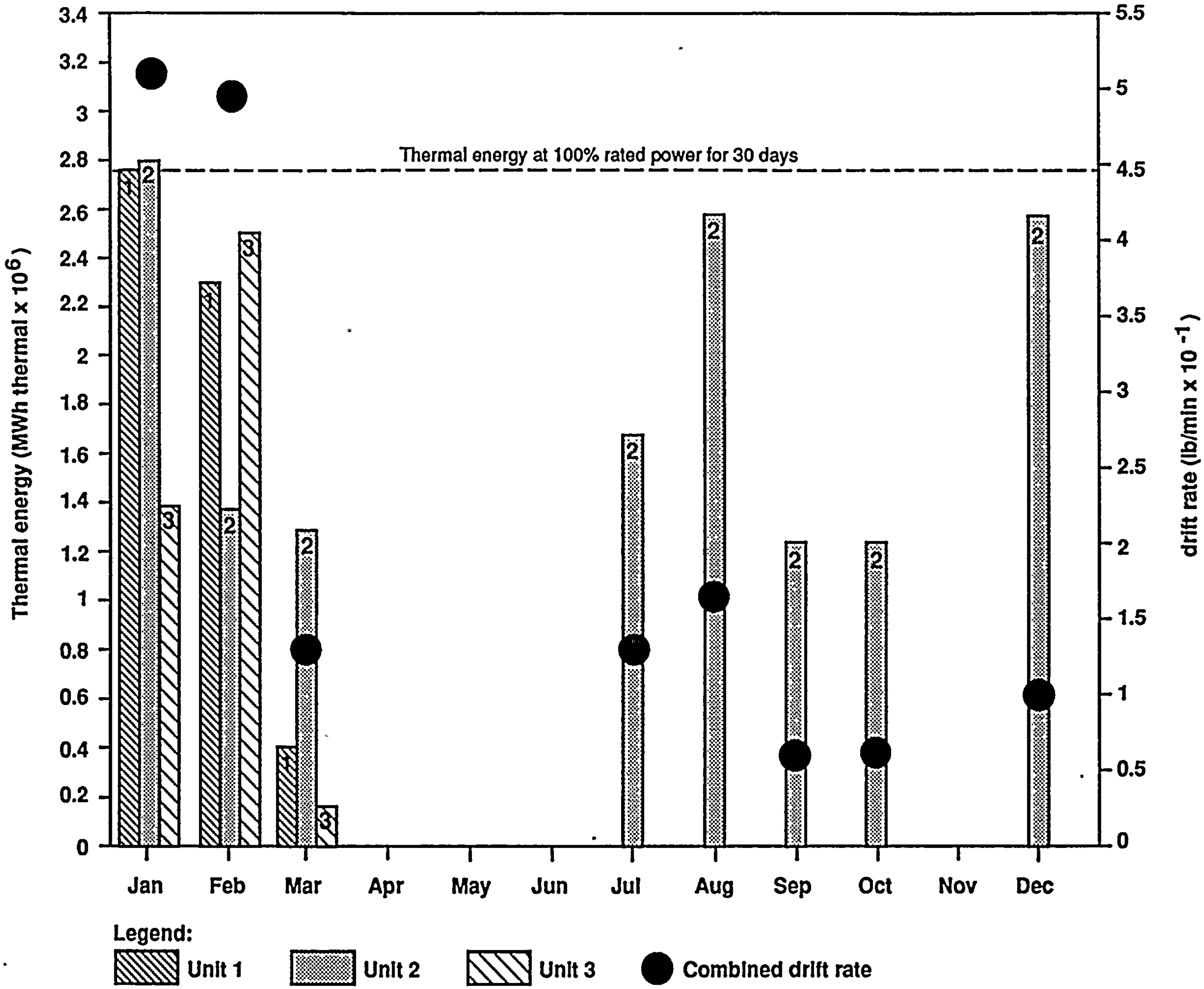


Figure 4-1. Thermal energy generation and drift rate for cooling towers at PVNGS, 1989

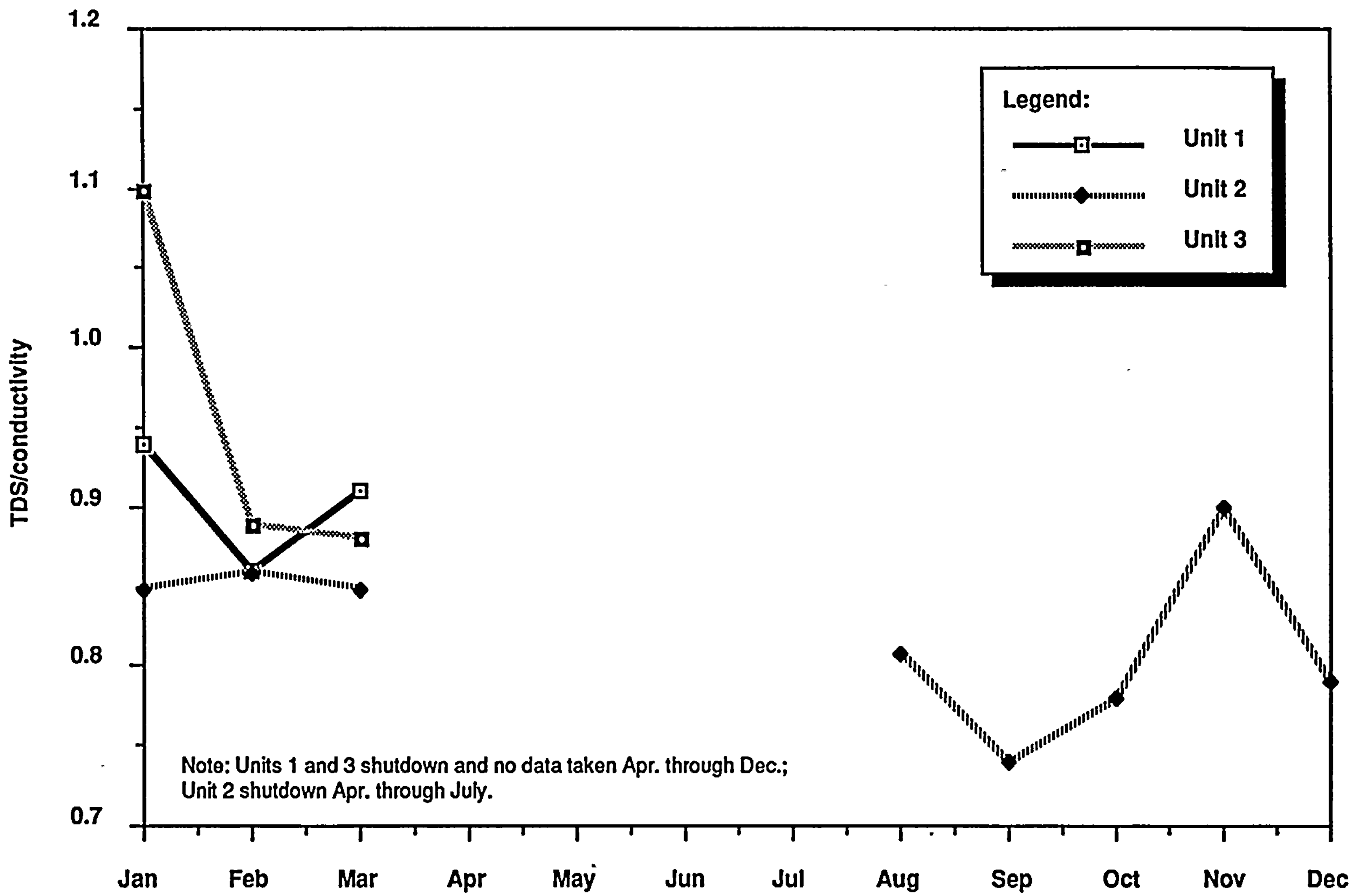
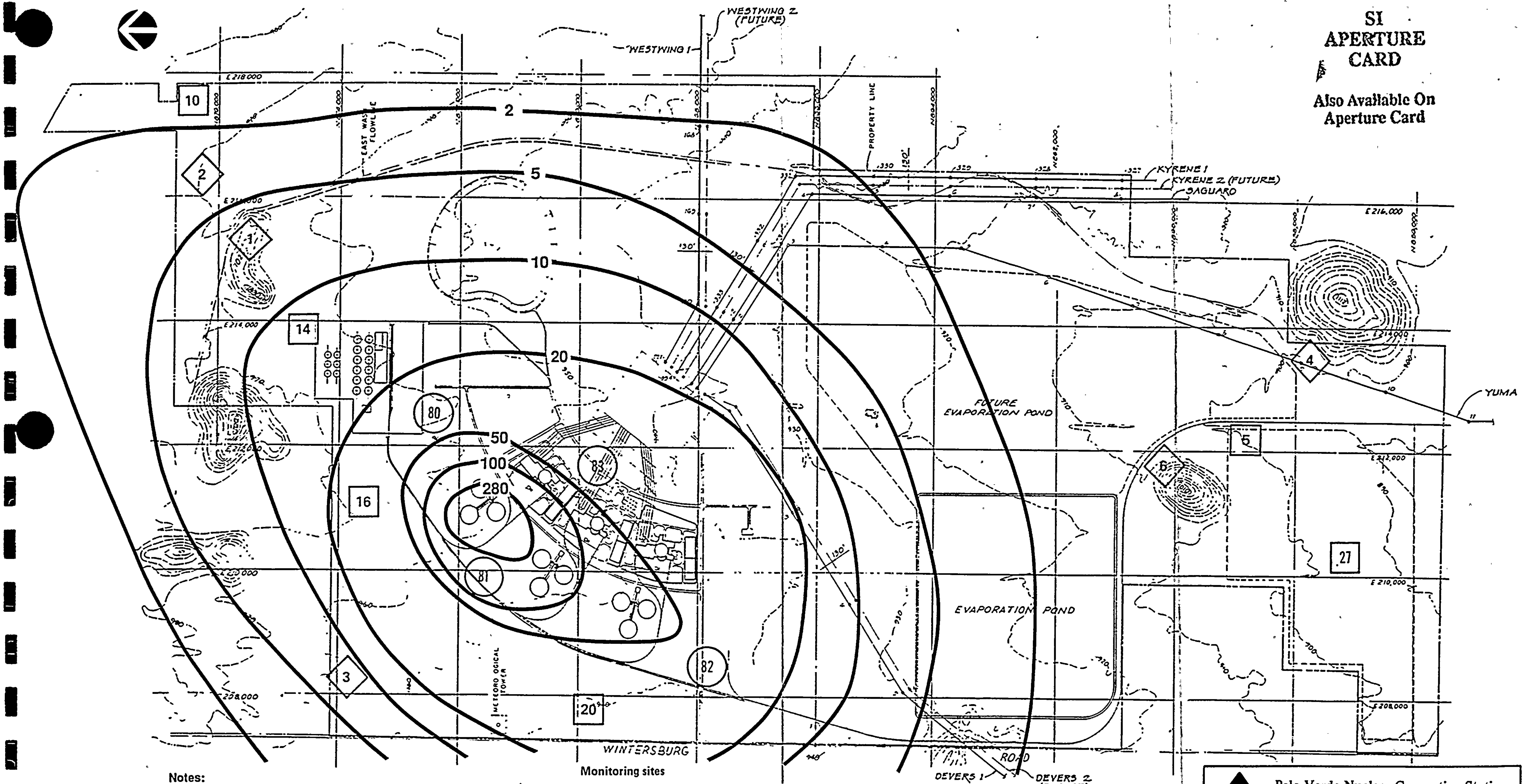


Figure 4-2. Ratio of total dissolved solids (TDS) to conductivity for cooling tower basin water at PVNGS, 1989

SI APERTURE CARD

Also Available On Aperture Card



Notes:
PVNGS 16-bin spectra
01/01/88 - 12/31/88
0.0002% Drift rate
3 Units (9 towers)
Total drift deposition, lb/(acre) (yr)

Monitoring sites

- ◇ Native vegetation, dustfall, soils
- □ Dustfall, soils
- ○ Dustfall

600 0 600 1200 Feet

Palo Verde Nuclear Generating Station

Figure 4-3

FOG code predictions of 1989 onsite drift deposition for PVNGS Units 1, 2, and 3

9005100139-03

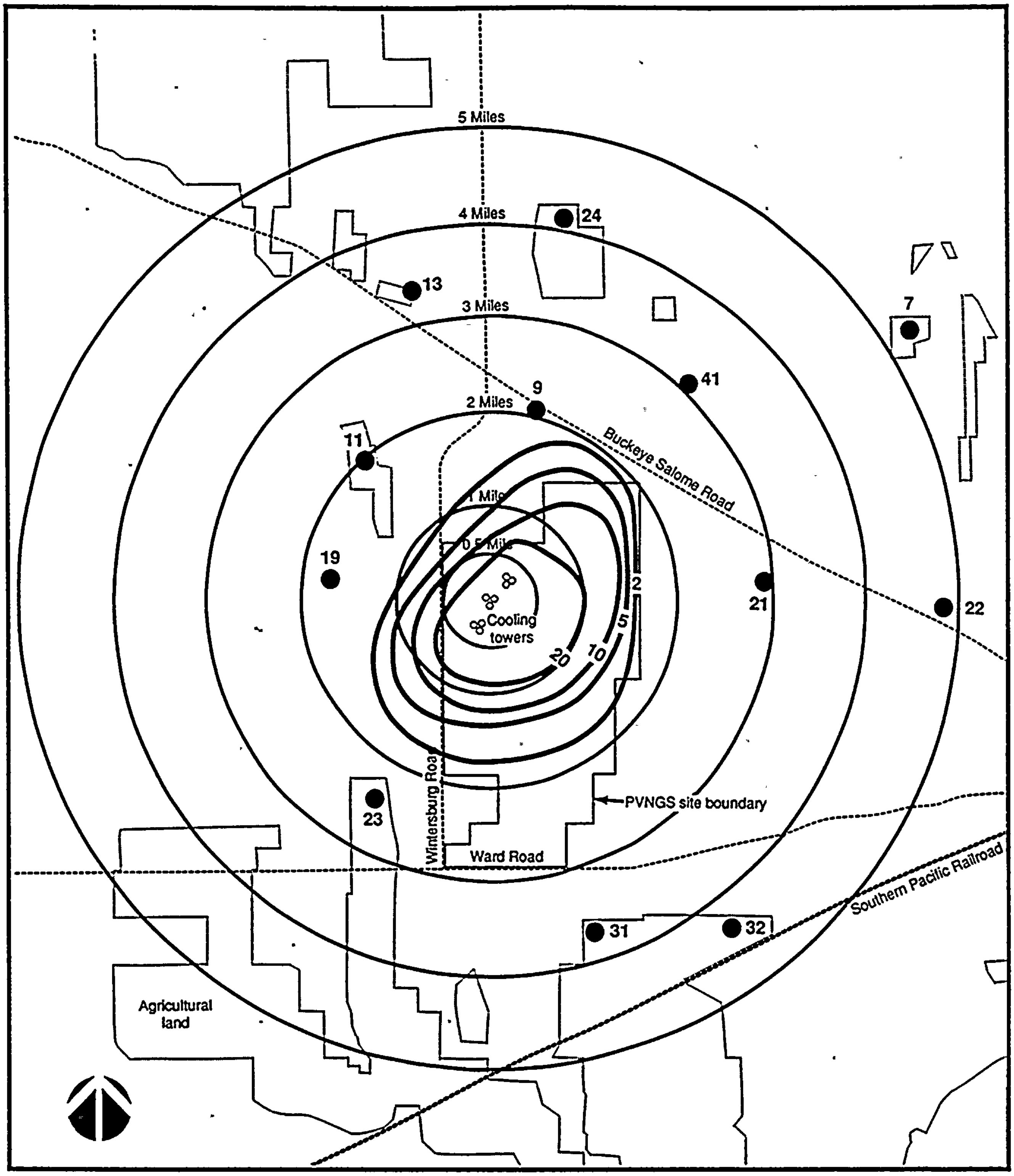
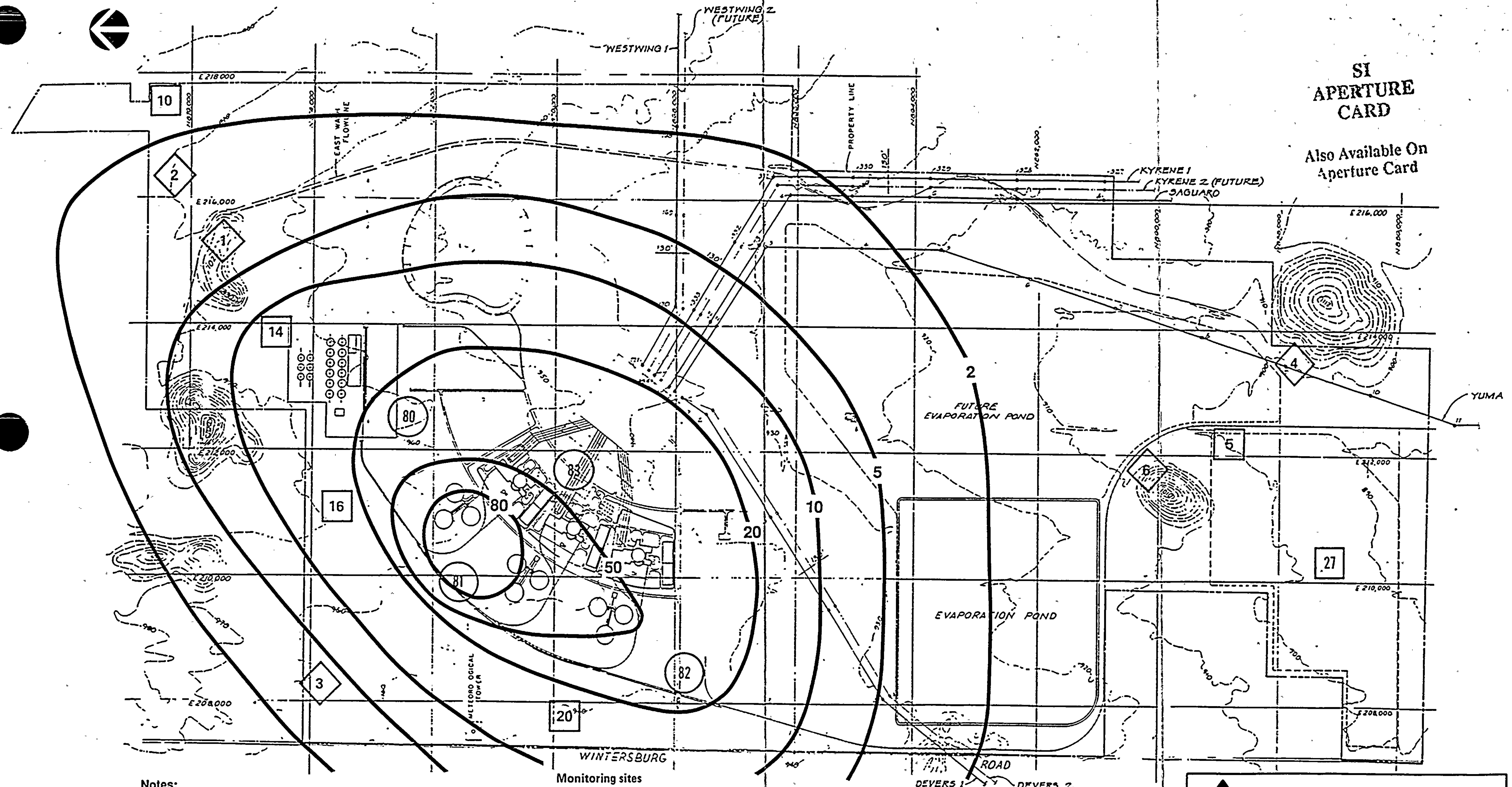


Figure 4-4. FOG code predictions of 1989 offsite drift deposition for PVNGS Units 1, 2, and 3



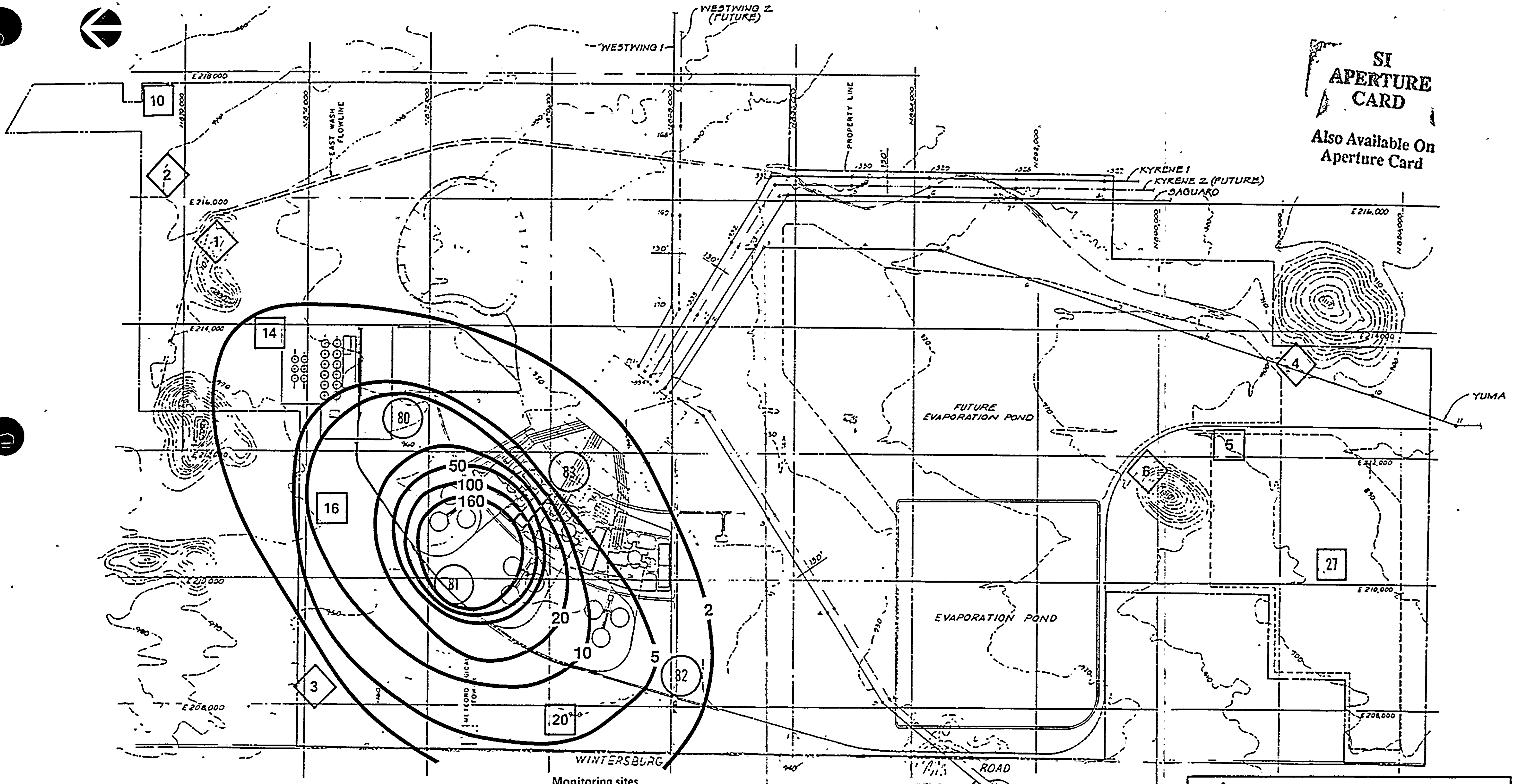
Notes:
PVNGS 16-bin spectra
01/01/88 - 12/31/88
0.0002% Drift rate
3 Units (9 towers)
Total drift deposition, lb/(acre) (yr)

Monitoring sites
- ◇ Native vegetation, dustfall, soils
- □ Dustfall, soils
- ○ Dustfall

Palo Verde Nuclear Generating Station

Figure 4-5

FOG code predictions of first quarter 1989 onsite drift deposition for PVNGS Units 1, 2, and 3



Notes:
PVNGS 16-bin spectra
01/01/88 - 12/31/88
0.0002% Drift rate
3 Units (9 towers)
Total drift deposition, lb/(acre) (yr)

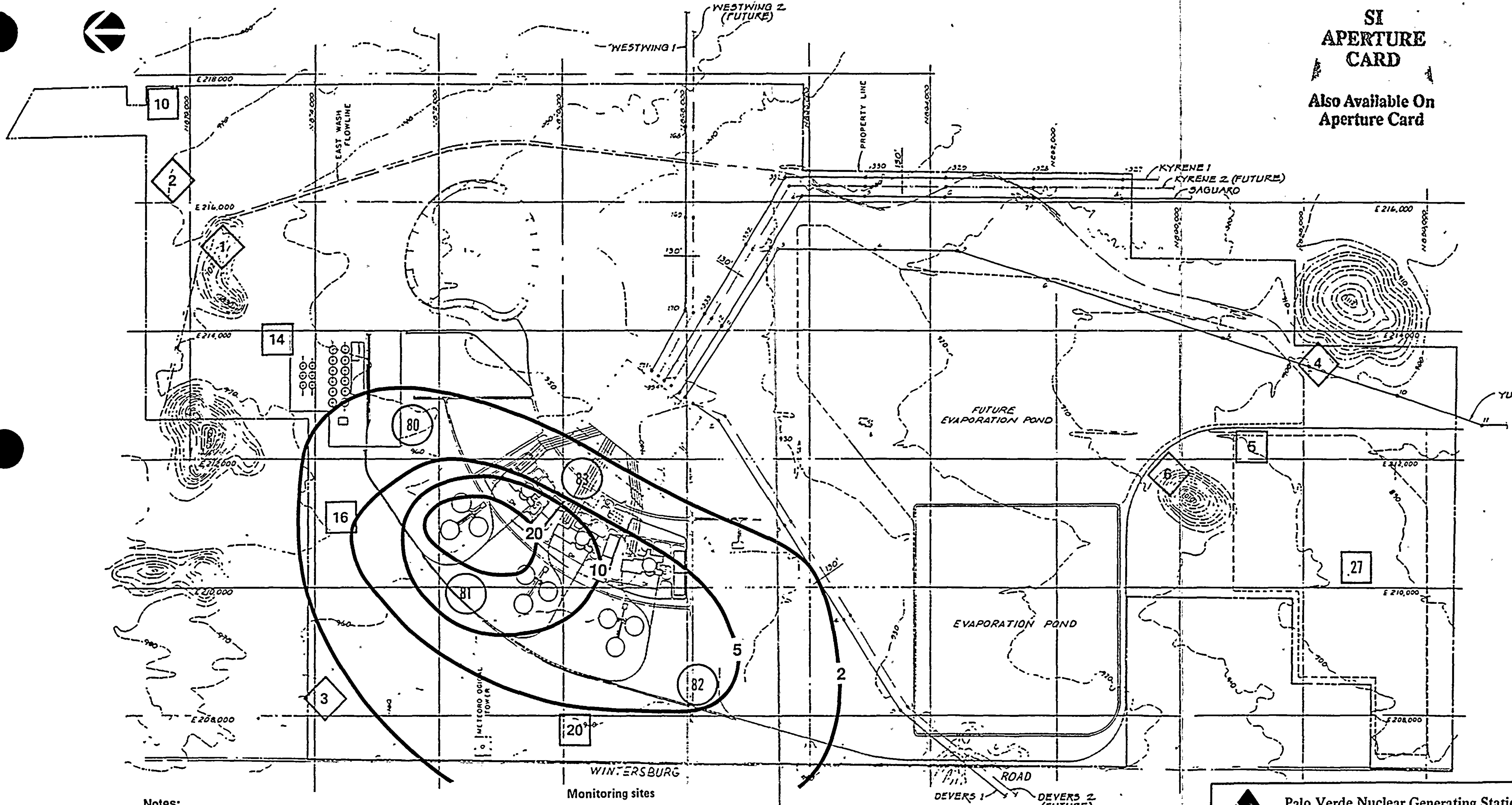
Monitoring sites
- ◇ Native vegetation, dustfall, soils
- □ Dustfall, soils
- ○ Dustfall

Palo Verde Nuclear Generating Station

Figure 4-6

FOG code predictions of third quarter 1989 onsite drift deposition for PVNGS Units 1, 2, and 3

9005100139-05



Notes:
PVNGS 16-bin spectra
01/01/88 - 12/31/88
0.0002% Drift rate
3 Units (9 towers)
Total drift deposition, lb/(acre) (yr)

Monitoring sites

◇ Native vegetation, dustfall, soils
□ Dustfall, soils
○ Dustfall

600 0 600 1200 Feet

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Figure 4-7

FOG code predictions of fourth quarter 1989 onsite drift deposition for PVNGS Units 1, 2, and 3

9005100139-06

5 Salt Deposition

5.1 INTRODUCTION

In order to monitor the amount of drift deposition in the area surrounding PVNGS, samples collected during 1989 from the dustfall jars at the 44 primary monitoring locations (Figure 2-1) and at the four supplemental onsite monitoring locations (see Section 2.3) were analyzed for drift constituents.

Drift deposition was also evaluated through analyses of suspended particulate matter obtained from onsite and near-site low-volume (lo-vol) air samplers. (See Chapter 2 of this report for a discussion on the drift deposition and air sampler monitoring programs.)

The drift deposition data were analyzed to provide temporal and areal distributions of the deposition of ions present in the cooling tower circulating water as well as the deposition of total suspended solids (TSS). In addition, statistical analyses were performed to determine the significance of differences in the deposition of these ions and to relate any observed changes to variations in cooling tower operations. The types of statistical analyses employed were based on the amounts and distributions of the deposition and lo-vol sample data available.

5.2 DEPOSITION DATA COLLECTION SUMMARY

The two drift deposition samples collected monthly at each of the 48 monitoring locations were analyzed for the concentration of those ions expected to constitute the majority of the salt drift from the cooling tower and for TSS. The concentrations for each analyte were converted to deposition rates in pounds per acre per month based on the collection jar surface area and each sample's collection period and water volume. This section addresses the significant results for the 12-month monitoring period of January to December 31, 1989. Appendix C presents all results of monthly deposition analyses for the period by location.

Many of the monthly samples produced concentrations at or below the detectable limit of the laboratory analytical procedures. Of the 14 parameters measured in each sample, fluoride, sulfate, phosphate, carbonate, ammonium, and copper were routinely below their analytical detection limits.

Detection limits for the analyzed parameters are provided in Table 5-1. Also provided in the table are minimum detectable deposition rates normalized to a 12-month period and the percentage of samples whose concentrations were below detection for each constituent. These minimum deposition rates are based on the detection limit of the analysis method, a nominal monthly sample water volume and period of collection, and the surface area of the collector opening. The sample water volume available for analysis consists of the water remaining in the collector at the end of the month and the rinse water. It varies with the season and the amount of rinse water necessary to clean the dust from the collector. Since the water volume is different for each location and sample, the actual minimum detectable deposition rate for an ion varies for each sample. In Appendix C, those deposition values that are below the analytical detection limit are reported at one-half the laboratory detection limit for that analyte.

5.2.1 Special Considerations in Data Evaluation

The data listed in Appendix C are collected and processed routinely; there is no field evaluation of changes at the monitoring locations or correction for significant concentrations of the measured ions in the field blanks of the sample collection water. Field evaluation of the samples is limited to accepting or voiding a sample because of possible contamination by birds, insects, or vandalism.

Of the 13 agricultural monitoring locations, seven (sites 7, 12, 24, 28, 31, 32, and 45) were fallow during the 1989 growing season. The deposition measured at these seven locations was probably less than it would be during periods of cultivation.

5.2.2 Drift Deposition Results

The method for analyzing the 1989 deposition data featured the modifications adopted in 1987 to allow for better representation of the observed data. Prior to 1987, the mean deposition for a particular monitoring location was taken as the average of the two collocated samples. Values below the detection limit were considered missing. However, beginning in 1987, each collocated sample was included as a discrete datum. Data below the detection limit were assigned a value of one-half the detection limit. This method is suggested by Nehls and Akland (1973) for data sets containing values below the laboratory detection limit. A constraint of this method is that no more than 25 percent of the data may be below the detection limit without possibly introducing a bias in the computed statistics. Gilbert (1987) determined this method to be unbiased for the mean but not for the variance if all measurements between zero and the detection limit are uniformly distributed. A more detailed description of this method, as well as a comparison of it with previous methods, is included in NUS-5073 (NUS, 1988b).

Monthly deposition values were analyzed individually by monitoring location and month. Concentrations below the detection limit were assumed to be uniformly distributed. Sodium, potassium, calcium, magnesium, and TSS were analyzed statistically to determine the spatial and temporal variations of the data. Because of its importance, potassium was included for statistical analysis even though more than 25 percent of the data, as indicated in Table 5-1, were below the detection limit.

Monthly means of deposition for each site were analyzed with least-significant-difference and F-Test statistics to determine the variability of the data throughout the study region and year. Unless stated otherwise, differences are reported as significant at the 95-percent confidence level. Although means were generated for nitrate, phosphate, ammonium, and chloride for comparison, no further statistical analysis was performed because of the high percentage of data below the detection limit.

The sites were divided into agricultural and native (i.e., nonagricultural) sites and the deposition totals of the analyzed ions examined statistically. The significance of this division can be seen in Table 5-2. The mean deposition values for all ions except nitrate were significantly higher for the agricultural sites than for the native sites. The standard errors, which are a measure of data variability, were also larger for the agricultural sites for all ions but sodium. Further discussion of these variations is provided in Chapter 9.

5.2.2.1 Drift Deposition at Agricultural Sites

Figures 5-1 and 5-2 present the mean monthly deposition of the eight measurable ions and TSS at the 13 agricultural sites (sites 7, 11-13, 23-25, 28, 30-32, 43, and 45). Generally, the variation in deposition for sodium, chloride, calcium, ammonium, and TSS was large. This can be attributed primarily to wet and dry season fugitive dust trends and to seasonal agricultural practices that release varying amounts of these ions and settleable dust into the atmosphere. Most ions had higher deposition in March, July and October. This can be attributed to cultivation and planting in March, the dryness in July and harvesting in October.

Table 5-3 presents an analysis of the deposition of three of the primary ions (sodium, potassium, and calcium) in the cooling tower basin water for each agricultural site. Sodium at sites 23 and 30 was higher than at the eleven other agricultural sites, of which seven (sites 7, 12, 24, 28, 31, 32, and 45) were fallow during 1989. Potassium at site 23 was significantly higher for the year than at the other 12 agricultural sites. This may be attributable to agricultural activity. Site 23 showed a significantly higher deposition rate of calcium than the other agricultural monitoring sites. Site 30 deposition was also significantly higher than all the other agricultural sites with the exception of site 23. As it is for sodium and potassium, the agricultural activity at these sites is probably the primary reason for increased calcium.

Examination of the data in Appendix C indicates that, among the agricultural sites, sites 13, 23, and 30 had the maximum deposition rates of most ions, while sites 12 and 28 (both fallow) had the minimum deposition rates of most ions.

5.2.2.2 Drift Deposition at Native (Nonagricultural) Sites

Figures 5-3 and 5-4 present the mean monthly deposition of the eight measurable ions and total suspended solids at all the native sites (1-6, 8-10, 14-22, 26, 27, 33-42, 44, and 80-83). As with the agricultural sites, the variability of the deposition rates of sodium, chloride, calcium, and TSS was large. Sodium, calcium and chloride showed declines in February from higher values in January and March. From April through year-end, sodium and chloride remained low and essentially constant, while calcium increased following an April decline to a peak in August. Behavior similar to that of calcium was exhibited by potassium and magnesium, although the relatively higher January peaks were not evident for magnesium. The January maximum is a trend seen in previous years and, as discussed below, is likely associated with the meteorology at the site. Measurements made at the supplemental sites, which are the most indicative of plant-origin effects, are discussed separately in this section.

Analysis of the distribution of the monthly means of deposition for the native sites of three of the primary ions (sodium, potassium, and calcium) in the drift indicates that statistically different groups can be identified. Table 5-4 presents an analysis of the annual deposition (means ± standard errors) of these ions for each native site. For sodium, the deposition at site 81 was significantly greater (approximately 33 pounds per acre per year) than at all other native sites. Additionally, sites 20, 80, and 83 were significantly greater for sodium than all other sites except 81. The analyses for calcium indicate that the annual deposition at site 14 was significantly greater than that of any of the other sites. Site 14 is north of the Water Reclamation Facility, and west-northwest of the sludge landfill, and is probably affected by the lime-drying and handling activities at those locations, and the associated vehicular traffic. For potassium, site 81 was significantly greater than all other sites.

Figures 5-5 and 5-6 provide the mean monthly deposition for the four supplemental sites. Both sodium and chloride had maximum deposition rates in January, and secondary peaks in March, following declines in February. Potassium, calcium and nitrate displayed similar behavior in the first quarter. As shown in Figure 4-1, the combined nominal drift and the power level were at the maximum for the year in January, and only slightly lower in February. No abnormal meteorological trends were evident in January that would account for this behavior. However, January is typically the coldest month, with high relative humidities, as well as having lighter than average wind speed. These combinations result in more deposition at the close-in sites, which may account for this peak. Lighter than average wind speed (Table 9-1) may account for the secondary peak in March even though the nominal drift rate was somewhat less than that of February. During the second quarter, when all units were shut down, Sites 80 and 81, downwind from Units 1 and 2 cooling towers, respectively, displayed sodium and chloride deposition substantially above the mean of all samples (see Appendix C). As noted in Chapter 4, cooling water continues to be circulated and some tower fans operated even when no power is generated. It is suspected that drift from the cooling towers, during these shutdown periods resulted in the excess measured deposition. Following declines in April, calcium deposition rose to a peak in August, as did magnesium, while TSS, potassium, chloride and ammonium peaked in June, and phosphate in July. In December, sodium, calcium, nitrate, magnesium and TSS rose sharply and is likely attributed to the meteorological conditions discussed earlier.

Table 5-5 presents the annual deposition (means ± standard errors) for all ions and for TSS for all native sites except the four supplemental sites, for all onsite monitoring locations except the supplemental sites, and for the four supplemental sites alone. Drift from the cooling towers should be most evident at the supplemental sites, which are close to the cooling towers (see Section 2.3). The annual mean deposition of sodium, potassium, calcium, and magnesium at the supplemental sites was significantly higher than at all other native sites and onsite locations. Chloride deposition was also much higher at the supplemental sites than at the other native sites and onsite locations. However, statistics for significant difference were not generated for chloride because more than 25 percent of the data for all the other native sites were below detection. Table 5-5 shows rather large differences for sodium, chloride, and TSS between the high values for sites 80-83 and the somewhat lower values at other onsite locations.

5.2.2.3 Agricultural Versus Native Paired Control Sites

The salt deposition monitoring network includes two sets of neighboring agricultural and native control sites. The purpose of the control sites is to measure natural background levels and distributions of ionic deposition at distances unlikely to be affected by PVNGS cooling tower emissions. These paired sites are sites 25 and 40, approximately 20 miles northwest of PVNGS, and sites 42 and 43, approximately 15 miles southeast; sites 25 and 43 are the agricultural sites.

Table 5-6 presents the annual deposition of measured ions and TSS for each control site. Statistics showing significant differences were not computed for this table because more than 25 percent of the data for each analyte were below the detection limit. Thus, the reality of any apparent differences between sites cannot be confirmed. A comparison of these sites shows that, generally, potassium, calcium, and magnesium were the only ions to be a factor of two or more higher at agricultural sites than at native sites. These differences are likely attributable to agricultural influences.

5.2.2.4 Ion Ratios

The analyses of cooling tower basin water provide concentrations of ions present in the drift emitted from the towers. The drift should preserve the proportions of most of these constituents. A comparison of ratios of these constituents in the deposition samples with those in the drift should provide an indication of the contribution of the drift to the measured deposition rates at any location.

Table 5-7 presents the ratios of the average values for agricultural and native locations for sodium to potassium, sodium to calcium, sodium to magnesium, and sodium to nitrate. The native sites are broken down into three groups: all-native, onsite (less supplemental), and supplemental. Onsite locations in the comparison include sites 1-6, 10, 14, 16, 20, and 27. The corresponding average ratios for cooling tower water composition for 1989 are also included in Table 5-7 for comparison. The ratios for the monitoring site measurements were fairly consistent between the all-native and onsite groups. The supplemental sites had larger ratios than all other site groups. However, the ratios for all sites were much lower than those observed in the cooling tower circulating water.

5.2.3 Conclusions

From analyses of the salt deposition data for the report period, the following primary conclusions can be drawn (refer to Section 9.2 for the relationship of these conclusions to cooling tower operation):

1. For 1989, cooling tower operations resulted in identifiable sodium deposition onsite but not at any offsite location. This is likely due to limited operation of the units in 1989.

2. Agricultural sites show significantly higher average salt deposition than native sites (Table 5-2), even when the supplemental onsite locations near the cooling towers are included in the latter set. This is evident for the mean of all sites, including the paired control sites (Table 5-6). The sum of mean measured ion deposition rates totaled approximately 68 and 29 pounds per acre per year for the agricultural and native sites, respectively.

3. A characteristic of all sites is the large variability in monthly measurements of most ions and TSS. The exact pattern varies with the ion.

4. The salt deposition rates of most ions at two agricultural sites (sites 23 and 30) are significantly higher than at all other agricultural sites (Table 5-3). The highest mean annual sodium deposition rate measured at any agricultural site was approximately 13 pounds per acre per year at site 30, about 4 miles south-southwest of the Unit 2 cooling towers. No other geographic trends are evident for agricultural sites.

5. The supplemental sites nearest the cooling towers had considerably higher mean salt deposition rates for sodium, chloride, and TSS than all other native sites (Table 5-5). However, site 81 showed a significantly higher deposition rate of sodium (33 pounds per acre) than all the other native sites (Table 5-4). Site 14 (onsite) showed a significantly higher deposition rate of calcium (26 lb/(acre)(yr)) than all other native sites. This was probably due

to the sludge handling and calcining activities at the Water Reclamation Facility south of site 14.

6. Increased average salt deposition rates and higher ion ratios (Table 5-7) were generally observed at the onsite and supplemental sites. Comparison of these parameters with ratios for all native and agricultural sites clearly indicates the presence of drift from the PVNGS cooling tower operation, particularly at the supplemental sites. Section 9 presents a more detailed assessment of these data in comparison with predictions and with those rates measured during the preoperational period.

5.3 SUSPENDED PARTICULATE MATTER

5.3.1 Sample Collection

Airborne particulate matter has been collected at six locations around the PVNGS site and in nearby residential areas as part of the station radiological monitoring program. Air particulate samples are collected weekly at sites 8, 9, 10, 20, 21, and 27 with low-volume air samplers (lo-vols) that draw air through a 2-inch-diameter filter. The filters are analyzed weekly for radioactivity and, since the initiation of the salt drift monitoring program, composited monthly for analyses of calcium, chloride, iron, fluoride, potassium, magnesium, sodium, nitrate (as N), sulfate, and total phosphate (as P). As indicated in the Salt Deposition and Impact Monitoring Plan, Revision 5, (NUS, 1987c), "the primary purpose of analyzing the filters for salt concentration is to determine if there is a correlation between salt deposition (determined from the drift deposition analysis) and the airborne concentration at a location." Average concentrations for each of the 10 ions at individual locations by month for 1989 are presented in Appendix D.

In July 1988, a different analytical laboratory began analyzing the particulate samples using the same procedures employed by the previous laboratory. However, in part due to the low concentrations present and differences in analytical equipment, the reported concentrations from July 1988 onward are somewhat lower and show little variation from month to month

(NUS, 1989). Since the lo-vol data in the past have not correlated with the salt deposition data, the impact of this difference is inconsequential.

5.3.2 Data Analysis

Table 5-8 presents monthly concentrations (means and standard errors) of sodium, calcium, magnesium, sulfate, fluoride, and chloride. As with the drift deposition data, lo-vol data below the laboratory detection limit were included using one-half that limit. Nearly all analyses for iron, potassium, nitrate, and phosphate were below detection limits, and these ions were not included in any comparative evaluations. Mean concentrations of magnesium and fluoride varied little between sites; sodium, calcium, sulfate and chloride showed more variability. Sodium, sulfate and chloride, primary ions in the PVNGS cooling tower drift, showed a slight peak in mean concentrations at site 20. Site 20 is the lo-vol site closest to the cooling towers.

Figures 5-7 and 5-8 indicate the variation in the mean monthly concentrations of the measured ions for the report period. There were no trends similar to those reflected in the deposition measurements.

5.3.3 Comparison of Airborne Concentrations and Drift Deposition Data

Of the 10 ions for which analyses were performed on the lo-vol filters, iron is the only element that was not measured in the drift deposition. However, only four ions (sodium, calcium, chloride, and magnesium) were present in both deposition and airborne samples at concentrations greater than their respective detection limits. Three of the four predominant ions were compared for possible associations between airborne concentrations and deposition using correlation coefficients; chloride was not analyzed because of insufficient deposition and lo-vol data above detection limits. Table 5-9 presents the correlation coefficients between deposition and airborne concentrations for the three ions at the six locations. There was no significant correlation between average airborne concentrations and total deposition for any of the ions. Since both sampling methods involve collecting particulate matter samples from the same medium (air), a greater association between concentration and deposition might be expected. However, the lo-vol filters collect only the smaller particles suspended in air; larger particles, represented by those collected in the dustfall jars, are less likely to be drawn onto the lo-vol filter.

Table 5-1. Detectability of drift constituents at PVNGS, 1989

Constituent	Laboratory detection limit (mg/L)	Minimum detectable deposition rate (lb/(acre)(yr))*	Percentage of analyses below detection limit
Sodium, total	0.1	1.8	8.1
Potassium, total	0.1	1.8	41.6
Calcium, total	0.1	1.8	0.0
Magnesium, total	0.05	0.9	8.8
Chloride	0.3	5.4	64.2
Fluoride	0.5	9.0	100.0
Sulfate	1.0	18.0	88.3
Nitrate (as N)	0.05	0.9	73.5
Phosphate (as P)	0.02	0.36	82.2
Carbonate	5.0	†	100.0
Bicarbonate	5.0	90.0	63.0
Ammonium (as N)	0.2	3.6	84.7
TSS (at 105°C)	5.0	90.0	25.0
Copper, total	0.1	‡	96.1

Key: TSS, total suspended solids.

*Determined for standard sample volume of 3000 milliliters for rinse water and remaining collector water each month, normalized to 1 year.

†Based on pH.

‡Total mass determined only.

Table 5-2. Deposition (lb/(acre)(yr)) of drift constituents at all PVNGS agricultural and native monitoring sites, January 1-December 31, 1989 (means ± standard errors)

Constituent	Agricultural sites	Native sites	Ratio, agricultural to native sites
Sodium	5.8 ± 0.3	5.6 ± 0.3	1.0 ± 0.07
Potassium	7.3 ± 0.6	1.9 ± 0.07	3.8 ± 0.34
Calcium	34.9 ± 2.6	11.3 ± 0.3	3.1 ± 0.25
Magnesium	9.6 ± 0.9	2.2 ± 0.06	4.4 ± 0.43
Nitrate (as N)	0.8 ± 0.1	0.8 ± 0.03	1.0 ± 0.13
Phosphate (as P)	0.7 ± 0.1	0.3 ± 0.02	2.3 ± 0.36
Ammonium (as N)	3.3 ± 0.5	2.3 ± 0.12	1.4 ± 0.22
Chloride	5.8 ± 0.5	4.9 ± 0.2	1.2 ± 0.11
TSS	900.7 ± 87.4	207.5 ± 7.4	4.3 ± 0.44

Key: TSS, total suspended solids.

Table 5-3. Deposition (lb/(acre)(yr)) of sodium, potassium, and calcium at PVNGS agricultural sites, 1989 (means ± standard errors)

Site	Sodium	Potassium	Calcium
7	3.2 ± 0.3^{a}	1.8 ± 0.3^{ab}	20.0 ± 2.7^{ab}
11	5.8 ± 1.4^{ab}	5.5 ± 0.9^{abcd}	24.8 ± 3.9^{ab}
12	4.2 ± 0.5^{ab}	6.4 ± 2.2^{bcd}	21.3 ± 6.1^{ab}
13	9.2 ± 2.8^{c}	8.1 ± 2.0^{cde}	35.9 ± 8.0^{bc}
23	9.8 ± 0.9^{cd}	30.8 ± 5.3^{g}	134.4 ± 21.6^{e}
24	4.2 ± 0.5^{ab}	4.5 ± 0.8^{abc}	21.1 ± 3.0^{ab}
25	4.7 ± 0.2^{ab}	11.8 ± 1.1^{ef}	44.6 ± 4.0^{c}
28	3.0 ± 0.2^{a}	1.7 ± 0.2^{a}	29.0 ± 5.5^{abc}
30	12.7 ± 1.3^{d}	14.0 ± 1.7^{f}	81.6 ± 11.6^{d}
31	3.3 ± 0.4^{a}	2.2 ± 0.3^{ab}	11.7 ± 0.9^{a}
32	4.3 ± 0.4^{ab}	2.7 ± 0.4^{ab}	19.2 ± 2.8^{ab}
43	6.8 ± 0.9^{bc}	9.3 ± 2.4^{def}	21.5 ± 2.0^{ab}
45	5.1 ± 0.5^{ab}	1.6 ± 0.2^{a}	14.6 ± 2.7^{a}

Key: For each ion, values with same superscript letter are <u>not</u> significantly different at 95-percent confidence level.

Table 5-4. Deposition (lb/(acre)(yr)) of sodium, potassium, and calcium at PVNGS native monitoring sites, 1989 (means ± standard errors)

Site	Sodium	Potassium	Calcium
1*	5.3 ± 0.7[abc]	2.0 ± 0.3[bcdefghi]	12.5 ± 1.2[defg]
2*	4.6 ± 0.5[ab]	2.2 ± 0.4[defghi]	11.1 ± 1.2[cdef]
3*	5.5 ± 0.7[abc]	2.7 ± 0.3[ij]	13.9 ± 1.7[efg]
4*	3.6 ± 0.4[a]	1.5 ± 0.2[abcdef]	9.7 ± 0.9[abcde]
5*	3.7 ± 0.4[a]	1.6 ± 0.2[abcdef]	9.8 ± 0.8[abcde]
6*	4.2 ± 0.4[a]	1.5 ± 0.2[abcdef]	10.7 ± 0.9[bcde]
8	3.8 ± 0.4[a]	2.1 ± 0.3[bcdefghi]	10.1 ± 1.1[abcde]
9	4.4 ± 0.3[a]	2.7 ± 0.7[hij]	18.5 ± 5.3[h]
10*	4.3 ± 0.5[a]	1.6 ± 0.3[abcdef]	11.4 ± 1.0[cdef]
14*	8.2 ± 1.0[bc]	2.4 ± 0.3[fghij]	26.3 ± 3.0[i]
15	2.8 ± 0.3[a]	1.6 ± 0.2[abcdefg]	9.7 ± 0.9[abcde]
16*	9.0 ± 1.4[c]	1.4 ± 0.2[abcdef]	10.5 ± 1.3[bcde]
17	3.0 ± 0.3[a]	1.2 ± 0.1[abc]	7.4 ± 0.5[abc]
18	3.2 ± 0.4[a]	1.4 ± 0.1[abcde]	6.6 ± 0.4[ab]
19	4.1 ± 0.5[a]	2.3 ± 0.3[efghij]	15.4 ± 4.2[fg]
20*	14.1 ± 3.2[d]	1.9 ± 0.3[abcdefghi]	9.1 ± 0.8[abcd]
21	3.5 ± 0.4[a]	2.1 ± 0.5[cdefghi]	11.3 ± 1.1[cdef]
22	2.5 ± 0.3[a]	1.3 ± 0.2[abcde]	9.3 ± 0.6[abcd]
26	2.8 ± 0.3[a]	1.4 ± 0.2[abcdef]	10.7 ± 0.7[bcdef]
27*	3.4 ± 0.3[a]	1.9 ± 0.3[abcdefghi]	8.2 ± 0.6[abcd]
33	2.6 ± 0.3[a]	1.5 ± 0.3[abcdef]	9.8 ± 0.7[abcde]
34	2.4 ± 0.2[a]	1.3 ± 0.3[abcd]	7.6 ± 0.5[abc]
35	2.3 ± 0.2[a]	2.6 ± 0.3[ghij]	10.7 ± 1.0[bcde]
36	2.0 ± 0.2[a]	1.1 ± 0.1[ab]	6.7 ± 0.4[ab]
37	2.5 ± 0.2[a]	1.1 ± 0.1[ab]	7.2 ± 0.6[abc]
38	2.2 ± 0.2[a]	1.0 ± 0.1[a]	6.7 ± 0.7[abc]
39	1.9 ± 0.2[a]	1.0 ± 0.1[a]	6.1 ± 0.4[a]
40	2.5 ± 0.3[a]	3.4 ± 0.9[j]	10.8 ± 0.7[bcde]
41	3.1 ± 0.3[a]	1.7 ± 0.3[abcdefgh]	14.0 ± 1.3[efg]
42	2.5 ± 0.2[a]	1.5 ± 0.2[abcdef]	9.0 ± 1.4[abcd]
44	2.6 ± 0.3[a]	1.8 ± 0.4[abcdefghi]	8.6 ± 0.8[abcd]
80*	14.5 ± 1.9[d]	1.8 ± 0.2[abcdefghi]	16.7 ± 1.4[gh]
81*	33.2 ± 5.4[e]	4.9 ± 1.1[k]	16.8 ± 1.2[gh]
82*	8.8 ± 1.5[c]	1.8 ± 0.2[abcdefghi]	16.3 ± 2.4[gh]
83*	14.7 ± 3.3[d]	1.9 ± 0.2[abcdefghi]	16.1 ± 1.0[gh]

Key: For each ion, values with same superscript letter are not significantly different at 95-percent confidence level.

*Onsite location.

Table 5-5. Deposition (lb/(acre)(yr)) of drift constituents at PVNGS native sites, 1989 (means ± standard errors)

Constituent	All native sites (except 80-83)	All onsite sites* (except 80-83)	Sites 80-83
Sodium	4.0 ± 0.2	6.0 ± 0.4	17.6 ± 1.9
Potassium	1.8 ± 0.1[a]	1.9 ± 0.1[a]	2.6 ± 0.3
Calcium	10.6 ± 0.3	12.1 ± 0.5	16.5 ± 0.8
Magnesium	2.1 ± 0.1	2.4 ± 0.1	3.0 ± 0.2
Nitrate (as N)†	0.8 ± 0.03	0.8 ± 0.1	1.2 ± 0.2
Phosphate (as P)†	0.2 ± 0.02	0.2 ± 0.02	0.4 ± 0.1
Ammonium (as N)†	2.1 ± 0.1	2.1 ± 0.2	3.6 ± 0.7
Chloride†	3.6 ± 0.1	5.2 ± 0.4	14.7 ± 1.4
TSS	199.6 ± 7.8[a]	224.8 ± 15.0[ab]	267.7 ± 23.2[b]

Key:
1. For each ion, means with same superscript letter are not significantly different at 95-percent confidence level.
2. TSS, total suspended solids.

*Sites 1-6, 10, 14, 16, 20, and 27.

†Difference statistics were not generated because of the high percentage of data below the detection limit.

Table 5-6. Deposition (lb/(acre)(yr)) of drift constituents at PVNGS agricultural and native control sites, 1989 (means ± standard errors)

Constituent	Agricultural sites 25	Agricultural sites 43	Native sites 40	Native sites 42
Sodium	4.7 ± 0.2	6.8 ± 0.9	2.5 ± 0.3	2.5 ± 0.2
Potassium	11.8 ± 1.1	9.3 ± 2.4	3.4 ± 0.9	1.5 ± 0.2
Calcium	44.6 ± 4.0	21.5 ± 2.0	10.8 ± 0.7	9.0 ± 1.4
Magnesium	17.8 ± 1.6	5.4 ± 0.6	3.2 ± 0.3	2.1 ± 0.4
Nitrate (as N)	0.6 ± 0.1	1.3 ± 0.2	0.5 ± 0.1	0.7 ± 0.1
Phosphate (as P)	0.8 ± 0.2	2.7 ± 1.3	0.7 ± 0.4	0.3 ± 0.2
Ammonium (as N)	2.0 ± 0.2	15.1 ± 5.4	3.7 ± 2.1	2.0 ± 0.3
Chloride	3.0 ± 0.2	7.9 ± 1.1	2.7 ± 0.1	2.6 ± 0.2
TSS	1789.0 ± 193.2	452.4 ± 61.3	309.6 ± 39.9	209.1 ± 48.3

Key: TSS, total suspended solids.

Table 5-7. Ratios of ionic constituents of drift deposition at PVNGS monitoring sites and in cooling tower basin water, 1989

Ratio	Drift deposition: All agricultural sites	Drift deposition: All native sites*	Drift deposition: Onsite sites†	Drift deposition: Supplemental sites	Cooling tower basin water‡
Sodium/potassium	0.8	2.9	3.2	6.8	40.8
Sodium/calcium	0.2	0.5	0.5	1.1	15.2
Sodium/magnesium	0.6	2.5	2.5	5.9	171.2
Sodium/nitrate	7.3	7.0	7.5	14.7	22.8

*Includes onsite and supplemental sites.

†Sites 1-6, 10, 14, 16, 20, and 27.

‡Weighted average based on number of months of operations for Units 1-3.

Table 5-8. Mean monthly concentrations of suspended particulates (μg/m^3) collected by low-volume air samplers at PVNGS monitoring sites, 1989 (means ± standard errors)

Ion	Site 8	Site 9	Site 10	Site 20	Site 21	Site 27
Sodium	0.12 ± 0.02	0.13 ± 0.01	0.14 ± 0.02	0.28 ± 0.05	0.11 ± 0.01	0.13 ± 0.01
Calcium	0.24 ± 0.02	0.39 ± 0.03	0.27 ± 0.03	0.30 ± 0.02	0.29 ± 0.02	0.31 ± 0.02
Magnesium	0.01 ± 0.002	0.02 ± 0.002	0.02 ± 0.002	0.02 ± 0.001	0.01 ± 0.001	0.02 ± 0.001
Sulfate	0.25 ± 0.05	0.29 ± 0.04	0.32 ± 0.05	0.50 ± 0.07	0.23 ± 0.04	0.27 ± 0.04
Fluoride	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00	0.01 ± 0.00
Chloride	0.15 ± 0.00	0.15 ± 0.00	0.15 ± 0.00	0.25 ± 0.05	0.15 ± 0.00	0.15 ± 0.00

Table 5-9. Correlation, R, between deposition and airborne concentration of predominant ions at PVNGS low-volume air sampler monitoring sites, 1989

Site	Ion		
	Calcium	Magnesium	Sodium
8	0.20	0.12	0.14
9	-0.03	0.12	0.30
10	0.34	0.22	0.06
20	0.00	0.35	-0.29
21	-0.20	0.63	0.50
27	-0.22	0.19	-0.29

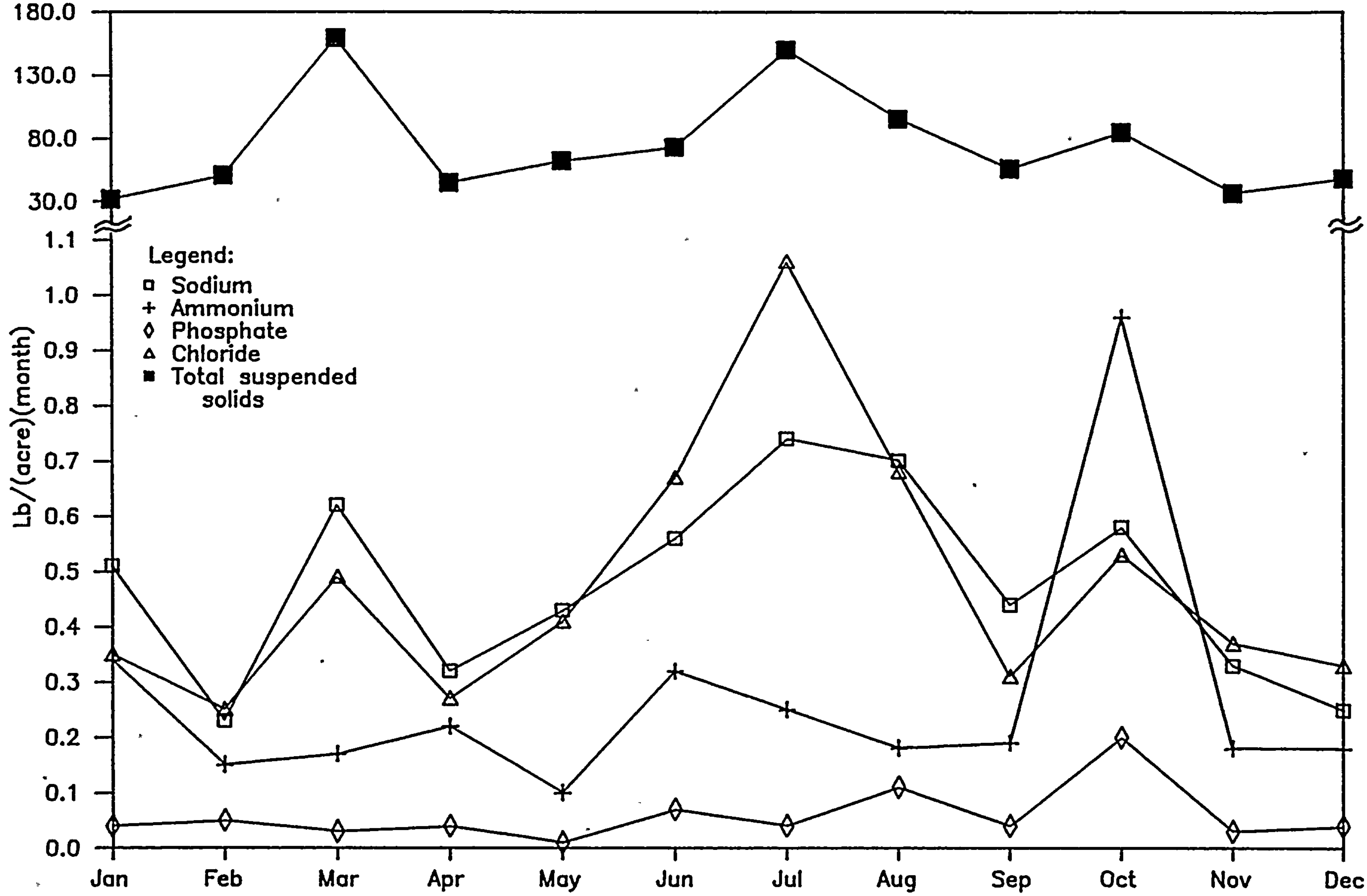

Figure 5–1. Mean monthly deposition of total suspended solids, sodium, ammonium, phosphate, and chloride at PVNGS agricultural monitoring sites, 1989

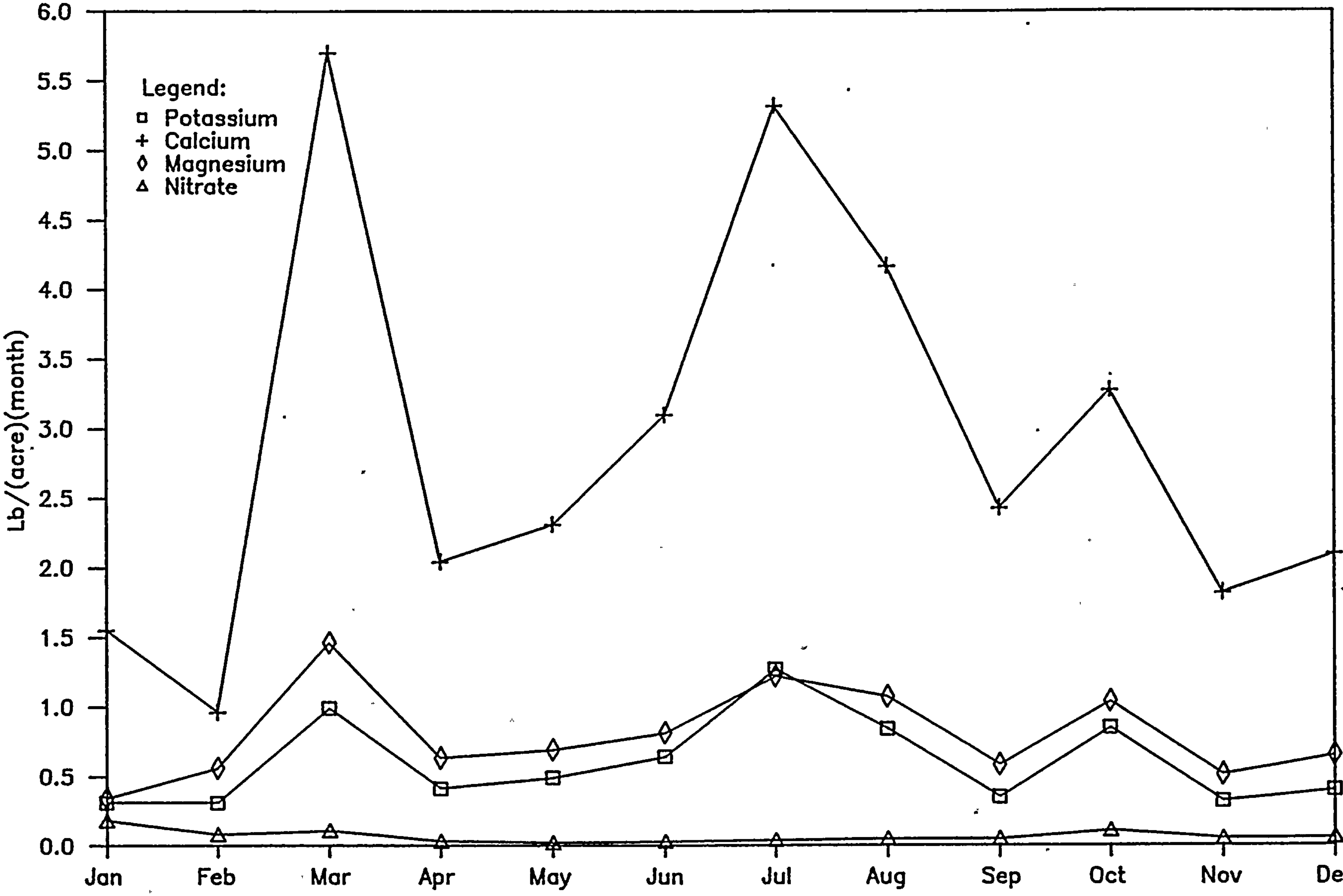

Figure 5–2. Mean monthly deposition of potassium, calcium, magnesium, and nitrate at PVNGS agricultural monitoring sites, 1989

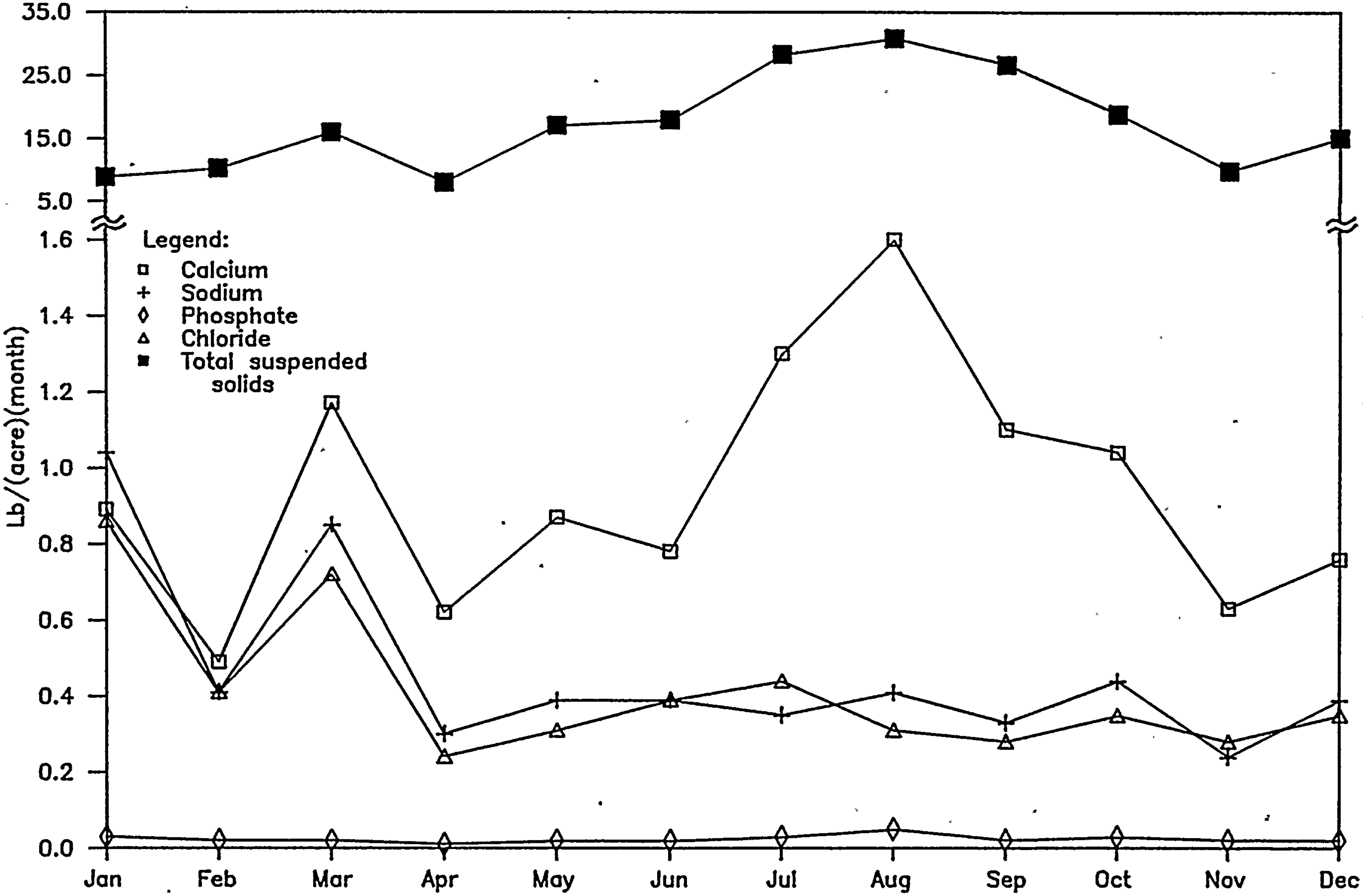

Figure 5–3. Mean monthly deposition of total suspended solids, calcium, sodium, phosphate, and chloride at PVNGS native monitoring sites, 1989

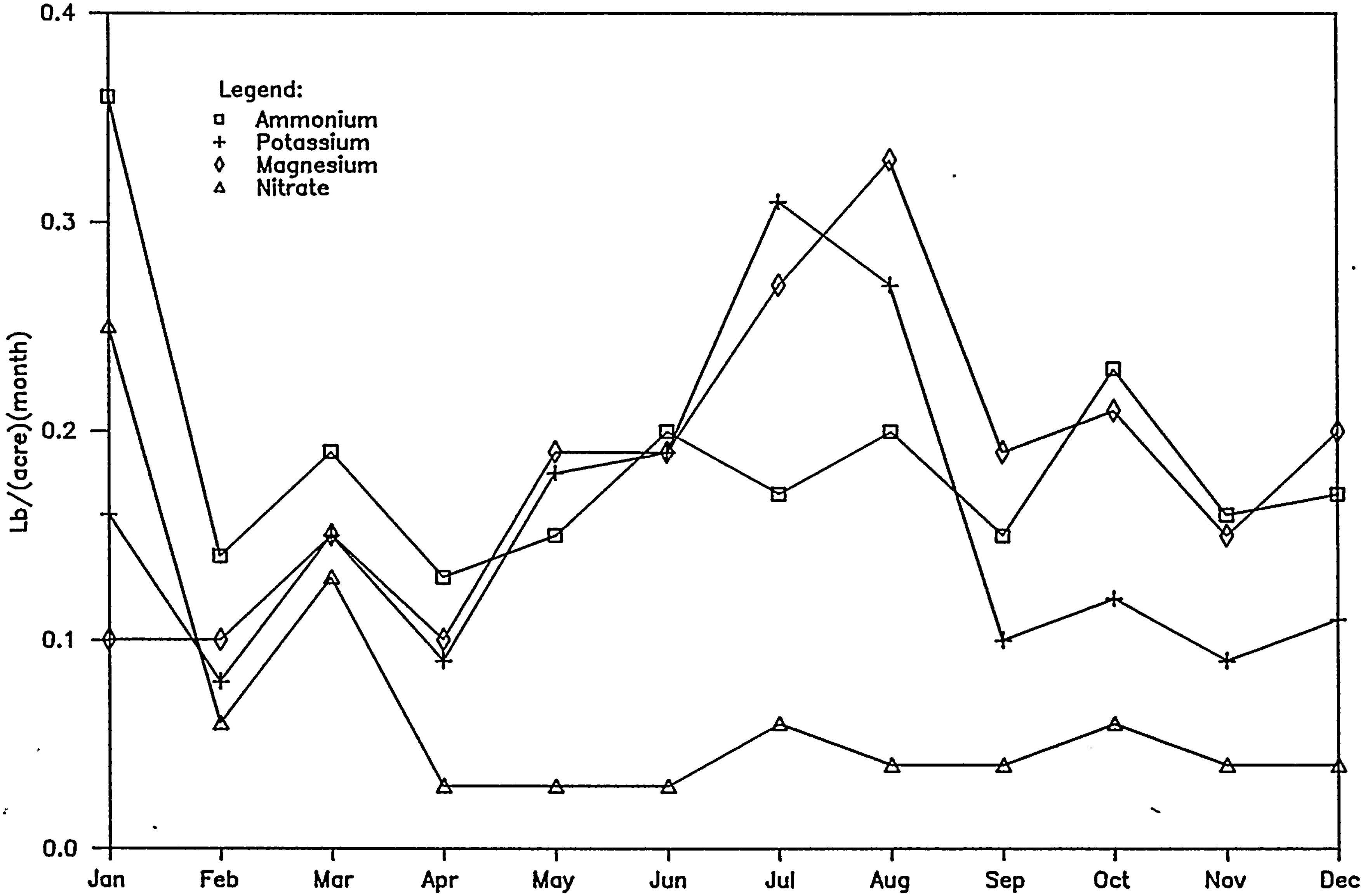

Figure 5-4. Mean monthly deposition of ammonium, potassium, magnesium, and nitrate at PVNGS native monitoring sites, 1989

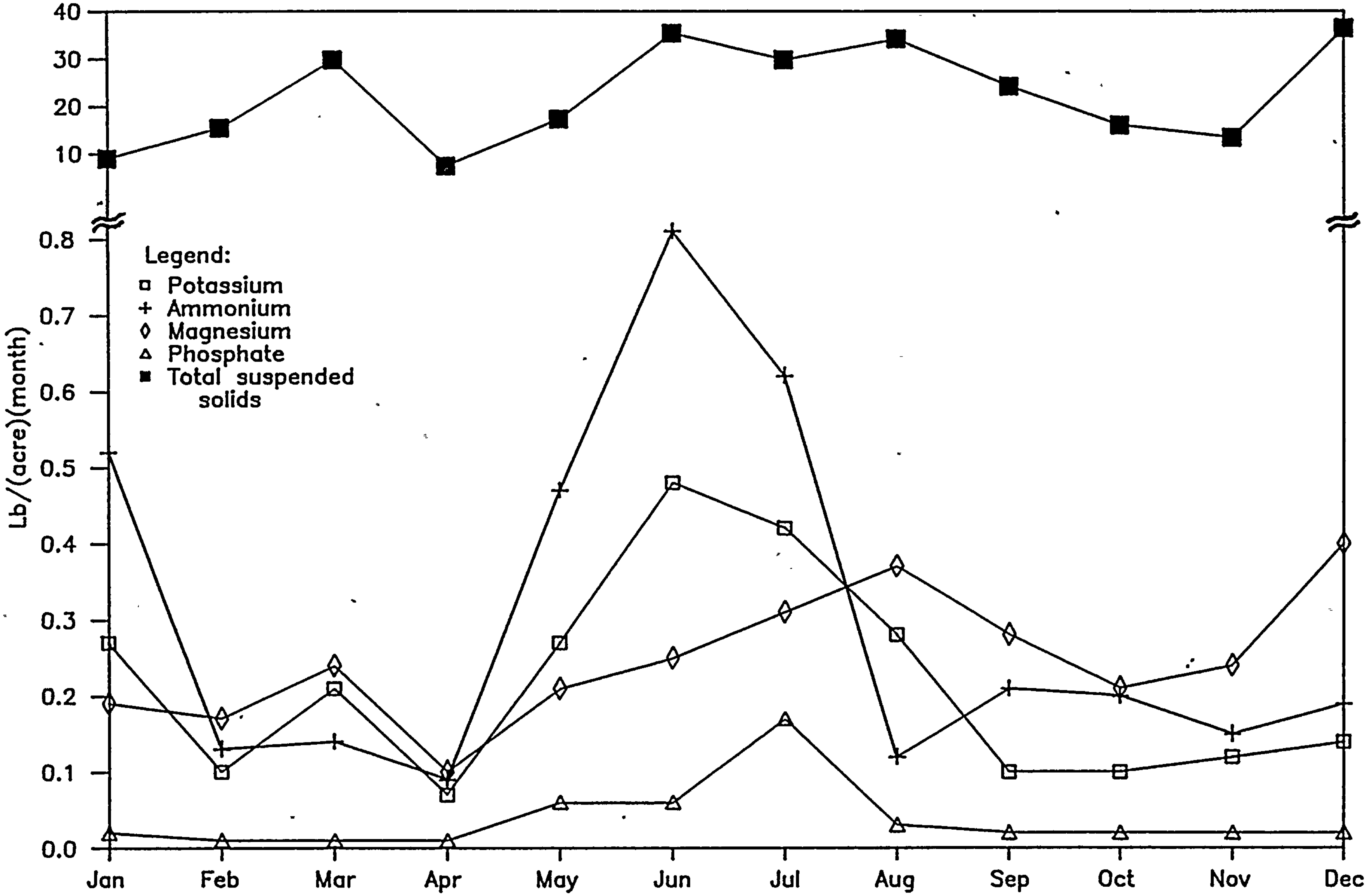

Figure 5–5. Mean monthly deposition of total suspended solids, potassium, ammonium, magnesium, and phosphate at PVNGS supplemental monitoring sites, 1989

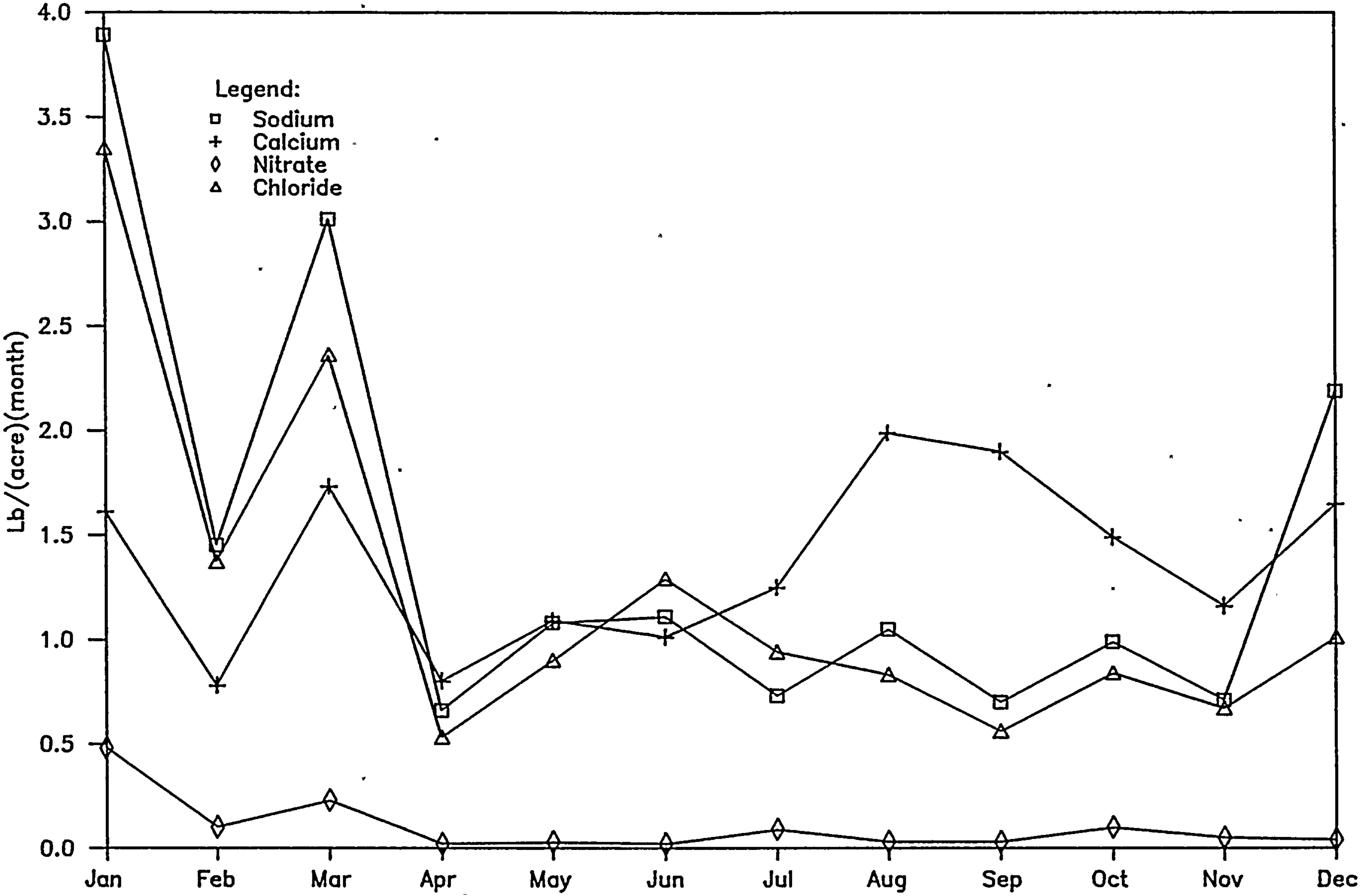

Figure 5-6. Mean monthly deposition of sodium, calcium, nitrate, and chloride at PVNGS supplemental monitoring sites, 1989

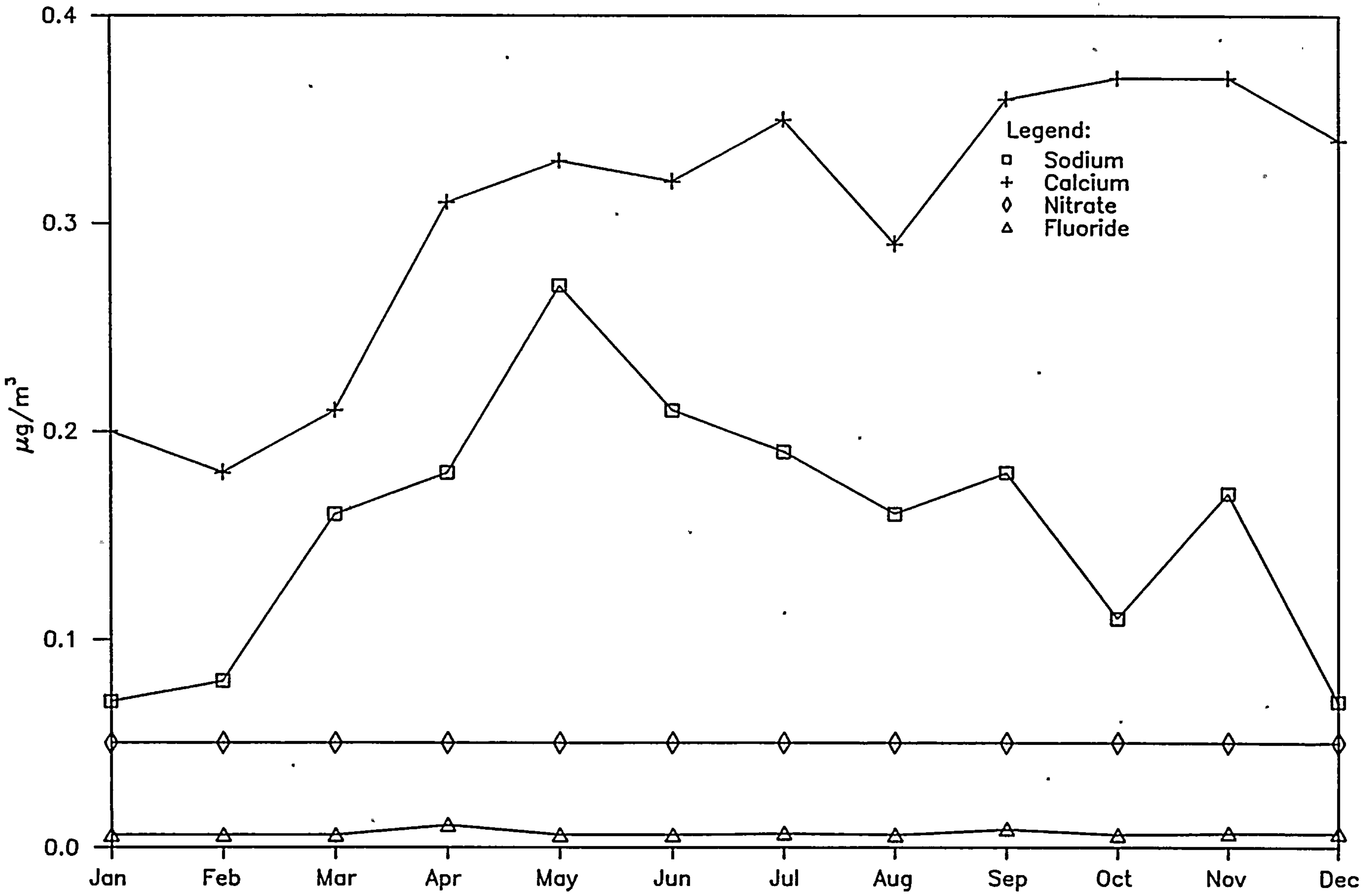

Figure 5–7. Mean monthly concentrations of sodium, calcium, nitrate, and fluoride in airborne particulate matter at PVNGS low–volume air sampler sites, 1989

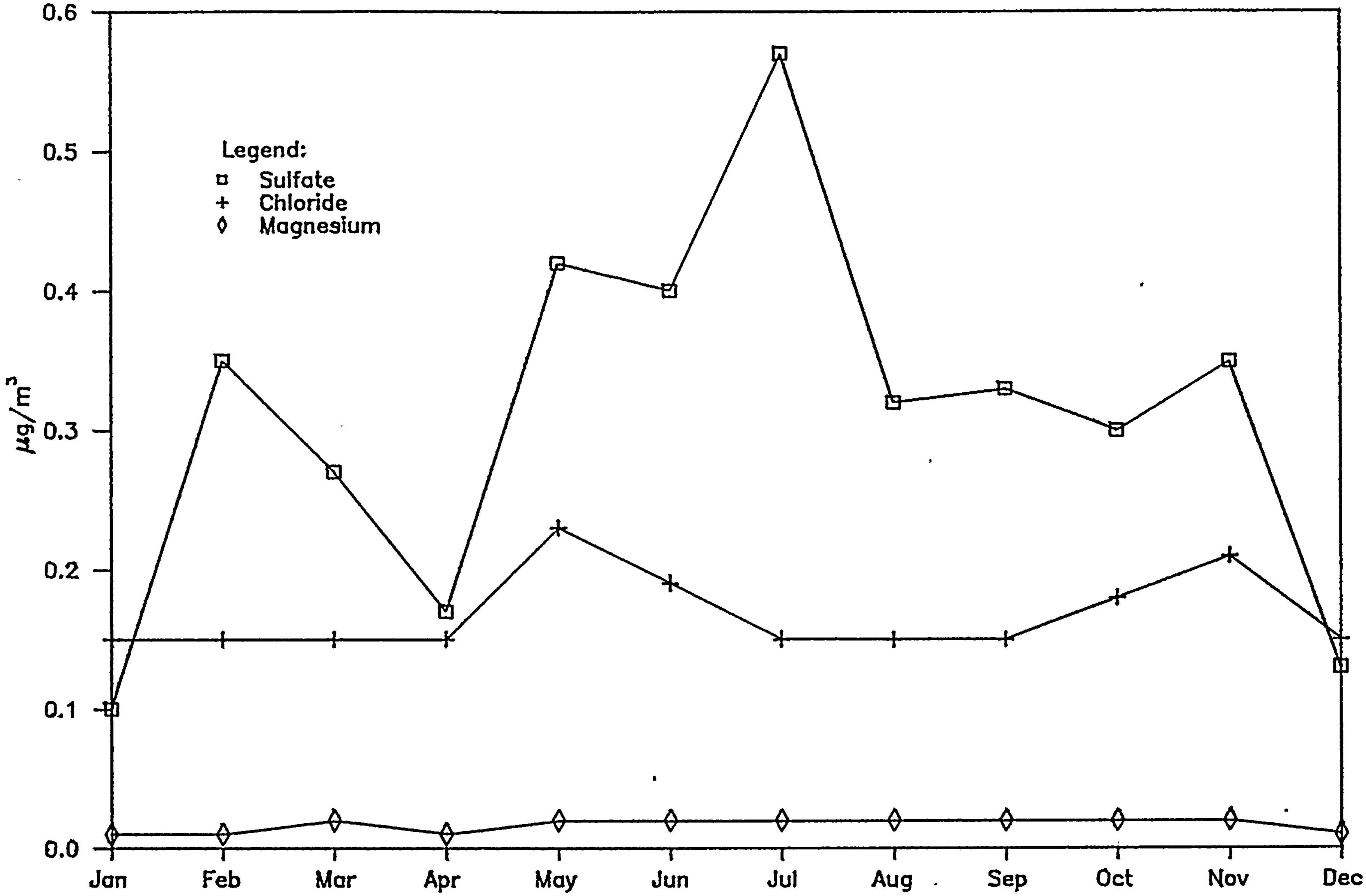

Figure 5-8. Mean monthly concentrations of sulfate, chloride, and magnesium in airborne particulate matter at PVNGS low-volume air sampler sites, 1989

6 Analyses of Agricultural Crops and Native Vegetation

6.1 CONCENTRATION OF SELECTED IONS IN LEAF TISSUE

Vascular plants require several nutrients for normal metabolic growth and acquire these from the air, water, and soil. The processes involved in the transport of a nutrient ion from the soil environment into the root and its translocation and distribution within the plant are complex and interrelated (Foth, 1972). The approach used here for evaluating the influence of cooling tower drift deposition on surrounding agricultural crops and indigenous flora is to identify and analyze ionic concentrations in cooling tower basin water, and to simultaneously monitor the same ionic concentrations in agricultural and indigenous leaf phytomass over time.

Leaf phytomass was sampled twice at each monitoring site in 1989: agricultural phytomass was taken during the middle (June/July) and end (August/September) of the growing season, and native phytomass was sampled during March and October. At each site a minimum of 20 grams wet weight of leaf tissue were collected from 10 randomly selected plots each season. One split sample was taken at each site to evaluate laboratory accuracy. Leaf phytomass was analyzed for concentrations of four cations (sodium, potassium, calcium, and magnesium) and five anions (chloride, sulfate, nitrate, phosphate, and fluoride), and results were reported in micrograms per gram dry weight (parts per million).

The results of chemical analyses of leaf phytomass sampled during 1989 are presented in Appendixes E (native vegetation) and F (agricultural crops). Statistical analysis included factorial and one-way analyses of variance (ANOVAs) in a completely randomized design. For the factorial ANOVA, main effects included location and year. The following sections summarize these analyses, as well as analyses of cotton yield and the structure of native vegetation. Differences between means were identified by using the least-significant-difference multiple range test. Unless stated otherwise, differences are reported as significant when the probability is less than .05 (i.e., at the 95-percent confidence level). A comparison of the 1989 concentrations with preoperational (1983-1985) concentrations is given in Chapter 9.

6.1.1 Agricultural Crops

During the 1989 growing season, sites 7, 12, 24, 28, 31, 32, and 45 were fallow (Figure 2-2). Of the remaining sites, one (i.e., 43) was planted in alfalfa and five (i.e., 11, 13, 23, 25, and 30) in cotton. Short-staple (i.e, upland) cotton was planted at sites 11, 13, and 30, while the long-staple (i.e, Pima) variety was planted at fields 23 and 25.

6.1.1.1 Alfalfa

Only site 43 contained alfalfa in 1989. The results of the analyte analysis are presented in Table 6-1. Site 43, a control site, is about 15 miles south-southeast of PVNGS (Figure 2-2). Since alfalfa was only planted in one field, comparisons between locations are not possible; comparisons between 1989 and the preoperational monitoring period are presented in Chapter 9.

6.1.1.2 Cotton

Five agricultural monitoring sites containing cotton were sampled during the 1989 growing season. Monitoring sites 11, 13, and 30 were planted with short-staple cotton and sites 23 and 25 with long-staple cotton. This was the first time since the monitoring program was initiated that monitoring site 23 was planted with long-staple cotton.

The mean concentrations of analytes for short-staple (Table 6-2) and long-staple (Table 6-3) cotton were examined independently since each is a separate variety. For short-staple cotton there was no significant difference between any of the sites in the mean concentrations of potassium, calcium, sulfate, and nitrate. The mean concentration of sodium at site 11 was not significantly different from that at sites 13 and 30; the concentration at site 13, however, was significantly higher than that at site 30. Site 30 had a significantly higher level of magnesium than either site 11 or 13, which were themselves not significantly different. Results for chloride and phosphate were similar in that site 11 had the lowest levels, while sites 13 and 30 were not significantly different. All three short-staple cotton sites showed significantly different mean concentrations of fluoride, site 13 having the highest and site 11 the lowest.

Long-staple cotton was planted at sites 23 and 25, the latter a control site. Results of the analysis of ion concentrations at these two locations showed no significant difference in mean levels of potassium, calcium, chloride, and sulfate. Levels of sodium, nitrate, and fluoride were significantly higher at site 23 than at site 25, while magnesium and phosphate concentrations were significantly higher at site 25.

6.1.2 Native Vegetation

6.1.2.1 Creosote-Bush

The ionic content of creosote-bush (Larrea divaricata) leaf tissue was measured at five locations in 1989. Sites 1, 4, and 6 are on the PVNGS; sites 40 and 42, which serve as controls, are approximately 21 miles north-west and 15 miles southeast, respectively, of the station (Figure 2-2).

