

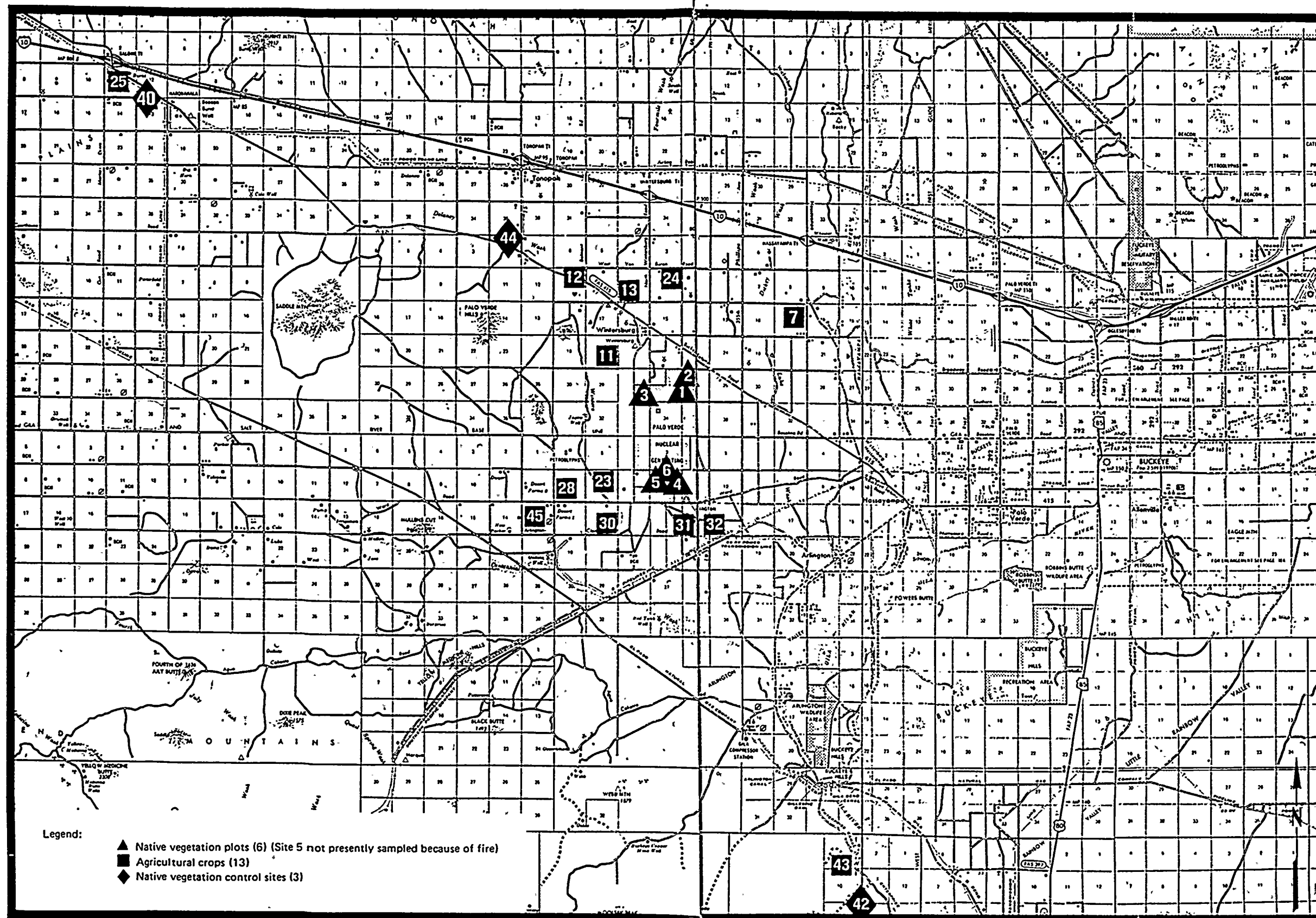


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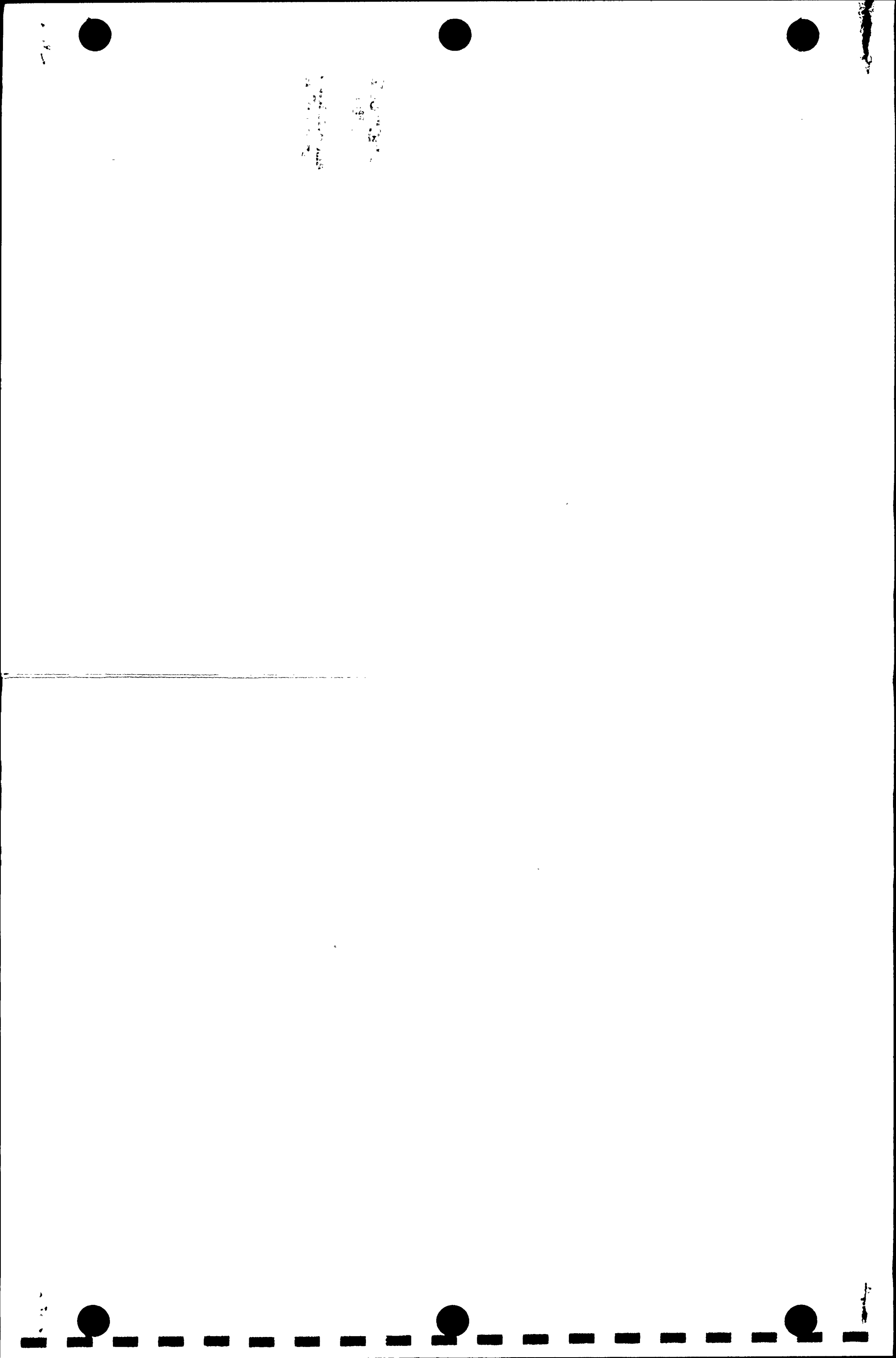
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Figure 2-2. Distribution of PVNGS vegetation  
sampling locations





### 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, wind speed, and monthly totals of precipitation for the PVNGS site and NWS Phoenix for 1990. The PVNGS data on temperature and dew point compare reasonably well with those for NWS Phoenix. They show, for example, that NWS Phoenix in 1990 was about 4°F warmer than the PVNGS site and that this difference is partly due to differences in measurement height. They also indicate, however, that in 1990 NWS Phoenix received 50 percent (2.58 inches) more precipitation than PVNGS. 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 1990 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 1990 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 1990 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 the 35-foot level are for winds from the east. The highest average wind speeds at the 200-foot level are for winds from the southwest, but there is a secondary peak for winds from the east. Also presented on the wind roses is the frequency of calm winds, 0.03 and 0.02 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 1990. 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 1990 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) dominated 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 1990 is presented in NUS-5339 (NUS, 1991a).

### 3.3 METEOROLOGICAL DATA RECOVERY

PVNGS meteorological data recovery for 1990 is indicated in Table 3-5. Annual data recovery for each parameter was greater than 99 percent, and at no time did monthly data recovery for any parameter drop below 97 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, 1990

Month	Temperature (°F)		Dew point (°F)		Precipitation(in.)*		Wind speed (mph)	
	PVNGS	NWS Phoenix†	PVNGS	NWS Phoenix†	PVNGS	NWS Phoenix†	PVNGS	NWS Phoenix‡
January	51	56	30	31	1.09	0.80	4.7	5.2
February	53	57	27	32	0.11	0.70	6.0	5.9
March	64	67	28	33	0.09	0.35	6.8	6.0
April	73	76	35	41	0.04	0.17	7.6	7.1
May	77	81	30	35	0.04	0.16	7.9	7.4
June	91	94	36	42	0.00	0.04	7.5	7.1
July	91	94	60	63	0.54	1.05	7.8	7.3
August	88	91	56	59	1.92	2.70	7.7	6.4
September	84	88	56	61	0.72	1.11	6.8	5.2
October	74	79	35	40	0.36	0.04	5.4	4.7
November	61	66	27	37	0.00	0.15	5.6	4.7
December	49	54	19	29	0.24	0.46	5.2	5.0
Annual	71	75	37	42	5.15	7.73	6.6	6.0

\*Annual precipitation is sum of monthly totals.

†Based on measurement at 5 feet.

‡Based on measurement at 33 feet.





Table 3-2. Number of days with precipitation events of  $\geq 0.01$  inch at PVNGS and NWS Phoenix, 1990

Month	PVNGS	NWS Phoenix
January	8	5
February	2	3
March	2	5
April	1	1
May	1	2
June	0	1
July	3	7
August	3	6
September	6	6
October	1	1
November	0	3
December	5	7
Average (month)	2.7	3.9

Table 3-3. Occurrences of wind gusts in excess of 50 miles per hour at PVNGS, 1990

Date	Hour ending	Occurrences during hour	Wind speed level (ft)	Probable cause
3/5	1230	1	200	Gust front *
7/2	0145	4	200	Gust front *
7/10	2200	4†	200	Thunderstorm
7/21	2200	>10	35	Thunderstorm
7/21	2200	>20	200	Thunderstorm
7/22	2400	1	200	Gust front *
7/30	2100	2	35	Thunderstorm
7/30	2100	8	200	Thunderstorm
7/30	2200	5	200	Thunderstorm
8/1	1800	1	35	Gust front *
8/11	1800	4	200	Gust front *
9/3	1600	5	35	Gust front *
9/3	1600	>10	200	Gust front *
9/3	1900	5	200	Gust front *
9/14	2400	8	200	Thunderstorm
11/26	1000	10	200	Gust front *

\*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, 1990

Month	Stability category						
	A	B	C	D	E	F	G
January	0.00	0.67	1.61	28.09	14.78	15.59	39.25
February	1.04	2.23	5.80	27.38	17.71	14.88	30.95
March	4.30	5.78	8.74	22.85	18.68	13.44	26.21
April	7.36	6.81	11.11	23.75	21.81	15.42	13.75
May	13.04	8.47	11.16	15.86	19.76	18.82	12.90
June	10.97	10.42	9.86	19.31	19.44	13.06	16.94
July	6.07	11.74	12.69	30.90	26.72	8.37	3.51
August	3.50	8.08	11.57	28.13	27.19	12.92	8.61
September	1.53	4.44	11.11	26.94	25.56	13.61	16.81
October	0.67	3.23	8.06	23.25	12.50	12.10	40.19
November	0.83	0.83	3.06	27.36	12.78	11.11	44.03
December	0.13	0.13	3.09	26.08	17.61	14.52	38.44
Annual	4.13	5.25	8.17	24.98	19.55	13.65	24.27

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, 1990

Month	35-ft wind		200-ft wind		$\Delta T^*$	Joint ( $\Delta T$ and 35-ft wind data)	35-ft dew point	35-ft temperature	Precipitation
	Speed	Direction	Speed	Direction					
January	100	100	100	100	100	100	97	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	99	99	99	99	99	99	99	99	99
September	100	100	100	100	100	100	100	100	100
October	100	100	100	100	100	100	100	100	100
November	100	100	100	100	100	100	100	100	100
December	100	100	100	100	100	100	100	100	100
Annual	99	99	99	99	99	99	99	99	99

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



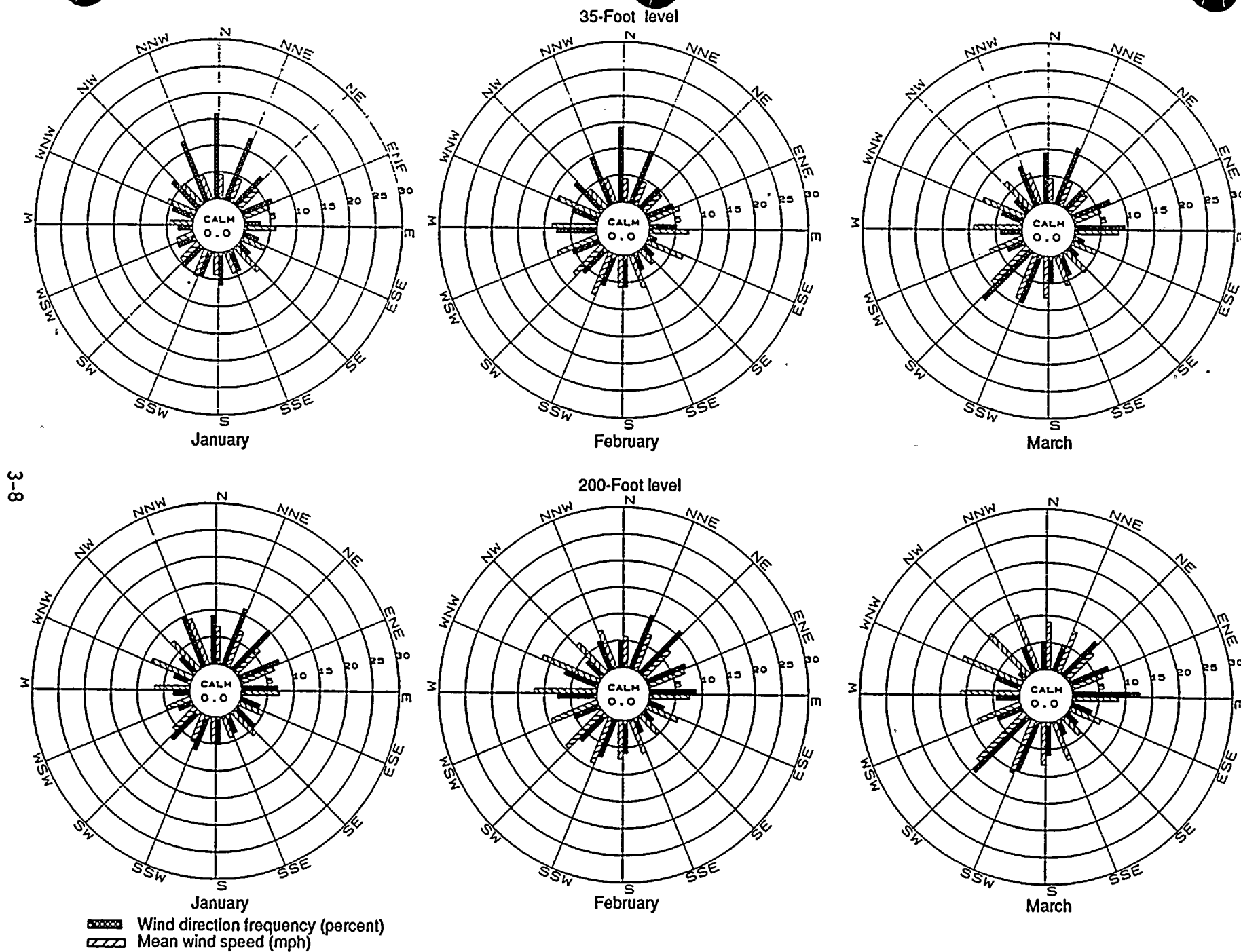


Figure 3-1. Gross wind roses for PVNGS, January, February, and March 1990





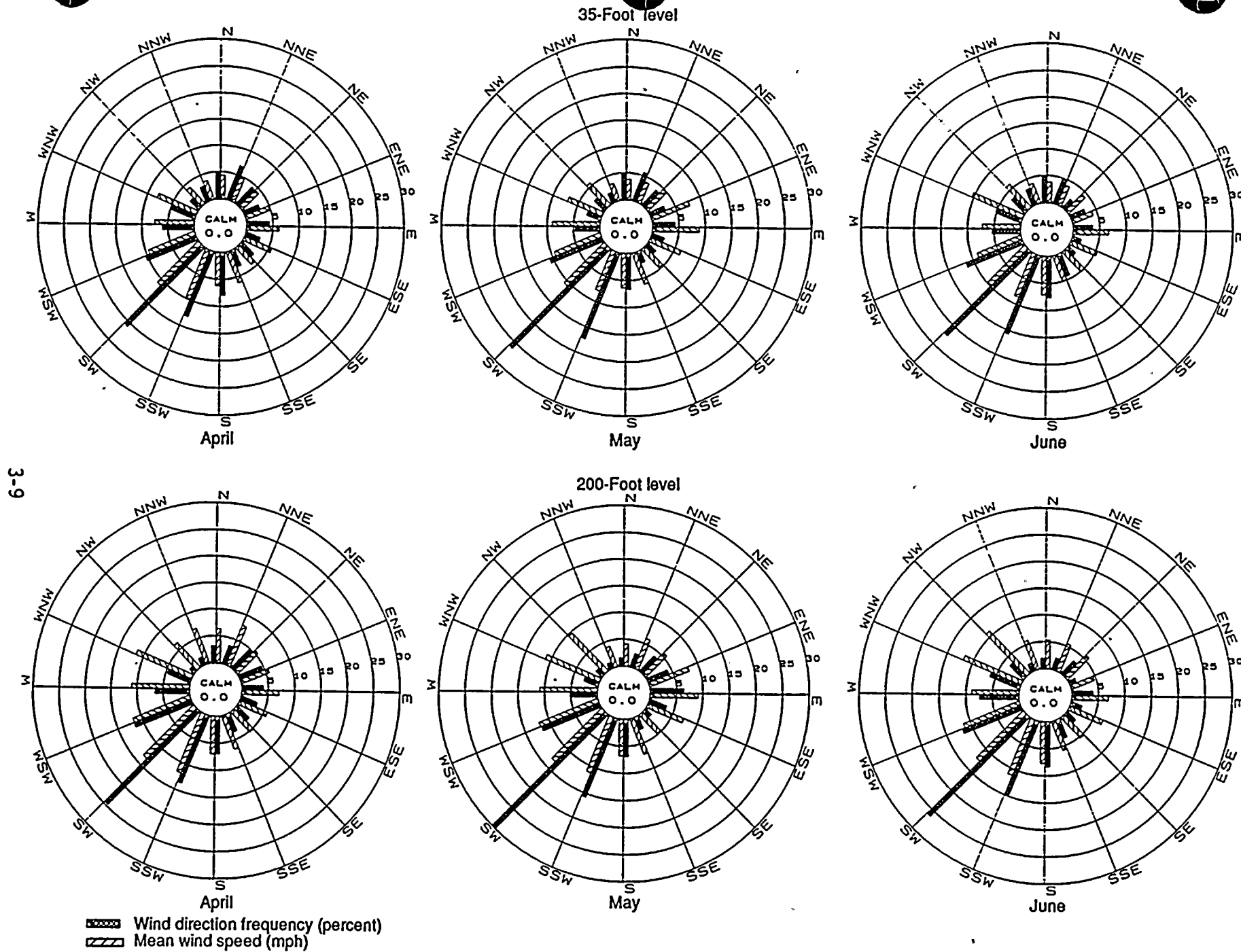
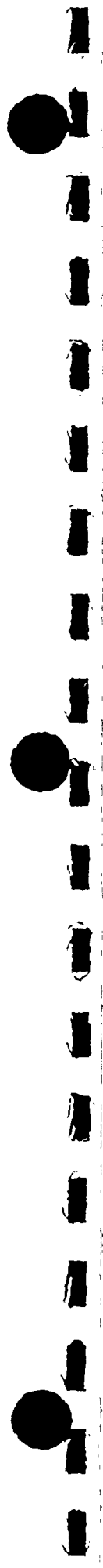
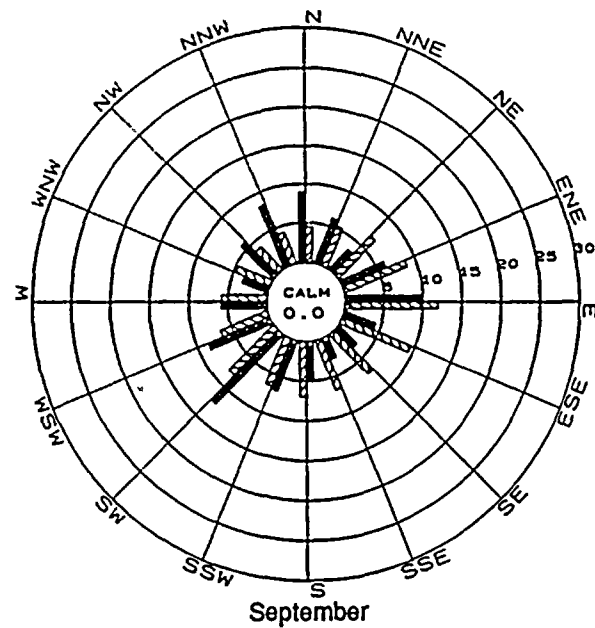
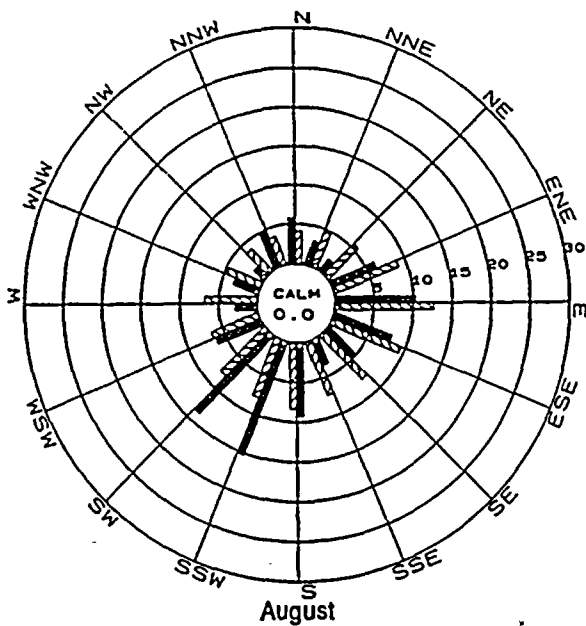
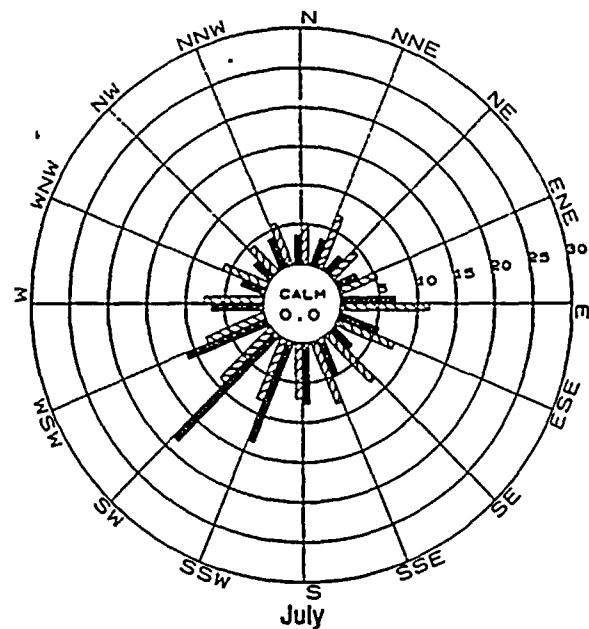


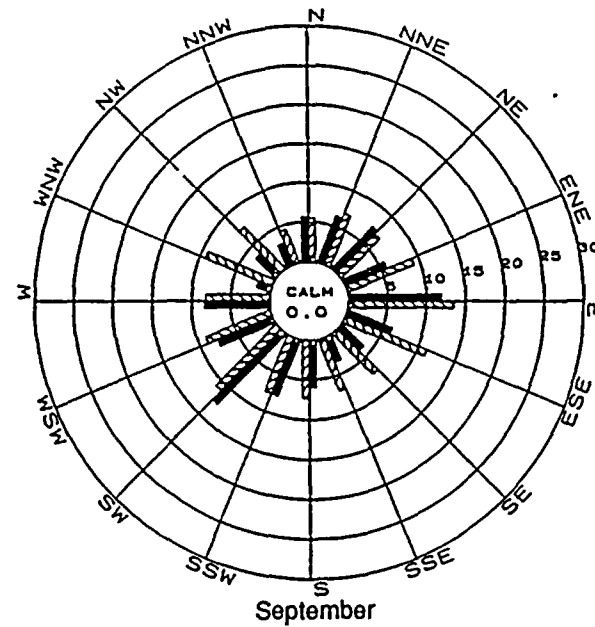
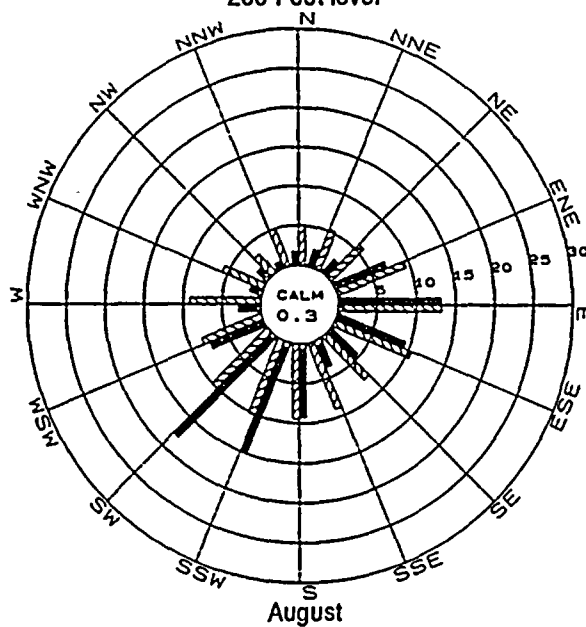
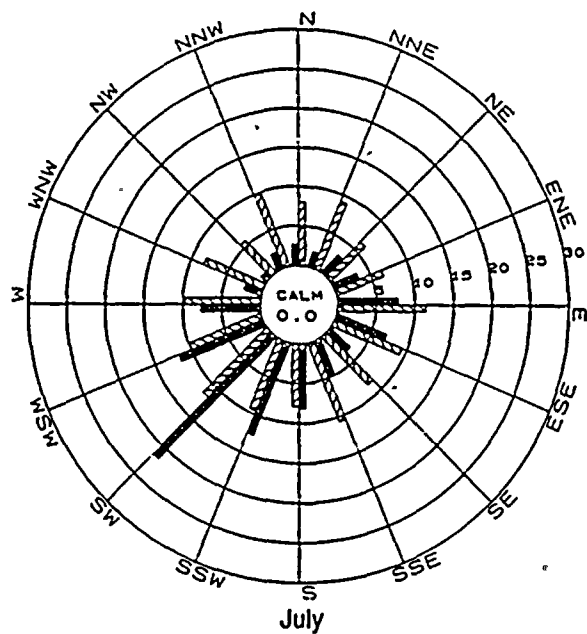
Figure 3-2. Gross wind roses for PVNGS, April, May, and June 1990



35-Foot level



200-Foot level

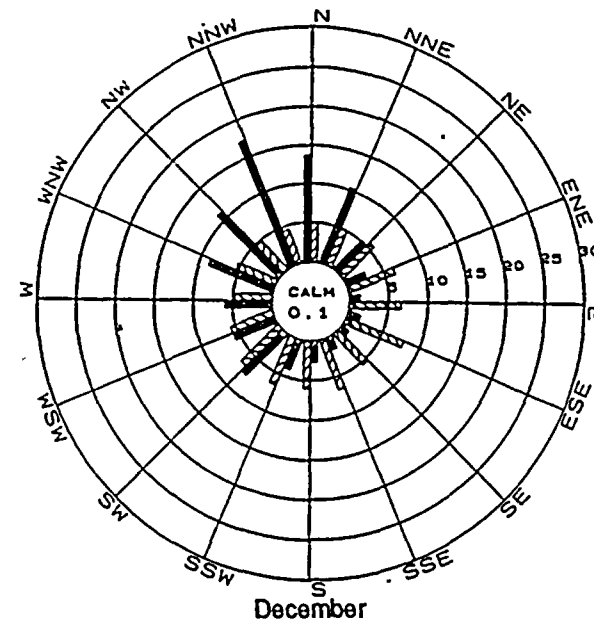
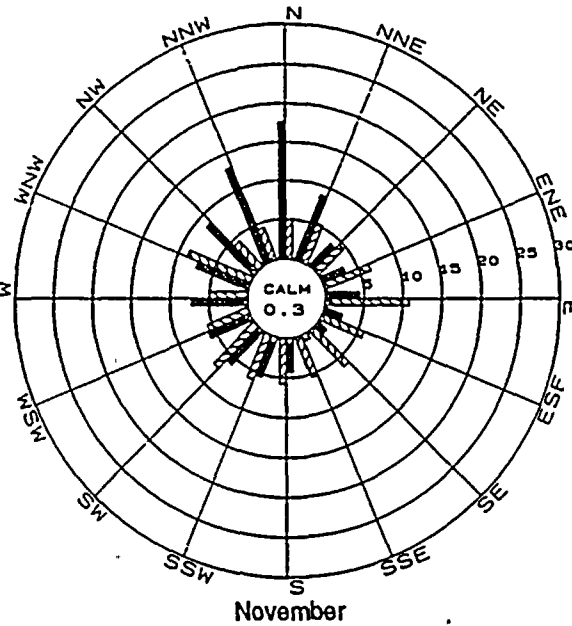
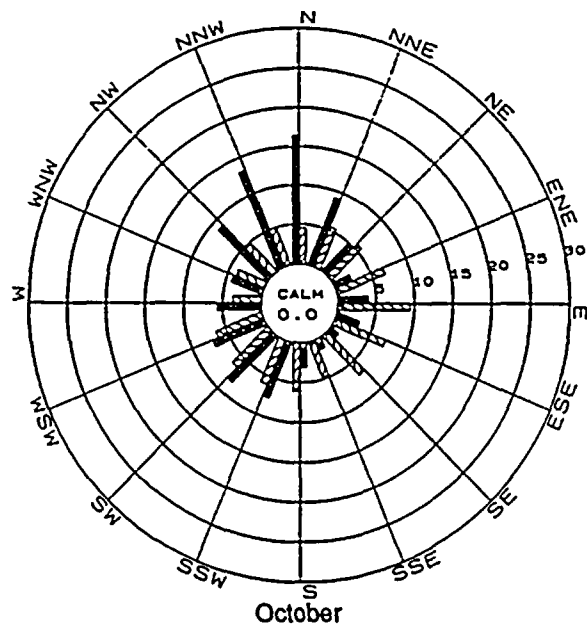


Wind direction frequency (percent)  
 Mean wind speed (mph)

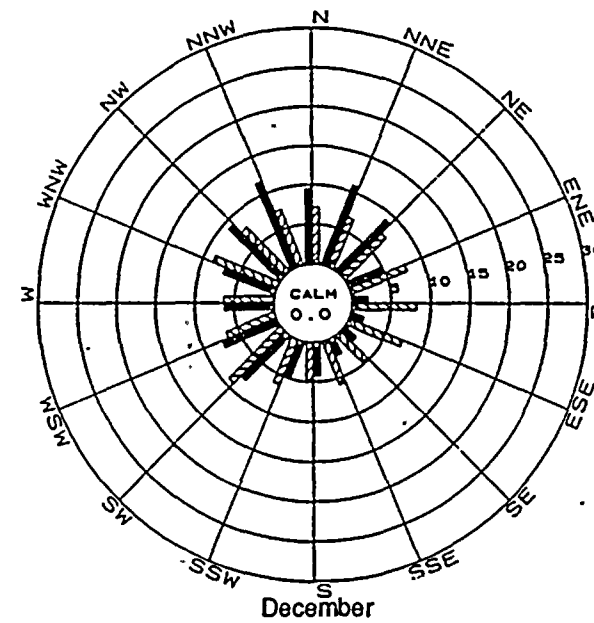
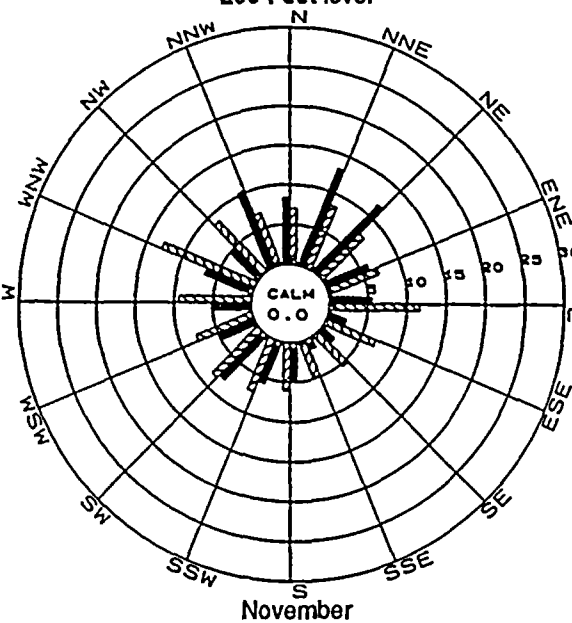
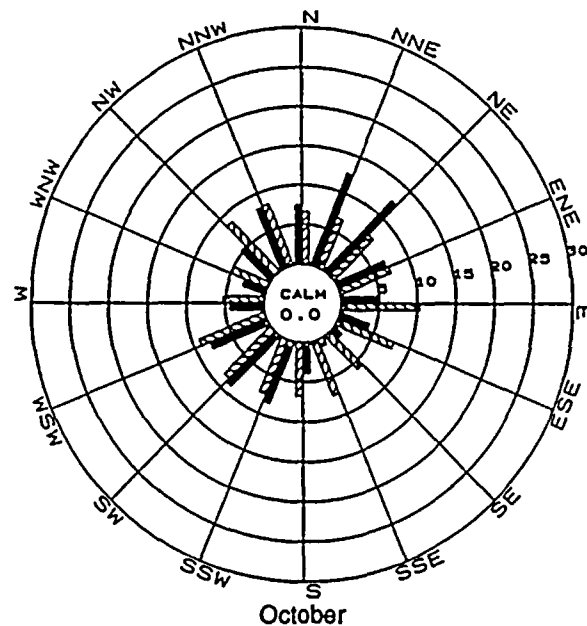
Figure 3-3. Gross wind roses for PVNGS, July, August, and September 1990



35-Foot level



200-Foot level



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

Figure 3-4. Gross wind roses for PVNGS, October, November, and December 1990



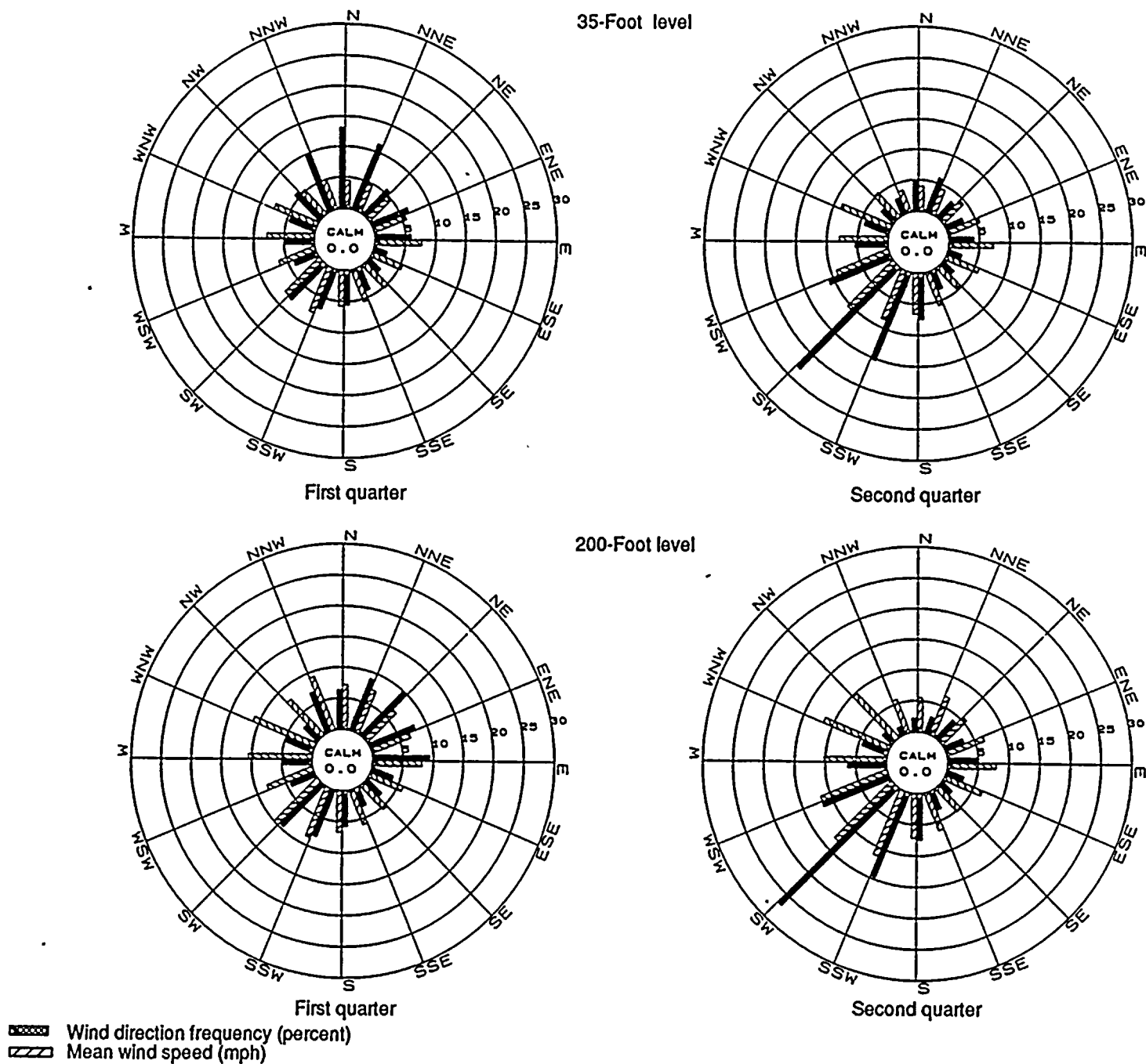
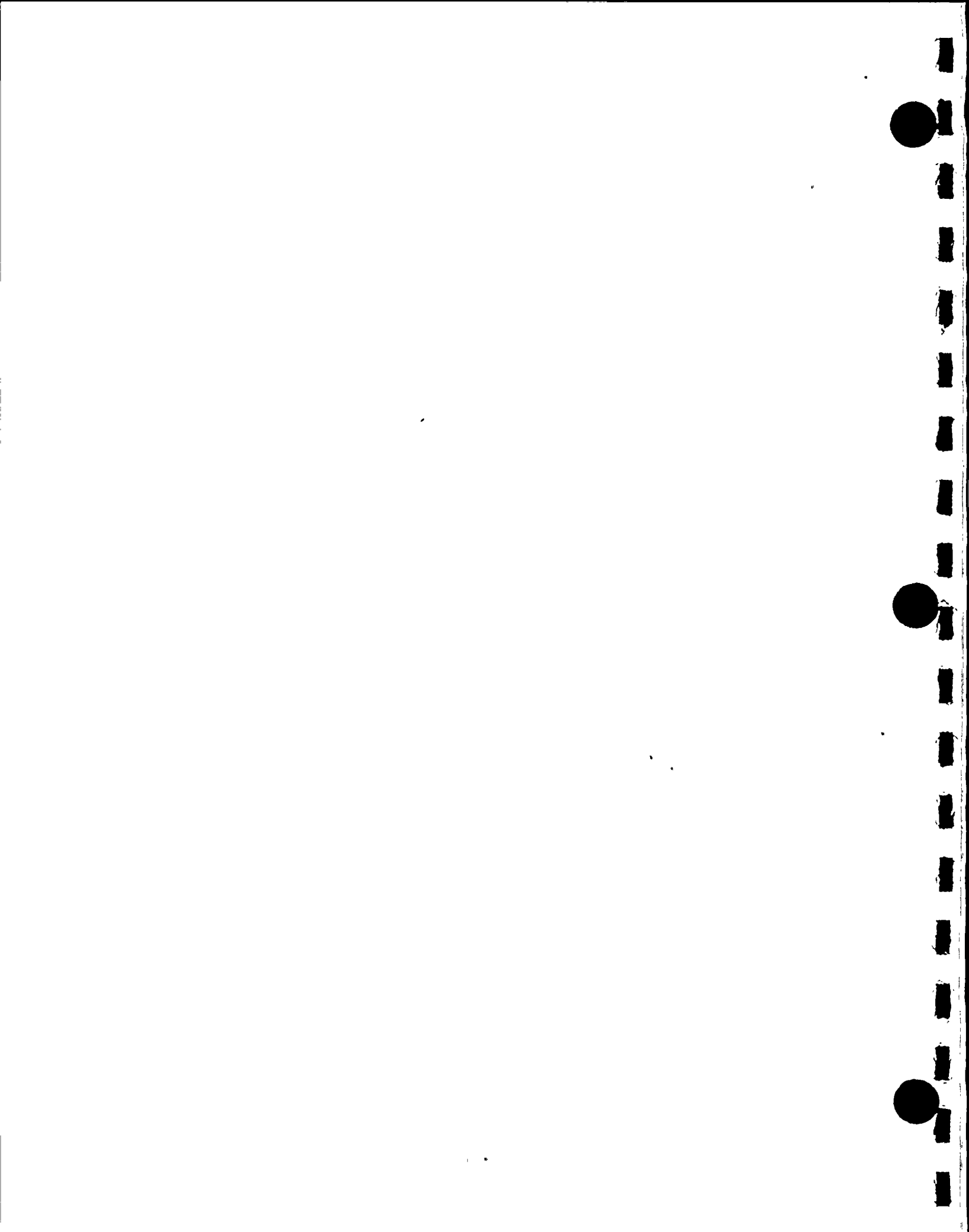
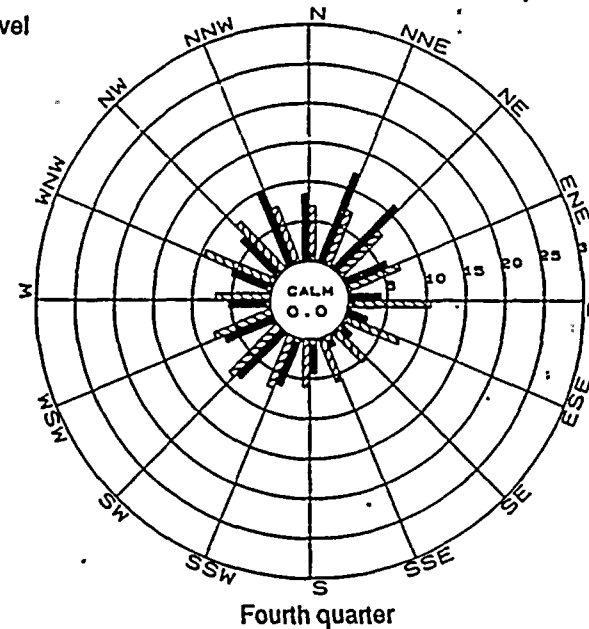
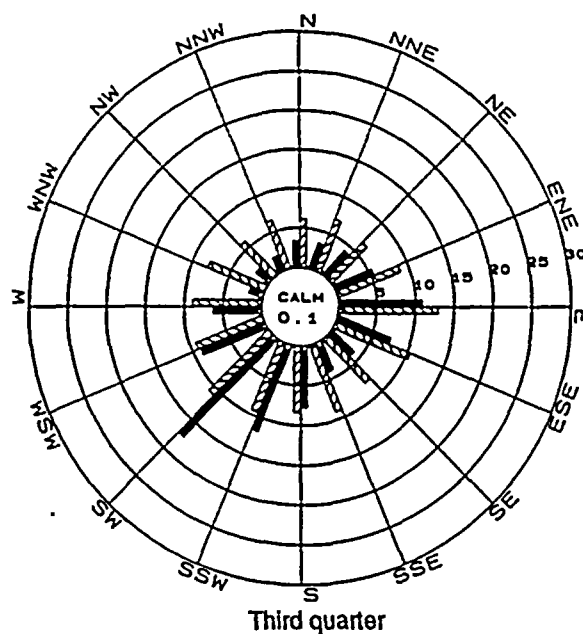
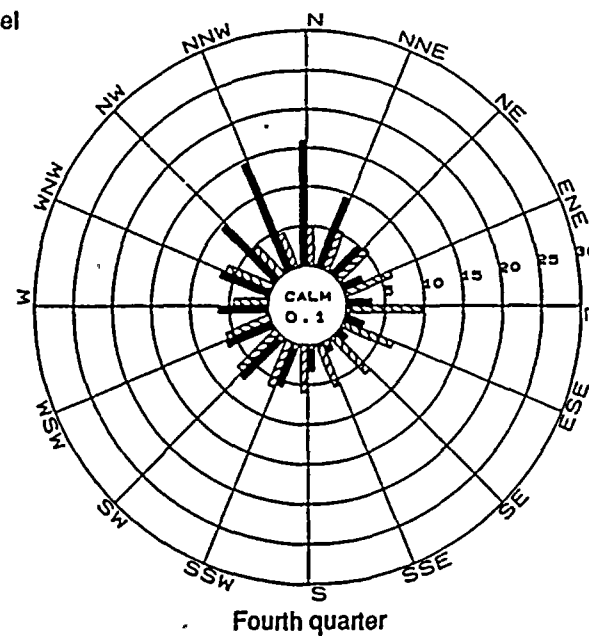
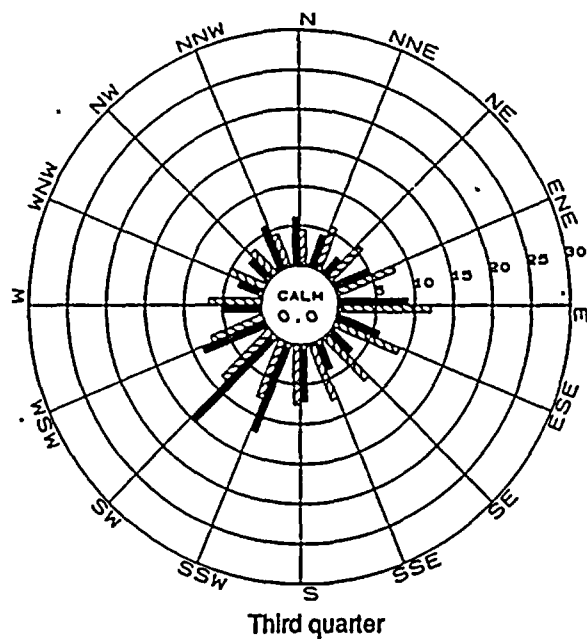


Figure 3-5. Gross wind roses for PVNGS, first and second quarters 1990







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

Figure 3-6. Gross wind roses for PVNGS, third and fourth quarters 1990



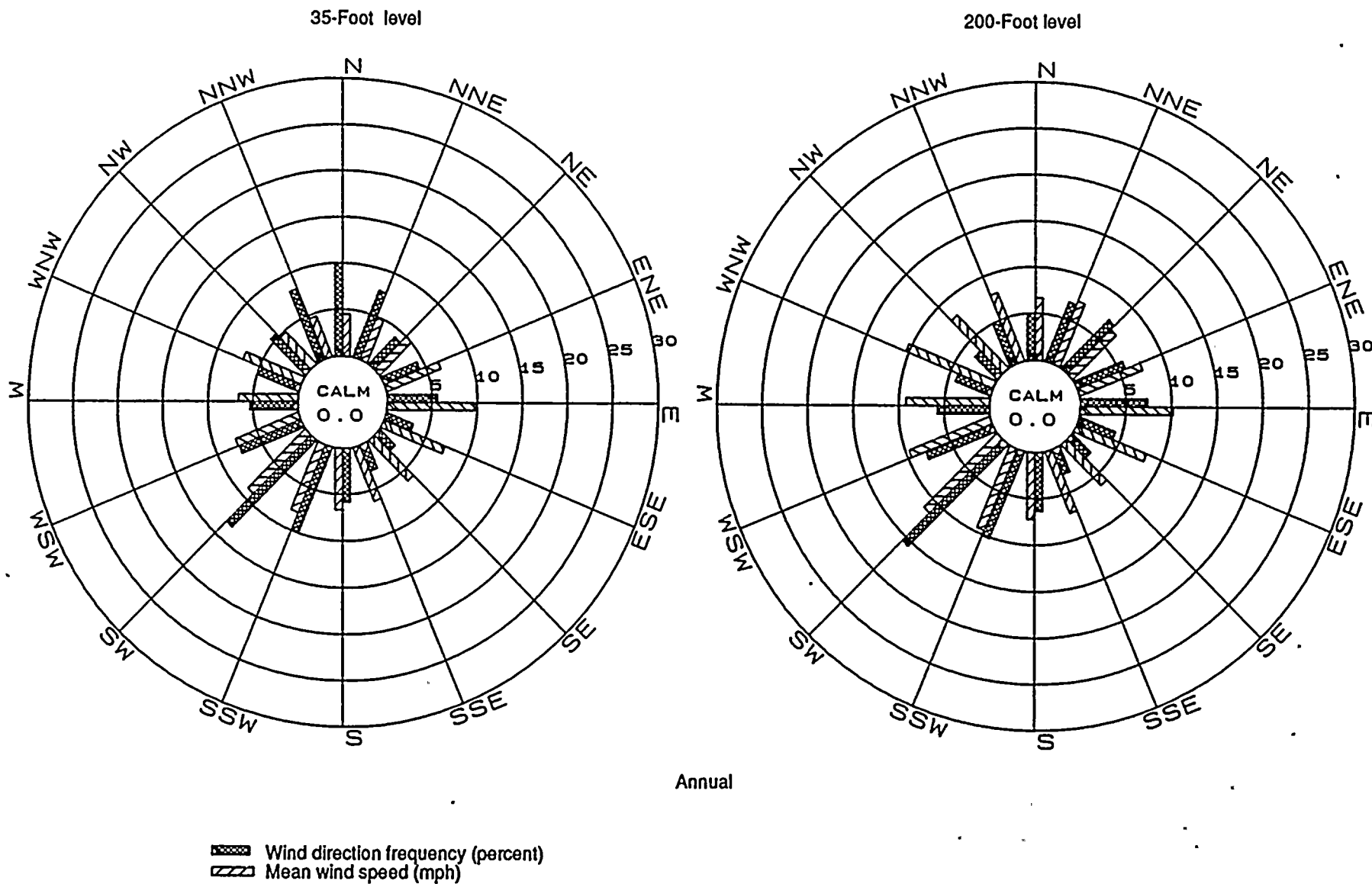


Figure 3-7. Gross annual wind roses for PVNGS, 1990



## 4 Plant Operation

### 4.1 COOLING TOWER OPERATION

During 1990, 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.

In October, a drift measurement test was performed on the same four cells of cooling tower 1C that were tested in 1983 to determine the current drift emission rate and drop size distribution of the Unit 1 cooling towers (ESC, 1990). The current drift rate at full fan flow was calculated to be 0.00075 percent of the circulating water flow rate based on both sensitive paper and isokinetic sampling. The previous drift rate was calculated to be 0.0002 percent of the circulating water flow rate (ESC, 1983). A physical inspection of the cooling towers during operation of the three units indicated clear differences in the physical condition of Units 1 and 2 which were likely to influence their drift emissions. Accordingly, the recently determined drift rate of 0.00075 percent was applied to the drift emission calculations for Units 1 and 2. The originally determined drift rate of 0.0002 percent was retained for the drift emission calculations for Unit 3. 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 1990. 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 1990 for all units operating on the day the samples were collected. Thus, Unit 1 was not sampled in January through June, Unit 2 was not sampled in March through May, and Unit 3 was not sampled in January. Additionally, a sampling of Unit 3 was not performed in April although the unit was operating. 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 (copper, lead, and selenium in Unit 1; arsenic, ammonium, mercury, selenium, and phenol in Unit 2; phosphate, lead, mercury, and selenium in Unit 3), were generally smaller for the major constituents than they were in 1989. TDS concentrations ranged from 4,200 to 32,000 milligrams per liter over the year; the mean values were 19,000, 15,656, and 18,000 milligrams per liter for Units 1, 2, and 3, respectively.

The annual average concentrations for 10 of the 30 analytes exceeded the average ER-OL values (PVNGS, 1979) for Units 1, 2, or 3. These 10 included sodium, chloride, sulfate, potassium, iron, boron, TDS, barium, mercury, and selenium. Moreover, 12 analytes (the 10 listed above plus calcium and phosphate) exceeded the maximum ER-OL values in one or more months of 1990.

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 ratios, the coefficients of variation are generally equal to those for the individual ions. The coefficients of variation of the ratios for Unit 2 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. For Unit 3, with the exception of the sodium-to-chloride ratio, the coefficients of variation are generally larger than those for the individual ions.

During 1990, as in previous years, 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 1990, calculated in reference to an annual mean value for TDS in the reservoir water of 892 milligrams per liter, were determined to be 21.3, 17.6, and 20.2 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 water (57.4 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 7.1, 6.6, and 6.9 for Units 1, 2, and 3, respectively.

A third determination of the effective cycles of concentration was made using potassium as a 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 16.3 milligrams per liter in the reservoir water, the mean annual concentrations of potassium in the cooling tower basin water (283, 223, and 220 milligrams per liter in Units 1, 2, and 3, respectively) would yield a mean annual concentration factor in the range of 13.5 to 17.4.

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 monthly variation during 1990, ranging from a low of 0.60 in

July to a high of 1.15 in August (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 rather than applying an average annual ratio. For those months for which samples or analyses were missing and some operation occurred, the annual mean of all ratio values for each unit (0.77, 0.79, and 0.81 for Units 1, 2, and 3, respectively) was 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 1990 when the units and their cooling towers were in operation. PVNGS Unit 1 was not in operation from January through June 1990, and Unit 2 was not in operation from March through June 1990. PVNGS Unit 3 operated in each month of the year. PVNGS Units 1, 2, and 3 were in operation for the entire third and fourth quarters (July through December 1990).

The drop sizes measured in the 1990 test program (ESC, 1990) identified a size distribution spectrum which differs significantly from that determined in the earlier tests (ESC, 1983), as shown in Figure 4-3. Of particular note is the much more significant contribution of large diameter droplets to the total drift mass of droplets in the recent tests than in the original test program, the mass median diameter increasing from about  $390\mu$  in the earlier tests to about  $1400\mu$  in the recent tests. When distributed into the 16 size classes, or "bins," for use in the NUS-FOG computer model, the results from the two test series appear as presented in Table 4-3. The 1990 drop size distribution was used in conjunction with a drift rate of 0.00075 percent for Units 1 and 2, whereas the previous drop size distribution and drift rate of 0.0002 percent were used for Unit 3, in predicting drift deposition using the NUS-FOG model.

The FOG code used sequential hourly meteorological data for 1990 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 4-4 and 4-5 reflect the results of this drift deposition modeling for the year in onsite and offsite areas, respectively. As shown in Figure 4-4, the maximum calculated offsite deposition was approximately 75 pounds per acre per year along the site boundary west and southwest of Unit 3. This value resulted primarily from the operation of all three units during the second half of the year (i.e., third and fourth quarters). The general deposition patterns remain unchanged from 1989; however, the area within each isopleth has increased as a result of the near full power operation of the three units after the second quarter, as well as higher drift rate for Units 1 and 2. Therefore, the maximum calculated deposition is higher for 1990 than for 1989.

Figure 4-5 indicates that the maximum drift deposition calculated at an agricultural site in 1990 was about 2 pounds per acre at site 23, about 2.5 miles southwest of the power block. Figures 4-6 through 4-9 present the results of the onsite drift deposition modeling for each quarter of 1990. Although the magnitude of drift deposition varies from quarter to quarter due to limited operation of cooling towers in the first half of the year, the drift deposition patterns remain similar for all quarters.

The predicted monthly and annual drift deposition at each of the onsite monitoring sites is summarized in Table 4-4. The highest predicted monthly deposition occurs in the months of August, September, and October 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 1310 pounds per acre at site 81 in August. 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 1990 is presented in Section 9.3.



Table 4-1. Power operation and cooling tower parameters for PVNGS, 1990 (sheet 1 of 2)

Month	Heat generation		Airflow (m <sup>3</sup> /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	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
February	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
March	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
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	1.61E+08†	67,725	10,012	9,141	7,576	542,333	15,131	3.660	0.503
August	1.79E+08	75,405	8,590	8,556	8,195	548,355	19,707	3.665	0.613
September	1.31E+08	55,095	6,210	6,443	6,063	430,333	20,246	2.682	0.464
October	2.14E+08	90,229	10,128	10,128	9,958	589,000	20,579	4.393	0.754
November	2.14E+08	90,165	10,128	10,065	9,833	589,000	21,023	4.365	0.766
December	2.15E+08	90,745	9,971	10,012	9,543	589,000	17,090	4.293	0.612
Unit 2									
January	2.15E+08	90,518	9,148	9,740	10,128	589,000	15,585	4.219	0.548
February	1.75E+08	73,737	7,845	8,206	8,319	499,000	12,827	3.543	0.386
March	0.00E+00	0	0	0	0	29,000	0	0.000	0.000
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	4.27E+07	18,026	3,750	1,572	3,648	342,118	6,992	0.976	0.082
August	2.03E+08	85,788	9,774	9,665	9,495	567,925	23,411	4.065	0.802
September	2.15E+08	90,826	10,128	10,128	10,128	589,000	19,347	4.418	0.713
October	2.10E+08	88,497	9,481	9,713	10,128	589,000	19,574	4.263	0.696
November	2.15E+08	90,755	9,439	9,544	10,128	589,000	18,809	4.232	0.664
December	2.15E+08	90,637	9,379	8,753	9,400	589,000	17,400	4.003	0.582

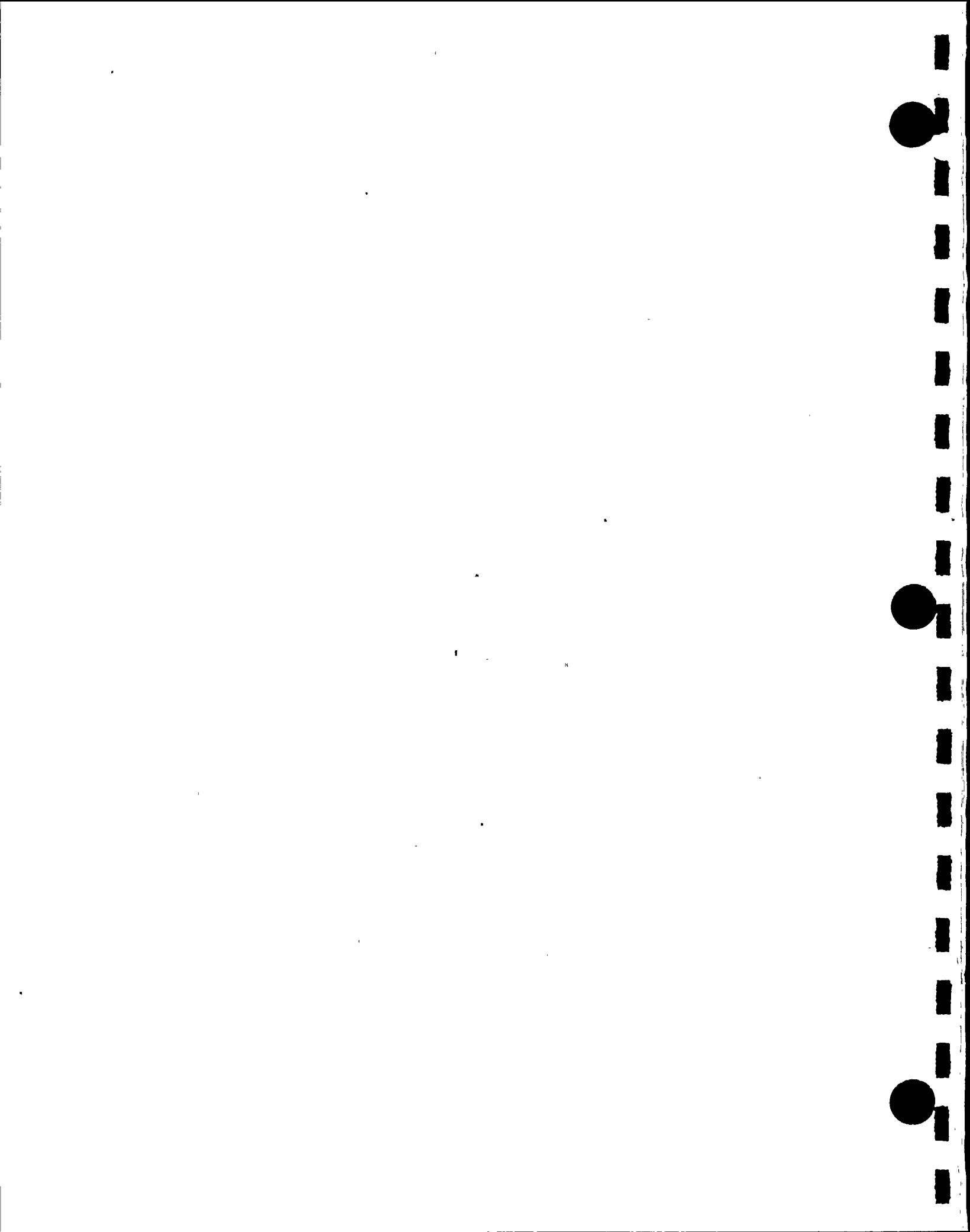


Table 4-1. Power operation and cooling tower parameters for PVNGS, 1990 (sheet 2 of 2)

Month	Heat generation		Airflow (m <sup>3</sup> /sec)			Circulating water		Calculated drift*	
	Btu/min	MWt/d	Tower 1	Tower 2	Tower 3	Flow (gpm)	TDS (ppm)	Gpm	Lb/min
Unit 3									
January	3.57E+07	15,079	796	429	1,266	173,516	6,896	0.097	0.008
February	1.94E+08	81,787	6,805	6,782	8,387	589,000	15,365	0.852	0.110
March	2.14E+08	90,138	9,148	8,862	8,882	589,000	14,458	1.043	0.126
April	1.58E+08	66,611	7,533	6,921	7,469	542,333	14,546	0.850	0.104
May	2.13E+08	89,939	9,944	9,372	10,046	589,000	16,446	1.138	0.156
June	2.15E+08	90,778	10,128	9,938	10,128	589,000	17,600	1.171	0.172
July	2.15E+08	90,790	10,128	10,128	10,128	589,000	17,435	1.178	0.171
August	1.97E+08	83,103	9,379	9,366	9,202	589,000	30,484	1.084	0.277
September	2.11E+08	88,985	10,001	10,128	10,107	589,000	20,258	1.172	0.198
October	2.01E+08	84,647	9,536	9,407	9,121	589,000	17,592	1.088	0.163
November	2.15E+08	90,802	10,114	10,121	10,058	589,000	15,118	1.174	0.148
December	2.08E+08	87,930	9,502	9,141	9,032	570,935	13,363	1.053	0.118

\*Based on drift rate at full fan flow of 0.00075 percent of circulating water flow for Units 1 and 2 and a drift rate at full fan flow of 0.0002 percent for Unit 3.

†1.61E+08 = 1.61 X 10<sup>8</sup>.





Table 4-2. Chemical composition of cooling tower basin water  
at PVNGS, 1990 (sheet 1 of 3)

Analyte	Average	Range	COV*	Design-basis value (ER-OL Table 3.6-1)
Unit 1: Concentrations†				
Calcium, total	407	320-500	0.178	420.0
Magnesium, total	22.2	16.0-30.0	0.267	150.0
Sodium, total	5,917	5,000-6,400	0.085	3,375.0
Chloride	6,750	5,900-7,800	0.110	2,400.0
Sulfate (as SO <sub>4</sub> )	4,067	3,800-4,400	0.053	2,250.0
Nitrate (as N)	248	180-330	0.218	1,650.0
Silica (as SiO <sub>2</sub> )	69	42-94	0.329	150.0
Phosphate	0.83	0.40-1.20	0.359	1.5
Fluoride	20	17-22	0.108	52.5
Potassium, total	283	200-380	0.243	207.0
Copper, total	0.10	0.054-0.270	0.806	0.3
Zinc, total	0.074	0.051-0.100	0.243	1.0
Iron, total	0.89	0.51-2.20	0.728	0.075
Arsenic, total	0.02	0.010-0.050	0.750	0.12
Boron	5.5	5.0-6.1	0.084	0.56
Ammonium (as N)	0.52	0.3-0.9	0.395	75.0
TSS (at 105°C)	44.6	3-68	0.599	150.0
COD	400	250-490	0.211	1,305.0
Alkalinity, total	26	22-29	0.101	1,500.0
TDS (at 180°C)	19,000	18,000-22,000	0.088	12,000.0
Silver, total	0.003	<0.005	N/A	0.05
Barium, total	0.167	0.1-0.2	0.311	0.15
Cadmium, total	0.003	≤0.005	0.333	0.015
Chromium, total	0.030	0.021-0.050	0.367	0.06
Lead, total	0.020	≤0.050	0.800	0.3
Mercury, total	0.0002	0.0001-0.0003	0.411	0.0015
Beryllium, total	0.003	<0.005	N/A	0.3
Selenium, total	0.053	<0.25	0.925	0.015
Manganese, total	0.034	0.015-0.080	0.706	0.75
Phenol	0.006	<0.005-0.011	0.667	0.14
Conductivity (µmhos/cm)	34,000	30,000-40,000	0.104	--
Unit 1: Ion Ratios				
Sodium/potassium	21.8	--	0.25	--
Sodium/calcium	14.9	--	0.18	--
Sodium/magnesium	280.8	--	0.24	--
Sodium/nitrate	24.8	--	0.24	--
Sodium/chloride	0.88	--	0.13	--
Sodium/sulfate	1.5	--	0.11	--



Table 4-2. Chemical composition of cooling tower basin water at PVNGS, 1990 (sheet 2 of 3)

Analyte	Average	Range	COV*	Design-basis value (ER-OL Table 3.6-1)
Unit 2: Concentrations†				
Calcium, total	377	140-500	0.358	420.0
Magnesium, total	21.9	7.8-33.0	0.416	150.0
Sodium, total	4,844	1,200-7,100	0.439	3,375.0
Chloride	5,444	1,300-8,200	0.485	2,400.0
Sulfate (as SO <sub>4</sub> )	3,389	1,200-4,300	0.358	2,250.0
Nitrate (as N)	220.3	53-320	0.435	1,650.0
Silica (as SiO <sub>2</sub> )	64	12-96	0.494	150.0
Phosphate	1.05	0.58-2.30	0.500	1.5
Fluoride	14.4	3.4-21.0	0.527	52.5
Potassium, total	223	61-370	0.514	207.0
Copper, total	0.071	0.044-0.180	0.620	0.3
Zinc, total	0.077	0.049-0.120	0.338	1.0
Iron, total	0.777	0.38-1.50	0.457	0.075
Arsenic, total	0.017	<0.050	0.824	0.12
Boron	4.7	1.6-6.2	0.350	0.56
Ammonium (as N)	0.744	0.2-2.2	0.862	75.0
TSS (at 105°C)	39.1	7-67	0.446	150.0
COD	358.9	100-560	0.420	1,305.0
Alkalinity, total	24.4	<5-38	0.441	1,500.0
TDS (at 180°C)	15,656	4,200-26,000	0.456	12,000.0
Silver, total	0.003	<0.005	N/A	0.05
Barium, total	0.150	<0.1-0.2	0.407	0.15
Cadmium, total	0.003	<0.005	N/A	0.015
Chromium, total	0.027	0.005-0.037	0.333	0.06
Lead, total	0.012	<0.050	0.667	0.3
Mercury, total	0.001	<0.001-0.0094	2.292	0.0015
Beryllium, total	0.003	<0.005	N/A	0.3
Selenium, total	0.046	<0.25	0.891	0.015
Manganese, total	0.030	0.017-0.052	0.400	0.75
Phenol	0.005	<0.005-0.010	0.800	0.14
Conductivity (µmhos/cm)	27,611	6,500-40,000	0.446	--
Unit 2: Ion Ratios				
Sodium/potassium	22.8	--	0.27	--
Sodium/calcium	12.3	--	0.17	--
Sodium/magnesium	225.4	--	0.37	--
Sodium/nitrate	22.7	--	0.20	--
Sodium/chloride	0.92	--	0.10	--
Sodium/sulfate	1.39	--	0.21	--



Table 4-2. Chemical composition of cooling tower basin water at PVNGS, 1990 (sheet 3 of 3)

Analyte	Average	Range	COV*	Design-basis value (ER-OL Table 3.6-1)
Unit 3: Concentrations <sup>†</sup>				
Calcium, total	394	270-470	0.169	420.0
Magnesium, total	23	12.0-35.0	0.299	150.0
Sodium, total	5,220	3,600-6,500	0.159	3,375.0
Chloride	6,040	3,800-8,800	0.260	2,400.0
Sulfate (as SO <sub>4</sub> )	3,720	2,800-4,500	0.166	2,250.0
Nitrate (as N)	249	190.0-300.0	0.160	1,650.0
Silica (as SiO <sub>2</sub> )	64	29-110	0.392	150.0
Phosphate	1.3	0.52-4.00	0.849	1.5
Fluoride	16.4	12.0-20.0	0.158	52.5
Potassium, total	220	120-300	0.233	207.0
Copper, total	0.078	0.044-0.160	0.436	0.3
Zinc, total	0.048	0.024-0.110	0.542	1.0
Iron, total	0.675	0.43-0.92	0.255	0.075
Arsenic, total	0.016	<0.05	0.750	0.12
Boron	4.86	4.1-5.8	0.108	0.56
Ammonium (as N)	0.51	0.3-1.2	0.535	75.0
TSS (at 105°C)	45.4	29-72	0.318	150.0
COD	370	110-600	0.419	1,305.0
Alkalinity, total	27.7	20-36	0.167	1,500.0
TDS (at 180°C)	18,000	14,000-32,000	0.294	12,000.0
Silver, total	0.003	<0.005	N/A	0.05
Barium, total	0.130	0.1-0.2	0.369	0.15
Cadmium, total	0.003	<0.005	N/A	0.015
Chromium, total	0.027	0.019-0.033	0.148	0.06
Lead, total	0.020	<0.100	0.850	0.3
Mercury, total	0.002	<0.001-0.0091	1.730	0.0015
Beryllium, total	0.003	<0.005	N/A	0.3
Selenium, total	0.039	<0.1	0.872	0.015
Manganese, total	0.026	0.018-0.037	0.308	0.75
Phenol	0.007	<0.005-0.017	0.714	0.14
Conductivity (µmhos/cm)	29,500	20,000-39,000	0.209	--
Unit 3: Ion Ratios				
Sodium/potassium	25.0	--	0.30	--
Sodium/calcium	13.6	--	0.25	--
Sodium/magnesium	255.4	--	0.44	--
Sodium/nitrate	21.6	--	0.26	--
Sodium/chloride	0.89	--	0.14	--
Sodium/sulfate	1.43	--	0.20	--

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

\*Standard deviation/mean.

<sup>†</sup>In milligrams per liter except where otherwise indicated.

NOTE: Statistics based on a sample size of 6 for Unit 1, 9 for Unit 2, and 10 for Unit 3.

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



Table 4-3. Drop size distribution, PVNGS Cooling Tower 1C

<u>1990 ESC measurement</u>			<u>1983 ESC measurement</u>	
<u>Bin</u>	<u>Mean radii, cm</u>	<u>Mass fraction</u>	<u>Mean radii, cm</u>	<u>Mass fraction</u>
1	0.0015	0.02828	0.00150	0.05000
2	0.0030	0.07036	0.00350	0.08780
3	0.0045	0.04583	0.00625	0.03720
4	0.0080	0.07458	0.009375	0.06460
5	0.01275	0.05786	0.01250	0.06040
6	0.0175	0.05126	0.01475	0.09000
7	0.0225	0.03907	0.01650	0.07000
8	0.0325	0.05270	0.01800	0.08180
9	0.0500	0.05240	0.01950	0.07820
10	0.0650	0.04262	0.02100	0.08000
11	0.0800	0.07973	0.02295	0.09760
12	0.0950	0.06170	0.024625	0.06240
13	0.1050	0.06169	0.02650	0.05640
14	0.1150	0.13025	0.03000	0.04150
15	0.1450	0.05398	0.03500	0.01640
16	0.1750	0.09769	0.05000	0.02570





Table 4-4. Predicted drift deposition at PVNGS onsite monitoring locations, 1990

Site	Monthly deposition (lb/acre)												Annual deposition (lb/(acre)(yr))
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1	3.13E-01	3.38E-01	2.35E-01	1.79E-01	4.21E-01	2.20E-01	6.80E-01	1.82E+00	8.09E-01	9.76E-01	7.51E-01	7.24E-01	7.56E+00
2	2.82E-01	1.42E-01	1.39E-01	1.50E-01	2.33E-01	2.19E-01	3.98E-01	1.08E+00	5.49E-01	5.61E-01	4.31E-01	6.40E-01	4.89E+00
3	7.83E-01	4.79E-01	2.03E-01	2.09E-01	3.00E-01	4.23E-01	9.30E-01	1.43E+00	9.33E-01	5.12E-01	8.50E-01	1.16E+00	8.21E+00
4	1.01E-01	6.25E-02	3.40E-02	1.03E-02	7.43E-03	5.74E-03	5.95E-01	2.51E-01	7.29E-01	1.48E+00	1.77E+00	1.73E+00	6.77E+00
5	1.54E-01	6.08E-02	6.29E-02	1.70E-02	7.60E-03	2.18E-02	1.95E-02	8.34E-02	1.17E-01	4.49E-01	6.44E-01	4.75E-01	2.17E+00
6	1.68E-01	9.75E-02	9.84E-02	3.18E-02	1.96E-02	2.65E-02	7.75E-02	8.76E-02	1.91E-01	5.09E-01	7.51E-01	5.11E-01	2.60E+00
10	1.09E-01	1.08E-01	5.93E-02	1.33E-01	1.51E-01	1.61E-01	3.21E-01	7.06E-01	4.55E-01	3.72E-01	3.28E-01	3.46E-01	3.12E+00
14	6.42E-01	5.19E-01	5.19E-01	3.64E-01	4.65E-01	3.75E-01	2.60E+00	4.12E+00	2.20E+00	2.55E+00	2.49E+00	2.16E+00	1.92E+01
16	3.64E+00	3.31E+00	1.15E+00	8.83E-01	1.76E+00	1.48E+00	4.00E+01	4.31E+01	1.21E+01	1.27E+01	2.08E+01	2.67E+01	1.59E+02
20	3.63E+00	4.23E+00	4.32E+00	1.68E+00	4.17E+00	3.09E+00	9.58E+00	1.83E+01	1.23E+01	9.51E+00	6.48E+00	4.16E+00	8.27E+01
27	1.34E-01	7.01E-02	3.31E-02	8.63E-03	8.36E-03	1.18E-02	4.71E-01	3.25E-01	6.76E-01	1.42E+00	1.52E+00	1.87E+00	6.43E+00
80	2.67E+00	2.33E+00	1.61E+00	1.36E+00	2.38E+00	1.82E+00	1.56E+01	2.40E+01	9.21E+00	1.03E+01	1.04E+01	8.14E+00	8.93E+01
81	2.92E+02	2.51E+02	6.01E+00	5.82E+00	1.16E+01	1.30E+01	2.17E+02	1.31E+03	8.69E+02	8.63E+02	6.39E+02	4.45E+02	4.96E+03
82	6.88E+00	1.07E+01	8.72E+00	5.25E+00	6.15E+00	7.65E+00	7.53E+00	1.06E+01	2.01E+01	3.22E+01	2.80E+01	1.79E+01	1.62E+02
83	3.16E+00	5.39E+00	2.09E+00	3.13E+00	3.89E+00	4.51E+00	5.33E+00	7.45E+00	9.24E+00	1.28E+01	1.53E+01	1.29E+01	8.39E+01



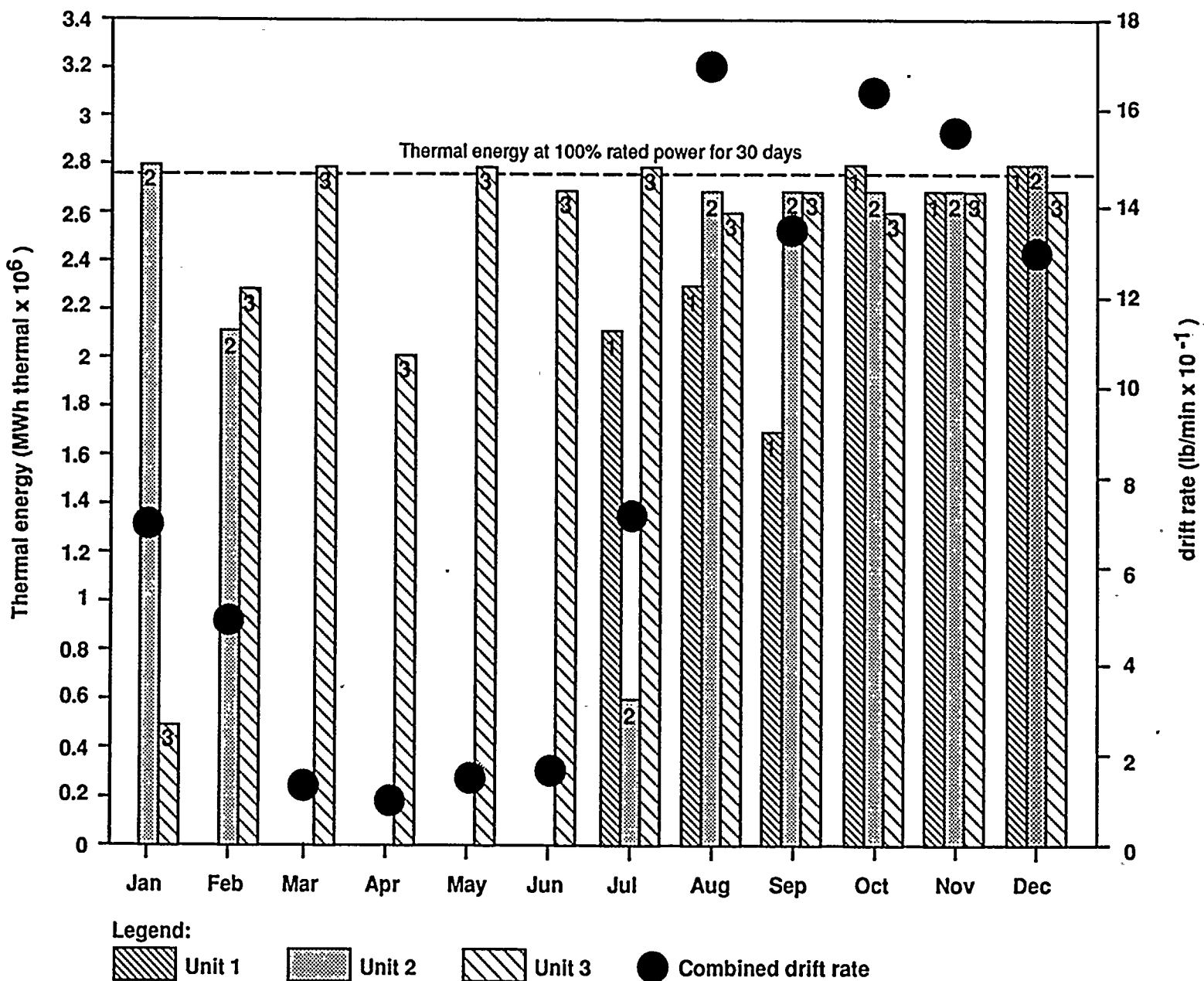


Figure 4-1. Thermal energy generation and drift rate for cooling towers at PVNGS, 1990



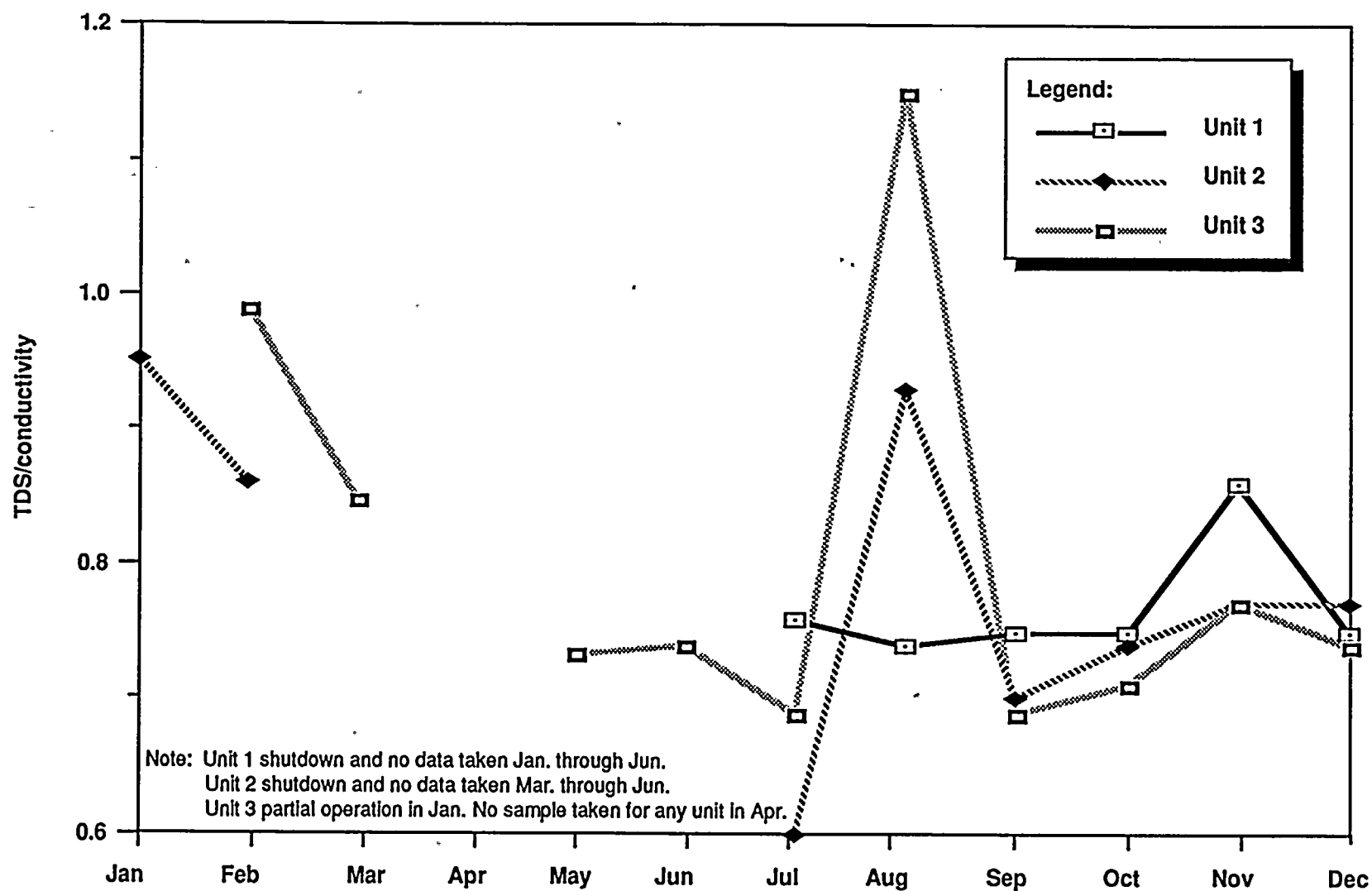


Figure 4-2. Ratio of total dissolved solids (TDS) to conductivity for cooling tower basin water at PVNGS, 1990



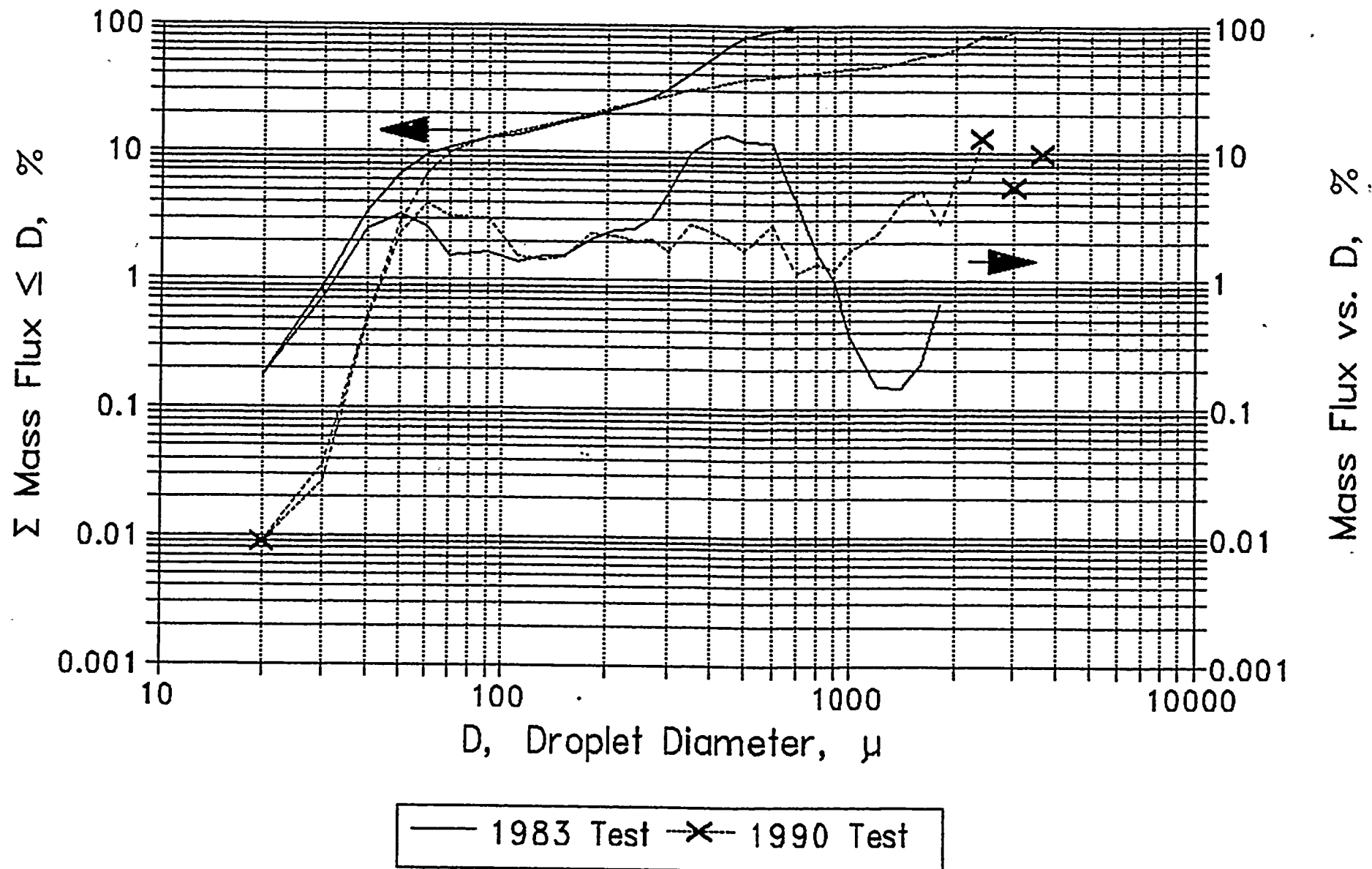
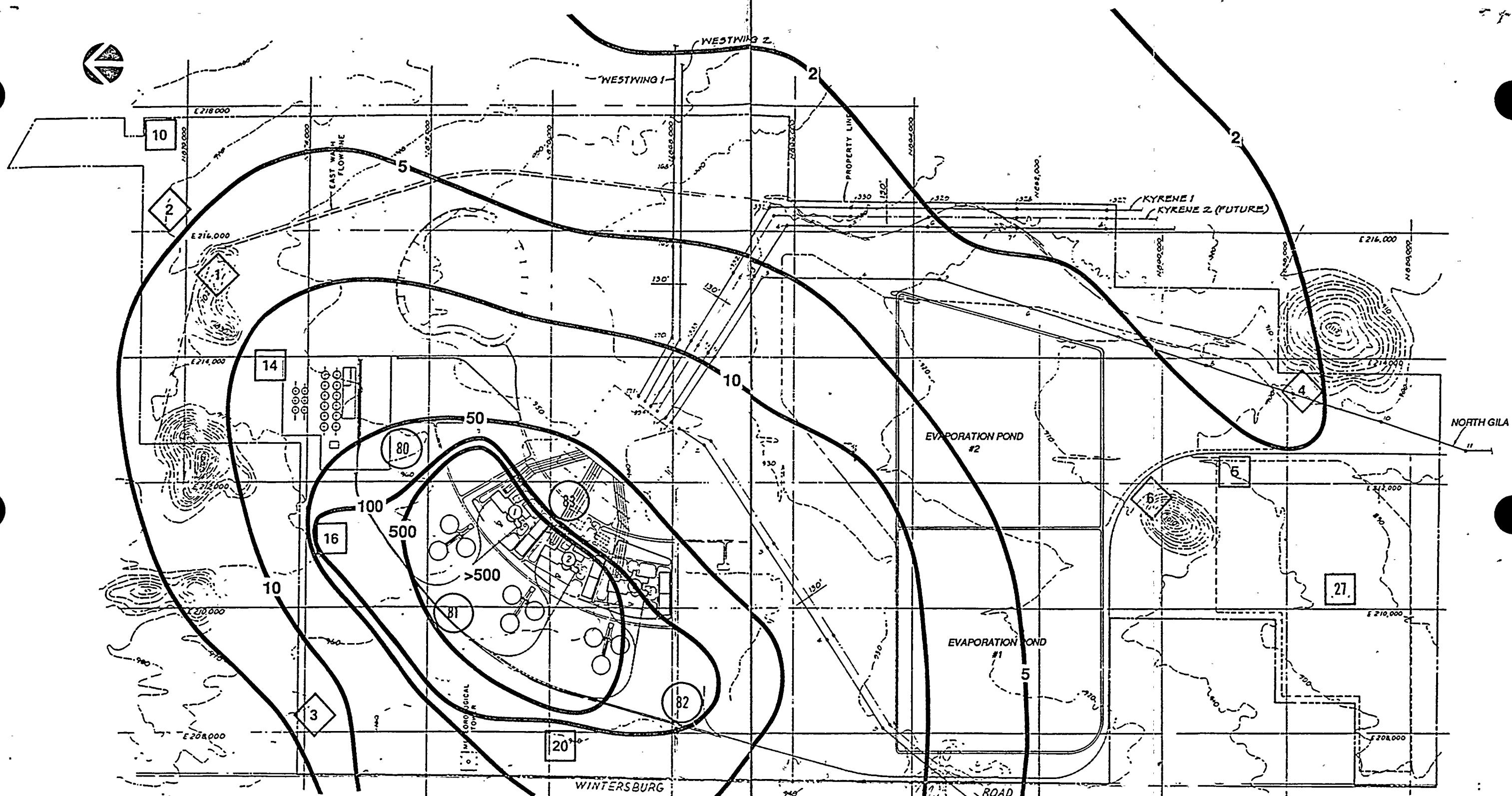


Figure 4-3. PVNGS cooling tower drift measurements percent mass flux vs. droplet diameter







Notes:  
 PVNGS 16-bin spectra (ESC, 1990) for Units 1 & 2  
 PVNGS 16-bin spectra (ESC, 1983) for Unit 3  
 01/01/90 - 12/31/90  
 0.00075% Drift rate for Units 1 & 2  
 0.0002% Drift rate for Unit 3  
 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 4-4

FOG code predictions of 1990 onsite drift deposition for PVNGS Units 1, 2, and 3

**SECRET**

2000

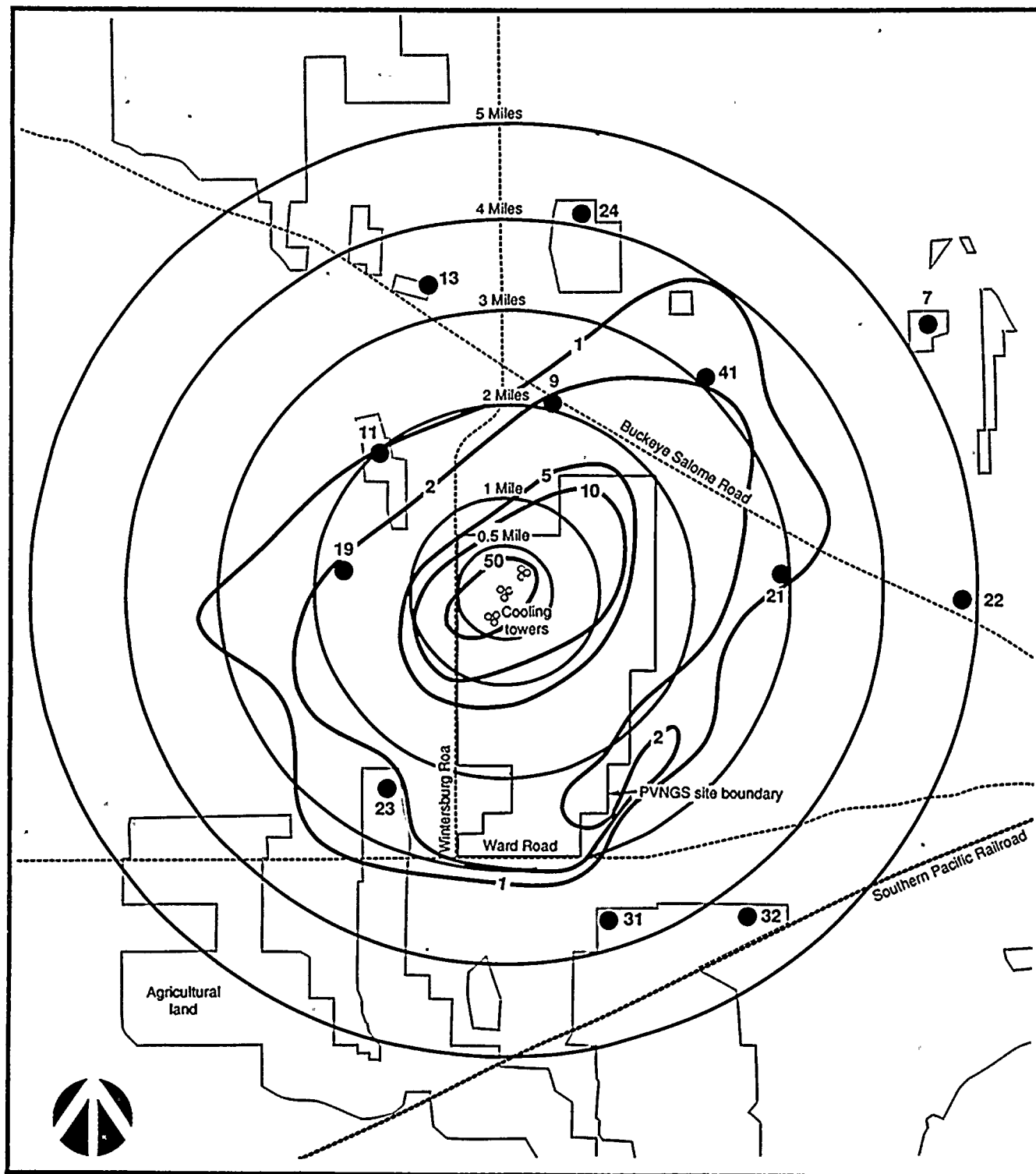
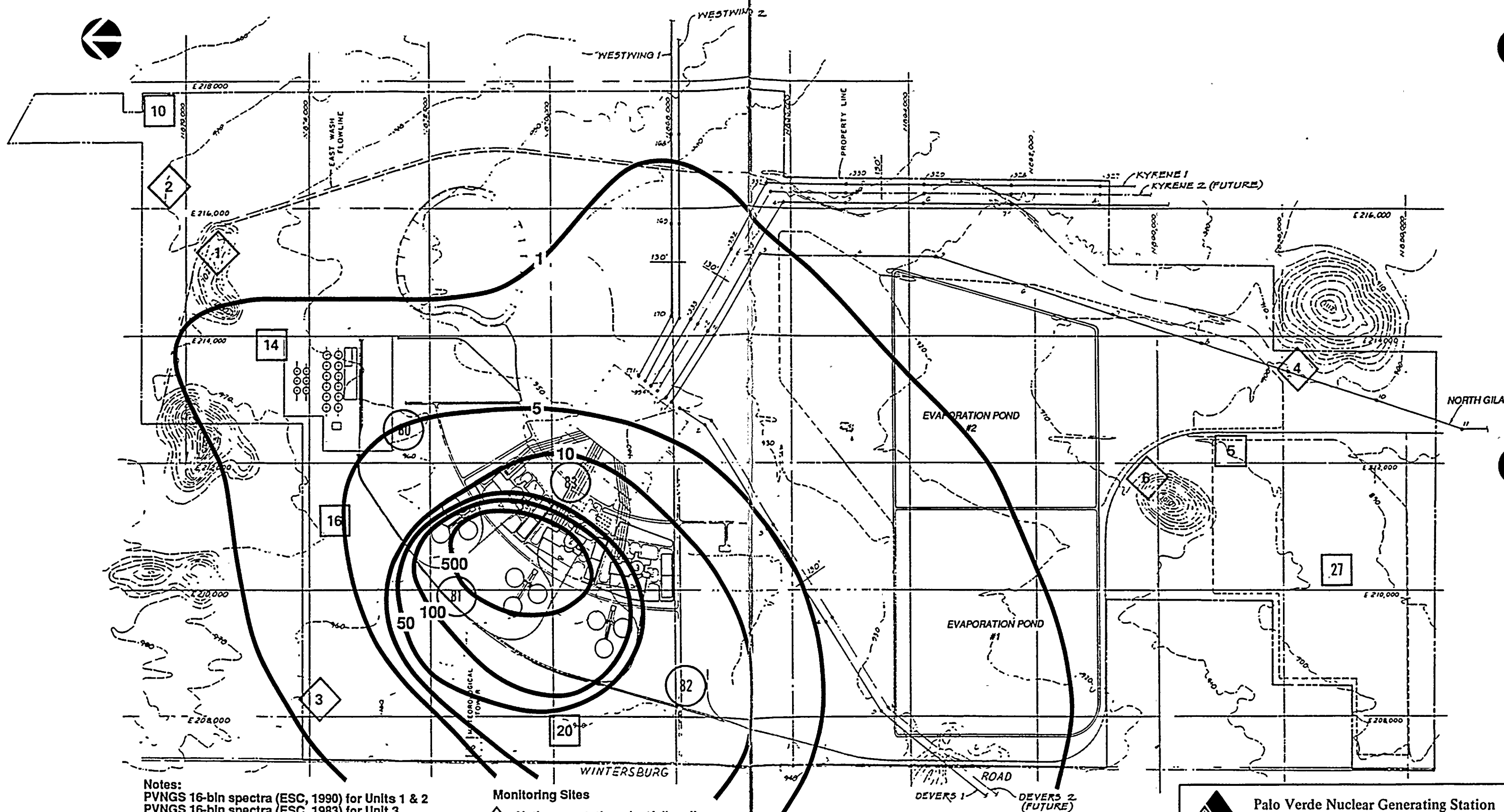


Figure 4-5. FOG code predictions of 1990 offsite drift deposition for PVNGS Units 1, 2, and 3





Notes:  
 PVNGS 16-bltn spectra (ESC, 1990) for Units 1 & 2  
 PVNGS 16-bltn spectra (ESC, 1983) for Unit 3  
 01/01/90 - 03/31/90  
 0.00075% Drift rate for Units 1 & 2  
 0.0002% Drift rate for Unit 3  
 3 Units (9 towers)  
 — Total drift deposition, lb/(acre) (quarter)

Monitoring Sites  
 ◆ Native vegetation, dustfall, soils  
 □ Dustfall, soils  
 ○ Dustfall

600 0 600 1200 Feet

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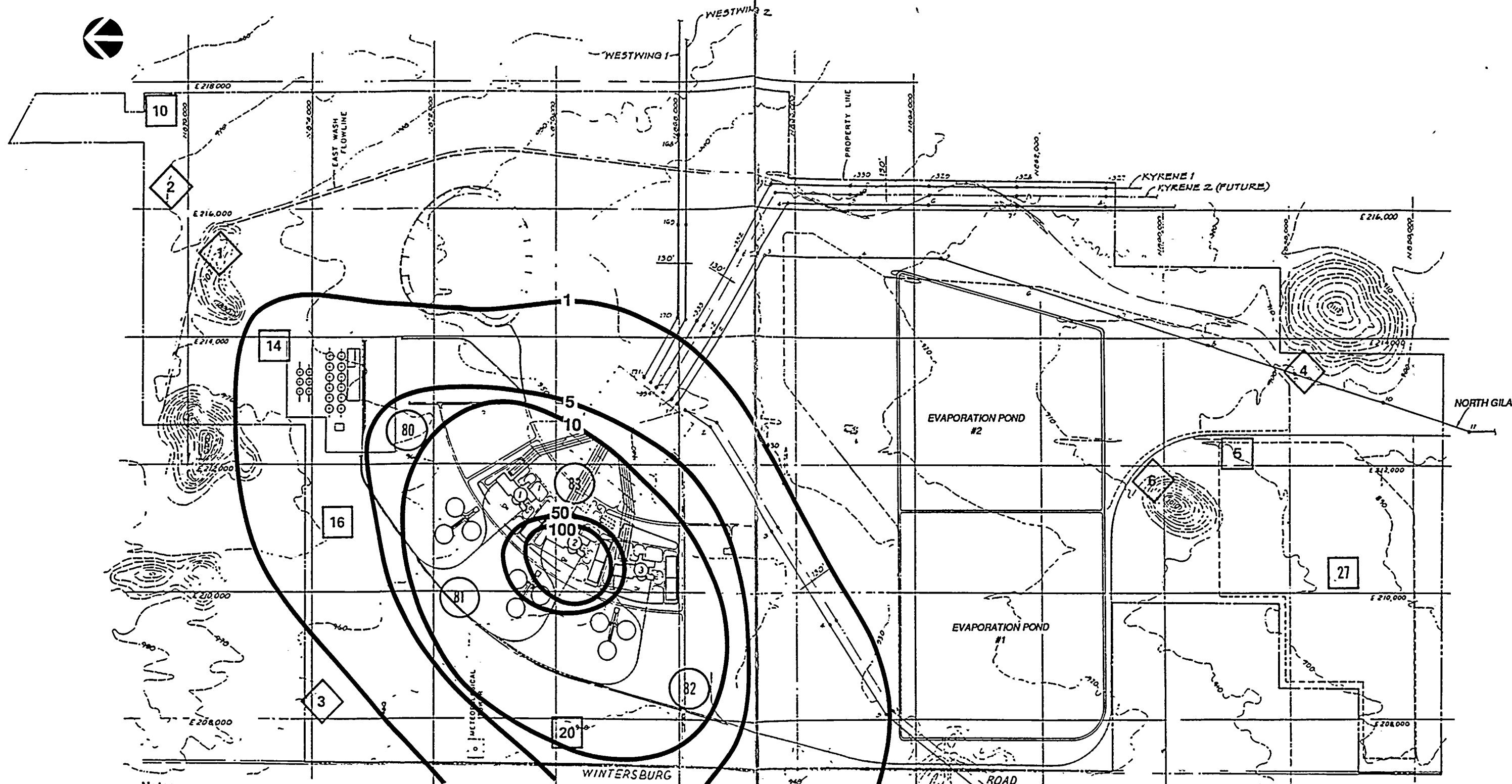
Figure 4-6

FOG code predictions of first quarter 1990  
onsite drift deposition for PVNGS Units 1, 2, and 3

9105090327-04  
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1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 84

1



Notes:  
 PVNGS 16-bin spectra (ESC, 1990) for Units 1 & 2  
 PVNGS 16-bin spectra (ESC, 1983) for Unit 3  
 04/01/90 - 06/30/90  
 0.00075% Drift rate for Units 1 & 2  
 0.0002% Drift rate for Unit 3  
 3 Units (9 towers)  
 Total drift deposition, lb/(acre) (quarter)

- Monitoring Sites
- ◆ Native vegetation, dustfall, soils
  - Dustfall, soils
  - Dustfall

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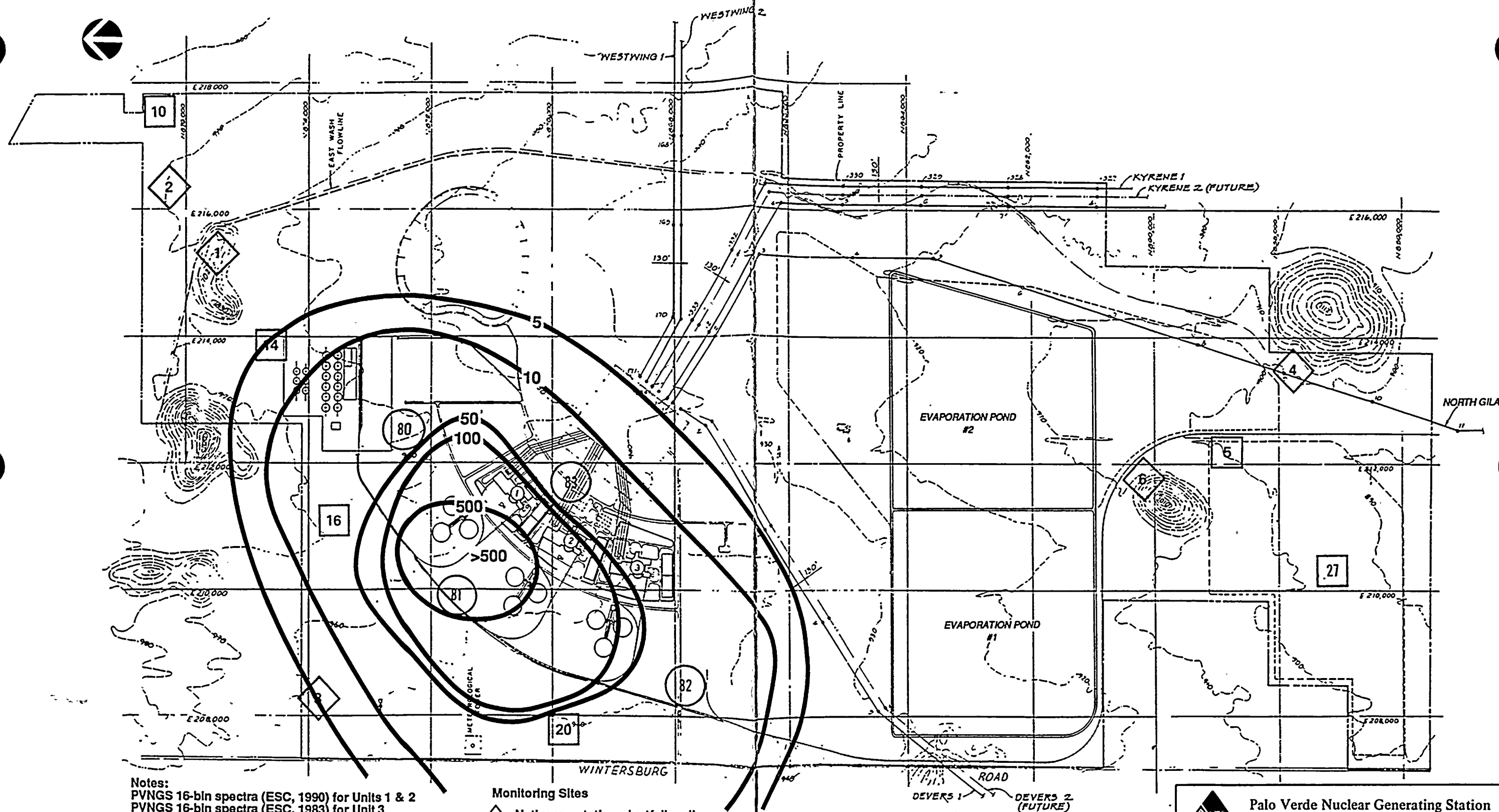
Figure 4-7

FOG code predictions of second quarter 1990  
 onsite drift deposition for PVNGS Units 1, 2, and 3

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Notes:  
 PVNGS 16-bln spectra (ESC, 1990) for Units 1 & 2  
 PVNGS 16-bln spectra (ESC, 1983) for Unit 3  
 07/01/90 - 09/30/90  
 0.00075% Drift rate for Units 1 & 2  
 0.0002% Drift rate for Unit 3  
 3 Units (9 towers)  
 Total drift deposition, lb/(acre) (quarter)

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

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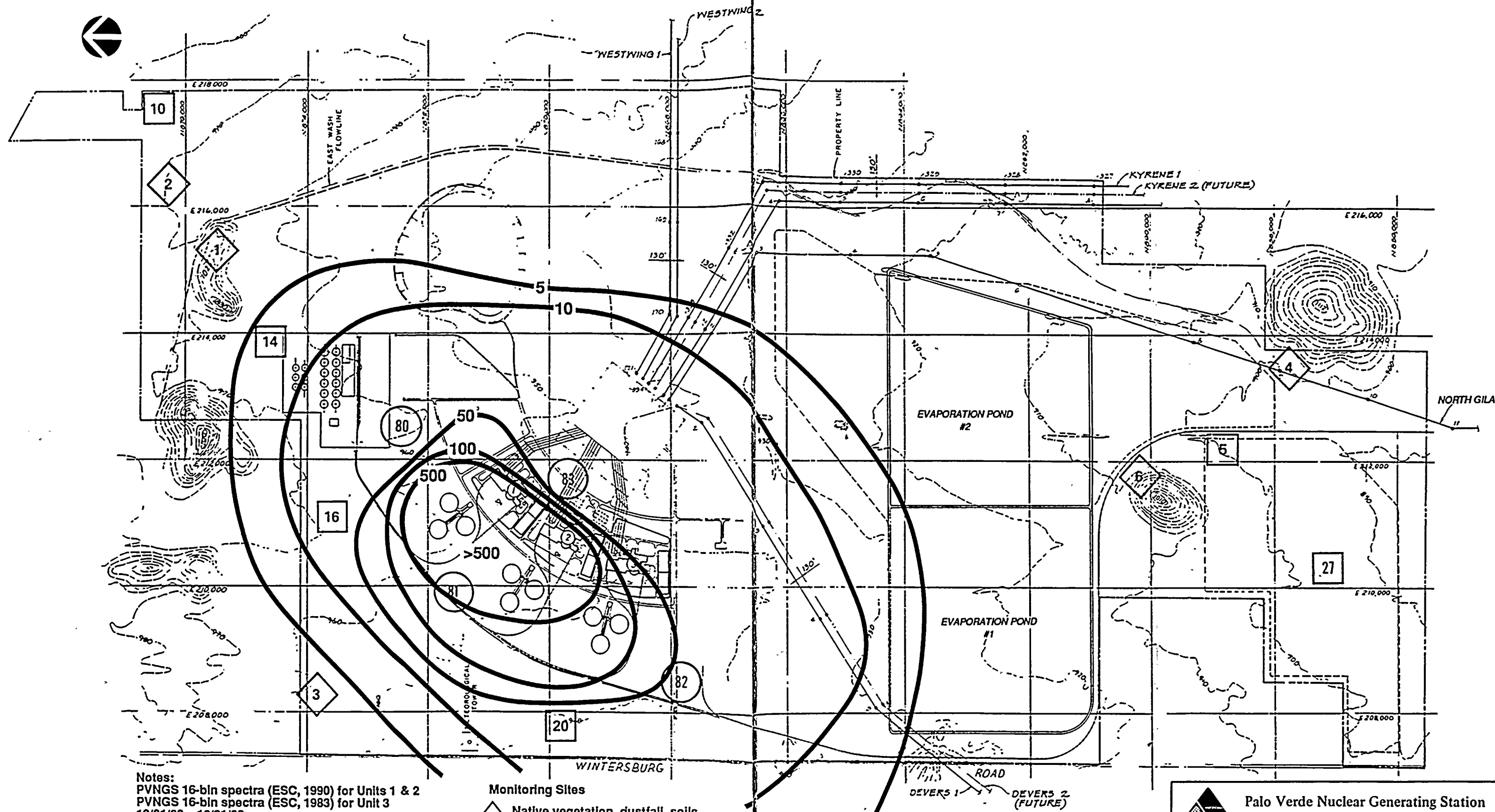
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Figure 4-8

FOG code predictions of third quarter 1990  
 onsite drift deposition for PVNGS Units 1, 2, and 3

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Notes:  
 PVNGS 16-bin spectra (ESC, 1990) for Units 1 & 2  
 PVNGS 16-bin spectra (ESC, 1983) for Unit 3  
 10/01/90 - 12/31/90  
 0.00075% Drift rate for Units 1 & 2  
 0.0002% Drift rate for Unit 3  
 3 Units (9 towers)  
 Total drift deposition, lb/(acre) (quarter)

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

600 0 600 1200 Feet

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Figure 4-9

FOG code predictions of fourth quarter 1990  
 onsite drift deposition for PVNGS Units 1, 2, and 3

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SECRETARY OF THE ARMY  
WASHINGTON, D. C.

## 5 Salt Deposition

### 5.1 INTRODUCTION

In order to monitor the amount of drift deposition in the area surrounding PVNGS, samples collected during 1990 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 results for the 12-month monitoring period of January 1 through December 31, 1990. 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 limit of detectability of the laboratory analytical procedures. Of the 14 parameters



measured in each sample, fluoride, sulfate, carbonate, ammonium, and copper were routinely below their analytical detection limits.

Detection limits for the analyzed parameters are presented 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

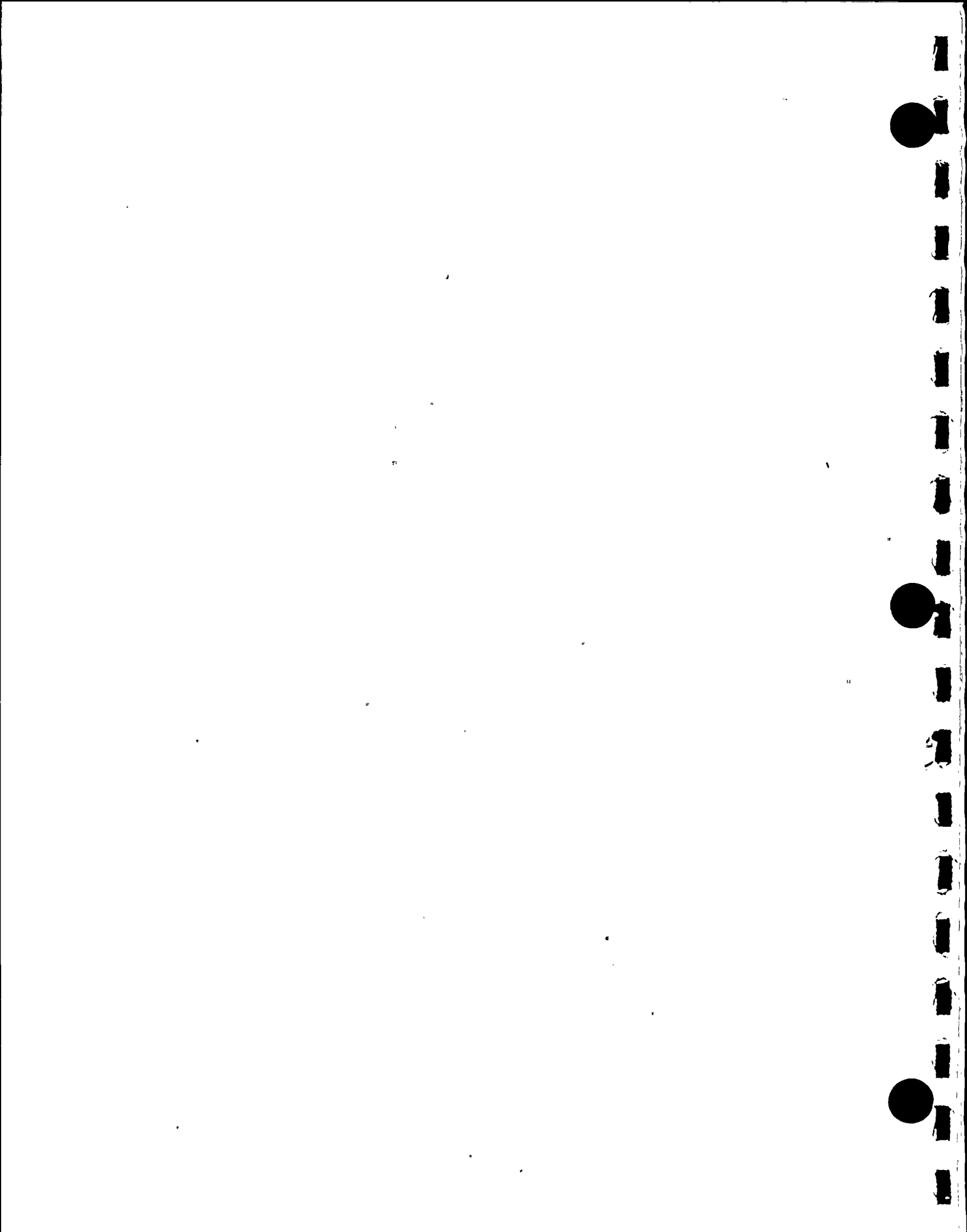
The data listed in Appendix C are collected and processed routinely; there is no field evaluation of changes at the monitoring locations or correction for significant concentrations of the measured ions in the field blanks of the sample collection water. Field evaluation of the samples is limited to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

Of the 13 agricultural monitoring locations, eight (sites 7, 12, 24, 25, 28, 31, 32, and 45) were fallow during the 1990 growing season. The deposition measured at these eight locations was probably less than it would be during periods of cultivation.