The mean concentrations of sodium, magnesium, and nitrate showed no significant difference between any of the sites (Table 6-4). Potassium concentrations were significantly higher at site 4 than at the remaining sites. Site 6 was not significantly different from sites 1, 40 or 42; however, potassium levels at sites 1 and 42 were significantly lower than those at site 40. Both the lowest and the highest values for potassium were found on the PVNGS (i.e., sites 1 and 4, respectively). Calcium concentrations at sites 4 and 40 were significantly lower than they were at sites 1 and 6; site 42 was not signifcantly different from any other site. As was true for potassium, the lowest and highest calcium values were found on the PVNGS (i.e., sites 4 and 6, respectively). Site 40 had significantly lower levels of chloride than all of the other locations, which were themselves not significantly different from each other. The analysis of mean sulfate concentrations revealed three overlapping groups of sites defined by relative sulfate concentrations. These groups, from lowest concentrations to highest, were sites 40, 6, and 1; sites 6, 1, and 42; and sites 1, 42, and 4. Sites 40 and 4 showed the lowest and highest sulfate levels, respectively. While phosphate values were significantly lower at sites 1 and 42 than at sites 4, 40, and 6, they were not significantly different within each of these groups. Sites 1 and 6, both on the PVNGS, exhibited the lowest and highest phosphate values, respectively. The analysis of fluoride showed that site 4 was not significantly different from any other site; however, fluoride was significantly higher at site 1 than at sites 6, 40, and 42.

6.1.2.2 Salt-Bush

The ionic content of salt-bush (Atriplex polycarpa) was measured at three monitoring sites in 1989. Monitoring sites 2 and 3 are on the PVNGS, whereas site 44, which serves as a control, lies approximately 5 miles northwest (Figure 2-2).

The mean concentrations of sodium, calcium, and chloride in salt-bush leaf tissue in 1989 were significantly lower at the control site than at sites 2 and 3 (Table 6-5). Conversely, the mean concentrations of nitrate, phosphate, and fluoride were significantly higher at the control site than at sites 2 and 3. The level of potassium at site 3 was not significantly different from sites 2 and 44; however, potassium was significantly higher at site 44 than at site 2. No significant differences were found in the mean concentrations of magnesium and sulfate at any of the three sites.

6.2 COTTON YIELD

The mean yield of short-staple cotton in 1989 ranged from 2450 pounds per acre at monitoring site 11 to 4549 pounds per acre at site 13. The mean yield of long-staple cotton ranged from 2343 pounds per acre at site 25 to 2968 pounds per acre at site 23. These results and a comparison of the 1989 harvest with those of 1983-1985 are discussed in greater detail in Section 9.4.

6.3 STRUCTURE OF NATIVE PLANT COMMUNITIES

Species composition, relative cover, and diversity were quantitatively monitored in eight native plant communities on or in the vicinity of PVNGS in 1989 (Figure 2-2). Ten 1- by 10-meter plots were sampled during March and October within each community. Cover refers to the percentage of a line intersected by a given species; it is a measure of plant biomass. Two components of diversity were considered. The first, richness, refers to the number of species sampled from the community. The second, heterogeneity, incorporates both richness and equitability or evenness (Shannon and Weaver, 1949). Floristic nomenclature, which had followed Kearney and Peebles (1973), has been updated (Lehr, 1978; Lehr and Pinkava, 1980; Lehr and Pinkava, 1982; and Turner, 1986). The updated nomenclature is presented in Table 6-6, which also lists all native vegetation observed to date. Except where noted, scientific names within the text and tables will not be changed, in order to facilitate a comparison of this annual report with previous reports.

6.3.1 Creosote-Bush

A comparison of the species composition, cover, and floristic diversity of five creosote-bush communities is presented in Table 6-7. Monitoring sites 1, 4, and 6 are on the PVNGS; control sites 40 and 42 are approximately 25 miles northwest and 20 miles southeast, respectively, from PVNGS (Figure 2-2).

The dominant perennial species at each of the five sites in 1989 was creosote-bush (Table 6-7). Relative cover values for creosote-bush at sites 1, 6, and 42 were similar; percent cover was also similar at sites 4 and 40. Compared with herbs and grasses, which appeared almost exclusively during the March sampling, creosote-bush was the dominant species at each of the five sites during both sampling periods; it characterized most of the native vegetation near PVNGS. Plantain (*Plantago insularis*) was the dominant vascular herbaceous species in 1989; however, it could not be considered abundant. *Schismus barbatus*, a short, sparse grass, was the dominant grass present in 1989. Four species of cacti were observed in 1989; site 4 supported the greatest abundance and diversity.

Species richness within four of the five plant communities in 1989 was considerably lower than that observed in 1988; it ranged from 7 to 19, and only at site 1 was there an increase in the number of species. A cumulative total of 29 species were observed in 1989. Monitoring site 1 showed the greatest richness, and it was followed in order by sites 4, 6, 40, and 42. Plant communities at PVNGS had species richness values that were about twice as high as those of the control sites. Heterogeneity was lower in 1989 than in 1988 in each of the creosote-bush communities. The heterogeneity of site 42 was 0. This was the case since only one species, creosote-bush, was recorded along the line transect. Although site 40 ranked low in species richness, it exhibited the greatest heterogeneity.

6.3.2 Salt-bush

Three salt-bush (*Atriplex* spp.) communities were measured in 1989. Sites 2 and 3 are located on the PVNGS, while site 44, a control, is located about 5 miles northwest of the station. Salt-bush communities, which are fairly uncommon in the vicinity of PVNGS, were characterized by species of flora different from those in the creosote-bush communities. Some species, however, were common to both communities.

Six species of perennial shrubs were identified from the three communities in 1989 (Table 6-8). Salt-bush was the dominant perennial shrub in each of the communities. A second species of salt-bush (*Atriplex linearis*) was also present at sites 2 and 3, but it occurred much less frequently. More species of perennial shrubs were observed at monitoring site 2 than at sites 3 and 44. As in the creosote-bush communities, plantain was the most common herbaceous species; however, it was by no means abundant. *Schismus arabicus* was the only grass present, and no cacti were observed.

In terms of species richness, site 3 showed the greatest value and the control site the lowest value. There was little difference between the sites with respect to species heterogeneity. The salt-bush communities had a greater number of species of perennial shrubs than the creosote-bush communities, but the creosote bush communities had more herbaceous species. A comparison of community structure in the preoperational and operational periods is presented in Section 9.4.2.

Table 6-1. Ion content (μg/g dry weight) of alfalfa leaf tissue at PVNGS agricultural monitoring site 43, 1989 (means ± standard errors)

Ion	Content
Sodium	1,607 ± 152
Potassium	22,155 ± 954
Calcium	14,880 ± 405
Magnesium	2,694 ± 76
Chloride	16,308 ± 360
Sulfate	8,268 ± 552
Nitrate (as N)	77 ± 11
Phosphate (as P)	3,019 ± 150
Fluoride	12 ± 0.4

Note: All values were derived from analysis of 20 samples.

Table 6-2. Ion content (μg/g dry weight) of short-staple cotton leaf tissue at PVNGS monitoring sites, 1989 (means ± standard errors)

Ion	Monitoring site 11	Monitoring site 13	Monitoring site 30
Sodium	3,428 ± 247[ab]	4,155 ± 340[b]	3,154 ± 236[a]
Potassium	18,086 ± 1,071[a]	20,356 ± 1,228[a]	19,805 ± 1,160[a]
Calcium	37,006 ± 1,566[a]	38,144 ± 1,086[a]	38,688 ± 1,426[a]
Magnesium	4,890 ± 194[a]	5,064 ± 174[a]	5,958 ± 150
Chloride	16,980 ± 511	19,600 ± 331[a]	20,060 ± 513[a]
Sulfate	38,857 ± 3,809[a]	40,340 ± 2,937[a]	43,983 ± 1,631[a]
Nitrate (as N)	537 ± 115[a]	677 ± 139[a]	573 ± 96[a]
Phosphate (as P)	1,615 ± 66	1,978 ± 53[a]	1,853 ± 70[a]
Fluoride	11 ± 0.2	13 ± 0.2	12 ± 0.2

Key: For individual ions, means with same superscript letter are not significantly different at 95-percent confidence level.

Note: All values were derived from analysis of 20 samples.

Table 6-3. Ion content (μg/g dry weight) of long-staple cotton leaf tissue at PVNGS monitoring sites, 1989 (means ± standard errors)

Ion	Monitoring site	
	23	25
Sodium	1,314 ± 115	576 ± 38
Potassium	19,477 ± 745[a]	18,307 ± 936[a]
Calcium	37,869 ± 1,529[a]	40,594 ± 916[a]
Magnesium	3,355 ± 118	4,337 ± 126
Chloride	20,680 ± 373[a]	20,480 ± 647[a]
Sulfate	35,191 ± 2,804[a]	38,402 ± 2,050[a]
Nitrate (as N)	634 ± 128	251 ± 51
Phosphate (as P)	1,996 ± 48	2,301 ± 55
Fluoride	13 ± 0.2	11 ± 0.2

Key: For individual ions, means with superscript letter a are not significantly different at 95-percent confidence level.

Note: All values were derived from analysis of 20 samples.

Table 6-4. Ion content (μg/g dry weight) of creosote-bush (*Larrea divaricata*) leaf tissue at PVNGS monitoring sites, 1989 (means ± standard errors)

Ion	Monitoring site				
	1	4	6	40	42
Sodium	428 ± 29^{a}	444 ± 40^{a}	341 ± 23^{a}	388 ± 25^{a}	391 ± 30^{a}
Potassium	10,300 ± 376^{a}	15,305 ± 557	11,190 ± 377^{ab}	11,590 ± 387^{b}	10,377 ± 425^{a}
Calcium	17,109 ± 787^{b}	14,449 ± 371^{a}	17,169 ± 590^{b}	15,097 ± 857^{a}	16,285 ± 575^{ab}
Magnesium	1,422 ± 50^{a}	1,435 ± 50^{a}	1,663 ± 77^{a}	1,483 ± 82^{a}	1,566 ± 60^{a}
Chloride	8,630 ± 369^{a}	9,140 ± 423^{a}	9,460 ± 350^{a}	7,090 ± 342	8,710 ± 412^{a}
Sulfate	3,431 ± 394^{abc}	3,952 ± 614^{c}	2,481 ± 294^{ab}	1,802 ± 607^{a}	3,601 ± 253^{bc}
Nitrate (as N)	70 ± 8^{a}	96 ± 12^{a}	80 ± 8^{a}	93 ± 12^{a}	102 ± 7^{a}
Phosphate (as P)	1,097 ± 44^{a}	1,350 ± 37^{b}	1,460 ± 33^{b}	1,419 ± 48^{b}	1,166 ± 40^{a}
Fluoride	19 ± 0.5^{b}	18 ± 0.5^{ab}	17 ± 0.1^{a}	17 ± 0.3^{a}	17 ± 0.5^{a}

Key: For individual ions, means with same superscript letter are not significantly different at 95-percent confidence level.

Note: Except for sulfate, all values were derived from analysis of 20 samples. Numbers of sulfate samples were as follows: 11 at site 1; 18 at site 4; 11 at site 6; 7 at site 40; and 16 at site 42.

Table 6-5. Ion content (μg/g dry weight) of salt-bush (*Atriplex polycarpa*) leaf tissue at PVNGS monitoring sites, 1989 (means ± standard errors)

Ion	Monitoring site 2	3	44
Sodium	61,962 ± 2,097[a]	64,878 ± 1,322[a]	40,570 ± 1,800
Potassium	17,175 ± 920[a]	20,587 ± 1,534[ab]	23,779 ± 1,360[b]
Calcium	11,760 ± 563[a]	12,190 ± 747[a]	9,122 ± 449
Magnesium	5,593 ± 357[a]	5,782 ± 279[a]	6,536 ± 294[a]
Chloride	61,460 ± 3,696[a]	62,310 ± 3,424[a]	44,520 ± 1,717
Sulfate	5,785 ± 706[a]	6,341 ± 642[a]	7,072 ± 599[a]
Nitrate (as N)	208 ± 26[a]	203 ± 35[a]	312 ± 28
Phosphate (as P)	1,176 ± 50[a]	1,327 ± 60[a]	1,548 ± 53
Fluoride	11 ± 0.2[a]	11 ± 0.2[a]	12 ± 0.3

Key: For individual ions, means with same superscript letter are not significantly different at 95-percent confidence level.

Note: All values were derived from analysis of 20 samples.

Table 6-6. Indigenous flora at PVNGS, 1983-1989: comprehensive list with updated nomenclature (sheet 1 of 4)

Scientific name*	Common name	Updated nomenclature[†]
Shrubs		
Ambrosia dumosa[‡]	White bursage[§]	
Atriplex polycarpa	Salt-bush, orache	
Atriplex linearis	Salt-bush, orache	Atriplex canescens ssp. linearis
Larrea divaricata	Creosote-bush	Larrea divaricata var. tridentata
Lycium Fremontii	Wolf-berry	
Lycium Parishii	Wolf-berry	
Lycium sp.	Wolf-berry	
Prosopis velutina	Mesquite	
Herbs		
Abronia villosa	Sand-verbena	
Allionia incarnata	None	
Amaranthus fimbriatus	Amaranth, pig-weed	
Amsinckia intermedia	Fiddle-neck	
Argythamnia neomexicana	None	
Astragalus Nuttallianus	Milk-vetch	
Bowlesia incana	None	
Brassica Tournefortii	None	
Camelina microcarpa	False-flax	
Chaenactis carphoclinia	None	
Chaenactis Fremontii	None	
Chorizanthe brevicornu	None	
Chorizanthe rigida	None	
Cryptantha angustifolia	None	
Cryptantha inaequata	None	

Table 6-6. Indigenous flora at PVNGS, 1983-1989: comprehensive list with updated nomenclature (sheet 2 of 4)

Scientific name*	Common name	Updated nomenclature†
Cryptantha maritima	None	
Cryptantha muricata	None	
Cryptantha pterocarya	None	
Cryptantha sp.	None	
Dalea neomexicana	Indigo-bush, pea-bush	
Daucus pusillus	Carrot	
Eriastrum diffusum	None	
Erigeron lobatus	Fleabane, wild-daisy	
Eriogonum Thomasii	Wild-buckwheat	
Eriogonum trichopes	Wild-buckwheat	
Eriophyllum lanosum	Wooly-daisy	
Erodium cicutarium	Heron-bill	
Erodium texanum	Heron-bill	
Eucrypta micrantha	None	
Euphorbia polycarpa	Spurge	
Euphorbia capitellata	Spurge	
Euphorbia sp.	Spurge	
Filago arizonica	None	
Hesperocallis undulata	Desert-lily	
Krameria sp.	Ratany	
Lepidium lasiocarpum	Pepper-grass	
Lepidium virginicum	Pepper-grass	
Lepidium sp.	Pepper-grass	
Lesquerella Gordoni	Bladder-pod	
Linanthus bigelovii	None	
Linanthus dichotomus	None	
Lotus salsuginosus	Deer-vetch	

Table 6-6. Indigenous flora at PVNGS, 1983-1989: comprehensive list with updated nomenclature (sheet 3 of 4)

Scientific name*	Common name	Updated nomenclature†
Lotus tomentellus	Deer-vetch	Lotus strigosus var. tomentellus
Lupinus sparsiflorus	Lupine	Lupinus sparsiflorus ssp. mohavensis
Machaeranthera arida	None	Machaeranthera Coulteri var. arida
Machaeranthera Coulteri	None	Machaeranthera Coulteri var. arida
Monoptilon bellioides	None	
Nama demissum	None	
Nama hispidum	None	
Nemacladus glanduliferus	None	
Oenothera sp.	Evening-primrose	
Oligomeris linifolia	None	
Orthocarpus purpurascens	Owl-clover	
Pectis papposa	Fetid-marigold, chinchweed	
Pectocarya platycarpa	None	
Perityle Emoryi	None	
Phacelia crenulata	None	
Pholistoma auritum	None	
Plantago insularis	Plaintain, Indian-wheat	
Portulaca parvula	None	
Proboscidea altheaefolia	Unicorn-plant	
Salsola Kali	Russian-thistle#	
Sisymbrium Irio	None	
Spermolepis echinata	None	
Sphaeralcea Coulteri	Globe-mallow	
Tidestromia lanuginosa	None	
Trianthema Portulacastrum	Pig-weed	

Table 6-6. Indigenous flora at PVNGS, 1983-1989: comprehensive list with updated nomenclature (sheet 4 of 4)

Scientific name*	Common name	Updated nomenclature†
Grasses		
Aristida adscensionis	Three-awn	
Aristida sp.	Three-awn	
Bouteloua barbata	Grama	
Bromus rubens	Foxtail brome	
Festuca octoflora	Fescue	Vulpia octoflora
Schismus arabicus	None	
Schismus barbatus	None	
Schismus sp.		
Cacti		
Echinocereus Engelmannii	Hedgehog cactus	
Ferocactus Wislizeni	Barrel cactus, bisnaga	
Opuntia acanthocarpa	None	
Opuntia echinocarpa	None	
Opuntia leptocaulis	Christmas cactus	
Opuntia ramossisima	None	

* From Kearney and Peebles, 1973.

† From Lehr, 1978; Lehr and Pinkava, 1980, 1982; and Turner, 1986.

‡ Scientific name.

§ Common name.

Until recently Salsola Kali was only species of Salsola listed in Arizona; however, there are now two species listed: Salsola iberica and Salsola paulsenii. Future field work may determine if one or both of these species are present within study plots.

Table 6-7. Species composition, cover, and diversity of flora in five creosote-bush (Larrea divaricata) communities at PVNGS monitoring sites, 1989 (sheet 1 of 2)

Parameter		Site 1	Site 4	Site 6	Site 40	Site 42	Cumulative total
Species composition and percent cover							
Shrubs							
Ambrosia dumosa*	White bursage†	1.7					1.7
Larrea divaricata	Creosote-bush	15.4	12.0	15.7	10.5	15.2	68.8
Herbs							
Amsinckia intermedia	Fiddle-neck	<0.1	--	1.3	<0.1		1.3
Brassica Tournefortii	None		<0.1	--			<0.1
Chorizanthe brevicornu	None	--					--
Chorizanthe rigida	None		--				--
Cryptantha muricata	None	--		--			--
Daucus pusillus	Carrot	0.4					0.4
Eriogonum Thomasii	Wild-buckwheat	--	--	<0.1		--	<0.1
Eriophyllum lanosum	Wooly-daisy	--		--			--
Erodium cicutarium	Heron-bill	0.1	--	--			0.1
Erodium texanum	Heron-bill	<0.1					<0.1
Euphorbia polycarpa	Spurge			--			--
Lepidium lasiocarpum	Pepper-grass	--	--	--	<0.1	--	<0.1
Lepidium virginicum	Pepper-grass	--	--	--			--
Lesquerella Gordoni	Bladder-pod		--		--		--
Lupinus sparsiflorus	Lupine			--			--
Machaeranthera Coulteri	None	<0.1	--				<0.1
Pectocarya platycarpa	None	<0.1	--	0.1	0.4		0.5
Phacelia crenulata	None	--	--				--

Table 6-7. Species composition, cover, and diversity of flora in five creosote-bush (Larrea divaricata) communities at PVNGS monitoring sites, 1989 (sheet 2 of 2)

Parameter		Site 1	4	6	40	42	Cumulative total
		Species composition and percent cover (continued)					
Plantago insularis	Plantain	0.7	0.6	1.5	1.5	--	4.3
Sphaeralcea Coulteri	Globe-mallow				0.5		0.5
Grasses							
Aristida adscensionis	Three-awn			0.1			0.1
Festuca octoflora	Fescue	--		0.4			0.4
Schismus barbatus	None	<0.1			2.0	--	2.0
Cacti							
Opuntia acanthocarpa	None		--			--	--
Opuntia echinocarpa	None		0.1				0.1
Opuntia leptocaulis	Christmas cactus	--					--
Opuntia ramossisima	None		0.7			--	0.7
		Species diversity and number of plots					
Species richness		19	16	15	8	7	29
Heterogeneity (H')		.28	.18	.30	.42	0	NA
Plots		20	20	20	20	20	100

Key: -- (dash), species present in plot but not on transect; NA, not applicable.

*Scientific name.

†Common name.

Table 6-8. Species composition, cover, and diversity of flora in three salt-bush (*Atriplex* spp.) communities at PVNGS monitoring sites, 1989 (sheet 1 of 2)

Parameter		Site 2	Site 3	Site 44	Cumulative total
Species composition and percent cover					
Shrubs					
*Ambrosia dumosa**	White bursage†		0.1		0.1
Atriplex linearis	Salt-bush	0.4	1.2		1.6
Atriplex polycarpa	Salt-bush	16.1	19.7	6.6	42.4
Larrea divaricata	Creosote-bush	4.7		0.5	5.2
Lycium Fremontii	Wolf-berry	0.5	6.4		6.9
Prosopis velutina	Mesquite	6.1		1.5	7.6
Herbs					
Amsinckia intermedia	Fiddle-neck	--	0.1	--	0.1
Cryptantha maritima	None		--		--
Eriastrum diffusum	None		--		--
Eriophyllum lanosum	Wooly-daisy	--	--		--
Erodium cicutarium	Heron-bill		--		--
Lepidium lasiocarpum	Pepper-grass	--	--	--	--
Machaeranthera Coulteri	None		--		--
Pectocarya platycarpa	None		<0.1	--	<0.1
Plantago insularis	Plantain	0.1	1.3	0.2	1.6
Grasses					
Schismus barbatus	None	0.5	3.6	4.6	8.7

Table 6-8. Species composition, cover, and diversity of flora in three salt-bush (Atriplex spp.) communities at PVNGS monitoring sites, 1989 (sheet 2 of 2)

Parameter	Site 2	Site 3	Site 44	Cumulative total
Species diversity and number of plots				
Species richness	10	14	8	16
Heterogeneity (H')	.51	.50	.50	NA
Plots	20	20	20	60

Key: -- (dash), species present in plot but not on transect; NA, not applicable.

*Scientific name.

†Common name.

7 Detection of Vegetative Stress Using Remote Sensing

The chemical monitoring of ionic concentrations in leaf phytomass during the growing season is an effective means of detecting physiological changes in vegetation, including vegetative stress. This component of the PVNGS monitoring program is discussed in Sections 6.1 and 9.3 of this report. Another technique to detect vegetative stress, and one which complements the chemical analysis, is remote sensing with color infrared (CIR) aerial photography. The infrared band of the electromagnetic spectrum exhibits a high level of reflectivity from living vegetation and thus can be used to identify physiological and morphological changes in such vegetation. On CIR imagery, more robust growth is generally indicated by reddish hues and less vigorous growth by lighter hues. Color infrared photography is especially useful for detecting vegetative stress in homogeneous assemblages of broad-leaved plants such as cotton. It is more limited in applicability to studies of native vegetation having sclerophyllous leaves, such as Sonoran desert flora.

Vegetative stress in agricultural crops and indigenous vegetation is attributable to drought, poor drainage, nutrient deficiencies associated with varying soil fertility, disease or insect damage, competition from weeds, or other conditions that alter the normal physiology of a plant. Stress conditions associated with salt deposition or uptake include chlorosis of the leaves, marginal necrosis, premature leaf drop, wilting, and widespread mortality. Significant stress of agricultural crops and native plant communities from salt drift dispersion would appear on the CIR imagery as a homogeneous tonal signature covering an entire field or a large portion thereof.

The environment within a 5-mile radius of the PVNGS cooling towers, as well as the control sites, were aerially photographed with CIR film on August 30, 1989. The flight line index for the photomission is shown in Figure 7-1, and mission specifications and associated data are given in Table 7-1. Color infrared transparencies were examined over a Richards elevated light table (Model GFL-940 MCE) using a Bausch and Lomb stereo zoom

(X0.7-X3.0) microscope. Exposures were examined for quality (i.e., color, resolution, scale, cloud cover), changes in color, tone, and pattern (i.e., signatures). Color-positive prints were made of areas exhibiting potential vegetative stress; these areas were ground-truthed on September 23, 1989. Ground verification efforts included (1) observation of species present and general vegetative health, (2) examination of plant parts and tissue for visible symptoms, (3) comparison of plant conditions within and outside the study area, (4) documentation of the location, extent, and severity of stressed areas, and (5) examination of the locations of stressed areas in relation to depositional predictions. All of these factors were weighted to determine if observed stress was attributable to cooling tower drift deposition.

Representative CIR photographs for sites 11 and 13 are included in Appendix H. Sites 11 and 13 have been planted in short-staple cotton since 1983 and 1984, respectively. The CIR photograph of site 11 indicated questionable tonal signatures along the eastern edge and a distinctively pinkish hue south of the field. Ground verification of these areas revealed extensive plant mortality attributable to Texas root rot along the eastern edge of the field. Texas root rot is caused by a fungus (_Phymatotrichium omnivorum_) and affects over 2300 species of dicotyledonous plants, including alfalfa, stone-fruits, grapes, sugar beets, and many ornamental shrubs and trees (Hine et al., 1983). The pinkish area south of the field was a homogeneous community of common cocklebur (_Xanthium saccharatum_). Variations in tonal signatures for site 13 were attributable to inconsistent germination. The height of the cotton at site 13 was between 3 and 4 feet. Evidence of leaf perforators was noted, but the crop appeared normal.

Examination of the CIR imagery for other agricultural areas revealed variations in tonal signature, but none that could be attributed to salt stress. Ground verification also failed to identify any symptoms of salt stress. All cotton fields showed direct or indirect evidence of damage by insects--e.g., white flies, pink boll worms, leaf perforators, and grasshoppers. Many of the fields also exhibited inconsistent growth, but this is attributable to typical variability in soil fertility, moisture, and plant genetics, and to other factors such as Texas root rot. Agricultural growth is, in fact, rarely uniform and homogeneous. There did not appear to be any abnormalities in the growth of native vegetation as determined by examination of the CIR imagery and ground verification.

In conclusion, the examination of CIR photography in conjunction with ground verification yielded no evidence of significant, widespread vegetative stress in either agricultural crops or native plant communities. Patterns of vegetative growth in 1989 were consistent with those observed in preoperational years and also with those of surrounding areas.

Table 7-1. Summary of 1989 color infrared photomission at PVNGS and vicinity

Subcontractor	Aero/Science P.O. Box 4 Scottsdale, AZ 85252 (602) 948-6634
Date	August 30, 1989
Weather	Clear
Start time	9:30 a.m. Mountain Standard Time
Stop time	11:27 a.m. Mountain Standard Time
Altitude	3000 ft above ground level
Film type	Eastman Kodak 2443 Color Infrared
Camera serial number	RC8 925
Magazine serial number	995
Lens serial number	UAG 414
Camera focal length	152.22 mm
Filter	BL (minus blue)
Shutter speed	1/375 sec
Aperture	F6.8
Scale	1:6000

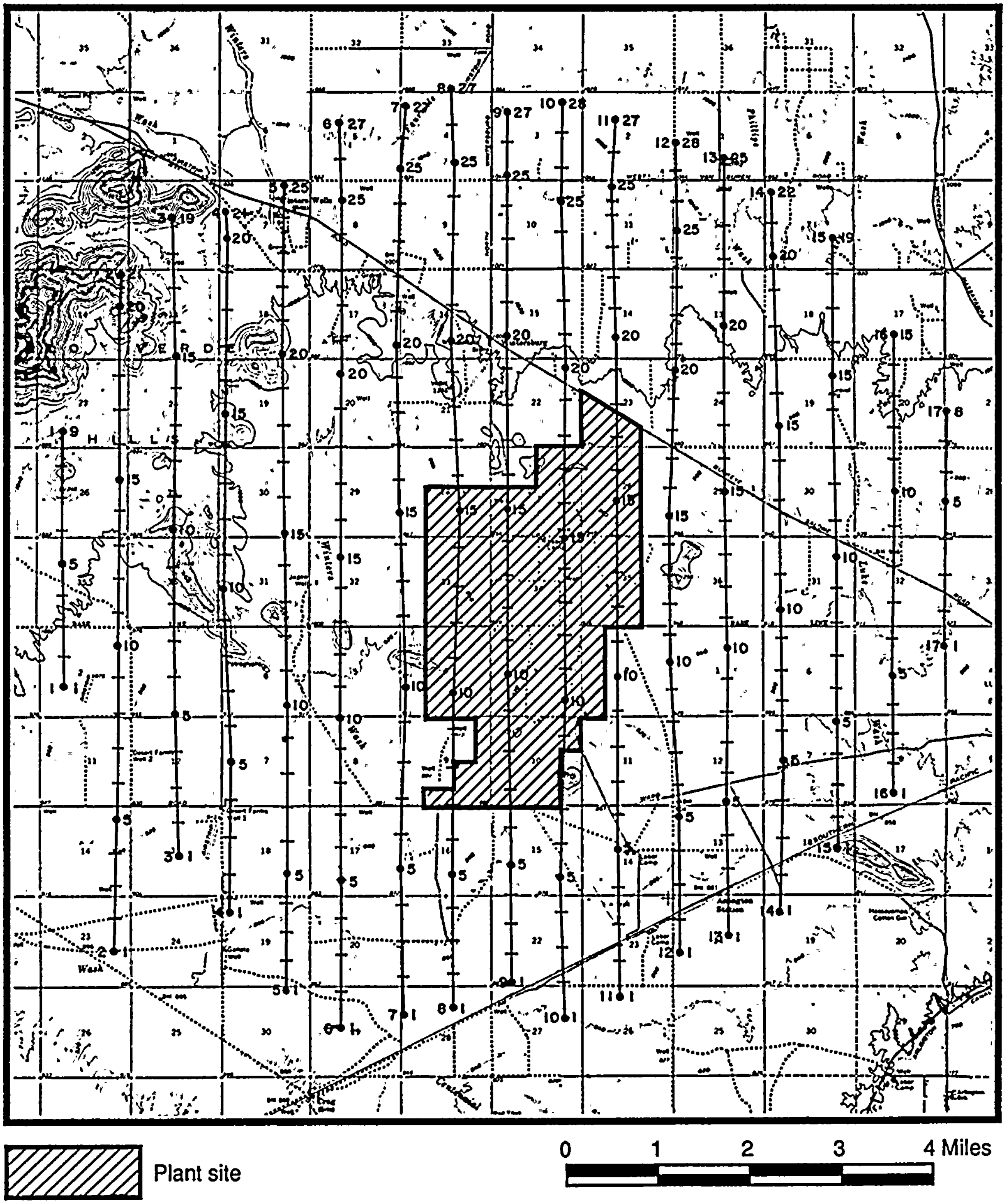

Figure 7-1. Orientation of flight lines of 1989 PVNGS color infrared aerial photomission

8 Soil Analyses

8.1 PHYSICAL ANALYSES

Soil samples collected from each site were analyzed in 1983 to determine their textural classification. The results of these analyses for the upper (0- to 15-centimeter) and lower (15- to 30-centimeter) sample segments are reported in Appendix G. Six inches (15 cm) was selected as the break point between the upper and lower sample segments because of the textural changes observed at this level at about one-half of the sites, and because hardpan layers form in these soils at about the 6-inch (15-cm) depth. The predominant texture of soils from agricultural sites is sandy loam, followed by loam and silt loam. Sites 33 and 35 have sand to loamy sand textures. Site 33 is located in a small sand dune and site 35 in the Hassyampa River floodplain. The finest-textured soil is found at site 45. No new physical analyses had to be performed in 1989.

8.2 CHEMICAL ANALYSES

8.2.1 Comparisons of Agricultural and Native Sites, 1989

Twelve soil samples were taken from each agricultural site in 1989: two replications (transects) for each of two depths for each of three seasons (wet, dry, and postdefoliation). Similarly, eight samples were taken from each native site: two replications for each of two depths for each of two seasons (wet and dry). A total of 156 agricultural samples (13 sites) and 248 native samples (31 sites) were collected and analyzed. Analytical results are presented in Appendix G.

Mean data for each measured parameter in the agricultural and the native samples are presented for each group in Table 8-1. The means of the two groups were significantly different for 13 of the 19 measured parameters: electrical conductivity, magnesium, sodium, potassium, chloride, fluoride, bicarbonate, nitrate, ammonium, phosphate, sulfate, exchangeable magnesium, and exchangeable sodium. Where significantly different, the parameter values were greater in agricultural soils than in native soils, except for potassium and phosphate. Such a trend is expected given the input of chemicals that agricultural soils receive from fertilizer and irrigation water.

8.2.2 Ion Comparisons of Agricultural Soils

Table 8-2 presents the mean values for individual parameters for the upper and lower soil depths at the agricultural sites. There were significant differences, as determined by the t-test, between the two depths only for fluoride, bicarbonate, and phosphate. The prevailing trend of no significant difference between the upper and lower depths is expected due to the mixing of soil layers as a result of agricultural practices.

Table 8-3 presents mean values for each parameter when upper and lower depth samples are averaged by season: April (following the wet season), July (following the dry season), and November (following cotton defoliation). A comparison of wet and dry season concentrations revealed a significant difference in the means for sodium, boron, ammonium, and exchangeable sodium. The values for sodium, boron, and exchangeable sodium were significantly lower in July than in April, while ammonium was significantly higher in July. Means for sodium and exchangeable sodium were significantly lower in both July and November, and ammonium was significantly higher in July and November as compared to April.

The mean value for each parameter by site is presented in Table 8-4. Sites 7, 12, 24, 28, 31, 32, and 45 were fallow in 1989. Sites 11, 13, 23, 25 and 30 were planted in cotton and site 43 in alfalfa. In 1989 all sites were in the same condition as they were in 1988, 1987, and 1986 with the exception of sites 23 and 31. Site 23 had been planted in alfalfa and 31 in cotton during the same period. A least-significant-difference (LSD) procedure was used to segregate the sites into homogeneous units based on the concentration of each parameter. These groupings are indicated by superscript in Table 8-4. As a result of using site 30A as the sampling location to replace site 30 in 1989, the high incidence of significant differences in parameter concentrations experienced in the past with site 30 has been eliminated. This is consistent with and upholds the established criteria for the relocation of sampling locations. The need to relocate the sampling location for site 30 is further detailed in the annual report for 1988 (NUS, 1989).

No agricultural site can be judged, statistically, to be significantly different from the others subsequent to the installation of the new sampling location for site 30. Both site 25 and site 45 did produce significantly different results for three parameters each as compared to all others in 1989. Site 25 had the significantly highest concentrations for calcium, magnesium, and nitrate, while site 45 had the significantly highest for bicarbonate, carbonate, and exchangeable sodium.

Figure 8-1 illustrates the concentration of sodium at individual agricultural sites for each depth and season. Sodium was considered the best indicator because it is an important constituent of the cooling tower basin water and is found at concentrations above the detection limit in deposition samples. The upper and lower samples from site 7, for example, had 113 and 155 parts per million of sodium, respectively, in the wet season. In 15 of the 39 samplings (that is, 13 sites for 3 seasons) represented in Figure 8-1, the soluble sodium concentration is greater in the upper sample segment than in the lower segment.

One agricultural site which deserves specific mention is site 11, located 2.0 miles northwest of the cooling towers. This site is noteworthy as evidenced by the proportionately high concentrations of soluble sodium in the upper and lower layer samples from the wet season as compared to both the dry and postdefoliation samplings. During the wet season, while sodium concentrations overall were high, the concentration of sodium was higher in the upper layer sample than in the lower layer while the reverse was true for the samples from the dry and postdefoliation periods. On first inspection, this could reflect a high rate of sodium deposition during the wet season prior to sampling (April) followed by a sharp decline in the rate of deposition thereafter, as referenced by the dry (July) and postdefoliation (November) samples. This analysis correlates well with the operations of the PVNGS generating units (see Figure 4-1). However, an examination of soil data from site 23, located 2.3 miles downwind (southwest) of the cooling towers, during the first quarter of 1989 indicated no abnormally high sodium concentrations. Additionally, drift deposition data (Appendix C) for the first quarter at site 11 were compared with those of 1988 (NUS, 1989) and found to be lower. A similar comparison with agricultural tissue data

(Appendix F) at site 11 yielded the same result. It is evident from the data that irrigation and cultivation practices at site 11 may have contributed significantly to the high sodium concentrations.

8.2.3 Ion Comparisons of Native Soils

Mean values for parameters measured in the upper and lower soil samples collected from native sites are also shown in Table 8-2. The samples differed significantly by depth for several parameters: EC, pH, sodium, boron, fluoride, carbonate, sulfate, and exchangeable sodium. For all parameters exhibiting significant differences, mean parameter values were higher in the lower-depth samples.

The distribution of soluble sodium by depth at each native site is shown in Figure 8-2. In contrast to the situation for agricultural sites, sodium concentrations were, in most cases, greater in the lower-depth samples in native soils. Exceptions were the dry season samples from sites 4, 14, 33, 35, 40, and 42 and the wet season samples from sites 4, 17, 18, 20, 33, 40, and 42.

Sites 3 and 16, both onsite locations, had much higher concentrations of sodium than the other sites. These sites are within 2000 feet of each other in the northwest section of the PVNGS site. The Soil Conservation Service (USDA, 1977) has shown that sites 3 and 16 are located in an area of naturally saline soils (Casa Grande-Laveen Complex), which suggests that the amount of sodium measured at these sites reflects natural conditions.

Table 8-1. Chemical properties of agricultural and native soils at PVNGS monitoring sites, 1989 (means ± standard errors)

Parameter	Agricultural soils (n = 156)	Native soils (n = 248)
Electrical conductivity (mmhos/cm)	1.33 ± 0.06	0.72 ± 0.07
pH (units)*	8.83 ± 0.03	8.84 ± 0.02
Soluble ions (ppm)		
Calcium*	54.5 ± 4.2	51.6 ± 2.7
Magnesium	7.8 ± 0.6	5.3 ± 0.2
Sodium	274 ± 12	125 ± 17
Potassium	15.4 ± 1.2	20.6 ± 1.5
Chloride	172 ± 13	109 ± 18
Boron*	2.0 ± 0.1	1.9 ± 0.4
Fluoride	6.7 ± 0.3	1.2 ± 0.2
Bicarbonate	265 ± 5	190 ± 4
Carbonate*	7.8 ± 0.8	9.3 ± 1.0
Nitrate (as N)	23.4 ± 2.7	13.6 ± 1.7
Ammonium (as N)	2.7 ± 0.1	2.2 ± 0.1
Phosphate (as P)	2.0 ± 0.1	2.6 ± 0.1
Sulfate	148 ± 11	25 ± 4
Exchangeable ions (meq/100g)		
Calcium*	24.5 ± 0.3	24.7 ± 0.4
Magnesium	2.3 ± 0.1	1.7 ± 0.0
Sodium	3.5 ± 0.1	1.6 ± 0.2
Potassium*	1.2 ± 0.1	1.2 ± 0.1

*For this parameter, means for agricultural and native soil samples are not significantly different at 95-percent confidence level.

Table 8-2. Chemical properties of samples of soils collected at two depths at PVNGS agricultural and native monitoring sites, 1989 (means ± standard errors) (sheet 1 of 2)

Parameter	Depth	Agricultural soils (n = 78)	Native soils (n = 124)
Electrical conductivity* (mmhos/cm)	U	1.26 ± 0.08	0.58 ± 0.07
	L	1.41 ± 0.08	0.87 ± 0.11
pH (units)*	U	8.84 ± 0.04	8.79 ± 0.03
	L	8.81 ± 0.04	8.90 ± 0.04
Soluble ions (ppm)			
Calcium*†	U	57.6 ± 7.2	53.6 ± 4.2
	L	51.4 ± 4.4	49.6 ± 3.4
Magnesium*†	U	8.7 ± 1.1	5.5 ± 0.3
	L	6.9 ± 0.7	5.1 ± 0.3
Sodium*	U	259 ± 17	82.0 ± 18.4
	L	288 ± 16	168 ± 29
Potassium*†	U	16.4 ± 1.7	22.2 ± 2.2
	L	14.4 ± 1.7	19.0 ± 2.0
Chloride*†	U	161 ± 19	76.5 ± 20.5
	L	182 ± 17	142 ± 28
Boron*	U	1.9 ± 0.1	1.0 ± 0.2
	L	2.0 ± 0.1	2.9 ± 0.7
Fluoride	U	5.9 ± 0.4	0.80 ± 0.13
	L	7.4 ± 0.5	1.7 ± 0.3
Bicarbonate†	U	277 ± 8	182 ± 5
	L	253 ± 7	197 ± 7
Carbonate*	U	7.8 ± 1.1	5.8 ± 0.7
	L	7.8 ± 1.0	12.7 ± 1.8
Nitrate (as N)*†	U	25.1 ± 4.6	11.7 ± 2.2
	L	21.7 ± 3.0	15.6 ± 2.7
Ammonium (as N)*†	U	2.8 ± 0.2	2.3 ± 0.2
	L	2.5 ± 0.2	2.1 ± 0.1
Phosphate (as P)†	U	2.2 ± 0.1	2.8 ± 0.2
	L	1.8 ± 0.1	2.3 ± 0.2
Sulfate*	U	130 ± 15	15.2 ± 3.3
	L	165 ± 16	35.6 ± 6.3

Table 8-2. Chemical properties of samples of soils collected at two depths at PVNGS agricultural and native monitoring sites, 1989 (means ± standard errors) (sheet 2 of 2)

Parameter	Depth	Agricultural soils (n = 78)	Native soils (n = 124)
Exchangeable ions (meq/100g)			
Calcium*†	U	24.6 ± 0.5	24.8 ± 0.6
	L	24.5 ± 0.4	24.5 ± 0.6
Magnesium*†	U	2.4 ± 0.1	1.8 ± 0.1
	L	2.3 ± 0.1	1.7 ± 0.1
Sodium*	U	3.3 ± 0.2	1.1 ± 0.2
	L	3.7 ± 0.2	2.2 ± 0.3
Potassium*†	U	1.2 ± 0.1	1.2 ± 0.1
	L	1.2 ± 0.1	1.2 ± 0.1

Key: U, upper-depth (0- to 15-centimeter) sample; L, lower-depth (15- to 30-centimeter) sample.

*For this parameter, means for upper- and lower-depth agricultural soil samples are <u>not</u> significantly different at 95-percent confidence level.

†For this parameter, means for upper- and lower-depth native soil samples are <u>not</u> significantly different at 95-percent confidence level.

Table 8-3. Chemical properties of samples of soils collected at PVNGS agricultural monitoring sites, April, July, and November 1989 (means ± standard errors)

Parameter	April (end of wet season)	July (end of dry season)	November (postdefoliation)
Electrical conductivity (mmhos/cm)	1.41 ± 0.10[a]	1.24 ± 0.08[a]	1.35 ± 0.10[a]
pH (units)	8.88 ± 0.05[a]	8.90 ± 0.05[a]	8.70 ± 0.05
Soluble ions (ppm)			
Calcium	51.9 ± 6.3[a]	59.9 ± 9.8[a]	51.7 ± 5.1[a]
Magnesium	7.7 ± 0.9[a]	7.3 ± 1.5[a]	8.3 ± 0.8[a]
Sodium	317 ± 24	249 ± 15[a]	255 ± 19[a]
Potassium	15.1 ± 1.6[a]	14.7 ± 1.6[a]	16.5 ± 2.7[a]
Chloride	190 ± 26[a]	155 ± 15[a]	170 ± 23[a]
Boron	2.3 ± 0.2[b]	1.7 ± 0.1[a]	1.9 ± 0.1[ab]
Fluoride	7.1 ± 0.7[a]	7.0 ± 0.6[a]	5.8 ± 0.5[a]
Bicarbonate	249 ± 10[a]	279 ± 10[a]	268 ± 8[a]
Carbonate	10.1 ± 1.8[b]	8.3 ± 1.1[ab]	4.9 ± 0.8[a]
Nitrate (as N)	30.0 ± 5.5[a]	22.3 ± 5.1[a]	18.0 ± 3.2[a]
Ammonium (as N)	1.5 ± 0.1	3.2 ± 0.2[a]	3.3 ± 0.3[a]
Phosphate (as P)	2.2 ± 0.2[a]	1.9 ± 0.2[a]	2.0 ± 0.1[a]
Sulfate	153 ± 18[a]	132 ± 20[a]	158 ± 20[a]
Exchangeable ions (meq/100g)			
Calcium	25.4 ± 0.6[b]	24.8 ± 0.6[ab]	23.4 ± 0.4[a]
Magnesium	2.3 ± 0.1[a]	2.2 ± 0.1[a]	2.5 ± 0.2[a]
Sodium	4.1 ± 0.2	3.3 ± 0.2[a]	3.1 ± 0.3[a]
Potassium	1.1 ± 0.1[a]	1.2 ± 0.1[a]	1.2 ± 0.1[a]

Key: For each parameter, means with same superscript are not significantly different at 95-percent confidence level.

Note: All values derived from analysis of 52 samples.

Table 8-4. Chemical properties of soils collected at PVNGS agricultural monitoring sites, 1989 (means ± standard errors) (sheet 1 of 2)

Parameter	Site 7 Fallow	Site 11 Cotton	Site 12 Fallow	Site 13 Cotton	Site 23 Cotton	Site 24 Fallow	Site 25 Cotton
Electrical conductivity (mmhos/cm)	0.94 ± 0.15^{ab}	1.63 ± 0.30^{cd}	1.54 ± 0.30^{cd}	0.92 ± 0.05^{ab}	0.96 ± 0.06^{ab}	0.94 ± 0.08^{ab}	1.82 ± 0.28^{d}
pH	8.91 ± 0.05^{e}	8.59 ± 0.06^{bc}	8.57 ± 0.09^{b}	8.67 ± 0.04^{bcd}	8.74 ± 0.05^{d}	8.73 ± 0.04^{cd}	8.21 ± 0.03^{a}
Soluble ions (ppm)							
Calcium	33.8 ± 1.9^{ab}	61.8 ± 10.2^{bc}	78.3 ± 18.1^{c}	34.7 ± 1.4^{ab}	43.8 ± 2.2^{ab}	42.7 ± 4.5^{ab}	176 ± 32^{d}
Magnesium	5.5 ± 0.5^{abc}	6.5 ± 1.3^{abc}	8.1 ± 1.9^{bcd}	4.2 ± 0.2^{ab}	5.1 ± 0.3^{abc}	5.3 ± 0.6^{abc}	28.2 ± 4.0^{e}
Sodium	201 ± 35^{abc}	371 ± 80^{f}	258 ± 37^{bcd}	201 ± 11^{abc}	203 ± 15^{abc}	164 ± 18^{ab}	235 ± 38^{abc}
Potassium	8.2 ± 0.9^{ab}	20.1 ± 2.2^{c}	49.4 ± 6.9^{e}	18.7 ± 1.2^{c}	7.2 ± 0.5^{ab}	29 ± 2.4^{d}	23.4 ± 2.9^{cd}
Chloride	108 ± 31^{abcd}	289 ± 95^{f}	238 ± 75^{ef}	105 ± 9^{abc}	112 ± 13^{abcd}	83.0 ± 15.3^{ab}	243 ± 48^{ef}
Boron	1.9 ± 0.3^{cd}	2.7 ± 0.5^{e}	1.9 ± 0.1^{bcd}	1.2 ± 0.1^{a}	1.4 ± 0.1^{abc}	1.2 ± 0.1^{ab}	1.0 ± 0.1^{a}
Fluoride	3.3 ± 0.3^{bc}	11.2 ± 1.0^{i}	7.1 ± 0.5^{ef}	10.9 ± 0.7^{hi}	9.3 ± 0.6^{gh}	4.4 ± 0.3^{cd}	1.2 ± 0.1^{a}
Bicarbonate	256 ± 10^{bcd}	250 ± 20^{bc}	252 ± 23^{bcd}	254 ± 11^{bcd}	288 ± 7^{cde}	240 ± 9^{b}	152 ± 24^{a}
Carbonate	5.5 ± 1.0^{a}	3.9 ± 0.7^{a}	2.4 ± 0.0^{a}	3.7 ± 0.5^{a}	4.8 ± 0.7^{a}	2.9 ± 0.3^{a}	2.4 ± 0.0^{a}
Nitrate (as N)	15.1 ± 2.2^{a}	28.0 ± 11.2^{ab}	37.4 ± 11.1^{b}	7.1 ± 1.1^{a}	8.9 ± 1.6^{a}	22.9 ± 5.4^{ab}	93.8 ± 21.9^{c}
Ammonium (as N)	2.6 ± 0.4^{abc}	3.0 ± 0.9^{abcd}	4.2 ± 0.8^{d}	2.1 ± 0.3^{ab}	3.1 ± 0.5^{bcd}	3.1 ± 0.5^{bcd}	2.6 ± 0.4^{abc}
Phosphate (as P)	3.2 ± 0.1^{f}	1.1 ± 0.1^{ab}	3.0 ± 0.2^{f}	1.6 ± 0.2^{bc}	2.1 ± 0.1^{de}	2.2 ± 0.1^{e}	1.9 ± 0.1^{cde}
Sulfate	67.5 ± 23.7^{a}	163 ± 43^{bc}	82.7 ± 23.8^{ab}	73.8 ± 6.0^{ab}	62.2 ± 11.8^{a}	61.1 ± 13.9^{a}	279 ± 47^{d}
Exchangeable ions (meq/100g)							
Calcium	25.4 ± 0.8^{d}	25.7 ± 0.9^{d}	24.3 ± 0.7^{cd}	23.1 ± 0.5^{bc}	23.6 ± 0.2^{bc}	24.7 ± 0.3^{cd}	28.6 ± 1.2^{e}
Magnesium	3.4 ± 0.1^{e}	1.8 ± 0.1^{bc}	1.7 ± 0.0^{b}	2.1 ± 0.1^{cd}	2.4 ± 0.1^{d}	2.2 ± 0.0^{d}	3.6 ± 0.2^{e}
Sodium	2.4 ± 0.3^{ab}	4.1 ± 0.6^{e}	3.0 ± 0.2^{bcd}	2.3 ± 0.1^{ab}	3.5 ± 0.1^{cde}	2.0 ± 0.2^{a}	2.5 ± 0.3^{ab}
Potassium	0.6 ± 0.0^{bc}	1.7 ± 0.0^{f}	2.7 ± 0.1^{h}	1.5 ± 0.1^{e}	1.1 ± 0.1^{d}	2.0 ± 0.1^{g}	1.4 ± 0.0^{e}

Table 8-4. Chemical properties of soils collected at PVNGS agricultural monitoring sites, 1989 (means ± standard errors) (sheet 2 of 2)

Parameter	Site 28 Fallow	30 Cotton	31 Fallow	32 Fallow	43 Alfalfa	45 Fallow
Electrical conductivity (mmhos/cm)	0.63 ± 0.04[a]	1.63 ± 0.14[cd]	1.62 ± 0.08[cd]	1.52 ± 0.13[cd]	1.34 ± 0.04[bc]	1.84 ± 0.21[d]
pH	9.07 ± 0.05[f]	8.71 ± 0.08[bcd]	9.23 ± 0.05[g]	9.30 ± 0.03[gh]	8.67 ± 0.03[bcd]	9.38 ± 0.04[h]
Soluble ions (ppm)						
Calcium	36.6 ± 2.2[ab]	54.6 ± 7.1[abc]	35.4 ± 2.0[ab]	30.0 ± 0.4[a]	54.9 ± 1.9[abc]	26.1 ± 1.6[a]
Magnesium	5.3 ± 0.5[abc]	8.9 ± 2.0[cd]	5.4 ± 1.7[abc]	3.6 ± 0.4[a]	11.5 ± 0.6[d]	3.7 ± 0.4[a]
Sodium	142 ± 11[a]	343 ± 26[def]	370 ± 14[f]	365 ± 35[ef]	269 ± 9[cde]	433 ± 45[f]
Potassium	9.1 ± 0.6[ab]	9.8 ± 1.2[ab]	7.6 ± 0.9[ab]	3.3 ± 0.4[a]	10.6 ± 0.6[b]	4.1 ± 0.3[ab]
Chloride	31.5 ± 5.0[a]	223 ± 39[def]	215 ± 16[cdef]	171 ± 26[bcde]	205 ± 11[cdef]	208 ± 42[cdef]
Boron	1.6 ± 0.1[abcd]	2.1 ± 0.1[d]	2.8 ± 0.1[e]	2.9 ± 0.2[e]	1.9 ± 0.1[cd]	3.3 ± 0.3[e]
Fluoride	1.9 ± 0.2[ab]	5.7 ± 0.5[de]	8.7 ± 0.9[fg]	10.1 ± 0.6[ghi]	1.6 ± 0.0[ab]	11.3 ± 1.4[i]
Bicarbonate	250 ± 10[bcd]	281 ± 14[bcde]	275 ± 12[bcde]	306 ± 12[e]	292 ± 5[de]	352 ± 22[f]
Carbonate	7.0 ± 1.2[a]	6.5 ± 1.6[a]	14.1 ± 2.5[b]	15.8 ± 1.9[b]	2.4 ± 0.0[a]	29.8 ± 4.3[c]
Nitrate (as N)	7.9 ± 1.2[a]	14.0 ± 3.1[a]	16.4 ± 2.0[ab]	26.4 ± 2.8[ab]	9.9 ± 1.0[a]	16.8 ± 1.7[ab]
Ammonium (as N)	1.7 ± 0.1[a]	2.5 ± 0.3[ab]	2.2 ± 0.3[ab]	2.0 ± 0.2[ab]	3.9 ± 0.6[cd]	1.7 ± 0.3[a]
Phosphate (as P)	1.6 ± 0.1[cd]	1.1 ± 0.1[a]	1.9 ± 0.1[cde]	1.6 ± 0.1[cd]	4.3 ± 0.4[g]	0.7 ± 0.1[a]
Sulfate	45.1 ± 15.1[a]	234 ± 29[cd]	243 ± 26[cd]	178 ± 39[c]	194 ± 14[cd]	239 ± 77[cd]
Exchangeable ions (meq/100g)						
Calcium	29.4 ± 0.7[e]	29.0 ± 0.9[e]	18.8 ± 0.1[a]	19.5 ± 0.2[a]	22.4 ± 0.4[b]	24.1 ± 0.2[bcd]
Magnesium	1.8 ± 0.0[b]	3.5 ± 0.2[e]	1.0 ± 0.0[a]	1.2 ± 0.0[a]	3.6 ± 0.1[e]	2.1 ± 0.1[cd]
Sodium	3.0 ± 0.2[bcd]	5.8 ± 0.6[f]	3.5 ± 0.2[cde]	3.5 ± 0.3[de]	2.6 ± 0.2[abc]	7.4 ± 0.3[g]
Potassium	1.2 ± 0.0[d]	1.2 ± 0.1[d]	0.4 ± 0.0[ab]	0.3 ± 0.0[a]	0.7 ± 0.0[c]	0.6 ± 0.0[c]

Key: For each parameter, means with same superscript letter are not significantly different at 95-percent confidence level. Alphabetic sequence of superscripts corresponds to increase in concentration level; thus letter a represents lowest level and letters b through i successively higher levels.

Note: All values derived from analysis of 12 samples.

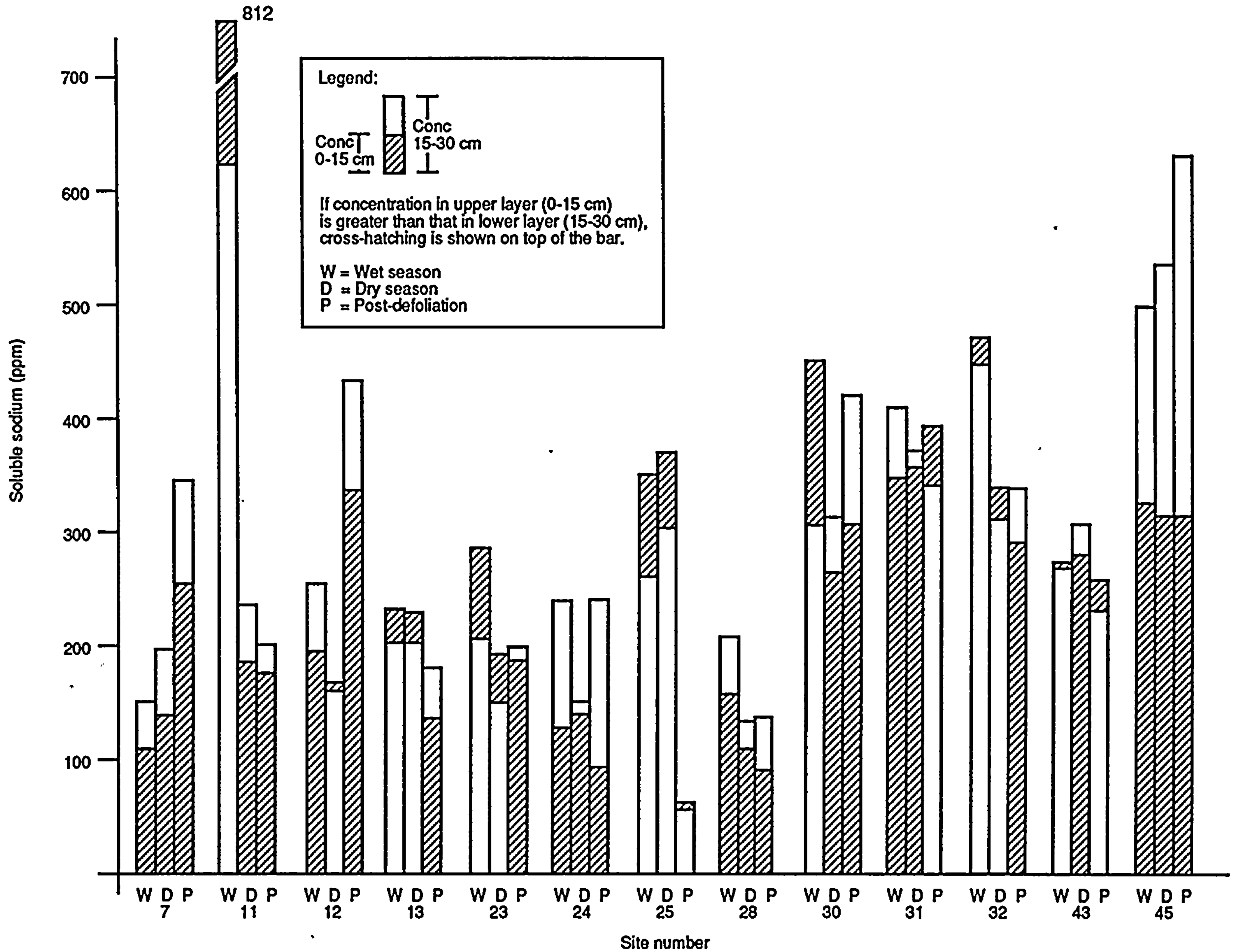

Figure 8-1. Mean concentrations of soluble sodium in soils at PVNGS agricultural monitoring sites by depth and season, 1989

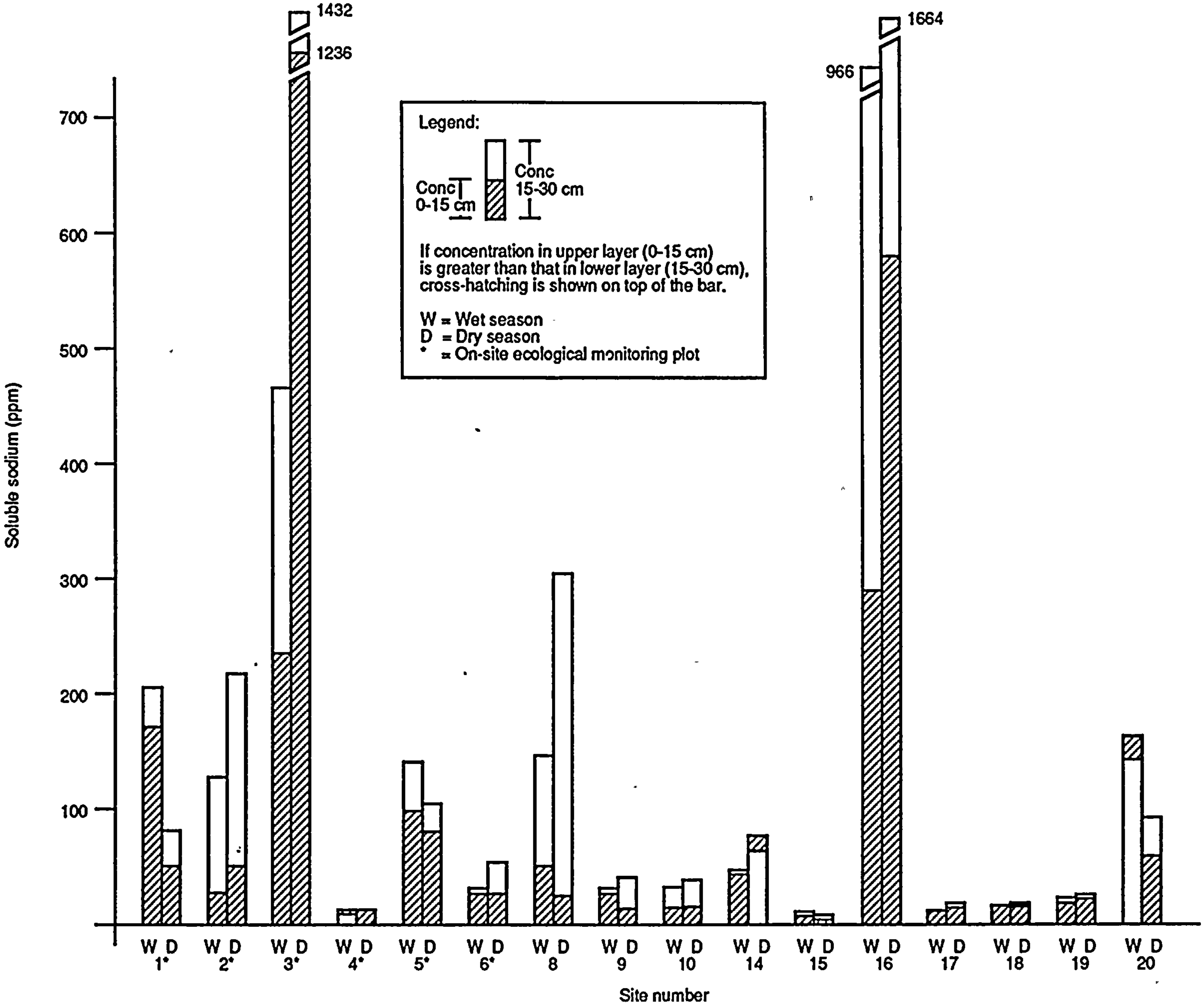

Figure 8-2. Mean concentrations of soluble sodium in soils at PVNGS native monitoring sites by depth and season, 1989 (sheet 1 of 2)

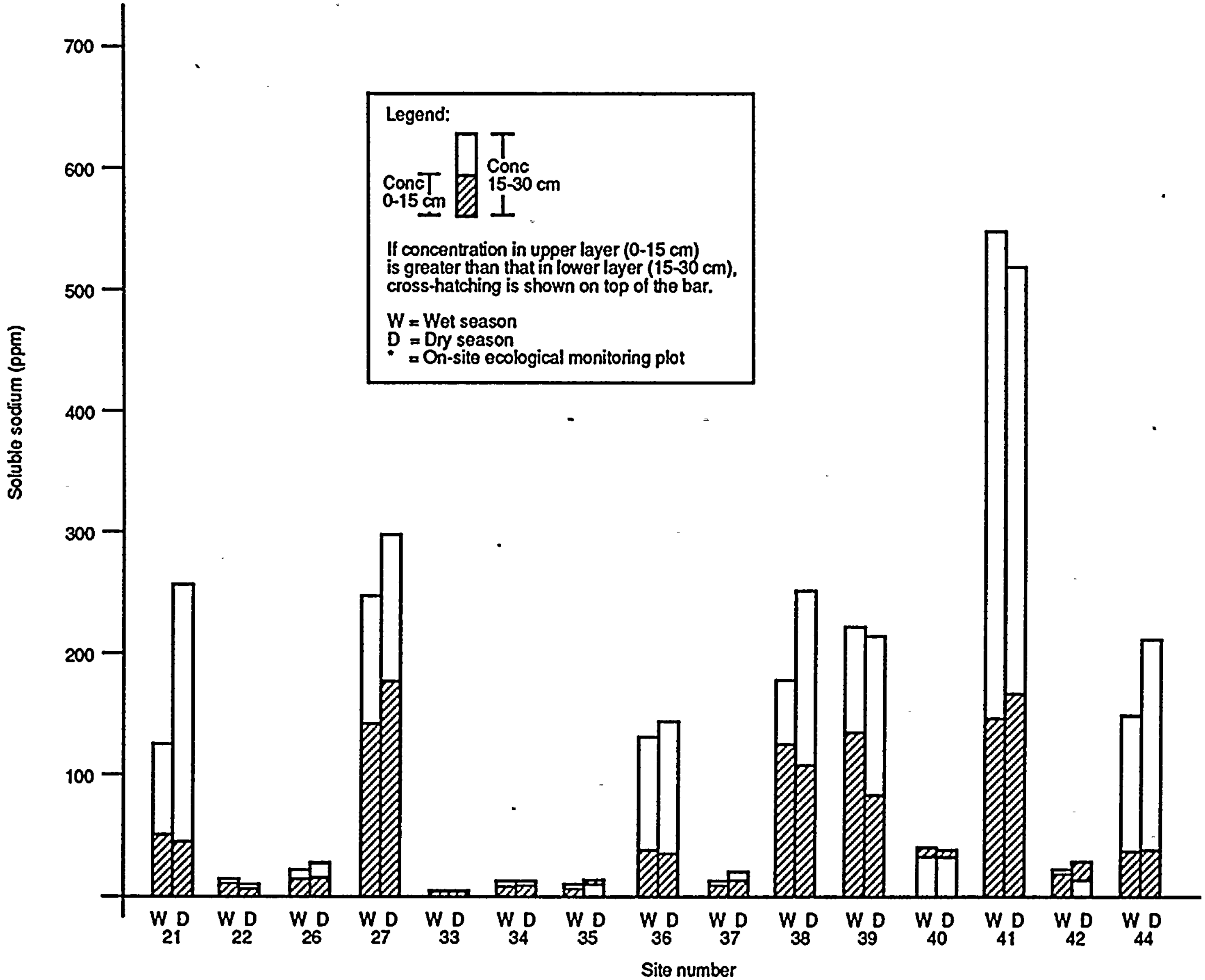

Figure 8-2. Mean concentrations of soluble sodium in soils at PVNGS native monitoring sites by depth and season, 1989 (sheet 2 of 2)

9 Discussion of Comparisons of Parameters

9.1 METEOROLOGY

9.1.1 General Meteorology and Climatological Comparisons

Monthly averages of temperature, dew point, and wind speed and monthly totals of precipitation at PVNGS for 1989 and for the period 1974-1985 are presented in Table 9-1. National Weather Service Phoenix (NWS) climatological data for 1989 and the period 1950-1980 are presented in Table 9-2. As reflected in the data, the precipitation at PVNGS for 1989 was slightly lower than the annual average for the period 1974-1985. The average wind speed at PVNGS for 1989 was slightly lower than the 1974-1985 annual average. The late spring and summer months had average wind speeds generally lower than the 1974-1985 averages. The annual average temperature for 1989 at PVNGS was higher than the long-term average. The precipitation at NWS for 1989 was lower than the annual average for 1950-1980. The average wind speed for 1989 at NWS was also slightly lower than the annual average recorded for 1950-1980. The average 1989 temperature for NWS was considerably higher than the NWS long-term average.

A comparison of the data presented in Tables 9-1 and 9-2 shows that, in terms of 1989 annual averages, the temperature and dew point for PVNGS were 4°F and 2°F, respectively, lower than those for NWS. The precipitation for PVNGS was higher than the NWS precipitation collected during 1989. The wind speeds are nearly identical when PVNGS is compared to NWS.

9.1.2 Effects of Meteorological Parameters on Dustfall, Soils, and Vegetation

Meteorological conditions for the site area influence the atmospheric particulate levels, soil conditions, runoff, and vegetative growth. These impacts may be locally altered by irrigation activities.

Locally heavy thunderstorms or other severe weather can at times damage one or more sites in the monitoring area. Which sites are affected is dependent upon the size, strength, path, and duration of any particular storm.

9.2 DRIFT DEPOSITION

Monthly deposition of drift constituents calculated from samples collected during the preoperational period (1983-1985) and 1989 were analyzed to determine whether differences exist between the two sets.

In view of the absence of changes in data from 1984 to 1985 related to the limited operation of PVNGS in 1985, the preoperational data set has been defined to include

1. Valid 1983 and 1984 data from all monitoring sites

2. Valid 1985 data from all offsite monitoring sites

3. 1985 data from those onsite locations at which measured deposition for operating months exceeded 10 times the predicted deposition for those periods (this excludes sites 14, 16, 20, 80, 81, and 83)

Therefore, the preoperational period for drift deposition at all agricultural sites is May 1983 through December 1985. The preoperational period for all native sites is also May 1983 through December 1985 with the following exceptions. According to results of a previous analysis (NUS, 1987a), the preoperational period for sites 16 and 20 is defined as May 1983 through December 1984. For sites 80, 81, and 83, which did not begin operation until May 1985, no meaningful preoperational period can be defined, as there were only 4 months without significant drift from the PVNGS Unit 1 cooling towers. Site 82 also began operation in May 1985, and the 8 months of data available are insufficient for an adequate assessment of preoperational drift deposition. Thus, the preoperational data set for sites 80-83 is defined as the mean for the onsite locations (i.e., sites 1-6, 10, 14, 16, 20, and 27) for 1983-1985 excluding sites 14, 16, and 20 in 1985 and including site 82 in 1985.

The preoperational values for all ions and total suspended solids (TSS) were recalculated in 1987 using the method described in Chapter 5. This method includes, in the calculation of means and standard errors, values of one-half the detection limit for those samples of ions and TSS whose concentrations were below the detection limit. For the onsite locations, the preoperational period for 1985 was reevaluated to determine if the criteria defined above were valid. The results suggest that site 14 data should have been excluded from the 1985 calculations. However, the impact of excluding these data was calculated and found to be insignificant. As a result, the 1985 values presented herein include site 14 data.

The two data sets (i.e., preoperational and 1989) were compared statistically to determine whether any differences were significant at the 95-percent confidence level. Comparisons were made for those major ionic constituents present in the cooling tower basin water whose deposition was not below the laboratory detection limit more than 25 percent of the time. These selected ions constitute the most significant portion of the salt drift from the cooling towers. As evidenced by the annual reports for 1984 through 1988, as well as the data presented in Chapter 5 of this report, ionic deposition varies greatly by site and by month for any particular year. Accordingly, comparisons are provided for nearly homogeneous site groups (both agricultural and native [nonagricultural] sites) as well as by month. In addition, comparisons are made for agricultural and native control sites for the two data sets.

9.2.1 Drift Deposition Comparisons and Methods

Monthly deposition values were analyzed to determine the differences in deposition rate between the preoperational period and 1989. The data for each constituent were examined individually by monitoring site and by month. Many of the monthly samples produced concentrations at or below the detection limit more than 25 percent of the time. Of the 14 parameters measured in each sample, only sodium, potassium, calcium, magnesium, and TSS were not routinely below their analytical detection limits. Therefore, only these constituents were compared in the deposition analyses. Other ions were not included in any subsequent analyses. Because of its importance, a comparison of potassium was made, even though more than 25 percent of the values were below the detection limit in 1989.

The monitoring sites were divided into four groups: agricultural sites; native sites; supplemental sites, which are near the cooling towers; and native sites at various distances from PVNGS. For comparison, deposition measured at the four control sites (two native and two agricultural sites) were also examined. The statistical significance of differences in the monthly means of each constituent between the preoperational and 1989 data sets was determined using the two sample t-tests. Depending on the differences in the variances between the two means, the calculation of the t-statistic assumed either the pooled-variance t-test or the separate-variance t-test. The pooled-variance t-test was used when the variances of the data sets were statistically equal at the 95-percent confidence level. The separate-variance estimate was used when the two variances were unequal statistically at the 95-percent confidence level.

9.2.2 Drift Deposition at Agricultural Sites

Table 9-3 presents the annual deposition of the four measurable ions and TSS for all agricultural sites (sites 7, 11-13, 23-25, 28, 30-32, 43, and 45) for the preoperational and 1989 data sets. As the table indicates, the increases in the mean annual deposition of calcium, magnesium, and TSS between the preoperational period and 1989 were statistically significant; sodium had lower deposition in 1989 than in the preoperational period. The change in the mean annual deposition of potassium was not statistically significant.

Figures 9-1 through 9-3 show the mean monthly deposition for the preoperational and 1989 data sets for the combined agricultural sites. These figures reflect the large month-to-month variability in measured deposition rates for both data sets.

Table 9-4 presents annual deposition for sodium, potassium, and calcium, three prominent ions in the cooling tower basin water, for each agricultural site for the preoperational period and 1989. Although chloride and sulfate were both prominent ions in the cooling tower basin water, deposition rates were not calculated because 64 and 88 percent, respectively, of the deposition samples were below their detection limits. Also included in the table is an indication of those sites that had statistically significant changes between the two data periods.

Most of the changes in ionic deposition in 1989 that were statistically significant at some of the agricultural sites were decreases from the respective preoperational means. Only the deposition of potassium at site 23 and that of calcium at sites 23, 25, 30, and 43 showed statistically significant increases between the preoperational period and 1989. Decreases in the deposition rate of sodium were statistically significant at sites 7, 12, 24, 25, 28, 31, 32, 43, and 45. Decreases in potassium deposition were statistically significant at all agricultural sites except 12, 13, 23, 25, 30, and 43. The deposition of calcium at sites 31 and 45 was statistically significantly lower in 1989 than in the preoperational period.

9.2.3 Drift Deposition at Native Sites

Table 9-5 presents the annual deposition of the four measurable ions and TSS at the combined native sites (sites 1-6, 8-10, 14-22, 26, 27, 33-42, 44, and 80-83) for the preoperational period and 1989. The mean annual deposition of potassium, magnesium, and TSS showed statistically significant decreases between the preoperational period and 1989. The differences between data sets in mean annual deposition for sodium and calcium were not significant.

Tables 9-6 through 9-9 present annual deposition of the four measurable ions and TSS for native sites at various distances from PVNGS for the preoperational period and 1989. Table 9-6 presents data for the four supplemental sites (sites 80-83) nearest the cooling towers; Table 9-7 provides data for the other native sites (sites 3, 14, 16, and 20) within 1 mile of PVNGS (centered on the centroid of the Unit 2 cooling towers); and Tables 9-8 and 9-9 reflect the analyses for those native sites from 1 to 2 miles (sites 1, 2, 5, 6, 9 and 10) and more than 2 miles (sites 4, 8, 9, 15, 17, 18, 19, 21, 22, 26, 27, 33-42, and 44) from PVNGS, respectively.

Changes in sodium deposition rates from preoperational values were statistically significant at all distances, with increases in 1989 at all the native sites out to 1 mile and with decreases at those more than 1 mile away. The mean annual sodium deposition and the magnitudes of the differences between preoperational and 1989 values decreased with increasing distance from PVNGS. Potassium showed significant decreases at all distances between the preoperational period and 1989. Calcium significantly increased at the supplemental sites, showed no significant change for other sites out to 2 miles, and showed significant decrease at those sites more than 2 miles away.

Magnesium showed no significant change at the supplemental sites and at native sites between 1 and 2 miles away, but it significantly decreased for sites within 1 mile and beyond 2 miles. Total suspended solids showed no significant change at all native sites out to 2 miles and a significant decrease beyond 2 miles between the preoperational period and 1989.

Figures 9-4 through 9-6 show the mean monthly deposition for the preoperational period and for 1989 at all native sites. As with the agricultural sites, a large variability in deposition rates is evident from month-to-month for both periods for most ions.

Table 9-10 presents annual deposition for sodium, potassium, and calcium for each native site for the preoperational period and 1989. The table identifies individual sites that showed statistically significant changes in annual mean values between the preoperational period and 1989.

Annual sodium deposition significantly increased at site 20, which is on the site, and at the supplemental sites (80-83). Examination of the monthly data for the onsite monitoring locations (Appendix C) indicates that the largest differences from the preoperational period occurred in January and December. As indicated in Chapter 4, significant differences in sodium and chloride also were identified in the second quarter during which none of the units was at power. Decreases in the sodium deposition rate were significant at sites 4, 5, 6, 8, 9, 15, 17, 18, 21, 22, 26, 27, 33-42 and 44. Annual calcium deposition did not significantly increase at any of the native sites except three of the supplemental sites (80, 81, and 83). The largest differences occurred in January, August, and September. Decreases in the calcium deposition rate were significant at sites 17, 18, 27, and 39. Annual potassium deposition decreased significantly at all sites except 9, 40 and 81 in 1989.

9.2.4 Drift Deposition at Agricultural and Native Control Sites

The salt deposition monitoring network includes two sets of neighboring agricultural and native control sites. The purpose of the control sites is to measure natural levels and distribution of salt deposition at distances unlikely to be affected by PVNGS cooling tower emissions. These paired monitoring locations are sites 25 and 40, located approximately 20 miles northwest of PVNGS, and sites 42 and 43 some 15 miles southeast; sites 25 and 43 are the agricultural sites.

Table 9-11 presents the annual drift deposition for both the agricultural and native paired control sites for the preoperational period and 1989.

For the agricultural site pair sodium significantly decreased and calcium, magnesium, and TSS significantly increased between the preoperational period and 1989. For the native site pair, sodium and potassium significantly decreased. All other analytes were not significantly changed.

9.2.5 Deposition Measurement and Prediction

Table 9-12 provides estimated net sodium deposition in 1989 at each of the 15 onsite drift deposition monitoring locations (sites 1-6, 10, 14, 16, 20, 27, and 80-83), as corrected for the preoperational period deposition. Since TDS was not measured in the drift deposition samples, the TDS values for 1989 were estimated from measured sodium deposition rates, assuming that the average TDS-to-sodium ratio in the circulating water at Units 1, 2, and 3 of 3.10 ± 0.07 (Appendix B) was applicable. The last column in the table provides the estimated net TDS deposition for each onsite location in 1989.

Assuming that the preoperational values are representative of 1989 absent any plant effects, any positive changes should be from other sources, including the PVNGS cooling towers. It is clear from these data that during 1989 the sites with the largest net deposition were those closest to the cooling towers (sites 14, 16, 20, and 80-83) and along the axis of the predominant wind directions at PVNGS. As in 1988, it appears that the preoperational sodium value may be an overestimate of the current value.

Table 9-13 presents a comparison of the measured net deposition values and FOG-code-predicted deposition (Table 4-3) at each onsite location for 1989. For three of these locations the net deposition was not significantly different from zero; the values are listed for purposes of qualitative comparison with predictions, but are not used in subsequent quantitative comparisons.

In general, when all onsite values are used, the correlation between measured and predicted deposition values for 1989 (Figure 9-7) is much better than for the 1988 data set; the predicted values are about three times those measured (compared to about 12 times in 1988), and the correlation coefficient (R^2) of 0.87 for the 1989 data is much more reassuring than the 0.36 value for the corresponding 1988 data set. As in 1988, the correlation can be improved (R^2 = 0.96) by excluding sites 20 and 83 from the 1989 data set, but the improvement is much less dramatic than in 1988 (Figure 9-8).

This apparently improved correlation must be viewed against the largely inoperative plant status in 1989; since measured drift deposition exceeded preoperational values even when none of the units were operating, the ratio of predicted to measured values would be expected to be lower in 1989 than in 1988. Thus, the implications noted in the report for 1988 remain appropriate based on the 1989 data analyses: first, the source term used in the FOG analyses does not appear to be representative of the drift emissions in terms of rate and/or droplet size distribution from all towers at PVNGS; second, the background correction applied to the onsite samples continues to appear to be, on average, too high by a few pounds per acre for 1989.

To these observations from last year should be added the observation that the contribution to onsite drift during unit shutdown periods appears to be significant. However, this contribution cannot be included in the FOG model predictions because the data on unit cooling water system (CWS) pump and tower fan operation, CWS conductivity and TDS, needed to estimate drift during shutdown periods, is not logged. Despite this deficiency, FOG yields sufficiently conservative (i.e., overestimated) deposition using the current tower source term, that modifying the analysis scheme to include shutdown period drift is not warranted. If the tower drift tests scheduled for 1990 change the source term, reexamination of the usefulness of including this contribution may be appropriate.

9.2.6 Deposition Summary and Conclusions

From analyses of the drift deposition in 1989, the following conclusions can be drawn:

1. There was a statistically significant increase in sodium and calcium deposition between the preoperational period and 1989 at the native sites within about 1 mile of PVNGS (sites 80-83 and sites 3, 14, 16, and 20).

2. At native sites more than about 1 mile from PVNGS, the deposition rates of all ions were either significantly decreased or unchanged from those of the preoperational period.

3. Calcium, magnesium, and TSS annual mean deposition showed a statistically significant increase between the preoperational period and 1989 at the agricultural sites. Sodium annual mean deposition rates showed a significant decrease. No effects of the operation of the cooling towers on measured deposition were evident at even the closest of these sites.

4. The correlation between predicted and measured drift deposition improved substantially from that obtained with 1988 data; however, considering the extended unit outages during 1989, the same potential source term uncertainties identified in the 1988 evaluation are still felt to exist.

5. Low volume air sampler data were again of no value for detecting and understanding the drift patterns; however, the results for 1989 were much more reasonable in their magnitude and variability than those obtained in prior years.

9.3 AGRICULTURAL CROPS AND NATIVE VEGETATION

The variability of ionic concentrations of leaf phytomass and leaf surface rinsate and the structural characteristics of native plant communities have been discussed in previous reports (NUS, 1985; 1986a,b; 1987a,b; 1988a; 1989). The following sections compare the results of chemical and structural analyses for 1989 with pooled data for the period 1983 through 1985 (i.e., the preoperational period).

9.3.1 Agricultural Crops

A total of 13 agricultural monitoring sites were identified at the beginning of the monitoring program in 1983. These sites were selected because they were representative of local agricultural practices and were in the general vicinity of PVNGS. Variations in crop sequence since 1983 are presented in Table 9-14. Monitoring site 29 was discontinued after the 1983 growing season because of vandalism; it was replaced by monitoring site 45 beginning in 1984. During the monitoring period, cotton was the most consistently planted crop in the vicinity of PVNGS, with the short-staple variety being planted almost three times more frequently in the monitored fields than the long-staple variety. In 1989, short-staple cotton was planted at sites 11, 13, and 30, while long-staple cotton was planted at sites 23 and 25.

Alfalfa has been the second most frequently planted crop in the vicinity of PVNGS. This legume generally remains in production for 4 to 5 years and may be harvested up to four times per year. Monitoring site 43 has been planted in alfalfa since 1983. Other crops that have been planted at monitored fields include barley, sorghum, and melon (Table 9-14).

9.3.1.1 Alfalfa

Because of crop rotations (Table 9-14), the comparison of ionic concentrations of alfalfa leaf tissue for the preoperational period and 1989 was limited to monitoring site 43 (Table 9-15). With the exception of calcium, chloride, and nitrate, there were no significant differences between the mean ionic concentrations in alfalfa leaf tissue for the preoperational period and 1989 at that site. The mean concentrations of calcium and chloride were significantly higher in 1989 than in the preoperational period. Conversely, the mean concentration of nitrate was significantly lower in 1989 than in the preoperational period. Because site 43, a control, lies well beyond the range of predicted drift deposition from PVNGS, the increase in ionic concentration for calcium and chloride in 1989 is unrelated to the operation of PVNGS.

9.3.1.2 Cotton

The preoperational and 1989 ionic content of short-staple and long-staple cotton leaf phytomass was evaluated at five monitoring sites (Tables 9-16a and 9-16b). Short-staple cotton was planted at sites 11, 13, and 30. Sodium levels at site 11 were significantly higher in 1989 than during the preoperational period, but were not significantly different over the two monitoring periods at sites 13 and 30. Concentrations of potassium, calcium, chloride, and sulfate were higher during 1989 than during the preoperational period at sites 11 and 13, but were not significantly different at site 30. Magnesium was the only ion that showed no significant change between monitoring periods at any site. Nitrate and fluoride levels at sites 11 and 13 were not significantly different between monitoring periods; however, at site 30 their concentrations were significantly greater during 1985 than in 1989. Phosphate concentrations at site 11 were significantly higher during the preoperational period than in 1989, but were not significantly different between monitoring periods at sites 13 and 30.

Long-staple cotton was planted at sites 23 and 25 during 1989; however, since this variety had not previously been planted at field 23, comparisons with preoperational data are possible only for field 25 (Table 9-16b). The mean concentrations of sodium, calcium, magnesium, chloride, and sulfate were significantly higher in 1989 than during the preoperational monitoring period. Of the remaining ions, nitrate was significantly higher during the preoperational monitoring period, while potassium, phosphate, and fluoride showed no significant change between monitoring periods. Since site 25, a control, is beyond the range of predicted drift deposition from PVNGS, the increase in ionic concentrations in 1989 is unrelated to operation of the plant.

9.3.1.3 Cotton Yield

A comparison of the mean cotton yield for the period 1983-1989 at agricultural monitoring sites in the vicinity of PVNGS is presented in Table 9-17. A comparison of 1989 yields with preoperational data (i.e., 1983-1985) is possible for sites 11, 13, 25, and 30. Sites 11, 13, and 30 have been planted in short-staple cotton for all years in which cotton has been planted, while site 25 has always been planted in long-staple cotton. In 1989 long-staple cotton was planted for the first time at site 23; thus, a direct comparison of preoperational and operational yield estimates is not meaningful.

The mean cotton yield for site 11 in 1989 was not significantly different from that for 1983 or 1988. For site 13 the 1989 cotton yield was found to be significantly higher than that reported for 1984; however, there was no significant difference in the yields for 1989 and 1988. Yield estimates are available for all three preoperational years for site 25. The yield for 1989 was not significantly different from that for 1983 and 1985, but it was significantly greater than that for 1984. The 1988 and 1989 yields for site 25 were not significantly different. Cotton yield at site 30 was not significantly different in 1989 from that reported in 1985 or 1988.

The grand mean cotton yields at sites 11 and 13 were higher for the operational period (2907 and 3949 pounds per acre, respectively) than they were for the preoperational period (2514 and 3201 pounds per acre, respectively). For sites 25 and 30 the grand mean yields were lower for the operational period (1993 and 2418 pounds per acre, respectively) than for the preoperational period (2143 and 2470 pounds per acre, respectively).

Detailed statistics for 1989 cotton yields in Arizona were unavailable at the time this report was written. However, preliminary statewide yields averaged 1305 pounds per acre for short-staple cotton and 891 pounds per acre for long-staple cotton (Kenerson, 1990). This represents an increase in short-staple cotton yield and a decrease in long-staple cotton yield relative to the 1988 yields. These values, however, are lower than those for 1987, the year of record high yields for both varieties. Historically, estimates of yield from NUS field studies have been higher than those compiled by the U.S. Department of Agriculture, Arizona Agricultural Statistics Service, because the removal of cotton lint by hand is a more complete process than mechanical harvesting.

9.3.2 Native Vegetation

Native vegetation was monitored at eight locations on or near the PVNGS. Sites 1, 4, 6, 40, and 42 are creosote-bush communities, while sites 2, 3, and 44 are salt-bush communities. Sites 40, 42, and 44 are controls which are located sufficiently far from the PVNGS so as not to be influenced by cooling tower drift.

9.3.2.1 Creosote-Bush

The mean concentrations of sodium and potassium at site 1 were significantly higher in 1989 than during the preoperational period, but were not significantly different over the two monitoring periods at sites 4, 6, 40, and 42 (Table 9-18). Calcium levels were significantly higher in 1989 than during the preoperational period at site 4, but no significant change was registered at the remaining sites. Magnesium was the only ion that showed no significant change between the monitoring periods at any site. The levels of chloride in 1989 were higher than those in 1983-1985 for all sites except 40, where there was no significant difference. The mean concentrations of sulfate and nitrate were significantly lower in 1989 than in the preoperational period at all sites. Phosphate levels were significantly higher in 1989 than during the preoperational period at sites 1 and 4, while the opposite was true at site 42. There was no significant change in phosphate concentrations between the monitoring periods at sites 6 and 40. Fluoride concentrations were significantly higher in 1989 than during the preoperational period at all sites except 42, where there was no significant difference.

An analysis of the phytosociological structure of the five creosote-bush communities for the preoperational and operational periods is presented in Table 9-19. Generally, the perennial shrub stratum was monotypic with creosote-bush being the dominant shrub at each site. Preoperational and operational cover values for this species were similar for each of the five sites, with the values for sites 4 and 40 being grouped below those for sites 1, 6, and 42. The percent cover of creosote-bush for all sites was lower in 1989 than it was in 1988. Also, with the exception of site 4, cover in 1989 was lower than it was in any preoperational year. Reasons for this drop could include the very hot year, which may have resulted in some dieback. In addition, the bushes from which leaf phytomass samples are taken are within the study plots, and some of these have suffered damage from leaf sample collection. If this element of the program is to continue beyond 1990, alternate study plots will need to be established. Fifty-four species of herbaceous flora have been tabulated since studies were initiated. Species that have been identified most frequently within the study plots include Amsinckia intermedia, Eriogonum Thomasii, Erodium texanum, Lepidium lasiocarpum, Lepidium virginicum, Pectocarya platycarpa, and Plantago insularis. Of the six species of grass that were identified, Bromus rubens and Schismus spp. were seen most often within the study plots. Five species of cacti were enumerated; most belonged to the genus Opuntia.

Species richness was greater for the operational than the preoperational period at each of the five creosote-bush communities. Onsite monitoring locations (sites 1, 4, and 6) had markedly higher species richness than control sites 40 and 42. Heterogeneity was similar between operational and preoperational periods at sites 1, 4, and 42, but it was higher in 1986-1989 at monitoring sites 6 and 40. A comparison of similarity indices for the preoperational and operational periods indicates that of the onsite monitoring locations, site 4 had the highest similarity. As for the offsite control locations, site 42 had the highest similarity index.

9.3.2.2 Salt-bush

The preoperational and 1989 ionic content of salt-bush leaf tissue is presented in Table 9-20.

The mean concentrations of sodium and fluoride were significantly higher at all salt-bush sites in 1989 than during the preoperational period. Levels of potassium and magnesium were significantly higher in 1989 only at site 2, while their concentrations at sites 3 and 44 did not change significantly between the monitoring periods. Calcium and chloride concentrations showed no significant change at any site between the study periods. Sulfate levels were found to be significantly higher during 1983-1985 than in 1989 at sites 2 and 44, but showed no real change at site 3. At site 3 nitrate levels were significantly higher during the preoperational period than in 1989. At sites

2 and 44, however, there was no significant change between preoperational and operational levels. Phosphate levels also showed no significant change at sites 2 and 44, but they were significantly higher in 1989 at site 3.

Salt-bush (Atriplex polycarpa) was the dominant species at each site during both the preoperational and operational monitoring periods (Table 9-21). A comparison of the percent cover of this species for the two periods at sites 2 and 3 showed little variation; however, salt-bush coverage dropped at site 44. As was the case for the creosote-bush communities, the percent cover for salt-bush was lower at all sites in 1989 than in 1988. Also, 1989 cover values were lower than those for all preoperational years at all sites except 3. The drop could have resulted from the very hot weather, which may have caused some dieback, and from phytomass sampling, which has resulted in damage to some shrubs within the study plots. As in the case of the creosote-bush, if this element of the program is to continue beyond 1990, alternate study plots will need to be established. Cover at site 44 has dropped every year since the study began, except for a slight increase in 1988. This decline may be attributable to those factors noted above and to the fact that the site has suffered considerable disturbance (e.g., it was driven over by persons who removed a nearby mesquite bush).

Species richness within the salt-bush communities was greater during the 1983-1985 monitoring period than the 1986-1989 period at site 2, while the opposite was true at site 3. Nearly the same number of species were seen at site 44 during both monitoring periods. Heterogeneity changed little between the monitoring periods at sites 2 and 3; however, it was greater during the operational period at site 44. The index of similarity was highest at site 3, while at sites 2 and 44 the values were nearly the same.

9.4 SOILS ANALYSES

This section presents statistical comparisons of soils analysis data at each of the 44 monitoring sites to determine if significant differences exist between 1989 and the preoperational period. Each soil sample was analyzed for 19 parameters, six of which were chosen as indicator parameters for the comparison of preoperational and 1989 data: electrical conductivity and soluble calcium, magnesium, sodium, potassium, and chloride. Indicator parameters were chosen on the basis of their expected concentration in cooling tower basin water, their importance as plant nutrients or potential toxins, and the probability of their being found in detectable concentrations in drift deposition. For each of these parameters, mean values were calculated for individual sites using all sample data from 1989 and from 1983 through 1985, the operational and preoperational periods, respectively.

As described in the report for 1986 (NUS, 1987a), linear regression equations were used to extrapolate the results obtained from the 1983 and 1984 analytical methods for the purpose of comparing the preoperational and 1989 data.

Statistical comparisons of the data were computed with the Student's t-statistic, using a 95-percent confidence level, to test for significant differences between mean values of each indicator parameter. Mean values for individual monitoring locations were compared using the t-test, as were group means for all agricultural and native sites.

9.4.1 Agricultural Soils

Preoperational and 1989 mean values and standard errors for each indicator parameter for agricultural sites (sites 7, 11-13, 23-25, 28, 30-32, 43, and 45) are presented in Table 9-22. With the exception of potassium, the mean values of all indicator parameters were not significantly different in 1989 than during the preoperational period. The mean value for potassium was significantly lower in 1989 than during the preoperational period. As discussed in Section 8.2.2, the adjustment of the sampling location for site 30 has likely resulted in a less biased comparison between the operational and preoperational periods in 1989 as compared to that of the 1988 annual report (NUS, 1989). This is based on the determination that the agricultural results had been previously affected by unrepresentatively high parameter values from the old sampling location for site 30.

The mean concentrations of indicator parameters for individual agricultural sites are given in Table 9-23. A comparison between preoperational and 1989 means shows that there were no significant differences for any of the indicator parameters at site 32. A significant increase in electrical conductivity was observed in 1989 for sites 25, 31, and 45; a significant decrease was observed for sites 23 and 30. No significant differences in electrical conductivity were observed at eight sites. Mean calcium values were significantly higher at sites 13, 24, 25, 28, 31, and 45 and significantly lower at site 30. No significant differences were observed for calcium at six sites. Mean concentrations of magnesium were significantly higher at sites 13, 25, and 28 and significantly lower at site 30. No significant differences in magnesium concentrations were observed at nine sites. Sodium concentrations significantly increased at sites 25, 31, and 45 and significantly decreased at site 30. No significant change in sodium content was observed at nine sites. Potassium concentrations were not observed to be significantly higher at any site but significantly lower at sites 7, 11, 12, 23, 30, and 43. No significant differences in potassium concentrations were observed at seven sites. Chloride concentrations were significantly higher at sites 25, 31, and 45 and significantly lower at site 30. No significant differences in chloride concentrations were observed at nine sites.