#### 5.2.2 Drift Deposition Results

The method for analyzing the 1990 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



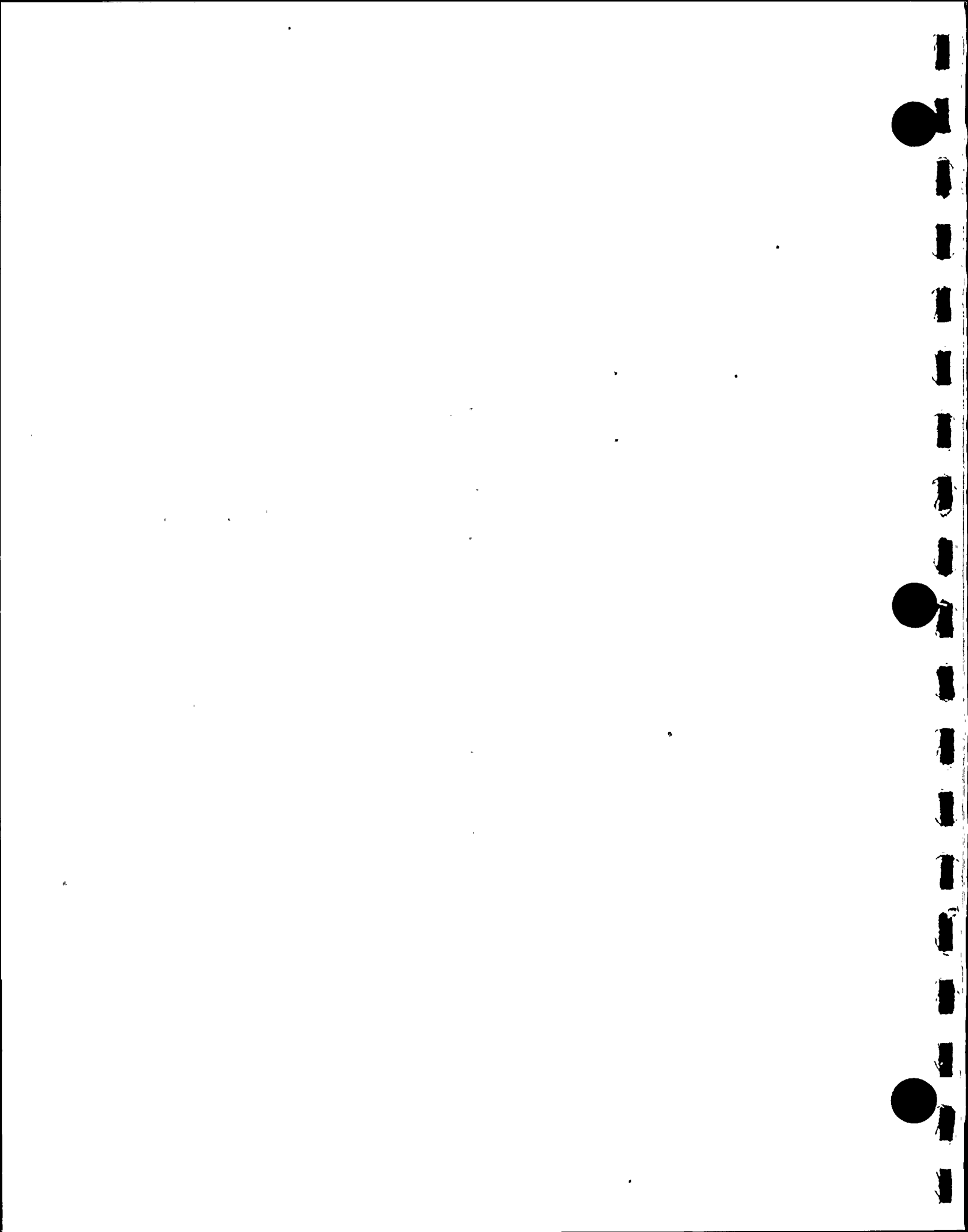


detection limit were considered missing. However, beginning in 1987, each collocated sample was included as a discrete datum. Data below the detection limit were assigned a value of one-half the detection limit. This method is suggested by Nehls and Akland (1973) for data sets containing values below 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.

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 potassium, calcium, magnesium, and total suspended solids 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. 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, and TSS was large both within a month and from month-to-month. 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. Because of this variability, the apparent peaks (except for sodium and chloride in September) are not statistically significant. Most ions had higher deposition in April, July, and August or September. This can be attributed to cultivation and planting in April and the dryness in July and August.

Table 5-3 presents an analysis of the deposition of three of the primary cations (sodium, potassium, and calcium) in the cooling tower basin water for each agricultural site. Sodium at sites 23 and 43 was significantly higher than at eight other agricultural sites, of which six (sites 7, 12, 24, 25, 28, and 45) were fallow during 1990. Potassium and calcium at site 23 were also significantly higher for the year than at the other 12 agricultural sites. This may be attributable to agricultural activity.

Examination of the data in Appendix C indicates that, among the agricultural sites, sites 23 and 30 had the maximum deposition rates of most ions, while sites 24, 25, and 28 (all 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 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 and chloride were essentially constant through June and then increased to a peak in September and a secondary peak in December. Calcium increased to a peak in July and showed a general decline through the year-end. Behavior similar to that of calcium was exhibited by TSS, potassium,



and magnesium. A January maximum, a trend seen in previous years, was not evident. 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 predominant cations (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  $\pm$  standard errors) of these cations for each native site. For sodium, the deposition at sites 20 and 81 was significantly greater (approximately 22 pounds per acre per year) than at all other native sites except site 80. The analyses for calcium indicate that the annual deposition at site 80 was significantly greater than that of any of the other sites. Site 80 is about 1500 feet southwest of the Water Reclamation Facility and west-southwest of the sludge landfill, and it is probably affected by the lime-drying and handling activities and the associated vehicular traffic at those locations. Similarly, sites 3, 9, 14, 19, and 83, which had significantly higher calcium deposition than most other sites, are also in the vicinity of the sludge landfill, except for site 19, which is west of the site. The annual deposition of potassium was significantly greater at site 19 than at any other site.

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 December. Both showed an overall increase through the year. Potassium, calcium, and phosphate displayed similar increases through the year but had peaks in July. No abnormal meteorological trends were evident in December that would account for this behavior. As shown in Figure 4-1, the combined nominal drift was at a maximum in August, and the power level was at the maximum for the year in December. The drift rate and power level were slightly lower than these maxima in October and November.

Table 5-5 presents the annual deposition (means  $\pm$  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, 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, calcium, and TSS between the values for sites 80-83 and those 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 for nitrate, phosphate, ammonium, and chloride were not computed for this table because more than 25 percent of the data for each analyte were below the detection limit. A comparison of these sites shows that potassium and calcium deposition at sites 25 and 43 (the agricultural sites) and site 40 (native) was significantly higher than that at site 42 (native), and that magnesium deposition at sites 25 and 40 also significantly exceeded that at site 42.

Sodium deposition at site 43 was significantly higher than that at the other three control sites. Site 40 (native) showed significantly higher deposition of TSS than sites 42 and 43.

#### 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.

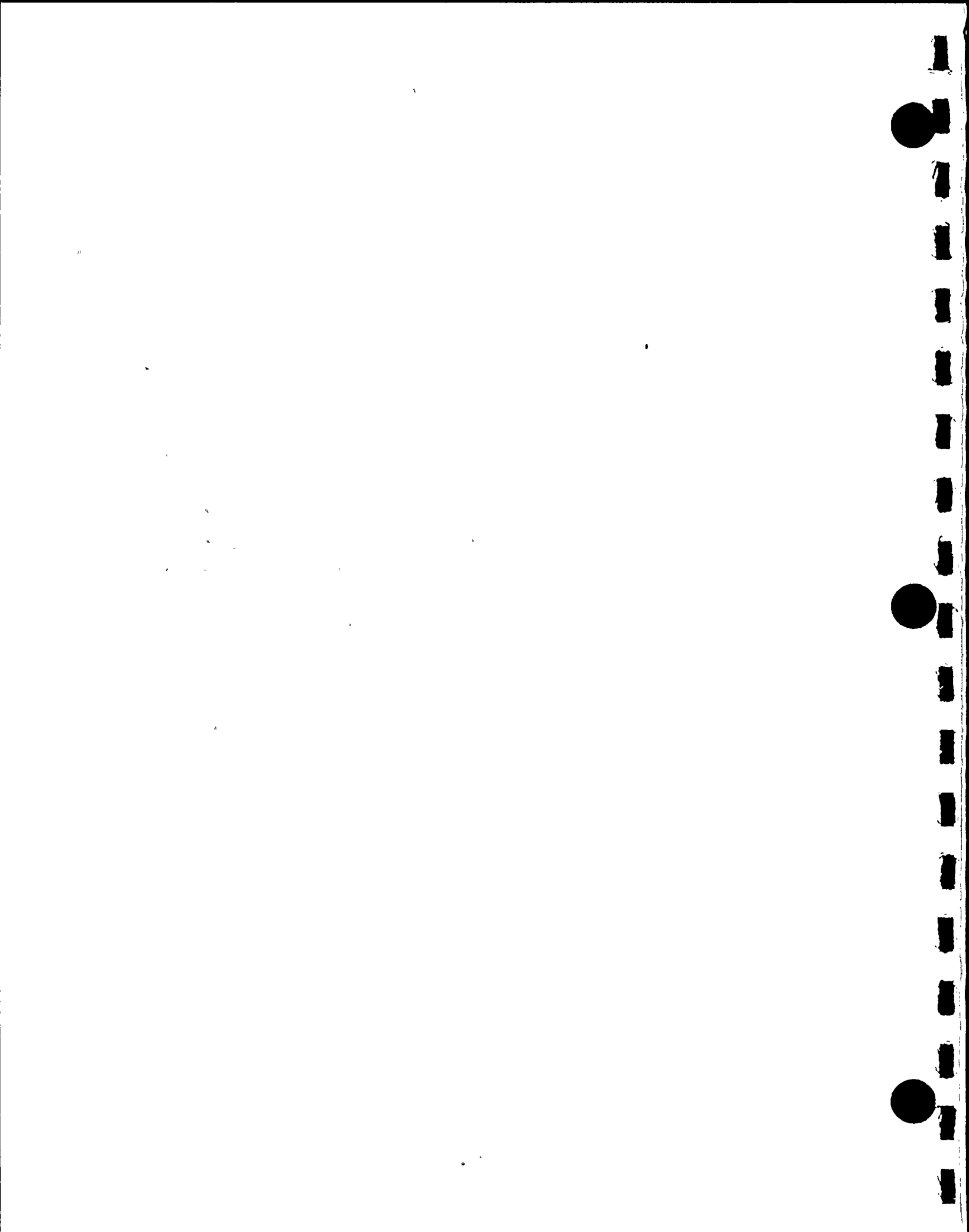
Table 5-7 presents the ratios of the average values for agricultural and native locations for sodium to potassium, sodium to calcium, sodium to magnesium, and sodium to nitrate. The native sites are broken down into three groups: all-native, onsite (less supplemental), and supplemental. Onsite locations in the comparison include sites 1-6, 10, 14, 16, 20, and 27. The corresponding average ratios for cooling tower water composition for 1990 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, except for the sodium/calcium ratio. 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. In 1990, increased deposition of drift constituents was clearly detectable both onsite and at offsite native (site 19) and agricultural (site 23) locations.
2. Agricultural sites showed significantly higher average salt deposition than native sites (Table 5-2), even when the supplemental onsite locations near the cooling towers were included in the latter set. This was 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 69 and 43 pounds per acre per year for the agricultural and native sites, respectively.

The deposition rate for sodium for the native sites was significantly lower than for the agricultural sites when the supplemental sites were not included in the calculation.



3. Characteristic of all sites was a great variability in monthly measurements of most ions and TSS. The exact pattern varied with the ion.
4. The deposition rates of two of the three predominant cations (calcium and potassium) were significantly higher at site 23 than those 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 23, about 2 miles southwest of the Unit 2 cooling towers. No other geographic trends were evident for agricultural sites.
5. The supplemental sites nearest the cooling towers had considerably higher mean salt deposition rates for sodium, calcium, chloride, and TSS than all other native sites (Table 5-5). However, sites 20 and 81 showed significantly higher deposition rates of sodium (22 pounds per acre) than all the other native sites except site 80 (Table 5-4). Site 80 (onsite) showed a significantly higher deposition rate of calcium (97 pounds per acre per year) than all other native sites. This was probably due to the sludge and bulk lime handling and calcining activities at the Water Reclamation Facility northeast of site 80.
6. Increased average salt deposition rates and higher ion ratios (Table 5-7) were generally observed at the onsite and supplemental sites. A comparison of these parameters with ratios for all native and agricultural sites clearly evidenced 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 parameters 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 (10-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 1990 are presented in Appendix D.

#### 5.3.2 Data Analysis

Table 5-8 presents monthly concentrations (means and standard errors) of sodium, calcium, magnesium, nitrate, sulfate, fluoride, and chloride. As with the drift deposition data, 10-vol data below the laboratory detection limit were included, assuming their value to be one-half that limit. Nearly all analyses for iron, potassium, and phosphate were below detection limits, and these ions were not included in any comparative evaluations. Mean concentrations of magnesium, nitrate, and fluoride varied little between sites; sodium, calcium, sulfate, and chloride showed more variability. Sodium and chloride, primary ions in the PVNGS cooling tower drift, showed a small but statistically significant peak in mean concentrations at site 20. Site 20 is the 10-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 10-vol filters, iron is the only element that was not measured in the drift deposition. However, only five ions (sodium, calcium, chloride, nitrate, and magnesium) were present in both deposition and airborne samples at concentrations greater



than their respective detection limits. Three of the five predominant ions were compared for possible associations between airborne concentrations and deposition using correlation coefficients; chloride and nitrate were not analyzed because of the large percentage of deposition and lo-vol data below 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, 1990

| 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   | 1.8  |
| Potassium, total | 0.1                               | 1.8   | 10.0   |
| Calcium, total   | 0.1                               | 1.8   | 0.0  |
| Magnesium, total | 0.05                              | 0.9   | 5.0  |
| Chloride         | 0.3                               | 5.4   | 50.3   |
| Fluoride         | 0.5                               | 9.0   | 99.3   |
| Sulfate          | 1.0                               | 18.0  | 90.8   |
| Nitrate (as N)   | 0.05                              | 0.9   | 67.1   |
| Phosphate (as P) | 0.02                              | 0.36  | 68.5   |
| Carbonate        | 5.0                               | †   | 100.0  |
| Bicarbonate      | 5.0                               | 90.0  | 62.4   |
| Ammonium (as N)  | 0.2                               | 3.6   | 81.8   |
| TSS (at 105°C)   | 5.0                               | 90.0  | 15.8   |
| Copper, total    | 0.1                               | ‡   | 95.5   |

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, 1990 (means  $\pm$  standard errors)

| Constituent      | Agricultural sites | Native sites     | Ratio, agricultural to native sites |
|------------------|--------------------|------------------|-------------------------------------|
| Sodium           | 7.0 $\pm$ 0.5      | 7.0 $\pm$ 0.3    | 1.0 $\pm$ 0.08                      |
| Potassium        | 7.1 $\pm$ 0.6      | 3.3 $\pm$ 0.1    | 2.2 $\pm$ 0.20                      |
| Calcium          | 34.1 $\pm$ 2.6     | 17.7 $\pm$ 1.0   | 1.9 $\pm$ 0.18                      |
| Magnesium        | 10.5 $\pm$ 1.1     | 4.9 $\pm$ 0.2    | 2.1 $\pm$ 0.24                      |
| Nitrate (as N)   | 1.0 $\pm$ 0.1      | 1.0 $\pm$ 0.04   | 1.0 $\pm$ 0.11                      |
| Phosphate (as P) | 0.7 $\pm$ 0.1      | 0.3 $\pm$ 0.01   | 2.3 $\pm$ 0.34                      |
| Ammonium (as N)  | 2.9 $\pm$ 0.2      | 2.2 $\pm$ 0.06   | 1.3 $\pm$ 0.10                      |
| Chloride         | 5.8 $\pm$ 0.4      | 6.4 $\pm$ 0.3    | 0.9 $\pm$ 0.08                      |
| TSS              | 864.7 $\pm$ 92.5   | 423.4 $\pm$ 19.2 | 2.0 $\pm$ 0.23                      |

Key: TSS, total suspended solids.

Table 5-3. Deposition (lb/(acre)(yr)) of sodium, potassium, and calcium at PVNGS agricultural sites, 1990 (means  $\pm$  standard errors)

| Site | Sodium             | Potassium         | Calcium           |
|------|--------------------|-------------------|-------------------|
| 7    | 3.9 $\pm$ 0.4a     | 3.1 $\pm$ 0.4a    | 22.9 $\pm$ 6.4abc |
| 11   | 5.0 $\pm$ 0.6ab    | 4.8 $\pm$ 0.8abc  | 25.7 $\pm$ 3.5abc |
| 12   | 4.9 $\pm$ 0.9ab    | 6.5 $\pm$ 1.5abcd | 19.6 $\pm$ 2.8abc |
| 13   | 6.9 $\pm$ 1.0abcd  | 7.3 $\pm$ 1.1cd   | 32.3 $\pm$ 5.2bcd |
| 23   | 12.71 $\pm$ 1.7e   | 33.1 $\pm$ 4.3e   | 145.5 $\pm$ 16.8e |
| 24   | 4.8 $\pm$ 1.2ab    | 3.4 $\pm$ 0.5abc  | 16.5 $\pm$ 1.6ab  |
| 25   | 3.6 $\pm$ 0.3a     | 5.1 $\pm$ 0.9abc  | 14.2 $\pm$ 1.7a   |
| 28   | 5.2 $\pm$ 1.1abc   | 2.7 $\pm$ 0.4a    | 33.9 $\pm$ 7.1bcd |
| 30   | 8.4 $\pm$ 0.7abcde | 9.4 $\pm$ 1.2d    | 47.2 $\pm$ 5.4d   |
| 31   | 10.3 $\pm$ 4.3cde  | 3.0 $\pm$ 0.6a    | 18.0 $\pm$ 2.7abc |
| 32   | 9.1 $\pm$ 2.0bcde  | 7.1 $\pm$ 1.2bcd  | 34.2 $\pm$ 5.9cd  |
| 43   | 11.0 $\pm$ 3.6de   | 4.9 $\pm$ 0.7abc  | 14.7 $\pm$ 1.2a   |
| 45   | 4.9 $\pm$ 0.4ab    | 3.3 $\pm$ 0.4ab   | 23.9 $\pm$ 5.8abc |

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



Table 5-4. Deposition (lb/(acre)(yr)) of sodium, potassium, and calcium at PVNGS native monitoring sites, 1990 (means  $\pm$  standard errors)

| Site | Sodium             | Potassium          | Calcium             |
|------|--------------------|--------------------|---------------------|
| 1*   | 5.1 $\pm$ 0.5abcd  | 2.7 $\pm$ 0.4abc   | 14.0 $\pm$ 1.7abcd  |
| 2*   | 5.4 $\pm$ 0.6abcd  | 2.9 $\pm$ 0.4abcd  | 13.3 $\pm$ 2.2abcd  |
| 3*   | 11.2 $\pm$ 0.4efg  | 4.4 $\pm$ 0.6def   | 22.4 $\pm$ 2.4cdef  |
| 4*   | 5.7 $\pm$ 1.1abcd  | 3.4 $\pm$ 0.4abcde | 17.5 $\pm$ 2.0abcde |
| 5*   | 5.6 $\pm$ 0.7abcd  | 2.8 $\pm$ 0.3abcd  | 19.0 $\pm$ 3.1abcde |
| 6*   | 8.9 $\pm$ 3.2def   | 3.0 $\pm$ 0.5abcd  | 16.6 $\pm$ 2.4abcde |
| 8    | 4.9 $\pm$ 0.5abcd  | 2.6 $\pm$ 0.2ab    | 13.2 $\pm$ 1.9abcd  |
| 9    | 6.1 $\pm$ 0.8abcd  | 3.6 $\pm$ 0.5bcde  | 22.2 $\pm$ 3.2bcdef |
| 10*  | 5.6 $\pm$ 0.7abcd  | 3.1 $\pm$ 0.5abcde | 15.6 $\pm$ 2.0abcd  |
| 14*  | 8.0 $\pm$ 1.1bcde  | 3.0 $\pm$ 0.5abcd  | 30.2 $\pm$ 7.9ef    |
| 15   | 3.7 $\pm$ 0.4abc   | 2.9 $\pm$ 0.4abcd  | 15.4 $\pm$ 2.1abcd  |
| 16*  | 8.4 $\pm$ 1.2cdef  | 3.2 $\pm$ 0.4abcde | 17.4 $\pm$ 3.1abcde |
| 17   | 4.0 $\pm$ 0.4abc   | 3.0 $\pm$ 0.7abcd  | 9.4 $\pm$ 1.0abcd   |
| 18   | 5.6 $\pm$ 0.8abcd  | 2.6 $\pm$ 0.3ab    | 11.6 $\pm$ 1.7abcd  |
| 19   | 7.0 $\pm$ 1.0abcde | 9.7 $\pm$ 1.9g     | 34.8 $\pm$ 5.7f     |
| 20*  | 21.5 $\pm$ 4.9i    | 4.3 $\pm$ 0.5cde   | 14.6 $\pm$ 2.0abcd  |
| 21   | 3.8 $\pm$ 0.3abc   | 2.4 $\pm$ 0.3ab    | 11.1 $\pm$ 0.9abcd  |
| 22   | 3.0 $\pm$ 0.3a     | 2.4 $\pm$ 0.3ab    | 11.6 $\pm$ 1.4abcd  |
| 26   | 4.9 $\pm$ 0.8abcd  | 2.7 $\pm$ 0.4abc   | 11.9 $\pm$ 1.1abcd  |
| 27*  | 5.1 $\pm$ 0.6abcd  | 3.1 $\pm$ 0.5abcde | 12.5 $\pm$ 1.8abcd  |
| 33   | 8.4 $\pm$ 3.3cdef  | 3.0 $\pm$ 0.5abcd  | 14.9 $\pm$ 2.0abcd  |
| 34   | 3.1 $\pm$ 0.3a     | 1.9 $\pm$ 0.2a     | 9.4 $\pm$ 0.9abcd   |
| 35   | 3.1 $\pm$ 0.3ab    | 3.2 $\pm$ 0.4abcde | 14.3 $\pm$ 2.1abcd  |
| 36   | 3.0 $\pm$ 0.3a     | 2.3 $\pm$ 0.3ab    | 8.8 $\pm$ 1.0ab     |
| 37   | 7.0 $\pm$ 2.2abcde | 2.8 $\pm$ 0.6abc   | 8.9 $\pm$ 0.7ab     |
| 38   | 2.9 $\pm$ 0.3a     | 1.9 $\pm$ 0.2a     | 9.6 $\pm$ 1.3abcd   |
| 39   | 3.0 $\pm$ 0.2a     | 2.3 $\pm$ 0.3ab    | 7.5 $\pm$ 0.7a      |
| 40   | 3.5 $\pm$ 0.4ab    | 4.7 $\pm$ 0.7ef    | 15.7 $\pm$ 2.0abcd  |
| 41   | 4.0 $\pm$ 0.3abc   | 2.5 $\pm$ 0.3ab    | 15.6 $\pm$ 2.7abcd  |
| 42   | 3.4 $\pm$ 0.2ab    | 2.4 $\pm$ 0.2ab    | 9.1 $\pm$ 1.0abc    |
| 44   | 3.9 $\pm$ 0.4abc   | 3.6 $\pm$ 0.5bcde  | 13.4 $\pm$ 1.5abcd  |
| 80*  | 17.8 $\pm$ 3.2hi   | 6.1 $\pm$ 1.5f     | 97.2 $\pm$ 26.5g    |
| 81*  | 21.8 $\pm$ 3.5i    | 3.8 $\pm$ 0.5bcde  | 21.0 $\pm$ 2.9abcde |
| 82*  | 13.2 $\pm$ 2.4fgh  | 3.2 $\pm$ 0.5abcde | 21.2 $\pm$ 3.2bcde  |
| 83*  | 13.8 $\pm$ 2.3gh   | 3.1 $\pm$ 0.3abcd  | 22.9 $\pm$ 2.4def   |

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, 1990 (means  $\pm$  standard errors)

| Constituent                   | All native sites<br>(except 80-83) | All onsite sites*<br>(except 80-83) | Sites 80-83      |
|-------------------------------|------------------------------------|-------------------------------------|------------------|
| Sodium                        | 5.8 $\pm$ 0.3                      | 8.3 $\pm$ 0.7                       | 16.7 $\pm$ 1.5   |
| Potassium                     | 3.2 $\pm$ 0.1a                     | 3.3 $\pm$ 0.1a                      | 4.0 $\pm$ 0.4a   |
| Calcium                       | 14.9 $\pm$ 0.5                     | 17.6 $\pm$ 1.0                      | 39.7 $\pm$ 7.2   |
| Magnesium                     | 4.4 $\pm$ 0.2a                     | 4.9 $\pm$ 0.3a                      | 9.0 $\pm$ 1.4    |
| Nitrate (as N) <sup>†</sup>   | 0.9 $\pm$ 0.04                     | 1.0 $\pm$ 0.1                       | 1.2 $\pm$ 0.2    |
| Phosphate (as P) <sup>†</sup> | 0.3 $\pm$ 0.01                     | 0.3 $\pm$ 0.03                      | 0.4 $\pm$ 0.1    |
| Ammonium (as N) <sup>†</sup>  | 2.2 $\pm$ 0.1                      | 2.4 $\pm$ 0.2                       | 2.1 $\pm$ 0.2    |
| Chloride <sup>†</sup>         | 5.2 $\pm$ 0.2                      | 7.3 $\pm$ 0.6                       | 15.5 $\pm$ 1.3   |
| TSS                           | 396.2 $\pm$ 18.0a                  | 415.1 $\pm$ 27.5a                   | 638.5 $\pm$ 92.3 |

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.

<sup>†</sup>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, 1990 (means  $\pm$  standard errors)

| Constituent                   | Agricultural sites  |                    | Native sites      |                   |
|-------------------------------|---------------------|--------------------|-------------------|-------------------|
|                               | 25                  | 43                 | 40                | 42                |
| Sodium                        | 3.6 $\pm$ 0.3a      | 11.0 $\pm$ 3.6b    | 3.5 $\pm$ 0.4a    | 3.4 $\pm$ 0.2a    |
| Potassium                     | 5.1 $\pm$ 0.9b      | 4.9 $\pm$ 0.7b     | 4.7 $\pm$ 0.7b    | 2.4 $\pm$ 0.2a    |
| Calcium                       | 14.2 $\pm$ 1.7b     | 14.7 $\pm$ 1.2b    | 15.7 $\pm$ 2.0b   | 9.1 $\pm$ 1.0a    |
| Magnesium                     | 5.8 $\pm$ 0.8b      | 4.1 $\pm$ 0.5ab    | 5.9 $\pm$ 1.1b    | 3.1 $\pm$ 0.5a    |
| Nitrate (as N) <sup>†</sup>   | 0.6 $\pm$ 0.1       | 1.2 $\pm$ 0.2      | 0.6 $\pm$ 0.1     | 1.0 $\pm$ 0.2     |
| Phosphate (as P) <sup>†</sup> | 0.4 $\pm$ 0.1       | 0.8 $\pm$ 0.2      | 0.4 $\pm$ 0.1     | 0.3 $\pm$ 0.1     |
| Ammonium (as N) <sup>†</sup>  | 2.4 $\pm$ 0.2       | 6.4 $\pm$ 1.5      | 2.3 $\pm$ 0.3     | 1.8 $\pm$ 0.2     |
| Chloride <sup>†</sup>         | 4.0 $\pm$ 0.8       | 9.6 $\pm$ 2.0      | 3.3 $\pm$ 0.4     | 3.5 $\pm$ 0.3     |
| TSS                           | 510.9 $\pm$ 107.9bc | 327.8 $\pm$ 49.6ab | 546.5 $\pm$ 91.2c | 275.4 $\pm$ 46.8a |

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

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

Table 5-7. Ratios of ionic constituents of drift deposition at PVNGS monitoring sites and in cooling tower basin water, 1990

| Ratio            | Drift deposition       |                   |                           |                    | Cooling tower basin water <sup>‡</sup> |
|------------------|------------------------|-------------------|---------------------------|--------------------|--|
|                  | All agricultural sites | All native sites* | Onsite sites <sup>†</sup> | Supplemental sites |  |
| Sodium/potassium | 1.0                    | 2.1               | 2.5                       | 4.2                | 22.3                                   |
| Sodium/calcium   | 0.2                    | 0.4               | 0.5                       | 0.4                | 13.4                                   |
| Sodium/magnesium | 0.7                    | 1.4               | 1.7                       | 1.9                | 224.8                                  |
| Sodium/nitrate   | 7.0                    | 7.0               | 8.3                       | 13.5               | 22.1                                   |

\*Includes onsite and supplemental sites.

<sup>†</sup>Sites 1-6, 10, 14, 16, 20, and 27.

<sup>‡</sup>Weighted average based on number of months of operations for Units 1-3.



Table 5-8. Mean monthly concentrations of suspended particulates ( $\mu\text{g}/\text{m}^3$ ) collected by low-volume air samplers at PVNGS monitoring sites, 1990 (means  $\pm$  standard errors)

| Ion            | Site            |                 |                 |                 |                 |                 |
|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                | 8               | 9               | 10              | 20              | 21              | 27              |
| Sodium         | 0.63 $\pm$ 0.05 | 0.62 $\pm$ 0.04 | 0.64 $\pm$ 0.04 | 0.83 $\pm$ 0.08 | 0.60 $\pm$ 0.03 | 0.60 $\pm$ 0.04 |
| Calcium        | 1.35 $\pm$ 0.09 | 2.02 $\pm$ 0.11 | 1.63 $\pm$ 0.10 | 1.52 $\pm$ 0.09 | 1.48 $\pm$ 0.12 | 1.33 $\pm$ 0.10 |
| Magnesium      | 0.08 $\pm$ 0.01 | 0.11 $\pm$ 0.01 | 0.10 $\pm$ 0.01 | 0.09 $\pm$ 0.01 | 0.08 $\pm$ 0.01 | 0.08 $\pm$ 0.01 |
| Nitrate (as N) | 0.19 $\pm$ 0.01 | 0.23 $\pm$ 0.01 | 0.23 $\pm$ 0.01 | 0.22 $\pm$ 0.01 | 0.20 $\pm$ 0.01 | 0.21 $\pm$ 0.01 |
| Sulfate        | 1.61 $\pm$ 0.27 | 1.53 $\pm$ 0.22 | 1.46 $\pm$ 0.26 | 1.86 $\pm$ 0.22 | 1.56 $\pm$ 0.25 | 1.52 $\pm$ 0.22 |
| Fluoride       | 0.03 $\pm$ 0.00 | 0.04 $\pm$ 0.00 | 0.04 $\pm$ 0.00 | 0.04 $\pm$ 0.00 | 0.04 $\pm$ 0.00 | 0.03 $\pm$ 0.00 |
| Chloride       | 0.26 $\pm$ 0.04 | 0.26 $\pm$ 0.04 | 0.26 $\pm$ 0.04 | 0.45 $\pm$ 0.07 | 0.25 $\pm$ 0.03 | 0.25 $\pm$ 0.03 |



Table 5-9. Correlation, R, between deposition and airborne concentration of predominant ions at PVNGS low-volume air sampler monitoring sites, 1990

| Site | Ion     |           |        |
|------|---------|-----------|--------|
|      | Calcium | Magnesium | Sodium |
| 8    | 0.49    | 0.07      | 0.16   |
| 9    | 0.26    | 0.73      | 0.28   |
| 10   | 0.17    | 0.42      | 0.35   |
| 20   | 0.07    | 0.71      | 0.52   |
| 21   | 0.33    | 0.31      | 0.28   |
| 27   | 0.36    | 0.34      | 0.10   |



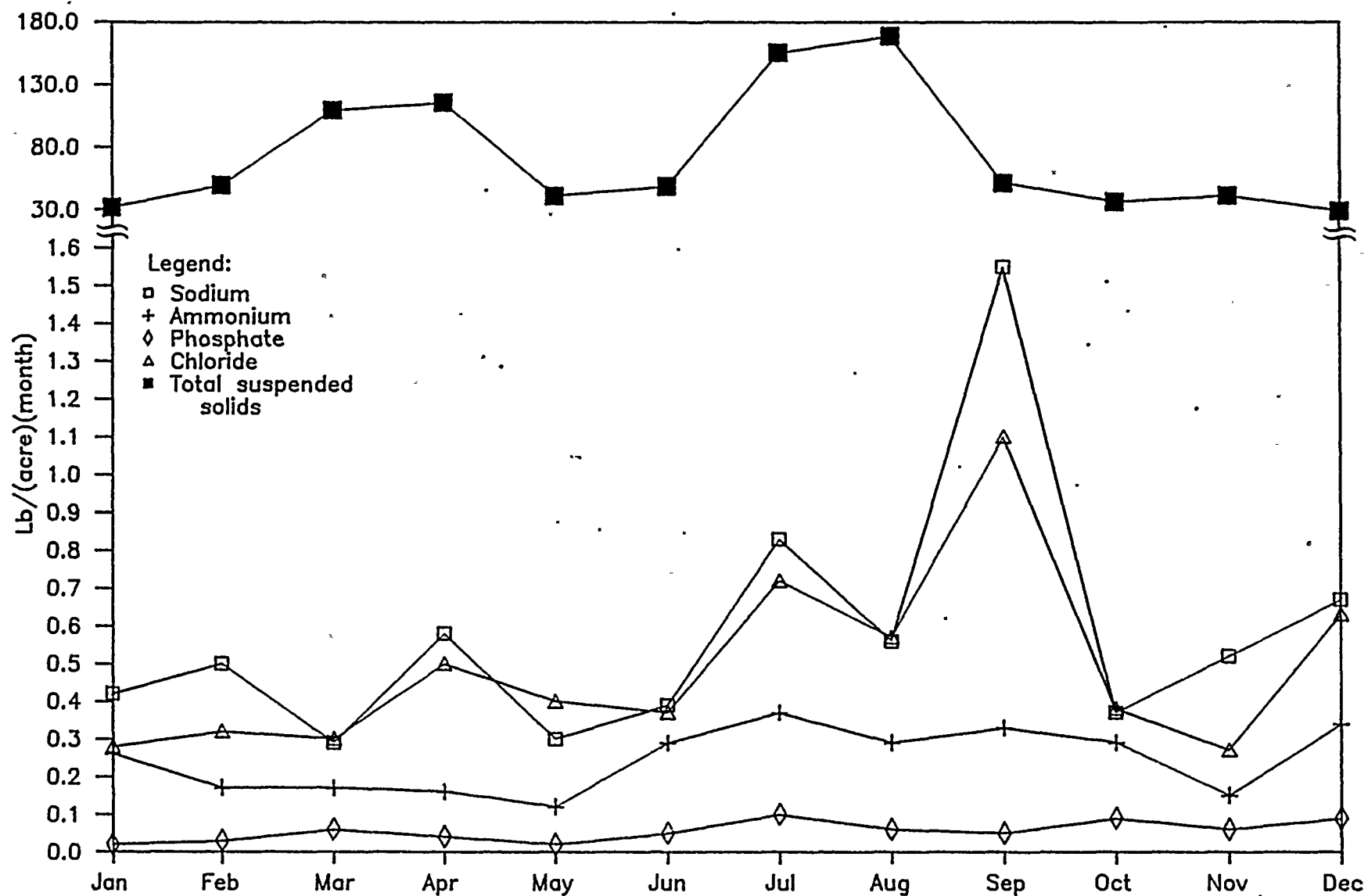


Figure 5-1. Mean monthly deposition of total suspended solids, sodium, ammonium, phosphate, and chloride at PVNGS agricultural monitoring sites, 1990





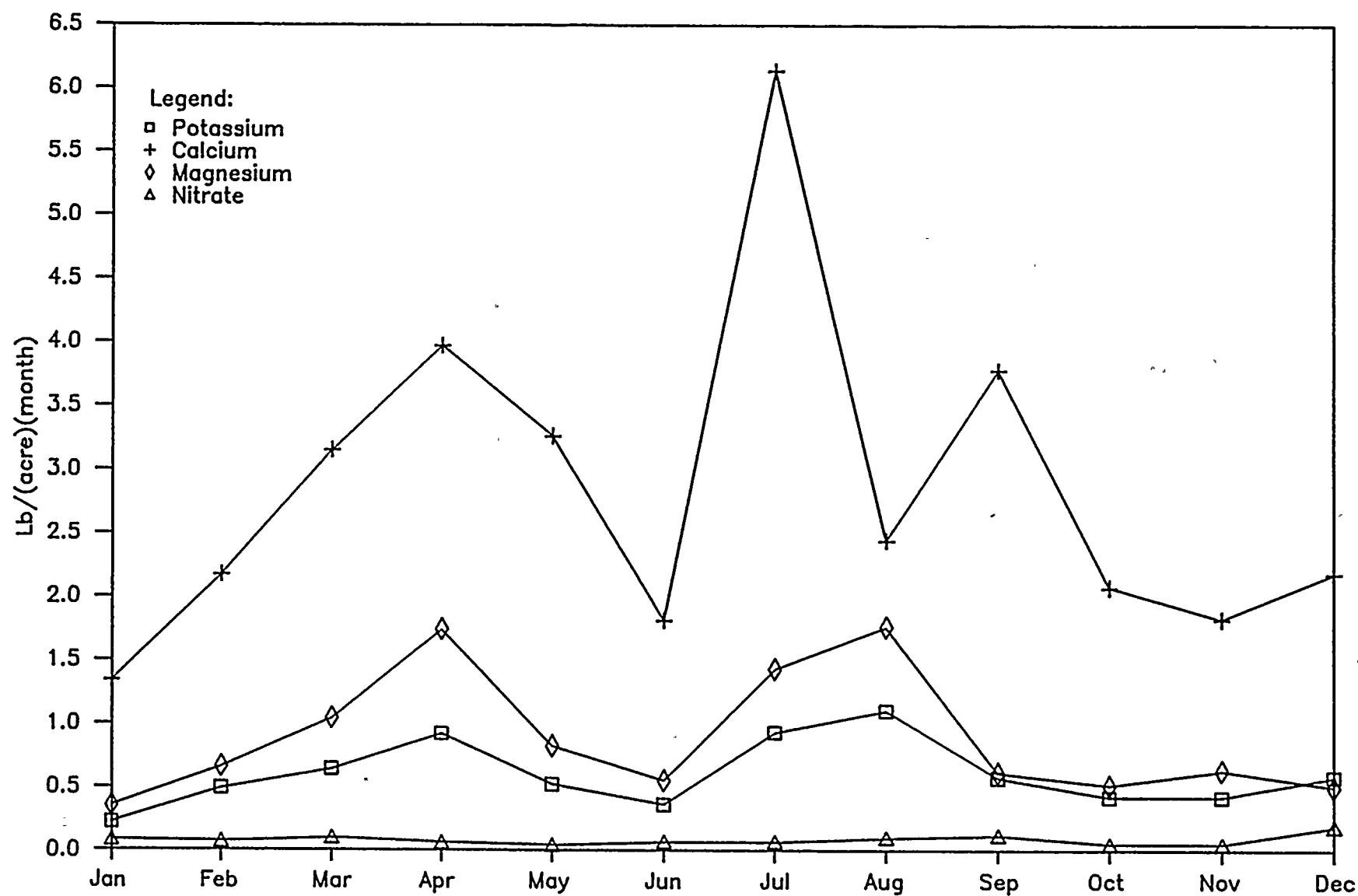


Figure 5-2. Mean monthly deposition of potassium, calcium, magnesium, and nitrate at PVNGS agricultural monitoring sites, 1990



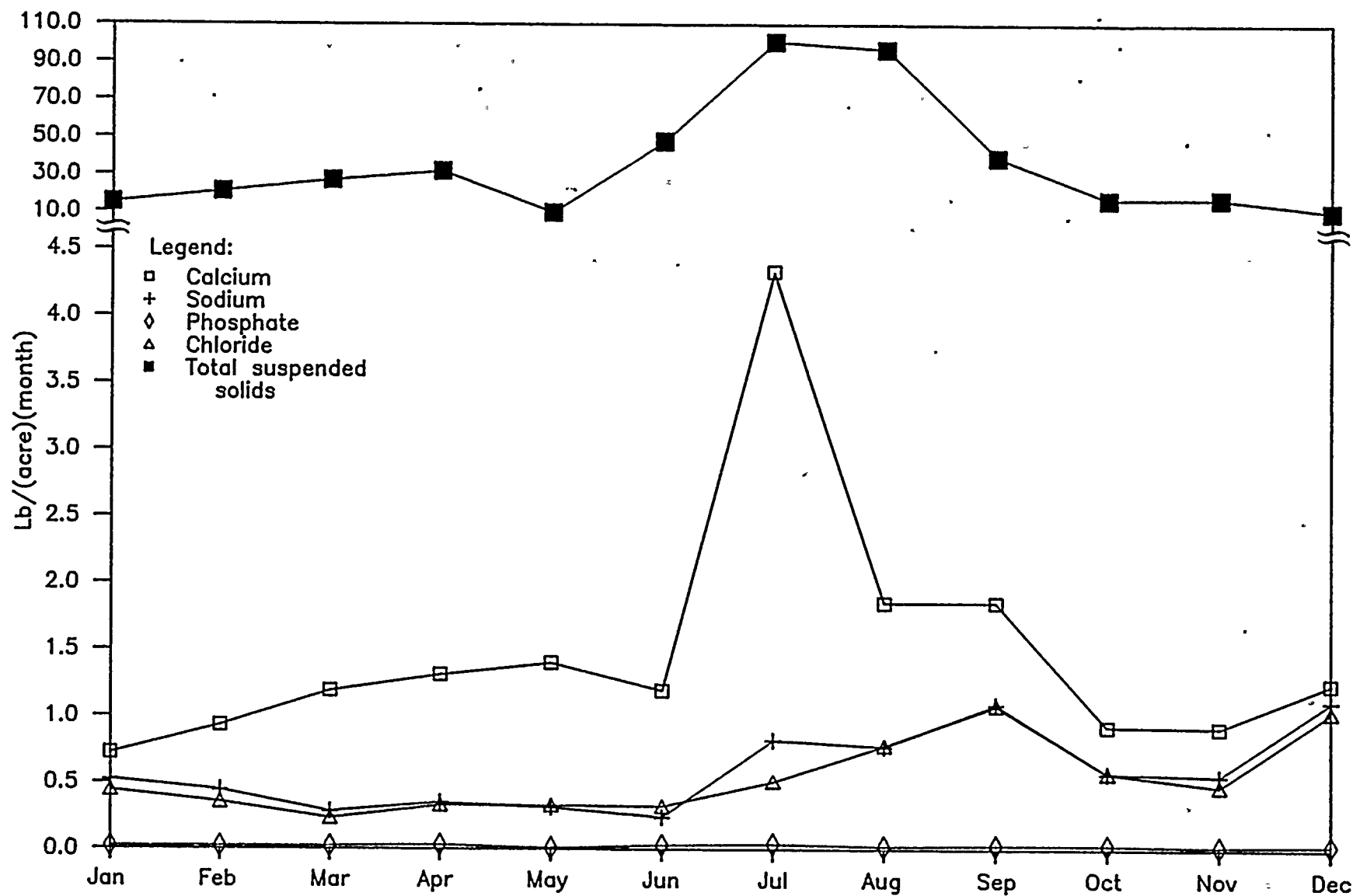


Figure 5-3. Mean monthly deposition of total suspended solids, calcium, sodium phosphate, and chloride at PVNGS native monitoring sites, 1990



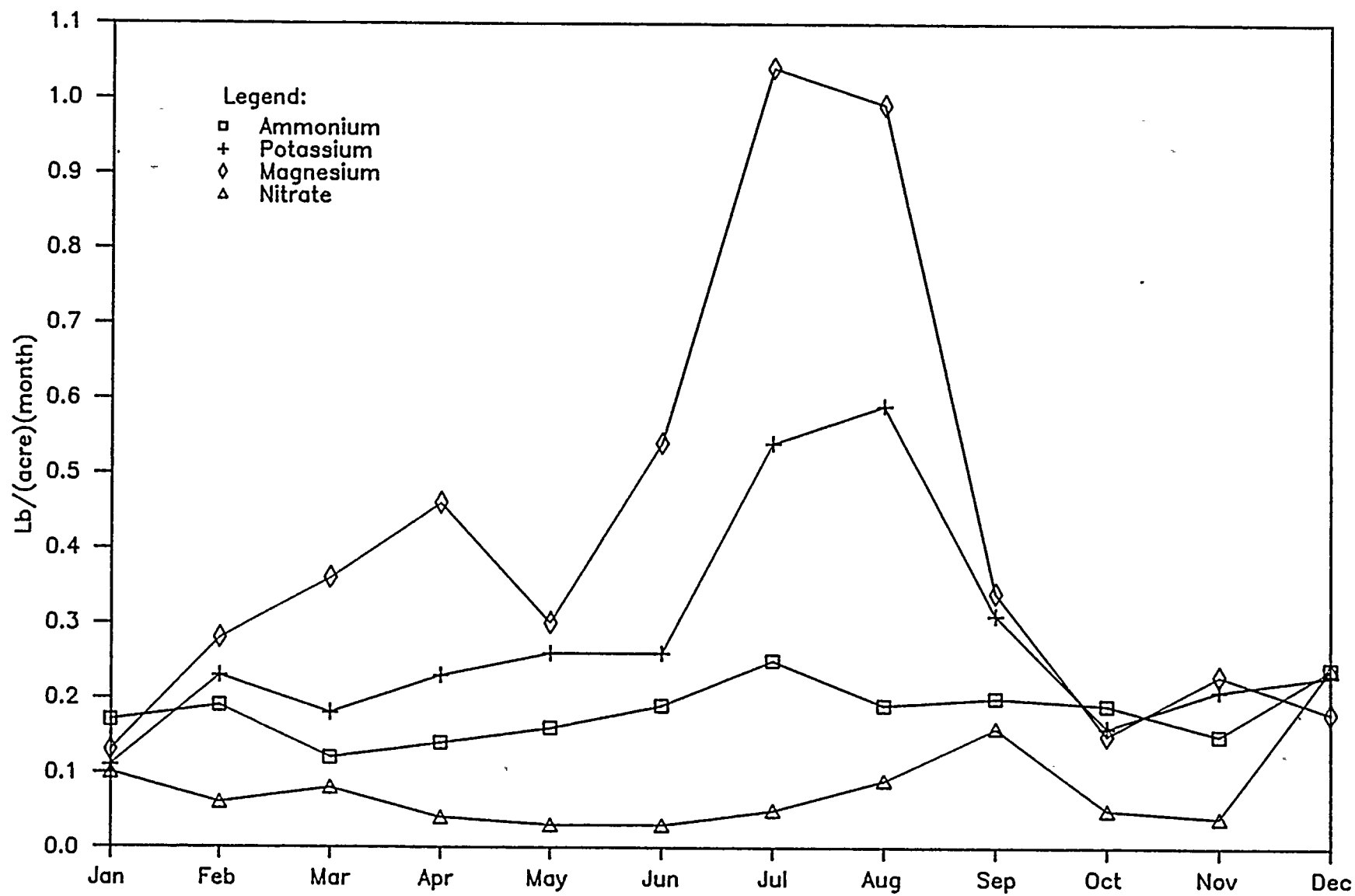


Figure 5-4. Mean monthly deposition of ammonium, potassium, magnesium, and nitrate at PVNGS native monitoring sites, 1990



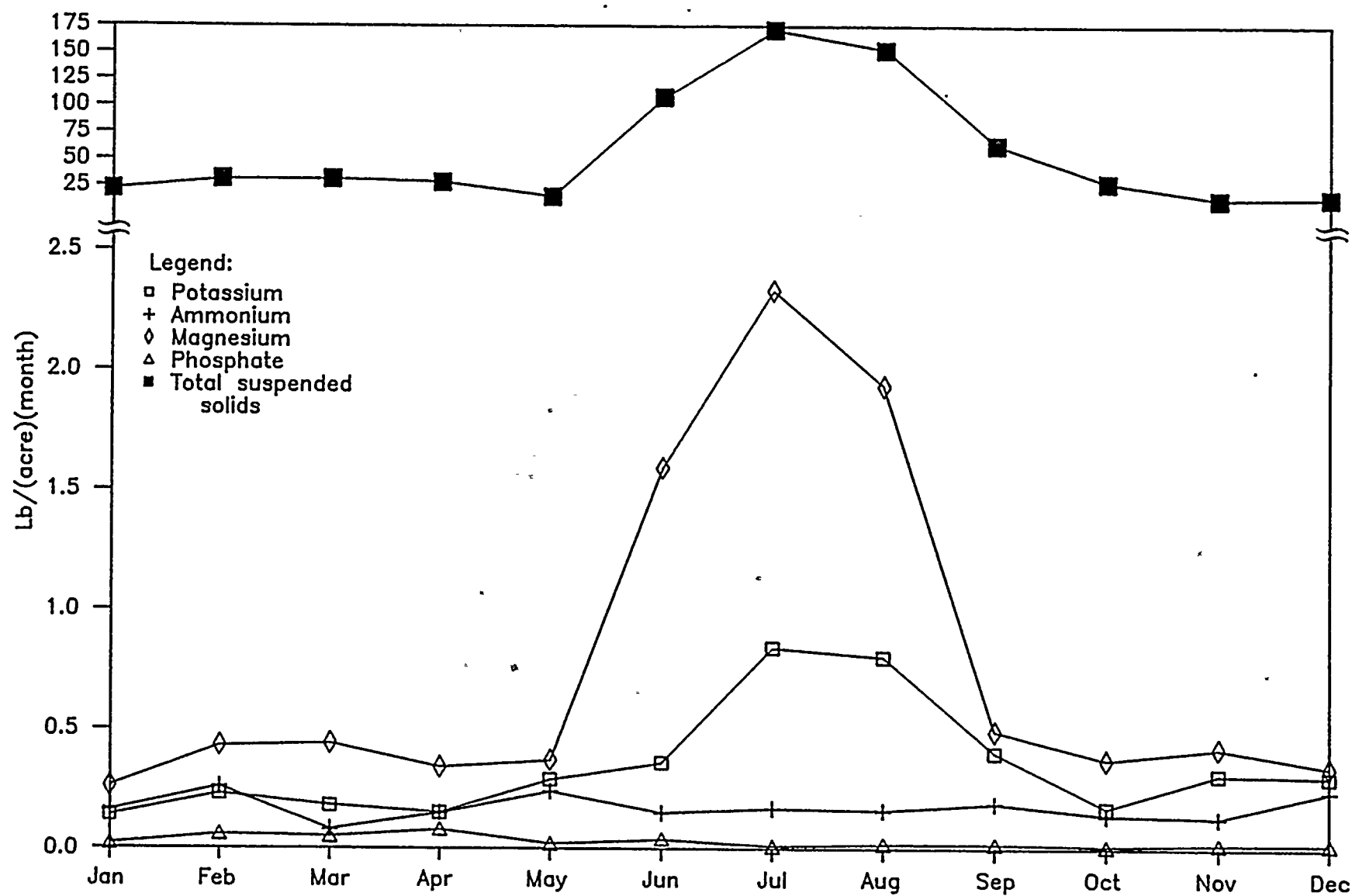


Figure 5-5. Mean monthly deposition of total suspended solids, potassium, ammonium, magnesium, and phosphate at PVNGS supplemental monitoring sites, 1990





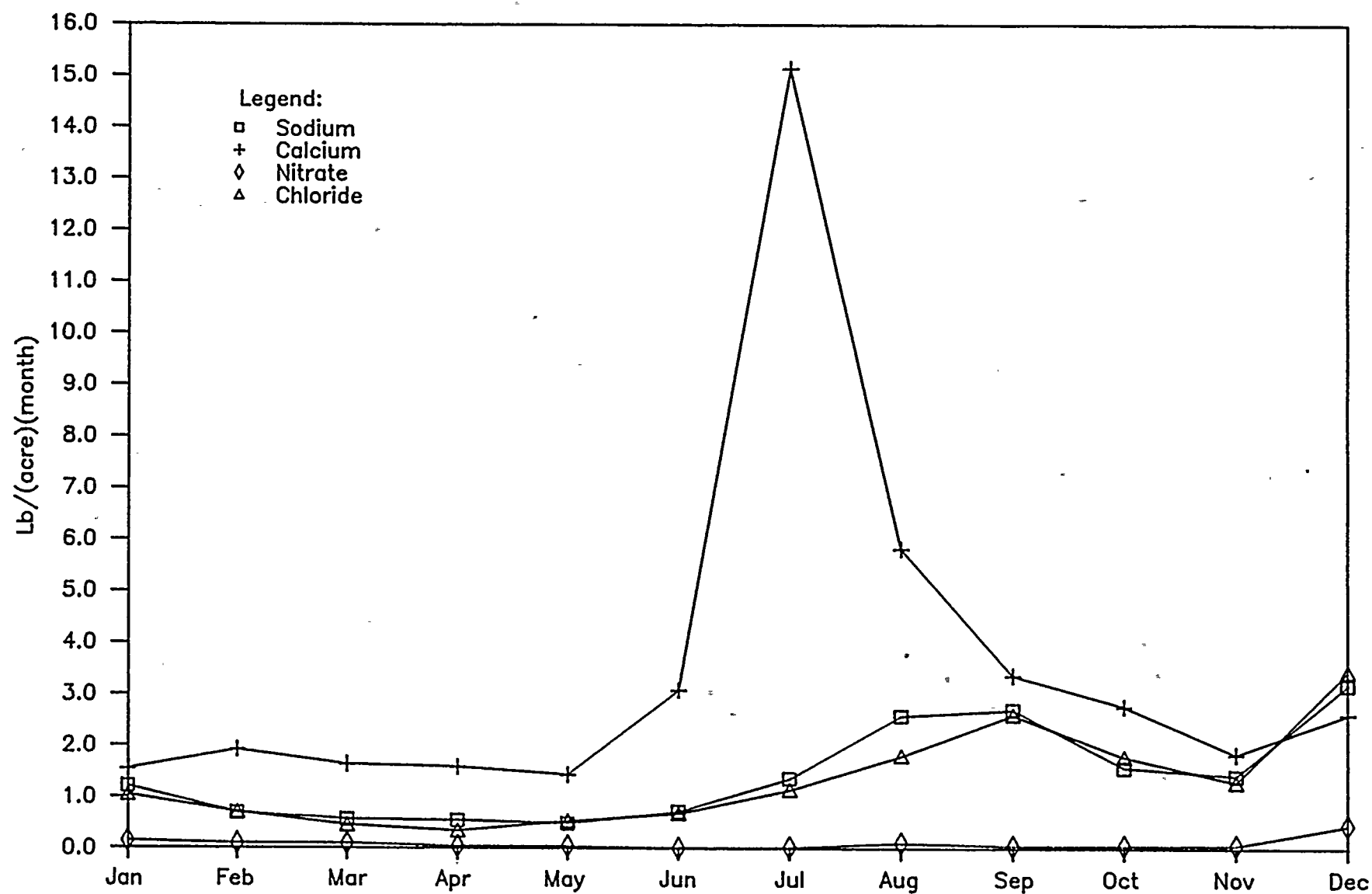


Figure 5-6. Mean monthly deposition of sodium, calcium, nitrate, and chloride at PVNGS supplemental monitoring sites, 1990



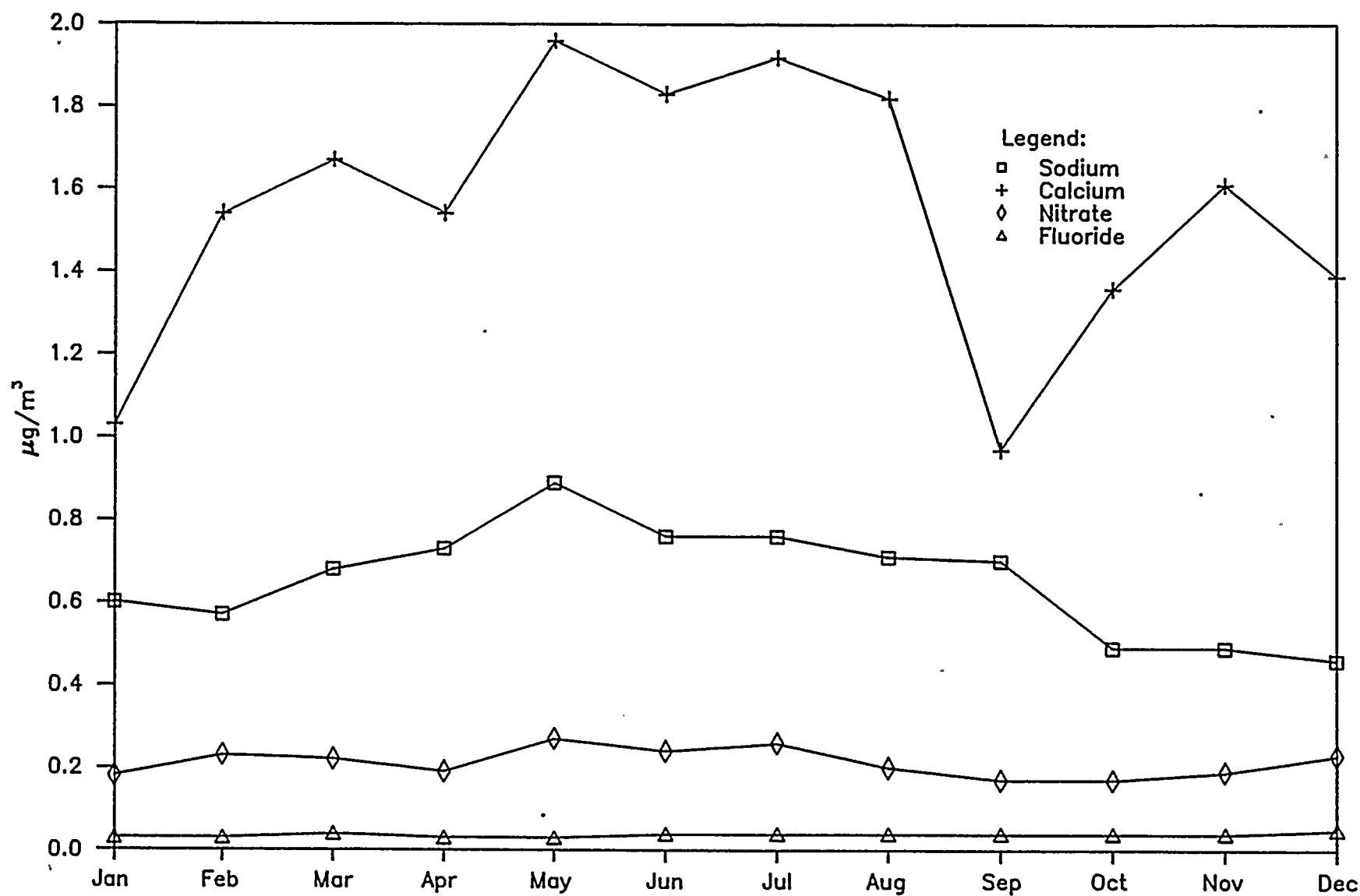


Figure 5-7. Mean monthly concentrations of sodium, calcium, nitrate, and fluoride in airborne particulate matter at PVNGS low-volume air sampler sites, 1990



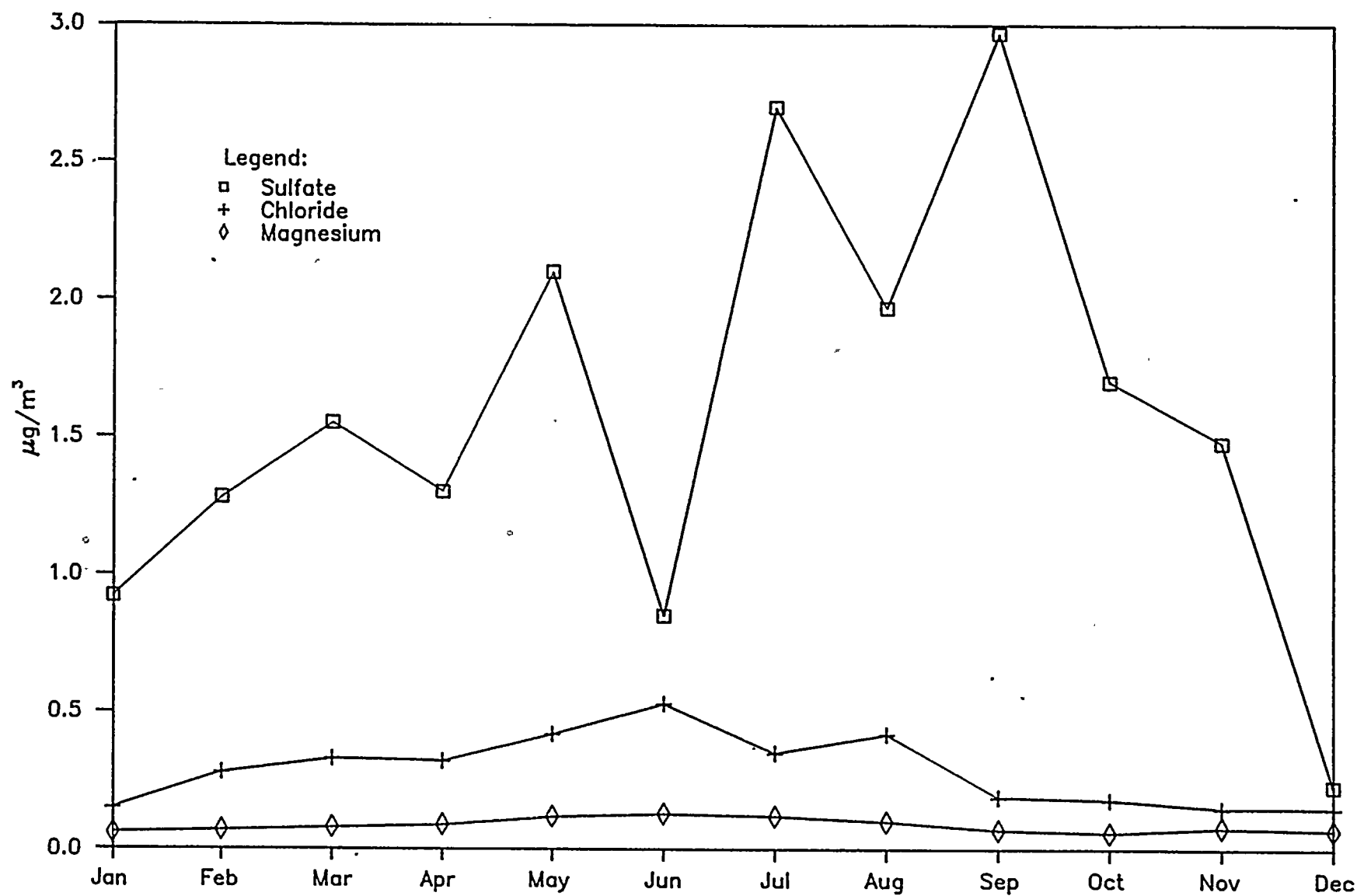


Figure 5-8. Mean monthly concentrations of sulfate, chloride, and magnesium in airborne particulate matter at PVNGS low-volume air sampler sites, 1990



## 6. Analyses of Agricultural Crops and Native Vegetation

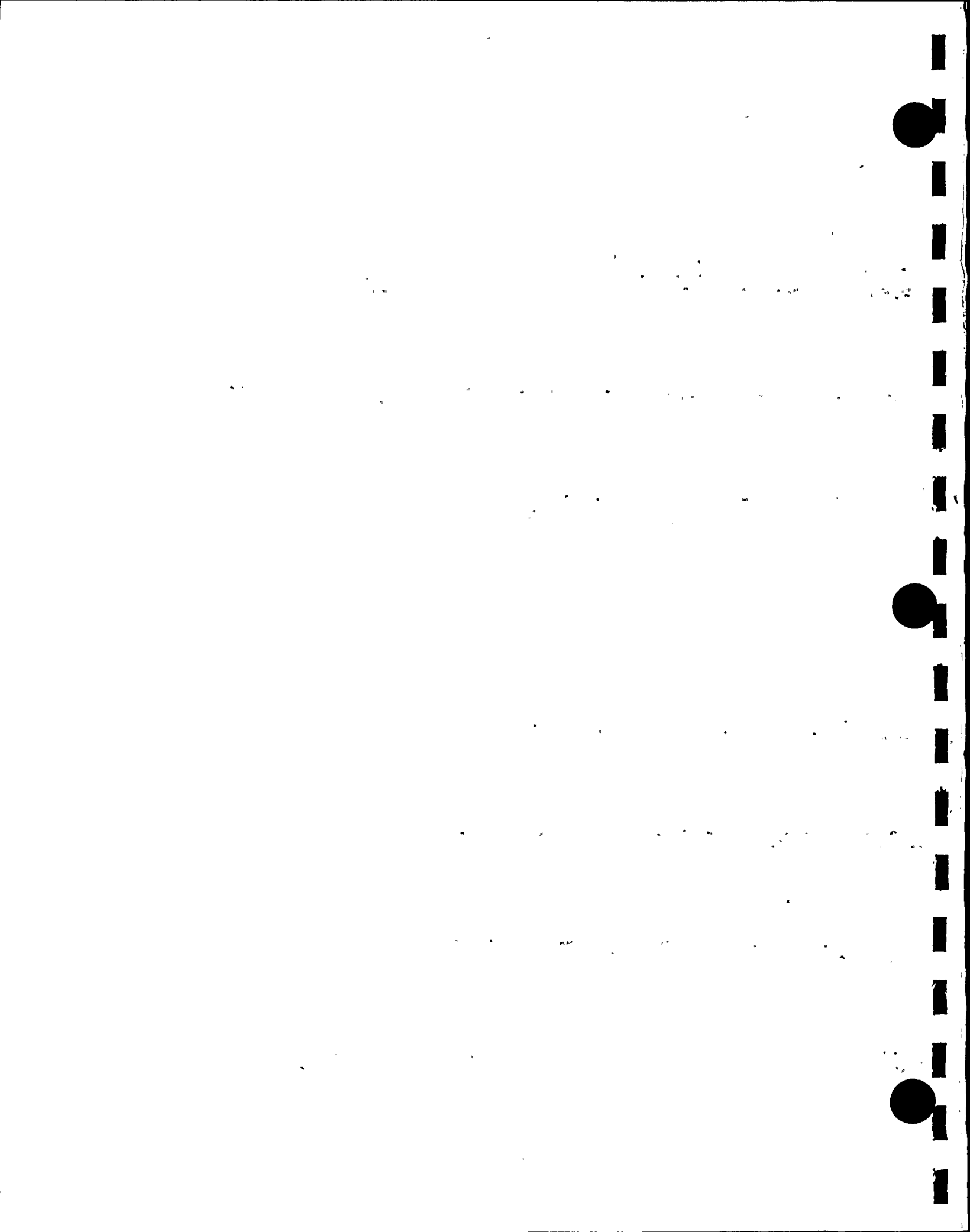
### 6.1 CONCENTRATION OF SELECTED IONS IN LEAF TISSUE

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 and Turk, 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 1990: agricultural phytomass was taken during the middle (early July) and end (late August) 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 was collected from 10 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 1990 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 1990 concentrations with preoperational (1983-1985) concentrations is given in Chapter 9.





### 6.1.1 Agricultural Crops

During the 1990 growing season, sites 7, 12, 24, 25, 28, 31, 32, and 45 were fallow (Figure 2-2). Of the remaining sites, one (i.e., 43) was planted in alfalfa and four (i.e., 11, 13, 23, and 30) in short-staple (i.e., upland) cotton. Long-staple (i.e., Pima) cotton was not planted at any of the sites in 1990.

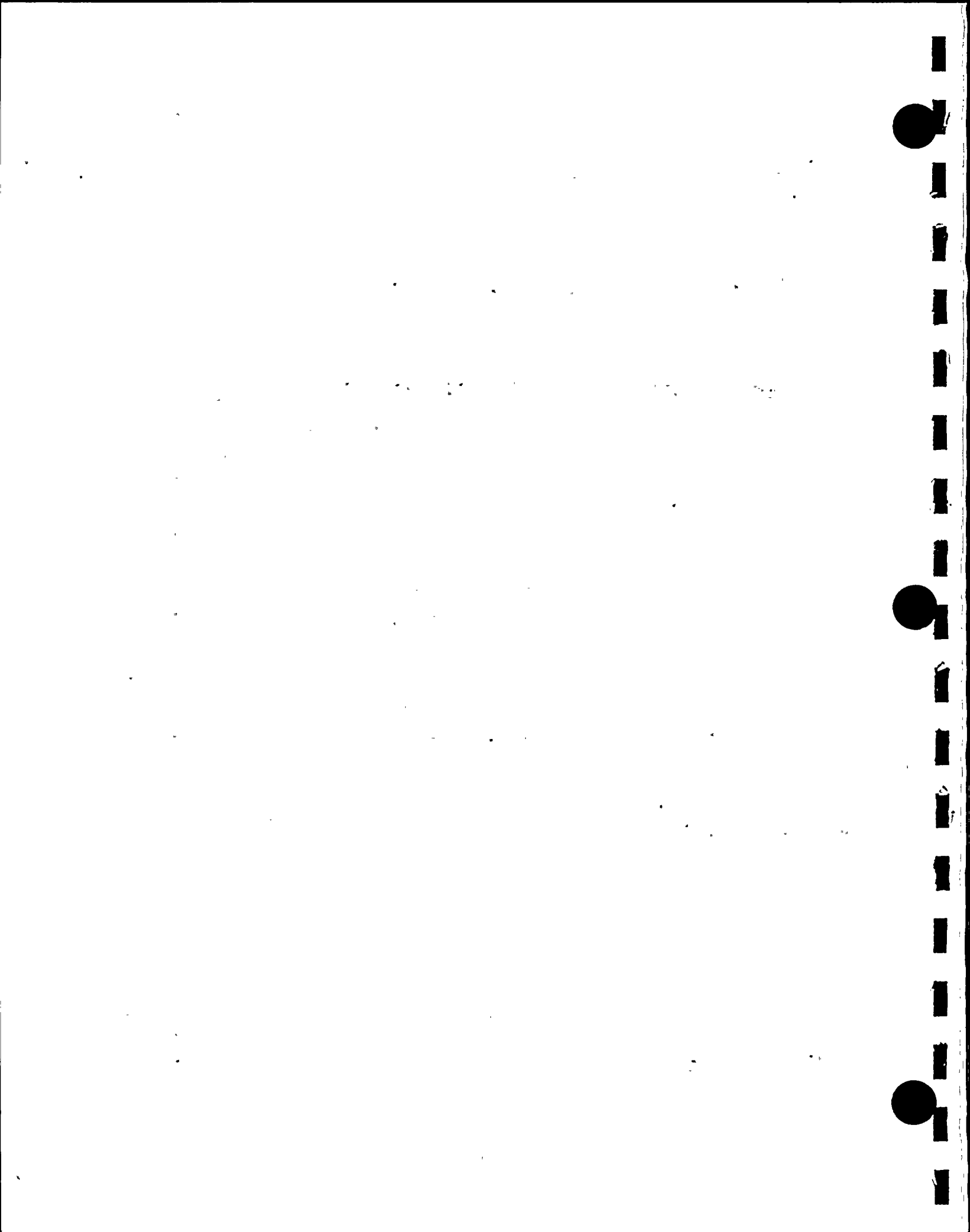
#### 6.1.1.1 Alfalfa

Only site 43 contained alfalfa in 1990. 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 1990 and the preoperational monitoring period are presented in Chapter 9.

#### 6.1.1.2 Cotton

Four agricultural monitoring sites containing short-staple cotton (i.e., sites 11, 13, 23, and 30) were sampled during the 1990 growing season. This was the first time since 1985 that monitoring site 23 was planted with short-staple cotton. It was also the first year since the study was initiated that site 25 was fallow.

The mean concentrations of analytes for short-staple cotton are presented in Table 6-2. Mean concentrations of sodium at sites 11, 13, and 23 were significantly higher than those at site 30. There was no significant difference between any of the sites in the mean concentrations of potassium, sulfate, nitrate, phosphate, and fluoride. Sites 13 and 23 had significantly higher levels of calcium than did site 11; calcium levels at site 30 were not significantly different from those at either site 11 or sites 13 and 23. The analysis of mean magnesium levels showed three overlapping groups of sites defined by relative magnesium concentration. These groups, from lowest concentration to highest, were sites 11 and 13, 13 and 30, and 30 and 23. Sites 11 and 23 showed the lowest and highest magnesium levels, respectively. Results for chloride indicate that site 13 had a significantly higher level than any other site.



### 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 1990. Sites 1, 4, and 6 are on PVNGS; sites 40 and 42, which serve as controls, are approximately 18 miles west-northwest and 17 miles south-southeast, respectively, of the station (Figure 2-2).

The analysis of mean sodium and potassium concentrations revealed three overlapping groups of sites where analyte levels were significantly different (Table 6-3). For sodium these groups, from lowest to highest, were sites 42 and 6; sites 6, 1, and 4; and sites 1, 4, and 40. Sites 42 and 40 had the lowest and highest sodium levels, respectively. In the case of potassium the three groups of sites, from lowest to highest, were sites 42 and 1; sites 1, 6, and 40; and sites 40 and 4. Mean concentrations of potassium were lowest at site 42 and highest at site 4. Mean concentrations of calcium also fell into three groups; however, they did not in each case overlap one another. From lowest calcium level to highest, the three groups were sites 4 and 40; sites 1 and 42; and sites 42 and 6. The lowest and highest mean calcium concentrations were recorded at sites 4 and 6, respectively. Levels of magnesium were significantly higher at site 6 than at sites 1, 4, 40, and 42, whose levels were not significantly different. Site 40 had significantly lower levels of chloride than any of the other locations, whose levels were not significantly different. Mean ionic concentrations of both sulfate and nitrate were not significantly different at any of the sites. While phosphate values were significantly lower at sites 1, 4, and 42 than at sites 6 and 40, they were not significantly different within each of these groups. Site 4 had significantly lower levels of fluoride than the remaining sites, whose levels did not differ significantly.

#### 6.1.2.2 Salt Bush

The ionic content of salt bush (Atriplex polycarpa) was measured at three monitoring sites in 1990. Monitoring sites 2 and 3 are on PVNGS, whereas site 44, which serves as a control, lies approximately 6 miles northwest (Figure 2-2).



The mean concentrations of sodium, calcium, and chloride were significantly higher at sites 2 and 3 than at site 44 (Table 6-4). Conversely, levels of magnesium, sulfate, and phosphate were found to be significantly lower for the onsite locations than for the control site. Mean concentrations of potassium and nitrate were not significantly different at any of the sites. Fluoride levels were significantly different at each site, with site 3 having the lowest value and site 44 the highest.

## 6.2 COTTON YIELD

The mean yield of short-staple cotton in 1990 ranged from 2538 pounds per acre at monitoring site 13 to 3666 pounds per acre at site 23. Long-staple cotton was not planted at any of the monitored fields in 1990. These results and a comparison of the 1990 harvest with those of 1983-1985 are discussed in greater detail in Section 9.3.

## 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 1990 (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), was updated in the 1989 Annual Report (Lehr, 1978; Lehr and Pinkava, 1980, 1982; and Turner, 1986). The updated nomenclature is presented in Table 6-5, which also lists all native vegetation observed to date. Except where noted, scientific names within the text and tables have not been 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 6-6. Monitoring sites



1, 4, and 6 are on PVNGS; control sites 40 and 42 are approximately 18 miles west-northwest and 17 miles south-southeast, respectively, from PVNGS (Figure 2-2).

Creosote bush was the dominant species at each of the five sites during both the spring and fall sampling periods; it characterized most of the native vegetation near PVNGS. Relative cover for this species at sites 1, 6, and 42 ranged from 12.8 to 14.6 percent, while at sites 4 and 40 it was 11.1 percent (Table 6-6). During most years, herbs and grasses are recorded primarily in the spring; however, as August and September of 1990 were wetter than normal (Table 9-1), a wide variety of these plants were seen during the fall. For example, in 1989 only 13 to 19 percent (depending on the site) of the number of species seen in the spring were recorded in the fall, while in 1990 the number was 38 to 78 percent. Woolly plantain (Plantago insularis) was the dominant vascular herbaceous species in 1990; however, it could not be considered abundant. Arabian grass (Schismus arabicus), a short, sparse grass, was the dominant grass present in 1990. Four species of cacti were observed in 1990; site 4 supported the greatest abundance and diversity.

Species richness within each of the five plant communities in 1990 was greater than that observed in 1989; it ranged from 15 to 22. A cumulative total of 39 species was observed in 1990. Monitoring site 4 showed the greatest richness, and it was followed in order by sites 1, 6, 42, and 40. Plant communities at PVNGS had species richness values that were higher than those of the control sites. Heterogeneity increased at sites 1, 4, and 42 in 1990; at sites 6 and 40 no meaningful change occurred. 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 1990. Sites 2 and 3 are on PVNGS, while site 44, a control, is about 6 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.





Five species of perennial shrubs were identified from the three communities in 1990 (Table 6-7). Salt bush (Atriplex polycarpa) was the dominant perennial shrub in each of the communities. A second species of salt bush (Atriplex linearis) was 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. The dominant herbaceous species was the small-seeded sand mat (Euphorbia polycarpa), which was recorded exclusively during the fall sampling period. Also observed at sites 2 and 3 was a variety of fringed amaranth (Amaranthus fimbriatus var. denticulatus) that had previously been identified at only two other locations in Arizona. Arabian grass (Schismus arabicus) was the dominant grass; no cacti were observed.

Site 2 showed the greatest species richness, and sites 3 and 44 had similar but lower values. This pattern was also observed with respect to 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 9.3.2.



Table 6-1. Ion content ( $\mu\text{g/g}$  dry weight) of alfalfa leaf tissue at PVNGS agricultural monitoring site 43, 1990 (means  $\pm$  standard errors)

| Ion              | Content            |
|------------------|--------------------|
| Sodium           | $1,669 \pm 87$     |
| Potassium        | $24,925 \pm 1,248$ |
| Calcium          | $13,802 \pm 489$   |
| Magnesium        | $2,935 \pm 99$     |
| Chloride         | $12,450 \pm 357$   |
| Sulfate          | $9,066 \pm 746$    |
| Nitrate (as N)   | $281 \pm 58$       |
| Phosphate (as P) | $3,793 \pm 218$    |
| Fluoride         | $13.5 \pm 0.1$     |

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



Table 6-2. Ion content ( $\mu\text{g/g}$  dry weight) of short-staple cotton leaf tissue at PVNGS monitoring sites, 1990 (means  $\pm$  standard errors)

| Ion              | Monitoring site     |                     |                     |                      |
|------------------|---------------------|---------------------|---------------------|----------------------|
|                  | 11                  | 13                  | 23                  | 30                   |
| Sodium           | 3,307 $\pm$ 407a    | 3,308 $\pm$ 397a    | 2,892 $\pm$ 247a    | 1,899 $\pm$ 143      |
| Potassium        | 18,289 $\pm$ 910a   | 17,750 $\pm$ 1,247a | 18,854 $\pm$ 872a   | 19,683 $\pm$ 784a    |
| Calcium          | 39,675 $\pm$ 1,203a | 45,403 $\pm$ 2,073b | 46,831 $\pm$ 1,103b | 43,506 $\pm$ 1,614ab |
| Magnesium        | 5,360 $\pm$ 220a    | 5,954 $\pm$ 289ab   | 6,805 $\pm$ 280c    | 6,425 $\pm$ 215bc    |
| Chloride         | 16,790 $\pm$ 571a   | 22,260 $\pm$ 814    | 16,704 $\pm$ 466a   | 15,950 $\pm$ 417a    |
| Sulfate          | 40,214 $\pm$ 3,272a | 46,908 $\pm$ 2,594a | 43,426 $\pm$ 4,763a | 42,318 $\pm$ 3,611a  |
| Nitrate (as N)   | 117 $\pm$ 20a       | 115 $\pm$ 30a       | 276 $\pm$ 74a       | 233 $\pm$ 72a        |
| Phosphate (as P) | 2,308 $\pm$ 132a    | 2,611 $\pm$ 205a    | 2,403 $\pm$ 115a    | 2,550 $\pm$ 128a     |
| Fluoride         | 16.3 $\pm$ 0.6a     | 15.9 $\pm$ 0.4a     | 15.5 $\pm$ 0.9a     | 15.2 $\pm$ 1.0a      |

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 ( $\mu\text{g/g}$  dry weight) of creosote bush (*Larrea divaricata*) leaf tissue at PVNGS monitoring sites, 1990 (means  $\pm$  standard errors)

| Ion              | Monitoring site    |                   |                   |                    |                    |
|------------------|--------------------|-------------------|-------------------|--------------------|--------------------|
|                  | 1                  | 4                 | 6                 | 40                 | 42                 |
| Sodium           | 345 $\pm$ 19bc     | 356 $\pm$ 27bc    | 296 $\pm$ 23ab    | 361 $\pm$ 28c      | 280 $\pm$ 17a      |
| Potassium        | 13,457 $\pm$ 451ab | 16,214 $\pm$ 547c | 14,025 $\pm$ 506b | 14,726 $\pm$ 497bc | 12,116 $\pm$ 631a  |
| Calcium          | 18,102 $\pm$ 667b  | 15,549 $\pm$ 554a | 19,790 $\pm$ 629c | 16,094 $\pm$ 490a  | 18,543 $\pm$ 559bc |
| Magnesium        | 1,458 $\pm$ 53a    | 1,441 $\pm$ 40a   | 1,892 $\pm$ 99    | 1,570 $\pm$ 93a    | 1,489 $\pm$ 40a    |
| Chloride         | 8,010 $\pm$ 358a   | 8,230 $\pm$ 366a  | 8,660 $\pm$ 285a  | 6,260 $\pm$ 219    | 8,900 $\pm$ 409a   |
| Sulfate          | 3,685 $\pm$ 540a   | 5,519 $\pm$ 841a  | 4,113 $\pm$ 567a  | 4,647 $\pm$ 780a   | 4,715 $\pm$ 530a   |
| Nitrate (as N)   | 121 $\pm$ 10a      | 157 $\pm$ 17a     | 151 $\pm$ 13a     | 122 $\pm$ 14a      | 130 $\pm$ 12a      |
| Phosphate (as P) | 1,383 $\pm$ 49a    | 1,426 $\pm$ 35a   | 1,729 $\pm$ 49b   | 1,739 $\pm$ 70b    | 1,362 $\pm$ 59a    |
| Fluoride         | 17.3 $\pm$ 1.0a    | 14.0 $\pm$ 0.5    | 16.5 $\pm$ 0.6a   | 16.3 $\pm$ 0.6a    | 16.3 $\pm$ 0.2a    |

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: 13 at site 1; 16 at site 4; 18 at site 6; 11 at site 40; and 17 at site 42.





Table 6-4. Ion content ( $\mu\text{g/g}$  dry weight) of salt bush  
(*Atriplex polycarpa*) leaf tissue at PVNGS  
monitoring sites, 1990 (means  $\pm$  standard errors)

| Ion              | Monitoring site     |                     |                     |
|------------------|---------------------|---------------------|---------------------|
|                  | 2                   | 3                   | 44                  |
| Sodium           | 64,625 $\pm$ 2,497a | 67,500 $\pm$ 2,882a | 40,522 $\pm$ 1,797  |
| Potassium        | 20,504 $\pm$ 1,146a | 22,800 $\pm$ 1,468a | 21,435 $\pm$ 1,549a |
| Calcium          | 11,920 $\pm$ 673a   | 11,941 $\pm$ 990a   | 9,561 $\pm$ 375     |
| Magnesium        | 5,538 $\pm$ 377a    | 5,571 $\pm$ 330a    | 6,696 $\pm$ 374     |
| Chloride         | 56,354 $\pm$ 2,058a | 61,894 $\pm$ 2,849a | 42,778 $\pm$ 2,307  |
| Sulfate          | 5,145 $\pm$ 469a    | 4,804 $\pm$ 513a    | 7,726 $\pm$ 675     |
| Nitrate (as N)   | 271 $\pm$ 33a       | 237 $\pm$ 23a       | 270 $\pm$ 22a       |
| Phosphate (as P) | 1,349 $\pm$ 63a     | 1,269 $\pm$ 54a     | 1,575 $\pm$ 65      |
| Fluoride         | 9.7 $\pm$ 0.3       | 9.1 $\pm$ 0.1       | 10.5 $\pm$ 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 except that for sulfate at site 3, which was based on 18.

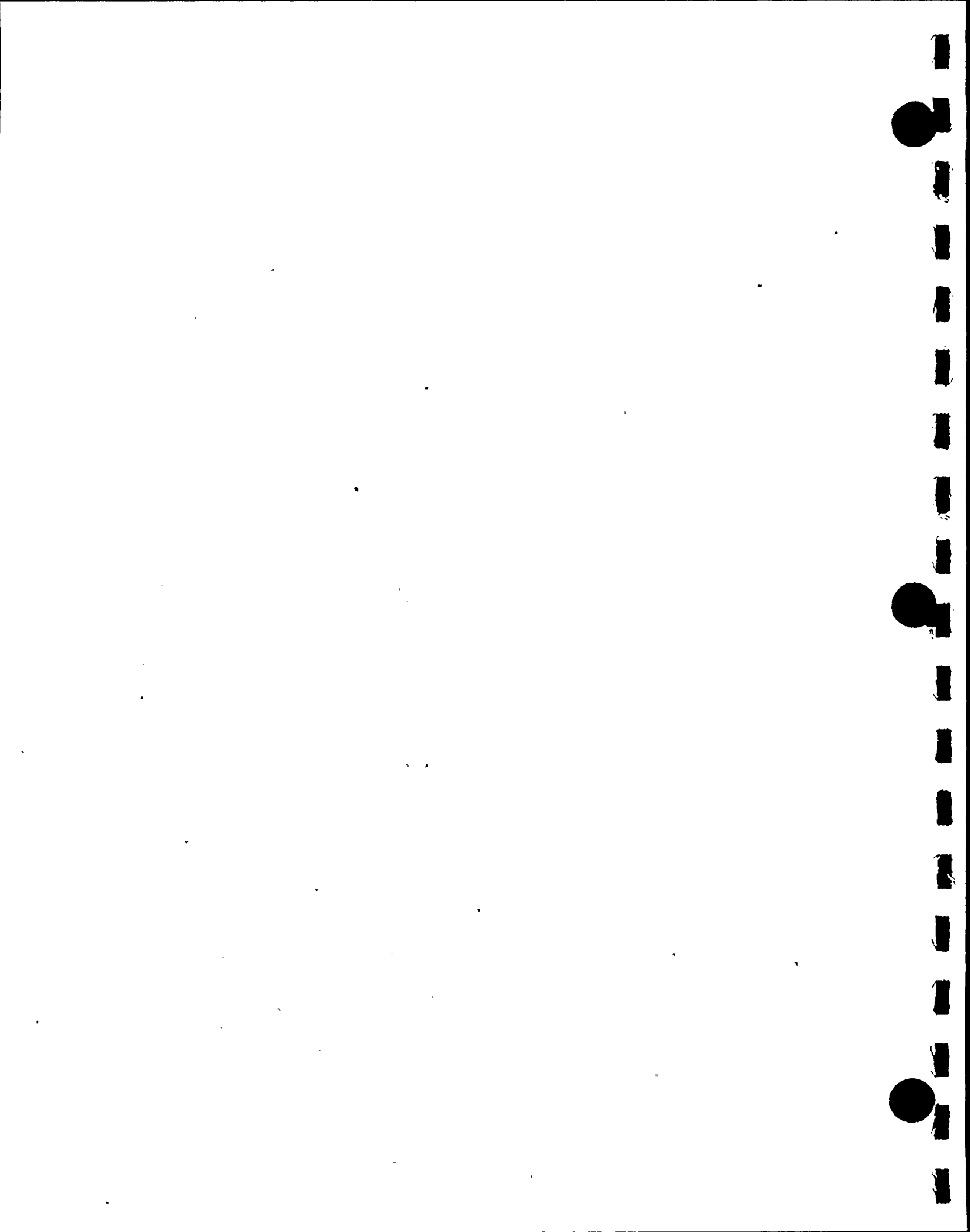


Table 6-5. Indigenous flora at PVNGS, 1983-1990: comprehensive list  
with updated nomenclature (sheet 1 of 5)

| Scientific name*               | Common name†                          | Updated<br>nomenclature‡                        |
|--------------------------------|---------------------------------------|---|
| <b>Shrubs</b>                  |                                       |   |
| <u>Ambrosia dumosa</u>         | White bursage                         |   |
| <u>Atriplex linearis</u>       | Salt bush; narrow-leaved<br>wingscale | <u>Atriplex canescens</u> ssp. <u>linearis</u>  |
| <u>Atriplex polycarpa</u>      | Salt bush; all scale                  |   |
| <u>Larrea divaricata</u>       | Creosote bush; greasewood             | <u>Larrea divaricata</u> var. <u>tridentata</u> |
| <u>Lycium Fremontii</u>        | Fremont thornbush                     |   |
| <u>Lycium Parishii</u>         | Parish thornbush                      |   |
| <u>Lycium</u> sp.              | Wolfberry; desert thorn               |   |
| <u>Prosopis velutina</u>       | Velvet mesquite                       |   |
| <b>Herbs</b>                   |                                       |   |
| <u>Abronia villosa</u>         | Hairy sand verbena                    |   |
| <u>Allionia incarnata</u>      | Trailing four-o'clock                 |   |
| <u>Amaranthus fimbriatus</u>   | Fringed amaranth                      |   |
| <u>Amsinckia intermedia</u>    | Coast fiddleneck                      |   |
| <u>Argythamnia neomexicana</u> | None                                  |   |
| <u>Astragalus Nuttallianus</u> | None                                  |   |
| <u>Boerhaavia intermedia</u>   | Five-winged ringstem                  |   |
| <u>Bowlesia incana</u>         | Hairy bowlesia                        |   |
| <u>Brassica Tournefortii</u>   | Mustard                               |   |
| <u>Camelina microcarpa</u>     | Little pod                            |   |
| <u>Chaenactis carphoclinia</u> | Pebble pincushion                     |   |
| <u>Chaenactis Fremontii</u>    | Fremont pincushion                    |   |
| <u>Chorizanthe brevicornu</u>  | Brittle spine flower                  |   |
| <u>Chorizanthe rigida</u>      | Rigid spiny herb                      |   |
| <u>Cryptantha angustifolia</u> | Narrow-leaved cryptantha              |   |
| <u>Cryptantha inaequata</u>    | Darwin cryptantha                     |   |



Table 6-5. Indigenous flora at PVNGS, 1983-1990: comprehensive list  
with updated nomenclature (sheet 2 of 5)

| Scientific name*                     | Common name†                            | Updated<br>nomenclature‡ |
|--------------------------------------|---|--------------------------|
| <u>Cryptantha</u> <u>maritima</u>    | White-haired cryptantha                 |                          |
| <u>Cryptantha</u> <u>muricata</u>    | None                                    |                          |
| <u>Cryptantha</u> <u>ptercarya</u>   | None                                    |                          |
| <u>Cryptantha</u> sp.                | None                                    |                          |
| <u>Dalea</u> <u>mollis</u>           | Silk dalea                              |                          |
| <u>Dalea</u> <u>neomexicana</u>      | Indigo bush; pea bush                   |                          |
| <u>Daucus</u> <u>pusillus</u>        | American carrot                         |                          |
| <u>Eremalche</u> <u>exilis</u>       | None                                    |                          |
| <u>Eriastrum</u> <u>diffusum</u>     | None                                    |                          |
| <u>Erigeron</u> <u>lobatus</u>       | Fleabane                                |                          |
| <u>Eriogonum</u> <u>Thomasii</u>     | Thomas eriogonum                        |                          |
| <u>Eriogonum</u> <u>trichopes</u>    | Little trumpet                          |                          |
| <u>Eriophyllum</u> <u>lanosum</u>    | Woolly eriophyllum                      |                          |
| <u>Erodium</u> <u>cicutarium</u>     | Filaree; heron bill                     |                          |
| <u>Erodium</u> <u>texanum</u>        | Large-flowered stork's bill; heron bill |                          |
| <u>Eucrypta</u> <u>micrantha</u>     | Small-flowered eucrypta                 |                          |
| <u>Euphorbia</u> <u>capitellata</u>  | Spurge                                  |                          |
| <u>Euphorbia</u> <u>polycarpa</u>    | Small-seeded sand mat                   |                          |
| <u>Euphorbia</u> sp.                 | Spurge                                  |                          |
| <u>Filago</u> <u>arizonica</u>       | Arizona filago                          |                          |
| <u>Hesperocallis</u> <u>undulata</u> | Desert lily                             |                          |
| <u>Krameria</u> sp.                  | Ratany                                  |                          |
| <u>Lepidium</u> <u>lasiocarpum</u>   | Sand pepper grass                       |                          |
| <u>Lepidium</u> <u>virginicum</u>    | Pepper grass; pepperwort                |                          |
| <u>Lepidium</u> sp.                  | Pepper grass; pepperwort                |                          |
| <u>Lesquerella</u> <u>Gordoni</u>    | Gordon bladderpod                       |                          |
| <u>Linanthus</u> <u>bigelovii</u>    | None                                    |                          |



Table 6-5. Indigenous flora at PVNGS, 1983-1990: comprehensive list  
with updated nomenclature (sheet 3 of 5)

| Scientific name*                | Common name†                            | Updated<br>nomenclature‡                           |
|---------------------------------|---|--|
| <u>Linanthus dichotomus</u>     | Evening snow                            |  |
| <u>Lotus salsuginosus</u>       | Deer vetch                              |  |
| <u>Lotus tomentellus</u>        | Hairy lotus                             | <u>Lotus strigosus</u> var. <u>tomentellus</u>     |
| <u>Lupinus sparsiflorus</u>     | Lupine                                  | <u>Lupinus sparsiflorus</u> ssp. <u>mohavensis</u> |
| <u>Machaeranthera arida</u>     | None                                    | <u>Machaeranthera Coulteri</u> var. <u>arida</u>   |
| <u>Machaeranthera Coulteri</u>  | None                                    | <u>Machaeranthera Coulteri</u> var. <u>arida</u>   |
| <u>Monoptilon bellioides</u>    | Mohave desert star                      |  |
| <u>Nama demissum</u>            | Purple mat                              |  |
| <u>Nama hispidum</u>            | None                                    |  |
| <u>Nemacladus glanduliferus</u> | Thread plant                            |  |
| <u>Oenothera</u> sp.            | Evening primrose; sun drops             |  |
| <u>Oligomeris linifolia</u>     | Linear-leaved cambess                   |  |
| <u>Orthocarpus purpurascens</u> | Mohave owl clover                       |  |
| <u>Pectis papposa</u>           | Chinchweed                              |  |
| <u>Pectocarya platycarpa</u>    | Broad-nutted comb bur                   |  |
| <u>Perityle Emoryi</u>          | Emory rock daisy                        |  |
| <u>Phacelia crenulata</u>       | None                                    |  |
| <u>Pholistoma auritum</u>       | None                                    |  |
| <u>Plantago insularis</u>       | Woolly plantain, Indian wheat           |  |
| <u>Portulaca parvula</u>        | Purslane                                |  |
| <u>Proboscidea altheaefolia</u> | Desert unicorn plant;<br>elephant tusks |  |
| <u>Salsola Kali</u> §           | Russian thistle                         |  |
| <u>Sisymbrium Irio</u>          | London rocket                           |  |
| <u>Spermolepis echinata</u>     | Scale seed                              |  |
| <u>Sphaeralcea Coulteri</u>     | Coulter globe mallow                    |  |
| <u>Sphaeralcea</u> sp.          | Alkali pink                             |  |





Table 6-5. Indigenous flora at PVNGS, 1983-1990: comprehensive list  
with updated nomenclature (sheet 4 of 5)

| Scientific name*                 | Common name†             | Updated<br>nomenclature‡ |
|----------------------------------|--------------------------|--------------------------|
| <u>Tidestromia lanuginosa</u>    | Woolly tidestromia       |                          |
| <u>Trianthema portulacastrum</u> | Horse purslane           |                          |
| Grasses                          |                          |                          |
| <u>Aristida adscensionis</u>     | Six weeks three-awn      |                          |
| <u>Aristida</u> sp.              | Three-awn                |                          |
| <u>Bouteloua barbata</u>         | Six-weeks grama          |                          |
| <u>Bromus rubens</u>             | Red brome; foxtail chess |                          |
| <u>Erioneuron pulchellum</u>     | Fluff grass              |                          |
| <u>Festuca octoflora</u>         | Six-weeks fescue         | <u>Vulpia octoflora</u>  |
| <u>Muhlenbergia microsperma</u>  | Littleseed muhly         |                          |
| <u>Schismus arabicus</u>         | Arabian grass            |                          |
| <u>Schismus barbatus</u>         | Mediterranean grass      |                          |
| <u>Schismus</u> sp.              | None                     |                          |



Table 6-5. Indigenous flora at PVNGS, 1983-1990: comprehensive list  
with updated nomenclature (sheet 5 of 5)

| Scientific name*                | Common name†                       | Updated<br>nomenclature‡ |
|---------------------------------|------------------------------------|--------------------------|
| Cacti                           |                                    |                          |
| <u>Echinocereus Engelmannii</u> | Hedgehog cactus; strawberry cactus |                          |
| <u>Ferocactus Wislizeni</u>     | Barrel cactus                      |                          |
| <u>Opuntia acanthocarpa</u>     | Buckhorn cholla                    |                          |
| <u>Opuntia echinocarpa</u>      | Silver cholla; golden cholla       |                          |
| <u>Opuntia leptocaulis</u>      | Desert Christmas cactus            |                          |
| <u>Opuntia ramosissima</u>      | Diamond cholla                     |                          |

\* From Kearney and Peebles, 1973.

† Updated using Lehr, 1978.

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

§ Until recently Salsola Kali was the 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 6-6. Species composition, cover, and diversity of flora in five creosote bush (Larrea divaricata) communities at PVNGS monitoring sites, 1990 (sheet 1 of 3)

| Parameter                             | Site  |      |      |      |      | Cumulative<br>total |
|---------------------------------------|---|------|------|------|------|---------------------|
|                                       | 1   | 4    | 6    | 40   | 42   |                     |
| Species composition and percent cover |   |      |      |      |      |                     |
| Shrubs                                |   |      |      |      |      |                     |
| <u>Ambrosia dumosa*</u>               | White bursaget                                | 1.6  |      |      |      | 1.6                 |
| <u>Larrea divaricata</u>              | Creosote bush;<br>greasewood                  | 13.0 | 11.1 | 14.6 | 11.1 | 62.6                |
| Herbs                                 |   |      |      |      |      |                     |
| <u>Allionia incarnata</u>             | Trailing four-o'clock                         |      | --   |      | 2.6  | 2.6                 |
| <u>Amsinckia intermedia</u>           | Coast fiddleneck                              | <0.1 |      | 0.1  | <0.1 | 0.2                 |
| <u>Argythamnia neomexicana</u>        | None  | --   |      |      |      | --                  |
| <u>Astragalus Nuttallianus</u>        | None  | --   | --   | <0.1 | <0.1 | <0.1                |
| <u>Brassica Tournefortii</u>          | Mustard                                       |      |      |      | --   | --                  |
| <u>Chaenactis carphoclinia</u>        | Pebble pincushion                             | --   | --   |      |      | --                  |
| <u>Chorizanthe brevicornu</u>         | Brittle spine flower                          |      |      |      |      | --                  |
| <u>Chorizanthe rigida</u>             | Rigid spiny herb                              |      | <0.1 | --   | --   | <0.1                |
| <u>Cryptantha maritima</u>            | White-haired<br>cryptantha                    |      |      |      | <0.1 | <0.1                |
| <u>Dalea mollis</u>                   | Silk dalea                                    |      |      | <0.1 | --   | <0.1                |
| <u>Daucus pusillus</u>                | American carrot                               | 0.3  |      |      |      | 0.3                 |
| <u>Eriogonum trichopes</u>            | Little trumpet                                |      | <0.1 | <0.1 | --   | 0.5                 |
| <u>Erodium cicutarium</u>             | Filaree; heron bill                           | 0.2  |      | <0.1 |      | 0.2                 |
| <u>Erodium texanum</u>                | Large-flowered<br>stork's bill;<br>heron bill | 0.1  | 0.1  |      | <0.1 | 0.2                 |



Table 6-6. Species composition, cover, and diversity of flora in five creosote bush (Larrea divaricata) communities at PVNGS monitoring sites, 1990 (sheet 2 of 3)

| Parameter | Site |   |   |    |    | Cumulative total |
|-----------|------|---|---|----|----|------------------|
|           | 1    | 4 | 6 | 40 | 42 |                  |

Species composition and percent cover (continued)

Herbs (continued)

|                               |                       |      |      |      |      |      |      |
|-------------------------------|-----------------------|------|------|------|------|------|------|
| <u>Euphorbia polycarpa</u>    | Small-seeded sand mat | 0.1  | --   | 0.3  | 0.5  | --   | 0.9  |
| <u>Hesperocallis undulata</u> | Desert lily           |      | <0.1 |      |      |      | <0.1 |
| <u>Lepidium lasiocarpum</u>   | Sand pepper grass     | 0.1  | <0.1 | <0.1 | --   | 0.4  | 0.5  |
| <u>Lesquerella Gordonii</u>   | Gordon bladderpod     |      | 0.2  |      | --   | --   | 0.2  |
| <u>Lupinus sparsiflorus</u>   | Lupine                |      |      | --   |      |      | --   |
| <u>Monoptilon bellioides</u>  | Mohave desert star    |      |      | --   |      |      | --   |
| <u>Pectis papposa</u>         | Chinchweed            | --   | <0.1 | <0.1 | 0.1  |      | 0.2  |
| <u>Pectocarya platycarpa</u>  | Broad-nutted comb bur | <0.1 | <0.1 | 0.1  | <0.1 | <0.1 | 0.2  |
| <u>Phacelia crenulata</u>     | None                  | <0.1 | <0.1 |      |      |      | <0.1 |
| <u>Plantago insularis</u>     | Woolly plantain;      |      |      |      |      |      |      |
|                               | Indian wheat          | 0.1  | 0.9  | 0.9  | <0.1 | 2.5  | 4.4  |
| <u>Sphaeralcea</u> sp.        | Alkali pink           |      |      |      | 0.1  |      | 0.1  |
| <u>Tidestromia lanuginosa</u> | Woolly tidestromia    |      | --   |      | 0.4  |      | 0.4  |

Grasses

|                              |                     |      |    |     |    |    |     |
|------------------------------|---------------------|------|----|-----|----|----|-----|
| <u>Aristida adscensionis</u> | Six weeks three-awn | <0.1 | -- | 0.5 |    | -- | 0.5 |
| <u>Bouteloua barbata</u>     | Six-weeks grama     | 0.6  | -- | --  | -- |    | 0.6 |
| <u>Bromus rubens</u>         | Red brome;          |      | -- |     |    |    | --  |
|                              | foxtail chess       |      |    |     |    |    |     |
| <u>Erioneuron pulchellum</u> | Fluff grass         | --   |    |     |    |    | --  |





Table 6-6. Species composition, cover, and diversity of flora in five creosote bush (Larrea divaricata) communities at PVNGS monitoring sites, 1990 (sheet 3 of 3)

| Parameter   | Site                            |      |     |     |     | Cumulative total |
|---|---------------------------------|------|-----|-----|-----|------------------|
|   | 1                               | 4    | 6   | 40  | 42  |                  |
| Species composition and percent cover (continued) |                                 |      |     |     |     |                  |
| Grasses (continued)                               |                                 |      |     |     |     |                  |
| <u>Festuca octoflora</u>                          | Six-weeks fescue                | <0.1 |     | 0.2 | --  | 0.2              |
| <u>Muhlenbergia microsperma</u>                   | Littleseed muhly                | --   |     |     |     | --               |
| <u>Schismus arabicus</u>                          | Arabian grass                   | <0.1 | 0.3 | 0.3 | 0.6 | 1.0              |
| Cacti   |                                 |      |     |     |     |                  |
| <u>Opuntia acanthocarpa</u>                       | Buckhorn cholla                 |      | --  |     | --  | --               |
| <u>Opuntia echinocarpa</u>                        | Silver cholla;<br>golden cholla |      | 0.1 |     |     | 0.1              |
| <u>Opuntia leptocaulis</u>                        | Desert Christmas cactus         | --   |     |     |     | --               |
| <u>Opuntia ramosissima</u>                        | Diamond cholla                  |      | 0.9 |     | --  | 0.9              |
| Species diversity and number of plots             |                                 |      |     |     |     |                  |
| Species richness                                  | 21                              | 22   | 20  | 15  | 18  | 39               |
| Heterogeneity (H')                                | .33                             | .35  | .29 | .42 | .38 | 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 6-7. Species composition, cover, and diversity of flora in three salt bush (*Atriplex* spp.) communities at PVNGS monitoring sites, 1990 (sheet 1 of 2)

| Parameter                             | Site                                |      |      | Cumulative total |
|---------------------------------------|-------------------------------------|------|------|------------------|
|                                       | 2                                   | 3    | 44   |                  |
| Species composition and percent cover |                                     |      |      |                  |
| Shrubs                                |                                     |      |      |                  |
| <u>Atriplex linearis</u> *            | Salt bush; narrow-leaved wingscale† | 0.4  | 1.2  | 1.6              |
| <u>Atriplex polycarpa</u>             | Salt bush; all scale                | 16.6 | 18.0 | 42.9             |
| <u>Larrea divaricata</u>              | Creosote bush; greasewood           | 4.3  |      | 4.9              |
| <u>Lycium Fremontii</u>               | Fremont thornbush                   | 0.4  | 4.4  | 4.8              |
| <u>Prosopis velutina</u>              | Velvet mesquite                     | 5.7  | --   | 7.1              |
| Herbs                                 |                                     |      |      |                  |
| <u>Allionia incarnata</u>             | Trailing four-o'clock               | 0.1  |      | 0.1              |
| <u>Amaranthus crassipes</u>           | Amaranth; pig weed                  | --   |      | --               |
| <u>Amaranthus fimbriatus</u>          | Fringed amaranth                    | <0.1 | --   | <0.1             |
| <u>Amsinckia intermedia</u>           | Coast fiddleneck                    |      | --   | --               |
| <u>Boerhaavia intermedia</u>          | Five-winged ringstem                | 0.4  |      | 0.4              |
| <u>Eremalcha exilis</u>               | None                                |      | --   | --               |
| <u>Eriogonum trichopes</u>            | Little trumpet                      |      | --   | --               |
| <u>Euphorbia polycarpa</u>            | Small-seeded sand mat               | 6.5  | 1.4  | 8.5              |
| <u>Lepidium lasiocarpum</u>           | Sand pepper grass                   | --   | <0.1 | <0.1             |
| <u>Oligomeris linifolia</u>           | Linear-leaved cambess               |      | <0.1 | <0.1             |
| <u>Pectis papposa</u>                 | Chinchweed                          | 0.4  | 1.4  | 1.9              |
| <u>Plantago insularis</u>             | Woolly plantain; Indian wheat       | 0.1  | <0.1 | 0.1              |
| <u>Portulaca parvula</u>              | Purslane                            | --   | --   | --               |
| <u>Sphaeralcea Coulteri</u>           | Coulter globe mallow                | --   |      | --               |



Table 6-7. Species composition, cover, and diversity of flora in three salt bush (*Atriplex* spp.) communities at PVNGS monitoring sites, 1990 (sheet 2 of 2)

| Parameter   | Site               |      |      | Cumulative total |      |
|---|--------------------|------|------|------------------|------|
|   | 2                  | 3    | 44   |                  |      |
| Species composition and percent cover (continued) |                    |      |      |                  |      |
| Herbs (continued)                                 |                    |      |      |                  |      |
| <u>Sphaeralcea</u> sp.                            | Alkali pink        | 0.3  | --   | <0.1             | 0.3  |
| <u>Tidestromia</u> lanuginosa                     | Woolly tidestromia | --   |      | <0.1             | <0.1 |
| <u>Trianthema</u> <u>Portulacastrum</u>           | Horse purslane     |      | <0.1 |                  | <0.1 |
| Grasses   |                    |      |      |                  |      |
| <u>Bouteloua</u> <u>barbata</u>                   | Six-weeks grama    | 0.4  | 0.8  |                  | 1.2  |
| <u>Schismus</u> <u>arabicus</u>                   | Arabian grass      | 0.7  | 0.8  | 2.1              | 3.6  |
| <u>Schismus</u> sp.                               | None               | <0.1 |      |                  | <0.1 |
| Species diversity and number of plots             |                    |      |      |                  |      |
| Species richness                                  |                    | 20   | 15   | 13               | 25   |
| Heterogeneity (H')                                |                    | .70  | .54  | .51              | 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. Symptoms associated with salt deposition or uptake include chlorosis and necrosis of the leaves, shoot-tip dieback, leaf curl, slower growth, increased susceptibility to disease and insect damage, and changes in structure and diversity in the plant community over time (Foster et al., 1984). 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, was aerially photographed with CIR film on August 28, 1990. 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) and changes in color, tone, and pattern (i.e., signatures). Color-positive prints were made of all agricultural and native sites. Sites were ground-truthed on September 21, 1990. 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, (5) examination of the locations of stressed areas in relation to depositional predictions, and (6) interviews with local farmers. 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. As was the case in 1989 (NUS, 1990), site 11 exhibited evidence of Texas root rot along the eastern border of the field. Texas root rot, which is caused by a fungus (Phymatotrichium omnivorum), is characterized on the CIR imagery by circular or partially circular outlines of bare soil (i.e., dead plants) within the field. Also seen again in 1990 was the pinkish area south of site 11, which is an area of common cocklebur (Xanthium saccharatum). The cotton field northwest of site 11 exhibited a somewhat lighter pink color than normal, especially in the southeast corner, indicating a possible stressed condition. Ground-truthing suggested a possible nitrogen deficiency. The farmer responsible for this field also felt that a lack of sufficient nitrogen was a problem with this particular field. There was little variation in tonal signature in the area of site 13. Variations that were present are attributable to inconsistent germination.

Examination of the CIR photography and ground-truthing did not reveal any evidence of salt stress in any of the agricultural fields. However, all fields showed evidence of insect pests, including pink bollworms (Pectinophora gossypiella), sweet potato whiteflies (Bemisia tabaci), and cotton leaf perforators (Bucculatrix thurberiella). Whiteflies and/or leaf perforators were especially abundant around sites 11, 13, and 23 (site 30



had been defoliated, and thus the status of insect pests was not readily discernible). Inconsistent growth was also noted in several fields.

Examination of CIR aerial photography revealed that native vegetation was in a more active state of growth than is normally seen during the late summer photo mission. This is a result of the above-average rainfall that occurred during the summer months. Neither CIR photography nor observations in the field yielded any evidence of salt damage from cooling tower drift.



Table 7-1. Summary of 1990 color infrared photomission  
at PVNGS and vicinity

|                        |  |
|------------------------|--|
| Subcontractor          | Aero/Science<br>P.O. Box 4<br>Scottsdale, AZ 85252<br>(602) 948-6634 |
| Date                   | August 28, 1990  |
| Weather                | Clear  |
| Start time             | 10:25 a.m. Mountain Standard Time                                    |
| Stop time              | 12:02 p.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          | 1/350 sec  |
| Aperture               | F6.8   |
| Scale                  | 1:6000   |









## 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 centimeters) 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-centimeter) 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 Hassayampa River floodplain. The finest-textured soil is found at site 45. No new physical analyses were performed in 1990.

### 8.2 CHEMICAL ANALYSES

#### 8.2.1 Comparisons of Agricultural and Native Sites, 1990

Twelve soil samples were taken from each agricultural site in 1990: 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.

Annual mean data for each measured parameter for the agricultural and the native soils are presented in Table 8-1. The means of the two groups were significantly different for 11 of the 19 measured parameters: pH, soluble magnesium, fluoride, bicarbonate, carbonate, ammonium, phosphate, sulfate, exchangeable calcium, exchangeable magnesium, and exchangeable sodium. Where significantly different, the parameter values were greater in agricultural soils than in native soils, except for phosphate and exchangeable calcium.



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 annual 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 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 carbonate and ammonium. The values for both carbonate and ammonium were significantly higher in July than in April. Ammonium was significantly higher in both July and November than in April. In terms of dry season and postdefoliation parameter concentrations, significant differences were revealed for phosphate, exchangeable calcium, and exchangeable magnesium. While phosphate was significantly higher in November than in July, both exchangeable calcium and exchangeable magnesium were significantly lower in November than in both April and July.

The annual mean value for each parameter by site is presented in Table 8-4. Sites 7, 11, 12, 24, 25, 28, 30, 31, 32, and 45 were fallow in 1990. Sites 13 and 23 were planted in cotton and site 43 in alfalfa. Most sites were in the same condition in 1990 as they were in 1988 and 1989, with the exception of sites 11, 23, 25, 30, and 31. Sites 11, 25, and 30 were planted in cotton during 1988-1989 while site 23 was planted in alfalfa in 1988 and cotton in 1989. Site 31 was planted in cotton in 1988 and was fallow in 1989. A least-significant-difference (LSD) procedure was used to segregate the sites into homogeneous units based on the concentration of each parameter. The procedure also made it possible to identify statistical outliers. These statistical groupings are indicated by superscript in Table 8-4. By any reasonable use of statistical measures, no agricultural site can be judged,



overall, to be significantly different from the others in the monitoring program. Sites 12 and 25, nevertheless, did show significantly higher readings for several parameters each as compared to all others in 1990. Site 12 had the significantly highest readings for electrical conductivity, soluble sodium, soluble potassium, chloride, and nitrate, and site 25 had the significantly highest concentrations for soluble calcium, soluble magnesium, and sulfate.

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 mean concentrations of 120 and 148 parts per million of soluble sodium, respectively, in the wet season. In 13 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-depth segment than in the lower-depth segment.

#### 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 most parameters: electrical conductivity, soluble sodium, chloride, boron, fluoride, carbonate, nitrate, phosphate, sulfate, and exchangeable sodium. For all parameters exhibiting significant differences, with the exception of phosphate, 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. Sodium concentrations were, almost invariably, greater in the lower-depth samples in native soils. Exceptions were the dry season samples from sites 26 and 42.

Sites 3 and 16, both onsite locations, had much higher concentrations of sodium than the other sites. This trend has been consistent throughout the monitoring program. These sites are within 2000 feet of each other in the



northwest section of the PVNGS site. As indicated by the Soil Conservation Service (USDA, 1977), sites 3 and 16 are located in an area of naturally saline soils (Casa Grande-Laveen Complex) which indicates that the amount of sodium measured at these sites reflects naturally occurring conditions.





Table 8-1. Chemical properties of agricultural and native soils at PVNGS monitoring sites, 1990 (means  $\pm$  standard errors)

| Parameter                              | Agricultural soils<br>(n = 156) | Native soils<br>(n = 248) |
|--|---------------------------------|---------------------------|
| Electrical conductivity*<br>(mmhos/cm) | 1.36 $\pm$ 0.06                 | 1.10 $\pm$ 0.13           |
| pH (units)                             | 8.74 $\pm$ 0.03                 | 8.62 $\pm$ 0.02           |
| Soluble ions (ppm)                     |                                 |                           |
| Calcium*                               | 50.3 $\pm$ 3.4                  | 56.7 $\pm$ 5.4            |
| Magnesium                              | 7.8 $\pm$ 0.6                   | 6.2 $\pm$ 0.4             |
| Sodium*                                | 250 $\pm$ 10                    | 204 $\pm$ 33              |
| Potassium*                             | 21.9 $\pm$ 1.6                  | 24.7 $\pm$ 2.0            |
| Chloride*                              | 180 $\pm$ 14                    | 191 $\pm$ 32              |
| Boron*                                 | 2.2 $\pm$ 0.1                   | 2.8 $\pm$ 0.5             |
| Fluoride                               | 5.3 $\pm$ 0.3                   | 1.1 $\pm$ 0.1             |
| Bicarbonate                            | 266 $\pm$ 6                     | 186 $\pm$ 4               |
| Carbonate                              | 7.8 $\pm$ 0.8                   | 5.8 $\pm$ 0.6             |
| Nitrate (as N)*                        | 24.9 $\pm$ 1.9                  | 23.9 $\pm$ 3.4            |
| Ammonium (as N)                        | 2.7 $\pm$ 0.2                   | 2.2 $\pm$ 0.1             |
| Phosphate (as P)                       | 2.0 $\pm$ 0.1                   | 2.3 $\pm$ 0.1             |
| Sulfate                                | 151 $\pm$ 11                    | 54 $\pm$ 9                |
| Exchangeable ions (meq/100g)           |                                 |                           |
| Calcium                                | 23.7 $\pm$ 0.4                  | 25.8 $\pm$ 0.5            |
| Magnesium                              | 2.2 $\pm$ 0.1                   | 1.9 $\pm$ 0.1             |
| Sodium                                 | 3.0 $\pm$ 0.1                   | 1.9 $\pm$ 0.2             |
| Potassium*                             | 1.2 $\pm$ 0.1                   | 1.3 $\pm$ 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 soil samples collected at two depths at PVNGS agricultural and native monitoring sites, 1990 (means  $\pm$  standard errors) (sheet 1 of 2)

| Parameter                              | Depth | Agricultural soils<br>(n = 78) | Native soils<br>(n = 124) |
|--|-------|--------------------------------|---------------------------|
| Electrical conductivity*<br>(mmhos/cm) | U     | 1.33 $\pm$ 0.08                | 0.72 $\pm$ 0.09           |
|  | L     | 1.39 $\pm$ 0.08                | 1.48 $\pm$ 0.23           |
| pH (units)*†                           | U     | 8.72 $\pm$ 0.05                | 8.59 $\pm$ 0.02           |
|  | L     | 8.76 $\pm$ 0.05                | 8.65 $\pm$ 0.03           |
| Soluble ions (ppm)                     |       |                                |                           |
| Calcium*†                              | U     | 52.2 $\pm$ 5.0                 | 52.9 $\pm$ 6.4            |
|  | L     | 48.4 $\pm$ 4.7                 | 60.5 $\pm$ 8.8            |
| Magnesium*†                            | U     | 8.4 $\pm$ 0.9                  | 5.7 $\pm$ 0.4             |
|  | L     | 7.3 $\pm$ 0.7                  | 6.7 $\pm$ 0.6             |
| Sodium*                                | U     | 239 $\pm$ 15                   | 102 $\pm$ 20              |
|  | L     | 262 $\pm$ 14                   | 305 $\pm$ 63              |
| Potassium*†                            | U     | 23.4 $\pm$ 2.2                 | 25.0 $\pm$ 2.8            |
|  | L     | 20.3 $\pm$ 2.5                 | 24.5 $\pm$ 2.8            |
| Chloride*                              | U     | 170 $\pm$ 19                   | 106 $\pm$ 24              |
|  | L     | 191 $\pm$ 21                   | 276 $\pm$ 58              |
| Boron*                                 | U     | 2.2 $\pm$ 0.1                  | 1.6 $\pm$ 0.3             |
|  | L     | 2.1 $\pm$ 0.1                  | 4.1 $\pm$ 1.0             |
| Fluoride                               | U     | 4.4 $\pm$ 0.3                  | 0.7 $\pm$ 0.1             |
|  | L     | 6.1 $\pm$ 0.4                  | 1.5 $\pm$ 0.3             |
| Bicarbonate*†                          | U     | 273 $\pm$ 9                    | 183 $\pm$ 5               |
|  | L     | 259 $\pm$ 8                    | 190 $\pm$ 6               |
| Carbonate*                             | U     | 7.1 $\pm$ 0.9                  | 4.2 $\pm$ 0.4             |
|  | L     | 8.5 $\pm$ 1.3                  | 7.4 $\pm$ 1.0             |
| Nitrate (as N)*                        | U     | 25.6 $\pm$ 2.5                 | 16.2 $\pm$ 3.0            |
|  | L     | 24.1 $\pm$ 2.9                 | 31.5 $\pm$ 6.1            |
| Ammonium (as N)*†                      | U     | 3.0 $\pm$ 0.3                  | 2.4 $\pm$ 0.2             |
|  | L     | 2.5 $\pm$ 0.2                  | 2.0 $\pm$ 0.1             |
| Phosphate (as P)                       | U     | 2.3 $\pm$ 0.2                  | 2.7 $\pm$ 0.2             |
|  | L     | 1.7 $\pm$ 0.1                  | 2.0 $\pm$ 0.1             |
| Sulfate*                               | U     | 148 $\pm$ 19                   | 20.2 $\pm$ 3.6            |
|  | L     | 155 $\pm$ 13                   | 88.5 $\pm$ 16.3           |



Table 8-2. Chemical properties of soil samples collected at two depths at PVNGS agricultural and native monitoring sites, 1990 (means  $\pm$  standard errors) (sheet 2 of 2)

| Parameter                       | Depth | Agricultural soils<br>(n = 78) | Native soils<br>(n = 124) |
|---------------------------------|-------|--------------------------------|---------------------------|
| Exchangeable ions<br>(meq/100g) |       |                                |                           |
| Calcium*†                       | U     | 23.5 $\pm$ 0.6                 | 25.9 $\pm$ 0.7            |
|                                 | L     | 23.8 $\pm$ 0.6                 | 25.7 $\pm$ 0.6            |
| Magnesium*†                     | U     | 2.3 $\pm$ 0.1                  | 1.9 $\pm$ 0.1             |
|                                 | L     | 2.2 $\pm$ 0.1                  | 2.0 $\pm$ 0.1             |
| Sodium*                         | U     | 2.8 $\pm$ 0.2                  | 1.1 $\pm$ 0.2             |
|                                 | L     | 3.1 $\pm$ 0.2                  | 2.7 $\pm$ 0.4             |
| Potassium*†                     | U     | 1.3 $\pm$ 0.1                  | 1.3 $\pm$ 0.1             |
|                                 | L     | 1.2 $\pm$ 0.1                  | 1.3 $\pm$ 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 not significantly different at 95-percent confidence level.