Monitoring locations which showed significant increases in one or more indicator parameters are found north-northwest (site 13), north (site 24), south-southeast (site 31), and southwest (sites 28 and 45) of the PVNGS site, the closest of which (13) is 3.2 miles from the towers. A remote (control) site, site 25, also experienced significant increases in five parameters. Four of these locations (sites 24, 28, 31, and 45) were fallow fields and two (sites 13 and 25) were cotton fields. Sites that showed significant decreases in one or more indicator parameters are found northwest (site 12), east-northeast (site 7), south-southwest (site 30), and southwest (site 23) of the PVNGS site. Remote (control) site 43 also showed a significant decrease in one parameter. Two of these locations (sites 7 and 12) were fallow, one (site 43) was planted in alfalfa, and two (sites 23 and 30) were planted in cotton in 1989.

To reiterate previous findings, significant changes in soluble salt content at the agricultural monitoring sites appear to reflect no spatial trend. It is most likely that irrigation management, cropping, and fertilizer application account for the statistical differences in the salt content of agricultural soils.

9.4.2 Native Soils

Table 9-24 presents the means and standard errors, based on 29 native sites, for each indicator parameter measured in 1989 and the preoperational period. Sites 3 and 16 were not used in calculating the means because they were identified as statistical outliers for several parameters (see Chapter 8). The results of the t-test analysis indicate that calcium was the only parameter value that was significantly different in 1989 as compared to the preoperational period. In 1989 calcium was significantly higher.

Mean values for individual native sites for the preoperational period and 1989 are given in Table 9-25. There was no significant difference between preoperational and 1989 values for any parameter at nine of the 31 native sites (2, 14, 16, 21, 27, 33, 36, 38, and 44). These include three onsite locations (sites 2, 14, and 16) as well as sites up to 13 miles away (site 36). Electrical conductivity values in 1989 were significantly higher than preoperational values at site 1 and significantly lower at five sites (sites 9, 15, 18, 33, and 39). No significant differences were found at the remaining 26 sites. Calcium concentrations were significantly higher during 1989 at nine sites (sites 1, 5, 6, 8, 17, 18, 19, 35, and 42). There were no significant differences in calcium values at 22 of the 31 native sites. Magnesium values were significantly higher during 1989 at sites 1, 19, and 42. There were no significant differences at the remaining 28 sites. Sodium concentrations increased significantly over preoperational values at sites 4, 22, 37, 40, and 42 and decreased significantly at site 39. There were no significant differences in sodium concentration at 25 of the 31 native sites. Potassium values were significantly lower during 1989 at five sites (sites 3, 9, 22, 26, and 40), and there were no differences at the remaining 26 sites. Chloride concentrations were significantly greater in 1989 than in the preoperational period at eleven sites (sites 1, 4, 10, 17, 20, 34, 35, 37, 40, 41, and 42), and not significantly different at the other 20 native sites.

Sites 3, 4, 16, and 20 are the nearest soil monitoring sites to the cooling towers. It is expected that the soils at these sites would be the first to show effects of drift from the cooling towers. The only indicator parameters showing a significant change at these four sites were sodium, potassium, and chloride. Sodium and chloride concentrations were significantly higher in

1989 than in the preoperational period at site 4, chloride was significantly higher at site 20, and potassium was significantly lower at site 3. Chloride also significantly increased at the three sites farthest from the PVNGS site, sites 37, 40, and 42, as did sodium at sites 37 and 40. Potassium significantly decreased at site 40. This analysis would seem to indicate that there are influences on soil concentrations other than cooling tower drift deposition.

9.5 REMOTE SENSING/AERIAL PHOTOGRAPHY

Specifications and discussion of the 1989 color infrared photomission for PVNGS and its environs are presented in Section 7. Vegetative stress in agricultural crops and indigenous vegetation may be attributable to drought, poor drainage, nutrient deficiencies associated with varying soil fertility, disease or insect damage, weed competition, and other conditions that alter the normal physiology of a plant. Stress conditions associated with salt deposition or uptake include chlorosis of the leaves, marginal necrosis, premature leaf drop, wilting, and widespread mortality. Significant vegetative stress from drift deposition would appear on the color infrared imagery as a homogeneous tonal signature covering an entire field or a large portion thereof.

A comparison of the color infrared imagery for the preoperational period and 1989 revealed similar growth patterns at most of the monitoring sites. Salt stress symptoms such as chlorosis and necrosis of the leaves were not observed during ground-truthing. Furthermore, no evidence of significant, widespread vegetative stress in either agricultural crops or native plant communities was found. Patterns of agricultural vegetative growth in PVNGS operational years have been consistent with those observed in preoperational years, suggesting that the observed variability was related not to PVNGS but rather to soil fertility, drainage, and agricultural practices.

9.6 SUMMARY AND CONCLUSIONS

As in 1988, the results obtained from elements of the 1989 drift monitoring program have been compared with the corresponding preoperational values. In a number of instances, there are clear indications of the effects of cooling tower emissions, particularly for deposition samples at monitoring sites within about 1 mile of the PVNGS cooling towers.

Beyond these rather unambiguous indications of drift deposition, however, the 1989 results from the other program elements are less definitive. As in 1988, although there are 1989 samples showing statistically significant changes in specific ion concentrations in soil, native vegetation, and crop samples, these appear not to follow consistently any spatial or temporal patterns that can be correlated with PVNGS operations.

The changes from preoperational background observed for four analytes in deposition, soil, and crop samples were compiled for the agricultural monitoring sites as for 1988 data and are summarized in Table 9-26.

With these caveats, a review of the table indicates that

1. There is only one cultivated site at which significant changes occurred in the same parameter (analyte) for all media sampled: calcium and magnesium at site 25 increased in deposition, soil, and crop tissue samples. Potassium showed no changes, but sodium increased in soil and crop samples and decreased in deposition. Site 25 is a control location 19 miles west-northwest of the plant.

2. The major drift constituent, sodium, showed decreased deposition or no change at all agricultural sites.

3. Site 11, the closest of the agricultural sites, which had shown increases in the leaf tissue content of all five ions in 1986, and in three ions in 1987 and 1988, showed the same increases over the background period in 1989. Again, as in 1986, no statistically significant increases were observed for any ions in the deposition or soil samples at this site.

For 1989, it can be concluded that the cooling tower operations resulted in detectable deposition levels onsite. However, these deposition levels cannot be correlated with changes in soil and/or vegetation concentrations of the same analytes, nor can any soil structure or crop effects be identified that are attributable to the deposition measured in the offsite area.

Table 9-1. Monthly average meteorological data for PVNGS, 1989 versus 1974-1985

Month	Temperature (°F)*		Dew point (°F)*		Precipitation (in.)		Wind speed (mph)*	
	1989	1974-1985	1989	1974-1985	1989	1974-1985	1989	1974-1985
January	50	52	32	33	2.36	0.58	5.7	4.8
February	57	56	30	32	0.00	0.59	6.2	5.5
March	67	61	30	34	1.16	0.82	6.0	6.7
April	77	68	31	31	0.00	0.19	6.0	7.3
May	80	78	33	35	0.00	0.12	7.3	7.7
June	89	89	38	37	0.00	0.03	7.5	7.7
July	94	92	55	57	0.10	0.64	7.6	7.8
August	90	90	54	56	0.36	0.53	7.7	7.1
September	86	85	42	53	0.26	0.59	6.8	6.8
October	73	72	38	42	0.66	0.60	6.1	5.6
November	61	59	26	33	0.02	0.74	4.6	5.1
December	52	52	18	33	0.18	0.70	4.4	4.6
Annual	73	71	36	40	5.05	6.13	6.3	6.4

*Based on measurement at 35 feet.

Table 9-2. Monthly average meteorological data for NWS Phoenix, 1989 versus 1950-1980

Month	Temperature (°F)*		Dew point (°F)*		Precipitation (in.)*		Wind speed (mph)†	
	1989	1950-1980	1989	1950-1980‡	1989	1950-1980	1989	1950-1980
January	54	52	30	--	1.19	0.73	5.3	5.3
February	62	56	31	--	T**	0.59	5.9	5.9
March	70	61	31	--	1.25	0.81	6.2	6.7
April	80	68	32	--	0.00	0.27	6.5	7.0
May	83	77	34	--	T**	0.14	6.9	7.1
June	92	87	37	--	0.00	0.17	6.9	6.9
July	97	92	55	--	0.13	0.74	7.4	7.1
August	94	90	56	--	1.11	1.02	7.3	6.6
September	90	85	46	--	0.47	0.64	6.6	6.3
October	77	73	43	--	0.46	0.63	5.9	5.9
November	66	61	32	--	0.14	0.54	5.3	5.4
December	57	53	24	--	0.19	0.83	4.6	5.2
Annual	77	71	38	--	4.94	7.11	6.2	6.3

*Based on measurement at 5 feet.

†Based on measurement at 33 feet.

‡National Weather Service does not keep climatological records of dew point.

**Trace of precipitation.

Table 9-3. Annual mean deposition (lb/(acre)(yr)) of drift constituents at PVNGS agricultural monitoring sites, preoperational period and 1989 (means ± standard errors)

Parameter	Preoperational* (n = 770)	1989 (n = 292)
Sodium	7.9 ± 0.3[a]	5.8 ± 0.3[a]
Potassium	8.6 ± 0.4	7.3 ± 0.6
Calcium	23.6 ± 0.8[a]	34.9 ± 2.6[a]
Magnesium	6.3 ± 0.3[a]	9.6 ± 0.9[a]
TSS	575.4 ± 29.2[a]	900.7 ± 87.4[a]

Key:

1. For individual parameters, means with superscript a are significantly different at 95-percent confidence level.
2. TSS, total suspended solids.

*May 1983 through December 1985.

Table 9-4. Annual deposition (lb/(acre)(yr)) of sodium, potassium, and calcium at PVNGS agricultural monitoring sites, preoperational period and 1989 (means ± standard errors)

Site	Sodium		Potassium		Calcium	
	Preoperational*	1989	Preoperational*	1989	Preoperational*	1989
7	4.9 ± 0.6[a]	3.2 ± 0.3[a]	5.1 ± 0.5[a]	1.8 ± 0.3[a]	16.8 ± 1.6	20.0 ± 2.7
11	6.7 ± 0.6	5.8 ± 1.4	8.6 ± 0.8[a]	5.5 ± 0.9[a]	21.1 ± 1.7	24.8 ± 3.9
12	7.9 ± 1.2[a]	4.2 ± 0.5[a]	6.0 ± 0.9	6.4 ± 2.2	13.4 ± 1.2	21.3 ± 6.1
13	7.0 ± 0.9	9.2 ± 2.8	6.3 ± 0.7	8.1 ± 2.0	20.4 ± 2.4	35.9 ± 8.0
23	6.8 ± 0.8	9.8 ± 0.9	12.7 ± 1.6[a]	30.8 ± 5.4[a]	37.8 ± 4.0[a]	134.4 ± 21.6[a]
24	7.9 ± 1.2[a]	4.2 ± 0.5[a]	7.9 ± 1.3[a]	4.5 ± 0.8[a]	20.8 ± 2.9	21.1 ± 3.0
25	8.1 ± 1.0[a]	4.7 ± 0.3[a]	11.3 ± 1.0	11.8 ± 1.1	32.4 ± 2.1[a]	44.6 ± 4.0[a]
28	5.6 ± 0.5[a]	3.0 ± 0.2[a]	4.9 ± 0.6[a]	1.7 ± 0.2[a]	26.7 ± 3.2	29.0 ± 5.5
30	9.6 ± 0.8	12.7 ± 1.3	11.5 ± 1.4	14.0 ± 1.7	39.5 ± 3.5[a]	81.6 ± 11.6[a]
31	8.6 ± 0.7[a]	3.3 ± 0.4[a]	5.7 ± 0.6[a]	2.2 ± 0.3[a]	15.3 ± 1.3[a]	11.7 ± 0.9[a]
32	8.0 ± 0.8[a]	4.3 ± 0.4[a]	6.6 ± 0.8[a]	2.7 ± 0.4[a]	18.3 ± 1.8	19.2 ± 2.8
43	9.8 ± 1.1[a]	6.8 ± 0.9[a]	9.9 ± 1.1	9.3 ± 2.4	12.3 ± 1.0[a]	21.5 ± 2.0[a]
45	12.4 ± 1.6[a]	5.1 ± 0.5[a]	19.6 ± 5.2[a]	1.6 ± 0.2[a]	39.5 ± 7.5[a]	14.6 ± 2.7[a]

Key: For individual ions at each site, means with superscript a are significantly different at 95-percent confidence level.

*May 1983 through December 1985.

Table 9-5. Annual mean deposition (lb/(acre)(yr)) of drift constituents at PVNGS native monitoring sites, preoperational period and 1989 (means ± standard errors)

Parameter	Preoperational* (n = 1835)	1989 (n = 815)
Sodium	5.7 ± 0.1	5.6 ± 0.3
Potassium	4.3 ± 0.1[a]	1.9 ± 0.1[a]
Calcium	11.1 ± 0.3	11.3 ± 0.3
Magnesium	2.6 ± 0.1[a]	2.2 ± 0.1[a]
TSS	228.2 ± 5.7[a]	207.5 ± 7.4[a]

Key:
1. For each parameter, means with superscript a are significantly different at 95-percent confidence level.
2. TSS, total suspended solids.

*May 1983 through December 1985.

Table 9-6. Annual mean deposition (lb/(acre)(yr)) of drift constituents at PVNGS supplemental monitoring sites, preoperational period and 1989 (means ± standard errors)

Parameter	Preoperational* (n = 662)	1989 (n = 95)
Sodium	5.7 ± 0.2[a]	17.6 ± 1.9[a]
Potassium	4.3 ± 0.2[a]	2.6 ± 0.3[a]
Calcium	13.0 ± 0.5[a]	16.5 ± 0.8[a]
Magnesium	3.1 ± 0.2	3.0 ± 0.2
TSS	248.2 ± 12.0	267.7 ± 23.2

Key:
1. For individual parameters, means with superscript a are significantly different at 95-percent confidence level.
2. TSS, total suspended solids.

*May 1983 through December 1985.

Table 9-7. Annual mean deposition (lb/(acre)(yr)) of drift constituents at PVNGS native monitoring sites (excluding supplemental sites) within 1 mile of PVNGS, preoperational period and 1989 (means ± standard errors)

Parameter	Preoperational* (n = 206)	1989 (n = 94)
Sodium	6.0 ± 0.3[a]	9.2 ± 1.0[a]
Potassium	4.7 ± 0.3[a]	2.1 ± 0.1[a]
Calcium	16.4 ± 1.1	15.0 ± 1.2
Magnesium	3.9 ± 0.4[a]	3.0 ± 0.2[a]
TSS	307.7 ± 22.2	277.5 ± 32.1

Key:
1. For individual parameters, means with superscript a are significantly different at 95-percent confidence level.
2. TSS, total suspended solids.

*May 1983 through December 1985.

Table 9-8. Annual mean deposition (lb/(acre)(yr)) of drift constituents at native monitoring sites 1 to 2 miles from PVNGS, preoperational period and 1989 (means ± standard errors)

Parameter	Preoperational* (n = 381)	1989 (n = 142)
Sodium	5.7 ± 0.3[a]	4.4 ± 0.2[a]
Potassium	3.9 ± 0.2[a]	1.9 ± 0.1[a]
Calcium	11.1 ± 0.5	12.3 ± 0.9
Magnesium	2.5 ± 0.1	2.5 ± 0.2
TSS	206.6 ± 9.7	245.6 ± 19.6

Key:
1. For individual parameters, means with superscript a are significantly different at 95-percent confidence level.
2. TSS, total suspended solids.

*May 1983 through December 1985.

Table 9-9. Annual mean deposition (lb/(acre)(yr)) of drift constituents at native monitoring sites more than 2 miles from PVNGS, preoperational period and 1989 (means ± standard errors)

Parameter	Preoperational* (n = 1233)	1989 (n = 476)
Sodium	5.6 ± 0.2	2.8 ± 0.1
Potassium	4.4 ± 0.1	1.7 ± 0.1
Calcium	10.3 ± 0.3	9.3 ± 0.3
Magnesium	2.4 ± 0.1	1.8 ± 0.1
TSS	221.7 ± 7.0	170.9 ± 7.5

Key: TSS, total suspended solids.

*May 1983 through December 1985.

Note: For each parameter, means of preoperational and 1989 values are significantly different at 95-percent confidence level.

Table 9-10. Annual deposition (lb/(acre)(yr)) of sodium, potassium, and calcium at PVNGS native monitoring sites, preoperational period and 1989 (means ± standard errors) (sheet 1 of 2)

Site	Sodium		Potassium		Calcium	
	Preoperational*	1989	Preoperational*	1989	Preoperational*	1989
1	5.4 ± 0.6	5.3 ± 0.7	4.0 ± 0.5[a]	2.0 ± 0.3[a]	10.4 ± 0.7	12.5 ± 1.2
2	5.9 ± 0.6	4.6 ± 0.5	4.1 ± 0.5[a]	2.2 ± 0.4[a]	9.2 ± 0.7	11.1 ± 1.2
3	6.4 ± 0.6	5.5 ± 0.7	5.2 ± 0.6[a]	2.7 ± 0.3[a]	15.8 ± 2.8	13.9 ± 1.7
4	5.1 ± 0.6[a]	3.6 ± 0.4[a]	4.7 ± 0.7[a]	1.5 ± 0.2[a]	10.8 ± 1.1	9.7 ± 0.9
5	5.5 ± 0.6[a]	3.7 ± 0.4[a]	4.2 ± 0.6[a]	1.6 ± 0.2[a]	13.5 ± 1.9	9.8 ± 0.8
6	6.6 ± 0.6[a]	4.2 ± 0.4[a]	3.4 ± 0.3[a]	1.5 ± 0.2[a]	10.6 ± 1.0	10.7 ± 0.9
8	5.7 ± 0.7[a]	3.8 ± 0.4[a]	4.5 ± 0.8[a]	2.1 ± 0.3[a]	9.3 ± 1.0	10.1 ± 1.1
9	6.0 ± 0.7[a]	4.4 ± 0.3[a]	4.4 ± 0.5	2.7 ± 0.7	11.8 ± 1.5	18.5 ± 5.3
10	5.1 ± 0.6	4.3 ± 0.5	3.3 ± 0.3[a]	1.6 ± 0.3[a]	11.1 ± 1.3	11.4 ± 1.0
14	6.5 ± 0.8	8.2 ± 1.0	4.7 ± 0.5[a]	2.4 ± 0.3[a]	22.5 ± 2.0	26.3 ± 3.0
15	5.7 ± 0.6[a]	2.8 ± 0.3[a]	4.0 ± 0.4[a]	1.6 ± 0.2[a]	9.4 ± 0.7	9.7 ± 0.9
16	5.8 ± 0.7	9.0 ± 1.4	3.6 ± 0.4[a]	1.4 ± 0.2[a]	12.2 ± 1.1	10.5 ± 1.3
17	6.3 ± 0.9[a]	3.0 ± 0.3[a]	5.7 ± 0.6[a]	1.2 ± 0.1[a]	13.2 ± 1.5[a]	7.4 ± 0.5[a]
18	4.6 ± 0.5[a]	3.2 ± 0.4[a]	3.3 ± 0.3[a]	1.4 ± 0.1[a]	9.4 ± 0.9[a]	6.6 ± 0.4[a]
19	5.3 ± 0.7	4.1 ± 0.5	5.4 ± 0.6[a]	2.3 ± 0.3[a]	13.4 ± 1.3	15.4 ± 4.2
20	4.9 ± 0.6[a]	14.1 ± 3.2[a]	5.3 ± 0.7[a]	1.9 ± 0.3[a]	11.7 ± 0.9	9.1 ± 0.8
21	5.8 ± 1.0[a]	3.5 ± 0.4[a]	3.9 ± 0.4[a]	2.1 ± 0.5[a]	14.9 ± 3.6	11.3 ± 1.1
22	4.7 ± 0.5[a]	2.5 ± 0.3[a]	4.1 ± 0.6[a]	1.3 ± 0.2[a]	9.0 ± 0.6	9.3 ± 0.6
26	6.4 ± 0.9[a]	2.8 ± 0.3[a]	3.5 ± 0.4[a]	1.4 ± 0.2[a]	9.8 ± 0.7	10.7 ± 0.7
27	5.4 ± 0.5[a]	3.4 ± 0.3[a]	5.3 ± 0.7[a]	1.9 ± 0.3[a]	14.0 ± 2.3[a]	8.2 ± 0.6[a]
33	6.0 ± 0.6[a]	2.6 ± 0.3[a]	5.2 ± 0.6[a]	1.5 ± 0.3[a]	11.5 ± 1.1	9.8 ± 0.7
34	5.7 ± 0.6[a]	2.4 ± 0.2[a]	4.0 ± 0.5[a]	1.3 ± 0.3[a]	7.5 ± 0.6	7.6 ± 0.5
35	5.8 ± 0.9[a]	2.3 ± 0.2[a]	6.0 ± 0.8[a]	2.6 ± 0.3[a]	11.5 ± 1.3	10.7 ± 1.0
36	4.9 ± 0.6[a]	2.0 ± 0.2[a]	3.4 ± 0.3[a]	1.1 ± 0.1[a]	6.9 ± 0.5	6.7 ± 0.4

Table 9-10. Annual deposition (lb/(acre)(yr)) of sodium, potassium, and calcium at PVNGS native monitoring sites, preoperational period and 1989 (means ± standard errors) (sheet 2 of 2)

Site	Sodium		Potassium		Calcium	
	Preoperational*	1989	Preoperational*	1989	Preoperational*	1989
37	5.5 ± 0.7[a]	2.5 ± 0.2[a]	3.7 ± 0.5[a]	1.1 ± 0.1[a]	7.1 ± 0.5	7.2 ± 0.6
38	6.2 ± 0.7[a]	2.2 ± 0.2[a]	5.1 ± 0.7[a]	1.0 ± 0.1[a]	8.6 ± 0.7	6.7 ± 0.7
39	6.0 ± 0.8[a]	1.9 ± 0.2[a]	4.3 ± 0.6[a]	1.0 ± 0.1[a]	9.0 ± 0.8[a]	6.1 ± 0.4[a]
40	6.0 ± 0.7[a]	2.5 ± 0.3[a]	4.5 ± 0.4	3.4 ± 0.9	12.8 ± 1.0	10.8 ± 0.7
41	6.2 ± 0.9[a]	3.1 ± 0.3[a]	4.7 ± 0.8[a]	1.7 ± 0.3[a]	11.9 ± 1.5	14.0 ± 1.3
42	5.3 ± 0.6[a]	2.5 ± 0.2[a]	3.7 ± 0.7[a]	1.5 ± 0.2[a]	7.6 ± 0.5	9.0 ± 1.4
44	6.0 ± 1.0[a]	2.6 ± 0.3[a]	3.4 ± 0.6[a]	1.8 ± 0.4[a]	7.8 ± 0.7	8.6 ± 0.8
80	5.7 ± 0.2[a]	14.5 ± 1.9[a]	4.3 ± 0.2[a]	1.8 ± 0.2[a]	13.0 ± 0.5[a]	16.7 ± 1.4[a]
81	5.7 ± 0.2[a]	33.2 ± 5.4[a]	4.3 ± 0.2	4.9 ± 1.1	13.0 ± 0.5[a]	16.8 ± 1.2[a]
82	5.7 ± 0.2[a]	8.8 ± 1.5[a]	4.3 ± 0.2[a]	1.8 ± 0.2[a]	13.0 ± 0.5	16.3 ± 2.4
83	5.7 ± 0.2[a]	14.7 ± 3.3[a]	4.3 ± 0.2[a]	1.9 ± 0.2[a]	13.0 ± 0.5[a]	16.1 ± 1.0[a]

Key: For individual ions at each site, means with superscript a are significantly different at 95-percent confidence level.

*May 1983 through December 1985.

Table 9-11. Annual mean deposition (lb/(acre)(yr)) of drift constituents at PVNGS agricultural and native monitoring control sites, preoperational period and 1989 (means ± standard errors)

Parameter	Agricultural control sites (sites 25 and 43)		Native control sites (sites 40 and 42)	
	Preoperational* (n = 120)	1989 (n = 45)	Preoperational* (n = 119)	1989 (n = 47)
Sodium	8.9 ± 0.7[a]	5.7 ± 0.5[a]	5.7 ± 0.5[a]	2.5 ± 0.2[a]
Potassium	10.6 ± 0.7	10.6 ± 1.3	4.1 ± 0.4[a]	2.5 ± 0.5[a]
Calcium	22.5 ± 1.5[a]	33.8 ± 2.9[a]	10.4 ± 0.6	9.9 ± 0.8
Magnesium	7.4 ± 0.6[a]	12.0 ± 1.3[a]	2.9 ± 0.3	2.7 ± 0.3
TSS	728.9 ± 57.4[a]	1165.2 ± 146.0[a]	264.1 ± 22.9	260.4 ± 31.8

Key:
1. For individual parameters, means with superscript a are significantly different at 95-percent confidence level.
2. TSS, total suspended solids.

*May 1983 through December 1985.

Table 9-12. Net drift deposition (lb/(acre)(yr)) for PVNGS onsite monitoring sites, 1989 (means ± standard errors)

Site	Deposition			
	Sodium 1989	Sodium preoperational†	Net sodium 1989	Net TDS 1989*
1	5.3 ± 0.7	5.4 ± 0.6	-0.1 ± 0.9	-0.3 ± 2.8
2	4.6 ± 0.5	5.9 ± 0.6	-1.3 ± 0.8	-4.0 ± 2.5
3	5.5 ± 0.7	6.4 ± 0.6	-0.9 ± 0.9	-2.8 ± 2.8
4	3.6 ± 0.4	5.1 ± 0.6	-1.5 ± 0.7	-4.7 ± 2.2
5	3.7 ± 0.4	5.5 ± 0.6	-1.8 ± 0.7	-5.6 ± 2.2
6	4.2 ± 0.4	6.6 ± 0.6	-2.4 ± 0.7	-7.4 ± 2.2
10	4.3 ± 0.5	5.1 ± 0.6	-0.8 ± 0.8	-2.5 ± 2.5
14	8.2 ± 1.0	6.5 ± 0.8	1.7 ± 1.3	5.3 ± 3.7
16	9.0 ± 1.4	5.8 ± 0.7	3.2 ± 1.6	9.9 ± 5.0
20	14.1 ± 3.2	4.9 ± 0.6	9.2 ± 3.3	28.5 ± 10.2
27	3.4 ± 0.3	5.4 ± 0.5	-2.0 ± 0.6	-6.2 ± 1.9
80	14.5 ± 1.9	5.7 ± 0.2	8.8 ± 1.9	27.3 ± 5.9
81	33.2 ± 5.4	5.7 ± 0.2	27.5 ± 5.4	85.3 ± 16.7
82	8.8 ± 1.5	5.7 ± 0.2	3.1 ± 1.5	9.6 ± 4.7
83	14.7 ± 3.3	5.7 ± 0.2	9.0 ± 3.3	27.9 ± 10.2

*Based on scaling measured sodium deposition at each monitoring site by ratio of total dissolved solids to sodium (3.1 ± 0.07) as determined from monthly 1989 cooling tower basin water samples from Units 1-3.

†May 1983 through December 1985.

Table 9-13. Measured versus predicted drift deposition (lb/(acre)(year)) at PVNGS onsite monitoring sites, 1989

Site	Net deposition* (measured)	FOG-code-predicted total deposition	Measured/ predicted (ratio)
1	-0.3 ± 2.8†	5.08	NC
2	-4.0 ± 2.5	2.70	NC
3	-2.8 ± 2.8†	6.37	NC
4	-4.7 ± 2.2	1.15	NC
5	-5.6 ± 2.2	0.533	NC
6	-7.4 ± 2.2	1.01	NC
10	-2.5 ± 2.5†	1.47	NC
14	5.3 ± 3.7	17.3	0.31
16	9.9 ± 5.0	35.6	0.28
20	28.5 ± 10.2	23.9	1.19
27	-6.2 ± 1.9	0.976	NC
80	27.3 ± 5.9	47.7	0.57
81	85.3 ± 16.7	277.0	0.31
82	9.6 ± 4.7	48.3	0.20
83	27.9 ± 10.2	35.9	0.78
Mean ratio			0.52

Key: NC, not calculated.

*Means ± standard errors.

†Not significantly different from zero.

Note: Correlation analysis based on following equation:

$$y = A + BX$$

where

y = measured deposition
A = 0.69 (intercept)
B = 0.32 (slope)
X = predicted deposition
Correlation coefficient (R^2) = 0.86

Table 9-14. Sequence of crops planted at PVNGS agricultural monitoring sites, 1983-1989

Monitoring site	1983	1984	1985	1986	1987	1988	1989
7	SS cotton	Fallow	Fallow	Fallow	Fallow	Fallow	Fallow
11	SS cotton	SS cotton*	SS cotton	SS cotton	SS cotton	SS cotton	SS cotton
12	SS cotton	SS cotton	SS cotton	Fallow	Fallow	Fallow	Fallow
13	Sorghum	SS cotton	SS cotton	SS cotton	SS cotton	SS cotton	SS cotton
23	SS cotton	SS cotton	SS cotton	Alfalfa	Alfalfa	Alfalfa	LS cotton
24	Fallow	LS cotton*	LS cotton	Fallow	Fallow	Fallow	Fallow
25	LS cotton	LS cotton	LS cotton	LS cotton	LS cotton	LS cotton	LS cotton
28	Fallow	SS cotton*	Fallow	Fallow	Fallow	Fallow	Fallow
29†	Alfalfa	--	--	--	--	--	--
30	Melon	Fallow	Barley/ SS cotton	SS cotton	Alfalfa	SS cotton	SS cotton
31	SS cotton	SS cotton	SS cotton	SS cotton	SS cotton	LS cotton	Fallow
32	SS cotton	SS cotton	SS cotton	Fallow	SS cotton	LS cotton	Fallow
43	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa
45‡	--	SS cotton	Alfalfa	Fallow	Fallow	Fallow	Fallow

Key: SS cotton, short-staple (upland) cotton; LS cotton, long-staple (Pima) cotton.

*Monitoring site was fallow; field in immediate vicinity was sampled.

†Discontinued after 1983 growing season.

‡Established in 1984.

Table 9-15. Preoperational and 1989 mean ion content ($\mu g/g$ dry weight) of alfalfa leaf tissue at PVNGS monitoring site 43 (means ± standard errors)

Ion	1983-1985 (n = 40)	1989 (n = 20)
Sodium	1,547 ± 129[a]	1,607 ± 152[a]
Potassium	22,194 ± 944[a]	22,155 ± 954[a]
Calcium	12,026 ± 424	14,880 ± 405
Magnesium	2,705 ± 77[a]	2,694 ± 76[a]
Chloride	11,951 ± 606	16,308 ± 360
Sulfate	11,283 ± 1,080[a]	8,268 ± 552[a]
Nitrate (as N)	302 ± 59	77 ± 11
Phosphate (as P)	3,010 ± 91[a]	3,019 ± 150[a]
Fluoride	14 ± 2[a]	12 ± 0.4[a]

Key: For individual ions, means with superscript a are not significantly different at 95-percent confidence level.

Table 9-16a. Preoperational and 1989 ionic content (μg/g dry weight) of short-staple cotton leaf tissue at PVNGS monitoring sites (means ± standard errors)

Ion	Site 11		Site 13		Site 30	
	1983-1985	1989	1984-1985	1989	1985	1989
Sodium	2,159 ± 149 (n = 50)	3,428 ± 247 (n = 20)	3,310 ± 271[a] (n = 40)	4,155 ± 340[a] (n = 20)	2,553 ± 208[a] (n = 20)	3,154 ± 236[a] (n = 20)
Potassium	15,312 ± 647 (n = 50)	18,086 ± 1,071 (n = 20)	16,943 ± 592 (n = 40)	20,356 ± 1,228 (n = 20)	17,423 ± 781[a] (n = 20)	19,805 ± 1,160[a] (n = 20)
Calcium	30,187 ± 997 (n = 50)	37,006 ± 1,566 (n = 20)	33,836 ± 1,038 (n = 40)	38,144 ± 1,086 (n = 20)	38,103 ± 1,587[a] (n = 20)	38,688 ± 1,426[a] (n = 20)
Magnesium	4,612 ± 122[a] (n = 50)	4,890 ± 194[a] (n = 20)	5,378 ± 170[a] (n = 40)	5,064 ± 174[a] (n = 20)	5,463 ± 227[a] (n = 20)	5,958 ± 150[a] (n = 20)
Chloride	13,617 ± 341 (n = 50)	16,980 ± 511 (n = 20)	16,377 ± 597 (n = 40)	19,600 ± 331 (n = 20)	21,350 ± 1,573[a] (n = 20)	20,060 ± 513[a] (n = 20)
Sulfate	30,560 ± 1,418 (n = 50)	38,857 ± 3,809 (n = 20)	33,600 ± 1,741 (n = 40)	40,340 ± 2,937 (n = 20)	41,513 ± 3,240[a] (n = 20)	43,983 ± 1,631[a] (n = 20)
Nitrate (as N)	653 ± 97[a] (n = 40)	537 ± 115[a] (n = 20)	715 ± 136[a] (n = 32)	677 ± 139[a] (n = 20)	1,341 ± 302 (n = 20)	573 ± 96 (n = 20)
Phosphate (as P)	2,425 ± 107 (n = 50)	1,615 ± 66 (n = 20)	1,831 ± 103[a] (n = 40)	1,978 ± 53[a] (n = 20)	2,018 ± 185[a] (n = 20)	1,853 ± 70[a] (n = 20)
Fluoride	89 ± 55[a] (n = 42)	11 ± 0.2[a] (n = 20)	142 ± 64[a] (n = 24)	13 ± 0.2[a] (n = 20)	29 ± 5 (n = 20)	12 ± 0.2 (n = 20)

Key: For individual ions at same site, means with superscript a are not significantly different at 95-percent confidence level.

Table 9-16b. Preoperational and 1989 ionic content (µg/g dry weight) of long-staple cotton leaf tissue at PVNGS monitoring site 25 (means ± standard errors)

Ion	1983-1985	1989
Sodium	443 ± 30 (n = 59)	576 ± 38 (n = 20)
Potassium	17,134 ± 728[a] (n = 59)	18,307 ± 936[a] (n = 20)
Calcium	32,842 ± 1,357 (n = 59)	40,594 ± 916 (n = 20)
Magnesium	3,477 ± 90 (n = 59)	4,337 ± 126 (n = 20)
Chloride	14,700 ± 518 (n = 59)	20,480 ± 647 (n = 20)
Sulfate	26,062 ± 1,497 (n = 59)	38,402 ± 2,050 (n = 20)
Nitrate (as N)	635 ± 105 (n = 49)	251 ± 51 (n = 20)
Phosphate (as P)	2,612 ± 96[a] (n = 59)	2,301 ± 55[a] (n = 20)
Fluoride	13 ± 1[a] (n = 40)	11 ± 0.2[a] (n = 20)

Key: For individual ions, means with superscript a are not significantly different at 95-percent confidence level.

Table 9-17. Mean cotton yield (lb/acre) at PVNGS agricultural monitoring sites, 1983-1989 (means ± standard errors)

Monitoring site	1983	1984	1985	1986	1987	1988	1989
7	749 ± 127	Fallow	Fallow	Fallow	Fallow	Fallow	Fallow
11	2514 ± 184^{a}	ND*	ND*	ND*	3736 ± 225	2535 ± 188^{a}	2450 ± 337^{a}
12	ND*	2787 ± 139^{a}	2314 ± 208^{a}	Fallow	Fallow	Fallow	Fallow
13	Sorghum	3201 ± 99^{ab}	ND*	3029 ± 194^{a}	3608 ± 170^{b}	4610 ± 204^{c}	4549 ± 168^{c}
23	2463 ± 304^{a}	1375 ± 128^{b}	1894 ± 299^{ab}	Alfalfa	Alfalfa	Alfalfa	2968 ± 198†
24	Fallow	948 ± 57^{a}	1423 ± 356^{a}	Fallow	Fallow	Fallow	Fallow
25	2088 ± 162^{bc}	1460 ± 68^{a}	2880 ± 220^{d}	1970 ± 354^{abc}	1733 ± 167^{ab}	1925 ± 142^{abc}	2343 ± 139^{cd}
28	Fallow	1595 ± 64	Fallow	Fallow	Fallow	Fallow	Fallow
30	Melon	Fallow	2470 ± 163^{a}	1569 ± 52	Alfalfa	3051 ± 479^{a}	2633 ± 323^{a}
31	1860 ± 210	1330 ± 178^{a}	1169 ± 142^{a}	1205 ± 78^{a}	1229 ± 72^{a}	684 ± 146‡	Fallow
32	1316 ± 173^{a}	2486 ± 189	2002 ± 213	Fallow	866 ± 89^{a}	379 ± 90‡	Fallow
43	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa	Alfalfa
45	NA	2294 ± 184	Alfalfa	Fallow	Fallow	Fallow	Fallow

Key: For yields at same site, means with same superscript letter are not significantly different at 95-percent confidence level.

* ND = No data; field harvested prior to sampling.

† Data are not comparable with preoperational (1983-1985) data, since long-staple cotton was planted in 1989 and short-staple cotton was planted during preoperational period.

‡ Data are not directly comparable with data for previous years, since long-staple cotton was planted in 1988 and short-staple cotton was planted earlier.

Note: All values were derived from analysis of 10 samples.

Table 9-18. Preoperational and 1989 ionic content (µg/g dry weight) of creosote-bush (*Larrea divaricata*) leaf tissue at PVNGS monitoring sites (means ± standard errors)

Ion	Site 1		Site 4		Site 6		Site 40		Site 42	
	1983-1985	1989	1983-1985	1989	1983-1985	1989	1983-1985	1989	1983-1985	1989
Sodium	309 ± 28 (n = 50)	428 ± 29 (n = 20)	357 ± 27[a] (n = 50)	444 ± 40[a] (n = 20)	291 ± 26[a] (n = 49)	341 ± 23[a] (n = 20)	403 ± 108[a] (n = 49)	388 ± 25[a] (n = 20)	304 ± 28[a] (n = 41)	391 ± 30[a] (n = 20)
Potassium	8,589 ± 448 (n = 50)	10,300 ± 376 (n = 20)	13,876 ± 488[a] (n = 50)	15,305 ± 557[a] (n = 20)	10,579 ± 538[a] (n = 50)	11,190 ± 377[a] (n = 20)	11,154 ± 678[a] (n = 50)	11,590 ± 387[a] (n = 20)	10,906 ± 639[a] (n = 50)	10,377 ± 425[a] (n = 20)
Calcium	16,117 ± 694[a] (n = 50)	17,109 ± 787[a] (n = 20)	13,307 ± 307 (n = 50)	14,449 ± 371 (n = 20)	16,972 ± 503[a] (n = 50)	17,169 ± 590[a] (n = 20)	17,250 ± 3,010[a] (n = 50)	15,097 ± 857[a] (n = 20)	16,348 ± 1,816[a] (n = 50)	16,285 ± 575[a] (n = 20)
Magnesium	1,523 ± 59[a] (n = 50)	1,422 ± 50[a] (n = 20)	1,388 ± 39[a] (n = 50)	1,435 ± 50[a] (n = 20)	1,681 ± 62[a] (n = 50)	1,663 ± 77[a] (n = 20)	1,424 ± 94[a] (n = 50)	1,483 ± 82[a] (n = 20)	1,488 ± 89[a] (n = 50)	1,566 ± 60[a] (n = 20)
Chloride	6,086 ± 259 (n = 50)	8,630 ± 369 (n = 20)	6,462 ± 347 (n = 50)	9,140 ± 423 (n = 20)	6,609 ± 244 (n = 50)	9,460 ± 350 (n = 20)	6,691 ± 277[a] (n = 50)	7,090 ± 342[a] (n = 20)	7,072 ± 324 (n = 50)	8,710 ± 412 (n = 20)
Sulfate	17,538 ± 1,687 (n = 50)	3,431 ± 394 (n = 11)	8,680 ± 528 (n = 50)	3,952 ± 614 (n = 18)	8,894 ± 550 (n = 50)	2,481 ± 294 (n = 11)	11,484 ± 744 (n = 50)	1,802 ± 607 (n = 7)	15,042 ± 1,548 (n = 50)	3,601 ± 253 (n = 16)
Nitrate (as N)	1,373 ± 317 (n = 39)	70 ± 8 (n = 20)	436 ± 73 (n = 40)	96 ± 12 (n = 20)	389 ± 61 (n = 39)	80 ± 8 (n = 20)	433 ± 70 (n = 39)	93 ± 12 (n = 20)	439 ± 65 (n = 38)	102 ± 7 (n = 20)
Phosphate (as P)	969 ± 28 (n = 50)	1,097 ± 44 (n = 20)	1,106 ± 35 (n = 50)	1,350 ± 37 (n = 20)	1,411 ± 42[a] (n = 50)	1,460 ± 33[a] (n = 20)	1,464 ± 72[a] (n = 50)	1,419 ± 48[a] (n = 20)	1,330 ± 41 (n = 50)	1,166 ± 40 (n = 20)
Fluoride	15 ± 1 (n = 30)	19 ± 0.5 (n = 20)	13 ± 2 (n = 29)	18 ± 0.5 (n = 20)	12 ± 1 (n = 32)	17 ± 0.1 (n = 20)	13 ± 1 (n = 30)	17 ± 0.3 (n = 20)	14 ± 1[a] (n = 30)	17 ± 0.5[a] (n = 20)

Key: For individual ions at same site, means with superscript a are not significantly different at 95-percent confidence level.

Table 9-19. Species composition, cover, and diversity of flora in five creosote-bush (Larrea divaricata) communities during preoperational (1983-1985) and operational (1986-1989) periods at PVNGS monitoring sites (sheet 1 of 5)

Parameter		Site 1		Site 4		Site 6		Site 40		Site 42	
		Preop	Op	Preop	Op	Preop	Op	Preop	Op	Preop	Op
		Species composition and percent cover									
Shrubs											
Ambrosia dumosa*	White bursage	1.2	1.8								
Larrea divaricata	Creosote-bush†	18.5	18.0	13.4	12.9	20.2	19.0	12.4	12.4	17.4	18.9
Herbs											
Amsinckia intermedia	Fiddle-neck	0.6	0.3	<0.1	<0.1	1.4	0.9	--	0.1	0.1	0.1
Argythamnia neomexicana	None	--	--								
Astragalus Nuttallianus	Milk-vetch			<0.1	0.1	<0.1	<0.1		<0.1		<0.1
Bowlesia incana	None		<0.1								
Brassica Tournefortii	None		<0.1	--	0.3		<0.1		<0.1		
Camelina microcarpa	False-flax			<0.1							
Chaenactis carphoclinia	None	0.2	0.1	0.2	0.1					--	<0.1
Chaenactis Fremontii	None		--		<0.1						--
Chorizanthe brevicornu	None		--		<0.1		<0.1				
Chorizanthe rigida	None	<0.1	--	0.1	<0.1		<0.1				
Cryptantha augustifolia	None			<0.1	--	<0.1					
Cryptantha inaequata	None	<0.1									
Cryptantha maritima	None		<0.1				--			0.1	<0.1
Cryptantha muricata	None		--				--				
Cryptantha pterocarya	None		--								
Cryptantha sp.	None		--		<0.1		<0.1				--

Table 9-19. Species composition, cover, and diversity of flora in five creosote-bush (Larrea divaricata) communities during preoperational (1983-1985) and operational (1986-1989) periods at PVNGS monitoring sites (sheet 2 of 5)

Parameter		Site 1 Preop	Site 1 Op	Site 4 Preop	Site 4 Op	Site 6 Preop	Site 6 Op	Site 40 Preop	Site 40 Op	Site 42 Preop	Site 42 Op
Species composition and percent cover (continued)											
Herbs (continued)											
Dalea neomexicana	Indigo-bush, pea-bush									0.1	<0.1
Daucus pusillus	Carrot	--	0.9								
Eriastrum diffusum	None	<0.1									
Erigeron lobatus	Fleabane, wild-daisy		--								
Eriogonum Thomasii	Wild-buckwheat	0.1	<0.1	<0.1	0.1	--	0.1			--	0.3
Eriogonum trichopes	Wild-buckwheat			0.1	--	<0.1				0.8	
Eriophyllum lanosum	Wooly-daisy	0.1	--			<0.1	--				
Erodium cicutarium	Heron-bill		0.2		<0.1		0.1		<0.1		
Erodium texanum	Heron-bill	0.9	0.4	0.1	<0.1	0.1	0.1			<0.1	<0.1
Euphorbia polycarpa	Spurge					--	--				
Euphorbia sp.	Spurge				--	--	--	2.0			
Filago arizonica	None	0.1	--								
Hesperocallis undulata	Desert-lily			<0.1	--						
Lepidium lasiocarpum	Pepper-grass	0.2	0.1	0.1	0.2	0.1	0.2		<0.1	0.7	0.3
Lepidium virginicum	Pepper-grass	--	--	--	--	--	--	--		--	
Lepidium sp.	Pepper-grass		--		--		--		--		--
Lesquerella Gordoni	Bladder-pod				0.3			--	0.2		
Linanthus bigelovii	None		<0.1				<0.1				
Linanthus dichotomus	None	0.1				<0.1					
Lotus salsuginosus	Deer-vetch				--						<0.1

Table 9-19. Species composition, cover, and diversity of flora in five creosote-bush (*Larrea divaricata*) communities during preoperational (1983-1985) and operational (1986-1989) periods at PVNGS monitoring sites (sheet 3 of 5)

Parameter		Site 1		Site 4		Site 6		Site 40		Site 42	
		Preop	Op	Preop	Op	Preop	Op	Preop	Op	Preop	Op
Species composition and percent cover (continued)											
Herbs (continued)											
Lotus tomentellus	Deer-vetch					<0.1	<0.1				
Lupinus sparsiflorus	Lupine					0.1	0.1				
Machaeranthera Coulteri‡	None		<0.1		--		<0.1				
Monoptilon bellioides	None		<0.1				<0.1		--		
Nemacladus glanduliferus	None	0.1									
Oenothera sp.	Evening-primrose						--				
Oligomeris linifolia	None	<0.1		--	<0.1						
Orthocarpus purpurascens	Owl-clover		--	--	<0.1		--				<0.1
Pectis papposa	Fetid-marigold	--		--		--	--	<0.1	0.1		
Pectocarya platycarpa	None	0.3	<0.1	0.2	<0.1	0.1	0.3		0.1	0.2	<0.1
Perityle Emoryi	None						--				
Phacelia crenulata	None	<0.1	<0.1	--	<0.1						
Pholistoma auritum	None						<0.1				
Plantago insularis	Plantain	1.1	1.6	3.5	5.6	0.5	4.1	8.1	3.6	0.7	1.4
Sisymbrium Irio	None								--		
Spermolepis echinata	None	0.6									
Sphaeralcea Coulteri	Globe-mallow							16.0	0.3		
Tidestromia lanuginosa	None								<0.1		
Grasses											
Aristida adscensionis	Three-awn	--					<0.1				

Table 9-19. Species composition, cover, and diversity of flora in five creosote-bush (Larrea divaricata) communities during preoperational (1983-1985) and operational (1986-1989) periods at PVNGS monitoring sites (sheet 4 of 5)

Parameter		Site 1		Site 4		Site 6		Site 40		Site 42	
		Preop	Op	Preop	Op	Preop	Op	Preop	Op	Preop	Op
Species composition and percent cover (continued)											
Grasses (continued)											
Aristida sp.	Three-awn	--									
Bouteloua barbata	Gamma	--		--		--		--			
Bromus rubens	Foxtail brome	--	0.3		--	--	0.7	--			
Festuca octoflora	Fescue	0.5	0.3			0.4	0.1				
Schismus arabicus	None		0.1	--	0.3		0.3		1.2		0.2
Schismus barbatus	None	0.6	<0.1	1.8		<0.1		0.3	2.1	0.7	0.4
Schismus sp.			0.2		0.4		1.9		2.9		0.8
Cacti											
Echinocereus Englemannii	Hedgehog cactus				--						
Opuntia acanthocarpa	None			0.3	--	--				--	--
Opuntia echinocarpa	None			0.1	<0.1						--
Opuntia leptocaulis	Christmas cactus	--	--								
Opuntia ramosissima	None			0.5	0.3					--	--

Table 9-19. Species composition, cover, and diversity of flora in five creosote-bush (Larrea divaricata) communities during preoperational (1983-1985) and operational (1986-1989) periods at PVNGS monitoring sites (sheet 5 of 5)

Parameter	Site 1		Site 4		Site 6		Site 40		Site 42	
	Preop	Op	Preop	Op	Preop	Op	Preop	Op	Preop	Op
Species diversity and number of plots										
Species richness	30	37	26	34	23	35	11	18	15	22
Heterogeneity (H')	.52	.49	.52	.50	.26	.52	.54	.63	.32	.31
Index of similarity (%)	60		73		59		48		70	
Plots	53	80	50	80	50	80	50	80	50	80

Key: -- (dash), species present in plot, but not on transect.

*Scientific name.

†Common name.

‡Machaeranthera arida is now recognized as the same species as Machaeranthera Coulteri.

Table 9-20. Preoperational and 1989 ionic content (μg/g dry weight) of salt-bush (<u>Atriplex</u> <u>polycarpa</u>) leaf tissue at PVNGS monitoring sites (means ± standard errors)

Ion	Site 2		Site 3		Site 44	
	1983-1985	1989	1983-1985	1989	1984-1985	1989
Sodium	48,721 ± 1,077 (n = 50)	61,962 ± 2,097 (n = 20)	51,417 ± 1,296 (n = 50)	64,878 ± 1,322 (n = 20)	33,564 ± 1,082 (n = 40)	40,570 ± 1,800 (n = 20)
Potassium	13,328 ± 888 (n = 50)	17,175 ± 920 (n = 20)	17,207 ± 969[a] (n = 50)	20,587 ± 1,534[a] (n = 20)	22,612 ± 1,324[a] (n = 40)	23,779 ± 1,360[a] (n = 20)
Calcium	11,887 ± 1,153[a] (n = 50)	11,760 ± 563[a] (n = 20)	13,333 ± 1,767[a] (n = 50)	12,190 ± 747[a] (n = 20)	9,175 ± 346[a] (n = 40)	9,122 ± 449[a] (n = 20)
Magnesium	4,359 ± 257 (n = 50)	5,593 ± 357 (n = 20)	5,721 ± 243[a] (n = 50)	5,782 ± 279[a] (n = 20)	8,038 ± 1,831[a] (n = 40)	6,536 ± 294[a] (n = 20)
Chloride	59,225 ± 4,683[a] (n = 50)	61,460 ± 3,696[a] (n = 20)	60,440 ± 3,691[a] (n = 50)	62,310 ± 3,424[a] (n = 20)	40,428 ± 2,445[a] (n = 40)	44,520 ± 1,717[a] (n = 20)
Sulfate	8,914 ± 659 (n = 50)	5,785 ± 706 (n = 20)	7,550 ± 623[a] (n = 50)	6,341 ± 642[a] (n = 20)	11,200 ± 1,072 (n = 40)	7,072 ± 599 (n = 20)
Nitrate (as N)	342 ± 49[a] (n = 44)	208 ± 26[a] (n = 20)	386 ± 55 (n = 45)	203 ± 35 (n = 20)	372 ± 54[a] (n = 33)	312 ± 28[a] (n = 20)
Phosphate (as P)	1,324 ± 183[a] (n = 50)	1,176 ± 50[a] (n = 20)	979 ± 43 (n = 50)	1,327 ± 60 (n = 20)	1,437 ± 74[a] (n = 40)	1,548 ± 53[a] (n = 20)
Fluoride	8 ± 0.6 (n = 30)	11 ± 0.2 (n = 20)	8 ± 0.7 (n = 32)	11 ± 0.2 (n = 20)	8 ± 0.6 (n = 30)	12 ± 0.3 (n = 20)

Key: For individual ions at same site, means with superscript a are not significantly different at 95-percent confidence level.

Table 9-21. Species composition, cover, and diversity of flora in three salt-bush (Atriplex sp.) communities during preoperational (1983-1985) and operational (1986-1989) periods at PVNGS monitoring sites (sheet 1 of 3)

Parameter		Site 2		Site 3		Site 44	
		Preop	Op	Preop	Op	Preop	Op
Species composition and percent cover							
Shrubs							
Ambrosia dumosa*	White bursage†			0.1	<0.1		
Atriplex polycarpa	Salt-bush, orache	18.9	19.5	20.0	22.2	13.1	7.7
Atriplex linearis	Salt-bush, orache	0.5	0.5	1.5	0.9	0.4	
Prosopis velutina	Mesquite	3.9	5.7				0.4
Larrea divaricata	Cresote-bush	4.9	5.0			0.8	0.6
Lycium Fremontii	Wolf-berry	0.1	0.2	1.3	2.3		
Lycium sp.	Wolf-berry	0.3	0.1	5.4	2.1		
Herbs							
Abronia villosa	Sand-verbena	<0.1					
Allionia incarnata	None	--					
Amaranthus fimbriatus	Amaranth, pig-weed	0.1		<0.1			
Amsinckia intermedia	Fiddle-neck	0.1	0.1	--	<0.1	<0.1	--
Brassica Tournefortii	None						--
Chaenactis carphoclinia	None	--					
Cryptantha augustifolia	None			--			
Cryptantha inaequata	None				<0.1		
Cryptantha maritima	None				--		
Eriastrum diffusum	None			<0.1	<0.1		
Erigeron lobatus	Fleabane, wild-daisy		--				
Eriogonum Thomasii	Wild-buckwheat	--					
Eriophyllum lanosum	Wooly-daisy	0.2	0.1	<0.1	<0.1		

Table 9-21. Species composition, cover, and diversity of flora in three salt-bush (*Atriplex* sp.) communities during preoperational (1983-1985) and operational (1986-1989) periods at PVNGS monitoring sites (sheet 2 of 3)

Parameter		Site 2		Site 3		Site 44	
		Preop	Op	Preop	Op	Preop	Op
Species composition and percent cover (continued)							
Herbs (continued)							
Erodium cicutarium	Heron-bill				--		
Erodium texanum	Heron-bill		--				
Eucrypta micrantha	None					<0.1	
Euphorbia capitellata	Spurge	--					
Euphorbia sp.	Spurge	<0.1	--	0.3	--	6.2	
Lepidium lasiocarpum	Pepper-grass	<0.1	<0.1	0.1	<0.1	<0.1	--
Lepidium virginicum	Pepper-grass	--		--		--	
Lepidium sp.	Pepper-grass		--		--		
Lesquerella Gordoni	Bladder-pod	--					
Machaeranthera Coulteri‡	None	<0.1	<0.1	<0.1	<0.1		
Monoptilon bellioides	None		--		--		
Nama demissum	None		--		--		
Nama hispidum	None			<0.1			
Oligomeris linifolia	None	--	<0.1	--	<0.1		
Orthocarpus purpurascens	Owl-clover	--				--	
Pectis papposa	Fetid-marigold, chinchweed	0.1		0.2	<0.1	0.3	--
Pectocarya platycarpa	None		--	--	<0.1		--
Phacelia crenulata	None				--		
Plantago insularis	Plantain, Indian-wheat	1.1	1.5	0.3	0.5	2.5	0.6
Proboscidea altheaefolia	Unicorn-plant	0.1					
Salsola Kali	Russian-thistle				--		
Sisymbrium Irio	None		--		--		
Sphaeralcea Coulteri	Globe-mallow	1.8	<0.1	<0.1	<0.1	7.2	0.1

Table 9-21. Species composition, cover, and diversity of flora in three salt-bush (Atriplex sp.) communities during preoperational (1983-1985) and operational (1986-1989) periods at PVNGS monitoring sites (sheet 3 of 3)

Parameter		Site 2		Site 3		Site 44	
		Preop	Op	Preop	Op	Preop	Op
Species composition and percent cover (continued)							
Herbs (continued)							
Tidestromia lanuginosa	None					--	
Trianthema Portulacastrum	Pig-weed	<0.1					
Grasses							
Bouteloua barbata	Gamma	0.3		0.9	--		
Festuca octoflora	Fescue	--		0.1			
Schismus arabicus	None		2.2		2.7		3.1
Schismus barbatus	None	2.1	0.1	6.8	0.9	7.2	1.2
Schismus sp.	None		4.5		4.9		7.8
Species diversity and number of plots							
Species richness		29	24	23	29	14	13
Heterogeneity (H')		.67	.69	.62	.60	.72	.64
Index of similarity (%)		57		69		59	
Plots		50	80	50	80	50	80

Key: -- (dash), species present in plot, but not on transect.

*Scientific name.

†Common name.

‡Since Machaeranthera arida and Machaeranthera Coulteri are now recognized as one species, all data have been combined.

Table 9-22. Electrical conductivity and concentrations of soluble ions in soils at PVNGS agricultural monitoring sites, preoperational period and 1989 (means ± standard errors)

Parameter	Preoperational* (n = 404)	1989 (n = 156)
Electrical conductivity (mmhos/cm)	1.40 ± 0.06	1.33 ± 0.06
Soluble ions (ppm)		
Calcium	48 ± 3	55 ± 4
Magnesium	7.0 ± 0.4	7.8 ± 0.6
Sodium	266 ± 10	274 ± 12
Potassium†	26 ± 1	15 ± 1
Chloride	173 ± 12	172 ± 13

*May 1983 through December 1985.

†Means for preoperational period and 1989 are significantly different at 95 percent confidence level.

Table 9-23. Electrical conductivity and ion content of soil at PVNGS agricultural monitoring sites, preoperational period and 1989 (means ± standard errors)

Site†	Electrical conductivity (mmhos/cm)		Soluble calcium (ppm)		Soluble magnesium (ppm)	
	Preoperational*	1989	Preoperational*	1989	Preoperational*	1989
7	1.17 ± 0.14	0.94 ± 0.15	31 ± 2	34 ± 2	6.0 ± 0.5	5.5 ± 0.5
11	1.35 ± 0.12	1.63 ± 0.30	44 ± 4	62 ± 10	3.7 ± 0.3	6.5 ± 1.3
12	1.89 ± 0.20	1.54 ± 0.30	63 ± 8	78 ± 18	9.6 ± 1.4	8.1 ± 1.9
13	0.96 ± 0.07	0.92 ± 0.05	21 ± 2[a]	35 ± 1[a]	2.8 ± 0.2[a]	4.3 ± 0.3[a]
23	1.27 ± 0.12[a]	0.96 ± 0.06[a]	56 ± 7	44 ± 2	6.2 ± 0.7	5.1 ± 0.3
24	0.89 ± 0.04	0.94 ± 0.01	31 ± 2[a]	43 ± 5[a]	4.0 ± 0.4	5.3 ± 0.6
25	0.98 ± 0.07[a]	1.82 ± 0.28[a]	66 ± 8[a]	176 ± 32[a]	9.0 ± 0.8[a]	28 ± 4[a]
28	0.71 ± 0.04	0.63 ± 0.04	20 ± 2[a]	37 ± 2[a]	2.3 ± 0.3[a]	5.3 ± 0.5[a]
30	3.82 ± 0.30[a]	1.63 ± 0.14[a]	157 ± 17[a]	55 ± 7[a]	22 ± 2[a]	8.9 ± 2.0[a]
31	0.87 ± 0.05[a]	1.62 ± 0.08[a]	19 ± 2[a]	35 ± 2[a]	3.9 ± 0.9	5.4 ± 1.7
32	1.26 ± 0.09	1.52 ± 0.13	26 ± 7	30 ± 0	2.8 ± 0.4	3.6 ± 0.4
43	1.65 ± 0.22	1.34 ± 0.04	66 ± 9	55 ± 2	14 ± 2	12 ± 1
45	1.31 ± 0.11[a]	1.84 ± 0.22[a]	17 ± 2[a]	26 ± 2[a]	3.3 ± 0.7	3.7 ± 0.4

Site†	Soluble sodium (ppm)		Soluble potassium (ppm)		Chloride (ppm)	
	Preoperational*	1989	Preoperational*	1989	Preoperational*	1989
7	231 ± 30	201 ± 35	11 ± 1[a]	8.2 ± 0.9[a]	103 ± 28	108 ± 31
11	235 ± 19	371 ± 80	32 ± 3[a]	20 ± 2[a]	153 ± 21	289 ± 95
12	361 ± 43	258 ± 37	80 ± 8[a]	49 ± 7[a]	299 ± 46	238 ± 75
13	197 ± 21	201 ± 11	17 ± 1	19 ± 1	120 ± 16	105 ± 9
23	254 ± 26	203 ± 15	18 ± 1[a]	7.2 ± 0.5[a]	153 ± 28	112 ± 13
24	166 ± 9	165 ± 18	34 ± 2	29 ± 2	65 ± 8	83 ± 15
25	124 ± 9[a]	235 ± 38[a]	28 ± 2	23 ± 3	59 ± 9[a]	243 ± 48[a]
28	148 ± 8	142 ± 11	9.4 ± 0.7	9.1 ± 0.6	35 ± 4	32 ± 5
30	694 ± 51[a]	343 ± 26[a]	52 ± 5[a]	9.8 ± 1.2[a]	696 ± 63[a]	223 ± 39[a]
31	189 ± 11[a]	370 ± 14[a]	7.9 ± 0.6	7.6 ± 0.9	79 ± 11[a]	215 ± 16[a]
32	294 ± 24	365 ± 35	4.3 ± 0.4	3.3 ± 0.4	124 ± 17	171 ± 26
43	289 ± 35	269 ± 9	28 ± 3[a]	11 ± 1[a]	241 ± 38	205 ± 11
45	295 ± 23[a]	433 ± 45[a]	6.8 ± 1.6	4.1 ± 0.3	99 ± 19[a]	208 ± 42[a]

Key: For individual parameters at each site, means with superscript a are significantly different at 95-percent confidence level.

*May 1983 through December 1985.

†Number of samples was 12 for each site in 1989; it was 32 for all sites except site 45 (n = 20) in preoperational period.

Table 9-24. Electrical conductivity and concentrations of soluble ions in soils at PVNGS native monitoring sites, preoperational period and 1989 (means ± standard errors)

Parameter	Preoperational (n = 576)	1989 (n = 232)
Electrical conductivity (mmhos/cm)	0.59 ± 0.03	0.53 ± 0.03
Soluble ions (ppm)		
Calcium†	44 ± 2	53 ± 3
Magnesium	5.1 ± 0.3	5.2 ± 0.2
Sodium	70 ± 5	74 ± 7
Potassium	22 ± 1	20 ± 2
Chloride	50 ± 6	59 ± 8

†Means for preoperational period and 1989 are significantly different at 95-percent confidence level.

Notes:
1. Preoperational period is defined as May 1983 through December 1985 for all sites except sites 16 and 20, for which it is May 1983 through December 1984.
2. Measurements for sites 3 and 16 are not included in calculations.

Table 9-25. Electrical conductivity and ion content of soil at PVNGS native monitoring sites, preoperational period and 1989 (means ± standard errors) (sheet 1 of 2)

Site	Electrical conductivity (mmhos/cm) Preoperational	Electrical conductivity (mmhos/cm) 1989	Soluble calcium (ppm) Preoperational	Soluble calcium (ppm) 1989	Soluble magnesium (ppm) Preoperational	Soluble magnesium (ppm) 1989
1	1.05 ± 0.16[a]	1.80 ± 0.30[a]	110 ± 18[a]	241 ± 41[a]	8.1 ± 1.0[a]	15 ± 3[a]
2	0.78 ± 0.22	0.55 ± 0.08	35 ± 6	39 ± 3	10 ± 5	4.9 ± 0.6
3	5.57 ± 1.15	3.24 ± 0.92	45 ± 8	38 ± 7	18 ± 6	10 ± 3
4	0.35 ± 0.02	0.31 ± 0.01	50 ± 3	58 ± 3	4.2 ± 0.3	4.5 ± 0.2
5	0.58 ± 0.03	0.50 ± 0.04	21 ± 2[a]	33 ± 3[a]	3.2 ± 0.3	3.6 ± 0.2
6	0.35 ± 0.02	0.31 ± 0.02	35 ± 3[a]	46 ± 3[a]	3.2 ± 0.3	3.4 ± 0.2
8	0.91 ± 0.17	0.66 ± 0.16	21 ± 2[a]	29 ± 1[a]	3.5 ± 0.3	4.0 ± 0.3
9	0.50 ± 0.04[a]	0.39 ± 0.02[a]	53 ± 6	46 ± 5	7.3 ± 0.4	6.3 ± 0.4
10	0.40 ± 0.03	0.34 ± 0.03	45 ± 6	54 ± 3	6.1 ± 0.6	5.6 ± 0.3
14	1.21 ± 0.31	0.69 ± 0.08	45 ± 6	48 ± 5	7.0 ± 0.5	6.9 ± 0.7
15	0.38 ± 0.03[a]	0.28 ± 0.01[a]	55 ± 5	53 ± 4	4.4 ± 0.3	4.3 ± 0.2
16	4.80 ± 1.12	3.78 ± 0.75	29 ± 3	36 ± 3	4.6 ± 0.5	4.6 ± 0.7
17	0.49 ± 0.05	0.57 ± 0.05	54 ± 5[a]	78 ± 6[a]	7.6 ± 1.6	13 ± 2
18	0.33 ± 0.02[a]	0.29 ± 0.0[a]	48 ± 3[a]	55 ± 1[a]	4.2 ± 0.3	4.1 ± 0.1
19	0.42 ± 0.02	0.36 ± 0.02	37 ± 2[a]	44 ± 1[a]	4.2 ± 0.2[a]	5.1 ± 0.1[a]
20	0.47 ± 0.03	0.44 ± 0.03	33 ± 8	33 ± 3	13 ± 5	6.4 ± 1.2
21	0.58 ± 0.08	0.56 ± 0.12	20 ± 2	26 ± 2	4.3 ± 0.6	5.0 ± 0.7
22	0.27 ± 0.02	0.23 ± 0.01	41 ± 2	46 ± 1	3.2 ± 0.2	3.5 ± 0.2
26	0.31 ± 0.02	0.26 ± 0.02	52 ± 7	47 ± 1	3.6 ± 0.2	3.8 ± 0.2
27	1.43 ± 0.27	0.86 ± 0.16	28 ± 3	30 ± 2	5.4 ± 1.2	4.6 ± 0.6
33	0.21 ± 0.02[a]	0.18 ± 0.0[a]	28 ± 2	37 ± 2	2.8 ± 0.2	3.3 ± 0.3
34	0.31 ± 0.02[a]	0.26 ± 0.01[a]	45 ± 3	52 ± 2	3.6 ± 0.2	3.9 ± 0.2
35	0.21 ± 0.02	0.20 ± 0.01	31 ± 2[a]	45 ± 2[a]	2.8 ± 0.1	3.0 ± 0.3
36	0.57 ± 0.14	0.61 ± 0.17	53 ± 8	54 ± 7	4.4 ± 0.6	4.8 ± 0.6
37	0.31 ± 0.02	0.29 ± 0.02	56 ± 4	60 ± 2	3.8 ± 0.2	3.9 ± 0.1
38	0.58 ± 0.05	0.65 ± 0.12	15 ± 4	28 ± 2	2.7 ± 0.5	3.8 ± 0.5
39	1.68 ± 0.36[a]	0.78 ± 0.15[a]	69 ± 25	37 ± 4	8.0 ± 2.9	3.9 ± 0.5
40	0.37 ± 0.02	0.36 ± 0.03	56 ± 2	60 ± 4	4.5 ± 0.2	5.0 ± 0.3
41	1.00 ± 0.21	1.78 ± 0.41	43 ± 8	52 ± 8	4.4 ± 0.3	5.1 ± 0.7
42	0.29 ± 0.02	0.29 ± 0.01	46 ± 2[a]	58 ± 2[a]	3.3 ± 0.2[a]	3.9 ± 0.1[a]
44	0.65 ± 0.06	0.68 ± 0.17	44 ± 14	37 ± 4	4.9 ± 0.5	5.6 ± 0.7

Table 9-25. Electrical conductivity and ion content of soil at PVNGS native monitoring sites, preoperational period and 1989 (means ± standard errors) (sheet 2 of 2)

Site	Soluble sodium (ppm)		Soluble potassium (ppm)		Chloride (ppm)	
	Preoperational	1989	Preoperational	1989	Preoperational	1989
1	91 ± 17	131 ± 29	12 ± 1	14 ± 2	108 ± 26[a]	296 ± 57[a]
2	92 ± 20	112 ± 30	23 ± 3	18 ± 3	44 ± 14	55 ± 15
3	1111 ± 167	844 ± 263	32 ± 5[a]	16 ± 3[a]	1164 ± 210	826 ± 290
4	10 ± 1[a]	15 ± 1[a]	16 ± 1	15 ± 1	8.7 ± 1.0[a]	19 ± 1[a]
5	104 ± 11	109 ± 11	15 ± 1	14 ± 2	21 ± 5	25 ± 4
6	40 ± 4	43 ± 9	4.4 ± 0.5	3.7 ± 0.6	12 ± 4	18 ± 1
8	174 ± 35	133 ± 43	26 ± 11	12 ± 1	148 ± 38	105 ± 38
9	35 ± 7	39 ± 5	40 ± 3[a]	30 ± 2[a]	31 ± 7	33 ± 6
10	30 ± 4	25 ± 5	14 ± 1	14 ± 1	15 ± 3[a]	28 ± 6[a]
14	63 ± 7	55 ± 8	93 ± 6	86 ± 13	38 ± 11	37 ± 4
15	9.6 ± 0.9	9.1 ± 0.6	25 ± 3	23 ± 2	12 ± 2	16 ± 1
16	1075 ± 192	873 ± 210	59 ± 8	42 ± 5	1048 ± 205	833 ± 183
17	11 ± 1	12 ± 1	50 ± 8	76 ± 9	12 ± 1[a]	17 ± 3[a]
18	13 ± 1	15 ± 0	9.6 ± 0.9	8.0 ± 0.8	11 ± 1	13 ± 1
19	23 ± 4	18 ± 1	53 ± 2	51 ± 5	12 ± 1	13 ± 1
20	86 ± 8	115 ± 20	33 ± 3	25 ± 2	9.3 ± 0.8[a]	24 ± 2[a]
21	102 ± 18	121 ± 33	20 ± 1	19 ± 1	52 ± 15	56 ± 22
22	8.1 ± 0.7[a]	10.9 ± 0.4[a]	9.2 ± 0.8[a]	6.3 ± 0.6[a]	9.5 ± 1.9	14 ± 1
26	16 ± 1	21 ± 4	8.4 ± 0.8[a]	4.0 ± 0.8[a]	10 ± 1	18 ± 4
27	317 ± 54	217 ± 43	15 ± 1	12 ± 2	148 ± 49	54 ± 21
33	8.9 ± 2.7	6.9 ± 0.4	10 ± 1	9.0 ± 0.5	12 ± 4	12 ± 1
34	12 ± 1	10 ± 0	7.1 ± 0.4	6.8 ± 0.9	9.2 ± 1.1[a]	13 ± 1[a]
35	7.1 ± 0.4	8.0 ± 0.5	11 ± 1	8.8 ± 1.6	7.2 ± 1.0[a]	13 ± 1[a]
36	56 ± 18	87 ± 31	11 ± 1	7.6 ± 0.9	54 ± 24	86 ± 37
37	7.9 ± 0.8[a]	11 ± 1[a]	6.5 ± 0.7	6.0 ± 1.3	9.8 ± 1.8[a]	20 ± 4[a]
38	137 ± 16	165 ± 31	3.3 ± 0.2	3.4 ± 0.5	33 ± 8	45 ± 17
39	304 ± 58[a]	158 ± 33[a]	9.8 ± 1.3	7.8 ± 1.5	370 ± 104	138 ± 47
40	12 ± 1[a]	31 ± 2[a]	24 ± 1[a]	18 ± 2[a]	12 ± 1[a]	18 ± 2[a]
41	179 ± 45	345 ± 92	12 ± 1	14 ± 2	177 ± 51[a]	441 ± 119[a]
42	11 ± 1[a]	17 ± 2[a]	7.4 ± 0.4	8.0 ± 1.0	8.8 ± 1.5[a]	19 ± 1[a]
44	74 ± 15	110 ± 40	76 ± 5	63 ± 6	44 ± 11	79 ± 32

Key: For individual ions at each site, means with superscript a are significantly different at 95-percent confidence level.

*Significant difference cannot be determined because there is no variance associated with one mean.

Notes:

1. Preoperational period is defined as May 1983 through December 1985 except for sites 16 and 20, for which it is May 1983 through December 1984.
2. Number of samples was 8 for each site in 1989; it was 20 for all sites except sites 16 (n = 12), 20 (n = 12), and 44 (n = 16) in preoperational period.

Table 9-26. Deposition, soil, and crop comparison, preoperational period (May 1983 through December 1985) and 1989

	Analyte											
	Sodium			Calcium			Potassium			Magnesium		
Site	Deposition	Soil	Crop	Deposition	Soil	Crop	Deposition	Soil	Crop	Deposition	Soil	Crop
7	D	NC	F	NC	NC	F	D	D	F	NC	NC	F
11	NC	NC	I	NC	NC	I	D	D	I	NC	NC	NC
12	D	NC	F	NC	NC	F	NC	D	F	NC	NC	F
13	NC	NC	NC	NC	I	I	NC	NC	I	NC	I	NC
23	NC	NC	UC	I	NC	UC	I	D	UC	I	NC	UC
24	D	NC	F	NC	I	F	D	NC	F	NC	NC	F
25	D	I	I	I	I	I	NC	NC	NC	I	I	I
28	D	NC	F	NC	I	F	D	NC	F	NC	I	F
30	NC	D	NC	I	D	NC	NC	D	NC	I	D	NC
31	D	I	F	NC	I	F	D	NC	F	NC	NC	F
32	D	NC	F	NC	NC	F	D	NC	F	NC	NC	F
43	D	NC	NC	I	NC	I	NC	D	NC	I	NC	NC
45	D	I	F	D	I	F	D	NC	F	D	NC	F

Key: NC, no significant change from preoperational period; F, fallow, no sample; D, decrease; I, increase; UC, crop changed, no comparison base.

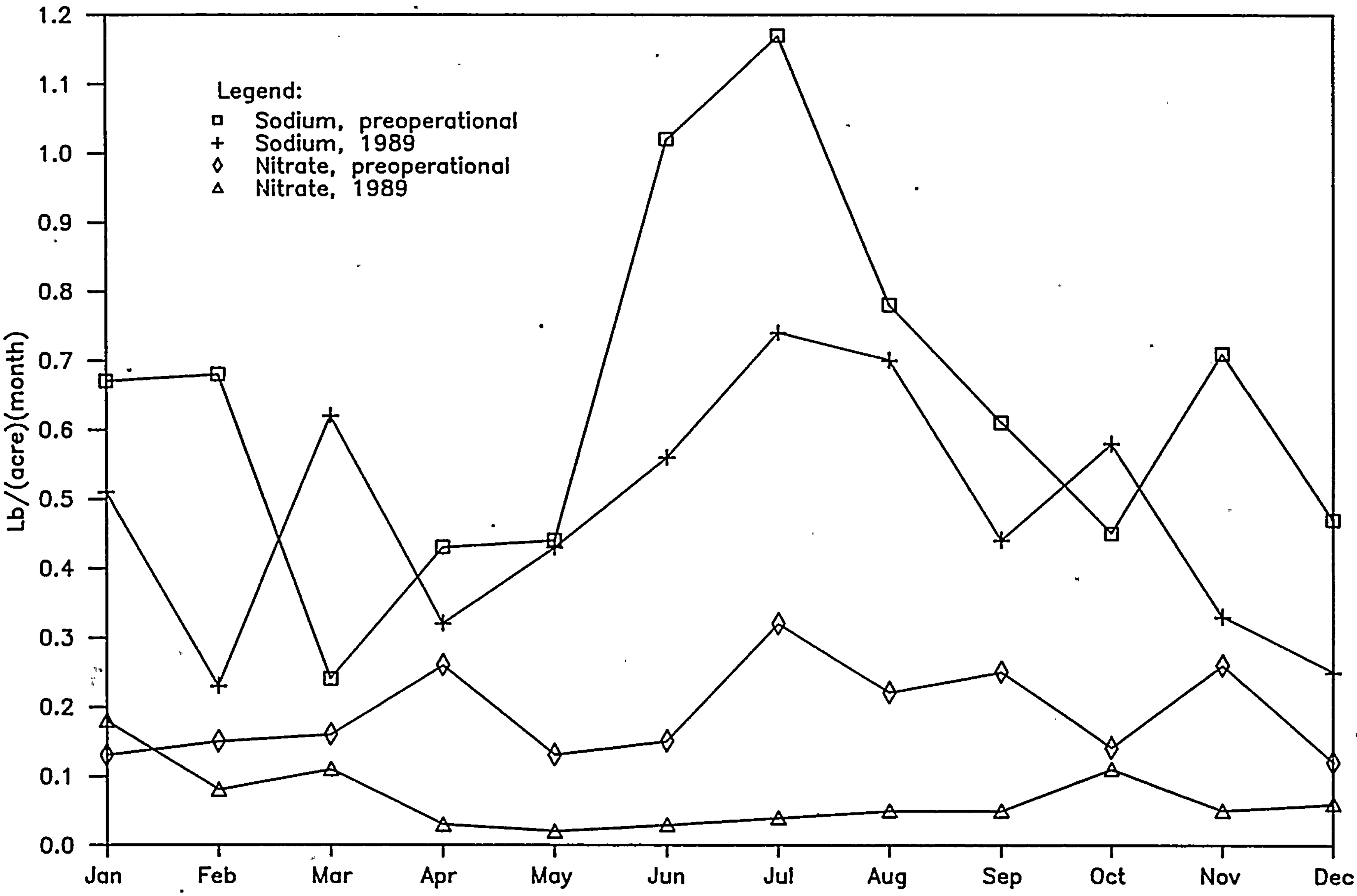

Figure 9—1. Mean monthly deposition of sodium and nitrate at PVNGS agricultural monitoring sites, preoperational period and 1989

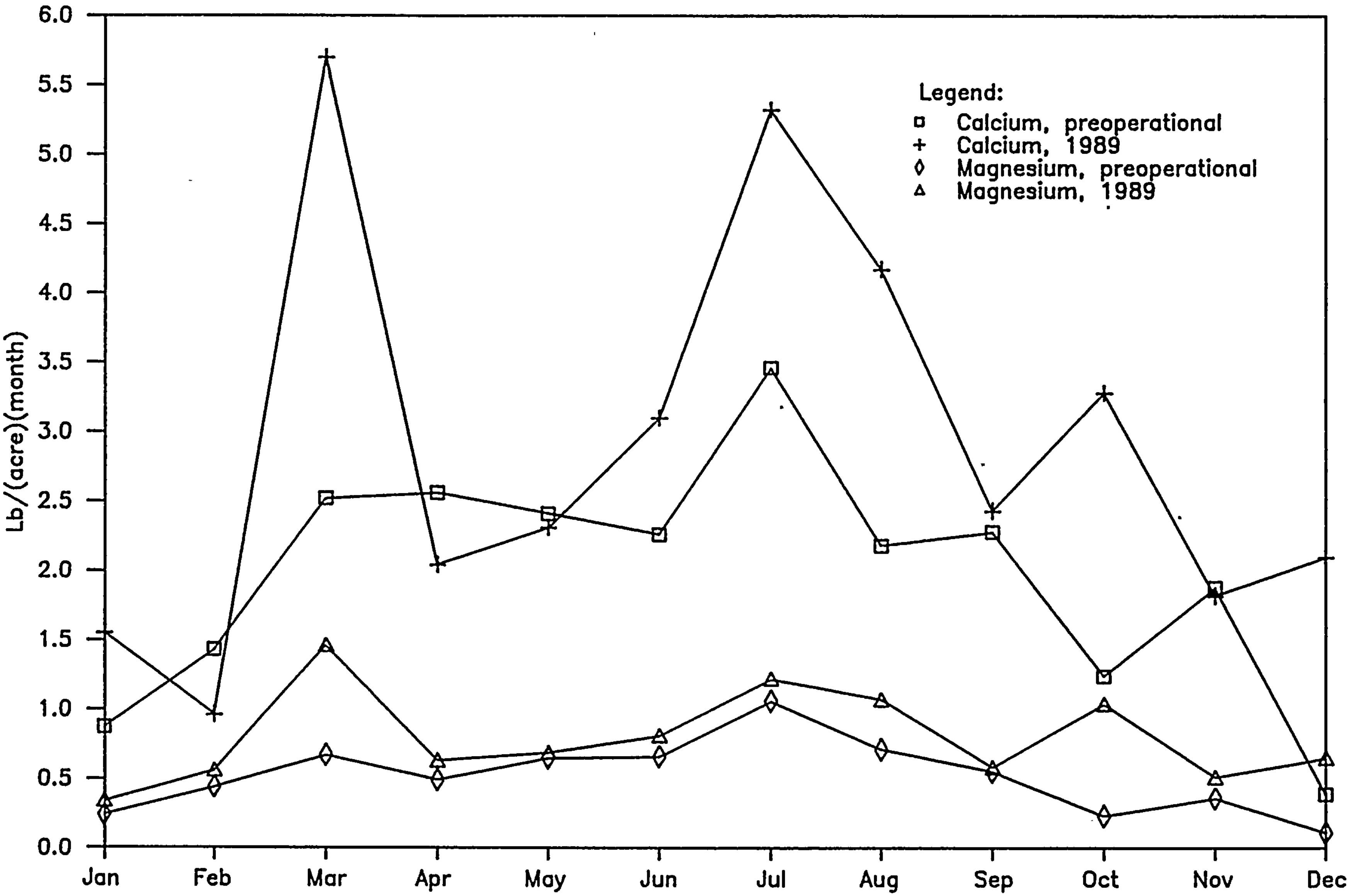

Figure 9-2. Mean monthly deposition of calcium and magnesium at PVNGS agricultural monitoring sites, preoperational period and 1989

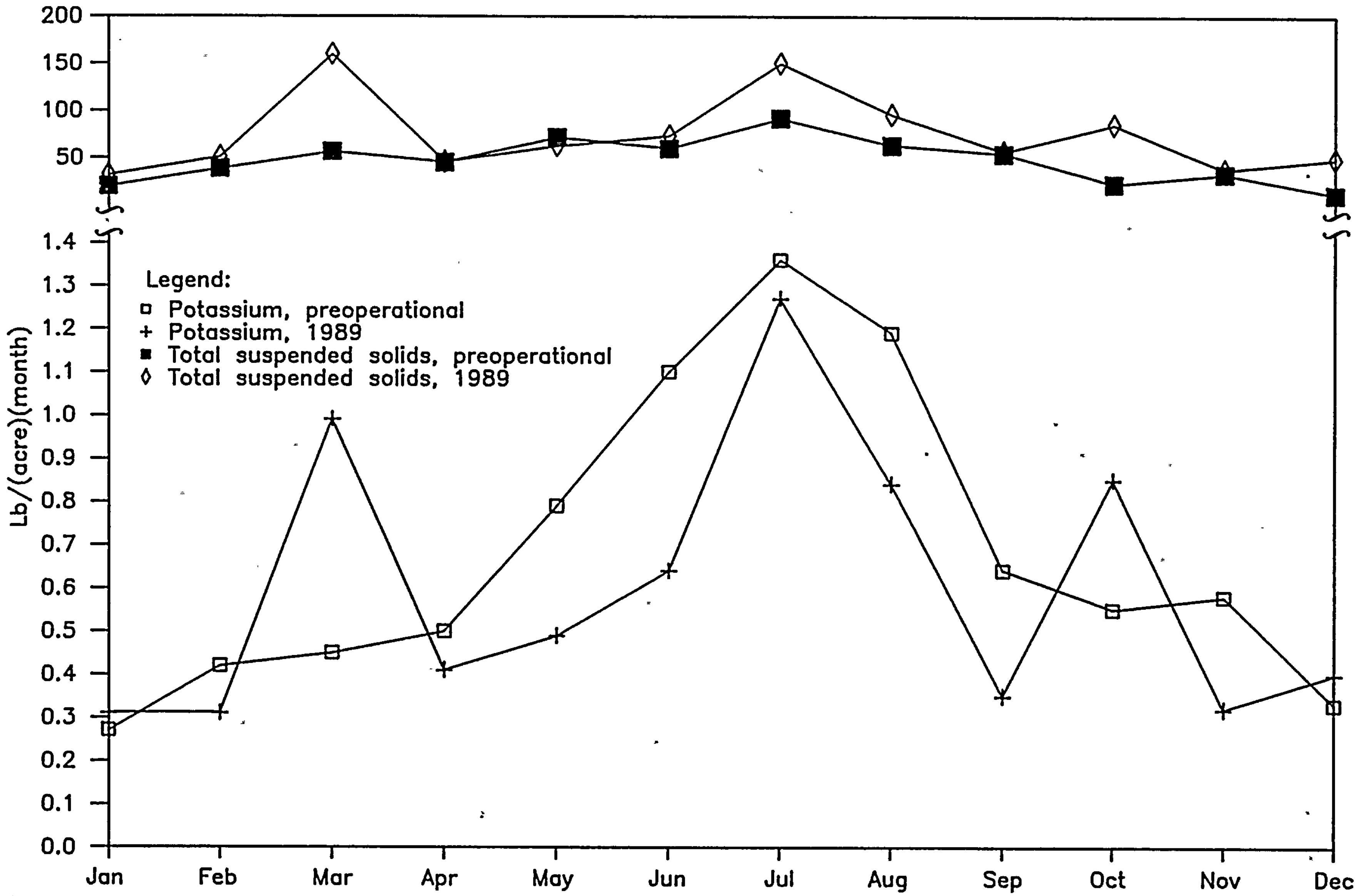

Figure 9–3. Mean monthly deposition of potassium and total suspended solids at PVNGS agricultural monitoring sites, preoperational period and 1989

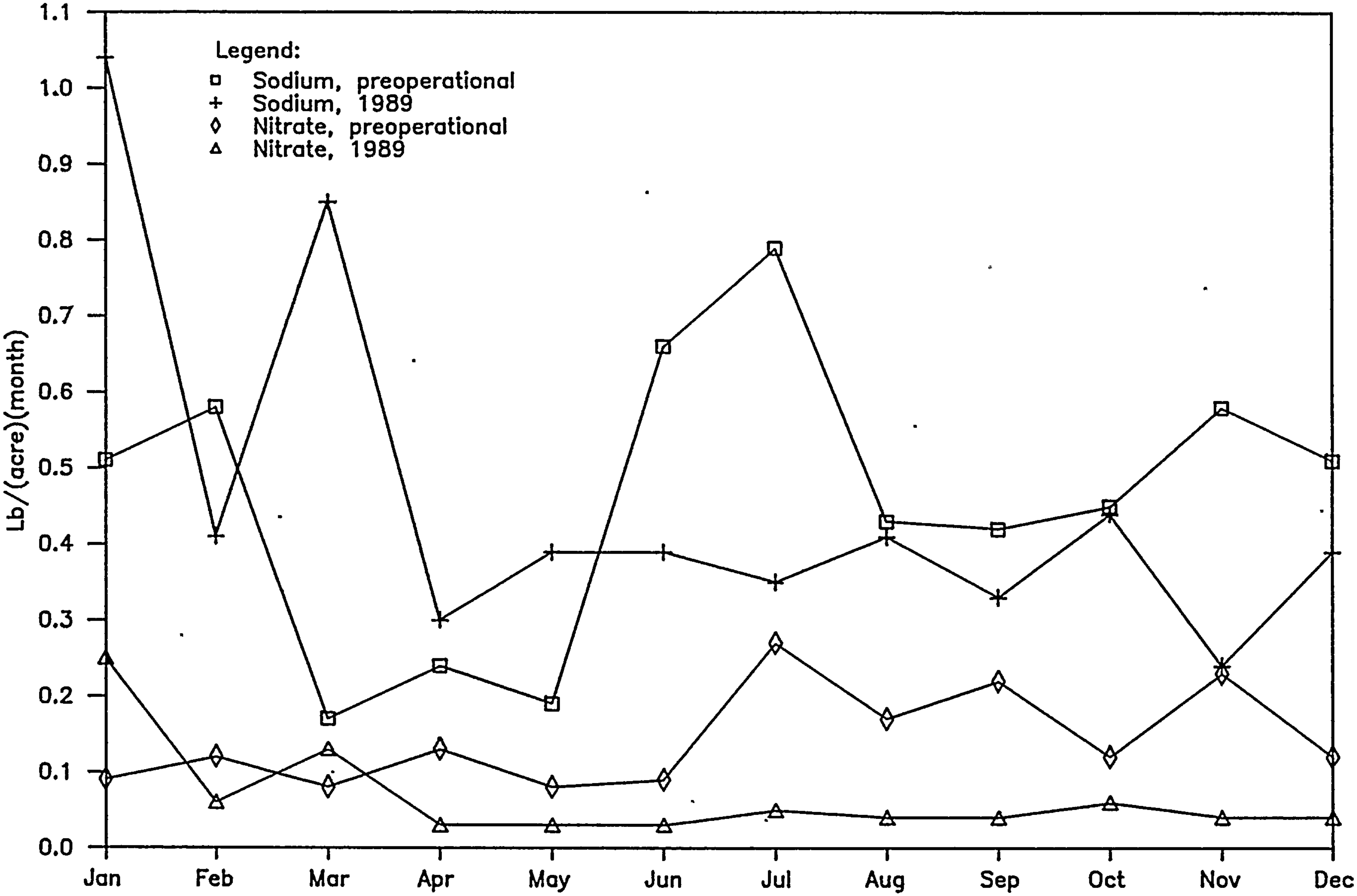

Figure 9-4. Mean monthly deposition of sodium and nitrate at PVNGS native monitoring sites (including sites 80-83), preoperational period and 1989

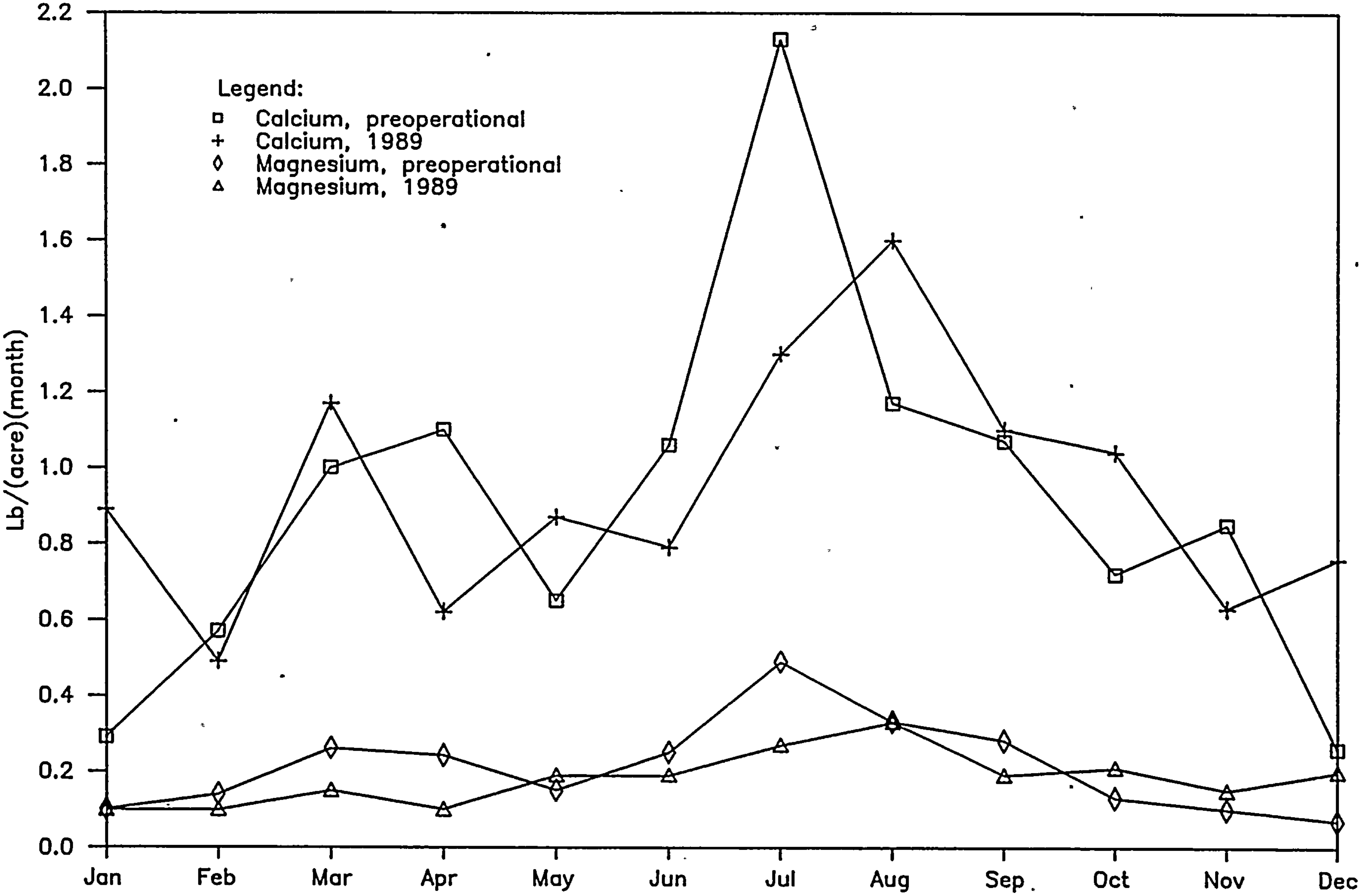

Figure 9–5. Mean monthly deposition of calcium and magnesium at PVNGS native monitoring sites (including sites 80–83), preoperational period and 1989

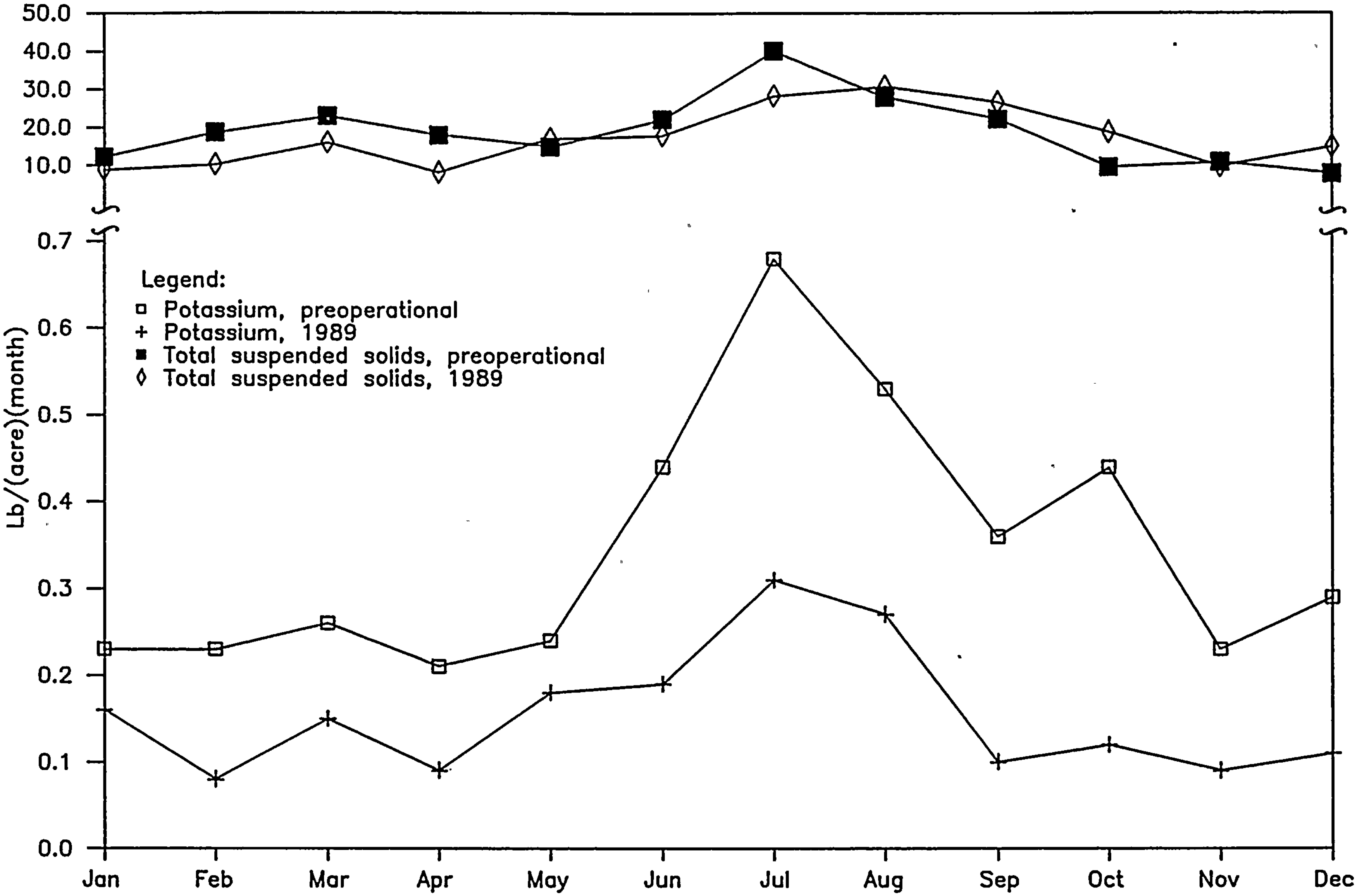

Figure 9-6. Mean monthly deposition of potassium and total suspended solids at PVNGS native monitoring sites (including sites 80-83), preoperational period and 1989

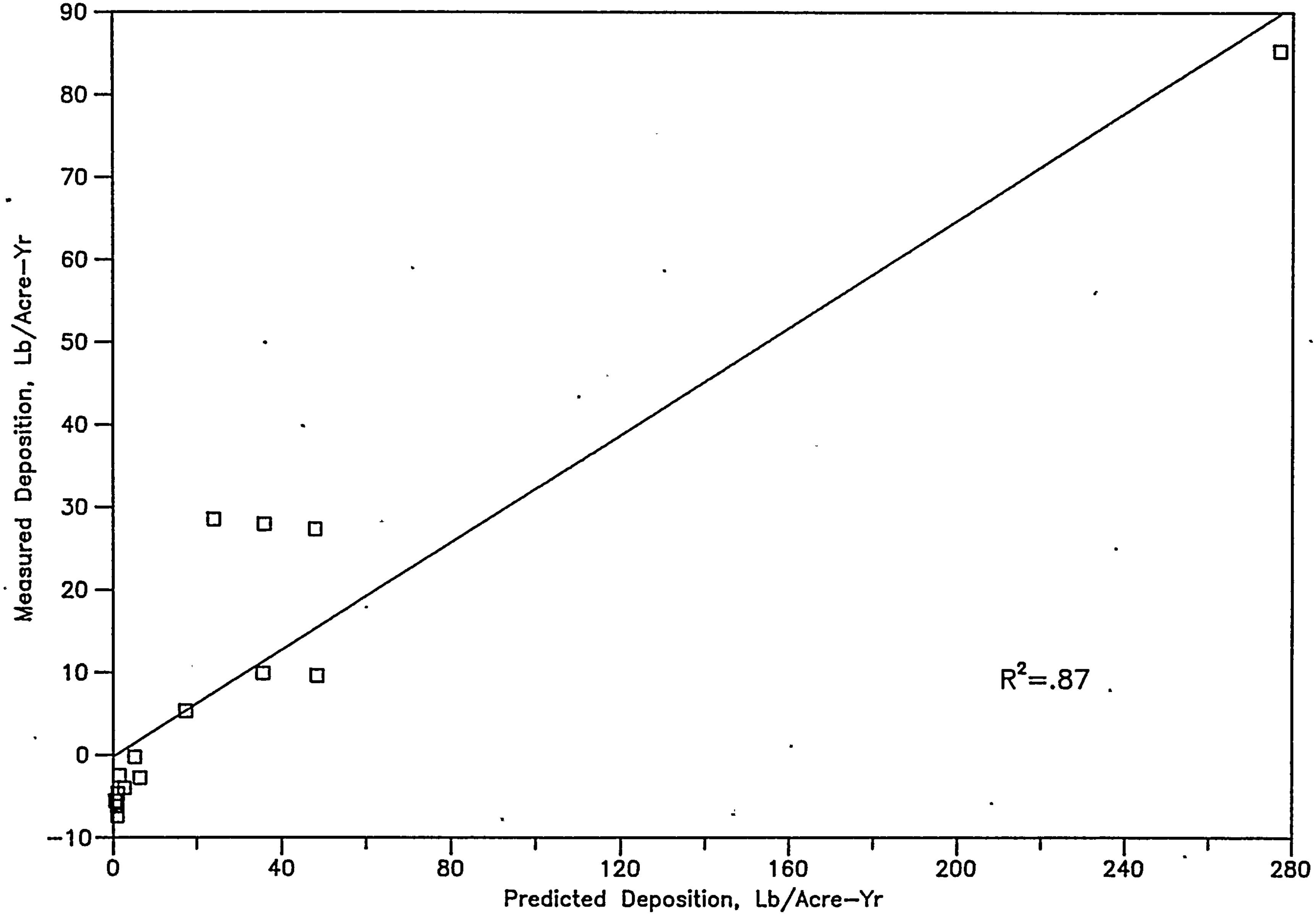

Figure 9–7. Linear regression of predicted versus measured deposition for all onsite locations at PVNGS for 1989

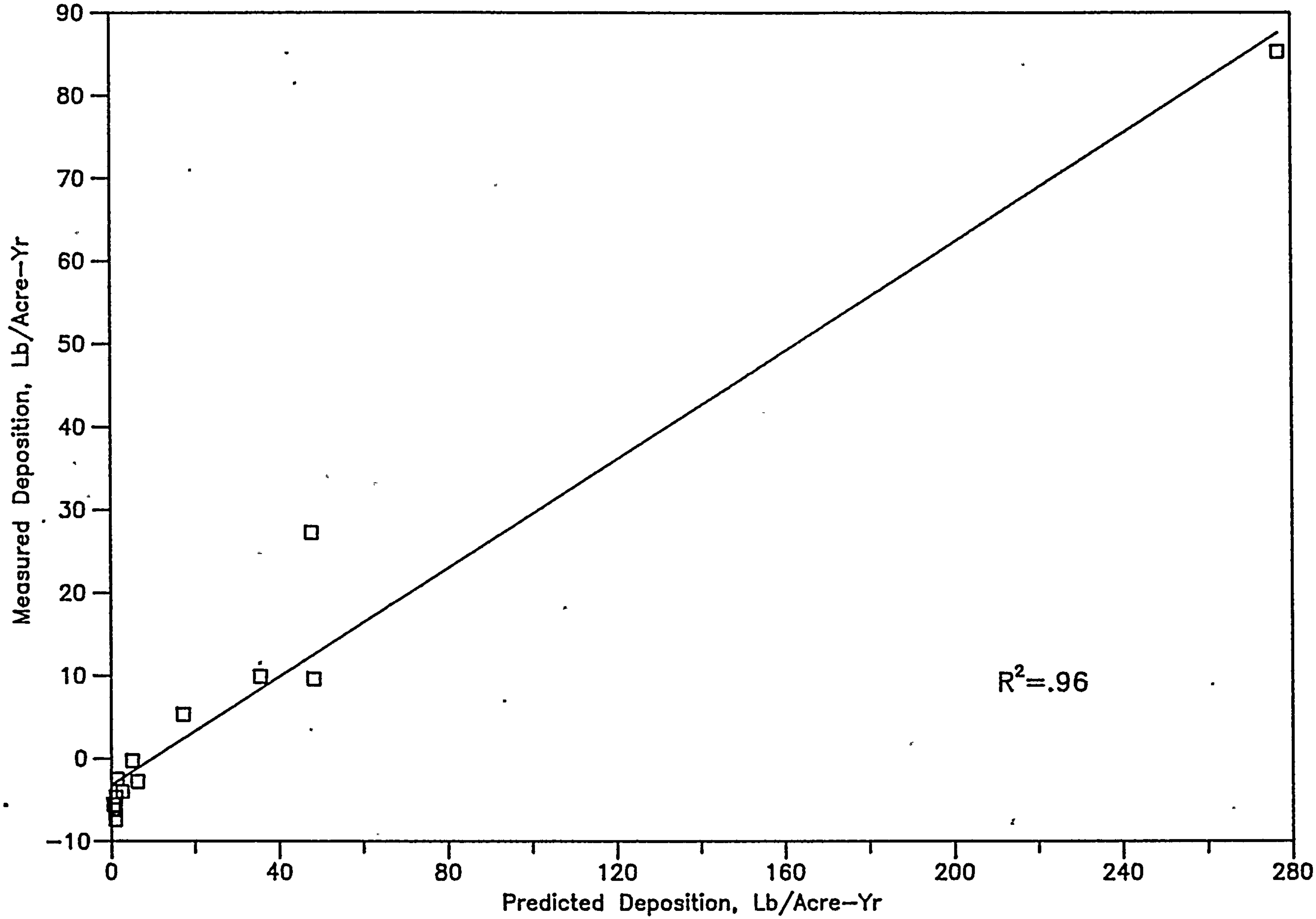

Figure 9–8. Linear regression of predicted versus measured deposition for all onsite locations except sites 20 and 83 at PVNGS for 1989

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APPENDIX A

PLANT OPERATING DATA

Appendix A
Plant Operating Data

Presented in this appendix are daily plant operating data which were used by the FOG code as input for the calculation of predicted drift deposition from the cooling towers for PVNGS Units 1-3. Specifically provided are circulating water conductivity data, circulating water thermal data, circulating water flowrate data (number of pumps operated per shift), total number of fans operated per shift for each of the three cooling towers, and calculated tower parameters.

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

JANUARY	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	23950	90835	4	4	4	48	48	42
	2	24800	90835	4	4	4	48	48	47
	3	25450	90835	4	4	4	48	48	42
	4	25500	90835	4	4	4	48	46	43
	5	25450	90835	4	4	4	45	33	45
	6	25100	90835	4	4	4	45	35	45
	7	23100	90926	4	4	4	45	45	47
	8	23000	90835	4	4	4	45	45	48
	9	22650	90835	4	4	4	45	47	48
	10	22800	90835	4	4	4	45	48	48
	11	23750	90835	4	4	4	45	48	48
	12	21750	90926	4	4	4	45	48	48
	13	22450	89832	4	4	4	46	48	48
	14	21000	72960	4	4	4	48	31	48
	15	21250	74237	4	4	4	48	33	48
	16	19350	86731	4	4	4	48	37	48
	17	22100	90926	4	4	4	48	48	48
	18	22050	90926	4	4	4	48	48	48
	19	23500	90744	4	4	4	48	48	48
	20	25450	90835	4	4	4	48	48	48
	21	26500	90197	4	3	3	48	48	24
	22	26200	90835	3	3	3	48	48	48
	23	26750	90835	3	3	4	48	48	48
	24	26750	90835	4	4	4	48	48	48
	25	26350	90835	4	4	4	48	48	48
	26	26300	90835	4	4	4	48	48	48
	27	25300	90835	4	4	4	48	48	48
	28	25900	90744	4	4	4	48	48	48
	29	24200	90835	4	4	4	48	48	48
	30	22800	90926	4	4	4	48	48	48
	31	24850	90835	4	4	4	48	48	48
AVERAGE		24076	89546	4	4	4	47	45	46

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.94 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM

FOR 1989

CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
JANUARY	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	10128	10128	8862	2.15E+08	22513	589000	1.129	0.212
	2	10128	10128	9917	2.15E+08	23312	589000	1.170	0.228
	3	10128	10128	8862	2.15E+08	23923	589000	1.129	0.225
	4	10128	9706	9073	2.15E+08	23970	589000	1.121	0.224
	5	9495	6963	9495	2.15E+08	23923	589000	1.006	0.201
	6	9495	7385	9495	2.15E+08	23594	589000	1.023	0.201
	7	9495	9495	9917	2.15E+08	21714	589000	1.121	0.203
	8	9495	9495	10128	2.15E+08	21620	589000	1.129	0.204
	9	9495	9917	10128	2.15E+08	21291	589000	1.145	0.203
	10	9495	10128	10128	2.15E+08	21432	589000	1.153	0.206
	11	9495	10128	10128	2.15E+08	22325	589000	1.153	0.215
	12	9495	10128	10128	2.15E+08	20445	589000	1.153	0.197
	13	9706	10128	10128	2.13E+08	21103	589000	1.162	0.205
	14	10128	6541	10128	1.73E+08	19740	589000	1.039	0.171
	15	10128	6963	10128	1.76E+08	19975	589000	1.055	0.176
	16	10128	7807	10128	2.06E+08	18189	589000	1.088	0.165
	17	10128	10128	10128	2.15E+08	20774	589000	1.178	0.204
	18	10128	10128	10128	2.15E+08	20727	589000	1.178	0.204
	19	10128	10128	10128	2.15E+08	22090	589000	1.178	0.217
	20	10128	10128	10128	2.15E+08	23923	589000	1.178	0.235
	21	10128	10128	5064	2.14E+08	24910	495667	0.826	0.172
	22	10128	10128	10128	2.15E+08	24628	449000	0.898	0.185
	23	10128	10128	10128	2.15E+08	25145	495667	0.991	0.208
	24	10128	10128	10128	2.15E+08	25145	589000	1.178	0.247
	25	10128	10128	10128	2.15E+08	24769	589000	1.178	0.243
	26	10128	10128	10128	2.15E+08	24722	589000	1.178	0.243
	27	10128	10128	10128	2.15E+08	23782	589000	1.178	0.234
	28	10128	10128	10128	2.15E+08	24346	589000	1.178	0.239
	29	10128	10128	10128	2.15E+08	22748	589000	1.178	0.224
	30	10128	10128	10128	2.15E+08	21432	589000	1.178	0.211
	31	10128	10128	10128	2.15E+08	23359	589000	1.178	0.230
AVERAGE		9951	9583	9794	2.12E+08	22631	578462	1.117	0.211

ASSUMPTIONS: Drift Rate = 0.0002%

TDS ppm = 0.94 x Conductivity, umhos/cm

Airflow = 64.4 E 06 cfm/ 48 fans

CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

FEBRUARY DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	23500	90835	4	4	4	48	48	48
2	24150	90853	4	4	4	48	48	48
3	22600	90826	4	4	4	48	48	48
4	23100	90881	4	4	4	48	48	48
5	22200	90863	4	4	4	48	48	48
6	21850	90844	4	4	4	48	48	48
7	22000	90853	4	4	4	48	48	48
8	21700	90853	4	4	4	48	48	48
9	22100	90872	4	4	4	48	48	48
10	22200	89230	4	4	4	48	48	48
11	21750	74483	4	4	4	48	48	48
12	21150	81761	4	4	4	48	48	48
13	21850	90826	4	4	4	48	48	46
14	22050	90744	4	4	4	48	48	36
15	21200	90890	4	4	4	48	48	36
16	21400	90844	4	4	4	48	48	36
17	22800	86941	4	4	4	48	48	36
18	22500	87114	4	4	4	48	48	38
19	21800	82080	4	4	4	48	44	33
20	24500	36553	4	2	2	42	11	0
21	21200	44807	2	4	4	48	25	0
22	23800	75924	4	4	4	48	41	7
23	20500	90881	4	4	4	48	48	42
24	20200	90863	4	4	4	48	48	43
25	21800	90881	4	4	4	48	48	48
26	24200	90799	4	4	4	48	48	48
27	23300	90881	4	4	4	48	48	48
28	24500	0	4	4	4	48	48	48
AVERAGE	22354	81935	4	4	4	48	45	40

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.86 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

	Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
FEBRUARY DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
1	10128	10128	10128	2.15E+08	20210	589000	1.178	0.199
2	10128	10128	10128	2.15E+08	20769	589000	1.178	0.204
3	10128	10128	10128	2.15E+08	19436	589000	1.178	0.191
4	10128	10128	10128	2.15E+08	19866	589000	1.178	0.195
5	10128	10128	10128	2.15E+08	19092	589000	1.178	0.188
6	10128	10128	10128	2.15E+08	18791	589000	1.178	0.185
7	10128	10128	10128	2.15E+08	18920	589000	1.178	0.186
8	10128	10128	10128	2.15E+08	18662	589000	1.178	0.183
9	10128	10128	10128	2.15E+08	19006	589000	1.178	0.187
10	10128	10128	10128	2.11E+08	19092	589000	1.178	0.188
11	10128	10128	10128	1.77E+08	18705	589000	1.178	0.184
12	10128	10128	10128	1.94E+08	18189	589000	1.178	0.179
13	10128	10128	9706	2.15E+08	18791	589000	1.162	0.182
14	10128	10128	7596	2.15E+08	18963	589000	1.080	0.171
15	10128	10128	7596	2.15E+08	18232	589000	1.080	0.164
16	10128	10128	7596	2.15E+08	18404	589000	1.080	0.166
17	10128	10128	7596	2.06E+08	19608	589000	1.080	0.177
18	10128	10128	8018	2.06E+08	19350	589000	1.096	0.177
19	10128	9284	6963	1.95E+08	18748	589000	1.023	0.160
20	8862	2321	0	8.66E+07	21070	402333	0.296	0.052
21	10128	5275	0	1.06E+08	18232	495667	0.503	0.076
22	10128	8651	1477	1.80E+08	20468	589000	0.785	0.134
23	10128	10128	8862	2.15E+08	17630	589000	1.129	0.166
24	10128	10128	9073	2.15E+08	17372	589000	1.137	0.165
25	10128	10128	10128	2.15E+08	18748	589000	1.178	0.184
26	10128	10128	10128	2.15E+08	20812	589000	1.178	0.205
27	10128	10128	10128	2.15E+08	20038	589000	1.178	0.197
28	10128	10128	10128	0.00E+00	21070	589000	1.178	0.207
AVERAGE	10083	9593	8448	1.94E+08	19224	579000	1.082	0.173

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.86 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

MARCH	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	24600	90808	4	4	4	48	48	48
	2	25150	90744	4	4	4	48	48	48
	3	26750	90771	4	4	4	48	48	48
	4	24500	90853	4	4	4	48	48	44
	5	25000	41642	4	2	2	16	16	14
	6	25100	0	2	4	0	0	0	0
	7	24300	0	0	0	0	0	0	0
	8	24050	0	0	0	0	0	0	0
	9	23250	0	0	0	0	0	0	0
	10	23550	0	0	0	0	0	0	0
	11	23450	0	0	0	0	0	0	0
	12	23150	0	0	0	0	0	0	0
	13	23550	0	0	0	0	0	0	0
	14	23400	0	0	0	0	0	0	0
	15	22450	0	0	0	0	0	0	0
	16	22800	0	0	0	0	0	0	0
	17	22500	0	0	0	0	0	0	0
	18	21400	0	0	0	0	0	0	0
	19	17100	0	0	0	0	0	0	0
	20	18900	0	0	0	0	0	0	0
	21	16200	0	0	0	0	0	0	0
	22	15550	0	0	0	0	0	0	0
	23	16000	0	0	0	0	0	0	0
	24	16200	0	0	0	0	0	0	0
	25	16000	0	0	0	0	0	0	0
	26	15800	0	0	0	0	0	0	0
	27	15250	0	0	0	0	0	0	0
	28	15600	0	0	0	0	0	0	0
	29	17000	0	0	0	0	0	0	0
	30	17150	0	0	0	0	0	0	0
	31	17850	0	0	0	0	0	0	0
AVERAGE		20760	13059	1	1	1	7	7	7

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.91 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

MARCH	DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
	1	10128	10128	10128	2.15E+08	22386	589000	1.178	0.220
	2	10128	10128	10128	2.15E+08	22887	589000	1.178	0.225
	3	10128	10128	10128	2.15E+08	24343	589000	1.178	0.239
	4	10128	10128	9284	2.15E+08	22295	589000	1.145	0.213
	5	3376	3376	2954	9.87E+07	22750	402333	0.257	0.049
	6	0	0	0	0.00E+00	22841	309000	0.000	0.000
	7	0	0	0	0.00E+00	22113	29000	0.000	0.000
	8	0	0	0	0.00E+00	21886	29000	0.000	0.000
	9	0	0	0	0.00E+00	21158	29000	0.000	0.000
	10	0	0	0	0.00E+00	21431	29000	0.000	0.000
	11	0	0	0	0.00E+00	21340	29000	0.000	0.000
	12	0	0	0	0.00E+00	21067	29000	0.000	0.000
	13	0	0	0	0.00E+00	21431	29000	0.000	0.000
	14	0	0	0	0.00E+00	21294	29000	0.000	0.000
	15	0	0	0	0.00E+00	20430	29000	0.000	0.000
	16	0	0	0	0.00E+00	20748	29000	0.000	0.000
	17	0	0	0	0.00E+00	20475	29000	0.000	0.000
	18	0	0	0	0.00E+00	19474	29000	0.000	0.000
	19	0	0	0	0.00E+00	15561	29000	0.000	0.000
	20	0	0	0	0.00E+00	17199	29000	0.000	0.000
	21	0	0	0	0.00E+00	14742	29000	0.000	0.000
	22	0	0	0	0.00E+00	14151	29000	0.000	0.000
	23	0	0	0	0.00E+00	14560	29000	0.000	0.000
	24	0	0	0	0.00E+00	14742	29000	0.000	0.000
	25	0	0	0	0.00E+00	14560	29000	0.000	0.000
	26	0	0	0	0.00E+00	14378	29000	0.000	0.000
	27	0	0	0	0.00E+00	13878	29000	0.000	0.000
	28	0	0	0	0.00E+00	14196	29000	0.000	0.000
	29	0	0	0	0.00E+00	15470	29000	0.000	0.000
	30	0	0	0	0.00E+00	15607	29000	0.000	0.000
	31	0	0	0	0.00E+00	16244	29000	0.000	0.000
AVERAGE		1416	1416	1375	3.09E+07	18891	122333	0.159	0.031

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.91 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

APRIL	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
APRIL	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	C	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

MAY	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
	31	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

MAY	DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
	31	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

JUNE	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

JUNE	DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW.Flow gpm	Calc Drift gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

JULY	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
	31	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
JULY	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
	31	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

AUGUST	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
	31	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

AUGUST	DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
	31	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

SEPTEMBER DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
AVERAGE	0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

	Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
SEPTEMBER DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
1	0	0	0	0.00E+00	0	29000	0.000	0.000
2	0	0	0	0.00E+00	0	29000	0.000	0.000
3	0	0	0	0.00E+00	0	29000	0.000	0.000
4	0	0	0	0.00E+00	0	29000	0.000	0.000
5	0	0	0	0.00E+00	0	29000	0.000	0.000
6	0	0	0	0.00E+00	0	29000	0.000	0.000
7	0	0	0	0.00E+00	0	29000	0.000	0.000
8	0	0	0	0.00E+00	0	29000	0.000	0.000
9	0	0	0	0.00E+00	0	29000	0.000	0.000
10	0	0	0	0.00E+00	0	29000	0.000	0.000
11	0	0	0	0.00E+00	0	29000	0.000	0.000
12	0	0	0	0.00E+00	0	29000	0.000	0.000
13	0	0	0	0.00E+00	0	29000	0.000	0.000
14	0	0	0	0.00E+00	0	29000	0.000	0.000
15	0	0	0	0.00E+00	0	29000	0.000	0.000
16	0	0	0	0.00E+00	0	29000	0.000	0.000
17	0	0	0	0.00E+00	0	29000	0.000	0.000
18	0	0	0	0.00E+00	0	29000	0.000	0.000
19	0	0	0	0.00E+00	0	29000	0.000	0.000
20	0	0	0	0.00E+00	0	29000	0.000	0.000
21	0	0	0	0.00E+00	0	29000	0.000	0.000
22	0	0	0	0.00E+00	0	29000	0.000	0.000
23	0	0	0	0.00E+00	0	29000	0.000	0.000
24	0	0	0	0.00E+00	0	29000	0.000	0.000
25	0	0	0	0.00E+00	0	29000	0.000	0.000
26	0	0	0	0.00E+00	0	29000	0.000	0.000
27	0	0	0	0.00E+00	0	29000	0.000	0.000
28	0	0	0	0.00E+00	0	29000	0.000	0.000
29	0	0	0	0.00E+00	0	29000	0.000	0.000
30	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE	0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

OCTOBER	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
	31	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
OCTOBER	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
	31	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

NOVEMBER DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
AVERAGE	0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
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COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

	Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
NOVEMBER DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
1	0	0	0	0.00E+00	0	29000	0.000	0.000
2	0	0	0	0.00E+00	0	29000	0.000	0.000
3	0	0	0	0.00E+00	0	29000	0.000	0.000
4	0	0	0	0.00E+00	0	29000	0.000	0.000
5	0	0	0	0.00E+00	0	29000	0.000	0.000
6	0	0	0	0.00E+00	0	29000	0.000	0.000
7	0	0	0	0.00E+00	0	29000	0.000	0.000
8	0	0	0	0.00E+00	0	29000	0.000	0.000
9	0	0	0	0.00E+00	0	29000	0.000	0.000
10	0	0	0	0.00E+00	0	29000	0.000	0.000
11	0	0	0	0.00E+00	0	29000	0.000	0.000
12	0	0	0	0.00E+00	0	29000	0.000	0.000
13	0	0	0	0.00E+00	0	29000	0.000	0.000
14	0	0	0	0.00E+00	0	29000	0.000	0.000
15	0	0	0	0.00E+00	0	29000	0.000	0.000
16	0	0	0	0.00E+00	0	29000	0.000	0.000
17	0	0	0	0.00E+00	0	29000	0.000	0.000
18	0	0	0	0.00E+00	0	29000	0.000	0.000
19	0	0	0	0.00E+00	0	29000	0.000	0.000
20	0	0	0	0.00E+00	0	29000	0.000	0.000
21	0	0	0	0.00E+00	0	29000	0.000	0.000
22	0	0	0	0.00E+00	0	29000	0.000	0.000
23	0	0	0	0.00E+00	0	29000	0.000	0.000
24	0	0	0	0.00E+00	0	29000	0.000	0.000
25	0	0	0	0.00E+00	0	29000	0.000	0.000
26	0	0	0	0.00E+00	0	29000	0.000	0.000
27	0	0	0	0.00E+00	0	29000	0.000	0.000
28	0	0	0	0.00E+00	0	29000	0.000	0.000
29	0	0	0	0.00E+00	0	29000	0.000	0.000
30	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE	0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 1

DECEMBER DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0
AVERAGE	0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

DECEMBER DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
1	0	0	0	0.00E+00	0	29000	0.000	0.000
2	0	0	0	0.00E+00	0	29000	0.000	0.000
3	0	0	0	0.00E+00	0	29000	0.000	0.000
4	0	0	0	0.00E+00	0	29000	0.000	0.000
5	0	0	0	0.00E+00	0	29000	0.000	0.000
6	0	0	0	0.00E+00	0	29000	0.000	0.000
7	0	0	0	0.00E+00	0	29000	0.000	0.000
8	0	0	0	0.00E+00	0	29000	0.000	0.000
9	0	0	0	0.00E+00	0	29000	0.000	0.000
10	0	0	0	0.00E+00	0	29000	0.000	0.000
11	0	0	0	0.00E+00	0	29000	0.000	0.000
12	0	0	0	0.00E+00	0	29000	0.000	0.000
13	0	0	0	0.00E+00	0	29000	0.000	0.000
14	0	0	0	0.00E+00	0	29000	0.000	0.000
15	0	0	0	0.00E+00	0	29000	0.000	0.000
16	0	0	0	0.00E+00	0	29000	0.000	0.000
17	0	0	0	0.00E+00	0	29000	0.000	0.000
18	0	0	0	0.00E+00	0	29000	0.000	0.000
19	0	0	0	0.00E+00	0	29000	0.000	0.000
20	0	0	0	0.00E+00	0	29000	0.000	0.000
21	0	0	0	0.00E+00	0	29000	0.000	0.000
22	0	0	0	0.00E+00	0	29000	0.000	0.000
23	0	0	0	0.00E+00	0	29000	0.000	0.000
24	0	0	0	0.00E+00	0	29000	0.000	0.000
25	0	0	0	0.00E+00	0	29000	0.000	0.000
26	0	0	0	0.00E+00	0	29000	0.000	0.000
27	0	0	0	0.00E+00	0	29000	0.000	0.000
28	0	0	0	0.00E+00	0	29000	0.000	0.000
29	0	0	0	0.00E+00	0	29000	0.000	0.000
30	0	0	0	0.00E+00	0	29000	0.000	0.000
31	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE	0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

JANUARY	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	23950	90726	4	4	4	32	45	45
	2	23650	90762	4	4	4	48	45	38
	3	24650	90881	4	4	4	48	45	41
	4	24550	90790	4	4	4	48	45	39
	5	24450	90744	4	4	4	48	45	39
	6	24650	90808	4	4	4	48	45	39
	7	23350	81204	4	4	4	48	39	19
	8	22500	90826	4	4	4	48	42	32
	9	22900	90817	4	4	4	48	38	35
	10	23000	90790	4	4	4	48	41	39
	11	23200	90762	4	4	4	48	45	41
	12	21900	90844	4	4	4	48	38	48
	13	22950	90753	4	4	4	48	42	41
	14	23650	90799	4	4	4	48	42	29
	15	23700	90753	4	4	4	48	42	36
	16	24550	89741	4	4	4	48	42	34
	17	25950	88674	4	4	4	48	42	38
	18	24550	90717	4	4	4	48	43	48
	19	25900	90671	4	4	4	48	43	42
	20	25100	90762	4	4	4	48	42	48
	21	26250	90726	4	4	4	48	42	48
	22	25750	90726	4	4	4	48	42	48
	23	25800	90753	4	4	4	48	42	48
	24	25900	90735	4	4	4	48	42	48
	25	25150	90753	4	4	4	48	42	48
	26	24650	90753	4	4	4	48	42	48
	27	24100	90625	4	4	4	45	42	48
	28	24000	90762	4	4	4	45	42	48
	29	23200	90653	4	4	4	45	42	48
	30	22350	90780	4	4	4	45	42	42
	31	23250	90762	4	4	4	45	42	44
AVERAGE		24177	90350	4	4	4	47	42	42

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.85 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

JANUARY	DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
	1	6752	9495	9495	2.15E+08	20358	589000	0.998	0.170
	2	10128	9495	8018	2.15E+08	20103	589000	1.072	0.180
	3	10128	9495	8651	2.15E+08	20953	589000	1.096	0.192
	4	10128	9495	8229	2.15E+08	20868	589000	1.080	0.188
	5	10128	9495	8229	2.15E+08	20783	589000	1.080	0.187
	6	10128	9495	8229	2.15E+08	20953	589000	1.080	0.189
	7	10128	8229	4009	1.92E+08	19848	589000	0.867	0.144
	8	10128	8862	6752	2.15E+08	19125	589000	0.998	0.159
	9	10128	8018	7385	2.15E+08	19465	589000	0.990	0.161
	10	10128	8651	8229	2.15E+08	19550	589000	1.047	0.171
	11	10128	9495	8651	2.15E+08	19720	589000	1.096	0.180
	12	10128	8018	10128	2.15E+08	18615	589000	1.096	0.170
	13	10128	8862	8651	2.15E+08	19508	589000	1.072	0.174
	14	10128	8862	6119	2.15E+08	20103	589000	0.973	0.163
	15	10128	8862	7596	2.15E+08	20145	589000	1.031	0.173
	16	10128	8862	7174	2.13E+08	20868	589000	1.014	0.177
	17	10128	8862	8018	2.10E+08	22058	589000	1.047	0.193
	18	10128	9073	10128	2.15E+08	20868	589000	1.137	0.198
	19	10128	9073	8862	2.15E+08	22015	589000	1.088	0.200
	20	10128	8862	10128	2.15E+08	21335	589000	1.129	0.201
	21	10128	8862	10128	2.15E+08	22313	589000	1.129	0.210
	22	10128	8862	10128	2.15E+08	21888	589000	1.129	0.206
	23	10128	8862	10128	2.15E+08	21930	589000	1.129	0.207
	24	10128	8862	10128	2.15E+08	22015	589000	1.129	0.207
	25	10128	8862	10128	2.15E+08	21378	589000	1.129	0.201
	26	10128	8862	10128	2.15E+08	20953	589000	1.129	0.197
	27	9495	8862	10128	2.15E+08	20485	589000	1.104	0.189
	28	9495	8862	10128	2.15E+08	20400	589000	1.104	0.188
	29	9495	8862	10128	2.15E+08	19720	589000	1.104	0.182
	30	9495	8862	8862	2.15E+08	18998	589000	1.055	0.167
	31	9495	8862	9284	2.15E+08	19763	589000	1.072	0.177
AVERAGE		9917	8937	8774	2.14E+08	20551	589000	1.071	0.184

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.85 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

FEBRUARY DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	22850	90799	4	4	4	45	42	48
2	23650	90735	4	4	4	45	42	45
3	22250	90635	4	4	4	45	43	45
4	22150	90771	4	4	4	45	48	45
5	22900	90753	4	4	4	45	48	45
6	22400	90844	4	4	4	45	44	45
7	22400	90881	4	4	4	45	41	44
8	21900	90826	4	4	4	45	42	45
9	22200	90853	4	4	4	45	42	45
10	21150	90580	4	4	4	45	42	45
11	21050	90753	4	4	4	45	42	45
12	21350	90744	4	4	4	45	42	45
13	21900	90799	4	4	4	45	42	45
14	21650	90826	4	4	4	45	42	45
15	22250	90844	4	4	4	45	42	45
16	18300	15121	4	4	2	15	14	15
17	18500	0	2	2	0	0	0	0
18	18900	0	0	0	0	0	0	0
19	16150	0	0	0	0	0	0	0
20	16450	0	0	0	0	0	0	0
21	16850	0	0	0	0	0	0	0
22	19750	0	0	0	0	0	0	0
23	17100	0	0	0	0	0	0	0
24	16350	0	0	0	0	0	0	0
25	16300	0	0	0	0	0	0	0
26	15550	0	0	0	0	0	0	0
27	15750	0	0	0	0	0	0	0
28	16300	0	0	0	0	0	0	0
AVERAGE	19796	49170	2	2	2	25	24	25

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.86 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

FEBRUARY DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
1	9495	8862	10128	2.15E+08	19651	589000	1.104	0.181
2	9495	8862	9495	2.15E+08	20339	589000	1.080	0.183
3	9495	9073	9495	2.15E+08	19135	589000	1.088	0.174
4	9495	10128	9495	2.15E+08	19049	589000	1.129	0.179
5	9495	10128	9495	2.15E+08	19694	589000	1.129	0.186
6	9495	9284	9495	2.15E+08	19264	589000	1.096	0.176
7	9495	8651	9284	2.15E+08	19264	589000	1.063	0.171
8	9495	8862	9495	2.15E+08	18834	589000	1.080	0.170
9	9495	8862	9495	2.15E+08	19092	589000	1.080	0.172
10	9495	8862	9495	2.15E+08	18189	589000	1.080	0.164
11	9495	8862	9495	2.15E+08	18103	589000	1.080	0.163
12	9495	8862	9495	2.15E+08	18361	589000	1.080	0.165
13	9495	8862	9495	2.15E+08	18834	589000	1.080	0.170
14	9495	8862	9495	2.15E+08	18619	589000	1.080	0.168
15	9495	8862	9495	2.15E+08	19135	589000	1.080	0.172
16	3165	2954	3165	3.58E+07	15738	495667	0.303	0.040
17	0	0	0	0.00E+00	15910	215667	0.000	0.000
18	0	0	0	0.00E+00	16254	29000	0.000	0.000
19	0	0	0	0.00E+00	13889	29000	0.000	0.000
20	0	0	0	0.00E+00	14147	29000	0.000	0.000
21	0	0	0	0.00E+00	14491	29000	0.000	0.000
22	0	0	0	0.00E+00	16985	29000	0.000	0.000
23	0	0	0	0.00E+00	14706	29000	0.000	0.000
24	0	0	0	0.00E+00	14061	29000	0.000	0.000
25	0	0	0	0.00E+00	14018	29000	0.000	0.000
26	0	0	0	0.00E+00	13373	29000	0.000	0.000
27	0	0	0	0.00E+00	13545	29000	0.000	0.000
28	0	0	0	0.00E+00	14018	29000	0.000	0.000
AVERAGE	5200	4959	5215	1.17E+08	17025	352333	0.594	0.094

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.86 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

MARCH	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	17050	48920	4	4	4	27	8	2
	2	18350	88783	4	4	4	45	48	34
	3	19200	90644	4	4	4	45	48	45
	4	19100	90872	4	4	4	45	48	45
	5	20050	90853	4	4	4	45	48	45
	6	22350	90780	4	4	4	45	48	45
	7	23400	90735	4	4	4	45	48	45
	8	24050	90717	4	4	4	45	45	45
	9	25100	90726	4	4	4	45	45	45
	10	25700	90717	4	4	4	45	45	45
	11	26650	90735	4	4	4	45	45	45
	12	26400	90799	4	4	4	45	45	45
	13	27650	90689	4	4	4	45	45	45
	14	27050	90735	4	4	4	45	45	45
	15	26650	76845	4	4	4	45	38	39
	16	25100	0	4	4	4	15	0	3
	17	25000	0	4	4	0	0	0	0
	18	26600	0	0	0	0	0	0	0
	19	24050	0	0	0	0	0	0	0
	20	24850	0	0	0	0	0	0	0
	21	23950	0	0	0	0	0	0	0
	22	24550	0	0	0	0	0	0	0
	23	25900	0	0	0	0	0	0	0
	24	22600	0	0	0	0	0	0	0
	25	23300	0	0	0	0	0	0	0
	26	22850	0	0	0	0	0	0	0
	27	21900	0	0	0	0	0	0	0
	28	22050	0	0	0	0	0	0	0
	29	23200	0	0	0	0	0	0	0
	30	24500	0	0	0	0	0	0	0
	31	25400	0	0	0	0	0	0	0
AVERAGE		23695	42050	2	2	2	22	21	20

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.85 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
MARCH	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	5697	1688	422	1.16E+08	14493	589000	0.303	0.037
	2	9495	10128	7174	2.10E+08	15598	589000	1.039	0.135
	3	9495	10128	9495	2.15E+08	16320	589000	1.129	0.154
	4	9495	10128	9495	2.15E+08	16235	589000	1.129	0.153
	5	9495	10128	9495	2.15E+08	17043	589000	1.129	0.161
	6	9495	10128	9495	2.15E+08	18998	589000	1.129	0.179
	7	9495	10128	9495	2.15E+08	19890	589000	1.129	0.187
	8	9495	9495	9495	2.15E+08	20443	589000	1.104	0.188
	9	9495	9495	9495	2.15E+08	21335	589000	1.104	0.197
	10	9495	9495	9495	2.15E+08	21845	589000	1.104	0.201
	11	9495	9495	9495	2.15E+08	22653	589000	1.104	0.209
	12	9495	9495	9495	2.15E+08	22440	589000	1.104	0.207
	13	9495	9495	9495	2.15E+08	23503	589000	1.104	0.217
	14	9495	9495	9495	2.15E+08	22993	589000	1.104	0.212
	15	9495	8018	8229	1.82E+08	22653	589000	0.998	0.189
	16	3165	0	633	0.00E+00	21335	589000	0.147	0.026
	17	0	0	0	0.00E+00	21250	402333	0.000	0.000
	18	0	0	0	0.00E+00	22610	29000	0.000	0.000
	19	0	0	0	0.00E+00	20443	29000	0.000	0.000
	20	0	0	0	0.00E+00	21123	29000	0.000	0.000
	21	0	0	0	0.00E+00	20358	29000	0.000	0.000
	22	0	0	0	0.00E+00	20868	29000	0.000	0.000
	23	0	0	0	0.00E+00	22015	29000	0.000	0.000
	24	0	0	0	0.00E+00	19210	29000	0.000	0.000
	25	0	0	0	0.00E+00	19805	29000	0.000	0.000
	26	0	0	0	0.00E+00	19423	29000	0.000	0.000
	27	0	0	0	0.00E+00	18615	29000	0.000	0.000
	28	0	0	0	0.00E+00	18743	29000	0.000	0.000
	29	0	0	0	0.00E+00	19720	29000	0.000	0.000
	30	0	0	0	0.00E+00	20825	29000	0.000	0.000
	31	0	0	0	0.00E+00	21590	29000	0.000	0.000
AVERAGE		4574	4417	4206	9.97E+07	20141	330075	0.512	0.086

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.85 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

APRIL	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.82 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

APRIL	DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.82 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

MAY	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
	31	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.82 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
MAY	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
	31	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.82 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

JUNE	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.82 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

JUNE	DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.82 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

JULY	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	22600	47342	4	4	4	43	23	42
	2	26700	78514	4	4	4	42	45	42
	3	30400	85381	4	4	4	42	45	42
	4	31800	10251	4	4	4	14	20	14
	5	29100	0	4	4	4	0	22	0
	6	27800	5326	4	4	4	2	22	0
	7	29100	61897	4	4	4	30	43	28
	8	30800	90598	4	4	4	43	45	42
	9	32200	90233	4	4	4	44	44	39
	10	34900	90671	4	4	4	45	45	38
	11	34400	90698	4	4	4	45	45	41
	12	32900	89349	4	4	4	45	45	42
	13	28200	0	4	2	2	40	15	14
	14	23600	0	2	2	2	10	0	0
	15	22300	0	2	2	2	0	0	0
	16	20700	0	2	2	2	0	0	0
	17	20400	0	2	2	1	0	0	0
	18	18800	0	2	2	2	0	0	0
	19	17600	0	4	4	4	0	0	0
	20	16700	0	4	4	4	0	0	0
	21	16000	24077	4	4	4	30	30	26
	22	17400	89531	4	4	4	47	47	42
	23	20600	90589	4	4	4	48	48	45
	24	24600	90653	4	4	4	48	48	45
	25	26200	90698	4	4	4	48	48	43
	26	27700	85153	4	4	4	48	48	43
	27	27800	84123	4	4	4	48	48	45
	28	25800	90598	4	4	4	48	48	45
	29	26700	90708	4	4	4	48	48	45
	30	25800	90726	4	4	4	48	48	45
	31	28300	90543	4	4	4	48	46	45
AVERAGE		25739	53473	4	4	4	31	31	28

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.82 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
JULY	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	9073	4853	8862	1.12E+08	18532	589000	0.884	0.137
	2	8862	9495	8862	1.86E+08	21894	589000	1.055	0.193
	3	8862	9495	8862	2.02E+08	24928	589000	1.055	0.220
	4	2954	4220	2954	2.43E+07	26076	589000	0.393	0.085
	5	0	4642	0	0.00E+00	23862	589000	0.180	0.036
	6	422	4642	0	1.26E+07	22796	589000	0.196	0.037
	7	6330	9073	5908	1.47E+08	23862	589000	0.826	0.165
	8	9073	9495	8862	2.15E+08	25256	589000	1.063	0.224
	9	9284	9284	8229	2.14E+08	26404	589000	1.039	0.229
	10	9495	9495	8018	2.15E+08	28618	589000	1.047	0.250
	11	9495	9495	8651	2.15E+08	28208	589000	1.072	0.252
	12	9495	9495	8862	2.12E+08	26978	589000	1.080	0.243
	13	8440	3165	2954	0.00E+00	23124	402333	0.386	0.074
	14	2110	0	0	0.00E+00	19352	309000	0.043	0.007
	15	0	0	0	0.00E+00	18286	309000	0.000	0.000
	16	0	0	0	0.00E+00	16974	309000	0.000	0.000
	17	0	0	0	0.00E+00	16728	262333	0.000	0.000
	18	0	0	0	0.00E+00	15416	309000	0.000	0.000
	19	0	0	0	0.00E+00	14432	589000	0.000	0.000
	20	0	0	0	0.00E+00	13694	589000	0.000	0.000
	21	6330	6330	5486	5.71E+07	13120	589000	0.704	0.077
	22	9917	9917	8862	2.12E+08	14268	589000	1.113	0.132
	23	10128	10128	9495	2.15E+08	16892	589000	1.153	0.163
	24	10128	10128	9495	2.15E+08	20172	589000	1.153	0.194
	25	10128	10128	9073	2.15E+08	21484	589000	1.137	0.204
	26	10128	10128	9073	2.02E+08	22714	589000	1.137	0.216
	27	10128	10128	9495	1.99E+08	22796	589000	1.153	0.219
	28	10128	10128	9495	2.15E+08	21156	589000	1.153	0.204
	29	10128	10128	9495	2.15E+08	21894	589000	1.153	0.211
	30	10128	10128	9495	2.15E+08	21156	589000	1.153	0.204
	31	10128	9706	9495	2.15E+08	23206	589000	1.137	0.220
AVERAGE		6493	6575	5806	1.27E+08	21106	536312	0.725	0.135

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.82 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

AUGUST	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	27200	90771	4	4	4	48	46	45
	2	25600	90580	4	4	4	48	48	45
	3	24500	89613	4	4	4	48	48	45
	4	26100	39809	4	4	4	45	40	38
	5	24800	4542	4	4	4	23	0	0
	6	21500	36024	4	4	4	27	8	7
	7	19600	89951	4	4	4	45	48	42
	8	18600	90616	4	4	4	45	48	42
	9	20000	90726	4	4	4	47	48	44
	10	20600	90698	4	4	4	48	45	45
	11	20700	90698	4	4	4	48	48	45
	12	21100	90698	4	4	4	48	48	45
	13	22000	90671	4	4	4	48	48	45
	14	21900	90689	4	4	4	47	48	45
	15	21700	90635	4	4	4	41	48	45
	16	22300	90662	4	4	4	46	48	45
	17	25100	90543	4	4	4	48	48	45
	18	25300	90671	4	4	4	48	48	45
	19	23900	90689	4	4	4	48	48	45
	20	23800	90580	4	4	4	48	48	45
	21	22300	90625	4	4	4	48	48	45
	22	22200	87716	4	4	4	48	48	45
	23	22000	59244	4	4	4	32	48	45
	24	21000	84734	4	4	4	40	48	45
	25	20800	90525	4	4	4	48	48	45
	26	20500	90516	4	4	4	48	48	45
	27	20800	90635	4	4	4	48	48	45
	28	20500	90644	4	4	4	48	48	45
	29	19800	90616	4	4	4	48	48	45
	30	19900	90562	4	4	4	48	48	45
	31	20900	90708	4	4	4	48	48	45
AVERAGE		22161	83109	4	4	4	45	45	42

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.81 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
AUGUST	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	10128	9706	9495	2.15E+08	22032	589000	1.137	0.209
	2	10128	10128	9495	2.15E+08	20736	589000	1.153	0.200
	3	10128	10128	9495	2.12E+08	19845	589000	1.153	0.191
	4	9495	8440	8018	9.43E+07	21141	589000	1.006	0.178
	5	4853	0	0	1.08E+07	20088	589000	0.188	0.032
	6	5697	1688	1477	8.54E+07	17415	589000	0.344	0.050
	7	9495	10128	8862	2.13E+08	15876	589000	1.104	0.146
	8	9495	10128	8862	2.15E+08	15066	589000	1.104	0.139
	9	9917	10128	9284	2.15E+08	16200	589000	1.137	0.154
	10	10128	9495	9495	2.15E+08	16686	589000	1.129	0.157
	11	10128	10128	9495	2.15E+08	16767	589000	1.153	0.161
	12	10128	10128	9495	2.15E+08	17091	589000	1.153	0.165
	13	10128	10128	9495	2.15E+08	17820	589000	1.153	0.172
	14	9917	10128	9495	2.15E+08	17739	589000	1.145	0.170
	15	8651	10128	9495	2.15E+08	17577	589000	1.096	0.161
	16	9706	10128	9495	2.15E+08	18063	589000	1.137	0.171
	17	10128	10128	9495	2.15E+08	20331	589000	1.153	0.196
	18	10128	10128	9495	2.15E+08	20493	589000	1.153	0.197
	19	10128	10128	9495	2.15E+08	19359	589000	1.153	0.186
	20	10128	10128	9495	2.15E+08	19278	589000	1.153	0.186
	21	10128	10128	9495	2.15E+08	18063	589000	1.153	0.174
	22	10128	10128	9495	2.08E+08	17982	589000	1.153	0.173
	23	6752	10128	9495	1.40E+08	17820	589000	1.023	0.152
	24	8440	10128	9495	2.01E+08	17010	589000	1.088	0.154
	25	10128	10128	9495	2.15E+08	16848	589000	1.153	0.162
	26	10128	10128	9495	2.15E+08	16605	589000	1.153	0.160
	27	10128	10128	9495	2.15E+08	16848	589000	1.153	0.162
	28	10128	10128	9495	2.15E+08	16605	589000	1.153	0.160
	29	10128	10128	9495	2.15E+08	16038	589000	1.153	0.154
	30	10128	10128	9495	2.15E+08	16119	589000	1.153	0.155
	31	10128	10128	9495	2.15E+08	16929	589000	1.153	0.163
AVERAGE		9515	9441	8835	1.97E+08	17951	589000	1.077	0.161

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.81 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

SEPTEMBER DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	19300	90534	4	4	4	48	48	45
2	18000	88090	4	4	4	48	48	45
3	18100	89558	4	4	4	48	48	45
4	19100	88172	4	4	4	48	48	45
5	18300	90534	4	4	4	48	48	45
6	19100	53379	4	4	3	40	40	38
7	18000	0	2	2	2	0	0	0
8	17200	0	2	2	2	0	0	0
9	16700	0	2	2	2	0	0	0
10	16400	0	2	2	2	0	0	0
11	16200	0	2	2	2	0	0	0
12	16600	0	2	2	2	0	0	0
13	16100	0	2	2	2	0	0	0
14	15300	0	2	2	2	0	0	0
15	15700	0	2	2	2	0	0	0
16	16600	0	2	2	2	0	0	0
17	16900	0	2	2	2	0	0	0
18	16600	0	2	2	2	0	0	0
19	15400	0	2	2	2	0	0	0
20	14700	0	2	2	2	0	0	0
21	14900	0	2	2	2	0	0	0
22	15700	7752	2	2	2	6	6	0
23	17200	65846	2	4	4	42	43	30
24	19200	90516	4	4	4	46	48	45
25	18900	90543	4	4	4	48	48	45
26	19100	90507	4	4	4	48	48	45
27	20200	90571	4	4	4	48	48	45
28	20700	90744	4	4	4	48	48	45
29	20600	90717	4	4	4	48	48	45
30	20700	89449	4	4	4	48	48	45
AVERAGE	17583	40230	3	3	3	22	22	20

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.74 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

SEPTEMBER DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
1	10128	10128	9495	2.15E+08	14282	589000	1.153	0.137
2	10128	10128	9495	2.09E+08	13320	589000	1.153	0.128
3	10128	10128	9495	2.12E+08	13394	589000	1.153	0.129
4	10128	10128	9495	2.09E+08	14134	589000	1.153	0.136
5	10128	10128	9495	2.15E+08	13542	589000	1.153	0.130
6	8440	8440	8018	1.27E+08	14134	542333	0.889	0.105
7	0	0	0	0.00E+00	13320	309000	0.000	0.000
8	0	0	0	0.00E+00	12728	309000	0.000	0.000
9	0	0	0	0.00E+00	12358	309000	0.000	0.000
10	0	0	0	0.00E+00	12136	309000	0.000	0.000
11	0	0	0	0.00E+00	11988	309000	0.000	0.000
12	0	0	0	0.00E+00	12284	309000	0.000	0.000
13	0	0	0	0.00E+00	11914	309000	0.000	0.000
14	0	0	0	0.00E+00	11322	309000	0.000	0.000
15	0	0	0	0.00E+00	11618	309000	0.000	0.000
16	0	0	0	0.00E+00	12284	309000	0.000	0.000
17	0	0	0	0.00E+00	12506	309000	0.000	0.000
18	0	0	0	0.00E+00	12284	309000	0.000	0.000
19	0	0	0	0.00E+00	11396	309000	0.000	0.000
20	0	0	0	0.00E+00	10878	309000	0.000	0.000
21	0	0	0	0.00E+00	11026	309000	0.000	0.000
22	1266	1266	0	1.84E+07	11618	309000	0.052	0.005
23	8862	9073	6330	1.56E+08	12728	495667	0.792	0.084
24	9706	10128	9495	2.15E+08	14208	589000	1.137	0.135
25	10128	10128	9495	2.15E+08	13986	589000	1.153	0.135
26	10128	10128	9495	2.15E+08	14134	589000	1.153	0.136
27	10128	10128	9495	2.15E+08	14948	589000	1.153	0.144
28	10128	10128	9495	2.15E+08	15318	589000	1.153	0.147
29	10128	10128	9495	2.15E+08	15244	589000	1.153	0.147
30	10128	10128	9495	2.12E+08	15318	589000	1.153	0.147
AVERAGE	4656	4677	4276	9.53E+07	13012	435000	0.519	0.062

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.74 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

OCTOBER DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	22400	90470	4	4	4	48	48	45
2	20800	90607	4	4	4	48	48	45
3	20600	90571	4	4	4	48	48	45
4	22200	90562	4	4	4	48	48	45
5	21900	90680	4	4	4	48	48	45
6	21900	90662	4	4	4	48	48	44
7	19400	90680	4	4	4	48	48	45
8	18900	90580	4	4	4	48	48	45
9	17200	90744	4	4	4	48	48	45
10	17400	90680	4	4	4	48	48	45
11	17700	90625	4	4	4	48	48	46
12	18300	90571	4	4	4	48	48	48
13	18000	88391	4	4	4	48	48	45
14	17600	3557	4	4	4	16	16	14
15	15300	0	4	4	4	0	0	0
16	13800	0	4	4	4	0	0	0
17	13300	0	4	4	4	0	0	0
18	12570	0	4	4	4	0	0	0
19	12890	0	4	4	4	0	0	0
20	12860	0	4	4	4	0	0	0
21	12770	0	4	4	4	0	0	0
22	12630	0	4	4	4	0	0	0
23	13200	0	4	4	4	0	0	0
24	13000	0	4	4	4	0	0	0
25	12650	0	4	4	4	0	0	0
26	11770	0	4	4	4	0	0	0
27	10570	0	4	4	4	0	0	0
28	11700	0	4	4	4	0	0	0
29	11770	0	4	4	4	0	0	0
30	11500	4451	4	4	4	0	0	0
31	13700	21706	4	4	4	0	0	0
AVERAGE	15815	38888	4	4	4	21	21	19

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.78 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
OCTOBER	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	10128	10128	9495	2.14E+08	17472	589000	1.153	0.168
	2	10128	10128	9495	2.15E+08	16224	589000	1.153	0.156
	3	10128	10128	9495	2.15E+08	16068	589000	1.153	0.155
	4	10128	10128	9495	2.15E+08	17316	589000	1.153	0.167
	5	10128	10128	9495	2.15E+08	17082	589000	1.153	0.164
	6	10128	10128	9284	2.15E+08	17082	589000	1.145	0.163
	7	10128	10128	9495	2.15E+08	15132	589000	1.153	0.146
	8	10128	10128	9495	2.15E+08	14742	589000	1.153	0.142
	9	10128	10128	9495	2.15E+08	13416	589000	1.153	0.129
	10	10128	10128	9495	2.15E+08	13572	589000	1.153	0.131
	11	10128	10128	9706	2.15E+08	13806	589000	1.162	0.134
	12	10128	10128	10128	2.15E+08	14274	589000	1.178	0.140
	13	10128	10128	9495	2.09E+08	14040	589000	1.153	0.135
	14	3376	3376	2954	8.43E+06	13728	589000	0.376	0.043
	15	0	0	0	0.00E+00	11934	589000	0.000	0.000
	16	0	0	0	0.00E+00	10764	589000	0.000	0.000
	17	0	0	0	0.00E+00	10374	589000	0.000	0.000
	18	0	0	0	0.00E+00	9805	589000	0.000	0.000
	19	0	0	0	0.00E+00	10054	589000	0.000	0.000
	20	0	0	0	0.00E+00	10031	589000	0.000	0.000
	21	0	0	0	0.00E+00	9961	589000	0.000	0.000
	22	0	0	0	0.00E+00	9851	589000	0.000	0.000
	23	0	0	0	0.00E+00	10296	589000	0.000	0.000
	24	0	0	0	0.00E+00	10140	589000	0.000	0.000
	25	0	0	0	0.00E+00	9867	589000	0.000	0.000
	26	0	0	0	0.00E+00	9181	589000	0.000	0.000
	27	0	0	0	0.00E+00	8245	589000	0.000	0.000
	28	0	0	0	0.00E+00	9126	589000	0.000	0.000
	29	0	0	0	0.00E+00	9181	589000	0.000	0.000
	30	0	0	0	1.05E+07	8970	589000	0.000	0.000
	31	0	0	0	5.14E+07	10686	589000	0.000	0.000
AVERAGE		4356	4356	4097	9.22E+07	12336	589000	0.497	0.064

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.78 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

NOVEMBER DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	12140	0	4	4	4	0	0	0
2	12090	0	4	4	4	0	0	0
3	11750	0	4	4	2	0	0	0
4	11260	0	2	2	2	0	0	0
5	11800	0	2	0	0	0	0	0
6	14400	0	0	0	0	0	0	0
7	13300	0	0	0	0	0	0	0
8	11960	0	0	0	0	0	0	0
9	12790	0	0	0	0	0	0	0
10	11510	0	0	0	0	0	0	0
11	11930	0	0	0	0	0	0	0
12	13800	0	0	0	0	0	0	0
13	11870	0	0	0	0	0	0	0
14	11480	0	0	0	0	0	0	0
15	11880	0	0	0	0	0	0	0
16	11730	0	0	0	0	0	0	0
17	11110	0	0	0	0	0	0	0
18	10400	0	0	0	0	0	0	0
19	10880	0	0	0	0	0	0	0
20	12700	0	0	0	0	0	0	0
21	12200	0	0	0	0	0	0	0
22	11760	0	2	0	0	0	0	0
23	11870	0	0	0	1	0	0	0
24	10650	0	2	2	2	0	0	0
25	11600	0	2	2	2	0	0	0
26	11590	0	2	2	2	0	0	0
27	11200	0	2	2	2	0	0	0
28	10599	0	2	2	2	0	0	0
29	10070	0	2	2	2	0	0	0
30	11910	0	2	2	2	0	0	0
AVERAGE	11427	0	1	1	1	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

	Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
NOVEMBER DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
1	0	0	0	0.00E+00	10926	589000	0.000	0.000
2	0	0	0	0.00E+00	10881	589000	0.000	0.000
3	0	0	0	0.00E+00	10575	495667	0.000	0.000
4	0	0	0	0.00E+00	10134	309000	0.000	0.000
5	0	0	0	0.00E+00	10620	122333	0.000	0.000
6	0	0	0	0.00E+00	12960	29000	0.000	0.000
7	0	0	0	0.00E+00	11970	29000	0.000	0.000
8	0	0	0	0.00E+00	10764	29000	0.000	0.000
9	0	0	0	0.00E+00	11511	29000	0.000	0.000
10	0	0	0	0.00E+00	10359	29000	0.000	0.000
11	0	0	0	0.00E+00	10737	29000	0.000	0.000
12	0	0	0	0.00E+00	12420	29000	0.000	0.000
13	0	0	0	0.00E+00	10683	29000	0.000	0.000
14	0	0	0	0.00E+00	10332	29000	0.000	0.000
15	0	0	0	0.00E+00	10692	29000	0.000	0.000
16	0	0	0	0.00E+00	10557	29000	0.000	0.000
17	0	0	0	0.00E+00	9999	29000	0.000	0.000
18	0	0	0	0.00E+00	9360	29000	0.000	0.000
19	0	0	0	0.00E+00	9792	29000	0.000	0.000
20	0	0	0	0.00E+00	11430	29000	0.000	0.000
21	0	0	0	0.00E+00	10980	29000	0.000	0.000
22	0	0	0	0.00E+00	10584	122333	0.000	0.000
23	0	0	0	0.00E+00	10683	75667	0.000	0.000
24	0	0	0	0.00E+00	9585	309000	0.000	0.000
25	0	0	0	0.00E+00	10440	309000	0.000	0.000
26	0	0	0	0.00E+00	10431	309000	0.000	0.000
27	0	0	0	0.00E+00	10080	309000	0.000	0.000
28	0	0	0	0.00E+00	9539	309000	0.000	0.000
29	0	0	0	0.00E+00	9063	309000	0.000	0.000
30	0	0	0	0.00E+00	10719	309000	0.000	0.000
AVERAGE	0	0	0	0.00E+00	10627	164333	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.90 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 2

DECEMBER DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	10850	0	2	2	2	0	0	0
2	11460	529	2	2	2	0	0	0
3	14300	24378	2	4	4	7	7	6
4	13400	80721	4	4	4	40	43	34
5	14500	89504	4	4	4	40	45	40
6	15800	90480	4	4	4	36	45	42
7	17800	90480	4	4	4	36	45	42
8	18000	90571	4	4	4	35	45	43
9	18000	90470	4	4	4	36	45	45
10	18500	90552	4	4	4	36	45	45
11	18900	90616	4	4	4	36	45	45
12	17500	90388	4	4	4	36	45	45
13	17400	90562	4	4	4	36	45	39
14	17400	90534	4	4	4	36	45	45
15	17000	90443	4	4	4	36	45	45
16	17100	90662	4	4	4	36	45	45
17	15800	90507	4	4	4	36	45	45
18	16600	90534	4	4	4	36	39	39
19	17100	90507	4	4	4	36	45	45
20	16900	90589	4	4	4	36	45	45
21	17000	90653	4	4	4	36	45	45
22	16300	90589	4	4	4	36	45	45
23	16100	89248	4	4	4	36	45	45
24	16800	90653	4	4	4	36	45	45
25	17600	90744	4	4	4	36	45	45
26	17900	90708	4	4	4	36	45	45
27	17700	90771	4	4	4	36	45	45
28	17400	90589	4	4	4	36	45	45
29	18200	88601	4	4	4	36	45	45
30	17100	90525	4	4	4	36	45	47
31	17300	90625	4	4	4	36	45	48
AVERAGE	16571	82153	4	4	4	33	41	40

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.79 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

	Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
DECEMBER DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
1	0	0	0	0.00E+00	8572	309000	0.000	0.000
2	0	0	0	1.25E+06	9053	309000	0.000	0.000
3	1477	1477	1266	5.78E+07	11297	495667	0.138	0.013
4	8440	9073	7174	1.91E+08	10586	589000	0.957	0.085
5	8440	9495	8440	2.12E+08	11455	589000	1.023	0.098
6	7596	9495	8862	2.14E+08	12482	589000	1.006	0.105
7	7596	9495	8862	2.14E+08	14062	589000	1.006	0.118
8	7385	9495	9073	2.15E+08	14220	589000	1.006	0.119
9	7596	9495	9495	2.14E+08	14220	589000	1.031	0.122
10	7596	9495	9495	2.15E+08	14615	589000	1.031	0.126
11	7596	9495	9495	2.15E+08	14931	589000	1.031	0.128
12	7596	9495	9495	2.14E+08	13825	589000	1.031	0.119
13	7596	9495	8229	2.15E+08	13746	589000	0.982	0.113
14	7596	9495	9495	2.15E+08	13746	589000	1.031	0.118
15	7596	9495	9495	2.14E+08	13430	589000	1.031	0.116
16	7596	9495	9495	2.15E+08	13509	589000	1.031	0.116
17	7596	9495	9495	2.15E+08	12482	589000	1.031	0.107
18	7596	8229	8229	2.15E+08	13114	589000	0.933	0.102
19	7596	9495	9495	2.15E+08	13509	589000	1.031	0.116
20	7596	9495	9495	2.15E+08	13351	589000	1.031	0.115
21	7596	9495	9495	2.15E+08	13430	589000	1.031	0.116
22	7596	9495	9495	2.15E+08	12877	589000	1.031	0.111
23	7596	9495	9495	2.12E+08	12719	589000	1.031	0.109
24	7596	9495	9495	2.15E+08	13272	589000	1.031	0.114
25	7596	9495	9495	2.15E+08	13904	589000	1.031	0.120
26	7596	9495	9495	2.15E+08	14141	589000	1.031	0.122
27	7596	9495	9495	2.15E+08	13983	589000	1.031	0.120
28	7596	9495	9495	2.15E+08	13746	589000	1.031	0.118
29	7596	9495	9495	2.10E+08	14378	589000	1.031	0.124
30	7596	9495	9917	2.15E+08	13509	589000	1.047	0.118
31	7596	9495	10128	2.15E+08	13667	589000	1.055	0.120
AVERAGE	6956	8569	8406	1.95E+08	13091	567925	0.927	0.104

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.79 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

JANUARY	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	25650	90835	4	4	4	45	48	36
	2	23000	90826	4	4	4	27	48	45
	3	26350	90863	4	4	4	45	48	45
	4	27050	90881	4	4	4	45	48	45
	5	25800	90844	4	4	4	45	45	45
	6	25250	65217	4	4	3	38	38	38
	7	23550	0	2	0	0	0	0	0
	8	21650	0	0	0	0	0	0	0
	9	19800	0	0	0	0	0	0	0
	10	21700	0	0	0	0	0	0	0
	11	21300	0	0	0	0	0	0	0
	12	18650	0	0	0	0	0	0	0
	13	19150	0	0	0	0	0	0	0
	14	18400	0	0	0	0	0	0	0
	15	17100	0	0	0	0	0	0	0
	16	18500	0	0	0	0	0	0	0
	17	17750	0	0	0	0	0	0	0
	18	17500	0	0	0	0	0	0	0
	19	18050	0	0	0	0	0	0	0
	20	15300	0	0	0	0	0	0	0
	21	17800	13142	4	3	3	7	0	0
	22	19750	57976	3	3	3	44	17	5
	23	21400	85436	3	3	3	48	48	36
	24	23400	90817	3	3	3	48	48	46
	25	24200	90853	3	3	3	48	48	48
	26	25000	86321	3	3	3	48	48	48
	27	24650	86184	3	4	4	48	48	48
	28	26800	90726	4	4	4	48	48	48
	29	27250	90890	4	4	4	48	48	48
	30	29300	90808	4	4	4	48	48	48
	31	30650	90817	4	4	4	48	48	48
AVERAGE		22313	44950	2	2	2	23	23	22

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 1.10 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM

FOR 1989

CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
JANUARY	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	9495	10128	7596	2.15E+08	28215	589000	1.055	0.248
	2	5697	10128	9495	2.15E+08	25300	589000	0.982	0.207
	3	9495	10128	9495	2.15E+08	28985	589000	1.129	0.273
	4	9495	10128	9495	2.15E+08	29755	589000	1.129	0.280
	5	9495	9495	9495	2.15E+08	28380	589000	1.104	0.262
	6	8018	8018	8018	1.55E+08	27775	542333	0.859	0.199
	7	0	0	0	0.00E+00	25905	122333	0.000	0.000
	8	0	0	0	0.00E+00	23815	29000	0.000	0.000
	9	0	0	0	0.00E+00	21780	29000	0.000	0.000
	10	0	0	0	0.00E+00	23870	29000	0.000	0.000
	11	0	0	0	0.00E+00	23430	29000	0.000	0.000
	12	0	0	0	0.00E+00	20515	29000	0.000	0.000
	13	0	0	0	0.00E+00	21065	29000	0.000	0.000
	14	0	0	0	0.00E+00	20240	29000	0.000	0.000
	15	0	0	0	0.00E+00	18810	29000	0.000	0.000
	16	0	0	0	0.00E+00	20350	29000	0.000	0.000
	17	0	0	0	0.00E+00	19525	29000	0.000	0.000
	18	0	0	0	0.00E+00	19250	29000	0.000	0.000
	19	0	0	0	0.00E+00	19855	29000	0.000	0.000
	20	0	0	0	0.00E+00	16830	29000	0.000	0.000
	21	1477	0	0	3.11E+07	19580	495667	0.048	0.008
	22	9284	3587	1055	1.37E+08	21725	449000	0.412	0.075
	23	10128	10128	7596	2.02E+08	23540	449000	0.823	0.162
	24	10128	10128	9706	2.15E+08	25740	449000	0.886	0.190
	25	10128	10128	10128	2.15E+08	26620	449000	0.898	0.199
	26	10128	10128	10128	2.05E+08	27500	449000	0.898	0.206
	27	10128	10128	10128	2.04E+08	27115	542333	1.085	0.245
	28	10128	10128	10128	2.15E+08	29480	589000	1.178	0.290
	29	10128	10128	10128	2.15E+08	29975	589000	1.178	0.295
	30	10128	10128	10128	2.15E+08	32230	589000	1.178	0.317
	31	10128	10128	10128	2.15E+08	33715	589000	1.178	0.331
AVERAGE		4955	4928	4608	1.07E+08	24544	310505	0.517	0.122

ASSUMPTIONS: Drift Rate = 0.0002%

TDS ppm = 1.10 x Conductivity, umhos/cm

Airflow = 64.4 E 06 cfm/ 48 fans

CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

FEBRUARY DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	32150	90808	4	4	4	48	48	48
2	32950	90817	4	4	4	48	48	48
3	30450	90844	4	4	4	48	48	48
4	30750	90881	4	4	4	48	48	48
5	29750	90881	4	4	4	48	48	48
6	28700	90826	4	4	4	48	42	42
7	26850	90881	4	4	4	32	45	48
8	26700	90708	4	4	4	13	45	48
9	26150	90863	4	4	4	22	45	48
10	25950	90835	4	4	4	33	45	48
11	25200	77329	4	4	4	27	45	48
12	24750	87862	4	4	4	35	45	48
13	24450	90790	4	4	4	42	45	48
14	24100	90744	4	4	4	42	45	48
15	24950	90762	4	4	4	42	37	48
16	23900	90808	4	4	4	42	31	48
17	24750	90835	4	4	4	42	45	48
18	26350	90781	4	4	4	39	45	48
19	27550	90835	4	4	4	39	45	48
20	28500	90908	4	4	4	40	45	48
21	25150	90826	4	4	4	42	45	48
22	29750	90844	4	4	4	42	45	48
23	29600	89431	4	4	4	40	45	48
24	30050	88975	4	4	4	42	45	48
25	30800	89057	4	4	4	42	45	48
26	30100	88984	4	4	4	42	45	48
27	30450	88820	4	4	4	42	45	48
28	29250	88829	4	4	4	42	46	48
AVERAGE	27859	89849	4	4	4	40	45	48

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.89 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

FEBRUARY DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
1	10128	10128	10128	2.15E+08	28614	589000	1.178	0.281
2	10128	10128	10128	2.15E+08	29326	589000	1.178	0.288
3	10128	10128	10128	2.15E+08	27101	589000	1.178	0.266
4	10128	10128	10128	2.15E+08	27368	589000	1.178	0.269
5	10128	10128	10128	2.15E+08	26478	589000	1.178	0.260
6	10128	8862	8862	2.15E+08	25543	589000	1.080	0.230
7	6752	9495	10128	2.15E+08	23897	589000	1.023	0.204
8	2743	9495	10128	2.15E+08	23763	589000	0.867	0.172
9	4642	9495	10128	2.15E+08	23274	589000	0.941	0.183
10	6963	9495	10128	2.15E+08	23096	589000	1.031	0.199
11	5697	9495	10128	1.83E+08	22428	589000	0.982	0.184
12	7385	9495	10128	2.08E+08	22028	589000	1.047	0.192
13	8862	9495	10128	2.15E+08	21761	589000	1.104	0.201
14	8862	9495	10128	2.15E+08	21449	589000	1.104	0.198
15	8862	7807	10128	2.15E+08	22206	589000	1.039	0.193
16	8862	6541	10128	2.15E+08	21271	589000	0.990	0.176
17	8862	9495	10128	2.15E+08	22028	589000	1.104	0.203
18	8229	9495	10128	2.15E+08	23452	589000	1.080	0.211
19	8229	9495	10128	2.15E+08	24520	589000	1.080	0.221
20	8440	9495	10128	2.15E+08	25365	589000	1.088	0.230
21	8862	9495	10128	2.15E+08	22384	589000	1.104	0.206
22	8862	9495	10128	2.15E+08	26478	589000	1.104	0.244
23	8440	9495	10128	2.12E+08	26344	589000	1.088	0.239
24	8862	9495	10128	2.11E+08	26745	589000	1.104	0.246
25	8862	9495	10128	2.11E+08	27412	589000	1.104	0.253
26	8862	9495	10128	2.11E+08	26789	589000	1.104	0.247
27	8862	9495	10128	2.11E+08	27101	589000	1.104	0.250
28	8862	9706	10128	2.11E+08	26033	589000	1.113	0.242
AVERAGE	8380	9427	10083	2.13E+08	24794	589000	1.081	0.225

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.89 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

MARCH	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	29550	88646	4	4	4	40	48	48
	2	30350	88464	4	4	4	39	48	42
	3	28050	3785	4	2	2	13	16	13
	4	25900	0	2	2	0	0	0	0
	5	25050	0	0	0	0	0	0	0
	6	24250	0	0	0	0	0	0	0
	7	25750	0	0	0	0	0	0	0
	8	26200	0	0	0	0	0	0	0
	9	25800	0	0	0	0	0	0	0
	10	24950	0	0	0	0	0	0	0
	11	22500	0	0	0	0	0	0	0
	12	20800	0	0	0	0	0	0	0
	13	19200	0	0	0	0	0	0	0
	14	18950	0	0	0	0	0	0	0
	15	16600	0	0	0	0	0	0	0
	16	15650	0	0	0	0	0	0	0
	17	15000	0	0	0	0	0	0	0
	18	11100	0	0	0	0	0	0	0
	19	11750	0	0	0	0	0	0	0
	20	12300	0	0	0	0	0	0	0
	21	12200	0	0	0	0	0	0	0
	22	11560	0	0	0	0	0	0	0
	23	17450	0	0	0	0	0	0	0
	24	11450	0	0	0	0	0	0	0
	25	17500	0	0	0	0	0	0	0
	26	10300	0	0	0	0	0	0	0
	27	9650	0	0	0	0	0	0	0
	28	9720	0	0	0	0	0	0	0
	29	10445	0	0	0	0	0	0	0
	30	10525	0	0	0	0	0	0	0
	31	10585	0	0	0	0	0	0	0
AVERAGE		18100	5835	0	0	0	3	4	3

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.88 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
MARCH	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	8440	10128	10128	2.10E+08	26004	589000	1.113	0.241
	2	8229	10128	8862	2.10E+08	26708	589000	1.055	0.235
	3	2743	3376	2743	8.97E+06	24684	402333	0.235	0.048
	4	0	0	0	0.00E+00	22792	215667	0.000	0.000
	5	0	0	0	0.00E+00	22044	29000	0.000	0.000
	6	0	0	0	0.00E+00	21340	29000	0.000	0.000
	7	0	0	0	0.00E+00	22660	29000	0.000	0.000
	8	0	0	0	0.00E+00	23056	29000	0.000	0.000
	9	0	0	0	0.00E+00	22704	29000	0.000	0.000
	10	0	0	0	0.00E+00	21956	29000	0.000	0.000
	11	0	0	0	0.00E+00	19800	29000	0.000	0.000
	12	0	0	0	0.00E+00	18304	29000	0.000	0.000
	13	0	0	0	0.00E+00	16896	29000	0.000	0.000
	14	0	0	0	0.00E+00	16676	29000	0.000	0.000
	15	0	0	0	0.00E+00	14608	29000	0.000	0.000
	16	0	0	0	0.00E+00	13772	29000	0.000	0.000
	17	0	0	0	0.00E+00	13200	29000	0.000	0.000
	18	0	0	0	0.00E+00	9768	29000	0.000	0.000
	19	0	0	0	0.00E+00	10340	29000	0.000	0.000
	20	0	0	0	0.00E+00	10824	29000	0.000	0.000
	21	0	0	0	0.00E+00	10736	29000	0.000	0.000
	22	0	0	0	0.00E+00	10173	29000	0.000	0.000
	23	0	0	0	0.00E+00	15356	29000	0.000	0.000
	24	0	0	0	0.00E+00	10076	29000	0.000	0.000
	25	0	0	0	0.00E+00	15400	29000	0.000	0.000
	26	0	0	0	0.00E+00	9064	29000	0.000	0.000
	27	0	0	0	0.00E+00	8492	29000	0.000	0.000
	28	0	0	0	0.00E+00	8554	29000	0.000	0.000
	29	0	0	0	0.00E+00	9192	29000	0.000	0.000
	30	0	0	0	0.00E+00	9262	29000	0.000	0.000
	31	0	0	0	0.00E+00	9315	29000	0.000	0.000
AVERAGE		626	762	701	1.38E+07	15928	83194	0.078	0.017

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.88 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

APRIL	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
APRIL	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

MAY	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
	31	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
MAY	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
	31	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

JUNE	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
JUNE	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

JULY	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03.
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
	31	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

JULY	DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
	31	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

AUGUST	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
	31	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

AUGUST	DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
	31	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

SEPTEMBER DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
AVERAGE	0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

SEPTEMBER DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
1	0	0	0	0.00E+00	0	29000	0.000	0.000
2	0	0	0	0.00E+00	0	29000	0.000	0.000
3	0	0	0	0.00E+00	0	29000	0.000	0.000
4	0	0	0	0.00E+00	0	29000	0.000	0.000
5	0	0	0	0.00E+00	0	29000	0.000	0.000
6	0	0	0	0.00E+00	0	29000	0.000	0.000
7	0	0	0	0.00E+00	0	29000	0.000	0.000
8	0	0	0	0.00E+00	0	29000	0.000	0.000
9	0	0	0	0.00E+00	0	29000	0.000	0.000
10	0	0	0	0.00E+00	0	29000	0.000	0.000
11	0	0	0	0.00E+00	0	29000	0.000	0.000
12	0	0	0	0.00E+00	0	29000	0.000	0.000
13	0	0	0	0.00E+00	0	29000	0.000	0.000
14	0	0	0	0.00E+00	0	29000	0.000	0.000
15	0	0	0	0.00E+00	0	29000	0.000	0.000
16	0	0	0	0.00E+00	0	29000	0.000	0.000
17	0	0	0	0.00E+00	0	29000	0.000	0.000
18	0	0	0	0.00E+00	0	29000	0.000	0.000
19	0	0	0	0.00E+00	0	29000	0.000	0.000
20	0	0	0	0.00E+00	0	29000	0.000	0.000
21	0	0	0	0.00E+00	0	29000	0.000	0.000
22	0	0	0	0.00E+00	0	29000	0.000	0.000
23	0	0	0	0.00E+00	0	29000	0.000	0.000
24	0	0	0	0.00E+00	0	29000	0.000	0.000
25	0	0	0	0.00E+00	0	29000	0.000	0.000
26	0	0	0	0.00E+00	0	29000	0.000	0.000
27	0	0	0	0.00E+00	0	29000	0.000	0.000
28	0	0	0	0.00E+00	0	29000	0.000	0.000
29	0	0	0	0.00E+00	0	29000	0.000	0.000
30	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE	0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

OCTOBER	DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
	1	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0
	3	0	0	0	0	0	0	0	0
	4	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	6	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	9	0	0	0	0	0	0	0	0
	10	0	0	0	0	0	0	0	0
	11	0	0	0	0	0	0	0	0
	12	0	0	0	0	0	0	0	0
	13	0	0	0	0	0	0	0	0
	14	0	0	0	0	0	0	0	0
	15	0	0	0	0	0	0	0	0
	16	0	0	0	0	0	0	0	0
	17	0	0	0	0	0	0	0	0
	18	0	0	0	0	0	0	0	0
	19	0	0	0	0	0	0	0	0
	20	0	0	0	0	0	0	0	0
	21	0	0	0	0	0	0	0	0
	22	0	0	0	0	0	0	0	0
	23	0	0	0	0	0	0	0	0
	24	0	0	0	0	0	0	0	0
	25	0	0	0	0	0	0	0	0
	26	0	0	0	0	0	0	0	0
	27	0	0	0	0	0	0	0	0
	28	0	0	0	0	0	0	0	0
	29	0	0	0	0	0	0	0	0
	30	0	0	0	0	0	0	0	0
	31	0	0	0	0	0	0	0	0
AVERAGE		0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

		Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
OCTOBER	DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
	1	0	0	0	0.00E+00	0	29000	0.000	0.000
	2	0	0	0	0.00E+00	0	29000	0.000	0.000
	3	0	0	0	0.00E+00	0	29000	0.000	0.000
	4	0	0	0	0.00E+00	0	29000	0.000	0.000
	5	0	0	0	0.00E+00	0	29000	0.000	0.000
	6	0	0	0	0.00E+00	0	29000	0.000	0.000
	7	0	0	0	0.00E+00	0	29000	0.000	0.000
	8	0	0	0	0.00E+00	0	29000	0.000	0.000
	9	0	0	0	0.00E+00	0	29000	0.000	0.000
	10	0	0	0	0.00E+00	0	29000	0.000	0.000
	11	0	0	0	0.00E+00	0	29000	0.000	0.000
	12	0	0	0	0.00E+00	0	29000	0.000	0.000
	13	0	0	0	0.00E+00	0	29000	0.000	0.000
	14	0	0	0	0.00E+00	0	29000	0.000	0.000
	15	0	0	0	0.00E+00	0	29000	0.000	0.000
	16	0	0	0	0.00E+00	0	29000	0.000	0.000
	17	0	0	0	0.00E+00	0	29000	0.000	0.000
	18	0	0	0	0.00E+00	0	29000	0.000	0.000
	19	0	0	0	0.00E+00	0	29000	0.000	0.000
	20	0	0	0	0.00E+00	0	29000	0.000	0.000
	21	0	0	0	0.00E+00	0	29000	0.000	0.000
	22	0	0	0	0.00E+00	0	29000	0.000	0.000
	23	0	0	0	0.00E+00	0	29000	0.000	0.000
	24	0	0	0	0.00E+00	0	29000	0.000	0.000
	25	0	0	0	0.00E+00	0	29000	0.000	0.000
	26	0	0	0	0.00E+00	0	29000	0.000	0.000
	27	0	0	0	0.00E+00	0	29000	0.000	0.000
	28	0	0	0	0.00E+00	0	29000	0.000	0.000
	29	0	0	0	0.00E+00	0	29000	0.000	0.000
	30	0	0	0	0.00E+00	0	29000	0.000	0.000
	31	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE		0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

NOVEMBER DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
AVERAGE	0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

NOVEMBER DAY	Airflow /Tower. cu m/s Twr 01	Twr 02	Twr 03	Heat BTU/min	Calc TDS, ppm	CW Flow gpm	Calc Drift gpm	lb/min
1	0	0	0	0.00E+00	0	29000	0.000	0.000
2	0	0	0	0.00E+00	0	29000	0.000	0.000
3	0	0	0	0.00E+00	0	29000	0.000	0.000
4	0	0	0	0.00E+00	0	29000	0.000	0.000
5	0	0	0	0.00E+00	0	29000	0.000	0.000
6	0	0	0	0.00E+00	0	29000	0.000	0.000
7	0	0	0	0.00E+00	0	29000	0.000	0.000
8	0	0	0	0.00E+00	0	29000	0.000	0.000
9	0	0	0	0.00E+00	0	29000	0.000	0.000
10	0	0	0	0.00E+00	0	29000	0.000	0.000
11	0	0	0	0.00E+00	0	29000	0.000	0.000
12	0	0	0	0.00E+00	0	29000	0.000	0.000
13	0	0	0	0.00E+00	0	29000	0.000	0.000
14	0	0	0	0.00E+00	0	29000	0.000	0.000
15	0	0	0	0.00E+00	0	29000	0.000	0.000
16	0	0	0	0.00E+00	0	29000	0.000	0.000
17	0	0	0	0.00E+00	0	29000	0.000	0.000
18	0	0	0	0.00E+00	0	29000	0.000	0.000
19	0	0	0	0.00E+00	0	29000	0.000	0.000
20	0	0	0	0.00E+00	0	29000	0.000	0.000
21	0	0	0	0.00E+00	0	29000	0.000	0.000
22	0	0	0	0.00E+00	0	29000	0.000	0.000
23	0	0	0	0.00E+00	0	29000	0.000	0.000
24	0	0	0	0.00E+00	0	29000	0.000	0.000
25	0	0	0	0.00E+00	0	29000	0.000	0.000
26	0	0	0	0.00E+00	0	29000	0.000	0.000
27	0	0	0	0.00E+00	0	29000	0.000	0.000
28	0	0	0	0.00E+00	0	29000	0.000	0.000
29	0	0	0	0.00E+00	0	29000	0.000	0.000
30	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE	0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
INPUT DATA - UNIT 3

DECEMBER DAY	CW CONDUCTIVITY DATA umhos/cm	THERMAL GEN MWt/d	CW FLOW - No PUMPS/SHIFT Mids	Days	Swings	SUM - FANS OPER IN EA SHIFT Twr 01	Twr 02	Twr 03
1	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0
27	0	0	0	0	0	0	0	0
28	0	0	0	0	0	0	0	0
29	0	0	0	0	0	0	0	0
30	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0
AVERAGE	0	0	0	0	0	0	0	0

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM
FOR 1989
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

	Airflow /Tower. cu m/s			Heat	Calc	CW Flow	Calc Drift	
DECEMBER DAY	Twr 01	Twr 02	Twr 03	BTU/min	TDS, ppm	gpm	gpm	lb/min
1	0	0	0	0.00E+00	0	29000	0.000	0.000
2	0	0	0	0.00E+00	0	29000	0.000	0.000
3	0	0	0	0.00E+00	0	29000	0.000	0.000
4	0	0	0	0.00E+00	0	29000	0.000	0.000
5	0	0	0	0.00E+00	0	29000	0.000	0.000
6	0	0	0	0.00E+00	0	29000	0.000	0.000
7	0	0	0	0.00E+00	0	29000	0.000	0.000
8	0	0	0	0.00E+00	0	29000	0.000	0.000
9	0	0	0	0.00E+00	0	29000	0.000	0.000
10	0	0	0	0.00E+00	0	29000	0.000	0.000
11	0	0	0	0.00E+00	0	29000	0.000	0.000
12	0	0	0	0.00E+00	0	29000	0.000	0.000
13	0	0	0	0.00E+00	0	29000	0.000	0.000
14	0	0	0	0.00E+00	0	29000	0.000	0.000
15	0	0	0	0.00E+00	0	29000	0.000	0.000
16	0	0	0	0.00E+00	0	29000	0.000	0.000
17	0	0	0	0.00E+00	0	29000	0.000	0.000
18	0	0	0	0.00E+00	0	29000	0.000	0.000
19	0	0	0	0.00E+00	0	29000	0.000	0.000
20	0	0	0	0.00E+00	0	29000	0.000	0.000
21	0	0	0	0.00E+00	0	29000	0.000	0.000
22	0	0	0	0.00E+00	0	29000	0.000	0.000
23	0	0	0	0.00E+00	0	29000	0.000	0.000
24	0	0	0	0.00E+00	0	29000	0.000	0.000
25	0	0	0	0.00E+00	0	29000	0.000	0.000
26	0	0	0	0.00E+00	0	29000	0.000	0.000
27	0	0	0	0.00E+00	0	29000	0.000	0.000
28	0	0	0	0.00E+00	0	29000	0.000	0.000
29	0	0	0	0.00E+00	0	29000	0.000	0.000
30	0	0	0	0.00E+00	0	29000	0.000	0.000
31	0	0	0	0.00E+00	0	29000	0.000	0.000
AVERAGE	0	0	0	0.00E+00	0	29000	0.000	0.000

ASSUMPTIONS: Drift Rate = 0.0002%
TDS ppm = 0.95 x Conductivity, umhos/cm
Airflow = 64.4 E 06 cfm/ 48 fans
CW Flow = (No pumps x 140,000) + 29,000 gpm

APPENDIX B

COOLING TOWER BASIN WATER

Appendix B

Cooling Tower Basin Water

Cooling tower basin water samples are usually collected once per month from the cooling tower basins of PVNGS Units 1-3. Sample collection is dependent upon each representative unit's operational status during the month. Presented in this appendix are the data on 31 parameters for those months of 1989 during which the units were operating: January through March for Units 1, 2, and 3, and August through December for Unit 2. Values below the detectable limit of the laboratory procedure are preceded by minus signs. Missing data are represented by a field of "9s."