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



Table 8-3. Chemical properties of soil samples collected at PVNGS agricultural monitoring sites, April, July, and November 1990 (means  $\pm$  standard errors)

| Parameter                             | April<br>(end of<br>wet season) | July<br>(end of<br>dry season) | November<br>(postdefoliation) |
|---------------------------------------|---------------------------------|--------------------------------|-------------------------------|
| Electrical conductivity<br>(mmhos/cm) | 1.33 $\pm$ 0.08a                | 1.35 $\pm$ 0.11a               | 1.39 $\pm$ 0.11a              |
| pH (units)                            | 8.66 $\pm$ 0.05a                | 8.71 $\pm$ 0.06ab              | 8.85 $\pm$ 0.06b              |
| Soluble ions (ppm)                    |                                 |                                |                               |
| Calcium                               | 48.6 $\pm$ 5.7a                 | 49.3 $\pm$ 6.0a                | 53.1 $\pm$ 6.2a               |
| Magnesium                             | 7.7 $\pm$ 1.2a                  | 8.0 $\pm$ 0.9a                 | 7.8 $\pm$ 0.9a                |
| Sodium                                | 264 $\pm$ 16a                   | 252 $\pm$ 20a                  | 234 $\pm$ 18a                 |
| Potassium                             | 18.8 $\pm$ 2.8a                 | 26.6 $\pm$ 2.9a                | 20.3 $\pm$ 2.8a               |
| Chloride                              | 173 $\pm$ 20a                   | 181 $\pm$ 26a                  | 186 $\pm$ 28a                 |
| Boron                                 | 2.1 $\pm$ 0.1a                  | 2.2 $\pm$ 0.1a                 | 2.2 $\pm$ 0.1a                |
| Fluoride                              | 5.2 $\pm$ 0.5a                  | 5.6 $\pm$ 0.5a                 | 5.0 $\pm$ 0.5a                |
| Bicarbonate                           | 280 $\pm$ 10b                   | 268 $\pm$ 9ab                  | 251 $\pm$ 11a                 |
| Carbonate                             | 5.6 $\pm$ 1.1a                  | 10.4 $\pm$ 1.6b                | 7.3 $\pm$ 1.4ab               |
| Nitrate (as N)                        | 21.7 $\pm$ 3.2a                 | 23.7 $\pm$ 2.9a                | 29.1 $\pm$ 3.7a               |
| Ammonium (as N)                       | 1.7 $\pm$ 0.2                   | 2.9 $\pm$ 0.3a                 | 3.5 $\pm$ 0.3a                |
| Phosphate (as P)                      | 2.1 $\pm$ 0.2ab                 | 1.6 $\pm$ 0.2a                 | 2.2 $\pm$ 0.2b                |
| Sulfate                               | 157 $\pm$ 16a                   | 146 $\pm$ 24a                  | 151 $\pm$ 19a                 |
| Exchangeable ions<br>(meq/100g)       |                                 |                                |                               |
| Calcium                               | 25.4 $\pm$ 0.4a                 | 27.0 $\pm$ 0.8a                | 18.6 $\pm$ 0.4                |
| Magnesium                             | 2.4 $\pm$ 0.1a                  | 2.5 $\pm$ 0.1a                 | 1.8 $\pm$ 0.1                 |
| Sodium                                | 3.3 $\pm$ 0.2b                  | 2.9 $\pm$ 0.2ab                | 2.7 $\pm$ 0.1a                |
| Potassium                             | 1.2 $\pm$ 0.1a                  | 1.3 $\pm$ 0.1a                 | 1.2 $\pm$ 0.1a                |

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, 1990 (means  $\pm$  standard errors) (sheet 1 of 2)

| Parameter                          | Site             |                   |                  |                   |                   |                   |                  |
|------------------------------------|------------------|-------------------|------------------|-------------------|-------------------|-------------------|------------------|
|                                    | 7<br>Fallow      | 11<br>Fallow      | 12<br>Fallow     | 13<br>Cotton      | 23<br>Cotton      | 24<br>Fallow      | 25<br>Fallow     |
| Electrical conductivity (mmhos/cm) | 0.71 $\pm$ 0.05a | 1.8 $\pm$ 0.13e   | 2.84 $\pm$ 0.17f | 0.89 $\pm$ 0.05ab | 1.66 $\pm$ 0.28de | 0.96 $\pm$ 0.05ab | 1.72 $\pm$ 0.14e |
| pH                                 | 8.85 $\pm$ 0.03f | 8.59 $\pm$ 0.04de | 8.33 $\pm$ 0.03b | 8.62 $\pm$ 0.05e  | 8.44 $\pm$ 0.07bc | 8.68 $\pm$ 0.04e  | 8.15 $\pm$ 0.04a |
| Soluble ions (ppm)                 |                  |                   |                  |                   |                   |                   |                  |
| Calcium                            | 28.0 $\pm$ 1.4ab | 43.4 $\pm$ 1.6bc  | 112 $\pm$ 13e    | 33.8 $\pm$ 1.6ab  | 74.7 $\pm$ 16.2d  | 35.3 $\pm$ 1.8ab  | 138 $\pm$ 14f    |
| Magnesium                          | 4.7 $\pm$ 0.3a   | 4.7 $\pm$ 0.2a    | 10.7 $\pm$ 1.2c  | 5.2 $\pm$ 0.5a    | 9.0 $\pm$ 2.2bc   | 4.8 $\pm$ 0.3a    | 25.8 $\pm$ 2.6e  |
| Sodium                             | 133 $\pm$ 12a    | 345 $\pm$ 28d     | 467 $\pm$ 43e    | 164 $\pm$ 10ab    | 329 $\pm$ 49d     | 173 $\pm$ 14ab    | 155 $\pm$ 14a    |
| Potassium                          | 11.8 $\pm$ 1.7ab | 31.7 $\pm$ 1.4e   | 79.0 $\pm$ 2.8f  | 20.8 $\pm$ 2.8cd  | 12.8 $\pm$ 2.1ab  | 27.2 $\pm$ 3.1de  | 32.3 $\pm$ 2.8e  |
| Chloride                           | 46.7 $\pm$ 9.1a  | 269 $\pm$ 27d     | 593 $\pm$ 53e    | 98.7 $\pm$ 10.7ab | 275 $\pm$ 69d     | 86.5 $\pm$ 10.7ab | 139 $\pm$ 19b    |
| Boron                              | 1.8 $\pm$ 0.1cd  | 3.0 $\pm$ 0.2f    | 2.9 $\pm$ 0.2f   | 1.1 $\pm$ 0.1a    | 1.7 $\pm$ 0.1cd   | 1.6 $\pm$ 0.1abc  | 1.1 $\pm$ 0.1ab  |
| Fluoride                           | 2.1 $\pm$ 0.4ab  | 12.1 $\pm$ 0.4h   | 4.5 $\pm$ 0.3cd  | 7.2 $\pm$ 0.7ef   | 6.5 $\pm$ 0.5ef   | 3.2 $\pm$ 0.2bc   | 1.5 $\pm$ 0.1a   |
| Bicarbonate                        | 252 $\pm$ 9cd    | 274 $\pm$ 10def   | 162 $\pm$ 9a     | 282 $\pm$ 10def   | 299 $\pm$ 26ef    | 215 $\pm$ 6bc     | 183 $\pm$ 19ab   |
| Carbonate                          | 3.6 $\pm$ 0.8ab  | 5.2 $\pm$ 1.5ab   | 2.4 $\pm$ 0.0a   | 4.3 $\pm$ 0.9ab   | 2.9 $\pm$ 0.3a    | 5.0 $\pm$ 1.1ab   | 2.4 $\pm$ 0.0a   |
| Nitrate (as N)                     | 20.8 $\pm$ 4.0c  | 20.3 $\pm$ 3.3bc  | 84.4 $\pm$ 6.2f  | 5.6 $\pm$ 1.0a    | 18.2 $\pm$ 5.8bc  | 36.9 $\pm$ 2.9d   | 48.4 $\pm$ 5.9e  |
| Ammonium (as N)                    | 2.4 $\pm$ 0.5abc | 2.0 $\pm$ 0.2ab   | 3.6 $\pm$ 0.8c   | 2.3 $\pm$ 0.5abc  | 3.4 $\pm$ 0.6bc   | 1.2 $\pm$ 0.0a    | 3.4 $\pm$ 0.6bc  |
| Phosphate (as P)                   | 3.4 $\pm$ 0.3c   | 1.1 $\pm$ 0.1a    | 3.3 $\pm$ 0.2c   | 1.8 $\pm$ 0.1b    | 2.2 $\pm$ 0.3b    | 1.9 $\pm$ 0.1b    | 1.7 $\pm$ 0.2b   |
| Sulfate                            | 34.1 $\pm$ 8.2a  | 209 $\pm$ 13de    | 211 $\pm$ 22de   | 53.3 $\pm$ 8.6ab  | 217 $\pm$ 40e     | 46.8 $\pm$ 8.6ab  | 373 $\pm$ 69f    |
| Exchangeable ions (meq/100g)       |                  |                   |                  |                   |                   |                   |                  |
| Calcium                            | 22.2 $\pm$ 0.6bc | 26.8 $\pm$ 1.3def | 22.5 $\pm$ 0.9bc | 22.8 $\pm$ 1.1bc  | 26.7 $\pm$ 1.6def | 23.2 $\pm$ 0.7bcd | 27.1 $\pm$ 1.3ef |
| Magnesium                          | 3.2 $\pm$ 0.1f   | 2.2 $\pm$ 0.1de   | 1.5 $\pm$ 0.1b   | 1.9 $\pm$ 0.1cd   | 2.3 $\pm$ 0.1e    | 2.0 $\pm$ 0.1cd   | 3.8 $\pm$ 0.2g   |
| Sodium                             | 1.5 $\pm$ 0.2a   | 4.3 $\pm$ 0.3de   | 3.5 $\pm$ 0.3d   | 1.9 $\pm$ 0.1ab   | 4.1 $\pm$ 0.5de   | 1.9 $\pm$ 0.1abc  | 1.6 $\pm$ 0.1a   |
| Potassium                          | 0.7 $\pm$ 0.0b   | 2.4 $\pm$ 0.19    | 2.4 $\pm$ 0.19   | 1.3 $\pm$ 0.0d    | 1.1 $\pm$ 0.0d    | 1.8 $\pm$ 0.1f    | 1.6 $\pm$ 0.1e   |



Table 8-4. Chemical properties of soils collected at PVNGS agricultural monitoring sites, 1990 (means  $\pm$  standard errors) (sheet 2 of 2)

| Parameter                          | Site                          |                                |                               |                               |                                |                               |
|------------------------------------|-------------------------------|--------------------------------|-------------------------------|-------------------------------|--------------------------------|-------------------------------|
|                                    | 28<br>Fallow                  | 30<br>Fallow                   | 31<br>Fallow                  | 32<br>Fallow                  | 43<br>Alfalfa                  | 45<br>Fallow                  |
| Electrical conductivity (mmhos/cm) | 0.63 $\pm$ 0.04 <sup>a</sup>  | 1.52 $\pm$ 0.10 <sup>de</sup>  | 1.35 $\pm$ 0.09 <sup>cd</sup> | 1.09 $\pm$ 0.12 <sup>bc</sup> | 1.63 $\pm$ 0.12 <sup>de</sup>  | 0.93 $\pm$ 0.06 <sup>ab</sup> |
| pH                                 | 8.95 $\pm$ 0.04 <sup>f</sup>  | 8.54 $\pm$ 0.03 <sup>cde</sup> | 9.28 $\pm$ 0.07 <sup>g</sup>  | 9.36 $\pm$ 0.07 <sup>g</sup>  | 8.46 $\pm$ 0.05 <sup>bcd</sup> | 9.38 $\pm$ 0.05 <sup>g</sup>  |
| Soluble ions (ppm)                 |                               |                                |                               |                               |                                |                               |
| Calcium                            | 24.9 $\pm$ 1.0 <sup>ab</sup>  | 40.8 $\pm$ 2.2 <sup>bc</sup>   | 26.3 $\pm$ 1.1 <sup>ab</sup>  | 21.0 $\pm$ 1.0 <sup>a</sup>   | 58.3 $\pm$ 3.3 <sup>cd</sup>   | 18.9 $\pm$ 1.1 <sup>a</sup>   |
| Magnesium                          | 3.1 $\pm$ 0.3 <sup>a</sup>    | 6.3 $\pm$ 0.5 <sup>ab</sup>    | 4.3 $\pm$ 0.8 <sup>a</sup>    | 4.6 $\pm$ 1.1 <sup>a</sup>    | 14.4 $\pm$ 1.0 <sup>d</sup>    | 4.3 $\pm$ 0.8 <sup>a</sup>    |
| Sodium                             | 136 $\pm$ 12 <sup>a</sup>     | 297 $\pm$ 25 <sup>cd</sup>     | 285 $\pm$ 24 <sup>cd</sup>    | 252 $\pm$ 26 <sup>c</sup>     | 288 $\pm$ 24 <sup>cd</sup>     | 232 $\pm$ 16 <sup>bc</sup>    |
| Potassium                          | 9.8 $\pm$ 1.4 <sup>a</sup>    | 10.8 $\pm$ 1.1 <sup>ab</sup>   | 9.7 $\pm$ 1.5 <sup>a</sup>    | 17.8 $\pm$ 6.7 <sup>bc</sup>  | 13.3 $\pm$ 0.8 <sup>abc</sup>  | 7.5 $\pm$ 1.6 <sup>a</sup>    |
| Chloride                           | 39.8 $\pm$ 8.6 <sup>a</sup>   | 235 $\pm$ 24 <sup>cd</sup>     | 158 $\pm$ 22 <sup>bc</sup>    | 103 $\pm$ 20 <sup>ab</sup>    | 254 $\pm$ 32 <sup>d</sup>      | 42.1 $\pm$ 8.6 <sup>a</sup>   |
| Boron                              | 1.6 $\pm$ 0.1 <sup>bc</sup>   | 2.0 $\pm$ 0.1 <sup>cd</sup>    | 3.6 $\pm$ 0.2 <sup>g</sup>    | 2.7 $\pm$ 0.3 <sup>ef</sup>   | 2.2 $\pm$ 0.2 <sup>de</sup>    | 2.6 $\pm$ 0.2 <sup>ef</sup>   |
| Fluoride                           | 1.7 $\pm$ 0.2 <sup>a</sup>    | 5.8 $\pm$ 0.3 <sup>de</sup>    | 7.3 $\pm$ 1.1 <sup>f</sup>    | 8.8 $\pm$ 0.8 <sup>g</sup>    | 1.9 $\pm$ 0.1 <sup>ab</sup>    | 5.8 $\pm$ 0.7 <sup>def</sup>  |
| Bicarbonate                        | 262 $\pm$ 14 <sup>de</sup>    | 251 $\pm$ 5 <sup>cd</sup>      | 291 $\pm$ 12 <sup>def</sup>   | 303 $\pm$ 17 <sup>f</sup>     | 306 $\pm$ 17 <sup>f</sup>      | 383 $\pm$ 14 <sup>g</sup>     |
| Carbonate                          | 7.9 $\pm$ 1.4 <sup>bc</sup>   | 3.6 $\pm$ 0.6 <sup>ab</sup>    | 12.1 $\pm$ 1.5 <sup>cd</sup>  | 13.8 $\pm$ 4.5 <sup>d</sup>   | 4.0 $\pm$ 1.0 <sup>ab</sup>    | 33.9 $\pm$ 2.7 <sup>e</sup>   |
| Nitrate (as N)                     | 10.1 $\pm$ 1.6 <sup>ab</sup>  | 13.3 $\pm$ 1.4 <sup>abc</sup>  | 21.9 $\pm$ 2.7 <sup>c</sup>   | 14.2 $\pm$ 3.5 <sup>abc</sup> | 15.0 $\pm$ 3.2 <sup>abc</sup>  | 14.0 $\pm$ 1.3 <sup>abc</sup> |
| Ammonium (as N)                    | 3.4 $\pm$ 1.0 <sup>bc</sup>   | 2.7 $\pm$ 0.7 <sup>abc</sup>   | 1.6 $\pm$ 0.2 <sup>a</sup>    | 1.5 $\pm$ 0.2 <sup>a</sup>    | 5.9 $\pm$ 0.8 <sup>d</sup>     | 2.0 $\pm$ 0.5 <sup>abc</sup>  |
| Phosphate (as P)                   | 1.1 $\pm$ 0.1 <sup>a</sup>    | 0.8 $\pm$ 0.1 <sup>a</sup>     | 1.7 $\pm$ 0.2 <sup>b</sup>    | 1.0 $\pm$ 0.1 <sup>a</sup>    | 4.7 $\pm$ 0.4 <sup>d</sup>     | 1.0 $\pm$ 0.1 <sup>a</sup>    |
| Sulfate                            | 44.8 $\pm$ 15.1 <sup>ab</sup> | 234 $\pm$ 26 <sup>e</sup>      | 136 $\pm$ 27 <sup>cd</sup>    | 114 $\pm$ 23 <sup>bc</sup>    | 264 $\pm$ 32 <sup>e</sup>      | 31.3 $\pm$ 13.3 <sup>a</sup>  |
| Exchangeable ions (meq/100g)       |                               |                                |                               |                               |                                |                               |
| Calcium                            | 29.9 $\pm$ 1.7 <sup>f</sup>   | 25.6 $\pm$ 1.7 <sup>cde</sup>  | 17.9 $\pm$ 1.0 <sup>a</sup>   | 18.2 $\pm$ 1.0 <sup>a</sup>   | 20.6 $\pm$ 1.4 <sup>ab</sup>   | 24.3 $\pm$ 1.9 <sup>cde</sup> |
| Magnesium                          | 1.8 $\pm$ 0.0 <sup>bc</sup>   | 2.9 $\pm$ 0.2 <sup>f</sup>     | 0.9 $\pm$ 0.1 <sup>a</sup>    | 0.9 $\pm$ 0.1 <sup>a</sup>    | 3.7 $\pm$ 0.2 <sup>g</sup>     | 2.1 $\pm$ 0.2 <sup>cde</sup>  |
| Sodium                             | 2.5 $\pm$ 0.3 <sup>bc</sup>   | 4.4 $\pm$ 0.4 <sup>ef</sup>    | 2.6 $\pm$ 0.1 <sup>c</sup>    | 2.4 $\pm$ 0.2 <sup>bc</sup>   | 2.6 $\pm$ 0.2 <sup>c</sup>     | 5.1 $\pm$ 0.4 <sup>f</sup>    |
| Potassium                          | 1.1 $\pm$ 0.0 <sup>d</sup>    | 1.1 $\pm$ 0.0 <sup>d</sup>     | 0.6 $\pm$ 0.0 <sup>b</sup>    | 0.3 $\pm$ 0.0 <sup>a</sup>    | 0.8 $\pm$ 0.0 <sup>c</sup>     | 0.7 $\pm$ 0.0 <sup>bc</sup>   |

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.



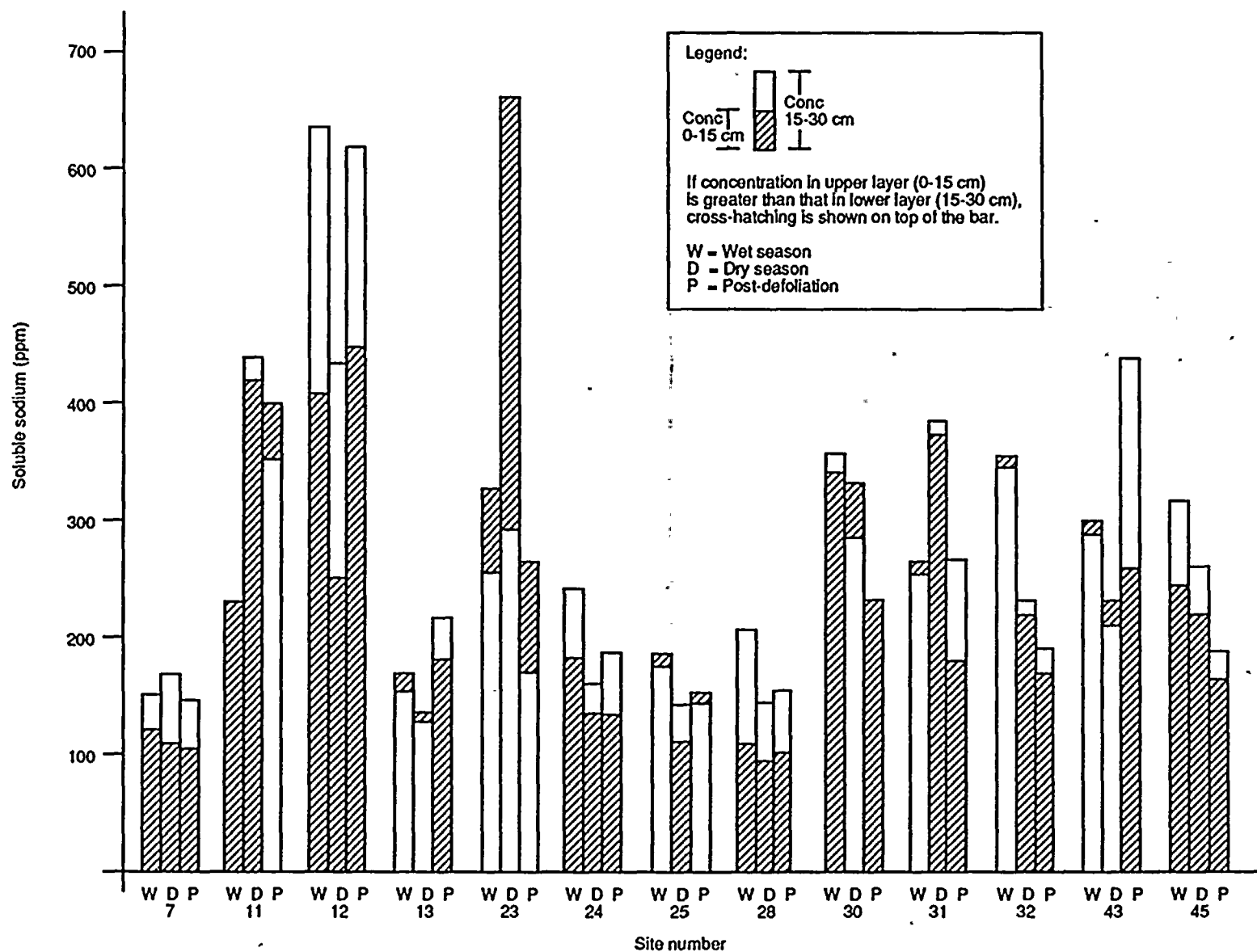


Figure 8-1. Mean concentrations of soluble sodium in soils at PVNGS agricultural monitoring sites by depth and season, 1990



8-12

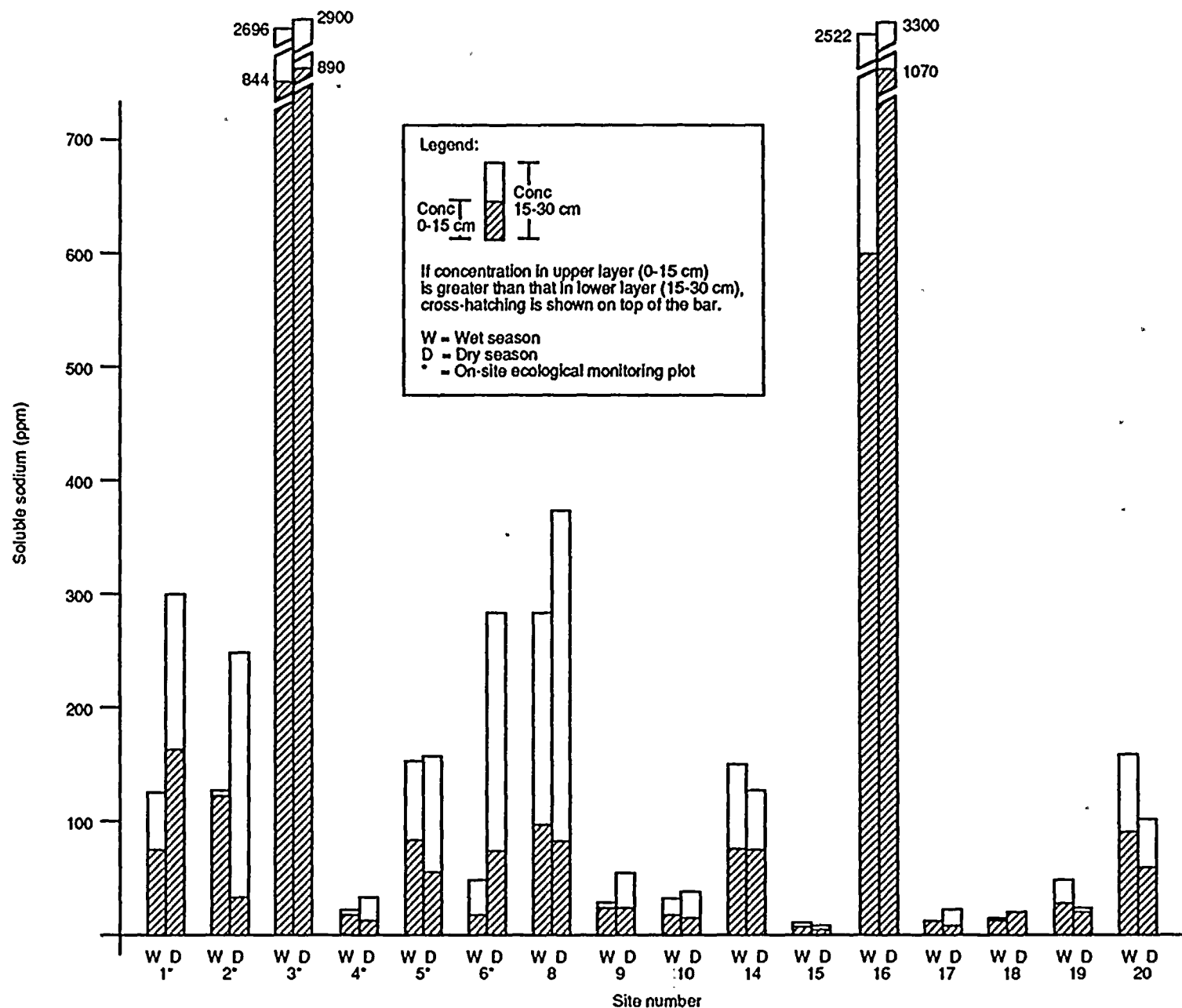


Figure 8-2. Mean concentrations of soluble sodium in soils at PVNGS native monitoring sites by depth and season, 1990 (sheet 1 of 2)





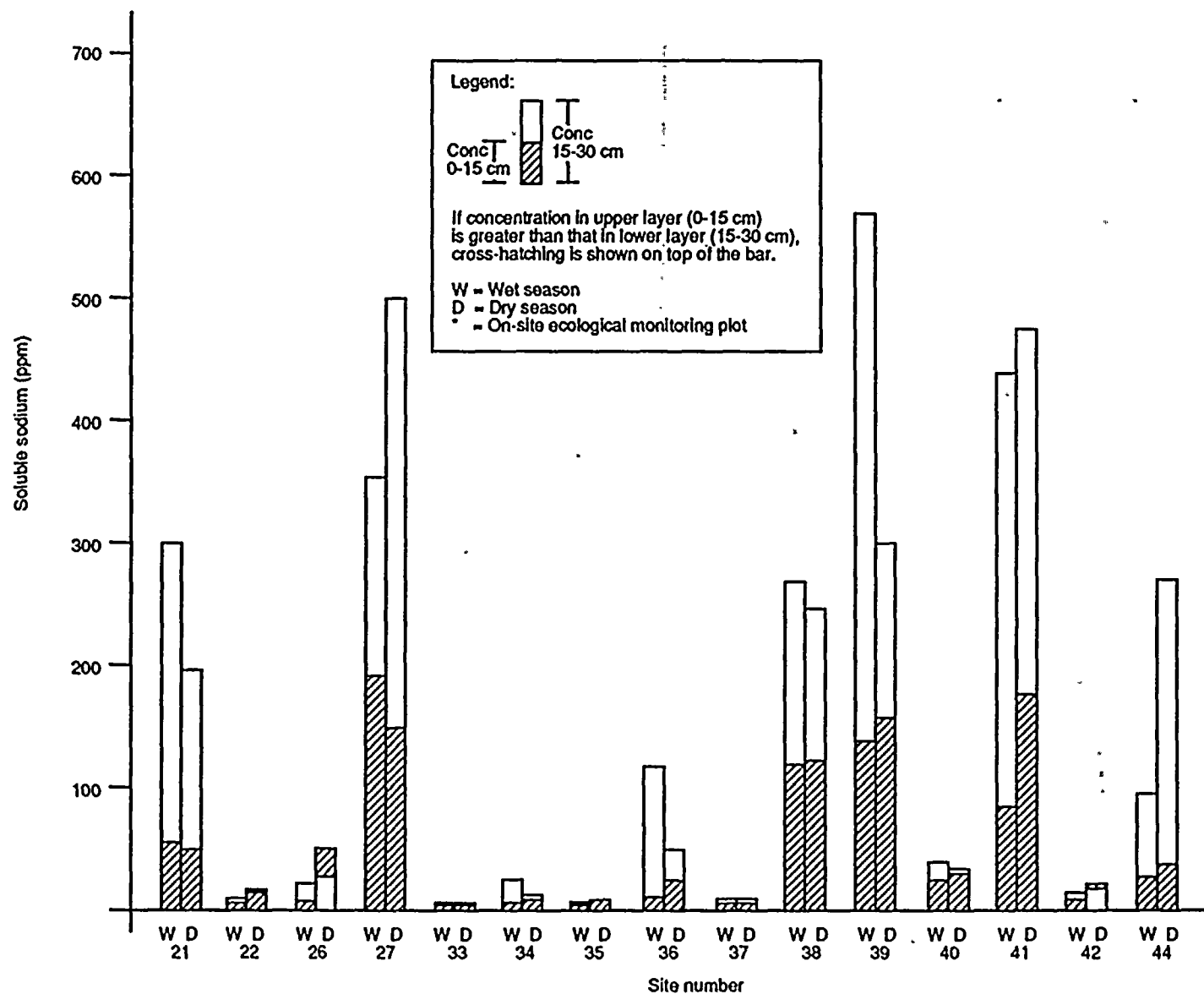


Figure 8-2. Mean concentrations of soluble sodium in soils at PVNGS native monitoring sites by depth and season, 1990 (sheet 2 of 2)



## 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 1990 and for the period 1974-1985 are presented in Table 9-1. National Weather Service Phoenix (NWS) climatological data for 1990 and the period 1950-1980 are presented in Table 9-2. As shown in these data, the precipitation at PVNGS for 1990 was slightly lower than the annual average for the period 1974-1985. The average wind speed at PVNGS for 1990 was slightly higher than the 1974-1985 annual average. The late winter and spring months had average wind speeds generally higher than the 1974-1985 averages. The annual average temperature for 1990 at PVNGS was the same as the long-term average. The precipitation at NWS for 1990 was greater than the annual average for 1950-1980. The average wind speed for 1990 at NWS was slightly lower than the annual average recorded for 1950-1980. The average 1990 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 1990 annual averages, the temperature and dew point for PVNGS were 4°F and 5°F, respectively, lower than those for NWS. The precipitation for PVNGS was lower than the NWS precipitation collected during 1990. The PVNGS wind speeds were higher than the wind speeds at NWS during 1990.

#### 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 1990 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 1990) 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 1989, 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 1990. 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.

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 1990 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 1990 data sets. As the table indicates, the increases in the mean annual deposition of calcium, magnesium, and TSS between the preoperational period and 1990 were statistically significant; potassium had lower deposition in 1990 than in the preoperational period. There was no statistically significant change in the mean annual deposition of sodium.

Figures 9-1 through 9-3 show the mean monthly deposition for the preoperational and 1990 data sets for the combined agricultural sites. These figures reflect the large variability in measured deposition rates both month-to-month and within any month for both data sets, and apparent peaks in 1990 (except for sodium and calcium) are not significant.

Table 9-4 presents the annual deposition for sodium, potassium, and calcium for each agricultural site for the preoperational period and 1990. Although chloride and sulfate were both prominent ions in the cooling tower basin water, deposition rates were not calculated because 50 and 91 percent, respectively, of the deposition samples were below their detection limits. Also included in the table is an indication of those sites and analytes for which statistically significant changes occurred between the two data periods.

Most of the changes in ionic deposition in 1990 that were statistically significant at some of the agricultural sites were decreases from the respective preoperational means. Only the deposition of sodium and potassium



at site 23 and that of calcium at sites 13, 23, and 32 showed significant increases between the preoperational period and 1990. Decreases in the deposition of sodium were statistically significant at sites 12, 25, and 45. Decreases in potassium deposition were statistically significant at all agricultural sites except 12, 13, 23, 30, and 32. The deposition of calcium at site 25 was significantly lower in 1990 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 1990. The mean annual deposition of potassium showed a statistically significant decrease between the preoperational period and 1990. The mean annual deposition for sodium, calcium, magnesium, and TSS showed statistically significant increases.

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 1990. 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 except between 1 and 2 miles, with increases in 1990 at all the native sites out to 1 mile and with decreases at those more than 2 miles away. The mean annual sodium deposition and the magnitudes of the differences between preoperational and 1990 values decreased with increasing distance from PVNGS. Potassium showed significant decreases at all distances between the preoperational period and 1990 except at the supplemental sites, where the decrease was not statistically significant. Calcium significantly increased at the supplemental sites, showed no significant change for other sites out to 1 mile and sites beyond 2 miles, and showed a significant increase at those sites between 1 and 2 miles



away. Magnesium showed a significant increase at sites out to 2 miles away and no significant change for sites beyond 2 miles. Total suspended solids showed a statistically significant increase at all native sites out to 2 miles and no significant change beyond 2 miles between the preoperational period and 1990.

Figures 9-4 through 9-6 show the mean monthly deposition for the preoperational period and for 1990 at all native sites. As with the agricultural sites, a large variability in deposition rates exists both within months and from month-to-month for both periods for most ions, which makes apparent peaks not statistically significant (except for peaks for calcium in July 1980 and sodium in September and December 1990).

Table 9-10 presents annual deposition for sodium, potassium, and calcium for each native site for the preoperational period and 1990. The table identifies individual sites and analytes that showed statistically significant changes in annual mean values between the preoperational period and 1990.

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 August and December. Decreases in the sodium deposition rate were significant at sites 15, 17, 22, 34-36, and 38-42. Annual calcium deposition significantly increased at sites 4, 6, 9, 15, 19, and 44, and at the supplemental sites (80-83). The largest differences occurred in July and September. There was a significant decrease in the calcium deposition rate at site 17. Annual potassium deposition decreased significantly at sites 8, 14, 17, 21, 22, 27, 33-36, 38, 39, 41, 82, and 83 in 1990. There was a significant increase in potassium deposition at site 19.

#### 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 1990.

For the agricultural site pair, potassium, calcium, magnesium, and TSS significantly decreased between the preoperational period and 1990. For the native site pair, sodium significantly decreased and magnesium and TSS significantly increased.

#### 9.2.5 Deposition Measurement and Prediction

Table 9-12 provides estimated net sodium deposition in 1990 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 1990 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  $3.3 \pm 0.09$  (Appendix B) was applicable. The last column in the table provides the estimated net TDS deposition for each onsite location in 1990.

Assuming that the preoperational values are representative of 1990 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 1990 the sites with the largest net deposition were those closest to the cooling towers (sites 3, 20, and 80-83). As in 1988 and 1989, it appears that the preoperational sodium value may overestimate the current "background" 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 1990. For seven 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, there is not good agreement between the net measured and predicted deposition values for 1990 (Figure 9-7); the correlation coefficient ( $R^2$ ) of 0.29 for the 1990 data shows a much poorer correlation than the value (0.86) for the corresponding 1989 data set. To a considerable extent, the reduced correlation is influenced by the application of the NUS FOG model at the very close distances to the towers where other influences (micro wind field effects and WRF emissions) are effective. Thus, excluding sites 16, 81, and 82 from the data set raises the correlation coefficient to 0.82 as shown in Figure 9-8.

#### 9.2.6 Deposition Summary and Conclusions

From analyses of the drift deposition in 1990, the following conclusions can be drawn:

1. There was a statistically significant increase in sodium, calcium, magnesium, and TSS deposition between the preoperational period and 1990 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 average deposition rates of calcium, magnesium, and TSS showed significant increases from those of the preoperational period. However, sodium and potassium deposition at sites in this group either showed a significant decrease or were unchanged.
3. Calcium, magnesium, and TSS annual mean deposition showed a statistically significant increase between the preoperational period and 1990 at the agricultural sites. Potassium annual mean deposition rates showed a significant decrease. Sodium annual mean deposition did not show a significant change. No effects of the operation of the cooling towers on measured deposition were evident except possibly at site 23 southwest of the cooling towers.
4. A poor correlation was obtained between NUS FOG-code-predicted deposition and measured deposition in 1990.



5. Low-volume air sampler data were again of no value for detecting and identifying the drift patterns.

### 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; 1990). The following sections compare the results of chemical and structural analyses for 1990 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 over three times more frequently in the monitored fields than the long-staple variety. In 1990, short-staple cotton was planted at sites 11, 13, 23, and 30; long-staple cotton was not planted at any monitoring site in 1990.

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 1990 was limited to monitoring site 43 (Table 9-15). With the exception of



calcium and phosphate, there were no significant differences between the mean ionic concentrations in alfalfa leaf tissue for the preoperational period and 1990 at that site. The mean concentrations of calcium and phosphate were significantly higher in 1990 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 phosphate in 1990 is unrelated to the operation of PVNGS.

#### 9.3.1.2 Cotton

The preoperational and 1990 ionic content of short-staple cotton leaf phytomass was evaluated at four monitoring sites (Table 9-16). Sodium levels at sites 11 and 23 were significantly higher in 1990 than during the preoperational period, while the opposite was true at site 30. There was no significant difference between the sodium levels at site 13 for the two monitoring periods. Potassium concentrations were significantly higher in 1990 than during the preoperational period at sites 11 and 30; sites 13 and 23 showed no significant difference in potassium levels. Concentrations of calcium were significantly higher in 1990 than during the preoperational monitoring period at each of the four sites. Magnesium levels were significantly higher in 1990 than during the preoperational monitoring period at sites 11, 23, and 30, while those at site 13 for the two periods were not significantly different. Levels of chloride were significantly higher in 1990 than during the 1983-1985 period at sites 11 and 13. At site 23, chloride values showed no significant difference, and at site 30, the 1990 value was significantly lower than the preoperational level. Concentrations of sulfate were significantly higher in 1990 than during the preoperational period at sites 11 and 13; however, there was no significant difference in values at site 23 or 30. In 1990, nitrate levels were found to be significantly lower than during the preoperational period for all sites. In the case of phosphate, concentrations were significantly higher at sites 13 and 30 in 1990 than during the 1983-1985 period. There was no significant difference in phosphate values at sites 11 and 23. Fluoride concentrations were significantly lower in 1990 than during the preoperational period at site 30; all other sites showed no significant difference.



### 9.3.1.3 Cotton Yield

A comparison of the mean cotton yield for the period 1983-1990 at agricultural monitoring sites in the vicinity of PVNGS is presented in Table 9-17. A comparison of 1990 yields with preoperational (i.e., 1983-1985) data is possible for sites 11, 13, 23, and 30. Sites 11 and 13 have been planted in short-staple cotton since 1983 and 1984, respectively. Sites 23 and 30 have been planted in a variety of crops since the study began in 1983, including melons, alfalfa, barley, long-staple cotton, and short-staple cotton.

The mean cotton yield for site 11 in 1990 was not significantly different from that for 1983. At site 13 the 1990 cotton yield was found to be significantly lower than that reported for 1984. Yield estimates are available for all three preoperational years for site 23. The yield for 1990 was significantly higher than that for 1983 through 1985. Cotton yield at site 30 was not significantly different in 1990 from that reported in 1985.

The grand mean cotton yields at sites 11, 13, 23, and 30 were higher for the operational period (2821, 3667, 3666, and 2482 pounds per acre, respectively) than they were for the preoperational period (2514, 3201, 1911, and 2470 pounds per acre, respectively). It is noteworthy, however, that for site 30 the difference is slight.

Final statistics for 1990 cotton yields in Arizona were unavailable at the time this report was written. However, the cotton harvest forecast provides estimates of average statewide yield of 1131 pounds per acre for short-staple cotton and 755 pounds per acre for long-staple cotton (Kenerson, 1991). This represents a decrease in yield for both varieties relative to the 1989 yields. These values represent 81 and 74 percent, respectively, of the 1987 record harvest for short-staple and long-staple cotton.

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 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 preoperational and 1990 ionic content of creosote bush leaf tissue was evaluated at five monitoring sites (Table 9-18). The mean concentrations of sodium and magnesium showed no significant change at any site between the preoperational period and 1990. Levels of potassium and phosphate were significantly higher in 1990 than in 1983-1985 at sites 1, 4, 6, and 40; there was no significant difference at site 42. Calcium levels were significantly higher at sites 4 and 6 in 1990 than during the preoperational period. Calcium values for sites 1, 40, and 42 did not change significantly between the monitoring periods. While chloride concentrations at site 40 showed no significant change between the preoperational and operational periods, those at each of the remaining sites were significantly higher in 1990 than in 1983-1985. The mean concentrations of sulfate and nitrate were significantly lower in 1990 than in the preoperational period at all sites. Values for fluoride were significantly higher in 1990 than in 1983-1985 at sites 6 and 40, while there was no significant difference between the values for the two monitoring periods at sites 1, 4, and 42.

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. The operational cover values for creosote bush presented in Table 9-19 are lower than those presented in the 1989 Annual Report (NUS, 1990). Further, coverage values for the operational period are lower than those for the preoperational period for all sites except site 42. As noted in the 1989 Annual Report, this downward trend is due, at least in part, to the continued sampling of leaf tissue (for ion analysis), which stresses plants and reduces cover. As in



the past, the cover values for creosote bush break down into two groups: higher for sites 1, 6, and 42 and lower for sites 4 and 40.

Fifty-seven species of herbaceous flora have been tabulated since studies were initiated. Based on percent cover, dominant species within the study plots include Amsinckia intermedia, Erodium texanum, Euphorbia spp., Lepidium lasiocarpum, Plantago insularis, and Sphaeralcea Coulteri. Of the nine species of grass that were identified, Festuca octoflora and Schismus spp. were seen most often within the study plots. Five species of cacti were enumerated; most belonged to the genus Opuntia.

Between 1.4 and 2.1 times as many species were recorded during the operational monitoring period than during the preoperational period. This observation is not surprising, given the different lengths of the two periods: 5 years for the operational period versus 3 years for the preoperational period. 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 1986-1990 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 1990 ionic content of salt bush leaf tissue is presented in Table 9-20. The mean concentration of sodium was significantly higher at all salt bush sites in 1990 than during the preoperational period. Potassium levels were significantly higher at sites 2 and 3 in 1990 than in 1983-1985; at site 44 there was no significant difference. Levels of calcium, chloride, and nitrate for the two periods showed no significant differences at any location. Values for magnesium were not significantly different at sites 3 and 44; however, magnesium levels were significantly higher at site 2 in 1990 than during the preoperational period. Mean concentrations of sulfate were significantly lower in 1990 than in 1983-1985 at all sites. Phosphate values at sites 2 and 44 were not significantly



different from those of the preoperational monitoring period, but the values at site 3 were significantly higher in 1990. Levels of fluoride at sites 2 and 44 were significantly higher in 1990 than during the preoperational monitoring period; those at site 3 for the two periods were not significantly different.

Salt bush (Atriplex polycarpa) was the dominant species at each site during both the preoperational and operational monitoring periods (Table 9-21). Percent cover for the operational period was lower at site 44, equal at site 2, and higher at site 3 than that of the preoperational period. Coverage in 1990 was higher at sites 2 and 44 than in 1989 (NUS, 1990), thus reversing the downward trend observed since 1987. Coverage at site 3 was once again lower in 1990. The adverse effect on coverage of removing leaf tissue for ionic analysis may have been mitigated at sites 2 and 44 by the wetter-than-normal year in 1990. Forty-five species of herbaceous plants have been identified since studies were begun. Based on percent cover, dominant species include Euphorbia spp., Pectis papposa, Plantago insularis, and Sphaeralcea Coulteri. Of the five species of grass that were identified, Schismus spp. was seen most often within the study plots. No species of cacti were found in any of the salt bush communities.

Species richness within the salt bush communities was greater during the 1986-1990 monitoring period than the 1983-1985 period at all sites. Heterogeneity was greater at site 2 during the operational monitoring period than during the preoperational period; however, the opposite was true at site 44; at site 3, heterogeneity was equal for both monitoring periods. The index of similarity was highest at site 3 and lowest at site 44.

#### 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 1990 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 1990 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 1990 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 1990 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 1990 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. None of the mean values of the indicator parameters were significantly different in 1990 from the preoperational period.

The mean concentrations of indicator parameters for individual agricultural sites are given in Table 9-23. A comparison between preoperational and 1990 means shows that there were no significant differences for any of the indicator parameters at sites 23, 24, and 32. A significant increase in electrical conductivity was observed in 1990 for sites 12, 25, and 31, and a significant decrease was observed for sites 7, 30, and 45. No significant differences in electrical conductivity were observed at seven sites. Mean calcium values in 1990 were significantly higher at sites 12, 13, 25, 28, and 31 and significantly lower at site 30. No significant differences were observed for calcium at seven sites. Mean concentrations of magnesium in 1990 were significantly higher at sites 11, 13, and 25 and significantly lower at sites 7 and 30. No significant differences in magnesium concentrations were observed at eight sites. Sodium concentrations





significantly increased at sites 11 and 31 and significantly decreased at sites 7, 30, and 45 in 1990. No significant change in sodium content was observed at eight sites. Potassium concentrations were not observed to be significantly higher in 1990 over preoperational values at any site but were significantly lower at sites 30 and 43. No significant differences in potassium concentrations were observed at 11 sites. Chloride concentrations were significantly higher in 1990 at sites 11, 12, 25, and 31 and significantly lower at sites 30 and 45. No significant differences in chloride concentrations were observed at seven sites.

Monitoring locations which showed significant increases in one or more indicator parameters are found northwest (sites 11 and 12), north-northwest (site 13), south-southeast (site 31), and southwest (site 28) of the PVNGS site. The closest of these (site 11) is 2.0 miles from the centroid of the PVNGS cooling towers. A remote (control) site, site 25 (west-northwest and 19.0 miles from the towers), also exhibited significant increases in four parameters. Five of these locations (sites 11, 12, 25, 28, and 31) were fallow fields and one (site 13) was planted in cotton in 1990. Sites that showed significant decreases in one or more indicator parameters are found east-northeast (site 7), south-southwest (site 30), and southwest (site 45) of the PVNGS site. Remote (control) site 43 (south-southeast and 15.0 miles from the cooling towers) also showed a significant decrease in one parameter. Three of these locations (sites 7, 30, and 45) were fallow, and the last (control site 43) was planted in alfalfa in 1990.

These findings continue to indicate that significant changes in soluble salt content, as indicated by soil ion content at the agricultural monitoring sites, appear to reflect no spatial trend. It is most likely that irrigation practices, crop selection, and fertilizer application account for the statistical differences in the ion 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 1990 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 the soluble ions of calcium, sodium, and chloride were significantly different in 1990 as compared to the preoperational period. In 1990, all three parameters were significantly higher.

Mean values for individual native sites for the preoperational period and 1990 are given in Table 9-25. There was no significant difference between preoperational and 1990 values for any parameter at 14 of the 31 native sites (1, 2, 3, 4, 8, 9, 10, 21, 22, 27, 36, 37, 39, and 44). These include six onsite locations (sites 1, 2, 3, 4, 10, and 27) as well as sites up to 15 miles away (site 37). Electrical conductivity values in 1990 were significantly higher than preoperational values at sites 19 and 38 and significantly lower at site 15. No significant differences were found at the remaining 28 sites. Calcium concentrations were significantly higher during 1990 at nine sites (sites 5, 6, 16, 17, 18, 19, 33, 35, and 42). There were no significant differences in calcium values at 22 of the 31 native sites. Magnesium values were significantly higher during 1990 at sites 16, 17, 19, 33, and 42. There were no significant differences at the remaining 26 sites. Sodium concentrations increased significantly in 1990 over preoperational values at sites 14, 40, and 42 and decreased significantly at site 35. There were no significant differences in sodium concentration at 27 of the 31 native sites. Potassium values were significantly higher during 1990 at sites 17 and 19 and significantly lower at sites 15 and 26. There were no differences at the remaining 27 sites. Chloride concentrations were significantly greater in 1990 than in the preoperational period at 10 sites (sites 17, 18, 19, 20, 26, 34, 35, 40, 41, and 42) and not significantly different at the other 21 native sites.

Sites 3, 14, 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. In particular, sites 16 and 20 would be expected to exhibit maximum deposition effects based on prevailing drift deposition modeling trends. The indicator parameters showing a significant change at these four sites were calcium, magnesium, sodium, and chloride. Calcium and magnesium concentrations were significantly higher in 1990 than in the preoperational period at site 16.



Sodium was significantly higher at site 14, and chloride was significantly higher at site 20. Significant increases in these indicator parameters were also observed at the two sites farthest from the PVNGS site (sites 40 and 42). Specifically, calcium and magnesium concentrations in 1990 were significantly higher than preoperational values at site 42 while sodium and chloride concentrations were significantly higher at both sites. 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 1990 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. Symptom conditions associated with salt deposition or uptake include chlorosis and necrosis of the leaves, shoot-tip dieback, leaf curl, slower growth, increased susceptibility to disease and insect damage, and changes in the structure and diversity in the plant community over time. 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 1990 revealed similar growth patterns at the monitoring sites. Areas of stress revealed by the 1990 photography proved to be a result of Texas root rot and nitrogen deficiency. Salt stress symptoms such as chlorosis and necrosis of the leaves were not observed during ground-truthing. 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 factors such as soil fertility, drainage, and agricultural practices.



## 9.6 SUMMARY AND CONCLUSIONS

As in 1989, the results obtained from elements of the 1990 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 1990 results from the other program elements are less definitive. As in 1989, although there are 1990 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 and are summarized in Table 9-26.

With these caveats, a review of the table indicates that

1. In 1990, only one cultivated site displayed significant changes in the same parameter (analyte) for all media sampled: calcium at site 13 for deposition, soil, and crop tissue samples. Site 23 evidenced increases in deposition of sodium, calcium, potassium, and magnesium which were also observed for sodium, calcium, and magnesium in crop tissue. However, soil at this site showed no change from the baseline period, nor did crop samples for potassium.
2. The major drift constituent, sodium, showed decreased deposition or no change from the preoperational period at all agricultural sites except for site 23.
3. Site 11, the closest of the agricultural sites, which had shown increases in the leaf tissue content of five ions in 1986 and in three ions in 1987, 1988, and 1989, showed increases in four ions over the background period in 1990. Statistically significant





increases were observed only for sodium and magnesium in the soil samples at this site.

For 1990, 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.

Based on an analysis of these results, as well as those obtained since the operational program began in 1985, a recommendation for reduction of the scope of the monitoring program has been presented to APS (NUS, 1991b).



Table 9-1. Monthly average meteorological data for PVNGS, 1990 versus 1974-1985

| Month     | Temperature (°F)* |           | Dew point (°F)* |           | Precipitation (in.)† |           | Wind speed (mph)* |           |
|-----------|-------------------|-----------|-----------------|-----------|----------------------|-----------|-------------------|-----------|
|           | 1990              | 1974-1985 | 1990            | 1974-1985 | 1990                 | 1974-1985 | 1990              | 1974-1985 |
| January   | 51                | 52        | 30              | 33        | 1.09                 | 0.58      | 4.7               | 4.8       |
| February  | 53                | 56        | 27              | 32        | 0.11                 | 0.59      | 6.0               | 5.5       |
| March     | 64                | 61        | 28              | 34        | 0.09                 | 0.82      | 6.8               | 6.7       |
| April     | 73                | 68        | 35              | 31        | 0.04                 | 0.19      | 7.6               | 7.3       |
| May       | 77                | 78        | 30              | 35        | 0.04                 | 0.12      | 7.9               | 7.7       |
| June      | 91                | 89        | 36              | 37        | 0.00                 | 0.03      | 7.5               | 7.7       |
| July      | 91                | 92        | 60              | 57        | 0.54                 | 0.64      | 7.8               | 7.8       |
| August    | 88                | 90        | 56              | 56        | 1.92                 | 0.53      | 7.7               | 7.1       |
| September | 84                | 85        | 56              | 53        | 0.72                 | 0.59      | 6.8               | 6.8       |
| October   | 74                | 72        | 35              | 42        | 0.36                 | 0.60      | 5.4               | 5.6       |
| November  | 61                | 59        | 27              | 33        | 0.00                 | 0.74      | 5.6               | 5.1       |
| December  | 49                | 52        | 19              | 33        | 0.24                 | 0.70      | 5.2               | 4.6       |
| Annual    | 71                | 71        | 37              | 40        | 5.15                 | 6.13      | 6.6               | 6.4       |

\*Based on measurement at 35 feet.

†Annual precipitation is sum of monthly totals.



Table 9-2. Monthly average meteorological data for NWS Phoenix, 1990 versus 1950-1980

| Month     | Temperature (°F)* |           | Dew point (°F)* |            | Precipitation (in.) |           | Wind speed (mph)† |           |
|-----------|-------------------|-----------|-----------------|------------|---------------------|-----------|-------------------|-----------|
|           | 1990              | 1950-1980 | 1990            | 1950-1980‡ | 1990                | 1950-1980 | 1990              | 1950-1980 |
| January   | 56                | 52        | 31              | --         | 0.80                | 0.73      | 5.2               | 5.3       |
| February  | 57                | 56        | 32              | --         | 0.70                | 0.59      | 5.9               | 5.9       |
| March     | 67                | 61        | 33              | --         | 0.35                | 0.81      | 6.0               | 6.7       |
| April     | 76                | 68        | 41              | --         | 0.17                | 0.27      | 7.1               | 7.0       |
| May       | 81                | 77        | 35              | --         | 0.16                | 0.14      | 7.4               | 7.1       |
| June      | 94                | 87        | 42              | --         | 0.04                | 0.17      | 7.1               | 6.9       |
| July      | 94                | 92        | 63              | --         | 1.05                | 0.74      | 7.3               | 7.1       |
| August    | 91                | 90        | 59              | --         | 2.70                | 1.02      | 6.4               | 6.6       |
| September | 88                | 85        | 61              | --         | 1.11                | 0.64      | 5.2               | 6.3       |
| October   | 79                | 73        | 40              | --         | 0.04                | 0.63      | 4.7               | 5.9       |
| November  | 66                | 61        | 37              | --         | 0.15                | 0.54      | 4.7               | 5.4       |
| December  | 54                | 53        | 29              | --         | 0.46                | 0.83      | 5.0               | 5.2       |
| Annual    | 75                | 71        | 42              | --         | 7.73                | 7.11      | 6.0               | 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.



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Table 9-3. Annual mean deposition (lb/(acre)(yr)) of drift constituents at PVNGS agricultural monitoring sites, preoperational period and 1990 (means  $\pm$  standard errors)

| Parameter | Preoperational*<br>(n = 770) | 1990<br>(n = 298) |
|-----------|------------------------------|-------------------|
| Sodium    | 7.9 $\pm$ 0.3a               | 7.0 $\pm$ 0.5a    |
| Potassium | 8.6 $\pm$ 0.4                | 7.1 $\pm$ 0.6     |
| Calcium   | 23.6 $\pm$ 0.8               | 34.1 $\pm$ 2.6    |
| Magnesium | 6.3 $\pm$ 0.3                | 10.5 $\pm$ 1.1    |
| TSS       | 575.4 $\pm$ 29.2             | 864.7 $\pm$ 92.5  |

Key:

1. For individual parameters, means with superscript "a" are not 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 1990 (means  $\pm$  standard errors)

| Site | Sodium          |                 | Potassium       |                | Calcium         |                  |
|------|-----------------|-----------------|-----------------|----------------|-----------------|------------------|
|      | Preoperational* | 1990            | Preoperational* | 1990           | Preoperational* | 1990             |
| 7    | 4.9 $\pm$ 0.6a  | 3.9 $\pm$ 0.4a  | 5.1 $\pm$ 0.5   | 3.1 $\pm$ 0.4  | 16.8 $\pm$ 1.6a | 22.9 $\pm$ 6.4a  |
| 11   | 6.7 $\pm$ 0.6a  | 5.0 $\pm$ 0.6a  | 8.6 $\pm$ 0.8   | 4.8 $\pm$ 0.9  | 21.1 $\pm$ 1.7a | 25.7 $\pm$ 3.5a  |
| 12   | 7.9 $\pm$ 1.2   | 4.9 $\pm$ 0.9   | 6.0 $\pm$ 0.9a  | 6.5 $\pm$ 1.5a | 13.4 $\pm$ 1.2a | 19.6 $\pm$ 2.8a  |
| 13   | 7.0 $\pm$ 0.9a  | 6.9 $\pm$ 1.0a  | 6.3 $\pm$ 0.7a  | 7.3 $\pm$ 1.1a | 20.4 $\pm$ 2.4  | 32.3 $\pm$ 5.2   |
| 23   | 6.8 $\pm$ 0.8   | 12.7 $\pm$ 1.7  | 12.7 $\pm$ 1.6  | 33.1 $\pm$ 4.3 | 37.8 $\pm$ 4.0  | 145.5 $\pm$ 16.8 |
| 24   | 7.9 $\pm$ 1.2a  | 4.8 $\pm$ 1.2a  | 7.9 $\pm$ 1.3   | 3.4 $\pm$ 0.5  | 20.8 $\pm$ 2.9a | 16.5 $\pm$ 1.6a  |
| 25   | 8.1 $\pm$ 1.0   | 3.6 $\pm$ 0.3   | 11.3 $\pm$ 1.0  | 5.1 $\pm$ 0.9  | 32.4 $\pm$ 2.1  | 14.2 $\pm$ 1.7   |
| 28   | 5.6 $\pm$ 0.5a  | 5.2 $\pm$ 1.1a  | 4.9 $\pm$ 0.6   | 2.7 $\pm$ 0.4  | 26.7 $\pm$ 3.2a | 33.9 $\pm$ 7.1a  |
| 30   | 9.6 $\pm$ 0.8a  | 8.4 $\pm$ 0.7a  | 11.5 $\pm$ 1.4a | 9.4 $\pm$ 1.2a | 39.5 $\pm$ 3.5a | 47.2 $\pm$ 5.4a  |
| 31   | 8.6 $\pm$ 0.7a  | 10.3 $\pm$ 4.3a | 5.7 $\pm$ 0.6   | 3.0 $\pm$ 0.6  | 15.3 $\pm$ 1.3a | 18.0 $\pm$ 2.7a  |
| 32   | 8.0 $\pm$ 0.8a  | 9.1 $\pm$ 2.0a  | 6.6 $\pm$ 0.8a  | 7.1 $\pm$ 1.2a | 18.3 $\pm$ 1.8  | 34.2 $\pm$ 5.9   |
| 43   | 9.8 $\pm$ 1.1a  | 11.0 $\pm$ 3.6a | 9.9 $\pm$ 1.1   | 4.9 $\pm$ 0.6  | 12.3 $\pm$ 1.0a | 14.7 $\pm$ 1.2a  |
| 45   | 12.4 $\pm$ 1.6  | 4.9 $\pm$ 0.4   | 19.6 $\pm$ 5.2  | 3.3 $\pm$ 0.4  | 39.5 $\pm$ 7.5a | 23.9 $\pm$ 5.8a  |

Key: For individual ions at each site, means with superscript "a" are not 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 1990 (means  $\pm$  standard errors)

| Parameter | Preoperational*<br>(n = 1835) | 1990<br>(n = 820) |
|-----------|-------------------------------|-------------------|
| Sodium    | 5.7 $\pm$ 0.1                 | 7.0 $\pm$ 0.3     |
| Potassium | 4.3 $\pm$ 0.1                 | 3.3 $\pm$ 0.1     |
| Calcium   | 11.1 $\pm$ 0.3                | 17.7 $\pm$ 1.0    |
| Magnesium | 2.6 $\pm$ 0.1                 | 4.9 $\pm$ 0.2     |
| TSS       | 228.2 $\pm$ 5.7               | 423.4 $\pm$ 19.2  |

Key:

1. For all parameters, means 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 1990 (means  $\pm$  standard errors)

| Parameter | Preoperational*<br>(n = 662) | 1990<br>(n = 92)           |
|-----------|------------------------------|----------------------------|
| Sodium    | 5.7 $\pm$ 0.2                | 16.7 $\pm$ 1.5             |
| Potassium | 4.3 $\pm$ 0.2 <sup>a</sup>   | 4.0 $\pm$ 0.4 <sup>a</sup> |
| Calcium   | 13.0 $\pm$ 0.5               | 39.7 $\pm$ 7.2             |
| Magnesium | 3.1 $\pm$ 0.2                | 9.0 $\pm$ 1.4              |
| TSS       | 248.2 $\pm$ 12.0             | 638.5 $\pm$ 92.3           |

Key:

1. For individual parameters, means with superscript "a" are not 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 1990 (means  $\pm$  standard errors)

| Parameter | Preoperational*<br>(n = 206) | 1990<br>(n = 95) |
|-----------|------------------------------|------------------|
| Sodium    | 6.0 $\pm$ 0.3                | 12.3 $\pm$ 1.7   |
| Potassium | 4.7 $\pm$ 0.3                | 3.7 $\pm$ 0.3    |
| Calcium   | 16.4 $\pm$ 1.1a              | 21.1 $\pm$ 2.3a  |
| Magnesium | 3.9 $\pm$ 0.4                | 5.6 $\pm$ 0.5    |
| TSS       | 307.7 $\pm$ 22.2             | 435.3 $\pm$ 43.7 |

Key:

1. For individual parameters, means with superscript "a" are not 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 1990 (means  $\pm$  standard errors)

| Parameter | Preoperational*<br>(n = 381) | 1990<br>(n = 139) |
|-----------|------------------------------|-------------------|
| Sodium    | 5.7 $\pm$ 0.3a               | 6.1 $\pm$ 0.6a    |
| Potassium | 3.9 $\pm$ 0.2                | 3.0 $\pm$ 0.2     |
| Calcium   | 11.1 $\pm$ 0.5               | 16.8 $\pm$ 1.0    |
| Magnesium | 2.5 $\pm$ 0.1                | 4.8 $\pm$ 0.4     |
| TSS       | 206.6 $\pm$ 9.7              | 418.2 $\pm$ 40.4  |

Key:

1. For individual parameters, means with superscript "a" are not 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 1990 (means  $\pm$  standard errors)

| Parameter | Preoperational*<br>(n = 1233) | 1990<br>(n = 494) |
|-----------|-------------------------------|-------------------|
| Sodium    | 5.6 $\pm$ 0.2                 | 4.4 $\pm$ 0.2     |
| Potassium | 4.4 $\pm$ 0.1                 | 3.1 $\pm$ 0.1     |
| Calcium   | 10.3 $\pm$ 0.3                | 13.1 $\pm$ 0.5    |
| Magnesium | 2.4 $\pm$ 0.1                 | 4.1 $\pm$ 0.2     |
| TSS       | 221.7 $\pm$ 7.0               | 382.5 $\pm$ 22.5  |

Key: TSS, total suspended solids.

\*May 1983 through December 1985.

Note: For all parameters, means of preoperational and 1990 values are significantly different at 95-percent confidence level.



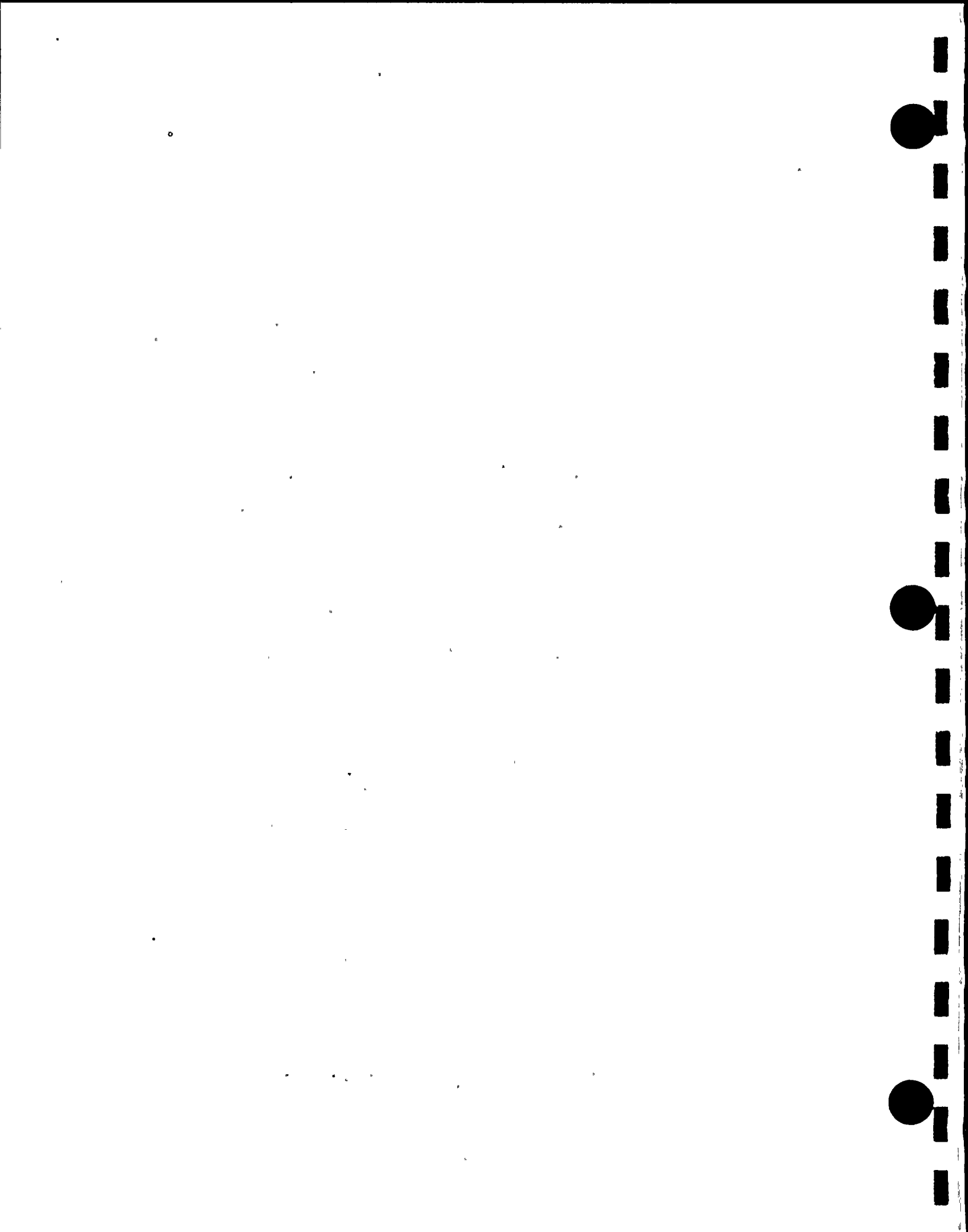


Table 9-10. Annual deposition (lb/(acre)(yr)) of sodium, potassium, and calcium at PVNGS native monitoring sites, preoperational period and 1990 (means  $\pm$  standard errors) (sheet 1 of 2)

| Site | Sodium          |                 | Potassium       |                | Calcium         |                 |
|------|-----------------|-----------------|-----------------|----------------|-----------------|-----------------|
|      | Preoperational* | 1990            | Preoperational* | 1990           | Preoperational* | 1990            |
| 1    | 5.4 $\pm$ 0.6a  | 5.1 $\pm$ 0.5a  | 4.0 $\pm$ 0.5a  | 2.7 $\pm$ 0.4a | 10.4 $\pm$ 0.7a | 14.0 $\pm$ 1.8a |
| 2    | 5.9 $\pm$ 0.6a  | 5.4 $\pm$ 0.6a  | 4.1 $\pm$ 0.5a  | 2.9 $\pm$ 0.4a | 9.2 $\pm$ 0.7a  | 13.3 $\pm$ 2.2a |
| 3    | 6.4 $\pm$ 0.6a  | 11.2 $\pm$ 3.7a | 5.2 $\pm$ 0.6a  | 4.4 $\pm$ 0.6a | 15.8 $\pm$ 2.8a | 22.4 $\pm$ 2.4a |
| 4    | 5.1 $\pm$ 0.6a  | 5.7 $\pm$ 1.2a  | 4.7 $\pm$ 0.7a  | 3.4 $\pm$ 0.4a | 10.8 $\pm$ 1.1  | 17.5 $\pm$ 2.0  |
| 5    | 5.5 $\pm$ 0.6a  | 5.6 $\pm$ 0.7a  | 4.2 $\pm$ 0.6   | 2.8 $\pm$ 0.3  | 13.5 $\pm$ 1.9a | 19.0 $\pm$ 3.1a |
| 6    | 6.6 $\pm$ 0.6a  | 8.9 $\pm$ 3.2a  | 3.4 $\pm$ 0.3a  | 3.0 $\pm$ 0.5a | 10.6 $\pm$ 1.0  | 16.6 $\pm$ 2.4  |
| 8    | 5.7 $\pm$ 0.7a  | 4.9 $\pm$ 0.5a  | 4.5 $\pm$ 0.8   | 2.6 $\pm$ 0.2  | 9.3 $\pm$ 1.0a  | 13.2 $\pm$ 1.9a |
| 9    | 6.0 $\pm$ 0.7a  | 6.1 $\pm$ 0.8a  | 4.4 $\pm$ 0.5a  | 3.6 $\pm$ 0.5a | 11.8 $\pm$ 1.5  | 22.2 $\pm$ 3.2  |
| 10   | 5.1 $\pm$ 0.6a  | 5.6 $\pm$ 0.7a  | 3.3 $\pm$ 0.3a  | 3.1 $\pm$ 0.5a | 11.1 $\pm$ 1.3a | 15.6 $\pm$ 2.0a |
| 14   | 6.5 $\pm$ 0.8a  | 8.0 $\pm$ 1.1a  | 4.7 $\pm$ 0.5   | 3.0 $\pm$ 0.5  | 22.5 $\pm$ 2.0a | 30.2 $\pm$ 7.9a |
| 15   | 5.7 $\pm$ 0.6   | 3.7 $\pm$ 0.4   | 4.0 $\pm$ 0.4a  | 2.9 $\pm$ 0.4a | 9.4 $\pm$ 0.7   | 15.4 $\pm$ 2.1  |
| 16   | 5.8 $\pm$ 0.7a  | 8.4 $\pm$ 1.2a  | 3.6 $\pm$ 0.4a  | 3.2 $\pm$ 0.4a | 12.2 $\pm$ 1.1a | 17.4 $\pm$ 3.1a |
| 17   | 6.3 $\pm$ 0.9   | 4.0 $\pm$ 0.4   | 5.7 $\pm$ 0.6   | 3.0 $\pm$ 0.6  | 13.2 $\pm$ 1.5  | 9.4 $\pm$ 1.0   |
| 18   | 4.6 $\pm$ 0.5a  | 5.6 $\pm$ 0.8a  | 3.3 $\pm$ 0.3a  | 2.6 $\pm$ 0.3a | 9.4 $\pm$ 0.9a  | 11.6 $\pm$ 1.7a |
| 19   | 5.3 $\pm$ 0.7a  | 7.0 $\pm$ 1.0a  | 5.4 $\pm$ 0.6   | 9.7 $\pm$ 1.9  | 13.4 $\pm$ 1.3  | 34.8 $\pm$ 5.7  |
| 20   | 4.9 $\pm$ 0.6   | 21.5 $\pm$ 4.9  | 5.3 $\pm$ 0.7a  | 4.3 $\pm$ 0.4a | 11.7 $\pm$ 0.9a | 14.6 $\pm$ 2.0a |
| 21   | 5.8 $\pm$ 1.0a  | 3.8 $\pm$ 0.3a  | 3.9 $\pm$ 0.4   | 2.4 $\pm$ 0.3  | 14.9 $\pm$ 3.6a | 11.1 $\pm$ 0.9a |
| 22   | 4.7 $\pm$ 0.5   | 3.0 $\pm$ 0.3   | 4.1 $\pm$ 0.6   | 2.4 $\pm$ 0.3  | 9.0 $\pm$ 0.6a  | 11.6 $\pm$ 1.4a |
| 26   | 6.4 $\pm$ 0.9a  | 4.9 $\pm$ 0.8a  | 3.5 $\pm$ 0.4a  | 2.7 $\pm$ 0.4a | 9.8 $\pm$ 0.7a  | 11.9 $\pm$ 1.1a |
| 27   | 5.4 $\pm$ 0.5a  | 5.1 $\pm$ 0.6a  | 5.3 $\pm$ 0.7   | 3.1 $\pm$ 0.6  | 14.0 $\pm$ 2.3a | 12.5 $\pm$ 1.8a |
| 33   | 6.0 $\pm$ 0.6a  | 8.4 $\pm$ 3.3a  | 5.2 $\pm$ 0.6   | 3.0 $\pm$ 0.5  | 11.5 $\pm$ 1.1a | 14.9 $\pm$ 2.0a |
| 34   | 5.7 $\pm$ 0.6   | 3.1 $\pm$ 0.3   | 4.0 $\pm$ 0.5   | 1.9 $\pm$ 0.2  | 7.5 $\pm$ 0.6a  | 9.4 $\pm$ 0.9a  |
| 35   | 5.8 $\pm$ 0.9   | 3.1 $\pm$ 0.3   | 6.0 $\pm$ 0.8   | 3.2 $\pm$ 0.4  | 11.5 $\pm$ 1.3a | 14.3 $\pm$ 2.1a |
| 36   | 4.9 $\pm$ 0.6   | 3.0 $\pm$ 0.3   | 3.4 $\pm$ 0.3   | 2.3 $\pm$ 0.3  | 6.9 $\pm$ 0.5a  | 8.8 $\pm$ 1.0a  |



Table 9-10. Annual deposition (lb/(acre)(yr)) of sodium, potassium, and calcium at PVNGS native monitoring sites, preoperational period and 1990 (means  $\pm$  standard errors) (sheet 2 of 2)

| Site | Sodium          |                | Potassium       |                | Calcium         |                 |
|------|-----------------|----------------|-----------------|----------------|-----------------|-----------------|
|      | Preoperational* | 1990           | Preoperational* | 1990           | Preoperational* | 1990            |
| 37   | 5.5 $\pm$ 0.7a  | 7.0 $\pm$ 2.2a | 3.7 $\pm$ 0.5a  | 2.8 $\pm$ 0.6a | 7.1 $\pm$ 0.5a  | 8.9 $\pm$ 0.7a  |
| 38   | 6.2 $\pm$ 0.7   | 2.9 $\pm$ 0.3  | 5.1 $\pm$ 0.7   | 1.9 $\pm$ 0.3  | 8.6 $\pm$ 0.7a  | 9.6 $\pm$ 1.3a  |
| 39   | 6.0 $\pm$ 0.8   | 3.0 $\pm$ 0.2  | 4.3 $\pm$ 0.6   | 2.3 $\pm$ 0.3  | 9.0 $\pm$ 0.8a  | 7.5 $\pm$ 0.7a  |
| 40   | 6.0 $\pm$ 0.7   | 3.5 $\pm$ 0.4  | 4.5 $\pm$ 0.4a  | 4.7 $\pm$ 0.7a | 12.8 $\pm$ 1.0a | 15.7 $\pm$ 2.0a |
| 41   | 6.2 $\pm$ 0.9   | 4.0 $\pm$ 0.3  | 4.7 $\pm$ 0.8   | 2.5 $\pm$ 0.3  | 11.9 $\pm$ 1.5a | 15.6 $\pm$ 2.7a |
| 42   | 5.3 $\pm$ 0.6   | 3.4 $\pm$ 0.2  | 3.7 $\pm$ 0.7a  | 2.4 $\pm$ 0.2a | 7.6 $\pm$ 0.5a  | 9.1 $\pm$ 1.0a  |
| 44   | 6.0 $\pm$ 1.0a  | 3.9 $\pm$ 0.4a | 3.4 $\pm$ 0.6a  | 3.6 $\pm$ 0.5a | 7.8 $\pm$ 0.7   | 13.4 $\pm$ 1.5  |
| 80   | 5.7 $\pm$ 0.2   | 17.8 $\pm$ 3.3 | 4.3 $\pm$ 0.2a  | 6.1 $\pm$ 1.5a | 13.0 $\pm$ 0.5  | 97.2 $\pm$ 26.5 |
| 81   | 5.7 $\pm$ 0.2   | 21.8 $\pm$ 3.5 | 4.3 $\pm$ 0.2a  | 3.8 $\pm$ 0.5a | 13.0 $\pm$ 0.5  | 21.0 $\pm$ 2.9  |
| 82   | 5.7 $\pm$ 0.2   | 13.2 $\pm$ 2.4 | 4.3 $\pm$ 0.2   | 3.2 $\pm$ 0.5  | 13.0 $\pm$ 0.5  | 21.2 $\pm$ 3.2  |
| 83   | 5.7 $\pm$ 0.2   | 13.8 $\pm$ 2.3 | 4.3 $\pm$ 0.2   | 3.1 $\pm$ 0.3  | 13.0 $\pm$ 0.5  | 22.9 $\pm$ 2.4  |

Key: For individual ions at each site, means with superscript "a" are not 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 1990 (means  $\pm$  standard errors)

| Parameter | Agricultural control sites<br>(sites 25 and 43) |                  | Native control sites<br>(sites 40 and 42) |                  |
|-----------|---|------------------|---|------------------|
|           | Preoperational*<br>(n = 120)                    | 1990<br>(n = 46) | Preoperational*<br>(n = 119)              | 1990<br>(n = 48) |
| Sodium    | 8.9 $\pm$ 0.7a                                  | 7.5 $\pm$ 1.9a   | 5.7 $\pm$ 0.5                             | 3.4 $\pm$ 0.2    |
| Potassium | 10.6 $\pm$ 0.7                                  | 5.0 $\pm$ 0.5    | 4.1 $\pm$ 0.4a                            | 3.5 $\pm$ 0.4a   |
| Calcium   | 22.5 $\pm$ 1.5                                  | 14.4 $\pm$ 1.0   | 10.4 $\pm$ 0.6a                           | 12.4 $\pm$ 1.2a  |
| Magnesium | 7.4 $\pm$ 0.6                                   | 4.9 $\pm$ 0.5    | 2.9 $\pm$ 0.3                             | 4.5 $\pm$ 0.6    |
| TSS       | 728.9 $\pm$ 57.4                                | 415.4 $\pm$ 58.7 | 264.1 $\pm$ 22.9                          | 410.9 $\pm$ 54.4 |

Key:

1. For individual parameters, means with superscript "a" are not 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, 1990 (means  $\pm$  standard errors)

| Site | Deposition     |                           |                    |                  |
|------|----------------|---------------------------|--------------------|------------------|
|      | Sodium<br>1990 | Sodium<br>preoperational* | Net sodium<br>1990 | Net TDS<br>1990† |
| 1    | 5.1 $\pm$ 0.5  | 5.4 $\pm$ 0.6             | -0.3 $\pm$ 0.8     | -1.0 $\pm$ 2.7   |
| 2    | 5.4 $\pm$ 0.6  | 5.9 $\pm$ 0.6             | -0.5 $\pm$ 0.8     | -1.7 $\pm$ 2.7   |
| 3    | 11.2 $\pm$ 3.7 | 6.4 $\pm$ 0.6             | 4.8 $\pm$ 3.7      | 15.8 $\pm$ 12.2  |
| 4    | 5.7 $\pm$ 1.2  | 5.1 $\pm$ 0.6             | 0.6 $\pm$ 1.3      | 2.0 $\pm$ 4.3    |
| 5    | 5.6 $\pm$ 0.7  | 5.5 $\pm$ 0.6             | 0.1 $\pm$ 0.9      | 0.3 $\pm$ 2.7    |
| 6    | 8.9 $\pm$ 3.2  | 6.6 $\pm$ 0.6             | 2.3 $\pm$ 3.3      | 7.6 $\pm$ 10.9   |
| 10   | 5.6 $\pm$ 0.7  | 5.1 $\pm$ 0.6             | 0.5 $\pm$ 0.9      | 1.7 $\pm$ 3.1    |
| 14   | 8.0 $\pm$ 1.1  | 6.5 $\pm$ 0.8             | 1.5 $\pm$ 1.4      | 5.0 $\pm$ 4.7    |
| 16   | 8.4 $\pm$ 1.2  | 5.8 $\pm$ 0.7             | 2.6 $\pm$ 1.4      | 8.6 $\pm$ 4.6    |
| 20   | 21.5 $\pm$ 4.9 | 4.9 $\pm$ 0.6             | 16.6 $\pm$ 4.9     | 54.8 $\pm$ 16.2  |
| 27   | 5.1 $\pm$ 0.6  | 5.4 $\pm$ 0.5             | -0.3 $\pm$ 0.8     | -1.0 $\pm$ 2.7   |
| 80   | 17.8 $\pm$ 3.3 | 5.7 $\pm$ 0.2             | 12.1 $\pm$ 3.3     | 39.9 $\pm$ 10.9  |
| 81   | 21.8 $\pm$ 3.5 | 5.7 $\pm$ 0.2             | 16.1 $\pm$ 3.5     | 53.1 $\pm$ 11.6  |
| 82   | 13.2 $\pm$ 2.4 | 5.7 $\pm$ 0.2             | 7.5 $\pm$ 2.4      | 24.8 $\pm$ 8.0   |
| 83   | 13.8 $\pm$ 2.3 | 5.7 $\pm$ 0.2             | 8.1 $\pm$ 2.3      | 26.7 $\pm$ 7.6   |

\*May 1983 through December 1985.

†Based on scaling measured sodium deposition at each monitoring site by ratio of total dissolved solids to sodium ( $3.3 \pm 0.09$ ) as determined from monthly 1990 cooling tower basin water samples from Units 1-3.





Table 9-13. Measured versus predicted drift deposition  
(lb/(acre)(year)) at PVNGS onsite monitoring  
sites, 1990

| Site       | Net deposition*<br>(measured) | FOG-code-predicted<br>total deposition | Measured/<br>predicted<br>(ratio) |
|------------|-------------------------------|--|-----------------------------------|
| 1          | -1.0 ± 2.7†                   | 7.56                                   | NC                                |
| 2          | -1.7 ± 2.7†                   | 4.89                                   | NC                                |
| 3          | 15.8 ± 12.2                   | 8.21                                   | 1.9                               |
| 4          | 2.0 ± 4.3†                    | 6.77                                   | NC                                |
| 5          | 0.3 ± 2.7†                    | 2.17                                   | NC                                |
| 6          | 7.6 ± 10.9†                   | 2.60                                   | NC                                |
| 10         | 1.7 ± 3.1†                    | 3.12                                   | NC                                |
| 14         | 5.0 ± 4.7                     | 19.2                                   | 0.26                              |
| 16         | 8.6 ± 4.6                     | 159.0                                  | 0.05                              |
| 20         | 54.8 ± 16.2                   | 82.7                                   | 0.66                              |
| 27         | -1.0 ± 2.7†                   | 6.43                                   | NC                                |
| 80         | 39.9 ± 10.9                   | 89.3                                   | 0.45                              |
| 81         | 53.1 ± 11.6                   | 4960.0                                 | 0.01                              |
| 82         | 24.8 ± 8.0                    | 162.0                                  | 0.15                              |
| 83         | 26.7 ± 7.6                    | 83.9                                   | 0.32                              |
| Mean ratio |                               |  | 0.48                              |

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 = 12.6 (intercept)

B = 0.008 (slope)

X = predicted deposition

Correlation coefficient (R<sup>2</sup>) = 0.29



Table 9-14. Sequence of crops planted at PVNGS agricultural monitoring sites, 1983-1990

| Monitoring site | 1983      | 1984       | 1985                 | 1986      | 1987      | 1988      | 1989      | 1990       |
|-----------------|-----------|------------|----------------------|-----------|-----------|-----------|-----------|------------|
| 7               | SS cotton | Fallow     | Fallow               | Fallow    | Fallow    | Fallow    | Fallow    | Fallow     |
| 11              | SS cotton | 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    | Fallow     |
| 13              | Sorghum   | SS cotton  | SS cotton            | SS cotton | SS cotton | SS cotton | SS cotton | SS cotton  |
| 23              | SS cotton | SS cotton  | SS cotton            | Alfalfa   | Alfalfa   | Alfalfa   | LS cotton | SS cotton  |
| 24              | Fallow    | LS cotton* | LS cotton            | Fallow    | Fallow    | Fallow    | Fallow    | Fallow     |
| 25              | LS cotton | LS cotton  | LS cotton            | LS cotton | LS cotton | LS cotton | LS cotton | Fallow     |
| 28              | Fallow    | SS cotton* | Fallow               | Fallow    | Fallow    | Fallow    | Fallow    | Fallow     |
| 29†             | Alfalfa   | --         | --                   | --        | --        | --        | --        | --         |
| 30              | Melon     | Fallow     | Barley/<br>SS cotton | SS cotton | Alfalfa   | SS cotton | SS cotton | SS cotton* |
| 31              | SS cotton | SS cotton  | SS cotton            | SS cotton | SS cotton | LS cotton | Fallow    | Fallow     |
| 32              | SS cotton | SS cotton  | SS cotton            | Fallow    | SS cotton | LS cotton | Fallow    | Fallow     |
| 43              | Alfalfa   | Alfalfa‡   | Alfalfa              | Alfalfa   | Alfalfa   | Alfalfa   | Alfalfa   | Alfalfa    |
| 45§             | --        | SS cotton  | Alfalfa              | Fallow    | 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.

‡Planted, but not sampled.

§Established in 1984.



Table 9-15. Preoperational and 1990 mean ion content ( $\mu\text{g/g}$  dry weight) of alfalfa leaf tissue at PVNGS monitoring site 43 (means  $\pm$  standard errors)

| Ion              | 1983, 1985<br>(n = 40) | 1990<br>(n = 20)    |
|------------------|------------------------|---------------------|
| Sodium           | 1,547 $\pm$ 129a       | 1,669 $\pm$ 87a     |
| Potassium        | 22,194 $\pm$ 944a      | 24,925 $\pm$ 1,248a |
| Calcium          | 12,026 $\pm$ 424       | 13,802 $\pm$ 489    |
| Magnesium        | 2,705 $\pm$ 77a        | 2,935 $\pm$ 99a     |
| Chloride         | 11,951 $\pm$ 606a      | 12,450 $\pm$ 357a   |
| Sulfate          | 11,283 $\pm$ 1,080a    | 9,066 $\pm$ 746a    |
| Nitrate (as N)   | 302 $\pm$ 59a          | 281 $\pm$ 58a       |
| Phosphate (as P) | 3,010 $\pm$ 91         | 3,793 $\pm$ 218     |
| Fluoride         | 14.1 $\pm$ 1.7a        | 13.5 $\pm$ 0.1a     |

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



Table 9-16. Preoperational and 1990 ionic content ( $\mu\text{g/g}$  dry weight) of short-staple cotton leaf tissue at PVNGS monitoring sites (means  $\pm$  standard errors)

| Ion              | Site 11                                  |  | Site 13                                   |   | Site 23                                      |   | Site 30                                     |   |
|------------------|--|--|---|---|--|---|---|---|
|                  | 1983-1985                                | 1990                                     | 1984-1985                                 | 1990  | 1983-1985                                    | 1990  | 1985  | 1990  |
| Sodium           | 2,159 $\pm$ 149<br>(n = 50)              | 3,307 $\pm$ 407<br>(n = 20)              | 3,310 $\pm$ 271 <sup>a</sup><br>(n = 40)  | 3,308 $\pm$ 397 <sup>a</sup><br>(n = 20)    | 1,655 $\pm$ 130<br>(n = 60)                  | 2,892 $\pm$ 247<br>(n = 20)                 | 2,553 $\pm$ 208<br>(n = 20)                 | 1,899 $\pm$ 143<br>(n = 20)                 |
| Potassium        | 15,312 $\pm$ 647<br>(n = 50)             | 18,289 $\pm$ 910<br>(n = 20)             | 16,943 $\pm$ 592 <sup>a</sup><br>(n = 40) | 17,750 $\pm$ 1,247 <sup>a</sup><br>(n = 20) | 17,900 $\pm$ 685 <sup>a</sup><br>(n = 60)    | 18,854 $\pm$ 872 <sup>a</sup><br>(n = 20)   | 17,423 $\pm$ 781<br>(n = 20)                | 19,683 $\pm$ 784<br>(n = 20)                |
| Calcium          | 30,187 $\pm$ 997<br>(n = 50)             | 39,675 $\pm$ 1,203<br>(n = 20)           | 33,836 $\pm$ 1,038<br>(n = 40)            | 45,403 $\pm$ 2,073<br>(n = 20)              | 34,524 $\pm$ 1,316<br>(n = 60)               | 46,831 $\pm$ 1,103<br>(n = 20)              | 38,103 $\pm$ 1,587<br>(n = 20)              | 43,506 $\pm$ 1,614<br>(n = 20)              |
| Magnesium        | 4,612 $\pm$ 122<br>(n = 50)              | 5,360 $\pm$ 220<br>(n = 20)              | 5,378 $\pm$ 170 <sup>a</sup><br>(n = 40)  | 5,954 $\pm$ 289 <sup>a</sup><br>(n = 20)    | 5,570 $\pm$ 126<br>(n = 60)                  | 6,805 $\pm$ 280<br>(n = 20)                 | 5,463 $\pm$ 227<br>(n = 20)                 | 6,425 $\pm$ 215<br>(n = 20)                 |
| Chloride         | 13,617 $\pm$ 341<br>(n = 50)             | 16,790 $\pm$ 571<br>(n = 20)             | 16,377 $\pm$ 597<br>(n = 40)              | 22,260 $\pm$ 814<br>(n = 20)                | 18,562 $\pm$ 778 <sup>a</sup><br>(n = 60)    | 16,704 $\pm$ 466 <sup>a</sup><br>(n = 20)   | 21,350 $\pm$ 1,573<br>(n = 20)              | 15,950 $\pm$ 417<br>(n = 20)                |
| Sulfate          | 30,560 $\pm$ 1,418<br>(n = 50)           | 40,214 $\pm$ 3,272<br>(n = 20)           | 33,600 $\pm$ 1,741<br>(n = 40)            | 46,908 $\pm$ 2,594<br>(n = 20)              | 67,296 $\pm$ 12,647 <sup>a</sup><br>(n = 60) | 43,426 $\pm$ 4,763 <sup>a</sup><br>(n = 20) | 41,513 $\pm$ 3,240 <sup>a</sup><br>(n = 20) | 42,318 $\pm$ 3,611 <sup>a</sup><br>(n = 20) |
| Nitrate (as N)   | 653 $\pm$ 97<br>(n = 40)                 | 117 $\pm$ 20<br>(n = 20)                 | 715 $\pm$ 136<br>(n = 32)                 | 115 $\pm$ 30<br>(n = 20)                    | 1,288 $\pm$ 234<br>(n = 52)                  | 276 $\pm$ 74<br>(n = 20)                    | 1,341 $\pm$ 302<br>(n = 20)                 | 233 $\pm$ 72<br>(n = 20)                    |
| Phosphate (as P) | 2,425 $\pm$ 107 <sup>a</sup><br>(n = 50) | 2,308 $\pm$ 132 <sup>a</sup><br>(n = 20) | 1,831 $\pm$ 103<br>(n = 40)               | 2,611 $\pm$ 205<br>(n = 20)                 | 2,928 $\pm$ 177 <sup>a</sup><br>(n = 60)     | 2,403 $\pm$ 115 <sup>a</sup><br>(n = 20)    | 2,018 $\pm$ 185<br>(n = 20)                 | 2,550 $\pm$ 128<br>(n = 20)                 |
| Fluoride         | 89.3 $\pm$ 54.6 <sup>a</sup><br>(n = 42) | 16.3 $\pm$ 0.6 <sup>a</sup><br>(n = 20)  | 142 $\pm$ 64 <sup>a</sup><br>(n = 24)     | 15.9 $\pm$ 0.4 <sup>a</sup><br>(n = 20)     | 43.3 $\pm$ 17.1 <sup>a</sup><br>(n = 42)     | 15.5 $\pm$ 0.9 <sup>a</sup><br>(n = 20)     | 29.4 $\pm$ 5.3<br>(n = 20)                  | 15.2 $\pm$ 1.0<br>(n = 20)                  |

Key: For individual ions at same site, 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, 1983-1990  
(means  $\pm$  standard errors)

| Monitoring site | 1983             | 1984            | 1985             | 1986              | 1987             | 1988              | 1989             | 1990            |
|-----------------|------------------|-----------------|------------------|-------------------|------------------|-------------------|------------------|-----------------|
| 7               | 749 $\pm$ 127    | Fallow          | Fallow           | Fallow            | Fallow           | Fallow            | Fallow           | Fallow          |
| 11              | 2514 $\pm$ 184a  | ND*             | ND               | ND                | 3736 $\pm$ 225   | 2535 $\pm$ 188a   | 2450 $\pm$ 337a  | 2561 $\pm$ 194a |
| 12              | ND               | 2787 $\pm$ 139a | 2314 $\pm$ 208a  | Fallow            | Fallow           | Fallow            | Fallow           | Fallow          |
| 13              | Sorghum          | 3201 $\pm$ 99ab | ND               | 3029 $\pm$ 194a   | 3608 $\pm$ 170b  | 4610 $\pm$ 204c   | 4549 $\pm$ 168c  | 2538 $\pm$ 143  |
| 23              | 2463 $\pm$ 304a  | 1375 $\pm$ 128b | 1894 $\pm$ 299ab | Alfalfa           | Alfalfa          | Alfalfa           | 2968 $\pm$ 198†  | 3666 $\pm$ 191  |
| 24              | Fallow           | 948 $\pm$ 57a   | 1423 $\pm$ 356a  | Fallow            | Fallow           | Fallow            | Fallow           | Fallow          |
| 25              | 2088 $\pm$ 162bc | 1460 $\pm$ 68a  | 2880 $\pm$ 220d  | 1970 $\pm$ 354abc | 1733 $\pm$ 167ab | 1925 $\pm$ 142abc | 2343 $\pm$ 139cd | Fallow          |
| 28              | Fallow           | 1595 $\pm$ 64   | Fallow           | Fallow            | Fallow           | Fallow            | Fallow           | Fallow          |
| 30              | Melon            | Fallow          | 2470 $\pm$ 163a  | 1569 $\pm$ 52     | Alfalfa          | 3051 $\pm$ 479a   | 2633 $\pm$ 323a  | 2676 $\pm$ 207a |
| 31              | 1860 $\pm$ 210   | 1330 $\pm$ 178a | 1169 $\pm$ 142a  | 1205 $\pm$ 78a    | 1229 $\pm$ 72a   | 684 $\pm$ 146‡    | Fallow           | Fallow          |
| 32              | 1316 $\pm$ 173a  | 2486 $\pm$ 189  | 2002 $\pm$ 213   | Fallow            | 866 $\pm$ 89a    | 379 $\pm$ 90‡     | Fallow           | Fallow          |
| 43              | Alfalfa          | Alfalfa         | Alfalfa          | Alfalfa           | Alfalfa          | Alfalfa           | Alfalfa          | Alfalfa         |
| 45              | NA§              | 2294 $\pm$ 184  | Alfalfa          | Fallow            | Fallow           | Fallow            | Fallow           | Fallow          |

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

\*No data; field harvested prior to sampling.

†Not comparable with other sample data, since long-staple cotton was planted in 1989 and short-staple cotton was planted in all other years.

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

§Data not available; site established in 1984.

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



Table 9-18. Preoperational and 1990 ionic content ( $\mu\text{g/g}$  dry weight) of creosote bush (*Larrea divaricata*) leaf tissue at PVNGS monitoring sites (means  $\pm$  standard errors)

| Ion              | Site 1                                    |   | Site 4                                  |   | Site 6                                  |   | Site 40                                     |   | Site 42                                     |   |
|------------------|---|---|---|---|---|---|---|---|---|---|
|                  | 1983-1985                                 | 1990                                      | 1983-1985                               | 1990                                    | 1983-1985                               | 1990                                    | 1983-1985                                   | 1990                                      | 1983-1985                                   | 1990                                      |
| Sodium           | 309 $\pm$ 28 <sup>a</sup><br>(n = 50)     | 345 $\pm$ 19 <sup>a</sup><br>(n = 20)     | 357 $\pm$ 27 <sup>a</sup><br>(n = 50)   | 356 $\pm$ 27 <sup>a</sup><br>(n = 20)   | 291 $\pm$ 26 <sup>a</sup><br>(n = 49)   | 296 $\pm$ 23 <sup>a</sup><br>(n = 20)   | 403 $\pm$ 108 <sup>a</sup><br>(n = 49)      | 361 $\pm$ 28 <sup>a</sup><br>(n = 20)     | 304 $\pm$ 28 <sup>a</sup><br>(n = 41)       | 280 $\pm$ 17 <sup>a</sup><br>(n = 20)     |
| Potassium        | 8,589 $\pm$ 448<br>(n = 50)               | 13,457 $\pm$ 451<br>(n = 20)              | 13,876 $\pm$ 488<br>(n = 50)            | 16,214 $\pm$ 547<br>(n = 20)            | 10,579 $\pm$ 538<br>(n = 50)            | 14,025 $\pm$ 506<br>(n = 20)            | 11,154 $\pm$ 678<br>(n = 50)                | 14,726 $\pm$ 497<br>(n = 20)              | 10,906 $\pm$ 639 <sup>a</sup><br>(n = 50)   | 12,116 $\pm$ 631 <sup>a</sup><br>(n = 20) |
| Calcium          | 16,117 $\pm$ 694 <sup>a</sup><br>(n = 50) | 18,102 $\pm$ 667 <sup>a</sup><br>(n = 20) | 13,307 $\pm$ 307<br>(n = 50)            | 15,549 $\pm$ 554<br>(n = 20)            | 16,972 $\pm$ 503<br>(n = 50)            | 19,790 $\pm$ 629<br>(n = 20)            | 17,250 $\pm$ 3,010 <sup>a</sup><br>(n = 50) | 16,094 $\pm$ 490 <sup>a</sup><br>(n = 20) | 16,348 $\pm$ 1,816 <sup>a</sup><br>(n = 50) | 18,543 $\pm$ 559 <sup>a</sup><br>(n = 20) |
| Magnesium        | 1,523 $\pm$ 59 <sup>a</sup><br>(n = 50)   | 1,458 $\pm$ 53 <sup>a</sup><br>(n = 20)   | 1,388 $\pm$ 39 <sup>a</sup><br>(n = 50) | 1,441 $\pm$ 40 <sup>a</sup><br>(n = 20) | 1,681 $\pm$ 62 <sup>a</sup><br>(n = 50) | 1,892 $\pm$ 99 <sup>a</sup><br>(n = 20) | 1,424 $\pm$ 94 <sup>a</sup><br>(n = 50)     | 1,570 $\pm$ 93 <sup>a</sup><br>(n = 20)   | 1,488 $\pm$ 89 <sup>a</sup><br>(n = 50)     | 1,489 $\pm$ 40 <sup>a</sup><br>(n = 20)   |
| Chloride         | 6,086 $\pm$ 259<br>(n = 50)               | 8,010 $\pm$ 358<br>(n = 20)               | 6,462 $\pm$ 347<br>(n = 50)             | 8,230 $\pm$ 366<br>(n = 20)             | 6,609 $\pm$ 244<br>(n = 50)             | 8,660 $\pm$ 285<br>(n = 20)             | 6,691 $\pm$ 277 <sup>a</sup><br>(n = 50)    | 6,260 $\pm$ 219 <sup>a</sup><br>(n = 20)  | 7,072 $\pm$ 324<br>(n = 50)                 | 8,900 $\pm$ 409<br>(n = 20)               |
| Sulfate          | 17,538 $\pm$ 1,687<br>(n = 50)            | 3,685 $\pm$ 540<br>(n = 13)               | 8,680 $\pm$ 528<br>(n = 50)             | 5,519 $\pm$ 841<br>(n = 16)             | 8,894 $\pm$ 550<br>(n = 50)             | 4,113 $\pm$ 567<br>(n = 18)             | 11,484 $\pm$ 744<br>(n = 50)                | 4,647 $\pm$ 780<br>(n = 11)               | 15,042 $\pm$ 1,548<br>(n = 50)              | 4,715 $\pm$ 530<br>(n = 17)               |
| Nitrate (as N)   | 1,373 $\pm$ 317<br>(n = 39)               | 121 $\pm$ 10<br>(n = 20)                  | 436 $\pm$ 73<br>(n = 40)                | 157 $\pm$ 17<br>(n = 20)                | 389 $\pm$ 61<br>(n = 39)                | 151 $\pm$ 13<br>(n = 20)                | 433 $\pm$ 70<br>(n = 39)                    | 122 $\pm$ 14<br>(n = 20)                  | 439 $\pm$ 65<br>(n = 38)                    | 130 $\pm$ 12<br>(n = 20)                  |
| Phosphate (as P) | 969 $\pm$ 28<br>(n = 50)                  | 1,383 $\pm$ 49<br>(n = 20)                | 1,106 $\pm$ 35<br>(n = 50)              | 1,426 $\pm$ 35<br>(n = 20)              | 1,411 $\pm$ 42<br>(n = 50)              | 1,729 $\pm$ 49<br>(n = 20)              | 1,464 $\pm$ 72<br>(n = 50)                  | 1,739 $\pm$ 70<br>(n = 20)                | 1,330 $\pm$ 41 <sup>a</sup><br>(n = 50)     | 1,362 $\pm$ 59 <sup>a</sup><br>(n = 20)   |
| Fluoride         | 14.8 $\pm$ 1.4 <sup>a</sup><br>(n = 30)   | 17.3 $\pm$ 1.0 <sup>a</sup><br>(n = 20)   | 13.0 $\pm$ 1.6 <sup>a</sup><br>(n = 29) | 14.0 $\pm$ 0.5 <sup>a</sup><br>(n = 20) | 12.4 $\pm$ 1.4<br>(n = 32)              | 16.5 $\pm$ 0.6<br>(n = 20)              | 12.6 $\pm$ 1.4<br>(n = 30)                  | 16.3 $\pm$ 0.6<br>(n = 20)                | 14.3 $\pm$ 1.1 <sup>a</sup><br>(n = 30)     | 16.3 $\pm$ 0.2 <sup>a</sup><br>(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 (1986-1990) 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                                |                        |        |      |        |      |        |      |         |      |         |      |
| <u>Ambrosia dumosa</u>                | White bursage†         | 1.1    | 1.7  |        |      |        |      |         |      |         |      |
| <u>Larrea divaricata</u>              | Creosote bush;         |        |      |        |      |        |      |         |      |         |      |
|                                       | greasewood             | 18.2   | 17.0 | 13.4   | 12.5 | 20.2   | 18.1 | 12.4    | 12.2 | 17.4    | 17.7 |
| Herbs                                 |                        |        |      |        |      |        |      |         |      |         |      |
| <u>Allionia incarnata</u>             | Trailing four-o'clock; |        |      |        |      |        |      |         |      |         |      |
|                                       | windmills              |        |      |        | --   |        |      |         | 0.5  |         |      |
| <u>Amsinckia intermedia</u>           | Coast fiddleneck       | 0.5    | 0.3  | <0.1   | <0.1 | 1.4    | 0.8  | --      | 0.1  | 0.1     | 0.1  |
| <u>Argythamnia neomexicana</u>        | None                   | --     | --   |        |      |        |      |         |      |         |      |
| <u>Astragalus Nuttallianus</u>        | Nuttall locoweed       |        |      | <0.1   | 0.1  | <0.1   | <0.1 |         | <0.1 |         | <0.1 |
| <u>Bowlesia incana</u>                | Hairy bowlesia         |        | <0.1 |        |      |        |      |         |      |         |      |
| <u>Brassica Tournefortii</u>          | Mustard                |        | <0.1 | --     | 0.2  |        | <0.1 |         | <0.1 |         |      |
| <u>Camelina microcarpa</u>            | Little pod             |        |      | <0.1   |      |        |      |         |      |         |      |
| <u>Chaenactis carphoclinia</u>        | Pebble pincushion      | 0.2    | <0.1 | 0.2    | 0.1  |        |      |         |      | --      | <0.1 |
| <u>Chaenactis Fremontii</u>           | Fremont pincushion     |        | --   |        | <0.1 |        |      |         |      |         | --   |
| <u>Chorizanthe brevicornu</u>         | Brittle spine flower   |        | --   |        | <0.1 |        | <0.1 |         |      |         |      |
| <u>Chorizanthe rigida</u>             | Rigid spiny herb       | <0.1   | --   | 0.1    | <0.1 |        | <0.1 |         |      |         | --   |
| <u>Cryptantha angustifolia</u>        | Narrow-leaved          |        |      |        |      |        |      |         |      |         |      |
|                                       | cryptantha             |        |      | <0.1   | --   | <0.1   |      |         |      |         |      |
| <u>Cryptantha inaequata</u>           | Darwin cryptantha      | <0.1   |      |        |      |        |      |         |      |         |      |
| <u>Cryptantha maritima</u>            | White-haired           |        |      |        |      |        |      |         |      |         |      |
|                                       | cryptantha             |        | <0.1 |        |      |        | --   |         |      | 0.1     | <0.1 |
| <u>Cryptantha muricata</u>            | None                   |        | --   |        |      |        | --   |         |      |         |      |



Table 9-19. Species composition, cover, and diversity of flora in five creosote bush (*Larrea divaricata*) communities during preoperational (1983-1985) and operational (1986-1990) periods at PVNGS monitoring sites (sheet 2 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)                                 |   |        |      |        |      |        |      |         |      |         |      |
| <u>Cryptantha pterocarya</u>                      | None  |        | --   |        |      |        |      |         |      |         |      |
| <u>Cryptantha</u> sp.                             | None  |        | --   |        | <0.1 |        | <0.1 |         |      |         | --   |
| <u>Dalea mollis</u>                               | Silk dalea                                    |        |      |        |      |        | <0.1 |         |      |         | --   |
| <u>Dalea neomexicana</u>                          | Indigo bush; pea bush                         |        |      |        |      |        |      |         |      | 0.1     | <0.1 |
| <u>Daucus pusillus</u>                            | American carrot                               | --     | 0.7  |        |      |        |      |         |      |         |      |
| <u>Eriastrum diffusum</u>                         | None  | <0.1   |      |        |      |        |      |         |      |         |      |
| <u>Erigeron lobatus</u>                           | Fleabane                                      |        | --   |        |      |        |      |         |      |         |      |
| <u>Eriogonum Thomasii</u>                         | Thomas eriogonum                              | 0.1    | <0.1 | <0.1   | 0.1  | --     | 0.1  |         |      | --      | 0.3  |
| <u>Eriogonum trichopes</u>                        | Little trumpet                                |        |      | 0.1    | <0.1 | <0.1   | <0.1 |         | --   | 0.8     | 0.1  |
| <u>Eriophyllum lanosum</u>                        | Woolly eriophyllum                            | 0.1    | --   |        |      | <0.1   | --   |         |      |         |      |
| <u>Erodium cicutarium</u>                         | Filaree; heron bill                           |        | 0.2  |        | <0.1 |        | 0.1  |         | <0.1 |         |      |
| <u>Erodium texanum</u>                            | Large-flowered<br>stork's bill;<br>heron bill | 0.9    | 0.4  | 0.1    | <0.1 | 0.1    | 0.1  |         |      | <0.1    | <0.1 |
| <u>Euphorbia polycarpa</u>                        | Small-seeded sand mat                         |        | <0.1 |        |      | --     | 0.1  |         | 0.1  |         | --   |
| <u>Euphorbia</u> sp.                              | Spurge  |        |      |        | --   | --     | --   | 2.0     |      |         |      |
| <u>Filago arizonica</u>                           | Arizona filago                                | 0.1    | --   |        |      |        |      |         |      |         |      |
| <u>Hesperocallis undulata</u>                     | Desert lily                                   |        |      | <0.1   | <0.1 |        |      |         |      |         |      |
| <u>Lepidium lasiocarpum</u>                       | Sand pepper grass                             | 0.2    | 0.1  | 0.1    | 0.2  | 0.1    | 0.1  |         | <0.1 | 0.7     | 0.3  |
| <u>Lepidium virginicum</u>                        | Pepper grass;<br>pepperwort                   | --     | --   | --     | --   | --     | --   | --      |      | --      |      |
| <u>Lepidium</u> sp.                               | Pepper grass;<br>pepperwort                   |        | --   |        | --   |        | --   |         | --   |         | --   |





Table 9-19. Species composition, cover, and diversity of flora in five creosote bush (*Larrea divaricata*) communities during preoperational (1983-1985) and operational (1986-1990) 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)                                 |                                |        |      |        |      |        |      |         |     |         |      |
| <u>Lesquerella Gordonii</u>                       | Gordon bladderpod              |        |      |        | 0.3  |        |      | --      | 0.2 |         | --   |
| <u>Linanthus bigelovii</u>                        | None                           |        | <0.1 |        |      | <0.1   |      |         |     |         |      |
| <u>Linanthus dichotomus</u>                       | Evening snow                   | 0.1    |      |        |      | <0.1   |      |         |     |         |      |
| <u>Lotus salsuginosus</u>                         | Deer vetch                     |        |      |        | --   |        |      |         |     |         | <0.1 |
| <u>Lotus tomentellus</u>                          | Hairy lotus                    |        |      |        |      | <0.1   | <0.1 |         |     |         |      |
| <u>Lupinus sparsiflorus</u>                       | Lupine                         |        |      |        |      | 0.1    | 0.1  |         |     |         |      |
| <u>Machaeranthera Coulteri</u>                    | None                           |        | <0.1 |        | --   |        |      |         |     |         |      |
| <u>Monoptilon bellioides</u>                      | Mohave desert star             |        | <0.1 |        |      |        | <0.1 |         | --  |         |      |
| <u>Nemacladus glanduliferus</u>                   | Thread plant                   | 0.1    |      |        |      |        |      |         |     |         |      |
| <u>Oenothera</u> sp.                              | Evening primrose;<br>sun drops |        |      |        |      |        | --   |         |     |         |      |
| <u>Oligomeris linifolia</u>                       | Linear-leaved cambess          | <0.1   |      | --     | <0.1 |        |      |         |     |         |      |
| <u>Orthocarpus purpurascens</u>                   | Mohave owl clover              |        | --   | --     | <0.1 |        | --   |         |     |         | <0.1 |
| <u>Pectis papposa</u>                             | Chinchweed                     | --     | --   | --     | <0.1 | --     | <0.1 | <0.1    | 0.1 |         |      |
| <u>Pectocarya platycarpa</u>                      | Broad-nutted comb bur          | 0.2    | <0.1 | 0.2    | <0.1 | 0.1    | 0.2  |         | 0.1 | 0.2     | <0.1 |
| <u>Perityle Emoryi</u>                            | Emory rock daisy               |        |      |        |      |        | --   |         |     |         |      |
| <u>Phacelia crenulata</u>                         | None                           | <0.1   | <0.1 | --     | <0.1 |        |      |         |     |         |      |
| <u>Pholistoma auritum</u>                         | None                           |        |      |        |      |        | <0.1 |         |     |         |      |
| <u>Plantago insularis</u>                         | Woolly plantain;               |        |      |        |      |        |      |         |     |         |      |
|   | Indian wheat                   | 1.1    | 1.3  | 3.5    | 4.7  | 0.5    | 3.4  | 8.1     | 2.9 | 0.7     | 1.6  |
| <u>Sisymbrium Irio</u>                            | London rocket                  |        |      |        |      |        |      |         | --  |         |      |
| <u>Spermolepis echinata</u>                       | Scale seed                     | 0.6    |      |        |      |        |      |         |     |         |      |



Table 9-19. Species composition, cover, and diversity of flora in five creosote bush (Larrea divaricata) communities during preoperational (1983-1985) and operational (1986-1990) 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) |                                    |     |        |     |        |     |         |      |         |     |
| Herbs (continued)                                 |                                    |     |        |     |        |     |         |      |         |     |
| <u>Sphaeralcea Coulteri</u>                       | Coulter globe mallow               |     |        |     |        |     | 16.0    | 0.2  |         |     |
| <u>Sphaeralcea</u> sp.                            | Alkali pink                        |     |        |     |        |     |         | <0.1 |         |     |
| <u>Tidestromia lanuginosa</u>                     | Woolly tidestromia                 |     |        |     |        |     | --      | 0.1  |         |     |
| Grasses   |                                    |     |        |     |        |     |         |      |         |     |
| <u>Aristida adscensionis</u>                      | Six weeks three-awn                | --  | <0.1   | --  |        | 0.1 |         |      |         | --  |
| <u>Aristida</u> sp.                               | Three-awn                          | --  |        |     |        |     |         |      |         |     |
| <u>Bouteloua barbata</u>                          | Six-weeks grama                    | --  | 0.1    | --  | --     | --  | --      | --   |         |     |
| <u>Bromus rubens</u>                              | Red brome; foxtail chess           | --  | 0.2    | --  | --     | 0.6 | --      |      |         |     |
| <u>Erioneuron pulchellum</u>                      | Fluff grass                        |     | --     |     |        |     |         |      |         |     |
| <u>Festuca octoflora</u>                          | Six-weeks fescue                   | 0.4 | 0.2    |     | 0.4    | 0.1 |         |      |         | --  |
| <u>Muhlenbergia microsperma</u>                   | Littleseed muhly                   |     | --     |     |        |     |         |      |         |     |
| <u>Schismus arabicus</u>                          | Arabian grass                      |     | 0.1    | --  | 0.3    | 0.3 |         | 1.1  |         | 0.4 |
| <u>Schismus barbatus</u>                          | Mediterranean grass                | 0.6 | <0.1   | 1.8 | <0.1   | 0.3 | 0.3     | 1.7  | 0.7     | 0.3 |
| <u>Schismus</u> sp.                               | None                               |     | 0.2    | 0.3 |        | 1.5 |         | 2.3  |         | 0.7 |
| Cacti   |                                    |     |        |     |        |     |         |      |         |     |
| <u>Echinocereus Englemannii</u>                   | Hedgehog cactus; strawberry cactus |     |        | --  |        |     |         |      |         |     |



Table 9-19. Species composition, cover, and diversity of flora in five creosote bush (*Larrea divaricata*) communities during preoperational (1983-1985) and operational (1986-1990) 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 composition and percent cover (continued) |        |     |        |     |        |     |         |     |         |     |
| Cacti (continued)                                 |        |     |        |     |        |     |         |     |         |     |
| <u>Opuntia acanthocarpa</u>                       |        |     |        | 0.3 | --     | --  |         |     | --      | --  |
| <u>Opuntia echinocarpa</u>                        |        |     |        |     |        |     |         |     |         |     |
|   |        |     |        |     |        |     |         |     |         |     |
|   |        |     |        | 0.1 | <0.1   |     |         |     |         | --  |
| <u>Opuntia leptocaulis</u>                        |        |     |        |     |        |     |         |     |         |     |
|   |        |     |        |     |        |     |         |     |         |     |
|   |        |     |        |     |        |     |         |     |         |     |
| <u>Opuntia ramosissima</u>                        |        |     |        | 0.5 | 0.4    |     |         |     | --      | --  |
|   |        |     |        |     |        |     |         |     |         |     |
|   |        |     |        |     |        |     |         |     |         |     |
| Species diversity and number of plots             |        |     |        |     |        |     |         |     |         |     |
| Species richness                                  | 30     | 43  | 26     | 40  | 23     | 38  | 11      | 23  | 15      | 29  |
| Heterogeneity (H')                                | .52    | .48 | .52    | .50 | .26    | .50 | .54     | .65 | .32     | .34 |
| Index of similarity (%)                           |        | 63  |        | 73  |        | 62  |         | 47  |         | 64  |
| Plots   | 53     | 100 | 50     | 100 | 50     | 100 | 50      | 100 | 50      | 100 |

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

\*Values have been recalculated due to a previous slight error in total plot size.

†Scientific name.

‡Common name. Names have been updated using Lehr, 1978.

§*Machaeranthera arida* is now recognized as the same species as *Machaeranthera Coulteri*.



Table 9-20. Preoperational and 1990 ionic content ( $\mu\text{g/g}$  dry weight) of salt bush (*Atriplex polycarpa*) leaf tissue at PVNGS monitoring sites (means  $\pm$  standard errors)

| Ion              | Site 2                          |                                 | Site 3                          |                                 | Site 44                         |                                 |
|------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
|                  | 1983-1985                       | 1990                            | 1983-1985                       | 1990                            | 1984-1985                       | 1990                            |
| Sodium           | 48,721 $\pm$ 1,077<br>(n = 50)  | 64,625 $\pm$ 2,497<br>(n = 20)  | 51,417 $\pm$ 1,296<br>(n = 50)  | 67,500 $\pm$ 2,882<br>(n = 20)  | 33,564 $\pm$ 1,082<br>(n = 40)  | 40,522 $\pm$ 1,797<br>(n = 20)  |
| Potassium        | 13,328 $\pm$ 888<br>(n = 50)    | 20,504 $\pm$ 1,146<br>(n = 20)  | 17,207 $\pm$ 969<br>(n = 50)    | 22,800 $\pm$ 1,468<br>(n = 20)  | 22,612 $\pm$ 1,324a<br>(n = 40) | 21,435 $\pm$ 1,549a<br>(n = 20) |
| Calcium          | 11,887 $\pm$ 1,153a<br>(n = 50) | 11,920 $\pm$ 673a<br>(n = 20)   | 13,333 $\pm$ 1,767a<br>(n = 50) | 11,941 $\pm$ 990a<br>(n = 20)   | 9,175 $\pm$ 346a<br>(n = 40)    | 9,561 $\pm$ 375a<br>(n = 20)    |
| Magnesium        | 4,359 $\pm$ 257<br>(n = 50)     | 5,538 $\pm$ 377<br>(n = 20)     | 5,721 $\pm$ 243a<br>(n = 50)    | 5,571 $\pm$ 330a<br>(n = 20)    | 8,038 $\pm$ 1,831a<br>(n = 40)  | 6,696 $\pm$ 374a<br>(n = 20)    |
| Chloride         | 59,225 $\pm$ 4,683a<br>(n = 50) | 56,354 $\pm$ 2,058a<br>(n = 20) | 60,440 $\pm$ 3,691a<br>(n = 50) | 61,894 $\pm$ 2,849a<br>(n = 20) | 40,428 $\pm$ 2,445a<br>(n = 40) | 42,778 $\pm$ 2,307a<br>(n = 20) |
| Sulfate          | 8,914 $\pm$ 659<br>(n = 50)     | 5,145 $\pm$ 469<br>(n = 20)     | 7,550 $\pm$ 623<br>(n = 50)     | 4,804 $\pm$ 513<br>(n = 18)     | 11,200 $\pm$ 1,072<br>(n = 40)  | 7,726 $\pm$ 675<br>(n = 20)     |
| Nitrate (as N)   | 342 $\pm$ 49a<br>(n = 44)       | 271 $\pm$ 33a<br>(n = 20)       | 386 $\pm$ 55a<br>(n = 45)       | 237 $\pm$ 23a<br>(n = 20)       | 372 $\pm$ 54a<br>(n = 33)       | 270 $\pm$ 22a<br>(n = 20)       |
| Phosphate (as P) | 1,324 $\pm$ 183a<br>(n = 50)    | 1,349 $\pm$ 63a<br>(n = 20)     | 979 $\pm$ 43<br>(n = 50)        | 1,269 $\pm$ 54<br>(n = 20)      | 1,437 $\pm$ 74a<br>(n = 40)     | 1,575 $\pm$ 65a<br>(n = 20)     |
| Fluoride         | 7.7 $\pm$ 0.6<br>(n = 30)       | 9.7 $\pm$ 0.3<br>(n = 20)       | 7.9 $\pm$ 0.7a<br>(n = 32)      | 9.1 $\pm$ 0.1a<br>(n = 20)      | 8.4 $\pm$ 0.6<br>(n = 30)       | 10.5 $\pm$ 0.3<br>(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 (1986-1990) periods at PVNGS monitoring sites (sheet 1 of 4)

| Parameter                             | Site 2                           |      | Site 3 |      | Site 44 |      |
|---------------------------------------|----------------------------------|------|--------|------|---------|------|
|                                       | Preop                            | Op   | Preop  | Op   | Preop   | Op   |
| Species composition and percent cover |                                  |      |        |      |         |      |
| Shrubs                                |                                  |      |        |      |         |      |
| <u>Ambrosia dumosa</u> *              | White bursaget                   |      | 0.1    | <0.1 |         |      |
| <u>Atriplex linearis</u>              | Salt bush, narrow-leaf wingscale | 0.5  | 0.5    | 1.5  | 1.0     | 0.4  |
| <u>Atriplex polycarpa</u>             | Salt bush, all scale             | 18.9 | 18.9   | 20.0 | 21.4    | 13.1 |
| <u>Larrea divaricata</u>              | Cresote bush; greasewood         | 4.9  | 4.8    |      |         | 0.8  |
| <u>Lycium Fremontii</u>               | Fremont thornbush                | 0.1  | 0.2    | 1.3  | 2.7     | 0.6  |
| <u>Lycium</u> sp.                     | Wolf-berry; desert thorn         | 0.3  | 0.1    | 5.4  | 1.7     |      |
| <u>Prosopis velutina</u>              | Velvet mesquite                  | 3.9  | 5.7    |      | --      | 0.6  |
| Herbs                                 |                                  |      |        |      |         |      |
| <u>Abronia villosa</u>                | Hairy sand verbena               | <0.1 |        |      |         |      |
| <u>Allionia incarnata</u>             | Trailing four-o'clock; windmills | --   | <0.1   |      |         |      |
| <u>Amaranthus crassipes</u>           | Amaranth; pig weed               |      | --     |      |         |      |
| <u>Amaranthus fimbriatus</u>          | Fringed amaranth                 | 0.1  | <0.1   | <0.1 | --      |      |
| <u>Amsinckia intermedia</u>           | Coast fiddleneck                 | 0.1  | 0.1    | --   | <0.1    | <0.1 |
| <u>Boerhaavia intermedia</u>          | Five-winged ringstem             |      | 0.1    |      |         | --   |
| <u>Brassica Tournefortii</u>          | Mustard                          |      |        |      |         | --   |
| <u>Chaenactis carphoclinia</u>        | Pebble pincushion                | --   |        |      |         |      |
| <u>Cryptantha angustifolia</u>        | Narrow-leaved cryptantha         |      | --     |      |         |      |
| <u>Cryptantha inaequata</u>           | Darwin cryptantha                |      |        | <0.1 |         |      |
| <u>Cryptantha maritima</u>            | White-haired cryptantha          |      |        | --   |         |      |
| <u>Eremalche exilis</u>               | None                             |      |        |      |         | --   |
| <u>Eriastrum diffusum</u>             | None                             |      | <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 (1986-1990) periods at PVNGS monitoring sites (sheet 2 of 4)

| Parameter   | Site 2 |      | Site 3 |      | Site 44 |      |
|---|--------|------|--------|------|---------|------|
|   | Preop  | Op   | Preop  | Op   | Preop   | Op   |
| Species composition and percent cover (continued) |        |      |        |      |         |      |
| Herbs (continued)                                 |        |      |        |      |         |      |
| <u>Eriogonum lobatus</u>                          |        |      |        |      |         |      |
| <u>Eriogonum Thomasii</u>                         |        |      |        |      |         |      |
| <u>Eriogonum trichopes</u>                        |        |      |        |      |         |      |
| <u>Eriophyllum lanosum</u>                        |        |      |        |      |         |      |
| <u>Erodium cicutarium</u>                         |        |      |        |      |         |      |
| <u>Erodium texanum</u>                            |        |      |        |      |         |      |
| <u>Eucrypta micrantha</u>                         |        |      |        |      |         |      |
| <u>Euphorbia capitellata</u>                      |        |      |        |      |         |      |
| <u>Euphorbia polycarpa</u>                        |        |      |        |      |         |      |
| <u>Euphorbia</u> sp.                              |        |      |        |      |         |      |
| <u>Lepidium lasiocarpum</u>                       |        |      |        |      |         |      |
| <u>Lepidium virginicum</u>                        |        |      |        |      |         |      |
| <u>Lepidium</u> sp.                               |        |      |        |      |         |      |
| <u>Lesquerella Gordonii</u>                       |        |      |        |      |         |      |
| <u>Machaeranthera Coulteri</u> †                  |        |      |        |      |         |      |
| <u>Monoptilon bellioides</u>                      |        |      |        |      |         |      |
| <u>Nama demissum</u>                              |        |      |        |      |         |      |
| <u>Nama hispidum</u>                              |        |      |        |      |         |      |
| <u>Oligomeris linifolia</u>                       |        |      |        |      |         |      |
| <u>Orthocarpus purpurascens</u>                   |        |      |        |      |         |      |
| <u>Pectis papposa</u>                             |        |      |        |      |         |      |
| <u>Pectocarya platycarpa</u>                      |        |      |        |      |         |      |
| <u>Phacelia crenulata</u>                         |        |      |        |      |         |      |
| Fleabane  |        | --   |        |      |         |      |
| Thomas eriogonum                                  | --     |      |        |      |         |      |
| Little trumpet                                    |        |      |        |      |         | --   |
| Woolly eriophyllum                                | 0.2    | <0.1 | <0.1   | <0.1 |         |      |
| Filaree; heron bill                               |        |      |        | --   |         |      |
| Large-flowered stork's bill;<br>heron bill        |        | --   |        |      |         |      |
| Small-flowered eucrypta                           |        |      |        |      | <0.1    |      |
| Spurge  | --     |      |        |      |         |      |
| Small-seeded sand mat                             |        | 1.3  |        | 0.3  |         | 0.1  |
| Spurge  | <0.1   | --   | 0.3    | --   | 6.2     |      |
| Sand pepper grass                                 | <0.1   | <0.1 | 0.1    | <0.1 | <0.1    | <0.1 |
| Pepper grass; pepperwort                          | --     |      | --     |      | --      |      |
| Pepper grass; pepperwort                          |        | --   |        | --   |         |      |
| Gordon bladderpod                                 | --     |      |        |      |         |      |
| None  | <0.1   | <0.1 | <0.1   | <0.1 |         |      |
| Mohave desert star                                |        | --   |        | --   |         |      |
| Purple mat  |        | --   |        | --   |         |      |
| None  |        |      | <0.1   |      |         |      |
| Linear-leaved cambess                             | --     | <0.1 | --     | <0.1 |         |      |
| Mohave owl clover                                 | --     |      |        |      | --      |      |
| Chinchweed  | 0.1    | 0.1  | 0.2    | 0.3  | 0.3     | <0.1 |
| Broad-nutted comb bur                             |        | --   | --     | <0.1 |         | --   |
| None  |        |      |        | --   |         |      |



Table 9-21. Species composition, cover, and diversity of flora in three salt bush (*Atriplex* sp.) communities during preoperational (1983-1985) and operational (1986-1990) periods at PVNGS monitoring sites (sheet 3 of 4)

| Parameter   |                                      | Site 2 |      | Site 3 |      | Site 44 |      |
|---|--------------------------------------|--------|------|--------|------|---------|------|
|   |                                      | Preop  | Op   | Preop  | Op   | Preop   | Op   |
| Species composition and percent cover (continued) |                                      |        |      |        |      |         |      |
| Herbs (continued)                                 |                                      |        |      |        |      |         |      |
| <u>Plantago insularis</u>                         | Woolly plantain; Indian wheat        | 1.1    | 1.2  | 0.3    | 0.4  | 2.5     | 0.5  |
| <u>Portulaca parvula</u>                          | Purslane                             |        | --   |        | --   |         |      |
| <u>Proboscidea altheaefolia</u>                   | Desert unicorn plant; elephant tusks | 0.1    |      |        |      |         |      |
| <u>Salsola Kali</u>                               | Russian thistle                      |        |      |        | --   |         |      |
| <u>Sisymbrium Irio</u>                            | London rocket                        |        | --   |        | --   |         |      |
| <u>Sphaeralcea Coulteri</u>                       | Coulter globe mallow                 | 1.8    | <0.1 | <0.1   | <0.1 | 7.2     | 0.1  |
| <u>Sphaeralcea</u> sp.                            | Alkali pink                          |        | 0.1  |        | --   |         | <0.1 |
| <u>Tidestromia lanuginosa</u>                     | Woolly tidestromia                   |        | --   |        |      | --      | <0.1 |
| <u>Trianthema Portulacastrum</u>                  | Horse purslane                       | <0.1   |      |        | <0.1 |         |      |
| Grasses   |                                      |        |      |        |      |         |      |
| <u>Bouteloua barbata</u>                          | Six-weeks gamma                      | 0.3    | 0.1  | 0.9    | 0.2  |         |      |
| <u>Festuca octoflora</u>                          | Six-weeks fescue                     | --     |      | 0.1    |      |         |      |
| <u>Schismus arabicus</u>                          | Arabian grass                        |        | 1.9  |        | 2.3  |         | 2.9  |
| <u>Schismus barbatus</u>                          | Mediterranean grass                  | 2.1    | 0.1  | 6.8    | 0.7  | 7.2     | 0.9  |
| <u>Schismus</u> sp.                               | None                                 |        | 3.6  |        | 3.9  |         | 6.3  |



Table 9-21. Species composition, cover, and diversity of flora in three salt bush (Atriplex sp.) communities during preoperational (1983-1985) and operational (1986-1990) periods at PVNGS monitoring sites (sheet 4 of 4)

| Parameter                             | Site 2 |     | Site 3 |     | Site 44 |     |
|---------------------------------------|--------|-----|--------|-----|---------|-----|
|                                       | Preop  | Op  | Preop  | Op  | Preop   | Op  |
| Species diversity and number of plots |        |     |        |     |         |     |
| Species richness                      | 29     | 34  | 23     | 35  | 14      | 18  |
| Heterogeneity (H')                    | .67    | .74 | .62    | .62 | .72     | .66 |
| Index of similarity (%)               | 60     |     | 66     |     | 56      |     |
| Plots                                 | 50     | 100 | 50     | 100 | 50      | 100 |

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

\*Scientific name.

†Common name. Names have been updated using Lehr, 1978.

‡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 1990 (means  $\pm$  standard errors)

| Parameter                             | Preoperational*<br>(n = 404) | 1990<br>(n = 156) |
|---------------------------------------|------------------------------|-------------------|
| Electrical conductivity<br>(mmhos/cm) | 1.40 $\pm$ 0.06              | 1.36 $\pm$ 0.06   |
| Soluble ions (ppm)                    |                              |                   |
| Calcium                               | 48 $\pm$ 3                   | 50 $\pm$ 3        |
| Magnesium                             | 7.0 $\pm$ 0.4                | 7.8 $\pm$ 0.6     |
| Sodium                                | 266 $\pm$ 10                 | 250 $\pm$ 10      |
| Potassium                             | 26 $\pm$ 1                   | 22 $\pm$ 2        |
| Chloride                              | 173 $\pm$ 12                 | 180 $\pm$ 14      |

\*May 1983 through December 1985.

Note: For all values, none of the means for the pre-operational period and 1990 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 1990 (means  $\pm$  standard errors)

| Site† | Electrical conductivity (mmhos/cm) |                              | Soluble calcium (ppm)     |                           | Soluble magnesium (ppm)    |                            |
|-------|------------------------------------|------------------------------|---------------------------|---------------------------|----------------------------|----------------------------|
|       | Preoperational*                    | 1990                         | Preoperational*           | 1990                      | Preoperational*            | 1990                       |
| 7     | 1.17 $\pm$ 0.14 <sup>a</sup>       | 0.71 $\pm$ 0.05 <sup>a</sup> | 31 $\pm$ 2                | 28 $\pm$ 1                | 6.0 $\pm$ 0.5 <sup>a</sup> | 4.7 $\pm$ 0.3 <sup>a</sup> |
| 11    | 1.35 $\pm$ 0.12                    | 1.75 $\pm$ 0.13              | 44 $\pm$ 4                | 43 $\pm$ 2                | 3.7 $\pm$ 0.3 <sup>a</sup> | 4.7 $\pm$ 0.2 <sup>a</sup> |
| 12    | 1.89 $\pm$ 0.20 <sup>a</sup>       | 2.84 $\pm$ 0.17 <sup>a</sup> | 63 $\pm$ 8 <sup>a</sup>   | 112 $\pm$ 13 <sup>a</sup> | 9.6 $\pm$ 1.4              | 11 $\pm$ 1                 |
| 13    | 0.96 $\pm$ 0.07                    | 0.89 $\pm$ 0.05              | 21 $\pm$ 2 <sup>a</sup>   | 34 $\pm$ 2 <sup>a</sup>   | 2.8 $\pm$ 0.2 <sup>a</sup> | 5.2 $\pm$ 0.5 <sup>a</sup> |
| 23    | 1.27 $\pm$ 0.12                    | 1.66 $\pm$ 0.28              | 56 $\pm$ 7                | 75 $\pm$ 16               | 6.2 $\pm$ 0.7              | 9.0 $\pm$ 2.2              |
| 24    | 0.89 $\pm$ 0.04                    | 0.96 $\pm$ 0.06              | 31 $\pm$ 2                | 35 $\pm$ 2                | 4.0 $\pm$ 0.4              | 4.8 $\pm$ 0.3              |
| 25    | 0.98 $\pm$ 0.07 <sup>a</sup>       | 1.72 $\pm$ 0.14 <sup>a</sup> | 66 $\pm$ 8 <sup>a</sup>   | 138 $\pm$ 14 <sup>a</sup> | 9.0 $\pm$ 0.8 <sup>a</sup> | 26 $\pm$ 3 <sup>a</sup>    |
| 28    | 0.71 $\pm$ 0.04                    | 0.63 $\pm$ 0.04              | 20 $\pm$ 2 <sup>a</sup>   | 25 $\pm$ 1 <sup>a</sup>   | 2.3 $\pm$ 0.3              | 3.1 $\pm$ 0.3              |
| 30    | 3.82 $\pm$ 0.30 <sup>a</sup>       | 1.52 $\pm$ 0.10 <sup>a</sup> | 157 $\pm$ 17 <sup>a</sup> | 41 $\pm$ 2 <sup>a</sup>   | 22 $\pm$ 2 <sup>a</sup>    | 6.3 $\pm$ 0.5 <sup>a</sup> |
| 31    | 0.87 $\pm$ 0.05 <sup>a</sup>       | 1.35 $\pm$ 0.09 <sup>a</sup> | 19 $\pm$ 2 <sup>a</sup>   | 26 $\pm$ 1 <sup>a</sup>   | 3.9 $\pm$ 0.9              | 4.3 $\pm$ 0.8              |
| 32    | 1.26 $\pm$ 0.09                    | 1.09 $\pm$ 0.12              | 26 $\pm$ 7                | 21 $\pm$ 1                | 2.8 $\pm$ 0.4              | 4.6 $\pm$ 1.1              |
| 43    | 1.65 $\pm$ 0.22                    | 1.63 $\pm$ 0.12              | 66 $\pm$ 9                | 58 $\pm$ 3                | 14 $\pm$ 2                 | 14 $\pm$ 1                 |
| 45    | 1.31 $\pm$ 0.11 <sup>a</sup>       | 0.93 $\pm$ 0.06 <sup>a</sup> | 17 $\pm$ 2                | 19 $\pm$ 1                | 3.3 $\pm$ 0.7              | 4.3 $\pm$ 0.8              |

| Site† | Soluble sodium (ppm)      |                           | Soluble potassium (ppm) |                         | Chloride (ppm)            |                           |
|-------|---------------------------|---------------------------|-------------------------|-------------------------|---------------------------|---------------------------|
|       | Preoperational*           | 1990                      | Preoperational*         | 1990                    | Preoperational*           | 1990                      |
| 7     | 231 $\pm$ 30 <sup>a</sup> | 133 $\pm$ 12 <sup>a</sup> | 11 $\pm$ 1              | 12 $\pm$ 2              | 103 $\pm$ 28              | 47 $\pm$ 9                |
| 11    | 235 $\pm$ 19 <sup>a</sup> | 345 $\pm$ 28 <sup>a</sup> | 32 $\pm$ 3              | 32 $\pm$ 1              | 153 $\pm$ 21 <sup>a</sup> | 269 $\pm$ 27 <sup>a</sup> |
| 12    | 361 $\pm$ 43              | 467 $\pm$ 43              | 80 $\pm$ 8              | 79 $\pm$ 3              | 299 $\pm$ 46 <sup>a</sup> | 593 $\pm$ 53 <sup>a</sup> |
| 13    | 197 $\pm$ 21              | 164 $\pm$ 10              | 17 $\pm$ 1              | 21 $\pm$ 3              | 120 $\pm$ 16              | 99 $\pm$ 11               |
| 23    | 254 $\pm$ 26              | 329 $\pm$ 49              | 18 $\pm$ 1              | 13 $\pm$ 2              | 153 $\pm$ 28              | 275 $\pm$ 69              |
| 24    | 166 $\pm$ 9               | 173 $\pm$ 14              | 34 $\pm$ 2              | 27 $\pm$ 3              | 65 $\pm$ 8                | 87 $\pm$ 11               |
| 25    | 124 $\pm$ 9               | 155 $\pm$ 14              | 28 $\pm$ 2              | 32 $\pm$ 3              | 59 $\pm$ 9 <sup>a</sup>   | 139 $\pm$ 19 <sup>a</sup> |
| 28    | 148 $\pm$ 8               | 136 $\pm$ 12              | 9.4 $\pm$ 0.7           | 9.8 $\pm$ 1.4           | 35 $\pm$ 4                | 40 $\pm$ 9                |
| 30    | 694 $\pm$ 51 <sup>a</sup> | 297 $\pm$ 25 <sup>a</sup> | 52 $\pm$ 5 <sup>a</sup> | 11 $\pm$ 1 <sup>a</sup> | 696 $\pm$ 63 <sup>a</sup> | 235 $\pm$ 24 <sup>a</sup> |
| 31    | 189 $\pm$ 11 <sup>a</sup> | 285 $\pm$ 24 <sup>a</sup> | 7.9 $\pm$ 0.6           | 9.7 $\pm$ 1.5           | 79 $\pm$ 11 <sup>a</sup>  | 158 $\pm$ 22 <sup>a</sup> |
| 32    | 294 $\pm$ 24              | 252 $\pm$ 26              | 4.3 $\pm$ 0.4           | 18 $\pm$ 7              | 124 $\pm$ 17              | 103 $\pm$ 20              |
| 43    | 289 $\pm$ 35              | 288 $\pm$ 24              | 28 $\pm$ 3 <sup>a</sup> | 13 $\pm$ 1 <sup>a</sup> | 241 $\pm$ 38              | 254 $\pm$ 32              |
| 45    | 295 $\pm$ 23 <sup>a</sup> | 232 $\pm$ 16 <sup>a</sup> | 6.8 $\pm$ 1.6           | 7.5 $\pm$ 1.6           | 99 $\pm$ 19 <sup>a</sup>  | 42 $\pm$ 9 <sup>a</sup>   |

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 1990; 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 1990 (means  $\pm$  standard errors)

| Parameter                             | Preoperational<br>(n = 576) | 1990<br>(n = 232) |
|---------------------------------------|-----------------------------|-------------------|
| Electrical conductivity<br>(mmhos/cm) | 0.59 $\pm$ 0.03             | 0.68 $\pm$ 0.05   |
| Soluble ions (ppm)                    | -                           | -                 |
| Calcium†                              | 44 $\pm$ 2                  | 56 $\pm$ 6        |
| Magnesium                             | 5.1 $\pm$ 0.3               | 5.9 $\pm$ 0.4     |
| Sodium†                               | 70 $\pm$ 5                  | 90 $\pm$ 8        |
| Potassium                             | 22 $\pm$ 1                  | 23 $\pm$ 2        |
| Chloride†                             | 50 $\pm$ 6                  | 82 $\pm$ 10       |

†Means for preoperational period and 1990 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 1990 (means  $\pm$  standard errors) (sheet 1 of 2)

| Site | Electrical conductivity (mmhos/cm) |                              | Soluble calcium (ppm)   |                         | Soluble magnesium (ppm)    |                            |
|------|------------------------------------|------------------------------|-------------------------|-------------------------|----------------------------|----------------------------|
|      | Preoperational                     | 1990                         | Preoperational          | 1990                    | Preoperational             | 1990                       |
| 1    | 1.05 $\pm$ 0.16                    | 2.51 $\pm$ 0.82              | 110 $\pm$ 18            | 363 $\pm$ 128           | 8.1 $\pm$ 1.0              | 21 $\pm$ 7                 |
| 2    | 0.78 $\pm$ 0.22                    | 0.71 $\pm$ 0.17              | 35 $\pm$ 6              | 31 $\pm$ 3              | 10 $\pm$ 5                 | 4.9 $\pm$ 0.4              |
| 3    | 5.57 $\pm$ 1.15                    | 7.18 $\pm$ 1.44              | 45 $\pm$ 8              | 77 $\pm$ 20             | 18 $\pm$ 6                 | 11 $\pm$ 3                 |
| 4    | 0.35 $\pm$ 0.02                    | 0.41 $\pm$ 0.05              | 50 $\pm$ 3              | 60 $\pm$ 4              | 4.2 $\pm$ 0.3              | 4.8 $\pm$ 0.4              |
| 5    | 0.58 $\pm$ 0.03                    | 0.61 $\pm$ 0.06              | 21 $\pm$ 2 <sup>a</sup> | 35 $\pm$ 4 <sup>a</sup> | 3.2 $\pm$ 0.3              | 4.1 $\pm$ 0.4              |
| 6    | 0.35 $\pm$ 0.02                    | 0.70 $\pm$ 0.32              | 35 $\pm$ 3 <sup>a</sup> | 51 $\pm$ 5 <sup>a</sup> | 3.2 $\pm$ 0.3              | 4.0 $\pm$ 0.2              |
| 8    | 0.91 $\pm$ 0.17                    | 1.06 $\pm$ 0.24              | 21 $\pm$ 2              | 27 $\pm$ 2              | 3.5 $\pm$ 0.3              | 4.4 $\pm$ 0.3              |
| 9    | 0.50 $\pm$ 0.04                    | 0.47 $\pm$ 0.05              | 53 $\pm$ 6              | 48 $\pm$ 2              | 7.3 $\pm$ 0.4              | 7.8 $\pm$ 0.5              |
| 10   | 0.40 $\pm$ 0.03                    | 0.36 $\pm$ 0.04              | 45 $\pm$ 6              | 51 $\pm$ 2              | 6.1 $\pm$ 0.6              | 5.4 $\pm$ 0.3              |
| 14   | 1.21 $\pm$ 0.31                    | 1.22 $\pm$ 0.20              | 45 $\pm$ 6              | 70 $\pm$ 15             | 7.0 $\pm$ 0.5              | 12 $\pm$ 3                 |
| 15   | 0.38 $\pm$ 0.03 <sup>a</sup>       | 0.31 $\pm$ 0.01 <sup>a</sup> | 55 $\pm$ 5              | 51 $\pm$ 2              | 4.4 $\pm$ 0.3              | 4.8 $\pm$ 0.2              |
| 16   | 4.80 $\pm$ 1.12                    | 7.16 $\pm$ 1.49              | 29 $\pm$ 3 <sup>a</sup> | 62 $\pm$ 8 <sup>a</sup> | 4.6 $\pm$ 0.5 <sup>a</sup> | 9.8 $\pm$ 1.7 <sup>a</sup> |
| 17   | 0.49 $\pm$ 0.05                    | 0.58 $\pm$ 0.04              | 54 $\pm$ 5 <sup>a</sup> | 79 $\pm$ 5 <sup>a</sup> | 7.6 $\pm$ 1.6 <sup>a</sup> | 15 $\pm$ 2 <sup>a</sup>    |
| 18   | 0.33 $\pm$ 0.02                    | 0.31 $\pm$ 0.01              | 48 $\pm$ 3 <sup>a</sup> | 57 $\pm$ 2 <sup>a</sup> | 4.2 $\pm$ 0.3              | 4.8 $\pm$ 0.2              |
| 19   | 0.42 $\pm$ 0.02 <sup>a</sup>       | 0.53 $\pm$ 0.04 <sup>a</sup> | 37 $\pm$ 2 <sup>a</sup> | 47 $\pm$ 3 <sup>a</sup> | 4.2 $\pm$ 0.2 <sup>a</sup> | 6.8 $\pm$ 0.5 <sup>a</sup> |
| 20   | 0.47 $\pm$ 0.03                    | 0.56 $\pm$ 0.04              | 33 $\pm$ 8              | 26 $\pm$ 1              | 13 $\pm$ 5                 | 5.3 $\pm$ 0.4              |
| 21   | 0.58 $\pm$ 0.08                    | 0.74 $\pm$ 0.17              | 20 $\pm$ 2              | 23 $\pm$ 2              | 4.3 $\pm$ 0.6              | 4.9 $\pm$ 0.4              |
| 22   | 0.27 $\pm$ 0.02                    | 0.24 $\pm$ 0.01              | 41 $\pm$ 2              | 46 $\pm$ 1              | 3.2 $\pm$ 0.2              | 4.0 $\pm$ 0.2              |
| 26   | 0.31 $\pm$ 0.02                    | 0.34 $\pm$ 0.03              | 52 $\pm$ 7              | 45 $\pm$ 2              | 3.6 $\pm$ 0.2              | 4.0 $\pm$ 0.2              |
| 27   | 1.43 $\pm$ 0.27                    | 1.36 $\pm$ 0.35              | 28 $\pm$ 3              | 30 $\pm$ 2              | 5.4 $\pm$ 1.2              | 6.3 $\pm$ 1.3              |
| 33   | 0.21 $\pm$ 0.02 <sup>a</sup>       | 0.18 $\pm$ 0.00 <sup>a</sup> | 28 $\pm$ 2 <sup>a</sup> | 34 $\pm$ 2 <sup>a</sup> | 2.8 $\pm$ 0.2 <sup>a</sup> | 3.5 $\pm$ 0.2 <sup>a</sup> |
| 34   | 0.31 $\pm$ 0.02                    | 0.30 $\pm$ 0.02              | 45 $\pm$ 3              | 49 $\pm$ 3              | 3.6 $\pm$ 0.2              | 3.9 $\pm$ 0.3              |
| 35   | 0.21 $\pm$ 0.02                    | 0.20 $\pm$ 0.01              | 31 $\pm$ 2 <sup>a</sup> | 38 $\pm$ 2 <sup>a</sup> | 2.8 $\pm$ 0.1 <sup>a</sup> | 3.0 $\pm$ 0.0 <sup>a</sup> |
| 36   | 0.57 $\pm$ 0.14                    | 0.49 $\pm$ 0.10              | 53 $\pm$ 8              | 54 $\pm$ 6              | 4.4 $\pm$ 0.6              | 4.5 $\pm$ 0.5              |
| 37   | 0.31 $\pm$ 0.02                    | 0.28 $\pm$ 0.01              | 56 $\pm$ 4              | 58 $\pm$ 2              | 3.8 $\pm$ 0.2              | 3.8 $\pm$ 0.2              |
| 38   | 0.58 $\pm$ 0.05 <sup>a</sup>       | 0.83 $\pm$ 0.12 <sup>a</sup> | 15 $\pm$ 4              | 18 $\pm$ 2              | 2.7 $\pm$ 0.5              | 4.0 $\pm$ 0.7              |
| 39   | 1.68 $\pm$ 0.36                    | 1.45 $\pm$ 0.31              | 69 $\pm$ 25             | 29 $\pm$ 3              | 8.0 $\pm$ 2.9              | 4.1 $\pm$ 0.5              |
| 40   | 0.37 $\pm$ 0.02                    | 0.45 $\pm$ 0.05              | 56 $\pm$ 2              | 57 $\pm$ 5              | 4.5 $\pm$ 0.2              | 5.9 $\pm$ 0.6              |
| 41   | 1.00 $\pm$ 0.21                    | 1.56 $\pm$ 0.29              | 43 $\pm$ 8              | 50 $\pm$ 11             | 4.4 $\pm$ 0.3              | 5.1 $\pm$ 1.1              |
| 42   | 0.29 $\pm$ 0.02                    | 0.31 $\pm$ 0.02              | 46 $\pm$ 2 <sup>a</sup> | 58 $\pm$ 2 <sup>a</sup> | 3.3 $\pm$ 0.2 <sup>a</sup> | 4.1 $\pm$ 0.1 <sup>a</sup> |
| 44   | 0.65 $\pm$ 0.06                    | 0.75 $\pm$ 0.16              | 44 $\pm$ 14             | 36 $\pm$ 3              | 4.9 $\pm$ 0.5              | 6.3 $\pm$ 0.6              |



Table 9-25. Electrical conductivity and ion content of soil at PVNGS native monitoring sites, preoperational period and 1990 (means  $\pm$  standard errors) (sheet 2 of 2)

| Site | Soluble sodium (ppm)       |                            | Soluble potassium (ppm)    |                            | Chloride (ppm)             |                           |
|------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|---------------------------|
|      | Preoperational             | 1990                       | Preoperational             | 1990                       | Preoperational             | 1990                      |
| 1    | 91 $\pm$ 17                | 166 $\pm$ 45               | 12 $\pm$ 1                 | 12 $\pm$ 2                 | 108 $\pm$ 26               | 398 $\pm$ 160             |
| 2    | 92 $\pm$ 20                | 132 $\pm$ 41               | 23 $\pm$ 3                 | 21 $\pm$ 2                 | 44 $\pm$ 14                | 91 $\pm$ 42               |
| 3    | 1111 $\pm$ 167             | 1833 $\pm$ 388             | 32 $\pm$ 5                 | 32 $\pm$ 3                 | 1164 $\pm$ 210             | 1864 $\pm$ 358            |
| 4    | 10 $\pm$ 1                 | 22 $\pm$ 5                 | 16 $\pm$ 1 <sup>1</sup>    | 13 $\pm$ 1                 | 8.7 $\pm$ 1.0              | 35 $\pm$ 18               |
| 5    | 104 $\pm$ 11               | 117 $\pm$ 19               | 15 $\pm$ 1                 | 16 $\pm$ 3                 | 21 $\pm$ 5                 | 50 $\pm$ 15               |
| 6    | 40 $\pm$ 4                 | 108 $\pm$ 63               | 4.4 $\pm$ 0.5              | 5.0 $\pm$ 0.9              | 12 $\pm$ 4                 | 97 $\pm$ 74               |
| 8    | 174 $\pm$ 35               | 210 $\pm$ 60               | 26 $\pm$ 11                | 16 $\pm$ 2                 | 148 $\pm$ 38               | 203 $\pm$ 58              |
| 9    | 35 $\pm$ 7                 | 35 $\pm$ 6                 | 40 $\pm$ 3                 | 35 $\pm$ 3                 | 31 $\pm$ 7                 | 33 $\pm$ 12               |
| 10   | 30 $\pm$ 4                 | 25 $\pm$ 5                 | 14 $\pm$ 1                 | 11 $\pm$ 1                 | 15 $\pm$ 3                 | 27 $\pm$ 6                |
| 14   | 63 $\pm$ 7 <sup>a</sup>    | 111 $\pm$ 17 <sup>a</sup>  | 93 $\pm$ 6                 | 117 $\pm$ 20               | 38 $\pm$ 11                | 102 $\pm$ 36              |
| 15   | 9.6 $\pm$ 0.9              | 8.3 $\pm$ 1.0              | 25 $\pm$ 3 <sup>a</sup>    | 15 $\pm$ 1 <sup>a</sup>    | 12 $\pm$ 2                 | 14 $\pm$ 1                |
| 16   | 1075 $\pm$ 192             | 1873 $\pm$ 419             | 59 $\pm$ 8                 | 69 $\pm$ 10                | 1048 $\pm$ 205             | 1670 $\pm$ 332            |
| 17   | 11 $\pm$ 1                 | 15 $\pm$ 3                 | 50 $\pm$ 8 <sup>a</sup>    | 78 $\pm$ 8 <sup>a</sup>    | 12 $\pm$ 1 <sup>a</sup>    | 16 $\pm$ 2 <sup>a</sup>   |
| 18   | 13 $\pm$ 1                 | 17 $\pm$ 1                 | 9.6 $\pm$ 0.9              | 7.3 $\pm$ 1.3              | 11 $\pm$ 1 <sup>a</sup>    | 16 $\pm$ 1 <sup>a</sup>   |
| 19   | 23 $\pm$ 4                 | 30 $\pm$ 5                 | 53 $\pm$ 2 <sup>a</sup>    | 75 $\pm$ 8 <sup>a</sup>    | 12 $\pm$ 1 <sup>a</sup>    | 17 $\pm$ 2 <sup>a</sup>   |
| 20   | 86 $\pm$ 8                 | 106 $\pm$ 13               | 33 $\pm$ 3                 | 30 $\pm$ 2                 | 9.3 $\pm$ 0.8 <sup>a</sup> | 20 $\pm$ 2 <sup>a</sup>   |
| 21   | 102 $\pm$ 18               | 152 $\pm$ 43               | 20 $\pm$ 1                 | 24 $\pm$ 2                 | 52 $\pm$ 15                | 106 $\pm$ 37              |
| 22   | 8.1 $\pm$ 0.7              | 13 $\pm$ 2                 | 9.2 $\pm$ 0.8              | 6.8 $\pm$ 0.8 <sup>a</sup> | 9.5 $\pm$ 1.9              | 14 $\pm$ 1                |
| 26   | 16 $\pm$ 1                 | 30 $\pm$ 11                | 8.4 $\pm$ 0.8 <sup>a</sup> | 4.3 $\pm$ 0.6 <sup>a</sup> | 10 $\pm$ 1 <sup>a</sup>    | 25 $\pm$ 4 <sup>a</sup>   |
| 27   | 317 $\pm$ 54               | 300 $\pm$ 72               | 15 $\pm$ 1                 | 16 $\pm$ 2                 | 148 $\pm$ 49               | 149 $\pm$ 57              |
| 33   | 8.9 $\pm$ 2.7              | 6.5 $\pm$ 0.3              | 10 $\pm$ 1                 | 8.5 $\pm$ 0.8              | 12 $\pm$ 4                 | 13 $\pm$ 1                |
| 34   | 12 $\pm$ 1                 | 14 $\pm$ 5                 | 7.1 $\pm$ 0.4              | 8.3 $\pm$ 1.1              | 9.2 $\pm$ 1.1 <sup>a</sup> | 25 $\pm$ 5 <sup>a</sup>   |
| 35   | 7.1 $\pm$ 0.4 <sup>a</sup> | 5.3 $\pm$ 0.4 <sup>a</sup> | 11 $\pm$ 1                 | 10 $\pm$ 2                 | 7.2 $\pm$ 1.0 <sup>a</sup> | 13 $\pm$ 2 <sup>a</sup>   |
| 36   | 56 $\pm$ 18                | 53 $\pm$ 19                | 11 $\pm$ 1                 | 9 $\pm$ 1                  | 54 $\pm$ 24                | 57 $\pm$ 18               |
| 37   | 7.9 $\pm$ 0.8              | 8.5 $\pm$ 1.1              | 6.5 $\pm$ 0.7              | 4.8 $\pm$ 1.0              | 9.8 $\pm$ 1.8              | 13 $\pm$ 1                |
| 38   | 137 $\pm$ 16               | 187 $\pm$ 27               | 3.3 $\pm$ 0.2              | 3.5 $\pm$ 0.5              | 33 $\pm$ 8                 | 60 $\pm$ 15               |
| 39   | 304 $\pm$ 58               | 292 $\pm$ 69               | 9.8 $\pm$ 1.3              | 6.5 $\pm$ 0.5              | 370 $\pm$ 104              | 292 $\pm$ 79              |
| 40   | 12 $\pm$ 1 <sup>a</sup>    | 34 $\pm$ 4 <sup>a</sup>    | 24 $\pm$ 1                 | 21 $\pm$ 4                 | 12 $\pm$ 1 <sup>a</sup>    | 22 $\pm$ 4 <sup>a</sup>   |
| 41   | 179 $\pm$ 45               | 292 $\pm$ 68               | 12 $\pm$ 1                 | 10 $\pm$ 2                 | 177 $\pm$ 51 <sup>a</sup>  | 376 $\pm$ 82 <sup>a</sup> |
| 42   | 11 $\pm$ 1 <sup>a</sup>    | 17 $\pm$ 2 <sup>a</sup>    | 7.4 $\pm$ 0.4              | 8.0 $\pm$ 1.4              | 8.8 $\pm$ 1.5 <sup>a</sup> | 20 $\pm$ 2 <sup>a</sup>   |
| 44   | 74 $\pm$ 15                | 106 $\pm$ 41               | 76 $\pm$ 5                 | 75 $\pm$ 10                | 44 $\pm$ 11                | 90 $\pm$ 31               |

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 1990; it was 20 for all sites except site 44 (n = 16) in preoperational period.





Table 9-26. Deposition, soil, and crop comparison, preoperational period  
(May 1983 through December 1985) and 1990

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

Key: NC, no significant change from preoperational period; F, fallow, no sample; D, decrease; I, increase.

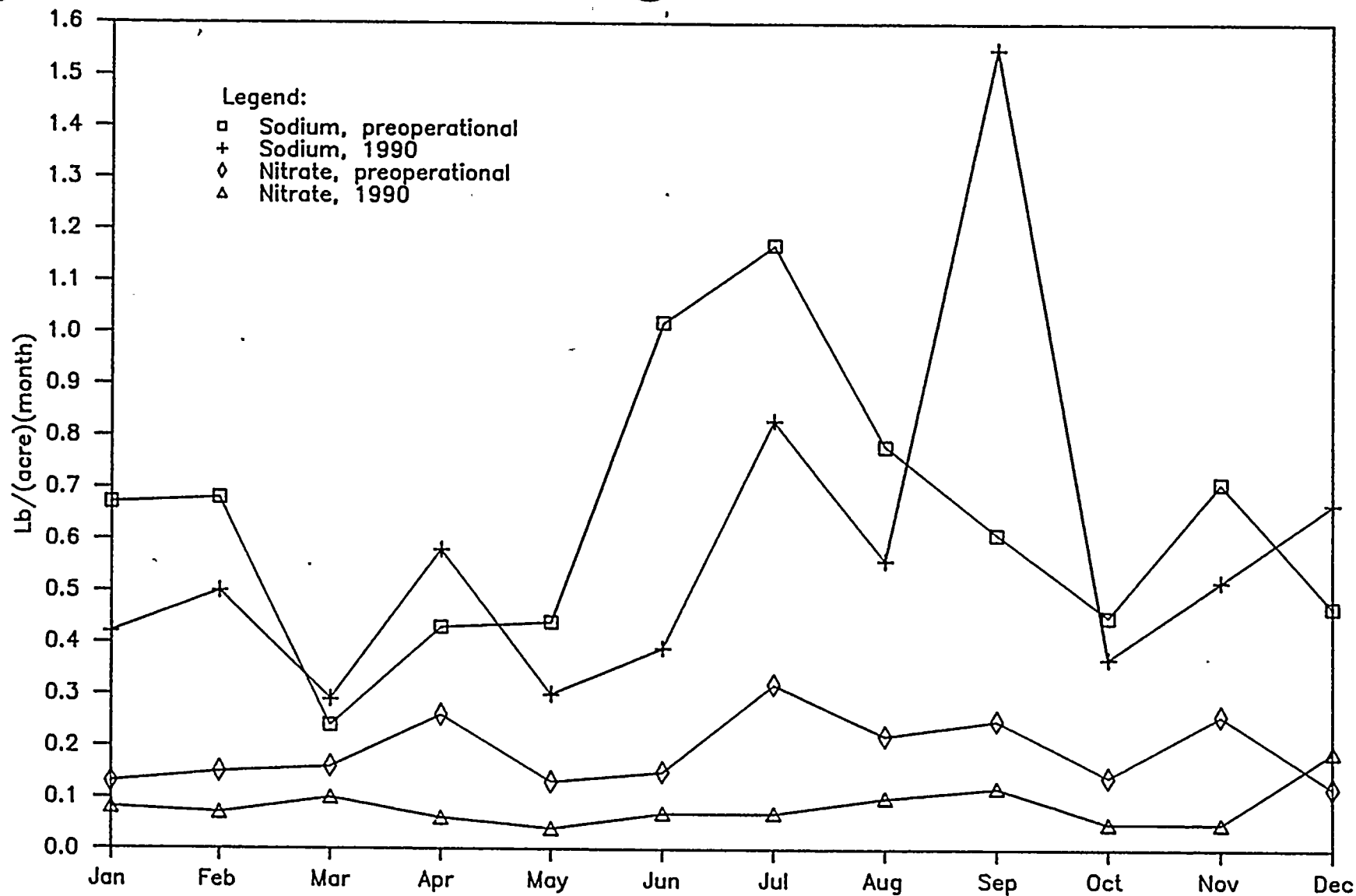


Figure 9-1. Mean monthly deposition of sodium and nitrate at PVNGS agricultural monitoring sites, preoperational period and 1990

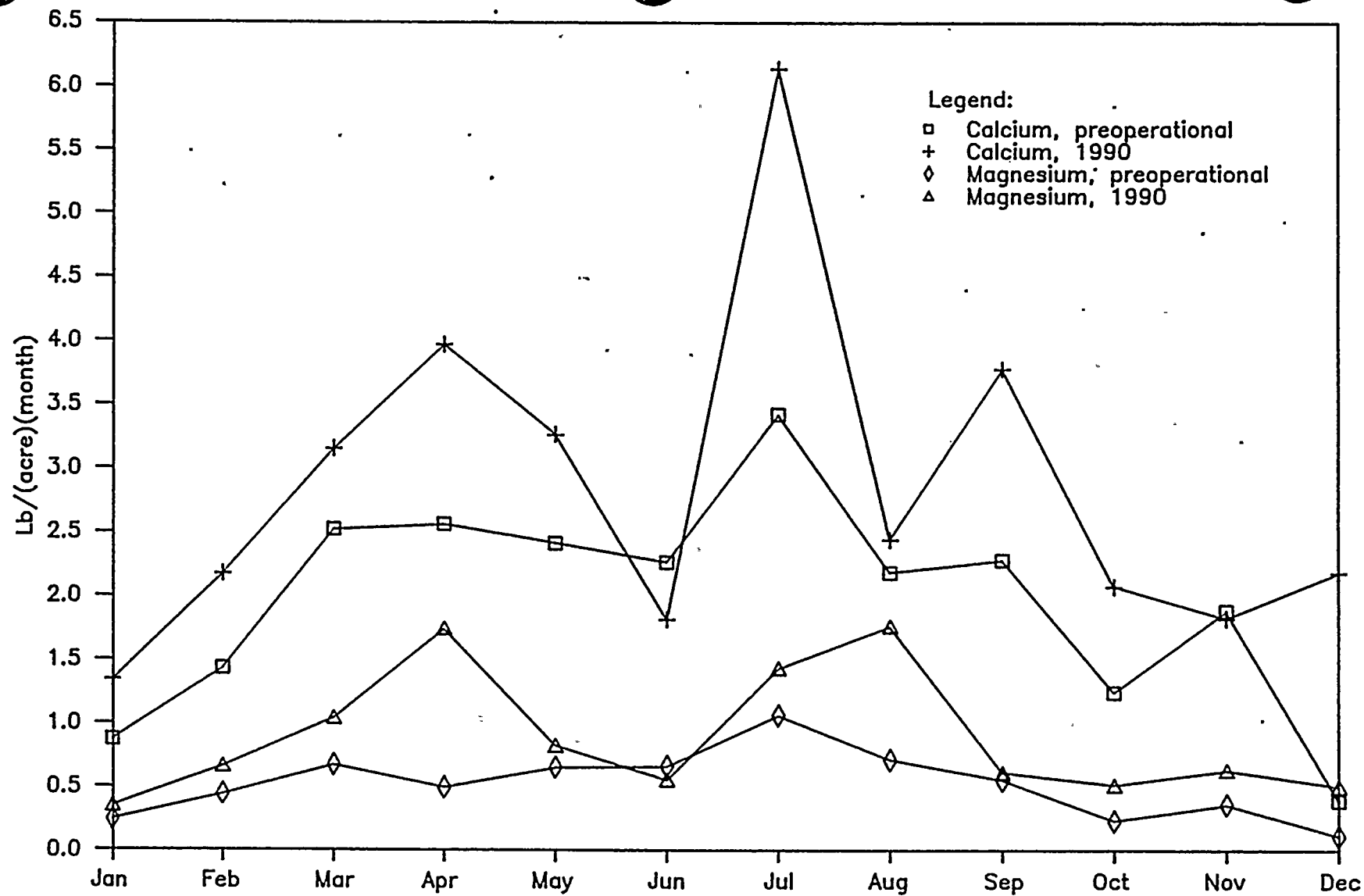


Figure 9-2. Mean monthly deposition of calcium and magnesium at PVNGS agricultural monitoring sites, preoperational period and 1990



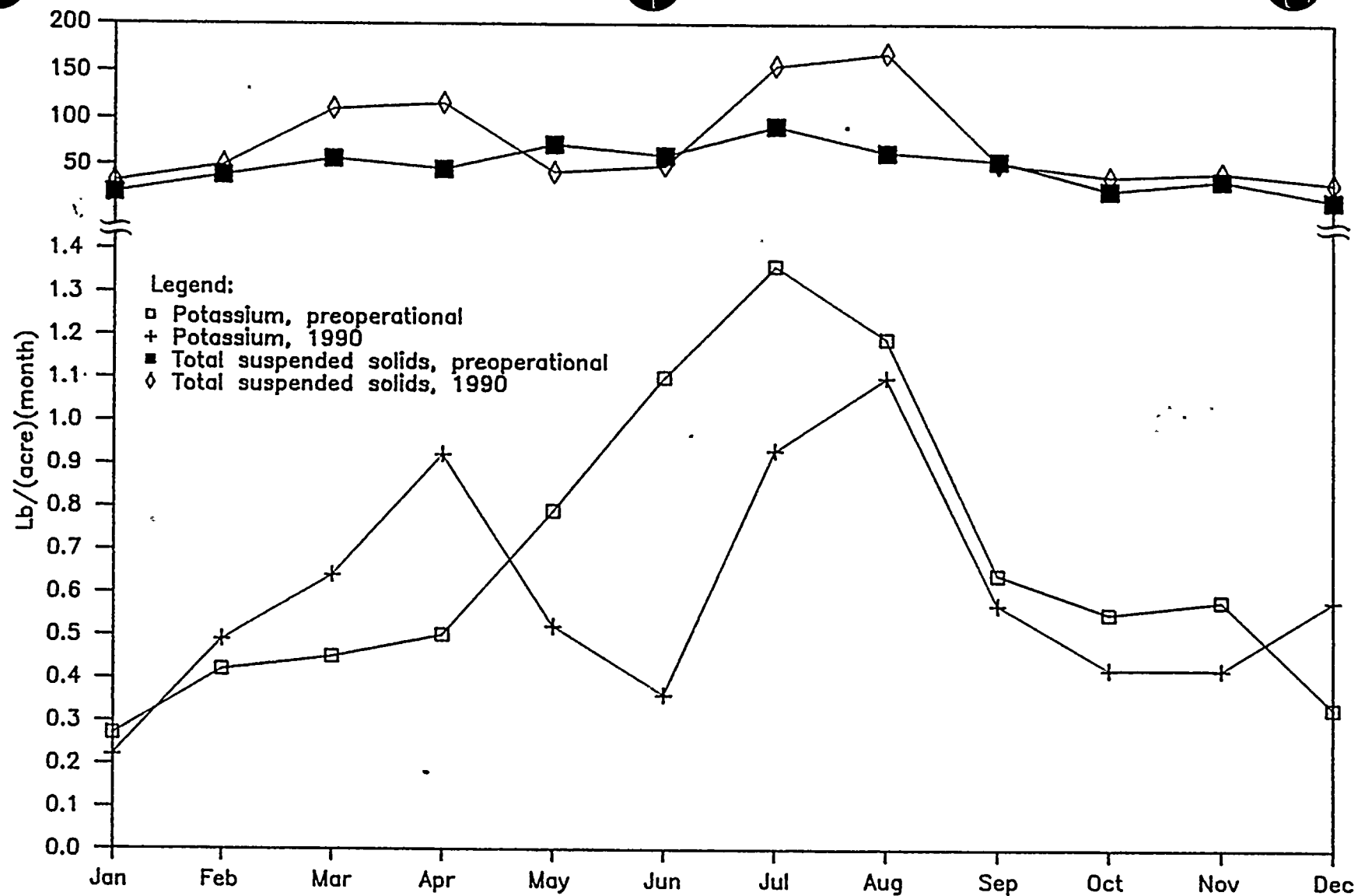


Figure 9-3. Mean monthly deposition of potassium and total suspended solids at PVNGS agricultural monitoring sites, preoperational period and 1990



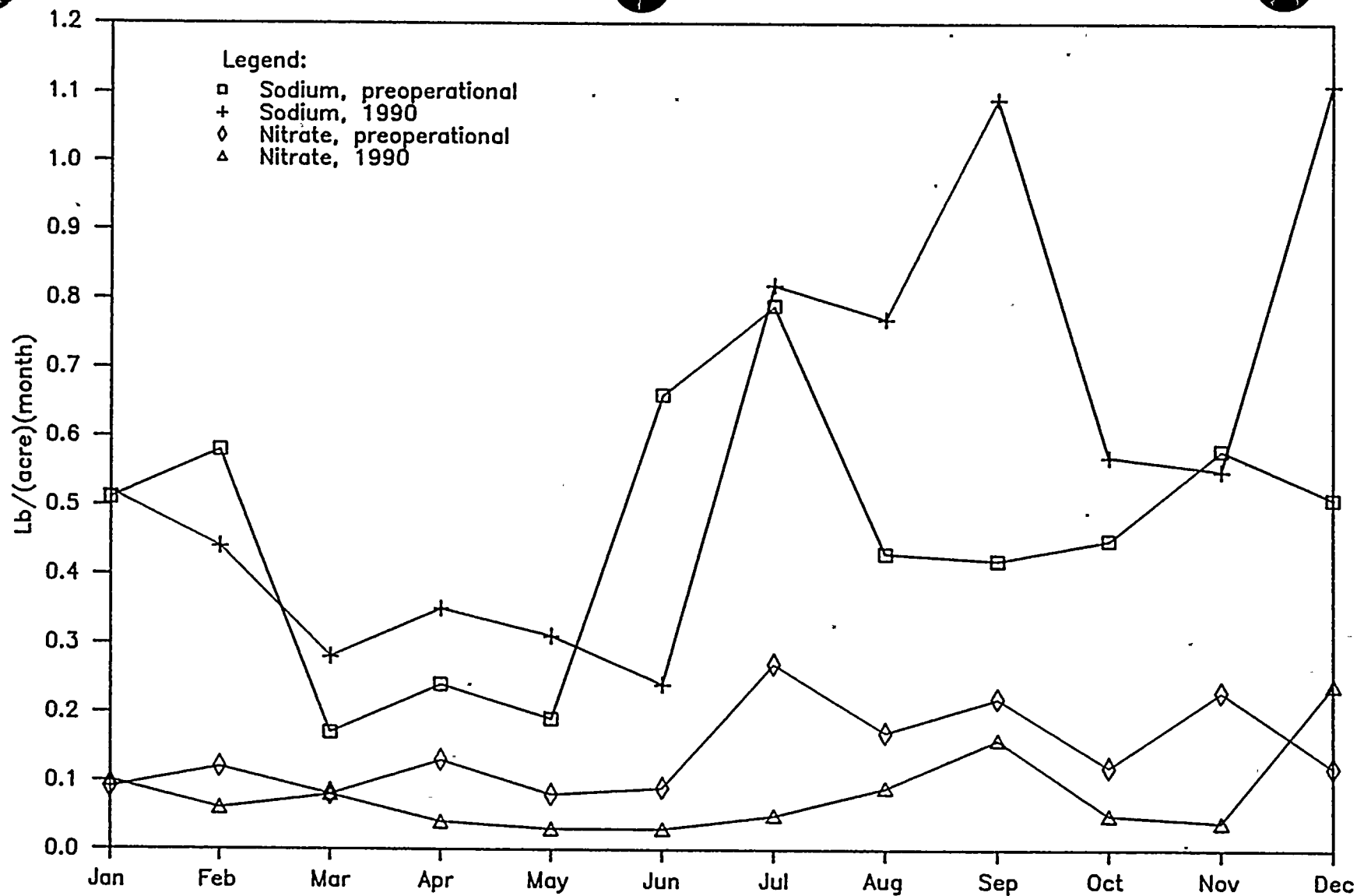


Figure 9-4. Mean monthly deposition of sodium and nitrate at PVNGS native monitoring sites (including sites 80-83), preoperational period and 1990





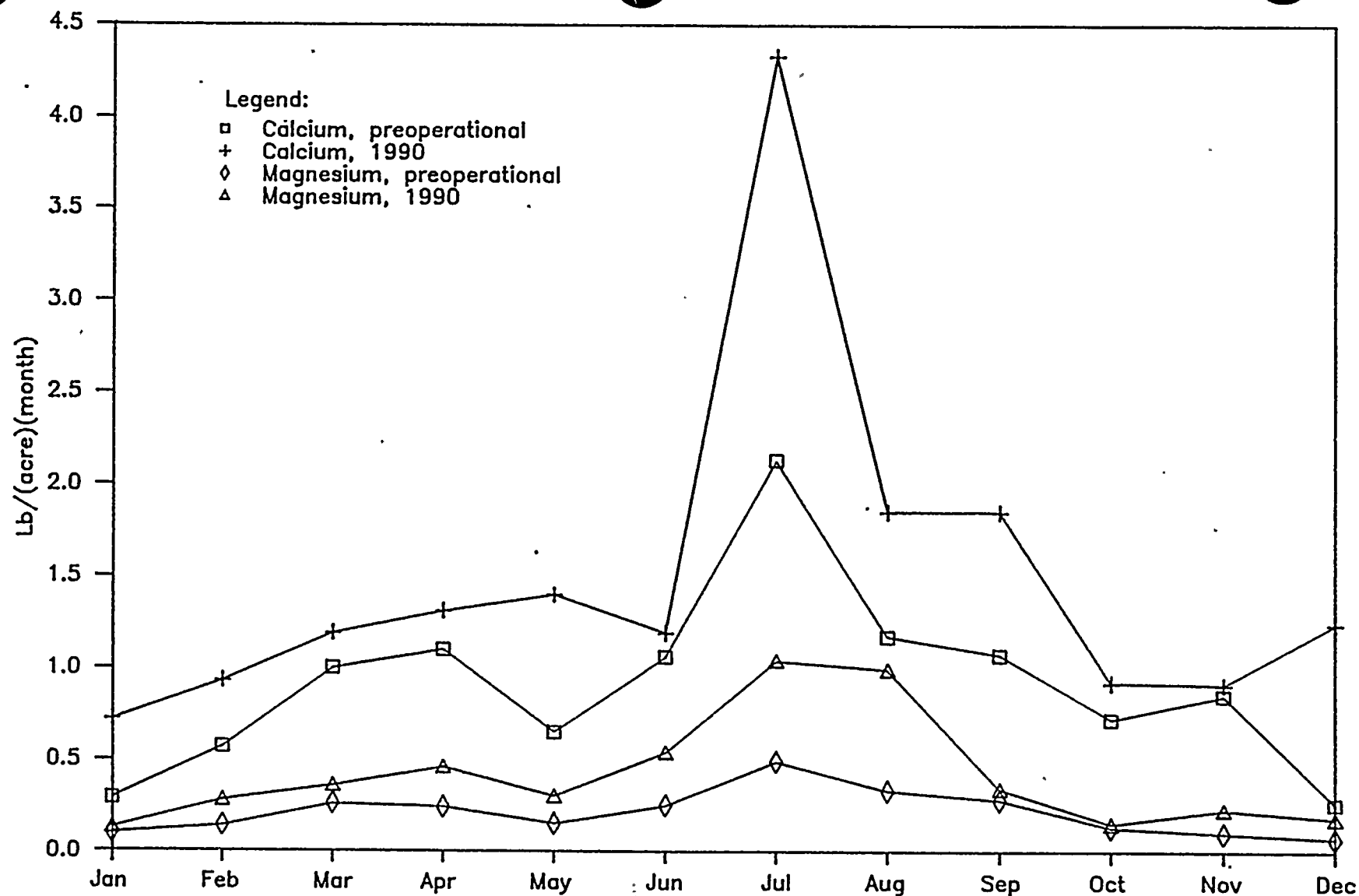


Figure 9-5. Mean monthly deposition of calcium and magnesium at PVNGS native monitoring sites (including sites 80-83), preoperational period and 1990



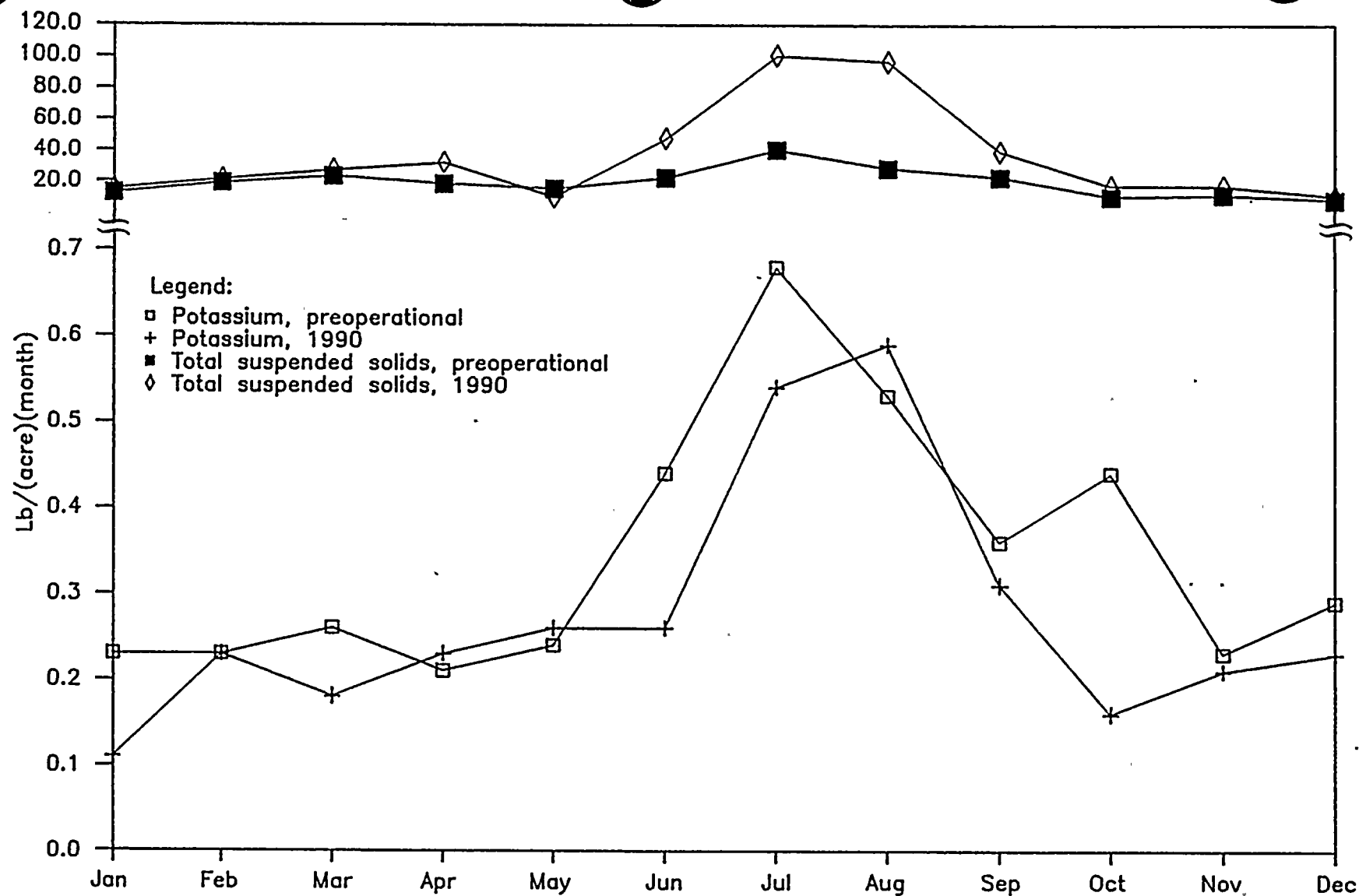


Figure 9-6. Mean monthly deposition of potassium and total suspended solids at PVNGS native monitoring sites (including sites 80-83), preoperational period and 1990



09-6

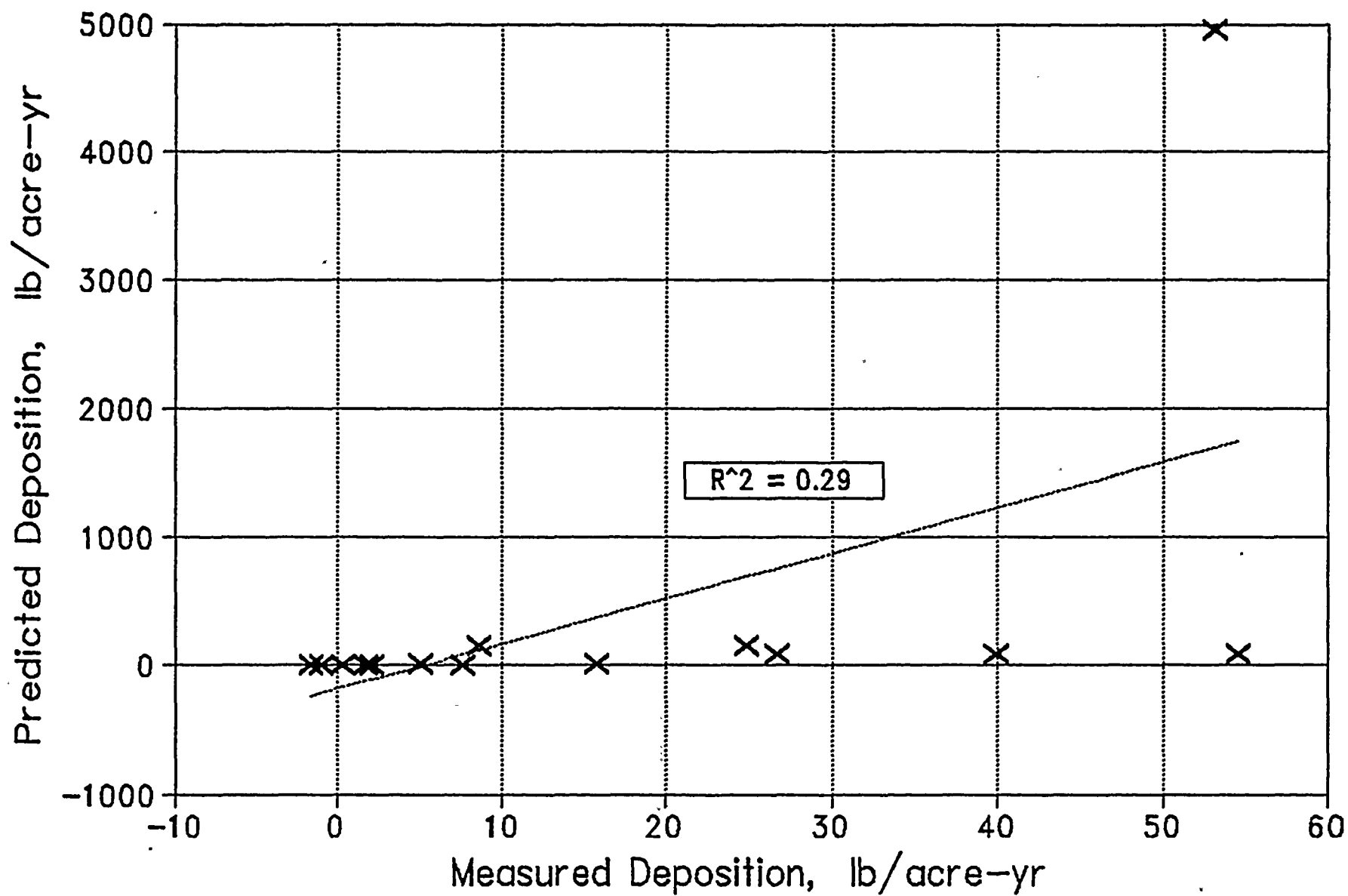


Figure 9-7. Linear regression of predicted versus measured deposition for all onsite locations at PVNGS for 1990



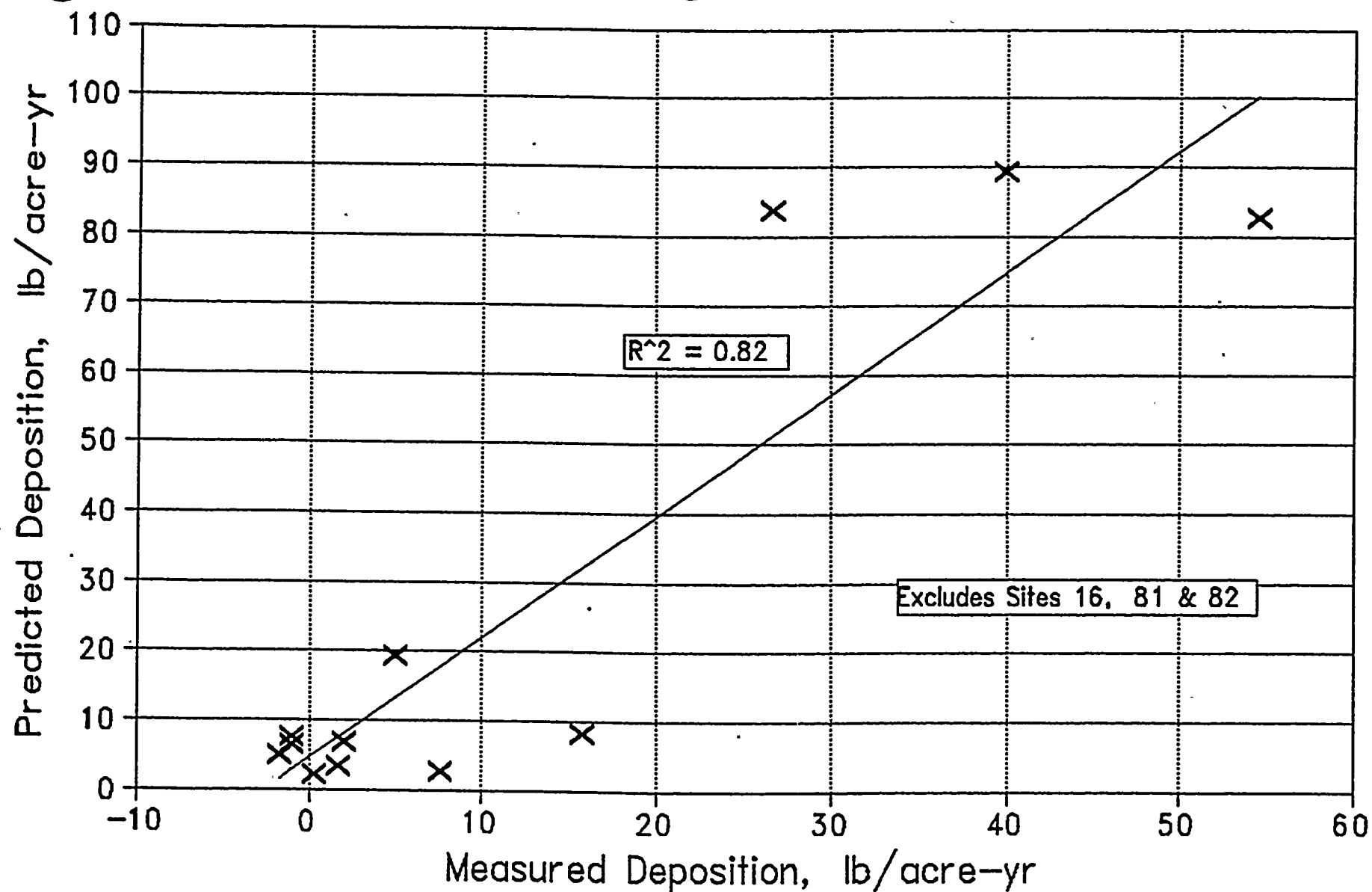


Figure 9-8. Linear regression of predicted versus measured deposition for all onsite locations except sites 16, 81 and 82 at PVNGS for 1990





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## 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 1990  
INPUT DATA - UNIT 1

| JANUARY | DAY | CW CONDUCTIVITY<br>DATA<br>umhos/cm | THERMAL<br>GEN<br>Mwt/d | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------------------|-------------------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     |                                     |                         | Hids                     | Days | Swings | 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 = 0.00075%

TDS ppm =  $0.77 \times \text{Conductivity, umhos/cm}$

Airflow = 64.4 E 06 cfm/ 48 fans

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

COOLING TOWER SOURCE-TERM  
FOR 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| JANUARY | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 2   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 3   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 4   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 5   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 6   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 7   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 8   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 9   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 10  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 11  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 12  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 13  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 14  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 18  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 19  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 20  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 21  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 22  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 23  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 24  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 25  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 26  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 27  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 28  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 29  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 30  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 31  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| AVERAGE |     | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |

ASSUMPTIONS: Drift Rate = 0.00075%  
 TDS ppm = 0.77 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 1990  
 INPUT DATA - UNIT 1

| FEBRUARY DAY | CW CONDUCTIVITY<br>DATA<br>umhos/cm | THERMAL<br>GEN<br>Mwt/d | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|--------------|-------------------------------------|-------------------------|--------------------------|------|--------|-----------------------------|--------|--------|
|              |                                     |                         | Mids                     | Days | Swings | 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      |
| AVERAGE      | 0                                   | 0                       | 0                        | 0    | 0      | 0                           | 0      | 0      |

ASSUMPTIONS: Drift Rate = 0.00075%

TDS ppm = 0.77 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| FEBRUARY DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|--------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|              | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1            | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 2            | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 3            | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 4            | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 5            | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 6            | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 7            | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 8            | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 9            | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 10           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 11           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 12           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 13           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 14           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 15           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 16           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 17           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 18           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 19           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 20           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 21           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 22           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 23           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 24           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 25           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 26           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 27           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| 28           | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| AVERAGE      | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm = 0.77 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 1990  
INPUT DATA - UNIT 1

| MARCH   | DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | DATA<br>unhos/cm | GEN<br>MWt/d | Hids                     | Days | Swings | 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 = 0.00075%  
TDS ppm = 0.77 x Conductivity, unhos/cm  
Airflow = 64.4 E 06 cfm/ 48 fans  
CW Flow = (No pumps x 140,000) + 29,000 gpm



COOLING TOWER SOURCE TERM  
FOR 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| MARCH   | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 2   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 3   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 4   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 5   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 6   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 7   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 8   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 9   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 10  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 11  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 12  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 13  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 14  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 18  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 19  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 20  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 21  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 22  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 23  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 24  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 25  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 26  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 27  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 28  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 29  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 30  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 31  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| AVERAGE |     | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |

ASSUMPTIONS: Drift Rate = 0.00075%  
 TDS ppm = 0.77 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 1990  
INPUT DATA - UNIT 1

| APRIL   | DAY | CW CONDUCTIVITY<br>DATA | THERMAL<br>GEN | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------|----------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | umhos/cm                | MWt/d          | Mids                     | Days | Swings | 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 = 0.00075%  
TDS ppm =  $0.77 \times \text{Conductivity, umhos/cm}$   
Airflow = 64.4 E 06 cfm/ 48 fans  
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM  
FOR 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| APRIL   | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 2   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 3   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 4   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 5   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 6   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 7   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 8   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 9   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 10  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 11  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 12  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 13  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 14  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 18  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 19  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 20  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 21  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 22  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 23  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 24  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 25  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 26  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 27  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 28  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 29  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 30  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| AVERAGE |     | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |

ASSUMPTIONS: Drift Rate = 0.00075%  
 TDS ppm = 0.77 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 1990  
INPUT DATA - UNIT 1

| MAY     | DAY | CW CONDUCTIVITY<br>DATA | THERMAL<br>GEN | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------|----------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | umhos/cm                | MWt/d          | Mids                     | Days | Swings | 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 = 0.00075%  
TDS ppm = 0.77 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| MAY     | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 2   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 3   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 4   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 5   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 6   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 7   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 8   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 9   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 10  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 11  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 12  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 13  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 14  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 18  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 19  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 20  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 21  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 22  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 23  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 24  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 25  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 26  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 27  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 28  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 29  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 30  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 31  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| AVERAGE |     | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm = 0.77 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 1990  
INPUT DATA - UNIT 1

| JUNE    | DAY | CW CONDUCTIVITY<br>DATA<br>umhos/cm | THERMAL<br>GEN<br>Mwt/d | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------------------|-------------------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     |                                     |                         | Mids                     | Days | Swings | 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 = 0.00075%  
TDS ppm = 0.77 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| JUNE    | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 2   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 3   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 4   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 5   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 6   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 7   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 8   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 9   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 10  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 11  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 12  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 13  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 14  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 18  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 19  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 20  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 21  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 22  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 23  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 24  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 25  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 26  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 27  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 28  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 29  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 30  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| AVERAGE |     | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm =  $0.77 \times \text{Conductivity, umhos/cm}$   
Airflow = 64.4 E 06 cfm/ 48 fans  
CW Flow = (No pumps x 140,000) + 29,000 gpm

COOLING TOWER SOURCE TERM  
FOR 1990  
INPUT DATA - UNIT 1

| JULY    | DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | DATA<br>umhos/cm | GEN<br>Hwt/d | Hids                     | Days | Swings | Trw 01                      | Trw 02 | Trw 03 |
|         | 1   | 7,480            | 0            | 2                        | 2    | 2      | 46                          | 35     | 18     |
|         | 2   | 8,120            | 0            | 2                        | 2    | 2      | 48                          | 29     | 19     |
|         | 3   | 8,995            | 0            | 2                        | 2    | 2      | 48                          | 30     | 21     |
|         | 4   | 9,465            | 0            | 2                        | 2    | 2      | 48                          | 30     | 19     |
|         | 5   | 10,495           | 0            | 2                        | 2    | 3      | 48                          | 30     | 0      |
|         | 6   | 11,540           | 14,309       | 3                        | 3    | 4      | 48                          | 27     | 0      |
|         | 7   | 11,250           | 27,187       | 4                        | 4    | 4      | 45                          | 27     | 5      |
|         | 8   | 12,100           | 52,276       | 4                        | 4    | 4      | 47                          | 31     | 28     |
|         | 9   | 14,950           | 62,800       | 4                        | 4    | 4      | 48                          | 48     | 33     |
|         | 10  | 16,900           | 62,782       | 4                        | 4    | 4      | 48                          | 48     | 34     |
|         | 11  | 19,100           | 74,766       | 4                        | 4    | 4      | 48                          | 48     | 36     |
|         | 12  | 21,750           | 84,506       | 4                        | 4    | 4      | 48                          | 48     | 42     |
|         | 13  | 22,350           | 90,917       | 4                        | 4    | 4      | 45                          | 48     | 45     |
|         | 14  | 24,350           | 90,416       | 4                        | 4    | 4      | 45                          | 48     | 45     |
|         | 15  | 25,850           | 90,343       | 4                        | 4    | 4      | 45                          | 48     | 45     |
|         | 16  | 23,750           | 90,379       | 4                        | 4    | 4      | 46                          | 48     | 45     |
|         | 17  | 24,195           | 90,598       | 4                        | 4    | 4      | 48                          | 48     | 46     |
|         | 18  | 24,800           | 90,936       | 4                        | 4    | 4      | 48                          | 48     | 47     |
|         | 19  | 24,600           | 90,908       | 4                        | 4    | 4      | 48                          | 48     | 46     |
|         | 20  | 24,350           | 90,407       | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 21  | 25,750           | 87,570       | 4                        | 4    | 4      | 48                          | 48     | 44     |
|         | 22  | 24,900           | 90,881       | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 23  | 24,750           | 90,853       | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 24  | 24,450           | 90,835       | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 25  | 24,150           | 90,908       | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 26  | 24,450           | 90,771       | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 27  | 23,650           | 90,781       | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 28  | 23,600           | 90,698       | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 29  | 23,850           | 90,881       | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 30  | 26,450           | 90,890       | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 31  | 24,800           | 90,890       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| AVERAGE |     | 19,909           | 67,725       | 4                        | 4    | 4      | 47                          | 43     | 36     |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm = 0.76 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| JULY    | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 9,706                  | 7,385  | 3,798  | 0.00E+00        | 5,685            | 309,000        | 1.593      | 0.076  |
|         | 2   | 10,128                 | 6,119  | 4,009  | 0.00E+00        | 6,171            | 309,000        | 1.545      | 0.080  |
|         | 3   | 10,128                 | 6,330  | 4,431  | 0.00E+00        | 6,836            | 309,000        | 1.593      | 0.091  |
|         | 4   | 10,128                 | 6,330  | 4,009  | 0.00E+00        | 7,193            | 309,000        | 1.561      | 0.094  |
|         | 5   | 10,128                 | 6,330  | 0      | 0.00E+00        | 7,976            | 355,667        | 1.445      | 0.096  |
|         | 6   | 10,128                 | 5,697  | 0      | 3.39E+07        | 8,770            | 495,667        | 1.936      | 0.142  |
|         | 7   | 9,495                  | 5,697  | 1,055  | 6.44E+07        | 8,550            | 589,000        | 2.362      | 0.169  |
|         | 8   | 9,917                  | 6,541  | 5,908  | 1.24E+08        | 9,196            | 589,000        | 3.252      | 0.250  |
|         | 9   | 10,128                 | 10,128 | 6,963  | 1.49E+08        | 11,362           | 589,000        | 3.957      | 0.375  |
|         | 10  | 10,128                 | 10,128 | 7,174  | 1.49E+08        | 12,844           | 589,000        | 3.988      | 0.427  |
|         | 11  | 10,128                 | 10,128 | 7,596  | 1.77E+08        | 14,516           | 589,000        | 4.049      | 0.491  |
|         | 12  | 10,128                 | 10,128 | 8,862  | 2.00E+08        | 16,530           | 589,000        | 4.233      | 0.584  |
|         | 13  | 9,495                  | 10,128 | 9,495  | 2.15E+08        | 16,986           | 589,000        | 4.233      | 0.600  |
|         | 14  | 9,495                  | 10,128 | 9,495  | 2.14E+08        | 18,506           | 589,000        | 4.233      | 0.654  |
|         | 15  | 9,495                  | 10,128 | 9,495  | 2.14E+08        | 19,646           | 589,000        | 4.233      | 0.694  |
|         | 16  | 9,706                  | 10,128 | 9,495  | 2.14E+08        | 18,050           | 589,000        | 4.264      | 0.642  |
|         | 17  | 10,128                 | 10,128 | 9,706  | 2.15E+08        | 18,388           | 589,000        | 4.356      | 0.668  |
|         | 18  | 10,128                 | 10,128 | 9,917  | 2.16E+08        | 18,848           | 589,000        | 4.387      | 0.690  |
|         | 19  | 10,128                 | 10,128 | 9,706  | 2.15E+08        | 18,696           | 589,000        | 4.356      | 0.680  |
|         | 20  | 10,128                 | 10,128 | 9,495  | 2.14E+08        | 18,506           | 589,000        | 4.325      | 0.668  |
|         | 21  | 10,128                 | 10,128 | 9,284  | 2.08E+08        | 19,570           | 589,000        | 4.295      | 0.701  |
|         | 22  | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 18,924           | 589,000        | 4.325      | 0.683  |
|         | 23  | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 18,810           | 589,000        | 4.325      | 0.679  |
|         | 24  | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 18,582           | 589,000        | 4.325      | 0.671  |
|         | 25  | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 18,354           | 589,000        | 4.325      | 0.663  |
|         | 26  | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 18,582           | 589,000        | 4.325      | 0.671  |
|         | 27  | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 17,974           | 589,000        | 4.325      | 0.649  |
|         | 28  | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 17,936           | 589,000        | 4.325      | 0.647  |
|         | 29  | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 18,126           | 589,000        | 4.325      | 0.654  |
|         | 30  | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 20,102           | 589,000        | 4.325      | 0.726  |
|         | 31  | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 18,848           | 589,000        | 4.325      | 0.680  |
| AVERAGE |     | 10,012                 | 9,141  | 7,576  | 1.61E+08        | 15,131           | 542,333        | 3.660      | 0.503  |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm = 0.76 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 1990  
INPUT DATA - UNIT 1

| AUGUST  | DAY | CW CONDUCTIVITY<br>DATA | THERMAL<br>GEN | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------|----------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | umhos/cm                | MWt/d          | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 25,400                  | 90,917         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 2   | 27,300                  | 90,954         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 3   | 27,400                  | 90,945         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 4   | 28,000                  | 90,963         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 5   | 28,700                  | 90,926         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 6   | 28,900                  | 90,945         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 7   | 29,650                  | 90,936         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 8   | 28,550                  | 90,917         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 9   | 28,200                  | 90,890         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 10  | 26,600                  | 90,926         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 11  | 27,850                  | 90,689         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 12  | 27,400                  | 90,926         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 13  | 26,750                  | 90,926         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 14  | 24,750                  | 90,361         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 15  | 24,050                  | 0              | 4                        | 2    | 2      | 16                          | 16     | 15     |
|         | 16  | 24,400                  | 0              | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 17  | 25,100                  | 0              | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 18  | 23,950                  | 0              | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 19  | 23,300                  | 10,242         | 2                        | 2    | 3      | 5                           | 6      | 0      |
|         | 20  | 23,300                  | 56,535         | 4                        | 4    | 4      | 41                          | 35     | 31     |
|         | 21  | 24,150                  | 90,607         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 22  | 25,350                  | 90,735         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 23  | 26,300                  | 90,288         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 24  | 25,100                  | 90,872         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 25  | 27,650                  | 90,908         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 26  | 28,700                  | 90,881         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 27  | 28,200                  | 90,817         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 28  | 28,600                  | 90,835         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 29  | 28,000                  | 90,790         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 30  | 27,950                  | 90,872         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 31  | 26,000                  | 90,945         | 4                        | 4    | 4      | 48                          | 48     | 48     |
| AVERAGE |     | 26,631                  | 75,405         | 4                        | 4    | 4      | 41                          | 41     | 39     |

ASSUMPTIONS: Drift Rate = 0.00075%  
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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| AUGUST  | DAY | Airflow / Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|-------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                  | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 10,128                  | 10,128 | 9,495  | 2.15E+08        | 18,796           | 589,000        | 4.325      | 0.678  |
|         | 2   | 10,128                  | 10,128 | 9,495  | 2.16E+08        | 20,202           | 589,000        | 4.325      | 0.729  |
|         | 3   | 10,128                  | 10,128 | 9,495  | 2.16E+08        | 20,276           | 589,000        | 4.325      | 0.732  |
|         | 4   | 10,128                  | 10,128 | 9,495  | 2.16E+08        | 20,720           | 589,000        | 4.325      | 0.748  |
|         | 5   | 10,128                  | 10,128 | 9,495  | 2.15E+08        | 21,238           | 589,000        | 4.325      | 0.767  |
|         | 6   | 10,128                  | 10,128 | 9,495  | 2.16E+08        | 21,386           | 589,000        | 4.325      | 0.772  |
|         | 7   | 10,128                  | 10,128 | 9,495  | 2.16E+08        | 21,941           | 589,000        | 4.325      | 0.792  |
|         | 8   | 10,128                  | 10,128 | 9,495  | 2.15E+08        | 21,127           | 589,000        | 4.325      | 0.763  |
|         | 9   | 10,128                  | 10,128 | 9,495  | 2.15E+08        | 20,868           | 589,000        | 4.325      | 0.753  |
|         | 10  | 10,128                  | 10,128 | 9,495  | 2.15E+08        | 19,684           | 589,000        | 4.325      | 0.711  |
|         | 11  | 10,128                  | 10,128 | 9,495  | 2.15E+08        | 20,609           | 589,000        | 4.325      | 0.744  |
|         | 12  | 10,128                  | 10,128 | 9,495  | 2.15E+08        | 20,276           | 589,000        | 4.325      | 0.732  |
|         | 13  | 10,128                  | 10,128 | 9,495  | 2.15E+08        | 19,795           | 589,000        | 4.325      | 0.715  |
|         | 14  | 10,128                  | 10,128 | 9,495  | 2.14E+08        | 18,315           | 589,000        | 4.325      | 0.661  |
|         | 15  | 3,376                   | 3,376  | 3,165  | 0.00E+00        | 17,797           | 402,333        | 0.985      | 0.146  |
|         | 16  | 0                       | 0      | 0      | 0.00E+00        | 18,056           | 309,000        | 0.000      | 0.000  |
|         | 17  | 0                       | 0      | 0      | 0.00E+00        | 18,574           | 309,000        | 0.000      | 0.000  |
|         | 18  | 0                       | 0      | 0      | 0.00E+00        | 17,723           | 309,000        | 0.000      | 0.000  |
|         | 19  | 1,055                   | 1,266  | 0      | 2.43E+07        | 17,242           | 355,667        | 0.204      | 0.029  |
|         | 20  | 8,651                   | 7,385  | 6,541  | 1.34E+08        | 17,242           | 589,000        | 3.282      | 0.472  |
|         | 21  | 10,128                  | 10,128 | 10,128 | 2.15E+08        | 17,871           | 589,000        | 4.418      | 0.659  |
|         | 22  | 10,128                  | 10,128 | 10,128 | 2.15E+08        | 18,759           | 589,000        | 4.418      | 0.692  |
|         | 23  | 10,128                  | 10,128 | 10,128 | 2.14E+08        | 19,462           | 589,000        | 4.418      | 0.717  |
|         | 24  | 10,128                  | 10,128 | 10,128 | 2.15E+08        | 18,574           | 589,000        | 4.418      | 0.685  |
|         | 25  | 10,128                  | 10,128 | 10,128 | 2.15E+08        | 20,461           | 589,000        | 4.418      | 0.754  |
|         | 26  | 10,128                  | 10,128 | 10,128 | 2.15E+08        | 21,238           | 589,000        | 4.418      | 0.783  |
|         | 27  | 10,128                  | 10,128 | 10,128 | 2.15E+08        | 20,868           | 589,000        | 4.418      | 0.769  |
|         | 28  | 10,128                  | 10,128 | 10,128 | 2.15E+08        | 21,164           | 589,000        | 4.418      | 0.780  |
|         | 29  | 10,128                  | 10,128 | 10,128 | 2.15E+08        | 20,720           | 589,000        | 4.418      | 0.764  |
|         | 30  | 10,128                  | 10,128 | 10,128 | 2.15E+08        | 20,683           | 589,000        | 4.418      | 0.762  |
|         | 31  | 10,128                  | 10,128 | 10,128 | 2.16E+08        | 19,240           | 589,000        | 4.418      | 0.709  |
| AVERAGE |     | 8,590                   | 8,556  | 8,195  | 1.79E+08        | 19,707           | 548,355        | 3.665      | 0.613  |

ASSUMPTIONS: Drift Rate = 0.00075%  
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 1990

INPUT DATA - UNIT 1

| SEPTEMBER DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------------|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|               | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
| 1             | 26,600           | 90,999       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 2             | 27,050           | 90,926       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 3             | 26,000           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 4             | 25,800           | 90,881       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 5             | 25,250           | 90,908       | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 6             | 25,800           | 90,926       | 4                        | 4    | 4      | 46                          | 48     | 48     |
| 7             | 26,350           | 91,018       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 8             | 29,200           | 90,872       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 9             | 29,650           | 90,863       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 10            | 29,650           | 90,963       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 11            | 30,100           | 90,926       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 12            | 31,450           | 90,972       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 13            | 31,200           | 45,071       | 4                        | 4    | 3      | 40                          | 38     | 40     |
| 14            | 29,850           | 0            | 2                        | 2    | 1      | 0                           | 0      | 0      |
| 15            | 27,000           | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
| 16            | 26,450           | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
| 17            | 25,500           | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
| 18            | 24,400           | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
| 19            | 23,950           | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
| 20            | 24,700           | 0            | 0                        | 2    | 2      | 0                           | 0      | 0      |
| 21            | 26,450           | 0            | 2                        | 2    | 2      | 0                           | 0      | 0      |
| 22            | 26,100           | 0            | 2                        | 2    | 2      | 0                           | 0      | 0      |
| 23            | 25,250           | 0            | 2                        | 2    | 2      | 0                           | 0      | 0      |
| 24            | 24,400           | 3,894        | 2                        | 2    | 2      | 0                           | 32     | 0      |
| 25            | 26,800           | 57,967       | 2                        | 4    | 4      | 32                          | 48     | 8      |
| 26            | 25,350           | 90,826       | 4                        | 4    | 4      | 48                          | 48     | 46     |
| 27            | 26,250           | 90,999       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 28            | 27,000           | 90,899       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 29            | 27,500           | 90,926       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 30            | 28,800           | 91,027       | 4                        | 4    | 4      | 48                          | 48     | 48     |

|         |        |        |   |   |   |    |    |    |
|---------|--------|--------|---|---|---|----|----|----|
| AVERAGE | 26,995 | 55,095 | 3 | 3 | 3 | 29 | 31 | 29 |
|---------|--------|--------|---|---|---|----|----|----|

ASSUMPTIONS: Drift Rate = 0.00075%

TDS ppm = 0.75 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| SEPTEMBER DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|               | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1             | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,950           | 589,000        | 4.418      | 0.735  |
| 2             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,288           | 589,000        | 4.418      | 0.748  |
| 3             | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,500           | 589,000        | 4.418      | 0.719  |
| 4             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,350           | 589,000        | 4.418      | 0.713  |
| 5             | 9,495                  | 10,128 | 10,128 | 2.15E+08        | 18,938           | 589,000        | 4.325      | 0.684  |
| 6             | 9,706                  | 10,128 | 10,128 | 2.15E+08        | 19,350           | 589,000        | 4.356      | 0.703  |
| 7             | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 19,763           | 589,000        | 4.325      | 0.713  |
| 8             | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 21,900           | 589,000        | 4.325      | 0.791  |
| 9             | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 22,238           | 589,000        | 4.325      | 0.803  |
| 10            | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 22,238           | 589,000        | 4.325      | 0.803  |
| 11            | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 22,575           | 589,000        | 4.325      | 0.815  |
| 12            | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 23,588           | 589,000        | 4.325      | 0.851  |
| 13            | 8,440                  | 8,018  | 8,440  | 1.07E+08        | 23,400           | 542,333        | 3.333      | 0.651  |
| 14            | 0                      | 0      | 0      | 0.00E+00        | 22,388           | 262,333        | 0.000      | 0.000  |
| 15            | 0                      | 0      | 0      | 0.00E+00        | 20,250           | 29,000         | 0.000      | 0.000  |
| 16            | 0                      | 0      | 0      | 0.00E+00        | 19,838           | 29,000         | 0.000      | 0.000  |
| 17            | 0                      | 0      | 0      | 0.00E+00        | 19,125           | 29,000         | 0.000      | 0.000  |
| 18            | 0                      | 0      | 0      | 0.00E+00        | 18,300           | 29,000         | 0.000      | 0.000  |
| 19            | 0                      | 0      | 0      | 0.00E+00        | 17,963           | 29,000         | 0.000      | 0.000  |
| 20            | 0                      | 0      | 0      | 0.00E+00        | 18,525           | 215,667        | 0.000      | 0.000  |
| 21            | 0                      | 0      | 0      | 0.00E+00        | 19,838           | 309,000        | 0.000      | 0.000  |
| 22            | 0                      | 0      | 0      | 0.00E+00        | 19,575           | 309,000        | 0.000      | 0.000  |
| 23            | 0                      | 0      | 0      | 0.00E+00        | 18,938           | 309,000        | 0.000      | 0.000  |
| 24            | 0                      | 6,752  | 0      | 9.23E+06        | 18,300           | 309,000        | 0.515      | 0.079  |
| 25            | 6,752                  | 10,128 | 1,688  | 1.37E+08        | 20,100           | 495,667        | 2.272      | 0.381  |
| 26            | 10,128                 | 10,128 | 9,706  | 2.15E+08        | 19,013           | 589,000        | 4.356      | 0.691  |
| 27            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,688           | 589,000        | 4.418      | 0.726  |
| 28            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,250           | 589,000        | 4.418      | 0.746  |
| 29            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,625           | 589,000        | 4.418      | 0.760  |
| 30            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 21,600           | 589,000        | 4.418      | 0.796  |
| AVERAGE       | 6,210                  | 6,443  | 6,063  | 1.31E+08        | 20,246           | 430,333        | 2.682      | 0.464  |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm = 0.75 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 1990

INPUT DATA - UNIT 1

| OCTOBER | DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 30,050           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 2   | 29,400           | 69,212       | 4                        | 4    | 4      | 48                          | 48     | 24     |
|         | 3   | 30,000           | 90,853       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 4   | 29,850           | 90,936       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 5   | 29,700           | 90,881       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 6   | 29,500           | 90,917       | 4                        | 4    | 4      | 48                          | 48     | 47     |
|         | 7   | 30,450           | 90,899       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 8   | 29,600           | 90,963       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 9   | 28,950           | 91,036       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 10  | 27,250           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 11  | 27,100           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 12  | 27,250           | 91,009       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 13  | 27,650           | 90,954       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 14  | 27,250           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 15  | 26,750           | 90,908       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 16  | 27,250           | 90,926       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 17  | 28,450           | 90,899       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 18  | 27,050           | 90,753       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 19  | 27,800           | 90,872       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 20  | 26,550           | 90,917       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 21  | 26,000           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 22  | 23,300           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 23  | 25,850           | 90,954       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 24  | 25,800           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 25  | 25,850           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 26  | 25,900           | 90,936       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 27  | 25,900           | 90,908       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 28  | 25,800           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 29  | 26,400           | 90,863       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 30  | 25,650           | 90,899       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 31  | 26,300           | 90,844       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| AVERAGE |     | 27,439           | 90,229       | 4                        | 4    | 4      | 48                          | 48     | 47     |

ASSUMPTIONS: Drift Rate = 0.00075%

TDS ppm = 0.75 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| OCTOBER | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 22,538           | 589,000        | 4.418      | 0.831  |
|         | 2   | 10,128                 | 10,128 | 5,064  | 1.64E+08        | 22,050           | 589,000        | 3.681      | 0.677  |
|         | 3   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 22,500           | 589,000        | 4.418      | 0.829  |
|         | 4   | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 22,388           | 589,000        | 4.418      | 0.825  |
|         | 5   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 22,275           | 589,000        | 4.418      | 0.821  |
|         | 6   | 10,128                 | 10,128 | 9,917  | 2.15E+08        | 22,125           | 589,000        | 4.387      | 0.810  |
|         | 7   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 22,838           | 589,000        | 4.418      | 0.842  |
|         | 8   | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 22,200           | 589,000        | 4.418      | 0.818  |
|         | 9   | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 21,713           | 589,000        | 4.418      | 0.800  |
|         | 10  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,438           | 589,000        | 4.418      | 0.753  |
|         | 11  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,325           | 589,000        | 4.418      | 0.749  |
|         | 12  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,438           | 589,000        | 4.418      | 0.753  |
|         | 13  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,738           | 589,000        | 4.418      | 0.764  |
|         | 14  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,438           | 589,000        | 4.418      | 0.753  |
|         | 15  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,063           | 589,000        | 4.418      | 0.740  |
|         | 16  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,438           | 589,000        | 4.418      | 0.753  |
|         | 17  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 21,338           | 589,000        | 4.418      | 0.787  |
|         | 18  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,288           | 589,000        | 4.418      | 0.748  |
|         | 19  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,850           | 589,000        | 4.418      | 0.769  |
|         | 20  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,913           | 589,000        | 4.418      | 0.734  |
|         | 21  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,500           | 589,000        | 4.418      | 0.719  |
|         | 22  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 17,475           | 589,000        | 4.418      | 0.644  |
|         | 23  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,388           | 589,000        | 4.418      | 0.715  |
|         | 24  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,350           | 589,000        | 4.418      | 0.713  |
|         | 25  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,388           | 589,000        | 4.418      | 0.715  |
|         | 26  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,425           | 589,000        | 4.418      | 0.716  |
|         | 27  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,425           | 589,000        | 4.418      | 0.716  |
|         | 28  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,350           | 589,000        | 4.418      | 0.713  |
|         | 29  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,800           | 589,000        | 4.418      | 0.730  |
|         | 30  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,238           | 589,000        | 4.418      | 0.709  |
|         | 31  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,725           | 589,000        | 4.418      | 0.727  |
| AVERAGE |     | 10,128                 | 10,128 | 9,958  | 2.14E+08        | 20,579           | 589,000        | 4.393      | 0.754  |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm = 0.75 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 1990

INPUT DATA - UNIT 1

| NOVEMBER DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|--------------|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|              | DATA<br>umhos/cm | GEN<br>Hwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
| 1            | 25,950           | 90,844       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 2            | 25,700           | 90,954       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 3            | 24,650           | 90,954       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 4            | 24,700           | 90,926       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 5            | 24,400           | 90,926       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 6            | 24,450           | 90,926       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 7            | 25,100           | 90,954       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 8            | 25,000           | 90,936       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 9            | 23,200           | 90,963       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 10           | 24,400           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 11           | 25,400           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 12           | 25,700           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 13           | 26,200           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 14           | 25,600           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 15           | 25,500           | 91,018       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 16           | 25,500           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 17           | 25,900           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 18           | 25,700           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 19           | 24,200           | 90,999       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 20           | 25,800           | 91,045       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 21           | 24,100           | 91,054       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 22           | 23,500           | 90,954       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 23           | 23,900           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 24           | 23,100           | 67,114       | 4                        | 4    | 4      | 48                          | 39     | 24     |
| 25           | 23,600           | 90,890       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 26           | 25,700           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 27           | 21,300           | 90,915       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 28           | 21,000           | 90,963       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 29           | 21,400           | 90,954       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 30           | 22,700           | 90,981       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| -----        |                  |              |                          |      |        |                             |        |        |
| AVERAGE      | 24,445           | 90,165       | 4                        | 4    | 4      | 48                          | 48     | 47     |

ASSUMPTIONS: Drift Rate = 0.00075%

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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| NOVEMBER DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|--------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|              | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 22,317           | 589,000        | 4.418      | 0.823  |
| 2            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 22,102           | 589,000        | 4.418      | 0.815  |
| 3            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 21,199           | 589,000        | 4.418      | 0.781  |
| 4            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 21,242           | 589,000        | 4.418      | 0.783  |
| 5            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,984           | 589,000        | 4.418      | 0.774  |
| 6            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 21,027           | 589,000        | 4.418      | 0.775  |
| 7            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 21,586           | 589,000        | 4.418      | 0.796  |
| 8            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 21,500           | 589,000        | 4.418      | 0.793  |
| 9            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,952           | 589,000        | 4.418      | 0.736  |
| 10           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,984           | 589,000        | 4.418      | 0.774  |
| 11           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 21,844           | 589,000        | 4.418      | 0.805  |
| 12           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 22,102           | 589,000        | 4.418      | 0.815  |
| 13           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 22,532           | 589,000        | 4.418      | 0.831  |
| 14           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 22,016           | 589,000        | 4.418      | 0.812  |
| 15           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 21,930           | 589,000        | 4.418      | 0.808  |
| 16           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 21,930           | 589,000        | 4.418      | 0.808  |
| 17           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 22,274           | 589,000        | 4.418      | 0.821  |
| 18           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 22,102           | 589,000        | 4.418      | 0.815  |
| 19           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,812           | 589,000        | 4.418      | 0.767  |
| 20           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 22,188           | 589,000        | 4.418      | 0.818  |
| 21           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,726           | 589,000        | 4.418      | 0.764  |
| 22           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,210           | 589,000        | 4.418      | 0.745  |
| 23           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,554           | 589,000        | 4.418      | 0.758  |
| 24           | 10,128                 | 8,229  | 5,064  | 1.59E+08        | 19,866           | 589,000        | 3.405      | 0.565  |
| 25           | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 20,296           | 589,000        | 4.325      | 0.733  |
| 26           | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 22,102           | 589,000        | 4.325      | 0.798  |
| 27           | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 18,318           | 589,000        | 4.325      | 0.661  |
| 28           | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 18,060           | 589,000        | 4.325      | 0.652  |
| 29           | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 18,404           | 589,000        | 4.325      | 0.664  |
| 30           | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 19,522           | 589,000        | 4.325      | 0.705  |
| AVERAGE      | 10,128                 | 10,065 | 9,833  | 2.14E+08        | 21,023           | 589,000        | 4.365      | 0.766  |

ASSUMPTIONS: Drift Rate = 0.00075%  
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 1990

INPUT DATA - UNIT 1

| DECEMBER DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|--------------|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|              | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
| 1            | 22,200           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 2            | 21,900           | 91,072       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 3            | 23,400           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 4            | 23,300           | 90,988       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 5            | 22,500           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 6            | 22,500           | 90,999       | 4                        | 4    | 4      | 48                          | 48     | 46     |
| 7            | 24,100           | 90,954       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 8            | 23,800           | 91,018       | 4                        | 4    | 4      | 48                          | 48     | 46     |
| 9            | 23,500           | 91,018       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 10           | 21,800           | 90,999       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 11           | 21,800           | 90,936       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 12           | 24,000           | 90,917       | 4                        | 4    | 4      | 48                          | 48     | 42     |
| 13           | 24,500           | 90,917       | 4                        | 4    | 4      | 48                          | 48     | 43     |
| 14           | 22,500           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 15           | 21,900           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 16           | 23,100           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 17           | 21,300           | 84,378       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 18           | 21,400           | 90,908       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 19           | 21,500           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 20           | 21,200           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 21           | 21,100           | 90,917       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 22           | 22,600           | 90,999       | 4                        | 4    | 4      | 48                          | 48     | 46     |
| 23           | 22,800           | 91,027       | 4                        | 4    | 4      | 42                          | 42     | 40     |
| 24           | 22,600           | 90,945       | 4                        | 4    | 4      | 43                          | 44     | 44     |
| 25           | 20,500           | 90,999       | 4                        | 4    | 4      | 42                          | 42     | 47     |
| 26           | 23,400           | 90,963       | 4                        | 4    | 4      | 42                          | 47     | 44     |
| 27           | 23,400           | 91,027       | 4                        | 4    | 4      | 48                          | 48     | 43     |
| 28           | 24,700           | 90,635       | 4                        | 4    | 4      | 48                          | 48     | 43     |
| 29           | 24,700           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 42     |
| 30           | 24,800           | 90,890       | 4                        | 4    | 4      | 48                          | 48     | 42     |
| 31           | 23,600           | 90,933       | 4                        | 4    | 4      | 48                          | 48     | 42     |
| AVERAGE      | 22,787           | 90,745       | 4                        | 4    | 4      | 47                          | 47     | 45     |

ASSUMPTIONS: Drift Rate = 0.00075%

TDS ppm = 0.75 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 1

| DECEMBER DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|--------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|              | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1            | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 16,650           | 589,000        | 4.325      | 0.601  |
| 2            | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 16,425           | 589,000        | 4.325      | 0.593  |
| 3            | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 17,550           | 589,000        | 4.325      | 0.633  |
| 4            | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 17,475           | 589,000        | 4.325      | 0.631  |
| 5            | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 16,875           | 589,000        | 4.325      | 0.609  |
| 6            | 10,128                 | 10,128 | 9,706  | 2.16E+08        | 16,875           | 589,000        | 4.356      | 0.613  |
| 7            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 18,075           | 589,000        | 4.418      | 0.666  |
| 8            | 10,128                 | 10,128 | 9,706  | 2.16E+08        | 17,850           | 589,000        | 4.356      | 0.649  |
| 9            | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 17,625           | 589,000        | 4.325      | 0.636  |
| 10           | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 16,350           | 589,000        | 4.325      | 0.590  |
| 11           | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 16,350           | 589,000        | 4.325      | 0.590  |
| 12           | 10,128                 | 10,128 | 8,862  | 2.15E+08        | 18,000           | 589,000        | 4.233      | 0.636  |
| 13           | 10,128                 | 10,128 | 9,073  | 2.15E+08        | 18,375           | 589,000        | 4.264      | 0.654  |
| 14           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 16,875           | 589,000        | 4.418      | 0.622  |
| 15           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 16,425           | 589,000        | 4.418      | 0.605  |
| 16           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 17,325           | 589,000        | 4.418      | 0.639  |
| 17           | 10,128                 | 10,128 | 10,128 | 2.00E+08        | 15,975           | 589,000        | 4.418      | 0.589  |
| 18           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,050           | 589,000        | 4.418      | 0.592  |
| 19           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 16,125           | 589,000        | 4.418      | 0.594  |
| 20           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 15,900           | 589,000        | 4.418      | 0.586  |
| 21           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,825           | 589,000        | 4.418      | 0.583  |
| 22           | 10,128                 | 10,128 | 9,706  | 2.16E+08        | 16,950           | 589,000        | 4.356      | 0.616  |
| 23           | 8,862                  | 8,862  | 8,440  | 2.16E+08        | 17,100           | 589,000        | 3.804      | 0.543  |
| 24           | 9,073                  | 9,284  | 9,284  | 2.16E+08        | 16,950           | 589,000        | 4.019      | 0.568  |
| 25           | 8,862                  | 8,862  | 9,917  | 2.16E+08        | 15,375           | 589,000        | 4.019      | 0.516  |
| 26           | 8,862                  | 9,917  | 9,284  | 2.16E+08        | 17,550           | 589,000        | 4.080      | 0.598  |
| 27           | 10,128                 | 10,128 | 9,073  | 2.16E+08        | 17,550           | 589,000        | 4.264      | 0.624  |
| 28           | 10,128                 | 10,128 | 9,073  | 2.15E+08        | 18,525           | 589,000        | 4.264      | 0.659  |
| 29           | 10,128                 | 10,128 | 8,862  | 2.16E+08        | 18,525           | 589,000        | 4.233      | 0.654  |
| 30           | 10,128                 | 10,128 | 8,862  | 2.15E+08        | 18,600           | 589,000        | 4.233      | 0.657  |
| 31           | 10,128                 | 10,128 | 8,862  | 2.00E+08        | 17,700           | 589,000        | 4.233      | 0.625  |
| AVERAGE      | 9,971                  | 10,012 | 9,543  | 2.15E+08        | 17,090           | 589,000        | 4.293      | 0.612  |

ASSUMPTIONS: Drift Rate = 0.00075%

TDS ppm = 0.75 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 1990  
INPUT DATA - UNIT 2

| JANUARY | DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 16,750           | 90,662       | 4                        | 4    | 4      | 36                          | 45     | 48     |
|         | 2   | 17,500           | 90,680       | 4                        | 4    | 4      | 36                          | 45     | 48     |
|         | 3   | 17,600           | 90,680       | 4                        | 4    | 4      | 36                          | 45     | 48     |
|         | 4   | 16,200           | 90,525       | 4                        | 4    | 4      | 36                          | 45     | 48     |
|         | 5   | 16,050           | 90,516       | 4                        | 4    | 4      | 39                          | 45     | 48     |
|         | 6   | 16,500           | 90,534       | 4                        | 4    | 4      | 39                          | 45     | 48     |
|         | 7   | 15,550           | 90,580       | 4                        | 4    | 4      | 39                          | 45     | 48     |
|         | 8   | 17,450           | 90,543       | 4                        | 4    | 4      | 39                          | 45     | 48     |
|         | 9   | 17,100           | 90,480       | 4                        | 4    | 4      | 39                          | 45     | 48     |
|         | 10  | 17,700           | 90,498       | 4                        | 4    | 4      | 39                          | 45     | 48     |
|         | 11  | 17,600           | 90,516       | 4                        | 4    | 4      | 39                          | 45     | 48     |
|         | 12  | 17,200           | 90,543       | 4                        | 4    | 4      | 42                          | 45     | 48     |
|         | 13  | 18,000           | 90,616       | 4                        | 4    | 4      | 42                          | 45     | 48     |
|         | 14  | 17,000           | 90,580       | 4                        | 4    | 4      | 42                          | 45     | 48     |
|         | 15  | 18,000           | 90,370       | 4                        | 4    | 4      | 42                          | 45     | 48     |
|         | 16  | 14,750           | 90,662       | 4                        | 4    | 4      | 42                          | 45     | 48     |
|         | 17  | 16,850           | 90,553       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 18  | 16,500           | 90,644       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 19  | 15,900           | 90,625       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 20  | 15,450           | 90,452       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 21  | 15,800           | 90,607       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 22  | 16,950           | 90,525       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 23  | 16,350           | 90,543       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 24  | 16,300           | 90,635       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 25  | 16,450           | 90,370       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 26  | 16,350           | 90,480       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 27  | 16,300           | 89,814       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 28  | 16,850           | 90,525       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 29  | 12,475           | 90,452       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 30  | 15,100           | 90,461       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 31  | 14,000           | 90,397       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| AVERAGE |     | 16,406           | 90,518       | 4                        | 4    | 4      | 43                          | 46     | 48     |

ASSUMPTIONS: Drift Rate = 0.00075%  
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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| JANUARY | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 7,596                  | 9,495  | 10,128 | 2.15E+08        | 15,913           | 589,000        | 3.957      | 0.525  |
|         | 2   | 7,596                  | 9,495  | 10,128 | 2.15E+08        | 16,625           | 589,000        | 3.957      | 0.549  |
|         | 3   | 7,596                  | 9,495  | 10,128 | 2.15E+08        | 16,720           | 589,000        | 3.957      | 0.552  |
|         | 4   | 7,596                  | 9,495  | 10,128 | 2.15E+08        | 15,390           | 589,000        | 3.957      | 0.508  |
|         | 5   | 8,229                  | 9,495  | 10,128 | 2.15E+08        | 15,248           | 589,000        | 4.049      | 0.515  |
|         | 6   | 8,229                  | 9,495  | 10,128 | 2.15E+08        | 15,675           | 589,000        | 4.049      | 0.530  |
|         | 7   | 8,229                  | 9,495  | 10,128 | 2.15E+08        | 14,773           | 589,000        | 4.049      | 0.499  |
|         | 8   | 8,229                  | 9,495  | 10,128 | 2.15E+08        | 16,578           | 589,000        | 4.049      | 0.560  |
|         | 9   | 8,229                  | 9,495  | 10,128 | 2.14E+08        | 16,245           | 589,000        | 4.049      | 0.549  |
|         | 10  | 8,229                  | 9,495  | 10,128 | 2.14E+08        | 16,815           | 589,000        | 4.049      | 0.568  |
|         | 11  | 8,229                  | 9,495  | 10,128 | 2.15E+08        | 16,720           | 589,000        | 4.049      | 0.565  |
|         | 12  | 8,862                  | 9,495  | 10,128 | 2.15E+08        | 16,340           | 589,000        | 4.141      | 0.565  |
|         | 13  | 8,862                  | 9,495  | 10,128 | 2.15E+08        | 17,100           | 589,000        | 4.141      | 0.591  |
|         | 14  | 8,862                  | 9,495  | 10,128 | 2.15E+08        | 16,150           | 589,000        | 4.141      | 0.558  |
|         | 15  | 8,862                  | 9,495  | 10,128 | 2.14E+08        | 17,100           | 589,000        | 4.141      | 0.591  |
|         | 16  | 8,862                  | 9,495  | 10,128 | 2.15E+08        | 14,013           | 589,000        | 4.141      | 0.484  |
|         | 17  | 9,495                  | 9,495  | 10,128 | 2.15E+08        | 16,008           | 589,000        | 4.233      | 0.566  |
|         | 18  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,675           | 589,000        | 4.325      | 0.566  |
|         | 19  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,105           | 589,000        | 4.325      | 0.545  |
|         | 20  | 10,128                 | 10,128 | 10,128 | 2.14E+08        | 14,678           | 589,000        | 4.418      | 0.541  |
|         | 21  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,010           | 589,000        | 4.418      | 0.553  |
|         | 22  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,103           | 589,000        | 4.418      | 0.594  |
|         | 23  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,533           | 589,000        | 4.418      | 0.573  |
|         | 24  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,485           | 589,000        | 4.418      | 0.571  |
|         | 25  | 10,128                 | 10,128 | 10,128 | 2.14E+08        | 15,628           | 589,000        | 4.418      | 0.576  |
|         | 26  | 10,128                 | 10,128 | 10,128 | 2.14E+08        | 15,533           | 589,000        | 4.418      | 0.573  |
|         | 27  | 10,128                 | 10,128 | 10,128 | 2.13E+08        | 15,485           | 589,000        | 4.418      | 0.571  |
|         | 28  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,008           | 589,000        | 4.418      | 0.590  |
|         | 29  | 10,128                 | 10,128 | 10,128 | 2.14E+08        | 11,851           | 589,000        | 4.418      | 0.437  |
|         | 30  | 10,128                 | 10,128 | 10,128 | 2.14E+08        | 14,345           | 589,000        | 4.418      | 0.529  |
|         | 31  | 10,128                 | 10,128 | 10,128 | 2.14E+08        | 13,300           | 589,000        | 4.418      | 0.490  |
| AVERAGE |     | 9,148                  | 9,740  | 10,128 | 2.15E+08        | 15,585           | 589,000        | 4.219      | 0.548  |

ASSUMPTIONS: Drift Rate = 0.00075%  
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 1990  
INPUT DATA - UNIT 2

| FEBRUARY DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|--------------|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|              | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
| 1            | 13,395           | 90,735       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 2            | 17,900           | 90,489       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 3            | 17,450           | 90,498       | 4                        | 4    | 4      | 48                          | 36     | 48     |
| 4            | 15,950           | 90,562       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 5            | 14,300           | 90,662       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 6            | 12,950           | 90,552       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 7            | 14,550           | 90,543       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 8            | 13,500           | 90,562       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 9            | 15,750           | 90,480       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 10           | 15,500           | 90,598       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 11           | 15,800           | 90,480       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 12           | 15,300           | 90,461       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 13           | 15,350           | 90,598       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 14           | 15,300           | 90,598       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 15           | 15,100           | 90,534       | 4                        | 4    | 4      | 36                          | 48     | 48     |
| 16           | 12,775           | 90,753       | 4                        | 4    | 4      | 18                          | 48     | 48     |
| 17           | 15,950           | 90,680       | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 18           | 14,705           | 90,489       | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 19           | 16,500           | 90,434       | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 20           | 15,150           | 90,334       | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 21           | 16,450           | 90,461       | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 22           | 16,150           | 89,558       | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 23           | 12,800           | 73,571       | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 24           | 12,550           | 0            | 2                        | 2    | 2      | 0                           | 0      | 0      |
| 25           | 14,050           | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
| 26           | 14,050           | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
| 27           | 14,150           | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
| 28           | 14,250           | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
| AVERAGE      | 14,915           | 73,737       | 3                        | 3    | 3      | 37                          | 39     | 39     |

ASSUMPTIONS: Drift Rate = 0.00075%  
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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| FEBRUARY DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|--------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|              | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 11,520           | 589,000        | 4.418      | 0.425  |
| 2            | 10,128                 | 10,128 | 10,128 | 2.14E+08        | 15,394           | 589,000        | 4.418      | 0.567  |
| 3            | 10,128                 | 7,596  | 10,128 | 2.14E+08        | 15,007           | 589,000        | 4.049      | 0.507  |
| 4            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 13,717           | 589,000        | 4.418      | 0.506  |
| 5            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 12,298           | 589,000        | 4.418      | 0.453  |
| 6            | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 11,137           | 589,000        | 4.325      | 0.402  |
| 7            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 12,513           | 589,000        | 4.418      | 0.461  |
| 8            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 11,610           | 589,000        | 4.418      | 0.428  |
| 9            | 10,128                 | 10,128 | 10,128 | 2.14E+08        | 13,545           | 589,000        | 4.418      | 0.499  |
| 10           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 13,330           | 589,000        | 4.418      | 0.491  |
| 11           | 10,128                 | 10,128 | 10,128 | 2.14E+08        | 13,588           | 589,000        | 4.418      | 0.501  |
| 12           | 10,128                 | 10,128 | 10,128 | 2.14E+08        | 13,158           | 589,000        | 4.418      | 0.485  |
| 13           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 13,201           | 589,000        | 4.418      | 0.487  |
| 14           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 13,158           | 589,000        | 4.418      | 0.485  |
| 15           | 7,596                  | 10,128 | 10,128 | 2.15E+08        | 12,986           | 589,000        | 4.049      | 0.439  |
| 16           | 3,798                  | 10,128 | 10,128 | 2.15E+08        | 10,987           | 589,000        | 3.497      | 0.321  |
| 17           | 9,495                  | 10,128 | 10,128 | 2.15E+08        | 13,717           | 589,000        | 4.325      | 0.495  |
| 18           | 9,495                  | 10,128 | 10,128 | 2.14E+08        | 12,646           | 589,000        | 4.325      | 0.456  |
| 19           | 9,495                  | 10,128 | 10,128 | 2.14E+08        | 14,190           | 589,000        | 4.325      | 0.512  |
| 20           | 9,495                  | 10,128 | 10,128 | 2.14E+08        | 13,029           | 589,000        | 4.325      | 0.470  |
| 21           | 9,495                  | 10,128 | 10,128 | 2.14E+08        | 14,147           | 589,000        | 4.325      | 0.511  |
| 22           | 9,495                  | 10,128 | 10,128 | 2.12E+08        | 13,889           | 589,000        | 4.325      | 0.501  |
| 23           | 9,495                  | 10,128 | 10,128 | 1.74E+08        | 11,008           | 589,000        | 4.325      | 0.397  |
| 24           | 0                      | 0      | 0      | 0.00E+00        | 10,793           | 309,000        | 0.000      | 0.000  |
| 25           | 0                      | 0      | 0      | 0.00E+00        | 12,083           | 29,000         | 0.000      | 0.000  |
| 26           | 0                      | 0      | 0      | 0.00E+00        | 12,083           | 29,000         | 0.000      | 0.000  |
| 27           | 0                      | 0      | 0      | 0.00E+00        | 12,169           | 29,000         | 0.000      | 0.000  |
| 28           | 0                      | 0      | 0      | 0.00E+00        | 12,255           | 29,000         | 0.000      | 0.000  |
| AVERAGE      | 7,845                  | 8,206  | 8,319  | 1.75E+08        | 12,827           | 499,000        | 3.543      | 0.386  |

ASSUMPTIONS: Drift Rate = 0.00075%  
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 1990  
INPUT DATA - UNIT 2

| MARCH   | DAY | CW CONDUCTIVITY<br>DATA | THERMAL<br>GEN | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------|----------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | umhos/cm                | MWt/d          | Mids                     | Days | Swings | 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 = 0.00075%