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-29050-3-1
Sponsor Designation	UNIT1
Cooling Tower	1
Sample Date	01-09-89

Determination (mg/l)	
Calcium, total	380
Magnesium, total	36.0
Sodium, total	7000
Chloride	5600
Sulfate (as SO4)	6300
Nitrate (as N)	310.0
Silica (as SiO2)	38
Phosphate	3.70
Fluoride	20.0
Potassium, total	110
Copper, total	0.120
Zinc, total	0.083
Iron, total	0.30
Arsenic, total	-0.050
Boron	7.0
Ammonium	0.4
TSS (at 105 Deg C)	26
COD	520
Alkalinity, total	190
TDS (at 180 Deg C)	20000
Silver, total	-0.005
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.016
Lead, total	-0.050
Mercury, total	-0.0001
Beryllium, total	-0.005
Selenium, total	-0.100
Manganese, total	0.022
Phenol	0.010
Conductivity mmhos/cm	39000

A R I Z O N A P U B L I C S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-29050-3-2
Sponsor Designation	UNIT2
Cooling Tower	2
Sample Date	01-09-89

Determination (mg/l)	
Calcium, total	370
Magnesium, total	34.0
Sodium, total	6500
Chloride	5400
Sulfate (as SO4)	6200
Nitrate (as N)	310.0
Silica (as SiO2)	37
Phosphate	3.10
Fluoride	19.0
Potassium, total	110
Copper, total	0.075
Zinc, total	0.069
Iron, total	0.33
Arsenic, total	-0.050
Boron	6.7
Ammonium	0.3
TSS (at 105 Deg C)	18
COD	430
Alkalinity, total	42
TDS (at 180 Deg C)	19000
Silver, total	-0.005
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.018
Lead, total	-0.050
Mercury, total	-0.0001
Beryllium, total	-0.005
Selenium, total	-0.100
Manganese, total	0.019
Phenol	0.010
Conductivity mmhos/cm	37000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-29050-3-3
Sponsor Designation	UNIT3
Cooling Tower	3
Sample Date	01-09-89

Determination (mg/l)	
Calcium, total	410
Magnesium, total	37.0
Sodium, total	6600
Chloride	5700
Sulfate (as SO4)	6500
Nitrate (as N)	350.0
Silica (as SiO2)	36
Phosphate	3.40
Fluoride	21.0
Potassium, total	94
Copper, total	0.078
Zinc, total	0.071
Iron, total	0.46
Arsenic, total	-0.050
Boron	6.9
Ammonium	0.2
TSS (at 105 Deg C)	12
COD	540
Alkalinity, total	57
TDS (at 180 Deg C)	20000
Silver, total	-0.005
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.019
Lead, total	-0.050
Mercury, total	-0.0002
Beryllium, total	-0.005
Selenium, total	-0.100
Manganese, total	0.023
Phenol	0.006
Conductivity mmhos/cm	39000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-29434-3-1
Sponsor Designation	UNIT1
Cooling Tower	1
Sample Date	02-23-89

Determination (mg/l)	
Calcium, total	410
Magnesium, total	37.0
Sodium, total	6300
Chloride	4900
Sulfate (as SO4)	5600
Nitrate (as N)	330.0
Silica (as SiO2)	63
Phosphate	4.60
Fluoride	16.0
Potassium, total	120
Copper, total	0.090
Zinc, total	0.064
Iron, total	0.52
Arsenic, total	0.015
Boron	6.4
Ammonium	4.2
TSS (at 105 Deg C)	16
COD	510
Alkalinity, total	40
TDS (at 180 Deg C)	18000
Silver, total	-0.005
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.016
Lead, total	-0.050
Mercury, total	0.0003
Beryllium, total	-0.005
Selenium, total	-0.050
Manganese, total	0.038
Phenol	0.008
Conductivity mmhos/cm	32000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-29434-3-2
Sponsor Designation	UNIT2
Cooling Tower	2
Sample Date	02-23-89

Determination (mg/l)	
Calcium, total	330
Magnesium, total	29.0
Sodium, total	4800
Chloride	3700
Sulfate (as SO4)	4500
Nitrate (as N)	240.0
Silica (as SiO2)	47
Phosphate	4.20
Fluoride	13.0
Potassium, total	100
Copper, total	0.057
Zinc, total	0.059
Iron, total	0.31
Arsenic, total	0.011
Boron	4.8
Ammonium	0.7
TSS (at 105 Deg C)	-5
COD	370
Alkalinity, total	45
TDS (at 180 Deg C)	14000
Silver, total	-0.005
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.011
Lead, total	-0.050
Mercury, total	0.0003
Beryllium, total	-0.005
Selenium, total	-0.050
Manganese, total	0.030
Phenol	0.004
Conductivity mmhos/cm	24000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-29434-3-3
Sponsor Designation	UNIT3
Cooling Tower	3
Sample Date	02-23-89

Determination (mg/l)	
Calcium, total	540
Magnesium, total	50.0
Sodium, total	8600
Chloride	6500
Sulfate (as SO4)	8400
Nitrate (as N)	460.0
Silica (as SiO2)	130
Phosphate	7.50
Fluoride	23.0
Potassium, total	360
Copper, total	0.100
Zinc, total	0.068
Iron, total	0.55
Arsenic, total	0.011
Boron	8.7
Ammonium	2.0
TSS (at 105 Deg C)	20
COD	1000
Alkalinity, total	53
TDS (at 180 Deg C)	26000
Silver, total	-0.005
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.022
Lead, total	-0.050
Mercury, total	0.0014
Beryllium, total	-0.005
Selenium, total	0.050
Manganese, total	0.049
Phenol	0.009
Conductivity mmhos/cm	44000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-29659-3-1
Sponsor Designation	UNIT1
Cooling Tower	1
Sample Date	03-15-89

Determination (mg/l)	
Calcium, total	400
Magnesium, total	39.0
Sodium, total	6300
Chloride	6000
Sulfate (as SO4)	6200
Nitrate (as N)	400.0
Silica (as SiO2)	64
Phosphate	4.80
Fluoride	18.0
Potassium, total	98
Copper, total	0.140
Zinc, total	0.110
Iron, total	0.40
Arsenic, total	-0.025
Boron	6.7
Ammonium	0.3
TSS (at 105 Deg C)	12
COD	550
Alkalinity, total	36
TDS (at 180 Deg C)	20000
Silver, total	0.012
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.019
Lead, total	-0.020
Mercury, total	0.0002
Beryllium, total	-0.005
Selenium, total	-0.050
Manganese, total	0.028
Phenol	0.008
Conductivity mmhos/cm	34000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-29659-3-2
Sponsor Designation	UNIT2
Cooling Tower	2
Sample Date	03-15-89

Determination (mg/l)	
Calcium, total	450
Magnesium, total	42.0
Sodium, total	6800
Chloride	7000
Sulfate (as SO4)	6700
Nitrate (as N)	490.0
Silica (as SiO2)	83
Phosphate	4.90
Fluoride	20.0
Potassium, total	280
Copper, total	0.092
Zinc, total	0.078
Iron, total	0.35
Arsenic, total	-0.025
Boron	7.1
Ammonium	0.7
TSS (at 105 Deg C)	17
COD	590
Alkalinity, total	36
TDS (at 180 Deg C)	22000
Silver, total	0.018
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.021
Lead, total	-0.020
Mercury, total	0.0002
Beryllium, total	-0.005
Selenium, total	-0.100
Manganese, total	0.028
Phenol	0.005
Conductivity mmhos/cm	38000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-29659-3-3
Sponsor Designation	UNIT3
Cooling Tower	3
Sample Date	03-15-89

Determination (mg/l)	
Calcium, total	280
Magnesium, total	27.0
Sodium, total	3900
Chloride	4000
Sulfate (as SO4)	4100
Nitrate (as N)	310.0
Silica (as SiO2)	54
Phosphate	3.70
Fluoride	13.0
Potassium, total	170
Copper, total	0.130
Zinc, total	0.082
Iron, total	0.60
Arsenic, total	-0.025
Boron	4.3
Ammonium	1.0
TSS (at 105 Deg C)	30
COD	430
Alkalinity, total	82
TDS (at 180 Deg C)	14000
Silver, total	0.016
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.013
Lead, total	-0.020
Mercury, total	0.0004
Beryllium, total	-0.005
Selenium, total	-0.100
Manganese, total	0.020
Phenol	0.003
Conductivity mmhos/cm	24000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-31441-1-1
Sponsor Designation	UNIT2
Cooling Tower	2
Sample Date	08-21-89

Determination (mg/l)	
Calcium, total	330
Magnesium, total	39.0
Sodium, total	5600
Chloride	6000
Sulfate (as.SO4)	4900
Nitrate (as N)	200.0
Silica (as SiO2)	38
Phosphate	0.77
Fluoride	21.0
Potassium, total	120
Copper, total	0.069
Zinc, total	0.050
Iron, total	0.50
Arsenic, total	0.024
Boron	5.4
Ammonium	0.5
TSS (at 105 Deg C)	49
COD	270
Alkalinity, total	30
TDS (at 180 Deg C)	18000
Silver, total	-0.005
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.026
Lead, total	-0.050
Mercury, total	0.0011
Beryllium, total	-0.005
Selenium, total	-0.050
Manganese, total	0.025
Phenol	0.008
Conductivity mmhos/cm	33000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-31769-1-1
Sponsor Designation	UNIT2
Cooling Tower	2
Sample Date	09-25-89

Determination (mg/l)	
Calcium, total	270
Magnesium, total	25.0
Sodium, total	4400
Chloride	4800
Sulfate (as SO4)	3500
Nitrate (as N)	140.0
Silica (as SiO2)	110
Phosphate	0.60
Fluoride	18.0
Potassium, total	220
Copper, total	0.066
Zinc, total	0.057
Iron, total	0.46
Arsenic, total	0.019
Boron	4.6
Ammonium	0.5
TSS (at 105 Deg C)	52
COD	290
Alkalinity, total	31
TDS (at 180 Deg C)	14000
Silver, total	-0.010
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.017
Lead, total	-0.010
Mercury, total	0.0012
Beryllium, total	-0.005
Selenium, total	-0.050
Manganese, total	0.021
Phenol	-0.002
Conductivity mmhos/cm	24000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-32071-1-1
Sponsor Designation	UNIT2
Cooling Tower	2
Sample Date	10-19-89

Determination (mg/l)	
Calcium, total	210
Magnesium, total	17.0
Sodium, total	2700
Chloride	3400
Sulfate (as SO4)	2500
Nitrate (as N)	100.0
Silica (as SiO2)	73
Phosphate	0.32
Fluoride	13.0
Potassium, total	170
Copper, total	0.056
Zinc, total	0.039
Iron, total	0.38
Arsenic, total	0.014
Boron	3.4
Ammonium	-0.2
TSS (at 105 Deg C)	23
COD	270
Alkalinity, total	21
TDS (at 180 Deg C)	10000
Silver, total	-0.005
Barium, total	-0.2
Cadmium, total	-0.005
Chromium, total	0.014
Lead, total	-0.010
Mercury, total	0.0009
Beryllium, total	-0.005
Selenium, total	-0.050
Manganese, total	0.016
Phenol	-0.002
Conductivity mmhos/cm	15000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-32368-1-1
Sponsor Designation	UNIT2
Cooling Tower	2
Sample Date	11-17-89

Determination (mg/l)	
Calcium, total	280
Magnesium, total	18.0
Sodium, total	3600
Chloride	3500
Sulfate (as SO4)	2700
Nitrate (as N)	100.0
Silica (as SiO2)	64
Phosphate	0.60
Fluoride	14.0
Potassium, total	100
Copper, total	0.100
Zinc, total	0.064
Iron, total	0.56
Arsenic, total	0.014
Boron	3.6
Ammonium	-0.2
TSS (at 105 Deg C)	8
COD	260
Alkalinity, total	21
TDS (at 180 Deg C)	10000
Silver, total	0.015
Barium, total	0.1
Cadmium, total	-0.005
Chromium, total	0.024
Lead, total	-0.010
Mercury, total	-0.0001
Beryllium, total	-0.005
Selenium, total	-0.050
Manganese, total	0.012
Phenol	-0.002
Conductivity mmhos/cm	21000

A R I Z O N A   P U B L I C   S E R V I C E

Cooling Tower Basin Water Sample Data

Lab Designation	8928-32579-1-1
Sponsor Designation	UNIT2
Cooling Tower	2
Sample Date	12-11-89

Determination (mg/l)	
Calcium, total	480
Magnesium, total	29.0
Sodium, total	5200
Chloride	5200
Sulfate (as SO4)	4200
Nitrate (as N)	150.0
Silica (as SiO2)	44
Phosphate	1.20
Fluoride	19.0
Potassium, total	210
Copper, total	0.120
Zinc, total	0.130
Iron, total	1.90
Arsenic, total	0.024
Boron	5.1
Ammonium	0.2
TSS (at 105 Deg C)	49
COD	340
Alkalinity, total	27
TDS (at 180 Deg C)	15000
Silver, total	0.030
Barium, total	0.2
Cadmium, total	-0.005
Chromium, total	0.046
Lead, total	-0.010
Mercury, total	0.0002
Beryllium, total	-0.005
Selenium, total	-0.020
Manganese, total	0.057
Phenol	-0.002
Conductivity mmhos/cm	17000

APPENDIX C

DUSTFALL DATA

Appendix C
Dustfall Data

This appendix presents all the airborne salt drift deposition data obtained during the period January through December 1989 at the 48 PVNGS monitoring sites (sites 1-28, 30-45, and 80-83).

Drift deposition samples were collected each month and analyzed for the concentration of ions of interest by Accu-Labs Research, Inc., in Wheat Ridge, Colorado.

NUS converted the laboratory results for each of the two collocated samplers to average deposition rates in pounds per acre per month based on the collection jar surface area and each sample's collection period and water volume. No corrections were applied to the deposition rates to account for the presence of ions in the collection water at the beginning of the sampling period. Except for bicarbonate, the concentrations of these ions in the water were below the detection limits of the laboratory analytical methods for the monitoring program, and their presence did not contribute to the calculation of significant deposition rates. The solubility of bicarbonate in a sample is influenced more by the pH, the ambient temperature, and the presence of other ions in the sample than by the initial concentration in the collection water.

The deposition rates were tabulated by location for each of the 12 months. The attached monthly data tables present the calculated deposition rates for each of the selected ions and for total suspended solids. In the column to the right of each monthly chemical deposition rate is a value, identified as "d," which is the absolute difference between the two samples at each location. If one of the samples was missing or invalid, a field of "9s" appears in the "d" column. If both samples were missing or invalid, a field of "9s" appears in all positions for that location. Those values reported as below the detection limit are included at one-half the detection limit value.

For each location, a mean for the values of "d" and a corresponding standard deviation were determined to assess the precision of the measurements.

Arithmetic means and the standard deviations of the arithmetic means were determined for each ion as an aid in assessing the calculated deposition rates. The significant figures listed for the means and the standard deviations were determined by the computer data field lengths assigned to the chemical; they do not represent the accuracy of the measurements.

For those ions reported as below the laboratory detection limit, a value of one-half the laboratory detection limit was used to calculate the mean of the collocated samples. In those cases in which both collocated samples are reported as below the laboratory detection limit, the absolute difference between the two samples, "d," represents the difference of the reported normalized sample volumes.

Included in a comments table for each month's samples are significant comments on the validity of the analyzed samples or on special conditions at the monitoring locations. For the 12-month period, there were 9 occasions in which neither sample at a location produced valid data. There were also 27 occasions in which one sample at a location was invalidated; either the jars were knocked over by cattle or the sample itself was contaminated by birds or insects. The overall deposition sample recovery rate for the period January 1989 through December 1989 was 96.9 percent.

The sample data have been reviewed for data entry errors and for consistency of paired samples and consistency of samples collected at similar locations. Contaminated samples have been identified and those values removed from the tables.

ARIZONA PUBLIC SERVICE
MONTHLY REPORT for 1-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	0.807	0.04	0.153	0.11	1.009	0.05	0.050	0.00	0.458	0.33	0.505	0.03	1.009	0.05	0.097	0.10
002	0.742	0.01	0.093	0.00	0.836	0.20	0.046	0.00	0.508	0.46	0.464	0.01	0.928	0.02	0.204	0.08
003	0.992	0.02	0.099	0.00	0.793	0.02	0.050	0.00	0.695	0.21	0.496	0.01	1.492	1.02	0.189	0.14
004	0.630	0.21	0.135	0.10	0.717	0.03	0.045	0.00	0.498	0.47	0.448	0.02	0.897	0.04	0.251	0.01
005	0.606	0.17	0.130	0.09	0.693	0.00	0.043	0.00	0.476	0.43	0.433	0.00	0.866	0.00	0.242	0.00
006	0.707	0.09	0.088	0.01	0.883	0.11	0.073	0.05	0.530	0.07	0.442	0.06	0.883	0.11	0.273	0.02
007	0.364	0.04	0.134	0.08	2.462	0.45	0.218	0.02	0.273	0.03	0.455	0.05	0.910	0.10	0.272	0.01
008	0.476	0.13	0.097	0.01	0.579	0.07	0.048	0.01	0.290	0.04	0.483	0.06	0.965	0.12	0.210	0.05
009	0.418	0.01	0.104	0.00	0.941	0.23	0.089	0.08	0.313	0.01	0.522	0.01	1.044	0.02	0.177	0.02
010	0.673	0.22	0.096	0.00	0.958	0.04	0.082	0.07	0.288	0.01	0.479	0.02	0.958	0.04	0.173	0.05
011	0.491	0.18	0.294	0.19	1.178	0.35	0.501	0.12	0.295	0.01	0.492	0.02	0.985	0.04	0.094	0.09
012	0.410	0.02	0.205	0.01	1.025	0.06	0.194	0.05	0.307	0.02	0.512	0.03	1.025	0.06	0.256	0.01
013	0.417	0.02	0.208	0.01	1.978	0.13	0.355	0.06	0.313	0.01	0.521	0.02	1.042	0.04	0.119	0.13
014	1.250	0.21	0.096	0.00	2.788	0.62	0.327	0.12	0.961	0.02	0.480	0.01	1.445	0.98	0.159	0.22
015	0.159	0.10	0.106	0.00	0.745	0.22	0.053	0.00	0.319	0.00	0.532	0.01	1.063	0.01	0.170	0.00
016	2.220	0.59	0.116	0.08	0.999	0.52	0.092	0.04	1.980	0.19	0.382	0.02	3.053	0.18	0.253	0.06
017	0.394	0.41	0.147	0.11	0.489	0.22	0.049	0.00	0.292	0.02	0.486	0.03	0.972	0.06	0.214	0.01
018	0.691	0.10	0.173	0.02	0.518	0.07	0.043	0.01	0.518	0.07	0.432	0.06	0.864	0.12	0.225	0.03
019	0.773	0.02	0.244	0.30	0.580	0.02	0.072	0.05	0.580	0.02	0.483	0.02	0.966	0.03	0.261	0.01
020	4.685	0.24	0.336	0.03	0.839	0.08	0.205	0.15	3.861	0.36	0.420	0.04	5.837	1.14	0.478	0.03
021	0.341	0.01	0.127	0.08	0.685	0.37	0.064	0.04	0.256	0.01	0.426	0.02	0.853	0.03	0.247	0.03
022	0.330	0.02	0.122	0.07	0.739	0.12	0.069	0.05	0.247	0.02	0.412	0.03	0.824	0.06	0.239	0.00
023	0.962	0.02	0.239	0.28	1.059	0.21	0.154	0.00	0.577	0.01	0.481	0.01	0.962	0.02	0.121	0.15
024	0.440	0.24	0.332	0.29	1.306	0.38	0.324	0.27	0.260	0.04	0.433	0.07	0.866	0.14	0.173	0.03
025	0.414	0.20	0.573	0.12	2.974	0.88	0.847	0.01	0.247	0.02	0.411	0.03	0.823	0.06	0.041	0.00
026	0.236	0.18	0.118	0.09	0.772	0.08	0.064	0.05	0.232	0.03	0.386	0.04	0.772	0.08	0.223	0.01
027	0.500	0.02	0.415	0.15	0.833	0.03	0.158	0.08	0.377	0.26	0.416	0.01	1.242	0.79	0.258	0.03
028	0.442	0.15	0.132	0.08	0.976	0.11	0.141	0.10	0.267	0.02	0.445	0.03	0.890	0.06	0.258	0.00
030	0.542	0.09	0.625	0.07	3.297	1.00	0.830	0.19	0.690	0.39	0.390	0.04	1.149	0.65	0.326	0.03
031	0.616	0.51	0.352	0.34	0.974	0.14	0.283	0.03	0.266	0.01	0.443	0.02	0.887	0.03	0.110	0.13
032	0.569	0.40	0.238	0.29	0.846	0.16	0.109	0.13	0.283	0.01	0.471	0.02	0.942	0.04	0.151	0.08
033	0.491	0.33	0.205	0.25	0.815	0.32	0.098	0.03	0.245	0.00	0.408	0.00	0.816	0.01	0.220	0.01
034	0.242	0.16	0.081	0.00	0.486	0.01	0.041	0.00	0.243	0.00	0.405	0.01	0.811	0.02	0.195	0.00
035	0.191	0.00	0.144	0.10	0.669	0.18	0.105	0.02	0.287	0.00	0.478	0.01	0.956	0.01	0.143	0.02
036	0.152	0.01	0.076	0.00	0.533	0.18	0.038	0.00	0.227	0.01	0.379	0.02	0.758	0.05	0.205	0.06
037	0.255	0.21	0.083	0.02	0.571	0.06	0.041	0.01	0.248	0.05	0.413	0.08	0.826	0.15	0.164	0.00
038	0.180	0.01	0.090	0.00	0.449	0.16	0.045	0.00	0.271	0.01	0.451	0.02	0.902	0.05	0.208	0.03
039	0.169	0.01	0.085	0.01	0.507	0.03	0.042	0.00	0.254	0.02	0.423	0.03	0.845	0.05	0.203	0.01
040	0.178	0.00	0.357	0.36	0.891	0.01	0.367	0.48	0.267	0.00	0.446	0.00	0.891	0.01	0.107	0.00
041	0.280	0.17	0.094	0.01	1.033	0.12	0.071	0.05	0.283	0.02	0.471	0.03	0.942	0.06	0.302	0.06
042	0.135	999.99	0.067	999.99	0.405	999.99	0.034	999.99	0.202	999.99	0.337	999.99	0.675	999.99	0.149	999.99
043	0.327	0.01	0.493	0.34	0.983	0.36	0.334	0.13	0.245	0.01	0.409	0.01	0.817	0.03	0.187	0.04
044	0.386	0.02	0.097	0.01	0.579	0.04	0.048	0.00	0.290	0.02	0.483	0.03	0.965	0.06	0.184	0.03
045	0.615	0.15	0.266	0.19	1.144	0.13	0.097	0.01	0.480	0.42	0.441	0.02	0.881	0.04	0.229	0.05
080	2.341	0.32	0.187	0.01	2.336	0.05	0.280	0.02	1.871	0.11	0.468	0.03	3.741	0.21	0.109	0.13
081	7.016	0.38	0.448	0.21	1.510	0.07	0.229	0.13	5.960	0.25	0.445	0.03	8.901	0.64	0.729	0.02
082	2.002	0.02	0.182	0.00	1.182	0.17	0.127	0.03	2.092	0.16	0.455	0.01	3.640	0.04	0.482	0.01
083	4.215	0.13	0.278	0.17	1.403	0.08	0.140	0.05	3.458	0.30	0.469	0.04	5.625	0.42	0.599	0.01
Ar.Mean	0.885	0.14	0.199	0.10	1.062	0.19	0.163	0.06	0.716	0.11	0.449	0.03	1.467	0.17	0.227	0.04
Std.Dev.	1.287	0.14	0.136	0.11	0.669	0.21	0.181	0.09	1.093	0.15	0.042	0.02	1.575	0.29	0.124	0.05

ARIZONA PUBLIC SERVICE
MONTHLY REPORT for 1-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.020	0.00	5.046	0.25	5.046	0.25	0.202	0.01	5.046	0.25	0.150	0.09	0.11	0.11
002	0.019	0.00	4.638	0.08	4.638	0.08	0.186	0.00	4.638	0.08	0.140	0.10	0.08	0.12
003	0.020	0.00	4.958	0.10	4.958	0.10	0.198	0.00	4.958	0.10	0.149	0.10	0.13	0.26
004	0.018	0.00	4.483	0.19	4.483	0.19	0.620	0.19	4.483	0.19	0.134	0.08	0.12	0.13
005	0.017	0.00	4.329	0.01	4.329	0.01	0.615	0.30	4.329	0.01	0.130	0.09	0.08	0.13
006	0.018	0.00	4.417	0.56	4.417	0.56	0.505	0.18	4.417	0.56	0.135	0.11	0.18	0.21
007	0.018	0.00	4.550	0.50	7.561	5.53	0.406	0.43	4.550	0.50	0.139	0.11	0.56	1.44
008	0.019	0.00	4.825	0.61	4.825	0.61	0.193	0.02	7.390	5.74	0.097	0.01	0.53	1.51
009	0.021	0.00	5.222	0.12	5.222	0.12	0.209	0.00	5.222	0.12	0.104	0.00	0.05	0.07
010	0.019	0.00	4.792	0.21	4.792	0.21	0.192	0.01	7.136	4.48	0.096	0.00	0.38	1.18
011	0.020	0.00	4.925	0.19	4.925	0.19	0.197	0.01	47.201	6.08	0.098	0.00	0.53	1.60
012	0.020	0.00	5.123	0.28	5.123	0.28	0.205	0.01	26.585	2.66	0.155	0.11	0.26	0.70
013	0.021	0.00	5.211	0.21	8.786	6.94	0.208	0.01	28.288	15.72	0.104	0.00	1.66	4.44
014	0.039	0.04	4.803	0.08	11.528	0.19	0.192	0.00	4.803	0.08	0.096	0.00	0.18	0.28
015	0.021	0.00	5.316	0.07	5.316	0.07	0.213	0.00	5.316	0.07	0.106	0.00	0.04	0.06
016	0.015	0.00	3.816	0.22	3.816	0.22	0.153	0.01	12.847	18.28	0.116	0.08	1.46	4.84
017	0.019	0.00	4.858	0.28	4.858	0.28	0.194	0.01	4.858	0.28	0.097	0.01	0.12	0.14
018	0.017	0.00	4.318	0.61	4.318	0.61	0.293	0.26	11.250	14.47	0.086	0.01	1.17	3.83
019	0.019	0.00	4.831	0.15	4.831	0.15	0.317	0.24	16.715	23.61	0.097	0.00	1.76	6.29
020	0.017	0.00	4.197	0.39	4.197	0.39	0.521	0.27	13.405	18.03	0.084	0.01	1.51	4.76
021	0.017	0.00	4.264	0.15	4.264	0.15	0.666	0.09	15.112	21.85	0.085	0.00	1.63	5.82
022	0.016	0.00	4.119	0.28	4.119	0.28	0.335	0.35	15.902	15.88	0.082	0.01	1.23	4.22
023	0.019	0.00	4.809	0.09	8.144	6.58	0.192	0.00	22.094	5.36	0.096	0.00	0.91	2.16
024	0.139	0.25	4.329	0.69	10.390	1.67	0.733	0.26	34.696	35.72	0.133	0.11	2.87	9.47
025	0.059	0.09	4.114	0.31	9.261	9.99	0.165	0.01	89.283	14.66	0.082	0.01	1.88	4.52
026	0.015	0.00	3.860	0.42	9.151	11.00	0.268	0.24	7.876	7.61	0.077	0.01	1.42	3.41
027	0.224	0.14	4.164	0.14	9.993	0.34	2.001	0.40	4.164	0.14	0.126	0.09	0.19	0.21
028	0.018	0.00	4.450	0.30	7.461	5.72	0.279	0.21	10.903	12.61	0.089	0.01	1.39	3.56
030	0.038	0.04	3.904	0.44	14.056	1.59	0.156	0.02	74.876	5.35	0.078	0.01	0.71	1.41
031	0.018	0.00	4.434	0.15	4.434	0.15	0.177	0.01	30.212	8.14	0.134	0.09	0.70	2.15
032	0.019	0.00	4.710	0.18	4.710	0.18	0.188	0.01	9.419	0.35	0.094	0.00	0.13	0.14
033	0.041	0.05	4.081	0.04	6.953	5.79	0.293	0.26	7.774	7.43	0.082	0.00	1.04	2.39
034	0.016	0.00	4.053	0.08	4.053	0.08	0.162	0.00	4.053	0.08	0.081	0.00	0.03	0.05
035	0.019	0.00	4.781	0.06	4.781	0.06	0.315	0.24	7.158	4.70	0.096	0.00	0.39	1.24
036	0.015	0.00	3.789	0.23	3.789	0.23	0.152	0.01	12.904	2.30	0.113	0.07	0.23	0.60
037	0.017	0.00	4.131	0.76	4.131	0.76	0.165	0.03	9.758	10.49	0.083	0.02	0.90	2.77
038	0.018	0.00	4.511	0.23	4.511	0.23	0.180	0.01	7.590	5.93	0.090	0.00	0.48	1.57
039	0.017	0.00	4.227	0.27	4.227	0.27	0.169	0.01	6.273	3.82	0.085	0.01	0.32	1.01
040	0.018	0.00	4.456	0.04	4.456	0.04	0.178	0.00	36.622	34.23	0.133	0.09	2.52	9.13
041	0.048	0.06	4.710	0.31	4.710	0.31	0.188	0.01	8.811	7.90	0.094	0.01	0.65	2.09
042	0.013	999.99	3.375	999.99	3.375	999.99	0.311	999.99	6.750	999.99	0.135	999.99	999.99	999.99
043	0.032	0.03	4.085	0.15	9.805	0.35	1.380	0.90	28.493	10.40	0.123	0.09	0.92	2.74
044	0.019	0.00	4.825	0.30	4.825	0.30	0.193	0.01	4.825	0.30	0.143	0.09	0.09	0.12
045	0.036	0.04	4.406	0.19	10.575	0.45	0.176	0.01	4.406	0.19	0.088	0.00	0.13	0.15
080	0.019	0.00	4.676	0.26	11.224	0.64	1.096	1.81	4.676	0.26	0.094	0.01	0.28	0.47
081	0.018	0.00	4.450	0.32	7.678	6.77	0.178	0.01	11.744	14.27	0.089	0.01	1.65	4.04
082	0.018	0.00	4.550	0.06	4.550	0.06	0.536	0.12	9.524	9.89	0.091	0.00	0.76	2.63
083	0.019	0.00	4.688	0.35	7.845	5.96	0.287	0.18	9.650	9.57	0.094	0.01	1.23	2.86
Ar.Mean	0.028	0.02	4.492	0.25	6.155	1.64	0.353	0.15	14.979	7.68	0.106	0.03	0.76	2.19
Std.dev.	0.035	0.04	0.417	0.18	2.575	2.85	0.346	0.30	17.366	8.77	0.023	0.04	0.70	2.31

DEPOSITION DATA
Comments and Messages Only

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002			
003			
004			
005			
006			
007			
008			
009			
010			
011			
012			
013			
014			
015			
016			
017			
018			
019			
020			
021			
022			
023			
024			
025			
026			
027			
028			
030			
031			
032			
033			
034			
035			
036			
037			
038			
039			
040			
041			
042		VOID/CAP LOST IN TRANSPORT	MISSING SAMPLE B
043			
044			
045			
080			
081			
082			
083			

ARIZONA PUBLIC SERVICE
MONTHLY REPORT for 2-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	0.331	0.08	0.067	0.01	0.672	0.11	0.105	0.04	0.202	0.03	0.336	0.05	0.672	0.11	0.034	0.01
002	0.286	0.30	0.107	0.08	0.280	0.02	0.267	0.08	0.210	0.02	0.350	0.03	0.701	0.06	0.119	0.02
003	0.394	0.25	0.066	0.00	0.397	0.02	0.106	0.00	0.368	0.35	0.331	0.02	0.662	0.03	0.050	0.04
004	0.198	0.15	0.065	0.01	0.321	0.10	0.078	0.01	0.194	0.02	0.324	0.03	0.648	0.06	0.085	0.02
005	0.324	0.15	0.065	0.00	0.258	0.01	0.071	0.01	0.387	0.02	0.323	0.02	0.645	0.03	0.049	0.03
006	0.343	0.10	0.069	0.01	0.343	0.10	0.051	0.03	0.317	0.24	0.347	0.03	0.693	0.07	0.064	0.06
007	0.196	0.13	0.066	0.00	0.590	0.11	0.079	0.02	0.197	0.01	0.328	0.01	0.657	0.02	0.033	0.00
008	0.306	0.02	0.077	0.01	0.306	0.02	0.038	0.00	0.230	0.02	0.383	0.03	0.766	0.06	0.038	0.00
009	0.463	0.08	0.077	0.01	0.309	0.06	0.222	0.17	0.337	0.17	0.386	0.07	0.771	0.14	0.039	0.01
010	0.283	0.02	0.071	0.01	0.493	0.10	0.086	0.04	0.213	0.02	0.354	0.03	0.708	0.06	0.035	0.00
011	0.214	0.16	0.107	0.08	0.492	0.11	0.263	0.12	0.212	0.02	0.353	0.03	0.706	0.05	0.035	0.00
012	0.197	0.12	0.067	0.01	0.400	0.03	0.101	0.05	0.200	0.02	0.333	0.03	0.666	0.05	0.049	0.03
013	0.143	0.01	0.175	0.20	1.280	0.19	0.347	0.13	0.386	0.33	0.357	0.03	0.714	0.05	0.067	0.06
014	0.536	0.11	0.114	0.07	3.068	0.37	0.367	0.09	0.616	0.05	0.385	0.03	0.770	0.06	0.039	0.00
015	0.127	0.08	0.085	0.00	0.341	0.02	0.043	0.00	0.256	0.01	0.427	0.02	0.853	0.05	0.043	0.00
016	0.599	0.12	0.046	0.00	0.413	0.07	0.110	0.00	0.642	0.16	0.230	0.01	0.460	0.02	0.112	0.10
017	0.230	0.18	0.075	0.01	0.371	0.10	0.038	0.00	0.225	0.03	0.376	0.05	0.751	0.09	0.038	0.00
018	0.257	0.00	0.064	0.00	0.321	0.12	0.054	0.04	0.193	0.00	0.321	0.01	0.643	0.01	0.032	0.00
019	0.258	0.00	0.065	0.00	0.387	0.01	0.048	0.03	0.194	0.00	0.323	0.01	0.646	0.01	0.048	0.03
020	1.134	0.22	0.063	0.00	0.441	0.11	0.088	0.02	1.072	0.09	0.316	0.01	0.941	0.60	0.183	0.03
021	0.065	0.00	0.065	0.00	0.455	0.11	0.085	0.02	0.196	0.01	0.326	0.01	0.652	0.03	0.033	[illegible]
022	0.124	0.01	0.062	0.01	0.371	0.03	0.053	0.05	0.185	0.02	0.309	0.03	0.618	0.05	0.075	[illegible]
023	0.488	0.13	0.836	0.27	1.395	0.29	1.813	0.30	0.209	0.00	0.348	0.00	0.697	0.01	0.084	[illegible]
024	0.130	0.01	0.065	0.01	0.259	0.03	0.072	0.02	0.194	0.02	0.324	0.03	0.648	0.06	0.032	0.00
025	0.347	0.10	1.471	0.02	1.397	0.13	2.469	0.68	0.211	0.02	0.351	0.04	0.702	0.08	0.061	0.06
026	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99
027	0.339	0.15	0.171	0.21	0.406	0.01	0.081	0.03	0.203	0.01	0.338	0.01	0.676	0.02	0.094	0.02
028	0.134	0.01	0.067	0.00	0.471	0.16	0.074	0.01	0.201	0.01	0.335	0.02	0.670	0.04	0.064	0.06
030	0.532	0.00	0.665	0.01	1.594	0.79	1.177	0.10	0.731	0.13	0.332	0.00	0.665	0.01	0.306	0.08
031	0.082	0.03	0.082	0.03	0.640	0.30	0.095	0.01	0.172	0.05	0.287	0.08	0.574	0.17	0.046	0.03
032	0.133	0.02	0.102	0.08	0.795	0.15	0.139	0.01	0.199	0.04	0.331	0.06	0.663	0.12	0.066	0.07
033	0.052	0.01	0.052	0.01	0.310	0.03	0.026	0.00	0.155	0.02	0.258	0.03	0.516	0.05	0.038	0.02
034	0.060	0.00	0.060	0.00	0.359	0.00	0.051	0.04	0.180	0.00	0.299	0.00	0.599	0.00	0.063	0.07
035	0.152	999.99	0.076	999.99	0.304	999.99	0.038	999.99	0.228	999.99	0.380	999.99	0.760	999.99	0.038	999.99
036	0.152	0.17	0.063	0.01	0.322	0.17	0.032	0.00	0.190	0.03	0.317	0.04	0.635	0.09	0.032	0.00
037	0.138	0.03	0.069	0.01	0.277	0.05	0.035	0.01	0.208	0.04	0.346	0.06	0.692	0.13	0.035	0.01
038	0.094	0.06	0.064	0.01	0.256	0.02	0.032	0.00	0.192	0.02	0.319	0.03	0.639	0.06	0.032	0.00
039	0.059	0.01	0.059	0.01	0.235	0.04	0.029	0.01	0.176	0.03	0.293	0.05	0.587	0.10	0.029	0.01
040	0.178	0.23	0.100	0.05	0.410	0.06	0.174	0.06	0.205	0.03	0.341	0.05	0.683	0.10	0.034	0.01
041	0.207	0.13	0.069	0.00	0.485	0.12	0.035	0.00	0.208	0.01	0.347	0.01	0.694	0.03	0.052	0.03
042	0.143	0.08	0.097	0.01	0.336	0.06	0.079	0.07	0.145	0.02	0.242	0.03	0.484	0.05	0.052	0.06
043	0.265	0.24	0.208	0.16	2.728	0.56	0.473	0.06	0.204	0.02	0.340	0.04	7.373	3.28	0.094	0.04
044	0.191	0.22	0.077	0.00	0.233	0.16	0.039	0.00	0.232	0.01	0.386	0.01	0.772	0.03	0.039	0.00
045	0.127	0.08	0.064	0.04	0.382	0.08	0.148	0.09	0.127	0.00	0.212	0.00	0.424	0.00	0.089	0.09
080	0.829	0.08	0.097	0.07	0.894	0.05	0.199	0.05	0.829	0.08	0.319	0.02	0.949	0.58	0.032	0.00
081	2.606	0.12	0.162	0.07	0.777	0.03	0.159	0.04	2.281	0.02	0.283	0.07	2.754	0.42	0.101	0.15
082	0.767	0.15	0.070	0.00	0.628	0.15	0.174	0.01	0.766	0.13	0.348	0.00	0.697	0.01	0.153	0.03
083	1.609	0.08	0.067	0.01	0.808	0.10	0.148	0.02	1.609	0.08	0.337	0.04	1.981	1.11	0.113	0.15
Ar.Mean	0.358	0.10	0.141	0.03	0.617	0.12	0.223	0.06	0.364	0.05	0.331	0.03	0.891	0.18	0.065	[illegible]
Std.Dev.	0.443	0.08	0.243	0.06	0.584	0.14	0.453	0.11	0.399	0.08	0.040	0.02	1.034	0.51	0.049	0.04

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.013	0.00	3.362	0.54	5.906	5.63	0.134	0.02	11.995	0.73	0.067	0.01	0.53	1.49
002	0.014	0.00	3.504	0.28	3.504	0.28	0.140	0.01	36.729	16.98	0.070	0.01	1.30	4.51
003	0.013	0.00	3.310	0.16	3.310	0.16	0.132	0.01	9.916	0.86	0.066	0.00	0.13	0.23
004	0.013	0.00	3.239	0.32	3.239	0.32	0.130	0.01	6.980	7.81	0.065	0.01	0.63	2.07
005	0.013	0.00	3.226	0.17	3.226	0.17	0.129	0.01	3.226	0.17	0.065	0.00	0.06	0.07
006	0.014	0.00	3.466	0.34	3.466	0.34	0.139	0.01	8.317	0.81	0.069	0.01	0.15	0.22
007	0.013	0.00	3.284	0.10	3.284	0.10	0.131	0.00	3.284	0.10	0.066	0.00	0.04	0.05
008	0.015	0.00	3.830	0.29	3.830	0.29	0.153	0.01	3.830	0.29	0.077	0.01	0.08	0.12
009	0.015	0.00	3.857	0.70	3.857	0.70	0.154	0.03	27.782	28.65	0.077	0.01	2.20	7.62
010	0.014	0.00	3.542	0.31	3.542	0.31	0.142	0.01	5.237	3.08	0.071	0.01	0.29	0.81
011	0.014	0.00	3.529	0.25	3.529	0.25	0.141	0.01	31.157	7.89	0.071	0.01	0.64	2.09
012	0.013	0.00	3.330	0.27	3.330	0.27	0.133	0.01	12.409	10.96	0.067	0.01	0.85	2.91
013	0.014	0.00	3.569	0.26	12.848	0.93	0.143	0.01	18.662	7.06	0.071	0.01	0.66	1.86
014	0.015	0.00	3.850	0.31	13.862	1.11	0.154	0.01	22.117	8.99	0.077	0.01	0.80	2.38
015	0.017	0.00	4.267	0.23	4.267	0.23	0.171	0.01	9.966	11.63	0.085	0.00	0.88	3.10
016	0.009	0.00	2.302	0.10	2.302	0.10	0.092	0.00	8.307	2.21	0.046	0.00	0.21	0.58
017	0.015	0.00	3.756	0.45	3.756	0.45	0.150	0.02	3.756	0.45	0.075	0.01	0.13	0.18
018	0.013	0.00	3.214	0.05	3.214	0.05	0.129	0.00	3.214	0.05	0.064	0.00	0.03	0.04
019	0.013	0.00	3.228	0.05	3.228	0.05	0.129	0.00	6.749	6.99	0.065	0.00	0.51	1.86
020	0.013	0.00	3.155	0.10	3.155	0.10	0.126	0.00	7.810	9.21	0.063	0.00	0.75	2.44
021	0.013	0.00	3.259	0.13	3.259	0.13	0.130	0.01	5.585	4.78	0.065	0.00	0.37	1.27
022	0.012	0.00	3.091	0.26	3.091	0.26	0.124	0.01	5.344	4.77	0.062	0.01	0.40	1.26
023	0.139	0.03	3.485	0.04	14.625	4.02	0.139	0.00	135.892	5.46	0.070	0.00	0.75	1.72
024	0.013	0.00	3.239	0.32	3.239	0.32	0.130	0.01	4.940	3.72	0.065	0.01	0.33	0.98
025	0.118	0.21	3.511	0.38	25.278	2.70	0.207	0.12	270.466	97.14	0.070	0.01	7.26	25.88
026	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.99	999.99
027	0.069	0.11	3.381	0.12	3.381	0.12	0.339	0.15	7.702	8.52	0.068	0.00	0.68	2.26
028	0.013	0.00	3.349	0.18	3.349	0.18	0.134	0.01	3.349	0.18	0.067	0.00	0.06	0.08
030	0.173	0.03	3.323	0.03	17.938	3.85	0.133	0.00	99.688	4.54	0.066	0.00	0.68	1.51
031	0.011	0.00	2.871	0.83	2.871	0.83	0.115	0.03	10.169	0.68	0.057	0.02	0.22	0.31
032	0.013	0.00	3.314	0.61	7.953	1.47	0.133	0.02	24.103	9.72	0.066	0.01	0.89	2.57
033	0.010	0.00	2.580	0.27	2.580	0.27	0.103	0.01	4.779	4.13	0.052	0.01	0.35	1.09
034	0.012	0.00	2.994	0.01	2.994	0.01	0.120	0.00	5.094	4.21	0.060	0.00	0.31	1.12
035	0.015	999.99	3.802	999.99	3.802	999.99	0.152	999.99	3.802	999.99	0.076	999.99	999.99	999.99
036	0.013	0.00	3.175	0.43	3.175	0.43	0.127	0.02	3.175	0.43	0.063	0.01	0.13	0.17
037	0.014	0.00	3.459	0.63	3.459	0.63	0.138	0.03	7.612	8.94	0.069	0.01	0.76	2.37
038	0.013	0.00	3.194	0.29	3.194	0.29	0.128	0.01	6.198	6.29	0.064	0.01	0.51	1.67
039	0.012	0.00	2.933	0.52	2.933	0.52	0.117	0.02	5.169	4.99	0.059	0.01	0.45	1.32
040	0.026	0.02	3.414	0.52	3.414	0.52	0.137	0.02	19.014	0.17	0.068	0.01	0.13	0.17
041	0.014	0.00	3.472	0.14	3.472	0.14	0.139	0.01	7.213	7.34	0.069	0.00	0.57	1.95
042	0.014	0.01	2.418	0.26	2.418	0.26	0.188	0.17	15.778	5.06	0.048	0.01	0.44	1.33
043	0.081	0.02	3.401	0.36	8.162	0.87	0.336	0.10	33.437	7.63	0.068	0.01	0.96	2.10
044	0.015	0.00	3.860	0.14	3.860	0.14	0.154	0.01	9.756	11.94	0.077	0.00	0.91	3.18
045	0.017	0.02	2.121	0.00	3.605	2.97	0.127	0.08	12.724	13.57	0.042	0.00	1.22	3.64
080	0.013	0.00	3.194	0.18	7.666	0.43	0.128	0.01	19.929	10.07	0.064	0.00	0.83	2.66
081	0.011	0.00	2.825	0.71	4.554	2.75	0.113	0.03	13.772	2.09	0.057	0.01	0.47	0.86
082	0.014	0.00	3.485	0.04	3.485	0.04	0.139	0.00	13.932	2.63	0.070	0.00	0.23	0.69
083	0.013	0.00	3.369	0.40	5.867	5.40	0.135	0.02	13.947	5.05	0.067	0.01	0.89	1.86
Ar.Mean	0.025	0.01	3.305	0.28	5.197	0.90	0.145	0.02	21.362	7.80	0.066	0.01	0.69	2.14
Std.dev.	0.034	0.03	0.404	0.20	4.530	1.39	0.045	0.04	43.977	14.50	0.008	0.00	1.07	3.84

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002			
003			
004			
005			
006			
007			
008			
009			
010			
011			
012			
013		DIRT ON SCREEN	
014			
015			
016			
017			
018			
019			
020			
021			
022			
023			
024	BIRD DROPPINGS ON SCREEN	BIRD DROPPINGS ON SCREEN	
025		OLD COTTON BOLL,DIRT ON SCREEN	
026	VOID/VANDALISM	VOID/VANDALISM	MISSING SAMPLE A and B
027	BIRD DROPPINGS ON SCREEN	BIRD DROPPINGS ON SCREEN	
028			
030			
031			
032			
033			
034			
035		VOID/VANDALISM	MISSING SAMPLE B
036			
037			
038			
039			
040			
041			
042			
043	BIRD DROPPINGS ON SCREEN	BIRD DROPPINGS ON SCREEN	
044			
045			
080			
081			
082			
083			

ARIZONA PUBLIC SERVICE

MONTHLY REPORT for 3-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)

and Differences (d)

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	1.118	0.24	0.200	0.15	1.180	0.12	0.144	0.01	0.849	0.05	0.328	0.03	0.656	0.06	0.112	0.16
002	0.663	0.04	0.265	0.02	1.066	0.34	0.277	0.35	0.663	0.04	0.332	0.02	1.006	0.73	0.119	0.17
003	1.163	0.00	0.194	0.13	1.163	0.00	0.129	0.10	0.970	0.13	0.323	0.00	0.646	0.00	0.081	0.10
004	0.362	0.11	0.155	0.11	1.239	0.22	0.134	0.06	0.362	0.11	0.258	0.00	0.516	0.01	0.144	0.02
005	0.491	0.10	0.109	0.00	1.256	0.13	0.153	0.04	0.437	0.01	0.273	0.01	0.546	0.01	0.175	0.00
006	0.531	0.06	0.156	0.06	1.562	0.14	0.194	0.09	0.531	0.06	0.273	0.08	0.780	0.30	0.109	0.15
007	0.540	999.99	0.135	999.99	1.755	999.99	0.149	999.99	0.202	999.99	0.337	999.99	0.675	999.99	0.149	999.99
008	0.335	0.15	0.158	0.23	0.938	0.30	0.123	0.05	0.233	0.06	0.279	0.12	0.559	0.24	0.140	0.04
009	0.551	0.16	0.079	0.00	1.102	0.00	0.150	0.02	0.433	0.39	0.394	0.00	0.788	0.00	0.126	0.09
010	0.803	0.08	0.102	0.08	1.000	0.03	0.121	0.04	0.599	0.07	0.334	0.03	0.669	0.07	0.033	0.00
011	0.498	0.02	0.371	0.23	2.858	0.36	0.460	0.59	0.187	0.01	0.311	0.02	0.622	0.03	0.031	0.00
012	0.386	0.27	0.321	0.14	1.281	0.32	0.203	0.09	0.290	0.21	0.319	0.02	0.639	0.03	0.068	0.07
013	0.324	0.17	0.187	0.10	1.218	0.30	0.242	0.01	0.192	0.03	0.319	0.05	0.639	0.09	0.032	0.00
014	1.740	0.23	0.320	0.11	3.605	0.21	0.528	0.06	1.287	0.08	0.322	0.02	1.287	0.08	0.089	0.11
015	0.364	0.24	0.111	0.10	0.828	0.04	0.097	0.00	0.212	0.06	0.354	0.10	0.707	0.20	0.050	0.02
016	1.303	0.47	0.146	0.13	1.052	0.14	0.130	0.06	1.169	0.04	0.190	0.03	1.520	0.24	0.062	0.04
017	0.408	0.21	0.081	0.01	0.731	0.25	0.075	0.06	0.242	0.03	0.403	0.05	0.807	0.09	0.090	0.09
018	0.436	0.07	0.049	0.00	0.630	0.06	0.073	0.01	0.389	0.03	0.243	0.02	0.486	0.03	0.180	0.02
019	0.606	0.04	0.090	0.06	0.665	0.08	0.061	0.00	0.547	0.15	0.303	0.02	0.606	0.04	0.133	0.04
020	3.096	0.50	0.253	0.03	0.819	0.04	0.104	0.03	3.527	0.11	0.261	0.08	3.572	0.03	0.372	0.07
021	0.483	0.00	0.181	0.12	1.932	0.23	0.151	0.01	0.362	0.00	0.302	0.00	0.604	0.00	0.163	0.04
022	0.445	0.40	0.084	0.05	1.312	0.17	0.114	0.03	0.173	0.02	0.288	0.04	0.575	0.07	0.050	0.05
023	1.375	0.03	5.512	0.60	23.330	0.32	8.397	1.50	0.653	0.32	0.299	0.02	0.888	0.54	0.030	0.00
024	0.648	0.54	0.330	0.16	2.206	0.13	0.432	0.26	0.171	0.04	0.285	0.06	0.570	0.12	0.106	0.09
025	0.556	0.12	1.764	0.05	7.614	0.13	2.619	0.32	0.275	0.24	0.252	0.01	1.009	0.03	0.025	0.00
026	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99
027	0.358	0.15	0.181	0.02	1.035	0.18	0.095	0.00	0.207	0.15	0.226	0.02	0.453	0.04	0.180	0.02
028	0.380	0.13	0.216	0.01	8.133	5.98	0.316	0.19	0.188	0.04	0.270	0.02	0.541	0.03	0.097	0.14
030	1.801	0.37	1.978	1.53	10.047	0.73	3.467	3.10	2.697	2.37	0.244	0.02	1.451	0.88	0.410	0.77
031	0.272	0.15	0.264	0.07	1.296	0.41	0.114	0.05	0.285	0.22	0.268	0.04	0.537	0.08	0.027	0.00
032	0.398	0.07	0.398	0.07	4.952	0.52	0.552	0.14	0.199	0.04	0.331	0.06	0.663	0.12	0.087	0.11
033	0.201	0.18	0.052	0.01	1.282	0.17	0.088	0.02	0.155	0.02	0.258	0.03	0.516	0.05	0.087	0.12
034	0.239	0.00	0.060	0.00	0.778	0.12	0.075	0.09	0.180	0.00	0.299	0.00	0.599	0.00	0.126	0.01
035	0.153	0.00	0.306	0.00	0.994	0.16	0.107	0.03	0.229	0.00	0.382	0.00	0.764	0.01	0.065	0.05
036	0.083	0.06	0.055	0.00	0.829	0.15	0.066	0.00	0.166	0.01	0.276	0.01	0.552	0.02	0.138	0.04
037	0.092	0.04	0.064	0.01	0.878	0.06	0.046	0.02	0.191	0.04	0.319	0.07	0.638	0.14	0.069	0.07
038	0.073	0.03	0.051	0.01	0.596	0.06	0.051	0.01	0.152	0.04	0.253	0.06	0.507	0.12	0.128	0.03
039	0.117	0.07	0.120	0.09	0.513	0.05	0.071	0.00	0.119	0.01	0.198	0.01	0.396	0.03	0.134	0.01
040	0.166	0.21	0.325	0.11	1.567	0.09	0.434	0.20	0.291	0.18	0.327	0.02	0.653	0.04	0.111	0.01
041	0.378	0.03	0.063	0.00	1.008	0.08	0.076	0.01	0.189	0.01	0.315	0.02	0.630	0.05	0.094	0.13
042	0.085	0.05	0.085	0.05	0.663	0.02	0.058	0.01	0.087	0.01	0.144	0.02	0.289	0.03	0.138	0.02
043	0.340	0.02	0.226	0.01	1.631	0.70	0.282	0.07	0.395	0.09	0.283	0.02	1.391	1.62	0.186	0.05
044	0.152	0.17	0.063	0.01	0.635	0.10	0.097	0.05	0.190	0.03	0.317	0.05	0.635	0.10	0.076	0.01
045	0.389	999.99	0.389	999.99	6.029	999.99	0.622	999.99	0.389	999.99	0.243	999.99	0.486	999.99	0.194	999.99
080	2.914	0.88	0.227	0.22	1.999	0.70	0.380	0.36	2.117	0.46	0.287	0.02	2.855	0.99	0.029	0.00
081	3.230	0.16	0.228	0.04	1.418	0.11	0.159	0.02	2.801	0.77	0.284	0.04	3.414	0.53	0.308	0.36
082	1.954	0.23	0.159	0.13	1.417	0.13	0.196	0.14	1.465	0.03	0.213	0.06	2.077	0.28	0.261	0.04
083	3.939	0.03	0.239	0.02	2.089	0.03	0.241	0.11	3.041	0.15	0.299	0.02	4.161	0.91	0.327	0.08
Ar.Mean	0.786	0.16	0.364	0.11	2.386	0.32	0.486	0.19	0.653	0.15	0.290	0.03	0.970	0.20	0.126	0.08
Std.Dev.	0.901	0.17	0.847	0.24	3.742	0.88	1.326	0.51	0.835	0.37	0.050	0.03	0.857	0.33	0.088	0.13

ARIZONA PUBLIC SERVICE
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AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.013	0.00	3.278	0.32	5.459	4.04	0.131	0.01	20.785	5.80	0.066	0.01	0.79	1.79
002	0.027	0.03	3.317	0.22	3.317	0.22	0.270	0.28	29.672	31.12	0.066	0.00	2.40	8.27
003	0.013	0.00	3.231	0.01	3.231	0.01	0.129	0.00	13.570	1.24	0.065	0.00	0.12	0.33
004	0.010	0.00	2.580	0.04	4.372	3.55	0.154	0.10	8.247	1.94	0.052	0.00	0.45	1.02
005	0.011	0.00	2.728	0.05	2.728	0.05	0.218	0.00	12.587	7.88	0.055	0.00	0.59	2.10
006	0.020	0.02	2.735	0.81	4.934	5.21	0.203	0.15	19.366	1.49	0.055	0.02	0.62	1.38
007	0.013	999.99	3.375	999.99	3.375	999.99	0.135	999.99	12.150	999.99	0.067	999.99	999.99	999.99
008	0.066	0.11	2.794	1.21	5.174	5.97	0.360	0.37	8.018	0.29	0.056	0.02	0.65	1.56
009	0.016	0.00	3.938	0.00	3.938	0.00	0.158	0.00	25.200	15.75	0.079	0.00	1.17	4.20
010	0.013	0.00	3.344	0.34	3.344	0.34	0.134	0.01	12.038	1.21	0.067	0.01	0.17	0.32
011	0.032	0.04	3.113	0.15	9.383	4.19	0.188	0.13	57.405	89.31	0.062	0.00	6.79	23.78
012	0.013	0.00	3.194	0.16	3.194	0.16	0.128	0.01	29.322	3.68	0.064	0.00	0.37	0.96
013	0.013	0.00	3.194	0.47	3.194	0.47	0.128	0.02	15.923	1.05	0.064	0.01	0.20	0.30
014	0.026	0.03	3.219	0.19	15.450	0.90	0.129	0.01	27.588	4.82	0.064	0.00	0.49	1.27
015	0.014	0.00	3.537	1.02	3.537	1.02	0.141	0.04	6.260	4.42	0.071	0.02	0.52	1.18
016	0.008	0.00	1.900	0.30	5.610	1.38	0.076	0.01	13.560	0.88	0.038	0.01	0.27	0.40
017	0.016	0.00	4.034	0.47	4.034	0.47	0.161	0.02	11.964	3.44	0.081	0.01	0.37	0.90
018	0.010	0.00	2.431	0.16	2.431	0.16	0.097	0.01	8.282	1.52	0.049	0.00	0.15	0.40
019	0.012	0.00	3.031	0.19	3.031	0.19	0.121	0.01	9.112	1.78	0.061	0.00	0.18	0.46
020	0.010	0.00	2.606	0.76	2.606	0.76	0.104	0.03	11.312	1.27	0.052	0.02	0.27	0.40
021	0.012	0.00	3.019	0.01	5.137	4.25	0.121	0.00	15.098	1.27	0.060	0.00	0.42	1.15
022	0.012	0.00	2.877	0.38	4.760	3.39	0.115	0.01	12.359	7.56	0.058	0.01	0.87	2.1[illegible]
023	0.041	0.06	2.994	0.19	85.016	5.51	0.120	0.01	969.517	38.90	0.060	0.00	3.43	10.31
024	0.030	0.04	2.851	0.61	6.163	6.02	0.114	0.02	39.965	11.78	0.057	0.01	1.42	3.37
025	0.020	0.02	2.522	0.08	27.186	5.21	0.101	0.00	312.517	10.55	0.050	0.00	1.20	3.02
026	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.99	999.99
027	0.032	0.03	2.263	0.21	3.919	3.52	0.457	0.22	9.566	3.58	0.045	0.00	0.58	1.26
028	0.011	0.00	2.703	0.16	32.061	13.72	0.108	0.01	34.223	13.85	0.054	0.00	2.45	5.05
030	0.029	0.04	2.444	0.16	35.007	9.50	0.098	0.01	280.707	157.97	0.049	0.00	12.67	41.89
031	0.011	0.00	2.683	0.40	4.421	3.07	0.107	0.02	18.486	9.17	0.054	0.01	0.98	2.49
032	0.049	0.07	3.314	0.61	21.685	0.08	0.277	0.31	90.731	15.50	0.066	0.01	1.27	4.10
033	0.010	0.00	2.580	0.27	2.580	0.27	0.103	0.01	9.722	2.06	0.052	0.01	0.23	0.54
034	0.012	0.00	2.994	0.01	2.994	0.01	0.120	0.00	10.174	3.55	0.060	0.00	0.27	0.94
035	0.077	0.03	3.821	0.04	6.509	5.42	0.842	0.47	10.684	6.01	0.115	0.08	0.88	2.05
036	0.011	0.00	2.761	0.12	2.761	0.12	0.110	0.00	6.815	7.99	0.055	0.00	0.61	2.13
037	0.013	0.00	3.188	0.71	3.188	0.71	0.128	0.03	6.869	6.65	0.064	0.01	0.61	1.76
038	0.010	0.00	2.534	0.59	2.534	0.59	0.271	0.36	6.083	1.43	0.051	0.01	0.24	0.40
039	0.008	0.00	1.978	0.13	3.409	2.99	0.442	0.42	8.628	4.18	0.040	0.00	0.57	1.30
040	0.013	0.00	3.265	0.19	3.265	0.19	0.131	0.01	49.203	25.78	0.065	0.00	1.93	6.87
041	0.013	0.00	3.149	0.25	3.149	0.25	0.126	0.01	12.398	9.09	0.063	0.00	0.71	2.41
042	0.006	0.00	1.444	0.16	2.511	2.30	0.173	0.02	4.108	2.77	0.029	0.00	0.39	0.91
043	0.061	0.05	2.831	0.16	4.870	4.24	0.505	0.31	27.082	5.23	0.057	0.00	0.90	1.69
044	0.013	0.00	3.175	0.48	3.175	0.48	0.127	0.02	23.227	30.02	0.063	0.01	2.25	7.99
045	0.019	999.99	2.431	999.99	23.338	999.99	0.292	999.99	60.290	999.99	0.049	999.99	999.99	999.99
080	0.011	0.00	2.871	0.16	10.428	7.45	0.115	0.01	58.034	35.88	0.057	0.00	3.36	9.55
081	0.011	0.00	2.845	0.44	4.682	3.24	0.114	0.02	18.732	1.76	0.057	0.01	0.54	0.91
082	0.009	0.00	2.134	0.57	3.428	2.02	0.196	0.20	17.439	21.34	0.043	0.01	1.80	5.65
083	0.012	0.00	2.987	0.21	9.023	4.21	0.119	0.01	24.556	5.28	0.060	0.00	0.79	1.70
Ar.Mean	0.019	0.01	2.899	0.31	8.714	2.62	0.185	0.08	52.970	13.73	0.059	0.01	1.29	3.8[illegible]
Std.dev.	0.016	0.02	0.505	0.28	13.802	2.94	0.139	0.13	148.757	26.90	0.013	0.01	2.11	7.08

A R I Z O N A   P U B L I C   S E R V I C E
MONTHLY REPORT for 3-89

DEPOSITION DATA
Comments and Messages Only

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002			
003			
004			
005			
006			
007		VOID/SAMPLE LEAKED	MISSING SAMPLE B
008			
009			
010			
011			
012			
013			
014			
015			
016			
017			
018			
019			
020			
021			
022			
023			
024			
025			
026	VOID/VANDALISM	VOID/VANDALISM	MISSING SAMPLE A and B
027			
028			
030			
031			
032			
033			
034			
035			
036			
037			
038			
039			
040			
041			
042			
043			
044			
045	VOID/CONTAMINATION		MISSING SAMPLE A
080			
081			
082			
083			

A R I Z O N A   P U B L I C   S E R V I C E
MONTHLY REPORT for 4-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	0.443	0.16	0.096	0.07	0.630	0.05	0.159	0.10	0.189	0.01	0.315	0.02	0.630	0.05	0.032	0.00
002	0.259	0.03	0.218	0.30	0.456	0.17	0.032	0.00	0.194	0.02	0.323	0.03	0.646	0.06	0.049	0.04
003	0.177	0.03	0.272	0.22	0.573	0.00	0.138	0.03	0.194	0.10	0.221	0.03	0.443	0.07	0.022	0.00
004	0.237	0.01	0.059	0.00	0.532	0.10	0.071	0.00	0.178	0.00	0.296	0.01	0.592	0.02	0.030	0.00
005	0.223	0.02	0.056	0.00	0.557	0.04	0.121	0.06	0.167	0.01	0.278	0.02	0.557	0.04	0.028	0.00
006	0.259	0.03	0.065	0.01	0.579	0.07	0.151	0.11	0.194	0.02	0.323	0.03	0.647	0.07	0.032	0.00
007	0.226	0.01	0.056	0.00	1.466	0.15	0.136	0.03	0.169	0.01	0.282	0.01	0.565	0.03	0.028	0.00
008	0.269	999.99	0.067	999.99	0.538	999.99	0.034	999.99	0.202	999.99	0.336	999.99	0.673	999.99	0.034	999.99
009	0.284	0.06	0.205	0.10	0.836	0.10	0.215	0.07	0.213	0.05	0.355	0.08	0.710	0.16	0.036	0.01
010	0.300	0.13	0.090	0.06	0.539	0.13	0.114	0.04	0.179	0.00	0.299	0.01	0.597	0.02	0.030	0.00
011	0.236	0.06	0.221	0.18	0.878	0.10	0.272	0.20	0.177	0.04	0.295	0.07	0.590	0.15	0.030	0.01
012	0.273	0.18	0.091	0.00	0.545	0.00	0.068	0.05	0.273	0.00	0.454	0.00	0.909	0.00	0.045	0.00
013	0.308	0.02	0.308	0.02	1.312	0.24	0.341	0.15	0.231	0.02	0.385	0.03	0.770	0.05	0.039	0.00
014	0.666	0.19	0.112	0.08	1.038	0.37	0.252	0.08	0.412	0.40	0.369	0.02	0.738	0.05	0.037	0.00
015	0.304	0.04	0.076	0.01	0.608	0.08	0.056	0.03	0.228	0.03	0.380	0.05	0.760	0.09	0.038	0.00
016	0.573	0.08	0.078	0.09	0.448	0.04	0.089	0.04	0.604	0.14	0.160	0.01	0.640	0.05	0.060	0.01
017	0.249	0.03	0.062	0.01	0.498	0.06	0.062	0.01	0.187	0.02	0.311	0.04	0.622	0.08	0.031	0.00
018	0.171	0.01	0.064	0.04	0.641	0.06	0.077	0.03	0.128	0.00	0.214	0.01	0.428	0.02	0.021	0.00
019	0.183	0.01	0.068	0.04	0.640	0.03	0.087	0.03	0.137	0.01	0.229	0.01	0.457	0.02	0.023	0.00
020	0.419	0.05	0.069	0.04	0.512	0.04	0.079	0.00	0.252	0.21	0.234	0.02	0.468	0.04	0.023	0.00
021	0.186	0.00	0.046	0.00	0.557	0.01	0.116	0.01	0.139	0.00	0.232	0.00	0.464	0.01	0.035	[illegible]
022	0.198	0.02	0.076	0.06	0.692	0.09	0.115	0.06	0.148	0.02	0.247	0.03	0.495	0.06	0.025	[illegible]
023	0.333	0.09	1.763	1.60	7.900	0.80	3.246	2.26	0.223	0.16	0.215	0.05	0.429	0.10	0.042	[illegible]
024	0.312	999.99	0.208	999.99	1.248	999.99	0.229	999.99	0.156	999.99	0.260	999.99	0.520	999.99	0.026	999.99
025	0.379	0.01	0.820	0.11	3.154	0.44	1.375	0.25	0.189	0.00	0.316	0.01	0.631	0.01	0.048	0.03
026	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99
027	0.281	0.11	0.056	0.00	0.450	0.01	0.048	0.04	0.169	0.00	0.281	0.01	0.563	0.01	0.042	0.03
028	0.228	0.04	0.047	0.01	1.749	0.79	0.137	0.02	0.140	0.03	0.233	0.05	0.467	0.11	0.023	0.01
030	0.572	0.07	0.656	0.60	3.642	1.58	1.317	1.19	0.704	0.02	0.220	0.01	0.440	0.01	0.037	0.03
031	0.177	0.14	0.068	0.03	0.552	0.06	0.091	0.03	0.141	0.03	0.234	0.05	0.469	0.11	0.023	0.01
032	0.271	0.27	0.101	0.07	0.947	0.54	0.169	0.10	0.203	0.00	0.338	0.00	0.676	0.00	0.034	0.00
033	0.136	0.12	0.044	0.01	0.512	0.04	0.055	0.01	0.131	0.03	0.218	0.05	0.436	0.11	0.058	0.07
034	0.196	0.03	0.049	0.01	0.634	0.01	0.069	0.01	0.147	0.03	0.246	0.04	0.491	0.09	0.025	0.00
035	0.141	0.01	0.350	0.12	0.632	0.10	0.105	0.01	0.211	0.01	0.352	0.02	0.704	0.04	0.035	0.00
036	0.088	0.01	0.044	0.01	0.438	0.05	0.061	0.01	0.131	0.02	0.219	0.03	0.438	0.05	0.049	0.05
037	0.218	0.04	0.055	0.01	0.428	0.14	0.066	0.01	0.164	0.03	0.273	0.05	0.546	0.09	0.027	0.00
038	0.165	0.13	0.053	0.01	0.427	0.07	0.044	0.03	0.160	0.03	0.267	0.04	0.533	0.09	0.027	0.00
039	0.145	0.06	0.051	0.01	0.550	0.06	0.065	0.01	0.152	0.04	0.253	0.07	0.507	0.14	0.025	0.01
040	0.122	0.00	0.183	0.12	0.917	0.12	0.220	0.05	0.183	0.00	0.306	0.00	0.611	0.00	0.031	0.00
041	0.150	0.03	0.058	0.05	0.932	0.09	0.115	0.08	0.112	0.02	0.187	0.03	0.374	0.07	0.019	0.00
042	0.183	0.11	0.143	0.03	0.675	0.08	0.101	0.03	0.206	0.22	0.179	0.04	0.357	0.08	0.073	0.02
043	0.489	999.99	1.223	999.99	1.223	999.99	0.432	999.99	0.897	999.99	0.204	999.99	0.408	999.99	0.049	999.99
044	0.201	0.13	0.067	0.00	0.470	0.12	0.107	0.02	0.202	0.00	0.336	0.01	0.673	0.02	0.034	0.00
045	0.451	0.14	0.050	0.00	1.040	0.21	0.105	0.02	0.299	0.03	0.249	0.02	0.499	0.04	0.025	0.00
080	0.957	0.38	0.065	0.03	0.923	0.12	0.122	0.03	0.868	0.40	0.222	0.03	1.059	1.16	0.022	0.00
081	1.009	0.15	0.083	0.06	0.900	0.14	0.084	0.00	0.958	0.26	0.201	0.12	0.831	0.63	0.020	0.01
082	0.329	0.05	0.047	0.01	0.659	0.11	0.057	0.01	0.142	0.02	0.237	0.03	0.475	0.06	0.024	0.00
083	0.361	0.04	0.069	0.05	0.722	0.07	0.119	0.07	0.135	0.01	0.226	0.02	0.451	0.04	0.023	0.00
Ar.Mean	0.305	0.08	0.187	0.10	0.996	0.18	0.241	0.12	0.251	0.06	0.273	0.03	0.574	0.10	0.033	[illegible]
Std.Dev.	0.191	0.08	0.321	0.25	1.201	0.28	0.519	0.38	0.205	0.10	0.062	0.02	0.144	0.19	0.012	0.01

ARIZONA PUBLIC SERVICE
MONTHLY REPORT for 4-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.013	0.00	3.150	0.23	3.150	0.23	0.126	0.01	8.775	1.89	0.063	0.00	0.20	0.49
002	0.013	0.00	3.231	0.31	3.231	0.31	0.129	0.01	3.231	0.31	0.065	0.01	0.11	0.13
003	0.028	0.04	2.215	0.33	2.215	0.33	0.136	0.11	10.221	2.40	0.044	0.01	0.26	0.62
004	0.012	0.00	2.959	0.08	2.959	0.08	0.118	0.00	2.959	0.08	0.059	0.00	0.03	0.04
005	0.011	0.00	2.783	0.20	2.783	0.20	0.111	0.01	12.623	9.10	0.056	0.00	0.69	2.42
006	0.013	0.00	3.234	0.33	3.234	0.33	0.129	0.01	14.297	4.03	0.065	0.01	0.36	1.06
007	0.011	0.00	2.824	0.14	4.850	4.19	0.113	0.01	6.008	6.51	0.056	0.00	0.79	1.98
008	0.013	999.99	3.363	999.99	3.363	999.99	0.135	999.99	3.363	999.99	0.067	999.99	999.99	999.99
009	0.014	0.00	3.550	0.78	3.550	0.78	0.142	0.03	18.615	6.87	0.071	0.02	0.65	1.81
010	0.012	0.00	2.988	0.08	2.988	0.08	0.120	0.00	6.233	6.41	0.060	0.00	0.50	1.70
011	0.012	0.00	2.950	0.73	2.950	0.73	0.221	0.18	23.847	18.54	0.059	0.01	1.50	4.91
012	0.018	0.00	4.544	0.01	4.544	0.01	0.182	0.00	4.544	0.01	0.091	0.00	0.02	0.05
013	0.015	0.00	3.850	0.25	3.850	0.25	0.154	0.01	23.350	16.90	0.077	0.01	1.28	4.50
014	0.015	0.00	3.688	0.25	3.688	0.25	0.148	0.01	23.800	13.40	0.074	0.00	1.08	3.55
015	0.015	0.00	3.800	0.47	3.800	0.47	0.152	0.02	3.800	0.47	0.076	0.01	0.13	0.19
016	0.013	0.01	1.600	0.13	1.600	0.13	0.095	0.06	2.674	2.02	0.032	0.00	0.20	0.53
017	0.012	0.00	3.110	0.40	3.110	0.40	0.124	0.02	3.110	0.40	0.062	0.01	0.11	0.16
018	0.009	0.00	2.139	0.08	2.139	0.08	0.086	0.00	6.375	4.03	0.043	0.00	0.31	1.07
019	0.009	0.00	2.285	0.12	2.285	0.12	0.091	0.00	6.891	3.09	0.046	0.00	0.25	0.82
020	0.009	0.00	2.338	0.22	2.338	0.22	0.094	0.01	4.787	4.68	0.047	0.00	0.40	1.23
021	0.009	0.00	2.320	0.05	2.320	0.05	0.185	0.18	8.334	3.54	0.046	0.00	0.28	0.94
022	0.010	0.00	2.473	0.30	2.473	0.30	0.099	0.01	9.035	13.43	0.049	0.01	1.03	3.57
023	0.124	0.11	2.145	0.52	38.501	13.53	0.274	0.36	201.419	95.07	0.043	0.01	8.19	25.25
024	0.010	999.99	2.600	999.99	2.600	999.99	0.104	999.99	20.800	999.99	0.052	999.99	999.99	999.99
025	0.064	0.10	3.156	0.06	13.275	4.05	0.190	0.13	122.425	5.15	0.063	0.00	0.74	1.65
026	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.99	999.99
027	0.011	0.00	2.813	0.07	2.813	0.07	0.168	0.11	9.513	7.64	0.056	0.00	0.58	2.03
028	0.009	0.00	2.333	0.54	4.155	4.18	0.093	0.02	7.681	5.46	0.047	0.01	0.81	1.74
030	0.026	0.03	2.200	0.06	14.473	7.56	0.349	0.52	96.821	67.09	0.044	0.00	5.63	17.80
031	0.009	0.00	2.344	0.54	2.344	0.54	0.094	0.02	9.574	2.42	0.047	0.01	0.29	0.64
032	0.014	0.00	3.381	0.01	3.381	0.01	0.135	0.00	14.880	5.46	0.068	0.00	0.46	1.45
033	0.016	0.01	2.180	0.54	2.180	0.54	0.240	0.28	2.180	0.54	0.044	0.01	0.17	0.21
034	0.010	0.00	2.455	0.43	2.455	0.43	0.098	0.02	5.929	7.38	0.049	0.01	0.61	1.96
035	0.062	0.09	3.521	0.22	3.521	0.22	0.550	0.81	6.791	6.76	0.070	0.00	0.60	1.79
036	0.009	0.00	2.191	0.26	2.191	0.26	0.088	0.01	5.208	6.29	0.044	0.01	0.50	1.67
037	0.011	0.00	2.730	0.47	2.730	0.47	0.109	0.02	7.178	9.36	0.055	0.01	0.76	2.48
038	0.011	0.00	2.667	0.45	2.667	0.45	0.107	0.02	5.269	5.65	0.053	0.01	0.50	1.49
039	0.010	0.00	2.534	0.71	2.534	0.71	0.101	0.03	3.980	3.60	0.051	0.01	0.39	0.96
040	0.012	0.00	3.056	0.01	3.056	0.01	0.122	0.00	18.955	6.19	0.061	0.00	0.47	1.65
041	0.007	0.00	1.870	0.33	1.870	0.33	0.075	0.01	8.151	8.13	0.037	0.01	0.66	2.15
042	0.007	0.00	1.787	0.39	1.787	0.39	0.199	0.24	10.491	1.97	0.036	0.01	0.26	0.51
043	0.367	999.99	2.039	999.99	19.575	999.99	1.468	999.99	21.206	999.99	0.041	999.99	999.99	999.99
044	0.013	0.00	3.363	0.08	3.363	0.08	0.135	0.00	7.020	7.24	0.067	0.00	0.55	1.93
045	0.010	0.00	2.493	0.22	4.160	3.11	0.100	0.01	6.979	0.62	0.050	0.00	0.32	0.82
080	0.009	0.00	2.221	0.34	2.221	0.34	0.089	0.01	7.995	1.22	0.044	0.01	0.29	0.41
081	0.008	0.00	2.010	1.16	3.011	0.84	0.080	0.05	7.753	5.21	0.040	0.02	0.62	1.37
082	0.009	0.00	2.373	0.29	2.373	0.29	0.095	0.01	2.373	0.29	0.047	0.01	0.08	0.12
083	0.009	0.00	2.256	0.22	2.256	0.22	0.090	0.01	11.006	8.29	0.045	0.00	0.65	2.20
Ar.Mean	0.024	0.01	2.726	0.30	4.487	1.09	0.171	0.08	17.627	8.75	0.055	0.01	0.78	2.37
Std.dev.	0.055	0.03	0.623	0.24	6.064	2.43	0.210	0.16	34.816	16.80	0.012	0.00	1.42	4.45

ARIZONA PUBLIC SERVICE
MONTHLY REPORT for 4-89

DEPOSITION DATA
Comments and Messages Only

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002			
003			
004			
005			
006			
007			
008		VOID/CONTAMINATION	MISSING SAMPLE B
009			
010			
011			
012			
013			
014			
015			
016			
017			
018			
019			
020			
021			
022			
023	LIQUID DIRTY		
024	VOID/CONTAMINATION		MISSING SAMPLE A
025			
026	VOID/VANDALISM	VOID/VANDALISM	MISSING SAMPLE A and B
027			
028			
030			
031			
032			
033			
034			
035			
036			
037			
038			
039			
040			
041			
042			
043		VOID/DEAD BIRD IN CONTAINER	MISSING SAMPLE B
044			
045			
080			
081			
082			
083			

ARIZONA PUBLIC SERVICE
MONTHLY REPORT for 5-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	0.399	0.09	0.177	0.18	1.285	0.09	0.319	0.27	0.199	0.13	0.222	0.00	0.443	0.00	0.022	0.00
002	0.381	0.07	0.182	0.03	1.152	0.02	0.246	0.11	0.323	0.15	0.166	0.08	0.456	0.08	0.062	0.08
003	0.479	0.09	0.370	0.30	0.808	0.13	0.277	0.11	0.554	0.38	0.137	0.09	0.368	0.01	0.014	0.01
004	0.465	0.23	0.213	0.01	0.890	0.11	0.189	0.01	0.572	0.31	0.178	0.01	0.356	0.01	0.018	0.00
005	0.206	0.05	0.129	0.10	0.649	0.09	0.181	0.04	0.103	0.02	0.172	0.04	0.344	0.08	0.017	0.00
006	0.261	0.06	0.202	0.04	0.770	0.07	0.254	0.22	0.247	0.06	0.149	0.07	0.413	0.09	0.015	0.01
007	0.283	999.99	0.094	999.99	1.604	999.99	0.151	999.99	0.142	999.99	0.236	999.99	0.472	999.99	0.024	999.99
008	0.230	0.08	0.130	0.12	0.672	0.00	0.134	0.04	0.122	0.04	0.204	0.07	0.408	0.14	0.020	0.01
009	0.400	0.10	0.173	0.12	1.028	0.18	0.260	0.16	0.172	0.01	0.286	0.01	0.573	0.03	0.029	0.00
010	0.341	0.11	0.085	0.03	0.789	0.01	0.114	0.03	0.181	0.07	0.213	0.07	0.426	0.14	0.021	0.01
011	0.365	0.01	0.684	0.07	1.882	0.32	1.131	0.04	0.283	0.01	0.206	0.05	0.411	0.10	0.021	0.01
012	0.237	0.01	0.178	0.03	0.926	0.23	0.209	0.05	0.177	0.11	0.149	0.11	0.299	0.21	0.029	0.02
013	0.344	0.19	0.750	0.26	1.803	0.49	0.917	0.21	0.381	0.26	0.169	0.03	0.339	0.05	0.017	0.00
014	0.625	0.14	0.145	0.11	2.104	0.24	0.323	0.13	0.480	0.03	0.240	0.02	0.480	0.03	0.024	0.00
015	0.212	0.01	0.208	0.20	0.789	0.26	0.290	0.34	0.159	0.01	0.265	0.02	0.530	0.04	0.026	0.00
016	0.742	0.22	0.120	0.01	0.657	0.05	0.117	0.01	0.615	0.47	0.150	0.02	0.725	0.82	0.064	0.10
017	0.205	0.04	0.135	0.18	0.933	0.37	0.173	0.10	0.154	0.03	0.257	0.05	0.513	0.09	0.026	0.00
018	0.211	0.03	0.174	0.05	0.526	0.00	0.189	0.11	0.106	0.01	0.176	0.02	0.352	0.05	0.018	0.00
019	0.270	999.99	0.270	999.99	1.170	999.99	0.198	999.99	0.135	999.99	0.225	999.99	0.450	999.99	0.023	999.99
020	0.695	0.02	0.151	0.17	0.695	0.02	0.145	0.01	0.602	0.03	0.159	0.03	0.465	0.24	0.016	0.00
021	0.287	0.19	0.224	0.06	0.735	0.19	0.271	0.07	0.351	0.32	0.160	0.00	0.319	0.00	0.016	0.00
022	0.176	0.03	0.129	0.07	0.739	0.16	0.168	0.09	0.132	0.02	0.220	0.03	0.440	0.06	0.022	0.00
023	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99
024	0.327	0.06	0.699	0.21	3.474	0.54	0.900	0.16	0.179	0.09	0.205	0.04	0.409	0.07	0.020	0.00
025	0.372	0.00	1.105	0.16	4.385	0.18	1.560	0.14	0.218	0.16	0.209	0.05	0.418	0.10	0.021	0.00
026	0.288	0.04	0.141	0.08	1.199	0.06	0.230	0.15	0.144	0.02	0.240	0.03	0.481	0.06	0.096	0.01
027	0.227	0.10	0.098	0.08	0.577	0.08	0.108	0.07	0.096	0.01	0.160	0.02	0.321	0.05	0.016	0.00
028	0.283	0.03	0.142	0.02	2.484	0.43	0.248	0.04	0.200	0.20	0.177	0.02	0.354	0.04	0.018	0.00
030	1.121	0.16	1.189	0.14	5.971	0.42	1.668	0.50	1.682	0.24	0.168	0.04	0.672	0.14	0.017	0.00
031	0.266	0.03	0.089	0.01	0.620	0.07	0.123	0.00	0.195	0.11	0.221	0.03	0.443	0.05	0.022	0.00
032	0.326	0.14	0.196	0.14	1.171	0.30	0.346	0.26	0.195	0.01	0.325	0.01	0.650	0.02	0.032	0.00
033	0.224	0.01	0.092	0.11	0.857	0.10	0.111	0.04	0.112	0.00	0.186	0.00	0.373	0.01	0.019	0.00
034	0.270	0.04	0.398	0.46	0.893	0.04	0.212	0.19	0.304	0.36	0.165	0.09	0.450	0.07	0.056	0.07
035	0.245	0.00	0.245	0.00	0.796	0.13	0.128	0.04	0.184	0.00	0.306	0.00	0.612	0.00	0.031	0.00
036	0.204	0.06	0.161	0.15	0.739	0.10	0.169	0.01	0.124	0.01	0.206	0.02	0.413	0.04	0.034	0.03
037	0.206	0.06	0.079	0.08	0.932	0.32	0.129	0.01	0.103	0.03	0.172	0.05	0.344	0.09	0.017	0.00
038	0.206	999.99	0.052	999.99	0.721	999.99	0.093	999.99	0.155	999.99	0.258	999.99	0.515	999.99	0.026	999.99
039	0.148	0.02	0.030	0.01	0.417	0.00	0.057	0.01	0.091	0.03	0.152	0.04	0.304	0.08	0.015	0.00
040	0.308	0.03	0.259	0.13	0.773	0.17	0.330	0.33	0.154	0.01	0.257	0.02	0.514	0.05	0.026	0.00
041	0.278	999.99	0.093	999.99	1.019	999.99	0.111	999.99	0.139	999.99	0.232	999.99	0.463	999.99	0.023	999.99
042	0.225	0.03	0.074	0.05	0.375	0.02	0.085	0.02	0.225	0.03	0.125	0.01	0.250	0.02	0.013	0.00
043	0.671	999.99	0.287	999.99	1.437	999.99	0.316	999.99	0.766	999.99	0.240	999.99	0.479	999.99	0.024	999.99
044	0.210	0.09	0.167	0.01	0.668	0.03	0.134	0.04	0.125	0.01	0.209	0.01	0.418	0.02	0.021	0.00
045	0.585	0.05	0.167	0.02	1.122	0.15	0.219	0.07	0.541	0.03	0.209	0.02	0.418	0.04	0.035	0.03
080	1.282	0.36	0.225	0.10	1.164	0.13	0.263	0.09	1.056	0.46	0.159	0.03	1.565	0.38	0.026	0.02
081	2.959	999.99	0.673	999.99	2.018	999.99	0.309	999.99	2.623	999.99	0.168	999.99	2.690	999.99	0.017	999.99
082	0.405	0.24	0.220	0.14	0.610	0.22	0.131	0.06	0.510	0.32	0.047	0.01	0.377	0.12	0.049	0.06
083	0.610	0.05	0.156	0.17	1.030	0.16	0.185	0.11	0.279	0.32	0.191	0.02	0.381	0.03	0.019	0.00
Ar.Mean	0.427	0.08	0.254	0.11	1.235	0.16	0.307	0.11	0.353	0.12	0.198	0.03	0.508	0.09	0.026	0.01
Std.Dev.	0.442	0.08	0.253	0.09	1.032	0.14	0.349	0.11	0.445	0.14	0.050	0.03	0.377	0.14	0.016	0.02

A R I Z O N A P U B L I C S E R V I C E
MONTHLY REPORT for 5-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.009	0.00	2.216	0.00	5.318	0.00	0.089	0.00	32.352	31.02	0.044	0.00	2.27	8.28
002	0.081	0.05	1.659	0.84	5.468	0.95	0.287	0.41	18.255	11.74	0.033	0.02	1.04	3.09
003	0.102	0.19	1.373	0.88	6.090	3.47	0.409	0.67	27.813	19.86	0.027	0.02	1.87	5.25
004	0.007	0.00	1.778	0.07	4.268	0.17	0.071	0.00	16.708	0.03	0.036	0.00	0.07	0.10
005	0.007	0.00	1.718	0.41	3.064	3.10	0.069	0.02	13.551	5.56	0.034	0.01	0.68	1.62
006	0.013	0.01	1.488	0.68	4.260	0.25	0.149	0.15	20.412	13.24	0.041	0.01	1.07	3.51
007	0.009	999.99	2.359	999.99	5.661	999.99	0.094	999.99	60.387	999.99	0.047	999.99	999.99	999.99
008	0.008	0.00	2.040	0.72	3.217	1.64	0.082	0.03	16.175	4.10	0.041	0.01	0.50	1.13
009	0.011	0.00	2.864	0.14	4.820	3.78	0.115	0.01	23.182	24.00	0.057	0.00	2.04	6.40
010	0.009	0.00	2.131	0.69	3.380	1.80	0.085	0.03	9.018	3.76	0.043	0.01	0.48	1.06
011	0.008	0.00	2.057	0.52	7.091	3.05	0.082	0.02	104.864	5.73	0.041	0.01	0.71	1.65
012	0.014	0.01	1.494	1.06	4.166	1.38	0.098	0.03	22.055	6.89	0.030	0.02	0.73	1.82
013	0.007	0.00	1.693	0.27	7.193	3.18	0.178	0.23	70.841	4.68	0.034	0.01	0.70	1.40
014	0.010	0.00	2.398	0.16	8.632	0.57	0.096	0.01	23.177	11.12	0.048	0.00	0.90	2.95
015	0.011	0.00	2.648	0.18	2.648	0.18	0.106	0.01	24.873	30.03	0.053	0.00	2.23	8.00
016	0.006	0.00	1.500	0.17	3.600	0.41	0.060	0.01	12.385	4.39	0.030	0.00	0.48	1.15
017	0.010	0.00	2.567	0.45	4.522	4.36	0.103	0.02	17.741	1.97	0.051	0.01	0.55	1.21
018	0.007	0.00	1.760	0.23	1.760	0.23	0.070	0.01	15.871	7.74	0.035	0.00	0.61	2.06
019	0.009	999.99	2.250	999.99	5.400	999.99	0.090	999.99	38.700	999.99	0.045	999.99	999.99	999.99
020	0.006	0.00	1.591	0.25	2.793	2.66	0.064	0.01	9.837	0.94	0.032	0.01	0.31	0.72
021	0.006	0.00	1.597	0.00	3.832	0.00	0.064	0.00	20.439	7.66	0.032	0.00	0.61	2.03
022	0.009	0.00	2.202	0.31	3.633	2.55	0.088	0.01	18.336	14.03	0.044	0.01	1.24	3.7
023	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.99	999.99
024	0.022	0.03	2.045	0.36	12.055	2.73	0.171	0.19	80.036	10.98	0.063	0.05	1.11	2.93
025	0.008	0.00	2.091	0.48	14.768	1.58	0.084	0.02	148.636	0.91	0.042	0.01	0.27	0.45
026	0.014	0.01	2.404	0.31	5.770	0.74	0.096	0.01	22.401	18.20	0.048	0.01	1.41	4.84
027	0.006	0.00	1.603	0.23	2.644	1.85	0.064	0.01	9.433	3.75	0.032	0.00	0.45	1.07
028	0.007	0.00	1.772	0.21	9.628	3.24	0.071	0.01	21.132	10.24	0.035	0.00	1.03	2.78
030	0.007	0.00	1.681	0.36	25.572	6.46	0.067	0.01	127.862	32.28	0.034	0.01	2.91	8.62
031	0.009	0.00	2.214	0.27	2.214	0.27	0.089	0.01	14.894	3.50	0.044	0.01	0.31	0.92
032	0.013	0.00	3.248	0.11	5.560	4.73	0.130	0.00	39.876	31.21	0.065	0.00	2.64	8.32
033	0.007	0.00	1.863	0.05	4.471	0.12	0.075	0.00	11.139	5.67	0.037	0.00	0.44	1.51
034	0.019	0.02	1.645	0.87	5.400	0.81	0.285	0.20	21.823	14.61	0.033	0.02	1.28	3.85
035	0.018	0.01	3.060	0.02	3.060	0.02	0.122	0.00	13.466	0.11	0.061	0.00	0.02	0.04
036	0.013	0.01	2.063	0.18	3.570	3.20	0.126	0.09	14.814	0.34	0.041	0.00	0.30	0.84
037	0.007	0.00	1.718	0.46	4.123	1.10	0.069	0.02	7.444	5.37	0.034	0.01	0.54	1.42
038	0.010	999.99	2.577	999.99	2.577	999.99	0.103	999.99	7.215	999.99	0.052	999.99	999.99	999.99
039	0.006	0.00	1.518	0.42	1.518	0.42	0.061	0.02	2.694	1.93	0.030	0.01	0.21	0.51
040	0.010	0.00	2.568	0.23	2.568	0.23	0.103	0.01	35.882	46.24	0.051	0.00	3.39	12.33
041	0.009	999.99	2.317	999.99	5.561	999.99	0.093	999.99	8.341	999.99	0.046	999.99	999.99	999.99
042	0.005	0.00	1.252	0.08	1.252	0.08	0.050	0.00	6.167	5.09	0.025	0.00	0.39	1.35
043	0.010	999.99	2.395	999.99	8.623	999.99	0.096	999.99	26.826	999.99	0.048	999.99	999.99	999.99
044	0.008	0.00	2.088	0.09	3.153	2.22	0.084	0.00	8.727	3.82	0.042	0.00	0.45	1.13
045	0.008	0.00	2.088	0.19	5.012	0.47	0.084	0.01	11.846	19.32	0.042	0.00	1.46	5.14
080	0.006	0.00	1.591	0.25	4.696	1.15	0.064	0.01	14.393	4.20	0.032	0.01	0.51	1.10
081	0.336	999.99	1.681	999.99	14.124	999.99	1.749	999.99	33.629	999.99	0.034	999.99	999.99	999.99
082	0.029	0.03	0.472	0.15	18.486	28.35	0.642	0.28	13.645	14.23	0.009	0.00	3.16	8.17
083	0.008	0.00	1.905	0.16	4.573	0.38	0.076	0.01	15.462	11.93	0.038	0.00	0.95	3.16
Ar.Mean	0.020	0.01	1.984	0.33	5.783	2.29	0.153	0.06	28.399	11.03	0.040	0.01	1.03	3.1
Std.dev.	0.050	0.03	0.502	0.26	4.579	4.45	0.259	0.13	30.676	10.69	0.010	0.01	0.87	2.91

A R I Z O N A   P U B L I C   S E R V I C E
MONTHLY REPORT for 5-89

DEPOSITION DATA
Comments and Messages Only

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002			
003			
004			
005			
006			
007		VOID/DEAD BIRD IN CONTAINER	MISSING SAMPLE B
008			
009			
010			
011			
012			
013	LIQUID DIRTY		
014			
015			
016			
017			
018			
019		VOID/DEAD BIRDS IN CONTAINER	MISSING SAMPLE B
020			
021			
022			
023	VOID/CONTAMINATION	VOID/VANDALISM	MISSING SAMPLE A and B
024			
025			
026			
027			
028			
030		DIRTY GREEN WATER	
031			
032			
033			
034			
035			
036			
037			
038	VOID/DEAD BIRD IN CONTAINER		MISSING SAMPLE A
039			
040			
041		VOID/CONTAMINATION	MISSING SAMPLE B
042			
043		VOID/CONTAMINATION	MISSING SAMPLE B
044			
045			
080			
081	VOID/CONTAMINATION		MISSING SAMPLE A
082			
083			

A R I Z O N A   P U B L I C   S E R V I C E

MONTHLY REPORT for 6-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Page

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	0.431	0.14	0.185	0.13	0.808	0.06	0.236	0.15	0.431	0.14	0.179	0.06	0.509	0.18	0.018	0.01
002	0.373	0.10	0.117	0.05	0.630	0.15	0.165	0.05	0.396	0.06	0.146	0.06	0.407	0.11	0.099	0.01
003	0.301	0.06	0.241	0.05	0.798	0.13	0.293	0.04	0.362	0.07	0.151	0.03	0.301	0.06	0.015	0.00
004	0.213	0.01	0.108	0.08	0.497	0.03	0.092	0.01	0.158	0.10	0.177	0.01	0.355	0.02	0.018	0.00
005	0.197	0.07	0.175	0.04	0.570	0.09	0.200	0.03	0.172	0.11	0.137	0.11	0.275	0.22	0.014	0.01
006	0.230	0.09	0.138	0.09	0.737	0.01	0.171	0.05	0.207	0.14	0.230	0.00	0.461	0.01	0.023	0.00
007	0.289	0.01	0.193	0.01	1.879	0.01	0.237	0.06	0.145	0.01	0.241	0.01	0.482	0.02	0.059	0.07
008	0.245	0.06	0.073	0.04	0.589	0.10	0.108	0.02	0.149	0.03	0.249	0.04	0.498	0.09	0.025	0.00
009	0.334	0.03	0.236	0.01	0.963	0.16	0.228	0.01	0.147	0.05	0.245	0.09	0.490	0.18	0.025	0.01
010	0.274	0.06	0.099	0.04	0.639	0.05	0.093	0.09	0.209	0.19	0.171	0.04	0.343	0.08	0.017	0.00
011	0.271	0.10	0.366	0.07	2.010	0.16	0.617	0.16	0.271	0.10	0.169	0.06	0.339	0.13	0.017	0.01
012	0.225	0.12	0.198	0.17	0.814	0.08	0.224	0.19	0.217	0.01	0.158	0.04	0.316	0.08	0.016	0.00
013	1.986	2.69	1.416	0.26	8.478	0.88	1.529	0.80	3.375	5.14	0.175	0.05	1.390	1.98	0.017	0.01
014	0.711	0.00	0.279	0.15	1.541	0.23	0.288	0.09	0.830	0.23	0.275	0.04	0.550	0.08	0.028	0.00
015	0.265	999.99	0.177	999.99	0.442	999.99	0.248	999.99	0.133	999.99	0.221	999.99	0.442	999.99	0.022	999.99
016	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99
017	0.283	0.14	0.112	0.01	0.618	0.17	0.135	0.04	0.373	0.43	0.280	0.03	0.560	0.05	0.028	0.00
018	0.199	0.08	0.199	0.08	0.596	0.10	0.322	0.08	0.119	0.00	0.199	0.01	0.397	0.01	0.020	0.00
019	0.293	0.11	0.377	0.11	0.833	0.07	0.272	0.08	0.333	0.03	0.208	0.02	0.417	0.03	0.031	0.02
020	0.299	0.16	0.223	0.09	0.501	0.08	0.269	0.13	0.458	0.05	0.095	0.08	0.355	0.17	0.010	0.01
021	0.421	999.99	0.252	999.99	1.093	999.99	0.126	999.99	0.505	999.99	0.210	999.99	0.421	999.99	0.021	[illegible]
022	0.174	0.01	0.234	0.13	0.740	0.05	0.254	0.34	0.183	0.11	0.181	0.06	0.362	0.13	0.018	[illegible]
023	0.821	999.99	3.520	999.99	14.079	999.99	5.397	999.99	0.469	999.99	0.293	999.99	0.587	999.99	0.029	[illegible]
024	0.267	0.02	0.491	0.13	2.092	0.27	0.615	0.11	0.267	0.02	0.222	0.02	0.445	0.04	0.022	0.00
025	0.548	0.01	1.371	0.29	4.315	0.37	1.713	0.15	0.206	0.00	0.343	0.00	0.685	0.01	0.058	0.05
026	0.255	0.02	0.129	0.09	0.808	0.14	0.136	0.03	0.299	0.11	0.212	0.01	0.425	0.03	0.052	0.06
027	0.161	0.02	0.082	0.06	0.429	0.06	0.120	0.08	0.161	0.02	0.134	0.02	0.268	0.04	0.013	0.00
028	0.257	999.99	0.171	999.99	3.600	999.99	0.351	999.99	0.129	999.99	0.214	999.99	0.429	999.99	0.021	999.99
030	0.762	999.99	0.635	999.99	4.571	999.99	1.270	999.99	0.889	999.99	0.317	999.99	0.635	999.99	0.032	999.99
031	0.250	0.09	0.173	0.24	1.353	0.25	0.199	0.23	0.323	0.34	0.251	0.01	0.502	0.02	0.042	0.03
032	0.460	0.10	0.456	0.37	1.453	0.09	0.250	0.04	0.422	0.44	0.330	0.02	0.660	0.04	0.033	0.00
033	0.273	0.16	0.046	0.00	0.739	0.07	0.097	0.00	0.248	0.21	0.231	0.02	0.462	0.05	0.023	0.00
034	0.248	0.01	0.083	0.00	0.784	0.22	0.107	0.03	0.185	0.12	0.207	0.01	0.414	0.01	0.021	0.00
035	0.244	0.01	0.122	0.00	0.611	0.02	0.134	0.00	0.183	0.01	0.305	0.01	0.611	0.02	0.031	0.00
036	0.228	0.09	0.068	0.05	0.457	0.00	0.096	0.05	0.137	0.00	0.228	0.00	0.457	0.00	0.023	0.00
037	0.325	999.99	0.108	999.99	0.541	999.99	0.119	999.99	0.162	999.99	0.271	999.99	0.541	999.99	0.027	999.99
038	0.196	999.99	0.049	999.99	0.880	999.99	0.108	999.99	0.147	999.99	0.244	999.99	0.489	999.99	0.024	999.99
039	0.232	0.00	0.077	0.00	0.541	0.01	0.101	0.02	0.212	0.19	0.193	0.00	0.387	0.01	0.019	0.00
040	0.326	0.07	0.266	0.05	1.015	0.10	0.328	0.00	0.163	0.04	0.272	0.06	0.544	0.12	0.027	0.01
041	0.283	0.03	0.119	0.06	1.988	0.02	0.222	0.03	0.283	0.03	0.205	0.04	0.410	0.08	0.020	0.00
042	0.231	0.03	0.077	0.01	0.463	0.05	0.099	0.05	0.272	0.11	0.193	0.02	0.386	0.04	0.019	0.00
043	0.595	0.76	0.485	0.25	1.187	0.06	0.300	0.08	1.042	0.35	0.242	0.12	0.485	0.25	0.058	0.08
044	0.229	0.07	0.137	0.08	0.599	0.05	0.177	0.14	0.139	0.01	0.231	0.02	0.462	0.03	0.023	0.00
045	0.640	0.17	0.098	0.01	0.974	0.08	0.164	0.09	0.738	0.19	0.245	0.03	0.490	0.06	0.025	0.00
080	0.948	0.27	0.116	0.02	0.792	0.03	0.165	0.06	1.114	0.39	0.076	0.03	1.286	0.45	0.035	0.06
081	2.732	0.78	1.479	0.64	1.401	0.20	0.336	0.04	3.173	0.73	0.111	0.08	2.213	0.38	0.011	0.01
082	0.262	0.03	0.173	0.05	0.756	0.16	0.164	0.03	0.326	0.06	0.111	0.02	0.222	0.05	0.034	0.04
083	0.506	0.03	0.160	0.01	1.091	0.11	0.319	0.02	0.532	0.08	0.133	0.01	0.267	0.01	0.013	0.00
Ar.Mean	0.432	0.17	0.342	0.10	1.559	0.12	0.408	0.09	0.455	0.26	0.211	0.04	0.520	0.13	0.027	[illegible]
Std.Dev.	0.455	0.44	0.576	0.12	2.338	0.15	0.818	0.13	0.647	0.81	0.061	0.03	0.328	0.31	0.016	0.02

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.030	0.02	1.795	0.59	4.307	1.41	0.114	0.11	21.825	14.85	0.051	0.02	1.28	3.92
002	0.013	0.02	1.460	0.62	3.504	1.48	0.211	0.14	10.034	2.56	0.029	0.01	0.39	0.74
003	0.006	0.00	1.507	0.31	4.428	0.88	0.060	0.01	33.086	5.57	0.030	0.01	0.52	1.47
004	0.007	0.00	1.775	0.12	1.775	0.12	0.071	0.00	3.660	3.65	0.035	0.00	0.30	0.97
005	0.007	0.00	1.373	1.11	1.945	0.03	0.055	0.04	27.538	5.71	0.027	0.02	0.54	1.51
006	0.009	0.00	2.304	0.03	3.907	3.18	0.092	0.00	19.829	6.68	0.046	0.00	0.73	1.91
007	0.010	0.00	2.411	0.11	7.200	2.57	0.096	0.00	11.593	2.44	0.048	0.00	0.38	0.90
008	0.010	0.00	2.491	0.43	2.491	0.43	0.100	0.02	2.491	0.43	0.050	0.01	0.12	0.17
009	0.022	0.02	2.451	0.88	3.857	1.93	0.098	0.04	19.430	5.11	0.049	0.02	0.61	1.40
010	0.007	0.00	1.714	0.40	2.774	1.72	0.129	0.10	7.784	5.88	0.034	0.01	0.62	1.58
011	0.012	0.01	1.694	0.63	7.754	1.04	0.068	0.03	51.552	12.61	0.034	0.01	1.08	3.33
012	0.013	0.02	1.580	0.40	3.793	0.96	0.099	0.09	20.330	26.31	0.032	0.01	2.04	6.99
013	0.058	0.04	1.748	0.52	35.012	2.52	0.100	0.04	144.161	145.61	0.035	0.01	11.47	38.64
014	0.011	0.00	2.752	0.42	6.605	1.00	0.110	0.02	18.632	0.62	0.055	0.01	0.21	0.29
015	0.009	999.99	2.210	999.99	5.304	999.99	0.088	999.99	19.446	999.99	0.044	999.99	999.99	999.99
016	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.99	999.99
017	0.011	0.00	2.799	0.27	2.799	0.27	0.112	0.01	22.500	6.62	0.056	0.01	0.57	1.75
018	0.008	0.00	1.986	0.06	1.986	0.06	0.079	0.00	36.600	8.97	0.040	0.00	0.67	2.39
019	0.057	0.08	2.083	0.17	5.000	0.40	0.493	0.29	26.000	10.40	0.042	0.00	0.84	2.75
020	0.004	0.00	0.951	0.80	1.665	0.62	0.038	0.03	33.787	1.68	0.019	0.02	0.28	0.47
021	0.008	999.99	2.103	999.99	5.046	999.99	0.084	999.99	11.775	999.99	0.042	999.99	999.99	999.99
022	0.013	0.01	1.808	0.64	2.849	1.44	0.191	0.21	22.773	35.32	0.036	0.01	2.75	9.38
023	0.129	999.99	2.933	999.99	57.487	999.99	0.117	999.99	422.357	999.99	0.059	999.99	999.99	999.99
024	0.078	0.14	2.223	0.19	9.394	3.46	0.089	0.01	67.736	12.81	0.044	0.00	1.23	3.45
025	0.144	0.04	3.425	0.03	18.486	3.93	0.273	0.27	184.929	11.89	0.069	0.00	1.22	3.24
026	0.008	0.00	2.123	0.15	3.660	3.22	0.126	0.08	9.429	5.74	0.042	0.00	0.69	1.68
027	0.005	0.00	1.339	0.19	1.339	0.19	0.054	0.01	8.971	4.99	0.027	0.00	0.41	1.32
028	0.009	999.99	2.143	999.99	15.429	999.99	0.086	999.99	25.714	999.99	0.043	999.99	999.99	999.99
030	0.013	999.99	3.174	999.99	19.045	999.99	0.127	999.99	126.964	999.99	0.063	999.99	999.99	999.99
031	0.030	0.04	2.511	0.09	6.027	0.23	0.150	0.09	10.643	16.17	0.050	0.00	1.27	4.29
032	0.218	0.41	3.301	0.20	9.383	11.96	1.540	2.81	19.808	1.21	0.066	0.00	1.26	3.17
033	0.009	0.00	2.310	0.23	2.310	0.23	0.092	0.01	6.954	1.61	0.046	0.00	0.18	0.42
034	0.008	0.00	2.069	0.07	2.069	0.07	0.083	0.00	7.029	0.60	0.041	0.00	0.08	0.16
035	0.012	0.00	3.054	0.11	3.054	0.11	0.122	0.00	6.471	6.94	0.061	0.00	0.52	1.85
036	0.009	0.00	2.283	0.01	2.283	0.01	0.091	0.00	5.243	5.91	0.046	0.00	0.44	1.57
037	0.011	999.99	2.705	999.99	2.705	999.99	0.108	999.99	2.705	999.99	0.054	999.99	999.99	999.99
038	0.010	999.99	2.444	999.99	2.444	999.99	0.098	999.99	12.709	999.99	0.049	999.99	999.99	999.99
039	0.008	0.00	1.933	0.04	1.933	0.04	0.077	0.00	5.428	3.20	0.039	0.00	0.25	0.85
040	0.011	0.00	2.719	0.59	4.416	2.80	0.109	0.02	28.524	0.81	0.054	0.01	0.33	0.75
041	0.008	0.00	2.049	0.40	8.486	0.77	0.082	0.02	10.977	8.65	0.041	0.01	0.72	2.29
042	0.008	0.00	1.929	0.21	1.929	0.21	0.077	0.01	1.929	0.21	0.039	0.00	0.07	0.08
043	0.102	0.09	2.424	1.23	8.727	4.44	0.958	0.76	23.863	5.78	0.048	0.02	1.02	1.79
044	0.018	0.02	2.310	0.17	2.310	0.17	0.092	0.01	10.981	17.17	0.046	0.00	1.28	4.57
045	0.010	0.00	2.451	0.29	4.063	2.93	0.098	0.01	18.402	11.00	0.049	0.01	1.06	2.96
080	0.003	0.00	0.757	0.25	2.194	0.14	0.030	0.01	9.779	6.12	0.015	0.01	0.56	1.61
081	0.220	0.11	1.112	0.78	16.087	3.83	2.996	0.73	85.714	32.57	0.022	0.02	2.92	8.59
082	0.008	0.01	1.112	0.24	2.668	0.58	0.144	0.19	16.896	3.66	0.022	0.00	0.37	0.96
083	0.008	0.00	1.333	0.07	3.978	1.40	0.053	0.00	28.690	6.02	0.027	0.00	0.55	1.61
Ar.Mean	0.030	0.03	2.110	0.35	6.934	1.57	0.220	0.16	36.674	11.60	0.043	0.01	1.05	3.19
Std.dev.	0.051	0.07	0.613	0.30	9.707	2.13	0.483	0.46	68.304	23.18	0.012	0.01	1.81	6.12

ARIZONA PUBLIC SERVICE

MONTHLY REPORT for 6-89

DEPOSITION DATA

Comments and Messages Only

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002			
003			
004			
005			
006			
007			
008			
009			
010			
011			
012			
013		SCREEN OFF COTTON BOLL IN CONTAINER	
014			
015	VOID/DEAD BIRD IN CONTAINER		MISSING SAMPLE A
016	VOID/VANDALISM	VOID/VANDALISM	MISSING SAMPLE A and B
017			
018			
019			
020			
021	VOID/DEAD BIRD IN CONTAINER		MISSING SAMPLE A
022			
023	VOID/DEAD BIRD IN CONTAINER	WATER DIRTY	MISSING SAMPLE A
024			
025			
026			
027			
028	VOID/SAMPLE LEAKED DURING SHIPMENT		MISSING SAMPLE A
030		VOID/CONTAMINATION	MISSING SAMPLE B
031			
032			
033			
034			
035			
036			
037	VOID/SAMPLE LEAKED DURING SHIPMENT		MISSING SAMPLE A
038	VOID/DEAD BIRD IN CONTAINER		MISSING SAMPLE A
039			
040			
041			
042			
043			
044			
045			
080			
081			
082			
083			

ARIZONA PUBLIC SERVICE
MONTHLY REPORT for 7-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	0.425	0.04	0.407	0.09	1.410	0.15	0.283	0.06	0.531	0.07	0.107	0.01	0.630	0.36	0.011	0.00
002	0.401	0.19	0.549	0.14	1.392	0.11	0.500	0.09	0.546	0.02	0.064	0.08	0.748	0.16	0.006	0.01
003	0.322	0.10	0.355	0.03	1.339	0.03	0.284	0.01	0.397	0.12	0.136	0.07	0.583	0.49	0.014	0.01
004	0.200	0.00	0.301	0.07	1.136	0.02	0.184	0.04	0.267	0.00	0.167	0.00	0.334	0.00	0.126	0.19
005	0.322	0.08	0.327	0.05	0.911	0.01	0.273	0.09	0.292	0.02	0.164	0.02	0.327	0.05	0.016	0.00
006	0.335	0.06	0.260	0.06	1.156	0.13	0.269	0.03	0.373	0.02	0.186	0.01	0.373	0.02	0.097	0.16
007	0.249	0.04	0.267	0.26	1.879	0.58	0.190	0.03	0.277	0.01	0.156	0.03	0.311	0.05	0.112	0.16
008	0.380	0.11	0.303	0.05	1.537	0.20	0.238	0.01	0.633	0.15	0.126	0.02	1.009	0.16	0.013	0.00
009	0.416	0.17	0.876	0.92	6.429	8.89	0.770	0.30	0.583	0.17	0.208	0.00	1.250	0.85	0.021	0.00
010	0.395	999.99	0.264	999.99	1.450	999.99	0.283	999.99	0.461	999.99	0.165	999.99	0.330	999.99	0.016	999.99
011	0.356	0.04	0.797	0.47	2.251	0.01	0.835	0.20	0.460	0.02	0.129	0.02	0.375	0.19	0.013	0.00
012	0.868	0.02	3.294	1.09	9.727	0.55	2.177	0.93	1.121	0.00	0.087	0.03	1.191	0.02	0.009	0.00
013	3.087	2.37	2.638	0.88	9.150	5.63	2.310	1.79	4.807	3.20	0.100	0.01	2.400	0.33	0.010	0.00
014	0.580	0.00	0.426	0.21	2.109	0.22	0.369	0.00	0.740	0.06	0.141	0.04	0.805	0.32	0.014	0.00
015	0.339	0.06	0.339	0.06	1.645	0.05	0.345	0.18	0.468	0.05	0.169	0.03	0.986	0.50	0.070	0.11
016	0.487	0.16	0.209	0.19	0.960	0.12	0.177	0.05	0.630	0.10	0.084	0.02	0.668	0.17	0.008	0.00
017	0.190	0.05	0.163	0.10	0.725	0.12	0.181	0.05	0.190	0.05	0.159	0.04	0.317	0.08	0.016	0.00
018	0.152	0.01	0.178	0.06	0.787	0.08	0.135	0.03	0.203	0.01	0.127	0.00	0.254	0.01	0.053	0.08
019	0.201	999.99	0.268	999.99	1.073	999.99	0.148	999.99	0.268	999.99	0.168	999.99	0.335	999.99	0.074	999.99
020	0.319	0.01	0.124	0.03	0.727	0.02	0.174	0.03	0.408	0.02	0.089	0.00	0.530	0.34	0.050	0.08
021	0.242	0.03	0.299	0.08	1.112	0.26	0.297	0.01	0.325	0.03	0.135	0.01	0.270	0.02	0.014	0.00
022	0.200	0.06	0.201	0.18	0.970	0.02	0.191	0.02	0.285	0.01	0.143	0.00	0.285	0.01	0.030	0.03
023	0.769	0.35	3.727	2.71	16.570	7.04	3.788	1.17	0.769	0.35	0.296	0.00	0.592	0.00	0.030	0.00
024	0.265	0.13	0.788	0.29	2.327	1.61	0.797	0.71	0.313	0.14	0.119	0.04	0.650	0.90	0.012	0.00
025	0.354	0.04	0.904	0.24	3.485	0.48	1.267	0.07	0.354	0.04	0.256	0.05	0.513	0.09	0.026	0.00
026	0.188	999.99	0.241	999.99	1.046	999.99	0.161	999.99	0.268	999.99	0.067	999.99	0.536	999.99	0.007	999.99
027	0.229	0.00	0.286	0.11	0.888	0.06	0.263	0.06	0.258	0.06	0.143	0.00	0.286	0.00	0.014	0.00
028	0.208	0.02	0.252	0.11	2.864	0.03	0.315	0.02	0.271	0.07	0.104	0.01	0.317	0.24	0.051	0.08
030	1.768	1.63	2.281	2.17	15.412	18.57	3.179	3.97	3.226	3.43	0.240	0.08	0.959	0.33	0.024	0.01
031	0.269	0.07	0.306	0.30	1.267	0.06	0.264	0.19	0.384	0.00	0.192	0.00	0.384	0.00	0.019	0.00
032	0.395	0.07	0.275	0.31	1.367	0.16	0.179	0.02	0.305	0.25	0.258	0.09	0.516	0.17	0.026	0.01
033	0.241	0.13	0.212	0.19	1.291	0.12	0.219	0.05	0.300	0.01	0.150	0.01	0.300	0.01	0.015	0.00
034	0.198	0.04	0.169	0.10	0.993	0.01	0.153	0.02	0.227	0.01	0.142	0.01	0.284	0.02	0.101	0.17
035	0.193	0.06	0.230	0.14	0.932	0.07	0.208	0.07	0.173	0.10	0.195	0.02	0.390	0.03	0.019	0.00
036	0.228	0.08	0.132	0.14	0.715	0.04	0.117	0.03	0.228	0.08	0.163	0.01	0.325	0.02	0.189	0.01
037	0.283	0.04	0.157	0.14	1.013	0.09	0.160	0.06	0.365	0.02	0.205	0.03	0.818	0.13	0.284	0.00
038	0.263	0.06	0.195	0.08	1.225	0.13	0.194	0.01	0.292	0.12	0.170	0.05	0.486	0.20	0.147	0.26
039	0.232	0.16	0.161	0.09	0.765	0.24	0.183	0.02	0.270	0.08	0.112	0.04	0.355	0.33	0.011	0.00
040	0.287	0.11	0.219	0.03	0.944	0.02	0.206	0.04	0.253	0.04	0.182	0.02	0.535	0.29	0.018	0.00
041	0.321	0.07	0.391	0.02	1.567	0.02	0.445	0.16	0.414	0.06	0.115	0.01	0.684	0.41	0.012	0.00
042	0.236	0.06	0.136	0.11	0.712	0.05	0.127	0.04	0.315	0.06	0.099	0.01	0.395	0.03	0.042	0.03
043	0.503	0.11	0.734	0.67	1.384	0.03	0.379	0.04	0.756	0.11	0.116	0.02	1.141	0.28	0.130	0.24
044	0.328	0.04	0.555	0.37	1.321	0.06	0.535	0.06	0.359	0.02	0.131	0.04	0.372	0.13	0.013	0.00
045	0.568	0.16	0.199	0.07	1.412	0.01	0.204	0.11	0.684	0.29	0.141	0.01	0.431	0.32	0.024	0.02
080	0.675	0.14	0.207	0.01	1.234	0.02	0.333	0.01	0.909	0.20	0.109	0.05	1.036	0.05	0.025	0.02
081	1.506	0.26	1.060	0.29	1.434	0.12	0.318	0.10	1.919	0.40	0.132	0.02	2.350	0.12	0.207	0.07
082	0.261	0.02	0.167	0.17	0.826	0.10	0.133	0.00	0.397	0.13	0.078	0.05	0.418	0.42	0.120	0.22
083	0.470	0.03	0.252	0.05	1.520	0.02	0.445	0.03	0.542	0.03	0.181	0.01	0.536	0.32	0.018	0.00
Ar.Mean	0.452	0.17	0.564	0.31	2.383	1.03	0.525	0.24	0.600	0.23	0.148	0.03	0.623	0.20	0.049	0.04
Std.Dev.	0.493	0.41	0.787	0.53	3.417	3.24	0.769	0.66	0.794	0.68	0.050	0.02	0.456	0.21	0.061	0.07

ARIZONA PUBLIC SERVICE

MONTHLY REPORT for 7-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.004	0.00	1.068	0.11	5.127	0.55	0.043	0.00	31.214	4.17	0.021	0.00	0.40	1.10
002	0.003	0.00	0.636	0.80	4.964	0.00	0.135	0.19	50.750	6.05	0.015	0.01	0.56	1.59
003	0.024	0.03	1.364	0.66	4.514	0.90	0.096	0.06	20.914	1.19	0.027	0.01	0.26	0.39
004	0.007	0.00	1.670	0.02	4.009	0.05	0.133	0.13	16.045	2.89	0.050	0.03	0.25	0.76
005	0.007	0.00	1.636	0.25	3.927	0.60	0.065	0.01	38.768	9.83	0.033	0.00	0.79	2.61
006	0.007	0.00	1.864	0.09	4.473	0.22	0.075	0.00	28.327	1.38	0.095	0.12	0.16	0.36
007	0.006	0.00	1.557	0.27	7.473	1.31	0.130	0.15	14.836	0.13	0.031	0.01	0.22	0.35
008	0.007	0.00	1.261	0.20	6.055	0.98	0.284	0.20	21.355	7.47	0.039	0.03	0.69	1.97
009	0.008	0.00	2.080	0.02	22.973	36.02	0.167	0.17	98.300	54.31	0.062	0.04	7.28	16.61
010	0.007	999.99	1.648	999.99	5.932	999.99	0.066	999.99	22.409	999.99	0.033	999.99	999.99	999.99
011	0.005	0.00	1.290	0.24	6.334	4.24	0.052	0.01	101.750	11.86	0.026	0.00	1.24	3.25
012	0.085	0.09	0.869	0.26	32.650	0.30	0.035	0.01	305.273	98.55	0.027	0.03	7.28	26.27
013	0.004	0.00	1.000	0.14	34.768	33.01	0.040	0.01	252.364	161.82	0.020	0.00	14.94	43.15
014	0.006	0.00	1.409	0.41	8.209	0.93	0.056	0.02	32.209	10.45	0.040	0.02	0.91	2.76
015	0.007	0.00	1.693	0.30	4.991	1.15	0.099	0.05	31.827	25.36	0.034	0.01	1.99	6.73
016	0.003	0.00	0.835	0.22	4.009	1.04	0.106	0.14	18.591	8.09	0.017	0.00	0.73	2.13
017	0.006	0.00	1.585	0.40	2.556	1.54	0.063	0.02	21.400	2.87	0.032	0.01	0.38	0.82
018	0.005	0.00	1.268	0.04	2.141	1.70	0.051	0.00	15.737	1.56	0.025	0.00	0.26	0.58
019	0.007	999.99	1.676	999.99	4.024	999.99	0.067	999.99	10.729	999.99	0.034	999.99	999.99	999.99
020	0.004	0.00	0.886	0.02	2.666	1.13	0.124	0.04	14.964	11.73	0.026	0.02	0.96	3.11
021	0.005	0.00	1.352	0.11	4.091	1.96	0.082	0.06	38.018	15.16	0.027	0.00	1.27	4.03
022	0.006	0.00	1.426	0.03	4.289	1.81	0.199	0.05	22.214	5.17	0.029	0.00	0.53	1.4
023	0.172	0.11	2.960	0.01	56.234	10.44	0.355	0.24	497.455	144.00	0.059	0.00	11.89	38.15
024	0.037	0.03	1.188	0.37	9.600	7.20	0.130	0.18	99.000	110.00	0.068	0.03	8.69	29.22
025	0.010	0.00	2.563	0.47	12.020	3.91	0.103	0.02	133.250	24.23	0.051	0.01	2.12	6.44
026	0.003	999.99	0.670	999.99	3.218	999.99	0.027	999.99	16.091	999.99	0.013	999.99	999.99	999.99
027	0.006	0.00	1.432	0.00	3.436	0.00	0.057	0.00	32.073	9.16	0.029	0.00	0.67	2.44
028	0.004	0.00	1.040	0.10	9.982	0.98	0.145	0.03	36.150	14.70	0.021	0.00	1.17	3.90
030	0.054	0.09	2.398	0.82	48.350	53.75	0.264	0.37	404.909	380.27	0.048	0.02	33.25	100.92
031	0.008	0.00	1.920	0.02	4.609	0.05	0.154	0.16	30.636	30.36	0.038	0.00	2.23	8.10
032	0.010	0.00	2.580	0.86	7.480	0.50	0.232	0.22	14.100	0.71	0.052	0.02	0.24	0.27
033	0.006	0.00	1.500	0.07	4.520	2.00	0.152	0.19	20.427	3.33	0.030	0.00	0.44	0.98
034	0.006	0.00	1.420	0.09	3.409	0.22	0.115	0.12	13.673	3.15	0.028	0.00	0.28	0.83
035	0.008	0.00	1.949	0.17	1.949	0.17	0.078	0.01	29.895	15.06	0.039	0.00	1.14	4.01
036	0.007	0.00	1.625	0.09	1.625	0.09	0.128	0.12	7.764	2.16	0.033	0.00	0.21	0.57
037	0.008	0.00	2.045	0.32	2.045	0.32	0.120	0.06	12.209	0.27	0.041	0.01	0.11	0.12
038	0.007	0.00	1.699	0.47	2.725	1.58	0.127	0.10	17.063	15.38	0.034	0.01	1.32	4.07
039	0.005	0.00	1.125	0.35	2.700	0.84	0.045	0.01	22.795	6.05	0.032	0.01	0.59	1.59
040	0.007	0.00	1.824	0.24	3.017	2.15	0.073	0.01	24.614	2.59	0.054	0.03	0.40	0.84
041	0.005	0.00	1.153	0.08	6.205	0.95	0.158	0.22	53.136	8.27	0.046	0.00	0.73	2.18
042	0.004	0.00	0.989	0.07	2.373	0.16	0.117	0.07	7.964	3.71	0.020	0.00	0.31	0.98
043	0.108	0.08	1.159	0.18	9.518	4.04	1.519	0.64	42.436	1.13	0.036	0.03	0.54	1.06
044	0.005	0.00	1.312	0.44	4.459	1.55	0.245	0.12	61.227	0.27	0.053	0.02	0.23	0.41
045	0.006	0.00	1.415	0.12	6.791	0.60	0.138	0.16	14.855	17.89	0.028	0.00	1.41	4.75
080	0.004	0.00	1.085	0.49	5.714	1.34	0.212	0.32	29.159	0.88	0.047	0.04	0.26	0.40
081	0.604	0.05	1.318	0.23	10.936	1.25	1.982	0.76	50.791	23.69	0.026	0.00	1.95	6.27
082	0.065	0.12	0.784	0.52	2.509	0.00	0.209	0.33	11.918	10.45	0.021	0.00	0.90	2.76
083	0.007	0.00	1.813	0.15	5.393	1.73	0.073	0.01	26.675	49.58	0.073	0.01	3.71	13.21
Ar.Mean	0.029	0.01	1.480	0.25	8.562	4.12	0.190	0.13	60.797	29.27	0.037	0.01	2.57	7.8
Std.dev.	0.090	0.03	0.501	0.22	11.432	10.41	0.340	0.16	100.143	64.87	0.016	0.02	5.64	17.23

DEPOSITION DATA
Comments and Messages Only

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002	LIQUID DIRTY AND GREEN	LIQUID DIRTY AND GREEN	
003			
004			
005			
006			
007	BIRD DROPPINGS ON SCREEN		
008			
009	CLAY TYPE DIRT ON SCREEN		
010		VOID/DEAD BIRD IN CONTAINER	MISSING SAMPLE B
011			
012			
013	SCREEN MISSING DIRTY GREEN WATER	DIRTY GREEN WATER	
014			
015			
016			
017			
018			
019		VOID/VANDALISM	MISSING SAMPLE B
020			
021			
022			
023	DIRTY WATER		
024			
025			
026		VOID/LIVE OWL IN CONTAINER	MISSING SAMPLE B
027			
028			
030	SCREEN MISSING /BIRD DROPPINGS	DIRT AND DEBRIS ON SCREEN /DIRTY GREEN WATER	
031			
032			
033			
034			
035			
036			
037			
038			
039			
040			
041			
042			
043	SCREEN MISSING/DIRTY GREEN WATER	SCREEN MISSING	
044			
045			
080			
081			
082			
083			

A R I Z O N A P U B L I C S E R V I C E
MONTHLY REPORT for 8-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	0.434	0.07	0.376	0.05	2.429	0.07	0.537	0.04	0.376	0.05	0.313	0.04	0.626	0.08	0.134	0.20
002	0.491	0.10	0.246	0.05	2.021	0.28	0.432	0.13	0.267	0.13	0.307	0.06	0.614	0.12	0.031	0.01
003	0.504	0.04	0.452	0.07	2.921	0.01	0.671	0.21	0.391	0.05	0.283	0.04	0.565	0.09	0.028	0.00
004	0.285	0.02	0.143	0.01	1.564	0.20	0.214	0.04	0.214	0.01	0.356	0.02	0.712	0.04	0.036	0.00
005	0.272	0.00	0.204	0.14	1.429	0.15	0.231	0.06	0.204	0.00	0.340	0.00	0.680	0.01	0.085	0.10
006	0.349	0.11	0.141	0.01	1.557	0.44	0.203	0.05	0.211	0.02	0.352	0.03	0.705	0.07	0.035	0.00
007	0.259	0.01	0.325	0.14	4.398	0.62	0.446	0.05	0.194	0.01	0.324	0.01	0.648	0.02	0.032	0.00
008	0.378	0.12	0.378	0.12	1.831	0.16	0.424	0.11	0.338	0.20	0.381	0.03	0.763	0.07	0.038	0.00
009	0.512	0.04	0.363	0.07	2.492	0.05	0.549	0.01	0.223	0.05	0.371	0.08	0.742	0.16	0.037	0.01
010	0.357	0.01	0.418	0.36	1.727	0.39	0.538	0.51	0.268	0.18	0.297	0.01	0.595	0.01	0.030	0.00
011	2.096	0.95	1.132	0.64	5.539	3.89	1.600	1.05	2.315	1.85	0.284	0.01	1.138	0.04	0.028	0.00
012	0.416	0.17	0.457	0.09	2.156	0.46	0.441	0.22	0.290	0.08	0.208	0.00	0.625	0.43	0.021	0.00
013	1.115	1.34	1.207	0.86	4.122	3.37	1.676	1.71	1.281	1.01	0.325	0.10	1.766	2.43	0.032	0.01
014	0.744	0.04.	0.297	0.02	4.755	0.05	0.593	0.09	0.519	0.12	0.372	0.02	0.744	0.04	0.037	0.00
015	0.237	0.09	0.158	0.06	1.221	0.01	0.201	0.14	0.199	0.12	0.198	0.07	0.396	0.15	0.020	0.01
016	0.656	0.07	0.237	0.12	2.196	0.05	0.302	0.12	0.518	0.15	0.234	0.02	0.469	0.05	0.143	0.09
017	0.162	0.09	0.111	0.01	0.553	0.07	0.133	0.02	0.166	0.02	0.276	0.04	0.553	0.07	0.028	0.00
018	0.205	0.01	0.152	0.09	0.612	0.17	0.203	0.13	0.154	0.01	0.256	0.01	0.512	0.03	0.026	0.00
019	0.183	0.02	0.318	0.05	1.659	0.57	0.332	0.02	0.137	0.02	0.229	0.03	0.458	0.06	0.023	0.00
020	0.451	0.01	0.338	0.01	1.747	0.08	0.417	0.01	0.451	0.01	0.282	0.01	0.564	0.01	0.028	0.00
021	0.422	0.18	0.247	0.27	1.123	0.20	0.156	0.05	0.263	0.14	0.299	0.04	0.597	0.08	0.030	[illegible]
022	0.243	0.00	0.122	0.00	0.851	0.25	0.128	0.01	0.182	0.00	0.304	0.00	0.608	0.01	0.052	[illegible]
023	0.938	0.02	2.614	0.46	12.741	2.96	4.284	1.15	0.871	0.15	0.314	0.03	0.628	0.07	0.117	[illegible]
024	0.573	0.36	0.892	0.47	4.174	0.59	0.798	0.27	0.537	0.68	0.321	0.02	0.641	0.03	0.032	0.00
025	0.430	0.20	0.935	0.10	3.223	0.77	1.203	0.35	0.256	0.02	0.427	0.03	0.853	0.07	0.043	0.00
026	0.328	0.12	0.196	0.13	1.181	0.23	0.164	0.02	0.197	0.00	0.328	0.01	0.657	0.02	0.118	0.05
027	0.312	0.12	0.250	0.00	1.124	0.00	0.250	0.05	0.187	0.00	0.312	0.00	0.625	0.00	0.031	0.00
028	0.206	0.04	0.243	0.11	2.708	0.17	0.357	0.16	0.126	0.03	0.210	0.04	0.420	0.09	0.021	0.00
030	1.402	0.68	1.124	0.65	7.573	0.51	1.534	0.99	1.541	0.69	0.348	0.03	0.695	0.06	0.154	0.24
031	0.323	0.21	0.162	0.11	1.512	0.19	0.189	0.05	0.378	0.10	0.270	0.01	0.541	0.01	0.027	0.00
032	0.439	0.27	0.249	0.12	1.912	0.77	0.312	0.20	0.258	0.06	0.430	0.09	0.860	0.19	0.043	0.01
033	0.156	0.18	0.341	0.55	1.011	0.44	0.527	0.82	0.191	0.01	0.319	0.02	0.638	0.04	0.032	0.00
034	0.145	0.19	0.110	0.02	0.821	0.04	0.165	0.03	0.165	0.03	0.275	0.05	0.551	0.10	0.028	0.00
035	0.200	0.24	0.476	0.01	1.740	0.59	0.318	0.10	0.238	0.01	0.396	0.01	0.793	0.02	0.040	0.00
036	0.157	0.20	0.122	0.01	0.729	0.09	0.115	0.00	0.182	0.02	0.304	0.04	0.608	0.07	0.030	0.00
037	0.272	0.03	0.136	0.01	0.679	0.07	0.175	0.03	0.204	0.02	0.339	0.04	0.679	0.07	0.034	0.00
038	0.199	0.01	0.083	0.04	0.597	0.04	0.083	0.00	0.173	0.04	0.209	0.10	0.417	0.19	0.021	0.01
039	0.144	0.06	0.072	0.03	0.603	0.03	0.112	0.02	0.178	0.09	0.145	0.15	0.290	0.30	0.024	0.00
040	0.261	0.30	1.072	1.71	0.862	0.20	0.348	0.13	0.185	0.04	0.308	0.07	1.647	2.21	0.031	0.01
041	0.381	0.00	0.317	0.13	2.158	0.50	0.444	0.33	0.190	0.00	0.317	0.00	0.635	0.00	0.092	0.12
042	0.284	0.17	0.272	0.05	2.459	0.22	0.562	0.06	0.167	0.04	0.278	0.06	0.556	0.12	0.028	0.01
043	0.569	0.18	1.379	0.20	2.999	0.08	0.908	0.03	0.649	0.02	0.405	0.01	0.811	0.02	0.102	0.12
044	0.301	0.09	0.301	0.09	1.449	0.33	0.393	0.30	0.183	0.02	0.305	0.03	0.609	0.06	0.030	0.00
045	0.305	0.00	0.203	0.00	1.116	0.01	0.178	0.01	0.152	0.00	0.254	0.00	0.507	0.01	0.025	0.00
080	0.971	0.16	0.342	0.02	2.278	0.11	0.519	0.01	0.629	0.15	0.285	0.01	0.570	0.03	0.029	0.00
081	1.894	0.10	0.350	0.03	2.617	0.13	0.466	0.11	1.628	0.10	0.257	0.09	1.142	1.07	0.026	0.01
082	0.555	0.02	0.222	0.01	1.111	0.26	0.211	0.05	0.444	0.01	0.277	0.01	0.555	0.02	0.028	0.00
083	0.768	0.13	0.209	0.14	1.954	0.25	0.265	0.05	0.628	0.13	0.349	0.01	0.698	0.01	0.035	0.00
Ar.Mean	0.485	0.16	0.427	0.18	2.297	0.44	0.527	0.21	0.410	0.14	0.304	0.03	0.681	0.19	0.045	[illegible]
Std.Dev.	0.413	0.24	0.458	0.30	2.086	0.81	0.668	0.35	0.437	0.32	0.059	0.03	0.267	0.48	0.035	0.06

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.024	0.02	3.129	0.39	6.945	7.24	0.368	0.20	38.216	5.98	0.063	0.01	1.03	2.38
002	0.026	0.03	3.071	0.61	7.459	9.38	0.123	0.02	75.678	5.24	0.061	0.01	1.16	2.74
003	0.017	0.01	2.825	0.43	13.562	2.05	0.113	0.02	78.259	10.66	0.057	0.01	0.98	2.84
004	0.014	0.00	3.563	0.19	10.629	3.69	0.143	0.01	19.950	1.09	0.071	0.00	0.38	1.00
005	0.014	0.00	3.401	0.03	3.401	0.03	0.136	0.00	10.883	0.08	0.068	0.00	0.04	0.05
006	0.014	0.00	3.524	0.35	5.868	4.34	0.141	0.01	12.616	1.56	0.070	0.01	0.50	1.18
007	0.020	0.01	3.239	0.12	15.548	0.56	0.130	0.00	45.279	6.14	0.065	0.00	0.55	1.62
008	0.015	0.00	3.815	0.34	6.367	4.77	0.153	0.01	43.376	35.77	0.076	0.01	2.98	9.52
009	0.028	0.02	3.711	0.80	9.057	11.49	0.148	0.03	42.890	6.33	0.074	0.02	1.37	3.36
010	0.177	0.31	2.974	0.05	6.874	7.85	0.299	0.36	47.834	57.93	0.059	0.00	4.85	15.41
011	0.090	0.11	2.845	0.10	18.621	16.39	0.114	0.00	138.041	81.43	0.057	0.00	7.61	21.68
012	0.017	0.02	2.075	0.04	8.705	2.33	0.083	0.00	45.776	25.76	0.042	0.00	2.11	6.83
013	0.538	1.01	3.246	0.96	17.814	9.06	0.800	1.38	137.783	111.74	0.065	0.02	9.64	29.48
014	0.022	0.01	3.718	0.19	17.845	0.93	0.149	0.01	44.534	3.62	0.074	0.00	0.37	0.97
015	0.021	0.02	1.978	0.75	6.672	2.05	0.079	0.03	24.641	18.50	0.040	0.01	1.57	4.90
016	0.024	0.03	2.344	0.24	8.438	0.87	0.094	0.01	23.679	11.79	0.047	0.00	0.97	3.12
017	0.011	0.00	2.763	0.37	2.763	0.37	0.111	0.01	6.008	6.86	0.055	0.01	0.57	1.82
018	0.010	0.00	2.560	0.13	2.560	0.13	0.102	0.01	16.287	27.32	0.051	0.00	2.00	7.29
019	0.013	0.01	2.289	0.28	3.791	2.72	0.092	0.01	45.197	45.74	0.046	0.01	3.54	12.17
020	0.011	0.00	2.819	0.05	6.517	7.45	0.113	0.00	40.614	5.26	0.056	0.00	0.92	2.34
021	0.018	0.01	2.987	0.41	2.987	0.41	0.119	0.02	21.507	2.98	0.060	0.01	0.34	0.77
022	0.012	0.00	3.039	0.03	5.157	4.21	0.122	0.00	11.555	3.74	0.061	0.00	0.59	1.44
023	0.197	0.11	3.138	0.35	41.205	2.91	0.126	0.01	421.800	128.10	0.063	0.01	9.75	34.08
024	0.176	0.32	3.207	0.16	15.393	0.74	0.128	0.01	58.003	25.88	0.064	0.00	2.11	6.85
025	0.139	0.11	4.267	0.34	7.372	6.55	0.171	0.01	113.219	49.02	0.085	0.01	4.11	13.04
026	0.013	0.00	3.284	0.08	5.556	4.47	0.131	0.00	18.300	15.33	0.066	0.00	1.46	4.16
027	0.012	0.00	3.123	0.01	5.304	4.35	0.125	0.00	19.353	8.66	0.062	0.00	0.94	2.50
028	0.012	0.01	2.100	0.45	12.705	3.09	0.084	0.02	25.620	17.76	0.042	0.01	1.57	4.73
030	0.083	0.02	3.475	0.30	25.745	3.61	0.212	0.16	128.230	91.54	0.070	0.01	7.11	24.32
031	0.016	0.01	2.703	0.05	2.703	0.05	0.108	0.00	17.780	11.55	0.054	0.00	0.88	3.07
032	0.017	0.00	4.300	0.94	6.979	4.41	0.172	0.04	4.300	0.94	0.086	0.02	0.58	1.16
033	0.019	0.01	3.188	0.22	5.496	4.84	0.132	999.99	7.914	999.99	0.064	0.00	0.59	1.36
034	0.011	0.00	2.754	0.49	2.754	0.49	0.110	0.02	17.824	7.55	0.055	0.01	0.64	2.00
035	0.048	0.06	3.963	0.09	6.706	5.39	0.239	0.16	60.279	7.72	0.079	0.00	1.03	2.39
036	0.025	0.03	3.039	0.36	5.039	3.64	0.122	0.01	10.444	15.17	0.061	0.01	1.40	4.08
037	0.034	0.01	3.394	0.37	5.639	4.11	0.136	0.01	3.394	0.37	0.068	0.01	0.37	1.08
038	0.033	0.02	2.087	0.96	3.213	1.30	0.083	0.04	6.959	10.70	0.042	0.02	0.96	2.83
039	0.012	0.01	1.452	1.50	1.943	0.52	0.058	0.06	11.052	13.12	0.029	0.03	1.14	3.47
040	0.470	0.88	3.078	0.72	16.329	19.62	2.187	4.16	37.003	30.56	0.062	0.01	4.33	9.13
041	0.051	0.03	3.175	0.01	7.310	8.28	0.190	0.13	41.245	23.96	0.063	0.00	2.39	6.58
042	0.198	0.30	2.780	0.62	8.527	5.20	0.111	0.02	49.174	4.40	0.056	0.01	0.81	1.71
043	0.057	0.02	4.054	0.12	20.258	1.04	0.162	0.00	95.555	13.47	0.081	0.00	1.09	3.57
044	0.227	0.32	3.045	0.32	9.039	2.68	0.122	0.01	42.828	11.83	0.061	0.01	1.15	3.15
045	0.020	0.02	2.537	0.03	4.323	3.60	0.102	0.00	7.335	9.57	0.051	0.00	0.95	2.66
080	0.034	0.00	2.851	0.14	4.897	4.23	0.114	0.01	51.238	4.28	0.057	0.00	0.65	1.53
081	0.041	0.02	2.567	0.94	4.033	1.99	0.103	0.04	54.098	15.82	0.051	0.02	1.46	4.17
082	0.028	0.03	2.774	0.09	4.747	4.04	0.111	0.00	22.190	0.72	0.055	0.00	0.38	1.07
083	0.021	0.01	3.491	0.05	5.917	4.80	0.140	0.00	8.767	10.60	0.070	0.00	1.16	3.00
Ar.Mean	0.065	0.08,	3.036	0.35	8.890	4.26	0.192	0.15	48.011	21.37	0.061	0.01	1.94	5.85
Std.dev.	0.109	0.20	0.594	0.33	7.189	3.99	0.314	0.63	64.981	28.83	0.012	0.01	2.29	7.47

ARIZONA PUBLIC SERVICE
MONTHLY REPORT for 8-89

DEPOSITION DATA
Comments and Messages Only

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002			
003			
004			
005			
006			
007			
008			
009			
010			
011		CLUMP OF DIRT ON SCREEN	
012			
013	SCREEN MISSING		
014			
015			
016			
017			
018			
019			
020			
021			
022			
023			
024		BIRD DROPPINGS ON SCREEN	
025			
026			
027			
028			
030		BIRD DROPPINGS ON SCREEN	
031			
032			
033		LIMITED SAMPLE FOR COMPLETE ANALYSIS	
034			
035			
036			
037			
038			
039			
040		BIRD DROPPINGS ON SCREEN	
041			
042			
043			
044			
045			
080			
081			
082			
083			

A R I Z O N A   P U B L I C   S E R V I C E

MONTHLY REPORT for 9-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)

and Differences (d)

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	0.353	0.20	0.139	0.03	0.832	0.16	0.259	0.03	0.208	0.04	0.347	0.06	0.693	0.13	0.035	0.01
002	0.347	0.09	0.103	0.06	0.901	0.29	0.186	0.10	0.211	0.03	0.352	0.05	0.705	0.10	0.078	0.08
003	0.260	0.01	0.260	0.01	1.496	0.07	0.528	0.16	0.195	0.01	0.325	0.01	0.651	0.02	0.033	0.00
004	0.270	0.00	0.102	0.07	0.811	0.01	0.128	0.01	0.203	0.00	0.338	0.00	0.676	0.01	0.034	0.00
005	0.339	0.14	0.068	0.00	0.744	0.15	0.142	0.04	0.203	0.00	0.338	0.01	0.676	0.01	0.034	0.00
006	0.361	0.13	0.072	0.00	0.870	0.03	0.182	0.05	0.328	0.23	0.362	0.01	0.725	0.03	0.092	0.11
007	0.316	0.02	0.079	0.01	1.180	0.07	0.141	0.05	0.237	0.02	0.394	0.03	0.789	0.06	0.039	0.00
008	0.518	0.50	0.221	0.18	0.784	0.03	0.199	0.03	0.215	0.03	0.359	0.05	0.718	0.11	0.036	0.01
009	0.341	0.02	0.085	0.01	0.940	0.24	0.178	0.04	0.256	0.02	0.426	0.03	0.852	0.06	0.043	0.00
010	0.334	0.06	0.107	0.09	1.626	0.10	0.187	0.08	0.205	0.05	0.342	0.08	0.684	0.16	0.034	0.01
011	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99
012	0.357	0.20	0.217	0.18	1.402	0.26	0.225	0.08	0.210	0.04	0.350	0.06	0.701	0.13	0.035	0.01
013	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99
014	0.569	0.05	0.278	0.26	1.490	0.01	0.490	0.30	0.383	0.32	0.356	0.03	0.711	0.06	0.036	0.00
015	0.301	0.02	0.114	0.08	1.054	0.08	0.244	0.20	0.226	0.02	0.376	0.03	0.753	0.06	0.038	0.00
016	0.515	0.16	0.087	0.06	0.857	0.18	0.210	0.02	0.401	0.15	0.285	0.02	0.570	0.05	0.028	0.00
017	0.172	0.20	0.070	0.00	0.632	0.17	0.134	0.05	0.210	0.01	0.350	0.02	0.700	0.04	0.035	0.00
018	0.208	0.11	0.071	0.01	0.571	0.09	0.118	0.05	0.214	0.03	0.357	0.06	0.714	0.12	0.036	0.01
019	0.202	0.11	0.138	0.02	4.801	7.23	0.211	0.04	0.207	0.03	0.345	0.05	0.690	0.10	0.034	0.01
020	0.601	0.02	0.090	0.06	0.721	0.02	0.150	0.03	0.540	0.10	0.301	0.01	0.601	0.02	0.030	0.00
021	0.280	0.02	0.070	0.01	1.184	0.33	0.140	0.02	0.210	0.02	0.350	0.03	0.701	0.05	0.035	0.00
022	0.133	0.00	0.066	0.00	0.864	0.13	0.106	0.05	0.199	0.00	0.332	0.00	0.665	0.01	0.056	0.05
023	0.622	0.16	1.448	0.10	9.067	0.63	2.673	0.10	0.233	0.06	0.389	0.10	0.778	0.19	0.039	0.01
024	0.513	0.50	0.218	0.17	1.072	0.29	0.241	0.00	0.213	0.03	0.356	0.05	0.711	0.10	0.036	0.00
025	0.348	0.02	0.348	0.02	2.442	0.49	0.644	0.04	0.261	0.01	0.435	0.02	0.870	0.05	0.044	0.00
026	0.276	0.03	0.069	0.01	0.966	0.12	0.124	0.01	0.207	0.02	0.345	0.04	0.690	0.08	0.034	0.00
027	0.240	0.00	0.060	0.00	0.540	0.12	0.114	0.08	0.180	0.00	0.300	0.00	0.600	0.00	0.030	0.00
028	0.266	0.05	0.067	0.01	1.707	0.20	0.174	0.09	0.200	0.04	0.333	0.06	0.666	0.13	0.033	0.01
030	0.801	0.02	0.880	0.13	4.595	1.92	1.102	0.58	0.926	0.59	0.367	0.06	0.734	0.11	0.142	0.20
031	0.150	0.00	0.150	0.00	0.900	0.02	0.277	0.13	0.225	0.01	0.375	0.01	0.750	0.02	0.038	0.00
032	0.377	0.02	0.140	0.09	1.506	0.08	0.302	0.09	0.282	0.02	0.471	0.03	0.941	0.05	0.047	0.00
033	0.265	0.00	0.066	0.00	0.796	0.00	0.139	0.07	0.199	0.00	0.332	0.00	0.663	0.00	0.056	0.05
034	0.193	0.12	0.065	0.00	0.581	0.11	0.090	0.02	0.194	0.01	0.323	0.01	0.647	0.03	0.032	0.00
035	0.236	0.17	0.156	0.01	1.174	0.22	0.265	0.02	0.234	0.01	0.391	0.02	0.781	0.04	0.039	0.00
036	0.210	0.13	0.070	0.00	0.564	0.03	0.106	0.05	0.211	0.01	0.352	0.02	0.705	0.03	0.035	0.00
037	0.219	0.14	0.073	0.00	0.734	0.03	0.103	0.03	0.220	0.01	0.367	0.02	0.734	0.03	0.037	0.00
038	0.211	0.25	0.085	0.00	0.511	0.01	0.064	0.04	0.256	0.01	0.426	0.01	0.852	0.02	0.043	0.00
039	0.123	0.09	0.081	0.00	0.572	0.19	0.061	0.04	0.244	0.01	0.407	0.02	0.815	0.04	0.041	0.00
040	0.123	0.08	0.082	0.00	0.818	0.33	0.139	0.02	0.245	0.00	0.409	0.00	0.817	0.01	0.041	0.00
041	0.297	0.00	0.074	0.00	1.113	0.14	0.193	0.03	0.223	0.00	0.371	0.00	0.742	0.01	0.037	0.00
042	0.245	0.17	0.082	0.00	0.572	0.17	0.090	0.02	0.245	0.00	0.408	0.00	0.816	0.01	0.041	0.00
043	0.763	999.99	0.095	999.99	0.954	999.99	0.153	999.99	0.573	999.99	0.477	999.99	0.954	999.99	0.048	999.99
044	0.116	0.08	0.116	0.08	0.773	0.02	0.216	0.03	0.232	0.00	0.387	0.01	0.773	0.02	0.039	0.00
045	0.520	0.09	0.075	0.01	1.119	0.02	0.204	0.10	0.225	0.03	0.374	0.04	0.749	0.09	0.037	0.00
080	0.608	0.21	0.067	0.01	1.272	0.02	0.224	0.12	0.822	0.63	0.336	0.04	1.027	0.79	0.034	0.00
081	1.096	0.28	0.130	0.01	1.035	0.15	0.174	0.05	0.726	0.46	0.325	0.03	0.651	0.07	0.033	0.00
082	0.454	0.17	0.085	0.05	3.930	0.95	0.372	0.20	0.254	0.14	0.289	0.04	0.577	0.08	0.029	0.00
083	0.637	0.12	0.106	0.07	1.346	0.10	0.339	0.10	0.425	0.01	0.354	0.01	0.709	0.02	0.035	0.00
Ar.Mean	0.363	0.11	0.159	0.04	1.400	0.36	0.277	0.08	0.290	0.07	0.363	0.03	0.733	0.07	0.042	0.01
Std.Dev.	0.203	0.11	0.234	0.06	1.490	1.09	0.402	0.10	0.167	0.15	0.042	0.02	0.094	0.12	0.019	0.04

A R I Z O N A   P U B L I C   S E R V I C E

MONTHLY REPORT for 9-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.033	0.04	3.466	0.65	3.466	0.65	0.139	0.03	24.434	6.43	0.069	0.01	0.60	1.69
002	0.014	0.00	3.524	0.50	3.524	0.50	0.141	0.02	16.510	8.86	0.070	0.01	0.76	2.34
003	0.013	0.00	3.254	0.12	7.810	0.29	0.130	0.00	118.355	134.52	0.065	0.00	9.66	35.94
004	0.014	0.00	3.381	0.04	3.381	0.04	0.135	0.00	20.294	2.92	0.068	0.00	0.22	0.78
005	0.014	0.00	3.381	0.06	3.381	0.06	0.135	0.00	29.874	27.58	0.068	0.00	2.00	7.36
006	0.014	0.00	3.623	0.13	3.623	0.13	0.293	0.30	29.037	6.86	0.072	0.00	0.57	1.81
007	0.032	0.03	3.944	0.28	3.944	0.28	0.239	0.17	31.329	10.37	0.079	0.01	0.81	2.75
008	0.014	0.00	3.588	0.53	3.588	0.53	0.144	0.02	50.612	21.07	0.072	0.01	1.65	5.59
009	0.017	0.00	4.261	0.30	4.261	0.30	0.170	0.01	27.507	15.54	0.085	0.01	1.18	4.13
010	0.014	0.00	3.420	0.79	5.538	3.45	0.137	0.03	64.878	71.66	0.068	0.02	5.47	19.07
011	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.99	999.99
012	0.014	0.00	3.504	0.65	5.731	3.81	0.140	0.03	43.841	16.43	0.070	0.01	1.56	4.39
013	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.99	999.99
014	0.014	0.00	3.556	0.31	5.937	4.45	0.142	0.01	71.736	30.65	0.071	0.01	2.60	8.16
015	0.015	0.00	3.763	0.28	3.763	0.28	0.151	0.01	24.083	1.82	0.075	0.01	0.21	0.48
016	0.011	0.00	2.849	0.23	2.849	0.23	0.114	0.01	44.385	55.58	0.057	0.00	4.05	14.83
017	0.014	0.00	3.500	0.18	3.500	0.18	0.140	0.01	11.200	0.56	0.070	0.00	0.10	0.15
018	0.014	0.00	3.569	0.58	3.569	0.58	0.143	0.02	14.738	13.73	0.071	0.01	1.10	3.64
019	0.014	0.00	3.449	0.52	17.155	26.89	0.138	0.02	24.830	3.76	0.069	0.01	2.77	7.24
020	0.012	0.00	3.006	0.08	3.006	0.08	0.120	0.00	8.637	11.18	0.060	0.00	0.83	2.98
021	0.014	0.00	3.504	0.26	3.504	0.26	0.140	0.01	58.872	4.34	0.070	0.01	0.38	1.15
022	0.013	0.00	3.323	0.03	3.323	0.03	0.133	0.00	10.937	15.20	0.066	0.00	1.11	4.0[illegible]
023	0.016	0.00	3.888	0.97	17.450	28.10	0.156	0.04	216.700	83.40	0.078	0.02	8.13	22.90
024	0.014	0.00	3.556	0.49	20.664	34.71	0.142	0.02	22.759	3.14	0.071	0.01	2.82	9.21
025	0.017	0.00	4.351	0.25	7.483	6.51	0.174	0.01	59.079	3.62	0.087	0.00	0.79	1.90
026	0.014	0.00	3.449	0.42	6.008	5.53	0.138	0.02	16.720	7.51	0.069	0.01	0.99	2.38
027	0.012	0.00	3.000	0.00	3.000	0.00	0.120	0.00	5.100	4.20	0.060	0.00	0.31	1.12
028	0.013	0.00	3.331	0.64	5.440	3.58	0.133	0.03	16.685	10.01	0.067	0.01	1.06	2.74
030	0.212	0.36	3.669	0.56	13.545	10.83	0.384	0.50	91.660	31.56	0.073	0.01	3.39	8.58
031	0.015	0.00	3.750	0.10	3.750	0.10	0.150	0.00	37.397	13.97	0.075	0.00	1.03	3.72
032	0.019	0.00	4.707	0.26	4.707	0.26	0.188	0.01	41.731	24.87	0.094	0.01	1.84	6.63
033	0.013	0.00	3.317	0.01	3.317	0.01	0.133	0.00	18.569	5.23	0.066	0.00	0.38	1.40
034	0.013	0.00	3.233	0.13	3.233	0.13	0.129	0.01	9.252	11.91	0.065	0.00	0.89	3.17
035	0.016	0.00	3.905	0.21	3.905	0.21	0.156	0.01	31.324	7.90	0.078	0.00	0.63	2.10
036	0.014	0.00	3.524	0.17	3.524	0.17	0.141	0.01	16.151	25.42	0.070	0.00	1.86	6.78
037	0.015	0.00	3.672	0.16	3.672	0.16	0.147	0.01	11.814	6.37	0.073	0.00	0.50	1.69
038	0.017	0.00	4.261	0.12	4.261	0.12	0.170	0.00	4.261	0.12	0.085	0.00	0.05	0.07
039	0.016	0.00	4.073	0.21	4.073	0.21	0.163	0.01	10.028	11.70	0.081	0.00	0.89	3.11
040	0.016	0.00	4.086	0.03	4.086	0.03	0.163	0.00	14.705	3.18	0.082	0.00	0.26	0.84
041	0.015	0.00	3.710	0.03	3.710	0.03	0.148	0.00	15.605	13.47	0.074	0.00	0.98	3.59
042	0.016	0.00	4.080	0.04	4.080	0.04	0.163	0.00	8.589	9.06	0.082	0.00	0.68	2.41
043	0.019	999.99	4.772	999.99	4.772	999.99	0.191	999.99	22.903	999.99	0.095	999.99	999.99	999.99
044	0.015	0.00	3.866	0.08	3.866	0.08	0.155	0.00	20.090	2.69	0.077	0.00	0.22	0.71
045	0.015	0.00	3.744	0.44	3.744	0.44	0.150	0.02	14.975	1.75	0.075	0.01	0.22	0.47
080	0.013	0.00	3.357	0.40	3.357	0.40	0.134	0.02	18.639	3.14	0.067	0.01	0.41	0.83
081	0.027	0.03	3.254	0.34	5.413	3.98	0.452	0.08	15.284	23.72	0.065	0.01	2.09	6.31
082	0.012	0.00	2.885	0.40	13.848	1.92	0.115	0.02	18.305	2.06	0.058	0.01	0.43	0.71
083	0.014	0.00	3.544	0.10	3.544	0.10	0.142	0.00	43.931	1.64	0.071	0.00	0.16	0.43
Ar.Mean	0.020	0.01	3.627	0.29	5.507	3.13	0.162	0.03	33.225	17.13	0.073	0.01	1.53	4.94
Std.dev.	0.029	0.05	0.417	0.23	4.133	7.61	0.063	0.09	36.070	25.01	0.008	0.00	1.97	6.70

ARIZONA PUBLIC SERVICE
MONTHLY REPORT for 9-89

DEPOSITION DATA
Comments and Messages Only

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002			
003			
004			
005			
006			
007			
008			
009			
010			
011	VOID/VANDALISM	VOID/VANDALISM	MISSING SAMPLE A and B
012			
013	VOID/SAMPLE SPILLED	VOID/SAMPLE SPILLED	MISSING SAMPLE A and B
014			
015			
016			
017			
018			
019			
020			
021			
022			
023			
024			
025			
026			
027			
028			
030			
031			
032			
033			
034			
035			
036			
037			
038			
039			
040			
041			
042			
043	VOID/CONTAMINATION		MISSING SAMPLE A
044			
045			
080			
081			
082			
083			

A R I Z O N A   P U B L I C   S E R V I C E

MONTHLY REPORT for 10-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Page [illegible]

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	0.301	0.04	0.075	0.01	1.053	0.14	0.213	0.09	0.226	0.03	0.376	0.05	0.752	0.10	0.098	0.13
002	0.317	0.00	0.198	0.24	1.269	0.00	0.412	0.25	0.238	0.00	0.397	0.00	0.793	0.00	0.123	0.17
003	0.377	0.03	0.188	0.01	2.066	0.22	0.581	0.11	0.283	0.02	0.471	0.04	0.942	0.07	0.047	0.00
004	0.394	0.01	0.098	0.00	0.788	0.03	0.108	0.02	0.295	0.01	0.492	0.02	0.985	0.03	0.049	0.00
005	0.427	0.00	0.107	0.00	1.068	0.01	0.150	0.04	0.320	0.00	0.534	0.00	1.068	0.01	0.053	0.00
006	0.397	0.03	0.099	0.01	0.889	0.12	0.129	0.01	0.298	0.02	0.496	0.04	0.992	0.08	0.086	0.08
007	0.347	0.00	0.087	0.00	1.302	0.18	0.226	0.07	0.260	0.00	0.434	0.00	0.868	0.01	0.043	0.00
008	0.384	0.00	0.239	0.29	0.864	0.18	0.479	0.49	0.288	0.00	0.480	0.01	0.960	0.01	0.048	0.00
009	0.324	0.03	0.196	0.22	1.286	0.19	0.373	0.24	0.243	0.02	0.405	0.04	0.809	0.08	0.040	0.00
010	0.289	0.03	0.072	0.01	0.867	0.09	0.130	0.01	0.217	0.02	0.361	0.04	0.723	0.07	0.036	0.00
011	0.345	0.00	0.259	0.17	1.554	0.33	0.465	0.38	0.259	0.00	0.432	0.00	0.864	0.01	0.043	0.00
012	0.520	0.35	0.866	1.04	1.214	0.35	0.312	0.28	0.477	0.43	0.434	0.00	1.300	0.86	0.091	0.10
013	0.402	0.41	0.247	0.29	2.201	0.87	0.545	0.48	0.299	0.01	0.499	0.02	0.998	0.03	0.094	0.09
014	0.425	0.17	0.128	0.09	2.383	0.02	0.613	0.10	0.255	0.00	0.426	0.00	0.851	0.01	0.043	0.00
015	0.372	0.02	0.093	0.00	0.930	0.05	0.121	0.02	0.279	0.01	0.465	0.02	0.930	0.05	0.046	0.00
016	0.611	0.19	0.087	0.00	1.045	0.03	0.131	0.02	0.261	0.01	0.435	0.01	0.871	0.02	0.175	0.07
017	0.391	0.02	0.098	0.00	0.783	0.04	0.117	0.01	0.294	0.01	0.489	0.02	0.979	0.05	0.049	0.00
018	0.363	0.00	0.091	0.00	0.725	0.00	0.127	0.04	0.272	0.00	0.453	0.00	0.907	0.00	0.045	0.00
019	0.516	0.03	0.172	0.01	1.802	0.07	0.439	0.08	0.258	0.02	0.430	0.03	0.859	0.05	0.043	0.00
020	0.862	0.15	0.096	0.00	0.960	0.04	0.182	0.01	0.675	0.22	0.480	0.02	0.960	0.04	0.100	0.10
021	0.519	0.33	0.471	0.76	1.042	0.30	0.148	0.02	0.261	0.01	0.436	0.02	0.872	0.04	0.082	[illegible]
022	0.270	0.17	0.091	0.01	0.725	0.04	0.069	0.05	0.272	0.02	0.453	0.03	0.907	0.05	0.045	[illegible]
023	1.020	0.29	3.935	2.61	16.121	4.62	6.946	5.12	0.826	0.10	0.517	0.06	1.033	0.13	0.183	[illegible]
024	0.385	0.01	0.145	0.10	1.248	0.15	0.358	0.30	0.288	0.01	0.481	0.02	0.961	0.03	0.048	0.00
025	0.378	0.02	0.378	0.02	2.073	0.28	0.698	0.08	0.283	0.01	0.472	0.02	0.944	0.04	0.132	0.01
026	0.265	0.18	0.088	0.00	0.795	0.17	0.115	0.02	0.265	0.00	0.442	0.00	0.883	0.00	0.044	0.00
027	0.398	0.01	0.100	0.00	0.796	0.01	0.084	0.07	0.299	0.01	0.498	0.01	0.996	0:02	0.050	0.00
028	0.273	0.14	0.093	0.01	1.767	0.08	0.273	0.14	0.280	0.04	0.467	0.07	0.934	0.14	0.047	0.01
030	1.159	0.18	1.368	0.60	7.903	1.30	2.233	0.54	1.474	0.39	0.527	0.01	1.055	0.02	0.378	0.24
031	0.447	0.16	0.090	0.00	1.163	0.50	0.205	0.12	0.269	0.01	0.449	0.02	0.898	0.03	0.045	0.00
032	0.531	0.16	0.158	0.09	2.450	0.40	0.391	0.20	0.322	0.03	0.536	0.05	1.072	0.11	0.054	0.01
033	0.277	0.19	0.092	0.00	0.828	0.22	0.079	0.07	0.275	0.01	0.459	0.02	0.918	0.04	0.046	0.00
034	0.355	0.03	0.089	0.01	0.533	0.05	0.098	0.03	0.267	0.02	0.444	0.04	0.889	0.08	0.044	0.00
035	0.286	0.20	0.142	0.09	0.948	0.36	0.320	0.45	0.285	0.01	0.475	0.01	0.950	0.02	0.048	0.00
036	0.252	0.17	0.084	0.00	0.589	0.17	0.063	0.04	0.252	0.00	0.420	0.00	0.841	0.01	0.042	0.00
037	0.264	0.18	0.088	0.00	0.526	0.01	0.088	0.00	0.263	0.01	0.439	0.01	0.877	0.02	0.044	0.00
038	0.325	0.04	0.081	0.01	0.563	0.09	0.081	0.01	0.244	0.03	0.406	0.05	0.812	0.10	0.041	0.01
039	0.254	0.17	0.085	0.00	0.595	0.18	0.093	0.02	0.383	0.26	0.425	0.00	0.849	0.01	0.042	0.00
040	0.350	0.02	0.087	0.01	1.133	0.10	0.173	0.13	0.262	0.02	0.437	0.03	0.874	0.06	0.044	0.00
041	0.340	0.00	0.127	0.08	1.019	0.01	0.339	0.23	0.255	0.00	0.425	0.00	0.849	0.01	0.042	0.00
042	0.343	0.00	0.214	0.26	0.943	0.17	0.446	0.21	0.257	0.00	0.429	0.00	0.858	0.00	0.043	0.00
043	1.323	0.82	3.283	0.03	2.637	0.88	0.762	0.17	1.516	1.20	0.469	0.02	3.754	0.19	0.196	0.30
044	0.287	0.20	0.095	0.00	0.762	0.02	0.134	0.04	0.286	0.01	0.476	0.01	0.952	0.03	0.048	0.00
045	0.401	0.03	0.100	0.01	1.002	0.09	0.149	0.05	0.300	0.03	0.501	0.04	1.002	0.09	0.050	0.00
080	1.934	0.73	0.097	0.00	1.840	0.15	0.261	0.09	1.838	0.54	0.484	0.01	0.969	0.02	0.083	0.07
081	1.034	0.11	0.094	0.01	1.404	0.46	0.207	0.02	0.936	0.30	0.472	0.04	0.944	0.07	0.047	0.00
082	0.578	0.00	0.096	0.00	1.350	0.00	0.154	0.04	0.289	0.00	0.482	0.00	0.964	0.00	0.120	0.14
083	0.422	0.01	0.105	0.00	1.372	0.24	0.233	0.13	0.316	0.01	0.527	0.01	1.055	0.02	0.143	0.18
Ar.Mean	0.480	0.13	0.320	0.15	1.650	0.29	0.439	0.23	0.397	0.08	0.459	0.02	0.986	0.06	0.075	[illegible]
Std.Dev.	0.321	0.17	0.730	0.42	2.401	0.69	1.016	0.73	0.348	0.21	0.040	0.02	0.419	0.13	0.060	0.08

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.015	0.00	3.761	0.50	3.761	0.50	0.150	0.02	3.761	0.50	0.075	0.01	0.15	0.19
002	0.087	0.05	3.966	0.00	3.966	0.00	0.611	0.90	17.450	15.86	0.079	0.00	1.25	4.21
003	0.019	0.00	4.712	0.35	4.712	0.35	0.188	0.01	62.405	15.94	0.094	0.01	1.23	4.24
004	0.020	0.00	4.923	0.17	4.923	0.17	0.197	0.01	10.432	11.19	0.098	0.00	0.83	2.98
005	0.021	0.00	5.341	0.04	5.341	0.04	0.214	0.00	23.463	21.20	0.107	0.00	1.52	5.66
006	0.020	0.00	4.960	0.41	4.960	0.41	0.198	0.02	22.069	13.71	0.099	0.01	1.07	3.64
007	0.017	0.00	4.340	0.03	4.340	0.03	0.174	0.00	13.888	0.11	0.087	0.00	0.03	0.05
008	0.019	0.00	4.801	0.06	4.801	0.06	0.192	0.00	47.795	72.41	0.096	0.00	5.25	19.33
009	0.016	0.00	4.045	0.41	4.045	0.41	0.162	0.02	30.173	19.55	0.081	0.01	1.52	5.19
010	0.014	0.00	3.614	0.36	3.614	0.36	0.145	0.01	3.614	0.36	0.072	0.01	0.10	0.15
011	0.017	0.00	4.318	0.05	4.318	0.05	0.173	0.00	39.682	16.85	0.086	0.00	1.27	4.49
012	0.537	0.93	4.335	0.01	13.427	18.17	2.780	4.48	23.001	37.34	0.087	0.00	4.60	10.57
013	0.030	0.02	4.989	0.16	4.989	0.16	0.200	0.01	39.843	69.55	0.100	0.00	5.15	18.54
014	0.017	0.00	4.256	0.03	11.068	1.79	0.170	0.00	59.627	24.31	0.085	0.00	1.89	6.47
015	0.028	0.02	4.648	0.23	4.648	0.23	0.186	0.01	25.845	13.60	0.093	0.00	1.02	3.62
016	0.026	0.02	4.355	0.12	4.355	0.12	0.271	0.20	24.435	7.65	0.087	0.00	0.60	2.03
017	0.020	0.00	4.893	0.23	4.893	0.23	0.196	0.01	16.412	23.27	0.098	0.00	1.71	6.21
018	0.018	0.00	4.533	0.02	4.533	0.02	0.181	0.00	10.879	0.05	0.091	0.00	0.01	0.02
019	0.017	0.00	4.296	0.25	4.296	0.25	0.172	0.01	25.522	15.66	0.086	0.01	1.18	4.17
020	0.019	0.00	4.802	0.22	4.802	0.22	0.192	0.01	4.802	0.22	0.096	0.00	0.09	0.09
021	0.239	0.44	4.358	0.19	12.455	16.00	1.453	2.55	4.358	0.19	0.087	0.00	1.50	4.23
022	0.018	0.00	4.534	0.25	4.534	0.25	0.181	0.01	14.509	0.80	0.091	0.01	0.12	0.22
023	0.069	0.09	5.165	0.63	57.690	32.09	0.207	0.03	533.056	408.53	0.103	0.01	32.47	108.57
024	0.039	0.04	4.807	0.16	8.227	7.00	0.192	0.01	38.327	14.11	0.096	0.00	1.57	4.06
025	0.037	0.04	4.722	0.22	11.332	0.52	0.189	0.01	64.041	12.17	0.094	0.00	0.96	3.23
026	0.018	0.00	4.417	0.01	4.417	0.01	0.177	0.00	4.417	0.01	0.088	0.00	0.03	0.06
027	0.020	0.00	4.978	0.08	8.433	6.83	0.199	0.00	4.978	0.08	0.100	0.00	0.51	1.82
028	0.019	0.00	4.669	0.70	7.692	5.34	0.187	0.03	39.644	17.10	0.093	0.01	1.70	4.65
030	0.137	0.06	5.274	0.12	27.426	0.63	0.211	0.00	166.156	84.78	0.105	0.00	6.35	22.58
031	0.018	0.00	4.489	0.15	7.577	6.02	0.335	0.32	28.668	6.19	0.090	0.00	0.97	2.18
032	0.032	0.02	5.360	0.53	8.927	6.60	0.459	0.47	47.171	4.66	0.107	0.01	0.95	2.03
033	0.018	0.00	4.591	0.18	7.868	6.74	0.184	0.01	4.591	0.18	0.092	0.00	0.55	1.78
034	0.018	0.00	4.443	0.41	4.443	0.41	0.178	0.02	4.443	0.41	0.089	0.01	0.11	0.16
035	0.019	0.00	4.750	0.11	8.115	6.84	0.190	0.00	22.664	22.25	0.095	0.00	2.17	6.06
036	0.017	0.00	4.205	0.05	4.205	0.05	0.168	0.00	7.132	5.81	0.084	0.00	0.45	1.54
037	0.018	0.00	4.386	0.11	4.386	0.11	0.175	0.00	11.051	13.44	0.088	0.00	0.99	3.58
038	0.016	0.00	4.059	0.51	4.059	0.51	0.162	0.02	14.713	5.07	0.081	0.01	0.46	1.34
039	0.017	0.00	4.246	0.04	4.246	0.04	0.170	0.00	4.246	0.04	0.085	0.00	0.05	0.08
040	0.017	0.00	4.369	0.28	7.527	6.60	0.175	0.01	15.559	9.46	0.087	0.01	1.19	2.95
041	0.017	0.00	4.246	0.04	4.246	0.04	0.170	0.00	28.849	9.89	0.085	0.00	0.74	2.64
042	0.017	0.00	4.288	0.01	7.287	5.99	0.172	0.00	54.891	27.51	0.086	0.00	2.44	7.39
043	1.680	0.67	4.693	0.23	19.798	29.98	7.152	1.85	61.716	15.71	0.094	0.00	3.72	8.59
044	0.019	0.00	4.761	0.14	8.047	6.43	0.190	0.01	8.047	6.43	0.095	0.00	0.95	2.32
045	0.020	0.00	5.008	0.44	8.666	7.75	0.200	0.02	10.756	11.93	0.100	0.01	1.46	3.64
080	0.019	0.00	4.845	0.11	8.198	6.60	0.194	0.00	27.087	7.14	0.097	0.00	1.11	2.45
081	0.019	0.00	4.718	0.36	11.323	0.87	0.189	0.01	16.966	24.13	0.094	0.01	1.89	6.41
082	0.019	0.00	4.821	0.01	8.199	6.77	0.193	0.00	8.191	6.73	0.096	0.00	0.98	2.44
083	0.021	0.00	5.274	0.10	9.000	7.55	0.211	0.00	11.129	11.81	0.105	0.00	1.43	3.59
Ar.Mean	0.075	0.05	4.591	0.20	8.211	4.13	0.429	0.23	36.718	23.04	0.092	0.00	2.05	6.51
Std.dev.	0.250	0.17	0.396	0.18	8.504	7.04	1.075	0.78	78.020	59.66	0.008	0.00	4.70	15.78

A R I Z O N A   P U B L I C   S E R V I C E
MONTHLY REPORT for 10-89

DEPOSITION DATA
Comments and Messages Only

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002			
003			
004			
005			
006			
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045			
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081			
082			
083			

A R I Z O N A   P U B L I C   S E R V I C E
MONTHLY REPORT for 11-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	0.130	0.03	0.094	0.04	0.580	0.00	0.142	0.11	0.196	0.04	0.326	0.07	0.652	0.14	0.033	0.01
002	0.197	0.08	0.069	0.02	0.472	0.00	0.110	0.03	0.207	0.06	0.345	0.10	0.689	0.20	0.034	0.01
003	0.268	0.01	0.067	0.00	0.601	0.11	0.160	0.05	0.201	0.01	0.335	0.01	0.670	0.03	0.033	0.00
004	0.178	0.21	0.072	0.00	0.576	0.02	0.094	0.02	0.216	0.01	0.360	0.01	0.720	0.02	0.076	0.08
005	0.113	0.08	0.075	0.00	0.823	0.18	0.112	0.01	0.224	0.01	0.374	0.01	0.747	0.03	0.037	0.00
006	0.298	0.01	0.075	0.00	0.672	0.16	0.112	0.05	0.335	0.22	0.373	0.01	0.746	0.01	0.086	0.10
007	0.080	0.01	0.207	0.26	0.641	0.07	0.080	0.01	0.240	0.03	0.400	0.04	0.801	0.09	0.040	0.00
008	0.110	0.09	0.189	0.25	0.643	0.29	0.355	0.48	0.212	0.05	0.353	0.08	0.706	0.16	0.035	0.01
009	0.084	999.99	0.084	999.99	0.672	999.99	0.151	999.99	0.252	999.99	0.420	999.99	0.841	999.99	0.042	999.99
010	0.095	0.04	0.067	0.02	0.704	0.18	0.116	0.02	0.200	0.06	0.334	0.10	0.667	0.20	0.033	0.01
011	0.151	0.01	0.114	0.08	0.976	0.10	0.227	0.10	0.226	0.01	0.376	0.02	0.753	0.04	0.078	0.08
012	0.137	0.07	0.093	0.01	0.561	0.08	0.117	0.03	0.205	0.11	0.342	0.18	0.684	0.36	0.034	0.02
013	0.182	0.01	0.091	0.00	0.547	0.03	0.100	0.01	0.273	0.01	0.456	0.02	0.912	0.04	0.046	0.00
014	0.171	0.05	0.098	0.10	0.685	0.19	0.225	0.14	0.183	0.07	0.306	0.12	0.612	0.25	0.031	0.01
015	0.080	0.00	0.080	0.00	0.479	0.03	0.119	0.07	0.240	0.01	0.400	0.02	0.799	0.05	0.040	0.00
016	0.308	0.05	0.091	0.04	0.434	0.02	0.085	0.03	0.189	0.05	0.315	0.08	0.631	0.15	0.032	0.01
017	0.135	0.01	0.068	0.01	0.335	0.10	0.068	0.01	0.203	0.02	0.338	0.03	0.676	0.06	0.034	0.00
018	0.143	0.02	0.071	0.01	0.352	0.10	0.099	0.02	0.214	0.02	0.356	0.04	0.712	0.08	0.036	0.00
019	0.231	0.18	0.075	0.01	0.602	0.08	0.135	0.02	0.226	0.03	0.376	0.05	0.753	0.10	0.038	0.00
020	0.770	0.02	0.077	0.00	0.462	0.01	0.085	0.02	0.692	0.14	0.385	0.01	0.770	0.02	0.039	0.00
021	0.148	999.99	0.074	999.99	0.444	999.99	0.118	999.99	0.222	999.99	0.370	999.99	0.740	999.99	0.037	999.99
022	0.110	0.07	0.075	0.01	0.680	0.50	0.064	0.06	0.224	0.02	0.373	0.03	0.746	0.06	0.037	0.00
023	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99
024	0.196	0.26	0.074	0.01	0.657	0.01	0.156	0.05	0.222	0.04	0.369	0.07	0.738	0.15	0.037	0.01
025	0.364	0.14	1.241	0.45	5.327	1.64	1.970	0.74	0.219	0.00	0.365	0.00	0.729	0.01	0.036	0.00
026	0.184	0.23	0.072	0.00	0.729	0.33	0.125	0.11	0.217	0.01	0.362	0.02	0.725	0.04	0.036	0.00
027	0.211	0.13	0.071	0.00	0.496	0.11	0.120	0.06	0.214	0.01	0.356	0.02	0.712	0.05	0.036	0.00
028	0.201	0.15	0.097	0.05	0.912	0.15	0.117	0.04	0.197	0.02	0.328	0.04	0.657	0.08	0.033	0.00
030	1.224	0.04	1.224	0.04	7.837	0.62	2.384	0.35	1.368	0.03	0.361	0.03	0.722	0.06	0.155	0.17
031	0.256	0.16	0.130	0.09	0.600	0.15	0.191	0.15	0.258	0.01	0.430	0.02	0.860	0.04	0.043	0.00
032	0.273	0.16	0.186	0.02	0.918	0.27	0.148	0.02	0.278	0.03	0.464	0.05	0.928	0.10	0.046	0.00
033	0.186	0.22	0.188	0.23	0.674	0.16	0.271	0.39	0.225	0.00	0.374	0.01	0.749	0.01	0.037	0.00
034	0.157	0.18	0.064	0.00	0.384	0.03	0.071	0.02	0.192	0.01	0.320	0.02	0.640	0.04	0.032	0.00
035	0.082	999.99	0.164	999.99	1.148	999.99	0.197	999.99	0.246	999.99	0.410	999.99	0.820	999.99	0.041	999.99
036	0.158	0.19	0.128	0.00	0.447	0.14	0.236	0.09	0.191	0.00	0.319	0.01	0.638	0.01	0.032	0.00
037	0.168	0.19	0.069	0.01	0.277	0.03	0.035	0.00	0.208	0.02	0.347	0.04	0.693	0.07	0.035	0.00
038	0.197	0.14	0.065	0.00	0.262	0.01	0.062	0.06	0.196	0.00	0.327	0.01	0.654	0.02	0.033	0.00
039	0.147	0.18	0.059	0.00	0.355	0.01	0.065	0.01	0.178	0.00	0.296	0.01	0.592	0.01	0.030	0.00
040	0.077	0.00	0.077	0.00	0.619	0.00	0.155	0.09	0.232	0.00	0.387	0.00	0.773	0.00	0.039	0.00
041	0.112	0.06	0.182	0.20	0.904	0.16	0.312	0.36	0.229	0.04	0.382	0.06	0.763	0.12	0.038	0.01
042	0.127	0.00	0.157	0.19	0.569	0.11	0.264	0.40	0.190	0.00	0.317	0.01	0.634	0.02	0.054	0.04
043	0.609	0.34	0.302	0.02	2.198	0.60	0.518	0.28	0.609	0.34	0.378	0.03	0.755	0.05	0.038	0.00
044	0.071	0.00	0.071	0.00	0.497	0.12	0.106	0.04	0.213	0.01	0.356	0.01	0.711	0.03	0.036	0.00
045	0.324	0.11	0.065	0.00	0.716	0.08	0.131	0.03	0.291	0.18	0.327	0.02	0.653	0.04	0.033	0.00
080	0.547	0.06	0.068	0.01	0.885	0.03	0.157	0.00	0.547	0.06	0.342	0.04	0.684	0.08	0.034	0.00
081	1.106	0.14	0.158	0.02	1.106	0.14	0.253	0.03	1.180	0.01	0.395	0.05	0.790	0.10	0.040	0.01
082	0.502	0.03	0.170	0.18	1.280	0.28	0.291	0.19	0.380	0.27	0.365	0.08	0.730	0.17	0.078	0.08
083	0.685	0.49	0.076	0.00	1.359	0.07	0.264	0.03	0.575	0.71	0.378	0.02	0.755	0.04	0.038	0.00
Ar.Mean	0.261	0.11	0.152	0.06	0.938	0.17	0.244	0.11	0.303	0.06	0.363	0.04	0.726	0.08	0.043	0.02
Std.Dev.	0.250	0.10	0.236	0.10	1.275	0.27	0.424	0.16	0.237	0.12	0.036	0.04	0.072	0.07	0.021	0.03

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.013	0.00	3.259	0.70	3.259	0.70	0.130	0.03	3.259	0.70	0.065	0.01	0.18	0.28
002	0.014	0.00	3.446	1.00	3.446	1.00	0.138	0.04	16.541	4.78	0.069	0.02	0.52	1.27
003	0.013	0.00	3.348	0.13	3.348	0.13	0.134	0.01	3.348	0.13	0.067	0.00	0.05	0.06
004	0.014	0.00	3.601	0.12	3.601	0.12	0.144	0.00	3.601	0.12	0.072	0.00	0.05	0.07
005	0.015	0.00	3.737	0.13	6.398	5.45	0.149	0.01	6.398	5.45	0.075	0.00	0.81	1.97
006	0.030	0.03	3.731	0.06	3.731	0.06	0.224	0.15	3.731	0.06	0.075	0.00	0.07	0.07
007	0.067	0.10	4.004	0.43	4.004	0.43	0.329	0.35	4.004	0.43	0.080	0.01	0.16	0.18
008	0.014	0.00	3.530	0.80	3.530	0.80	0.141	0.03	35.493	35.94	0.071	0.02	2.79	9.55
009	0.017	999.99	4.203	999.99	4.203	999.99	0.168	999.99	4.203	999.99	0.084	999.99	999.99	999.99
010	0.025	0.02	3.336	0.98	5.328	3.00	0.133	0.04	3.336	0.98	0.067	0.02	0.40	0.82
011	0.031	0.03	3.763	0.21	3.763	0.21	0.151	0.01	17.123	12.59	0.075	0.00	0.96	3.35
012	0.014	0.01	3.420	1.82	3.420	1.82	0.237	0.13	7.183	5.70	0.068	0.04	0.74	1.56
013	0.018	0.00	4.558	0.22	4.558	0.22	0.182	0.01	4.558	0.22	0.091	0.00	0.06	0.09
014	0.012	0.00	3.058	1.23	3.058	1.23	0.122	0.05	15.652	7.80	0.330	0.51	0.84	2.05
015	0.016	0.00	3.996	0.23	3.996	0.23	0.160	0.01	3.996	0.23	0.080	0.00	0.06	0.09
016	0.013	0.00	3.154	0.76	5.629	5.71	0.126	0.03	3.154	0.76	0.063	0.02	0.55	1.51
017	0.014	0.00	3.381	0.32	3.381	0.32	0.135	0.01	3.381	0.32	0.068	0.01	0.09	0.13
018	0.014	0.00	3.563	0.40	3.563	0.40	0.143	0.02	3.563	0.40	0.071	0.01	0.11	0.16
019	0.015	0.00	3.763	0.48	3.763	0.48	0.151	0.02	9.047	10.08	0.075	0.01	0.82	2.67
020	0.015	0.00	3.850	0.09	3.850	0.09	0.154	0.00	3.850	0.09	0.077	0.00	0.04	0.05
021	0.015	999.99	3.698	999.99	3.698	999.99	0.148	999.99	17.752	999.99	0.074	999.99	999.99	999.99
022	0.015	0.00	3.731	0.30	3.731	0.30	0.149	0.01	3.731	0.30	0.075	0.01	0.12	0.16
023	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.99	999.99
024	0.015	0.00	3.692	0.74	3.692	0.74	0.148	0.03	22.775	38.90	0.074	0.01	2.93	10.36
025	0.058	0.00	3.647	0.03	18.235	1.59	0.146	0.00	181.003	77.13	0.073	0.00	5.84	20.53
026	0.014	0.00	3.623	0.20	6.229	5.41	0.145	0.01	3.623	0.20	0.072	0.00	0.47	1.43
027	0.014	0.00	3.563	0.25	3.563	0.25	0.143	0.01	3.563	0.25	0.071	0.00	0.08	0.10
028	0.013	0.00	3.284	0.39	3.284	0.39	0.131	0.02	3.284	0.39	0.066	0.01	0.12	0.15
030	0.085	0.05	3.608	0.31	26.666	0.85	0.144	0.01	151.216	1.40	0.072	0.01	0.28	0.41
031	0.017	0.00	4.299	0.19	4.299	0.19	0.172	0.01	10.888	13.37	0.086	0.00	1.03	3.55
032	0.019	0.00	4.641	0.50	4.641	0.50	0.186	0.02	4.641	0.50	0.093	0.01	0.16	0.20
033	0.015	0.00	3.744	0.06	3.744	0.06	0.150	0.00	26.021	44.62	0.075	0.00	3.27	11.90
034	0.013	0.00	3.200	0.22	3.200	0.22	0.128	0.01	3.200	0.22	0.064	0.00	0.07	0.09
035	0.016	999.99	4.099	999.99	4.099	999.99	0.164	999.99	4.099	999.99	0.082	999.99	999.99	999.99
036	0.013	0.00	3.188	0.06	3.188	0.06	0.128	0.00	21.636	7.21	0.064	0.00	0.56	1.92
037	0.014	0.00	3.466	0.36	3.466	0.36	0.139	0.01	3.466	0.36	0.069	0.01	0.11	0.15
038	0.013	0.00	3.272	0.08	3.272	0.08	0.131	0.00	3.272	0.08	0.065	0.00	0.03	0.04
039	0.012	0.00	2.961	0.05	2.961	0.05	0.118	0.00	2.961	0.05	0.059	0.00	0.03	0.05
040	0.015	0.00	3.866	0.00	3.866	0.00	0.155	0.00	9.666	11.60	0.077	0.00	0.84	3.10
041	0.015	0.00	3.817	0.59	3.817	0.59	0.364	0.40	25.363	30.99	0.076	0.01	2.40	8.23
042	0.013	0.00	3.168	0.08	3.168	0.08	0.314	0.37	34.045	27.04	0.063	0.00	2.02	7.20
043	0.039	0.05	3.776	0.26	9.062	0.62	0.151	0.01	33.228	2.28	0.076	0.01	0.35	0.60
044	0.014	0.00	3.556	0.13	3.556	0.13	0.142	0.01	3.556	0.13	0.071	0.00	0.04	0.06
045	0.013	0.00	3.265	0.22	3.265	0.22	0.131	0.01	3.265	0.22	0.065	0.00	0.08	0.09
080	0.014	0.00	3.420	0.40	5.674	4.11	0.137	0.02	7.403	8.37	0.068	0.01	0.94	2.40
081	0.016	0.00	3.951	0.51	3.951	0.51	0.158	0.02	8.017	7.62	0.079	0.01	0.66	2.01
082	0.040	0.05	3.650	0.84	3.650	0.84	0.146	0.03	16.237	24.33	0.073	0.02	1.96	6.45
083	0.015	0.00	3.776	0.18	6.356	4.98	0.151	0.01	21.434	25.18	0.076	0.00	2.26	6.72
Ar.Mean	0.020	0.01	3.631	0.39	4.855	1.03	0.161	0.04	16.697	9.31	0.078	0.02	0.82	2.59
Std.dev.	0.015	0.02	0.362	0.37	4.015	1.59	0.052	0.10	33.311	15.82	0.038	0.08	1.17	4.16

A R I Z O N A P U B L I C S E R V I C E
MONTHLY REPORT for 11-89

DEPOSITION DATA
Comments and Messages Only

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002			
003			
004			
005			
006			
007		LIQUID SPILLED DURING TRANSPORT	
008			
009	VOID/DEAD BIRD IN CONTAINER		MISSING SAMPLE A
010			
011			
012			
013			
014		SCREEN MISSING	
015			
016			
017			
018			
019			
020			
021		VOID/DEAD BIRD IN CONTAINER	MISSING SAMPLE B
022			
023	VOID/VANDALISM	VOID/VANDALISM	MISSING SAMPLE A and B
024			
025			
026			
027			
028			
030			
031			
032			
033			
034			
035	VOID/DEAD BIRD IN CONTAINER		MISSING SAMPLE A
036			
037			
038			
039			
040			
041			
042			
043			
044			
045			
080			
081		LIQUID LOSS DURING TRANSPORT	
082			
083			

A R I Z O N A   P U B L I C   S E R V I C E

MONTHLY REPORT for 12-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	Na	d	K	d	Ca	d	Mg	d	Cl	d	F	d	SO4	d	NO3	d
001	0.116	0.09	0.076	0.01	0.604	0.09	0.163	0.06	0.227	0.04	0.378	0.06	0.755	0.12	0.038	0.01
002	0.110	0.06	0.075	0.01	0.598	0.07	0.120	0.01	0.224	0.03	0.374	0.05	0.747	0.09	0.037	0.00
003	0.234	0.14	0.158	0.01	0.948	0.08	0.442	0.04	0.237	0.02	0.395	0.03	0.790	0.07	0.040	0.00
004	0.133	0.08	0.089	0.01	0.624	0.14	0.115	0.05	0.268	0.02	0.447	0.03	0.895	0.05	0.045	0.00
005	0.136	0.09	0.136	0.09	0.815	0.19	0.254	0.15	0.272	0.00	0.453	0.01	0.905	0.01	0.045	0.00
006	0.176	0.02	0.088	0.01	0.703	0.07	0.149	0.00	0.264	0.03	0.439	0.04	0.879	0.09	0.044	0.00
007	0.153	0.00	0.115	0.08	0.843	0.17	0.215	0.13	0.230	0.00	0.383	0.01	0.766	0.01	0.038	0.00
008	0.134	0.09	0.089	0.00	0.714	0.02	0.214	0.01	0.268	0.01	0.446	0.01	0.892	0.03	0.045	0.00
009	0.128	0.09	0.128	0.09	1.103	0.16	0.315	0.19	0.255	0.00	0.425	0.01	0.849	0.01	0.042	0.00
010	0.146	0.03	0.170	0.18	0.858	0.10	0.313	0.20	0.219	0.05	0.364	0.08	0.729	0.16	0.036	0.01
011	0.309	0.00	0.695	0.15	3.091	0.01	1.105	0.02	0.232	0.00	0.386	0.00	0.773	0.00	0.039	0.00
012	0.136	0.10	0.438	0.12	1.241	0.15	0.709	0.21	0.266	0.03	0.443	0.05	0.887	0.11	0.044	0.01
013	0.142	0.11	0.240	0.30	0.843	0.27	0.323	0.29	0.280	0.03	0.466	0.05	0.932	0.09	0.047	0.00
014	0.220	0.26	0.088	0.00	0.705	0.00	0.220	0.09	0.264	0.00	0.441	0.00	0.881	0.00	0.044	0.00
015	0.095	0.00	0.095	0.00	0.474	0.19	0.137	0.18	0.284	0.00	0.473	0.00	0.947	0.00	0.047	0.00
016	0.218	0.13	0.074	0.01	0.591	0.06	0.110	0.03	0.222	0.02	0.369	0.03	0.738	0.07	0.037	0.00
017	0.176	0.01	0.088	0.00	0.703	0.03	0.105	0.03	0.264	0.01	0.440	0.02	0.879	0.04	0.044	0.00
018	0.168	0.00	0.084	0.00	0.336	0.01	0.063	0.04	0.252	0.01	0.421	0.01	0.841	0.02	0.042	0.00
019	0.249	0.18	0.329	0.01	0.988	0.04	0.469	0.00	0.247	0.01	0.412	0.02	0.824	0.03	0.041	0.00
020	0.757	0.16	0.084	0.00	0.673	0.01	0.093	0.02	0.673	0.01	0.421	0.00	0.842	0.01	0.042	0.00
021	0.074	0.01	0.074	0.01	0.737	0.10	0.189	0.16	0.221	0.03	0.369	0.05	0.737	0.10	0.037	[illegible]
022	0.121	0.08	0.081	0.00	0.644	0.31	0.121	0.08	0.242	0.00	0.403	0.01	0.807	0.01	0.040	[illegible]
023	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	[illegible]
024	0.133	0.07	0.133	0.07	0.812	0.06	0.188	0.06	0.273	0.04	0.455	0.07	0.909	0.13	0.045	0.01
025	0.250	0.16	0.918	0.16	4.176	0.28	1.411	0.27	0.251	0.00	0.418	0.01	0.835	0.01	0.042	0.00
026	0.086	0.01	0.086	0.01	0.605	0.21	0.043	0.00	0.258	0.02	0.430	0.03	0.860	0.05	0.043	0.00
027	0.138	0.09	0.092	0.00	0.644	0.18	0.239	0.07	0.276	0.00	0.460	0.00	0.920	0.01	0.046	0.00
028	0.164	0.01	0.210	0.26	2.220	0.32	0.425	0.38	0.246	0.02	0.411	0.03	0.821	0.06	0.085	0.08
030	0.864	0.18	1.152	0.37	8.066	0.07	2.208	0.17	0.960	0.01	0.480	0.00	0.960	0.01	0.221	0.13
031	0.171	0.00	0.342	0.00	0.855	0.33	0.454	0.01	0.257	0.00	0.428	0.00	0.856	0.01	0.043	0.00
032	0.138	0.08	0.228	0.26	0.922	0.31	0.365	0.39	0.278	0.02	0.464	0.03	0.928	0.06	0.046	0.00
033	0.083	0.00	0.083	0.00	0.662	0.03	0.086	0.09	0.248	0.01	0.414	0.02	0.828	0.04	0.041	0.00
034	0.078	0.02	0.078	0.02	0.380	0.07	0.098	0.02	0.233	0.05	0.388	0.09	0.777	0.17	0.039	0.01
035	0.094	0.00	0.094	0.00	0.565	0.02	0.123	0.02	0.282	0.01	0.471	0.02	0.942	0.03	0.047	0.00
036	0.076	0.00	0.114	0.08	0.380	0.16	0.149	0.22	0.227	0.01	0.379	0.01	0.758	0.02	0.038	0.00
037	0.085	0.00	0.085	0.00	0.340	0.01	0.043	0.00	0.255	0.01	0.425	0.02	0.850	0.03	0.043	0.00
038	0.079	0.01	0.079	0.01	0.476	0.05	0.069	0.06	0.238	0.03	0.396	0.05	0.793	0.09	0.066	0.05
039	0.124	0.08	0.083	0.00	0.413	0.16	0.041	0.00	0.248	0.00	0.413	0.00	0.826	0.01	0.062	0.04
040	0.126	0.11	0.326	0.06	0.872	0.31	0.358	0.11	0.244	0.05	0.407	0.08	0.814	0.16	0.041	0.01
041	0.116	0.08	0.077	0.00	0.687	0.11	0.175	0.10	0.230	0.01	0.383	0.02	0.766	0.04	0.038	0.00
042	0.197	0.24	0.078	0.00	0.627	0.01	0.094	0.03	0.235	0.00	0.392	0.01	0.784	0.01	0.102	0.01
043	0.436	0.20	0.220	0.27	1.219	0.41	0.280	0.19	0.394	0.28	0.434	0.02	0.868	0.04	0.043	0.00
044	0.091	0.00	0.091	0.00	0.641	0.20	0.219	0.01	0.274	0.01	0.457	0.01	0.913	0.03	0.046	0.00
045	0.128	0.07	0.087	0.01	0.950	0.07	0.173	0.02	0.260	0.03	0.434	0.05	0.868	0.09	0.043	0.00
080	0.517	0.04	0.128	0.08	1.116	0.09	0.294	0.09	0.258	0.02	0.431	0.03	0.861	0.07	0.043	0.00
081	7.084	1.04	0.119	0.07	1.527	0.29	0.405	0.22	3.248	0.41	0.406	0.05	4.009	1.11	0.041	0.01
082	0.697	0.01	0.174	0.00	2.528	0.20	0.611	0.22	0.261	0.00	0.436	0.01	0.872	0.01	0.044	0.00
083	0.450	0.20	0.135	0.09	1.434	0.06	0.278	0.01	0.269	0.01	0.448	0.02	0.896	0.03	0.045	0.00
Ar.Mean	0.352	0.09	0.185	0.06	1.105	0.13	0.314	0.10	0.343	0.03	0.421	0.03	0.911	0.07	0.049	[illegible]
Std.Dev.	1.019	0.16	0.216	0.09	1.262	0.11	0.383	0.10	0.450	0.07	0.031	0.02	0.466	0.16	0.028	0.02

ARIZONA PUBLIC SERVICE
MONTHLY REPORT for 12-89

AVERAGE DEPOSITION DATA (Pounds per Acre - 30 Days)
and Differences (d)

Location Number	PO4	d	CO3	d	HCO3	d	NH3	d	TSS	d	CU	d	Av d	SD(d)
001	0.015	0.00	3.777	0.59	3.777	0.59	0.151	0.02	11.786	15.43	0.076	0.01	1.22	4.09
002	0.015	0.00	3.737	0.46	3.737	0.46	0.149	0.02	3.737	0.46	0.075	0.01	0.12	0.18
003	0.016	0.00	3.950	0.35	3.950	0.35	0.158	0.01	26.793	0.79	0.079	0.01	0.14	0.22
004	0.018	0.00	4.473	0.27	4.473	0.27	0.179	0.01	4.473	0.27	0.089	0.01	0.09	0.11
005	0.018	0.00	4.527	0.05	4.527	0.05	0.181	0.00	23.593	18.39	0.091	0.00	1.36	4.90
006	0.026	0.02	4.393	0.43	4.393	0.43	0.268	0.20	14.004	18.79	0.088	0.01	1.44	5.00
007	0.015	0.00	3.830	0.05	3.830	0.05	0.153	0.00	8.073	8.54	0.077	0.00	0.65	2.27
008	0.018	0.00	4.460	0.13	4.460	0.13	0.178	0.01	21.407	0.64	0.089	0.00	0.08	0.17
009	0.017	0.00	4.246	0.05	4.246	0.05	0.170	0.00	28.945	24.14	0.085	0.00	1.77	6.44
010	0.015	0.00	3.643	0.80	3.643	0.80	0.146	0.03	25.358	42.63	0.073	0.02	3.22	11.34
011	0.015	0.00	3.864	0.01	9.273	0.03	0.155	0.00	95.057	8.06	0.077	0.00	0.59	2.15
012	0.077	0.08	4.433	0.54	4.433	0.54	0.261	0.15	68.834	2.28	0.089	0.01	0.31	0.59
013	0.028	0.02	4.661	0.46	4.661	0.46	0.186	0.02	19.815	30.76	0.093	0.01	2.35	8.18
014	0.018	0.00	4.406	0.00	4.406	0.00	0.176	0.00	7.491	6.17	0.088	0.00	0.47	1.64
015	0.019	0.00	4.734	0.01	4.734	0.01	0.189	0.00	8.053	6.65	0.095	0.00	0.50	1.77
016	0.015	0.00	3.692	0.35	3.692	0.35	0.148	0.01	3.692	0.35	0.074	0.01	0.10	0.14
017	0.018	0.00	4.397	0.18	4.397	0.18	0.176	0.01	4.397	0.18	0.088	0.00	0.05	0.07
018	0.017	0.00	4.205	0.11	4.205	0.11	0.168	0.00	4.205	0.11	0.084	0.00	0.03	0.04
019	0.033	0.03	4.118	0.17	4.118	0.17	0.165	0.01	47.668	7.86	0.082	0.00	0.61	2.09
020	0.017	0.00	4.209	0.04	4.209	0.04	0.168	0.00	4.209	0.04	0.084	0.00	0.02	0.04
021	0.045	0.04	3.685	0.49	3.685	0.49	0.147	0.02	18.279	20.05	0.074	0.01	1.54	5.33
022	0.032	0.03	4.034	0.05	4.034	0.05	0.161	0.00	7.642	7.16	0.081	0.00	0.56	1.90
023	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.999	999.99	999.99	999.99
024	0.018	0.00	4.547	0.66	4.547	0.66	0.182	0.03	17.625	25.50	0.091	0.01	1.95	6.78
025	0.108	0.12	4.177	0.05	15.005	9.84	0.167	0.00	110.141	38.73	0.084	0.00	3.54	10.46
026	0.017	0.00	4.299	0.27	4.299	0.27	0.172	0.01	4.299	0.27	0.086	0.01	0.08	0.11
027	0.018	0.00	4.600	0.04	4.600	0.04	0.184	0.00	22.082	0.19	0.092	0.00	0.05	0.07
028	0.016	0.00	4.106	0.30	9.853	0.71	0.164	0.01	20.697	33.48	0.082	0.01	2.55	8.91
030	0.077	0.08	4.801	0.04	23.046	0.19	0.192	0.00	151.602	56.35	0.096	0.00	4.12	15.03
031	0.017	0.00	4.279	0.04	4.279	0.04	0.171	0.00	54.755	6.33	0.086	0.00	0.48	1.69
032	0.019	0.00	4.641	0.28	4.641	0.28	0.186	0.01	22.191	34.82	0.093	0.01	2.61	9.27
033	0.017	0.00	4.138	0.19	4.138	0.19	0.166	0.01	8.588	8.71	0.083	0.00	0.66	2.32
034	0.016	0.00	3.884	0.86	3.884	0.86	0.155	0.03	3.884	0.86	0.078	0.02	0.22	0.35
035	0.019	0.00	4.708	0.17	4.708	0.17	0.188	0.01	4.708	0.17	0.094	0.00	0.05	0.07
036	0.015	0.00	3.790	0.11	3.790	0.11	0.152	0.00	12.631	17.79	0.076	0.00	1.32	4.74
037	0.017	0.00	4.252	0.17	4.252	0.17	0.170	0.01	4.252	0.17	0.085	0.00	0.04	0.07
038	0.016	0.00	3.963	0.45	3.963	0.45	0.159	0.02	3.963	0.45	0.079	0.01	0.12	0.18
039	0.017	0.00	4.131	0.04	4.131	0.04	0.165	0.00	4.131	0.04	0.083	0.00	0.03	0.05
040	0.034	0.04	4.071	0.80	6.640	4.33	0.163	0.03	19.851	30.76	0.081	0.02	2.63	8.17
041	0.015	0.00	3.830	0.21	3.830	0.21	0.153	0.01	3.830	0.21	0.077	0.00	0.07	0.08
042	0.016	0.00	3.918	0.05	3.918	0.05	0.157	0.00	3.918	0.05	0.078	0.00	0.03	0.06
043	0.044	0.05	4.338	0.22	4.338	0.22	0.174	0.01	14.569	20.68	0.087	0.00	1.61	5.49
044	0.036	0.04	4.567	0.13	4.567	0.13	0.183	0.01	20.068	3.06	0.091	0.00	0.26	0.81
045	0.017	0.00	4.339	0.46	4.339	0.46	0.174	0.02	4.339	0.46	0.087	0.01	0.12	0.18
080	0.017	0.00	4.306	0.33	4.306	0.33	0.262	0.19	29.480	12.61	0.086	0.01	0.99	3.35
081	0.025	0.02	4.060	0.52	6.722	4.81	0.162	0.02	31.053	53.47	0.081	0.01	4.43	14.17
082	0.017	0.00	4.358	0.05	4.358	0.05	0.174	0.00	47.074	4.04	0.087	0.00	0.33	1.07
083	0.018	0.00	4.480	0.17	4.480	0.17	0.179	0.01	37.945	33.72	0.090	0.00	2.46	9.00
Ar.Mean	0.025	0.01	4.214	0.26	5.181	0.65	0.174	0.02	23.727	12.82	0.084	0.01	1.02	3.43
Std.dev.	0.019	0.02	0.312	0.23	3.299	1.64	0.027	0.04	29.828	15.42	0.006	0.00	1.19	4.10

ARIZONA PUBLIC SERVICE

MONTHLY REPORT for 12-89

DEPOSITION DATA

Comments and Messages Only

Location Number	Sample A Comments	Sample B Comments	Processing Messages
001			
002			
003			
004			
005			
006			
007			
008			
009			
010			
011			
012			
013			
014			
015			
016			
017			
018			
019			
020			
021			
022			
023	VOID/VANDALISM	VOID/VANDALISM	MISSING SAMPLE A and B
024			
025			
026			
027			
028			
030			
031			
032			
033			
034			
035			
036			
037			
038			
039			
040			
041			
042			
043			
044			
045			
080			
081			
082			
083			

APPENDIX D

SUSPENDED PARTICULATE MATTER DATA

Appendix D

Suspended Particulate Matter Data

Data on suspended particulate matter were collected each month at the following sites: 8, 9, 10, 20, 21, and 27. The data for the 10 ions analyzed are presented for each month in the following tables. Values below the detectable limit of the laboratory procedure are preceded by minus signs. Missing data are represented by a field of "9s."