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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| MARCH   | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 2   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 3   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 4   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 5   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 6   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 7   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 8   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 9   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 10  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 11  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 12  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 13  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 14  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 18  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 19  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 20  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 21  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 22  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 23  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 24  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 25  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 26  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 27  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 28  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 29  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 30  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 31  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| AVERAGE |     | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |

ASSUMPTIONS: Drift Rate = 0.00075%  
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 1990  
INPUT DATA - UNIT 2

| APRIL   | DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | 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 = 0.00075%  
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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| APRIL   | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 2   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 3   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 4   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 5   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 6   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 7   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 8   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 9   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 10  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 11  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 12  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 13  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 14  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 18  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 19  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 20  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 21  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 22  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 23  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 24  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 25  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 26  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 27  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 28  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 29  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 30  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| AVERAGE |     | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm =  $0.79 \times \text{Conductivity, umhos/cm}$   
Airflow =  $64.4 \text{ E } 06 \text{ cfm/ 48 fans}$   
CW Flow =  $(\text{No pumps} \times 140,000) + 29,000 \text{ gpm}$

COOLING TOWER SOURCE TERM  
FOR 1990  
INPUT DATA - UNIT 2

| MAY     | DAY | CW CONDUCTIVITY<br>DATA | THERMAL<br>GEN | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------|----------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | umhos/cm                | MWt/d          | Mids                     | Days | Swings | 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 = 0.00075%

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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| MAY     | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 2   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 3   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 4   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 5   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 6   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 7   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 8   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 9   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 10  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 11  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 12  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 13  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 14  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 18  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 19  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 20  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 21  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 22  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 23  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 24  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 25  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 26  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 27  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 28  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 29  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 30  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 31  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| AVERAGE |     | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |

ASSUMPTIONS: Drift Rate = 0.00075%  
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 1990  
INPUT DATA - UNIT 2

| JUNE    | DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | DATA<br>umhos/cm | GEN<br>MWt/d | Mids                     | Days | Swings | 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 = 0.00075%  
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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| JUNE    | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 2   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 3   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 4   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 5   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 6   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 7   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 8   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 9   | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 10  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 11  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 12  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 13  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 14  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 18  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 19  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 20  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 21  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 22  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 23  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 24  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 25  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 26  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 27  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 28  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 29  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
|         | 30  | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |
| AVERAGE |     | 0                      | 0      | 0      | 0.00E+00        | 0                | 29,000         | 0.000      | 0.000  |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm =  $0.79 \times \text{Conductivity, umhos/cm}$   
Airflow =  $64.4 \text{ E } 06 \text{ cfm/ 48 fans}$   
CW Flow =  $(\text{No pumps} \times 140,000) + 29,000 \text{ gpm}$

COOLING TOWER SOURCE TERM  
FOR 1990  
INPUT DATA - UNIT 2

| JULY    | DAY | CW CONDUCTIVITY<br>DATA<br>umhos/cm | THERMAL<br>GEN<br>MWt/d | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------------------|-------------------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     |                                     |                         | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 8,105                               | 0                       | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 2   | 8,025                               | 0                       | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 3   | 8,005                               | 0                       | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 4   | 8,000                               | 0                       | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 5   | 8,085                               | 0                       | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 6   | 8,640                               | 0                       | 2                        | 2    | 2      | 2                           | 0      | 0      |
|         | 7   | 8,225                               | 0                       | 2                        | 2    | 2      | 3                           | 0      | 1      |
|         | 8   | 8,255                               | 0                       | 2                        | 2    | 2      | 3                           | 0      | 3      |
|         | 9   | 8,635                               | 0                       | 2                        | 2    | 2      | 1                           | 0      | 0      |
|         | 10  | 8,770                               | 0                       | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 11  | 8,900                               | 0                       | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 12  | 9,090                               | 0                       | 2                        | 2    | 2      | 2                           | 0      | 0      |
|         | 13  | 8,855                               | 0                       | 2                        | 2    | 2      | 9                           | 0      | 0      |
|         | 14  | 9,055                               | 0                       | 2                        | 2    | 2      | 8                           | 0      | 0      |
|         | 15  | 9,175                               | 0                       | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 16  | 9,455                               | 0                       | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 17  | 9,645                               | 192                     | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 18  | 9,550                               | 7,205                   | 2                        | 2    | 2      | 8                           | 0      | 9      |
|         | 19  | 9,480                               | 14,045                  | 2                        | 2    | 2      | 18                          | 0      | 27     |
|         | 20  | 9,530                               | 17,693                  | 2                        | 2    | 2      | 18                          | 0      | 27     |
|         | 21  | 11,055                              | 17,146                  | 2                        | 2    | 2      | 18                          | 0      | 28     |
|         | 22  | 11,835                              | 35,212                  | 2                        | 2    | 3      | 38                          | 5      | 40     |
|         | 23  | 12,450                              | 58,833                  | 3                        | 3    | 4      | 48                          | 30     | 45     |
|         | 24  | 14,400                              | 63,083                  | 4                        | 4    | 4      | 48                          | 0      | 45     |
|         | 25  | 16,200                              | 62,135                  | 4                        | 4    | 4      | 48                          | 0      | 45     |
|         | 26  | 17,800                              | 60,447                  | 4                        | 4    | 4      | 48                          | 7      | 41     |
|         | 27  | 19,250                              | 60,073                  | 4                        | 4    | 4      | 48                          | 39     | 45     |
|         | 28  | 20,250                              | 50,279                  | 4                        | 4    | 3      | 48                          | 39     | 45     |
|         | 29  | 20,950                              | 37,201                  | 2                        | 2    | 2      | 45                          | 39     | 45     |
|         | 30  | 20,950                              | 37,538                  | 2                        | 2    | 2      | 45                          | 36     | 45     |
|         | 31  | 20,650                              | 37,720                  | 2                        | 2    | 2      | 45                          | 36     | 45     |
| AVERAGE |     | 11,654                              | 18,026                  | 2                        | 2    | 2      | 18                          | 7      | 17     |

ASSUMPTIONS: Drift Rate = 0.00075%

TDS ppm = 0.60 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| JULY    | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 0                      | 0      | 0      | 0.00E+00        | 4,863            | 29,000         | 0.000      | 0.000  |
|         | 2   | 0                      | 0      | 0      | 0.00E+00        | 4,815            | 29,000         | 0.000      | 0.000  |
|         | 3   | 0                      | 0      | 0      | 0.00E+00        | 4,803            | 309,000        | 0.000      | 0.000  |
|         | 4   | 0                      | 0      | 0      | 0.00E+00        | 4,800            | 309,000        | 0.000      | 0.000  |
|         | 5   | 0                      | 0      | 0      | 0.00E+00        | 4,851            | 309,000        | 0.000      | 0.000  |
|         | 6   | 422                    | 0      | 0      | 0.00E+00        | 5,184            | 309,000        | 0.032      | 0.001  |
|         | 7   | 633                    | 0      | 211    | 0.00E+00        | 4,935            | 309,000        | 0.064      | 0.003  |
|         | 8   | 633                    | 0      | 633    | 0.00E+00        | 4,953            | 309,000        | 0.097      | 0.004  |
|         | 9   | 211                    | 0      | 0      | 0.00E+00        | 5,181            | 309,000        | 0.016      | 0.001  |
|         | 10  | 0                      | 0      | 0      | 0.00E+00        | 5,262            | 309,000        | 0.000      | 0.000  |
|         | 11  | 0                      | 0      | 0      | 0.00E+00        | 5,340            | 309,000        | 0.000      | 0.000  |
|         | 12  | 422                    | 0      | 0      | 0.00E+00        | 5,454            | 309,000        | 0.032      | 0.001  |
|         | 13  | 1,899                  | 0      | 0      | 0.00E+00        | 5,313            | 309,000        | 0.145      | 0.006  |
|         | 14  | 1,688                  | 0      | 0      | 0.00E+00        | 5,433            | 309,000        | 0.129      | 0.006  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 5,505            | 309,000        | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 5,673            | 309,000        | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 4.55E+05        | 5,787            | 309,000        | 0.000      | 0.000  |
|         | 18  | 1,688                  | 0      | 1,899  | 1.71E+07        | 5,730            | 309,000        | 0.274      | 0.013  |
|         | 19  | 3,798                  | 0      | 5,697  | 3.33E+07        | 5,688            | 309,000        | 0.724      | 0.034  |
|         | 20  | 3,798                  | 0      | 5,697  | 4.19E+07        | 5,718            | 309,000        | 0.724      | 0.035  |
|         | 21  | 3,798                  | 0      | 5,908  | 4.06E+07        | 6,633            | 309,000        | 0.740      | 0.041  |
|         | 22  | 8,018                  | 1,055  | 8,440  | 8.35E+07        | 7,101            | 355,667        | 1.538      | 0.091  |
|         | 23  | 10,128                 | 6,330  | 9,495  | 1.39E+08        | 7,470            | 495,667        | 3.175      | 0.198  |
|         | 24  | 10,128                 | 0      | 9,495  | 1.50E+08        | 8,640            | 589,000        | 2.853      | 0.206  |
|         | 25  | 10,128                 | 0      | 9,495  | 1.47E+08        | 9,720            | 589,000        | 2.853      | 0.231  |
|         | 26  | 10,128                 | 1,477  | 8,651  | 1.43E+08        | 10,680           | 589,000        | 2.945      | 0.262  |
|         | 27  | 10,128                 | 8,229  | 9,495  | 1.42E+08        | 11,550           | 589,000        | 4.049      | 0.390  |
|         | 28  | 10,128                 | 8,229  | 9,495  | 1.19E+08        | 12,150           | 542,333        | 3.729      | 0.378  |
|         | 29  | 9,495                  | 8,229  | 9,495  | 8.82E+07        | 12,570           | 309,000        | 2.076      | 0.218  |
|         | 30  | 9,495                  | 7,596  | 9,495  | 8.90E+07        | 12,570           | 309,000        | 2.028      | 0.213  |
|         | 31  | 9,495                  | 7,596  | 9,495  | 8.94E+07        | 12,390           | 309,000        | 2.028      | 0.210  |
| AVERAGE |     | 3,750                  | 1,572  | 3,648  | 4.27E+07        | 6,992            | 342,118        | 0.976      | 0.082  |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm = 0.60 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 1990  
INPUT DATA - UNIT 2

| AUGUST  | DAY | CW CONDUCTIVITY<br>DATA<br>umhos/cm | THERMAL<br>GEN<br>MWt/d | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------------------|-------------------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     |                                     |                         | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 20,050                              | 37,638                  | 2                        | 2    | 2      | 45                          | 37     | 45     |
|         | 2   | 19,650                              | 37,684                  | 2                        | 2    | 2      | 44                          | 42     | 44     |
|         | 3   | 18,650                              | 63,867                  | 2                        | 4    | 4      | 45                          | 43     | 45     |
|         | 4   | 19,650                              | 89,832                  | 4                        | 4    | 4      | 45                          | 45     | 45     |
|         | 5   | 20,650                              | 90,799                  | 4                        | 4    | 4      | 45                          | 43     | 45     |
|         | 6   | 21,850                              | 90,233                  | 4                        | 4    | 4      | 45                          | 42     | 45     |
|         | 7   | 23,250                              | 90,252                  | 4                        | 4    | 4      | 45                          | 43     | 46     |
|         | 8   | 23,650                              | 90,726                  | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 9   | 24,350                              | 90,698                  | 4                        | 4    | 4      | 45                          | 44     | 48     |
|         | 10  | 24,950                              | 90,644                  | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 11  | 25,150                              | 88,181                  | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 12  | 26,300                              | 90,762                  | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 13  | 25,700                              | 90,771                  | 4                        | 4    | 4      | 43                          | 45     | 48     |
|         | 14  | 27,050                              | 88,108                  | 4                        | 4    | 4      | 42                          | 45     | 40     |
|         | 15  | 27,250                              | 79,025                  | 4                        | 4    | 4      | 45                          | 45     | 0      |
|         | 16  | 28,000                              | 87,981                  | 4                        | 4    | 4      | 47                          | 46     | 32     |
|         | 17  | 27,600                              | 90,844                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 18  | 27,600                              | 90,972                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 19  | 28,850                              | 90,981                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 20  | 29,200                              | 91,081                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 21  | 28,400                              | 91,036                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 22  | 29,000                              | 90,124                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 23  | 28,600                              | 90,835                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 24  | 26,900                              | 90,954                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 25  | 25,750                              | 89,732                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 26  | 25,800                              | 90,972                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 27  | 25,600                              | 91,018                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 28  | 26,050                              | 91,036                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 29  | 24,650                              | 91,081                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 30  | 25,350                              | 90,835                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 31  | 24,850                              | 90,717                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
| AVERAGE |     | 25,173                              | 85,788                  | 4                        | 4    | 4      | 46                          | 46     | 45     |

ASSUMPTIONS: Drift Rate = 0.00075%

TDS ppm = 0.93 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| AUGUST  | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 9,495                  | 7,807  | 9,495  | 8.92E+07        | 18,647           | 309,000        | 2.044      | 0.318  |
|         | 2   | 9,284                  | 8,862  | 9,284  | 8.93E+07        | 18,275           | 309,000        | 2.092      | 0.319  |
|         | 3   | 9,495                  | 9,073  | 9,495  | 1.51E+08        | 17,345           | 495,667        | 3.434      | 0.497  |
|         | 4   | 9,495                  | 9,495  | 9,495  | 2.13E+08        | 18,275           | 589,000        | 4.141      | 0.632  |
|         | 5   | 9,495                  | 9,073  | 9,495  | 2.15E+08        | 19,205           | 589,000        | 4.080      | 0.654  |
|         | 6   | 9,495                  | 8,862  | 9,495  | 2.14E+08        | 20,321           | 589,000        | 4.049      | 0.687  |
|         | 7   | 9,495                  | 9,073  | 9,706  | 2.14E+08        | 21,623           | 589,000        | 4.111      | 0.742  |
|         | 8   | 9,495                  | 9,495  | 10,128 | 2.15E+08        | 21,995           | 589,000        | 4.233      | 0.777  |
|         | 9   | 9,495                  | 9,284  | 10,128 | 2.15E+08        | 22,646           | 589,000        | 4.203      | 0.794  |
|         | 10  | 9,495                  | 9,495  | 10,128 | 2.15E+08        | 23,204           | 589,000        | 4.233      | 0.820  |
|         | 11  | 9,495                  | 9,495  | 10,128 | 2.09E+08        | 23,390           | 589,000        | 4.233      | 0.826  |
|         | 12  | 9,495                  | 9,495  | 10,128 | 2.15E+08        | 24,459           | 589,000        | 4.233      | 0.864  |
|         | 13  | 9,073                  | 9,495  | 10,128 | 2.15E+08        | 23,901           | 589,000        | 4.172      | 0.832  |
|         | 14  | 8,862                  | 9,495  | 8,440  | 2.09E+08        | 25,157           | 589,000        | 3.896      | 0.818  |
|         | 15  | 9,495                  | 9,495  | 0      | 1.87E+08        | 25,343           | 589,000        | 2.761      | 0.584  |
|         | 16  | 9,917                  | 9,706  | 6,752  | 2.09E+08        | 26,040           | 589,000        | 3.835      | 0.833  |
|         | 17  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 25,668           | 589,000        | 4.418      | 0.946  |
|         | 18  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 25,668           | 589,000        | 4.418      | 0.946  |
|         | 19  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 26,831           | 589,000        | 4.418      | 0.989  |
|         | 20  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 27,156           | 589,000        | 4.418      | 1.001  |
|         | 21  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 26,412           | 589,000        | 4.418      | 0.974  |
|         | 22  | 10,128                 | 10,128 | 10,128 | 2.14E+08        | 26,970           | 589,000        | 4.418      | 0.994  |
|         | 23  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 26,598           | 589,000        | 4.418      | 0.981  |
|         | 24  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 25,017           | 589,000        | 4.418      | 0.922  |
|         | 25  | 10,128                 | 10,128 | 10,128 | 2.13E+08        | 23,948           | 589,000        | 4.418      | 0.883  |
|         | 26  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 23,994           | 589,000        | 4.418      | 0.885  |
|         | 27  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 23,808           | 589,000        | 4.418      | 0.878  |
|         | 28  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 24,227           | 589,000        | 4.418      | 0.893  |
|         | 29  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 22,925           | 589,000        | 4.418      | 0.845  |
|         | 30  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 23,576           | 589,000        | 4.418      | 0.869  |
|         | 31  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 23,111           | 589,000        | 4.418      | 0.852  |
| AVERAGE |     | 9,774                  | 9,665  | 9,495  | 2.03E+08        | 23,411           | 567,925        | 4.065      | 0.802  |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm = 0.93 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 1990

INPUT DATA - UNIT 2

| SEPTEMBER DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------------|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|               | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
| 1             | 25,250           | 90,708       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 2             | 26,050           | 90,698       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 3             | 25,450           | 90,708       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 4             | 25,900           | 90,853       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 5             | 25,850           | 90,963       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 6             | 25,900           | 90,844       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 7             | 25,550           | 90,863       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 8             | 28,250           | 90,708       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 9             | 28,650           | 90,571       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 10            | 28,650           | 90,799       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 11            | 28,550           | 90,945       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 12            | 28,900           | 90,908       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 13            | 28,750           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 14            | 27,950           | 90,981       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 15            | 28,750           | 90,936       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 16            | 26,950           | 90,844       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 17            | 26,500           | 90,790       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 18            | 27,550           | 90,835       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 19            | 27,250           | 90,808       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 20            | 28,400           | 90,735       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 21            | 28,650           | 90,899       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 22            | 28,350           | 90,853       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 23            | 29,200           | 90,835       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 24            | 29,000           | 90,844       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 25            | 28,600           | 90,844       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 26            | 28,250           | 90,817       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 27            | 28,050           | 90,835       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 28            | 27,950           | 90,817       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 29            | 28,000           | 90,689       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 30            | 28,050           | 90,863       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| AVERAGE       | 27,638           | 90,826       | 4                        | 4    | 4      | 48                          | 48     | 48     |

ASSUMPTIONS: Drift Rate = 0.00075%

TDS ppm = 0.70 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| SEPTEMBER DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|               | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,675           | 589,000        | 4.418      | 0.652  |
| 2             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,235           | 589,000        | 4.418      | 0.672  |
| 3             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,815           | 589,000        | 4.418      | 0.657  |
| 4             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,130           | 589,000        | 4.418      | 0.668  |
| 5             | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 18,095           | 589,000        | 4.418      | 0.667  |
| 6             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,130           | 589,000        | 4.418      | 0.668  |
| 7             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,885           | 589,000        | 4.418      | 0.659  |
| 8             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,775           | 589,000        | 4.418      | 0.729  |
| 9             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,055           | 589,000        | 4.418      | 0.739  |
| 10            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,055           | 589,000        | 4.418      | 0.739  |
| 11            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,985           | 589,000        | 4.418      | 0.737  |
| 12            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,230           | 589,000        | 4.418      | 0.746  |
| 13            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,125           | 589,000        | 4.418      | 0.742  |
| 14            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 19,565           | 589,000        | 4.418      | 0.721  |
| 15            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,125           | 589,000        | 4.418      | 0.742  |
| 16            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,865           | 589,000        | 4.418      | 0.695  |
| 17            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,550           | 589,000        | 4.418      | 0.684  |
| 18            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,285           | 589,000        | 4.418      | 0.711  |
| 19            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,075           | 589,000        | 4.418      | 0.703  |
| 20            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,880           | 589,000        | 4.418      | 0.733  |
| 21            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,055           | 589,000        | 4.418      | 0.739  |
| 22            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,845           | 589,000        | 4.418      | 0.732  |
| 23            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,440           | 589,000        | 4.418      | 0.754  |
| 24            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,300           | 589,000        | 4.418      | 0.748  |
| 25            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,020           | 589,000        | 4.418      | 0.738  |
| 26            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,775           | 589,000        | 4.418      | 0.729  |
| 27            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,635           | 589,000        | 4.418      | 0.724  |
| 28            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,565           | 589,000        | 4.418      | 0.721  |
| 29            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,600           | 589,000        | 4.418      | 0.723  |
| 30            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,635           | 589,000        | 4.418      | 0.724  |
| AVERAGE       | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,347           | 589,000        | 4.418      | 0.713  |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm = 0.70 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 1990  
INPUT DATA - UNIT 2

| OCTOBER | DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 27,450           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 2   | 27,650           | 79,344       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 3   | 22,100           | 89,267       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 4   | 22,450           | 90,872       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 5   | 22,400           | 90,899       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 6   | 25,900           | 90,890       | 4                        | 4    | 4      | 48                          | 46     | 48     |
|         | 7   | 25,550           | 90,853       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 8   | 29,750           | 90,872       | 4                        | 4    | 4      | 46                          | 45     | 48     |
|         | 9   | 29,500           | 90,835       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 10  | 26,900           | 90,890       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 11  | 27,000           | 90,863       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 12  | 27,150           | 90,853       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 13  | 27,500           | 90,808       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 14  | 27,250           | 90,917       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 15  | 26,850           | 90,872       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 16  | 27,350           | 90,890       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 17  | 28,400           | 88,601       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 18  | 27,250           | 73,617       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 19  | 27,500           | 74,018       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 20  | 26,750           | 86,357       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 21  | 28,700           | 71,227       | 4                        | 4    | 4      | 22                          | 45     | 48     |
|         | 22  | 25,350           | 90,698       | 4                        | 4    | 4      | 44                          | 45     | 48     |
|         | 23  | 25,350           | 90,817       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 24  | 25,400           | 90,872       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 25  | 25,300           | 90,872       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 26  | 26,050           | 90,881       | 4                        | 4    | 4      | 45                          | 46     | 48     |
|         | 27  | 25,650           | 90,881       | 4                        | 4    | 4      | 45                          | 48     | 48     |
|         | 28  | 25,900           | 90,936       | 4                        | 4    | 4      | 45                          | 48     | 48     |
|         | 29  | 26,650           | 90,908       | 4                        | 4    | 4      | 45                          | 48     | 48     |
|         | 30  | 26,350           | 90,917       | 4                        | 4    | 4      | 45                          | 48     | 48     |
|         | 31  | 26,650           | 90,917       | 4                        | 4    | 4      | 45                          | 48     | 48     |
| AVERAGE |     | 26,452           | 88,497       | 4                        | 4    | 4      | 45                          | 46     | 48     |

ASSUMPTIONS: Drift Rate = 0.00075%

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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| OCTOBER | DAY | Airflow /Tower. cu m/s |        |        | Heat     | Calc     | CW Flow | Calc Drift |        |
|---------|-----|------------------------|--------|--------|----------|----------|---------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 | BTU/min  | TDS, ppm | gpm     | gpm        | lb/min |
|         | 1   | 10,128                 | 10,128 | 10,128 | 2.16E+08 | 20,313   | 589,000 | 4.418      | 0.749  |
|         | 2   | 10,128                 | 10,128 | 10,128 | 1.88E+08 | 20,461   | 589,000 | 4.418      | 0.754  |
|         | 3   | 10,128                 | 10,128 | 10,128 | 2.12E+08 | 16,354   | 589,000 | 4.418      | 0.603  |
|         | 4   | 10,128                 | 10,128 | 10,128 | 2.15E+08 | 16,613   | 589,000 | 4.418      | 0.612  |
|         | 5   | 10,128                 | 10,128 | 10,128 | 2.15E+08 | 16,576   | 589,000 | 4.418      | 0.611  |
|         | 6   | 10,128                 | 9,706  | 10,128 | 2.15E+08 | 19,166   | 589,000 | 4.356      | 0.697  |
|         | 7   | 10,128                 | 9,495  | 10,128 | 2.15E+08 | 18,907   | 589,000 | 4.325      | 0.682  |
|         | 8   | 9,706                  | 9,495  | 10,128 | 2.15E+08 | 22,015   | 589,000 | 4.264      | 0.783  |
|         | 9   | 9,495                  | 9,495  | 10,128 | 2.15E+08 | 21,830   | 589,000 | 4.233      | 0.771  |
|         | 10  | 9,495                  | 9,495  | 10,128 | 2.15E+08 | 19,906   | 589,000 | 4.233      | 0.703  |
|         | 11  | 9,495                  | 9,495  | 10,128 | 2.15E+08 | 19,980   | 589,000 | 4.233      | 0.706  |
|         | 12  | 9,495                  | 9,495  | 10,128 | 2.15E+08 | 20,091   | 589,000 | 4.233      | 0.710  |
|         | 13  | 9,495                  | 9,495  | 10,128 | 2.15E+08 | 20,350   | 589,000 | 4.233      | 0.719  |
|         | 14  | 9,495                  | 9,495  | 10,128 | 2.15E+08 | 20,165   | 589,000 | 4.233      | 0.712  |
|         | 15  | 9,495                  | 9,495  | 10,128 | 2.15E+08 | 19,869   | 589,000 | 4.233      | 0.702  |
|         | 16  | 9,495                  | 9,495  | 10,128 | 2.15E+08 | 20,239   | 589,000 | 4.233      | 0.715  |
|         | 17  | 9,495                  | 9,495  | 10,128 | 2.10E+08 | 21,016   | 589,000 | 4.233      | 0.742  |
|         | 18  | 9,495                  | 9,495  | 10,128 | 1.74E+08 | 20,165   | 589,000 | 4.233      | 0.712  |
|         | 19  | 9,495                  | 9,495  | 10,128 | 1.75E+08 | 20,350   | 589,000 | 4.233      | 0.719  |
|         | 20  | 9,495                  | 9,495  | 10,128 | 2.05E+08 | 19,795   | 589,000 | 4.233      | 0.699  |
|         | 21  | 4,642                  | 9,495  | 10,128 | 1.69E+08 | 21,238   | 589,000 | 3.528      | 0.625  |
|         | 22  | 9,284                  | 9,495  | 10,128 | 2.15E+08 | 18,759   | 589,000 | 4.203      | 0.658  |
|         | 23  | 9,495                  | 9,495  | 10,128 | 2.15E+08 | 18,759   | 589,000 | 4.233      | 0.663  |
|         | 24  | 9,495                  | 9,495  | 10,128 | 2.15E+08 | 18,796   | 589,000 | 4.233      | 0.664  |
|         | 25  | 9,495                  | 9,495  | 10,128 | 2.15E+08 | 18,722   | 589,000 | 4.233      | 0.661  |
|         | 26  | 9,495                  | 9,706  | 10,128 | 2.15E+08 | 19,277   | 589,000 | 4.264      | 0.686  |
|         | 27  | 9,495                  | 10,128 | 10,128 | 2.15E+08 | 18,981   | 589,000 | 4.325      | 0.685  |
|         | 28  | 9,495                  | 10,128 | 10,128 | 2.16E+08 | 19,166   | 589,000 | 4.325      | 0.692  |
|         | 29  | 9,495                  | 10,128 | 10,128 | 2.15E+08 | 19,721   | 589,000 | 4.325      | 0.712  |
|         | 30  | 9,495                  | 10,128 | 10,128 | 2.15E+08 | 19,499   | 589,000 | 4.325      | 0.704  |
|         | 31  | 9,495                  | 10,128 | 10,128 | 2.15E+08 | 19,721   | 589,000 | 4.325      | 0.712  |
| AVERAGE |     | 9,481                  | 9,713  | 10,128 | 2.10E+08 | 19,574   | 589,000 | 4.263      | 0.696  |

ASSUMPTIONS: Drift Rate = 0.00075%  
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 1990  
INPUT DATA - UNIT 2

| NOVEMBER DAY | CW CONDUCTIVITY<br>DATA | THERMAL<br>GEN | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|--------------|-------------------------|----------------|--------------------------|------|--------|-----------------------------|--------|--------|
|              | umhos/cm                | MWt/d          | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
| 1            | 26,500                  | 90,917         | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 2            | 26,450                  | 90,926         | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 3            | 25,500                  | 90,954         | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 4            | 24,900                  | 90,954         | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 5            | 23,850                  | 90,936         | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 6            | 24,900                  | 90,853         | 4                        | 4    | 4      | 45                          | 48     | 48     |
| 7            | 25,400                  | 90,881         | 4                        | 4    | 4      | 45                          | 43     | 48     |
| 8            | 25,500                  | 90,890         | 4                        | 4    | 4      | 45                          | 42     | 48     |
| 9            | 22,600                  | 90,954         | 4                        | 4    | 4      | 45                          | 43     | 48     |
| 10           | 23,800                  | 90,936         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 11           | 24,500                  | 90,990         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 12           | 25,800                  | 90,936         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 13           | 26,100                  | 90,936         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 14           | 25,900                  | 90,963         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 15           | 25,200                  | 90,999         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 16           | 24,900                  | 90,908         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 17           | 25,500                  | 89,340         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 18           | 24,500                  | 90,908         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 19           | 24,400                  | 90,945         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 20           | 25,500                  | 90,917         | 4                        | 4    | 4      | 45                          | 43     | 48     |
| 21           | 24,000                  | 90,972         | 4                        | 4    | 4      | 45                          | 43     | 48     |
| 22           | 23,300                  | 90,881         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 23           | 23,400                  | 90,954         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 24           | 22,900                  | 87,132         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 25           | 23,200                  | 90,881         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 26           | 25,800                  | 90,990         | 4                        | 4    | 4      | 45                          | 45     | 48     |
| 27           | 21,900                  | 90,963         | 4                        | 4    | 4      | 42                          | 45     | 48     |
| 28           | 22,900                  | 90,963         | 4                        | 4    | 4      | 34                          | 45     | 48     |
| 29           | 21,600                  | 90,890         | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 30           | 22,100                  | 90,990         | 4                        | 4    | 4      | 48                          | 45     | 48     |
| AVERAGE      | 24,427                  | 90,755         | 4                        | 4    | 4      | 45                          | 45     | 48     |

ASSUMPTIONS: Drift Rate = 0.00075%

TDS ppm =  $0.77 \times \text{Conductivity, umhos/cm}$

Airflow =  $64.4 \times 10^6$  cfm/ 48 fans

CW Flow = (No pumps  $\times$  140,000) + 29,000 gpm



COOLING TOWER SOURCE TERM  
FOR 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| NOVEMBER DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|--------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|              | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1            | 9,495                  | 10,128 | 10,128 | 2.15E+08        | 20,405           | 589,000        | 4.325      | 0.737  |
| 2            | 9,495                  | 10,128 | 10,128 | 2.15E+08        | 20,367           | 589,000        | 4.325      | 0.735  |
| 3            | 9,495                  | 10,128 | 10,128 | 2.16E+08        | 19,635           | 589,000        | 4.325      | 0.709  |
| 4            | 9,495                  | 10,128 | 10,128 | 2.16E+08        | 19,173           | 589,000        | 4.325      | 0.692  |
| 5            | 9,495                  | 10,128 | 10,128 | 2.16E+08        | 18,365           | 589,000        | 4.325      | 0.663  |
| 6            | 9,495                  | 10,128 | 10,128 | 2.15E+08        | 19,173           | 589,000        | 4.325      | 0.692  |
| 7            | 9,495                  | 9,073  | 10,128 | 2.15E+08        | 19,558           | 589,000        | 4.172      | 0.681  |
| 8            | 9,495                  | 8,862  | 10,128 | 2.15E+08        | 19,635           | 589,000        | 4.141      | 0.679  |
| 9            | 9,495                  | 9,073  | 10,128 | 2.16E+08        | 17,402           | 589,000        | 4.172      | 0.606  |
| 10           | 9,495                  | 9,495  | 10,128 | 2.16E+08        | 18,326           | 589,000        | 4.233      | 0.647  |
| 11           | 9,495                  | 9,495  | 10,128 | 2.16E+08        | 18,865           | 589,000        | 4.233      | 0.666  |
| 12           | 9,495                  | 9,495  | 10,128 | 2.16E+08        | 19,866           | 589,000        | 4.233      | 0.702  |
| 13           | 9,495                  | 9,495  | 10,128 | 2.16E+08        | 20,097           | 589,000        | 4.233      | 0.710  |
| 14           | 9,495                  | 9,495  | 10,128 | 2.16E+08        | 19,943           | 589,000        | 4.233      | 0.705  |
| 15           | 9,495                  | 9,495  | 10,128 | 2.16E+08        | 19,404           | 589,000        | 4.233      | 0.686  |
| 16           | 9,495                  | 9,495  | 10,128 | 2.15E+08        | 19,173           | 589,000        | 4.233      | 0.677  |
| 17           | 9,495                  | 9,495  | 10,128 | 2.12E+08        | 19,635           | 589,000        | 4.233      | 0.694  |
| 18           | 9,495                  | 9,495  | 10,128 | 2.15E+08        | 18,865           | 589,000        | 4.233      | 0.666  |
| 19           | 9,495                  | 9,495  | 10,128 | 2.16E+08        | 18,788           | 589,000        | 4.233      | 0.664  |
| 20           | 9,495                  | 9,073  | 10,128 | 2.15E+08        | 19,635           | 589,000        | 4.172      | 0.684  |
| 21           | 9,495                  | 9,073  | 10,128 | 2.16E+08        | 18,480           | 589,000        | 4.172      | 0.643  |
| 22           | 9,495                  | 9,495  | 10,128 | 2.15E+08        | 17,941           | 589,000        | 4.233      | 0.634  |
| 23           | 9,495                  | 9,495  | 10,128 | 2.16E+08        | 18,018           | 589,000        | 4.233      | 0.637  |
| 24           | 9,495                  | 9,495  | 10,128 | 2.07E+08        | 17,633           | 589,000        | 4.233      | 0.623  |
| 25           | 9,495                  | 9,495  | 10,128 | 2.15E+08        | 17,864           | 589,000        | 4.233      | 0.631  |
| 26           | 9,495                  | 9,495  | 10,128 | 2.16E+08        | 19,866           | 589,000        | 4.233      | 0.702  |
| 27           | 8,862                  | 9,495  | 10,128 | 2.16E+08        | 16,863           | 589,000        | 4.141      | 0.583  |
| 28           | 7,174                  | 9,495  | 10,128 | 2.16E+08        | 17,633           | 589,000        | 3.896      | 0.573  |
| 29           | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 16,632           | 589,000        | 4.325      | 0.600  |
| 30           | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 17,017           | 589,000        | 4.325      | 0.614  |
| AVERAGE      | 9,439                  | 9,544  | 10,128 | 2.15E+08        | 18,809           | 589,000        | 4.232      | 0.664  |

ASSUMPTIONS: Drift Rate = 0.00075%

TDS ppm = 0.77 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 1990  
INPUT DATA - UNIT 2

| DECEMBER DAY | CW CONDUCTIVITY<br>DATA<br>umhos/cm | THERMAL<br>GEN<br>Mwt/d | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|--------------|-------------------------------------|-------------------------|--------------------------|------|--------|-----------------------------|--------|--------|
|              |                                     |                         | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
| 1            | 21,800                              | 90,954                  | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 2            | 21,300                              | 91,027                  | 4                        | 4    | 4      | 48                          | 39     | 48     |
| 3            | 23,300                              | 90,999                  | 4                        | 4    | 4      | 48                          | 43     | 48     |
| 4            | 22,700                              | 91,036                  | 4                        | 4    | 4      | 48                          | 42     | 48     |
| 5            | 22,000                              | 90,981                  | 4                        | 4    | 4      | 48                          | 42     | 41     |
| 6            | 22,600                              | 90,999                  | 4                        | 4    | 4      | 48                          | 42     | 48     |
| 7            | 23,800                              | 90,981                  | 4                        | 4    | 4      | 48                          | 38     | 48     |
| 8            | 23,400                              | 91,008                  | 4                        | 4    | 4      | 48                          | 47     | 48     |
| 9            | 23,500                              | 91,027                  | 4                        | 4    | 4      | 48                          | 41     | 48     |
| 10           | 22,500                              | 90,945                  | 4                        | 4    | 4      | 48                          | 45     | 46     |
| 11           | 22,700                              | 90,926                  | 4                        | 4    | 4      | 48                          | 46     | 45     |
| 12           | 24,700                              | 90,990                  | 4                        | 4    | 4      | 48                          | 46     | 45     |
| 13           | 25,400                              | 90,926                  | 4                        | 4    | 4      | 48                          | 45     | 45     |
| 14           | 21,900                              | 91,036                  | 4                        | 4    | 4      | 48                          | 45     | 46     |
| 15           | 20,500                              | 91,008                  | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 16           | 22,000                              | 90,954                  | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 17           | 20,000                              | 90,972                  | 4                        | 4    | 4      | 48                          | 45     | 44     |
| 18           | 20,800                              | 90,908                  | 4                        | 4    | 4      | 48                          | 45     | 36     |
| 19           | 20,800                              | 90,945                  | 4                        | 4    | 4      | 48                          | 45     | 43     |
| 20           | 22,000                              | 90,999                  | 4                        | 4    | 4      | 48                          | 26     | 48     |
| 21           | 20,600                              | 80,110                  | 4                        | 4    | 4      | 28                          | 28     | 39     |
| 22           | 22,700                              | 90,936                  | 4                        | 4    | 4      | 33                          | 40     | 48     |
| 23           | 22,400                              | 91,027                  | 4                        | 4    | 4      | 25                          | 38     | 40     |
| 24           | 22,900                              | 91,027                  | 4                        | 4    | 4      | 33                          | 42     | 38     |
| 25           | 20,100                              | 91,045                  | 4                        | 4    | 4      | 40                          | 36     | 42     |
| 26           | 22,800                              | 91,045                  | 4                        | 4    | 4      | 40                          | 44     | 42     |
| 27           | 23,600                              | 91,008                  | 4                        | 4    | 4      | 41                          | 36     | 41     |
| 28           | 24,600                              | 90,954                  | 4                        | 4    | 4      | 46                          | 41     | 45     |
| 29           | 24,900                              | 90,954                  | 4                        | 4    | 4      | 48                          | 44     | 45     |
| 30           | 24,200                              | 90,981                  | 4                        | 4    | 4      | 42                          | 41     | 41     |
| 31           | 24,000                              | 91,054                  | 4                        | 4    | 4      | 42                          | 39     | 41     |
| AVERAGE      | 22,597                              | 90,637                  | 4                        | 4    | 4      | 44                          | 41     | 45     |

ASSUMPTIONS: Drift Rate = 0.00075%  
TDS ppm = 0.77 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 2

| DECEMBER DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|--------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|              | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1            | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 16,786           | 589,000        | 4.325      | 0.606  |
| 2            | 10,128                 | 8,229  | 10,128 | 2.16E+08        | 16,401           | 589,000        | 4.141      | 0.567  |
| 3            | 10,128                 | 9,073  | 10,128 | 2.16E+08        | 17,941           | 589,000        | 4.264      | 0.638  |
| 4            | 10,128                 | 8,862  | 10,128 | 2.16E+08        | 17,479           | 589,000        | 4.233      | 0.617  |
| 5            | 10,128                 | 8,862  | 8,651  | 2.16E+08        | 16,940           | 589,000        | 4.019      | 0.568  |
| 6            | 10,128                 | 8,862  | 10,128 | 2.16E+08        | 17,402           | 589,000        | 4.233      | 0.615  |
| 7            | 10,128                 | 8,018  | 10,128 | 2.16E+08        | 18,326           | 589,000        | 4.111      | 0.629  |
| 8            | 10,128                 | 9,917  | 10,128 | 2.16E+08        | 18,018           | 589,000        | 4.387      | 0.660  |
| 9            | 10,128                 | 8,651  | 10,128 | 2.16E+08        | 18,095           | 589,000        | 4.203      | 0.635  |
| 10           | 10,128                 | 9,495  | 9,706  | 2.16E+08        | 17,325           | 589,000        | 4.264      | 0.616  |
| 11           | 10,128                 | 9,706  | 9,495  | 2.15E+08        | 17,479           | 589,000        | 4.264      | 0.622  |
| 12           | 10,128                 | 9,706  | 9,495  | 2.16E+08        | 19,019           | 589,000        | 4.264      | 0.677  |
| 13           | 10,128                 | 9,495  | 9,495  | 2.15E+08        | 19,558           | 589,000        | 4.233      | 0.691  |
| 14           | 10,128                 | 9,495  | 9,706  | 2.16E+08        | 16,863           | 589,000        | 4.264      | 0.600  |
| 15           | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 15,785           | 589,000        | 4.325      | 0.570  |
| 16           | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 16,940           | 589,000        | 4.325      | 0.611  |
| 17           | 10,128                 | 9,495  | 9,284  | 2.16E+08        | 15,400           | 589,000        | 4.203      | 0.540  |
| 18           | 10,128                 | 9,495  | 7,596  | 2.15E+08        | 16,016           | 589,000        | 3.957      | 0.529  |
| 19           | 10,128                 | 9,495  | 9,073  | 2.16E+08        | 16,016           | 589,000        | 4.172      | 0.558  |
| 20           | 10,128                 | 5,486  | 10,128 | 2.16E+08        | 16,940           | 589,000        | 3.743      | 0.529  |
| 21           | 5,908                  | 5,908  | 8,229  | 1.90E+08        | 15,862           | 589,000        | 2.914      | 0.386  |
| 22           | 6,963                  | 8,440  | 10,128 | 2.16E+08        | 17,479           | 589,000        | 3.712      | 0.541  |
| 23           | 5,275                  | 8,018  | 8,440  | 2.16E+08        | 17,248           | 589,000        | 3.160      | 0.455  |
| 24           | 6,963                  | 8,862  | 8,018  | 2.16E+08        | 17,633           | 589,000        | 3.467      | 0.510  |
| 25           | 8,440                  | 7,596  | 8,862  | 2.16E+08        | 15,477           | 589,000        | 3.620      | 0.468  |
| 26           | 8,440                  | 9,284  | 8,862  | 2.16E+08        | 17,556           | 589,000        | 3.865      | 0.566  |
| 27           | 8,651                  | 7,596  | 8,651  | 2.16E+08        | 18,172           | 589,000        | 3.620      | 0.549  |
| 28           | 9,706                  | 8,651  | 9,495  | 2.16E+08        | 18,942           | 589,000        | 4.049      | 0.640  |
| 29           | 10,128                 | 9,284  | 9,495  | 2.16E+08        | 19,173           | 589,000        | 4.203      | 0.672  |
| 30           | 8,862                  | 8,651  | 8,651  | 2.16E+08        | 18,634           | 589,000        | 3.804      | 0.592  |
| 31           | 8,862                  | 8,229  | 8,651  | 2.16E+08        | 18,480           | 589,000        | 3.743      | 0.577  |
| AVERAGE      | 9,379                  | 8,753  | 9,400  | 2.15E+08        | 17,400           | 589,000        | 4.003      | 0.582  |

ASSUMPTIONS: Drift Rate = 0.00075%

TDS ppm = 0.77 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 1990

INPUT DATA - UNIT 3

| JANUARY | DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 11,265           | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 2   | 9,065            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 3   | 9,605            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 4   | 9,475            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 5   | 5,900            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 6   | 5,930            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 7   | 5,695            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 8   | 9,755            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 9   | 6,425            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 10  | 6,460            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 11  | 9,065            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 12  | 6,895            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 13  | 6,075            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 14  | 5,995            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 15  | 6,500            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 16  | 6,530            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 17  | 6,510            | 0            | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 18  | 6,595            | 1,368        | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 19  | 6,360            | 1,915        | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 20  | 8,765            | 8,117        | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 21  | 9,470            | 13,498       | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 22  | 7,420            | 16,681       | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 23  | 7,585            | 14,008       | 0                        | 0    | 0      | 0                           | 0      | 0      |
|         | 24  | 7,975            | 21,797       | 4                        | 4    | 4      | 0                           | 0      | 0      |
|         | 25  | 8,885            | 38,468       | 4                        | 4    | 4      | 0                           | 12     | 15     |
|         | 26  | 10,005           | 45,418       | 4                        | 4    | 4      | 0                           | 0      | 21     |
|         | 27  | 11,300           | 49,704       | 4                        | 4    | 4      | 18                          | 0      | 9      |
|         | 28  | 12,250           | 60,201       | 4                        | 4    | 4      | 21                          | 9      | 36     |
|         | 29  | 13,930           | 61,441       | 4                        | 4    | 4      | 21                          | 12     | 30     |
|         | 30  | 13,600           | 63,557       | 4                        | 4    | 4      | 27                          | 12     | 33     |
|         | 31  | 12,650           | 71,273       | 4                        | 4    | 4      | 30                          | 18     | 42     |
| AVERAGE |     | 8,514            | 15,079       | 1                        | 1    | 1      | 4                           | 2      | 6      |

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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| JANUARY | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 0                      | 0      | 0      | 0.00E+00        | 9,125            | 29,000         | 0.000      | 0.000  |
|         | 2   | 0                      | 0      | 0      | 0.00E+00        | 7,343            | 29,000         | 0.000      | 0.000  |
|         | 3   | 0                      | 0      | 0      | 0.00E+00        | 7,780            | 29,000         | 0.000      | 0.000  |
|         | 4   | 0                      | 0      | 0      | 0.00E+00        | 7,675            | 29,000         | 0.000      | 0.000  |
|         | 5   | 0                      | 0      | 0      | 0.00E+00        | 4,779            | 29,000         | 0.000      | 0.000  |
|         | 6   | 0                      | 0      | 0      | 0.00E+00        | 4,803            | 29,000         | 0.000      | 0.000  |
|         | 7   | 0                      | 0      | 0      | 0.00E+00        | 4,613            | 29,000         | 0.000      | 0.000  |
|         | 8   | 0                      | 0      | 0      | 0.00E+00        | 7,902            | 29,000         | 0.000      | 0.000  |
|         | 9   | 0                      | 0      | 0      | 0.00E+00        | 5,204            | 29,000         | 0.000      | 0.000  |
|         | 10  | 0                      | 0      | 0      | 0.00E+00        | 5,233            | 29,000         | 0.000      | 0.000  |
|         | 11  | 0                      | 0      | 0      | 0.00E+00        | 7,343            | 29,000         | 0.000      | 0.000  |
|         | 12  | 0                      | 0      | 0      | 0.00E+00        | 5,585            | 29,000         | 0.000      | 0.000  |
|         | 13  | 0                      | 0      | 0      | 0.00E+00        | 4,921            | 29,000         | 0.000      | 0.000  |
|         | 14  | 0                      | 0      | 0      | 0.00E+00        | 4,856            | 29,000         | 0.000      | 0.000  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 5,265            | 29,000         | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 5,289            | 29,000         | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 0.00E+00        | 5,273            | 29,000         | 0.000      | 0.000  |
|         | 18  | 0                      | 0      | 0      | 3.24E+06        | 5,342            | 29,000         | 0.000      | 0.000  |
|         | 19  | 0                      | 0      | 0      | 4.54E+06        | 5,152            | 29,000         | 0.000      | 0.000  |
|         | 20  | 0                      | 0      | 0      | 1.92E+07        | 7,100            | 29,000         | 0.000      | 0.000  |
|         | 21  | 0                      | 0      | 0      | 3.20E+07        | 7,671            | 29,000         | 0.000      | 0.000  |
|         | 22  | 0                      | 0      | 0      | 3.95E+07        | 6,010            | 29,000         | 0.000      | 0.000  |
|         | 23  | 0                      | 0      | 0      | 3.32E+07        | 6,144            | 29,000         | 0.000      | 0.000  |
|         | 24  | 0                      | 0      | 0      | 5.17E+07        | 6,460            | 589,000        | 0.000      | 0.000  |
|         | 25  | 0                      | 2,532  | 3,165  | 9.12E+07        | 7,197            | 589,000        | 0.221      | 0.013  |
|         | 26  | 0                      | 0      | 4,431  | 1.08E+08        | 8,104            | 589,000        | 0.172      | 0.012  |
|         | 27  | 3,798                  | 0      | 1,899  | 1.18E+08        | 9,153            | 589,000        | 0.221      | 0.017  |
|         | 28  | 4,431                  | 1,899  | 7,596  | 1.43E+08        | 9,923            | 589,000        | 0.540      | 0.045  |
|         | 29  | 4,431                  | 2,532  | 6,330  | 1.46E+08        | 11,283           | 589,000        | 0.515      | 0.049  |
|         | 30  | 5,697                  | 2,532  | 6,963  | 1.51E+08        | 11,016           | 589,000        | 0.589      | 0.054  |
|         | 31  | 6,330                  | 3,798  | 8,862  | 1.69E+08        | 10,247           | 589,000        | 0.736      | 0.063  |
| AVERAGE |     | 796                    | 429    | 1,266  | 3.57E+07        | 6,896            | 173,516        | 0.097      | 0.008  |

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 1990  
INPUT DATA - UNIT 3

| FEBRUARY DAY | CW CONDUCTIVITY<br>DATA | THERMAL<br>GEN | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|--------------|-------------------------|----------------|--------------------------|------|--------|-----------------------------|--------|--------|
|              | umhos/cm                | MWt/d          | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
| 1            | 13,800                  | 79,089         | 4                        | 4    | 4      | 30                          | 18     | 42     |
| 2            | 15,700                  | 82,308         | 4                        | 4    | 4      | 30                          | 18     | 42     |
| 3            | 15,800                  | 74,419         | 4                        | 4    | 4      | 24                          | 18     | 42     |
| 4            | 15,250                  | 64,141         | 4                        | 4    | 4      | 24                          | 18     | 27     |
| 5            | 14,850                  | 64,050         | 4                        | 4    | 4      | 18                          | 21     | 42     |
| 6            | 13,550                  | 64,296         | 4                        | 4    | 4      | 18                          | 27     | 42     |
| 7            | 17,725                  | 64,132         | 4                        | 4    | 4      | 18                          | 27     | 42     |
| 8            | 15,250                  | 68,838         | 4                        | 4    | 4      | 27                          | 21     | 42     |
| 9            | 15,150                  | 82,928         | 4                        | 4    | 4      | 33                          | 30     | 42     |
| 10           | 15,200                  | 85,236         | 4                        | 4    | 4      | 33                          | 30     | 42     |
| 11           | 15,250                  | 87,087         | 4                        | 4    | 4      | 36                          | 30     | 42     |
| 12           | 15,200                  | 86,604         | 4                        | 4    | 4      | 36                          | 30     | 42     |
| 13           | 15,550                  | 86,813         | 4                        | 4    | 4      | 39                          | 30     | 39     |
| 14           | 15,450                  | 86,886         | 4                        | 4    | 4      | 39                          | 33     | 39     |
| 15           | 15,200                  | 86,576         | 4                        | 4    | 4      | 39                          | 36     | 39     |
| 16           | 14,800                  | 86,448         | 4                        | 4    | 4      | 36                          | 33     | 39     |
| 17           | 14,500                  | 64,351         | 4                        | 4    | 4      | 30                          | 21     | 18     |
| 18           | 15,650                  | 86,777         | 4                        | 4    | 4      | 36                          | 39     | 42     |
| 19           | 15,350                  | 89,376         | 4                        | 4    | 4      | 36                          | 42     | 39     |
| 20           | 15,550                  | 89,540         | 4                        | 4    | 4      | 36                          | 42     | 39     |
| 21           | 15,900                  | 89,668         | 4                        | 4    | 4      | 36                          | 42     | 39     |
| 22           | 15,950                  | 89,431         | 4                        | 4    | 4      | 36                          | 42     | 39     |
| 23           | 16,300                  | 89,586         | 4                        | 4    | 4      | 33                          | 42     | 42     |
| 24           | 16,050                  | 89,485         | 4                        | 4    | 4      | 36                          | 42     | 42     |
| 25           | 17,750                  | 86,248         | 4                        | 4    | 4      | 36                          | 42     | 42     |
| 26           | 15,750                  | 86,877         | 4                        | 4    | 4      | 36                          | 42     | 42     |
| 27           | 16,150                  | 89,431         | 4                        | 4    | 4      | 36                          | 42     | 42     |
| 28           | 15,950                  | 89,412         | 4                        | 4    | 4      | 36                          | 42     | 42     |
| AVERAGE      | 15,521                  | 81,787         | 4                        | 4    | 4      | 32                          | 32     | 40     |

ASSUMPTIONS: Drift Rate = 0.0002%  
TDS ppm = 0.99 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| FEBRUARY DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|--------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|              | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1            | 6,330                  | 3,798  | 8,862  | 1.87E+08        | 13,662           | 589,000        | 0.736      | 0.084  |
| 2            | 6,330                  | 3,798  | 8,862  | 1.95E+08        | 15,543           | 589,000        | 0.736      | 0.095  |
| 3            | 5,064                  | 3,798  | 8,862  | 1.76E+08        | 15,642           | 589,000        | 0.687      | 0.090  |
| 4            | 5,064                  | 3,798  | 5,697  | 1.52E+08        | 15,098           | 589,000        | 0.564      | 0.071  |
| 5            | 3,798                  | 4,431  | 8,862  | 1.52E+08        | 14,702           | 589,000        | 0.663      | 0.081  |
| 6            | 3,798                  | 5,697  | 8,862  | 1.52E+08        | 13,415           | 589,000        | 0.712      | 0.080  |
| 7            | 3,798                  | 5,697  | 8,862  | 1.52E+08        | 17,548           | 589,000        | 0.712      | 0.104  |
| 8            | 5,697                  | 4,431  | 8,862  | 1.63E+08        | 15,098           | 589,000        | 0.736      | 0.093  |
| 9            | 6,963                  | 6,330  | 8,862  | 1.97E+08        | 14,999           | 589,000        | 0.859      | 0.108  |
| 10           | 6,963                  | 6,330  | 8,862  | 2.02E+08        | 15,048           | 589,000        | 0.859      | 0.108  |
| 11           | 7,596                  | 6,330  | 8,862  | 2.06E+08        | 15,098           | 589,000        | 0.884      | 0.111  |
| 12           | 7,596                  | 6,330  | 8,862  | 2.05E+08        | 15,048           | 589,000        | 0.884      | 0.111  |
| 13           | 8,229                  | 6,330  | 8,229  | 2.06E+08        | 15,395           | 589,000        | 0.884      | 0.114  |
| 14           | 8,229                  | 6,963  | 8,229  | 2.06E+08        | 15,296           | 589,000        | 0.908      | 0.116  |
| 15           | 8,229                  | 7,596  | 8,229  | 2.05E+08        | 15,048           | 589,000        | 0.933      | 0.117  |
| 16           | 7,596                  | 6,963  | 8,229  | 2.05E+08        | 14,652           | 589,000        | 0.884      | 0.108  |
| 17           | 6,330                  | 4,431  | 3,798  | 1.53E+08        | 14,355           | 589,000        | 0.564      | 0.068  |
| 18           | 7,596                  | 8,229  | 8,862  | 2.06E+08        | 15,494           | 589,000        | 0.957      | 0.124  |
| 19           | 7,596                  | 8,862  | 8,229  | 2.12E+08        | 15,197           | 589,000        | 0.957      | 0.121  |
| 20           | 7,596                  | 8,862  | 8,229  | 2.12E+08        | 15,395           | 589,000        | 0.957      | 0.123  |
| 21           | 7,596                  | 8,862  | 8,229  | 2.13E+08        | 15,741           | 589,000        | 0.957      | 0.126  |
| 22           | 7,596                  | 8,862  | 8,229  | 2.12E+08        | 15,791           | 589,000        | 0.957      | 0.126  |
| 23           | 6,963                  | 8,862  | 8,862  | 2.12E+08        | 16,137           | 589,000        | 0.957      | 0.129  |
| 24           | 7,596                  | 8,862  | 8,862  | 2.12E+08        | 15,890           | 589,000        | 0.982      | 0.130  |
| 25           | 7,596                  | 8,862  | 8,862  | 2.04E+08        | 17,573           | 589,000        | 0.982      | 0.144  |
| 26           | 7,596                  | 8,862  | 8,862  | 2.06E+08        | 15,593           | 589,000        | 0.982      | 0.128  |
| 27           | 7,596                  | 8,862  | 8,862  | 2.12E+08        | 15,989           | 589,000        | 0.982      | 0.131  |
| 28           | 7,596                  | 8,862  | 8,862  | 2.12E+08        | 15,791           | 589,000        | 0.982      | 0.129  |
| AVERAGE      | 6,805                  | 6,782  | 8,387  | 1.94E+08        | 15,365           | 589,000        | 0.852      | 0.110  |

ASSUMPTIONS: Drift Rate = 0.0002%  
TDS ppm = 0.99 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 1990  
INPUT DATA - UNIT 3

| MARCH   | DAY | CW CONDUCTIVITY<br>DATA | THERMAL<br>GEN | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------|----------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | umhos/cm                | MWt/d          | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 17,400                  | 88,656         | 4                        | 4    | 4      | 36                          | 42     | 42     |
|         | 2   | 17,650                  | 88,245         | 4                        | 4    | 4      | 39                          | 42     | 42     |
|         | 3   | 17,500                  | 89,367         | 4                        | 4    | 4      | 39                          | 42     | 42     |
|         | 4   | 17,250                  | 89,239         | 4                        | 4    | 4      | 39                          | 42     | 42     |
|         | 5   | 17,050                  | 89,203         | 4                        | 4    | 4      | 39                          | 42     | 42     |
|         | 6   | 17,000                  | 89,166         | 4                        | 4    | 4      | 33                          | 42     | 42     |
|         | 7   | 16,450                  | 89,157         | 4                        | 4    | 4      | 42                          | 42     | 36     |
|         | 8   | 16,500                  | 89,294         | 4                        | 4    | 4      | 42                          | 42     | 36     |
|         | 9   | 16,650                  | 89,558         | 4                        | 4    | 4      | 45                          | 39     | 36     |
|         | 10  | 16,700                  | 90,790         | 4                        | 4    | 4      | 45                          | 39     | 42     |
|         | 11  | 16,650                  | 89,431         | 4                        | 4    | 4      | 45                          | 39     | 42     |
|         | 12  | 16,200                  | 89,878         | 4                        | 4    | 4      | 45                          | 39     | 36     |
|         | 13  | 15,900                  | 90,762         | 4                        | 4    | 4      | 45                          | 39     | 42     |
|         | 14  | 15,080                  | 90,717         | 4                        | 4    | 4      | 45                          | 39     | 42     |
|         | 15  | 16,700                  | 90,735         | 4                        | 4    | 4      | 45                          | 42     | 42     |
|         | 16  | 16,900                  | 88,610         | 4                        | 4    | 4      | 42                          | 42     | 42     |
|         | 17  | 16,550                  | 90,799         | 4                        | 4    | 4      | 45                          | 42     | 39     |
|         | 18  | 16,850                  | 90,799         | 4                        | 4    | 4      | 45                          | 42     | 42     |
|         | 19  | 16,950                  | 90,726         | 4                        | 4    | 4      | 45                          | 42     | 42     |
|         | 20  | 17,400                  | 90,744         | 4                        | 4    | 4      | 42                          | 39     | 42     |
|         | 21  | 17,850                  | 90,698         | 4                        | 4    | 4      | 42                          | 39     | 42     |
|         | 22  | 17,500                  | 90,771         | 4                        | 4    | 4      | 48                          | 42     | 45     |
|         | 23  | 18,200                  | 90,735         | 4                        | 4    | 4      | 48                          | 42     | 45     |
|         | 24  | 18,550                  | 90,771         | 4                        | 4    | 4      | 45                          | 45     | 45     |
|         | 25  | 18,900                  | 90,790         | 4                        | 4    | 4      | 48                          | 45     | 45     |
|         | 26  | 17,400                  | 90,771         | 4                        | 4    | 4      | 45                          | 45     | 45     |
|         | 27  | 17,400                  | 90,753         | 4                        | 4    | 4      | 45                          | 45     | 45     |
|         | 28  | 18,500                  | 90,771         | 4                        | 4    | 4      | 45                          | 45     | 45     |
|         | 29  | 18,050                  | 90,817         | 4                        | 4    | 4      | 45                          | 45     | 45     |
|         | 30  | 17,850                  | 90,799         | 4                        | 4    | 4      | 45                          | 45     | 45     |
|         | 31  | 18,050                  | 90,735         | 4                        | 4    | 4      | 45                          | 45     | 45     |
| AVERAGE |     | 17,212                  | 90,138         | 4                        | 4    | 4      | 43                          | 42     | 42     |

ASSUMPTIONS: Drift Rate = 0.0002%

TDS ppm = 0.84 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| MARCH   | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1.  | 7,596                  | 8,862  | 8,862  | 2.10E+08        | 14,616           | 589,000        | 0.982      | 0.120  |
|         | 2   | 8,229                  | 8,862  | 8,862  | 2.09E+08        | 14,826           | 589,000        | 1.006      | 0.124  |
|         | 3   | 8,229                  | 8,862  | 8,862  | 2.12E+08        | 14,700           | 589,000        | 1.006      | 0.123  |
|         | 4   | 8,229                  | 8,862  | 8,862  | 2.11E+08        | 14,490           | 589,000        | 1.006      | 0.122  |
|         | 5   | 8,229                  | 8,862  | 8,862  | 2.11E+08        | 14,322           | 589,000        | 1.006      | 0.120  |
|         | 6   | 6,963                  | 8,862  | 8,862  | 2.11E+08        | 14,280           | 589,000        | 0.957      | 0.114  |
|         | 7   | 8,862                  | 8,862  | 7,596  | 2.11E+08        | 13,818           | 589,000        | 0.982      | 0.113  |
|         | 8   | 8,862                  | 8,862  | 7,596  | 2.12E+08        | 13,860           | 589,000        | 0.982      | 0.114  |
|         | 9   | 9,495                  | 8,229  | 7,596  | 2.12E+08        | 13,986           | 589,000        | 0.982      | 0.115  |
|         | 10  | 9,495                  | 8,229  | 8,862  | 2.15E+08        | 14,028           | 589,000        | 1.031      | 0.121  |
|         | 11  | 9,495                  | 8,229  | 8,862  | 2.12E+08        | 13,986           | 589,000        | 1.031      | 0.120  |
|         | 12  | 9,495                  | 8,229  | 7,596  | 2.13E+08        | 13,608           | 589,000        | 0.982      | 0.111  |
|         | 13  | 9,495                  | 8,229  | 8,862  | 2.15E+08        | 13,356           | 589,000        | 1.031      | 0.115  |
|         | 14  | 9,495                  | 8,229  | 8,862  | 2.15E+08        | 12,667           | 589,000        | 1.031      | 0.109  |
|         | 15  | 9,495                  | 8,862  | 8,862  | 2.15E+08        | 14,028           | 589,000        | 1.055      | 0.124  |
|         | 16  | 8,862                  | 8,862  | 8,862  | 2.10E+08        | 14,196           | 589,000        | 1.031      | 0.122  |
|         | 17  | 9,495                  | 8,862  | 8,229  | 2.15E+08        | 13,902           | 589,000        | 1.031      | 0.120  |
|         | 18  | 9,495                  | 8,862  | 8,862  | 2.15E+08        | 14,154           | 589,000        | 1.055      | 0.125  |
|         | 19  | 9,495                  | 8,862  | 8,862  | 2.15E+08        | 14,238           | 589,000        | 1.055      | 0.125  |
|         | 20  | 8,862                  | 8,229  | 8,862  | 2.15E+08        | 14,616           | 589,000        | 1.006      | 0.123  |
|         | 21  | 8,862                  | 8,229  | 8,862  | 2.15E+08        | 14,994           | 589,000        | 1.006      | 0.126  |
|         | 22  | 10,128                 | 8,862  | 9,495  | 2.15E+08        | 14,700           | 589,000        | 1.104      | 0.135  |
|         | 23  | 10,128                 | 8,862  | 9,495  | 2.15E+08        | 15,288           | 589,000        | 1.104      | 0.141  |
|         | 24  | 9,495                  | 9,495  | 9,495  | 2.15E+08        | 15,582           | 589,000        | 1.104      | 0.144  |
|         | 25  | 10,128                 | 9,495  | 9,495  | 2.15E+08        | 15,876           | 589,000        | 1.129      | 0.150  |
|         | 26  | 9,495                  | 9,495  | 9,495  | 2.15E+08        | 14,616           | 589,000        | 1.104      | 0.135  |
|         | 27  | 9,495                  | 9,495  | 9,495  | 2.15E+08        | 14,616           | 589,000        | 1.104      | 0.135  |
|         | 28  | 9,495                  | 9,495  | 9,495  | 2.15E+08        | 15,540           | 589,000        | 1.104      | 0.143  |
|         | 29  | 9,495                  | 9,495  | 9,495  | 2.15E+08        | 15,162           | 589,000        | 1.104      | 0.140  |
|         | 30  | 9,495                  | 9,495  | 9,495  | 2.15E+08        | 14,994           | 589,000        | 1.104      | 0.138  |
|         | 31  | 9,495                  | 9,495  | 9,495  | 2.15E+08        | 15,162           | 589,000        | 1.104      | 0.140  |
| AVERAGE |     | 9,148                  | 8,862  | 8,882  | 2.14E+08        | 14,458           | 589,000        | 1.043      | 0.126  |

ASSUMPTIONS: Drift Rate = 0.0002%  
TDS ppm = 0.84 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 1990  
INPUT DATA - UNIT 3

| APRIL   | DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | DATA<br>umhos/cm | GEN<br>Mwt/d | Hids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 17,750           | 90,653       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 2   | 17,700           | 90,808       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 3   | 17,300           | 90,853       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 4   | 18,100           | 90,762       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 5   | 18,050           | 90,698       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 6   | 18,200           | 90,781       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 7   | 18,550           | 90,790       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 8   | 18,750           | 90,799       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 9   | 18,250           | 90,835       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 10  | 18,250           | 90,781       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 11  | 19,050           | 90,771       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 12  | 19,000           | 90,771       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 13  | 17,200           | 90,662       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 14  | 17,650           | 12,950       | 4                        | 4    | 4      | 0                           | 0      | 0      |
|         | 15  | 17,150           | 0            | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 16  | 17,400           | 0            | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 17  | 17,100           | 0            | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 18  | 17,700           | 0            | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 19  | 17,250           | 4,040        | 2                        | 2    | 2      | 0                           | 0      | 0      |
|         | 20  | 18,450           | 22,964       | 4                        | 4    | 4      | 24                          | 0      | 0      |
|         | 21  | 16,950           | 54,912       | 4                        | 4    | 4      | 48                          | 12     | 9      |
|         | 22  | 17,150           | 82,253       | 4                        | 4    | 4      | 48                          | 45     | 45     |
|         | 23  | 17,150           | 82,290       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 24  | 18,700           | 82,481       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 25  | 17,400           | 82,563       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 26  | 18,450           | 82,655       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 27  | 17,600           | 82,527       | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 28  | 18,750           | 50,616       | 4                        | 4    | 4      | 0                           | 18     | 48     |
|         | 29  | 17,250           | 87,479       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 30  | 20,500           | 90,635       | 4                        | 4    | 4      | 45                          | 42     | 48     |
| AVERAGE |     | 17,958           | 66,611       | 4                        | 4    | 4      | 36                          | 33     | 35     |

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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| APRIL   | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 9,495                  | 9,495  | 10,128 | 2.15E+08        | 14,378           | 589,000        | 1.129      | 0.135  |
|         | 2   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 14,337           | 589,000        | 1.153      | 0.138  |
|         | 3   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 14,013           | 589,000        | 1.153      | 0.135  |
|         | 4   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 14,661           | 589,000        | 1.153      | 0.141  |
|         | 5   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 14,621           | 589,000        | 1.153      | 0.141  |
|         | 6   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 14,742           | 589,000        | 1.153      | 0.142  |
|         | 7   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,026           | 589,000        | 1.153      | 0.145  |
|         | 8   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,188           | 589,000        | 1.153      | 0.146  |
|         | 9   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 14,783           | 589,000        | 1.153      | 0.142  |
|         | 10  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 14,783           | 589,000        | 1.153      | 0.142  |
|         | 11  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,431           | 589,000        | 1.178      | 0.152  |
|         | 12  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,390           | 589,000        | 1.178      | 0.151  |
|         | 13  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 13,932           | 589,000        | 1.178      | 0.137  |
|         | 14  | 0                      | 0      | 0      | 3.07E+07        | 14,297           | 589,000        | 0.000      | 0.000  |
|         | 15  | 0                      | 0      | 0      | 0.00E+00        | 13,892           | 309,000        | 0.000      | 0.000  |
|         | 16  | 0                      | 0      | 0      | 0.00E+00        | 14,094           | 309,000        | 0.000      | 0.000  |
|         | 17  | 0                      | 0      | 0      | 0.00E+00        | 13,851           | 309,000        | 0.000      | 0.000  |
|         | 18  | 0                      | 0      | 0      | 0.00E+00        | 14,337           | 309,000        | 0.000      | 0.000  |
|         | 19  | 0                      | 0      | 0      | 9.57E+06        | 13,973           | 309,000        | 0.000      | 0.000  |
|         | 20  | 5,064                  | 0      | 0      | 5.44E+07        | 14,945           | 589,000        | 0.196      | 0.024  |
|         | 21  | 10,128                 | 2,532  | 1,899  | 1.30E+08        | 13,730           | 589,000        | 0.564      | 0.065  |
|         | 22  | 10,128                 | 9,495  | 9,495  | 1.95E+08        | 13,892           | 589,000        | 1.129      | 0.131  |
|         | 23  | 10,128                 | 9,495  | 10,128 | 1.95E+08        | 13,892           | 589,000        | 1.153      | 0.134  |
|         | 24  | 10,128                 | 9,495  | 10,128 | 1.95E+08        | 15,147           | 589,000        | 1.153      | 0.146  |
|         | 25  | 10,128                 | 9,495  | 10,128 | 1.96E+08        | 14,094           | 589,000        | 1.153      | 0.136  |
|         | 26  | 10,128                 | 9,495  | 10,128 | 1.96E+08        | 14,945           | 589,000        | 1.153      | 0.144  |
|         | 27  | 10,128                 | 10,128 | 10,128 | 1.96E+08        | 14,256           | 589,000        | 1.178      | 0.140  |
|         | 28  | 0                      | 3,798  | 10,128 | 1.20E+08        | 15,188           | 589,000        | 0.540      | 0.068  |
|         | 29  | 9,495                  | 9,495  | 10,128 | 2.07E+08        | 13,973           | 589,000        | 1.129      | 0.132  |
|         | 30  | 9,495                  | 8,862  | 10,128 | 2.15E+08        | 16,605           | 589,000        | 1.104      | 0.153  |
| AVERAGE |     | 7,533                  | 6,921  | 7,469  | 1.58E+08        | 14,546           | 542,333        | 0.850      | 0.104  |

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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| MAY     | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 9,495                  | 8,862  | 10,128 | 2.15E+08        | 14,089           | 589,000        | 1.104      | 0.130  |
|         | 2   | 9,495                  | 8,862  | 10,128 | 2.15E+08        | 15,440           | 589,000        | 1.104      | 0.142  |
|         | 3   | 9,495                  | 8,862  | 10,128 | 2.15E+08        | 16,024           | 589,000        | 1.104      | 0.148  |
|         | 4   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 17,155           | 589,000        | 1.153      | 0.165  |
|         | 5   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 17,630           | 589,000        | 1.153      | 0.170  |
|         | 6   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 17,995           | 589,000        | 1.153      | 0.173  |
|         | 7   | 9,495                  | 9,495  | 10,128 | 2.15E+08        | 17,666           | 589,000        | 1.129      | 0.166  |
|         | 8   | 9,495                  | 9,495  | 10,128 | 2.15E+08        | 18,141           | 589,000        | 1.129      | 0.171  |
|         | 9   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 18,031           | 589,000        | 1.153      | 0.174  |
|         | 10  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 18,506           | 589,000        | 1.153      | 0.178  |
|         | 11  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 17,849           | 589,000        | 1.153      | 0.172  |
|         | 12  | 10,128                 | 9,495  | 10,128 | 2.11E+08        | 17,666           | 589,000        | 1.153      | 0.170  |
|         | 13  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 17,155           | 589,000        | 1.153      | 0.165  |
|         | 14  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 16,608           | 589,000        | 1.153      | 0.160  |
|         | 15  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 16,900           | 589,000        | 1.153      | 0.163  |
|         | 16  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 16,535           | 589,000        | 1.153      | 0.159  |
|         | 17  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 16,681           | 589,000        | 1.153      | 0.161  |
|         | 18  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 16,389           | 589,000        | 1.153      | 0.158  |
|         | 19  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 16,206           | 589,000        | 1.153      | 0.156  |
|         | 20  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,659           | 589,000        | 1.153      | 0.151  |
|         | 21  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,841           | 589,000        | 1.153      | 0.152  |
|         | 22  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,914           | 589,000        | 1.153      | 0.153  |
|         | 23  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 16,097           | 589,000        | 1.153      | 0.155  |
|         | 24  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,987           | 589,000        | 1.153      | 0.154  |
|         | 25  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,549           | 589,000        | 1.153      | 0.150  |
|         | 26  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,476           | 589,000        | 1.153      | 0.149  |
|         | 27  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,403           | 589,000        | 1.153      | 0.148  |
|         | 28  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,038           | 589,000        | 1.153      | 0.145  |
|         | 29  | 10,128                 | 9,495  | 10,128 | 1.91E+08        | 15,549           | 589,000        | 1.153      | 0.150  |
|         | 30  | 7,596                  | 7,596  | 7,596  | 1.79E+08        | 15,330           | 589,000        | 0.884      | 0.113  |
|         | 31  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,330           | 589,000        | 1.153      | 0.148  |
| AVERAGE |     | 9,944                  | 9,372  | 10,046 | 2.13E+08        | 16,446           | 589,000        | 1.138      | 0.156  |

ASSUMPTIONS: Drift Rate = 0.0002%

TDS ppm = 0.73 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 1990  
INPUT DATA - UNIT 3

| MAY     | DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 19,300           | 90,735       | 4                        | 4    | 4      | 45                          | 42     | 48     |
|         | 2   | 21,150           | 90,844       | 4                        | 4    | 4      | 45                          | 42     | 48     |
|         | 3   | 21,950           | 90,799       | 4                        | 4    | 4      | 45                          | 42     | 48     |
|         | 4   | 23,500           | 90,726       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 5   | 24,150           | 90,808       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 6   | 24,650           | 90,771       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 7   | 24,200           | 90,689       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 8   | 24,850           | 90,744       | 4                        | 4    | 4      | 45                          | 45     | 48     |
|         | 9   | 24,700           | 90,780       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 10  | 25,350           | 90,771       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 11  | 24,450           | 90,771       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 12  | 24,200           | 89,084       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 13  | 23,500           | 90,790       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 14  | 22,750           | 90,835       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 15  | 23,150           | 90,872       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 16  | 22,650           | 90,899       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 17  | 22,850           | 90,835       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 18  | 22,450           | 90,835       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 19  | 22,200           | 90,771       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 20  | 21,450           | 90,863       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 21  | 21,700           | 90,844       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 22  | 21,800           | 90,872       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 23  | 22,050           | 90,835       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 24  | 21,900           | 90,872       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 25  | 21,300           | 90,863       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 26  | 21,200           | 90,835       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 27  | 21,100           | 90,872       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 28  | 20,600           | 90,853       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 29  | 21,300           | 80,785       | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 30  | 21,000           | 75,432       | 4                        | 4    | 4      | 36                          | 36     | 36     |
|         | 31  | 21,000           | 90,835       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| AVERAGE |     | 22,529           | 89,939       | 4                        | 4    | 4      | 47                          | 44     | 48     |

ASSUMPTIONS: Drift Rate = 0.0002%  
TDS ppm = 0.73 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 1990  
INPUT DATA - UNIT 3

| JUNE    | DAY | CW CONDUCTIVITY<br>DATA | THERMAL<br>GEN | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------|----------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | umhos/cm                | MWt/d          | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 21,500                  | 90,881         | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 2   | 21,400                  | 90,872         | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 3   | 21,650                  | 90,872         | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 4   | 21,800                  | 90,817         | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 5   | 23,000                  | 90,844         | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 6   | 23,100                  | 90,853         | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 7   | 23,000                  | 90,808         | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 8   | 23,250                  | 90,799         | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 9   | 24,300                  | 89,330         | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 10  | 23,750                  | 90,835         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 11  | 23,250                  | 90,780         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 12  | 23,200                  | 90,844         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 13  | 22,750                  | 90,863         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 14  | 22,500                  | 90,826         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 15  | 22,900                  | 90,835         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 16  | 22,250                  | 90,780         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 17  | 22,500                  | 90,817         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 18  | 22,100                  | 90,872         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 19  | 25,200                  | 90,881         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 20  | 23,150                  | 90,835         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 21  | 24,800                  | 90,735         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 22  | 24,450                  | 90,835         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 23  | 24,950                  | 90,780         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 24  | 25,400                  | 90,835         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 25  | 25,350                  | 90,817         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 26  | 25,300                  | 90,826         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 27  | 25,550                  | 90,790         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 28  | 27,000                  | 90,826         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 29  | 27,450                  | 90,771         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 30  | 26,700                  | 90,881         | 4                        | 4    | 4      | 48                          | 48     | 48     |
| AVERAGE |     | 23,783                  | 90,778         | 4                        | 4    | 4      | 48                          | 47     | 48     |

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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| JUNE    | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,910           | 589,000        | 1.153      | 0.153  |
|         | 2   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 15,836           | 589,000        | 1.153      | 0.152  |
|         | 3   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 16,021           | 589,000        | 1.153      | 0.154  |
|         | 4   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 16,132           | 589,000        | 1.153      | 0.155  |
|         | 5   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 17,020           | 589,000        | 1.153      | 0.164  |
|         | 6   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 17,094           | 589,000        | 1.153      | 0.165  |
|         | 7   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 17,020           | 589,000        | 1.153      | 0.164  |
|         | 8   | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 17,205           | 589,000        | 1.153      | 0.166  |
|         | 9   | 10,128                 | 9,495  | 10,128 | 2.12E+08        | 17,982           | 589,000        | 1.153      | 0.173  |
|         | 10  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,575           | 589,000        | 1.178      | 0.173  |
|         | 11  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,205           | 589,000        | 1.178      | 0.169  |
|         | 12  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,168           | 589,000        | 1.178      | 0.169  |
|         | 13  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,835           | 589,000        | 1.178      | 0.165  |
|         | 14  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,650           | 589,000        | 1.178      | 0.164  |
|         | 15  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,946           | 589,000        | 1.178      | 0.167  |
|         | 16  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,465           | 589,000        | 1.178      | 0.162  |
|         | 17  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,650           | 589,000        | 1.178      | 0.164  |
|         | 18  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,354           | 589,000        | 1.178      | 0.161  |
|         | 19  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,648           | 589,000        | 1.178      | 0.183  |
|         | 20  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,131           | 589,000        | 1.178      | 0.168  |
|         | 21  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,352           | 589,000        | 1.178      | 0.180  |
|         | 22  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,093           | 589,000        | 1.178      | 0.178  |
|         | 23  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,463           | 589,000        | 1.178      | 0.181  |
|         | 24  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,796           | 589,000        | 1.178      | 0.185  |
|         | 25  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,759           | 589,000        | 1.178      | 0.184  |
|         | 26  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,722           | 589,000        | 1.178      | 0.184  |
|         | 27  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,907           | 589,000        | 1.178      | 0.186  |
|         | 28  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,980           | 589,000        | 1.178      | 0.196  |
|         | 29  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,313           | 589,000        | 1.178      | 0.200  |
|         | 30  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,758           | 589,000        | 1.178      | 0.194  |
| AVERAGE |     | 10,128                 | 9,938  | 10,128 | 2.15E+08        | 17,600           | 589,000        | 1.171      | 0.172  |

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 1990  
INPUT DATA - UNIT 3

| JULY    | DAY | CW CONDUCTIVITY<br>DATA<br>umhos/cm | THERMAL<br>GEN<br>Mwt/d | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------------------|-------------------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     |                                     |                         | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 27,300                              | 90,844                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 2   | 27,350                              | 90,790                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 3   | 26,200                              | 90,817                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 4   | 26,150                              | 90,808                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 5   | 25,400                              | 90,799                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 6   | 26,400                              | 90,853                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 7   | 25,700                              | 89,349                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 8   | 25,600                              | 90,790                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 9   | 25,900                              | 90,863                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 10  | 25,700                              | 90,826                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 11  | 25,850                              | 90,762                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 12  | 25,650                              | 90,808                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 13  | 24,950                              | 90,853                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 14  | 24,800                              | 90,890                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 15  | 24,450                              | 90,890                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 16  | 24,500                              | 90,808                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 17  | 24,550                              | 90,835                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 18  | 24,150                              | 90,853                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 19  | 24,250                              | 90,853                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 20  | 25,650                              | 90,853                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 21  | 26,450                              | 90,826                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 22  | 24,800                              | 90,881                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 23  | 24,800                              | 90,844                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 24  | 25,150                              | 90,872                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 25  | 24,550                              | 90,872                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 26  | 24,375                              | 90,826                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 27  | 24,300                              | 90,872                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 28  | 24,400                              | 90,853                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 29  | 23,850                              | 90,835                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 30  | 24,950                              | 90,844                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 31  | 25,200                              | 90,808                  | 4                        | 4    | 4      | 48                          | 48     | 48     |
| AVERAGE |     | 25,269                              | 90,790                  | 4                        | 4    | 4      | 48                          | 48     | 48     |

ASSUMPTIONS: Drift Rate = 0.0002%

TDS ppm = 0.69 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| JULY    | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,837           | 589,000        | 1.178      | 0.185  |
|         | 2   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,872           | 589,000        | 1.178      | 0.186  |
|         | 3   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,078           | 589,000        | 1.178      | 0.178  |
|         | 4   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,044           | 589,000        | 1.178      | 0.177  |
|         | 5   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,526           | 589,000        | 1.178      | 0.172  |
|         | 6   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,216           | 589,000        | 1.178      | 0.179  |
|         | 7   | 10,128                 | 10,128 | 10,128 | 2.12E+08        | 17,733           | 589,000        | 1.178      | 0.174  |
|         | 8   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,664           | 589,000        | 1.178      | 0.174  |
|         | 9   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,871           | 589,000        | 1.178      | 0.176  |
|         | 10  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,733           | 589,000        | 1.178      | 0.174  |
|         | 11  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,837           | 589,000        | 1.178      | 0.175  |
|         | 12  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,699           | 589,000        | 1.178      | 0.174  |
|         | 13  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,216           | 589,000        | 1.178      | 0.169  |
|         | 14  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,112           | 589,000        | 1.178      | 0.168  |
|         | 15  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,871           | 589,000        | 1.178      | 0.166  |
|         | 16  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,905           | 589,000        | 1.178      | 0.166  |
|         | 17  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,940           | 589,000        | 1.178      | 0.167  |
|         | 18  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,664           | 589,000        | 1.178      | 0.164  |
|         | 19  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,733           | 589,000        | 1.178      | 0.164  |
|         | 20  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,699           | 589,000        | 1.178      | 0.174  |
|         | 21  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,251           | 589,000        | 1.178      | 0.179  |
|         | 22  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,112           | 589,000        | 1.178      | 0.168  |
|         | 23  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,112           | 589,000        | 1.178      | 0.168  |
|         | 24  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,354           | 589,000        | 1.178      | 0.171  |
|         | 25  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,940           | 589,000        | 1.178      | 0.167  |
|         | 26  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,819           | 589,000        | 1.178      | 0.165  |
|         | 27  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,767           | 589,000        | 1.178      | 0.165  |
|         | 28  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,836           | 589,000        | 1.178      | 0.166  |
|         | 29  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,457           | 589,000        | 1.178      | 0.162  |
|         | 30  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,216           | 589,000        | 1.178      | 0.169  |
|         | 31  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,388           | 589,000        | 1.178      | 0.171  |
| AVERAGE |     | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,435           | 589,000        | 1.178      | 0.171  |

ASSUMPTIONS: Drift Rate = 0.0002%  
TDS ppm = 0.69 x Conductivity, umhos/cm<sup>2</sup>  
Airflow = 64.4 E 06 cfm/ 48 fans  
CW Flow = (No pumps x 140,000) + 29,000 gpm

## COOLING TOWER SOURCE TERM

FOR 1990

INPUT DATA - UNIT 3

| AUGUST  | DAY | CW CONDUCTIVITY<br>DATA | THERMAL<br>GEN | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------|----------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | umhos/cm                | MWt/d          | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 25,600                  | 90,881         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 2   | 26,850                  | 90,853         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 3   | 26,100                  | 90,817         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 4   | 26,400                  | 88,728         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 5   | 27,000                  | 64,095         | 4                        | 4    | 4      | 40                          | 40     | 40     |
|         | 6   | 25,500                  | 0              | 4                        | 4    | 4      | 0                           | 0      | 0      |
|         | 7   | 23,400                  | 10,616         | 4                        | 4    | 4      | 6                           | 6      | 0      |
|         | 8   | 22,600                  | 52,057         | 4                        | 4    | 4      | 37                          | 44     | 17     |
|         | 9   | 22,750                  | 89,622         | 4                        | 4    | 4      | 47                          | 48     | 47     |
|         | 10  | 23,450                  | 90,826         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 11  | 25,000                  | 90,835         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 12  | 25,300                  | 90,826         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 13  | 26,300                  | 90,771         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 14  | 26,100                  | 90,835         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 15  | 26,200                  | 90,799         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 16  | 27,850                  | 90,817         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 17  | 28,050                  | 90,844         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 18  | 28,400                  | 90,908         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 19  | 28,350                  | 90,890         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 20  | 29,750                  | 90,853         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 21  | 29,500                  | 90,835         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 22  | 30,300                  | 90,890         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 23  | 30,400                  | 90,890         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 24  | 27,600                  | 90,844         | 4                        | 4    | 4      | 48                          | 46     | 48     |
|         | 25  | 27,950                  | 90,863         | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 26  | 27,550                  | 90,835         | 4                        | 4    | 4      | 48                          | 45     | 48     |
|         | 27  | 26,000                  | 90,835         | 4                        | 4    | 4      | 48                          | 46     | 48     |
|         | 28  | 26,200                  | 90,844         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 29  | 25,350                  | 90,853         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 30  | 24,850                  | 90,817         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 31  | 25,100                  | 90,817         | 4                        | 4    | 4      | 48                          | 48     | 48     |
| AVERAGE |     | 26,508                  | 83,103         | 4                        | 4    | 4      | 44                          | 44     | 44     |

ASSUMPTIONS: Drift Rate = 0.0002%

TDS ppm = 1.15 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| AUGUST  | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 29,440           | 589,000        | 1.178      | 0.289  |
|         | 2   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 30,877           | 589,000        | 1.178      | 0.304  |
|         | 3   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 30,015           | 589,000        | 1.178      | 0.295  |
|         | 4   | 10,128                 | 10,128 | 10,128 | 2.10E+08        | 30,360           | 589,000        | 1.178      | 0.298  |
|         | 5   | 8,440                  | 8,440  | 8,440  | 1.52E+08        | 31,050           | 589,000        | 0.982      | 0.254  |
|         | 6   | 0                      | 0      | 0      | 0.00E+00        | 29,325           | 589,000        | 0.000      | 0.000  |
|         | 7   | 1,266                  | 1,266  | 0      | 2.52E+07        | 26,910           | 589,000        | 0.098      | 0.022  |
|         | 8   | 7,807                  | 9,284  | 3,587  | 1.23E+08        | 25,990           | 589,000        | 0.802      | 0.174  |
|         | 9   | 9,917                  | 10,128 | 9,917  | 2.12E+08        | 26,162           | 589,000        | 1.162      | 0.254  |
|         | 10  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 26,967           | 589,000        | 1.178      | 0.265  |
|         | 11  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 28,750           | 589,000        | 1.178      | 0.283  |
|         | 12  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 29,095           | 589,000        | 1.178      | 0.286  |
|         | 13  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 30,245           | 589,000        | 1.178      | 0.297  |
|         | 14  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 30,015           | 589,000        | 1.178      | 0.295  |
|         | 15  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 30,130           | 589,000        | 1.178      | 0.296  |
|         | 16  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 32,027           | 589,000        | 1.178      | 0.315  |
|         | 17  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 32,257           | 589,000        | 1.178      | 0.317  |
|         | 18  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 32,660           | 589,000        | 1.178      | 0.321  |
|         | 19  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 32,602           | 589,000        | 1.178      | 0.320  |
|         | 20  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 34,213           | 589,000        | 1.178      | 0.336  |
|         | 21  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 33,925           | 589,000        | 1.178      | 0.333  |
|         | 22  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 34,845           | 589,000        | 1.178      | 0.343  |
|         | 23  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 34,960           | 589,000        | 1.178      | 0.344  |
|         | 24  | 10,128                 | 9,706  | 10,128 | 2.15E+08        | 31,740           | 589,000        | 1.162      | 0.308  |
|         | 25  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 32,142           | 589,000        | 1.153      | 0.309  |
|         | 26  | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 31,682           | 589,000        | 1.153      | 0.305  |
|         | 27  | 10,128                 | 9,706  | 10,128 | 2.15E+08        | 29,900           | 589,000        | 1.162      | 0.290  |
|         | 28  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 30,130           | 589,000        | 1.178      | 0.296  |
|         | 29  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 29,152           | 589,000        | 1.178      | 0.287  |
|         | 30  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 28,577           | 589,000        | 1.178      | 0.281  |
|         | 31  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 28,865           | 589,000        | 1.178      | 0.284  |
| AVERAGE |     | 9,379                  | 9,366  | 9,202  | 1.97E+08        | 30,484           | 589,000        | 1.084      | 0.277  |

ASSUMPTIONS: Drift Rate = 0.0002%  
TDS ppm = 1.15 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 1990  
INPUT DATA - UNIT 3

| SEPTEMBER DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------------|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|               | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
| 1             | 24,900           | 90,835       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 2             | 25,700           | 90,826       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 3             | 25,450           | 90,835       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 4             | 25,300           | 90,926       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 5             | 25,900           | 90,863       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 6             | 29,650           | 90,771       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 7             | 29,100           | 90,826       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 8             | 29,350           | 66,950       | 4                        | 4    | 4      | 30                          | 48     | 48     |
| 9             | 28,250           | 64,260       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 10            | 28,850           | 89,732       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 11            | 28,950           | 90,799       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 12            | 31,350           | 90,826       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 13            | 31,750           | 90,835       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 14            | 33,450           | 90,863       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 15            | 33,400           | 90,863       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 16            | 30,900           | 90,844       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 17            | 29,800           | 90,835       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 18            | 30,950           | 90,771       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 19            | 30,600           | 89,285       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 20            | 30,700           | 89,868       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 21            | 31,600           | 90,844       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 22            | 29,650           | 90,863       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 23            | 29,700           | 90,872       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 24            | 29,800           | 90,799       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 25            | 29,650           | 90,844       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 26            | 29,300           | 90,826       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 27            | 28,950           | 90,826       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 28            | 29,200           | 90,808       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 29            | 28,950           | 89,385       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 30            | 29,700           | 90,881       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| AVERAGE       | 29,360           | 88,985       | 4                        | 4    | 4      | 47                          | 48     | 48     |

ASSUMPTIONS: Drift Rate = 0.0002%  
TDS ppm = 0.69 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| SEPTEMBER DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|               | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,181           | 589,000        | 1.178      | 0.169  |
| 2             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,733           | 589,000        | 1.178      | 0.174  |
| 3             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,561           | 589,000        | 1.178      | 0.173  |
| 4             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,457           | 589,000        | 1.178      | 0.172  |
| 5             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,871           | 589,000        | 1.178      | 0.176  |
| 6             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,459           | 589,000        | 1.178      | 0.201  |
| 7             | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,079           | 589,000        | 1.178      | 0.197  |
| 8             | 6,330                  | 10,128 | 10,128 | 1.59E+08        | 20,252           | 589,000        | 1.031      | 0.174  |
| 9             | 10,128                 | 10,128 | 10,128 | 1.52E+08        | 19,493           | 589,000        | 1.178      | 0.192  |
| 10            | 10,128                 | 10,128 | 10,128 | 2.13E+08        | 19,907           | 589,000        | 1.178      | 0.196  |
| 11            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,976           | 589,000        | 1.178      | 0.196  |
| 12            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 21,632           | 589,000        | 1.178      | 0.213  |
| 13            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 21,908           | 589,000        | 1.178      | 0.215  |
| 14            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 23,081           | 589,000        | 1.178      | 0.227  |
| 15            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 23,046           | 589,000        | 1.178      | 0.227  |
| 16            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 21,321           | 589,000        | 1.178      | 0.210  |
| 17            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,562           | 589,000        | 1.178      | 0.202  |
| 18            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 21,356           | 589,000        | 1.178      | 0.210  |
| 19            | 10,128                 | 10,128 | 10,128 | 2.12E+08        | 21,114           | 589,000        | 1.178      | 0.208  |
| 20            | 10,128                 | 10,128 | 10,128 | 2.13E+08        | 21,183           | 589,000        | 1.178      | 0.208  |
| 21            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 21,804           | 589,000        | 1.178      | 0.214  |
| 22            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,459           | 589,000        | 1.178      | 0.201  |
| 23            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,493           | 589,000        | 1.178      | 0.201  |
| 24            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,562           | 589,000        | 1.178      | 0.202  |
| 25            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,459           | 589,000        | 1.178      | 0.201  |
| 26            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,217           | 589,000        | 1.178      | 0.199  |
| 27            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,976           | 589,000        | 1.178      | 0.196  |
| 28            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 20,148           | 589,000        | 1.178      | 0.198  |
| 29            | 10,128                 | 10,128 | 10,128 | 2.12E+08        | 19,976           | 589,000        | 1.178      | 0.196  |
| 30            | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 20,493           | 589,000        | 1.153      | 0.197  |
| AVERAGE       | 10,001                 | 10,128 | 10,107 | 2.11E+08        | 20,258           | 589,000        | 1.172      | 0.198  |

ASSUMPTIONS: Drift Rate = 0.0002%  
TDS ppm = 0.69 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 1990  
INPUT DATA - UNIT 3

| OCTOBER | DAY | CW CONDUCTIVITY<br>DATA | THERMAL<br>GEN | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|---------|-----|-------------------------|----------------|--------------------------|------|--------|-----------------------------|--------|--------|
|         |     | umhos/cm                | MWt/d          | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
|         | 1   | 30,550                  | 91,009         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 2   | 30,000                  | 90,881         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 3   | 30,150                  | 90,917         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 4   | 30,200                  | 90,936         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 5   | 30,150                  | 90,890         | 4                        | 4    | 4      | 48                          | 48     | 45     |
|         | 6   | 30,200                  | 90,926         | 4                        | 4    | 4      | 48                          | 48     | 46     |
|         | 7   | 30,900                  | 90,936         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 8   | 30,100                  | 90,890         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 9   | 29,450                  | 90,945         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 10  | 26,850                  | 90,908         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 11  | 26,650                  | 90,917         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 12  | 26,150                  | 90,954         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 13  | 25,400                  | 90,890         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 14  | 24,700                  | 90,908         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 15  | 23,950                  | 90,899         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 16  | 23,455                  | 90,917         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 17  | 23,000                  | 90,908         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 18  | 22,150                  | 90,899         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 19  | 21,800                  | 90,954         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 20  | 20,850                  | 49,257         | 4                        | 4    | 4      | 40                          | 40     | 39     |
|         | 21  | 18,300                  | 2,134          | 4                        | 4    | 4      | 0                           | 0      | 0      |
|         | 22  | 17,750                  | 30,908         | 4                        | 4    | 4      | 17                          | 5      | 0      |
|         | 23  | 17,100                  | 87,114         | 4                        | 4    | 4      | 48                          | 41     | 22     |
|         | 24  | 19,800                  | 90,872         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 25  | 20,650                  | 90,917         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 26  | 23,300                  | 90,908         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 27  | 22,350                  | 90,954         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 28  | 22,650                  | 90,899         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 29  | 23,350                  | 90,844         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 30  | 23,100                  | 90,872         | 4                        | 4    | 4      | 48                          | 48     | 48     |
|         | 31  | 23,100                  | 90,899         | 4                        | 4    | 4      | 48                          | 48     | 48     |
| AVERAGE |     | 24,778                  | 84,647         | 4                        | 4    | 4      | 45                          | 45     | 43     |

ASSUMPTIONS: Drift Rate = 0.0002%

TDS ppm = 0.71 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| OCTOBER | DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|---------|-----|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|         |     | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
|         | 1   | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 21,691           | 589,000        | 1.153      | 0.209  |
|         | 2   | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 21,300           | 589,000        | 1.153      | 0.205  |
|         | 3   | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 21,407           | 589,000        | 1.153      | 0.206  |
|         | 4   | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 21,442           | 589,000        | 1.153      | 0.206  |
|         | 5   | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 21,407           | 589,000        | 1.153      | 0.206  |
|         | 6   | 10,128                 | 10,128 | 9,706  | 2.15E+08        | 21,442           | 589,000        | 1.162      | 0.208  |
|         | 7   | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 21,939           | 589,000        | 1.178      | 0.216  |
|         | 8   | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 21,371           | 589,000        | 1.178      | 0.210  |
|         | 9   | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 20,910           | 589,000        | 1.178      | 0.206  |
|         | 10  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 19,064           | 589,000        | 1.178      | 0.187  |
|         | 11  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,922           | 589,000        | 1.178      | 0.186  |
|         | 12  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 18,567           | 589,000        | 1.178      | 0.183  |
|         | 13  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 18,034           | 589,000        | 1.178      | 0.177  |
|         | 14  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,537           | 589,000        | 1.178      | 0.172  |
|         | 15  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,005           | 589,000        | 1.178      | 0.167  |
|         | 16  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,653           | 589,000        | 1.178      | 0.164  |
|         | 17  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,330           | 589,000        | 1.178      | 0.161  |
|         | 18  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,727           | 589,000        | 1.178      | 0.155  |
|         | 19  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 15,478           | 589,000        | 1.178      | 0.152  |
|         | 20  | 8,440                  | 8,440  | 8,229  | 1.17E+08        | 14,804           | 589,000        | 0.973      | 0.120  |
|         | 21  | 0                      | 0      | 0      | 5.06E+06        | 12,993           | 589,000        | 0.000      | 0.000  |
|         | 22  | 3,587                  | 1,055  | 0      | 7.33E+07        | 12,603           | 589,000        | 0.180      | 0.019  |
|         | 23  | 10,128                 | 8,651  | 4,642  | 2.06E+08        | 12,141           | 589,000        | 0.908      | 0.092  |
|         | 24  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 14,058           | 589,000        | 1.178      | 0.138  |
|         | 25  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 14,662           | 589,000        | 1.178      | 0.144  |
|         | 26  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,543           | 589,000        | 1.178      | 0.163  |
|         | 27  | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 15,869           | 589,000        | 1.178      | 0.156  |
|         | 28  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,082           | 589,000        | 1.178      | 0.158  |
|         | 29  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,579           | 589,000        | 1.178      | 0.163  |
|         | 30  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,401           | 589,000        | 1.178      | 0.161  |
|         | 31  | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,401           | 589,000        | 1.178      | 0.161  |
| AVERAGE |     | 9,536                  | 9,407  | 9,121  | 2.01E+08        | 17,592           | 589,000        | 1.088      | 0.163  |

ASSUMPTIONS: Drift Rate = 0.0002%  
TDS ppm = 0.71 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 1990  
INPUT DATA - UNIT 3

| NOVEMBER DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|--------------|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|              | DATA<br>umhos/cm | GEN<br>Hwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
| 1            | 22,550           | 90,844       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 2            | 22,100           | 90,872       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 3            | 21,400           | 90,926       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 4            | 20,550           | 90,908       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 5            | 20,150           | 90,917       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 6            | 20,100           | 90,917       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 7            | 20,100           | 90,908       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 8            | 20,050           | 90,923       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 9            | 17,800           | 90,923       | 4                        | 4    | 4      | 48                          | 47     | 48     |
| 10           | 18,700           | 90,963       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 11           | 19,000           | 90,899       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 12           | 19,600           | 90,881       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 13           | 20,100           | 90,890       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 14           | 19,500           | 90,908       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 15           | 19,300           | 90,863       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 16           | 19,000           | 90,890       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 17           | 19,700           | 90,914       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 18           | 19,300           | 90,790       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 19           | 19,400           | 90,835       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 20           | 20,500           | 90,904       | 4                        | 4    | 4      | 48                          | 48     | 47     |
| 21           | 19,500           | 90,908       | 4                        | 4    | 4      | 48                          | 48     | 47     |
| 22           | 18,800           | 90,863       | 4                        | 4    | 4      | 48                          | 48     | 47     |
| 23           | 18,700           | 90,863       | 4                        | 4    | 4      | 48                          | 48     | 47     |
| 24           | 18,500           | 90,899       | 4                        | 4    | 4      | 48                          | 48     | 47     |
| 25           | 19,500           | 90,863       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 26           | 21,300           | 88,245       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 27           | 18,200           | 90,822       | 4                        | 4    | 4      | 46                          | 48     | 48     |
| 28           | 18,300           | 90,881       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 29           | 18,500           | 90,899       | 4                        | 4    | 4      | 48                          | 48     | 46     |
| 30           | 18,800           | 90,936       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| AVERAGE      | 19,633           | 90,802       | 4                        | 4    | 4      | 48                          | 48     | 48     |

ASSUMPTIONS: Drift Rate = 0.0002%

TDS ppm = 0.77 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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| NOVEMBER DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|--------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|              | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,364           | 589,000        | 1.178      | 0.171  |
| 2            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 17,017           | 589,000        | 1.178      | 0.167  |
| 3            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 16,478           | 589,000        | 1.178      | 0.162  |
| 4            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,824           | 589,000        | 1.178      | 0.156  |
| 5            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,516           | 589,000        | 1.178      | 0.153  |
| 6            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,477           | 589,000        | 1.178      | 0.152  |
| 7            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,477           | 589,000        | 1.178      | 0.152  |
| 8            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,439           | 589,000        | 1.178      | 0.152  |
| 9            | 10,128                 | 9,917  | 10,128 | 2.15E+08        | 13,706           | 589,000        | 1.170      | 0.134  |
| 10           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 14,399           | 589,000        | 1.178      | 0.142  |
| 11           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 14,630           | 589,000        | 1.178      | 0.144  |
| 12           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,092           | 589,000        | 1.178      | 0.148  |
| 13           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,477           | 589,000        | 1.178      | 0.152  |
| 14           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,015           | 589,000        | 1.178      | 0.148  |
| 15           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 14,861           | 589,000        | 1.178      | 0.146  |
| 16           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 14,630           | 589,000        | 1.178      | 0.144  |
| 17           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,169           | 589,000        | 1.178      | 0.149  |
| 18           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 14,861           | 589,000        | 1.178      | 0.146  |
| 19           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 14,938           | 589,000        | 1.178      | 0.147  |
| 20           | 10,128                 | 10,128 | 9,917  | 2.15E+08        | 15,785           | 589,000        | 1.170      | 0.154  |
| 21           | 10,128                 | 10,128 | 9,917  | 2.15E+08        | 15,015           | 589,000        | 1.170      | 0.147  |
| 22           | 10,128                 | 10,128 | 9,917  | 2.15E+08        | 14,476           | 589,000        | 1.170      | 0.141  |
| 23           | 10,128                 | 10,128 | 9,917  | 2.15E+08        | 14,399           | 589,000        | 1.170      | 0.141  |
| 24           | 10,128                 | 10,128 | 9,917  | 2.15E+08        | 14,245           | 589,000        | 1.170      | 0.139  |
| 25           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 15,015           | 589,000        | 1.178      | 0.148  |
| 26           | 10,128                 | 10,128 | 10,128 | 2.09E+08        | 16,401           | 589,000        | 1.178      | 0.161  |
| 27           | 9,706                  | 10,128 | 10,128 | 2.15E+08        | 14,014           | 589,000        | 1.162      | 0.136  |
| 28           | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 14,091           | 589,000        | 1.153      | 0.136  |
| 29           | 10,128                 | 10,128 | 9,706  | 2.15E+08        | 14,245           | 589,000        | 1.162      | 0.138  |
| 30           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 14,476           | 589,000        | 1.178      | 0.142  |
| AVERAGE      | 10,114                 | 10,121 | 10,058 | 2.15E+08        | 15,118           | 589,000        | 1.174      | 0.148  |

ASSUMPTIONS: Drift Rate = 0.0002%  
TDS ppm = 0.77 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 1990  
INPUT DATA - UNIT 3

| DECEMBER DAY | CW CONDUCTIVITY  | THERMAL      | CW FLOW - No PUMPS/SHIFT |      |        | SUM - FANS OPER IN EA SHIFT |        |        |
|--------------|------------------|--------------|--------------------------|------|--------|-----------------------------|--------|--------|
|              | DATA<br>umhos/cm | GEN<br>Mwt/d | Mids                     | Days | Swings | Twr 01                      | Twr 02 | Twr 03 |
| 1            | 18,600           | 91,045       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 2            | 18,300           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 3            | 19,900           | 90,972       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 4            | 20,600           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 5            | 19,000           | 90,981       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 6            | 18,600           | 90,926       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 7            | 20,300           | 90,936       | 4                        | 4    | 4      | 42                          | 46     | 48     |
| 8            | 19,800           | 90,917       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 9            | 19,900           | 90,981       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 10           | 19,300           | 91,008       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 11           | 19,300           | 91,027       | 4                        | 4    | 4      | 48                          | 46     | 48     |
| 12           | 20,400           | 91,072       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 13           | 20,800           | 91,036       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 14           | 17,800           | 90,936       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 15           | 18,100           | 90,936       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 16           | 18,900           | 90,936       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 17           | 16,900           | 90,990       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 18           | 16,900           | 90,981       | 4                        | 4    | 4      | 48                          | 45     | 48     |
| 19           | 16,800           | 91,008       | 4                        | 4    | 4      | 48                          | 46     | 48     |
| 20           | 16,300           | 90,881       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 21           | 15,800           | 90,990       | 4                        | 4    | 4      | 48                          | 48     | 48     |
| 22           | 16,600           | 91,008       | 4                        | 4    | 4      | 48                          | 48     | 45     |
| 23           | 16,600           | 90,990       | 4                        | 4    | 4      | 40                          | 38     | 39     |
| 24           | 16,200           | 90,899       | 4                        | 4    | 4      | 44                          | 42     | 36     |
| 25           | 14,500           | 88,738       | 4                        | 4    | 4      | 45                          | 38     | 34     |
| 26           | 16,800           | 38,523       | 4                        | 2    | 2      | 14                          | 8      | 7      |
| 27           | 17,800           | 53,507       | 2                        | 4    | 4      | 15                          | 8      | 0      |
| 28           | 17,400           | 88,856       | 2                        | 4    | 4      | 44                          | 48     | 30     |
| 29           | 18,100           | 90,863       | 2                        | 4    | 4      | 48                          | 48     | 45     |
| 30           | 17,400           | 90,954       | 2                        | 4    | 4      | 48                          | 48     | 45     |
| 31           | 16,100           | 90,954       | 4                        | 4    | 4      | 48                          | 39     | 38     |
| AVERAGE      | 18,058           | 87,930       | 4                        | 4    | 4      | 45                          | 43     | 43     |

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 1990  
CALCULATED TOWER PERFORMANCE PARAMETERS - UNIT 3

| DECEMBER DAY | Airflow /Tower. cu m/s |        |        | Heat<br>BTU/min | Calc<br>TDS, ppm | CW Flow<br>gpm | Calc Drift |        |
|--------------|------------------------|--------|--------|-----------------|------------------|----------------|------------|--------|
|              | Twr 01                 | Twr 02 | Twr 03 |                 |                  |                | gpm        | lb/min |
| 1            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 13,764           | 589,000        | 1.178      | 0.135  |
| 2            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 13,542           | 589,000        | 1.178      | 0.133  |
| 3            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 14,726           | 589,000        | 1.178      | 0.145  |
| 4            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 15,244           | 589,000        | 1.178      | 0.150  |
| 5            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 14,060           | 589,000        | 1.178      | 0.138  |
| 6            | 10,128                 | 9,495  | 10,128 | 2.15E+08        | 13,764           | 589,000        | 1.153      | 0.132  |
| 7            | 8,862                  | 9,706  | 10,128 | 2.16E+08        | 15,022           | 589,000        | 1.113      | 0.139  |
| 8            | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 14,652           | 589,000        | 1.178      | 0.144  |
| 9            | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 14,726           | 589,000        | 1.178      | 0.145  |
| 10           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 14,282           | 589,000        | 1.178      | 0.140  |
| 11           | 10,128                 | 9,706  | 10,128 | 2.16E+08        | 14,282           | 589,000        | 1.162      | 0.138  |
| 12           | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 15,096           | 589,000        | 1.153      | 0.145  |
| 13           | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 15,392           | 589,000        | 1.153      | 0.148  |
| 14           | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 13,172           | 589,000        | 1.153      | 0.127  |
| 15           | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 13,394           | 589,000        | 1.153      | 0.129  |
| 16           | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 13,986           | 589,000        | 1.153      | 0.135  |
| 17           | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 12,506           | 589,000        | 1.153      | 0.120  |
| 18           | 10,128                 | 9,495  | 10,128 | 2.16E+08        | 12,506           | 589,000        | 1.153      | 0.120  |
| 19           | 10,128                 | 9,706  | 10,128 | 2.16E+08        | 12,432           | 589,000        | 1.162      | 0.121  |
| 20           | 10,128                 | 10,128 | 10,128 | 2.15E+08        | 12,062           | 589,000        | 1.178      | 0.119  |
| 21           | 10,128                 | 10,128 | 10,128 | 2.16E+08        | 11,692           | 589,000        | 1.178      | 0.115  |
| 22           | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 12,284           | 589,000        | 1.153      | 0.118  |
| 23           | 8,440                  | 8,018  | 8,229  | 2.16E+08        | 12,284           | 589,000        | 0.957      | 0.098  |
| 24           | 9,284                  | 8,862  | 7,596  | 2.15E+08        | 11,988           | 589,000        | 0.998      | 0.100  |
| 25           | 9,495                  | 8,018  | 7,174  | 2.10E+08        | 10,730           | 589,000        | 0.957      | 0.086  |
| 26           | 2,954                  | 1,688  | 1,477  | 9.13E+07        | 12,432           | 402,333        | 0.162      | 0.017  |
| 27           | 3,165                  | 1,688  | 0      | 1.27E+08        | 13,172           | 495,667        | 0.158      | 0.017  |
| 28           | 9,284                  | 10,128 | 6,330  | 2.11E+08        | 12,876           | 495,667        | 0.840      | 0.090  |
| 29           | 10,128                 | 10,128 | 9,495  | 2.15E+08        | 13,394           | 495,667        | 0.971      | 0.108  |
| 30           | 10,128                 | 10,128 | 9,495  | 2.16E+08        | 12,876           | 495,667        | 0.971      | 0.104  |
| 31           | 10,128                 | 8,229  | 8,018  | 2.16E+08        | 11,914           | 589,000        | 1.023      | 0.102  |
| AVERAGE      | 9,502                  | 9,141  | 9,032  | 2.08E+08        | 13,363           | 570,935        | 1.053      | 0.118  |

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

## 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 1990 during which the units were operating: July through December for Unit 1; January, February, and June through December for Unit 2; and February through December for Unit 3. No sample was taken during April for either Units 1, 2, or 3. Values below the detectable limit of the laboratory procedure are preceded by minus signs. Missing data are represented by a field of "9s."



# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

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 Lab Designation 9999-99999-9-9  
 Sponsor Designation UNIT1  
 Cooling Tower 1  
 Sample Date 01/16/90

### Determination (mg/l) -----

|                       |         |
|-----------------------|---------|
| Calcium, total        | 999     |
| Magnesium, total      | 999.9   |
| Sodium, total         | 9999    |
| Chloride              | 9999    |
| Sulfate (as SO4)      | 9999    |
| Nitrate (as N)        | 999.9   |
| Silica (as SiO2)      | 999     |
| Phosphate             | 99.99   |
| Fluoride              | 999.9   |
| Potassium, total      | 999     |
| Copper, total         | 99.999  |
| Zinc, total           | 99.999  |
| Iron, total           | 99.99   |
| Arsenic, total        | 99.999  |
| Boron.                | 99.9    |
| Ammonium              | 99.9    |
| TSS (at 105 Deg C)    | 999     |
| COD                   | 9999    |
| Alkalinity, total     | 999     |
| TDS (at 180 Deg C)    | 99999   |
| Silver, total         | 99.999  |
| Barium, total         | 99.9    |
| Cadmium, total        | 99.999  |
| Chromium, total       | 99.999  |
| Lead, total           | 99.999  |
| Mercury, total        | 99.9999 |
| Beryllium, total      | 99.999  |
| Selenium, total       | 99.999  |
| Manganese, total      | 99.999  |
| Phenol                | 99.999  |
| Conductivity mmhos/cm | 99999   |

# 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

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|                     |                |
|---------------------|----------------|
| Lab Designation     | 8928-32904-1-1 |
| Sponsor Designation | UNIT2          |
| Cooling Tower       | 2              |
| Sample Date         | 01/16/90       |

### Determination (mg/l)

---

|                               |         |
|-------------------------------|---------|
| Calcium, total                | 360     |
| Magnesium, total              | 28.0    |
| Sodium, total                 | 4300    |
| Chloride                      | 4700    |
| Sulfate (as SO <sub>4</sub> ) | 4100    |
| Nitrate (as N)                | 250.0   |
| Silica (as SiO <sub>2</sub> ) | 94      |
| Phosphate                     | 1.10    |
| Fluoride                      | 3.4     |
| Potassium, total              | 190     |
| Copper, total                 | 0.052   |
| Zinc, total                   | 0.070   |
| Iron, total                   | 0.58    |
| Arsenic, total                | 0.030   |
| Boron                         | 4.9     |
| Ammonium                      | 0.4     |
| TSS (at 105 Deg C)            | 34      |
| COD                           | 410     |
| Alkalinity, total             | 28      |
| TDS (at 180 Deg C)            | 14000   |
| Silver, total                 | -0.005  |
| Barium, total                 | 0.2     |
| Cadmium, total                | -0.005  |
| Chromium, total               | 0.030   |
| Lead, total                   | -0.025  |
| Mercury, total                | -0.0005 |
| Beryllium, total              | -0.005  |
| Selenium, total               | -0.050  |
| Manganese, total              | 0.026   |
| Phenol                        | 0.010   |
| Conductivity mmhos/cm         | 37000   |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

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|                     |                |
|---------------------|----------------|
| Lab Designation     | 9999-99999-9-9 |
| Sponsor Designation | UNIT3          |
| Cooling Tower       | 3              |
| Sample Date         | 01/16/90       |

### Determination (mg/l)

---

|                       |         |
|-----------------------|---------|
| Calcium, total        | 999     |
| Magnesium, total      | 999.9   |
| Sodium, total         | 9999    |
| Chloride              | 9999    |
| Sulfate (as SO4)      | 9999    |
| Nitrate (as N)        | 999.9   |
| Silica (as SiO2)      | 999     |
| Phosphate             | 99.99   |
| Fluoride              | 999.9   |
| Potassium, total      | 999     |
| Copper, total         | 99.999  |
| Zinc, total           | 99.999  |
| Iron, total           | 99.99   |
| Arsenic, total        | 99.999  |
| Boron                 | 99.9    |
| Ammonium              | 99.9    |
| TSS (at 105 Deg C)    | 999     |
| COD                   | 9999    |
| Alkalinity, total     | 999     |
| TDS (at 180 Deg C)    | 99999   |
| Silver, total         | 99.999  |
| Barium, total         | 99.9    |
| Cadmium, total        | 99.999  |
| Chromium, total       | 99.999  |
| Lead, total           | 99.999  |
| Mercury, total        | 99.9999 |
| Beryllium, total      | 99.999  |
| Selenium, total       | 99.999  |
| Manganese, total      | 99.999  |
| Phenol                | 99.999  |
| Conductivity mmhos/cm | 99999   |



# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 9999-99999-9-9  
 Sponsor Designation UNIT1  
 Cooling Tower 1  
 Sample Date 02/15/90

### Determination (mg/l) -----

|                       |         |
|-----------------------|---------|
| Calcium, total        | 999     |
| Magnesium, total      | 999.9   |
| Sodium, total         | 9999    |
| Chloride              | 9999    |
| Sulfate (as SO4)      | 9999    |
| Nitrate (as N)        | 999.9   |
| Silica (as SiO2)      | 999     |
| Phosphate             | 99.99   |
| Fluoride              | 999.9   |
| Potassium, total      | 999     |
| Copper, total         | 99.999  |
| Zinc, total           | 99.999  |
| Iron, total           | 99.99   |
| Arsenic, total        | 99.999  |
| Boron                 | 99.9    |
| Ammonium              | 99.9    |
| TSS (at 105 Deg C)    | 999     |
| COD                   | 9999    |
| Alkalinity, total     | 999     |
| TDS (at 180 Deg C)    | 99999   |
| Silver, total         | 99.999  |
| Barium, total         | 99.9    |
| Cadmium, total        | 99.999  |
| Chromium, total       | 99.999  |
| Lead, total           | 99.999  |
| Mercury, total        | 99.9999 |
| Beryllium, total      | 99.999  |
| Selenium, total       | 99.999  |
| Manganese, total      | 99.999  |
| Phenol                | 99.999  |
| Conductivity mmhos/cm | 99999   |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

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|                     |                |
|---------------------|----------------|
| Lab Designation     | 8928-33196-2-1 |
| Sponsor Designation | UNIT2          |
| Cooling Tower       | 2              |
| Sample Date         | 02/15/90       |

### Determination (mg/l)

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|                       |        |
|-----------------------|--------|
| Calcium, total        | 420    |
| Magnesium, total      | 30.0   |
| Sodium, total         | 4500   |
| Chloride              | 4200   |
| Sulfate (as SO4)      | 3900   |
| Nitrate (as N)        | 270.0  |
| Silica (as SiO2)      | 75     |
| Phosphate             | 2.30   |
| Fluoride              | 10.0   |
| Potassium, total      | 120    |
| Copper, total         | 0.053  |
| Zinc, total           | 0.071  |
| Iron, total           | 0.69   |
| Arsenic, total        | 0.014  |
| Boron                 | 4.4    |
| Ammonium              | 0.4    |
| TSS (at 105 Deg C)    | 67     |
| COD                   | 340    |
| Alkalinity, total     | 20     |
| TDS (at 180 Deg C)    | 13000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.1    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.028  |
| Lead, total           | -0.010 |
| Mercury, total        | 0.0094 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.050 |
| Manganese, total      | 0.030  |
| Phenol                | 0.010  |
| Conductivity mmhos/cm | 18000  |

# 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

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|                     |                |
|---------------------|----------------|
| Lab Designation     | 8928-33196-2-2 |
| Sponsor Designation | UNIT3          |
| Cooling Tower       | 3              |
| Sample Date         | 02/15/90       |

### Determination (mg/l)

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|                       |        |
|-----------------------|--------|
| Calcium, total        | 470    |
| Magnesium, total      | 32.0   |
| Sodium, total         | 5100   |
| Chloride              | 4500   |
| Sulfate (as SO4)      | 4000   |
| Nitrate (as N)        | 290.0  |
| Silica (as SiO2)      | 81     |
| Phosphate             | 2.20   |
| Fluoride              | 13.0   |
| Potassium, total      | 120    |
| Copper, total         | 0.160  |
| Zinc, total           | 0.110  |
| Iron, total           | 0.92   |
| Arsenic, total        | 0.013  |
| Boron                 | 5.0    |
| Ammonium              | 0.4    |
| TSS (at 105 Deg C)    | 72     |
| COD                   | 210    |
| Alkalinity, total     | 25     |
| TDS (at 180 Deg C)    | 15000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.1    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.030  |
| Lead, total           | -0.010 |
| Mercury, total        | 0.0091 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.050 |
| Manganese, total      | 0.037  |
| Phenol                | 0.012  |
| Conductivity mmhos/cm | 20000  |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 9999-99999-9-9  
 Sponsor Designation UNIT1  
 Cooling Tower 1  
 Sample Date 03/15/90

### Determination (mg/l)

-----

|                       |         |
|-----------------------|---------|
| Calcium, total        | 999     |
| Magnesium, total      | 999.9   |
| Sodium, total         | 9999    |
| Chloride              | 9999    |
| Sulfate (as SO4)      | 9999    |
| Nitrate (as N)        | 999.9   |
| Silica (as SiO2)      | 999     |
| Phosphate             | 99.99   |
| Fluoride              | 999.9   |
| Potassium, total      | 999     |
| Copper, total         | 99.999  |
| Zinc, total           | 99.999  |
| Iron, total           | 99.99   |
| Arsenic, total        | 99.999  |
| Boron                 | 99.9    |
| Ammonium              | 99.9    |
| TSS (at 105 Deg C)    | 999     |
| COD                   | 9999    |
| Alkalinity, total     | 999     |
| TDS (at 180 Deg C)    | 99999   |
| Silver, total         | 99.999  |
| Barium, total         | 99.9    |
| Cadmium, total        | 99.999  |
| Chromium, total       | 99.999  |
| Lead, total           | 99.999  |
| Mercury, total        | 99.9999 |
| Beryllium, total      | 99.999  |
| Selenium, total       | 99.999  |
| Manganese, total      | 99.999  |
| Phenol                | 99.999  |
| Conductivity mmhos/cm | 99999   |

# 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     | 9999-99999-9-9 |
| Sponsor Designation | UNIT2          |
| Cooling Tower       | 2              |
| Sample Date         | 03/15/90       |

### Determination (mg/l)

---

|                       |         |
|-----------------------|---------|
| Calcium, total        | 999     |
| Magnesium, total      | 999.9   |
| Sodium, total         | 9999    |
| Chloride              | 9999    |
| Sulfate (as SO4)      | 9999    |
| Nitrate (as N)        | 999.9   |
| Silica (as SiO2)      | 999     |
| Phosphate             | 99.99   |
| Fluoride              | 999.9   |
| Potassium, total      | 999     |
| Copper, total         | 99.999  |
| Zinc, total           | 99.999  |
| Iron, total           | 99.99   |
| Arsenic, total        | 99.999  |
| Boron                 | 99.9    |
| Ammonium              | 99.9    |
| TSS (at 105 Deg C)    | 999     |
| COD                   | 9999    |
| Alkalinity, total     | 999     |
| TDS (at 180 Deg C)    | 99999   |
| Silver, total         | 99.999  |
| Barium, total         | 99.9    |
| Cadmium, total        | 99.999  |
| Chromium, total       | 99.999  |
| Lead, total           | 99.999  |
| Mercury, total        | 99.9999 |
| Beryllium, total      | 99.999  |
| Selenium, total       | 99.999  |
| Manganese, total      | 99.999  |
| Phenol                | 99.999  |
| Conductivity mmhos/cm | 99999   |

# 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     | 8928-33474-1-1 |
| Sponsor Designation | UNIT3          |
| Cooling Tower       | 3              |
| Sample Date         | 03/15/90       |

### Determination (mg/l)

---

|                       |        |
|-----------------------|--------|
| Calcium, total        | 370    |
| Magnesium, total      | 35.0   |
| Sodium, total         | 3600   |
| Chloride              | 3800   |
| Sulfate (as SO4)      | 3700   |
| Nitrate (as N)        | 290.0  |
| Silica (as SiO2)      | 61     |
| Phosphate             | 4.00   |
| Fluoride              | 12.0   |
| Potassium, total      | 180    |
| Copper, total         | 0.065  |
| Zinc, total           | 0.062  |
| Iron, total           | 0.66   |
| Arsenic, total        | 0.012  |
| Boron                 | 4.6    |
| Ammonium              | 0.4    |
| TSS (at 105 Deg C)    | 55     |
| COD                   | 420    |
| Alkalinity, total     | 31     |
| TDS (at 180 Deg C)    | 14000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.1    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.026  |
| Lead, total           | -0.100 |
| Mercury, total        | 0.0078 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.100 |
| Manganese, total      | 0.034  |
| Phenol                | 0.017  |
| Conductivity mmhos/cm | 22000  |

# 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     | 9999-99999-9-9 |
| Sponsor Designation | UNIT1          |
| Cooling Tower       | 1              |
| Sample Date         | 04/15/90       |

### Determination (mg/l)

---

|                       |         |
|-----------------------|---------|
| Calcium, total        | 999     |
| Magnesium, total      | 999.9   |
| Sodium, total         | 9999    |
| Chloride              | 9999    |
| Sulfate (as SO4)      | 9999    |
| Nitrate (as N)        | 999.9   |
| Silica (as SiO2)      | 999     |
| Phosphate             | 99.99   |
| Fluoride              | 999.9   |
| Potassium, total      | 999     |
| Copper, total         | 99.999  |
| Zinc, total           | 99.999  |
| Iron, total           | 99.99   |
| Arsenic, total        | 99.999  |
| Boron                 | 99.9    |
| Ammonium              | 99.9    |
| TSS (at 105 Deg C)    | 999     |
| COD                   | 9999    |
| Alkalinity, total     | 999     |
| TDS (at 180 Deg C)    | 99999   |
| Silver, total         | 99.999  |
| Barium, total         | 99.9    |
| Cadmium, total        | 99.999  |
| Chromium, total       | 99.999  |
| Lead, total           | 99.999  |
| Mercury, total        | 99.9999 |
| Beryllium, total      | 99.999  |
| Selenium, total       | 99.999  |
| Manganese, total      | 99.999  |
| Phenol                | 99.999  |
| Conductivity mmhos/cm | 99999   |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 9999-99999-9-9  
 Sponsor Designation UNIT2  
 Cooling Tower 2  
 Sample Date 04/15/90

### Determination (mg/l)

-----

|                       |         |
|-----------------------|---------|
| Calcium, total        | 999     |
| Magnesium, total      | 999.9   |
| Sodium, total         | 9999    |
| Chloride              | 9999    |
| Sulfate (as SO4)      | 9999    |
| Nitrate (as N)        | 999.9   |
| Silica (as SiO2)      | 999     |
| Phosphate             | 99.99   |
| Fluoride              | 999.9   |
| Potassium, total      | 999     |
| Copper, total         | 99.999  |
| Zinc, total           | 99.999  |
| Iron, total           | 99.99   |
| Arsenic, total        | 99.999  |
| Boron                 | 99.9    |
| Ammonium              | 99.9    |
| TSS (at 105 Deg C)    | 999     |
| COD                   | 9999    |
| Alkalinity, total     | 999     |
| TDS (at 180 Deg C)    | 99999   |
| Silver, total         | 99.999  |
| Barium, total         | 99.9    |
| Cadmium, total        | 99.999  |
| Chromium, total       | 99.999  |
| Lead, total           | 99.999  |
| Mercury, total        | 99.9999 |
| Beryllium, total      | 99.999  |
| Selenium, total       | 99.999  |
| Manganese, total      | 99.999  |
| Phenol                | 99.999  |
| Conductivity mmhos/cm | 99999   |



# 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     | 9999-99999-9-9 |
| Sponsor Designation | UNIT3          |
| Cooling Tower       | 3              |
| Sample Date         | 04/15/90       |

### Determination (mg/l)

---

|                       |         |
|-----------------------|---------|
| Calcium, total        | 999     |
| Magnesium, total      | 999.9   |
| Sodium, total         | 9999    |
| Chloride              | 9999    |
| Sulfate (as SO4)      | 9999    |
| Nitrate (as N)        | 999.9   |
| Silica (as SiO2)      | 999     |
| Phosphate             | 99.99   |
| Fluoride              | 999.9   |
| Potassium, total      | 999     |
| Copper, total         | 99.999  |
| Zinc, total           | 99.999  |
| Iron, total           | 99.99   |
| Arsenic, total        | 99.999  |
| Boron                 | 99.9    |
| Ammonium              | 99.9    |
| TSS (at 105 Deg C)    | 999     |
| COD                   | 9999    |
| Alkalinity, total     | 999     |
| TDS (at 180 Deg C)    | 99999   |
| Silver, total         | 99.999  |
| Barium, total         | 99.9    |
| Cadmium, total        | 99.999  |
| Chromium, total       | 99.999  |
| Lead, total           | 99.999  |
| Mercury, total        | 99.9999 |
| Beryllium, total      | 99.999  |
| Selenium, total       | 99.999  |
| Manganese, total      | 99.999  |
| Phenol                | 99.999  |
| Conductivity mmhos/cm | 99999   |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 9999-99999-9-9  
 Sponsor Designation UNIT1  
 Cooling Tower 1  
 Sample Date 05/15/90

### Determination (mg/l) -----

|                       |         |
|-----------------------|---------|
| Calcium, total        | 999     |
| Magnesium, total      | 999.9   |
| Sodium, total         | 9999    |
| Chloride              | 9999    |
| Sulfate (as SO4)      | 9999    |
| Nitrate (as N)        | 999.9   |
| Silica (as SiO2)      | 999     |
| Phosphate             | 99.99   |
| Fluoride              | 999.9   |
| Potassium, total      | 999     |
| Copper, total         | 99.999  |
| Zinc, total           | 99.999  |
| Iron, total           | 99.99   |
| Arsenic, total        | 99.999  |
| Boron                 | 99.9    |
| Ammonium              | 99.9    |
| TSS (at 105 Deg C)    | 999     |
| COD                   | 9999    |
| Alkalinity, total     | 999     |
| TDS (at 180 Deg C)    | 99999   |
| Silver, total         | 99.999  |
| Barium, total         | 99.9    |
| Cadmium, total        | 99.999  |
| Chromium, total       | 99.999  |
| Lead, total           | 99.999  |
| Mercury, total        | 99.9999 |
| Beryllium, total      | 99.999  |
| Selenium, total       | 99.999  |
| Manganese, total      | 99.999  |
| Phenol                | 99.999  |
| Conductivity mmhos/cm | 99999   |

# 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      9999-99999-9-9
Sponsor Designation          UNIT2
Cooling Tower              2
Sample Date                05/15/90
  
```

### Determination (mg/l) -----

```

Calcium, total          999
Magnesium, total        999.9
Sodium, total           9999
Chloride                 9999
Sulfate (as SO4)        9999
Nitrate (as N)          999.9
Silica (as SiO2)        999
Phosphate                99.99
Fluoride                 999.9
Potassium, total        999
Copper, total            99.999
Zinc, total              99.999
Iron, total              99.99
Arsenic, total           99.999
Boron                    99.9
Ammonium                 99.9
TSS (at 105 Deg C)      999
COD                      9999
Alkalinity, total       999
TDS (at 180 Deg C)      99999
Silver, total            99.999
Barium, total            99.9
Cadmium, total           99.999
Chromium, total          99.999
Lead, total              99.999
Mercury, total           99.9999
Beryllium, total         99.999
Selenium, total          99.999
Manganese, total         99.999
Phenol                   99.999
Conductivity mmhos/cm   99999
  
```

# 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     | 8928-34158-1-1 |
| Sponsor Designation | UNIT3          |
| Cooling Tower       | 3              |
| Sample Date         | 05/15/90       |

### Determination (mg/l)

---

|                       |         |
|-----------------------|---------|
| Calcium, total        | 380     |
| Magnesium, total      | 24.0    |
| Sodium, total         | 5100    |
| Chloride              | 5800    |
| Sulfate (as SO4)      | 4500    |
| Nitrate (as N)        | 300.0   |
| Silica (as SiO2)      | 66      |
| Phosphate             | 1.30    |
| Fluoride              | 16.0    |
| Potassium, total      | 190     |
| Copper, total         | 0.094   |
| Zinc, total           | 0.058   |
| Iron, total           | 0.83    |
| Arsenic, total        | -0.025  |
| Boron                 | 4.7     |
| Ammonium              | 0.6     |
| TSS (at 105 Deg C)    | 60      |
| COD                   | 600     |
| Alkalinity, total     | 29      |
| TDS (at 180 Deg C)    | 17000   |
| Silver, total         | -0.005  |
| Barium, total         | 0.1     |
| Cadmium, total        | -0.005  |
| Chromium, total       | 0.033   |
| Lead, total           | -0.005  |
| Mercury, total        | -0.0010 |
| Beryllium, total      | -0.005  |
| Selenium, total       | -0.050  |
| Manganese, total      | 0.030   |
| 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     | 8928-34389-2-1 |
| Sponsor Designation | UNIT1          |
| Cooling Tower       | 1              |
| Sample Date         | 06/07/90       |

### Determination (mg/l)

-----

|                       |         |
|-----------------------|---------|
| Calcium, total        | 999     |
| Magnesium, total      | 999.9   |
| Sodium, total         | 9999    |
| Chloride              | 9999    |
| Sulfate (as SO4)      | 9999    |
| Nitrate (as N)        | 999.9   |
| Silica (as SiO2)      | 999     |
| Phosphate             | 99.99   |
| Fluoride              | 999.9   |
| Potassium, total      | 999     |
| Copper, total         | 99.999  |
| Zinc, total           | 99.999  |
| Iron, total           | 99.99   |
| Arsenic, total        | 99.999  |
| Boron                 | 99.9    |
| Ammonium              | 99.9    |
| TSS (at 105 Deg C)    | 999     |
| COD                   | 9999    |
| Alkalinity, total     | 999     |
| TDS (at 180 Deg C)    | 99999   |
| Silver, total         | 99.999  |
| Barium, total         | 99.9    |
| Cadmium, total        | 99.999  |
| Chromium, total       | 99.999  |
| Lead, total           | 99.999  |
| Mercury, total        | 99.9999 |
| Beryllium, total      | 99.999  |
| Selenium, total       | 99.999  |
| Manganese, total      | 99.999  |
| Phenol                | 99.999  |
| Conductivity mmhos/cm | 99999   |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-34389-2-1  
 Sponsor Designation UNIT2  
 Cooling Tower 2  
 Sample Date 06/07/90

### Determination (mg/l) -----

|                       |         |
|-----------------------|---------|
| Calcium, total        | 140     |
| Magnesium, total      | 7.8     |
| Sodium, total         | 1200    |
| Chloride              | 1300    |
| Sulfate (as SO4)      | 1200    |
| Nitrate (as N)        | 53.0    |
| Silica (as SiO2)      | 12      |
| Phosphate             | 0.60    |
| Fluoride              | 5.0     |
| Potassium, total      | 61      |
| Copper, total         | 0.045   |
| Zinc, total           | 0.120   |
| Iron, total           | 0.38    |
| Arsenic, total        | -0.010  |
| Boron                 | 1.6     |
| Ammonium              | 0.9     |
| TSS (at 105 Deg C)    | 7       |
| COD                   | 180     |
| Alkalinity, total     | -5      |
| TDS (at 180 Deg C)    | 4200    |
| Silver, total         | -0.005  |
| Barium, total         | 0.1     |
| Cadmium, total        | -0.005  |
| Chromium, total       | 0.005   |
| Lead, total           | -0.010  |
| Mercury, total        | -0.0010 |
| Beryllium, total      | -0.005  |
| Selenium, total       | -0.010  |
| Manganese, total      | 0.017   |
| Phenol                | -0.002  |
| Conductivity mmhos/cm | 6500    |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

---

|                     |                |
|---------------------|----------------|
| Lab Designation     | 8928-34389-2-2 |
| Sponsor Designation | UNIT3          |
| Cooling Tower       | 3              |
| Sample Date         | 06/07/90       |

### Determination (mg/l)

---

|                       |         |
|-----------------------|---------|
| Calcium, total        | 420     |
| Magnesium, total      | 18.0    |
| Sodium, total         | 5200    |
| Chloride              | 6400    |
| Sulfate (as SO4)      | 4300    |
| Nitrate (as N)        | 210.0   |
| Silica (as SiO2)      | 29      |
| Phosphate             | 0.88    |
| Fluoride              | 17.0    |
| Potassium, total      | 220     |
| Copper, total         | 0.077   |
| Zinc, total           | 0.032   |
| Iron, total           | 0.72    |
| Arsenic, total        | -0.025  |
| Boron                 | 4.5     |
| Ammonium              | 0.7     |
| TSS (at 105 Deg C)    | 42      |
| COD                   | 560     |
| Alkalinity, total     | 25      |
| TDS (at 180 Deg C)    | 17000   |
| Silver, total         | -0.005  |
| Barium, total         | 0.1     |
| Cadmium, total        | -0.005  |
| Chromium, total       | 0.026   |
| Lead, total           | -0.050  |
| Mercury, total        | -0.0010 |
| Beryllium, total      | -0.005  |
| Selenium, total       | -0.050  |
| Manganese, total      | 0.020   |
| Phenol                | 0.003   |
| Conductivity mmhos/cm | 27000   |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-34848-3-1  
 Sponsor Designation UNIT1  
 Cooling Tower 1  
 Sample Date 07/16/90

### Determination (mg/l) -----

|                       |        |
|-----------------------|--------|
| Calcium, total        | 340    |
| Magnesium, total      | 17.0   |
| Sodium, total         | 6300   |
| Chloride              | 6200   |
| Sulfate (as SO4)      | 3800   |
| Nitrate (as N)        | 180.0  |
| Silica (as SiO2)      | 50     |
| Phosphate             | 0.93   |
| Fluoride              | 19.0   |
| Potassium, total      | 200    |
| Copper, total         | 0.270  |
| Zinc, total           | 0.090  |
| Iron, total           | 2.20   |
| Arsenic, total        | 0.014  |
| Boron                 | 5.1    |
| Ammonium              | 0.5    |
| TSS (at 105 Deg C)    | 64     |
| COD                   | 460    |
| Alkalinity, total     | 25     |
| TDS (at 180 Deg C)    | 18000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.2    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.050  |
| Lead, total           | -0.010 |
| Mercury, total        | 0.0003 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.010 |
| Manganese, total      | 0.080  |
| Phenol                | -0.002 |
| Conductivity mmhos/cm | 40000  |



# 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     | 8928-34848-3-2 |
| Sponsor Designation | UNIT2          |
| Cooling Tower       | 2              |
| Sample Date         | 07/16/90       |

### Determination (mg/l)

---

|                       |        |
|-----------------------|--------|
| Calcium, total        | 160    |
| Magnesium, total      | 8.7    |
| Sodium, total         | 1700   |
| Chloride              | 1700   |
| Sulfate (as SO4)      | 1400   |
| Nitrate (as N)        | 60.0   |
| Silica (as SiO2)      | 23     |
| Phosphate             | 0.89   |
| Fluoride              | 8.2    |
| Potassium, total      | 78     |
| Copper, total         | 0.180  |
| Zinc, total           | 0.081  |
| Iron, total           | 1.20   |
| Arsenic, total        | 0.006  |
| Boron                 | 2.4    |
| Ammonium              | 0.2    |
| TSS (at 105 Deg C)    | 36     |
| COD                   | 100    |
| Alkalinity, total     | 18     |
| TDS (at 180 Deg C)    | 5700   |
| Silver, total         | -0.005 |
| Barium, total         | -0.1   |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.023  |
| Lead, total           | -0.005 |
| Mercury, total        | 0.0002 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.050 |
| Manganese, total      | 0.045  |
| Phenol                | -0.002 |
| Conductivity mmhos/cm | 12000  |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-34848-3-3  
 Sponsor Designation UNIT3  
 Cooling Tower 3  
 Sample Date 07/16/90

### Determination (mg/l)

-----

|                       |        |
|-----------------------|--------|
| Calcium, total        | 270    |
| Magnesium, total      | 12.0   |
| Sodium, total         | 6000   |
| Chloride              | 6400   |
| Sulfate (as SO4)      | 3100   |
| Nitrate (as N)        | 190.0  |
| Silica (as SiO2)      | 42     |
| Phosphate             | 0.52   |
| Fluoride              | 17.0   |
| Potassium, total      | 190    |
| Copper, total         | 0.089  |
| Zinc, total           | 0.031  |
| Iron, total           | 0.63   |
| Arsenic, total        | 0.013  |
| Boron                 | 4.1    |
| Ammonium              | 0.4    |
| TSS (at 105 Deg C)    | 38     |
| COD                   | 110    |
| Alkalinity, total     | 20     |
| TDS (at 180 Deg C)    | 17000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.1    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.025  |
| Lead, total           | -0.025 |
| Mercury, total        | 0.0004 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.010 |
| Manganese, total      | 0.018  |
| Phenol                | -0.002 |
| Conductivity mmhos/cm | 30000  |

# 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     | 8928-35175-3-1 |
| Sponsor Designation | UNIT1          |
| Cooling Tower       | 1              |
| Sample Date         | 08/16/90       |

### Determination (mg/l)

---

|                       |        |
|-----------------------|--------|
| Calcium, total        | 410    |
| Magnesium, total      | 18.0   |
| Sodium, total         | 5900   |
| Chloride              | 7400   |
| Sulfate (as SO4)      | 4100   |
| Nitrate (as N)        | 220.0  |
| Silica (as SiO2)      | 42     |
| Phosphate             | 0.40   |
| Fluoride              | 18.0   |
| Potassium, total      | 250    |
| Copper, total         | 0.090  |
| Zinc, total           | 0.100  |
| Iron, total           | 0.77   |
| Arsenic, total        | 0.017  |
| Boron                 | 5.2    |
| Ammonium              | 0.4    |
| TSS (at 105 Deg C)    | 40     |
| COD                   | 250    |
| Alkalinity, total     | 27     |
| TDS (at 180 Deg C)    | 18000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.2    |
| Cadmium, total        | 0.005  |
| Chromium, total       | 0.025  |
| Lead, total           | -0.100 |
| Mercury, total        | 0.0001 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.250 |
| Manganese, total      | 0.041  |
| Phenol                | 0.009  |
| Conductivity mmhos/cm | 30000  |

# 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     | 8928-35175-3-2 |
| Sponsor Designation | UNIT2          |
| Cooling Tower       | 2              |
| Sample Date         | 08/16/90       |

### Determination (mg/l)

---

|                       |        |
|-----------------------|--------|
| Calcium, total        | 500    |
| Magnesium, total      | 21.0   |
| Sodium, total         | 7100   |
| Chloride              | 8200   |
| Sulfate (as SO4)      | 4300   |
| Nitrate (as N)        | 250.0  |
| Silica (as SiO2)      | 46     |
| Phosphate             | 0.80   |
| Fluoride              | 21.0   |
| Potassium, total      | 290    |
| Copper, total         | 0.099  |
| Zinc, total           | 0.120  |
| Iron, total           | 1.50   |
| Arsenic, total        | 0.015  |
| Boron                 | 6.0    |
| Ammonium              | 0.5    |
| TSS (at 105 Deg C)    | 46     |
| COD                   | 290    |
| Alkalinity, total     | 38     |
| TDS (at 180 Deg C)    | 26000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.2    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.034  |
| Lead, total           | -0.050 |
| Mercury, total        | 0.0003 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.250 |
| Manganese, total      | 0.052  |
| 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     | 8928-35175-3-3 |
| Sponsor Designation | UNIT3          |
| Cooling Tower       | 3              |
| Sample Date         | 08/16/90       |

### Determination (mg/l)

---

|                       |        |
|-----------------------|--------|
| Calcium, total        | 470    |
| Magnesium, total      | 20.0   |
| Sodium, total         | 6500   |
| Chloride              | 8800   |
| Sulfate (as SO4)      | 4400   |
| Nitrate (as N)        | 240.0  |
| Silica (as SiO2)      | 45     |
| Phosphate             | 0.60   |
| Fluoride              | 20.0   |
| Potassium, total      | 260    |
| Copper, total         | 0.088  |
| Zinc, total           | 0.061  |
| Iron, total           | 0.91   |
| Arsenic, total        | 0.014  |
| Boron                 | 5.7    |
| Ammonium              | 0.4    |
| TSS (at 105 Deg C)    | 56     |
| COD                   | 230    |
| Alkalinity, total     | 32     |
| TDS (at 180 Deg C)    | 32000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.2    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.031  |
| Lead, total           | -0.050 |
| Mercury, total        | 0.0003 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.100 |
| Manganese, total      | 0.036  |
| Phenol                | 0.006  |
| Conductivity mmhos/cm | 38000  |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-35586-3-1  
 Sponsor Designation UNIT1  
 Cooling Tower 1  
 Sample Date 09/19/90

### Determination (mg/l)

-----

|                       |        |
|-----------------------|--------|
| Calcium, total        | 390    |
| Magnesium, total      | 16.0   |
| Sodium, total         | 5000   |
| Chloride              | 6300   |
| Sulfate (as SO4)      | 4000   |
| Nitrate (as N)        | 220.0  |
| Silica (as SiO2)      | 75     |
| Phosphate             | 0.55   |
| Fluoride              | 17.0   |
| Potassium, total      | 230    |
| Copper, total         | 0.054  |
| Zinc, total           | 0.073  |
| Iron, total           | 0.51   |
| Arsenic, total        | 0.014  |
| Boron                 | 5.0    |
| Ammonium              | 0.3    |
| TSS (at 105 Deg C)    | 26     |
| COD                   | 410    |
| Alkalinity, total     | 26     |
| TDS (at 180 Deg C)    | 18000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.1    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.022  |
| Lead, total           | -0.050 |
| Mercury, total        | 0.0002 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.050 |
| Manganese, total      | 0.015  |
| Phenol                | -0.005 |
| 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     | 8928-35586-3-2 |
| Sponsor Designation | UNIT2          |
| Cooling Tower       | 2              |
| Sample Date         | 09/19/90       |

### Determination (mg/l)

---

|                       |        |
|-----------------------|--------|
| Calcium, total        | 430    |
| Magnesium, total      | 17.0   |
| Sodium, total         | 6400   |
| Chloride              | 7500   |
| Sulfate (as SO4)      | 3700   |
| Nitrate (as N)        | 240.0  |
| Silica (as SiO2)      | 85     |
| Phosphate             | 0.58   |
| Fluoride              | 20.0   |
| Potassium, total      | 270    |
| Copper, total         | 0.044  |
| Zinc, total           | 0.067  |
| Iron, total           | 0.74   |
| Arsenic, total        | 0.014  |
| Boron                 | 5.4    |
| Ammonium              | 0.4    |
| TSS (at 105 Deg C)    | 24     |
| COD                   | 450    |
| Alkalinity, total     | 20     |
| TDS (at 180 Deg C)    | 19000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.2    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.029  |
| Lead, total           | -0.050 |
| Mercury, total        | 0.0002 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.100 |
| Manganese, total      | 0.024  |
| Phenol                | -0.005 |
| Conductivity mmhos/cm | 36000  |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-35586-3-3  
 Sponsor Designation UNIT3  
 Cooling Tower 3  
 Sample Date 09/19/90

### Determination (mg/l)

-----

|                       |        |
|-----------------------|--------|
| Calcium, total        | 460    |
| Magnesium, total      | 19.0   |
| Sodium, total         | 6100   |
| Chloride              | 8200   |
| Sulfate (as SO4)      | 4000   |
| Nitrate (as N)        | 270.0  |
| Silica (as SiO2)      | 110    |
| Phosphate             | 0.66   |
| Fluoride              | 19.0   |
| Potassium, total      | 250    |
| Copper, total         | 0.069  |
| Zinc, total           | 0.040  |
| Iron, total           | 0.65   |
| Arsenic, total        | 0.014  |
| Boron                 | 5.8    |
| Ammonium              | 0.3    |
| TSS (at 105 Deg C)    | 30     |
| COD                   | 460    |
| Alkalinity, total     | 26     |
| TDS (at 180 Deg C)    | 21000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.2    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.027  |
| Lead, total           | -0.100 |
| Mercury, total        | 0.0002 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.250 |
| Manganese, total      | 0.021  |
| Phenol                | -0.005 |
| Conductivity mmhos/cm | 39000  |



# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-35908-3-1  
 Sponsor Designation UNIT1  
 Cooling Tower 1  
 Sample Date 10/15/90

### Determination (mg/l) -----

|                       |        |
|-----------------------|--------|
| Calcium, total        | 500    |
| Magnesium, total      | 25.0   |
| Sodium, total         | 6400   |
| Chloride              | 7800   |
| Sulfate (as SO4)      | 4200   |
| Nitrate (as N)        | 250.0  |
| Silica (as SiO2)      | 94     |
| Phosphate             | 0.88   |
| Fluoride              | 22.0   |
| Potassium, total      | 380    |
| Copper, total         | 0.064  |
| Zinc, total           | 0.072  |
| Iron, total           | 0.64   |
| Arsenic, total        | -0.020 |
| Boron                 | 5.9    |
| Ammonium              | 0.5    |
| TSS (at 105 Deg C)    | 68     |
| COD                   | 490    |
| Alkalinity, total     | 22     |
| TDS (at 180 Deg C)    | 20000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.2    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.030  |
| Lead, total           | -0.025 |
| Mercury, total        | 0.0002 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.025 |
| Manganese, total      | 0.026  |
| Phenol                | 0.011  |
| Conductivity mmhos/cm | 32000  |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-35908-3-2  
 Sponsor Designation UNIT2  
 Cooling Tower 2  
 Sample Date 10/15/90

### Determination (mg/l)

-----

|                       |        |
|-----------------------|--------|
| Calcium, total        | 460    |
| Magnesium, total      | 24.0   |
| Sodium, total         | 6100   |
| Chloride              | 7900   |
| Sulfate (as SO4)      | 4200   |
| Nitrate (as N)        | 260.0  |
| Silica (as SiO2)      | 92     |
| Phosphate             | 0.84   |
| Fluoride              | 21.0   |
| Potassium, total      | 370    |
| Copper, total         | 0.046  |
| Zinc, total           | 0.055  |
| Iron, total           | 0.48   |
| Arsenic, total        | -0.020 |
| Boron                 | 5.7    |
| Ammonium              | 0.4    |
| TSS (at 105 Deg C)    | 44     |
| COD                   | 560    |
| Alkalinity, total     | 28     |
| TDS (at 180 Deg C)    | 20000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.2    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.030  |
| Lead, total           | -0.025 |
| Mercury, total        | 0.0003 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.025 |
| Manganese, total      | 0.020  |
| Phenol                | 0.007  |
| Conductivity mmhos/cm | 37000  |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

---

|                     |                |
|---------------------|----------------|
| Lab Designation     | 8928-35908-3-3 |
| Sponsor Designation | UNIT3          |
| Cooling Tower       | 3              |
| Sample Date         | 10/15/90       |

### Determination (mg/l)

---

|                       |        |
|-----------------------|--------|
| Calcium, total        | 400    |
| Magnesium, total      | 21.0   |
| Sodium, total         | 5200   |
| Chloride              | 6400   |
| Sulfate (as SO4)      | 3400   |
| Nitrate (as N)        | 220.0  |
| Silica (as SiO2)      | 79     |
| Phosphate             | 0.75   |
| Fluoride              | 19.0   |
| Potassium, total      | 300    |
| Copper, total         | 0.044  |
| Zinc, total           | 0.031  |
| Iron, total           | 0.43   |
| Arsenic, total        | -0.020 |
| Boron                 | 4.9    |
| Ammonium              | 0.3    |
| TSS (at 105 Deg C)    | 36     |
| COD                   | 390    |
| Alkalinity, total     | 24     |
| TDS (at 180 Deg C)    | 17000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.2    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.027  |
| Lead, total           | -0.025 |
| Mercury, total        | 0.0003 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.025 |
| Manganese, total      | 0.019  |
| Phenol                | 0.007  |
| Conductivity mmhos/cm | 31000  |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-36275-3-1  
 Sponsor Designation UNIT1  
 Cooling Tower 1  
 Sample Date 11/14/90

### Determination (mg/l)

-----

|                       |        |
|-----------------------|--------|
| Calcium, total        | 320    |
| Magnesium, total      | 27.0   |
| Sodium, total         | 5800   |
| Chloride              | 6900   |
| Sulfate (as SO4)      | 4400   |
| Nitrate (as N)        | 290.0  |
| Silica (as SiO2)      | 56     |
| Phosphate             | 1.00   |
| Fluoride              | 22.0   |
| Potassium, total      | 340    |
| Copper, total         | 0.070  |
| Zinc, total           | 0.060  |
| Iron, total           | 0.65   |
| Arsenic, total        | -0.100 |
| Boron                 | 6.1    |
| Ammonium              | 0.5    |
| TSS (at 105 Deg C)    | 67     |
| COD                   | 370    |
| Alkalinity, total     | 29     |
| TDS (at 180 Deg C)    | 22000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.2    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.034  |
| Lead, total           | -0.025 |
| Mercury, total        | 0.0002 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.100 |
| Manganese, total      | 0.025  |
| Phenol                | 0.008  |
| Conductivity mmhos/cm | 36000  |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-36275-3-2  
 Sponsor Designation UNIT2  
 Cooling Tower 2  
 Sample Date 11/14/90

### Determination (mg/l) -----

|                       |        |
|-----------------------|--------|
| Calcium, total        | 430    |
| Magnesium, total      | 28.0   |
| Sodium, total         | 6300   |
| Chloride              | 7500   |
| Sulfate (as SO4)      | 4200   |
| Nitrate (as N)        | 280.0  |
| Silica (as SiO2)      | 55     |
| Phosphate             | 1.00   |
| Fluoride              | 21.0   |
| Potassium, total      | 340    |
| Copper, total         | 0.053  |
| Zinc, total           | 0.049  |
| Iron, total           | 0.67   |
| Arsenic, total        | -0.100 |
| Boron                 | 6.2    |
| Ammonium              | 2.2    |
| TSS (at 105 Deg C)    | 56     |
| COD                   | 380    |
| Alkalinity, total     | 29     |
| TDS (at 180 Deg C)    | 20000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.2    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.037  |
| Lead, total           | -0.020 |
| Mercury, total        | 0.0002 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.100 |
| Manganese, total      | 0.029  |
| Phenol                | 0.006  |
| Conductivity mmhos/cm | 40000  |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-36275-3-3  
 Sponsor Designation UNIT3  
 Cooling Tower 3  
 Sample Date 11/14/90

### Determination (mg/l)

-----

|                       |         |
|-----------------------|---------|
| Calcium, total        | 310     |
| Magnesium, total      | 21.0    |
| Sodium, total         | 4600    |
| Chloride              | 5300    |
| Sulfate (as SO4)      | 3000    |
| Nitrate (as N)        | 210.0   |
| Silica (as SiO2)      | 42      |
| Phosphate             | 0.78    |
| Fluoride              | 16.0    |
| Potassium, total      | 240     |
| Copper, total         | 0.046   |
| Zinc, total           | 0.024   |
| Iron, total           | 0.47    |
| Arsenic, total        | -0.100  |
| Boron                 | 4.6     |
| Ammonium              | 0.4     |
| TSS (at 105 Deg C)    | 36      |
| COD                   | 320     |
| Alkalinity, total     | 29      |
| TDS (at 180 Deg C)    | 15000   |
| Silver, total         | -0.005  |
| Barium, total         | 0.1     |
| Cadmium, total        | -0.005  |
| Chromium, total       | 0.024   |
| Lead, total           | -0.020  |
| Mercury, total        | -0.0010 |
| Beryllium, total      | -0.005  |
| Selenium, total       | -0.100  |
| Manganese, total      | 0.023   |
| Phenol                | 0.006   |
| Conductivity mmhos/cm | 29000   |

# 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     | 8928-36604-3-1 |
| Sponsor Designation | UNIT1          |
| Cooling Tower       | 1              |
| Sample Date         | 12/12/90       |

### Determination (mg/l)

---

|                       |        |
|-----------------------|--------|
| Calcium, total        | 480    |
| Magnesium, total      | 30.0   |
| Sodium, total         | 6100   |
| Chloride              | 5900   |
| Sulfate (as SO4)      | 3900   |
| Nitrate (as N)        | 330.0  |
| Silica (as SiO2)      | 94     |
| Phosphate             | 1.20   |
| Fluoride              | 21.0   |
| Potassium, total      | 300    |
| Copper, total         | 0.068  |
| Zinc, total           | 0.051  |
| Iron, total           | 0.57   |
| Arsenic, total        | -0.025 |
| Boron                 | 5.7    |
| Ammonium              | 0.9    |
| TSS (at 105 Deg C)    | -5     |
| COD                   | 420    |
| Alkalinity, total     | 29     |
| TDS (at 180 Deg C)    | 18000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.1    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.021  |
| Lead, total           | -0.025 |
| Mercury, total        | 0.0001 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.200 |
| Manganese, total      | 0.020  |
| Phenol                | 0.007  |
| Conductivity mmhos/cm | 33000  |

# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-36604-3-2  
 Sponsor Designation UNIT2  
 Cooling Tower 2  
 Sample Date 12/12/90

### Determination (mg/l)

-----

|                       |        |
|-----------------------|--------|
| Calcium, total        | 490    |
| Magnesium, total      | 33.0   |
| Sodium, total         | 6000   |
| Chloride              | 6000   |
| Sulfate (as SO4)      | 3500   |
| Nitrate (as N)        | 320.0  |
| Silica (as SiO2)      | 96     |
| Phosphate             | 1.30   |
| Fluoride              | 20.0   |
| Potassium, total      | 290    |
| Copper, total         | 0.068  |
| Zinc, total           | 0.058  |
| Iron, total           | 0.75   |
| Arsenic, total        | -0.025 |
| Boron                 | 5.9    |
| Ammonium              | 1.3    |
| TSS (at 105 Deg C)    | 38     |
| COD                   | 520    |
| Alkalinity, total     | 36     |
| TDS (at 180 Deg C)    | 19000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.1    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.024  |
| Lead, total           | -0.025 |
| Mercury, total        | 0.0003 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.200 |
| Manganese, total      | 0.023  |
| Phenol                | -0.005 |
| Conductivity mmhos/cm | 29000  |



# ARIZONA PUBLIC SERVICE

## Cooling Tower Basin Water Sample Data

-----  
 Lab Designation 8928-36604-3-3  
 Sponsor Designation UNIT3  
 Cooling Tower 3  
 Sample Date 12/12/90

### Determination (mg/l)

-----

|                       |        |
|-----------------------|--------|
| Calcium, total        | 390    |
| Magnesium, total      | 27.0   |
| Sodium, total         | 4800   |
| Chloride              | 4800   |
| Sulfate (as SO4)      | 2800   |
| Nitrate (as N)        | 270.0  |
| Silica (as SiO2)      | 86     |
| Phosphate             | 1.00   |
| Fluoride              | 15.0   |
| Potassium, total      | 250    |
| Copper, total         | 0.050  |
| Zinc, total           | 0.035  |
| Iron, total           | 0.53   |
| Arsenic, total        | -0.025 |
| Boron                 | 4.7    |
| Ammonium              | 1.2    |
| TSS (at 105 Deg C)    | 29     |
| COD                   | 400    |
| Alkalinity, total     | 36     |
| TDS (at 180 Deg C)    | 15000  |
| Silver, total         | -0.005 |
| Barium, total         | 0.1    |
| Cadmium, total        | -0.005 |
| Chromium, total       | 0.019  |
| Lead, total           | -0.025 |
| Mercury, total        | 0.0002 |
| Beryllium, total      | -0.005 |
| Selenium, total       | -0.050 |
| Manganese, total      | 0.021  |
| Phenol                | 0.008  |
| Conductivity mmhos/cm | 26000  |

## Appendix C

### Dustfall Data

This appendix presents all the airborne salt drift deposition data obtained during the period January through December 1990 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 Golden, 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 5 occasions in which neither sample at a location produced valid data. There were also 24 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 1990 through December 1990 was 97 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.

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| Location<br>Number | Na    | d      | K     | d      | Ca    | d      | Hg    | d      | Cl    | d      | F     | d      | SO4   | d      | NO3   | d      |
|--------------------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| 001                | 0.546 | 0.04   | 0.079 | 0.02   | 0.546 | 0.04   | 0.123 | 0.04   | 0.344 | 0.16   | 0.396 | 0.09   | 0.793 | 0.17   | 0.064 | 0.04   |
| 002                | 0.481 | 0.08   | 0.117 | 0.06   | 0.641 | 0.11   | 0.184 | 0.02   | 0.240 | 0.04   | 0.401 | 0.07   | 0.801 | 0.14   | 0.166 | 0.02   |
| 003                | 0.509 | 0.01   | 0.128 | 0.09   | 0.594 | 0.18   | 0.136 | 0.00   | 0.254 | 0.01   | 0.424 | 0.01   | 0.848 | 0.02   | 0.042 | 0.00   |
| 004                | 0.438 | 0.17   | 0.132 | 0.09   | 0.790 | 0.19   | 0.149 | 0.02   | 0.394 | 0.26   | 0.439 | 0.01   | 0.877 | 0.01   | 0.184 | 0.01   |
| 005                | 0.509 | 0.02   | 0.126 | 0.08   | 0.678 | 0.02   | 0.144 | 0.01   | 0.254 | 0.01   | 0.424 | 0.01   | 0.848 | 0.03   | 0.105 | 0.12   |
| 006                | 0.484 | 0.03   | 0.120 | 0.07   | 0.645 | 0.03   | 0.192 | 0.09   | 0.360 | 0.22   | 0.403 | 0.02   | 0.806 | 0.04   | 0.123 | 0.16   |
| 007                | 0.460 | 0.18   | 0.092 | 0.00   | 0.644 | 0.18   | 0.083 | 0.02   | 0.276 | 0.00   | 0.460 | 0.00   | 0.921 | 0.00   | 0.046 | 0.00   |
| 008                | 0.423 | 0.20   | 0.168 | 0.01   | 0.503 | 0.04   | 0.187 | 0.12   | 0.252 | 0.02   | 0.419 | 0.04   | 0.839 | 0.07   | 0.042 | 0.00   |
| 009                | 0.459 | 0.26   | 0.132 | 0.07   | 0.805 | 0.04   | 0.136 | 0.04   | 0.271 | 0.05   | 0.452 | 0.08   | 0.903 | 0.15   | 0.045 | 0.01   |
| 010                | 0.358 | 0.07   | 0.073 | 0.02   | 0.730 | 0.15   | 0.130 | 0.00   | 0.448 | 0.41   | 0.365 | 0.08   | 0.730 | 0.15   | 0.099 | 0.12   |
| 011                | 0.508 | 0.02   | 0.169 | 0.01   | 1.269 | 0.12   | 0.356 | 0.05   | 0.254 | 0.01   | 0.423 | 0.02   | 0.847 | 0.03   | 0.161 | 0.01   |
| 012                | 0.394 | 0.09   | 0.190 | 0.20   | 0.627 | 0.20   | 0.160 | 0.23   | 0.241 | 0.04   | 0.401 | 0.07   | 0.802 | 0.15   | 0.169 | 0.05   |
| 013                | 0.461 | 0.19   | 0.138 | 0.09   | 1.106 | 0.37   | 0.240 | 0.07   | 0.277 | 0.00   | 0.461 | 0.00   | 0.922 | 0.00   | 0.046 | 0.00   |
| 014                | 0.718 | 0.11   | 0.119 | 0.07   | 0.481 | 0.04   | 0.111 | 0.06   | 0.558 | 0.12   | 0.401 | 0.03   | 0.801 | 0.06   | 0.090 | 0.10   |
| 015                | 0.355 | 0.00   | 0.089 | 0.00   | 0.444 | 0.18   | 0.044 | 0.00   | 0.266 | 0.00   | 0.444 | 0.00   | 0.888 | 0.01   | 0.044 | 0.00   |
| 016                | 0.655 | 0.03   | 0.074 | 0.01   | 0.668 | 0.26   | 0.103 | 0.02   | 0.508 | 0.06   | 0.368 | 0.06   | 0.735 | 0.13   | 0.087 | 0.09   |
| 017                | 0.332 | 0.01   | 0.083 | 0.00   | 0.416 | 0.18   | 0.062 | 0.04   | 0.249 | 0.01   | 0.415 | 0.01   | 0.829 | 0.03   | 0.041 | 0.00   |
| 018                | 0.303 | 0.02   | 0.076 | 0.01   | 0.376 | 0.12   | 0.038 | 0.00   | 0.227 | 0.02   | 0.379 | 0.03   | 0.758 | 0.05   | 0.144 | 0.00   |
| 019                | 0.315 | 0.04   | 0.079 | 0.01   | 0.555 | 0.22   | 0.065 | 0.05   | 1.018 | 0.04   | 0.393 | 0.04   | 0.786 | 0.09   | 0.131 | 0.06   |
| 020                | 1.038 | 0.24   | 0.149 | 0.01   | 0.745 | 0.04   | 0.147 | 0.11   | 0.894 | 0.05   | 0.372 | 0.02   | 0.745 | 0.04   | 0.157 | 0.24   |
| 021                | 0.486 | 0.11   | 0.126 | 0.11   | 0.810 | 0.18   | 0.133 | 0.09   | 0.243 | 0.05   | 0.405 | 0.09   | 0.810 | 0.18   | 0.081 | 0.09   |
| 022                | 0.350 | 0.04   | 0.134 | 0.10   | 0.700 | 0.08   | 0.140 | 0.02   | 0.262 | 0.03   | 0.438 | 0.05   | 0.875 | 0.10   | 0.138 | 0.05   |
| 023                | 0.565 | 0.14   | 0.968 | 0.28   | 6.069 | 0.20   | 1.587 | 0.62   | 0.441 | 0.38   | 0.405 | 0.02   | 0.810 | 0.04   | 0.121 | 0.01   |
| 024                | 0.584 | 0.22   | 0.166 | 0.01   | 1.081 | 0.26   | 0.265 | 0.01   | 0.249 | 0.02   | 0.415 | 0.04   | 0.829 | 0.07   | 0.041 | 0.00   |
| 025                | 0.330 | 0.03   | 0.338 | 0.36   | 1.241 | 0.28   | 0.628 | 0.47   | 0.248 | 0.02   | 0.413 | 0.04   | 0.825 | 0.08   | 0.041 | 0.00   |
| 026                | 0.513 | 0.03   | 0.086 | 0.00   | 0.601 | 0.20   | 0.094 | 0.02   | 0.381 | 0.23   | 0.428 | 0.02   | 0.855 | 0.05   | 0.088 | 0.09   |
| 027                | 0.488 | 0.00   | 0.081 | 0.00   | 0.814 | 0.01   | 0.155 | 0.05   | 0.488 | 0.00   | 0.407 | 0.00   | 0.814 | 0.01   | 0.102 | 0.12   |
| 028                | 0.318 | 0.01   | 0.080 | 0.00   | 0.796 | 0.03   | 0.119 | 0.07   | 0.239 | 0.01   | 0.398 | 0.02   | 0.796 | 0.03   | 0.076 | 0.07   |
| 030                | 0.400 | 0.17   | 0.241 | 0.17   | 1.594 | 0.06   | 0.447 | 0.05   | 0.356 | 0.23   | 0.398 | 0.02   | 0.797 | 0.03   | 0.112 | 0.04   |
| 031                | 0.370 | 0.00   | 0.093 | 0.00   | 0.741 | 0.00   | 0.176 | 0.13   | 0.278 | 0.00   | 0.463 | 0.00   | 0.926 | 0.00   | 0.097 | 0.10   |
| 032                | 0.392 | 0.00   | 0.098 | 0.00   | 0.882 | 0.19   | 0.137 | 0.04   | 0.294 | 0.00   | 0.490 | 0.01   | 0.980 | 0.01   | 0.049 | 0.00   |
| 033                | 0.362 | 0.01   | 0.091 | 0.00   | 0.816 | 0.21   | 0.100 | 0.02   | 0.272 | 0.01   | 0.453 | 0.01   | 0.905 | 0.03   | 0.096 | 0.10   |
| 034                | 0.333 | 0.02   | 0.083 | 0.01   | 0.666 | 0.04   | 0.091 | 0.01   | 0.250 | 0.02   | 0.416 | 0.03   | 0.832 | 0.05   | 0.042 | 0.00   |
| 035                | 0.362 | 999.99 | 0.090 | 999.99 | 0.723 | 999.99 | 0.090 | 999.99 | 0.271 | 999.99 | 0.452 | 999.99 | 0.904 | 999.99 | 0.045 | 999.99 |
| 036                | 0.317 | 0.00   | 0.079 | 0.00   | 0.633 | 0.00   | 0.095 | 0.00   | 0.238 | 0.00   | 0.396 | 0.00   | 0.792 | 0.00   | 0.158 | 0.03   |
| 037                | 0.250 | 0.17   | 0.083 | 0.00   | 0.415 | 0.16   | 0.062 | 0.04   | 0.249 | 0.00   | 0.415 | 0.01   | 0.830 | 0.01   | 0.062 | 0.04   |
| 038                | 0.249 | 0.17   | 0.083 | 0.00   | 0.331 | 0.00   | 0.041 | 0.00   | 0.248 | 0.00   | 0.414 | 0.00   | 0.827 | 0.01   | 0.041 | 0.00   |
| 039                | 0.238 | 0.17   | 0.079 | 0.00   | 0.315 | 0.01   | 0.039 | 0.00   | 0.236 | 0.01   | 0.394 | 0.02   | 0.788 | 0.03   | 0.039 | 0.00   |
| 040                | 0.354 | 0.01   | 0.133 | 0.09   | 0.708 | 0.02   | 0.130 | 0.17   | 0.266 | 0.01   | 0.443 | 0.01   | 0.885 | 0.03   | 0.085 | 0.08   |
| 041                | 0.413 | 0.16   | 0.083 | 0.00   | 0.828 | 0.02   | 0.166 | 0.04   | 0.497 | 0.01   | 0.414 | 0.01   | 0.828 | 0.02   | 0.157 | 0.01   |
| 042                | 0.313 | 0.04   | 0.078 | 0.01   | 0.470 | 0.05   | 0.058 | 0.03   | 0.235 | 0.03   | 0.392 | 0.04   | 0.783 | 0.09   | 0.072 | 0.06   |
| 043                | 0.344 | 0.03   | 0.254 | 0.15   | 0.516 | 0.05   | 0.196 | 0.07   | 0.258 | 0.02   | 0.430 | 0.04   | 0.859 | 0.08   | 0.043 | 0.00   |
| 044                | 0.524 | 0.02   | 0.087 | 0.00   | 0.524 | 0.02   | 0.105 | 0.04   | 0.485 | 0.45   | 0.437 | 0.02   | 0.874 | 0.03   | 0.074 | 0.06   |
| 045                | 0.379 | 0.10   | 0.077 | 0.01   | 0.840 | 0.03   | 0.149 | 0.10   | 0.231 | 0.03   | 0.384 | 0.05   | 0.769 | 0.11   | 0.100 | 0.13   |
| 080                | 1.047 | 0.07   | 0.120 | 0.07   | 1.209 | 0.06   | 0.200 | 0.10   | 0.886 | 0.09   | 0.404 | 0.03   | 0.808 | 0.07   | 0.145 | 0.21   |
| 081                | 1.837 | 0.26   | 0.160 | 0.01   | 1.195 | 0.10   | 0.207 | 0.02   | 1.596 | 0.08   | 0.399 | 0.02   | 1.596 | 0.08   | 0.137 | 0.19   |
| 082                | 0.856 | 0.04   | 0.115 | 0.06   | 2.015 | 0.34   | 0.314 | 0.16   | 0.700 | 0.06   | 0.392 | 0.05   | 0.783 | 0.11   | 0.039 | 0.01   |
| 083                | 1.070 | 0.11   | 0.165 | 0.01   | 1.730 | 0.08   | 0.321 | 0.03   | 0.990 | 0.05   | 0.413 | 0.02   | 0.825 | 0.04   | 0.256 | 0.03   |
| Ar. Mean           | 0.496 | 0.08   | 0.137 | 0.05   | 0.886 | 0.12   | 0.188 | 0.07   | 0.395 | 0.07   | 0.416 | 0.03   | 0.848 | 0.06   | 0.094 | 0.06   |
| Std. Dev.          | 0.277 | 0.08   | 0.133 | 0.08   | 0.841 | 0.10   | 0.233 | 0.11   | 0.271 | 0.11   | 0.027 | 0.02   | 0.122 | 0.05   | 0.050 | 0.06   |

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| Location<br>Number | PO4   | d      | CO3   | d      | HCO3   | d      | NH3   | d      | TSS     | d      | CU    | d      | Av d   | SD(d)  |
|--------------------|-------|--------|-------|--------|--------|--------|-------|--------|---------|--------|-------|--------|--------|--------|
| 001                | 0.016 | 0.00   | 3.964 | 0.86   | 3.964  | 0.86   | 0.159 | 0.03   | 6.435   | 4.08   | 0.079 | 0.02   | 0.46   | 1.08   |
| 002                | 0.016 | 0.00   | 4.005 | 0.70   | 4.005  | 0.70   | 0.160 | 0.03   | 8.027   | 7.35   | 0.080 | 0.01   | 0.67   | 1.94   |
| 003                | 0.017 | 0.00   | 4.240 | 0.08   | 4.240  | 0.08   | 0.170 | 0.00   | 7.236   | 6.08   | 0.085 | 0.00   | 0.47   | 1.62   |
| 004                | 0.018 | 0.00   | 4.385 | 0.06   | 4.385  | 0.06   | 0.175 | 0.00   | 9.244   | 9.78   | 0.088 | 0.00   | 0.76   | 2.60   |
| 005                | 0.017 | 0.00   | 4.240 | 0.15   | 4.240  | 0.15   | 0.170 | 0.01   | 8.983   | 9.63   | 0.085 | 0.00   | 0.73   | 2.56   |
| 006                | 0.016 | 0.00   | 4.031 | 0.21   | 4.031  | 0.21   | 0.397 | 0.46   | 16.827  | 7.19   | 0.081 | 0.00   | 0.62   | 1.89   |
| 007                | 0.018 | 0.00   | 4.604 | 0.02   | 4.604  | 0.02   | 0.184 | 0.00   | 4.604   | 0.02   | 0.092 | 0.00   | 0.03   | 0.06   |
| 008                | 0.017 | 0.00   | 4.193 | 0.36   | 4.193  | 0.36   | 0.168 | 0.01   | 18.521  | 4.96   | 0.084 | 0.01   | 0.44   | 1.31   |
| 009                | 0.018 | 0.00   | 4.516 | 0.76   | 4.516  | 0.76   | 0.181 | 0.03   | 9.901   | 11.53  | 0.090 | 0.02   | 0.99   | 3.05   |
| 010                | 0.015 | 0.00   | 3.651 | 0.76   | 3.651  | 0.76   | 0.146 | 0.03   | 7.956   | 0.21   | 0.073 | 0.02   | 0.20   | 0.26   |
| 011                | 0.017 | 0.00   | 4.234 | 0.16   | 4.234  | 0.16   | 0.253 | 0.16   | 22.050  | 4.20   | 0.085 | 0.00   | 0.35   | 1.11   |
| 012                | 0.016 | 0.00   | 4.010 | 0.73   | 4.010  | 0.73   | 0.379 | 0.41   | 15.458  | 9.92   | 0.080 | 0.01   | 0.92   | 2.60   |
| 013                | 0.018 | 0.00   | 4.609 | 0.01   | 4.609  | 0.01   | 0.184 | 0.00   | 11.516  | 13.80  | 0.092 | 0.00   | 1.04   | 3.67   |
| 014                | 0.016 | 0.00   | 4.005 | 0.30   | 4.005  | 0.30   | 0.160 | 0.01   | 6.703   | 5.09   | 0.080 | 0.01   | 0.45   | 1.34   |
| 015                | 0.018 | 0.00   | 4.438 | 0.04   | 4.438  | 0.04   | 0.178 | 0.00   | 4.438   | 0.04   | 0.089 | 0.00   | 0.02   | 0.05   |
| 016                | 0.015 | 0.00   | 3.677 | 0.65   | 3.677  | 0.65   | 0.147 | 0.03   | 5.354   | 2.71   | 0.074 | 0.01   | 0.34   | 0.72   |
| 017                | 0.017 | 0.00   | 4.146 | 0.13   | 4.146  | 0.13   | 0.166 | 0.01   | 4.146   | 0.13   | 0.083 | 0.00   | 0.05   | 0.06   |
| 018                | 0.015 | 0.00   | 3.792 | 0.27   | 3.792  | 0.27   | 0.152 | 0.01   | 3.792   | 0.27   | 0.076 | 0.01   | 0.08   | 0.11   |
| 019                | 0.016 | 0.00   | 3.932 | 0.45   | 3.932  | 0.45   | 0.157 | 0.02   | 10.921  | 1.89   | 0.079 | 0.01   | 0.24   | 0.50   |
| 020                | 0.015 | 0.00   | 3.724 | 0.22   | 3.724  | 0.22   | 0.149 | 0.01   | 16.167  | 13.93  | 0.074 | 0.00   | 1.08   |        |
| 021                | 0.016 | 0.00   | 4.052 | 0.92   | 4.052  | 0.92   | 0.162 | 0.04   | 19.817  | 10.88  | 0.081 | 0.02   | 0.98   |        |
| 022                | 0.018 | 0.00   | 4.375 | 0.50   | 4.375  | 0.50   | 0.175 | 0.02   | 24.700  | 9.80   | 0.088 | 0.01   | 0.81   | 2.57   |
| 023                | 0.058 | 0.08   | 4.050 | 0.19   | 21.060 | 1.00   | 0.162 | 0.01   | 140.053 | 67.81  | 0.081 | 0.00   | 5.06   | 18.06  |
| 024                | 0.017 | 0.00   | 4.146 | 0.35   | 4.146  | 0.35   | 0.166 | 0.01   | 29.567  | 10.72  | 0.083 | 0.01   | 0.86   | 2.84   |
| 025                | 0.017 | 0.00   | 4.125 | 0.39   | 4.125  | 0.39   | 0.165 | 0.02   | 54.990  | 28.19  | 0.083 | 0.01   | 2.16   | 7.49   |
| 026                | 0.017 | 0.00   | 4.276 | 0.24   | 4.276  | 0.24   | 0.171 | 0.01   | 17.104  | 0.96   | 0.086 | 0.00   | 0.15   | 0.25   |
| 027                | 0.024 | 0.02   | 4.068 | 0.03   | 4.068  | 0.03   | 0.163 | 0.00   | 14.625  | 9.65   | 0.081 | 0.00   | 0.71   | 2.57   |
| 028                | 0.016 | 0.00   | 3.980 | 0.16   | 3.980  | 0.16   | 0.159 | 0.01   | 20.666  | 2.35   | 0.080 | 0.00   | 0.21   | 0.62   |
| 030                | 0.016 | 0.00   | 3.984 | 0.16   | 3.984  | 0.16   | 0.159 | 0.01   | 40.938  | 31.87  | 0.080 | 0.00   | 2.35   | 8.50   |
| 031                | 0.019 | 0.00   | 4.630 | 0.01   | 4.630  | 0.01   | 0.185 | 0.00   | 13.418  | 17.56  | 0.093 | 0.00   | 1.27   | 4.69   |
| 032                | 0.020 | 0.00   | 4.901 | 0.05   | 4.901  | 0.05   | 0.196 | 0.00   | 25.454  | 11.49  | 0.098 | 0.00   | 0.85   | 3.06   |
| 033                | 0.018 | 0.00   | 4.526 | 0.14   | 4.526  | 0.14   | 0.181 | 0.01   | 17.185  | 1.30   | 0.091 | 0.00   | 0.14   | 0.34   |
| 034                | 0.017 | 0.00   | 4.161 | 0.26   | 4.161  | 0.26   | 0.166 | 0.01   | 10.794  | 0.99   | 0.083 | 0.01   | 0.12   | 0.26   |
| 035                | 0.018 | 999.99 | 4.521 | 999.99 | 4.521  | 999.99 | 0.181 | 999.99 | 4.521   | 999.99 | 0.090 | 999.99 | 999.99 | 999.99 |
| 036                | 0.016 | 0.00   | 3.958 | 0.02   | 3.958  | 0.02   | 0.158 | 0.00   | 84.029  | 85.94  | 0.079 | 0.00   | 6.15   | 22.97  |
| 037                | 0.017 | 0.00   | 4.151 | 0.05   | 4.151  | 0.05   | 0.166 | 0.00   | 18.213  | 16.38  | 0.083 | 0.00   | 1.21   | 4.37   |
| 038                | 0.017 | 0.00   | 4.136 | 0.04   | 4.136  | 0.04   | 0.165 | 0.00   | 18.207  | 3.50   | 0.083 | 0.00   | 0.27   | 0.93   |
| 039                | 0.016 | 0.00   | 3.938 | 0.15   | 3.938  | 0.15   | 0.158 | 0.01   | 11.565  | 15.41  | 0.079 | 0.00   | 1.14   | 4.11   |
| 040                | 0.018 | 0.00   | 4.427 | 0.13   | 4.427  | 0.13   | 0.177 | 0.01   | 14.753  | 20.78  | 0.089 | 0.00   | 1.53   | 5.54   |
| 041                | 0.017 | 0.00   | 4.141 | 0.09   | 4.141  | 0.09   | 0.166 | 0.00   | 13.213  | 6.32   | 0.083 | 0.00   | 0.48   | 1.68   |
| 042                | 0.016 | 0.00   | 3.915 | 0.44   | 3.915  | 0.44   | 0.157 | 0.02   | 7.980   | 7.69   | 0.078 | 0.01   | 0.64   | 2.03   |
| 043                | 0.042 | 0.05   | 4.296 | 0.41   | 4.296  | 0.41   | 1.031 | 0.10   | 16.857  | 12.11  | 0.086 | 0.01   | 0.97   | 3.21   |
| 044                | 0.017 | 0.00   | 4.370 | 0.16   | 4.370  | 0.16   | 0.175 | 0.01   | 9.091   | 9.29   | 0.087 | 0.00   | 0.73   | 2.46   |
| 045                | 0.015 | 0.00   | 3.844 | 0.54   | 3.844  | 0.54   | 0.154 | 0.02   | 18.233  | 3.55   | 0.077 | 0.01   | 0.37   | 0.93   |
| 080                | 0.016 | 0.00   | 4.042 | 0.33   | 4.042  | 0.33   | 0.162 | 0.01   | 19.267  | 4.87   | 0.081 | 0.01   | 0.45   | 1.28   |
| 081                | 0.016 | 0.00   | 3.990 | 0.21   | 3.990  | 0.21   | 0.160 | 0.01   | 15.875  | 5.55   | 0.080 | 0.00   | 0.48   | 1.46   |
| 082                | 0.016 | 0.00   | 3.917 | 0.54   | 7.198  | 6.02   | 0.157 | 0.02   | 27.550  | 14.90  | 0.078 | 0.01   | 1.59   |        |
| 083                | 0.017 | 0.00   | 4.125 | 0.21   | 4.125  | 0.21   | 0.165 | 0.01   | 23.267  | 14.37  | 0.083 | 0.00   | 1.08   |        |
| Ar. Mean           | 0.018 | 0.00   | 4.155 | 0.29   | 4.578  | 0.42   | 0.195 | 0.03   | 19.379  | 11.43  | 0.083 | 0.01   | 0.91   | 3.05   |
| Std. dev.          | 0.007 | 0.01   | 0.267 | 0.25   | 2.483  | 0.88   | 0.132 | 0.09   | 22.499  | 15.71  | 0.005 | 0.00   | 1.13   | 4.19   |

ARIZONA PUBLIC SERVICE  
MONTHLY REPORT for 1-90

DEPOSITION DATA  
Comments and Messages Only

Page 3

| Location<br>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                |                             |                   |                     |
| 023                |                             |                   |                     |
| 024                |                             |                   |                     |
| 025                |                             |                   |                     |
| 026                |                             |                   |                     |
| 027                |                             |                   |                     |
| 028                |                             |                   |                     |
| 030                |                             |                   |                     |
| 031                |                             |                   |                     |
| 032                |                             |                   |                     |
| 033                |                             |                   |                     |
| 034                |                             |                   |                     |
| 035                | VOID/POSSIBLE CONTAMINATION |                   | MISSING SAMPLE A    |
| 036                |                             |                   |                     |
| 037                |                             |                   |                     |
| 038                |                             |                   |                     |
| 039                |                             |                   |                     |
| 040                |                             |                   |                     |
| 041                |                             |                   |                     |
| 042                |                             |                   |                     |
| 043                |                             |                   |                     |
| 044                |                             |                   |                     |
| 045                |                             |                   |                     |
| 080                |                             |                   |                     |
| 081                |                             |                   |                     |
| 082                |                             |                   |                     |
| 0                  |                             |                   |                     |



## ARIZONA PUBLIC SERVICE

MONTHLY REPORT for 2-90

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

Page 1

| Location<br>Number | Na    | d      | K     | d      | Ca     | d      | Mg    | d      | Cl    | d      | F     | d      | SO4   | d      | NO3   | d      |
|--------------------|-------|--------|-------|--------|--------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| 001                | 0.484 | 0.38   | 0.242 | 0.19   | 0.948  | 0.12   | 0.218 | 0.07   | 0.237 | 0.03   | 0.395 | 0.05   | 0.790 | 0.10   | 0.077 | 0.08   |
| 002                | 0.420 | 0.52   | 0.250 | 0.18   | 0.993  | 0.40   | 0.298 | 0.12   | 0.247 | 0.02   | 0.411 | 0.03   | 0.822 | 0.06   | 0.085 | 0.08   |
| 003                | 0.315 | 0.03   | 0.308 | 0.28   | 1.013  | 0.38   | 0.464 | 0.30   | 0.236 | 0.02   | 0.394 | 0.04   | 0.788 | 0.07   | 0.039 | 0.00   |
| 004                | 0.170 | 0.00   | 0.254 | 0.17   | 0.509  | 0.00   | 0.229 | 0.15   | 0.254 | 0.00   | 0.424 | 0.00   | 0.848 | 0.00   | 0.042 | 0.00   |
| 005                | 0.214 | 0.25   | 0.173 | 0.01   | 0.608  | 0.19   | 0.200 | 0.09   | 0.260 | 0.01   | 0.433 | 0.01   | 0.867 | 0.03   | 0.043 | 0.00   |
| 006                | 0.246 | 0.16   | 0.192 | 0.05   | 0.903  | 0.16   | 0.230 | 0.07   | 0.205 | 0.08   | 0.342 | 0.14   | 0.684 | 0.28   | 0.055 | 0.05   |
| 007                | 0.358 | 0.37   | 0.267 | 0.19   | 0.976  | 0.22   | 0.396 | 0.18   | 0.266 | 0.01   | 0.443 | 0.02   | 0.885 | 0.03   | 0.083 | 0.08   |
| 008                | 0.379 | 0.01   | 0.190 | 0.00   | 0.759  | 0.02   | 0.228 | 0.08   | 0.284 | 0.01   | 0.474 | 0.01   | 0.948 | 0.02   | 0.047 | 0.00   |
| 009                | 0.422 | 0.12   | 0.171 | 0.02   | 1.266  | 0.37   | 0.407 | 0.06   | 0.256 | 0.03   | 0.427 | 0.05   | 0.853 | 0.09   | 0.043 | 0.00   |
| 010                | 0.311 | 0.01   | 0.156 | 0.01   | 0.934  | 0.04   | 0.281 | 0.07   | 0.233 | 0.01   | 0.389 | 0.01   | 0.778 | 0.03   | 0.039 | 0.00   |
| 011                | 0.394 | 0.13   | 0.317 | 0.02   | 1.580  | 0.21   | 0.529 | 0.08   | 0.238 | 0.02   | 0.396 | 0.03   | 0.793 | 0.05   | 0.040 | 0.00   |
| 012                | 0.336 | 0.02   | 0.336 | 0.02   | 1.346  | 0.09   | 0.506 | 0.13   | 0.252 | 0.02   | 0.421 | 0.03   | 0.841 | 0.05   | 0.062 | 0.04   |
| 013                | 0.752 | 0.04   | 0.376 | 0.02   | 1.316  | 0.07   | 0.415 | 0.10   | 0.282 | 0.01   | 0.470 | 0.02   | 0.940 | 0.05   | 0.047 | 0.00   |
| 014                | 0.361 | 0.01   | 0.180 | 0.00   | 1.172  | 0.20   | 0.334 | 0.02   | 0.270 | 0.00   | 0.451 | 0.01   | 0.901 | 0.01   | 0.045 | 0.00   |
| 015                | 0.367 | 0.03   | 0.183 | 0.02   | 0.734  | 0.07   | 0.177 | 0.14   | 0.275 | 0.02   | 0.459 | 0.04   | 0.917 | 0.08   | 0.046 | 0.00   |
| 016                | 0.419 | 0.04   | 0.140 | 0.01   | 0.632  | 0.19   | 0.190 | 0.09   | 0.210 | 0.02   | 0.350 | 0.03   | 0.699 | 0.06   | 0.112 | 0.04   |
| 017                | 0.339 | 0.04   | 0.170 | 0.02   | 0.509  | 0.06   | 0.234 | 0.11   | 0.254 | 0.03   | 0.424 | 0.05   | 0.848 | 0.09   | 0.042 | 0.00   |
| 018                | 0.324 | 0.02   | 0.162 | 0.01   | 0.648  | 0.05   | 0.180 | 0.11   | 0.243 | 0.02   | 0.405 | 0.03   | 0.810 | 0.06   | 0.041 | 0.00   |
| 019                | 0.316 | 0.01   | 0.235 | 0.15   | 1.104  | 0.03   | 0.417 | 0.13   | 0.237 | 0.01   | 0.394 | 0.01   | 0.789 | 0.02   | 0.039 | 0.00   |
| 020                | 1.059 | 0.09   | 0.163 | 0.01   | 0.738  | 0.22   | 0.197 | 0.05   | 0.817 | 0.06   | 0.408 | 0.03   | 0.817 | 0.06   | 0.068 | 0.05   |
| 021                | 0.334 | 999.99 | 0.167 | 999.99 | 0.836  | 999.99 | 0.201 | 999.99 | 0.251 | 999.99 | 0.418 | 999.99 | 0.836 | 999.99 | 0.042 | 999.99 |
| 022                | 0.167 | 0.00   | 0.167 | 0.00   | 0.669  | 0.02   | 0.218 | 0.04   | 0.251 | 0.01   | 0.418 | 0.01   | 0.836 | 0.02   | 0.042 | 0.00   |
| 023                | 0.928 | 0.20   | 2.622 | 1.27   | 12.890 | 0.62   | 3.795 | 0.64   | 0.253 | 0.01   | 0.421 | 0.01   | 0.842 | 0.03   | 0.124 | 0.16   |
| 024                | 0.522 | 0.34   | 0.347 | 0.34   | 1.570  | 0.31   | 0.574 | 0.37   | 0.262 | 0.01   | 0.437 | 0.01   | 0.873 | 0.02   | 0.044 | 0.00   |
| 025                | 0.452 | 0.16   | 0.182 | 0.01   | 0.815  | 0.14   | 0.272 | 0.01   | 0.272 | 0.01   | 0.454 | 0.02   | 0.908 | 0.04   | 0.078 | 0.07   |
| 026                | 0.995 | 0.54   | 0.633 | 0.18   | 1.086  | 0.01   | 0.190 | 0.02   | 1.086 | 0.36   | 0.453 | 0.00   | 0.905 | 0.01   | 0.077 | 0.06   |
| 027                | 0.505 | 999.99 | 0.168 | 999.99 | 0.841  | 999.99 | 0.042 | 999.99 | 0.252 | 999.99 | 0.421 | 999.99 | 0.841 | 999.99 | 0.042 | 999.99 |
| 028                | 0.406 | 0.19   | 0.161 | 0.01   | 0.806  | 0.06   | 0.212 | 0.11   | 0.242 | 0.02   | 0.403 | 0.03   | 0.806 | 0.06   | 0.060 | 0.04   |
| 030                | 0.399 | 0.15   | 0.320 | 0.01   | 1.759  | 0.26   | 0.496 | 0.08   | 0.240 | 0.01   | 0.400 | 0.01   | 0.801 | 0.03   | 0.077 | 0.07   |
| 031                | 0.406 | 0.13   | 0.163 | 0.01   | 0.902  | 0.23   | 0.261 | 0.02   | 0.245 | 0.02   | 0.408 | 0.03   | 0.817 | 0.06   | 0.061 | 0.04   |
| 032                | 0.394 | 0.03   | 0.299 | 0.22   | 1.677  | 0.32   | 0.367 | 0.16   | 0.295 | 0.02   | 0.492 | 0.04   | 0.984 | 0.07   | 0.049 | 0.00   |
| 033                | 0.497 | 0.33   | 0.332 | 0.00   | 0.913  | 0.15   | 0.524 | 0.22   | 0.249 | 0.00   | 0.415 | 0.01   | 0.830 | 0.01   | 0.079 | 0.08   |
| 034                | 0.242 | 0.14   | 0.164 | 0.02   | 0.571  | 0.11   | 0.179 | 0.05   | 0.246 | 0.02   | 0.410 | 0.04   | 0.821 | 0.08   | 0.076 | 0.07   |
| 035                | 0.289 | 0.18   | 0.194 | 0.01   | 0.775  | 0.02   | 0.308 | 0.18   | 0.290 | 0.01   | 0.484 | 0.01   | 0.968 | 0.03   | 0.048 | 0.00   |
| 036                | 0.339 | 0.01   | 0.170 | 0.01   | 0.592  | 0.15   | 0.227 | 0.14   | 0.254 | 0.01   | 0.424 | 0.02   | 0.848 | 0.03   | 0.088 | 0.09   |
| 037                | 1.143 | 1.48   | 0.666 | 0.93   | 0.772  | 0.34   | 0.395 | 0.23   | 0.292 | 0.02   | 0.486 | 0.03   | 0.972 | 0.06   | 0.049 | 0.00   |
| 038                | 0.302 | 0.05   | 0.151 | 0.02   | 0.593  | 0.21   | 0.152 | 0.05   | 0.227 | 0.03   | 0.378 | 0.06   | 0.755 | 0.11   | 0.083 | 0.09   |
| 039                | 0.336 | 0.02   | 0.254 | 0.18   | 0.585  | 0.13   | 0.185 | 0.01   | 0.252 | 0.02   | 0.420 | 0.03   | 0.839 | 0.05   | 0.111 | 0.14   |
| 040                | 0.358 | 0.36   | 0.269 | 0.18   | 0.806  | 0.18   | 0.206 | 0.09   | 0.269 | 0.00   | 0.448 | 0.00   | 0.896 | 0.00   | 0.045 | 0.00   |
| 041                | 0.158 | 0.02   | 0.158 | 0.02   | 0.792  | 0.10   | 0.233 | 0.13   | 0.237 | 0.03   | 0.396 | 0.05   | 0.792 | 0.10   | 0.110 | 0.02   |
| 042                | 0.335 | 0.03   | 0.167 | 0.02   | 0.749  | 0.10   | 0.274 | 0.06   | 0.251 | 0.02   | 0.418 | 0.04   | 0.837 | 0.08   | 0.094 | 0.10   |
| 043                | 0.745 | 0.12   | 0.830 | 0.05   | 1.717  | 0.21   | 0.624 | 0.12   | 1.060 | 0.30   | 0.155 | 0.03   | 0.310 | 0.05   | 0.148 | 0.08   |
| 044                | 0.367 | 0.36   | 0.185 | 0.00   | 0.738  | 0.02   | 0.212 | 0.05   | 0.277 | 0.01   | 0.461 | 0.01   | 0.923 | 0.02   | 0.046 | 0.00   |
| 045                | 0.399 | 0.11   | 0.162 | 0.02   | 0.809  | 0.11   | 0.170 | 0.04   | 0.243 | 0.03   | 0.404 | 0.05   | 0.809 | 0.11   | 0.059 | 0.03   |
| 080                | 0.480 | 0.02   | 0.160 | 0.01   | 1.595  | 0.24   | 0.319 | 0.02   | 0.363 | 0.26   | 0.400 | 0.02   | 0.800 | 0.04   | 0.096 | 0.04   |
| 081                | 1.116 | 0.05   | 0.462 | 0.38   | 1.198  | 0.21   | 0.354 | 0.27   | 1.048 | 0.18   | 0.374 | 0.07   | 1.156 | 0.95   | 0.089 | 0.10   |
| 082                | 0.563 | 0.15   | 0.161 | 0.00   | 1.774  | 0.05   | 0.316 | 0.19   | 0.361 | 0.23   | 0.403 | 0.01   | 0.806 | 0.02   | 0.116 | 0.15   |
| 083                | 0.611 | 1.04   | 0.125 | 0.07   | 3.130  | 0.21   | 0.739 | 0.09   | 1.011 | 0.24   | 0.425 | 0.04   | 0.849 | 0.08   | 0.042 | 0.00   |
| Ar. Mean           | 0.454 | 0.18   | 0.298 | 0.12   | 1.263  | 0.16   | 0.379 | 0.12   | 0.336 | 0.05   | 0.415 | 0.03   | 0.839 | 0.08   | 0.066 | 0.04   |
| Std. Dev.          | 0.239 | 0.28   | 0.371 | 0.24   | 1.778  | 0.13   | 0.523 | 0.11   | 0.234 | 0.09   | 0.050 | 0.02   | 0.110 | 0.14   | 0.027 | 0.04   |



## ARIZONA PUBLIC SERVICE

MONTHLY REPORT for 2-90

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

Page 2

| Location<br>Number | PO4   | d      | CO3   | d      | HCO3   | d      | NH3   | d      | TSS     | d      | CU    | d      | Av d   | SD(d)  |
|--------------------|-------|--------|-------|--------|--------|--------|-------|--------|---------|--------|-------|--------|--------|--------|
| 001                | 0.016 | 0.00   | 3.951 | 0.51   | 3.951  | 0.51   | 0.158 | 0.02   | 22.762  | 1.79   | 0.079 | 0.01   | 0.28   | 0.47   |
| 002                | 0.016 | 0.00   | 4.112 | 0.29   | 4.112  | 0.29   | 0.164 | 0.01   | 24.611  | 1.52   | 0.082 | 0.01   | 0.25   | 0.40   |
| 003                | 0.016 | 0.00   | 3.938 | 0.38   | 3.938  | 0.38   | 0.158 | 0.01   | 42.000  | 18.00  | 0.079 | 0.01   | 1.42   | 4.77   |
| 004                | 0.017 | 0.00   | 4.239 | 0.01   | 4.239  | 0.01   | 0.170 | 0.00   | 13.559  | 6.74   | 0.085 | 0.00   | 0.51   | 1.79   |
| 005                | 0.017 | 0.00   | 4.333 | 0.15   | 4.333  | 0.15   | 0.173 | 0.01   | 4.333   | 0.15   | 0.087 | 0.00   | 0.08   | 0.09   |
| 006                | 0.014 | 0.01   | 3.422 | 1.38   | 3.422  | 1.38   | 0.137 | 0.06   | 26.813  | 7.58   | 0.068 | 0.03   | 0.82   | 2.00   |
| 007                | 0.018 | 0.00   | 4.426 | 0.17   | 4.426  | 0.17   | 0.177 | 0.01   | 27.217  | 21.94  | 0.089 | 0.00   | 1.67   | 5.83   |
| 008                | 0.019 | 0.00   | 4.741 | 0.11   | 4.741  | 0.11   | 0.190 | 0.00   | 18.879  | 14.74  | 0.095 | 0.00   | 1.08   | 3.93   |
| 009                | 0.017 | 0.00   | 4.266 | 0.47   | 4.266  | 0.47   | 0.171 | 0.02   | 15.263  | 1.73   | 0.085 | 0.01   | 0.25   | 0.46   |
| 010                | 0.016 | 0.00   | 3.891 | 0.15   | 3.891  | 0.15   | 0.156 | 0.01   | 10.923  | 3.52   | 0.078 | 0.00   | 0.29   | 0.93   |
| 011                | 0.016 | 0.00   | 3.964 | 0.27   | 3.964  | 0.27   | 0.159 | 0.01   | 20.561  | 1.78   | 0.079 | 0.01   | 0.20   | 0.46   |
| 012                | 0.017 | 0.00   | 4.205 | 0.27   | 4.205  | 0.27   | 0.168 | 0.01   | 42.107  | 6.04   | 0.084 | 0.01   | 0.50   | 1.60   |
| 013                | 0.019 | 0.00   | 4.701 | 0.24   | 4.701  | 0.24   | 0.188 | 0.01   | 22.661  | 8.68   | 0.094 | 0.00   | 0.68   | 2.30   |
| 014                | 0.018 | 0.00   | 4.507 | 0.07   | 4.507  | 0.07   | 0.180 | 0.00   | 23.448  | 3.95   | 0.090 | 0.00   | 0.31   | 1.05   |
| 015                | 0.018 | 0.00   | 4.587 | 0.42   | 4.587  | 0.42   | 0.183 | 0.02   | 7.653   | 5.72   | 0.092 | 0.01   | 0.50   | 1.51   |
| 016                | 0.014 | 0.00   | 3.496 | 0.29   | 3.496  | 0.29   | 0.140 | 0.01   | 7.503   | 8.31   | 0.070 | 0.01   | 0.67   | 2.20   |
| 017                | 0.017 | 0.00   | 4.239 | 0.47   | 4.239  | 0.47   | 0.170 | 0.02   | 34.950  | 19.80  | 0.085 | 0.01   | 1.51   | 5.27   |
| 018                | 0.016 | 0.00   | 4.051 | 0.31   | 4.051  | 0.31   | 0.162 | 0.01   | 8.677   | 9.56   | 0.081 | 0.01   | 0.75   | 2.54   |
| 019                | 0.016 | 0.00   | 3.944 | 0.12   | 3.944  | 0.12   | 0.158 | 0.00   | 33.107  | 2.14   | 0.079 | 0.00   | 0.20   | 0.56   |
| 020                | 0.016 | 0.00   | 4.085 | 0.29   | 4.085  | 0.29   | 0.163 | 0.01   | 7.047   | 6.22   | 0.082 | 0.01   | 0.53   |        |
| 021                | 0.017 | 999.99 | 4.179 | 999.99 | 4.179  | 999.99 | 0.167 | 999.99 | 16.714  | 999.99 | 0.084 | 999.99 | 999.99 | 999.99 |
| 022                | 0.017 | 0.00   | 4.179 | 0.11   | 4.179  | 0.11   | 0.167 | 0.00   | 15.868  | 1.26   | 0.084 | 0.00   | 0.11   | 0.33   |
| 023                | 0.208 | 0.25   | 4.212 | 0.15   | 41.263 | 0.24   | 0.168 | 0.01   | 362.973 | 96.91  | 0.084 | 0.00   | 7.18   | 25.83  |
| 024                | 0.035 | 0.04   | 4.366 | 0.11   | 4.366  | 0.11   | 0.175 | 0.00   | 22.910  | 36.98  | 0.087 | 0.00   | 2.76   | 9.85   |
| 025                | 0.018 | 0.00   | 4.540 | 0.21   | 4.540  | 0.21   | 0.182 | 0.01   | 9.417   | 9.54   | 0.091 | 0.00   | 0.75   | 2.53   |
| 026                | 0.018 | 0.00   | 4.527 | 0.03   | 4.527  | 0.03   | 0.363 | 0.36   | 4.527   | 0.03   | 0.091 | 0.00   | 0.12   | 0.18   |
| 027                | 0.084 | 999.99 | 4.205 | 999.99 | 4.205  | 999.99 | 0.168 | 999.99 | 4.205   | 999.99 | 0.084 | 999.99 | 999.99 | 999.99 |
| 028                | 0.016 | 0.00   | 4.031 | 0.32   | 4.031  | 0.32   | 0.161 | 0.01   | 8.642   | 9.54   | 0.081 | 0.01   | 0.77   | 2.53   |
| 030                | 0.016 | 0.00   | 4.004 | 0.13   | 4.004  | 0.13   | 0.160 | 0.01   | 22.425  | 0.75   | 0.080 | 0.00   | 0.12   | 0.20   |
| 031                | 0.016 | 0.00   | 4.085 | 0.29   | 4.085  | 0.29   | 0.163 | 0.01   | 14.882  | 10.86  | 0.082 | 0.01   | 0.86   | 2.88   |
| 032                | 0.020 | 0.00   | 4.922 | 0.36   | 4.922  | 0.36   | 0.197 | 0.01   | 23.191  | 21.89  | 0.098 | 0.01   | 1.68   | 5.82   |
| 033                | 0.017 | 0.00   | 4.152 | 0.05   | 4.152  | 0.05   | 0.250 | 0.17   | 44.936  | 30.47  | 0.083 | 0.00   | 2.25   | 8.12   |
| 034                | 0.016 | 0.00   | 4.105 | 0.42   | 4.105  | 0.42   | 0.164 | 0.02   | 6.833   | 5.04   | 0.082 | 0.01   | 0.46   | 1.33   |
| 035                | 0.019 | 0.00   | 4.842 | 0.15   | 4.842  | 0.15   | 0.194 | 0.01   | 23.180  | 7.04   | 0.097 | 0.00   | 0.56   | 1.87   |
| 036                | 0.034 | 0.04   | 4.239 | 0.17   | 4.239  | 0.17   | 0.170 | 0.01   | 30.659  | 14.82  | 0.085 | 0.00   | 1.12   | 3.94   |
| 037                | 0.029 | 0.02   | 4.862 | 0.29   | 4.862  | 0.29   | 0.194 | 0.01   | 50.089  | 28.05  | 0.147 | 0.11   | 2.28   | 7.43   |
| 038                | 0.031 | 0.03   | 3.776 | 0.57   | 3.776  | 0.57   | 0.151 | 0.02   | 15.103  | 2.28   | 0.076 | 0.01   | 0.29   | 0.60   |
| 039                | 0.017 | 0.00   | 4.196 | 0.27   | 4.196  | 0.27   | 0.168 | 0.01   | 11.803  | 4.12   | 0.084 | 0.01   | 0.38   | 1.08   |
| 040                | 0.018 | 0.00   | 4.480 | 0.01   | 4.480  | 0.01   | 0.179 | 0.00   | 19.698  | 17.86  | 0.090 | 0.00   | 1.34   | 4.76   |
| 041                | 0.016 | 0.00   | 3.958 | 0.50   | 3.958  | 0.50   | 0.307 | 0.28   | 20.084  | 13.25  | 0.079 | 0.01   | 1.07   | 3.51   |
| 042                | 0.017 | 0.00   | 4.183 | 0.40   | 4.183  | 0.40   | 0.167 | 0.02   | 15.140  | 4.79   | 0.084 | 0.01   | 0.43   | 1.26   |
| 043                | 0.006 | 0.00   | 1.552 | 0.26   | 7.448  | 1.24   | 0.163 | 0.21   | 60.362  | 15.83  | 0.031 | 0.01   | 1.32   | 4.19   |
| 044                | 0.018 | 0.00   | 4.614 | 0.12   | 4.614  | 0.12   | 0.185 | 0.00   | 16.538  | 10.64  | 0.092 | 0.00   | 0.81   | 2.83   |
| 045                | 0.016 | 0.00   | 4.045 | 0.54   | 4.045  | 0.54   | 0.162 | 0.02   | 7.063   | 6.57   | 0.081 | 0.01   | 0.58   | 1.73   |
| 080                | 0.016 | 0.00   | 3.998 | 0.20   | 3.998  | 0.20   | 0.160 | 0.01   | 17.630  | 4.08   | 0.119 | 0.07   | 0.37   | 1.07   |
| 081                | 0.186 | 0.34   | 3.743 | 0.66   | 3.743  | 0.66   | 0.557 | 0.84   | 46.232  | 37.82  | 0.116 | 0.09   | 3.04   | 10.01  |
| 082                | 0.032 | 0.03   | 4.031 | 0.11   | 4.031  | 0.11   | 0.161 | 0.00   | 16.211  | 13.33  | 0.081 | 0.00   | 1.03   |        |
| 083                | 0.017 | 0.00   | 4.246 | 0.40   | 7.077  | 5.26   | 0.170 | 0.02   | 43.993  | 2.61   | 0.085 | 0.01   | 0.72   |        |
| Ar. Mean           | 0.027 | 0.02   | 4.153 | 0.29   | 5.107  | 0.42   | 0.185 | 0.05   | 28.445  | 12.09  | 0.086 | 0.01   | 0.98   | 3.23   |
| Std. dev.          | 0.038 | 0.06   | 0.500 | 0.23   | 5.375  | 0.78   | 0.066 | 0.14   | 51.065  | 15.85  | 0.015 | 0.02   | 1.17   | 4.21   |

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DEPOSITION DATA  
Comments and Messages Only

Page 3

| Location<br>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                | VOID/DEAD LIZARD IN CONTAINER |                   | MISSING SAMPLE A    |
| 023                |                               |                   |                     |
| 024                |                               |                   |                     |
| 025                |                               |                   |                     |
| 026                |                               |                   |                     |
| 027                | VOID/DEAD LIZARD IN CONTAINER |                   | MISSING SAMPLE A    |
| 028                |                               |                   |                     |
| 030                |                               |                   |                     |
| 031                |                               |                   |                     |
| 032                |                               |                   |                     |
| 033                |                               |                   |                     |
| 034                |                               |                   |                     |
| 035                |                               |                   |                     |
| 036                |                               |                   |                     |
| 037                |                               |                   |                     |
| 038                |                               |                   |                     |
| 039                |                               |                   |                     |
| 040                |                               |                   |                     |
| 041                |                               |                   |                     |
| 042                |                               |                   |                     |
| 043                | LIQUID GREEN                  | LIQUID GREEN      |                     |
| 044                |                               |                   |                     |
| 045                |                               |                   |                     |
| 080                |                               |                   |                     |
| 081                |                               |                   |                     |
| 082                |                               |                   |                     |
| 083                |                               |                   |                     |



## ARIZONA PUBLIC SERVICE

MONTHLY REPORT for 3-90

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

Page 1

| Location<br>Number | Na    | d      | K     | d      | Ca     | d      | Mg    | d      | Cl    | d      | F     | d      | SO4   | d      | NO3   | d      |
|--------------------|-------|--------|-------|--------|--------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| 001                | 0.207 | 0.00   | 0.173 | 0.07   | 1.016  | 0.16   | 0.407 | 0.10   | 0.129 | 0.05   | 0.216 | 0.09   | 0.431 | 0.18   | 0.075 | 0.10   |
| 002                | 0.498 | 0.57   | 0.127 | 0.03   | 0.839  | 0.11   | 0.381 | 0.18   | 0.137 | 0.06   | 0.229 | 0.10   | 0.458 | 0.20   | 0.048 | 0.06   |
| 003                | 0.322 | 0.02   | 0.228 | 0.01   | 1.492  | 0.33   | 0.627 | 0.15   | 0.294 | 0.04   | 0.167 | 0.06   | 0.333 | 0.11   | 0.081 | 0.13   |
| 004                | 0.237 | 0.16   | 0.118 | 0.08   | 0.945  | 0.14   | 0.307 | 0.01   | 0.118 | 0.00   | 0.197 | 0.00   | 0.394 | 0.01   | 0.201 | 0.04   |
| 005                | 0.190 | 0.07   | 0.114 | 0.08   | 1.179  | 0.10   | 0.297 | 0.10   | 0.208 | 0.19   | 0.190 | 0.00   | 0.380 | 0.01   | 0.074 | 0.11   |
| 006                | 0.185 | 0.04   | 0.127 | 0.09   | 1.001  | 0.19   | 0.311 | 0.06   | 0.199 | 0.15   | 0.146 | 0.12   | 0.377 | 0.07   | 0.127 | 0.21   |
| 007                | 0.186 | 0.05   | 0.146 | 0.13   | 1.237  | 0.08   | 0.237 | 0.06   | 0.140 | 0.04   | 0.233 | 0.07   | 0.466 | 0.13   | 0.023 | 0.01   |
| 008                | 0.197 | 0.16   | 0.256 | 0.04   | 0.755  | 0.32   | 0.492 | 0.39   | 0.158 | 0.04   | 0.263 | 0.07   | 0.526 | 0.14   | 0.071 | 0.10   |
| 009                | 0.185 | 0.16   | 0.158 | 0.21   | 1.322  | 0.52   | 0.289 | 0.24   | 0.178 | 0.04   | 0.297 | 0.06   | 0.595 | 0.13   | 0.030 | 0.01   |
| 010                | 0.179 | 0.05   | 0.345 | 0.07   | 1.471  | 0.25   | 0.563 | 0.38   | 0.230 | 0.15   | 0.224 | 0.07   | 0.449 | 0.14   | 0.040 | 0.03   |
| 011                | 0.189 | 0.01   | 0.281 | 0.17   | 1.415  | 0.30   | 0.621 | 0.08   | 0.211 | 0.13   | 0.237 | 0.01   | 0.473 | 0.03   | 0.149 | 0.17   |
| 012                | 0.344 | 0.46   | 0.328 | 0.21   | 2.181  | 2.11   | 0.653 | 0.56   | 0.369 | 0.16   | 0.231 | 0.10   | 0.462 | 0.20   | 0.194 | 0.03   |
| 013                | 0.325 | 0.20   | 0.650 | 0.41   | 3.545  | 1.40   | 1.463 | 1.34   | 0.190 | 0.05   | 0.317 | 0.08   | 0.635 | 0.15   | 0.032 | 0.01   |
| 014                | 0.237 | 0.06   | 0.192 | 0.03   | 1.798  | 0.52   | 0.433 | 0.10   | 0.256 | 0.20   | 0.240 | 0.03   | 0.480 | 0.07   | 0.058 | 0.06   |
| 015                | 0.117 | 0.03   | 0.059 | 0.01   | 0.939  | 0.23   | 0.160 | 0.03   | 0.176 | 0.04   | 0.294 | 0.07   | 0.587 | 0.14   | 0.029 | 0.01   |
| 016                | 0.270 | 0.01   | 0.183 | 0.05   | 1.010  | 0.11   | 0.304 | 0.29   | 0.279 | 0.08   | 0.109 | 0.05   | 0.304 | 0.08   | 0.015 | 0.00   |
| 017                | 0.095 | 0.05   | 0.047 | 0.02   | 0.611  | 0.07   | 0.123 | 0.06   | 0.152 | 0.13   | 0.163 | 0.03   | 0.327 | 0.07   | 0.016 | 0.00   |
| 018                | 0.239 | 0.05   | 0.142 | 0.07   | 1.280  | 1.48   | 0.360 | 0.25   | 0.147 | 0.03   | 0.244 | 0.05   | 0.489 | 0.10   | 0.065 | 0.09   |
| 019                | 0.187 | 0.07   | 0.131 | 0.04   | 1.521  | 0.58   | 0.392 | 0.09   | 0.235 | 0.13   | 0.234 | 0.09   | 0.468 | 0.18   | 0.090 | 0.05   |
| 020                | 0.448 | 0.04   | 0.267 | 0.17   | 1.104  | 0.14   | 0.484 | 0.32   | 0.420 | 0.13   | 0.149 | 0.01   | 0.451 | 0.31   | 0.159 | 0.29   |
| 021                | 0.224 | 0.08   | 0.056 | 0.02   | 1.128  | 0.14   | 0.277 | 0.19   | 0.168 | 0.06   | 0.281 | 0.10   | 0.561 | 0.20   | 0.049 | 0.03   |
| 022                | 0.182 | 0.14   | 0.119 | 0.01   | 1.420  | 0.35   | 0.364 | 0.07   | 0.179 | 0.02   | 0.298 | 0.03   | 0.596 | 0.05   | 0.184 | 0.02   |
| 023                | 0.496 | 0.08   | 4.310 | 0.84   | 16.401 | 0.76   | 6.446 | 0.99   | 0.572 | 0.38   | 0.286 | 0.19   | 0.381 | 0.00   | 0.492 | 0.07   |
| 024                | 0.202 | 0.06   | 0.303 | 0.10   | 2.012  | 0.05   | 0.496 | 0.18   | 0.297 | 0.34   | 0.252 | 0.08   | 0.504 | 0.16   | 0.025 | 0.01   |
| 025                | 0.205 | 0.00   | 0.665 | 0.30   | 1.381  | 0.70   | 0.854 | 0.33   | 0.154 | 0.00   | 0.256 | 0.00   | 0.512 | 0.01   | 0.026 | 0.00   |
| 026                | 0.207 | 0.04   | 0.136 | 0.18   | 0.875  | 0.05   | 0.355 | 0.37   | 0.155 | 0.03   | 0.259 | 0.05   | 0.517 | 0.09   | 0.047 | 0.04   |
| 027                | 0.208 | 0.14   | 0.208 | 0.14   | 1.106  | 1.02   | 0.302 | 0.01   | 0.254 | 0.05   | 0.127 | 0.02   | 0.254 | 0.05   | 0.013 | 0.00   |
| 028                | 0.166 | 0.03   | 0.115 | 0.13   | 1.982  | 0.63   | 0.245 | 0.08   | 0.221 | 0.03   | 0.138 | 0.02   | 0.276 | 0.04   | 0.058 | 0.01   |
| 030                | 0.468 | 999.99 | 0.535 | 999.99 | 4.613  | 999.99 | 0.735 | 999.99 | 0.735 | 999.99 | 0.167 | 999.99 | 0.334 | 999.99 | 0.017 | 999.99 |
| 031                | 0.303 | 0.12   | 0.182 | 0.12   | 1.577  | 0.25   | 0.352 | 0.02   | 0.182 | 0.00   | 0.303 | 0.00   | 0.606 | 0.00   | 0.030 | 0.00   |
| 032                | 0.398 | 0.20   | 0.398 | 0.20   | 3.348  | 1.91   | 0.730 | 0.00   | 0.236 | 0.02   | 0.394 | 0.04   | 0.788 | 0.08   | 0.039 | 0.00   |
| 033                | 0.269 | 0.10   | 0.487 | 0.55   | 2.221  | 2.94   | 0.557 | 0.36   | 0.352 | 0.38   | 0.270 | 0.00   | 0.539 | 0.01   | 0.056 | 0.06   |
| 034                | 0.275 | 0.11   | 0.138 | 0.17   | 0.769  | 0.00   | 0.170 | 0.01   | 0.165 | 0.00   | 0.275 | 0.00   | 0.550 | 0.00   | 0.027 | 0.00   |
| 035                | 0.440 | 0.15   | 0.250 | 0.02   | 1.671  | 1.01   | 0.232 | 0.03   | 0.188 | 0.01   | 0.313 | 0.02   | 0.626 | 0.04   | 0.031 | 0.00   |
| 036                | 0.214 | 0.01   | 0.054 | 0.00   | 0.642  | 0.04   | 0.188 | 0.04   | 0.161 | 0.01   | 0.268 | 0.02   | 0.535 | 0.03   | 0.074 | 0.10   |
| 037                | 0.254 | 0.01   | 0.063 | 0.00   | 0.697  | 0.10   | 0.127 | 0.03   | 0.190 | 0.01   | 0.317 | 0.01   | 0.635 | 0.03   | 0.085 | 0.10   |
| 038                | 0.204 | 0.16   | 0.077 | 0.01   | 0.557  | 0.12   | 0.112 | 0.00   | 0.136 | 0.06   | 0.140 | 0.07   | 0.280 | 0.15   | 0.116 | 0.05   |
| 039                | 0.141 | 0.04   | 0.139 | 0.16   | 0.424  | 0.13   | 0.126 | 0.11   | 0.086 | 0.01   | 0.143 | 0.01   | 0.285 | 0.03   | 0.076 | 0.06   |
| 040                | 0.245 | 0.24   | 0.797 | 0.58   | 1.970  | 0.66   | 0.839 | 0.74   | 0.185 | 0.01   | 0.309 | 0.01   | 0.618 | 0.03   | 0.052 | 0.04   |
| 041                | 0.304 | 0.00   | 0.177 | 0.25   | 1.215  | 0.60   | 0.516 | 0.48   | 0.228 | 0.15   | 0.253 | 0.00   | 0.507 | 0.01   | 0.104 | 0.16   |
| 042                | 0.240 | 0.03   | 0.148 | 0.04   | 1.033  | 0.59   | 0.278 | 0.09   | 0.268 | 0.03   | 0.150 | 0.02   | 0.300 | 0.03   | 0.186 | 0.02   |
| 043                | 0.334 | 0.11   | 0.186 | 0.09   | 1.075  | 0.56   | 0.326 | 0.28   | 0.485 | 0.04   | 0.107 | 0.02   | 0.427 | 0.08   | 0.098 | 0.06   |
| 044                | 0.341 | 0.24   | 0.201 | 0.29   | 0.964  | 0.38   | 0.501 | 0.43   | 0.170 | 0.01   | 0.283 | 0.01   | 0.565 | 0.02   | 0.060 | 0.06   |
| 045                | 0.184 | 0.14   | 0.123 | 0.13   | 0.885  | 0.50   | 0.253 | 0.11   | 0.302 | 0.03   | 0.151 | 0.01   | 0.302 | 0.03   | 0.102 | 0.17   |
| 080                | 0.410 | 0.02   | 0.114 | 0.05   | 1.013  | 0.08   | 0.318 | 0.09   | 0.330 | 0.04   | 0.143 | 0.07   | 0.396 | 0.09   | 0.014 | 0.01   |
| 081                | 0.677 | 0.02   | 0.135 | 0.00   | 1.152  | 0.16   | 0.284 | 0.01   | 0.507 | 0.05   | 0.169 | 0.00   | 0.506 | 0.33   | 0.017 | 0.00   |
| 082                | 0.417 | 0.31   | 0.112 | 0.17   | 2.631  | 0.21   | 0.618 | 0.26   | 0.445 | 0.09   | 0.242 | 0.32   | 3.351 | 0.19   | 0.011 | 0.01   |
| 083                | 0.738 | 0.13   | 0.345 | 0.21   | 1.710  | 0.29   | 0.532 | 0.29   | 0.503 | 0.04   | 0.194 | 0.02   | 0.574 | 0.34   | 0.321 | 0.00   |
| Ar. Mean           | 0.283 | 0.11   | 0.305 | 0.14   | 1.732  | 0.50   | 0.543 | 0.22   | 0.252 | 0.08   | 0.226 | 0.05   | 0.529 | 0.10   | 0.083 | 0.05   |
| Std. Dev.          | 0.134 | 0.11   | 0.613 | 0.17   | 2.305  | 0.60   | 0.903 | 0.26   | 0.134 | 0.09   | 0.067 | 0.06   | 0.432 | 0.09   | 0.087 | 0.06   |

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

Page 2

| Location<br>Number | PO4   | d      | CO3   | d      | HCO3   | d      | NH3   | d      | TSS     | d      | CU    | d      | Av d   | SD(d)  |
|--------------------|-------|--------|-------|--------|--------|--------|-------|--------|---------|--------|-------|--------|--------|--------|
| 001                | 0.014 | 0.01   | 2.156 | 0.89   | 5.752  | 6.31   | 0.120 | 0.03   | 24.150  | 9.94   | 0.043 | 0.02   | 1.28   | 2.99   |
| 002                | 0.009 | 0.00   | 2.289 | 1.01   | 2.289  | 1.01   | 0.092 | 0.04   | 22.500  | 9.25   | 0.046 | 0.02   | 0.90   | 2.43   |
| 003                | 0.026 | 0.04   | 1.666 | 0.57   | 8.664  | 2.95   | 0.145 | 0.18   | 43.204  | 13.43  | 0.033 | 0.01   | 1.29   | 3.58   |
| 004                | 0.008 | 0.00   | 1.971 | 0.04   | 3.336  | 2.69   | 0.079 | 0.00   | 22.166  | 16.25  | 0.039 | 0.00   | 1.39   | 4.34   |
| 005                | 0.008 | 0.00   | 1.902 | 0.03   | 7.249  | 5.45   | 0.076 | 0.00   | 19.037  | 4.89   | 0.038 | 0.00   | 0.79   | 1.86   |
| 006                | 0.021 | 0.03   | 1.457 | 1.20   | 4.697  | 0.48   | 0.230 | 0.29   | 28.114  | 9.60   | 0.038 | 0.01   | 0.90   | 2.52   |
| 007                | 0.033 | 0.02   | 2.328 | 0.67   | 9.316  | 9.07   | 0.093 | 0.03   | 29.509  | 14.27  | 0.047 | 0.01   | 1.76   | 4.32   |
| 008                | 0.033 | 0.04   | 2.631 | 0.69   | 4.713  | 4.85   | 0.105 | 0.03   | 46.231  | 68.67  | 0.053 | 0.01   | 5.40   | 18.26  |
| 009                | 0.012 | 0.00   | 2.974 | 0.65   | 5.282  | 5.26   | 0.119 | 0.03   | 14.515  | 23.73  | 0.059 | 0.01   | 2.22   | 6.34   |
| 010                | 0.020 | 0.02   | 2.244 | 0.69   | 3.574  | 1.98   | 0.204 | 0.20   | 38.540  | 23.29  | 0.045 | 0.01   | 1.95   | 6.16   |
| 011                | 0.034 | 0.03   | 2.366 | 0.13   | 2.366  | 0.13   | 0.095 | 0.01   | 41.979  | 8.11   | 0.047 | 0.00   | 0.67   | 2.14   |
| 012                | 0.024 | 0.02   | 2.308 | 1.02   | 5.540  | 2.45   | 0.380 | 0.53   | 42.078  | 16.50  | 0.046 | 0.02   | 1.74   | 4.32   |
| 013                | 0.041 | 0.06   | 3.175 | 0.76   | 12.597 | 11.79  | 0.127 | 0.03   | 95.493  | 47.98  | 0.063 | 0.02   | 4.59   | 12.86  |
| 014                | 0.010 | 0.00   | 2.400 | 0.33   | 5.760  | 0.78   | 0.096 | 0.01   | 29.825  | 5.95   | 0.048 | 0.01   | 0.58   | 1.56   |
| 015                | 0.012 | 0.00   | 2.935 | 0.72   | 2.935  | 0.72   | 0.117 | 0.03   | 17.467  | 2.00   | 0.059 | 0.01   | 0.29   | 0.55   |
| 016                | 0.004 | 0.00   | 1.093 | 0.47   | 2.623  | 1.13   | 0.129 | 0.15   | 29.143  | 26.74  | 0.022 | 0.01   | 2.08   | 7.10   |
| 017                | 0.007 | 0.00   | 1.634 | 0.33   | 1.634  | 0.33   | 0.065 | 0.01   | 10.911  | 1.66   | 0.033 | 0.01   | 0.20   | 0.44   |
| 018                | 0.019 | 0.02   | 2.444 | 0.49   | 3.983  | 2.59   | 0.098 | 0.02   | 20.281  | 10.44  | 0.049 | 0.01   | 1.12   | 2.78   |
| 019                | 0.028 | 0.03   | 2.341 | 0.91   | 3.662  | 1.74   | 0.169 | 0.11   | 45.693  | 15.87  | 0.047 | 0.02   | 1.42   | 4.19   |
| 020                | 0.030 | 0.02   | 1.495 | 0.05   | 5.642  | 3.98   | 0.179 | 0.01   | 32.700  | 19.15  | 0.030 | 0.00   | 1.76   | 2.60   |
| 021                | 0.044 | 0.07   | 2.806 | 1.01   | 2.806  | 1.01   | 0.112 | 0.04   | 16.521  | 14.63  | 0.056 | 0.02   | 1.26   | 2.60   |
| 022                | 0.012 | 0.00   | 2.981 | 0.27   | 2.981  | 0.27   | 0.119 | 0.01   | 16.285  | 9.81   | 0.060 | 0.01   | 0.79   | 2.60   |
| 023                | 0.084 | 0.03   | 1.907 | 0.00   | 54.926 | 4.58   | 0.076 | 0.00   | 858.214 | 419.57 | 0.038 | 0.00   | 30.53  | 111.98 |
| 024                | 0.054 | 0.06   | 2.522 | 0.80   | 9.021  | 4.01   | 0.101 | 0.03   | 41.834  | 19.20  | 0.050 | 0.02   | 1.79   | 5.12   |
| 025                | 0.097 | 0.17   | 2.560 | 0.03   | 6.145  | 0.06   | 0.204 | 0.20   | 62.374  | 38.29  | 0.051 | 0.00   | 2.86   | 10.20  |
| 026                | 0.021 | 0.00   | 2.586 | 0.47   | 10.153 | 9.01   | 0.103 | 0.02   | 15.983  | 13.14  | 0.052 | 0.01   | 1.68   | 4.06   |
| 027                | 0.021 | 0.01   | 1.270 | 0.25   | 4.652  | 2.62   | 0.051 | 0.01   | 26.361  | 19.71  | 0.025 | 0.00   | 1.72   | 5.23   |
| 028                | 0.193 | 0.37   | 1.382 | 0.21   | 7.187  | 1.11   | 0.055 | 0.01   | 19.736  | 12.95  | 0.028 | 0.00   | 1.12   | 3.42   |
| 030                | 0.007 | 999.99 | 1.671 | 999.99 | 16.714 | 999.99 | 0.067 | 999.99 | 86.914  | 999.99 | 0.033 | 999.99 | 999.99 | 999.99 |
| 031                | 0.043 | 0.06   | 3.032 | 0.01   | 5.159  | 4.27   | 0.121 | 0.00   | 24.259  | 0.10   | 0.061 | 0.00   | 0.35   | 1.13   |
| 032                | 0.071 | 0.02   | 3.938 | 0.40   | 20.475 | 2.08   | 0.158 | 0.02   | 69.621  | 19.66  | 0.079 | 0.01   | 1.76   | 5.20   |
| 033                | 0.103 | 0.10   | 2.696 | 0.04   | 10.272 | 7.70   | 0.108 | 0.00   | 50.834  | 41.71  | 0.054 | 0.00   | 3.85   | 11.10  |
| 034                | 0.016 | 0.01   | 2.748 | 0.01   | 4.667  | 3.83   | 0.110 | 0.00   | 14.286  | 2.13   | 0.055 | 0.00   | 0.45   | 1.12   |
| 035                | 0.019 | 0.01   | 3.129 | 0.21   | 11.747 | 7.98   | 0.125 | 0.01   | 21.238  | 1.10   | 0.214 | 0.30   | 0.78   | 2.10   |
| 036                | 0.033 | 0.04   | 2.677 | 0.16   | 4.605  | 4.01   | 0.107 | 0.01   | 19.272  | 1.12   | 0.054 | 0.00   | 0.40   | 1.08   |
| 037                | 0.032 | 0.04   | 3.175 | 0.14   | 3.175  | 0.14   | 0.127 | 0.01   | 10.159  | 0.46   | 0.063 | 0.00   | 0.08   | 0.12   |
| 038                | 0.006 | 0.00   | 1.401 | 0.74   | 2.123  | 0.70   | 0.056 | 0.03   | 11.675  | 6.35   | 0.028 | 0.01   | 0.60   | 1.67   |
| 039                | 0.006 | 0.00   | 1.427 | 0.13   | 2.470  | 2.21   | 0.057 | 0.01   | 14.542  | 12.40  | 0.029 | 0.00   | 1.09   | 3.31   |
| 040                | 0.031 | 0.04   | 3.091 | 0.13   | 7.417  | 0.31   | 0.124 | 0.01   | 71.079  | 56.34  | 0.062 | 0.00   | 4.22   | 15.00  |
| 041                | 0.010 | 0.00   | 2.534 | 0.03   | 4.300  | 3.50   | 0.202 | 0.20   | 24.269  | 24.08  | 0.051 | 0.00   | 2.10   | 6.39   |
| 042                | 0.015 | 0.01   | 1.500 | 0.17   | 1.500  | 0.17   | 0.180 | 0.02   | 26.433  | 17.40  | 0.044 | 0.03   | 1.33   | 4.63   |
| 043                | 0.036 | 0.00   | 1.068 | 0.20   | 6.481  | 1.76   | 0.571 | 0.02   | 15.129  | 11.59  | 0.021 | 0.00   | 1.06   | 3.07   |
| 044                | 0.017 | 0.01   | 2.825 | 0.12   | 2.825  | 0.12   | 0.113 | 0.00   | 34.138  | 24.00  | 0.057 | 0.00   | 1.84   | 6.38   |
| 045                | 0.009 | 0.01   | 1.511 | 0.13   | 7.856  | 0.67   | 0.060 | 0.01   | 29.012  | 11.40  | 0.030 | 0.00   | 0.95   | 3.01   |
| 080                | 0.116 | 0.16   | 1.430 | 0.65   | 4.757  | 1.08   | 0.057 | 0.03   | 23.263  | 9.98   | 0.029 | 0.01   | 0.88   | 2.64   |
| 081                | 0.054 | 0.09   | 1.693 | 0.04   | 4.063  | 0.10   | 0.068 | 0.00   | 22.286  | 8.91   | 0.034 | 0.00   | 0.70   | 2.77   |
| 082                | 0.005 | 0.00   | 1.125 | 0.62   | 6.377  | 1.03   | 0.045 | 0.02   | 37.397  | 23.98  | 0.023 | 0.01   | 1.94   | 2.77   |
| 083                | 0.008 | 0.00   | 1.939 | 0.15   | 4.654  | 0.36   | 0.155 | 0.01   | 40.680  | 0.82   | 0.039 | 0.00   | 0.19   | 2.77   |
| Ar. Mean           | 0.032 | 0.04   | 2.217 | 0.40   | 6.898  | 2.77   | 0.128 | 0.05   | 49.111  | 24.86  | 0.048 | 0.01   | 2.10   | 6.75   |
| Std. dev.          | 0.035 | 0.06   | 0.682 | 0.34   | 8.019  | 2.81   | 0.088 | 0.10   | 120.785 | 60.57  | 0.028 | 0.04   | 4.39   | 16.12  |

ARIZONA PUBLIC SERVICE  
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DEPOSITION DATA  
Comments and Messages Only

Page 3

| Location<br>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                |                                       | LIQUID LOSS DURING TRANSPORT |                     |
| 019                |                                       |                              |                     |
| 020                |                                       |                              |                     |
| 021                |                                       |                              |                     |
| 023                | LIQUID DIRTY                          | LIQUID DIRTY                 |                     |
| 024                |                                       |                              |                     |
| 025                |                                       |                              |                     |
| 026                |                                       |                              |                     |
| 027                |                                       |                              |                     |
| 028                |                                       |                              |                     |
| 030                |                                       | VOID/CONTAMINATION           | MISSING SAMPLE B    |
| 031                |                                       |                              |                     |
| 032                |                                       |                              |                     |
| 033                | LIQUID GREEN,BIRD DROPPINGS ON SCREEN |                              |                     |
| 034                |                                       |                              |                     |
| 035                |                                       |                              |                     |
| 036                |                                       |                              |                     |
| 037                |                                       |                              |                     |
| 038                |                                       |                              |                     |
| 039                |                                       |                              |                     |
| 040                |                                       |                              |                     |
| 041                |                                       |                              |                     |
| 042                |                                       |                              |                     |
| 043                | SCREEN MISSING                        | SCREEN MISSING               |                     |
| 044                |                                       |                              |                     |
| 045                |                                       |                              |                     |
| 080                |                                       |                              |                     |
| 081                |                                       |                              |                     |
| 082                |                                       |                              |                     |
| 083                |                                       |                              |                     |



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

Page 1

| Location<br>Number | Na    | d    | K     | d    | Ca     | d    | Mg     | d    | Cl    | d    | F     | d    | SO4   | d    | NO3   | d    |
|--------------------|-------|------|-------|------|--------|------|--------|------|-------|------|-------|------|-------|------|-------|------|
| 001                | 0.287 | 0.09 | 0.171 | 0.10 | 1.154  | 0.11 | 0.404  | 0.05 | 0.174 | 0.02 | 0.290 | 0.03 | 0.580 | 0.06 | 0.029 | 0.00 |
| 002                | 0.345 | 0.27 | 0.173 | 0.13 | 1.185  | 0.27 | 0.431  | 0.17 | 0.248 | 0.14 | 0.281 | 0.04 | 0.563 | 0.07 | 0.078 | 0.10 |
| 003                | 0.372 | 0.11 | 0.222 | 0.12 | 1.790  | 0.39 | 0.697  | 0.02 | 0.452 | 0.05 | 0.376 | 0.04 | 0.753 | 0.09 | 0.038 | 0.00 |
| 004                | 0.403 | 0.18 | 0.318 | 0.31 | 1.443  | 0.26 | 0.683  | 0.81 | 0.241 | 0.01 | 0.402 | 0.02 | 0.803 | 0.03 | 0.040 | 0.00 |
| 005                | 0.389 | 0.15 | 0.156 | 0.00 | 1.482  | 0.12 | 0.460  | 0.07 | 0.350 | 0.22 | 0.390 | 0.01 | 0.780 | 0.02 | 0.039 | 0.00 |
| 006                | 0.413 | 0.15 | 0.125 | 0.09 | 1.240  | 0.12 | 0.347  | 0.05 | 0.452 | 0.40 | 0.414 | 0.01 | 0.828 | 0.03 | 0.078 | 0.07 |
| 007                | 0.257 | 0.01 | 0.194 | 0.14 | 1.153  | 0.21 | 0.378  | 0.05 | 0.193 | 0.01 | 0.321 | 0.01 | 0.642 | 0.02 | 0.060 | 0.06 |
| 008                | 0.275 | 0.01 | 0.205 | 0.13 | 1.099  | 0.03 | 0.404  | 0.11 | 0.375 | 0.33 | 0.343 | 0.01 | 0.687 | 0.02 | 0.034 | 0.00 |
| 009                | 0.406 | 0.04 | 0.271 | 0.02 | 1.826  | 0.03 | 0.644  | 0.24 | 0.365 | 0.31 | 0.339 | 0.03 | 0.677 | 0.06 | 0.034 | 0.00 |
| 010                | 0.345 | 0.02 | 0.289 | 0.13 | 1.207  | 0.17 | 0.525  | 0.24 | 0.312 | 0.27 | 0.287 | 0.01 | 0.574 | 0.03 | 0.029 | 0.00 |
| 011                | 0.339 | 0.10 | 0.437 | 0.30 | 2.324  | 0.25 | 0.733  | 0.43 | 0.436 | 0.11 | 0.242 | 0.01 | 0.484 | 0.01 | 0.056 | 0.06 |
| 012                | 0.297 | 0.09 | 0.474 | 0.20 | 1.552  | 0.10 | 0.738  | 0.15 | 0.180 | 0.02 | 0.299 | 0.03 | 0.599 | 0.05 | 0.030 | 0.00 |
| 013                | 0.338 | 0.23 | 0.413 | 0.38 | 2.123  | 0.87 | 0.757  | 0.32 | 0.310 | 0.28 | 0.329 | 0.09 | 0.657 | 0.19 | 0.033 | 0.01 |
| 014                | 0.539 | 0.01 | 0.270 | 0.00 | 2.021  | 0.25 | 0.465  | 0.06 | 0.606 | 0.13 | 0.337 | 0.00 | 0.674 | 0.01 | 0.034 | 0.00 |
| 015                | 0.316 | 0.15 | 0.191 | 0.14 | 1.326  | 0.48 | 0.467  | 0.47 | 0.377 | 0.03 | 0.314 | 0.02 | 0.628 | 0.05 | 0.031 | 0.00 |
| 016                | 0.496 | 0.08 | 0.248 | 0.04 | 1.240  | 0.21 | 0.464  | 0.04 | 0.563 | 0.22 | 0.310 | 0.05 | 0.620 | 0.10 | 0.031 | 0.01 |
| 017                | 0.332 | 0.01 | 0.166 | 0.00 | 0.995  | 0.02 | 0.299  | 0.11 | 0.375 | 0.26 | 0.415 | 0.01 | 0.829 | 0.02 | 0.041 | 0.00 |
| 018                | 0.271 | 0.03 | 0.200 | 0.11 | 0.806  | 0.19 | 0.273  | 0.15 | 0.300 | 0.17 | 0.339 | 0.04 | 0.677 | 0.07 | 0.034 | 0.00 |
| 019                | 0.415 | 0.34 | 1.804 | 0.21 | 5.959  | 0.99 | 3.048  | 1.24 | 0.597 | 0.02 | 0.335 | 0.06 | 0.670 | 0.13 | 0.034 | 0.01 |
| 020                | 0.357 | 0.14 | 0.143 | 0.00 | 0.928  | 0.14 | 0.314  | 0.06 | 0.500 | 0.14 | 0.357 | 0.00 | 0.714 | 0.00 | 0.036 | 0.00 |
|                    | 0.304 | 0.13 | 0.183 | 0.13 | 1.091  | 0.03 | 0.377  | 0.28 | 0.331 | 0.29 | 0.303 | 0.01 | 0.606 | 0.02 | 0.030 | 0.00 |
|                    | 0.195 | 0.13 | 0.098 | 0.07 | 0.846  | 0.14 | 0.215  | 0.02 | 0.195 | 0.00 | 0.325 | 0.00 | 0.650 | 0.01 | 0.033 | 0.00 |
| 023                | 1.276 | 0.40 | 6.762 | 0.89 | 25.382 | 1.61 | 13.838 | 1.49 | 0.713 | 0.11 | 0.397 | 0.02 | 0.795 | 0.05 | 0.321 | 0.24 |
| 024                | 0.246 | 0.01 | 0.123 | 0.00 | 1.228  | 0.05 | 0.362  | 0.05 | 0.341 | 0.32 | 0.307 | 0.01 | 0.614 | 0.02 | 0.031 | 0.00 |
| 025                | 0.276 | 0.03 | 0.406 | 0.23 | 1.307  | 0.02 | 0.628  | 0.17 | 0.207 | 0.02 | 0.345 | 0.04 | 0.690 | 0.08 | 0.035 | 0.00 |
| 026                | 0.300 | 0.09 | 0.121 | 0.01 | 1.205  | 0.11 | 0.282  | 0.05 | 0.325 | 0.27 | 0.303 | 0.03 | 0.606 | 0.07 | 0.085 | 0.11 |
| 027                | 0.298 | 0.02 | 0.149 | 0.01 | 0.817  | 0.10 | 0.281  | 0.13 | 0.223 | 0.01 | 0.372 | 0.02 | 0.744 | 0.04 | 0.055 | 0.03 |
| 028                | 1.205 | 1.81 | 0.145 | 0.01 | 1.378  | 0.22 | 0.275  | 0.01 | 0.217 | 0.01 | 0.362 | 0.02 | 0.724 | 0.04 | 0.036 | 0.00 |
| 030                | 1.211 | 0.35 | 1.442 | 0.81 | 7.267  | 2.08 | 2.826  | 1.50 | 1.664 | 0.36 | 0.330 | 0.08 | 0.659 | 0.16 | 0.076 | 0.08 |
| 031                | 0.288 | 0.07 | 0.171 | 0.09 | 0.988  | 0.03 | 0.288  | 0.07 | 0.269 | 0.21 | 0.292 | 0.04 | 0.584 | 0.08 | 0.029 | 0.00 |
| 032                | 0.402 | 0.18 | 0.405 | 0.50 | 4.166  | 0.50 | 1.039  | 0.05 | 0.358 | 0.22 | 0.400 | 0.02 | 0.800 | 0.04 | 0.040 | 0.00 |
| 033                | 0.259 | 0.03 | 0.095 | 0.05 | 0.899  | 0.17 | 0.236  | 0.13 | 0.296 | 0.22 | 0.323 | 0.03 | 0.647 | 0.07 | 0.032 | 0.00 |
| 034                | 0.194 | 0.14 | 0.097 | 0.07 | 0.769  | 0.32 | 0.235  | 0.01 | 0.191 | 0.02 | 0.318 | 0.03 | 0.636 | 0.05 | 0.032 | 0.00 |
| 035                | 0.307 | 0.01 | 0.267 | 0.38 | 1.304  | 0.13 | 0.490  | 0.17 | 0.230 | 0.00 | 0.384 | 0.01 | 0.768 | 0.02 | 0.038 | 0.00 |
| 036                | 0.267 | 0.00 | 0.100 | 0.07 | 0.734  | 0.12 | 0.174  | 0.02 | 0.369 | 0.34 | 0.334 | 0.00 | 0.668 | 0.01 | 0.033 | 0.00 |
| 037                | 0.290 | 0.01 | 0.109 | 0.08 | 0.727  | 0.31 | 0.224  | 0.04 | 0.217 | 0.01 | 0.362 | 0.01 | 0.724 | 0.02 | 0.036 | 0.00 |
| 038                | 0.149 | 0.01 | 0.113 | 0.08 | 0.597  | 0.03 | 0.165  | 0.07 | 0.224 | 0.01 | 0.373 | 0.02 | 0.746 | 0.04 | 0.037 | 0.00 |
| 039                | 0.303 | 0.02 | 0.115 | 0.08 | 0.910  | 0.05 | 0.318  | 0.01 | 0.228 | 0.01 | 0.379 | 0.02 | 0.759 | 0.04 | 0.038 | 0.00 |
| 040                | 0.210 | 0.16 | 0.415 | 0.03 | 1.118  | 0.64 | 0.563  | 0.17 | 0.207 | 0.02 | 0.346 | 0.03 | 0.691 | 0.06 | 0.035 | 0.00 |
| 041                | 0.359 | 0.01 | 0.180 | 0.12 | 1.139  | 0.15 | 0.390  | 0.09 | 0.271 | 0.19 | 0.299 | 0.01 | 0.599 | 0.02 | 0.131 | 0.04 |
| 042                | 0.231 | 0.05 | 0.179 | 0.15 | 0.577  | 0.13 | 0.214  | 0.16 | 0.333 | 0.36 | 0.288 | 0.06 | 0.577 | 0.13 | 0.051 | 0.05 |
| 043                | 0.773 | 0.05 | 0.746 | 0.37 | 1.359  | 0.48 | 0.437  | 0.17 | 1.039 | 0.59 | 0.400 | 0.13 | 0.799 | 0.27 | 0.040 | 0.01 |
| 044                | 0.518 | 0.17 | 0.295 | 0.01 | 1.107  | 0.20 | 0.517  | 0.14 | 0.221 | 0.01 | 0.369 | 0.02 | 0.737 | 0.04 | 0.037 | 0.00 |
| 045                | 0.569 | 0.13 | 0.242 | 0.15 | 1.375  | 0.73 | 0.323  | 0.21 | 0.574 | 0.20 | 0.408 | 0.03 | 0.816 | 0.05 | 0.041 | 0.00 |
| 080                | 0.553 | 0.10 | 0.138 | 0.03 | 1.773  | 1.29 | 0.344  | 0.19 | 0.364 | 0.27 | 0.345 | 0.06 | 0.691 | 0.13 | 0.035 | 0.01 |
| 081                | 0.599 | 0.01 | 0.135 | 0.03 | 1.514  | 0.35 | 0.291  | 0.05 | 0.539 | 0.11 | 0.337 | 0.07 | 0.674 | 0.14 | 0.055 | 0.04 |
| 082                | 0.542 | 0.18 | 0.154 | 0.01 | 1.162  | 0.51 | 0.208  | 0.04 | 0.231 | 0.01 | 0.386 | 0.02 | 0.772 | 0.03 | 0.039 | 0.00 |
| 0                  | 0.485 | 0.01 | 0.162 | 0.00 | 1.861  | 0.54 | 0.502  | 0.14 | 0.242 | 0.01 | 0.404 | 0.01 | 0.808 | 0.02 | 0.040 | 0.00 |
| Ar. Mean           | 0.412 | 0.14 | 0.417 | 0.15 | 2.030  | 0.34 | 0.804  | 0.22 | 0.375 | 0.15 | 0.344 | 0.03 | 0.688 | 0.06 | 0.049 | 0.02 |
| Std. Dev.          | 0.246 | 0.27 | 0.986 | 0.19 | 3.652  | 0.42 | 1.996  | 0.34 | 0.252 | 0.14 | 0.041 | 0.03 | 0.083 | 0.05 | 0.044 | 0.04 |



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

Page 2

| Location<br>Number | PO4   | d    | CO3   | d    | HCO3   | d     | NH3   | d    | TSS     | d      | CU    | d    | Av d  | SD(d) |
|--------------------|-------|------|-------|------|--------|-------|-------|------|---------|--------|-------|------|-------|-------|
| 001                | 0.018 | 0.01 | 2.900 | 0.29 | 2.900  | 0.29  | 0.116 | 0.01 | 18.797  | 11.16  | 0.058 | 0.01 | 0.87  | 2.96  |
| 002                | 0.022 | 0.02 | 2.813 | 0.38 | 6.750  | 0.90  | 0.113 | 0.01 | 21.600  | 9.60   | 0.056 | 0.01 | 0.86  | 2.52  |
| 003                | 0.023 | 0.02 | 3.764 | 0.43 | 6.551  | 6.01  | 0.151 | 0.02 | 42.162  | 4.85   | 0.075 | 0.01 | 0.87  | 1.95  |
| 004                | 0.016 | 0.00 | 4.017 | 0.16 | 6.773  | 5.35  | 0.161 | 0.01 | 47.694  | 49.51  | 0.080 | 0.00 | 4.05  | 13.16 |
| 005                | 0.016 | 0.00 | 3.901 | 0.10 | 6.668  | 5.63  | 0.156 | 0.00 | 32.792  | 3.97   | 0.078 | 0.00 | 0.74  | 1.75  |
| 006                | 0.017 | 0.00 | 4.139 | 0.14 | 4.139  | 0.14  | 0.166 | 0.01 | 26.435  | 5.70   | 0.083 | 0.00 | 0.49  | 1.50  |
| 007                | 0.013 | 0.00 | 3.210 | 0.12 | 5.414  | 4.28  | 0.128 | 0.00 | 17.373  | 4.53   | 0.064 | 0.00 | 0.67  | 1.58  |
| 008                | 0.014 | 0.00 | 3.434 | 0.09 | 3.434  | 0.09  | 0.137 | 0.00 | 21.900  | 10.39  | 0.069 | 0.00 | 0.80  | 2.76  |
| 009                | 0.026 | 0.02 | 3.387 | 0.30 | 8.128  | 0.73  | 0.135 | 0.01 | 18.844  | 3.71   | 0.068 | 0.01 | 0.39  | 0.98  |
| 010                | 0.017 | 0.01 | 2.871 | 0.14 | 6.891  | 0.34  | 0.115 | 0.01 | 35.686  | 8.63   | 0.057 | 0.00 | 0.72  | 2.28  |
| 011                | 0.049 | 0.08 | 2.420 | 0.06 | 8.677  | 5.60  | 0.097 | 0.00 | 50.616  | 47.68  | 0.048 | 0.00 | 3.91  | 12.68 |
| 012                | 0.059 | 0.04 | 2.994 | 0.27 | 2.994  | 0.27  | 0.120 | 0.01 | 58.308  | 11.48  | 0.060 | 0.01 | 0.91  | 3.05  |
| 013                | 0.028 | 0.03 | 3.287 | 0.95 | 3.287  | 0.95  | 0.131 | 0.04 | 46.589  | 21.18  | 0.066 | 0.02 | 1.82  | 5.58  |
| 014                | 0.013 | 0.00 | 3.369 | 0.04 | 5.715  | 4.66  | 0.135 | 0.00 | 21.534  | 10.56  | 0.067 | 0.00 | 1.12  | 2.98  |
| 015                | 0.019 | 0.01 | 3.141 | 0.23 | 3.141  | 0.23  | 0.126 | 0.01 | 25.500  | 21.98  | 0.063 | 0.00 | 1.70  | 5.84  |
| 016                | 0.012 | 0.00 | 3.101 | 0.52 | 5.453  | 5.22  | 0.124 | 0.02 | 28.633  | 7.26   | 0.062 | 0.01 | 0.98  | 2.27  |
| 017                | 0.017 | 0.00 | 4.147 | 0.10 | 7.085  | 5.98  | 0.166 | 0.00 | 16.587  | 0.40   | 0.083 | 0.00 | 0.49  | 1.58  |
| 018                | 0.014 | 0.00 | 3.387 | 0.35 | 3.387  | 0.35  | 0.135 | 0.01 | 18.825  | 3.45   | 0.068 | 0.01 | 0.35  | 0.90  |
| 019                | 0.026 | 0.02 | 3.352 | 0.63 | 24.131 | 4.56  | 0.134 | 0.03 | 262.055 | 62.77  | 0.067 | 0.01 | 5.07  | 16.45 |
| 020                | 0.014 | 0.00 | 3.570 | 0.01 | 6.074  | 5.02  | 0.143 | 0.00 | 18.577  | 14.35  | 0.071 | 0.00 | 1.42  |       |
| 021                | 0.024 | 0.02 | 3.029 | 0.08 | 3.029  | 0.08  | 0.121 | 0.00 | 36.450  | 15.52  | 0.061 | 0.00 | 1.19  |       |
| 022                | 0.019 | 0.01 | 3.252 | 0.04 | 3.252  | 0.04  | 0.130 | 0.00 | 16.917  | 2.78   | 0.065 | 0.00 | 0.23  | 0.74  |
| 023                | 0.120 | 0.09 | 3.974 | 0.25 | 76.817 | 12.73 | 0.159 | 0.01 | 939.231 | 153.23 | 0.079 | 0.00 | 12.22 | 40.72 |
| 024                | 0.012 | 0.00 | 3.070 | 0.12 | 5.179  | 4.10  | 0.123 | 0.00 | 30.680  | 1.28   | 0.061 | 0.00 | 0.43  | 1.11  |
| 025                | 0.020 | 0.01 | 3.451 | 0.41 | 8.283  | 0.98  | 0.138 | 0.02 | 32.967  | 1.58   | 0.069 | 0.01 | 0.26  | 0.46  |
| 026                | 0.012 | 0.00 | 3.028 | 0.33 | 3.028  | 0.33  | 0.121 | 0.01 | 17.841  | 10.14  | 0.061 | 0.01 | 0.83  | 2.68  |
| 027                | 0.015 | 0.00 | 3.721 | 0.20 | 3.721  | 0.20  | 0.149 | 0.01 | 23.735  | 4.66   | 0.074 | 0.00 | 0.39  | 1.23  |
| 028                | 0.014 | 0.00 | 3.620 | 0.20 | 3.620  | 0.20  | 0.145 | 0.01 | 17.296  | 4.82   | 0.072 | 0.00 | 0.53  | 1.32  |
| 030                | 0.061 | 0.06 | 3.296 | 0.82 | 27.190 | 1.00  | 0.247 | 0.20 | 136.142 | 189.25 | 0.066 | 0.02 | 14.06 | 50.43 |
| 031                | 0.012 | 0.00 | 2.918 | 0.42 | 2.918  | 0.42  | 0.117 | 0.02 | 24.715  | 6.88   | 0.058 | 0.01 | 0.60  | 1.81  |
| 032                | 0.032 | 0.03 | 4.002 | 0.18 | 14.513 | 10.24 | 0.160 | 0.01 | 89.784  | 16.74  | 0.080 | 0.00 | 2.05  | 5.01  |
| 033                | 0.013 | 0.00 | 3.234 | 0.33 | 3.234  | 0.33  | 0.129 | 0.01 | 24.778  | 10.26  | 0.065 | 0.01 | 0.83  | 2.72  |
| 034                | 0.013 | 0.00 | 3.182 | 0.27 | 3.182  | 0.27  | 0.127 | 0.01 | 8.156   | 10.22  | 0.064 | 0.01 | 0.82  | 2.71  |
| 035                | 0.023 | 0.01 | 3.838 | 0.08 | 6.496  | 5.23  | 0.154 | 0.00 | 35.161  | 26.88  | 0.077 | 0.00 | 2.35  | 7.19  |
| 036                | 0.040 | 0.05 | 3.340 | 0.05 | 3.340  | 0.05  | 0.134 | 0.00 | 13.359  | 0.19   | 0.067 | 0.00 | 0.06  | 0.10  |
| 037                | 0.037 | 0.04 | 3.621 | 0.12 | 3.621  | 0.12  | 0.145 | 0.00 | 9.141   | 11.16  | 0.072 | 0.00 | 0.85  | 2.97  |
| 038                | 0.015 | 0.00 | 3.728 | 0.22 | 3.728  | 0.22  | 0.149 | 0.01 | 13.552  | 9.73   | 0.075 | 0.00 | 0.75  | 2.59  |
| 039                | 0.015 | 0.00 | 3.793 | 0.20 | 3.793  | 0.20  | 0.152 | 0.01 | 14.308  | 21.23  | 0.076 | 0.00 | 1.56  | 5.66  |
| 040                | 0.027 | 0.03 | 3.457 | 0.28 | 5.779  | 4.36  | 0.138 | 0.01 | 58.303  | 15.79  | 0.069 | 0.01 | 1.54  | 4.26  |
| 041                | 0.012 | 0.00 | 2.994 | 0.08 | 2.994  | 0.08  | 0.120 | 0.00 | 24.530  | 2.94   | 0.060 | 0.00 | 0.27  | 0.77  |
| 042                | 0.017 | 0.01 | 2.885 | 0.63 | 2.885  | 0.63  | 0.115 | 0.03 | 7.763   | 9.12   | 0.058 | 0.01 | 0.82  | 2.40  |
| 043                | 0.141 | 0.02 | 3.995 | 1.33 | 6.327  | 3.34  | 0.360 | 0.35 | 32.763  | 1.56   | 0.080 | 0.03 | 0.62  | 0.92  |
| 044                | 0.015 | 0.00 | 3.686 | 0.18 | 3.686  | 0.18  | 0.147 | 0.01 | 32.433  | 1.55   | 0.074 | 0.00 | 0.18  | 0.40  |
| 045                | 0.016 | 0.00 | 4.082 | 0.26 | 6.848  | 5.27  | 0.163 | 0.01 | 27.704  | 1.50   | 0.082 | 0.01 | 0.61  | 1.40  |
| 080                | 0.262 | 0.32 | 3.454 | 0.65 | 3.454  | 0.65  | 0.138 | 0.03 | 22.367  | 9.68   | 0.069 | 0.01 | 0.96  | 2.54  |
| 081                | 0.013 | 0.00 | 3.368 | 0.71 | 5.973  | 5.92  | 0.135 | 0.03 | 21.554  | 4.52   | 0.067 | 0.01 | 0.86  |       |
| 082                | 0.015 | 0.00 | 3.858 | 0.16 | 3.858  | 0.16  | 0.154 | 0.01 | 23.181  | 4.04   | 0.077 | 0.00 | 0.37  |       |
| 083                | 0.016 | 0.00 | 4.038 | 0.12 | 6.825  | 5.46  | 0.162 | 0.00 | 43.731  | 17.40  | 0.081 | 0.00 | 1.69  | 4.14  |
| Ar. Mean           | 0.031 | 0.02 | 3.440 | 0.29 | 7.399  | 2.49  | 0.144 | 0.02 | 54.355  | 18.29  | 0.069 | 0.01 | 1.59  | 5.02  |
| Std. dev.          | 0.042 | 0.05 | 0.414 | 0.26 | 11.266 | 2.99  | 0.039 | 0.06 | 136.372 | 34.82  | 0.008 | 0.01 | 2.64  | 9.21  |

ARIZONA PUBLIC SERVICE  
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DEPOSITION DATA  
Comments and Messages Only

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| Location<br>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                |                   | LIQUID LOSS IN TRANSPORT |                     |
| 020                |                   |                          |                     |
| 021                |                   |                          |                     |
| 022                |                   |                          |                     |
| 023                | LIQUID DIRTY      | LIQUID DIRTY             |                     |
| 024                |                   |                          |                     |
| 025                |                   |                          |                     |
| 026                |                   |                          |                     |
| 027                |                   |                          |                     |
| 028                |                   |                          |                     |
| 030                |                   |                          |                     |
| 031                |                   |                          |                     |
| 032                |                   |                          |                     |
| 033                |                   |                          |                     |
| 034                |                   |                          |                     |
| 035                |                   |                          |                     |
| 036                |                   |                          |                     |
| 037                |                   |                          |                     |
| 038                |                   |                          |                     |
| 039                |                   |                          |                     |
| 040                |                   |                          |                     |
| 041                |                   |                          |                     |
| 042                |                   |                          |                     |
| 043                |                   |                          |                     |
| 044                |                   |                          |                     |
| 045                |                   |                          |                     |
| 080                |                   |                          |                     |
| 081                |                   |                          |                     |
| 082                |                   |                          |                     |



ARIZONA PUBLIC SERVICE  
MONTHLY REPORT for 5-90

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

Page 1

| Location<br>Number | Na    | d    | K     | d    | Ca     | d    | Mg    | d    | Cl    | d    | F     | d    | SO4   | d    | NO3   | d    |
|--------------------|-------|------|-------|------|--------|------|-------|------|-------|------|-------|------|-------|------|-------|------|
| 001                | 0.409 | 0.28 | 0.354 | 0.17 | 1.150  | 0.34 | 0.345 | 0.01 | 0.261 | 0.19 | 0.249 | 0.05 | 0.498 | 0.11 | 0.025 | 0.01 |
| 002                | 0.234 | 0.01 | 0.194 | 0.07 | 1.186  | 0.14 | 0.339 | 0.15 | 0.371 | 0.06 | 0.242 | 0.09 | 0.485 | 0.17 | 0.024 | 0.01 |
| 003                | 0.471 | 0.31 | 0.345 | 0.06 | 1.486  | 0.05 | 0.386 | 0.08 | 0.397 | 0.04 | 0.288 | 0.05 | 0.575 | 0.11 | 0.029 | 0.01 |
| 004                | 0.508 | 0.13 | 0.291 | 0.01 | 1.960  | 0.09 | 0.456 | 0.23 | 0.436 | 0.01 | 0.363 | 0.01 | 0.726 | 0.02 | 0.036 | 0.00 |
| 005                | 0.498 | 0.18 | 0.425 | 0.03 | 2.052  | 0.00 | 0.453 | 0.03 | 0.493 | 0.11 | 0.354 | 0.02 | 0.708 | 0.05 | 0.035 | 0.00 |
| 006                | 0.774 | 0.33 | 0.309 | 0.01 | 2.084  | 0.09 | 0.426 | 0.12 | 0.539 | 0.14 | 0.386 | 0.01 | 0.772 | 0.02 | 0.039 | 0.00 |
| 007                | 0.385 | 0.33 | 0.275 | 0.11 | 1.318  | 0.21 | 0.187 | 0.02 | 0.165 | 0.00 | 0.275 | 0.00 | 0.549 | 0.00 | 0.027 | 0.00 |
| 008                | 0.541 | 0.09 | 0.316 | 0.16 | 1.131  | 0.08 | 0.176 | 0.03 | 0.374 | 0.05 | 0.270 | 0.04 | 0.541 | 0.09 | 0.027 | 0.00 |
| 009                | 0.391 | 0.22 | 0.266 | 0.03 | 1.791  | 0.08 | 0.281 | 0.09 | 0.199 | 0.02 | 0.332 | 0.04 | 0.665 | 0.08 | 0.033 | 0.00 |
| 010                | 0.552 | 0.32 | 0.158 | 0.16 | 1.339  | 0.18 | 0.207 | 0.09 | 0.245 | 0.13 | 0.246 | 0.10 | 0.493 | 0.20 | 0.025 | 0.01 |
| 011                | 0.183 | 0.01 | 0.641 | 0.04 | 2.699  | 0.06 | 0.960 | 0.04 | 0.366 | 0.02 | 0.229 | 0.01 | 0.458 | 0.03 | 0.070 | 0.09 |
| 012                | 0.199 | 0.06 | 0.324 | 0.19 | 1.542  | 0.10 | 0.347 | 0.33 | 0.340 | 0.01 | 0.248 | 0.08 | 0.497 | 0.16 | 0.052 | 0.05 |
| 013                | 0.326 | 0.11 | 0.263 | 0.02 | 1.313  | 0.09 | 0.340 | 0.03 | 0.197 | 0.01 | 0.328 | 0.02 | 0.656 | 0.05 | 0.033 | 0.00 |
| 014                | 0.391 | 0.10 | 0.280 | 0.12 | 1.452  | 0.03 | 0.279 | 0.08 | 0.503 | 0.12 | 0.279 | 0.01 | 0.559 | 0.01 | 0.028 | 0.00 |
| 015                | 0.451 | 0.14 | 0.386 | 0.01 | 1.414  | 0.03 | 0.290 | 0.12 | 0.193 | 0.00 | 0.321 | 0.01 | 0.643 | 0.01 | 0.032 | 0.00 |
| 016                | 0.277 | 0.03 | 0.204 | 0.11 | 1.166  | 0.28 | 0.258 | 0.08 | 0.438 | 0.01 | 0.200 | 0.03 | 0.401 | 0.07 | 0.020 | 0.00 |
| 017                | 0.136 | 0.27 | 0.146 | 0.07 | 0.897  | 0.02 | 0.204 | 0.01 | 0.264 | 0.20 | 0.252 | 0.05 | 0.504 | 0.10 | 0.025 | 0.01 |
| 018                | 0.194 | 0.01 | 0.097 | 0.00 | 0.968  | 0.04 | 0.150 | 0.00 | 0.145 | 0.01 | 0.242 | 0.01 | 0.484 | 0.02 | 0.058 | 0.00 |
| 019                | 0.000 | 0.00 | 0.334 | 0.21 | 2.173  | 0.23 | 0.396 | 0.27 | 0.262 | 0.18 | 0.253 | 0.07 | 0.506 | 0.13 | 0.025 | 0.01 |
| 020                | 0.413 | 0.11 | 0.530 | 0.34 | 1.182  | 0.20 | 0.388 | 0.39 | 0.532 | 0.10 | 0.296 | 0.01 | 0.592 | 0.02 | 0.030 | 0.00 |
| 021                | 0.260 | 0.03 | 0.153 | 0.06 | 1.470  | 0.01 | 0.273 | 0.07 | 0.275 | 0.18 | 0.268 | 0.08 | 0.536 | 0.16 | 0.027 | 0.01 |
| 022                | 0.175 | 0.09 | 0.183 | 0.14 | 1.547  | 0.21 | 0.220 | 0.02 | 0.262 | 0.14 | 0.298 | 0.04 | 0.595 | 0.08 | 0.030 | 0.00 |
| 023                | 0.355 | 0.23 | 2.666 | 0.10 | 18.955 | 2.21 | 5.034 | 0.79 | 0.415 | 0.12 | 0.296 | 0.00 | 0.593 | 0.01 | 0.030 | 0.00 |
| 024                | 0.214 | 0.04 | 0.156 | 0.08 | 1.227  | 0.10 | 0.266 | 0.00 | 0.283 | 0.22 | 0.268 | 0.04 | 0.535 | 0.09 | 0.027 | 0.00 |
| 025                | 0.219 | 0.03 | 0.270 | 0.07 | 0.759  | 0.10 | 0.262 | 0.00 | 0.164 | 0.02 | 0.274 | 0.04 | 0.548 | 0.08 | 0.027 | 0.00 |
| 026                | 0.208 | 0.04 | 0.169 | 0.03 | 1.139  | 0.14 | 0.215 | 0.11 | 0.292 | 0.03 | 0.212 | 0.04 | 0.423 | 0.08 | 0.038 | 0.03 |
| 027                | 0.261 | 0.04 | 0.261 | 0.04 | 1.688  | 0.02 | 0.363 | 0.03 | 0.392 | 0.06 | 0.326 | 0.05 | 0.653 | 0.09 | 0.033 | 0.00 |
| 028                | 0.200 | 0.01 | 0.149 | 0.09 | 2.845  | 0.39 | 0.215 | 0.04 | 0.223 | 0.14 | 0.250 | 0.01 | 0.500 | 0.02 | 0.025 | 0.00 |
| 030                | 0.503 | 0.03 | 0.699 | 0.37 | 4.239  | 0.64 | 1.416 | 1.28 | 0.773 | 0.17 | 0.230 | 0.03 | 0.460 | 0.06 | 0.023 | 0.00 |
| 031                | 0.293 | 0.12 | 0.175 | 0.11 | 1.638  | 0.03 | 0.286 | 0.05 | 0.468 | 0.01 | 0.293 | 0.01 | 0.585 | 0.01 | 0.029 | 0.00 |
| 032                | 0.090 | 0.18 | 0.427 | 0.14 | 2.584  | 0.20 | 0.454 | 0.08 | 0.258 | 0.02 | 0.431 | 0.03 | 0.861 | 0.07 | 0.043 | 0.00 |
| 033                | 0.224 | 0.02 | 0.282 | 0.13 | 1.846  | 0.02 | 0.343 | 0.13 | 0.390 | 0.08 | 0.280 | 0.02 | 0.560 | 0.04 | 0.028 | 0.00 |
| 034                | 0.000 | 0.00 | 0.160 | 0.11 | 0.963  | 0.21 | 0.166 | 0.01 | 0.160 | 0.00 | 0.267 | 0.00 | 0.535 | 0.00 | 0.027 | 0.00 |
| 035                | 0.000 | 0.00 | 0.256 | 0.04 | 2.732  | 2.96 | 0.180 | 0.06 | 0.192 | 0.03 | 0.320 | 0.06 | 0.640 | 0.11 | 0.032 | 0.01 |
| 036                | 0.061 | 0.12 | 0.235 | 0.01 | 1.236  | 0.19 | 0.286 | 0.28 | 0.176 | 0.01 | 0.294 | 0.02 | 0.587 | 0.04 | 0.029 | 0.00 |
| 037                | 0.248 | 0.01 | 0.368 | 0.48 | 1.238  | 0.21 | 0.517 | 0.50 | 0.186 | 0.01 | 0.310 | 0.01 | 0.620 | 0.02 | 0.031 | 0.00 |
| 038                | 0.153 | 0.12 | 0.147 | 0.08 | 1.047  | 0.03 | 0.168 | 0.04 | 0.150 | 0.02 | 0.250 | 0.03 | 0.500 | 0.06 | 0.025 | 0.00 |
| 039                | 0.167 | 0.01 | 0.167 | 0.01 | 0.873  | 0.20 | 0.203 | 0.08 | 0.186 | 0.11 | 0.209 | 0.01 | 0.418 | 0.03 | 0.063 | 0.08 |
| 040                | 0.130 | 0.26 | 0.205 | 0.15 | 0.875  | 0.07 | 0.188 | 0.04 | 0.202 | 0.01 | 0.337 | 0.02 | 0.675 | 0.05 | 0.034 | 0.00 |
| 041                | 0.313 | 0.08 | 0.314 | 0.10 | 1.208  | 0.05 | 0.254 | 0.11 | 0.200 | 0.13 | 0.224 | 0.01 | 0.448 | 0.01 | 0.055 | 0.07 |
| 042                | 0.348 | 0.06 | 0.193 | 0.07 | 0.928  | 0.12 | 0.277 | 0.19 | 0.387 | 0.02 | 0.194 | 0.01 | 0.387 | 0.02 | 0.019 | 0.00 |
| 043                | 0.791 | 0.07 | 0.362 | 0.22 | 1.700  | 0.38 | 0.324 | 0.06 | 0.972 | 0.18 | 0.305 | 0.02 | 0.610 | 0.04 | 0.031 | 0.00 |
| 044                | 0.172 | 0.34 | 0.365 | 0.19 | 0.991  | 0.08 | 0.292 | 0.31 | 0.274 | 0.14 | 0.313 | 0.05 | 0.626 | 0.10 | 0.031 | 0.01 |
| 045                | 0.166 | 0.33 | 0.335 | 0.23 | 1.616  | 0.10 | 0.536 | 0.36 | 0.558 | 0.01 | 0.279 | 0.00 | 0.558 | 0.01 | 0.042 | 0.03 |
| 080                | 0.607 | 0.09 | 0.201 | 0.12 | 1.627  | 0.13 | 0.291 | 0.01 | 0.613 | 0.19 | 0.339 | 0.03 | 0.678 | 0.06 | 0.034 | 0.00 |
| 081                | 0.618 | 0.06 | 0.353 | 0.28 | 1.102  | 1.02 | 0.626 | 0.71 | 0.618 | 0.06 | 0.257 | 0.02 | 0.515 | 0.05 | 0.026 | 0.00 |
| 082                | 0.323 | 0.17 | 0.323 | 0.17 | 1.331  | 0.07 | 0.180 | 0.08 | 0.382 | 0.06 | 0.318 | 0.05 | 0.636 | 0.09 | 0.032 | 0.00 |
| 083                | 0.414 | 0.26 | 0.279 | 0.02 | 1.666  | 0.46 | 0.377 | 0.08 | 0.558 | 0.03 | 0.349 | 0.02 | 0.697 | 0.04 | 0.090 | 0.01 |
| Ar. Mean           | 0.309 | 0.12 | 0.333 | 0.12 | 1.904  | 0.26 | 0.439 | 0.16 | 0.349 | 0.07 | 0.284 | 0.03 | 0.569 | 0.06 | 0.034 | 0.01 |
| Std. Dev.          | 0.186 | 0.11 | 0.365 | 0.10 | 2.594  | 0.53 | 0.710 | 0.24 | 0.175 | 0.07 | 0.049 | 0.02 | 0.099 | 0.05 | 0.014 | 0.02 |

ARIZONA PUBLIC SERVICE  
MONTHLY REPORT for 5-90

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

Page 2

| Location<br>Number | PO4   | d      | CO3   | d      | HCO3   | d      | NH3   | d    | TSS     | d      | CU    | d    | Av d | SD(d) |
|--------------------|-------|--------|-------|--------|--------|--------|-------|------|---------|--------|-------|------|------|-------|
| 001                | 0.010 | 0.00   | 2.489 | 0.53   | 2.489  | 0.53   | 0.100 | 0.02 | 21.016  | 6.44   | 0.050 | 0.01 | 0.62 | 1.69  |
| 002                | 0.014 | 0.00   | 2.425 | 0.87   | 2.425  | 0.87   | 0.097 | 0.03 | 19.153  | 6.30   | 0.048 | 0.02 | 0.63 | 1.66  |
| 003                | 0.012 | 0.00   | 2.877 | 0.53   | 2.877  | 0.53   | 0.115 | 0.02 | 18.414  | 3.39   | 0.058 | 0.01 | 0.37 | 0.89  |
| 004                | 0.015 | 0.00   | 3.632 | 0.10   | 3.632  | 0.10   | 0.145 | 0.00 | 13.017  | 8.37   | 0.109 | 0.08 | 0.65 | 2.22  |
| 005                | 0.014 | 0.00   | 3.542 | 0.25   | 3.542  | 0.25   | 0.142 | 0.01 | 11.975  | 17.12  | 0.071 | 0.00 | 1.29 | 4.56  |
| 006                | 0.015 | 0.00   | 3.861 | 0.11   | 3.861  | 0.11   | 0.154 | 0.00 | 11.303  | 14.99  | 0.115 | 0.07 | 1.14 | 3.99  |
| 007                | 0.011 | 0.00   | 2.746 | 0.02   | 2.746  | 0.02   | 0.110 | 0.00 | 5.780   | 6.09   | 0.055 | 0.00 | 0.49 | 1.62  |
| 008                | 0.011 | 0.00   | 2.703 | 0.44   | 2.703  | 0.44   | 0.158 | 0.08 | 2.703   | 0.44   | 0.054 | 0.01 | 0.14 | 0.17  |
| 009                | 0.013 | 0.00   | 3.323 | 0.39   | 3.323  | 0.39   | 0.133 | 0.02 | 5.514   | 3.99   | 0.066 | 0.01 | 0.38 | 1.05  |
| 010                | 0.010 | 0.00   | 2.463 | 1.02   | 2.463  | 1.02   | 0.099 | 0.04 | 5.735   | 7.56   | 0.049 | 0.02 | 0.78 | 1.98  |
| 011                | 0.036 | 0.03   | 2.289 | 0.13   | 5.493  | 0.31   | 0.092 | 0.01 | 59.741  | 19.84  | 0.046 | 0.00 | 1.47 | 5.29  |
| 012                | 0.018 | 0.01   | 2.483 | 0.78   | 2.483  | 0.78   | 0.099 | 0.03 | 4.492   | 4.79   | 0.050 | 0.02 | 0.53 | 1.26  |
| 013                | 0.013 | 0.00   | 3.282 | 0.23   | 3.282  | 0.23   | 0.131 | 0.01 | 10.569  | 14.35  | 0.066 | 0.00 | 1.08 | 3.82  |
| 014                | 0.011 | 0.00   | 2.793 | 0.05   | 2.793  | 0.05   | 0.112 | 0.00 | 6.944   | 8.25   | 0.056 | 0.00 | 0.63 | 2.19  |
| 015                | 0.013 | 0.00   | 3.213 | 0.06   | 3.213  | 0.06   | 0.129 | 0.00 | 15.872  | 25.38  | 0.064 | 0.00 | 1.85 | 6.77  |
| 016                | 0.008 | 0.00   | 2.004 | 0.34   | 3.290  | 2.23   | 0.080 | 0.01 | 9.890   | 8.03   | 0.040 | 0.01 | 0.80 | 2.16  |
| 017                | 0.010 | 0.00   | 2.519 | 0.51   | 2.519  | 0.51   | 0.101 | 0.02 | 4.461   | 4.40   | 0.050 | 0.01 | 0.44 | 1.15  |
| 018                | 0.010 | 0.00   | 2.419 | 0.10   | 2.419  | 0.10   | 0.097 | 0.00 | 6.924   | 8.91   | 0.048 | 0.00 | 0.66 | 2.38  |
| 019                | 0.015 | 0.01   | 2.528 | 0.65   | 6.068  | 1.57   | 0.101 | 0.03 | 15.039  | 1.90   | 0.051 | 0.01 | 0.38 | 0.60  |
| 020                | 0.053 | 0.06   | 2.958 | 0.08   | 5.000  | 4.00   | 0.823 | 0.69 | 2.958   | 0.08   | 0.059 | 0.00 | 0.43 | 1.04  |
| 021                | 0.020 | 0.02   | 2.681 | 0.79   | 4.283  | 2.41   | 0.199 | 0.15 | 2.681   | 0.79   | 0.054 | 0.02 | 0.34 | 1.04  |
| 022                | 0.012 | 0.00   | 2.975 | 0.40   | 2.975  | 0.40   | 0.119 | 0.02 | 2.975   | 0.40   | 0.060 | 0.01 | 0.14 | 0.17  |
| 023                | 0.035 | 0.05   | 2.962 | 0.02   | 50.955 | 0.43   | 0.119 | 0.00 | 331.600 | 92.00  | 0.059 | 0.00 | 6.85 | 24.51 |
| 024                | 0.011 | 0.00   | 2.677 | 0.44   | 2.677  | 0.44   | 0.107 | 0.02 | 2.677   | 0.44   | 0.083 | 0.07 | 0.14 | 0.17  |
| 025                | 0.011 | 0.00   | 2.741 | 0.41   | 2.741  | 0.41   | 0.169 | 0.13 | 4.516   | 3.13   | 0.055 | 0.01 | 0.32 | 0.82  |
| 026                | 0.008 | 0.00   | 2.117 | 0.41   | 2.117  | 0.41   | 0.085 | 0.02 | 2.117   | 0.41   | 0.042 | 0.01 | 0.13 | 0.16  |
| 027                | 0.013 | 0.00   | 3.264 | 0.47   | 3.264  | 0.47   | 0.131 | 0.02 | 3.264   | 0.47   | 0.065 | 0.01 | 0.13 | 0.19  |
| 028                | 0.010 | 0.00   | 2.500 | 0.10   | 12.000 | 0.48   | 0.100 | 0.00 | 2.500   | 0.10   | 0.050 | 0.00 | 0.10 | 0.15  |
| 030                | 0.022 | 0.02   | 2.300 | 0.30   | 13.620 | 3.72   | 0.092 | 0.01 | 81.160  | 72.88  | 0.046 | 0.01 | 5.68 | 19.37 |
| 031                | 0.012 | 0.00   | 2.925 | 0.05   | 2.925  | 0.05   | 0.117 | 0.00 | 2.925   | 0.05   | 0.059 | 0.00 | 0.04 | 0.04  |
| 032                | 0.017 | 0.00   | 4.306 | 0.34   | 4.306  | 0.34   | 0.172 | 0.01 | 12.168  | 15.39  | 0.086 | 0.01 | 1.20 | 4.08  |
| 033                | 0.011 | 0.00   | 2.800 | 0.20   | 4.690  | 3.58   | 0.112 | 0.01 | 4.830   | 4.26   | 0.056 | 0.00 | 0.61 | 1.41  |
| 034                | 0.011 | 0.00   | 2.675 | 0.00   | 2.675  | 0.00   | 0.107 | 0.00 | 2.675   | 0.00   | 0.053 | 0.00 | 0.02 | 0.06  |
| 035                | 0.013 | 0.00   | 3.200 | 0.55   | 8.758  | 10.56  | 0.128 | 0.02 | 8.850   | 1.02   | 0.093 | 0.05 | 1.11 | 2.84  |
| 036                | 0.012 | 0.00   | 2.938 | 0.18   | 2.938  | 0.18   | 0.118 | 0.01 | 2.938   | 0.18   | 0.059 | 0.00 | 0.09 | 0.10  |
| 037                | 0.013 | 999.99 | 3.150 | 999.99 | 3.150  | 999.99 | 0.124 | 0.00 | 3.150   | 999.99 | 0.062 | 0.00 | 0.12 | 0.20  |
| 038                | 0.010 | 0.00   | 2.500 | 0.30   | 2.500  | 0.30   | 0.100 | 0.01 | 6.965   | 8.63   | 0.050 | 0.01 | 0.69 | 2.29  |
| 039                | 0.008 | 0.00   | 2.088 | 0.13   | 2.088  | 0.13   | 0.084 | 0.01 | 7.490   | 1.22   | 0.042 | 0.00 | 0.14 | 0.32  |
| 040                | 0.013 | 0.00   | 3.375 | 0.23   | 3.375  | 0.23   | 0.135 | 0.01 | 12.010  | 7.26   | 0.067 | 0.00 | 0.60 | 1.92  |
| 041                | 0.009 | 0.00   | 2.238 | 0.07   | 2.238  | 0.07   | 0.090 | 0.00 | 10.655  | 10.39  | 0.045 | 0.00 | 0.79 | 2.76  |
| 042                | 0.008 | 0.00   | 1.937 | 0.08   | 1.937  | 0.08   | 0.078 | 0.00 | 9.300   | 0.36   | 0.039 | 0.00 | 0.07 | 0.10  |
| 043                | 0.012 | 0.00   | 3.050 | 0.20   | 5.115  | 3.93   | 0.181 | 0.11 | 9.760   | 0.64   | 0.061 | 0.00 | 0.42 | 1.03  |
| 044                | 0.030 | 0.03   | 3.129 | 0.52   | 3.129  | 0.52   | 0.355 | 0.44 | 17.845  | 19.43  | 0.063 | 0.01 | 1.58 | 5.14  |
| 045                | 0.011 | 0.00   | 2.787 | 0.03   | 2.787  | 0.03   | 0.112 | 0.00 | 5.840   | 6.08   | 0.056 | 0.00 | 0.51 | 1.61  |
| 080                | 0.014 | 0.00   | 3.389 | 0.28   | 3.389  | 0.28   | 0.136 | 0.01 | 8.681   | 10.86  | 0.068 | 0.01 | 0.86 | 2.88  |
| 081                | 0.015 | 0.01   | 2.573 | 0.23   | 4.456  | 4.00   | 0.299 | 0.38 | 37.707  | 70.03  | 0.051 | 0.00 | 5.49 | 18.61 |
| 082                | 0.030 | 0.03   | 3.181 | 0.47   | 3.181  | 0.47   | 0.372 | 0.20 | 7.597   | 8.36   | 0.064 | 0.01 | 0.73 | 1.04  |
| 083                | 0.014 | 0.00   | 3.486 | 0.19   | 3.486  | 0.19   | 0.139 | 0.01 | 3.486   | 0.19   | 0.070 | 0.00 | 0.11 | 0.17  |
| Ar. Mean           | 0.015 | 0.01   | 2.844 | 0.31   | 4.758  | 1.03   | 0.148 | 0.06 | 17.914  | 10.76  | 0.060 | 0.01 | 0.91 | 2.92  |
| Std. dev.          | 0.009 | 0.01   | 0.495 | 0.24   | 7.174  | 1.84   | 0.117 | 0.13 | 48.389  | 19.02  | 0.016 | 0.02 | 1.41 | 4.97  |

ARIZONA PUBLIC SERVICE  
MONTHLY REPORT for 5-90

DEPOSITION DATA  
Comments and Messages Only

Page 3

| Location<br>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                |                            |                   |                     |
| 023                |                            |                   |                     |
| 024                |                            |                   |                     |
| 025                |                            |                   |                     |
| 026                |                            |                   |                     |
| 027                |                            |                   |                     |
| 028                |                            |                   |                     |
| 030                |                            |                   |                     |
| 031                |                            |                   |                     |
| 032                |                            |                   |                     |
| 033                |                            |                   |                     |
| 034                |                            |                   |                     |
| 035                |                            |                   |                     |
| 036                |                            |                   |                     |
| 037                | SAMPLE LEAKED IN TRANSPORT |                   |                     |
| 038                |                            |                   |                     |
| 039                |                            |                   |                     |
| 040                |                            |                   |                     |
| 041                |                            |                   |                     |
| 042                |                            |                   |                     |
| 043                |                            |                   |                     |
| 044                |                            |                   |                     |
| 045                |                            |                   |                     |
| 080                |                            |                   |                     |
| 081                |                            |                   |                     |
| 082                |                            |                   |                     |



## ARIZONA PUBLIC SERVICE

MONTHLY REPORT for 6-90

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

Page 1

| Location<br>Number | Na      | d      | K       | d      | Ca      | d      | Mg      | d      | Cl      | d      | F       | d      | SO4     | d      | NO3     | d      |
|--------------------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|
| 001                | 0.151   | 0.02   | 0.087   | 0.01   | 0.883   | 0.07   | 0.164   | 0.06   | 0.241   | 0.08   | 0.109   | 0.02   | 0.218   | 0.03   | 0.056   | 0.06   |
| 002                | 0.330   | 0.32   | 0.370   | 0.57   | 0.580   | 0.15   | 0.178   | 0.05   | 0.497   | 0.15   | 0.208   | 0.01   | 0.415   | 0.01   | 0.035   | 0.03   |
| 003                | 0.263   | 0.15   | 0.328   | 0.15   | 1.798   | 0.45   | 0.784   | 0.19   | 0.422   | 0.03   | 0.163   | 0.01   | 0.326   | 0.02   | 0.024   | 0.01   |
| 004                | 0.093   | 0.05   | 0.185   | 0.10   | 0.849   | 0.04   | 0.396   | 0.39   | 0.256   | 0.16   | 0.157   | 0.02   | 0.315   | 0.04   | 0.037   | 0.01   |
| 005                | 0.180   | 0.09   | 0.218   | 0.17   | 1.733   | 1.06   | 0.537   | 0.28   | 0.285   | 0.03   | 0.178   | 0.02   | 0.356   | 0.04   | 0.018   | 0.00   |
| 006                | 0.152   | 0.01   | 0.149   | 0.14   | 0.792   | 0.16   | 0.291   | 0.22   | 0.464   | 0.49   | 0.190   | 0.01   | 0.379   | 0.03   | 0.019   | 0.00   |
| 007                | 0.139   | 0.12   | 0.268   | 0.05   | 1.154   | 0.05   | 0.569   | 0.04   | 0.235   | 0.18   | 0.224   | 0.04   | 0.447   | 0.09   | 0.022   | 0.00   |
| 008                | 0.367   | 0.53   | 0.103   | 0.00   | 0.672   | 0.13   | 0.119   | 0.04   | 0.234   | 0.16   | 0.258   | 0.01   | 0.516   | 0.02   | 0.026   | 0.00   |
| 009                | 0.123   | 0.00   | 0.307   | 0.12   | 1.476   | 0.02   | 0.424   | 0.10   | 0.340   | 0.31   | 0.308   | 0.01   | 0.615   | 0.01   | 0.031   | 0.00   |
| 010                | 0.133   | 0.05   | 0.149   | 0.09   | 0.705   | 0.13   | 0.250   | 0.09   | 0.256   | 0.19   | 0.174   | 0.19   | 0.347   | 0.37   | 0.017   | 0.02   |
| 011                | 0.209   | 0.05   | 0.232   | 0.10   | 1.604   | 0.65   | 0.453   | 0.50   | 0.210   | 0.14   | 0.173   | 0.11   | 0.346   | 0.22   | 0.017   | 0.01   |
| 012                | 0.089   | 999.99 | 0.178   | 999.99 | 0.712   | 999.99 | 0.240   | 999.99 | 0.134   | 999.99 | 0.223   | 999.99 | 0.445   | 999.99 | 0.022   | 999.99 |
| 013                | 0.462   | 0.67   | 0.709   | 0.98   | 1.629   | 2.06   | 0.295   | 0.39   | 0.756   | 0.88   | 0.206   | 0.25   | 0.411   | 0.51   | 0.021   | 0.03   |
| 014                | 0.209   | 0.13   | 0.141   | 0.01   | 1.201   | 0.21   | 0.180   | 0.00   | 0.357   | 0.30   | 0.262   | 0.16   | 0.524   | 0.32   | 0.026   | 0.02   |
| 015                | 0.076   | 0.03   | 0.153   | 0.05   | 1.150   | 0.01   | 0.280   | 0.15   | 0.162   | 0.06   | 0.270   | 0.10   | 0.540   | 0.19   | 0.027   | 0.01   |
| 016                | 0.207   | 0.08   | 0.310   | 0.12   | 1.020   | 0.19   | 0.577   | 0.08   | 0.518   | 0.04   | 0.096   | 0.01   | 0.192   | 0.03   | 0.010   | 0.00   |
| 017                | 0.117   | 0.07   | 0.238   | 0.02   | 0.756   | 0.15   | 0.407   | 0.20   | 0.119   | 0.01   | 0.198   | 0.02   | 0.397   | 0.04   | 0.020   | 0.00   |
| 018                | 0.092   | 0.07   | 0.210   | 0.17   | 0.462   | 0.33   | 0.395   | 0.27   | 0.212   | 0.05   | 0.152   | 0.01   | 0.305   | 0.02   | 0.051   | 0.07   |
| 019                | 0.238   | 0.03   | 1.187   | 0.24   | 4.141   | 4.80   | 2.635   | 0.67   | 0.291   | 0.02   | 0.133   | 0.01   | 0.266   | 0.03   | 0.013   | 0.00   |
| 020                | 0.306   | 0.18   | 0.392   | 0.08   | 0.619   | 0.10   | 0.387   | 0.01   | 0.477   | 0.01   | 0.104   | 0.01   | 0.306   | 0.18   | 0.010   | 0.00   |
| 021                | 0.226   | 0.14   | 0.226   | 0.14   | 0.747   | 0.08   | 0.199   | 0.19   | 0.231   | 0.17   | 0.221   | 0.05   | 0.442   | 0.10   | 0.022   | 0.00   |
| 022                | 0.080   | 0.06   | 0.107   | 0.00   | 0.692   | 0.08   | 0.129   | 0.15   | 0.160   | 0.01   | 0.266   | 0.01   | 0.533   | 0.02   | 0.055   | 0.06   |
| 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                | 1.220   | 2.26   | 0.285   | 0.21   | 1.037   | 0.47   | 0.382   | 0.35   | 0.140   | 0.01   | 0.234   | 0.02   | 0.467   | 0.04   | 0.023   | 0.00   |
| 025                | 0.250   | 0.18   | 0.358   | 0.24   | 0.490   | 0.30   | 0.502   | 0.14   | 0.332   | 0.42   | 0.185   | 0.03   | 0.370   | 0.06   | 0.019   | 0.00   |
| 026                | 0.145   | 0.09   | 0.246   | 0.11   | 0.779   | 0.15   | 0.395   | 0.09   | 0.147   | 0.01   | 0.244   | 0.01   | 0.489   | 0.03   | 0.024   | 0.00   |
| 027                | 0.115   | 0.01   | 0.115   | 0.01   | 0.602   | 0.02   | 0.234   | 0.01   | 0.182   | 0.03   | 0.119   | 0.04   | 0.238   | 0.08   | 0.050   | 0.08   |
| 028                | 0.145   | 0.00   | 0.182   | 0.08   | 1.746   | 0.63   | 0.455   | 0.25   | 0.163   | 0.10   | 0.181   | 0.00   | 0.363   | 0.01   | 0.099   | 0.11   |
| 030                | 0.579   | 0.01   | 0.675   | 0.18   | 4.728   | 0.51   | 1.656   | 0.33   | 0.934   | 0.34   | 0.201   | 0.08   | 0.402   | 0.15   | 0.224   | 0.36   |
| 031                | 0.284   | 0.13   | 0.316   | 0.41   | 1.893   | 0.91   | 0.369   | 0.43   | 0.439   | 0.01   | 0.247   | 0.06   | 0.494   | 0.12   | 0.232   | 0.42   |
| 032                | 0.409   | 0.21   | 0.484   | 0.06   | 3.561   | 0.78   | 0.772   | 0.28   | 0.242   | 0.03   | 0.403   | 0.05   | 0.807   | 0.10   | 0.040   | 0.01   |
| 033                | 0.209   | 0.21   | 0.157   | 0.10   | 0.836   | 0.21   | 0.235   | 0.24   | 0.444   | 0.57   | 0.261   | 0.00   | 0.522   | 0.00   | 0.026   | 0.00   |
| 034                | 0.144   | 0.08   | 0.144   | 0.08   | 0.680   | 0.13   | 0.237   | 0.07   | 0.356   | 0.41   | 0.244   | 0.02   | 0.489   | 0.05   | 0.129   | 0.21   |
| 035                | 0.202   | 0.14   | 0.268   | 0.01   | 0.938   | 0.04   | 0.403   | 0.12   | 0.201   | 0.01   | 0.335   | 0.01   | 0.670   | 0.03   | 0.033   | 0.00   |
| 036                | 0.206   | 0.05   | 0.251   | 0.04   | 0.857   | 0.11   | 0.382   | 0.07   | 0.154   | 0.04   | 0.257   | 0.06   | 0.515   | 0.12   | 0.046   | 0.04   |
| 037                | 0.240   | 0.02   | 0.297   | 0.09   | 0.830   | 0.41   | 0.622   | 0.02   | 0.180   | 0.02   | 0.300   | 0.03   | 0.600   | 0.05   | 0.030   | 0.00   |
| 038                | 0.120   | 0.03   | 0.167   | 0.07   | 0.405   | 0.13   | 0.344   | 0.11   | 0.234   | 0.26   | 0.117   | 0.10   | 0.235   | 0.21   | 0.036   | 0.04   |
| 039                | 0.171   | 0.06   | 0.287   | 0.16   | 0.581   | 0.46   | 0.556   | 0.11   | 0.377   | 0.06   | 0.138   | 0.07   | 0.276   | 0.15   | 0.031   | 0.02   |
| 040                | 0.263   | 0.01   | 0.196   | 0.13   | 0.851   | 0.38   | 0.250   | 0.03   | 0.197   | 0.00   | 0.328   | 0.01   | 0.656   | 0.01   | 0.033   | 0.00   |
| 041                | 0.142   | 0.04   | 0.142   | 0.04   | 0.578   | 0.32   | 0.141   | 0.17   | 0.151   | 0.06   | 0.140   | 0.13   | 0.279   | 0.26   | 0.037   | 0.03   |
| 042                | 0.154   | 0.02   | 0.254   | 0.07   | 0.489   | 0.33   | 0.317   | 0.01   | 0.136   | 0.05   | 0.158   | 0.05   | 0.317   | 0.09   | 0.016   | 0.00   |
| 043                | 0.293   | 0.02   | 0.195   | 0.01   | 1.069   | 0.33   | 0.255   | 0.09   | 0.265   | 0.23   | 0.244   | 0.01   | 0.489   | 0.03   | 0.046   | 0.04   |
| 044                | 0.174   | 0.10   | 0.118   | 0.01   | 0.534   | 0.17   | 0.137   | 0.07   | 0.177   | 0.02   | 0.295   | 0.03   | 0.590   | 0.06   | 0.030   | 0.00   |
| 045                | 0.403   | 0.27   | 0.358   | 0.36   | 1.599   | 0.32   | 0.547   | 0.37   | 0.486   | 0.25   | 0.208   | 0.03   | 0.416   | 0.07   | 0.063   | 0.04   |
| 080                | 1.981   | 0.79   | 0.773   | 0.36   | 10.474  | 3.79   | 4.285   | 1.71   | 1.483   | 0.46   | 0.711   | 0.10   | 0.806   | 0.29   | 0.020   | 0.01   |
| 081                | 0.457   | 0.03   | 0.287   | 0.13   | 0.832   | 0.01   | 0.832   | 0.01   | 0.685   | 0.05   | 0.129   | 0.04   | 0.368   | 0.15   | 0.013   | 0.00   |
| 082                | 0.151   | 0.00   | 0.151   | 0.00   | 0.317   | 0.03   | 0.430   | 0.14   | 0.196   | 0.09   | 0.101   | 0.05   | 0.201   | 0.10   | 0.010   | 0.01   |
| 0                  | 0.272   | 0.02   | 0.249   | 0.03   | 0.688   | 0.23   | 0.795   | 0.08   | 0.345   | 0.06   | 0.124   | 0.01   | 0.249   | 0.03   | 0.012   | 0.00   |
| Ar. Mean           | 0.276   | 0.17   | 0.281   | 0.14   | 1.335   | 0.48   | 0.541   | 0.20   | 0.330   | 0.15   | 0.217   | 0.05   | 0.424   | 0.10   | 0.041   | 0.04   |
| Std. Dev.          | 0.313   | 0.36   | 0.201   | 0.17   | 1.631   | 0.90   | 0.696   | 0.27   | 0.243   | 0.19   | 0.101   | 0.05   | 0.147   | 0.11   | 0.046   | 0.08   |



ARIZONA PUBLIC SERVICE  
MONTHLY REPORT for 6-90

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

Page 2

| Location<br>Number | PO4     | d      | CO3     | d      | HCO3    | d      | NH3     | d      | TSS     | d      | CU      | d      | Av d   | SD(d)  |
|--------------------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|--------|--------|
| 001                | 0.004   | 0.00   | 1.088   | 0.17   | 6.140   | 10.28  | 0.064   | 0.03   | 16.505  | 7.41   | 0.022   | 0.00   | 1.30   | 3.24   |
| 002                | 0.098   | 0.18   | 2.075   | 0.05   | 9.930   | 4.74   | 1.273   | 2.21   | 17.340  | 14.52  | 0.042   | 0.00   | 1.64   | 3.93   |
| 003                | 0.020   | 0.01   | 1.629   | 0.12   | 6.806   | 1.46   | 0.099   | 0.07   | 58.875  | 17.25  | 0.033   | 0.00   | 1.42   | 4.57   |
| 004                | 0.006   | 0.00   | 1.575   | 0.19   | 3.748   | 4.54   | 0.093   | 0.05   | 41.606  | 35.07  | 0.046   | 0.03   | 2.91   | 9.33   |
| 005                | 0.007   | 0.00   | 1.779   | 0.21   | 3.951   | 4.13   | 0.071   | 0.01   | 46.046  | 22.56  | 0.036   | 0.00   | 2.04   | 6.01   |
| 006                | 0.008   | 0.00   | 1.896   | 0.15   | 5.642   | 7.64   | 0.112   | 0.07   | 30.711  | 17.26  | 0.056   | 0.03   | 1.87   | 4.86   |
| 007                | 0.009   | 0.00   | 2.237   | 0.44   | 8.053   | 1.58   | 0.277   | 0.23   | 55.583  | 5.03   | 0.045   | 0.01   | 0.56   | 1.35   |
| 008                | 0.010   | 0.00   | 2.581   | 0.11   | 7.379   | 9.48   | 0.103   | 0.00   | 7.592   | 10.14  | 0.052   | 0.00   | 1.47   | 3.54   |
| 009                | 0.012   | 0.00   | 3.075   | 0.05   | 7.105   | 8.11   | 0.123   | 0.00   | 46.720  | 4.16   | 0.092   | 0.06   | 0.93   | 2.34   |
| 010                | 0.023   | 0.02   | 1.737   | 1.88   | 8.820   | 8.04   | 0.325   | 0.44   | 23.920  | 13.60  | 0.043   | 0.02   | 1.79   | 4.00   |
| 011                | 0.012   | 0.00   | 1.731   | 1.11   | 8.310   | 5.34   | 0.069   | 0.04   | 41.655  | 57.69  | 0.035   | 0.02   | 4.71   | 15.31  |
| 012                | 0.009   | 999.99 | 2.225   | 999.99 | 2.225   | 999.99 | 0.089   | 999.99 | 30.260  | 999.99 | 0.045   | 999.99 | 999.99 | 999.99 |
| 013                | 0.115   | 0.14   | 2.056   | 2.54   | 12.810  | 14.28  | 0.947   | 1.83   | 16.835  | 24.85  | 0.041   | 0.05   | 3.53   | 7.14   |
| 014                | 0.010   | 0.01   | 2.619   | 1.61   | 6.063   | 5.28   | 0.105   | 0.06   | 14.745  | 3.39   | 0.052   | 0.03   | 0.82   | 1.59   |
| 015                | 0.033   | 0.04   | 2.700   | 0.95   | 4.923   | 5.40   | 0.197   | 0.14   | 16.770  | 12.18  | 0.054   | 0.02   | 1.38   | 3.42   |
| 016                | 0.022   | 0.04   | 0.961   | 0.14   | 5.147   | 0.39   | 0.234   | 0.39   | 54.375  | 23.25  | 0.028   | 0.02   | 1.77   | 6.18   |
| 017                | 0.008   | 0.00   | 1.984   | 0.19   | 5.894   | 1.80   | 0.196   | 0.06   | 43.219  | 13.20  | 0.040   | 0.00   | 1.13   | 3.51   |
| 018                | 0.006   | 0.00   | 1.524   | 0.10   | 5.487   | 0.35   | 0.122   | 0.01   | 37.379  | 43.31  | 0.030   | 0.00   | 3.20   | 11.55  |
| 019                | 0.176   | 0.26   | 1.331   | 0.15   | 19.829  | 2.61   | 0.053   | 0.01   | 255.097 | 83.61  | 0.027   | 0.00   | 6.60   | 22.21  |
| 020                | 0.168   | 0.15   | 1.039   | 0.11   | 5.580   | 0.67   | 0.530   | 0.36   | 43.363  | 9.45   | 0.021   | 0.00   | 0.81   |        |
| 021                | 0.075   | 0.09   | 2.211   | 0.49   | 4.766   | 4.62   | 0.275   | 0.24   | 24.569  | 13.76  | 0.044   | 0.01   | 1.43   |        |
| 022                | 0.049   | 0.08   | 2.664   | 0.10   | 6.059   | 6.69   | 0.107   | 0.00   | 30.672  | 22.24  | 0.053   | 0.00   | 2.11   | 6.06   |
| 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                | 0.028   | 0.00   | 2.338   | 0.22   | 5.522   | 6.59   | 0.094   | 0.01   | 41.420  | 54.36  | 0.071   | 0.05   | 4.62   | 14.43  |
| 025                | 0.052   | 0.01   | 1.850   | 0.30   | 1.850   | 0.30   | 0.330   | 0.02   | 51.520  | 16.64  | 0.054   | 0.03   | 1.33   | 4.41   |
| 026                | 0.038   | 0.06   | 2.444   | 0.13   | 2.444   | 0.13   | 0.098   | 0.01   | 41.959  | 3.64   | 0.074   | 0.05   | 0.32   | 0.96   |
| 027                | 0.005   | 0.00   | 1.189   | 0.41   | 4.281   | 1.47   | 0.048   | 0.02   | 17.031  | 0.63   | 0.034   | 0.01   | 0.20   | 0.41   |
| 028                | 0.007   | 0.00   | 1.815   | 0.05   | 8.710   | 0.23   | 0.109   | 0.08   | 34.935  | 15.45  | 0.036   | 0.00   | 1.21   | 4.10   |
| 030                | 0.169   | 0.09   | 2.008   | 0.77   | 12.513  | 9.46   | 0.128   | 0.13   | 112.597 | 4.74   | 0.040   | 0.02   | 1.23   | 2.66   |
| 031                | 0.036   | 0.05   | 2.470   | 0.59   | 10.508  | 15.48  | 0.099   | 0.02   | 41.959  | 30.79  | 0.049   | 0.01   | 3.53   | 8.83   |
| 032                | 0.033   | 0.04   | 4.034   | 0.52   | 14.524  | 1.86   | 0.161   | 0.02   | 77.048  | 2.98   | 0.081   | 0.01   | 0.50   | 0.87   |
| 033                | 0.010   | 0.00   | 2.612   | 0.00   | 2.612   | 0.00   | 0.209   | 0.21   | 31.345  | 4.18   | 0.052   | 0.00   | 0.41   | 1.10   |
| 034                | 0.010   | 0.00   | 2.444   | 0.23   | 2.444   | 0.23   | 0.098   | 0.01   | 18.248  | 11.92  | 0.072   | 0.04   | 0.96   | 3.15   |
| 035                | 0.041   | 0.06   | 3.349   | 0.13   | 3.349   | 0.13   | 0.134   | 0.01   | 37.666  | 17.52  | 0.067   | 0.00   | 1.30   | 4.67   |
| 036                | 0.010   | 0.00   | 2.573   | 0.59   | 2.573   | 0.59   | 0.103   | 0.02   | 51.745  | 34.30  | 0.051   | 0.01   | 2.58   | 9.13   |
| 037                | 0.023   | 0.02   | 3.000   | 0.26   | 3.000   | 0.26   | 0.235   | 0.22   | 49.567  | 6.51   | 0.091   | 0.07   | 0.57   | 1.71   |
| 038                | 0.012   | 0.00   | 1.173   | 1.04   | 2.415   | 1.44   | 0.178   | 0.22   | 34.326  | 15.35  | 0.030   | 0.01   | 1.36   | 4.05   |
| 039                | 0.019   | 0.01   | 1.379   | 0.73   | 5.574   | 1.39   | 0.253   | 0.23   | 48.019  | 9.64   | 0.055   | 0.03   | 0.94   | 2.53   |
| 040                | 0.033   | 0.04   | 3.281   | 0.06   | 3.281   | 0.06   | 0.131   | 0.00   | 18.400  | 5.60   | 0.066   | 0.00   | 0.45   | 1.48   |
| 041                | 0.010   | 0.00   | 1.397   | 1.29   | 2.372   | 0.66   | 0.131   | 0.10   | 16.324  | 9.85   | 0.028   | 0.03   | 0.93   | 2.59   |
| 042                | 0.079   | 0.07   | 1.585   | 0.46   | 3.346   | 3.06   | 0.307   | 0.47   | 41.468  | 7.06   | 0.032   | 0.01   | 0.84   | 1.96   |
| 043                | 0.025   | 0.03   | 2.444   | 0.15   | 10.306  | 3.54   | 0.391   | 0.02   | 21.387  | 6.54   | 0.049   | 0.00   | 0.79   | 1.90   |
| 044                | 0.017   | 0.01   | 2.950   | 0.30   | 6.980   | 8.36   | 0.118   | 0.01   | 14.280  | 6.16   | 0.059   | 0.01   | 1.09   | 2.65   |
| 045                | 0.121   | 0.17   | 2.081   | 0.34   | 8.637   | 1.07   | 0.670   | 0.80   | 49.345  | 26.69  | 0.042   | 0.01   | 2.20   | 7.06   |
| 080                | 0.043   | 0.05   | 2.014   | 0.73   | 43.431  | 23.50  | 0.081   | 0.03   | 267.729 | 73.46  | 0.040   | 0.01   | 7.52   | 19.95  |
| 081                | 0.070   | 0.10   | 1.289   | 0.38   | 7.073   | 3.57   | 0.428   | 0.33   | 66.281  | 9.19   | 0.026   | 0.01   | 1.00   |        |
| 082                | 0.014   | 0.01   | 1.007   | 0.51   | 3.176   | 2.75   | 0.040   | 0.02   | 49.371  | 32.74  | 0.020   | 0.01   | 2.60   |        |
| 083                | 0.018   | 0.02   | 1.243   | 0.13   | 5.104   | 3.93   | 0.050   | 0.01   | 44.846  | 8.61   | 0.025   | 0.00   | 0.94   |        |
| Ar. Mean           | 0.038   | 0.04   | 2.057   | 0.46   | 7.036   | 4.29   | 0.215   | 0.20   | 47.503  | 18.88  | 0.046   | 0.02   | 1.80   | 5.23   |
| Std. dev.          | 0.045   | 0.06   | 0.697   | 0.52   | 6.523   | 4.79   | 0.233   | 0.43   | 49.375  | 18.30  | 0.018   | 0.02   | 1.55   | 4.80   |

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DEPOSITION DATA  
Comments and Messages Only

Page 3

| Location<br>Number | Sample A Comments             | Sample B Comments | Processing Messages    |
|--------------------|-------------------------------|-------------------|------------------------|
| 001                |                               |                   |                        |
| 002                |                               |                   |                        |
| 003                |                               |                   |                        |
| 004                |                               |                   |                        |
| 005                |                               |                   |                        |
| 006                |                               |                   |                        |
| 007                |                               |                   |                        |
| 008                |                               |                   |                        |
| 009                |                               |                   |                        |
| 010                |                               |                   |                        |
| 011                |                               |                   |                        |