A R I Z O N A   P U B L I C   S E R V I C E

Suspended Particulate

Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		1	1	1	1	1	1
Lab Number		89-01-001	89-01-001	89-01-001	89-01-001	89-01-001	89-01-001
Calcium	(ug/m3)	0.16	0.28	0.16	0.18	0.19	0.23
Chloride	(ug/m3)	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Iron	(ug/m3)	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
Fluoride	(ug/m3)	0.006	0.006	0.006	0.006	0.006	0.006
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
Sodium	(ug/m3)	-0.10	-0.10	-0.10	0.15	-0.10	-0.10
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Phosphate	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02

A R I Z O N A   P U B L I C   S E R V I C E

Suspended Particulate

Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		2	2	2	2	2	2
Lab Number		89-02-001	89-02-001	89-02-001	89-02-001	89-02-001	89-02-001
Calcium	(ug/m3)	0.16	0.23	0.17	0.15	0.18	0.18
Chloride	(ug/m3)	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Iron	(ug/m3)	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
Fluoride	(ug/m3)	0.006	0.007	0.007	0.006	0.006	0.006
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02
Sodium	(ug/m3)	-0.10	0.10	-0.10	0.11	-0.10	0.10
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	0.3	0.4	0.4	0.4	0.3	0.3
Phosphate	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02

A R I Z O N A   P U B L I C   S E R V I C E

Suspended Particulate

Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		3	3	3	3	3	3
Lab Number		89-03-001	89-03-001	89-03-001	89-03-001	89-03-001	89-03-001
Calcium	(ug/m3)	0.16	0.26	0.16	0.21	0.21	0.24
Chloride	(ug/m3)	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Iron	(ug/m3)	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
Fluoride	(ug/m3)	0.005	0.008	0.006	0.006	0.006	0.006
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	-0.02	0.02	0.02	-0.02	-0.02	0.02
Sodium	(ug/m3)	0.12	0.14	0.16	0.25	0.13	0.15
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	0.3	0.2	0.3	0.4	0.2	0.2
Phosphate	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02

A R I Z O N A   P U B L I C   S E R V I C E

Suspended Particulate

Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		4	4	4	4	4	4
Lab Number		89-04-001	89-04-001	89-04-001	89-04-001	89-04-001	89-04-001
Calcium	(ug/m3)	0.23	0.49	0.14	0.28	0.34	0.35
Chloride	(ug/m3)	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Iron	(ug/m3)	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
Fluoride	(ug/m3)	0.009	0.014	0.012	0.010	0.011	0.011
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	-0.02	0.02	-0.02	-0.02	-0.02	-0.02
Sodium	(ug/m3)	0.15	0.16	0.20	0.29	0.14	0.14
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	-0.2	-0.2	-0.2	0.5	-0.2	-0.2
Phosphate	(ug/m3)	-0.02	-0.02	0.02	-0.02	-0.02	-0.02

A R I Z O N A   P U B L I C   S E R V I C E

Suspended Particulate

Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		5	5	5	5	5	5
Lab Number		89-05-001	89-05-001	89-05-001	89-05-001	89-05-001	89-05-001
Calcium	(ug/m3)	0.28	0.45	0.24	0.34	0.33	0.35
Chloride	(ug/m3)	-0.3	-0.3	-0.3	0.6	-0.3	-0.3
Iron	(ug/m3)	-0.005	-0.005	0.005	-0.005	-0.005	-0.005
Fluoride	(ug/m3)	0.005	0.009	0.006	0.006	0.006	0.006
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	0.02	0.02	0.03	0.03	0.02	0.02
Sodium	(ug/m3)	0.18	0.21	0.22	0.66	0.16	0.19
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	-0.2	0.5	0.6	0.9	-0.2	0.3
Phosphate	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02

A R I Z O N A   P U B L I C   S E R V I C E

Suspended Particulate

Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		6	6	6	6	6	6
Lab Number		89-06-001	89-06-001	89-06-001	89-06-001	89-06-001	89-06-001
Calcium	(ug/m3)	0.28	0.38	0.27	0.34	0.30	0.33
Chloride	(ug/m3)	-0.3	-0.3	-0.3	0.4	-0.3	-0.3
Iron	(ug/m3)	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
Fluoride	(ug/m3)	0.005	0.006	0.006	0.006	0.006	0.005
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	0.02	0.02	0.02	0.02	0.02	0.02
Sodium	(ug/m3)	0.16	0.19	0.21	0.37	0.14	0.16
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	0.4	0.4	0.4	0.4	0.4	0.4
Phosphate	(ug/m3)	0.02	-0.02	0.12	0.02	0.05	0.02

A R I Z O N A   P U B L I C   S E R V I C E

Suspended Particulate

Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		7	7	7	7	7	7
Lab Number		89-07-001	89-07-001	89-07-001	89-07-001	89-07-001	89-07-001
Calcium	(ug/m3)	0.32	0.37	0.31	0.34	0.37	0.39
Chloride	(ug/m3)	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Iron	(ug/m3)	0.005	-0.005	-0.005	-0.005	-0.005	-0.005
Fluoride	(ug/m3)	0.006	0.007	0.008	0.007	0.007	0.007
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	0.02	0.02	0.02	0.02	0.02	0.02
Sodium	(ug/m3)	0.20	0.16	0.22	0.26	0.16	0.16
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	0.6	0.5	0.6	0.7	0.5	0.5
Phosphate	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02

A R I Z O N A   P U B L I C   S E R V I C E

Suspended Particulate

Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		8	8	8	8	8	8
Lab Number		89-08-001	89-08-001	89-08-001	89-08-001	89-08-001	89-08-001
Calcium	(ug/m3)	0.24	0.35	0.30	0.28	0.30	0.24
Chloride	(ug/m3)	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Iron	(ug/m3)	-0.005	-0.005	-0.005	-0.005	0.005	-0.005
Fluoride	(ug/m3)	0.005	0.007	0.006	0.006	0.006	0.006
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	0.02	0.02	0.02	0.02	0.02	0.02
Sodium	(ug/m3)	0.14	0.15	0.14	0.21	0.14	0.15
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	0.3	0.3	0.3	0.4	0.3	0.3
Phosphate	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02

A R I Z O N A P U B L I C S E R V I C E

Suspended Particulate

Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		9	9	9	9	9	9
Lab Number		89-09-001	89-09-001	89-09-001	89-09-001	89-09-001	89-09-001
Calcium	(ug/m3)	0.35	0.51	0.35	0.38	0.26	0.28
Chloride	(ug/m3)	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Iron	(ug/m3)	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
Fluoride	(ug/m3)	0.008	0.010	0.009	0.009	0.008	0.008
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	0.02	0.02	0.02	0.02	-0.02	-0.02
Sodium	(ug/m3)	0.16	0.14	0.16	0.33	0.12	0.16
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	0.3	0.3	0.4	0.5	0.2	0.3
Phosphate	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02

A R I Z O N A   P U B L I C   S E R V I C E

Suspended Particulate

		008	009	010	020	021	027
Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		10	10	10	10	10	10
Lab Number		89-10-001	89-10-001	89-10-001	89-10-001	89-10-001	89-10-001
Calcium	(ug/m3)	0.14	0.54	0.42	0.41	0.32	0.36
Chloride	(ug/m3)	-0.3	-0.3	-0.3	0.3	-0.3	-0.3
Iron	(ug/m3)	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
Fluoride	(ug/m3)	0.006	0.006	0.006	0.007	0.006	0.006
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	-0.02	0.02	0.02	0.02	-0.02	0.02
Sodium	(ug/m3)	0.10	0.11	0.11	0.10	0.11	0.13
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	-0.2	0.3	0.3	0.5	0.2	0.4
Phosphate	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02

A R I Z O N A   P U B L I C   S E R V I C E

Suspended Particulate

Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		11	11	11	11	11	11
Lab Number		89-11-001	89-11-001	89-11-001	89-11-001	89-11-001	89-11-001
Calcium	(ug/m3)	0.28	0.45	0.37	0.37	0.37	0.40
Chloride	(ug/m3)	-0.3	-0.3	-0.3	0.5	-0.3	-0.3
Iron	(ug/m3)	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
Fluoride	(ug/m3)	0.006	0.008	0.006	0.008	0.006	0.006
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	-0.02	0.03	0.02	0.02	-0.02	-0.02
Sodium	(ug/m3)	0.10	0.11	0.11	0.52	-0.10	0.12
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	0.3	0.3	0.2	0.9	0.2	0.2
Phosphate	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02

A R I Z O N A   P U B L I C   S E R V I C E

Suspended Particulate

Monitoring Location		008	009	010	020	021	027
Year		89	89	89	89	89	89
Month		12	12	12	12	12	12
Lab Number		89-12-001	89-12-001	89-12-001	89-12-001	89-12-001	89-12-001
Calcium	(ug/m3)	0.32	0.36	0.37	0.32	0.32	0.35
Chloride	(ug/m3)	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3
Iron	(ug/m3)	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005
Fluoride	(ug/m3)	0.006	0.009	0.008	0.007	0.007	0.007
Potassium	(ug/m3)	-0.30	-0.30	-0.30	-0.30	-0.30	-0.30
Magnesium	(ug/m3)	-0.02	0.02	0.02	-0.02	-0.02	-0.02
Sodium	(ug/m3)	-0.10	-0.10	-0.10	0.16	-0.10	-0.10
Nitrate	(ug/m3)	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10
Sulfate	(ug/m3)	-0.2	-0.2	-0.2	0.3	-0.2	-0.2
Phosphate	(ug/m3)	-0.02	-0.02	-0.02	-0.02	-0.02	-0.02

APPENDIX E

INDIGENOUS VEGETATION DATA

Appendix E

Indigenous Vegetation Data

Indigenous vegetation data were collected during the first and fourth quarters of 1989 at eight sites: 1, 2, 3, 4, 6, 40, 42, and 44. Leaf phytomass was analyzed for nine ions in the laboratory. No rinsate, leaf area, or leaf biomass data were reported in 1989. No data were reported as missing during the 1989 data collection.

A R I Z O N A   P U B L I C   S E R V I C E

Indigenous Vegetation

Phytomass

Species: LARREA DIVARICATA

Monitoring Location	0001	0001	0001	0001	0001	0001	0001	0001	0001	0001
Plant ID.	01-01	01-02	01-03	01-04	01-05	01-06	01-07	01-08	01-09	01-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	U	U	U	U	U	U	L	L	L	L
Quarter	1	1	1	1	1	1	1	1	1	1
Month	3	3	3	3	3	3	3	3	3	3
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010
Laboratory Number	51	52	53	54	55	56	57	58	59	60
Cations (ppm)										
Sodium	568.00	514.00	568.00	541.00	568.00	595.00	459.00	514.00	514.00	459.00
Potassium	10476.00	9615.00	9615.00	12381.00	13333.00	9615.00	8077.00	8077.00	7308.00	8462.00
Calcium	15275.00	19125.00	17963.00	16025.00	13813.00	17838.00	15425.00	13700.00	15625.00	13925.00
Magnesium	1250.00	1500.00	1063.00	1188.00	1238.00	1400.00	1563.00	1338.00	1563.00	1250.00
Anions (ppm)										
Chloride	7600.00	8000.00	7600.00	8800.00	10000.00	9000.00	6800.00	6000.00	6000.00	6400.00
Sulfate	3478.00	3478.00	3357.00	5577.00	3652.00	2609.00	0.00	0.00	0.00	2861.00
Nitrate	85.00	78.00	110.00	88.00	190.00	70.00	118.00	68.00	70.00	43.00
Phosphate	1097.00	1170.00	1097.00	1535.00	1608.00	1097.00	1243.00	1170.00	804.00	950.00
Fluoride	16.00	18.00	19.00	18.00	19.00	17.00	17.00	15.00	15.00	16.00

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Indigenous Vegetation

Phytomass

Species: ATRIPLEX

Monitoring Location	0002	0002	0002	0002	0002	0002	0002	0002	0002	0002
Plant ID.	02-01	02-02	02-03	02-04	02-05	02-06	02-07	02-08	02-09	02-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	A	A	A	A	A	A	A	A	A	A
Quarter	1	1	1	1	1	1	1	1	1	1
Month	3	3	3	3	3	3	3	3	3	3
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1012	1013	1014	1015	1016	1017	1018	1019	1020	1021
Laboratory Number	62	63	64	65	66	67	68	69	70	71
Cations (ppm)										
Sodium	62500.00	62500.00	75000.00	77273.00	60417.00	64583.00	60417.00	75000.00	68750.00	55769.00
Potassium	20526.00	22105.00	23158.00	13333.00	15714.00	23158.00	16667.00	18571.00	19048.00	21500.00
Calcium	13600.00	12188.00	8225.00	8463.00	11413.00	14575.00	13675.00	17550.00	8925.00	13825.00
Magnesium	4775.00	4825.00	3900.00	3913.00	5500.00	6625.00	7500.00	9250.00	3663.00	7500.00
Anions (ppm)										
Chloride	58000.00	54000.00	61200.00	68800.00	63000.00	63200.00	71600.00	89200.00	74600.00	64400.00
Sulfate	4757.00	4808.00	2808.00	6231.00	7500.00	8177.00	4115.00	5808.00	1346.00	3615.00
Nitrate	284.00	324.00	384.00	200.00	266.00	460.00	254.00	230.00	220.00	420.00
Phosphate	1024.00	1024.00	1389.00	1316.00	1097.00	1024.00	950.00	1097.00	1535.00	1682.00
Fluoride	13.00	12.00	12.00	11.00	11.00	10.00	10.00	10.00	10.00	12.00

A R I Z O N A   P U B L I C   S E R V I C E

Indigenous Vegetation

Phytomass

Species: ATRIPLEX

Monitoring Location	0003	0003	0003	0003	0003	0003	0003	0003	0003	0003
Plant ID.	03-01	03-02	03-03	03-04	03-05	03-06	03-07	03-08	03-09	03-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	A	A	A	A	A	A	A	A	A	A
Quarter	1	1	1	1	1	1	1	1	1	1
Month	3	3	3	3	3	3	3	3	3	3
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1023	1024	1025	1026	1027	1028	1029	1030	1031	1032
Laboratory Number	73	74	75	76	77	78	79	80	81	82
Cations (ppm)										
Sodium	65385.00	65385.00	67308.00	67308.00	65385.00	71154.00	77273.00	65385.00	61538.00	59615.00
Potassium	22000.00	31333.00	26000.00	34000.00	19545.00	14545.00	16818.00	29000.00	27500.00	26500.00
Calcium	22388.00	8725.00	11888.00	13688.00	8238.00	8938.00	8663.00	14238.00	12225.00	13400.00
Magnesium	9000.00	3475.00	5025.00	4988.00	5038.00	5750.00	4400.00	6000.00	6625.00	6250.00
Anions (ppm)										
Chloride	46000.00	86200.00	76000.00	82800.00	64400.00	70200.00	98600.00	59000.00	61000.00	53600.00
Sulfate	3908.00	4115.00	8828.00	5115.00	5429.00	5308.00	9020.00	5051.00	5615.00	5615.00
Nitrate	210.00	364.00	169.00	183.00	173.00	405.00	378.00	373.00	445.00	525.00
Phosphate	1316.00	1682.00	1243.00	1316.00	1243.00	1170.00	1682.00	1097.00	1170.00	1389.00
Fluoride	14.00	12.00	12.00	11.00	11.00	11.00	11.00	11.00	11.00	12.00

ARIZONA PUBLIC SERVICE

Indigenous Vegetation

Phytomass

Species: LARREA DIVARICATA

Monitoring Location	0004	0004	0004	0004	0004	0004	0004	0004	0004	0004
Plant ID.	04-01	04-02	04-03	04-04	04-05	04-06	04-07	04-08	04-09	04-10
Plot Number	1	1	2	3	3	4	4	5	6	7
Transect	W	W	W	W	W	W	W	W	E	E
Quarter	1	1	1	1	1	1	1	1	1	1
Month	3	3	3	3	3	3	3	3	3	3
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1034	1035	1036	1037	1038	1039	1040	1041	1042	1043
Laboratory Number	84	85	86	87	88	89	90	91	92	93
Cations (ppm)										
Sodium	500.00	737.00	447.00	421.00	526.00	526.00	816.00	389.00	722.00	500.00
Potassium	19545.00	18182.00	15455.00	10000.00	15455.00	14091.00	17273.00	15909.00	15909.00	12273.00
Calcium	16100.00	14425.00	11188.00	11125.00	14525.00	12850.00	14975.00	13713.00	13075.00	14450.00
Magnesium	1225.00	1438.00	1125.00	1300.00	1100.00	1650.00	1388.00	1313.00	1200.00	1500.00
Anions (ppm)										
Chloride	9200.00	8400.00	7200.00	5400.00	7600.00	6600.00	7600.00	8400.00	8800.00	7200.00
Sulfate	381.00	952.00	4462.00	1938.00	9667.00	2346.00	4462.00	3417.00	2295.00	1143.00
Nitrate	63.00	113.00	64.00	48.00	103.00	89.00	125.00	133.00	256.00	153.00
Phosphate	1316.00	1755.00	1535.00	1316.00	1535.00	1279.00	1389.00	1316.00	1426.00	1206.00
Fluoride	21.00	22.00	20.00	20.00	20.00	20.00	20.00	15.00	16.00	16.00

A R I Z O N A   P U B L I C   S E R V I C E

Indigenous Vegetation

Phytomass

Species: LARREA DIVARICATA

Monitoring Location	0006	0006	0006	0006	0006	0006	0006	0006	0006	0006
Plant ID.	06-01	06-02	06-03	06-04	06-05	06-06	06-07	06-08	06-09	06-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	U	U	U	U	U	U	L	L	L	L
Quarter	1	1	1	1	1	1	1	1	1	1
Month	3	3	3	3	3	3	3	3	3	3
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1045	1046	1047	1048	1049	1050	1051	1052	1053	1054
Laboratory Number	95	96	97	98	99	100	101	102	103	104
Cations (ppm)										
Sodium	361.00	500.00	417.00	333.00	472.00	361.00	500.00	444.00	500.00	389.00
Potassium	7600.00	10455.00	9200.00	12273.00	11364.00	10455.00	13182.00	9200.00	9200.00	11364.00
Calcium	20800.00	17125.00	16113.00	15313.00	15638.00	14100.00	12475.00	17175.00	13850.00	16513.00
Magnesium	1750.00	1913.00	2213.00	1375.00	1538.00	1575.00	1150.00	1438.00	1313.00	1438.00
Anions (ppm)										
Chloride	9200.00	7600.00	9000.00	8400.00	6800.00	8400.00	7200.00	8400.00	9400.00	7200.00
Sulfate	2857.00	3429.00	1924.00	3048.00	1714.00	0.00	2286.00	1714.00	417.00	3238.00
Nitrate	61.00	56.00	98.00	110.00	83.00	48.00	93.00	81.00	165.00	58.00
Phosphate	1535.00	1243.00	1535.00	1608.00	1608.00	1535.00	1462.00	1682.00	1682.00	1499.00
Fluoride	16.00	16.00	16.00	16.00	16.00	16.00	16.00	17.00	17.00	17.00

A R I Z O N A   P U B L I C   S E R V I C E

Indigenous Vegetation

Phytomass

Species: LARREA DIVARICATA

Monitoring Location	0040	0040	0040	0040	0040	0040	0040	0040	0040	0040
Plant ID.	40-01	40-02	40-03	40-04	40-05	40-06	40-07	40-08	40-09	40-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	A	A	A	A	A	A	A	A	A	A
Quarter	1	1	1	1	1	1	1	1	1	1
Month	3	3	3	3	3	3	3	3	3	3
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1056	1057	1058	1059	1060	1061	1062	1063	1064	1065
Laboratory Number	106	107	108	109	110	111	112	113	114	115
Cations (ppm)										
Sodium	333.00	361.00	361.00	472.00	222.00	556.00	528.00	417.00	444.00	361.00
Potassium	13182.00	14545.00	13636.00	12727.00	12273.00	13333.00	13333.00	11429.00	13810.00	11905.00
Calcium	11900.00	9775.00	12513.00	15425.00	11063.00	11487.00	13513.00	13938.00	11613.00	12000.00
Magnesium	1088.00	1225.00	1313.00	2263.00	1313.00	1025.00	1787.00	1150.00	1250.00	1425.00
Anions (ppm)										
Chloride	6400.00	7200.00	6000.00	6600.00	6000.00	7600.00	6000.00	5000.00	7200.00	6800.00
Sulfate	0.00	0.00	0.00	3238.00	0.00	0.00	4125.00	3048.00	952.00	0.00
Nitrate	175.00	165.00	163.00	185.00	88.00	166.00	65.00	106.00	170.00	61.00
Phosphate	1718.00	1828.00	1608.00	1535.00	1608.00	1462.00	1572.00	1682.00	1462.00	1316.00
Fluoride	15.00	16.00	15.00	16.00	16.00	18.00	18.00	19.00	19.00	19.00

A R I Z O N A   P U B L I C   S E R V I C E

Indigenous Vegetation

Phytomass

Species: LARREA DIVARICATA

Monitoring Location	0042	0042	0042	0042	0042	0042	0042	0042	0042	0042
Plant ID.	42-01	42-02	42-03	42-04	42-05	42-06	42-07	42-08	42-09	42-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	A	A	A	A	A	A	A	A	A	A
Quarter	1	1	1	1	1	1	1	1	1	1
Month	3	3	3	3	3	3	3	3	3	3
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1067	1068	1069	1070	1071	1072	1073	1074	1075	1076
Laboratory Number	117	118	119	120	121	122	123	124	125	126
Cations (ppm)										
Sodium	444.00	583.00	556.00	444.00	306.00	361.00	472.00	639.00	500.00	611.00
Potassium	13333.00	10000.00	9200.00	8000.00	8000.00	11429.00	10952.00	10000.00	12381.00	12857.00
Calcium	13900.00	16563.00	16150.00	17325.00	17238.00	15663.00	11813.00	13375.00	13950.00	13613.00
Magnesium	2288.00	1650.00	1700.00	1450.00	1787.00	1600.00	1463.00	1888.00	1538.00	1425.00
Anions (ppm)										
Chloride	10000.00	9800.00	7200.00	8000.00	9000.00	12000.00	8400.00	9000.00	8400.00	8000.00
Sulfate	3125.00	3619.00	3619.00	3238.00	3250.00	3238.00	3125.00	3048.00	2476.00	3619.00
Nitrate	126.00	83.00	66.00	60.00	113.00	61.00	118.00	73.00	108.00	116.00
Phosphate	1462.00	1462.00	1097.00	1133.00	1097.00	1316.00	1279.00	1170.00	1316.00	1243.00
Fluoride	19.00	19.00	19.00	19.00	19.00	18.00	19.00	18.00	19.00	18.00

A R I Z O N A P U B L I C S E R V I C E

Indigenous Vegetation

Phytomass

Species: ATRIPLEX

Monitoring Location	0044	0044	0044	0044	0044	0044	0044	0044	0044	0044
Plant ID.	44-01	44-02	44-03	44-04	44-05	44-06	44-07	44-08	44-09	44-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	S	S	S	S	S	S	N	N	N	N
Quarter	1	1	1	1	1	1	1	1	1	1
Month	3	3	3	3	3	3	3	3	3	3
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1078	1079	1080	1081	1082	1083	1084	1085	1086	1087
Laboratory Number	128	129	130	131	132	133	134	135	136	137
Cations (ppm)										
Sodium	41250.00	40000.00	41250.00	40476.00	45238.00	39286.00	32143.00	47619.00	46429.00	38095.00
Potassium	17143.00	24000.00	23500.00	23889.00	30000.00	32500.00	35625.00	19048.00	22778.00	30625.00
Calcium	11400.00	10313.00	7700.00	9100.00	10550.00	12625.00	12763.00	11150.00	7913.00	11475.00
Magnesium	8000.00	6375.00	6500.00	8625.00	4613.00	6375.00	8500.00	8000.00	7125.00	8375.00
Anions (ppm)										
Chloride	42600.00	46800.00	42400.00	42000.00	57400.00	40800.00	46400.00	48400.00	49200.00	44800.00
Sulfate	6042.00	10536.00	6250.00	8231.00	10154.00	5235.00	8538.00	5235.00	9846.00	11846.00
Nitrate	268.00	260.00	705.00	430.00	204.00	173.00	360.00	140.00	374.00	440.00
Phosphate	1682.00	1755.00	1828.00	1682.00	1828.00	1535.00	1535.00	1645.00	1828.00	1682.00
Fluoride	12.00	13.00	13.00	14.00	14.00	14.00	14.00	13.00	12.00	12.00

A R I Z O N A   P U B L I C   S E R V I C E

Indigenous Vegetation

Phytomass

Species: LARREA DIVARICATA

Monitoring Location	0001	0001	0001	0001	0001	0001	0001	0001	0001	0001
Plant ID.	01-01	01-02	01-03	01-04	01-05	01-06	01-07	01-08	01-09	01-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	U	U	U	U	U	U	L	L	L	L
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1101	1102	1103	1104	1105	1106	1107	1108	1109	1110
Laboratory Number	828	829	830	831	832	833	834	835	836	837
Cations (ppm)										
Sodium	316.00	316.00	263.00	316.00	316.00	579.00	368.00	263.00	211.00	316.00
Potassium	10952.00	8571.00	9524.00	12857.00	10952.00	10476.00	11905.00	11429.00	10952.00	11429.00
Calcium	18975.00	27625.00	23963.00	16563.00	12400.00	17800.00	15825.00	16288.00	16175.00	17850.00
Magnesium	1463.00	1787.00	1188.00	1313.00	1175.00	1513.00	1388.00	1637.00	1850.00	1763.00
Anions (ppm)										
Chloride	8400.00	10400.00	10400.00	10800.00	10000.00	10400.00	9200.00	11200.00	7200.00	8400.00
Sulfate	0.00	4615.00	4263.00	385.00	0.00	0.00	0.00	0.00	0.00	3462.00
Nitrate	54.00	51.00	50.00	60.00	48.00	50.00	55.00	30.00	43.00	40.00
Phosphate	1049.00	1049.00	888.00	1130.00	888.00	1049.00	1130.00	1049.00	969.00	969.00
Fluoride	24.00	22.00	21.00	20.00	20.00	19.00	19.00	19.00	19.00	18.00

ARIZONA PUBLIC SERVICE

Indigenous Vegetation

Phytomass

Species: ATRIPLEX

Monitoring Location	0002	0002	0002	0002	0002	0002	0002	0002	0002	0002
Plant ID.	02-01	02-02	02-03	02-04	02-05	02-06	02-07	02-08	02-09	02-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	A	A	A	A	A	A	A	A	A	A
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1112	1113	1114	1115	1116	1117	1118	1119	1120	1121
Laboratory Number	839	840	841	842	843	844	845	846	847	848
Cations (ppm)										
Sodium	63158.00	47368.00	68421.00	57895.00	52632.00	47368.00	63158.00	57895.00	73684.00	45455.00
Potassium	14286.00	21905.00	16190.00	10476.00	13333.00	20952.00	13333.00	13333.00	11905.00	14000.00
Calcium	13638.00	9850.00	10175.00	8425.00	12550.00	9038.00	13463.00	13488.00	10663.00	11475.00
Magnesium	5875.00	5000.00	4613.00	3963.00	5625.00	5000.00	8250.00	5750.00	3713.00	6625.00
Anions (ppm)										
Chloride	46800.00	43200.00	42800.00	59600.00	47200.00	50400.00	59600.00	106000.00	70800.00	34800.00
Sulfate	4423.00	6378.00	5609.00	6731.00	8088.00	9093.00	8505.00	14657.00	833.00	2222.00
Nitrate	139.00	125.00	143.00	104.00	86.00	159.00	79.00	124.00	64.00	100.00
Phosphate	1130.00	969.00	888.00	1049.00	1372.00	1049.00	888.00	1292.00	1453.00	1292.00
Fluoride	13.00	12.00	12.00	12.00	11.00	11.00	11.00	11.00	11.00	11.00

A R I Z O N A   P U B L I C   S E R V I C E

Indigenous Vegetation

Phytomass

Species: ATRIPLEX

Monitoring Location	0003	0003	0003	0003	0003	0003	0003	0003	0003	0003
Plant ID.	03-01	03-02	03-03	03-04	03-05	03-06	03-07	03-08	03-09	03-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	A	A	A	A	A	A	A	A	A	A
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1123	1124	1125	1126	1127	1128	1129	1130	1131	1132
Laboratory Number	850	851	852	853	854	855	856	857	858	859
Cations (ppm)										
Sodium	50000.00	63636.00	68182.00	59091.00	59091.00	68182.00	72727.00	63636.00	59091.00	68182.00
Potassium	14500.00	23000.00	14500.00	23000.00	13000.00	12000.00	11000.00	19000.00	21000.00	13500.00
Calcium	13563.00	11988.00	15513.00	15413.00	11638.00	10825.00	7713.00	12088.00	12388.00	10275.00
Magnesium	6375.00	5250.00	7000.00	6000.00	5375.00	7125.00	4200.00	4638.00	6500.00	6625.00
Anions (ppm)										
Chloride	35600.00	60400.00	63200.00	55200.00	52400.00	54000.00	75600.00	47200.00	51200.00	53600.00
Sulfate	2222.00	9510.00	9681.00	9093.00	2778.00	4345.00	9681.00	1389.00	9681.00	10441.00
Nitrate	73.00	68.00	43.00	54.00	33.00	74.00	53.00	60.00	184.00	199.00
Phosphate	646.00	1372.00	1453.00	1292.00	1453.00	1292.00	1937.00	969.00	1372.00	1453.00
Fluoride	11.00	12.00	11.00	11.00	11.00	12.00	11.00	10.00	10.00	10.00

A R I Z O N A   P U B L I C   S E R V I C E

Indigenous Vegetation

Phytomass

Species: LARREA DIVARICATA

Monitoring Location	0004	0004	0004	0004	0004	0004	0004	0004	0004	0004
Plant ID.	04-01	04-02	04-03	04-04	04-05	04-06	04-07	04-08	04-09	04-10
Plot Number	1	1	2	3	3	4	4	5	6	7
Transect	L	L	L	L	L	L	L	L	U	U
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1134	1135	1136	1137	1138	1139	1140	1141	1142	1143
Laboratory Number	861	862	863	864	865	866	867	868	869	870
Cations (ppm)										
Sodium	318.00	273.00	318.00	182.00	227.00	318.00	318.00	450.00	650.00	250.00
Potassium	16500.00	16000.00	15000.00	13500.00	13500.00	14000.00	16500.00	20500.00	14000.00	12500.00
Calcium	16875.00	15075.00	13938.00	12975.00	14225.00	15300.00	15875.00	17325.00	14913.00	16050.00
Magnesium	1500.00	1588.00	1363.00	1575.00	1163.00	1738.00	1488.00	1988.00	1488.00	1563.00
Anions (ppm)										
Chloride	10800.00	10400.00	8400.00	11200.00	9600.00	12000.00	12000.00	10000.00	11600.00	10400.00
Sulfate	5833.00	4524.00	8775.00	6977.00	4960.00	2262.00	4405.00	2333.00	0.00	0.00
Nitrate	54.00	54.00	158.00	90.00	68.00	48.00	126.00	53.00	58.00	64.00
Phosphate	1130.00	1292.00	1292.00	1292.00	1292.00	1292.00	1211.00	1695.00	1211.00	1211.00
Fluoride	14.00	16.00	16.00	16.00	16.00	16.00	16.00	18.00	18.00	18.00

A R I Z O N A   P U B L I C   S E R V I C E

Indigenous Vegetation

Phytomass

Species: LARREA DIVARICATA

Monitoring Location	0006	0006	0006	0006	0006	0006	0006	0006	0006	0006
Plant ID.	06-01	06-02	06-03	06-04	06-05	06-06	06-07	06-08	06-09	06-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	U	U	U	U	U	U	L	L	L	L
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1145	1146	1147	1148	1149	1150	1151	1152	1153	1154
Laboratory Number	872	873	874	875	876	877	878	879	880	881
Cations (ppm)										
Sodium	250.00	350.00	300.00	250.00	250.00	200.00	300.00	250.00	200.00	200.00
Potassium	9000.00	12000.00	11500.00	11500.00	11500.00	14000.00	13000.00	12000.00	13500.00	11500.00
Calcium	20663.00	16225.00	20550.00	21650.00	17088.00	16888.00	15738.00	20450.00	15100.00	19925.00
Magnesium	1950.00	1963.00	2563.00	1588.00	1513.00	1750.00	1288.00	1800.00	1350.00	1800.00
Anions (ppm)										
Chloride	11600.00	10400.00	11200.00	11200.00	9200.00	10000.00	10400.00	11200.00	11600.00	10800.00
Sulfate	3750.00	0.00	0.00	0.00	0.00	2917.00	0.00	0.00	0.00	0.00
Nitrate	35.00	88.00	79.00	73.00	65.00	51.00	68.00	100.00	158.00	38.00
Phosphate	1211.00	1453.00	1453.00	1453.00	1292.00	1292.00	1292.00	1453.00	1615.00	1292.00
Fluoride	18.00	17.00	18.00	17.00	17.00	17.00	17.00	17.00	17.00	17.00

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Indigenous Vegetation

Phytomass

Species: LARREA DIVARICATA

Monitoring Location	0040	0040	0040	0040	0040	0040	0040	0040	0040	0040
Plant ID.	40-01	40-02	40-03	40-04	40-05	40-06	40-07	40-08	40-09	40-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	A	A	A	A	A	A	A	A	A	A
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165
Laboratory Number	883	884	885	886	887	888	889	890	891	892
Cations (ppm)										
Sodium	350.00	400.00	350.00	700.00	400.00	300.00	300.00	350.00	300.00	250.00
Potassium	10000.00	10000.00	10000.00	11000.00	11000.00	9524.00	12000.00	9524.00	8571.00	10000.00
Calcium	19875.00	20688.00	20625.00	19875.00	18763.00	15800.00	11600.00	18388.00	20450.00	12650.00
Magnesium	1388.00	1738.00	1563.00	2488.00	1575.00	1463.00	1613.00	1275.00	1238.00	1475.00
Anions (ppm)										
Chloride	10400.00	8400.00	9200.00	10000.00	8800.00	6000.00	6400.00	5600.00	5400.00	6800.00
Sulfate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	417.00	417.00	417.00
Nitrate	43.00	81.00	53.00	46.00	40.00	28.00	34.00	78.00	54.00	68.00
Phosphate	1534.00	1372.00	1372.00	1292.00	1292.00	1130.00	1211.00	1211.00	1049.00	1130.00
Fluoride	17.00	17.00	17.00	17.00	17.00	16.00	16.00	15.00	15.00	16.00

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Indigenous Vegetation

Phytomass

Species: LARREA DIVARICATA

Monitoring Location	0042	0042	0042	0042	0042	0042	0042	0042	0042	0042
Plant ID.	42-01	42-02	42-03	42-04	42-05	42-06	42-07	42-08	42-09	42-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	A	A	A	A	A	A	A	A	A	A
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176
Laboratory Number	894	895	896	897	898	899	900	901	902	903
Cations (ppm)										
Sodium	300.00	300.00	300.00	250.00	250.00	350.00	250.00	450.00	250.00	200.00
Potassium	12500.00	10500.00	8571.00	7143.00	8095.00	11000.00	11500.00	8571.00	13000.00	10500.00
Calcium	13925.00	14675.00	21013.00	19850.00	20325.00	18663.00	14425.00	18688.00	17550.00	17000.00
Magnesium	1550.00	1250.00	1600.00	1088.00	1463.00	1613.00	1325.00	1938.00	1375.00	1325.00
Anions (ppm)										
Chloride	4400.00	8000.00	7600.00	12600.00	8400.00	11200.00	9200.00	8800.00	7200.00	7000.00
Sulfate	0.00	0.00	3902.00	1818.00	5795.00	3485.00	4886.00	5379.00	0.00	0.00
Nitrate	108.00	189.00	111.00	58.00	64.00	100.00	118.00	121.00	144.00	93.00
Phosphate	1372.00	1049.00	969.00	807.00	969.00	1130.00	1130.00	888.00	1211.00	1211.00
Fluoride	14.00	14.00	15.00	16.00	14.00	15.00	15.00	14.00	14.00	14.00

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Indigenous Vegetation

Phytomass

Species: ATRIPLEX

Monitoring Location	0044	0044	0044	0044	0044	0044	0044	0044	0044	0044
Plant ID.	44-01	44-02	44-03	44-04	44-05	44-06	44-07	44-08	44-09	44-10
Plot Number	1	2	3	4	5	6	7	8	9	10
Transect	S	S	S	S	S	S	N	N	N	N
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
NUS Sample ID Number	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187
Laboratory Number	905	906	907	908	909	910	911	912	913	914
Cations (ppm)										
Sodium	50000.00	37619.00	45000.00	18000.00	32000.00	50000.00	55000.00	34000.00	39500.00	38500.00
Potassium	23810.00	21905.00	24762.00	13000.00	26500.00	26000.00	18000.00	15500.00	16500.00	30500.00
Calcium	7675.00	9563.00	7763.00	5375.00	7763.00	8625.00	7050.00	7925.00	7825.00	7888.00
Magnesium	6000.00	5625.00	5750.00	6125.00	3863.00	6250.00	4738.00	7125.00	6125.00	6625.00
Anions (ppm)										
Chloride	48400.00	52000.00	45600.00	22000.00	52800.00	52400.00	45200.00	38400.00	36400.00	36400.00
Sulfate	5265.00	5265.00	8662.00	2083.00	6250.00	4583.00	5000.00	4583.00	6250.00	11591.00
Nitrate	213.00	243.00	316.00	355.00	254.00	343.00	366.00	213.00	244.00	344.00
Phosphate	1372.00	1534.00	1615.00	888.00	1292.00	1615.00	1615.00	1534.00	1211.00	1292.00
Fluoride	12.00	11.00	11.00	12.00	12.00	11.00	11.00	11.00	11.00	11.00

APPENDIX F

AGRICULTURAL VEGETATION DATA

Appendix F

Agricultural Vegetation Data

Agricultural vegetation data were collected during the second, third, and fourth quarters of 1989. Sites 11, 13, 23, 25, 30, and 43 were sampled during the second and third quarters, and sites 11, 13, 23, 25, and 30 during the fourth. Leaf phytomass was analyzed for nine ions in the laboratory. No rinsate, leaf area, or leaf biomass data were reported in 1989. Cotton boll biomass data were reported during the fourth quarter only. No data were reported as missing during the 1989 data collection.

A R I Z O N A   P U B L I C   S E R V I C E

Agricultural Vegetation

Phytomass

Crop: SHORT STAPLE COTTON

Monitoring Location	0011	0011	0011	0011	0011	0011	0011	0011	0011	0011
Quarter	2	2	2	2	2	2	2	2	2	2
Month	7	7	7	7	7	7	7	7	7	7
Year	89	89	89	89	89	89	89	89	89	89
Row Number	191	191	200	200	217	217	108	108	261	261
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	202	221	212	230	116	163	14	151	21	208
NUS Sample ID Number	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Laboratory Number	639	640	641	642	643	644	645	646	647	648
Cations (ppm)										
Sodium	3400.00	4737.00	4737.00	3100.00	3300.00	2813.00	1857.00	1476.00	1857.00	4740.00
Potassium	25556.00	21667.00	23333.00	21667.00	21667.00	24444.00	26111.00	19545.00	19545.00	19091.00
Calcium	38875.00	40875.00	42625.00	34250.00	36625.00	33875.00	34500.00	37000.00	35875.00	38000.00
Magnesium	6375.00	5875.00	6000.00	4813.00	4750.00	5750.00	4613.00	4463.00	3988.00	4250.00
Anions (ppm)										
Chloride	16800.00	16400.00	16400.00	15200.00	15600.00	14400.00	14400.00	12800.00	16800.00	18800.00
Sulfate	64286.00	55714.00	56286.00	44286.00	50286.00	56286.00	50286.00	54286.00	48286.00	42286.00
Nitrate	1240.00	1060.00	800.00	1370.00	1200.00	920.00	1160.00	394.00	900.00	970.00
Phosphate	1372.00	1534.00	1534.00	1534.00	2018.00	1695.00	1857.00	2018.00	2018.00	1534.00
Fluoride	12.00	12.00	12.00	12.00	11.00	11.00	10.00	10.00	10.00	11.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

A R I Z O N A   P U B L I C   S E R V I C E

Agricultural Vegetation

Phytomass

Crop: SHORT STAPLE COTTON

Monitoring Location	0013	0013	0013	0013	0013	0013	0013	0013	0013	0013
Quarter	2	2	2	2	2	2	2	2	2	2
Month	7	7	7	7	7	7	7	7	7	7
Year	89	89	89	89	89	89	89	89	89	89
Row Number	121	121	126	126	67	67	56	56	128	128
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	42	48	49	107	96	295	47	242	144	182
NUS Sample ID Number	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Laboratory Number	649	650	651	652	653	654	655	656	657	658
Cations (ppm)										
Sodium	4286.00	4857.00	4286.00	4571.00	2571.00	4286.00	5714.00	4000.00	2643.00	2214.00
Potassium	26842.00	24737.00	26842.00	23158.00	24211.00	25263.00	26842.00	23684.00	26316.00	26842.00
Calcium	38750.00	44125.00	40000.00	45625.00	42250.00	39000.00	44875.00	43500.00	40125.00	40500.00
Magnesium	6000.00	6500.00	5625.00	5500.00	5250.00	5625.00	6750.00	5125.00	5375.00	5125.00
Anions (ppm)										
Chloride	19600.00	18800.00	20400.00	20400.00	18800.00	20000.00	18400.00	18800.00	19200.00	19200.00
Sulfate	54364.00	56182.00	52545.00	34545.00	44545.00	61455.00	59697.00	45091.00	59636.00	46364.00
Nitrate	860.00	940.00	1110.00	980.00	1010.00	1190.00	1100.00	1850.00	1500.00	1780.00
Phosphate	2018.00	1857.00	1695.00	1695.00	2099.00	2503.00	1615.00	2422.00	2260.00	2180.00
Fluoride	13.00	14.00	14.00	15.00	14.00	13.00	13.00	13.00	13.00	13.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

A R I Z O N A   P U B L I C   S E R V I C E

Agricultural Vegetation

Phytomass

Crop: LONG STAPLE COTTON

Monitoring Location	0023	0023	0023	0023	0023	0023	0023	0023	0023	0023
Quarter	2	2	2	2	2	2	2	2	2	2
Month	7	7	7	7	7	7	7	7	7	7
Year	89	89	89	89	89	89	89	89	89	89
Row Number	62	62	165	165	195	195	210	210	287	287
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	98	270	48	283	166	169	184	238	38	131
NUS Sample ID Number	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Laboratory Number	589	590	591	592	593	594	595	596	597	598
Cations (ppm)										
Sodium	1667.00	1048.00	486.00	811.00	757.00	1048.00	1714.00	892.00	2154.00	1190.00
Potassium	19091.00	18636.00	17273.00	20000.00	22632.00	23158.00	24211.00	22632.00	23158.00	23158.00
Calcium	37000.00	35500.00	32875.00	36500.00	38625.00	36125.00	39500.00	43500.00	47875.00	42250.00
Magnesium	3788.00	3663.00	3288.00	3613.00	3675.00	3150.00	3887.00	4725.00	3538.00	3988.00
Anions (ppm)										
Chloride	20600.00	19600.00	20800.00	19600.00	20200.00	18200.00	20600.00	19800.00	19600.00	19000.00
Sulfate	42143.00	52381.00	42857.00	50000.00	46667.00	35714.00	46548.00	50952.00	42738.00	50952.00
Nitrate	445.00	950.00	980.00	1230.00	1070.00	1490.00	1090.00	1430.00	1450.00	1340.00
Phosphate	2180.00	1937.00	1857.00	1937.00	2220.00	2018.00	2018.00	1978.00	1857.00	1816.00
Fluoride	14.00	14.00	13.00	13.00	13.00	15.00	13.00	14.00	14.00	14.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

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Agricultural Vegetation

Phytomass

Crop: LONG STAPLE COTTON

Monitoring Location	0025	0025	0025	0025	0025	0025	0025	0025	0025	0025
Quarter	2	2	2	2	2	2	2	2	2	2
Month	7	7	7	7	7	7	7	7	7	7
Year	89	89	89	89	89	89	89	89	89	89
Row Number	32	32	100	100	199	199	271	271	295	295
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	65	106	60	72	100	244	16	19	59	246
NUS Sample ID Number	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Laboratory Number	659	660	661	662	663	664	665	666	667	668
Cations (ppm)										
Sodium	800.00	543.00	600.00	600.00	429.00	514.00	714.00	543.00	457.00	686.00
Potassium	23684.00	23684.00	23158.00	23158.00	22105.00	20000.00	22632.00	19545.00	19545.00	20526.00
Calcium	41875.00	36000.00	43250.00	35000.00	45000.00	41750.00	41625.00	33000.00	38000.00	37875.00
Magnesium	3763.00	4250.00	4013.00	4050.00	3887.00	4138.00	4900.00	4600.00	5750.00	4463.00
Anions (ppm)										
Chloride	17600.00	16400.00	17600.00	18400.00	18800.00	18000.00	19600.00	20000.00	19200.00	19200.00
Sulfate	39394.00	48727.00	36364.00	56000.00	48545.00	48545.00	46909.00	25455.00	37000.00	50364.00
Nitrate	315.00	590.00	370.00	575.00	515.00	555.00	390.00	355.00	440.00	540.00
Phosphate	1937.00	2260.00	2422.00	2503.00	2341.00	2341.00	2260.00	2826.00	2341.00	2745.00
Fluoride	12.00	12.00	12.00	12.00	12.00	12.00	11.00	11.00	11.00	11.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

A R I Z O N A   P U B L I C   S E R V I C E

Agricultural Vegetation

Phytomass

Crop: SHORT STAPLE COTTON

Monitoring Location	0030	0030	0030	0030	0030	0030	0030	0030	0030	0030
Quarter	2	2	2	2	2	2	2	2	2	2
Month	7	7	7	7	7	7	7	7	7	7
Year	89	89	89	89	89	89	89	89	89	89
Row Number	27	27	88	88	105	105	156	156	163	163
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	14	39	43	60	138	170	69	125	52	195
NUS Sample ID Number	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Laboratory Number	599	600	601	602	603	604	605	606	607	608
Cations (ppm)										
Sodium	3333.00	2923.00	2000.00	2462.00	2231.00	1762.00	2308.00	2154.00	2000.00	1714.00
Potassium	19545.00	17727.00	22632.00	22105.00	27368.00	25263.00	27368.00	26842.00	24211.00	25263.00
Calcium	36750.00	39125.00	31500.00	30500.00	33750.00	30750.00	33125.00	29875.00	34250.00	33250.00
Magnesium	6250.00	7000.00	4875.00	5000.00	6000.00	6375.00	6250.00	4825.00	6625.00	4975.00
Anions (ppm)										
Chloride	16000.00	16800.00	20400.00	19600.00	18000.00	19200.00	18800.00	21600.00	22200.00	18600.00
Sulfate	51905.00	40476.00	45357.00	40476.00	53333.00	34524.00	40833.00	32286.00	34524.00	45238.00
Nitrate	900.00	835.00	1280.00	970.00	945.00	1170.00	650.00	925.00	655.00	1230.00
Phosphate	1857.00	1857.00	2099.00	2180.00	2099.00	2018.00	2180.00	2422.00	1937.00	2503.00
Fluoride	12.00	12.00	11.00	11.00	11.00	11.00	12.00	11.00	10.00	10.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

A R I Z O N A   P U B L I C   S E R V I C E

Agricultural Vegetation

Phytomass

Crop: ALFALFA

Monitoring Location	0043	0043	0043	0043	0043	0043	0043	0043	0043	0043
Quarter	2	2	2	2	2	2	2	2	2	2
Month	7	7	7	7	7	7	7	7	7	7
Year	89	89	89	89	89	89	89	89	89	89
Row Number	30	30	50	50	65	65	87	87	31	31
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	85	86	24	193	70	24	39	115	52	99
NUS Sample ID Number	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060
Laboratory Number	609	610	611	612	613	614	615	616	617	618
Cations (ppm)										
Sodium	1000.00	919.00	1381.00	1095.00	919.00	676.00	973.00	1190.00	1048.00	1048.00
Potassium	25417.00	27500.00	27500.00	26667.00	26667.00	25417.00	25833.00	25417.00	25000.00	26250.00
Calcium	12850.00	14025.00	12325.00	12438.00	13075.00	14425.00	14750.00	15263.00	13688.00	13313.00
Magnesium	2413.00	2613.00	2388.00	2550.00	2538.00	2475.00	2463.00	2488.00	2625.00	2363.00
Anions (ppm)										
Chloride	16400.00	15600.00	18560.00	12800.00	16800.00	15600.00	15200.00	14000.00	16000.00	14400.00
Sulfate	9732.00	12589.00	6875.00	9732.00	8304.00	9732.00	9911.00	12589.00	8304.00	10536.00
Nitrate	116.00	111.00	85.00	160.00	124.00	138.00	96.00	170.00	98.00	83.00
Phosphate	3391.00	3471.00	3471.00	3875.00	4198.00	3794.00	3633.00	3875.00	3310.00	3229.00
Fluoride	13.00	17.00	14.00	13.00	12.00	14.00	12.00	12.00	13.00	13.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

A R I Z O N A   P U B L I C   S E R V I C E

Agricultural Vegetation

Phytomass

Crop: SHORT STAPLE COTTON

Monitoring Location	0011	0011	0011	0011	0011	0011	0011	0011	0011	0011
Quarter	3	3	3	3	3	3	3	3	3	3
Month	8	8	8	8	8	8	8	8	8	8
Year	89	89	89	89	89	89	89	89	89	89
Row Number	191	191	200	200	217	217	108	108	261	261
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	202	221	212	230	116	163	14	151	21	208
NUS Sample ID Number	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110
Laboratory Number	762	763	764	765	766	767	768	769	770	771
Cations (ppm)										
Sodium	2714.00	5294.00	2500.00	3333.00	3235.00	3750.00	3000.00	3667.00	3750.00	5294.00
Potassium	12727.00	11364.00	14091.00	11818.00	15455.00	11818.00	15909.00	14545.00	15455.00	15909.00
Calcium	30750.00	29500.00	25125.00	26000.00	44625.00	45000.00	48625.00	51375.00	31375.00	35250.00
Magnesium	4888.00	4588.00	3838.00	4013.00	4938.00	5625.00	5875.00	5875.00	3500.00	3775.00
Anions (ppm)										
Chloride	16800.00	17600.00	16400.00	15600.00	16400.00	16800.00	19200.00	20400.00	20800.00	22000.00
Sulfate	25000.00	16000.00	8571.00	12000.00	43333.00	39524.00	35714.00	40714.00	16000.00	18000.00
Nitrate	74.00	55.00	40.00	38.00	38.00	40.00	48.00	43.00	180.00	170.00
Phosphate	1776.00	1534.00	2018.00	1776.00	1211.00	1211.00	1292.00	1049.00	1776.00	1534.00
Fluoride	11.00	11.00	11.00	11.00	11.00	11.00	10.00	10.00	10.00	10.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

A R I Z O N A   P U B L I C   S E R V I C E

Agricultural Vegetation

Phytomass

Crop: SHORT STAPLE COTTON

Monitoring Location	0013	0013	0013	0013	0013	0013	0013	0013	0013	0013
Quarter	3	3	3	3	3	3	3	3	3	3
Month	8	8	8	8	8	8	8	8	8	8
Year	89	89	89	89	89	89	89	89	89	89
Row Number	121	121	126	126	67	67	56	56	128	128
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	42	48	49	107	96	295	47	242	144	182
NUS Sample ID Number	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120
Laboratory Number	772	773	774	775	776	777	778	779	780	781
Cations (ppm)										
Sodium	3667.00	3167.00	3917.00	5294.00	3417.00	9118.00	3833.00	5294.00	3417.00	2538.00
Potassium	16190.00	18095.00	14762.00	15238.00	14762.00	11429.00	15238.00	13810.00	15714.00	17143.00
Calcium	31875.00	29500.00	34750.00	35375.00	40875.00	38875.00	34250.00	32000.00	31000.00	35625.00
Magnesium	4425.00	3975.00	4238.00	4638.00	4775.00	4600.00	4913.00	3925.00	4525.00	4388.00
Anions (ppm)										
Chloride	18800.00	18000.00	21200.00	22000.00	17600.00	23600.00	17600.00	19200.00	20400.00	20000.00
Sulfate	25000.00	24405.00	26905.00	32619.00	36190.00	32262.00	32381.00	25000.00	27857.00	29762.00
Nitrate	195.00	255.00	68.00	118.00	55.00	55.00	163.00	55.00	175.00	80.00
Phosphate	1776.00	2018.00	1937.00	2018.00	1776.00	2018.00	1776.00	1937.00	2018.00	1937.00
Fluoride	13.00	13.00	12.00	12.00	12.00	13.00	12.00	12.00	12.00	12.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

A R I Z O N A   P U B L I C   S E R V I C E

Agricultural Vegetation

Phytomass

Crop: LONG STAPLE COTTON

Monitoring Location	0023	0023	0023	0023	0023	0023	0023	0023	0023	0023
Quarter	3	3	3	3	3	3	3	3	3	3
Month	8	8	8	8	8	8	8	8	8	8
Year	89	89	89	89	89	89	89	89	89	89
Row Number	62	62	165	165	195	195	210	210	287	287
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	98	270	48	283	166	169	184	238	38	131
NUS Sample ID Number	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130
Laboratory Number	706	707	708	709	710	711	712	713	714	715
Cations (ppm)										
Sodium	1000.00	1000.00	1474.00	2385.00	1474.00	1158.00	1263.00	944.00	1579.00	2231.00
Potassium	13182.00	11818.00	19091.00	16818.00	20000.00	21000.00	20500.00	17727.00	16364.00	19091.00
Calcium	46125.00	50875.00	30250.00	42125.00	29375.00	25375.00	29125.00	31625.00	38500.00	44250.00
Magnesium	2863.00	3463.00	2750.00	2825.00	2550.00	3013.00	2738.00	3013.00	3413.00	3150.00
Anions (ppm)										
Chloride	24400.00	25200.00	20800.00	22000.00	20000.00	20400.00	22000.00	20000.00	20800.00	20000.00
Sulfate	31071.00	31071.00	16667.00	19167.00	16667.00	19167.00	24167.00	26667.00	24167.00	34048.00
Nitrate	93.00	53.00	124.00	191.00	171.00	128.00	153.00	68.00	109.00	119.00
Phosphate	1615.00	1615.00	2099.00	2422.00	2018.00	2341.00	1857.00	2018.00	2260.00	1857.00
Fluoride	14.00	14.00	13.00	13.00	13.00	13.00	13.00	12.00	13.00	13.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

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Agricultural Vegetation

Phytomass

Crop: LONG STAPLE COTTON

Monitoring Location	0025	0025	0025	0025	0025	0025	0025	0025	0025	0025
Quarter	3	3	3	3	3	3	3	3	3	3
Month	8	8	8	8	8	8	8	8	8	8
Year	89	89	89	89	89	89	89	89	89	89
Row Number	32	32	100	100	199	199	271	271	295	295
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	65	106	60	72	100	244	16	19	59	246
NUS Sample ID Number	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140
Laboratory Number	782	783	784	785	786	787	788	789	790	791
Cations (ppm)										
Sodium	559.00	500.00	529.00	676.00	471.00	412.00	1095.00	647.00	382.00	353.00
Potassium	16190.00	15238:00	16667.00	20000.00	15238.00	15238.00	12857.00	10476.00	12857.00	13333.00
Calcium	43500.00	38750.00	47750.00	48500.00	41625.00	43000.00	38875.00	35500.00	41750.00	39250.00
Magnesium	3975.00	4288.00	4288.00	3225.00	3650.00	4638.00	4775.00	4838.00	5000.00	4250.00
Anions (ppm)										
Chloride	20000.00	18800.00	21200.00	23200.00	21600.00	23600.00	27200.00	26800.00	21600.00	20800.00
Sulfate	32381.00	28571.00	39286.00	39286.00	41190.00	36190.00	33571.00	24935.00	28571.00	26753.00
Nitrate	50.00	38.00	36.00	33.00	36.00	50.00	28.00	26.00	46.00	41.00
Phosphate	2018.00	2341.00	2099.00	1937.00	2018.00	2341.00	2099.00	2260.00	2583.00	2341.00
Fluoride	12.00	12.00	12.00	12.00	11.00	11.00	11.00	11.00	10.00	10.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

A R I Z O N A   P U B L I C   S E R V I C E

Agricultural Vegetation

Phytomass

Crop: SHORT STAPLE COTTON

Monitoring Location	0030	0030	0030	0030	0030	0030	0030	0030	0030	0030
Quarter	3	3	3	3	3	3	3	3	3	3
Month	8	8	8	8	8	8	8	8	8	8
Year	89	89	89	89	89	89	89	89	89	89
Row Number	27	27	88	88	105	105	156	156	163	163
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	14	39	43	60	138	170	69	125	52	195
NUS Sample ID Number	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150
Laboratory Number	716	717	718	719	720	721	722	723	724	725
Cations (ppm)										
Sodium	5278.00	3333.00	4167.00	4444.00	3750.00	3167.00	3583.00	4167.00	4722.00	3583.00
Potassium	10455.00	12273.00	13636.00	15909.00	20500.00	19091.00	15000.00	16818.00	15455.00	18636.00
Calcium	44000.00	36000.00	45375.00	46000.00	44250.00	43125.00	46375.00	43250.00	49875.00	42625.00
Magnesium	6125.00	6000.00	4850.00	6500.00	6375.00	6500.00	6250.00	5875.00	6125.00	6375.00
Anions (ppm)										
Chloride	20400.00	20800.00	20000.00	20000.00	22000.00	20800.00	20000.00	19200.00	19600.00	27200.00
Sulfate	43333.00	27500.00	43333.00	47143.00	49048.00	47143.00	50952.00	52024.00	50119.00	50119.00
Nitrate	73.00	173.00	134.00	184.00	216.00	330.00	174.00	144.00	53.00	410.00
Phosphate	1534.00	1695.00	1534.00	1534.00	1695.00	1453.00	1534.00	1695.00	1534.00	1695.00
Fluoride	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

A R I Z O N A P U B L I C S E R V I C E

Agricultural Vegetation

Phytomass

Crop: ALFALFA

Monitoring Location	0043	0043	0043	0043	0043	0043	0043	0043	0043	0043
Quarter	3	3	3	3	3	3	3	3	3	3
Month	8	8	8	8	8	8	8	8	8	8
Year	89	89	89	89	89	89	89	89	89	89
Row Number	30	30	50	50	65	65	87	87	31	31
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	85	86	24	193	70	24	39	115	52	99
NUS Sample ID Number	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160
Laboratory Number	726	727	728	729	730	731	732	733	734	735
Cations (ppm)										
Sodium	1850.00	1800.00	2385.00	2923.00	2462.00	1750.00	1950.00	1850.00	2077.00	2846.00
Potassium	18571.00	18571.00	18095.00	16190.00	20000.00	16667.00	19524.00	19048.00	18571.00	16190.00
Calcium	14225.00	14963.00	16413.00	19700.00	15025.00	17288.00	15738.00	16100.00	15363.00	16638.00
Magnesium	2363.00	2538.00	2738.00	3463.00	2788.00	2938.00	3563.00	3063.00	2850.00	2663.00
Anions (ppm)										
Chloride	15200.00	15600.00	17200.00	19600.00	18000.00	16400.00	17200.00	16800.00	18000.00	16800.00
Sulfate	4318.00	5032.00	9935.00	9383.00	5390.00	4481.00	7760.00	8312.00	6851.00	5584.00
Nitrate	43.00	28.00	33.00	28.00	30.00	30.00	53.00	46.00	35.00	26.00
Phosphate	2180.00	2503.00	2422.00	2341.00	2260.00	2341.00	2906.00	2341.00	2583.00	2260.00
Fluoride	11.00	11.00	11.00	11.00	10.00	10.00	10.00	10.00	10.00	9.00
NUS Cotton Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99	9999.99

A R I Z O N A P U B L I C S E R V I C E

Agricultural Vegetation

Phytomass

Crop: SHORT STAPLE COTTON

Monitoring Location	0011	0011	0011	0011	0011	0011	0011	0011	0011	0011
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
Row Number	191	191	200	200	217	217	108	108	261	261
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	202	221	212	230	116	163	14	151	21	208
NUS Sample ID Number	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999
Laboratory Number	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999
Cations (ppm)										
Sodium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Potassium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Calcium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Magnesium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Anions (ppm)										
Chloride	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Sulfate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Nitrate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Phosphate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Fluoride	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
NUS Cotton Boll ID	8901	8902	8903	8904	8905	8906	8907	8908	8909	8910
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	342.30	310.80	459.00	450.60	1006.40	640.80	399.10	846.30	339.00	699.10

A R I Z O N A P U B L I C S E R V I C E

Agricultural Vegetation

Phytomass

Crop: SHORT STAPLE COTTON

Monitoring Location	0013	0013	0013	0013	0013	0013	0013	0013	0013	0013
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
Row Number	121	121	126	126	67	67	56	56	128	128
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	42	48	49	107	96	295	47	242	144	182
NUS Sample ID Number	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999
Laboratory Number	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999
Cations (ppm)										
Sodium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Potassium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Calcium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Magnesium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Anions (ppm)										
Chloride	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Sulfate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Nitrate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Phosphate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Fluoride	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
NUS Cotton Boll ID	8911	8912	8913	8914	8915	8916	8917	8918	8919	8920
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	1103.60	1102.20	1092.20	1170.50	870.90	1004.00	815.20	895.70	1084.40	1061.30

A R I Z O N A   P U B L I C   S E R V I C E

Agricultural Vegetation

Phytomass

Crop: LONG STAPLE COTTON

Monitoring Location	0023	0023	0023	0023	0023	0023	0023	0023	0023	0023
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
Row Number	62	62	165	165	195	195	210	210	287	287
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	98	270	48	283	166	169	184	238	38	131
NUS Sample ID Number	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999
Laboratory Number	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999
Cations (ppm)										
Sodium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Potassium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Calcium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Magnesium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Anions (ppm)										
Chloride	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Sulfate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Nitrate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Phosphate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Fluoride	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
NUS Cotton Boll ID	8921	8922	8923	8924	8925	8926	8927	8928	8929	8930
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	945.40	670.40	665.30	836.40	574.10	578.10	605.70	743.60	524.70	512.10

A R I Z O N A P U B L I C S E R V I C E

Agricultural Vegetation

Phytomass

Crop: LONG STAPLE COTTON

Monitoring Location	0025	0025	0025	0025	0025	0025	0025	0025	0025	0025
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
Row Number	32	32	100	100	199	199	271	271	295	295
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	65	106	60	72	100	244	16	19	59	246
NUS Sample ID Number	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999
Laboratory Number	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999
Cations (ppm)										
Sodium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Potassium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Calcium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Magnesium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Anions (ppm)										
Chloride	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Sulfate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Nitrate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Phosphate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Fluoride	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
NUS Cotton Boll ID	8931	8932	8933	8934	8935	8936	8937	8938	8939	8940
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	507.00	558.70	402.40	563.70	478.90	587.70	727.40	375.20	518.20	534.80

A R I Z O N A   P U B L I C   S E R V I C E

Agricultural Vegetation

Phytomass

Crop: SHORT STAPLE COTTON

Monitoring Location	0030	0030	0030	0030	0030	0030	0030	0030	0030	0030
Quarter	4	4	4	4	4	4	4	4	4	4
Month	10	10	10	10	10	10	10	10	10	10
Year	89	89	89	89	89	89	89	89	89	89
Row Number	140	140	88	88	105	105	156	156	163	163
Plot Number	1	2	3	4	5	6	7	8	9	10
Paces From End	52	139	43	60	138	170	69	125	52	195
NUS Sample ID Number	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999
Laboratory Number	99999	99999	99999	99999	99999	99999	99999	99999	99999	99999
Cations (ppm)										
Sodium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Potassium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Calcium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Magnesium	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Anions (ppm)										
Chloride	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Sulfate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Nitrate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Phosphate	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
Fluoride	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99	999999.99
NUS Cotton Boll ID	8941	8942	8943	8944	8945	8946	8947	8948	8949	8950
Laboratory Boll ID	999999	999999	999999	999999	999999	999999	999999	999999	999999	999999
Boll Biomass (g/m2)	698.50	475.80	1086.00	492.50	503.30	290.60	602.20	650.20	762.70	342.00

APPENDIX G

SOILS DATA

Appendix G
Soils Data

Included in this appendix are tabulations of data on the soil texture at each of the 44 sites (1-28 and 30-45) where soil samples were collected, as well as laboratory analysis data on electrical conductivity (EC x 1000), soluble salts, pH, and the concentrations of 18 ions.

The soils texture data are presented for two depth levels, an upper level of 0 to 15 centimeters, and a lower level of 15 to 30 centimeters.

The results of laboratory analysis are presented for each of two collocated samplers (A and B) for the upper and lower levels (U and L). Samples collected during the second, third, and fourth quarters of 1989 represent the wet, dry, and postdefoliation seasons, respectively. The postdefoliation season is defined as the period following the cotton crop harvest.

A minus sign preceding a value indicates that the value was below the detectable limit of the laboratory procedure. Missing data are presented as a field of "9s." Phosphorus has been discontinued as an analyte and is not reported.

Site	Soil Texture: Upper Level (0 - 15 cm)	Soil Texture: Lower Level (15 - 30 cm)
1	Sandy Loam	Sandy Loam
2	Silt Loam-Loam	Loam
3	Silt Loam-Loam	Sandy Loam
4	Sandy Loam	Sandy Loam
5	Sandy Loam	Sandy Loam
6	Sandy Loam	Sandy Loam
7	Sandy Loam	Sandy Loam
8	Sandy Loam	Loamy Sand
9	Loam	Loam-Sandy Loam
10	Loamy Sand-Sandy Loam	Sandy Loam
11	Silt Loam	Silt Loam
12	Loam	Sandy Loam
13	Loam-Sandy Clay Loam	Loam-Sandy Loam
14	Silt Loam	Loam
15	Sandy Loam	Sandy Loam
16	Sandy Loam	Sandy Loam-Sandy Clay Loam
17	Loamy Sand-Sandy Loam	Loamy Sand-Sandy Loam
18	Sandy Loam	Sandy Loam
19	Silt Loam-Loam	Silt Loam
20	Sandy Loam	Sandy Loam-Loamy Sand
21	Sandy Loam	Sandy Loam
22	Sandy Loam-Loamy Sand	Sandy Loam
23	Loam-Silt Loam	Silt Loam
24	Silt Loam-Loam	Loam
25	Loam	Loam
26	Sandy Loam	Loam
27	Sandy Loam	Sandy Loam
28	Sandy Loam	Loam-Sandy Loam
29	Loam	Loam
30	Silt Loam	Loam-Silt Loam
31	Sandy Loam	Sandy Loam
32	Sandy Loam	Sandy Loam
33	Sand	Sand
34	Sandy Loam	Sandy Loam
35	Loamy Sand-Sand	Sand
36	Sandy Loam	Sandy Loam
37	Sandy Loam	Sandy Loam
38.	Sandy Loam	Sandy Loam
39	Sandy Loam	Sandy Loam
40	Sandy Loam-Loam	Sandy Loam
41	Sandy Loam	Sandy Loam
42	Sandy Loam	Sandy Loam
43	Silt Loam	Silt Loam
44	Silt Loam	Silt Loam
45	Loam-Clay Loam	Loam-Clay Loam

Raw Soil Sample Data

For Quarter 2/89

Site	Qr	Yr	Mn	Sea	Id Num	Lab Num	EC x 1000	Solu Salts ppm	pH	Ca ppm	Mg ppm	Na ppm	Cl ppm	SO4 ppm	HCO3 ppm	CO3 ppm	F ppm	NO3-N ppm	Boron ppm	NH4 ppm	PO4-P ppm	k ppm
01AL	2	89	4	WET	492	210	2.40	1536	8.0	280	18	249	468	145.0	78	-4.8	0.30	130.00	0.73	-2.50	1.46	14
01AU	2	89	4	WET	491	209	2.00	1280	8.1	264	20	108	344	145.0	85	-4.8	0.25	88.75	0.50	-2.50	1.46	22
01BL	2	89	4	WET	494	212	1.80	1152	8.1	189	11	184	244	191.0	97	-4.8	0.28	87.50	0.82	2.50	1.46	11
01BU	2	89	4	WET	493	211	3.00	1920	8.0	408	24	238	472	210.0	80	-4.8	0.23	200.00	1.09	2.50	1.75	22
02AL	2	89	4	WET	488	206	0.52	333	9.2	21	3	141	44	12.0	246	9.0	1.00	6.56	1.05	-2.50	1.46	10
02AU	2	89	4	WET	487	205	0.32	205	8.8	36	6	36	26	6.0	182	-4.8	0.37	4.25	0.45	-2.50	2.34	26
02BL	2	89	4	WET	490	208	0.48	307	9.1	32	8	130	36	-2.5	286	9.0	0.50	6.00	0.73	-2.50	2.92	22
02BU	2	89	4	WET	489	207	0.38	243	8.8	39	5	35	22	5.0	192	-4.8	0.31	6.00	0.45	-2.50	4.09	24
03AL	2	89	4	WET	476	194	2.20	1408	9.7	18	2	540	441	85.0	309	108.0	14.00	20.63	20.83	-2.50	2.63	8
03AU	2	89	4	WET	475	193	0.84	538	9.6	23	15	233	100	-2.5	317	42.0	3.30	4.50	2.08	-2.50	2.92	16
03BL	2	89	4	WET	478	196	1.70	1088	9.8	36	19	400	288	-2.5	511	47.0	7.60	16.88	13.75	-2.50	3.22	18
03BU	2	89	4	WET	477	195	1.00	640	9.5	41	26	244	134	10.0	327	47.0	3.50	8.13	2.92	-2.50	2.92	19
04AL	2	89	4	WET	468	186	0.30	192	8.6	53	4	14	20	19.0	166	5.0	0.40	3.38	0.25	-2.50	1.17	13
04AU	2	89	4	WET	467	185	0.28	179	8.6	50	4	14	16	14.0	156	-4.8	0.54	3.13	0.25	-2.50	1.46	13
04BL	2	89	4	WET	470	188	0.28	179	8.6	50	4	14	20	19.0	156	5.0	0.35	3.88	0.25	-2.50	1.32	14
04BU	2	89	4	WET	469	187	0.28	179	8.7	47	4	16	16	8.0	147	-4.8	0.40	3.38	0.25	-2.50	1.17	14
05AL	2	89	4	WET	464	182	0.60	384	9.3	23	4	178	24	20.0	298	9.0	14.00	4.38	1.33	-2.50	1.61	5
05AU	2	89	4	WET	463	181	0.44	282	9.0	28	3	111	22	-2.5	237	5.0	4.40	3.88	1.08	-2.50	2.34	11
05BL	2	89	4	WET	466	184	0.42	269	9.1	26	4	100	12	4.0	253	7.0	5.20	3.63	0.83	-2.50	2.34	11
05BU	2	89	4	WET	465	183	0.36	230	8.9	30	3	89	12	-2.5	218	5.0	4.00	3.94	0.75	2.50	2.34	16
06AL	2	89	4	WET	472	190	0.28	179	8.7	43	3	30	20	14.0	161	-4.8	0.28	3.56	0.42	1.25	0.88	5
06AU	2	89	4	WET	471	189	0.24	154	8.7	41	3	28	16	-2.5	156	-4.8	0.28	3.13	0.33	-2.50	1.02	5
06BL	2	89	4	WET	474	192	0.32	205	8.6	40	3	52	24	-2.5	204	-4.8	0.34	3.94	0.33	-2.50	1.17	3
06BU	2	89	4	WET	473	191	0.28	179	8.8	35	3	40	20	-2.5	170	-4.8	0.33	3.38	0.42	-2.50	1.17	3
07AL	2	89	4	WET	596	314	0.92	589	9.3	22	3	233	56	98.0	317	14.0	5.40	10.63	2.00	1.00	3.22	3
07AU	2	89	4	WET	595	313	0.64	410	9.1	27	3	145	34	3.0	289	9.0	3.70	10.00	1.20	-2.50	2.63	5
07BL	2	89	4	WET	598	316	0.44	282	8.8	29	5	76	24	-2.5	227	5.0	2.40	5.63	0.70	1.00	2.34	6
07BU	2	89	4	WET	597	315	0.44	282	8.8	31	5	80	22	-2.5	246	5.0	2.20	6.13	1.10	1.00	3.80	10
08AL	2	89	4	WET	544	262	0.60	384	9.4	27	5	173	88	32.0	185	16.0	1.20	4.50	1.20	-2.50	2.19	6
08AU	2	89	4	WET	543	261	0.34	218	9.0	29	5	57	28	-2.5	166	5.0	0.66	4.63	0.60	-2.50	2.92	9
08BL	2	89	4	WET	546	264	0.40	256	9.2	26	5	108	38	1.0	170	9.0	0.84	4.75	0.70	-2.50	2.34	9
08BU	2	89	4	WET	545	263	0.28	179	9.0	29	4	44	20	-2.5	156	5.0	0.72	3.75	0.40	-2.50	2.92	9
09AL	2	89	4	WET	500	218	0.38	243	8.9	29	5	46	26	21.0	180	5.0	0.39	5.25	0.64	-2.50	2.34	26
09AU	2	89	4	WET	499	217	0.36	230	8.7	37	7	38	22	10.0	211	-4.8	0.32	6.00	0.73	-2.50	2.34	27
09BL	2	89	4	WET	502	220	0.36	230	8.7	39	7	22	24	14.0	170	2.0	0.23	5.00	0.64	-2.50	5.26	32
09BU	2	89	4	WET	501	219	0.32	205	8.7	39	6	25	18	2.0	180	2.0	0.25	5.13	0.64	-2.50	4.09	24
10AL	2	89	4	WET	484	202	0.44	282	8.5	46	6	38	40	26.0	159	-4.8	0.68	12.50	0.55	-2.50	1.17	14
10AU	2	89	4	WET	483	201	0.30	192	8.7	43	5	15	20	-2.5	170	-4.8	0.58	4.75	0.45	2.50	2.05	14
10BL	2	89	4	WET	486	204	0.32	205	8.5	48	6	19	18	2.0	159	-4.8	0.56	8.13	0.36	-2.50	2.05	10
10BU	2	89	4	WET	485	203	0.28	179	8.5	51	6	15	14	-2.5	166	-4.8	0.48	8.75	0.41	-2.50	2.63	14
11AL	2	89	4	WET	548	266	2.10	1344	8.8	36	4	505	320	192.0	277	9.0	18.00	37.50	7.80	1.00	1.17	17
11AU	2	89	4	WET	547	265	3.00	1920	8.5	75	8	653	600	171.0	159	-4.8	7.60	82.50	3.70	3.00	1.17	26
11BL	2	89	4	WET	550	268	3.40	2176	8.4	88	11	737	732	440.0	147	-4.8	8.80	75.00	4.10	2.00	1.02	32
11BU	2	89	4	WET	549	267	3.30	2112	8.3	162	19	971	1052	480.0	125	-4.8	6.40	110.00	3.70	2.00	0.88	37

Raw Soil Sample Data

For Quarter 2/89

Site	Qr	Yr	Mn	Sea	Id Num	Lab Num	EC x 1000	Solu Salts ppm	pH	Ca ppm	Mg ppm	Na ppm	Cl ppm	SO4 ppm	HCO3 ppm	CO3 ppm	F ppm	NO3-N ppm	Boron ppm	NH4 ppm	PO4-P ppm	k ppm
12AL	2	89	4	WET	508	226	0.80	512	8.7	38	4	183	52	68.0	253	-4.8	8.40	18.13	1.95	1.00	3.36	30
12AU	2	89	4	WET	507	225	0.56	358	8.9	39	7	137	16	4.0	305	-4.8	9.20	5.13	1.95	1.00	3.51	30
12BL	2	89	4	WET	510	228	1.90	1216	8.4	65	6	320	308	150.0	173	-4.8	5.60	50.00	2.60	1.00	2.63	55
12BU	2	89	4	WET	509	227	1.14	730	8.7	45	4	251	152	112.0	241	-4.8	7.80	25.00	2.50	1.00	3.22	37
13AL	2	89	4	WET	504	222	0.76	486	8.7	34	4	183	82	63.0	220	5.0	13.00	6.88	1.10	-2.50	2.34	13
13AU	2	89	4	WET	503	221	0.96	614	8.8	32	3	217	122	70.0	213	2.0	8.40	8.13	1.40	1.00	2.34	13
13BL	2	89	4	WET	506	224	1.14	730	8.7	38	5	240	144	94.0	230	2.0	9.60	11.25	1.60	1.00	2.63	22
13BU	2	89	4	WET	505	223	1.20	768	8.8	34	4	251	158	108.0	208	5.0	9.80	10.94	1.20	-2.50	2.05	18
14AL	2	89	4	WET	496	214	0.38	243	8.7	40	6	28	22	-2.5	192	-4.8	0.42	6.25	0.64	-2.50	2.05	34
14AU	2	89	4	WET	495	213	0.88	563	8.6	55	9	40	40	101.0	189	-4.8	0.24	33.75	1.27	-2.50	2.63	104
14BL	2	89	4	WET	498	216	0.56	358	8.8	31	8	55	28	4.0	218	-4.8	0.38	14.38	1.00	-2.50	2.92	82
14BU	2	89	4	WET	497	215	0.56	358	8.9	32	8	42	24	-2.5	251	-4.8	0.30	13.12	1.64	-2.50	3.51	104
15AL	2	89	4	WET	512	230	0.28	179	8.6	41	5	13	12	15.0	147	-4.8	0.76	3.38	0.50	1.00	1.61	22
15AU	2	89	4	WET	511	229	0.26	166	8.7	43	5	9	16	-2.5	149	-4.8	0.52	3.50	0.35	1.00	2.19	21
15BL	2	89	4	WET	514	232	0.24	154	8.6	45	4	9	16	2.0	142	2.0	0.46	3.50	0.40	1.00	1.75	21
15BU	2	89	4	WET	513	231	0.24	154	8.6	47	4	8	12	-2.5	156	-4.8	0.32	3.13	0.35	1.00	1.61	19
16AL	2	89	4	WET	480	198	5.40	3456	9.4	31	4	1171	1148	295.0	246	74.0	2.60	165.00	23.75	-2.50	3.51	40
16AU	2	89	4	WET	479	197	1.20	768	9.4	26	3	267	188	-2.5	222	21.0	1.10	31.25	4.50	-2.50	5.26	22
16BL	2	89	4	WET	482	200	3.40	2176	9.5	27	3	760	696	167.0	319	71.0	1.50	85.00	22.08	-2.50	4.97	38
16BU	2	89	4	WET	481	199	1.30	832	9.6	29	9	289	220	6.0	270	28.0	1.00	28.75	3.75	-2.50	5.26	26
17AL	2	89	4	WET	576	294	0.40	256	8.6	58	25	10	8	3.0	227	-4.8	0.44	5.63	1.23	0.83	6.73	53
17AU	2	89	4	WET	575	293	0.38	243	8.5	59	7	10	12	-2.5	218	-4.8	0.36	6.00	0.86	2.50	6.73	42
17BL	2	89	4	WET	578	296	0.50	320	8.5	64	11	11	10	-2.5	275	-4.8	0.26	9.38	1.50	3.33	6.43	62
17BU	2	89	4	WET	577	295	0.50	320	8.4	74	11	11	10	-2.5	241	-4.8	0.29	12.50	1.55	3.33	9.94	55
18AL	2	89	4	WET	556	274	0.28	179	8.6	52	4	15	16	-2.5	161	-4.8	0.38	4.00	0.50	-2.50	0.88	6
18AU	2	89	4	WET	555	273	0.28	179	8.6	50	4	14	12	-2.5	170	-4.8	0.33	3.88	0.50	-2.50	1.90	9
18BL	2	89	4	WET	558	276	0.28	179	8.5	59	5	15	16	-2.5	170	-4.8	0.37	4.25	0.45	-2.50	1.46	6
18BU	2	89	4	WET	557	275	0.28	179	8.6	51	4	15	16	-2.5	156	-4.8	0.34	3.88	0.45	-2.50	1.61	9
19AL	2	89	4	WET	552	270	0.34	218	8.8	41	5	17	18	-2.5	180	5.0	0.72	4.38	0.90	-2.50	2.05	50
19AU	2	89	4	WET	551	269	0.34	218	8.8	43	5	15	16	-2.5	189	-4.8	0.68	5.38	0.60	1.00	2.34	37
19BL	2	89	4	WET	554	272	0.32	205	8.8	43	5	19	12	-2.5	189	5.0	0.44	4.00	0.80	-2.50	2.63	40
19BU	2	89	4	WET	553	271	0.28	179	8.8	43	5	16	10	-2.5	178	-4.8	0.44	3.88	0.50	-2.50	2.05	31
20AL	2	89	4	WET	456	174	0.56	358	9.6	28	10	160	24	-2.5	317	26.0	5.60	3.38	0.59	-2.50	2.63	20
20AU	2	89	4	WET	455	173	0.40	256	9.2	26	4	103	24	2.0	227	9.0	3.00	4.38	1.00	-2.50	2.49	28
20BL	2	89	4	WET	458	176	0.46	294	9.5	21	4	126	22	1.0	243	13.0	4.00	3.06	2.18	-2.50	2.92	20
20BU	2	89	4	WET	457	175	0.32	205	9.1	26	4	217	16	-2.5	194	5.0	2.40	3.00	1.00	-2.50	2.34	15
21AL	2	89	4	WET	612	330	0.68	435	9.6	19	6	150	54	4.0	298	33.0	0.58	3.75	0.85	-2.50	2.05	18
21AU	2	89	4	WET	611	329	0.32	205	9.0	26	5	52	14	-2.5	182	5.0	0.30	3.13	0.54	2.50	3.51	16
21BL	2	89	4	WET	614	332	0.44	282	9.5	19	9	102	16	4.0	249	14.0	0.44	2.63	0.54	-2.50	2.63	18
21BU	2	89	4	WET	613	331	0.28	179	9.0	26	6	52	16	-2.5	185	5.0	0.32	2.56	0.46	-2.50	3.36	16
22AL	2	89	4	WET	616	334	0.24	154	8.5	45	4	13	12	10.0	137	-4.8	0.32	2.69	0.50	1.25	1.32	8
22AU	2	89	4	WET	615	333	0.24	154	8.6	42	4	12	12	-2.5	140	-4.8	0.29	2.63	0.31	-2.50	1.61	8
22BL	2	89	4	WET	618	336	0.20	128	8.6	42	4	10	8	-2.5	123	-4.8	0.28	2.31	0.31	1.25	1.46	5
22BU	2	89	4	WET	617	335	0.20	128	8.6	41	4	10	12	-2.5	123	-4.8	0.26	2.38	0.46	1.25	1.61	6

Raw Soil Sample Data

For Quarter 2/89

Site	Qr	Yr	Mn	Sea	Id Num	Lab Num	EC x 1000	Solu Salts ppm	pH	Ca ppm	Mg ppm	Na ppm	Cl ppm	SO4 ppm	HCO3 ppm	CO3 ppm	F ppm	NO3-N ppm	Boron ppm	NH4 ppm	PO4-P ppm	k ppm
23AL	2	89	4	WET	560	278	0.84	538	8.8	46	5	227	116	62.0	284	5.0	10.00	11.25	1.40	-2.50	2.63	9
23AU	2	89	4	WET	559	277	1.40	896	8.6	49	6	314	224	139.0	251	5.0	6.80	21.25	1.70	-2.50	1.90	9
23BL	2	89	4	WET	562	280	0.84	538	8.8	37	5	205	130	27.0	270	9.0	9.00	11.25	1.30	1.00	2.34	6
23BU	2	89	4	WET	561	279	0.96	614	8.7	38	5	249	140	89.0	272	5.0	7.00	16.25	1.90	1.00	2.05	6
24AL	2	89	4	WET	604	322	0.88	563	8.8	29	4	211	36	114.0	246	5.0	6.20	20.00	1.35	2.50	2.05	19
24AU	2	89	4	WET	603	321	0.56	358	8.9	29	6	98	24	-2.5	246	-4.8	3.60	7.50	1.31	1.25	2.34	24
24BL	2	89	4	WET	606	324	1.20	768	8.8	32	4	256	88	145.0	204	5.0	4.40	37.50	1.42	1.25	2.34	29
24BU	2	89	4	WET	605	323	0.92	589	8.9	28	4	157	64	102.0	222	2.0	4.40	25.00	1.31	3.75	2.19	24
25AL	2	89	4	WET	444	162	1.80	1152	8.4	98	15	251	200	170.0	90	-4.8	1.30	82.50	1.09	-2.50	1.75	23
25AU	2	89	4	WET	443	161	2.60	1664	8.2	213	31	320	300	360.0	90	-4.8	0.94	145.00	1.27	-2.50	1.75	33
25BL	2	89	4	WET	446	164	2.00	1280	8.3	132	20	274	248	140.0	85	-4.8	1.20	115.00	0.95	-2.50	1.75	25
25BU	2	89	4	WET	445	163	3.00	1920	8.1	254	35	377	384	360.0	76	-4.8	0.98	205.00	1.09	-2.50	1.46	38
26AL	2	89	4	WET	600	318	0.26	166	8.6	47	4	18	16	17.0	137	-4.8	0.33	2.50	0.40	1.00	0.29	2
26AU	2	89	4	WET	599	317	0.24	154	8.6	46	4	11	12	-2.5	144	-4.8	0.37	2.56	0.30	1.00	0.29	5
26BL	2	89	4	WET	602	320	0.24	154	8.7	42	4	23	10	-2.5	147	-4.8	0.50	2.19	0.40	-2.50	1.02	2
26BU	2	89	4	WET	601	319	0.22	141	8.7	44	4	12	10	2.0	142	-4.8	0.37	2.19	0.30	-2.50	0.73	5
27AL	2	89	4	WET	460	178	1.10	704	9.6	21	4	331	63	42.0	424	49.0	19.00	13.12	4.45	-2.50	1.46	5
27AU	2	89	4	WET	459	177	0.72	461	9.4	26	8	149	20	6.0	341	21.0	5.40	18.13	2.09	-2.50	2.34	18
27BL	2	89	4	WET	462	180	0.60	384	9.2	24	5	171	20	-2.5	320	19.0	4.20	3.75	1.82	-2.50	2.19	10
27BU	2	89	4	WET	461	179	0.44	282	9.0	26	3	137	24	-2.5	301	7.0	2.40	4.50	1.45	-2.50	2.63	17
28AL	2	89	4	WET	572	290	0.76	486	9.0	33	5	216	54	89.0	232	5.0	1.90	12.50	2.18	1.67	2.05	8
28AU	2	89	4	WET	571	289	0.64	410	9.2	34	8	162	12	12.0	284	-4.8	2.60	4.75	1.82	1.67	1.90	10
28BL	2	89	4	WET	574	292	0.60	384	9.1	33	5	195	16	36.0	265	9.0	2.40	12.50	2.45	1.67	1.61	8
28BU	2	89	4	WET	573	291	0.60	384	9.1	32	7	173	16	12.0	270	9.0	0.48	7.50	1.68	1.67	2.34	11
30AL	2	89	4	WET	564	282	1.20	768	8.7	40	5	281	120	136.0	265	5.0	5.20	14.38	1.82	3.33	1.17	6
30AU	2	89	4	WET	563	281	1.90	1216	8.6	38	7	368	252	240.0	256	-4.8	5.00	30.00	2.36	1.67	2.05	10
30BL	2	89	4	WET	566	284	1.50	960	8.8	48	5	324	176	190.0	312	5.0	5.40	15.00	2.64	2.50	1.46	8
30BU	2	89	4	WET	565	283	2.20	1408	8.5	65	10	540	432	380.0	222	-4.8	5.20	32.50	2.73	1.67	1.75	14
31AL	2	89	4	WET	628	346	1.30	832	9.3	34	6	331	164	175.0	284	21.0	12.50	6.25	2.38	1.00	1.90	6
31AU	2	89	4	WET	627	345	1.04	666	9.5	55	24	297	102	7.0	321	17.0	11.00	5.75	2.54	1.00	1.75	12
31BL	2	89	4	WET	630	348	2.00	1280	9.3	34	3	476	302	302.0	246	21.0	13.50	14.38	2.85	1.00	1.75	3
31BU	2	89	4	WET	629	347	1.44	922	9.5	41	7	400	200	337.0	300	36.0	13.00	9.38	3.00	2.00	2.05	9
32AL	2	89	4	WET	624	342	2.10	1344	9.3	29	3	552	314	312.0	256	19.0	13.50	32.50	2.85	-2.50	1.46	2
32AU	2	89	4	WET	623	341	2.60	1664	9.3	31	3	648	348	523.0	289	19.0	12.00	50.00	5.08	1.00	2.34	5
32BL	2	89	4	WET	626	344	1.40	896	9.3	29	3	354	168	139.0	286	14.0	12.00	20.63	1.77	2.00	1.32	2
32BU	2	89	4	WET	625	343	1.10	704	9.6	33	7	297	79	56.0	323	25.0	9.40	16.88	2.46	1.00	2.05	6
33AL	2	89	4	WET	620	338	0.18	115	8.9	32	3	6	8	-2.5	95	-4.8	0.24	2.00	0.31	1.25	3.51	8
33AU	2	89	4	WET	619	337	0.18	115	9.0	29	3	6	10	-2.5	88	-4.8	0.22	2.00	0.23	1.25	4.39	8
33BL	2	89	4	WET	622	340	0.18	115	8.8	33	3	6	10	-2.5	95	-4.8	0.20	2.00	0.23	1.25	7.02	8
33BU	2	89	4	WET	621	339	0.18	115	8.8	31	3	6	12	-2.5	90	-4.8	0.22	1.94	0.23	1.25	5.26	8
34AL	2	89	4	WET	580	298	0.28	179	8.6	48	4	11	10	-2.5	154	-4.8	0.33	3.25	0.45	1.67	2.19	8
34AU	2	89	4	WET	579	297	0.28	179	8.5	49	5	9	8	-2.5	156	-4.8	0.31	3.31	0.64	0.83	2.63	11
34BL	2	89	4	WET	582	300	0.24	154	8.5	44	4	11	12	-2.5	140	-4.8	0.29	3.25	0.32	0.83	1.17	5
34BU	2	89	4	WET	581	299	0.24	154	8.5	44	4	9	12	-2.5	142	-4.8	0.27	3.13	0.23	0.83	1.17	6

Raw Soil Sample Data

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Site	Qr	Yr	Mn	Sea	Id Num	Lab Num	EC x 1000	Solu Salts ppm	pH	Ca ppm	Mg ppm	Na ppm	Cl ppm	SO4 ppm	HCO3 ppm	CO3 ppm	F ppm	NO3-N ppm	Boron ppm	NH4 ppm	PO4-P ppm	k ppm
35AL	2	89	4	WET	584	302	0.20	128	8.8	55	4	7	12	-2.5	99	-4.8	0.27	2.38	0.30	-2.50	3.51	6
35AU	2	89	4	WET	583	301	0.20	128	8.8	38	3	7	10	2.0	85	-4.8	0.26	2.31	0.30	1.00	5.56	6
35BL	2	89	4	WET	586	304	0.20	128	8.7	41	4	8	10	-2.5	111	-4.8	0.24	2.19	0.25	-2.50	2.92	6
35BU	2	89	4	WET	585	303	0.20	128	8.8	42	4	7	12	-2.5	95	-4.8	0.21	2.19	0.25	-2.50	4.68	8
36AL	2	89	4	WET	588	306	1.50	960	8.4	92	8	233	288	17.0	109	-4.8	0.38	52.50	0.85	-2.50	0.29	10
36AU	2	89	4	WET	587	305	0.44	282	8.6	54	5	48	62	3.0	130	-4.8	0.21	9.38	0.40	-2.50	0.44	8
36BL	2	89	4	WET	590	308	0.28	179	8.8	35	4	33	16	-2.5	149	-4.8	0.24	2.88	0.35	-2.50	0.44	5
36BU	2	89	4	WET	589	307	0.30	192	8.8	39	5	28	16	-2.5	142	-4.8	0.23	3.13	0.40	-2.50	0.44	8
37AL	2	89	4	WET	592	310	0.28	179	8.5	58	4	11	12	-2.5	166	-4.8	0.30	2.50	0.40	-2.50	0.44	3
37AU	2	89	4	WET	591	309	0.26	166	8.6	56	4	8	12	-2.5	168	-4.8	0.21	2.63	0.30	-2.50	1.02	8
37BL	2	89	4	WET	594	312	0.24	154	8.5	56	4	9	14	-2.5	159	-4.8	0.22	2.56	0.30	1.00	0.58	3
37BU	2	89	4	WET	593	311	0.24	154	8.6	50	4	8	8	-2.5	142	-4.8	0.23	2.25	0.35	-2.50	0.58	5
38AL	2	89	4	WET	536	254	0.70	448	9.4	21	6	206	52	42.0	279	30.0	0.48	7.50	1.24	-2.50	2.05	3
38AU	2	89	4	WET	535	253	0.44	282	9.3	24	5	126	20	-2.5	222	14.0	0.29	5.63	0.43	-2.50	1.90	3
38BL	2	89	4	WET	538	256	0.48	307	9.3	28	4	137	20	17.0	232	14.0	0.32	5.50	0.29	-2.50	1.90	5
38BU	2	89	4	WET	537	255	0.38	243	9.2	21	3	114	16	14.0	204	12.0	0.32	4.63	0.33	-2.50	2.19	6
39AL	2	89	4	WET	540	258	1.60	1024	8.6	51	7	297	380	50.0	114	-4.8	0.21	23.13	1.05	6.67	1.46	14
39AU	2	89	4	WET	539	257	1.04	666	8.6	47	5	194	180	54.0	128	-4.8	0.20	26.25	0.67	10.00	1.46	15
39BL	2	89	4	WET	542	260	0.44	282	9.2	22	3	137	32	30.0	199	14.0	0.29	5.00	0.57	-2.50	1.46	3
39BU	2	89	4	WET	541	259	0.36	230	9.0	25	4	67	24	24.0	170	5.0	0.20	4.63	0.33	-2.50	1.75	6
40AL	2	89	4	WET	448	166	0.48	307	8.5	75	6	27	26	123.0	142	-4.8	0.30	8.75	0.73	-2.50	1.17	13
40AU	2	89	4	WET	447	165	0.36	230	8.6	68	5	25	24	37.0	225	-4.8	0.33	5.00	0.77	-2.50	2.05	27
40BL	2	89	4	WET	450	168	0.26	166	8.7	44	4	33	18	-2.5	175	5.0	0.30	3.25	0.27	-2.50	1.75	12
40BU	2	89	4	WET	449	167	0.30	192	8.7	44	4	40	20	2.0	194	-4.8	0.27	3.88	0.45	-2.50	1.46	13
41AL	2	89	4	WET	608	326	4.00	2560	8.7	42	5	831	1048	220.0	147	2.0	0.35	40.00	8.46	-2.50	0.88	21
41AU	2	89	4	WET	607	325	1.30	832	8.5	60	7	233	310	34.0	128	-4.8	0.42	12.50	1.04	1.25	1.17	19
41BL	2	89	4	WET	610	328	1.00	640	8.8	25	3	256	204	57.0	199	5.0	0.37	6.88	1.92	2.50	0.88	8
41BU	2	89	4	WET	609	327	0.44	282	8.8	31	3	64	42	15.0	118	-4.8	0.32	4.00	0.81	5.00	1.17	8
42AL	2	89	4	WET	532	250	0.28	179	8.5	54	4	17	20	18.0	137	-4.8	0.27	4.25	0.29	-2.50	0.29	5
42AU	2	89	4	WET	531	249	0.28	179	8.5	55	4	15	24	-2.5	142	-4.8	0.32	4.00	0.38	-2.50	0.73	6
42BL	2	89	4	WET	534	252	0.30	192	8.5	55	4	18	22	-2.5	161	-4.8	0.21	5.13	0.43	11.67	1.17	8
42BU	2	89	4	WET	533	251	0.28	179	8.4	54	4	16	20	-2.5	151	-4.8	0.25	5.63	0.38	6.67	1.17	8
43AL	2	89	4	WET	528	246	1.30	832	8.7	57	11	274	202	210.0	270	-4.8	1.40	7.50	1.71	-2.50	4.39	14
43AU	2	89	4	WET	527	245	1.20	768	8.7	51	10	263	186	180.0	275	-4.8	1.70	8.75	1.81	-2.50	5.99	12
43BL	2	89	4	WET	530	248	1.30	832	8.8	52	10	274	186	190.0	277	-4.8	1.50	7.19	1.95	5.00	3.95	12
43BU	2	89	4	WET	529	247	1.30	832	8.7	48	11	286	228	74.0	263	-4.8	1.60	11.25	2.24	1.67	7.31	12
44AL	2	89	4	WET	452	170	1.16	742	9.4	20	3	251	154	53.0	324	23.0	0.56	26.25	2.91	-2.50	2.92	77
44AU	2	89	4	WET	451	169	0.38	243	9.0	36	7	40	20	2.0	234	5.0	0.22	4.63	0.82	-2.50	3.51	70
44BL	2	89	4	WET	454	172	0.40	256	9.1	26	4	60	16	-2.5	232	9.0	0.33	4.38	0.91	-2.50	2.34	45
44BU	2	89	4	WET	453	171	0.32	205	8.7	38	6	23	20	-2.5	189	5.0	0.20	4.63	0.73	-2.50	2.19	43
45AL	2	89	4	WET	568	286	2.40	1536	9.4	30	3	580	216	350.0	327	37.0	20.00	21.25	6.00	1.67	0.88	3
45AU	2	89	4	WET	567	285	1.20	768	9.5	26	5	335	68	56.0	407	42.0	13.50	16.88	2.82	1.67	0.88	5
45BL	2	89	4	WET	570	288	1.66	1062	9.5	22	3	420	172	160.0	341	47.0	16.00	17.50	4.18	-2.50	0.73	3
45BU	2	89	4	WET	569	287	1.10	704	9.6	25	5	314	46	48.0	417	56.0	8.60	13.12	3.09	1.67	0.88	5

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Site	Qtr	Yr	Mn	Sea	Id Num	Lab Num	Na exchg Meq/ 100gm	K exchg Meq/ 100gm	Ca exchg Meq/ 100gm	Mg exchg Meq/ 100gm	Total P ppm
01AL	2	89	4	WET	492	210	2.12	0.56	32.19	1.71	9999.99
01AU	2	89	4	WET	491	209	0.78	0.80	31.56	1.99	9999.99
01BL	2	89	4	WET	494	212	1.51	0.65	31.94	1.48	9999.99
01BU	2	89	4	WET	493	211	1.69	0.85	33.31	1.83	9999.99
02AL	2	89	4	WET	488	206	2.35	1.14	24.81	2.98	9999.99
02AU	2	89	4	WET	487	205	0.59	1.51	24.14	2.79	9999.99
02BL	2	89	4	WET	490	208	1.60	1.54	24.41	2.96	9999.99
02BU	2	89	4	WET	489	207	0.54	1.23	23.73	2.42	9999.99
03AL	2	89	4	WET	476	194	9.57	1.19	16.17	1.54	9999.99
03AU	2	89	4	WET	475	193	4.83	1.21	19.81	1.87	9999.99
03BL	2	89	4	WET	478	196	7.49	1.24	18.77	1.85	9999.99
03BU	2	89	4	WET	477	195	4.59	1.16	21.89	2.01	9999.99
04AL	2	89	4	WET	468	186	0.36	0.79	27.44	1.17	9999.99
04AU	2	89	4	WET	467	185	0.39	0.86	28.57	1.23	9999.99
04BL	2	89	4	WET	470	188	0.34	0.86	28.69	1.27	9999.99
04BU	2	89	4	WET	469	187	0.36	0.95	22.38	1.21	9999.99
05AL	2	89	4	WET	464	182	2.66	0.58	21.23	1.46	9999.99
05AU	2	89	4	WET	463	181	1.26	0.88	20.75	1.66	9999.99
05BL	2	89	4	WET	466	184	1.52	0.84	20.82	1.69	9999.99
05BU	2	89	4	WET	465	183	0.91	0.91	20.30	1.58	9999.99
06AL	2	89	4	WET	472	190	0.60	0.51	31.56	1.69	9999.99
06AU	2	89	4	WET	471	189	0.53	0.51	29.19	1.50	9999.99
06BL	2	89	4	WET	474	192	0.82	0.43	29.19	1.40	9999.99
06BU	2	89	4	WET	473	191	0.75	0.45	31.56	1.50	9999.99
07AL	2	89	4	WET	596	314	3.40	0.43	27.57	3.58	9999.99
07AU	2	89	4	WET	595	313	2.77	0.49	29.69	3.76	9999.99
07BL	2	89	4	WET	598	316	1.14	0.45	29.32	3.35	9999.99
07BU	2	89	4	WET	597	315	1.10	0.59	28.94	3.58	9999.99
08AL	2	89	4	WET	544	262	2.12	0.43	18.50	1.36	9999.99
08AU	2	89	4	WET	543	261	0.80	0.54	20.25	1.66	9999.99
08BL	2	89	4	WET	546	264	1.88	0.78	21.94	2.03	9999.99
08BU	2	89	4	WET	545	263	0.71	0.63	21.17	1.79	9999.99
09AL	2	89	4	WET	500	218	0.73	1.42	21.46	2.45	9999.99
09AU	2	89	4	WET	499	217	0.63	1.33	22.52	2.61	9999.99
09BL	2	89	4	WET	502	220	0.40	1.26	20.82	2.24	9999.99
09BU	2	89	4	WET	501	219	0.54	1.20	23.89	2.59	9999.99
10AL	2	89	4	WET	484	202	0.56	0.71	23.80	1.79	9999.99
10AU	2	89	4	WET	483	201	0.38	0.71	38.92	1.73	9999.99
10BL	2	89	4	WET	486	204	0.38	0.45	20.41	1.32	9999.99
10BU	2	89	4	WET	485	203	0.33	0.58	20.26	1.93	9999.99
11AL	2	89	4	WET	548	266	6.82	1.66	32.19	2.18	9999.99
11AU	2	89	4	WET	547	265	6.11	1.60	31.19	2.12	9999.99
11BL	2	89	4	WET	550	268	6.58	1.60	22.88	2.10	9999.99
11BU	2	89	4	WET	549	267	7.52	1.76	28.32	2.47	9999.99

Raw Soil Sample Data

For Quarter 2/89

Site	Qtr	Yr	Mn	Sea	Id Num	Lab Num	Na exchg Meq/ 100gm	K exchg Meq/ 100gm	Ca exchg Meq/ 100gm	Mg exchg Meq/ 100gm	Total P ppm
12AL	2	89	4	WET	508	226	2.73	2.65	23.78	1.69	9999.99
12AU	2	89	4	WET	507	225	2.24	2.65	22.70	1.58	9999.99
12BL	2	89	4	WET	510	228	3.48	2.47	23.88	1.62	9999.99
12BU	2	89	4	WET	509	227	3.23	2.47	22.83	1.50	9999.99
13AL	2	89	4	WET	504	222	2.49	0.98	22.93	1.81	9999.99
13AU	2	89	4	WET	503	221	2.49	0.93	28.19	2.01	9999.99
13BL	2	89	4	WET	506	224	2.49	1.27	21.47	1.87	9999.99
13BU	2	89	4	WET	505	223	2.98	1.29	21.27	1.81	9999.99
14AL	2	89	4	WET	496	214	0.54	1.97	21.37	2.36	9999.99
14AU	2	89	4	WET	495	213	0.66	3.89	22.27	3.02	9999.99
14BL	2	89	4	WET	498	216	0.75	4.10	21.18	2.65	9999.99
14BU	2	89	4	WET	497	215	0.78	5.79	23.55	3.27	9999.99
15AL	2	89	4	WET	512	230	0.32	1.35	23.59	1.50	9999.99
15AU	2	89	4	WET	511	229	0.32	1.05	23.52	1.27	9999.99
15BL	2	89	4	WET	514	232	0.30	1.29	23.83	1.40	9999.99
15BU	2	89	4	WET	513	231	0.27	1.02	23.34	1.17	9999.99
16AL	2	89	4	WET	480	198	13.05	1.40	21.13	2.42	9999.99
16AU	2	89	4	WET	479	197	3.14	0.98	18.72	1.38	9999.99
16BL	2	89	4	WET	482	200	8.70	1.51	19.01	1.95	9999.99
16BU	2	89	4	WET	481	199	3.38	1.05	17.38	1.34	9999.99
17AL	2	89	4	WET	576	294	0.35	4.51	26.57	2.84	9999.99
17AU	2	89	4	WET	575	293	0.33	3.48	24.71	2.36	9999.99
17BL	2	89	4	WET	578	296	0.33	4.10	25.82	3.21	9999.99
17BU	2	89	4	WET	577	295	0.33	3.28	27.69	3.06	9999.99
18AL	2	89	4	WET	556	274	0.38	0.66	29.82	1.58	9999.99
18AU	2	89	4	WET	555	273	0.35	0.78	29.57	1.42	9999.99
18BL	2	89	4	WET	558	276	0.38	0.56	29.57	1.62	9999.99
18BU	2	89	4	WET	557	275	0.38	0.68	27.57	1.48	9999.99
19AL	2	89	4	WET	552	270	0.45	3.74	23.54	2.01	9999.99
19AU	2	89	4	WET	551	269	0.38	2.76	22.24	1.60	9999.99
19BL	2	89	4	WET	554	272	0.45	2.95	23.45	1.87	9999.99
19BU	2	89	4	WET	553	271	0.40	1.98	21.06	1.69	9999.99
20AL	2	89	4	WET	456	174	1.90	1.11	18.59	1.81	9999.99
20AU	2	89	4	WET	455	173	1.17	1.25	19.70	1.89	9999.99
20BL	2	89	4	WET	458	176	1.61	1.17	19.50	1.97	9999.99
20BU	2	89	4	WET	457	175	0.80	1.19	18.77	1.77	9999.99
21AL	2	89	4	WET	612	330	2.68	1.31	20.52	2.03	9999.99
21AU	2	89	4	WET	611	329	0.73	0.91	23.47	2.28	9999.99
21BL	2	89	4	WET	614	332	1.52	1.14	21.94	1.99	9999.99
21BU	2	89	4	WET	613	331	0.77	0.91	24.61	2.34	9999.99
22AL	2	89	4	WET	616	334	0.29	0.37	24.23	0.88	9999.99
22AU	2	89	4	WET	615	333	0.29	0.39	23.58	0.92	9999.99
22BL	2	89	4	WET	618	336	0.29	0.29	24.25	0.88	9999.99
22BU	2	89	4	WET	617	335	0.29	0.33	24.13	0.90	9999.99

Raw Soil Sample Data

For Quarter 2/89

Site	Qtr	Yr	Mn	Sea	Id Num	Lab Num	Na exchg Meq/ 100gm	K exchg Meq/ 100gm	Ca exchg Meq/ 100gm	Mg exchg Meq/ 100gm	Total P ppm
23AL	2	89	4	WET	560	278	3.76	0.90	23.32	2.24	9999.99
23AU	2	89	4	WET	559	277	4.47	0.90	23.32	2.47	9999.99
23BL	2	89	4	WET	562	280	4.00	1.08	24.23	2.53	9999.99
23BU	2	89	4	WET	561	279	3.76	0.85	23.00	2.69	9999.99
24AL	2	89	4	WET	604	322	2.68	1.87	27.69	2.42	9999.99
24AU	2	89	4	WET	603	321	1.39	1.61	23.19	1.97	9999.99
24BL	2	89	4	WET	606	324	2.83	1.97	24.86	2.06	9999.99
24BU	2	89	4	WET	605	323	2.34	1.87	24.69	2.01	9999.99
25AL	2	89	4	WET	444	162	3.23	1.51	29.94	3.16	9999.99
25AU	2	89	4	WET	443	161	3.73	1.51	31.44	2.96	9999.99
25BL	2	89	4	WET	446	164	3.48	1.60	24.46	2.71	9999.99
25BU	2	89	4	WET	445	163	3.98	1.51	30.44	3.47	9999.99
26AL	2	89	4	WET	600	318	0.44	0.35	29.44	1.29	9999.99
26AU	2	89	4	WET	599	317	0.34	0.47	28.44	1.34	9999.99
26BL	2	89	4	WET	602	320	0.56	0.35	28.94	1.34	9999.99
26BU	2	89	4	WET	601	319	0.31	0.43	27.69	1.21	9999.99
27AL	2	89	4	WET	460	178	5.47	0.69	19.75	1.03	9999.99
27AU	2	89	4	WET	459	177	2.56	0.98	20.45	1.19	9999.99
27BL	2	89	4	WET	462	180	2.07	0.87	21.32	1.34	9999.99
27BU	2	89	4	WET	461	179	1.48	1.02	21.23	1.38	9999.99
28AL	2	89	4	WET	572	290	4.00	1.21	29.82	1.77	9999.99
28AU	2	89	4	WET	571	289	3.06	1.21	29.07	1.62	9999.99
28BL	2	89	4	WET	574	292	3.76	1.29	30.31	1.91	9999.99
28BU	2	89	4	WET	573	291	3.53	1.43	30.06	1.89	9999.99
30AL	2	89	4	WET	564	282	4.70	1.16	29.19	3.25	9999.99
30AU	2	89	4	WET	563	281	5.64	1.13	35.30	3.47	9999.99
30BL	2	89	4	WET	566	284	5.64	1.16	30.31	3.23	9999.99
30BU	2	89	4	WET	565	283	6.58	1.10	29.94	3.23	9999.99
31AL	2	89	4	WET	628	346	3.22	0.37	19.31	1.01	9999.99
31AU	2	89	4	WET	627	345	3.04	0.39	18.86	1.03	9999.99
31BL	2	89	4	WET	630	348	5.22	0.33	19.37	0.95	9999.99
31BU	2	89	4	WET	629	347	4.72	0.39	19.04	0.95	9999.99
32AL	2	89	4	WET	624	342	5.22	0.20	19.76	1.13	9999.99
32AU	2	89	4	WET	623	341	5.97	0.28	19.57	1.13	9999.99
32BL	2	89	4	WET	626	344	3.57	0.22	19.82	1.15	9999.99
32BU	2	89	4	WET	625	343	3.73	0.24	20.20	1.19	9999.99
33AL	2	89	4	WET	620	338	0.22	0.18	6.29	0.45	9999.99
33AU	2	89	4	WET	619	337	0.22	0.18	6.21	0.43	9999.99
33BL	2	89	4	WET	622	340	0.22	0.14	4.62	0.41	9999.99
33BU	2	89	4	WET	621	339	0.22	0.14	4.92	0.43	9999.99
34AL	2	89	4	WET	580	298	0.28	0.45	25.07	1.05	9999.99
34AU	2	89	4	WET	579	297	0.28	0.54	24.08	1.01	9999.99
34BL	2	89	4	WET	582	300	0.31	0.39	25.20	1.03	9999.99
34BU	2	89	4	WET	581	299	0.28	0.49	26.07	1.15	9999.99

Raw Soil Sample Data

For Quarter 2/89

Site	Qtr	Yr	Mn	Sea	Id Num	Lab Num	Na exchg Meq/ 100gm	K exchg Meq/ 100gm	Ca exchg Meq/ 100gm	Mg exchg Meq/ 100gm	Total P ppm
35AL	2	89	4	WET	584	302	0.24	0.23	11.51	0.55	9999.99
35AU	2	89	4	WET	583	301	0.27	0.25	10.69	0.51	9999.99
35BL	2	89	4	WET	586	304	0.27	0.25	13.16	0.60	9999.99
35BU	2	89	4	WET	585	303	0.24	0.25	13.29	0.62	9999.99
36AL	2	89	4	WET	588	306	1.94	0.69	34.68	1.99	9999.99
36AU	2	89	4	WET	587	305	0.75	1.05	36.18	2.26	9999.99
36BL	2	89	4	WET	590	308	0.60	0.77	33.06	2.16	9999.99
36BU	2	89	4	WET	589	307	0.56	1.02	34.56	2.51	9999.99
37AL	2	89	4	WET	592	310	0.31	0.33	32.31	1.17	9999.99
37AU	2	89	4	WET	591	309	0.29	0.49	24.85	1.11	9999.99
37BL	2	89	4	WET	594	312	0.29	0.33	31.31	1.07	9999.99
37BU	2	89	4	WET	593	311	0.27	0.39	30.56	1.07	9999.99
38AL	2	89	4	WET	536	254	5.22	0.41	35.43	2.69	9999.99
38AU	2	89	4	WET	535	253	2.73	0.49	42.17	3.37	9999.99
38BL	2	89	4	WET	538	256	3.48	0.51	37.05	3.16	9999.99
38BU	2	89	4	WET	537	255	2.49	0.54	38.67	3.14	9999.99
39AL	2	89	4	WET	540	258	3.23	0.61	31.19	2.82	9999.99
39AU	2	89	4	WET	539	257	1.99	0.66	32.93	2.40	9999.99
39BL	2	89	4	WET	542	260	2.49	0.43	30.44	2.59	9999.99
39BU	2	89	4	WET	541	259	1.06	0.51	31.69	2.30	9999.99
40AL	2	89	4	WET	448	166	0.57	0.96	23.54	1.46	9999.99
40AU	2	89	4	WET	447	165	0.50	1.74	24.95	1.69	9999.99
40BL	2	89	4	WET	450	168	0.70	1.17	22.89	1.52	9999.99
40BU	2	89	4	WET	449	167	0.80	1.31	24.04	1.93	9999.99
41AL	2	89	4	WET	608	326	6.53	0.62	23.22	1.42	9999.99
41AU	2	89	4	WET	607	325	1.81	0.78	27.94	1.79	9999.99
41BL	2	89	4	WET	610	328	2.34	0.51	28.19	1.54	9999.99
41BU	2	89	4	WET	609	327	0.87	0.65	24.54	1.62	9999.99
42AL	2	89	4	WET	532	250	0.40	0.30	29.44	1.03	9999.99
42AU	2	89	4	WET	531	249	0.35	0.35	28.69	1.07	9999.99
42BL	2	89	4	WET	534	252	0.37	0.39	29.19	1.15	9999.99
42BU	2	89	4	WET	533	251	0.35	0.39	27.69	1.11	9999.99
43AL	2	89	4	WET	528	246	2.98	0.80	23.02	3.35	9999.99
43AU	2	89	4	WET	527	245	2.98	0.76	25.20	3.31	9999.99
43BL	2	89	4	WET	530	248	2.98	0.63	24.10	3.51	9999.99
43BU	2	89	4	WET	529	247	2.98	0.63	22.64	3.66	9999.99
44AL	2	89	4	WET	452	170	4.72	7.35	22.14	2.73	9999.99
44AU	2	89	4	WET	451	169	0.82	5.57	22.65	2.57	9999.99
44BL	2	89	4	WET	454	172	2.24	6.01	22.69	2.86	9999.99
44BU	2	89	4	WET	453	171	6.71	4.69	23.10	2.45	9999.99
45AL	2	89	4	WET	568	286	9.13	0.67	24.54	1.83	9999.99
45AU	2	89	4	WET	567	285	6.82	0.61	24.24	2.01	9999.99
45BL	2	89	4	WET	570	288	7.52	0.49	24.50	1.89	9999.99
45BU	2	89	4	WET	569	287	6.82	0.67	24.54	2.26	9999.99

Raw Soil Sample Data

For Quarter 3/89

Site	Qr	Yr	Mn	Sea	Id Num	Lab Num	EC x 1000	Solu Salts ppm	pH	Ca ppm	Mg ppm	Na ppm	Cl ppm	SO4 ppm	HCO3 ppm	CO3 ppm	F ppm	NO3-N ppm	Boron ppm	NH4 ppm	PO4-P ppm	k ppm
01AL	3	89	7	DRY	680	450	2.00	1280	8.1	320	19	101	364	50.0	83	-4.8	0.19	127.50	0.46	1.43	1.61	10
01AU	3	89	7	DRY	679	449	2.00	1280	8.1	301	21	70	344	33.0	86	-4.8	0.22	115.00	0.54	2.86	1.61	17
01BL	3	89	7	DRY	682	452	0.56	358	8.5	78	4	56	66	29.0	123	-4.8	0.25	25.00	0.54	1.43	1.29	3
01BU	3	89	7	DRY	681	451	0.60	384	8.4	87	6	39	64	60.0	161	-4.8	0.17	23.13	0.46	2.86	1.78	13
02AL	3	89	7	DRY	676	446	0.92	589	9.4	41	4	263	142	48.0	269	20.0	0.88	21.88	1.23	1.43	1.61	13
02AU	3	89	7	DRY	675	445	0.44	282	8.9	51	6	62	34	30.0	218	-4.8	0.32	4.13	0.69	1.43	2.42	10
02BL	3	89	7	DRY	678	448	0.88	563	9.3	40	3	194	102	-2.5	278	20.0	0.60	5.88	0.77	2.14	2.42	12
02BU	3	89	7	DRY	677	447	0.44	282	8.8	48	4	35	34	23.0	172	-4.8	0.26	6.88	0.38	6.07	2.58	27
03AL	3	89	7	DRY	664	434	3.80	2432	9.4	32	3	914	1028	133.0	178	71.0	12.00	43.75	39.17	4.00	4.84	10
03AU	3	89	7	DRY	663	433	2.00	1280	9.3	29	3	421	492	-2.5	218	28.0	2.90	18.13	4.00	4.00	4.84	12
03BL	3	89	7	DRY	666	436	7.00	4480	9.2	44	5	1949	1920	286.0	143	51.0	9.60	67.50	40.00	4.00	7.27	10
03BU	3	89	7	DRY	665	435	7.40	4736	8.8	81	9	2051	2208	200.0	143	23.0	3.20	80.00	21.25	5.83	6.78	38
04AL	3	89	7	DRY	656	426	0.28	179	8.6	66	5	12	18	-2.5	181	-4.8	0.34	3.38	0.42	5.00	3.07	13
04AU	3	89	7	DRY	655	425	0.30	192	8.6	64	5	12	16	-2.5	181	-4.8	0.48	3.38	0.33	4.00	2.91	13
04BL	3	89	7	DRY	658	428	0.36	230	8.5	67	5	17	22	37.0	161	-4.8	0.27	6.00	0.50	5.00	3.23	18
04BU	3	89	7	DRY	657	427	0.36	230	8.6	67	5	18	20	-2.5	189	-4.8	0.35	4.75	0.42	6.67	4.20	20
05AL	3	89	7	DRY	652	422	0.62	397	9.1	37	3	129	36	-2.5	272	6.0	9.20	6.13	1.67	3.00	3.23	10
05AU	3	89	7	DRY	651	421	0.52	333	9.0	34	4	97	38	-2.5	255	3.0	5.20	6.13	1.25	4.00	3.23	15
05BL	3	89	7	DRY	654	424	0.60	384	8.8	44	4	97	36	-2.5	258	3.0	4.60	11.25	1.25	5.00	3.87	18
05BU	3	89	7	DRY	653	423	0.44	282	8.9	41	4	72	20	-2.5	229	3.0	4.20	7.19	1.25	3.00	3.71	22
06AL	3	89	7	DRY	660	430	0.30	192	8.7	57	4	31	16	-2.5	183	-4.8	0.25	3.75	0.83	5.83	3.39	3
06AU	3	89	7	DRY	659	429	0.28	179	8.7	50	4	30	16	-2.5	178	-4.8	0.24	3.88	0.50	7.50	3.23	5
06BL	3	89	7	DRY	662	432	0.44	282	9.2	47	3	100	20	-2.5	298	17.0	0.52	3.25	0.67	5.00	3.87	-1
06BU	3	89	7	DRY	661	431	0.32	205	8.6	55	4	35	14	6.0	206	-4.8	0.25	3.50	0.67	6.67	3.71	5
07AL	3	89	7	DRY	780	550	1.40	896	9.0	36	5	318	268	123.0	195	6.0	4.00	24.38	2.43	2.50	2.74	7
07AU	3	89	7	DRY	779	549	0.92	589	9.0	35	4	215	106	48.0	247	3.0	2.80	20.63	1.71	3.75	3.71	10
07BL	3	89	7	DRY	782	552	0.46	294	8.8	39	5	74	32	-2.5	235	-4.8	2.30	6.88	0.64	3.75	3.23	8
07BU	3	89	7	DRY	781	551	0.52	333	8.7	43	6	72	36	-2.5	267	-4.8	1.55	11.25	0.64	3.75	3.87	15
08AL	3	89	7	DRY	804	574	1.50	960	9.6	28	3	344	304	99.0	218	31.0	0.84	8.13	2.00	2.50	2.58	13
08AU	3	89	7	DRY	803	573	0.64	410	9.3	31	4	22	100	2.0	189	11.0	0.66	5.50	0.64	-2.50	3.55	15
08BL	3	89	7	DRY	806	576	1.20	768	9.5	28	3	278	232	49.0	212	25.0	0.62	6.25	1.50	0.83	2.58	15
08BU	3	89	7	DRY	805	575	0.34	218	9.1	36	3	39	28	-2.5	166	6.0	0.37	3.88	0.36	-2.50	3.87	18
09AL	3	89	7	DRY	688	458	0.44	282	8.8	53	6	62	60	20.0	161	6.0	0.30	7.19	0.62	-2.50	2.74	25
09AU	3	89	7	DRY	687	457	0.36	230	8.7	61	6	29	62	-2.5	235	-4.8	0.22	4.50	0.69	-2.50	2.91	25
09BL	3	89	7	DRY	690	460	0.44	282	9.2	43	5	60	24	7.0	212	-4.8	0.31	6.88	1.23	-2.50	3.39	44
09BU	3	89	7	DRY	689	459	0.44	282	8.7	68	8	33	26	22.0	172	6.0	0.18	10.00	0.85	0.71	4.52	33
10AL	3	89	7	DRY	672	442	0.50	320	8.7	62	7	54	64	29.0	149	-4.8	0.66	11.88	0.54	0.71	0.97	13
10AU	3	89	7	DRY	671	441	0.30	192	8.8	60	5	16	18	-2.5	155	-4.8	0.46	4.00	0.31	0.71	1.78	18
10BL	3	89	7	DRY	674	444	0.28	179	8.7	57	5	27	24	-2.5	155	-4.8	0.58	4.75	0.38	1.43	1.29	10
10BU	3	89	7	DRY	673	443	0.28	179	8.6	65	5	15	24	-2.5	161	-4.8	0.42	4.13	0.23	0.71	1.94	17
11AL	3	89	7	DRY	808	578	1.26	806	8.6	47	3	256	194	129.0	241	3.0	14.00	6.56	1.71	1.67	0.81	18
11AU	3	89	7	DRY	807	577	1.00	640	8.8	39	3	211	108	120.0	255	6.0	12.00	5.38	1.57	0.83	1.13	15
11BL	3	89	7	DRY	810	580	0.88	563	8.8	40	3	211	78	71.0	269	6.0	13.00	4.75	1.79	-2.50	0.97	15
11BU	3	89	7	DRY	809	579	0.76	486	8.9	38	5	152	64	4.0	271	6.0	12.00	4.56	1.43	2.50	1.13	15

Raw Soil Sample Data

For Quarter 3/89

Site	Qr	Yr	Mn	Sea	Id Num	Lab Num	EC x 1000	Solu Salts ppm	pH	Ca ppm	Mg ppm	Na ppm	Cl ppm	SO4 ppm	HCO3 ppm	CO3 ppm	F ppm	NO3-N ppm	Boron ppm	NH4 ppm	PO4-P ppm	k ppm
12AL	3	89	7	DRY	692	462	1.04	666	8.7	54	4	194	116	16.0	333	-4.8	7.00	13.75	1.43	5.00	3.55	35
12AU	3	89	7	DRY	691	461	0.80	512	8.9	53	6	156	80	-2.5	361	-4.8	6.80	10.00	1.43	5.75	3.71	47
12BL	3	89	7	DRY	694	464	0.78	499	8.8	57	5	136	66	-2.5	315	-4.8	9.80	5.50	1.14	3.00	2.91	27
12BU	3	89	7	DRY	693	463	1.04	666	8.8	60	5	194	116	16.0	333	-4.8	5.60	5.75	1.43	4.00	4.04	32
13AL	3	89	7	DRY	800	570	0.98	627	8.8	38	4	211	118	64.0	247	6.0	14.00	5.38	1.43	2.50	0.97	18
13AU	3	89	7	DRY	799	569	1.00	640	8.7	39	3	222	124	64.0	264	3.0	12.00	4.50	1.00	4.17	1.13	18
13BL	3	89	7	DRY	802	572	0.96	614	8.6	41	4	211	98	59.0	235	6.0	12.00	15.00	1.29	-2.50	1.29	23
13BU	3	89	7	DRY	801	571	0.98	627	8.8	39	5	233	102	104.0	310	6.0	13.00	9.38	1.36	-2.50	1.29	23
14AL	3	89	7	DRY	684	454	0.64	410	8.5	69	8	56	42	41.0	149	-4.8	0.24	33.75	0.62	1.43	2.26	45
14AU	3	89	7	DRY	683	453	0.92	589	8.5	67	8	50	48	93.0	166	-4.8	0.17	53.75	1.15	2.86	2.91	120
14BL	3	89	7	DRY	686	456	0.56	358	8.7	39	3	70	36	3.0	261	-4.8	0.32	13.75	1.00	2.14	3.55	58
14BU	3	89	7	DRY	685	455	1.04	666	8.7	51	5	101	56	190.0	235	6.0	0.18	50.00	1.92	1.43	3.87	142
15AL	3	89	7	DRY	700	470	0.28	179	8.7	64	4	9	16	18.0	138	-4.8	0.48	3.88	0.29	1.00	1.61	29
15AU	3	89	7	DRY	699	469	0.32	205	8.7	60	4	8	18	-2.5	155	-4.8	0.29	4.00	0.29	2.00	1.61	14
15BL	3	89	7	DRY	702	472	0.30	192	8.8	58	4	9	16	-2.5	161	-4.8	0.76	3.38	0.50	2.00	1.94	29
15BU	3	89	7	DRY	701	471	0.32	205	8.7	66	4	8	18	-2.5	186	-4.8	0.35	3.63	0.29	2.00	2.74	27
16AL	3	89	7	DRY	668	438	6.80	4352	9.3	42	5	1949	1552	457.0	201	76.0	3.30	150.00	46.67	4.00	6.62	70
16AU	3	89	7	DRY	667	437	3.80	2432	9.0	47	5	779	880	122.0	135	25.0	0.98	85.00	12.08	4.00	6.46	51
16BL	3	89	7	DRY	670	440	6.00	3840	9.3	40	4	1378	1436	248.0	204	62.0	2.15	125.00	35.00	4.00	6.78	50
16BU	3	89	7	DRY	669	439	2.30	1472	9.0	44	4	390	540	22.0	123	8.0	0.58	52.50	1.92	5.00	6.78	40
17AL	3	89	7	DRY	760	530	0.76	486	8.5	87	12	18	22	-2.5	298	-4.8	0.20	32.50	1.54	-2.50	11.95	107
17AU	3	89	7	DRY	759	529	0.60	384	8.5	92	10	13	28	-2.5	344	-4.8	0.30	15.00	1.31	7.00	13.56	98
17BL	3	89	7	DRY	762	532	0.60	384	8.5	83	12	13	18	-2.5	281	-4.8	0.16	28.75	1.23	2.50	6.46	98
17BU	3	89	7	DRY	761	531	0.80	512	8.4	103	15	12	30	-2.5	310	-4.8	0.17	38.75	1.38	5.00	14.85	89
18AL	3	89	7	DRY	816	586	0.30	192	8.6	58	4	16	10	-2.5	186	-4.8	0.50	2.31	0.43	2.14	0.97	7
18AU	3	89	7	DRY	815	585	0.30	192	8.7	55	4	15	8	-2.5	183	-4.8	0.44	2.56	0.43	2.86	0.97	10
18BL	3	89	7	DRY	818	588	0.28	179	8.6	60	4	15	12	-2.5	181	-4.8	0.38	2.38	0.43	2.14	0.97	5
18BU	3	89	7	DRY	817	587	0.28	179	8.6	58	4	13	12	-2.5	195	-4.8	0.28	2.31	0.43	2.14	1.29	12
19AL	3	89	7	DRY	812	582	0.40	256	8.9	45	5	18	14	-2.5	224	6.0	0.58	2.75	0.93	1.43	1.94	64
19AU	3	89	7	DRY	811	581	0.42	269	8.6	51	6	17	12	-2.5	235	-4.8	0.32	3.13	0.43	2.86	2.26	51
19BL	3	89	7	DRY	814	584	0.44	282	9.0	43	5	23	12	-2.5	244	6.0	0.73	2.50	0.79	1.43	1.78	78
19BU	3	89	7	DRY	813	583	0.36	230	8.8	46	5	21	12	-2.5	247	-4.8	0.38	2.44	0.64	2.86	2.10	56
20AL	3	89	7	DRY	644	414	0.60	384	9.6	44	13	136	32	15.0	310	39.0	11.50	3.00	2.42	5.00	3.23	22
20AU	3	89	7	DRY	643	413	0.40	256	9.3	34	5	72	24	-2.5	206	17.0	0.38	3.13	0.92	5.00	3.23	26
20BL	3	89	7	DRY	646	416	0.36	230	9.1	40	5	48	28	9.0	189	8.0	3.70	3.13	0.83	5.38	3.23	32
20BU	3	89	7	DRY	645	415	0.44	282	8.9	46	6	58	18	5.0	264	3.0	2.70	3.63	0.79	5.75	3.55	35
21AL	3	89	7	DRY	792	562	1.10	704	9.6	26	3	267	168	34.0	278	34.0	0.46	4.69	1.21	4.17	2.26	18
21AU	3	89	7	DRY	791	561	0.36	230	9.1	33	4	50	24	-2.5	183	6.0	0.25	3.13	0.29	0.83	2.91	17
21BL	3	89	7	DRY	794	564	1.00	640	9.7	26	4	256	144	4.0	252	42.0	0.38	6.13	0.79	1.67	1.94	27
21BU	3	89	7	DRY	793	563	0.32	205	9.2	31	3	40	14	-2.5	169	8.0	0.25	2.63	0.29	0.83	3.07	18
22AL	3	89	7	DRY	796	566	0.24	154	8.8	49	3	11	16	-2.5	129	-4.8	0.60	2.75	0.29	1.67	0.65	3
22AU	3	89	7	DRY	795	565	0.24	154	8.7	50	3	10	16	-2.5	132	-4.8	0.33	3.13	0.36	-2.50	0.65	7
22BL	3	89	7	DRY	798	568	0.24	154	8.7	51	3	11	16	1.0	132	-4.8	0.27	2.50	0.29	1.67	0.48	5
22BU	3	89	7	DRY	797	567	0.24	154	8.7	48	3	10	16	-2.5	138	-4.8	0.23	2.75	0.29	-2.50	0.81	8

Raw Soil Sample Data

For Quarter 3/89

Site	Qr	Yr	Mn	Sea	Id Num	Lab Num	EC x 1000	Solu Salts ppm	pH	Ca ppm	Mg ppm	Na ppm	Cl ppm	SO4 ppm	HCO3 ppm	CO3 ppm	F ppm	NO3-N ppm	Boron ppm	NH4 ppm	PO4-P ppm	k ppm
23AL	3	89	7	DRY	744	514	0.84	538	8.8	40	4	140	72	29.0	287	-4.8	12.00	4.75	1.31	2.86	1.94	7
23AU	3	89	7	DRY	743	513	0.78	499	9.0	36	4	152	64	45.0	292	6.0	9.60	4.31	1.46	4.29	1.78	7
23BL	3	89	7	DRY	746	516	0.88	563	8.8	42	4	156	76	44.0	281	8.0	13.00	4.63	1.46	3.57	1.61	5
23BU	3	89	7	DRY	745	515	1.00	640	8.9	37	3	229	108	49.0	267	8.0	8.40	12.50	1.38	3.57	1.61	5
24AL	3	89	7	DRY	696	466	1.00	640	8.7	50	4	156	114	35.0	255	3.0	5.20	20.63	1.07	4.00	1.94	24
24AU	3	89	7	DRY	695	465	0.80	512	8.7	46	4	124	80	24.0	241	-4.8	3.40	15.63	0.86	5.75	2.74	38
24BL	3	89	7	DRY	698	468	1.00	640	8.7	59	5	148	124	65.0	235	-4.8	4.20	19.38	1.00	4.00	1.94	32
24BU	3	89	7	DRY	697	467	1.10	704	8.5	68	6	152	188	72.0	218	3.0	2.70	13.75	0.93	5.75	2.26	44
25AL	3	89	7	DRY	636	406	2.60	1664	8.2	244	36	318	328	352.0	95	-4.8	1.35	125.00	0.83	4.17	1.78	22
25AU	3	89	7	DRY	635	405	1.50	960	8.1	349	50	365	466	384.0	258	-4.8	0.86	195.00	1.08	3.33	2.58	37
25BL	3	89	7	DRY	638	408	2.20	1408	8.3	198	29	294	274	440.0	86	-4.8	1.60	80.00	1.08	4.17	1.61	19
25BU	3	89	7	DRY	637	407	3.30	2112	8.1	368	54	376	504	618.0	77	-4.8	1.10	160.00	1.08	3.33	1.61	34
26AL	3	89	7	DRY	788	558	0.36	230	8.8	44	3	48	44	25.0	155	-4.8	0.36	3.31	0.36	1.25	0.81	2
26AU	3	89	7	DRY	787	557	0.26	166	8.7	48	4	13	22	1.0	143	-4.8	0.29	3.25	0.36	2.50	0.81	3
26BL	3	89	7	DRY	790	560	0.26	166	8.7	54	4	22	16	-2.5	172	-4.8	0.50	3.13	0.29	2.50	1.94	5
26BU	3	89	7	DRY	789	559	0.24	154	8.7	52	3	18	12	-2.5	166	-4.8	0.35	3.13	0.36	2.50	2.10	8
27AL	3	89	7	DRY	648	418	1.80	1152	9.5	36	3	460	192	223.0	330	39.0	20.00	18.75	8.00	5.38	1.94	8
27AU	3	89	7	DRY	647	417	0.98	627	9.4	33	4	247	72	8.0	347	23.0	11.00	11.88	4.50	5.00	1.61	13
27BL	3	89	7	DRY	650	420	0.66	422	9.4	33	5	132	26	4.0	333	25.0	8.40	4.88	1.75	5.38	1.78	10
27BU	3	89	7	DRY	649	419	0.54	346	9.2	37	5	108	16	-2.5	287	23.0	5.40	4.00	1.92	5.75	2.58	13
28AL	3	89	7	DRY	756	526	0.68	435	9.2	31	3	148	58	56.0	258	11.0	2.40	8.13	0.77	2.50	0.97	8
28AU	3	89	7	DRY	755	525	0.52	333	9.2	32	4	108	28	-2.5	281	11.0	2.40	5.00	1.00	-2.50	1.78	11
28BL	3	89	7	DRY	758	528	0.60	384	9.2	32	3	128	28	58.0	264	11.0	2.65	6.88	1.38	-2.50	0.97	6
28BU	3	89	7	DRY	757	527	0.48	307	9.3	35	5	108	18	-2.5	278	14.0	2.60	4.50	1.15	-2.50	1.61	13
30AL	3	89	7	DRY	748	518	1.40	896	9.1	38	3	343	164	231.0	298	14.0	9.80	3.88	2.08	3.57	0.32	5
30AU	3	89	7	DRY	747	517	1.00	640	9.1	33	3	229	84	81.0	301	17.0	8.40	3.38	1.69	3.57	0.97	5
30BL	3	89	7	DRY	750	520	1.30	832	9.1	32	3	286	150	143.0	269	14.0	6.40	5.50	1.85	2.86	0.48	5
30BU	3	89	7	DRY	749	519	1.30	832	8.8	43	4	297	160	131.0	252	8.0	6.00	15.00	2.00	2.86	0.81	8
31AL	3	89	7	DRY	740	510	1.80	1152	9.1	34	3	389	248	260.0	269	8.0	6.80	20.00	2.85	3.57	1.61	7
31AU	3	89	7	DRY	739	509	1.70	1088	9.1	35	3	366	236	279.0	304	8.0	5.20	21.88	2.85	3.57	1.94	10
31BL	3	89	7	DRY	742	512	1.60	1024	9.3	31	3	354	168	210.0	333	14.0	8.40	17.50	3.38	3.57	1.94	8
31BU	3	89	7	DRY	741	511	1.60	1024	9.2	32	3	366	200	285.0	315	14.0	6.20	24.38	3.62	3.57	1.94	12
32AL	3	89	7	DRY	736	506	1.30	832	9.2	30	3	297	134	111.0	338	11.0	7.80	21.88	2.46	2.14	1.13	3
32AU	3	89	7	DRY	735	505	1.30	832	9.3	29	3	320	128	103.0	356	17.0	8.60	25.00	2.62	3.57	1.61	3
32BL	3	89	7	DRY	738	508	1.40	896	9.4	29	3	331	140	115.0	333	25.0	11.00	19.38	3.00	2.86	1.29	3
32BU	3	89	7	DRY	737	507	1.40	896	9.3	29	3	343	136	116.0	367	23.0	9.00	28.75	3.38	2.86	1.29	3
33AL	3	89	7	DRY	732	502	0.18	115	8.8	42	3	7	12	-2.5	109	-4.8	0.17	2.06	0.15	3.57	4.20	10
33AU	3	89	7	DRY	731	501	0.18	115	8.8	45	5	9	16	-2.5	92	-4.8	0.18	2.19	0.08	5.00	5.49	12
33BL	3	89	7	DRY	734	504	0.18	115	8.8	44	3	8	14	-2.5	106	-4.8	0.15	2.19	0.15	3.57	4.20	10
33BU	3	89	7	DRY	733	503	0.18	115	8.8	41	3	7	12	-2.5	97	-4.8	0.15	2.00	0.08	3.57	5.49	8
34AL	3	89	7	DRY	764	534	0.24	154	8.7	54	3	11	18	3.0	138	-4.8	0.23	2.88	0.23	-2.50	0.32	3
34AU	3	89	7	DRY	763	533	0.26	166	8.6	55	4	9	18	-2.5	161	-4.8	0.19	3.63	0.23	-2.50	0.97	8
34BL	3	89	7	DRY	766	536	0.26	166	8.6	58	3	10	12	1.0	149	-4.8	0.22	3.50	0.23	-2.50	0.97	5
34BU	3	89	7	DRY	765	535	0.28	179	8.6	60	4	10	16	-2.5	155	-4.8	0.20	3.88	0.08	-2.50	0.97	8

Raw Soil Sample Data

For Quarter 3/89

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35AL	3	89	7	DRY	768	538	0.20	128	8.7	47	2	8	14	-2.5	115	-4.8	0.23	3.50	0.15	-2.50	2.42	6
35AU	3	89	7	DRY	767	537	0.22	141	8.5	46	3	11	16	1.0	118	-4.8	0.14	3.56	0.31	-2.50	5.81	16
35BL	3	89	7	DRY	770	540	0.18	115	8.8	44	2	8	14	-2.5	106	-4.8	0.22	2.63	0.15	-2.50	2.42	6
35BU	3	89	7	DRY	769	539	0.22	141	8.5	45	2	8	18	-2.5	103	-4.8	0.15	3.50	0.08	-2.50	5.17	16
36AL	3	89	7	DRY	772	542	1.30	832	8.5	71	6	226	212	47.0	143	-4.8	0.50	37.50	1.64	1.25	0.81	7
36AU	3	89	7	DRY	771	541	0.40	256	8.6	56	4	32	46	28.0	143	-4.8	0.21	8.75	0.36	1.25	0.97	10
36BL	3	89	7	DRY	774	544	0.32	205	9.0	33	2	62	20	1.0	201	3.0	0.40	4.00	0.36	2.50	0.97	3
36BU	3	89	7	DRY	773	543	0.34	218	8.7	49	4	31	30	29.0	158	-4.8	0.24	5.63	0.36	2.50	0.97	10
37AL	3	89	7	DRY	776	546	0.28	179	8.6	60	3	15	20	-2.5	155	-4.8	0.29	3.88	0.43	2.50	0.81	2
37AU	3	89	7	DRY	775	545	0.34	218	8.6	69	4	12	38	36.0	175	-4.8	0.24	5.31	0.43	2.50	1.61	10
37BL	3	89	7	DRY	778	548	0.36	230	8.5	69	4	16	34	34.0	172	-4.8	0.21	5.13	0.36	3.75	1.61	5
37BU	3	89	7	DRY	777	547	0.34	218	8.6	65	4	11	24	25.0	166	-4.8	0.21	4.88	0.36	2.50	1.61	12
38AL	3	89	7	DRY	728	498	1.44	922	9.6	32	2	363	160	134.0	351	81.0	2.90	9.38	2.71	-2.50	2.42	2
38AU	3	89	7	DRY	727	497	0.64	410	9.5	33	3	130	40	-2.5	284	31.0	0.41	4.63	0.64	-2.50	1.94	3
38BL	3	89	7	DRY	730	500	0.66	422	9.5	33	4	147	34	-2.5	304	48.0	0.47	4.75	0.79	-2.50	2.58	2
38BU	3	89	7	DRY	729	499	0.44	282	9.3	34	3	94	16	-2.5	235	23.0	0.42	3.31	0.57	-2.50	2.91	3
39AL	3	89	7	DRY	724	494	1.10	704	9.0	37	3	288	284	49.0	166	11.0	0.24	8.75	1.50	-2.50	1.61	5
39AU	3	89	7	DRY	723	493	0.60	384	8.9	41	3	97	92	17.0	172	3.0	0.17	4.88	0.50	-2.50	1.94	7
39BL	3	89	7	DRY	726	496	0.70	448	9.0	35	3	127	86	44.0	206	6.0	0.35	6.25	0.86	0.83	1.78	5
39BU	3	89	7	DRY	725	495	0.40	256	8.9	40	3	59	28	20.0	172	3.0	0.24	4.38	0.50	0.83	1.61	7
40AL	3	89	7	DRY	640	410	0.44	282	8.6	71	5	32	20	96.0	155	-4.8	0.33	4.13	0.58	4.17	1.94	18
40AU	3	89	7	DRY	639	409	0.44	282	8.7	71	5	29	14	75.0	195	-4.8	0.28	4.25	0.75	5.00	1.94	30
40BL	3	89	7	DRY	642	412	0.28	179	8.7	53	5	28	12	-2.5	178	-4.8	0.37	4.38	0.29	5.00	2.26	14
40BU	3	89	7	DRY	641	411	0.30	192	8.7	56	6	35	12	-2.5	224	-4.8	0.35	3.38	0.58	5.38	1.61	19
41AL	3	89	7	DRY	784	554	2.40	1536	9.0	36	3	500	622	112.0	138	20.0	1.75	23.75	7.14	1.25	0.48	10
41AU	3	89	7	DRY	783	553	1.50	960	8.5	81	8	246	364	11.0	126	-4.8	0.35	13.75	0.79	2.50	0.81	20
41BL	3	89	7	DRY	786	556	2.60	1664	8.6	65	5	540	740	63.0	140	-4.8	0.30	20.00	2.50	2.50	0.48	12
41BU	3	89	7	DRY	785	555	0.96	614	8.4	79	7	91	200	10.0	132	-4.8	0.30	9.38	0.57	2.50	0.65	17
42AL	3	89	7	DRY	720	490	0.30	192	8.6	64	4	13	14	-2.5	178	-4.8	0.30	3.38	0.43	-2.50	0.97	9
42AU	3	89	7	DRY	719	489	0.32	205	8.6	64	4	33	16	3.0	183	-4.8	0.34	3.75	0.43	0.83	1.29	14
42BL	3	89	7	DRY	722	492	0.28	179	8.6	62	4	11	16	1.0	178	-4.8	0.19	2.88	0.36	-2.50	0.81	7
42BU	3	89	7	DRY	721	491	0.28	179	8.6	56	3	14	22	-2.5	161	-4.8	0.21	4.00	0.36	-2.50	0.81	7
43AL	3	89	7	DRY	716	486	1.40	896	8.8	58	8	275	210	233.0	301	-4.8	1.55	7.19	1.57	1.67	3.23	7
43AU	3	89	7	DRY	715	485	1.50	960	8.6	61	12	275	220	183.0	304	-4.8	1.65	15.00	2.14	4.17	3.87	9
43BL	3	89	7	DRY	718	488	1.60	1024	8.7	65	13	338	282	283.0	315	-4.8	1.60	12.50	2.50	5.68	2.91	9
43BU	3	89	7	DRY	717	487	1.40	896	8.6	66	14	288	240	183.0	304	-4.8	1.60	15.00	2.29	5.68	4.84	12
44AL	3	89	7	DRY	632	402	1.60	1024	9.1	39	5	318	268	71.0	229	17.0	0.37	45.00	2.67	3.33	2.91	92
44AU	3	89	7	DRY	631	401	0.46	294	9.1	51	9	52	28	-2.5	261	8.0	0.30	4.50	0.75	5.00	4.04	66
44BL	3	89	7	DRY	634	404	0.74	474	9.1	41	5	111	96	29.0	226	6.0	0.36	15.00	1.04	3.33	3.23	43
44BU	3	89	7	DRY	633	403	0.36	230	8.9	47	6	25	28	2.0	198	3.0	0.26	5.25	0.46	3.33	2.58	64
45AL	3	89	7	DRY	752	522	1.80	1152	9.5	24	2	389	234	112.0	350	42.0	18.00	15.00	1.77	-2.50	0.65	2
45AU	3	89	7	DRY	751	521	1.10	704	9.5	26	3	270	68	19.0	482	6.0	12.00	4.38	1.69	-2.50	0.97	3
45BL	3	89	7	DRY	754	524	2.90	1856	9.2	29	2	680	428	575.0	264	20.0	11.00	27.50	4.38	-2.50	0.32	5
45BU	3	89	7	DRY	753	523	1.40	896	9.3	28	3	346	174	90.0	393	23.0	9.80	21.25	2.54	5.00	0.81	5

Raw Soil Sample Data

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Site	Qtr	Yr	Mn	Sea	Id Num	Lab Num	Na exchg Meq/ 100gm	K exchg Meq/ 100gm	Ca exchg Meq/ 100gm	Mg exchg Meq/ 100gm	Total P ppm
01AL	3	89	7	DRY	680	450	0.87	0.54	37.55	1.89	9999.99
01AU	3	89	7	DRY	679	449	0.66	0.72	36.30	2.03	9999.99
01BL	3	89	7	DRY	682	452	0.73	0.54	36.43	1.60	9999.99
01BU	3	89	7	DRY	681	451	0.55	0.93	35.18	1.91	9999.99
02AL	3	89	7	DRY	676	446	3.13	1.16	23.76	2.57	9999.99
02AU	3	89	7	DRY	675	445	0.78	1.51	31.69	2.88	9999.99
02BL	3	89	7	DRY	678	448	1.99	1.27	28.94	2.92	9999.99
02BU	3	89	7	DRY	677	447	0.50	1.24	23.32	2.30	9999.99
03AL	3	89	7	DRY	664	434	10.00	0.93	19.50	1.71	9999.99
03AU	3	89	7	DRY	663	433	6.04	1.00	20.68	1.73	9999.99
03BL	3	89	7	DRY	666	436	13.49	0.95	19.27	1.64	9999.99
03BU	3	89	7	DRY	665	435	13.05	1.19	22.98	2.06	9999.99
04AL	3	89	7	DRY	656	426	0.31	0.78	30.69	1.27	9999.99
04AU	3	89	7	DRY	655	425	0.31	0.83	30.94	1.32	9999.99
04BL	3	89	7	DRY	658	428	0.36	0.95	30.31	1.36	9999.99
04BU	3	89	7	DRY	657	427	0.36	1.11	31.56	1.46	9999.99
05AL	3	89	7	DRY	652	422	1.65	0.76	22.97	1.71	9999.99
05AU	3	89	7	DRY	651	421	1.22	1.00	22.64	1.91	9999.99
05BL	3	89	7	DRY	654	424	1.09	0.95	21.76	1.75	9999.99
05BU	3	89	7	DRY	653	423	0.87	1.17	22.36	1.87	9999.99
06AL	3	89	7	DRY	660	430	0.56	0.40	33.31	1.60	9999.99
06AU	3	89	7	DRY	659	429	0.56	0.51	38.17	1.60	9999.99
06BL	3	89	7	DRY	662	432	2.11	0.29	33.18	1.52	9999.99
06BU	3	89	7	DRY	661	431	0.58	0.49	32.43	1.58	9999.99
07AL	3	89	7	DRY	780	550	3.23	0.47	24.50	3.84	9999.99
07AU	3	89	7	DRY	779	549	2.21	0.63	23.93	3.39	9999.99
07BL	3	89	7	DRY	782	552	1.16	0.51	24.53	3.02	9999.99
07BU	3	89	7	DRY	781	551	0.99	0.66	24.46	3.12	9999.99
08AL	3	89	7	DRY	804	574	4.23	0.85	17.39	1.11	9999.99
08AU	3	89	7	DRY	803	573	1.53	0.93	19.22	1.48	9999.99
08BL	3	89	7	DRY	806	576	3.01	0.90	15.86	1.17	9999.99
08BU	3	89	7	DRY	805	575	0.57	0.68	18.60	1.62	9999.99
09AL	3	89	7	DRY	688	458	0.73	1.29	23.05	2.53	9999.99
09AU	3	89	7	DRY	687	457	0.46	1.32	24.00	2.45	9999.99
09BL	3	89	7	DRY	690	460	0.85	2.46	22.16	2.71	9999.99
09BU	3	89	7	DRY	689	459	0.50	1.43	24.54	2.73	9999.99
10AL	3	89	7	DRY	672	442	0.69	0.72	24.61	2.22	9999.99
10AU	3	89	7	DRY	671	441	0.32	0.74	23.71	1.77	9999.99
10BL	3	89	7	DRY	674	444	0.41	0.58	24.63	1.58	9999.99
10BU	3	89	7	DRY	673	443	0.30	0.63	22.87	1.50	9999.99
11AL	3	89	7	DRY	808	578	3.16	1.64	23.07	1.52	9999.99
11AU	3	89	7	DRY	807	577	2.93	1.54	23.04	1.46	9999.99
11BL	3	89	7	DRY	810	580	2.77	1.60	23.42	1.52	9999.99
11BU	3	89	7	DRY	809	579	2.93	1.64	23.39	1.56	9999.99

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Site	Qtr	Yr	Mn	Sea	Id Num	Lab Num	Na exchg Meq/ 100gm	K exchg Meq/ 100gm	Ca exchg Meq/ 100gm	Mg exchg Meq/ 100gm	Total P ppm
12AL	3	89	7	DRY	692	462	2.61	3.12	24.09	1.69	9999.99
12AU	3	89	7	DRY	691	461	2.55	2.89	23.52	1.66	9999.99
12BL	3	89	7	DRY	694	464	2.61	3.12	24.58	1.66	9999.99
12BU	3	89	7	DRY	693	463	2.49	2.89	32.19	1.77	9999.99
13AL	3	89	7	DRY	800	570	2.69	1.91	23.65	2.65	9999.99
13AU	3	89	7	DRY	799	569	2.54	1.74	22.99	2.14	9999.99
13BL	3	89	7	DRY	802	572	2.10	1.77	22.54	2.16	9999.99
13BU	3	89	7	DRY	801	571	2.77	1.95	23.02	2.24	9999.99
14AL	3	89	7	DRY	684	454	0.69	2.05	24.08	2.67	9999.99
14AU	3	89	7	DRY	683	453	0.60	3.69	29.82	3.23	9999.99
14BL	3	89	7	DRY	686	456	0.99	2.87	22.67	2.45	9999.99
14BU	3	89	7	DRY	685	455	1.04	4.71	24.46	3.53	9999.99
15AL	3	89	7	DRY	700	470	0.27	0.70	24.75	1.42	9999.99
15AU	3	89	7	DRY	699	469	0.25	0.79	24.74	1.27	9999.99
15BL	3	89	7	DRY	702	472	0.30	1.63	28.19	1.46	9999.99
15BU	3	89	7	DRY	701	471	0.25	1.17	24.65	1.23	9999.99
16AL	3	89	7	DRY	668	438	13.49	1.63	24.75	2.30	9999.99
16AU	3	89	7	DRY	667	437	6.53	1.14	21.38	1.64	9999.99
16BL	3	89	7	DRY	670	440	13.49	1.63	22.58	2.18	9999.99
16BU	3	89	7	DRY	669	439	3.29	1.14	19.92	1.40	9999.99
17AL	3	89	7	DRY	760	530	0.45	5.12	30.69	3.08	9999.99
17AU	3	89	7	DRY	759	529	0.37	4.05	30.81	2.63	9999.99
17BL	3	89	7	DRY	762	532	0.37	4.48	24.30	3.41	9999.99
17BU	3	89	7	DRY	761	531	0.35	3.20	31.06	3.51	9999.99
18AL	3	89	7	DRY	816	586	0.37	0.65	30.81	1.60	9999.99
18AU	3	89	7	DRY	815	585	0.35	0.77	30.69	1.48	9999.99
18BL	3	89	7	DRY	818	588	0.35	0.54	30.94	1.64	9999.99
18BU	3	89	7	DRY	817	587	0.32	0.72	29.44	1.46	9999.99
19AL	3	89	7	DRY	812	582	0.42	3.63	23.65	1.95	9999.99
19AU	3	89	7	DRY	811	581	0.37	2.05	22.09	1.75	9999.99
19BL	3	89	7	DRY	814	584	0.50	4.27	22.79	2.03	9999.99
19BU	3	89	7	DRY	813	583	0.37	2.56	21.24	1.79	9999.99
20AL	3	89	7	DRY	644	414	2.07	1.31	23.38	2.32	9999.99
20AU	3	89	7	DRY	643	413	1.00	1.18	20.27	1.85	9999.99
20BL	3	89	7	DRY	646	416	0.74	1.25	21.06	2.03	9999.99
20BU	3	89	7	DRY	645	415	0.66	1.18	20.23	1.83	9999.99
21AL	3	89	7	DRY	792	562	2.93	1.26	18.94	1.56	9999.99
21AU	3	89	7	DRY	791	561	0.75	0.90	19.81	1.69	9999.99
21BL	3	89	7	DRY	794	564	3.16	1.91	18.64	1.62	9999.99
21BU	3	89	7	DRY	793	563	0.67	0.98	20.36	1.83	9999.99
22AL	3	89	7	DRY	796	566	0.27	0.41	20.96	0.72	9999.99
22AU	3	89	7	DRY	795	565	0.27	0.36	20.43	0.74	9999.99
22BL	3	89	7	DRY	798	568	0.27	0.32	21.29	0.70	9999.99
22BU	3	89	7	DRY	797	567	0.27	0.45	20.62	0.74	9999.99

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Site	Qtr	Yr	Mn	Sea	Id Num	Lab Num	Na exchg Meq/ 100gm	K exchg Meq/ 100gm	Ca exchg Meq/ 100gm	Mg exchg Meq/ 100gm	Total P ppm
23AL	3	89	7	DRY	744	514	3.24	1.27	23.20	2.01	9999.99
23AU	3	89	7	DRY	743	513	3.24	1.00	23.58	2.03	9999.99
23BL	3	89	7	DRY	746	516	3.16	0.93	23.17	2.08	9999.99
23BU	3	89	7	DRY	745	515	3.48	0.89	22.88	2.08	9999.99
24AL	3	89	7	DRY	696	466	1.97	1.70	23.96	2.14	9999.99
24AU	3	89	7	DRY	695	465	1.45	1.98	23.94	2.14	9999.99
24BL	3	89	7	DRY	698	468	1.74	1.82	24.19	2.08	9999.99
24BU	3	89	7	DRY	697	467	1.57	1.76	23.86	2.08	9999.99
25AL	3	89	7	DRY	636	406	2.61	1.28	33.81	3.58	9999.99
25AU	3	89	7	DRY	635	405	3.29	1.48	31.19	3.37	9999.99
25BL	3	89	7	DRY	638	408	2.34	1.31	30.19	3.35	9999.99
25BU	3	89	7	DRY	637	407	3.29	1.41	34.31	3.82	9999.99
26AL	3	89	7	DRY	788	558	0.95	0.33	30.19	1.29	9999.99
26AU	3	89	7	DRY	787	557	0.35	0.40	24.68	1.27	9999.99
26BL	3	89	7	DRY	790	560	0.52	0.49	23.63	1.19	9999.99
26BU	3	89	7	DRY	789	559	0.47	0.61	22.68	1.07	9999.99
27AL	3	89	7	DRY	648	418	6.85	0.73	21.37	1.07	9999.99
27AU	3	89	7	DRY	647	417	3.09	0.85	21.48	1.21	9999.99
27BL	3	89	7	DRY	650	420	2.48	0.76	22.78	1.29	9999.99
27BU	3	89	7	DRY	649	419	1.65	1.00	23.58	1.48	9999.99
28AL	3	89	7	DRY	756	526	4.23	1.11	31.94	1.64	9999.99
28AU	3	89	7	DRY	755	525	2.54	1.23	32.06	1.60	9999.99
28BL	3	89	7	DRY	758	528	3.22	0.95	33.06	1.62	9999.99
28BU	3	89	7	DRY	757	527	2.48	1.17	31.81	1.66	9999.99
30AL	3	89	7	DRY	748	518	6.71	1.21	29.69	2.94	9999.99
30AU	3	89	7	DRY	747	517	4.97	1.16	24.61	2.90	9999.99
30BL	3	89	7	DRY	750	520	5.97	0.89	28.69	2.55	9999.99
30BU	3	89	7	DRY	749	519	4.97	1.19	30.19	3.14	9999.99
31AL	3	89	7	DRY	740	510	3.32	0.40	18.75	0.99	9999.99
31AU	3	89	7	DRY	739	509	3.24	0.49	18.81	1.11	9999.99
31BL	3	89	7	DRY	742	512	3.48	0.49	19.19	0.97	9999.99
31BU	3	89	7	DRY	741	511	3.32	0.53	18.75	0.97	9999.99
32AL	3	89	7	DRY	736	506	3.08	0.27	20.26	1.21	9999.99
32AU	3	89	7	DRY	735	505	3.16	0.28	20.15	1.13	9999.99
32BL	3	89	7	DRY	738	508	3.40	0.27	20.16	1.11	9999.99
32BU	3	89	7	DRY	737	507	3.32	0.32	19.50	1.17	9999.99
33AL	3	89	7	DRY	732	502	0.20	0.17	4.69	0.35	9999.99
33AU	3	89	7	DRY	731	501	0.22	0.15	4.95	0.39	9999.99
33BL	3	89	7	DRY	734	504	0.22	0.17	5.63	0.41	9999.99
33BU	3	89	7	DRY	733	503	0.20	0.17	4.98	0.37	9999.99
34AL	3	89	7	DRY	764	534	0.35	0.41	24.16	0.97	9999.99
34AU	3	89	7	DRY	763	533	0.45	0.58	24.45	1.05	9999.99
34BL	3	89	7	DRY	766	536	0.32	0.43	24.26	0.95	9999.99
34BU	3	89	7	DRY	765	535	0.32	0.47	23.18	0.90	9999.99

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For Quarter 3/89

Site	Qtr	Yr	Mn	Sea	Id Num	Lab Num	Na exchg Meq/ 100gm	K exchg Meq/ 100gm	Ca exchg Meq/ 100gm	Mg exchg Meq/ 100gm	Total P ppm
35AL	3	89	7	DRY	768	538	0.32	0.30	15.16	0.62	9999.99
35AU	3	89	7	DRY	767	537	0.25	0.41	12.33	0.45	9999.99
35BL	3	89	7	DRY	770	540	0.27	0.28	14.13	0.58	9999.99
35BU	3	89	7	DRY	769	539	0.25	0.41	12.77	0.47	9999.99
36AL	3	89	7	DRY	772	542	2.28	0.73	36.05	2.22	9999.99
36AU	3	89	7	DRY	771	541	0.65	1.08	27.69	2.47	9999.99
36BL	3	89	7	DRY	774	544	1.33	0.76	34.56	1.85	9999.99
36BU	3	89	7	DRY	773	543	0.62	1.17	32.81	2.45	9999.99
37AL	3	89	7	DRY	776	546	0.35	0.27	32.56	0.92	9999.99
37AU	3	89	7	DRY	775	545	0.32	0.54	31.44	1.05	9999.99
37BL	3	89	7	DRY	778	548	0.40	0.40	30.94	1.01	9999.99
37BU	3	89	7	DRY	777	547	0.32	0.63	30.69	1.07	9999.99
38AL	3	89	7	DRY	728	498	14.09	0.33	32.68	2.98	9999.99
38AU	3	89	7	DRY	727	497	5.63	0.45	33.18	2.77	9999.99
38BL	3	89	7	DRY	730	500	5.63	0.38	32.43	2.61	9999.99
38BU	3	89	7	DRY	729	499	2.61	0.42	41.42	2.67	9999.99
39AL	3	89	7	DRY	724	494	3.48	0.45	27.82	2.47	9999.99
39AU	3	89	7	DRY	723	493	1.45	0.56	28.69	2.10	9999.99
39BL	3	89	7	DRY	726	496	2.05	0.54	29.07	2.34	9999.99
39BU	3	89	7	DRY	725	495	0.91	0.67	29.44	2.01	9999.99
40AL	3	89	7	DRY	640	410	0.63	1.13	26.32	1.64	9999.99
40AU	3	89	7	DRY	639	409	0.55	1.48	28.07	1.60	9999.99
40BL	3	89	7	DRY	642	412	0.63	1.10	26.57	2.10	9999.99
40BU	3	89	7	DRY	641	411	0.66	1.23	27.57	2.12	9999.99
41AL	3	89	7	DRY	784	554	5.47	0.56	22.82	1.69	9999.99
41AU	3	89	7	DRY	783	553	1.74	0.78	24.54	1.93	9999.99
41BL	3	89	7	DRY	786	556	4.72	0.49	24.03	1.25	9999.99
41BU	3	89	7	DRY	785	555	0.87	0.78	23.67	1.54	9999.99
42AL	3	89	7	DRY	720	490	0.31	0.38	23.44	0.99	9999.99
42AU	3	89	7	DRY	719	489	0.31	0.47	22.18	1.05	9999.99
42BL	3	89	7	DRY	722	492	0.33	0.40	23.42	1.03	9999.99
42BU	3	89	7	DRY	721	491	0.33	0.40	23.15	1.07	9999.99
43AL	3	89	7	DRY	716	486	2.96	0.61	22.84	3.45	9999.99
43AU	3	89	7	DRY	715	485	2.61	0.63	22.70	3.82	9999.99
43BL	3	89	7	DRY	718	488	3.33	0.63	23.07	3.78	9999.99
43BU	3	89	7	DRY	717	487	2.70	0.72	22.21	3.86	9999.99
44AL	3	89	7	DRY	632	402	4.75	6.58	21.52	2.73	9999.99
44AU	3	89	7	DRY	631	401	1.04	4.69	23.76	2.98	9999.99
44BL	3	89	7	DRY	634	404	4.22	6.10	28.07	3.39	9999.99
44BU	3	89	7	DRY	633	403	0.61	3.84	30.19	2.94	9999.99
45AL	3	89	7	DRY	752	522	7.71	0.49	23.22	1.58	9999.99
45AU	3	89	7	DRY	751	521	5.72	0.54	22.94	1.73	9999.99
45BL	3	89	7	DRY	754	524	8.45	0.61	23.84	1.69	9999.99
45BU	3	89	7	DRY	753	523	6.46	0.65	23.29	1.97	9999.99

Raw Soil Sample Data

For Quarter 4/89

Site	Qr	Yr	Mn	Sea	Id Num	Lab Num	EC x 1000	Solu Salts ppm	pH	Ca ppm	Mg ppm	Na ppm	Cl ppm	SO4 ppm	HCO3 ppm	CO3 ppm	F ppm	NO3-N ppm	Boron ppm	NH4 ppm	PO4-P ppm	k ppm
07AL	4	89	11	POST	872	1040	2.20	1408	8.8	26	9	457	324	280.0	229	5.0	4.40	22.50	3.79	2.86	2.53	8
07AU	4	89	11	POST	871	1039	1.50	960	8.8	41	8	324	244	100.0	248	-4.8	4.00	25.00	2.93	3.57	3.28	8
07BL	4	89	11	POST	874	1042	1.02	653	8.9	37	6	229	90	107.0	271	9.0	3.70	14.38	3.36	2.14	3.28	8
07BU	4	89	11	POST	873	1041	0.84	538	8.9	39	7	190	56	46.0	298	-4.8	3.30	23.75	2.21	5.00	3.58	10
11AL	4	89	11	POST	880	1048	1.04	666	8.5	55	5	210	96	104.0	312	-4.8	12.50	2.63	1.86	4.29	1.19	18
11AU	4	89	11	POST	879	1047	0.96	614	8.4	62	6	190	72	108.0	312	-4.8	8.20	2.63	1.79	0.71	1.19	16
11BL	4	89	11	POST	882	1050	1.04	666	8.5	57	6	210	96	76.0	326	-4.8	14.00	2.38	2.00	5.00	1.34	20
11BU	4	89	11	POST	881	1049	0.84	538	8.6	43	5	151	58	58.0	300	-4.8	8.20	2.69	1.50	11.82	1.49	12
12AL	4	89	11	POST	824	992	3.90	2496	8.0	218	24	560	848	262.0	133	-4.8	5.60	115.00	1.93	6.88	2.38	96
12AU	4	89	11	POST	823	991	3.30	2112	8.0	204	19	420	656	172.0	133	-4.8	4.40	105.00	1.93	6.88	2.68	94
12BL	4	89	11	POST	826	994	1.80	1152	8.3	66	8	300	290	111.0	188	-4.8	7.20	60.00	1.86	7.81	2.24	60
12BU	4	89	11	POST	825	993	1.40	896	8.6	41	5	240	150	79.0	252	-4.8	7.20	35.00	2.14	6.88	2.09	50
13AL	4	89	11	POST	820	988	0.88	563	8.4	38	6	180	96	87.0	275	-4.8	11.00	3.44	0.93	2.50	1.19	24
13AU	4	89	11	POST	819	987	0.76	486	8.5	29	4	146	72	79.0	275	-4.8	7.00	4.38	1.00	3.75	1.19	16
13BL	4	89	11	POST	822	990	0.80	512	8.5	29	5	180	102	51.0	239	-4.8	13.00	3.38	0.93	2.50	1.19	22
13BU	4	89	11	POST	821	989	0.64	410	8.7	26	4	132	44	43.0	327	-4.8	8.00	2.88	0.86	2.50	1.04	14
23AL	4	89	11	POST	856	1024	1.04	666	8.5	57	6	200	120	98.0	300	-4.8	9.00	5.00	1.13	5.00	2.09	8
23AU	4	89	11	POST	855	1023	1.20	768	8.6	58	6	220	132	120.0	349	-4.8	7.40	6.88	1.47	5.68	2.68	10
23BL	4	89	11	POST	858	1026	1.00	640	8.5	47	6	200	106	41.0	319	-4.8	11.50	4.50	1.07	5.68	2.09	8
23BU	4	89	11	POST	857	1025	0.72	461	8.9	39	7	145	50	3.0	289	-4.8	7.80	4.25	1.47	2.00	2.38	6
24AL	4	89	11	POST	876	1044	0.96	614	8.8	41	5	190	76	58.0	300	-4.8	5.40	23.13	1.50	1.43	1.79	16
24AU	4	89	11	POST	875	1043	0.70	448	8.8	41	6	112	30	10.0	283	-4.8	5.20	12.50	1.43	2.86	2.24	28
24BL	4	89	11	POST	878	1046	1.60	1024	8.4	67	11	286	150	106.0	183	-4.8	3.70	75.00	1.43	1.43	1.79	38
24BU	4	89	11	POST	877	1045	0.58	371	8.7	22	5	84	22	-2.5	243	-4.8	4.00	4.50	1.36	3.57	2.38	32
25AL	4	89	11	POST	828	996	0.80	512	8.1	70	18	62	60	140.0	261	-4.8	1.35	3.13	0.79	2.50	2.38	16
25AU	4	89	11	POST	827	995	0.88	563	8.1	81	24	68	72	168.0	271	-4.8	1.10	6.25	0.64	5.00	2.24	14
25BL	4	89	11	POST	830	998	0.60	384	8.2	56	12	60	36	114.0	220	-4.8	2.10	3.75	0.93	1.25	1.49	12
25BU	4	89	11	POST	829	997	0.56	358	8.4	47	14	60	40	102.0	216	-4.8	0.92	4.63	0.71	2.50	2.38	8
28AL	4	89	11	POST	868	1036	0.80	512	8.9	42	4	144	56	76.0	188	2.0	1.10	10.00	1.50	1.43	1.19	6
28AU	4	89	11	POST	867	1035	0.56	358	9.0	36	7	97	24	8.0	252	5.0	1.70	3.38	1.36	2.14	1.49	8
28BL	4	89	11	POST	870	1038	0.88	563	8.7	58	6	142	48	180.0	186	-4.8	0.96	16.25	1.86	2.14	1.79	10
28BU	4	89	11	POST	869	1037	0.48	307	9.0	41	7	86	20	12.0	243	2.0	1.35	3.00	1.57	1.43	2.09	10
30AL	4	89	11	POST	860	1028	2.80	1792	8.3	114	25	495	544	386.0	197	-4.8	4.20	5.88	1.86	3.57	0.89	14
30AU	4	89	11	POST	859	1027	1.80	1152	8.5	83	17	343	224	309.0	328	-4.8	3.80	5.50	2.07	0.71	1.19	16
30BL	4	89	11	POST	862	1030	1.70	1088	8.5	69	13	343	248	261.0	289	-4.8	5.40	27.50	1.86	3.57	0.75	10
30BU	4	89	11	POST	861	1029	1.50	960	8.5	52	12	267	120	314.0	385	-4.8	3.60	9.38	1.86	0.71	1.19	16
31AL	4	89	11	POST	852	1020	1.70	1088	9.1	30	4	380	248	263.0	220	9.0	7.60	17.50	2.20	3.00	1.64	4
31AU	4	89	11	POST	851	1019	1.70	1088	9.1	32	3	360	236	266.0	234	7.0	6.00	25.00	2.60	1.00	2.09	6
31BL	4	89	11	POST	854	1022	1.50	960	9.2	30	3	300	184	192.0	261	9.0	8.40	10.63	2.20	1.00	1.49	4
31BU	4	89	11	POST	853	1021	2.00	1280	9.0	37	3	420	288	336.0	216	5.0	5.20	23.75	2.93	2.00	2.38	10
32AL	4	89	11	POST	848	1016	1.90	1216	9.1	31	3	400	252	273.0	239	5.0	10.50	35.00	2.87	1.00	1.79	2
32AU	4	89	11	POST	847	1015	1.60	1024	9.3	30	3	360	190	192.0	312	11.0	11.00	31.25	3.47	2.00	2.09	2
32BL	4	89	11	POST	850	1018	1.20	768	9.2	29	3	260	108	130.0	257	9.0	10.50	19.38	1.93	2.00	1.19	2
32BU	4	89	11	POST	849	1017	0.96	614	9.3	31	6	220	60	60.0	319	11.0	6.20	15.63	2.47	2.00	2.09	6

Raw Soil Sample Data

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Site	Qr	Yr	Mn	Sea	Id Num	Lab Num	EC x 1000	Solu Salts ppm	pH	Ca ppm	Mg ppm	Na ppm	Cl ppm	SO4 ppm	HCO3 ppm	CO3 ppm	F ppm	NO3-N ppm	Boron ppm	NH4 ppm	PO4-P ppm	k ppm
43AL	4	89	11	POST	844	1012	1.10	704	8.7	47	10	220	134	170.0	289	-4.8	1.60	5.38	1.53	5.00	2.24	8
43AU	4	89	11	POST	843	1011	1.20	768	8.6	50	12	240	168	193.0	303	-4.8	1.70	10.00	1.60	5.68	5.66	8
43BL	4	89	11	POST	846	1014	1.30	832	8.6	50	11	240	188	221.0	300	-4.8	1.30	5.13	1.67	3.00	3.58	12
43BU	4	89	11	POST	845	1013	1.45	934	8.5	54	16	260	212	210.0	303	-4.8	1.55	13.75	2.13	7.05	4.17	12
45AL	4	89	11	POST	864	1032	2.60	1664	9.1	31	4	533	476	311.0	252	14.0	7.60	17.50	3.00	0.71	0.60	4
45AU	4	89	11	POST	863	1031	1.40	896	9.3	12	2	324	124	130.0	362	27.0	7.20	20.00	2.93	1.43	0.75	4
45BL	4	89	11	POST	866	1034	3.20	2048	9.2	33	5	724	386	920.0	222	16.0	6.60	10.63	4.07	0.71	0.60	4
45BU	4	89	11	POST	865	1033	1.30	832	9.4	27	7	286	104	100.0	408	27.0	5.00	16.25	2.93	2.14	0.89	6

Raw Soil Sample Data

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Site	Qtr	Yr	Mn	Sea	Id Num	Lab Num	Na exchg Meq/ 100gm	K exchg Meq/ 100gm	Ca exchg Meq/ 100gm	Mg exchg Meq/ 100gm	Total P ppm
07AL	4	89	11	POST	872	1040	4.78	0.54	23.19	3.51	9999.99
07AU	4	89	11	POST	871	1039	3.52	0.61	23.73	3.64	9999.99
07BL	4	89	11	POST	874	1042	2.20	0.59	23.08	3.06	9999.99
07BU	4	89	11	POST	873	1041	2.01	0.69	22.43	3.21	9999.99
11AL	4	89	11	POST	880	1048	2.70	2.00	25.32	1.91	9999.99
11AU	4	89	11	POST	879	1047	2.24	1.61	25.57	1.75	9999.99
11BL	4	89	11	POST	882	1050	2.52	1.74	24.90	1.77	9999.99
11BU	4	89	11	POST	881	1049	2.61	1.72	24.95	1.75	9999.99
12AL	4	89	11	POST	824	992	5.22	2.82	24.73	1.97	9999.99
12AU	4	89	11	POST	823	991	3.19	2.30	23.35	1.71	9999.99
12BL	4	89	11	POST	826	994	2.73	2.56	23.54	1.77	9999.99
12BU	4	89	11	POST	825	993	2.52	2.56	22.82	1.62	9999.99
13AL	4	89	11	POST	820	988	1.66	1.63	22.62	2.24	9999.99
13AU	4	89	11	POST	819	987	1.78	1.46	23.18	1.95	9999.99
13BL	4	89	11	POST	822	990	1.74	1.71	22.97	2.34	9999.99
13BU	4	89	11	POST	821	989	1.57	1.36	22.68	1.95	9999.99
23AL	4	89	11	POST	856	1024	2.74	1.20	23.10	2.10	9999.99
23AU	4	89	11	POST	855	1023	3.13	1.33	24.65	2.61	9999.99
23BL	4	89	11	POST	858	1026	3.26	1.20	24.59	2.53	9999.99
23BU	4	89	11	POST	857	1025	3.22	1.23	23.94	2.96	9999.99
24AL	4	89	11	POST	876	1044	2.34	1.79	25.32	2.24	9999.99
24AU	4	89	11	POST	875	1043	1.65	2.56	24.25	2.36	9999.99
24BL	4	89	11	POST	878	1046	2.65	2.30	25.32	2.30	9999.99
24BU	4	89	11	POST	877	1045	1.35	2.82	25.20	2.32	9999.99
25AL	4	89	11	POST	828	996	1.08	1.54	25.07	4.52	9999.99
25AU	4	89	11	POST	827	995	1.04	1.28	23.70	4.46	9999.99
25BL	4	89	11	POST	830	998	1.08	1.38	25.45	3.70	9999.99
25BU	4	89	11	POST	829	997	1.04	1.00	22.68	4.46	9999.99
28AL	4	89	11	POST	868	1036	2.65	0.95	26.07	1.79	9999.99
28AU	4	89	11	POST	867	1035	2.06	1.36	26.20	1.95	9999.99
28BL	4	89	11	POST	870	1038	2.20	1.23	26.20	1.85	9999.99
28BU	4	89	11	POST	869	1037	1.74	1.48	26.57	1.93	9999.99
30AL	4	89	11	POST	860	1028	5.22	1.02	25.20	3.31	9999.99
30AU	4	89	11	POST	859	1027	4.78	1.43	28.82	3.88	9999.99
30BL	4	89	11	POST	862	1030	11.31	1.77	30.81	5.92	9999.99
30BU	4	89	11	POST	861	1029	3.00	1.36	24.95	3.86	9999.99
31AL	4	89	11	POST	852	1020	2.83	0.36	18.00	0.97	9999.99
31AU	4	89	11	POST	851	1019	3.31	0.46	19.09	1.15	9999.99
31BL	4	89	11	POST	854	1022	2.78	0.36	18.44	0.99	9999.99
31BU	4	89	11	POST	853	1021	3.00	0.46	18.23	1.03	9999.99
32AL	4	89	11	POST	848	1016	3.26	0.23	18.30	1.11	9999.99
32AU	4	89	11	POST	847	1015	3.26	0.33	18.04	1.13	9999.99
32BL	4	89	11	POST	850	1018	2.35	0.20	19.21	1.13	9999.99
32BU	4	89	11	POST	849	1017	1.96	0.33	19.16	1.29	9999.99

Raw Soil Sample Data

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Site	Qtr	Yr	Mn	Sea	Id Num	Lab Num	Na exchg Meq/ 100gm	K exchg Meq/ 100gm	Ca exchg Meq/ 100gm	Mg exchg Meq/ 100gm	Total P ppm
43AL	4	89	11	POST	844	1012	1.57	0.49	19.69	2.96	9999.99
43AU	4	89	11	POST	843	1011	1.83	0.59	20.63	3.64	9999.99
43BL	4	89	11	POST	846	1014	2.00	0.72	21.28	3.45	9999.99
43BU	4	89	11	POST	845	1013	2.17	0.69	21.53	4.07	9999.99
45AL	4	89	11	POST	864	1032	7.83	0.56	24.31	2.53	9999.99
45AU	4	89	11	POST	863	1031	6.52	0.67	24.29	2.69	9999.99
45BL	4	89	11	POST	866	1034	9.57	0.41	24.71	2.22	9999.99
45BU	4	89	11	POST	865	1033	6.09	0.69	24.48	2.53	9999.99

APPENDIX H

REMOTE SENSING

H-1. Color infrared imagery for monitoring site 11

H-2. Color infrared imagery for monitoring site 13