| 012                | VOID - POSSIBLE CONTAMINATION |                   | MISSING SAMPLE A       |
| 013                | SCREEN MISSING                | SCREEN MISSING    |                        |
| 014                |                               |                   |                        |
| 015                |                               |                   |                        |
| 016                |                               |                   |                        |
| 017                |                               |                   |                        |
| 018                |                               |                   |                        |
| 019                |                               |                   |                        |
| 020                |                               |                   |                        |
| 023                | VOID - POSSIBLE CONTAMINATION | 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                |                               |                   |                        |



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

Page 1

| Location<br>Number | Na      | d      | K       | d      | Ca      | d      | Hg      | d      | Cl      | d      | F       | d      | SO4     | d      | NO3     | d      |
|--------------------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|
| 001                | 0.584   | 0.09   | 0.613   | 0.28   | 2.983   | 0.57   | 1.240   | 0.22   | 0.809   | 0.27   | 0.391   | 0.03   | 0.483   | 0.29   | 0.034   | 0.03   |
| 002                | 0.396   | 0.12   | 0.684   | 0.09   | 3.570   | 2.86   | 1.470   | 0.21   | 0.526   | 0.04   | 0.184   | 0.09   | 0.368   | 0.17   | 0.018   | 0.01   |
| 003                | 4.185   | 7.09   | 0.710   | 0.08   | 4.171   | 1.07   | 1.340   | 0.53   | 0.660   | 0.25   | 0.274   | 0.01   | 0.548   | 0.03   | 0.114   | 0.17   |
| 004                | 1.492   | 1.72   | 0.528   | 0.16   | 3.022   | 1.34   | 1.067   | 0.15   | 0.573   | 0.07   | 0.197   | 0.06   | 0.393   | 0.11   | 0.020   | 0.01   |
| 005                | 0.879   | 0.35   | 0.290   | 0.05   | 5.100   | 1.41   | 0.600   | 0.32   | 0.712   | 0.16   | 0.242   | 0.04   | 0.484   | 0.09   | 0.024   | 0.00   |
| 006                | 3.833   | 5.24   | 0.693   | 0.31   | 4.041   | 0.09   | 1.376   | 0.88   | 1.029   | 0.12   | 0.286   | 0.03   | 0.841   | 0.47   | 0.029   | 0.00   |
| 007                | 0.427   | 0.20   | 0.322   | 0.01   | 9.918   | 4.30   | 0.553   | 0.08   | 0.427   | 0.20   | 0.268   | 0.01   | 0.537   | 0.02   | 0.027   | 0.00   |
| 008                | 0.693   | 0.43   | 0.216   | 0.02   | 3.140   | 0.15   | 0.404   | 0.01   | 0.501   | 0.09   | 0.227   | 0.11   | 0.455   | 0.22   | 0.023   | 0.01   |
| 009                | 1.186   | 0.44   | 0.465   | 0.23   | 5.510   | 2.11   | 0.795   | 0.53   | 0.514   | 0.32   | 0.267   | 0.05   | 0.534   | 0.10   | 0.027   | 0.01   |
| 010                | 0.891   | 0.69   | 0.440   | 0.00   | 2.359   | 3.84   | 1.034   | 0.22   | 0.303   | 0.28   | 0.247   | 0.05   | 0.495   | 0.11   | 0.025   | 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                | 1.211   | 1.36   | 2.034   | 1.42   | 1.564   | 0.66   | 2.127   | 1.03   | 0.596   | 0.13   | 0.229   | 0.02   | 2.114   | 3.35   | 0.023   | 0.00   |
| 013                | 0.771   | 0.19   | 1.317   | 1.19   | 7.692   | 2.39   | 1.969   | 2.81   | 0.530   | 0.38   | 0.321   | 0.08   | 0.642   | 0.16   | 0.032   | 0.01   |
| 014                | 0.839   | 0.27   | 0.672   | 0.66   | 12.127  | 1.83   | 1.419   | 1.38   | 0.667   | 0.13   | 0.186   | 0.13   | 0.738   | 0.47   | 0.088   | 0.13   |
| 015                | 0.483   | 999.99 | 0.579   | 999.99 | 4.538   | 999.99 | 0.966   | 999.99 | 0.579   | 999.99 | 0.241   | 999.99 | 0.483   | 999.99 | 0.024   | 999.99 |
| 016                | 0.601   | 0.17   | 0.585   | 0.14   | 4.639   | 3.26   | 1.587   | 0.21   | 0.539   | 0.05   | 0.130   | 0.02   | 0.377   | 0.19   | 0.026   | 0.02   |
| 017                | 0.262   | 0.02   | 0.267   | 0.37   | 1.483   | 0.09   | 0.457   | 0.51   | 0.262   | 0.02   | 0.219   | 0.01   | 0.437   | 0.03   | 0.022   | 0.00   |
| 018                | 0.370   | 0.05   | 0.448   | 0.48   | 2.248   | 0.61   | 0.672   | 0.82   | 0.370   | 0.05   | 0.209   | 0.07   | 0.419   | 0.14   | 0.054   | 0.06   |
| 019                | 0.526   | 0.06   | 1.370   | 1.25   | 6.372   | 1.45   | 2.090   | 2.46   | 0.370   | 0.37   | 0.294   | 0.03   | 0.588   | 0.07   | 0.029   | 0.00   |
| 020                | 0.642   | 0.10   | 0.584   | 0.34   | 2.932   | 1.34   | 1.035   | 0.84   | 0.723   | 0.06   | 0.154   | 0.04   | 0.442   | 0.19   | 0.015   | 0.00   |
| 021                | 0.383   | 999.99 | 0.478   | 999.99 | 1.912   | 999.99 | 0.755   | 999.99 | 0.383   | 999.99 | 0.239   | 999.99 | 0.478   | 999.99 | 0.024   | 999.99 |
| 022                | 0.326   | 0.00   | 0.489   | 0.11   | 2.393   | 0.22   | 0.533   | 0.46   | 0.245   | 0.16   | 0.272   | 0.00   | 0.544   | 0.00   | 0.027   | 0.00   |
| 023                | 2.319   | 2.31   | 2.145   | 2.18   | 15.442  | 8.38   | 3.571   | 4.76   | 1.952   | 1.84   | 0.350   | 0.05   | 1.078   | 0.86   | 0.035   | 0.01   |
| 024                | 0.405   | 0.04   | 0.442   | 0.46   | 2.936   | 0.33   | 0.745   | 0.81   | 0.399   | 0.16   | 0.253   | 0.03   | 0.506   | 0.06   | 0.025   | 0.00   |
| 025                | 0.436   | 999.99 | 0.262   | 999.99 | 3.313   | 999.99 | 0.296   | 999.99 | 0.523   | 999.99 | 0.218   | 999.99 | 0.872   | 999.99 | 0.022   | 999.99 |
| 026                | 0.344   | 0.11   | 0.341   | 0.28   | 2.055   | 0.33   | 0.608   | 0.58   | 0.219   | 0.14   | 0.245   | 0.01   | 0.490   | 0.01   | 0.024   | 0.00   |
| 027                | 0.777   | 0.10   | 0.771   | 0.32   | 2.103   | 3.61   | 1.061   | 0.47   | 0.564   | 0.26   | 0.083   | 0.05   | 0.776   | 0.19   | 0.023   | 0.02   |
| 028                | 0.529   | 0.26   | 0.601   | 0.07   | 7.998   | 6.60   | 1.195   | 0.32   | 0.348   | 0.06   | 0.217   | 0.04   | 0.434   | 0.07   | 0.022   | 0.00   |
| 030                | 0.826   | 0.12   | 1.059   | 0.79   | 5.120   | 5.03   | 1.948   | 1.46   | 0.940   | 0.11   | 0.234   | 0.09   | 0.659   | 0.21   | 0.152   | 0.25   |
| 031                | 0.585   | 0.02   | 0.689   | 0.93   | 4.396   | 0.94   | 1.351   | 1.92   | 0.626   | 0.07   | 0.196   | 0.02   | 0.577   | 0.33   | 0.244   | 0.45   |
| 032                | 1.168   | 0.21   | 1.031   | 0.85   | 9.146   | 4.62   | 1.336   | 0.82   | 1.107   | 0.70   | 0.417   | 0.07   | 0.834   | 0.15   | 0.042   | 0.01   |
| 033                | 0.343   | 0.00   | 0.556   | 0.59   | 2.702   | 0.06   | 0.996   | 1.08   | 0.193   | 0.13   | 0.214   | 0.00   | 1.076   | 1.30   | 0.021   | 0.00   |
| 034                | 0.275   | 0.00   | 0.355   | 0.02   | 1.881   | 0.12   | 0.572   | 0.03   | 0.240   | 0.06   | 0.200   | 0.05   | 0.401   | 0.11   | 0.151   | 0.16   |
| 035                | 0.297   | 0.06   | 0.462   | 0.49   | 1.868   | 0.21   | 0.611   | 0.72   | 0.148   | 0.03   | 0.247   | 0.05   | 0.495   | 0.11   | 0.025   | 0.01   |
| 036                | 0.231   | 0.00   | 0.461   | 0.46   | 1.768   | 0.00   | 0.865   | 1.19   | 0.211   | 0.19   | 0.192   | 0.00   | 0.384   | 0.00   | 0.019   | 0.00   |
| 037                | 0.210   | 0.00   | 0.263   | 0.32   | 0.945   | 0.00   | 0.394   | 0.45   | 0.341   | 0.37   | 0.263   | 0.00   | 0.525   | 0.00   | 0.026   | 0.00   |
| 038                | 0.364   | 0.06   | 0.289   | 0.41   | 2.101   | 0.55   | 0.519   | 0.72   | 0.364   | 0.06   | 0.227   | 0.04   | 0.455   | 0.08   | 0.194   | 0.35   |
| 039                | 0.278   | 0.06   | 0.216   | 0.18   | 0.936   | 0.48   | 0.377   | 0.37   | 0.270   | 0.08   | 0.174   | 0.04   | 0.348   | 0.08   | 0.017   | 0.00   |
| 040                | 0.459   | 0.10   | 0.664   | 0.31   | 3.216   | 0.31   | 1.002   | 0.65   | 0.300   | 0.22   | 0.287   | 0.06   | 0.574   | 0.13   | 0.029   | 0.01   |
| 041                | 0.391   | 0.03   | 0.426   | 0.29   | 4.560   | 1.94   | 0.874   | 0.70   | 0.432   | 0.11   | 0.219   | 0.03   | 0.438   | 0.06   | 0.183   | 0.32   |
| 042                | 0.325   | 0.01   | 0.448   | 0.09   | 1.768   | 0.79   | 0.812   | 0.14   | 0.353   | 0.06   | 0.169   | 0.06   | 0.338   | 0.13   | 0.017   | 0.01   |
| 043                | 0.568   | 0.04   | 0.513   | 0.15   | 1.812   | 0.08   | 0.641   | 0.24   | 0.627   | 0.16   | 0.284   | 0.02   | 0.568   | 0.04   | 0.120   | 0.19   |
| 044                | 0.420   | 0.21   | 0.420   | 0.00   | 2.153   | 0.10   | 0.803   | 0.05   | 0.420   | 0.21   | 0.263   | 0.00   | 0.525   | 0.00   | 0.165   | 0.28   |
| 045                | 0.513   | 0.12   | 0.418   | 0.07   | 2.935   | 0.73   | 0.805   | 0.39   | 0.456   | 0.23   | 0.261   | 0.05   | 0.522   | 0.09   | 0.026   | 0.00   |
| 080                | 2.147   | 0.25   | 1.486   | 1.07   | 35.586  | 4.55   | 4.628   | 2.36   | 1.467   | 0.16   | 0.306   | 0.02   | 1.226   | 0.07   | 0.031   | 0.00   |
| 081                | 1.387   | 0.01   | 0.483   | 0.47   | 4.560   | 0.72   | 1.433   | 0.73   | 1.420   | 0.44   | 0.178   | 0.05   | 1.420   | 0.44   | 0.031   | 0.02   |
| 082                | 0.502   | 999.99 | 0.803   | 999.99 | 6.021   | 999.99 | 0.963   | 999.99 | 0.401   | 999.99 | 0.251   | 999.99 | 0.502   | 999.99 | 0.025   | 999.99 |
| 083                | 0.574   | 999.99 | 0.306   | 999.99 | 4.593   | 999.99 | 0.880   | 999.99 | 0.689   | 999.99 | 0.096   | 999.99 | 0.766   | 999.99 | 0.010   | 999.99 |
| Ar. Mean           | 0.801   | 0.54   | 0.632   | 0.43   | 4.758   | 1.67   | 1.123   | 0.82   | 0.560   | 0.21   | 0.237   | 0.04   | 0.621   | 0.26   | 0.051   | 0.06   |
| Std. Dev.          | 0.820   | 1.37   | 0.423   | 0.46   | 5.450   | 1.98   | 0.789   | 0.90   | 0.354   | 0.29   | 0.064   | 0.03   | 0.321   | 0.54   | 0.056   | 0.11   |

## ARIZONA PUBLIC SERVICE

MONTHLY REPORT for 7-90

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

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| Location<br>Number | PO4     | d      | CO3     | d      | HCO3    | d      | NH3     | d      | TSS     | d      | CU      | d      | Av d   | SD(d)  |
|--------------------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|--------|--------|
| 001                | 0.086   | 0.10   | 1.629   | 0.12   | 16.941  | 1.22   | 0.222   | 0.31   | 106.687 | 37.88  | 0.033   | 0.00   | 2.96   | 10.05  |
| 002                | 0.080   | 0.06   | 1.840   | 0.87   | 19.134  | 9.02   | 0.316   | 0.27   | 152.391 | 113.53 | 0.037   | 0.02   | 9.10   | 30.16  |
| 003                | 0.061   | 0.08   | 2.738   | 0.13   | 10.490  | 8.14   | 0.222   | 0.23   | 115.100 | 16.20  | 0.083   | 0.06   | 2.43   | 4.79   |
| 004                | 0.035   | 0.05   | 1.966   | 0.57   | 12.574  | 1.75   | 0.460   | 0.56   | 114.517 | 13.03  | 0.056   | 0.02   | 1.40   | 3.41   |
| 005                | 0.038   | 0.01   | 2.418   | 0.44   | 25.148  | 4.57   | 0.317   | 0.42   | 165.310 | 49.24  | 0.048   | 0.01   | 4.08   | 13.05  |
| 006                | 0.035   | 0.03   | 2.858   | 0.34   | 19.097  | 10.22  | 0.471   | 0.51   | 141.207 | 40.34  | 0.087   | 0.07   | 4.19   | 10.80  |
| 007                | 0.042   | 0.04   | 2.684   | 0.12   | 38.189  | 9.18   | 0.107   | 0.00   | 112.538 | 38.17  | 0.054   | 0.00   | 3.74   | 10.25  |
| 008                | 0.015   | 0.02   | 2.273   | 1.13   | 14.217  | 1.06   | 0.091   | 0.05   | 60.759  | 12.62  | 0.045   | 0.02   | 1.14   | 3.33   |
| 009                | 0.064   | 0.10   | 2.672   | 0.52   | 24.272  | 1.67   | 0.155   | 0.08   | 128.250 | 24.75  | 0.053   | 0.01   | 2.21   | 6.52   |
| 010                | 0.026   | 0.04   | 2.473   | 0.54   | 15.942  | 3.37   | 0.099   | 0.02   | 109.969 | 44.44  | 0.049   | 0.01   | 3.83   | 11.76  |
| 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                | 0.079   | 0.09   | 2.285   | 0.16   | 14.967  | 5.32   | 0.268   | 0.35   | 215.625 | 61.12  | 0.046   | 0.00   | 5.36   | 16.12  |
| 013                | 0.027   | 0.03   | 3.211   | 0.80   | 36.375  | 15.00  | 0.128   | 0.03   | 169.950 | 155.10 | 0.064   | 0.02   | 12.73  | 41.16  |
| 014                | 0.097   | 0.05   | 1.863   | 1.29   | 45.253  | 1.78   | 0.618   | 0.03   | 121.266 | 18.28  | 0.037   | 0.03   | 1.89   | 4.76   |
| 015                | 0.039   | 999.99 | 2.414   | 999.99 | 12.553  | 999.99 | 0.097   | 999.99 | 79.181  | 999.99 | 0.048   | 999.99 | 999.99 | 999.99 |
| 016                | 0.051   | 0.07   | 1.300   | 0.25   | 18.635  | 7.19   | 0.217   | 0.32   | 92.600  | 2.80   | 0.026   | 0.00   | 1.05   | 2.06   |
| 017                | 0.030   | 0.01   | 2.185   | 0.13   | 8.664   | 4.73   | 0.087   | 0.01   | 56.048  | 10.30  | 0.044   | 0.00   | 1.16   | 2.91   |
| 018                | 0.026   | 0.03   | 2.095   | 0.72   | 16.759  | 5.79   | 0.321   | 0.05   | 94.190  | 8.17   | 0.042   | 0.01   | 1.22   | 2.50   |
| 019                | 0.102   | 0.07   | 2.941   | 0.35   | 30.581  | 3.60   | 0.429   | 0.64   | 230.400 | 62.32  | 0.059   | 0.01   | 5.19   | 16.48  |
| 020                | 0.046   | 0.01   | 1.539   | 0.39   | 16.003  | 4.03   | 0.062   | 0.02   | 102.724 | 44.07  | 0.031   | 0.01   | 3.67   | 11.76  |
| 021                | 0.038   | 999.99 | 2.391   | 999.99 | 12.431  | 999.99 | 0.191   | 999.99 | 93.712  | 999.99 | 0.048   | 999.99 | 999.99 | 999.99 |
| 022                | 0.060   | 0.05   | 2.719   | 0.00   | 10.875  | 6.53   | 0.381   | 0.33   | 66.881  | 29.36  | 0.054   | 0.00   | 2.66   | 7.83   |
| 023                | 0.469   | 0.42   | 3.504   | 0.54   | 53.907  | 11.15  | 0.507   | 0.50   | 515.431 | 177.41 | 0.070   | 0.01   | 15.03  | 46.86  |
| 024                | 0.041   | 0.02   | 2.531   | 0.28   | 10.294  | 7.20   | 0.149   | 0.08   | 74.081  | 14.29  | 0.051   | 0.01   | 1.70   | 4.08   |
| 025                | 0.061   | 999.99 | 2.180   | 999.99 | 17.438  | 999.99 | 0.349   | 999.99 | 139.500 | 999.99 | 0.044   | 999.99 | 999.99 | 999.99 |
| 026                | 0.034   | 0.03   | 2.449   | 0.07   | 12.736  | 0.37   | 0.247   | 0.30   | 101.147 | 36.21  | 0.049   | 0.00   | 2.75   | 9.63   |
| 027                | 0.025   | 0.02   | 0.828   | 0.52   | 12.983  | 1.84   | 0.204   | 0.32   | 69.828  | 16.76  | 0.017   | 0.01   | 1.75   | 4.43   |
| 028                | 0.013   | 0.01   | 2.172   | 0.36   | 27.517  | 18.39  | 0.087   | 0.01   | 108.259 | 9.41   | 0.043   | 0.01   | 2.54   | 5.41   |
| 030                | 0.144   | 0.11   | 2.341   | 0.85   | 27.021  | 3.52   | 0.706   | 1.19   | 167.638 | 47.48  | 0.066   | 0.02   | 4.37   | 12.49  |
| 031                | 0.063   | 0.04   | 1.957   | 0.21   | 18.131  | 6.64   | 0.396   | 0.20   | 133.491 | 145.52 | 0.039   | 0.00   | 11.23  | 38.69  |
| 032                | 0.088   | 0.07   | 4.172   | 0.75   | 51.563  | 42.38  | 0.531   | 0.76   | 70.763  | 119.70 | 0.083   | 0.02   | 12.22  | 32.88  |
| 033                | 0.030   | 0.01   | 2.145   | 0.02   | 11.152  | 0.12   | 0.258   | 0.35   | 48.504  | 92.74  | 0.043   | 0.00   | 6.89   | 24.71  |
| 034                | 0.028   | 0.00   | 2.004   | 0.54   | 7.992   | 7.66   | 0.206   | 0.13   | 43.116  | 2.57   | 0.092   | 0.09   | 0.83   | 2.08   |
| 035                | 0.040   | 0.01   | 2.473   | 0.54   | 12.858  | 2.80   | 0.275   | 0.33   | 79.359  | 3.62   | 0.049   | 0.01   | 0.64   | 1.12   |
| 036                | 0.046   | 0.03   | 1.922   | 0.00   | 9.994   | 0.00   | 0.192   | 0.23   | 73.800  | 52.27  | 0.038   | 0.00   | 3.88   | 13.93  |
| 037                | 0.021   | 0.02   | 2.625   | 0.00   | 6.825   | 1.05   | 0.210   | 0.21   | 47.775  | 17.85  | 0.053   | 0.00   | 1.45   | 4.73   |
| 038                | 0.027   | 0.00   | 2.275   | 0.40   | 8.860   | 3.86   | 0.240   | 0.31   | 55.940  | 1.00   | 0.046   | 0.01   | 0.56   | 1.00   |
| 039                | 0.010   | 0.00   | 1.738   | 0.38   | 4.555   | 1.67   | 0.194   | 0.23   | 39.070  | 11.18  | 0.035   | 0.01   | 1.05   | 2.95   |
| 040                | 0.057   | 0.01   | 2.871   | 0.63   | 14.930  | 3.29   | 0.319   | 0.38   | 82.172  | 29.46  | 0.057   | 0.01   | 2.54   | 7.79   |
| 041                | 0.021   | 0.02   | 2.191   | 0.30   | 20.344  | 8.06   | 0.432   | 0.11   | 91.594  | 12.56  | 0.044   | 0.01   | 1.75   | 3.77   |
| 042                | 0.040   | 0.06   | 1.688   | 0.63   | 8.775   | 3.25   | 0.068   | 0.03   | 62.600  | 6.80   | 0.048   | 0.01   | 0.86   | 1.91   |
| 043                | 0.082   | 0.14   | 2.838   | 0.22   | 10.940  | 8.80   | 0.881   | 1.54   | 49.490  | 18.74  | 0.057   | 0.00   | 2.17   | 5.30   |
| 044                | 0.047   | 0.01   | 2.625   | 0.00   | 6.825   | 1.05   | 0.210   | 0.21   | 65.100  | 29.40  | 0.053   | 0.00   | 2.25   | 7.82   |
| 045                | 0.037   | 0.02   | 2.612   | 0.47   | 13.583  | 2.42   | 0.370   | 0.17   | 104.172 | 58.14  | 0.052   | 0.01   | 4.49   | 15.45  |
| 080                | 0.012   | 0.00   | 3.065   | 0.18   | 114.983 | 72.93  | 0.123   | 0.01   | 257.793 | 39.72  | 0.061   | 0.00   | 8.67   | 21.26  |
| 081                | 0.025   | 0.03   | 1.775   | 0.55   | 18.100  | 3.40   | 0.311   | 0.46   | 124.800 | 45.60  | 0.036   | 0.01   | 3.78   | 12.07  |
| 082                | 0.010   | 999.99 | 2.509   | 999.99 | 26.090  | 999.99 | 0.100   | 999.99 | 120.414 | 999.99 | 0.050   | 999.99 | 999.99 | 999.99 |
| 083                | 0.004   | 999.99 | 0.957   | 999.99 | 15.310  | 999.99 | 0.038   | 999.99 | 141.621 | 999.99 | 0.019   | 999.99 | 999.99 | 999.99 |
| Ar. Mean           | 0.054   | 0.05   | 2.318   | 0.41   | 20.485  | 7.52   | 0.274   | 0.29   | 114.825 | 42.15  | 0.050   | 0.01   | 3.89   | 11.67  |
| Std. dev.          | 0.068   | 0.07   | 0.605   | 0.30   | 17.978  | 12.49  | 0.178   | 0.31   | 76.859  | 42.95  | 0.016   | 0.02   | 3.55   | 11.38  |

ARIZONA PUBLIC SERVICE  
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DEPOSITION DATA  
Comments and Messages Only

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

ARIZONA PUBLIC SERVICE  
MONTHLY REPORT for 8-90

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

Page 1

| Location<br>Number | Na      | d      | K       | d      | Ca      | d      | Mg      | d      | Cl      | d      | F       | d      | SO4     | d      | NO3     | d      |
|--------------------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|
| 001                | 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 |
| 002                | 0.807   | 0.04   | 0.349   | 0.01   | 0.577   | 0.01   | 0.428   | 0.36   | 1.019   | 0.04   | 0.067   | 0.01   | 0.935   | 0.15   | 0.111   | 0.21   |
| 003                | 1.022   | 0.11   | 0.726   | 0.59   | 2.555   | 0.27   | 1.452   | 1.08   | 1.426   | 0.27   | 0.134   | 0.00   | 1.076   | 0.00   | 0.013   | 0.00   |
| 004                | 0.241   | 0.04   | 0.438   | 0.01   | 2.744   | 0.41   | 0.732   | 0.03   | 0.355   | 0.16   | 0.177   | 0.08   | 0.355   | 0.16   | 0.018   | 0.01   |
| 005                | 0.334   | 999.99 | 0.418   | 999.99 | 2.340   | 999.99 | 0.652   | 999.99 | 0.334   | 999.99 | 0.209   | 999.99 | 0.418   | 999.99 | 0.021   | 999.99 |
| 006                | 0.373   | 0.06   | 0.534   | 0.38   | 2.123   | 0.07   | 1.009   | 0.55   | 0.503   | 0.20   | 0.208   | 0.01   | 1.063   | 1.32   | 0.333   | 0.63   |
| 007                | 0.327   | 0.11   | 0.511   | 0.07   | 0.972   | 1.10   | 0.782   | 0.22   | 0.474   | 0.00   | 0.150   | 0.18   | 0.486   | 0.02   | 0.265   | 0.02   |
| 008                | 0.479   | 0.05   | 0.395   | 0.12   | 1.663   | 0.30   | 0.576   | 0.18   | 0.428   | 0.35   | 0.399   | 0.04   | 0.798   | 0.09   | 0.040   | 0.00   |
| 009                | 0.709   | 0.07   | 0.868   | 0.00   | 2.265   | 0.67   | 1.784   | 0.10   | 0.868   | 0.00   | 0.275   | 0.07   | 0.551   | 0.14   | 0.154   | 0.26   |
| 010                | 0.720   | 0.01   | 0.718   | 0.57   | 2.160   | 0.32   | 1.442   | 1.41   | 0.864   | 0.30   | 0.360   | 0.00   | 0.720   | 0.01   | 0.036   | 0.00   |
| 011                | 0.678   | 0.12   | 1.287   | 0.22   | 5.116   | 1.54   | 2.120   | 0.41   | 0.756   | 0.04   | 0.378   | 0.02   | 0.756   | 0.04   | 0.181   | 0.29   |
| 012                | 0.554   | 0.02   | 1.315   | 0.09   | 4.571   | 0.17   | 2.284   | 0.05   | 0.314   | 0.22   | 0.346   | 0.01   | 0.693   | 0.03   | 0.035   | 0.00   |
| 013                | 0.460   | 0.11   | 1.073   | 0.26   | 4.801   | 0.69   | 1.925   | 0.61   | 0.399   | 0.28   | 0.383   | 0.09   | 0.766   | 0.18   | 0.038   | 0.01   |
| 014                | 1.576   | 999.99 | 0.577   | 999.99 | 2.960   | 999.99 | 1.076   | 999.99 | 1.768   | 999.99 | 0.096   | 999.99 | 1.153   | 999.99 | 0.010   | 999.99 |
| 015                | 0.295   | 0.04   | 0.642   | 0.18   | 2.030   | 0.09   | 1.125   | 0.26   | 0.313   | 0.21   | 0.304   | 0.08   | 0.607   | 0.17   | 0.030   | 0.01   |
| 016                | 1.453   | 0.30   | 0.486   | 0.09   | 2.275   | 0.06   | 1.093   | 0.09   | 1.580   | 0.37   | 0.049   | 0.02   | 1.143   | 0.04   | 0.005   | 0.00   |
| 017                | 0.477   | 0.07   | 0.802   | 0.50   | 0.809   | 0.25   | 0.998   | 0.51   | 0.573   | 0.06   | 0.120   | 0.10   | 0.560   | 0.02   | 0.020   | 0.03   |
| 018                | 0.437   | 0.06   | 0.404   | 0.01   | 0.471   | 0.01   | 0.515   | 0.06   | 0.571   | 0.05   | 0.168   | 0.00   | 0.336   | 0.01   | 0.090   | 0.15   |
| 019                | 0.698   | 0.04   | 2.278   | 0.40   | 1.727   | 0.39   | 3.150   | 0.27   | 0.840   | 0.12   | 0.121   | 0.02   | 0.485   | 0.07   | 0.046   | 0.00   |
| 020                | 1.880   | 0.39   | 0.536   | 0.13   | 0.444   | 0.06   | 0.399   | 0.12   | 2.129   | 0.07   | 0.142   | 0.05   | 1.934   | 0.18   | 0.151   | 0.14   |
| 021                | 0.286   | 0.01   | 0.388   | 0.05   | 0.529   | 0.31   | 0.591   | 0.19   | 1.174   | 1.54   | 0.102   | 0.00   | 0.928   | 1.45   | 0.108   | 0.20   |
| 022                | 0.304   | 0.06   | 0.360   | 0.17   | 0.221   | 0.22   | 0.274   | 0.29   | 0.360   | 0.17   | 0.138   | 0.00   | 0.415   | 0.28   | 0.134   | 0.24   |
| 023                | 1.228   | 0.43   | 3.801   | 1.28   | 3.105   | 2.67   | 6.234   | 4.63   | 1.172   | 0.32   | 0.297   | 0.04   | 0.594   | 0.08   | 0.100   | 0.02   |
| 024                | 0.326   | 0.02   | 0.812   | 0.05   | 1.379   | 1.63   | 1.272   | 0.38   | 0.326   | 0.02   | 0.271   | 0.02   | 0.543   | 0.04   | 0.027   | 0.00   |
| 025                | 0.252   | 999.99 | 0.839   | 999.99 | 2.265   | 999.99 | 1.426   | 999.99 | 0.336   | 999.99 | 0.210   | 999.99 | 0.420   | 999.99 | 0.021   | 999.99 |
| 026                | 0.282   | 999.99 | 0.377   | 999.99 | 1.036   | 999.99 | 0.471   | 999.99 | 0.377   | 999.99 | 0.235   | 999.99 | 0.471   | 999.99 | 0.179   | 999.99 |
| 027                | 0.238   | 0.06   | 0.549   | 0.36   | 1.013   | 0.77   | 1.013   | 0.77   | 0.264   | 0.00   | 0.149   | 0.03   | 0.297   | 0.07   | 0.015   | 0.00   |
| 028                | 0.318   | 999.99 | 0.318   | 999.99 | 1.325   | 999.99 | 0.488   | 999.99 | 0.371   | 999.99 | 0.133   | 999.99 | 0.265   | 999.99 | 0.276   | 999.99 |
| 030                | 0.676   | 0.01   | 1.038   | 0.06   | 1.312   | 1.07   | 1.375   | 0.95   | 0.899   | 0.05   | 0.226   | 0.03   | 0.453   | 0.07   | 0.023   | 0.00   |
| 031                | 0.301   | 999.99 | 0.552   | 999.99 | 0.753   | 999.99 | 0.753   | 999.99 | 0.401   | 999.99 | 0.125   | 999.99 | 0.502   | 999.99 | 0.055   | 999.99 |
| 032                | 0.677   | 0.04   | 1.039   | 0.22   | 3.637   | 3.67   | 2.055   | 0.15   | 0.356   | 0.22   | 0.350   | 0.12   | 0.701   | 0.24   | 0.035   | 0.01   |
| 033                | 0.254   | 0.05   | 0.312   | 0.07   | 0.630   | 0.68   | 0.477   | 0.02   | 0.278   | 0.14   | 0.159   | 0.03   | 0.463   | 0.23   | 0.250   | 0.03   |
| 034                | 0.267   | 0.05   | 0.267   | 0.05   | 0.587   | 0.56   | 0.457   | 0.32   | 0.297   | 0.02   | 0.167   | 0.03   | 0.334   | 0.06   | 0.243   | 0.04   |
| 035                | 0.292   | 0.04   | 0.531   | 0.02   | 0.956   | 1.01   | 0.774   | 0.27   | 0.213   | 0.11   | 0.243   | 0.04   | 0.486   | 0.07   | 0.024   | 0.00   |
| 036                | 0.159   | 0.03   | 0.269   | 0.03   | 0.177   | 0.01   | 0.379   | 0.11   | 0.208   | 0.02   | 0.061   | 0.06   | 0.215   | 0.07   | 0.110   | 0.20   |
| 037                | 0.266   | 0.03   | 0.476   | 0.06   | 0.720   | 0.68   | 0.794   | 0.20   | 0.325   | 0.02   | 0.149   | 0.02   | 0.297   | 0.04   | 0.015   | 0.00   |
| 038                | 0.318   | 0.00   | 0.322   | 0.09   | 0.235   | 0.27   | 0.254   | 0.28   | 0.344   | 0.05   | 0.084   | 0.10   | 0.349   | 0.17   | 0.056   | 0.09   |
| 039                | 0.326   | 0.02   | 0.429   | 0.08   | 0.258   | 0.05   | 0.325   | 0.02   | 0.344   | 0.02   | 0.086   | 0.00   | 0.344   | 0.02   | 0.038   | 0.06   |
| 040                | 0.244   | 0.16   | 0.812   | 0.32   | 2.439   | 0.30   | 1.381   | 0.44   | 0.244   | 0.00   | 0.407   | 0.00   | 0.813   | 0.01   | 0.041   | 0.00   |
| 041                | 0.480   | 0.10   | 0.331   | 0.05   | 1.322   | 0.21   | 0.674   | 0.22   | 0.625   | 0.03   | 0.184   | 0.01   | 0.369   | 0.02   | 0.165   | 0.20   |
| 042                | 0.333   | 0.14   | 0.258   | 0.09   | 0.242   | 0.32   | 0.269   | 0.41   | 0.425   | 0.15   | 0.208   | 0.09   | 0.499   | 0.01   | 0.015   | 0.02   |
| 043                | 0.573   | 0.21   | 0.526   | 0.31   | 0.573   | 0.21   | 0.531   | 0.30   | 0.779   | 0.25   | 0.258   | 0.05   | 0.516   | 0.10   | 0.138   | 0.11   |
| 044                | 0.319   | 0.02   | 0.716   | 0.12   | 2.471   | 0.01   | 1.137   | 0.20   | 0.239   | 0.01   | 0.399   | 0.02   | 0.798   | 0.05   | 0.040   | 0.00   |
| 045                | 0.451   | 0.18   | 0.343   | 0.04   | 0.469   | 0.36   | 0.291   | 0.21   | 0.551   | 0.09   | 0.158   | 0.05   | 0.316   | 0.09   | 0.116   | 0.20   |
| 080                | 4.816   | 1.22   | 1.746   | 0.32   | 18.619  | 2.83   | 5.257   | 2.31   | 1.345   | 0.49   | 0.291   | 0.08   | 2.826   | 0.36   | 0.029   | 0.01   |
| 081                | 3.650   | 0.71   | 0.532   | 0.15   | 2.053   | 1.06   | 0.925   | 0.38   | 3.852   | 1.12   | 0.095   | 0.06   | 2.788   | 0.51   | 0.010   | 0.01   |
| 082                | 0.504   | 0.03   | 0.432   | 0.02   | 0.650   | 0.18   | 0.600   | 0.15   | 0.576   | 0.03   | 0.180   | 0.01   | 0.360   | 0.02   | 0.153   | 0.27   |
| 083                | 1.359   | 0.78   | 0.473   | 0.08   | 1.946   | 0.02   | 0.919   | 0.16   | 1.422   | 0.17   | 0.263   | 0.01   | 1.053   | 0.05   | 0.234   | 0.42   |
| Ar. Mean           | 0.703   | 0.15   | 0.706   | 0.19   | 1.990   | 0.62   | 1.169   | 0.48   | 0.715   | 0.19   | 0.207   | 0.04   | 0.707   | 0.16   | 0.090   | 0.09   |
| Std. Dev.          | 0.854   | 0.24   | 0.607   | 0.23   | 2.767   | 0.81   | 1.156   | 0.79   | 0.653   | 0.29   | 0.101   | 0.04   | 0.549   | 0.30   | 0.086   | 0.14   |

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

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| Location<br>Number | PO4     | d      | CO3     | d      | HCO3    | d      | NH3     | d      | TSS     | d      | CU      | d      | Av d   | SD(d)  |
|--------------------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|--------|--------|
| 001                | 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 |
| 002                | 0.019   | 0.03   | 0.674   | 0.08   | 6.023   | 0.61   | 0.166   | 0.28   | 58.523  | 25.92  | 0.013   | 0.00   | 1.98   | 6.89   |
| 003                | 0.005   | 0.00   | 1.345   | 0.00   | 11.297  | 2.15   | 0.054   | 0.00   | 145.241 | 107.59 | 0.027   | 0.00   | 8.00   | 28.67  |
| 004                | 0.007   | 0.00   | 1.775   | 0.79   | 13.211  | 6.56   | 0.071   | 0.03   | 62.057  | 30.39  | 0.035   | 0.02   | 2.76   | 8.13   |
| 005                | 0.008   | 999.99 | 2.089   | 999.99 | 10.029  | 999.99 | 0.084   | 999.99 | 48.471  | 999.99 | 0.042   | 999.99 | 999.99 | 999.99 |
| 006                | 0.026   | 0.04   | 2.083   | 0.15   | 9.193   | 2.31   | 0.170   | 0.18   | 100.784 | 87.72  | 0.063   | 0.05   | 6.69   | 23.33  |
| 007                | 0.028   | 0.04   | 1.500   | 1.76   | 7.862   | 3.31   | 0.391   | 0.21   | 72.538  | 11.01  | 0.049   | 0.00   | 1.29   | 2.95   |
| 008                | 0.016   | 0.00   | 3.990   | 0.43   | 16.134  | 8.12   | 0.160   | 0.02   | 45.853  | 10.93  | 0.080   | 0.01   | 1.47   | 3.46   |
| 009                | 0.048   | 0.08   | 2.754   | 0.68   | 11.981  | 0.79   | 0.172   | 0.15   | 114.984 | 17.53  | 0.128   | 0.13   | 1.48   | 4.63   |
| 010                | 0.036   | 0.04   | 3.598   | 0.05   | 11.531  | 5.91   | 0.144   | 0.00   | 96.127  | 87.97  | 0.072   | 0.00   | 6.90   | 23.38  |
| 011                | 0.093   | 0.16   | 3.779   | 0.20   | 19.533  | 8.03   | 0.384   | 0.47   | 142.341 | 25.63  | 0.076   | 0.00   | 2.66   | 6.94   |
| 012                | 0.014   | 0.00   | 3.463   | 0.13   | 25.638  | 2.34   | 0.139   | 0.01   | 214.570 | 5.86   | 0.069   | 0.00   | 0.64   | 1.62   |
| 013                | 0.024   | 0.02   | 3.832   | 0.91   | 19.069  | 3.04   | 0.153   | 0.04   | 102.403 | 5.79   | 0.077   | 0.02   | 0.86   | 1.62   |
| 014                | 0.004   | 999.99 | 0.961   | 999.99 | 12.684  | 999.99 | 0.038   | 999.99 | 73.031  | 999.99 | 0.038   | 999.99 | 999.99 | 999.99 |
| 015                | 0.044   | 0.06   | 3.035   | 0.84   | 15.091  | 3.00   | 0.226   | 0.18   | 89.602  | 29.86  | 0.061   | 0.02   | 2.50   | 7.91   |
| 016                | 0.002   | 0.00   | 0.491   | 0.18   | 10.513  | 1.78   | 0.129   | 0.16   | 69.026  | 3.05   | 0.020   | 0.01   | 0.44   | 0.88   |
| 017                | 0.031   | 0.01   | 0.700   | 0.03   | 15.792  | 2.51   | 0.124   | 0.19   | 169.200 | 140.40 | 0.014   | 0.00   | 10.34  | 37.44  |
| 018                | 0.007   | 0.00   | 1.681   | 0.04   | 5.395   | 2.81   | 0.067   | 0.00   | 76.205  | 20.49  | 0.034   | 0.00   | 1.69   | 5.46   |
| 019                | 0.094   | 0.01   | 1.213   | 0.17   | 32.095  | 0.29   | 0.048   | 0.01   | 305.050 | 97.10  | 0.024   | 0.00   | 7.06   | 25.91  |
| 020                | 0.041   | 0.03   | 1.420   | 0.54   | 11.711  | 2.23   | 0.445   | 0.22   | 71.679  | 5.14   | 0.028   | 0.01   | 0.66   |        |
| 021                | 0.045   | 0.01   | 1.022   | 0.03   | 9.197   | 0.64   | 0.289   | 0.42   | 63.310  | 2.48   | 0.031   | 0.02   | 0.52   |        |
| 022                | 0.014   | 0.02   | 1.384   | 0.00   | 6.088   | 1.11   | 0.166   | 0.22   | 66.414  | 0.00   | 0.042   | 0.03   | 0.20   | 0.28   |
| 023                | 0.212   | 0.20   | 2.969   | 0.39   | 54.393  | 0.01   | 0.538   | 0.19   | 606.775 | 429.25 | 0.087   | 0.05   | 31.40  | 114.52 |
| 024                | 0.011   | 0.00   | 2.713   | 0.20   | 11.897  | 1.29   | 0.109   | 0.01   | 119.766 | 30.47  | 0.054   | 0.00   | 2.44   | 8.08   |
| 025                | 0.042   | 999.99 | 2.098   | 999.99 | 10.069  | 999.99 | 0.252   | 999.99 | 167.813 | 999.99 | 0.084   | 999.99 | 999.99 | 999.99 |
| 026                | 0.009   | 999.99 | 2.353   | 999.99 | 7.531   | 999.99 | 0.377   | 999.99 | 71.545  | 999.99 | 0.047   | 999.99 | 999.99 | 999.99 |
| 027                | 0.006   | 0.00   | 1.487   | 0.35   | 7.923   | 0.10   | 0.059   | 0.01   | 103.875 | 71.25  | 0.030   | 0.01   | 5.27   | 18.99  |
| 028                | 0.164   | 999.99 | 1.325   | 999.99 | 16.430  | 999.99 | 0.159   | 999.99 | 63.600  | 999.99 | 0.027   | 999.99 | 999.99 | 999.99 |
| 030                | 0.046   | 0.02   | 2.263   | 0.33   | 22.915  | 1.21   | 0.139   | 0.11   | 174.850 | 19.90  | 0.045   | 0.01   | 1.70   | 5.26   |
| 031                | 0.045   | 999.99 | 1.254   | 999.99 | 16.557  | 999.99 | 0.452   | 999.99 | 95.328  | 999.99 | 0.025   | 999.99 | 999.99 | 999.99 |
| 032                | 0.050   | 0.03   | 3.504   | 1.19   | 29.304  | 0.42   | 0.257   | 0.19   | 218.457 | 87.78  | 0.070   | 0.02   | 6.74   | 23.34  |
| 033                | 0.024   | 0.03   | 1.591   | 0.28   | 7.810   | 1.76   | 0.492   | 0.29   | 54.859  | 29.32  | 0.032   | 0.01   | 2.35   | 7.77   |
| 034                | 0.013   | 0.01   | 1.668   | 0.28   | 5.948   | 0.31   | 0.431   | 0.01   | 49.376  | 8.42   | 0.051   | 0.04   | 0.73   | 2.22   |
| 035                | 0.010   | 0.00   | 2.431   | 0.36   | 8.679   | 0.64   | 0.097   | 0.01   | 90.248  | 17.50  | 0.049   | 0.01   | 1.44   | 4.63   |
| 036                | 0.006   | 0.01   | 0.608   | 0.59   | 4.267   | 2.33   | 0.176   | 0.15   | 53.276  | 5.17   | 0.034   | 0.03   | 0.63   | 1.44   |
| 037                | 0.050   | 0.01   | 1.487   | 0.18   | 8.922   | 1.09   | 0.416   | 0.05   | 92.379  | 17.17  | 0.091   | 0.07   | 1.40   | 4.55   |
| 038                | 0.018   | 0.01   | 0.841   | 0.96   | 6.921   | 5.15   | 0.152   | 0.01   | 53.379  | 19.86  | 0.020   | 0.01   | 1.93   | 5.33   |
| 039                | 0.014   | 0.02   | 0.860   | 0.04   | 8.286   | 3.12   | 0.172   | 0.01   | 89.948  | 102.52 | 0.034   | 0.00   | 7.57   | 27.34  |
| 040                | 0.041   | 0.02   | 4.066   | 0.05   | 8.565   | 9.04   | 0.163   | 0.00   | 125.105 | 47.35  | 0.081   | 0.00   | 4.12   | 12.67  |
| 041                | 0.018   | 0.01   | 1.843   | 0.12   | 8.775   | 3.86   | 0.366   | 0.12   | 49.647  | 3.49   | 0.037   | 0.00   | 0.60   | 1.31   |
| 042                | 0.008   | 0.00   | 1.461   | 2.09   | 2.082   | 0.85   | 0.058   | 0.08   | 36.745  | 9.27   | 0.166   | 0.23   | 0.98   | 2.45   |
| 043                | 0.101   | 0.18   | 2.580   | 0.50   | 9.691   | 10.07  | 0.670   | 1.15   | 59.524  | 25.94  | 0.052   | 0.01   | 2.82   | 7.16   |
| 044                | 0.016   | 0.00   | 3.990   | 0.25   | 14.414  | 4.08   | 0.160   | 0.01   | 95.470  | 13.25  | 0.080   | 0.00   | 1.29   | 3.61   |
| 045                | 0.028   | 0.05   | 1.581   | 0.46   | 11.655  | 2.79   | 0.172   | 0.24   | 68.450  | 3.50   | 0.032   | 0.01   | 0.59   | 1.10   |
| 080                | 0.012   | 0.00   | 2.906   | 0.80   | 65.818  | 4.61   | 0.116   | 0.03   | 369.161 | 103.18 | 0.058   | 0.02   | 8.30   | 27.34  |
| 081                | 0.004   | 0.00   | 0.950   | 0.63   | 8.617   | 3.04   | 0.038   | 0.03   | 93.776  | 35.48  | 0.025   | 0.00   | 3.08   |        |
| 082                | 0.032   | 0.05   | 1.801   | 0.09   | 9.054   | 4.07   | 0.177   | 0.21   | 83.143  | 25.93  | 0.036   | 0.00   | 2.22   |        |
| 083                | 0.031   | 0.02   | 2.632   | 0.12   | 12.070  | 2.60   | 0.318   | 0.23   | 62.036  | 3.47   | 0.053   | 0.00   | 0.58   |        |
| Ar.Mean            | 0.034   | 0.03   | 2.044   | 0.42   | 14.014  | 2.93   | 0.216   | 0.14   | 113.531 | 44.50  | 0.052   | 0.02   | 3.57   | 11.91  |
| Std.dev.           | 0.040   | 0.05   | 1.028   | 0.46   | 11.630  | 2.52   | 0.150   | 0.20   | 98.625  | 71.73  | 0.030   | 0.04   | 5.19   | 19.10  |



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DEPOSITION DATA  
Comments and Messages Only

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| Location<br>Number | Sample A Comments                 | Sample B Comments                 | Processing Messages    |
|--------------------|-----------------------------------|-----------------------------------|------------------------|
| 001                | VOID/CONTAINER DRY,SCREEN MISSING | VOID/CONTAINER DRY,SCREEN MISSING | MISSING SAMPLE A and B |
| 002                |                                   |                                   |                        |
| 003                |                                   |                                   |                        |
| 004                |                                   |                                   |                        |
| 005                |                                   | VOID/POSSIBLE CONTAMINATION       | MISSING SAMPLE B       |
| 006                |                                   |                                   |                        |
| 007                |                                   |                                   |                        |
| 008                |                                   |                                   |                        |
| 009                | SCREEN IN CONTAINER               | SCREEN IN CONTAINER               |                        |
| 010                |                                   |                                   |                        |
| 011                |                                   |                                   |                        |
| 012                |                                   |                                   |                        |
| 013                |                                   |                                   |                        |
| 014                | VOID/CONTAINER DRY,SCREEN MISSING | BIRD DROPPINGS ON SCREEN          | MISSING SAMPLE A       |
| 015                |                                   |                                   |                        |
| 016                |                                   |                                   |                        |
| 017                |                                   |                                   |                        |
| 018                |                                   |                                   |                        |
| 019                |                                   |                                   |                        |
| 020                |                                   |                                   |                        |
| 023                |                                   |                                   |                        |
| 024                |                                   |                                   |                        |
| 025                | SCREEN IN CONTAINER               | VOID/DEAD BIRD IN CONTAINER       | MISSING SAMPLE B       |
| 026                | VOID/DEAD BIRD IN CONTAINER       |                                   | MISSING SAMPLE A       |
| 027                |                                   |                                   |                        |
| 028                |                                   | VOID/CONTAINER DRY                | MISSING SAMPLE B       |
| 030                |                                   |                                   |                        |
| 031                | VOID/CONTAINER DRY                |                                   | MISSING SAMPLE A       |
| 032                |                                   |                                   |                        |
| 033                |                                   |                                   |                        |
| 034                |                                   |                                   |                        |
| 035                |                                   | LIQUID GREEN                      |                        |
| 036                | CONTAINER ALMOST DRY              |                                   |                        |
| 037                |                                   |                                   |                        |
| 038                |                                   |                                   |                        |
| 039                |                                   |                                   |                        |
| 040                |                                   |                                   |                        |
| 041                |                                   |                                   |                        |
| 042                |                                   | SCREEN IN CONTAINER               |                        |
| 043                |                                   |                                   |                        |
| 044                |                                   |                                   |                        |
| 045                |                                   |                                   |                        |
| 080                | LIQUID DIRTY                      |                                   |                        |
| 081                |                                   |                                   |                        |
| 082                |                                   |                                   |                        |



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

Page 1

| Location<br>Number | Na      | d      | K       | d      | Ca      | d      | Mg      | d      | Cl      | d      | F       | d      | SO4     | d      | NO3     | d      |
|--------------------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|
| 001                | 0.666   | 0.02   | 0.299   | 0.06   | 1.726   | 0.47   | 0.427   | 0.07   | 1.278   | 0.39   | 0.374   | 0.07   | 1.086   | 0.54   | 0.372   | 0.04   |
| 002                | 0.534   | 0.36   | 0.178   | 0.00   | 1.335   | 0.18   | 0.142   | 0.00   | 0.801   | 0.18   | 0.445   | 0.00   | 0.890   | 0.00   | 0.312   | 0.09   |
| 003                | 1.086   | 0.31   | 0.630   | 0.51   | 2.727   | 0.14   | 0.622   | 0.39   | 1.450   | 0.29   | 0.455   | 0.02   | 0.909   | 0.05   | 0.125   | 0.16   |
| 004                | 0.504   | 0.17   | 0.203   | 0.01   | 1.421   | 0.08   | 0.173   | 0.07   | 0.305   | 0.02   | 0.507   | 0.03   | 1.015   | 0.06   | 0.171   | 0.09   |
| 005                | 0.494   | 0.24   | 0.196   | 0.02   | 1.278   | 0.30   | 0.216   | 0.02   | 0.435   | 0.26   | 0.490   | 0.04   | 0.980   | 0.08   | 0.049   | 0.00   |
| 006                | 0.632   | 0.02   | 0.159   | 0.11   | 0.949   | 0.24   | 0.053   | 0.00   | 1.225   | 1.83   | 0.526   | 0.02   | 1.052   | 0.03   | 0.242   | 0.03   |
| 007                | 0.404   | 0.17   | 0.201   | 0.24   | 2.420   | 0.62   | 0.258   | 0.13   | 0.363   | 0.24   | 0.404   | 0.00   | 0.807   | 0.01   | 0.267   | 0.08   |
| 008                | 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 |
| 009                | 1.010   | 999.99 | 0.337   | 999.99 | 2.189   | 999.99 | 0.387   | 999.99 | 1.179   | 999.99 | 0.421   | 999.99 | 0.842   | 999.99 | 0.269   | 999.99 |
| 010                | 0.755   | 0.32   | 0.240   | 0.12   | 2.107   | 0.56   | 0.393   | 0.02   | 0.738   | 0.01   | 0.415   | 0.08   | 0.830   | 0.17   | 0.308   | 0.08   |
| 011                | 0.848   | 0.49   | 0.424   | 0.24   | 4.117   | 1.59   | 0.329   | 0.33   | 0.719   | 0.07   | 0.359   | 0.04   | 0.719   | 0.07   | 0.120   | 0.09   |
| 012                | 0.377   | 0.14   | 0.534   | 0.47   | 2.346   | 0.08   | 0.495   | 0.39   | 0.227   | 0.01   | 0.379   | 0.01   | 0.757   | 0.02   | 0.038   | 0.00   |
| 013                | 0.637   | 0.11   | 0.734   | 0.08   | 3.765   | 0.60   | 0.798   | 0.11   | 0.492   | 0.40   | 0.458   | 0.05   | 0.917   | 0.10   | 0.046   | 0.01   |
| 014                | 1.238   | 0.33   | 0.267   | 0.18   | 3.542   | 0.08   | 0.434   | 0.06   | 1.240   | 0.03   | 0.443   | 0.01   | 0.885   | 0.02   | 0.044   | 0.00   |
| 015                | 0.317   | 0.47   | 0.267   | 0.20   | 1.485   | 0.03   | 0.299   | 0.06   | 0.263   | 0.03   | 0.438   | 0.04   | 0.876   | 0.09   | 0.044   | 0.00   |
| 016                | 1.275   | 0.76   | 0.323   | 0.35   | 2.392   | 1.50   | 0.523   | 0.51   | 1.325   | 0.33   | 0.393   | 0.04   | 0.786   | 0.08   | 0.088   | 0.09   |
| 017                | 0.548   | 0.09   | 0.576   | 0.85   | 1.375   | 1.41   | 0.217   | 0.14   | 0.446   | 0.45   | 0.395   | 0.05   | 0.790   | 0.09   | 0.039   | 0.00   |
| 018                | 0.836   | 0.02   | 0.335   | 0.01   | 2.340   | 0.28   | 0.367   | 0.16   | 0.754   | 0.18   | 0.418   | 0.01   | 0.836   | 0.02   | 0.042   | 0.00   |
| 019                | 1.003   | 0.19   | 1.367   | 0.18   | 6.563   | 0.76   | 1.667   | 0.30   | 0.911   | 0.00   | 0.456   | 0.00   | 0.911   | 0.00   | 0.155   | 0.09   |
| 020                | 2.788   | 0.34   | 0.542   | 0.04   | 2.514   | 0.54   | 0.517   | 0.20   | 3.243   | 0.13   | 0.451   | 0.03   | 1.805   | 0.13   | 0.207   | 0.00   |
|                    | 0.249   | 0.17   | 0.249   | 0.17   | 1.074   | 0.14   | 0.241   | 0.16   | 0.496   | 0.01   | 0.414   | 0.01   | 0.827   | 0.02   | 0.041   | 0.00   |
|                    | 0.454   | 0.01   | 0.228   | 0.16   | 1.136   | 0.18   | 0.281   | 0.11   | 0.339   | 0.22   | 0.378   | 0.01   | 0.757   | 0.02   | 0.243   | 0.07   |
| 023                | 0.742   | 0.63   | 1.715   | 0.45   | 10.560  | 3.13   | 2.354   | 0.58   | 0.973   | 0.18   | 0.486   | 0.09   | 0.973   | 0.18   | 0.049   | 0.01   |
| 024                | 0.534   | 0.02   | 0.266   | 0.17   | 1.334   | 0.13   | 0.230   | 0.21   | 0.403   | 0.28   | 0.445   | 0.01   | 0.890   | 0.03   | 0.045   | 0.00   |
| 025                | 0.290   | 0.02   | 0.361   | 0.13   | 1.597   | 0.09   | 0.386   | 0.12   | 0.218   | 0.01   | 0.363   | 0.02   | 0.726   | 0.04   | 0.036   | 0.00   |
| 026                | 0.853   | 1.07   | 0.245   | 0.14   | 1.327   | 0.13   | 0.156   | 0.03   | 0.920   | 1.32   | 0.415   | 0.04   | 0.829   | 0.08   | 0.124   | 0.16   |
| 027                | 0.818   | 0.20   | 0.274   | 0.19   | 1.179   | 0.15   | 0.181   | 0.03   | 0.813   | 0.52   | 0.454   | 0.01   | 0.908   | 0.03   | 0.045   | 0.00   |
| 028                | 0.392   | 0.11   | 0.266   | 0.36   | 4.635   | 3.55   | 0.335   | 0.43   | 0.350   | 0.19   | 0.397   | 0.05   | 0.793   | 0.10   | 0.040   | 0.00   |
| 030                | 0.615   | 0.25   | 0.783   | 1.40   | 3.111   | 0.29   | 0.583   | 0.61   | 0.696   | 0.09   | 0.435   | 0.06   | 0.870   | 0.11   | 0.095   | 0.11   |
| 031                | 6.274   | 0.76   | 0.314   | 0.35   | 2.410   | 0.05   | 0.746   | 0.03   | 3.026   | 0.44   | 0.378   | 0.06   | 7.456   | 1.92   | 0.175   | 0.27   |
| 032                | 3.168   | 0.67   | 0.375   | 0.38   | 1.585   | 0.15   | 0.271   | 0.03   | 3.260   | 0.86   | 0.467   | 0.01   | 3.732   | 0.09   | 0.180   | 0.27   |
| 033                | 5.053   | 0.31   | 0.139   | 0.01   | 1.524   | 0.14   | 0.233   | 0.09   | 2.704   | 0.38   | 0.346   | 0.03   | 6.203   | 0.83   | 0.287   | 0.15   |
| 034                | 0.518   | 0.19   | 0.147   | 0.01   | 0.881   | 0.08   | 0.150   | 0.16   | 0.220   | 0.02   | 0.367   | 0.03   | 0.735   | 0.07   | 0.256   | 0.02   |
| 035                | 0.252   | 0.20   | 0.317   | 0.28   | 0.985   | 0.14   | 0.257   | 0.13   | 0.246   | 0.03   | 0.410   | 0.06   | 0.821   | 0.11   | 0.100   | 0.05   |
| 036                | 0.403   | 0.32   | 0.202   | 0.16   | 0.719   | 0.03   | 0.193   | 0.09   | 0.596   | 0.21   | 0.329   | 0.04   | 0.657   | 0.09   | 0.235   | 0.02   |
| 037                | 3.291   | 0.09   | 0.124   | 0.09   | 1.071   | 0.19   | 0.157   | 0.05   | 3.124   | 0.25   | 0.411   | 0.01   | 4.937   | 0.13   | 0.354   | 0.03   |
| 038                | 0.344   | 0.02   | 0.130   | 0.09   | 1.460   | 0.10   | 0.180   | 0.04   | 0.479   | 0.45   | 0.430   | 0.02   | 0.860   | 0.04   | 0.319   | 0.07   |
| 039                | 0.339   | 0.01   | 0.169   | 0.01   | 1.014   | 0.31   | 0.186   | 0.01   | 0.383   | 0.27   | 0.424   | 0.01   | 0.847   | 0.03   | 0.163   | 0.24   |
| 040                | 0.277   | 0.05   | 0.214   | 0.18   | 1.121   | 0.49   | 0.246   | 0.12   | 0.613   | 0.77   | 0.346   | 0.07   | 0.692   | 0.14   | 0.035   | 0.01   |
| 041                | 0.538   | 0.10   | 0.155   | 0.02   | 1.467   | 0.01   | 0.229   | 0.10   | 0.619   | 0.06   | 0.387   | 0.04   | 0.774   | 0.08   | 0.317   | 0.02   |
| 042                | 0.366   | 0.14   | 0.147   | 0.00   | 0.954   | 0.12   | 0.161   | 0.02   | 0.401   | 0.36   | 0.367   | 0.01   | 0.735   | 0.02   | 0.183   | 0.07   |
| 043                | 5.534   | 1.83   | 0.708   | 0.43   | 1.982   | 0.33   | 0.408   | 0.11   | 3.191   | 0.55   | 0.398   | 0.03   | 7.906   | 2.61   | 0.279   | 0.04   |
| 044                | 0.337   | 0.03   | 0.505   | 0.05   | 1.427   | 0.04   | 0.569   | 0.12   | 0.373   | 0.22   | 0.421   | 0.04   | 0.842   | 0.08   | 0.042   | 0.00   |
| 045                | 0.341   | 0.32   | 0.696   | 0.05   | 9.290   | 0.49   | 0.775   | 0.51   | 0.387   | 0.23   | 0.435   | 0.03   | 0.870   | 0.07   | 0.146   | 0.08   |
| 080                | 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 |
| 081                | 4.580   | 0.60   | 0.490   | 0.32   | 3.762   | 0.61   | 0.563   | 0.44   | 3.191   | 0.20   | 0.409   | 0.00   | 4.086   | 1.59   | 0.041   | 0.00   |
| 082                | 1.972   | 0.33   | 0.392   | 0.38   | 3.236   | 2.45   | 0.517   | 0.71   | 2.564   | 0.30   | 0.494   | 0.02   | 0.988   | 0.03   | 0.049   | 0.00   |
|                    | 1.537   | 0.08   | 0.304   | 0.18   | 3.082   | 0.25   | 0.402   | 0.38   | 2.055   | 0.17   | 0.514   | 0.04   | 1.027   | 0.08   | 0.051   | 0.00   |
| Ar. Mean           | 1.218   | 0.29   | 0.385   | 0.22   | 2.402   | 0.52   | 0.420   | 0.19   | 1.088   | 0.30   | 0.421   | 0.03   | 1.509   | 0.23   | 0.149   | 0.06   |
| Std. Dev.          | 1.482   | 0.34   | 0.307   | 0.25   | 2.004   | 0.79   | 0.394   | 0.19   | 0.987   | 0.34   | 0.046   | 0.02   | 1.757   | 0.52   | 0.108   | 0.07   |

## ARIZONA PUBLIC SERVICE

MONTHLY REPORT for 9-90

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

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| Location<br>Number | PO4     | d      | CO3     | d      | HCO3    | d      | NH3     | d      | TSS     | d      | CU      | d      | Av d   | SD(d)  |
|--------------------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|--------|--------|
| 001                | 0.048   | 0.07   | 3.738   | 0.70   | 3.738   | 0.70   | 0.217   | 0.11   | 42.915  | 17.14  | 0.075   | 0.01   | 1.46   | 4.52   |
| 002                | 0.018   | 0.00   | 4.452   | 0.00   | 4.452   | 0.00   | 0.178   | 0.00   | 33.832  | 32.05  | 0.089   | 0.00   | 2.35   | 8.55   |
| 003                | 0.018   | 0.00   | 4.545   | 0.23   | 4.545   | 0.23   | 0.182   | 0.01   | 77.409  | 57.91  | 0.091   | 0.00   | 4.30   | 15.43  |
| 004                | 0.020   | 0.00   | 5.075   | 0.30   | 5.075   | 0.30   | 0.203   | 0.01   | 46.630  | 1.30   | 0.102   | 0.01   | 0.18   | 0.34   |
| 005                | 0.020   | 0.00   | 4.899   | 0.41   | 4.899   | 0.41   | 0.196   | 0.02   | 42.948  | 4.22   | 0.098   | 0.01   | 0.43   | 1.10   |
| 006                | 0.021   | 0.00   | 5.262   | 0.17   | 5.262   | 0.17   | 0.210   | 0.01   | 25.470  | 26.10  | 0.105   | 0.00   | 2.05   | 6.94   |
| 007                | 0.016   | 0.00   | 4.037   | 0.04   | 4.037   | 0.04   | 0.161   | 0.00   | 29.779  | 33.58  | 0.081   | 0.00   | 2.51   | 8.94   |
| 008                | 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 |
| 009                | 0.034   | 999.99 | 4.210   | 999.99 | 4.210   | 999.99 | 0.168   | 999.99 | 26.942  | 999.99 | 0.084   | 999.99 | 999.99 | 999.99 |
| 010                | 0.017   | 0.00   | 4.149   | 0.85   | 4.149   | 0.85   | 0.166   | 0.03   | 44.777  | 23.71  | 0.083   | 0.02   | 1.92   | 6.28   |
| 011                | 0.044   | 0.03   | 3.593   | 0.36   | 13.544  | 2.93   | 0.144   | 0.01   | 21.876  | 13.56  | 0.072   | 0.01   | 1.42   | 3.59   |
| 012                | 0.015   | 0.00   | 3.786   | 0.12   | 3.786   | 0.12   | 0.151   | 0.00   | 71.158  | 0.75   | 0.076   | 0.00   | 0.15   | 0.23   |
| 013                | 0.018   | 0.00   | 4.585   | 0.51   | 9.907   | 11.15  | 0.183   | 0.02   | 50.739  | 16.32  | 0.092   | 0.01   | 2.11   | 5.03   |
| 014                | 0.018   | 0.00   | 4.427   | 0.10   | 14.168  | 0.31   | 0.177   | 0.00   | 39.116  | 29.19  | 0.089   | 0.00   | 2.16   | 7.78   |
| 015                | 0.165   | 0.30   | 4.379   | 0.44   | 4.379   | 0.44   | 0.175   | 0.02   | 47.032  | 5.81   | 0.088   | 0.01   | 0.57   | 1.52   |
| 016                | 0.016   | 0.00   | 3.932   | 0.41   | 3.932   | 0.41   | 0.157   | 0.02   | 49.164  | 20.80  | 0.079   | 0.01   | 1.81   | 5.48   |
| 017                | 0.041   | 0.05   | 3.949   | 0.47   | 3.949   | 0.47   | 0.409   | 0.52   | 19.327  | 14.87  | 0.079   | 0.01   | 1.39   | 3.90   |
| 018                | 0.017   | 0.00   | 4.182   | 0.09   | 4.182   | 0.09   | 0.167   | 0.00   | 33.491  | 7.42   | 0.084   | 0.00   | 0.59   | 1.97   |
| 019                | 0.128   | 0.00   | 4.557   | 0.02   | 22.782  | 1.71   | 0.365   | 0.00   | 109.336 | 21.33  | 0.091   | 0.00   | 1.76   | 5.65   |
| 020                | 0.018   | 0.00   | 4.513   | 0.33   | 4.513   | 0.33   | 0.181   | 0.01   | 29.140  | 16.52  | 0.090   | 0.01   | 1.33   | 3.43   |
| 021                | 0.017   | 0.00   | 4.136   | 0.11   | 4.136   | 0.11   | 0.165   | 0.00   | 8.746   | 9.33   | 0.083   | 0.00   | 0.73   | 2.43   |
| 022                | 0.015   | 0.00   | 3.783   | 0.11   | 3.783   | 0.11   | 0.151   | 0.00   | 30.353  | 12.99  | 0.076   | 0.00   | 1.00   | 3.43   |
| 023                | 0.108   | 0.04   | 4.864   | 0.91   | 18.532  | 26.43  | 0.195   | 0.04   | 161.909 | 43.02  | 0.097   | 0.02   | 5.41   | 12.86  |
| 024                | 0.018   | 0.00   | 4.452   | 0.15   | 9.430   | 10.10  | 0.178   | 0.01   | 24.757  | 20.55  | 0.089   | 0.00   | 2.26   | 5.90   |
| 025                | 0.015   | 0.00   | 3.629   | 0.19   | 7.727   | 8.39   | 0.145   | 0.01   | 42.135  | 5.15   | 0.073   | 0.00   | 1.01   | 2.52   |
| 026                | 0.017   | 0.00   | 4.147   | 0.40   | 4.147   | 0.40   | 0.166   | 0.02   | 4.147   | 0.40   | 0.083   | 0.01   | 0.30   | 0.41   |
| 027                | 0.018   | 0.00   | 4.538   | 0.13   | 4.538   | 0.13   | 0.182   | 0.01   | 35.305  | 11.73  | 0.091   | 0.00   | 0.94   | 3.11   |
| 028                | 0.016   | 0.00   | 3.966   | 0.48   | 15.520  | 22.63  | 0.159   | 0.02   | 36.927  | 33.49  | 0.079   | 0.01   | 4.39   | 10.29  |
| 030                | 0.099   | 0.10   | 4.352   | 0.57   | 13.000  | 0.04   | 0.174   | 0.02   | 56.391  | 28.16  | 0.087   | 0.01   | 2.27   | 7.46   |
| 031                | 0.022   | 0.01   | 3.783   | 0.55   | 12.106  | 1.76   | 0.443   | 0.24   | 37.421  | 35.56  | 0.076   | 0.01   | 3.00   | 9.39   |
| 032                | 0.019   | 0.00   | 4.665   | 0.11   | 9.737   | 10.03  | 0.187   | 0.00   | 50.365  | 2.54   | 0.093   | 0.00   | 1.08   | 2.66   |
| 033                | 0.014   | 0.00   | 3.463   | 0.31   | 3.463   | 0.31   | 0.139   | 0.01   | 20.471  | 12.00  | 0.069   | 0.01   | 1.04   | 3.16   |
| 034                | 0.015   | 0.00   | 3.673   | 0.33   | 3.673   | 0.33   | 0.147   | 0.01   | 30.653  | 6.04   | 0.073   | 0.01   | 0.52   | 1.59   |
| 035                | 0.016   | 0.00   | 4.103   | 0.57   | 4.103   | 0.57   | 0.317   | 0.28   | 20.991  | 6.86   | 0.082   | 0.01   | 0.66   | 1.79   |
| 036                | 0.032   | 0.04   | 3.287   | 0.44   | 3.287   | 0.44   | 0.254   | 0.23   | 28.394  | 11.89  | 0.066   | 0.01   | 1.00   | 3.14   |
| 037                | 0.016   | 0.00   | 4.114   | 0.11   | 4.114   | 0.11   | 0.165   | 0.00   | 15.710  | 11.94  | 0.082   | 0.00   | 0.93   | 3.17   |
| 038                | 0.017   | 0.00   | 4.301   | 0.22   | 4.301   | 0.22   | 0.260   | 0.19   | 31.147  | 15.35  | 0.086   | 0.00   | 1.20   | 4.07   |
| 039                | 0.017   | 0.00   | 4.235   | 0.13   | 4.235   | 0.13   | 0.169   | 0.01   | 20.382  | 7.41   | 0.085   | 0.00   | 0.61   | 1.96   |
| 040                | 0.014   | 0.00   | 3.460   | 0.68   | 3.460   | 0.68   | 0.138   | 0.03   | 38.477  | 2.05   | 0.069   | 0.01   | 0.38   | 0.56   |
| 041                | 0.015   | 0.00   | 3.871   | 0.38   | 3.871   | 0.38   | 0.236   | 0.18   | 39.962  | 8.49   | 0.077   | 0.01   | 0.70   | 2.24   |
| 042                | 0.015   | 0.00   | 3.673   | 0.11   | 3.673   | 0.11   | 0.147   | 0.00   | 42.406  | 25.16  | 0.073   | 0.00   | 1.87   | 6.71   |
| 043                | 0.217   | 0.30   | 3.982   | 0.29   | 9.739   | 11.23  | 1.635   | 1.95   | 31.738  | 4.08   | 0.080   | 0.01   | 1.70   | 3.00   |
| 044                | 0.017   | 0.00   | 4.210   | 0.39   | 4.210   | 0.39   | 0.168   | 0.02   | 48.910  | 7.86   | 0.084   | 0.01   | 0.66   | 2.08   |
| 045                | 0.077   | 0.05   | 4.352   | 0.34   | 27.786  | 1.30   | 0.509   | 0.66   | 50.827  | 21.36  | 0.087   | 0.01   | 1.82   | 5.64   |
| 080                | 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 |
| 081                | 0.016   | 0.00   | 4.091   | 0.05   | 13.895  | 4.75   | 0.164   | 0.00   | 62.327  | 53.05  | 0.082   | 0.00   | 4.40   | 14.06  |
| 082                | 0.020   | 0.00   | 4.938   | 0.17   | 10.273  | 10.50  | 0.198   | 0.01   | 62.990  | 21.46  | 0.099   | 0.00   | 2.60   | 1.00   |
| 083                | 0.021   | 0.00   | 5.137   | 0.42   | 5.137   | 0.42   | 0.206   | 0.02   | 61.480  | 3.12   | 0.103   | 0.01   | 0.37   | 1.00   |
| Ar. Mean           | 0.035   | 0.02   | 4.206   | 0.32   | 7.334   | 2.95   | 0.234   | 0.11   | 42.096  | 16.97  | 0.084   | 0.01   | 1.59   | 4.72   |
| Std. dev.          | 0.043   | 0.06   | 0.463   | 0.22   | 5.541   | 5.83   | 0.226   | 0.31   | 25.990  | 13.56  | 0.009   | 0.00   | 1.21   | 3.63   |

ARIZONA PUBLIC SERVICE  
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DEPOSITION DATA  
Comments and Messages Only

Page 3

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



ARIZONA PUBLIC SERVICE  
MONTHLY REPORT for 10-90

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

Page 1

| Location<br>Number | Na    | d      | K     | d      | Ca    | d      | Hg    | d      | Cl    | d      | F     | d      | SO <sub>4</sub> | d      | NO <sub>3</sub> | d      |
|--------------------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-----------------|--------|-----------------|--------|
| 001                | 0.305 | 0.01   | 0.153 | 0.01   | 0.683 | 0.43   | 0.114 | 0.04   | 0.229 | 0.01   | 0.381 | 0.01   | 0.763           | 0.03   | 0.057           | 0.04   |
| 002                | 0.292 | 0.03   | 0.146 | 0.01   | 0.861 | 0.50   | 0.115 | 0.08   | 0.219 | 0.02   | 0.365 | 0.04   | 0.729           | 0.07   | 0.036           | 0.00   |
| 003                | 0.455 | 0.09   | 0.152 | 0.03   | 1.099 | 0.53   | 0.173 | 0.15   | 0.330 | 0.16   | 0.379 | 0.08   | 0.758           | 0.15   | 0.038           | 0.01   |
| 004                | 0.238 | 999.99 | 0.238 | 999.99 | 1.072 | 999.99 | 0.238 | 999.99 | 0.179 | 999.99 | 0.298 | 999.99 | 0.596           | 999.99 | 0.030           | 999.99 |
| 005                | 0.374 | 0.22   | 0.253 | 0.02   | 0.886 | 0.08   | 0.259 | 0.01   | 0.341 | 0.29   | 0.317 | 0.03   | 0.633           | 0.06   | 0.032           | 0.00   |
| 006                | 0.250 | 0.03   | 0.125 | 0.01   | 0.690 | 0.21   | 0.112 | 0.01   | 0.275 | 0.15   | 0.312 | 0.04   | 0.624           | 0.07   | 0.069           | 0.07   |
| 007                | 0.251 | 0.18   | 0.166 | 0.01   | 0.497 | 0.04   | 0.041 | 0.00   | 0.248 | 0.02   | 0.414 | 0.03   | 0.828           | 0.06   | 0.041           | 0.00   |
| 008                | 0.264 | 0.18   | 0.175 | 0.01   | 0.699 | 0.03   | 0.184 | 0.06   | 0.262 | 0.01   | 0.437 | 0.02   | 0.873           | 0.03   | 0.044           | 0.00   |
| 009                | 0.338 | 0.07   | 0.169 | 0.04   | 0.921 | 0.03   | 0.158 | 0.02   | 0.254 | 0.05   | 0.423 | 0.09   | 0.846           | 0.18   | 0.042           | 0.01   |
| 010                | 0.280 | 0.03   | 0.214 | 0.16   | 0.775 | 0.23   | 0.392 | 0.55   | 0.210 | 0.02   | 0.350 | 0.04   | 0.701           | 0.08   | 0.035           | 0.00   |
| 011                | 0.315 | 0.08   | 0.315 | 0.08   | 1.438 | 0.68   | 0.488 | 0.23   | 0.370 | 0.33   | 0.394 | 0.10   | 0.788           | 0.20   | 0.039           | 0.01   |
| 012                | 0.153 | 0.01   | 0.153 | 0.01   | 0.612 | 0.06   | 0.090 | 0.11   | 0.230 | 0.02   | 0.383 | 0.04   | 0.766           | 0.07   | 0.038           | 0.00   |
| 013                | 0.185 | 0.02   | 0.274 | 0.16   | 0.919 | 0.30   | 0.391 | 0.32   | 0.278 | 0.02   | 0.463 | 0.04   | 0.927           | 0.08   | 0.046           | 0.00   |
| 014                | 0.386 | 0.19   | 0.153 | 0.01   | 1.057 | 0.51   | 0.136 | 0.05   | 0.339 | 0.20   | 0.383 | 0.04   | 0.766           | 0.07   | 0.038           | 0.00   |
| 015                | 0.162 | 0.02   | 0.162 | 0.02   | 0.648 | 0.07   | 0.097 | 0.01   | 0.243 | 0.03   | 0.405 | 0.04   | 0.809           | 0.09   | 0.040           | 0.00   |
| 016                | 0.597 | 0.01   | 0.134 | 0.03   | 0.672 | 0.16   | 0.119 | 0.00   | 0.538 | 0.12   | 0.336 | 0.08   | 0.672           | 0.16   | 0.054           | 0.03   |
| 017                | 0.363 | 0.10   | 0.147 | 0.02   | 0.441 | 0.06   | 0.109 | 0.14   | 0.220 | 0.03   | 0.367 | 0.05   | 0.734           | 0.09   | 0.037           | 0.00   |
| 018                | 1.003 | 0.28   | 0.158 | 0.03   | 0.545 | 0.05   | 0.039 | 0.01   | 1.003 | 0.28   | 0.394 | 0.07   | 0.789           | 0.15   | 0.039           | 0.01   |
| 019                | 1.278 | 0.26   | 0.184 | 0.02   | 1.102 | 0.09   | 0.220 | 0.02   | 1.373 | 0.07   | 0.459 | 0.04   | 0.918           | 0.08   | 0.046           | 0.00   |
| 020                | 3.614 | 0.55   | 0.265 | 0.03   | 1.051 | 0.16   | 0.159 | 0.04   | 3.064 | 1.40   | 0.331 | 0.03   | 3.273           | 0.98   | 0.074           | 0.08   |
|                    | 0.239 | 0.17   | 0.120 | 0.08   | 0.476 | 0.02   | 0.040 | 0.00   | 0.238 | 0.01   | 0.396 | 0.02   | 0.793           | 0.03   | 0.040           | 0.00   |
|                    | 0.232 | 0.14   | 0.116 | 0.07   | 0.546 | 0.11   | 0.078 | 0.01   | 0.235 | 0.02   | 0.392 | 0.03   | 0.785           | 0.07   | 0.073           | 0.06   |
| 023                | 1.199 | 0.25   | 1.662 | 0.46   | 5.892 | 0.33   | 2.857 | 0.34   | 0.826 | 0.14   | 0.460 | 0.03   | 0.921           | 0.05   | 0.046           | 0.00   |
| 024                | 0.154 | 0.01   | 0.154 | 0.01   | 0.690 | 0.13   | 0.115 | 0.01   | 0.230 | 0.01   | 0.384 | 0.01   | 0.768           | 0.03   | 0.081           | 0.09   |
| 025                | 0.150 | 0.00   | 0.150 | 0.00   | 0.675 | 0.15   | 0.120 | 0.03   | 0.225 | 0.00   | 0.375 | 0.00   | 0.750           | 0.00   | 0.038           | 0.00   |
| 026                | 0.433 | 0.18   | 0.173 | 0.00   | 0.433 | 0.18   | 0.043 | 0.00   | 0.260 | 0.00   | 0.433 | 0.01   | 0.865           | 0.02   | 0.043           | 0.00   |
| 027                | 0.330 | 0.11   | 0.133 | 0.01   | 0.531 | 0.04   | 0.093 | 0.01   | 0.199 | 0.01   | 0.332 | 0.02   | 0.664           | 0.05   | 0.056           | 0.04   |
| 028                | 0.340 | 0.01   | 0.170 | 0.00   | 6.143 | 6.23   | 0.349 | 0.23   | 0.255 | 0.00   | 0.425 | 0.01   | 0.849           | 0.02   | 0.072           | 0.06   |
| 030                | 0.996 | 0.31   | 1.187 | 0.69   | 6.396 | 0.99   | 1.693 | 0.32   | 1.164 | 0.03   | 0.450 | 0.06   | 1.378           | 1.07   | 0.107           | 0.13   |
| 031                | 0.229 | 0.15   | 0.153 | 0.00   | 0.613 | 0.02   | 0.057 | 0.04   | 0.230 | 0.01   | 0.383 | 0.01   | 0.766           | 0.02   | 0.038           | 0.00   |
| 032                | 0.320 | 0.26   | 0.772 | 1.17   | 1.147 | 0.42   | 0.114 | 0.13   | 0.310 | 0.06   | 0.517 | 0.10   | 1.034           | 0.19   | 0.052           | 0.01   |
| 033                | 0.234 | 0.14   | 0.117 | 0.07   | 0.778 | 0.56   | 0.089 | 0.09   | 0.238 | 0.02   | 0.396 | 0.04   | 0.793           | 0.07   | 0.040           | 0.00   |
| 034                | 0.228 | 0.19   | 0.074 | 0.01   | 0.442 | 0.08   | 0.037 | 0.01   | 0.221 | 0.04   | 0.368 | 0.07   | 0.737           | 0.13   | 0.037           | 0.01   |
| 035                | 0.183 | 0.01   | 0.136 | 0.09   | 0.554 | 0.39   | 0.046 | 0.00   | 0.275 | 0.01   | 0.458 | 0.02   | 0.916           | 0.04   | 0.046           | 0.00   |
| 036                | 0.299 | 0.30   | 0.074 | 0.00   | 0.298 | 0.00   | 0.037 | 0.00   | 0.223 | 0.00   | 0.372 | 0.01   | 0.745           | 0.01   | 0.037           | 0.00   |
| 037                | 0.163 | 0.02   | 0.082 | 0.01   | 0.404 | 0.12   | 0.041 | 0.00   | 0.245 | 0.02   | 0.408 | 0.04   | 0.817           | 0.08   | 0.041           | 0.00   |
| 038                | 0.146 | 0.01   | 0.108 | 0.07   | 0.729 | 0.04   | 0.172 | 0.16   | 0.219 | 0.01   | 0.364 | 0.02   | 0.729           | 0.04   | 0.054           | 0.03   |
| 039                | 0.164 | 0.04   | 0.164 | 0.04   | 0.402 | 0.08   | 0.059 | 0.03   | 0.247 | 0.05   | 0.411 | 0.09   | 0.822           | 0.18   | 0.041           | 0.01   |
| 040                | 0.171 | 0.02   | 0.252 | 0.14   | 0.695 | 0.42   | 0.173 | 0.09   | 0.257 | 0.03   | 0.428 | 0.05   | 0.856           | 0.10   | 0.043           | 0.00   |
| 041                | 0.226 | 0.14   | 0.152 | 0.01   | 0.606 | 0.03   | 0.098 | 0.04   | 0.227 | 0.01   | 0.379 | 0.02   | 0.758           | 0.04   | 0.038           | 0.00   |
| 042                | 0.171 | 0.03   | 0.171 | 0.03   | 0.421 | 0.09   | 0.070 | 0.05   | 0.257 | 0.05   | 0.429 | 0.08   | 0.857           | 0.16   | 0.043           | 0.01   |
| 043                | 0.176 | 0.00   | 0.176 | 0.00   | 0.879 | 0.01   | 0.141 | 0.04   | 0.264 | 0.00   | 0.439 | 0.01   | 0.879           | 0.01   | 0.044           | 0.00   |
| 044                | 0.118 | 0.07   | 0.161 | 0.02   | 0.634 | 0.24   | 0.150 | 0.06   | 0.241 | 0.03   | 0.402 | 0.05   | 0.804           | 0.10   | 0.040           | 0.00   |
| 045                | 0.390 | 0.12   | 0.158 | 0.01   | 1.020 | 0.06   | 0.155 | 0.11   | 0.349 | 0.20   | 0.394 | 0.04   | 0.788           | 0.07   | 0.039           | 0.00   |
| 080                | 1.290 | 0.04   | 0.255 | 0.18   | 8.098 | 0.49   | 1.024 | 0.22   | 1.347 | 0.08   | 0.349 | 0.12   | 0.986           | 0.34   | 0.035           | 0.01   |
| 081                | 1.303 | 0.09   | 0.145 | 0.01   | 1.084 | 0.07   | 0.167 | 0.06   | 1.593 | 0.11   | 0.362 | 0.03   | 0.724           | 0.05   | 0.036           | 0.00   |
| 082                | 2.363 | 0.07   | 0.136 | 0.02   | 0.941 | 0.14   | 0.115 | 0.00   | 2.645 | 0.24   | 0.340 | 0.05   | 2.718           | 0.39   | 0.034           | 0.00   |
|                    | 1.341 | 0.23   | 0.141 | 0.01   | 0.914 | 0.08   | 0.161 | 0.06   | 1.550 | 0.10   | 0.352 | 0.02   | 1.409           | 0.09   | 0.155           | 0.02   |
| Ar. Mean           | 0.514 | 0.12   | 0.230 | 0.08   | 1.231 | 0.33   | 0.249 | 0.08   | 0.516 | 0.10   | 0.391 | 0.04   | 0.910           | 0.13   | 0.048           | 0.02   |
| Std. Dev.          | 0.641 | 0.11   | 0.276 | 0.20   | 1.683 | 0.90   | 0.472 | 0.11   | 0.621 | 0.21   | 0.045 | 0.03   | 0.468           | 0.21   | 0.021           | 0.03   |

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

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| Location<br>Number | PO4   | d      | CO3   | d      | HCO3   | d      | NH3   | d      | TSS     | d      | CU    | d      | Av d   | SD(d)  |
|--------------------|-------|--------|-------|--------|--------|--------|-------|--------|---------|--------|-------|--------|--------|--------|
| 001                | 0.015 | 0.00   | 3.815 | 0.13   | 3.815  | 0.13   | 0.228 | 0.14   | 13.190  | 18.62  | 0.076 | 0.00   | 1.40   | 4.96   |
| 002                | 0.015 | 0.00   | 3.647 | 0.36   | 3.647  | 0.36   | 0.146 | 0.01   | 16.448  | 11.46  | 0.073 | 0.01   | 0.93   | 3.04   |
| 003                | 0.015 | 0.00   | 3.789 | 0.75   | 3.789  | 0.75   | 0.152 | 0.03   | 28.893  | 37.80  | 0.076 | 0.02   | 2.90   | 10.05  |
| 004                | 0.012 | 999.99 | 2.978 | 999.99 | 2.978  | 999.99 | 0.119 | 999.99 | 39.309  | 999.99 | 0.060 | 999.99 | 999.99 | 999.99 |
| 005                | 0.013 | 0.00   | 3.165 | 0.29   | 3.165  | 0.29   | 0.127 | 0.01   | 38.475  | 2.83   | 0.063 | 0.01   | 0.30   | 0.74   |
| 006                | 0.036 | 0.05   | 3.121 | 0.37   | 5.762  | 4.91   | 0.793 | 0.53   | 21.600  | 15.04  | 0.062 | 0.01   | 1.54   | 4.09   |
| 007                | 0.025 | 0.01   | 4.138 | 0.29   | 4.138  | 0.29   | 0.166 | 0.01   | 14.100  | 2.66   | 0.083 | 0.01   | 0.26   | 0.70   |
| 008                | 0.017 | 0.00   | 4.366 | 0.16   | 4.366  | 0.16   | 0.175 | 0.01   | 18.354  | 2.42   | 0.087 | 0.00   | 0.22   | 0.64   |
| 009                | 0.017 | 0.00   | 4.228 | 0.91   | 4.228  | 0.91   | 0.169 | 0.04   | 25.552  | 8.81   | 0.085 | 0.02   | 0.80   | 2.33   |
| 010                | 0.110 | 0.19   | 3.504 | 0.39   | 3.504  | 0.39   | 0.214 | 0.16   | 38.348  | 47.57  | 0.070 | 0.01   | 3.56   | 12.67  |
| 011                | 0.032 | 0.01   | 3.938 | 1.02   | 3.938  | 1.02   | 0.158 | 0.04   | 38.818  | 25.52  | 0.079 | 0.02   | 2.10   | 6.75   |
| 012                | 0.079 | 0.13   | 3.828 | 0.36   | 3.828  | 0.36   | 0.153 | 0.01   | 13.267  | 11.95  | 0.077 | 0.01   | 0.94   | 3.17   |
| 013                | 0.104 | 0.10   | 4.634 | 0.38   | 4.634  | 0.38   | 0.571 | 0.79   | 31.950  | 21.47  | 0.093 | 0.01   | 1.72   | 5.69   |
| 014                | 0.015 | 0.00   | 3.828 | 0.36   | 3.828  | 0.36   | 0.153 | 0.01   | 10.790  | 4.08   | 0.077 | 0.01   | 0.42   | 1.06   |
| 015                | 0.016 | 0.00   | 4.047 | 0.44   | 4.047  | 0.44   | 0.162 | 0.02   | 7.492   | 6.45   | 0.081 | 0.01   | 0.55   | 1.71   |
| 016                | 0.013 | 0.00   | 3.362 | 0.78   | 3.362  | 0.78   | 0.134 | 0.03   | 18.931  | 16.86  | 0.067 | 0.02   | 1.36   | 4.47   |
| 017                | 0.042 | 0.05   | 3.672 | 0.47   | 3.672  | 0.47   | 0.147 | 0.02   | 15.693  | 12.64  | 0.073 | 0.01   | 1.01   | 3.35   |
| 018                | 0.016 | 0.00   | 3.944 | 0.75   | 3.944  | 0.75   | 0.158 | 0.03   | 5.728   | 2.82   | 0.079 | 0.02   | 0.37   | 0.75   |
| 019                | 0.018 | 0.00   | 4.591 | 0.39   | 4.591  | 0.39   | 0.184 | 0.02   | 21.647  | 16.50  | 0.092 | 0.01   | 1.28   | 4.38   |
| 020                | 0.013 | 0.00   | 3.307 | 0.34   | 3.307  | 0.34   | 0.132 | 0.01   | 16.923  | 8.81   | 0.066 | 0.01   | 0.91   |        |
| 021                | 0.016 | 0.00   | 3.964 | 0.16   | 3.964  | 0.16   | 0.159 | 0.01   | 3.964   | 0.16   | 0.079 | 0.00   | 0.06   |        |
| 022                | 0.016 | 0.00   | 3.924 | 0.35   | 3.924  | 0.35   | 0.157 | 0.01   | 8.668   | 2.34   | 0.078 | 0.01   | 0.25   | 0.61   |
| 023                | 0.189 | 0.34   | 4.603 | 0.26   | 24.936 | 6.92   | 0.941 | 1.52   | 167.136 | 44.35  | 0.092 | 0.01   | 3.93   | 11.77  |
| 024                | 0.015 | 0.00   | 3.841 | 0.13   | 3.841  | 0.13   | 0.154 | 0.01   | 6.574   | 5.60   | 0.077 | 0.00   | 0.44   | 1.49   |
| 025                | 0.030 | 0.03   | 3.750 | 0.00   | 3.750  | 0.00   | 0.150 | 0.00   | 7.125   | 6.75   | 0.075 | 0.00   | 0.50   | 1.80   |
| 026                | 0.026 | 0.02   | 4.326 | 0.08   | 4.326  | 0.08   | 0.173 | 0.00   | 6.509   | 4.45   | 0.087 | 0.00   | 0.36   | 1.18   |
| 027                | 0.026 | 0.02   | 3.320 | 0.24   | 3.320  | 0.24   | 0.133 | 0.01   | 8.704   | 4.61   | 0.066 | 0.00   | 0.39   | 1.22   |
| 028                | 0.068 | 0.10   | 4.246 | 0.08   | 20.459 | 17.37  | 0.170 | 0.00   | 31.570  | 32.86  | 0.085 | 0.00   | 4.07   | 9.56   |
| 030                | 0.493 | 0.58   | 4.500 | 0.57   | 31.169 | 21.87  | 0.180 | 0.02   | 115.360 | 8.72   | 0.090 | 0.01   | 2.53   | 6.00   |
| 031                | 0.046 | 0.03   | 3.830 | 0.11   | 3.830  | 0.11   | 0.460 | 0.01   | 3.830   | 0.11   | 0.077 | 0.00   | 0.04   | 0.05   |
| 032                | 0.077 | 0.12   | 5.170 | 0.96   | 5.170  | 0.96   | 0.301 | 0.15   | 10.326  | 9.35   | 0.103 | 0.02   | 0.99   | 2.44   |
| 033                | 0.016 | 0.00   | 3.964 | 0.37   | 3.964  | 0.37   | 0.159 | 0.01   | 10.270  | 0.61   | 0.079 | 0.01   | 0.17   | 0.22   |
| 034                | 0.015 | 0.00   | 3.683 | 0.67   | 3.683  | 0.67   | 0.147 | 0.03   | 8.705   | 9.38   | 0.074 | 0.01   | 0.81   | 2.48   |
| 035                | 0.045 | 0.05   | 4.580 | 0.21   | 4.580  | 0.21   | 0.273 | 0.17   | 4.580   | 0.21   | 0.092 | 0.00   | 0.10   | 0.12   |
| 036                | 0.022 | 0.02   | 3.723 | 0.05   | 3.723  | 0.05   | 0.149 | 0.00   | 9.348   | 11.30  | 0.074 | 0.00   | 0.84   | 3.01   |
| 037                | 0.051 | 0.07   | 4.085 | 0.40   | 4.085  | 0.40   | 0.163 | 0.02   | 4.085   | 0.40   | 0.082 | 0.01   | 0.11   | 0.16   |
| 038                | 0.029 | 0.03   | 3.643 | 0.21   | 3.643  | 0.21   | 0.146 | 0.01   | 18.150  | 3.30   | 0.073 | 0.00   | 0.30   | 0.87   |
| 039                | 0.016 | 0.00   | 4.112 | 0.88   | 4.112  | 0.88   | 0.164 | 0.04   | 8.882   | 8.66   | 0.082 | 0.02   | 0.78   | 2.29   |
| 040                | 0.101 | 0.06   | 4.280 | 0.49   | 7.911  | 6.77   | 0.413 | 0.46   | 20.840  | 12.63  | 0.086 | 0.01   | 1.52   | 3.66   |
| 041                | 0.015 | 0.00   | 3.790 | 0.19   | 3.790  | 0.19   | 0.152 | 0.01   | 10.074  | 12.38  | 0.076 | 0.00   | 0.93   | 3.30   |
| 042                | 0.025 | 0.01   | 4.286 | 0.80   | 4.286  | 0.80   | 0.171 | 0.03   | 4.286   | 0.80   | 0.086 | 0.02   | 0.21   | 0.32   |
| 043                | 0.044 | 0.05   | 4.393 | 0.05   | 4.393  | 0.05   | 0.176 | 0.00   | 17.518  | 17.36  | 0.088 | 0.00   | 1.26   | 4.63   |
| 044                | 0.072 | 0.01   | 4.022 | 0.49   | 4.022  | 0.49   | 0.236 | 0.13   | 12.967  | 4.79   | 0.080 | 0.01   | 0.46   | 1.26   |
| 045                | 0.016 | 0.00   | 3.938 | 0.38   | 7.313  | 6.38   | 0.158 | 0.01   | 13.500  | 6.00   | 0.079 | 0.01   | 0.96   | 2.22   |
| 080                | 0.014 | 0.00   | 3.489 | 1.20   | 26.705 | 4.32   | 0.140 | 0.05   | 54.518  | 12.05  | 0.070 | 0.02   | 1.37   | 3.28   |
| 081                | 0.014 | 0.00   | 3.621 | 0.26   | 3.621  | 0.26   | 0.145 | 0.01   | 26.483  | 25.03  | 0.072 | 0.01   | 1.86   |        |
| 082                | 0.014 | 0.00   | 3.397 | 0.49   | 3.397  | 0.49   | 0.136 | 0.02   | 12.666  | 4.95   | 0.068 | 0.01   | 0.49   |        |
| 083                | 0.014 | 0.00   | 3.523 | 0.23   | 3.523  | 0.23   | 0.141 | 0.01   | 14.682  | 6.09   | 0.070 | 0.00   | 0.51   | 1.01   |
| Ar. Mean           | 0.045 | 0.05   | 3.915 | 0.41   | 5.916  | 1.80   | 0.214 | 0.10   | 22.017  | 11.27  | 0.078 | 0.01   | 1.04   | 3.12   |
| Std. dev.          | 0.075 | 0.10   | 0.447 | 0.28   | 6.230  | 4.21   | 0.163 | 0.26   | 28.084  | 11.22  | 0.009 | 0.01   | 0.98   | 3.04   |



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DEPOSITION DATA  
Comments and Messages Only

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| Location<br>Number | Sample A Comments | Sample B Comments           | Processing Messages |
|--------------------|-------------------|-----------------------------|---------------------|
| 001                |                   |                             |                     |
| 002                |                   |                             |                     |
| 003                |                   |                             |                     |
| 004                |                   | VOID/DEAD BIRD IN CONTAINER | MISSING SAMPLE B    |
| 005                |                   |                             |                     |
| 006                |                   |                             |                     |
| 007                |                   |                             |                     |
| 008                |                   |                             |                     |
| 009                |                   |                             |                     |
| 010                |                   |                             |                     |
| 011                |                   |                             |                     |
| 012                |                   |                             |                     |
| 013                |                   |                             |                     |
| 014                |                   |                             |                     |
| 015                |                   |                             |                     |
| 016                |                   |                             |                     |
| 017                |                   |                             |                     |
| 018                |                   |                             |                     |
| 019                |                   |                             |                     |
| 020                |                   |                             |                     |
| 023                |                   |                             |                     |
| 024                |                   |                             |                     |
| 025                |                   |                             |                     |
| 026                |                   |                             |                     |
| 027                |                   |                             |                     |
| 028                |                   |                             |                     |
| 030                |                   |                             |                     |
| 031                |                   |                             |                     |
| 032                |                   |                             |                     |
| 033                |                   |                             |                     |
| 034                |                   |                             |                     |
| 035                |                   |                             |                     |
| 036                |                   |                             |                     |
| 037                |                   |                             |                     |
| 038                |                   |                             |                     |
| 039                |                   |                             |                     |
| 040                |                   |                             |                     |
| 041                |                   |                             |                     |
| 042                |                   |                             |                     |
| 043                |                   |                             |                     |
| 044                |                   |                             |                     |
| 045                |                   |                             |                     |
| 080                |                   |                             |                     |
| 081                |                   |                             |                     |
| 082                |                   |                             |                     |
| 0                  |                   |                             |                     |



ARIZONA PUBLIC SERVICE  
MONTHLY REPORT for 11-90

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

Page 1

| Location<br>Number | Na    | d      | K     | d      | Ca    | d      | Hg    | d      | Cl    | d      | F     | d      | SO <sub>4</sub> | d      | NO <sub>3</sub> | d      |
|--------------------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-----------------|--------|-----------------|--------|
| 001                | 0.401 | 0.09   | 0.134 | 0.03   | 0.653 | 0.12   | 0.131 | 0.02   | 0.200 | 0.04   | 0.334 | 0.07   | 0.668           | 0.15   | 0.033           | 0.01   |
| 002                | 0.290 | 0.27   | 0.148 | 0.01   | 0.590 | 0.04   | 0.110 | 0.01   | 0.336 | 0.25   | 0.369 | 0.03   | 0.738           | 0.05   | 0.056           | 0.04   |
| 003                | 0.680 | 0.28   | 0.299 | 0.06   | 1.331 | 0.03   | 0.375 | 0.19   | 0.650 | 0.31   | 0.374 | 0.08   | 0.748           | 0.15   | 0.037           | 0.01   |
| 004                | 0.485 | 0.34   | 0.297 | 0.28   | 1.169 | 0.14   | 0.202 | 0.07   | 0.700 | 0.93   | 0.288 | 0.21   | 1.120           | 0.67   | 0.092           | 0.11   |
| 005                | 0.438 | 0.02   | 0.217 | 0.14   | 0.584 | 0.03   | 0.159 | 0.14   | 0.405 | 0.38   | 0.365 | 0.02   | 0.730           | 0.03   | 0.036           | 0.00   |
| 006                | 0.575 | 999.99 | 0.287 | 999.99 | 0.718 | 999.99 | 0.158 | 999.99 | 0.431 | 999.99 | 0.359 | 999.99 | 0.718           | 999.99 | 0.036           | 999.99 |
| 007                | 0.234 | 0.16   | 0.234 | 0.16   | 0.855 | 0.18   | 0.093 | 0.03   | 0.233 | 0.01   | 0.388 | 0.01   | 0.777           | 0.02   | 0.039           | 0.00   |
| 008                | 0.417 | 0.35   | 0.135 | 0.03   | 0.747 | 0.28   | 0.143 | 0.07   | 0.202 | 0.04   | 0.336 | 0.07   | 0.673           | 0.14   | 0.034           | 0.01   |
| 009                | 0.486 | 0.08   | 0.236 | 0.12   | 1.445 | 0.07   | 0.479 | 0.08   | 0.375 | 0.31   | 0.405 | 0.07   | 0.810           | 0.14   | 0.041           | 0.01   |
| 010                | 0.636 | 0.33   | 0.159 | 0.00   | 0.873 | 0.17   | 0.190 | 0.03   | 0.238 | 0.00   | 0.397 | 0.00   | 0.794           | 0.01   | 0.040           | 0.00   |
| 011                | 0.274 | 0.09   | 0.111 | 0.01   | 0.827 | 0.04   | 0.144 | 0.01   | 0.245 | 0.14   | 0.277 | 0.02   | 0.553           | 0.05   | 0.062           | 0.07   |
| 012                | 0.276 | 0.00   | 0.207 | 0.14   | 1.105 | 0.27   | 0.256 | 0.07   | 0.207 | 0.00   | 0.345 | 0.00   | 0.691           | 0.00   | 0.035           | 0.00   |
| 013                | 2.166 | 999.99 | 0.591 | 999.99 | 2.559 | 999.99 | 0.748 | 999.99 | 0.295 | 999.99 | 0.492 | 999.99 | 0.984           | 999.99 | 0.049           | 999.99 |
| 014                | 0.608 | 0.27   | 0.153 | 0.01   | 1.223 | 0.06   | 0.221 | 0.03   | 0.416 | 0.36   | 0.382 | 0.02   | 0.765           | 0.04   | 0.038           | 0.00   |
| 015                | 0.423 | 0.54   | 0.163 | 0.02   | 1.152 | 0.47   | 0.274 | 0.18   | 0.375 | 0.29   | 0.408 | 0.05   | 0.815           | 0.10   | 0.041           | 0.01   |
| 016                | 0.492 | 0.02   | 0.110 | 0.02   | 0.552 | 0.10   | 0.128 | 0.04   | 0.381 | 0.04   | 0.276 | 0.05   | 0.552           | 0.10   | 0.028           | 0.01   |
| 017                | 0.318 | 0.12   | 0.106 | 0.04   | 0.403 | 0.05   | 0.121 | 0.07   | 0.159 | 0.06   | 0.265 | 0.10   | 0.530           | 0.20   | 0.026           | 0.01   |
| 018                | 0.557 | 0.08   | 0.126 | 0.05   | 0.431 | 0.03   | 0.094 | 0.02   | 0.528 | 0.43   | 0.316 | 0.11   | 0.632           | 0.23   | 0.050           | 0.02   |
| 019                | 0.845 | 0.20   | 0.381 | 0.13   | 1.304 | 0.22   | 0.392 | 0.10   | 0.766 | 0.04   | 0.383 | 0.02   | 0.766           | 0.04   | 0.038           | 0.00   |
| 020                | 1.582 | 0.23   | 0.262 | 0.07   | 0.475 | 0.05   | 0.162 | 0.05   | 1.601 | 0.41   | 0.266 | 0.03   | 1.562           | 0.86   | 0.059           | 0.06   |
|                    | 0.329 | 0.07   | 0.134 | 0.02   | 0.671 | 0.12   | 0.163 | 0.08   | 0.201 | 0.04   | 0.335 | 0.06   | 0.671           | 0.12   | 0.034           | 0.01   |
|                    | 0.261 | 0.02   | 0.198 | 0.14   | 0.653 | 0.04   | 0.185 | 0.12   | 0.196 | 0.01   | 0.326 | 0.02   | 0.653           | 0.04   | 0.033           | 0.00   |
| 023                | 1.003 | 0.14   | 2.065 | 0.17   | 9.299 | 1.38   | 4.727 | 0.38   | 0.395 | 0.44   | 0.338 | 0.09   | 0.675           | 0.19   | 0.125           | 0.01   |
| 024                | 0.109 | 0.06   | 0.148 | 0.02   | 0.890 | 0.12   | 0.089 | 0.10   | 0.222 | 0.03   | 0.371 | 0.05   | 0.742           | 0.10   | 0.037           | 0.01   |
| 025                | 0.277 | 0.06   | 0.201 | 0.10   | 0.679 | 0.13   | 0.198 | 0.15   | 0.208 | 0.04   | 0.347 | 0.07   | 0.693           | 0.14   | 0.035           | 0.01   |
| 026                | 0.279 | 0.02   | 0.140 | 0.01   | 0.559 | 0.03   | 0.105 | 0.05   | 0.209 | 0.01   | 0.349 | 0.02   | 0.698           | 0.04   | 0.035           | 0.00   |
| 027                | 0.354 | 0.03   | 0.118 | 0.01   | 0.652 | 0.18   | 0.149 | 0.10   | 0.177 | 0.02   | 0.295 | 0.03   | 0.590           | 0.06   | 0.029           | 0.00   |
| 028                | 0.417 | 999.99 | 0.278 | 999.99 | 1.252 | 999.99 | 0.389 | 999.99 | 0.209 | 999.99 | 0.348 | 999.99 | 0.695           | 999.99 | 0.035           | 999.99 |
| 030                | 0.862 | 999.99 | 0.431 | 999.99 | 2.585 | 999.99 | 0.373 | 999.99 | 0.431 | 999.99 | 0.359 | 999.99 | 0.718           | 999.99 | 0.036           | 999.99 |
| 031                | 0.428 | 0.09   | 0.143 | 0.03   | 0.712 | 0.15   | 0.160 | 0.09   | 0.214 | 0.04   | 0.356 | 0.07   | 0.712           | 0.15   | 0.036           | 0.01   |
| 032                | 0.775 | 0.05   | 0.709 | 0.46   | 1.485 | 0.41   | 0.355 | 0.18   | 0.261 | 0.04   | 0.435 | 0.07   | 0.869           | 0.14   | 0.043           | 0.01   |
| 033                | 0.327 | 0.11   | 0.195 | 0.12   | 0.789 | 0.04   | 0.307 | 0.13   | 0.197 | 0.01   | 0.329 | 0.02   | 0.657           | 0.04   | 0.033           | 0.00   |
| 034                | 0.210 | 0.15   | 0.139 | 0.01   | 0.488 | 0.17   | 0.045 | 0.02   | 0.208 | 0.01   | 0.347 | 0.02   | 0.694           | 0.04   | 0.035           | 0.00   |
| 035                | 0.187 | 999.99 | 0.187 | 999.99 | 0.934 | 999.99 | 0.187 | 999.99 | 0.280 | 999.99 | 0.467 | 999.99 | 0.934           | 999.99 | 0.047           | 999.99 |
| 036                | 0.280 | 0.27   | 0.210 | 0.13   | 0.562 | 0.26   | 0.134 | 0.07   | 0.212 | 0.01   | 0.353 | 0.01   | 0.706           | 0.03   | 0.035           | 0.00   |
| 037                | 0.388 | 0.15   | 0.155 | 0.00   | 0.621 | 0.01   | 0.101 | 0.01   | 0.233 | 0.00   | 0.388 | 0.01   | 0.777           | 0.01   | 0.039           | 0.00   |
| 038                | 0.133 | 0.04   | 0.133 | 0.04   | 0.855 | 0.14   | 0.053 | 0.03   | 0.200 | 0.06   | 0.333 | 0.11   | 0.666           | 0.21   | 0.033           | 0.01   |
| 039                | 0.201 | 0.13   | 0.135 | 0.00   | 0.675 | 0.02   | 0.095 | 0.06   | 0.202 | 0.01   | 0.337 | 0.01   | 0.675           | 0.02   | 0.034           | 0.00   |
| 040                | 0.338 | 0.39   | 0.556 | 0.05   | 0.983 | 0.51   | 0.686 | 0.01   | 0.242 | 0.05   | 0.403 | 0.08   | 0.806           | 0.16   | 0.040           | 0.01   |
| 041                | 0.444 | 0.30   | 0.148 | 0.00   | 0.814 | 0.15   | 0.133 | 0.03   | 0.407 | 0.37   | 0.370 | 0.00   | 0.740           | 0.00   | 0.070           | 0.07   |
| 042                | 0.262 | 0.06   | 0.131 | 0.03   | 0.655 | 0.15   | 0.180 | 0.01   | 0.196 | 0.04   | 0.327 | 0.07   | 0.655           | 0.15   | 0.073           | 0.09   |
| 043                | 0.347 | 0.08   | 0.141 | 0.02   | 0.912 | 0.01   | 0.130 | 0.08   | 0.309 | 0.16   | 0.353 | 0.06   | 0.706           | 0.12   | 0.035           | 0.01   |
| 044                | 0.296 | 0.00   | 0.370 | 0.15   | 0.888 | 0.00   | 0.281 | 0.00   | 0.222 | 0.00   | 0.370 | 0.00   | 0.740           | 0.00   | 0.037           | 0.00   |
| 045                | 0.536 | 0.01   | 0.202 | 0.14   | 1.006 | 0.15   | 0.302 | 0.15   | 0.367 | 0.33   | 0.335 | 0.01   | 0.670           | 0.01   | 0.034           | 0.00   |
| 080                | 0.972 | 0.33   | 0.294 | 0.26   | 4.262 | 1.42   | 0.901 | 0.64   | 0.830 | 0.04   | 0.379 | 0.05   | 0.759           | 0.10   | 0.038           | 0.00   |
| 081                | 1.458 | 0.60   | 0.231 | 0.04   | 0.755 | 0.25   | 0.139 | 0.02   | 1.085 | 1.42   | 0.289 | 0.05   | 0.841           | 0.43   | 0.053           | 0.04   |
| 082                | 1.611 | 0.06   | 0.405 | 0.34   | 1.291 | 0.00   | 0.269 | 0.05   | 1.728 | 0.30   | 0.326 | 0.07   | 0.945           | 0.45   | 0.100           | 0.06   |
| 0                  | 1.598 | 0.01   | 0.295 | 0.01   | 1.008 | 0.02   | 0.372 | 0.07   | 1.522 | 0.45   | 0.307 | 0.11   | 0.862           | 0.27   | 0.083           | 0.09   |
| Ar. Mean           | 0.560 | 0.16   | 0.268 | 0.08   | 1.165 | 0.19   | 0.329 | 0.09   | 0.415 | 0.19   | 0.352 | 0.05   | 0.754           | 0.14   | 0.045           | 0.02   |
| Std. Dev.          | 0.445 | 0.15   | 0.296 | 0.10   | 1.365 | 0.30   | 0.672 | 0.11   | 0.368 | 0.27   | 0.047 | 0.04   | 0.162           | 0.17   | 0.020           | 0.03   |

## ARIZONA PUBLIC SERVICE

MONTHLY REPORT for 11-90

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

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| Location<br>Number | PO4   | d      | CO3   | d      | HCO3   | d      | NH3   | d      | TSS     | d      | CU    | d      | Av d   | SD(d)  |
|--------------------|-------|--------|-------|--------|--------|--------|-------|--------|---------|--------|-------|--------|--------|--------|
| 001                | 0.013 | 0.00   | 3.339 | 0.73   | 3.339  | 0.73   | 0.134 | 0.03   | 10.394  | 3.02   | 0.067 | 0.01   | 0.36   | 0.80   |
| 002                | 0.015 | 0.00   | 3.690 | 0.27   | 3.690  | 0.27   | 0.148 | 0.01   | 5.468   | 3.29   | 0.074 | 0.01   | 0.32   | 0.86   |
| 003                | 0.015 | 0.00   | 3.739 | 0.75   | 6.093  | 3.96   | 0.150 | 0.03   | 28.636  | 4.62   | 0.116 | 0.10   | 0.75   | 1.52   |
| 004                | 0.034 | 0.00   | 2.875 | 2.11   | 9.082  | 0.71   | 0.268 | 0.22   | 15.677  | 9.54   | 0.057 | 0.04   | 1.10   | 2.49   |
| 005                | 0.015 | 0.00   | 3.648 | 0.16   | 3.648  | 0.16   | 0.146 | 0.01   | 15.423  | 23.39  | 0.073 | 0.00   | 1.75   | 6.23   |
| 006                | 0.014 | 999.99 | 3.591 | 999.99 | 3.591  | 999.99 | 0.345 | 999.99 | 12.927  | 999.99 | 0.072 | 999.99 | 999.99 | 999.99 |
| 007                | 0.016 | 0.00   | 3.883 | 0.12   | 6.559  | 5.23   | 0.232 | 0.15   | 3.883   | 0.12   | 0.078 | 0.00   | 0.44   | 1.38   |
| 008                | 0.028 | 0.03   | 3.363 | 0.68   | 5.955  | 5.86   | 0.223 | 0.20   | 8.813   | 3.11   | 0.067 | 0.01   | 0.78   | 1.67   |
| 009                | 0.024 | 0.01   | 4.052 | 0.70   | 9.726  | 1.68   | 0.162 | 0.03   | 33.339  | 10.32  | 0.081 | 0.01   | 0.97   | 2.73   |
| 010                | 0.016 | 0.00   | 3.968 | 0.05   | 3.968  | 0.05   | 0.159 | 0.00   | 14.294  | 3.35   | 0.079 | 0.00   | 0.29   | 0.89   |
| 011                | 0.033 | 0.00   | 2.766 | 0.23   | 2.766  | 0.23   | 0.111 | 0.01   | 5.679   | 5.59   | 0.055 | 0.00   | 0.46   | 1.48   |
| 012                | 0.021 | 0.01   | 3.454 | 0.01   | 3.454  | 0.01   | 0.138 | 0.00   | 23.487  | 2.85   | 0.069 | 0.00   | 0.24   | 0.75   |
| 013                | 0.059 | 999.99 | 4.922 | 999.99 | 11.813 | 999.99 | 0.197 | 999.99 | 59.063  | 999.99 | 0.098 | 999.99 | 999.99 | 999.99 |
| 014                | 0.053 | 0.01   | 3.823 | 0.19   | 3.823  | 0.19   | 0.153 | 0.01   | 22.819  | 8.01   | 0.076 | 0.00   | 0.66   | 2.12   |
| 015                | 0.025 | 0.02   | 4.077 | 0.51   | 4.077  | 0.51   | 0.163 | 0.02   | 29.095  | 21.49  | 0.082 | 0.01   | 1.73   | 5.69   |
| 016                | 0.011 | 0.00   | 2.761 | 0.52   | 2.761  | 0.52   | 0.110 | 0.02   | 10.441  | 0.88   | 0.055 | 0.01   | 0.17   | 0.27   |
| 017                | 0.011 | 0.00   | 2.648 | 1.02   | 2.648  | 1.02   | 0.106 | 0.04   | 10.850  | 9.06   | 0.053 | 0.02   | 0.85   | 2.39   |
| 018                | 0.013 | 0.00   | 3.159 | 1.14   | 3.159  | 1.14   | 0.126 | 0.05   | 4.455   | 1.45   | 0.063 | 0.02   | 0.34   | 0.51   |
| 019                | 0.039 | 0.05   | 3.830 | 0.20   | 6.582  | 5.71   | 0.153 | 0.01   | 40.032  | 17.45  | 0.077 | 0.00   | 1.73   | 4.77   |
| 020                | 0.011 | 0.00   | 2.658 | 0.33   | 2.658  | 0.33   | 0.106 | 0.01   | 13.491  | 8.91   | 0.053 | 0.01   | 0.81   | 2.76   |
| 021                | 0.013 | 0.00   | 3.353 | 0.62   | 3.353  | 0.62   | 0.134 | 0.02   | 12.565  | 12.95  | 0.067 | 0.01   | 1.05   | 3.76   |
| 022                | 0.027 | 0.03   | 3.265 | 0.22   | 5.627  | 4.95   | 0.252 | 0.25   | 11.166  | 4.67   | 0.065 | 0.00   | 0.75   | 1.92   |
| 023                | 0.351 | 0.10   | 3.375 | 0.93   | 38.173 | 15.84  | 0.135 | 0.04   | 295.136 | 55.00  | 0.068 | 0.02   | 5.34   | 14.88  |
| 024                | 0.015 | 0.00   | 3.708 | 0.52   | 6.121  | 4.31   | 0.148 | 0.02   | 3.708   | 0.52   | 0.074 | 0.01   | 0.42   | 1.13   |
| 025                | 0.014 | 0.00   | 3.466 | 0.71   | 3.466  | 0.71   | 0.139 | 0.03   | 13.241  | 4.10   | 0.069 | 0.01   | 0.45   | 1.08   |
| 026                | 0.014 | 0.00   | 3.491 | 0.19   | 3.491  | 0.19   | 0.140 | 0.01   | 8.868   | 10.94  | 0.070 | 0.00   | 0.82   | 2.91   |
| 027                | 0.012 | 0.00   | 2.949 | 0.28   | 2.949  | 0.28   | 0.118 | 0.01   | 15.000  | 12.04  | 0.059 | 0.01   | 0.93   | 3.20   |
| 028                | 0.028 | 999.99 | 3.477 | 999.99 | 8.345  | 999.99 | 0.139 | 999.99 | 43.118  | 999.99 | 0.070 | 999.99 | 999.99 | 999.99 |
| 030                | 0.057 | 999.99 | 3.591 | 999.99 | 8.618  | 999.99 | 0.144 | 999.99 | 27.291  | 999.99 | 0.072 | 999.99 | 999.99 | 999.99 |
| 031                | 0.014 | 0.00   | 3.563 | 0.73   | 3.563  | 0.73   | 0.143 | 0.03   | 11.894  | 1.80   | 0.071 | 0.01   | 0.28   | 0.50   |
| 032                | 0.044 | 0.02   | 4.346 | 0.71   | 7.635  | 7.28   | 0.174 | 0.03   | 24.146  | 21.98  | 0.087 | 0.01   | 2.24   | 5.99   |
| 033                | 0.013 | 0.00   | 3.287 | 0.18   | 3.287  | 0.18   | 0.131 | 0.01   | 25.443  | 13.09  | 0.066 | 0.00   | 0.99   | 3.48   |
| 034                | 0.014 | 0.00   | 3.472 | 0.22   | 3.472  | 0.22   | 0.139 | 0.01   | 8.376   | 3.30   | 0.069 | 0.00   | 0.30   | 0.87   |
| 035                | 0.019 | 999.99 | 4.669 | 999.99 | 4.669  | 999.99 | 0.187 | 999.99 | 11.206  | 999.99 | 0.093 | 999.99 | 999.99 | 999.99 |
| 036                | 0.014 | 0.00   | 3.532 | 0.15   | 3.532  | 0.15   | 0.141 | 0.01   | 14.879  | 4.85   | 0.071 | 0.00   | 0.42   | 1.28   |
| 037                | 0.016 | 0.00   | 3.883 | 0.07   | 3.883  | 0.07   | 0.155 | 0.00   | 5.806   | 3.77   | 0.078 | 0.00   | 0.29   | 1.00   |
| 038                | 0.013 | 0.00   | 3.330 | 1.07   | 3.330  | 1.07   | 0.133 | 0.04   | 16.277  | 16.90  | 0.067 | 0.02   | 1.41   | 4.47   |
| 039                | 0.013 | 0.00   | 3.375 | 0.11   | 5.777  | 4.92   | 0.135 | 0.00   | 11.464  | 0.96   | 0.068 | 0.00   | 0.45   | 1.31   |
| 040                | 0.060 | 0.08   | 4.028 | 0.80   | 4.028  | 0.80   | 0.234 | 0.11   | 69.126  | 10.51  | 0.081 | 0.02   | 0.97   | 2.76   |
| 041                | 0.015 | 0.00   | 3.702 | 0.00   | 3.702  | 0.00   | 0.148 | 0.00   | 7.033   | 6.66   | 0.074 | 0.00   | 0.54   | 1.77   |
| 042                | 0.013 | 0.00   | 3.273 | 0.73   | 3.273  | 0.73   | 0.131 | 0.03   | 13.964  | 4.65   | 0.065 | 0.01   | 0.48   | 1.23   |
| 043                | 0.047 | 0.06   | 3.528 | 0.58   | 3.528  | 0.58   | 0.141 | 0.02   | 7.739   | 7.84   | 0.071 | 0.01   | 0.69   | 2.07   |
| 044                | 0.015 | 0.00   | 3.702 | 0.00   | 6.293  | 5.18   | 0.148 | 0.00   | 29.613  | 2.96   | 0.074 | 0.00   | 0.59   | 1.54   |
| 045                | 0.013 | 0.00   | 3.352 | 0.07   | 5.723  | 4.81   | 0.134 | 0.00   | 20.805  | 4.45   | 0.067 | 0.00   | 0.72   | 1.66   |
| 080                | 0.045 | 0.02   | 3.794 | 0.49   | 18.212 | 2.33   | 0.152 | 0.02   | 27.093  | 20.09  | 0.076 | 0.01   | 1.84   | 5.29   |
| 081                | 0.012 | 0.00   | 2.886 | 0.50   | 2.886  | 0.50   | 0.115 | 0.02   | 4.205   | 2.14   | 0.058 | 0.01   | 0.43   | 0.63   |
| 082                | 0.013 | 0.00   | 3.261 | 0.66   | 7.827  | 1.58   | 0.130 | 0.03   | 6.493   | 7.12   | 0.065 | 0.01   | 0.77   | 1.91   |
| 083                | 0.012 | 0.00   | 3.066 | 1.15   | 4.811  | 2.34   | 0.123 | 0.05   | 9.298   | 11.32  | 0.061 | 0.02   | 1.14   | 3.11   |
| Ar.Mean            | 0.029 | 0.01   | 3.520 | 0.50   | 5.812  | 2.06   | 0.156 | 0.04   | 23.400  | 8.86   | 0.071 | 0.01   | 0.89   | 2.51   |
| Std.dev.           | 0.050 | 0.02   | 0.469 | 0.42   | 5.565  | 2.98   | 0.046 | 0.06   | 42.321  | 9.52   | 0.011 | 0.02   | 0.85   | 2.48   |

ARIZONA PUBLIC SERVICE  
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DEPOSITION DATA  
Comments and Messages Only

Page 3

| Location<br>Number | Sample A Comments | Sample B Comments           | Processing Messages |
|--------------------|-------------------|-----------------------------|---------------------|
| 001                |                   |                             |                     |
| 002                |                   |                             |                     |
| 003                |                   |                             |                     |
| 004                |                   |                             |                     |
| 005                |                   |                             |                     |
| 006                |                   | VOID/CONTAINER ON GROUND    | MISSING SAMPLE B    |
| 007                |                   |                             |                     |
| 008                |                   |                             |                     |
| 009                |                   |                             |                     |
| 010                |                   |                             |                     |
| 011                |                   |                             |                     |
| 012                |                   |                             |                     |
| 013                |                   | VOID/POSSIBLE CONTAMINATION | MISSING SAMPLE B    |
| 014                |                   |                             |                     |
| 015                |                   |                             |                     |
| 016                |                   |                             |                     |
| 017                |                   |                             |                     |
| 018                |                   |                             |                     |
| 019                |                   |                             |                     |
| 020                |                   |                             |                     |
| 023                |                   |                             |                     |
| 024                |                   |                             |                     |
| 025                |                   |                             |                     |
| 026                |                   |                             |                     |
| 027                |                   |                             |                     |
| 028                |                   | VOID/DEAD BIRD IN CONTAINER | MISSING SAMPLE B    |
| 030                |                   | VOID/POSSIBLE CONTAMINATION | MISSING SAMPLE B    |
| 031                |                   |                             |                     |
| 032                |                   |                             |                     |
| 033                |                   |                             |                     |
| 034                |                   |                             |                     |
| 035                |                   | VOID/VANDALISM              | MISSING SAMPLE B    |
| 036                |                   |                             |                     |
| 037                |                   |                             |                     |
| 038                |                   |                             |                     |
| 039                |                   |                             |                     |
| 040                |                   |                             |                     |
| 041                |                   |                             |                     |
| 042                |                   |                             |                     |
| 043                |                   |                             |                     |
| 044                |                   |                             |                     |
| 045                |                   |                             |                     |
| 080                |                   |                             |                     |
| 081                |                   |                             |                     |
| 082                |                   |                             |                     |
| 0                  |                   |                             |                     |



ARIZONA PUBLIC SERVICE  
MONTHLY REPORT for 12-90

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

Page 1

| Location<br>Number | Na    | d      | K     | d      | Ca    | d      | Hg    | d      | Cl    | d      | F     | d      | SO4   | d      | NO3   | d      |
|--------------------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| 001                | 0.664 | 0.17   | 0.190 | 0.00   | 1.045 | 0.17   | 0.133 | 0.00   | 0.761 | 0.02   | 0.475 | 0.01   | 0.951 | 0.02   | 0.219 | 0.01   |
| 002                | 0.769 | 0.35   | 0.169 | 0.04   | 0.957 | 0.73   | 0.179 | 0.06   | 0.580 | 0.03   | 0.421 | 0.10   | 0.843 | 0.20   | 0.178 | 0.06   |
| 003                | 1.520 | 0.20   | 0.350 | 0.23   | 2.344 | 0.52   | 0.398 | 0.01   | 1.405 | 0.03   | 0.585 | 0.01   | 1.171 | 0.03   | 0.316 | 0.02   |
| 004                | 0.807 | 0.07   | 0.339 | 0.17   | 1.381 | 0.19   | 0.161 | 0.01   | 0.615 | 0.46   | 0.585 | 0.11   | 1.169 | 0.23   | 0.213 | 0.09   |
| 005                | 0.986 | 0.58   | 0.342 | 0.34   | 1.460 | 0.15   | 0.276 | 0.14   | 0.538 | 0.31   | 0.536 | 0.21   | 1.072 | 0.41   | 0.054 | 0.02   |
| 006                | 0.866 | 0.52   | 0.213 | 0.02   | 1.067 | 0.12   | 0.181 | 0.00   | 0.741 | 0.13   | 0.533 | 0.06   | 1.067 | 0.12   | 0.201 | 0.04   |
| 007                | 0.511 | 0.14   | 0.428 | 0.47   | 1.755 | 0.02   | 0.198 | 0.05   | 0.311 | 0.04   | 0.518 | 0.07   | 1.036 | 0.14   | 0.185 | 0.02   |
| 008                | 0.487 | 0.21   | 0.194 | 0.01   | 0.973 | 0.41   | 0.165 | 0.06   | 0.291 | 0.01   | 0.485 | 0.01   | 0.971 | 0.03   | 0.175 | 0.04   |
| 009                | 0.592 | 0.06   | 0.197 | 0.02   | 1.578 | 0.15   | 0.225 | 0.04   | 0.437 | 0.25   | 0.493 | 0.05   | 0.986 | 0.09   | 0.197 | 0.02   |
| 010                | 0.484 | 0.04   | 0.161 | 0.01   | 0.975 | 0.40   | 0.161 | 0.01   | 0.242 | 0.02   | 0.404 | 0.03   | 0.807 | 0.06   | 0.185 | 0.00   |
| 011                | 0.630 | 0.10   | 0.182 | 0.02   | 1.176 | 0.03   | 0.201 | 0.06   | 0.418 | 0.32   | 0.454 | 0.06   | 0.909 | 0.11   | 0.126 | 0.16   |
| 012                | 0.503 | 0.31   | 0.257 | 0.19   | 0.934 | 0.23   | 0.144 | 0.03   | 0.254 | 0.02   | 0.424 | 0.03   | 0.847 | 0.05   | 0.186 | 0.01   |
| 013                | 0.803 | 0.10   | 0.709 | 0.29   | 1.486 | 0.41   | 0.569 | 0.33   | 0.709 | 0.29   | 0.502 | 0.06   | 1.004 | 0.13   | 0.098 | 0.10   |
| 014                | 1.394 | 0.01   | 0.187 | 0.02   | 1.394 | 0.01   | 0.166 | 0.05   | 1.120 | 0.14   | 0.467 | 0.06   | 0.933 | 0.12   | 0.251 | 0.01   |
| 015                | 0.378 | 0.03   | 0.189 | 0.02   | 1.125 | 0.28   | 0.113 | 0.01   | 0.283 | 0.02   | 0.472 | 0.04   | 0.944 | 0.08   | 0.079 | 0.06   |
| 016                | 1.661 | 0.01   | 0.381 | 0.35   | 1.176 | 0.13   | 0.202 | 0.11   | 1.465 | 0.04   | 0.490 | 0.05   | 1.444 | 0.82   | 0.369 | 0.08   |
| 017                | 0.647 | 0.00   | 0.216 | 0.00   | 0.755 | 0.22   | 0.119 | 0.02   | 0.323 | 0.00   | 0.539 | 0.00   | 1.078 | 0.01   | 0.226 | 0.02   |
| 018                | 0.999 | 0.50   | 0.250 | 0.00   | 0.999 | 0.00   | 0.094 | 0.06   | 0.874 | 0.25   | 0.624 | 0.00   | 1.248 | 0.00   | 0.312 | 0.02   |
| 019                | 1.148 | 0.22   | 0.385 | 0.27   | 2.304 | 0.58   | 0.590 | 0.27   | 1.022 | 0.03   | 0.639 | 0.02   | 1.278 | 0.04   | 0.307 | 0.01   |
| 020                | 7.340 | 0.39   | 0.474 | 0.06   | 1.898 | 0.22   | 0.271 | 0.04   | 7.075 | 0.59   | 0.593 | 0.07   | 7.117 | 0.83   | 0.822 | 0.19   |
| 021                | 0.520 | 0.23   | 0.207 | 0.01   | 0.828 | 0.03   | 0.124 | 0.00   | 0.311 | 0.01   | 0.518 | 0.02   | 1.035 | 0.04   | 0.197 | 0.03   |
| 022                | 0.308 | 0.22   | 0.204 | 0.01   | 0.817 | 0.03   | 0.133 | 0.02   | 0.306 | 0.01   | 0.510 | 0.02   | 1.021 | 0.04   | 0.204 | 0.03   |
| 023                | 1.542 | 0.18   | 1.658 | 0.41   | 9.370 | 0.83   | 2.744 | 1.04   | 1.309 | 0.29   | 0.594 | 0.02   | 1.188 | 0.04   | 0.392 | 0.04   |
| 024                | 0.173 | 999.99 | 0.173 | 999.99 | 0.865 | 999.99 | 0.104 | 999.99 | 0.259 | 999.99 | 0.432 | 999.99 | 0.865 | 999.99 | 0.190 | 999.99 |
| 025                | 0.504 | 0.06   | 1.232 | 0.68   | 1.243 | 0.34   | 0.569 | 0.24   | 1.232 | 0.68   | 0.420 | 0.05   | 0.839 | 0.11   | 0.159 | 0.00   |
| 026                | 0.317 | 0.20   | 0.106 | 0.00   | 0.851 | 0.03   | 0.080 | 0.06   | 0.319 | 0.01   | 0.532 | 0.02   | 1.063 | 0.04   | 0.170 | 0.01   |
| 027                | 0.722 | 0.09   | 0.241 | 0.03   | 1.075 | 0.11   | 0.132 | 0.01   | 0.553 | 0.43   | 0.601 | 0.08   | 1.203 | 0.15   | 0.276 | 0.01   |
| 028                | 0.656 | 0.47   | 0.328 | 0.24   | 1.417 | 0.73   | 0.163 | 0.07   | 0.325 | 0.02   | 0.541 | 0.03   | 1.083 | 0.06   | 0.208 | 0.16   |
| 030                | 0.824 | 0.23   | 0.706 | 0.47   | 4.121 | 0.25   | 0.800 | 0.37   | 1.060 | 0.24   | 0.589 | 0.00   | 1.177 | 0.01   | 0.283 | 0.00   |
| 031                | 0.308 | 0.17   | 0.210 | 0.03   | 1.047 | 0.14   | 0.136 | 0.00   | 0.314 | 0.04   | 0.524 | 0.07   | 1.047 | 0.14   | 0.210 | 0.03   |
| 032                | 0.927 | 0.58   | 1.079 | 1.73   | 1.033 | 0.36   | 0.264 | 0.10   | 1.010 | 1.38   | 0.570 | 0.07   | 1.140 | 0.15   | 0.094 | 0.07   |
| 033                | 0.324 | 0.21   | 0.217 | 0.01   | 0.978 | 0.25   | 0.130 | 0.00   | 0.325 | 0.01   | 0.543 | 0.02   | 1.085 | 0.04   | 0.113 | 0.12   |
| 034                | 0.398 | 0.00   | 0.149 | 0.10   | 0.696 | 0.19   | 0.050 | 0.00   | 0.299 | 0.00   | 0.498 | 0.00   | 0.995 | 0.01   | 0.169 | 0.02   |
| 035                | 0.292 | 0.20   | 0.146 | 0.10   | 0.485 | 0.19   | 0.049 | 0.00   | 0.291 | 0.00   | 0.486 | 0.00   | 0.972 | 0.01   | 0.049 | 0.00   |
| 036                | 0.270 | 0.18   | 0.180 | 0.00   | 0.539 | 0.00   | 0.045 | 0.00   | 0.269 | 0.00   | 0.449 | 0.00   | 0.898 | 0.00   | 0.162 | 0.00   |
| 037                | 0.221 | 0.26   | 0.089 | 0.00   | 0.447 | 0.19   | 0.045 | 0.00   | 0.267 | 0.01   | 0.445 | 0.01   | 0.891 | 0.03   | 0.076 | 0.06   |
| 038                | 0.389 | 0.02   | 0.147 | 0.11   | 0.678 | 0.16   | 0.084 | 0.07   | 0.292 | 0.02   | 0.486 | 0.03   | 0.972 | 0.06   | 0.185 | 0.03   |
| 039                | 0.323 | 0.22   | 0.107 | 0.00   | 0.536 | 0.21   | 0.054 | 0.00   | 0.322 | 0.00   | 0.536 | 0.01   | 1.073 | 0.02   | 0.193 | 0.00   |
| 040                | 0.459 | 0.18   | 0.184 | 0.00   | 0.918 | 0.00   | 0.220 | 0.04   | 0.275 | 0.00   | 0.459 | 0.00   | 0.918 | 0.00   | 0.101 | 0.02   |
| 041                | 0.188 | 0.01   | 0.188 | 0.01   | 1.034 | 0.16   | 0.104 | 0.02   | 0.282 | 0.01   | 0.470 | 0.01   | 0.941 | 0.03   | 0.207 | 0.03   |
| 042                | 0.302 | 0.23   | 0.198 | 0.02   | 0.793 | 0.08   | 0.141 | 0.09   | 0.297 | 0.03   | 0.496 | 0.05   | 0.991 | 0.10   | 0.188 | 0.00   |
| 043                | 0.561 | 0.28   | 0.222 | 0.02   | 1.110 | 0.11   | 0.123 | 0.03   | 0.333 | 0.03   | 0.555 | 0.06   | 1.110 | 0.11   | 0.188 | 0.00   |
| 044                | 0.276 | 0.18   | 0.184 | 0.00   | 0.920 | 0.00   | 0.129 | 0.04   | 0.276 | 0.00   | 0.460 | 0.00   | 0.920 | 0.00   | 0.175 | 0.02   |
| 045                | 0.572 | 0.08   | 0.191 | 0.03   | 2.096 | 0.28   | 0.283 | 0.04   | 0.438 | 0.34   | 0.476 | 0.06   | 0.953 | 0.13   | 0.184 | 0.12   |
| 080                | 1.971 | 0.21   | 0.263 | 0.01   | 4.865 | 0.13   | 0.606 | 0.12   | 2.234 | 0.20   | 0.658 | 0.02   | 1.315 | 0.04   | 0.228 | 0.32   |
| 081                | 4.157 | 0.04   | 0.416 | 0.00   | 1.767 | 0.23   | 0.270 | 0.04   | 4.055 | 0.67   | 0.520 | 0.01   | 4.157 | 0.04   | 0.592 | 0.06   |
| 082                | 3.060 | 0.67   | 0.254 | 0.01   | 1.912 | 0.35   | 0.216 | 0.01   | 3.693 | 0.45   | 0.636 | 0.03   | 2.544 | 0.13   | 0.547 | 0.00   |
| 083                | 3.513 | 0.44   | 0.251 | 0.00   | 1.884 | 0.28   | 0.252 | 0.10   | 3.767 | 0.07   | 0.628 | 0.01   | 2.511 | 0.04   | 0.490 | 0.02   |
| Ar. Mean           | 0.985 | 0.21   | 0.320 | 0.14   | 1.481 | 0.23   | 0.262 | 0.08   | 0.920 | 0.17   | 0.518 | 0.04   | 1.287 | 0.11   | 0.228 | 0.05   |
| Std. Dev.          | 1.249 | 0.17   | 0.298 | 0.29   | 1.420 | 0.20   | 0.401 | 0.16   | 1.278 | 0.26   | 0.065 | 0.04   | 1.021 | 0.17   | 0.143 | 0.06   |

## ARIZONA PUBLIC SERVICE

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

Page 2

| Location<br>Number | PO4   | d      | CO3   | d      | HCO3   | d      | NH3   | d      | TSS     | d      | CU    | d      | Av d   | SD(d)  |
|--------------------|-------|--------|-------|--------|--------|--------|-------|--------|---------|--------|-------|--------|--------|--------|
| 001                | 0.019 | 0.00   | 4.754 | 0.11   | 9.082  | 8.77   | 0.190 | 0.00   | 4.754   | 0.11   | 0.095 | 0.00   | 0.67   | 2.33   |
| 002                | 0.024 | 0.01   | 4.213 | 1.01   | 4.213  | 1.01   | 0.243 | 0.11   | 10.513  | 11.59  | 0.084 | 0.02   | 1.09   | 3.04   |
| 003                | 0.023 | 0.00   | 5.853 | 0.13   | 5.853  | 0.13   | 0.234 | 0.01   | 21.096  | 5.16   | 0.117 | 0.00   | 0.46   | 1.36   |
| 004                | 0.108 | 0.16   | 5.847 | 1.14   | 5.847  | 1.14   | 0.551 | 0.59   | 5.847   | 1.14   | 0.117 | 0.02   | 0.39   | 0.43   |
| 005                | 0.021 | 0.01   | 5.361 | 2.06   | 5.361  | 2.06   | 0.214 | 0.08   | 20.211  | 4.64   | 0.107 | 0.04   | 0.79   | 1.30   |
| 006                | 0.021 | 0.00   | 5.333 | 0.61   | 5.333  | 0.61   | 0.439 | 0.48   | 7.847   | 4.42   | 0.107 | 0.01   | 0.51   | 1.15   |
| 007                | 0.195 | 0.27   | 5.182 | 0.68   | 5.182  | 0.68   | 1.285 | 1.41   | 5.182   | 0.68   | 0.104 | 0.01   | 0.33   | 0.41   |
| 008                | 0.019 | 0.00   | 4.853 | 0.13   | 4.853  | 0.13   | 0.194 | 0.01   | 9.280   | 8.99   | 0.097 | 0.00   | 0.72   | 2.38   |
| 009                | 0.020 | 0.00   | 4.930 | 0.46   | 4.930  | 0.46   | 0.197 | 0.02   | 10.893  | 2.99   | 0.099 | 0.01   | 0.33   | 0.78   |
| 010                | 0.016 | 0.00   | 4.037 | 0.31   | 4.037  | 0.31   | 0.161 | 0.01   | 6.971   | 6.18   | 0.081 | 0.01   | 0.53   | 1.63   |
| 011                | 0.018 | 0.00   | 4.544 | 0.57   | 4.544  | 0.57   | 0.182 | 0.02   | 7.926   | 7.34   | 0.091 | 0.01   | 0.67   | 1.93   |
| 012                | 0.137 | 0.11   | 4.235 | 0.26   | 4.235  | 0.26   | 0.169 | 0.01   | 13.394  | 9.32   | 0.085 | 0.01   | 0.77   | 2.46   |
| 013                | 0.103 | 0.09   | 5.018 | 0.64   | 9.247  | 7.82   | 0.628 | 0.88   | 36.304  | 21.36  | 0.100 | 0.01   | 2.32   | 5.84   |
| 014                | 0.019 | 0.00   | 4.665 | 0.60   | 4.665  | 0.60   | 0.187 | 0.02   | 4.665   | 0.60   | 0.093 | 0.01   | 0.16   | 0.24   |
| 015                | 0.019 | 0.00   | 4.721 | 0.40   | 4.721  | 0.40   | 0.189 | 0.02   | 4.721   | 0.40   | 0.094 | 0.01   | 0.13   | 0.16   |
| 016                | 0.177 | 0.31   | 4.902 | 0.54   | 4.902  | 0.54   | 0.567 | 0.72   | 9.999   | 9.66   | 0.098 | 0.01   | 0.95   | 2.52   |
| 017                | 0.054 | 0.06   | 5.388 | 0.03   | 5.388  | 0.03   | 0.216 | 0.00   | 5.388   | 0.03   | 0.108 | 0.00   | 0.03   | 0.06   |
| 018                | 0.025 | 0.00   | 6.241 | 0.00   | 6.241  | 0.00   | 0.250 | 0.00   | 10.610  | 8.74   | 0.125 | 0.00   | 0.68   | 2.32   |
| 019                | 0.026 | 0.00   | 6.388 | 0.19   | 6.388  | 0.19   | 0.256 | 0.01   | 41.073  | 26.75  | 0.128 | 0.00   | 2.04   | 7.11   |
| 020                | 0.024 | 0.00   | 5.931 | 0.69   | 5.931  | 0.69   | 0.237 | 0.03   | 16.467  | 2.80   | 0.119 | 0.01   | 0.47   |        |
| 021                | 0.041 | 0.04   | 5.177 | 0.19   | 5.177  | 0.19   | 0.207 | 0.01   | 8.734   | 6.92   | 0.104 | 0.00   | 0.55   |        |
| 022                | 0.020 | 0.00   | 5.105 | 0.19   | 5.105  | 0.19   | 0.204 | 0.01   | 5.105   | 0.19   | 0.102 | 0.00   | 0.07   | 0.09   |
| 023                | 0.178 | 0.02   | 5.938 | 0.22   | 31.995 | 5.91   | 0.238 | 0.01   | 170.280 | 69.52  | 0.119 | 0.00   | 5.61   | 18.46  |
| 024                | 0.017 | 999.99 | 4.324 | 999.99 | 4.324  | 999.99 | 0.173 | 999.99 | 4.324   | 999.99 | 0.086 | 999.99 | 999.99 | 999.99 |
| 025                | 0.017 | 0.00   | 4.197 | 0.54   | 4.197  | 0.54   | 0.246 | 0.14   | 36.390  | 12.03  | 0.084 | 0.01   | 1.10   | 3.16   |
| 026                | 0.021 | 0.00   | 5.317 | 0.18   | 5.317  | 0.18   | 0.213 | 0.01   | 5.317   | 0.18   | 0.106 | 0.00   | 0.07   | 0.08   |
| 027                | 0.024 | 0.00   | 6.014 | 0.75   | 6.014  | 0.75   | 0.241 | 0.03   | 6.014   | 0.75   | 0.120 | 0.02   | 0.23   | 0.30   |
| 028                | 0.022 | 0.00   | 5.413 | 0.33   | 5.413  | 0.33   | 0.217 | 0.01   | 5.413   | 0.33   | 0.108 | 0.01   | 0.20   | 0.22   |
| 030                | 0.188 | 0.19   | 5.887 | 0.03   | 11.198 | 10.65  | 0.353 | 0.23   | 44.720  | 23.36  | 0.118 | 0.00   | 2.57   | 6.60   |
| 031                | 0.077 | 0.11   | 5.238 | 0.68   | 5.238  | 0.68   | 0.210 | 0.03   | 5.238   | 0.68   | 0.105 | 0.01   | 0.20   | 0.26   |
| 032                | 0.059 | 0.08   | 5.700 | 0.75   | 5.700  | 0.75   | 0.228 | 0.03   | 12.465  | 0.63   | 0.114 | 0.02   | 0.48   | 0.54   |
| 033                | 0.022 | 0.00   | 5.425 | 0.20   | 5.425  | 0.20   | 0.217 | 0.01   | 8.087   | 5.12   | 0.109 | 0.00   | 0.44   | 1.35   |
| 034                | 0.020 | 0.00   | 4.977 | 0.05   | 4.977  | 0.05   | 0.199 | 0.00   | 4.977   | 0.05   | 0.100 | 0.00   | 0.03   | 0.05   |
| 035                | 0.019 | 0.00   | 4.858 | 0.03   | 4.858  | 0.03   | 0.194 | 0.00   | 4.858   | 0.03   | 0.097 | 0.00   | 0.04   | 0.07   |
| 036                | 0.018 | 0.00   | 4.489 | 0.02   | 4.489  | 0.02   | 0.180 | 0.00   | 4.489   | 0.02   | 0.090 | 0.00   | 0.02   | 0.05   |
| 037                | 0.018 | 0.00   | 4.455 | 0.14   | 4.455  | 0.14   | 0.178 | 0.01   | 4.455   | 0.14   | 0.089 | 0.00   | 0.07   | 0.09   |
| 038                | 0.019 | 0.00   | 4.863 | 0.28   | 4.863  | 0.28   | 0.195 | 0.01   | 7.225   | 4.45   | 0.097 | 0.01   | 0.39   | 1.17   |
| 039                | 0.054 | 0.07   | 5.363 | 0.08   | 5.363  | 0.08   | 0.215 | 0.00   | 9.143   | 7.64   | 0.107 | 0.00   | 0.59   | 2.03   |
| 040                | 0.018 | 0.00   | 4.588 | 0.00   | 4.588  | 0.00   | 0.184 | 0.00   | 16.518  | 7.34   | 0.092 | 0.00   | 0.54   | 1.96   |
| 041                | 0.019 | 0.00   | 4.705 | 0.14   | 4.705  | 0.14   | 0.188 | 0.01   | 4.705   | 0.14   | 0.094 | 0.00   | 0.05   | 0.06   |
| 042                | 0.020 | 0.00   | 4.956 | 0.49   | 4.956  | 0.49   | 0.198 | 0.02   | 7.313   | 4.23   | 0.099 | 0.01   | 0.42   | 1.11   |
| 043                | 0.069 | 0.10   | 5.550 | 0.55   | 5.550  | 0.55   | 0.222 | 0.02   | 5.550   | 0.55   | 0.111 | 0.01   | 0.17   | 0.22   |
| 044                | 0.018 | 0.00   | 4.599 | 0.02   | 4.599  | 0.02   | 0.184 | 0.00   | 9.199   | 0.04   | 0.092 | 0.00   | 0.02   | 0.05   |
| 045                | 0.070 | 0.10   | 4.763 | 0.63   | 4.763  | 0.63   | 0.191 | 0.03   | 17.660  | 10.96  | 0.095 | 0.01   | 0.96   | 2.89   |
| 080                | 0.026 | 0.00   | 6.576 | 0.18   | 12.576 | 12.18  | 0.263 | 0.01   | 23.783  | 16.43  | 0.132 | 0.00   | 2.13   | 5.23   |
| 081                | 0.021 | 0.00   | 5.196 | 0.05   | 5.196  | 0.05   | 0.208 | 0.00   | 11.427  | 1.96   | 0.104 | 0.00   | 0.23   | 0.53   |
| 082                | 0.025 | 0.00   | 6.361 | 0.33   | 6.361  | 0.33   | 0.254 | 0.01   | 6.361   | 0.33   | 0.127 | 0.01   | 0.19   |        |
| 083                | 0.025 | 0.00   | 6.278 | 0.11   | 6.278  | 0.11   | 0.251 | 0.00   | 11.978  | 11.51  | 0.126 | 0.00   | 0.91   |        |
| Ar. Mean           | 0.046 | 0.04   | 5.181 | 0.38   | 6.138  | 1.32   | 0.263 | 0.11   | 14.893  | 6.77   | 0.104 | 0.01   | 0.69   | 1.91   |
| Std. dev.          | 0.050 | 0.07   | 0.646 | 0.38   | 4.162  | 2.82   | 0.181 | 0.27   | 24.918  | 11.36  | 0.013 | 0.01   | 0.95   | 3.02   |



ARIZONA PUBLIC SERVICE  
MONTHLY REPORT for 12-90

DEPOSITION DATA  
Comments and Messages Only

Page 3

| Location<br>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                |                   |                   |                     |
| 023                |                   |                   |                     |
| 024                | VOID/VANDALISM    |                   | MISSING SAMPLE A    |
| 025                |                   |                   |                     |
| 026                |                   |                   |                     |
| 027                |                   |                   |                     |
| 028                |                   |                   |                     |
| 030                |                   |                   |                     |
| 031                |                   |                   |                     |
| 032                |                   |                   |                     |
| 033                |                   |                   |                     |
| 034                |                   |                   |                     |
| 035                |                   |                   |                     |
| 036                |                   |                   |                     |
| 037                |                   |                   |                     |
| 038                |                   |                   |                     |
| 039                |                   |                   |                     |
| 040                |                   |                   |                     |
| 041                |                   |                   |                     |
| 042                |                   |                   |                     |
| 043                |                   |                   |                     |
| 044                |                   |                   |                     |
| 045                |                   |                   |                     |
| 080                |                   |                   |                     |
| 081                |                   |                   |                     |
| 082                |                   |                   |                     |



## 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."



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## Suspended Particulate

| Monitoring Location | 008        | 009        | 010        | 020        | 021        | 027        |
|---------------------|------------|------------|------------|------------|------------|------------|
| Year                | 90         | 90         | 90         | 90         | 90         | 90         |
| Month               | 1          | 1          | 1          | 1          | 1          | 1          |
| Lab Number          | 90-01-0008 | 90-01-0009 | 90-01-0010 | 90-01-0020 | 90-01-0021 | 90-01-0027 |
| Calcium (ug/m3)     | 0.85       | 1.44       | 1.12       | 1.14       | 0.73       | 0.90       |
| 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)    | 0.031      | 0.040      | 0.033      | 0.038      | 0.028      | 0.031      |
| Potassium (ug/m3)   | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      |
| Magnesium (ug/m3)   | 0.06       | 0.06       | 0.05       | 0.07       | 0.05       | 0.06       |
| Sodium (ug/m3)      | 0.56       | 0.54       | 0.59       | 0.73       | 0.59       | 0.56       |
| Nitrate (ug/m3)     | 0.16       | 0.18       | 0.19       | 0.21       | 0.16       | 0.20       |
| Sulfate (ug/m3)     | 0.7        | 0.9        | 0.9        | 1.2        | 0.9        | 0.9        |
| Phosphate (ug/m3)   | -0.02      | -0.02      | -0.02      | -0.02      | -0.02      | -0.02      |

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## Suspended Particulate

| Monitoring Location | 008        | 009        | 010        | 020        | 021        | 027        |
|---------------------|------------|------------|------------|------------|------------|------------|
| Year                | 90         | 90         | 90         | 90         | 90         | 90         |
| Month               | 2          | 2          | 2          | 2          | 2          | 2          |
| Lab Number          | 90-02-0008 | 90-02-0009 | 90-02-0010 | 90-02-0020 | 90-02-0021 | 90-02-0027 |
| Calcium (ug/m3)     | 1.40       | 2.13       | 1.68       | 1.71       | 1.18       | 1.16       |
| Chloride (ug/m3)    | -0.3       | -0.3       | -0.3       | 0.9        | -0.3       | -0.3       |
| Iron (ug/m3)        | 0.006      | 0.003      | 0.003      | 0.006      | 0.003      | 0.009      |
| Fluoride (ug/m3)    | 0.026      | 0.038      | 0.032      | 0.029      | 0.026      | 0.026      |
| Potassium (ug/m3)   | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      |
| Magnesium (ug/m3)   | 0.07       | 0.08       | 0.08       | 0.08       | 0.06       | 0.07       |
| Sodium (ug/m3)      | 0.55       | 0.49       | 0.53       | 0.74       | 0.53       | 0.56       |
| Nitrate (ug/m3)     | 0.21       | 0.24       | 0.24       | 0.26       | 0.20       | 0.22       |
| Sulfate (ug/m3)     | 1.2        | 1.2        | 1.2        | 1.5        | 0.9        | 1.7        |
| Phosphate (ug/m3)   | -0.02      | -0.02      | -0.02      | -0.02      | -0.02      | -0.02      |

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## Suspended Particulate

| Monitoring Location | 008        | 009        | 010        | 020        | 021        | 027        |
|---------------------|------------|------------|------------|------------|------------|------------|
| Year                | 90         | 90         | 90         | 90         | 90         | 90         |
| Month               | 3          | 3          | 3          | 3          | 3          | 3          |
| Lab Number          | 90-03-0008 | 90-03-0009 | 90-03-0010 | 90-03-0020 | 90-03-0021 | 90-03-0027 |
| Calcium (ug/m3)     | 1.55       | 2.05       | 1.58       | 1.70       | 1.64       | 1.48       |
| Chloride (ug/m3)    | 0.3        | 0.3        | 0.3        | 0.5        | 0.3        | 0.3        |
| Iron (ug/m3)        | 0.029      | 0.009      | -0.005     | 0.006      | 0.006      | -0.005     |
| Fluoride (ug/m3)    | 0.032      | 0.050      | 0.041      | 0.035      | 0.035      | 0.035      |
| Potassium (ug/m3)   | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      |
| Magnesium (ug/m3)   | 0.07       | 0.10       | 0.08       | 0.08       | 0.07       | 0.07       |
| Sodium (ug/m3)      | 0.51       | 0.54       | 0.50       | 1.53       | 0.49       | 0.53       |
| Nitrate (ug/m3)     | 0.19       | 0.26       | 0.23       | 0.24       | 0.19       | 0.21       |
| Sulfate (ug/m3)     | 0.9        | 1.8        | 1.5        | 1.5        | 2.1        | 1.5        |
| Phosphate (ug/m3)   | -0.02      | -0.02      | -0.02      | -0.02      | -0.02      | -0.02      |

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## Suspended Particulate

| Monitoring Location | 008        | 009        | 010        | 020        | 021        | 027        |
|---------------------|------------|------------|------------|------------|------------|------------|
| Year                | 90         | 90         | 90         | 90         | 90         | 90         |
| Month               | 4          | 4          | 4          | 4          | 4          | 4          |
| Lab Number          | 90-04-0008 | 90-04-0009 | 90-04-0010 | 90-04-0020 | 90-04-0021 | 90-04-0027 |
| Calcium (ug/m3)     | 1.17       | 2.06       | 1.65       | 1.35       | 1.66       | 1.37       |
| Chloride (ug/m3)    | 0.3        | 0.3        | 0.3        | 0.4        | 0.3        | 0.3        |
| Iron (ug/m3)        | 0.021      | 0.021      | 0.021      | 0.021      | 0.021      | 0.021      |
| Fluoride (ug/m3)    | 0.029      | 0.038      | 0.038      | 0.032      | 0.035      | 0.035      |
| Potassium (ug/m3)   | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      |
| Magnesium (ug/m3)   | 0.08       | 0.09       | 0.11       | 0.09       | 0.08       | 0.08       |
| Sodium (ug/m3)      | 0.97       | 0.62       | 0.68       | 0.79       | 0.65       | 0.68       |
| Nitrate (ug/m3)     | 0.17       | 0.20       | 0.21       | 0.20       | 0.18       | 0.19       |
| Sulfate (ug/m3)     | 1.5        | 1.5        | 0.9        | 1.5        | 1.2        | 1.2        |
| Phosphate (ug/m3)   | -0.02      | -0.02      | -0.02      | -0.02      | -0.02      | -0.02      |



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## Suspended Particulate

| Monitoring Location | 008        | 009        | 010        | 020        | 021        | 027        |
|---------------------|------------|------------|------------|------------|------------|------------|
| Year                | 90         | 90         | 90         | 90         | 90         | 90         |
| Month               | 5          | 5          | 5          | 5          | 5          | 5          |
| Lab Number          | 90-05-0008 | 90-05-0009 | 90-05-0010 | 90-05-0020 | 90-05-0021 | 90-05-0027 |
| Calcium (ug/m3)     | 1.82       | 2.32       | 2.00       | 1.82       | 2.04       | 1.76       |
| Chloride (ug/m3)    | 0.4        | 0.4        | 0.4        | 0.5        | 0.4        | 0.4        |
| Iron (ug/m3)        | 0.007      | -0.005     | 0.005      | -0.005     | -0.005     | 0.009      |
| Fluoride (ug/m3)    | 0.028      | 0.040      | 0.035      | 0.031      | 0.033      | 0.031      |
| Potassium (ug/m3)   | 0.15       | 0.15       | 0.15       | 0.16       | 0.14       | 0.15       |
| Magnesium (ug/m3)   | 0.12       | 0.13       | 0.14       | 0.11       | 0.11       | 0.12       |
| Sodium (ug/m3)      | 0.89       | 0.87       | 0.94       | 0.94       | 0.82       | 0.85       |
| Nitrate (ug/m3)     | 0.27       | 0.27       | 0.28       | 0.27       | 0.26       | 0.27       |
| Sulfate (ug/m3)     | 2.2        | 2.2        | 2.0        | 2.2        | 2.0        | 2.0        |
| Phosphate (ug/m3)   | -0.02      | -0.02      | 0.02       | -0.02      | -0.02      | -0.02      |

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## Suspended Particulate

| Monitoring Location | 008        | 009        | 010        | 020        | 021        | 027        |
|---------------------|------------|------------|------------|------------|------------|------------|
| Year                | 90         | 90         | 90         | 90         | 90         | 90         |
| Month               | 6          | 6          | 6          | 6          | 6          | 6          |
| Lab Number          | 90-06-0008 | 90-06-0009 | 90-06-0010 | 90-06-0020 | 90-06-0021 | 90-06-0027 |
| Calcium (ug/m3)     | 1.43       | 2.34       | 2.09       | 1.45       | 1.99       | 1.65       |
| Chloride (ug/m3)    | 0.5        | 0.5        | 0.5        | 0.7        | 0.5        | 0.5        |
| Iron (ug/m3)        | 0.021      | 0.012      | 0.015      | 0.018      | 0.006      | 0.009      |
| Fluoride (ug/m3)    | 0.032      | 0.044      | 0.035      | 0.035      | 0.035      | 0.032      |
| Potassium (ug/m3)   | 0.17       | 0.18       | 0.17       | 0.19       | 0.20       | 0.18       |
| Magnesium (ug/m3)   | 0.11       | 0.15       | 0.15       | 0.11       | 0.13       | 0.11       |
| Sodium (ug/m3)      | 0.68       | 0.77       | 0.77       | 0.94       | 0.71       | 0.71       |
| Nitrate (ug/m3)     | 0.20       | 0.23       | 0.23       | 0.21       | 0.29       | 0.29       |
| Sulfate (ug/m3)     | 0.4        | 0.9        | 0.6        | 1.9        | 0.4        | 0.9        |
| 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                | 90         | 90         | 90         | 90         | 90         | 90         |
| Month               | 7          | 7          | 7          | 7          | 7          | 7          |
| Lab Number          | 90-07-0008 | 90-07-0009 | 90-07-0010 | 90-07-0020 | 90-07-0021 | 90-07-0027 |
| Calcium (ug/m3)     | 1.69       | 2.31       | 2.09       | 2.00       | 1.82       | 1.59       |
| Chloride (ug/m3)    | 0.4        | 0.3        | 0.3        | 0.5        | 0.3        | 0.3        |
| Iron (ug/m3)        | 0.014      | 0.007      | 0.005      | 0.007      | 0.005      | 0.005      |
| Fluoride (ug/m3)    | 0.033      | 0.040      | 0.038      | 0.038      | 0.035      | 0.033      |
| Potassium (ug/m3)   | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      |
| Magnesium (ug/m3)   | 0.10       | 0.14       | 0.15       | 0.12       | 0.10       | 0.09       |
| Sodium (ug/m3)      | 0.73       | 0.80       | 0.80       | 0.82       | 0.71       | 0.68       |
| Nitrate (ug/m3)     | 0.24       | 0.29       | 0.31       | 0.26       | 0.23       | 0.24       |
| Sulfate (ug/m3)     | 2.7        | 2.7        | 2.9        | 2.7        | 2.7        | 2.5        |
| Phosphate (ug/m3)   | -0.02      | -0.02      | 0.02       | -0.02      | -0.02      | -0.02      |

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## Suspended Particulate

| Monitoring Location | 008        | 009        | 010        | 020        | 021        | 027        |
|---------------------|------------|------------|------------|------------|------------|------------|
| Year                | 90         | 90         | 90         | 90         | 90         | 90         |
| Month               | 8          | 8          | 8          | 8          | 8          | 8          |
| Lab Number          | 90-08-0008 | 90-08-0009 | 90-08-0010 | 90-08-0020 | 90-08-0021 | 90-08-0027 |
| Calcium (ug/m3)     | 1.46       | 2.30       | 1.85       | 2.05       | 1.59       | 1.64       |
| Chloride (ug/m3)    | 0.3        | 0.4        | 0.4        | 0.8        | 0.3        | 0.3        |
| Iron (ug/m3)        | 0.012      | 0.015      | 0.009      | 0.009      | 0.012      | 0.006      |
| Fluoride (ug/m3)    | 0.038      | 0.038      | 0.038      | 0.038      | 0.035      | 0.029      |
| Potassium (ug/m3)   | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      |
| Magnesium (ug/m3)   | 0.07       | 0.18       | 0.12       | 0.10       | 0.07       | 0.08       |
| Sodium (ug/m3)      | 0.59       | 0.62       | 0.71       | 1.12       | 0.62       | 0.59       |
| Nitrate (ug/m3)     | 0.18       | 0.21       | 0.22       | 0.22       | 0.18       | 0.19       |
| Sulfate (ug/m3)     | 2.4        | 1.9        | 2.2        | 2.4        | 1.0        | 1.9        |
| Phosphate (ug/m3)   | -0.02      | 0.02       | 0.02       | -0.02      | -0.02      | -0.02      |

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## Suspended Particulate

| Monitoring Location | 008        | 009        | 010        | 020        | 021        | 027        |
|---------------------|------------|------------|------------|------------|------------|------------|
| Year                | 90         | 90         | 90         | 90         | 90         | 90         |
| Month               | 9          | 9          | 9          | 9          | 9          | 9          |
| Lab Number          | 90-09-0008 | 90-09-0009 | 90-09-0010 | 90-09-0020 | 90-09-0021 | 90-09-0027 |
| Calcium (ug/m3)     | 0.87       | 1.25       | 1.03       | 1.23       | 0.73       | 0.68       |
| 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     | 0.006      |
| Fluoride (ug/m3)    | 0.030      | 0.050      | 0.040      | 0.040      | 0.040      | 0.040      |
| Potassium (ug/m3)   | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      | -0.30      |
| Magnesium (ug/m3)   | 0.06       | 0.07       | 0.08       | 0.08       | 0.06       | 0.06       |
| Sodium (ug/m3)      | 0.65       | 0.71       | 0.71       | 0.82       | 0.65       | 0.68       |
| Nitrate (ug/m3)     | 0.16       | 0.18       | 0.18       | 0.18       | 0.15       | 0.16       |
| Sulfate (ug/m3)     | 3.2        | 2.7        | 2.9        | 3.2        | 2.9        | 2.9        |
| Phosphate (ug/m3)   | -0.02      | -0.02      | -0.02      | -0.02      | -0.02      | -0.02      |

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## Suspended Particulate

| Monitoring Location | 008       | 009       | 010       | 020       | 021       | 027       |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Year                | 90        | 90        | 90        | 90        | 90        | 90        |
| Month               | 10        | 10        | 10        | 10        | 10        | 10        |
| Lab Number          | 90-10-008 | 90-10-009 | 90-10-010 | 90-10-020 | 90-10-021 | 90-10-027 |
| Calcium (ug/m3)     | 1.16      | 2.06      | 1.46      | 1.26      | 1.27      | 0.94      |
| Chloride (ug/m3)    | -0.3      | -0.3      | -0.3      | 0.3       | -0.3      | -0.3      |
| Iron (ug/m3)        | -0.005    | -0.005    | 0.005     | 0.012     | -0.005    | 0.005     |
| Fluoride (ug/m3)    | 0.040     | 0.040     | 0.040     | 0.040     | 0.040     | 0.040     |
| Potassium (ug/m3)   | -0.30     | -0.30     | -0.30     | -0.30     | -0.30     | -0.30     |
| Magnesium (ug/m3)   | 0.05      | 0.09      | 0.07      | 0.06      | 0.06      | 0.05      |
| Sodium (ug/m3)      | 0.52      | 0.49      | 0.49      | 0.56      | 0.47      | 0.40      |
| Nitrate (ug/m3)     | 0.15      | 0.21      | 0.18      | 0.18      | 0.16      | 0.14      |
| Sulfate (ug/m3)     | 1.8       | 1.4       | 1.8       | 2.1       | 2.2       | 0.9       |
| Phosphate (ug/m3)   | -0.02     | -0.02     | -0.02     | -0.02     | -0.02     | -0.02     |

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## Suspended Particulate

| Monitoring Location | 008       | 009       | 010       | 020       | 021       | 027       |
|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Year                | 90        | 90        | 90        | 90        | 90        | 90        |
| Month               | 11        | 11        | 11        | 11        | 11        | 11        |
| Lab Number          | 90-11-008 | 90-11-009 | 90-11-010 | 90-11-020 | 90-11-021 | 90-11-027 |
| Calcium (ug/m3)     | 1.51      | 2.26      | 1.61      | 1.29      | 1.60      | 1.41      |
| Chloride (ug/m3)    | -0.3      | -0.3      | -0.3      | -0.3      | -0.3      | -0.3      |
| Iron (ug/m3)        | 0.009     | 0.006     | -0.005    | 0.006     | 0.006     | 0.009     |
| Fluoride (ug/m3)    | 0.040     | 0.050     | 0.040     | 0.040     | 0.040     | 0.040     |
| Potassium (ug/m3)   | -0.30     | -0.30     | -0.30     | -0.30     | -0.30     | -0.30     |
| Magnesium (ug/m3)   | 0.07      | 0.10      | 0.08      | 0.06      | 0.07      | 0.07      |
| Sodium (ug/m3)      | 0.49      | 0.50      | 0.48      | 0.52      | 0.47      | 0.47      |
| Nitrate (ug/m3)     | 0.17      | 0.26      | 0.20      | 0.17      | 0.18      | 0.17      |
| Sulfate (ug/m3)     | 2.1       | 1.0       | 0.4       | 1.8       | 2.1       | 1.5       |
| Phosphate (ug/m3)   | -0.02     | -0.02     | -0.02     | -0.02     | -0.02     | -0.02     |

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## Suspended Particulate

| Monitoring Location | 008        | 009        | 010        | 020        | 021        | 027        |
|---------------------|------------|------------|------------|------------|------------|------------|
| Year                | 90         | 90         | 90         | 90         | 90         | 90         |
| Month               | 12         | 12         | 12         | 12         | 12         | 12         |
| Lab Number          | 90-12-0008 | 90-12-0009 | 90-12-0010 | 90-12-0020 | 90-12-0021 | 90-12-0027 |
| Calcium (ug/m3)     | 1.23       | 1.68       | 1.36       | 1.22       | 1.50       | 1.36       |
| Chloride (ug/m3)    | -0.3       | -0.3       | -0.3       | -0.3       | -0.3       | -0.3       |
| Iron (ug/m3)        | 0.006      | 0.009      | 0.009      | 0.006      | -0.005     | 0.006      |
| Fluoride (ug/m3)    | 0.040      | 0.060      | 0.050      | 0.040      | 0.040      | 0.040      |
| Potassium (ug/m3)   | 0.14       | 0.17       | 0.15       | 0.14       | 0.14       | 0.14       |
| Magnesium (ug/m3)   | 0.06       | 0.09       | 0.08       | 0.06       | 0.07       | 0.07       |
| Sodium (ug/m3)      | 0.43       | 0.48       | 0.46       | 0.49       | 0.44       | 0.44       |
| Nitrate (ug/m3)     | 0.19       | 0.24       | 0.24       | 0.24       | 0.23       | 0.24       |
| Sulfate (ug/m3)     | 0.2        | -0.2       | 0.2        | 0.3        | 0.3        | 0.3        |
| Phosphate (ug/m3)   | -0.02      | 0.02       | 0.03       | -0.02      | -0.02      | -0.02      |



## Appendix E

### Indigenous Vegetation Data

Indigenous vegetation data were collected during the first and fourth quarters of 1990 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 1990. No data were reported as missing during the 1990 data collection.



## ARIZONA PUBLIC SERVICE

## 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                 | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       |
| NUS Sample ID Number | 1001     | 1002     | 1003     | 1004     | 1005     | 1006     | 1007     | 1008     | 1009     | 1010     |
| Laboratory Number    | 45       | 46       | 47       | 48       | 49       | 50       | 51       | 52       | 53       | 54       |
| Cations (ppm)        |          |          |          |          |          |          |          |          |          |          |
| Sodium               | 381.00   | 286.00   | 381.00   | 333.00   | 524.00   | 286.00   | 238.00   | 286.00   | 190.00   | 286.00   |
| Potassium            | 14286.00 | 12857.00 | 11905.00 | 13810.00 | 16190.00 | 13810.00 | 11905.00 | 10476.00 | 11905.00 | 10000.00 |
| Calcium              | 16288.00 | 20750.00 | 18000.00 | 14775.00 | 13863.00 | 17613.00 | 17588.00 | 16438.00 | 13412.00 | 15013.00 |
| Magnesium            | 1388.00  | 1563.00  | 1050.00  | 1075.00  | 1300.00  | 1313.00  | 1563.00  | 1538.00  | 1438.00  | 1400.00  |
| Anions (ppm)         |          |          |          |          |          |          |          |          |          |          |
| Chloride             | 8000.00  | 8400.00  | 8400.00  | 10800.00 | 9200.00  | 12600.00 | 8400.00  | 7200.00  | 8200.00  | 8400.00  |
| Sulfate              | 4500.00  | 3000.00  | 5000.00  | 5500.00  | 0.00     | 4000.00  | 2400.00  | 0.00     | 0.00     | 500.00   |
| Nitrate              | 139.00   | 98.00    | 181.00   | 133.00   | 263.00   | 101.00   | 164.00   | 105.00   | 139.00   | 115.00   |
| Phosphate            | 1492.00  | 1657.00  | 1326.00  | 1740.00  | 1823.00  | 1409.00  | 1533.00  | 1533.00  | 994.00   | 1285.00  |
| Fluoride             | 14.00    | 15.00    | 15.00    | 13.00    | 13.00    | 12.00    | 13.00    | 11.00    | 12.00    | 11.00    |

## 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              | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     |
| Month                | 3     | 3     | 3     | 3     | 3     | 3     | 3     | 3     | 3     | 3     |
| Year                 | 90    | 90    | 90    | 90    | 90    | 90    | 90    | 90    | 90    | 90    |
| NUS Sample ID Number | 1012  | 1013  | 1014  | 1015  | 1016  | 1017  | 1018  | 1019  | 1020  | 1021  |
| Laboratory Number    | 56    | 57    | 58    | 59    | 60    | 61    | 62    | 63    | 64    | 65    |

**Cations (ppm)**

|           |          |          |          |          |          |          |          |          |          |          |
|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Sodium    | 60000.00 | 62500.00 | 73750.00 | 83750.00 | 71250.00 | 58750.00 | 76250.00 | 65000.00 | 72500.00 | 53750.00 |
| Potassium | 15714.00 | 21000.00 | 26500.00 | 15238.00 | 18571.00 | 36000.00 | 21000.00 | 23000.00 | 20000.00 | 20476.00 |
| Calcium   | 14138.00 | 16388.00 | 11213.00 | 9475.00  | 14450.00 | 17838.00 | 18788.00 | 11675.00 | 10513.00 | 13125.00 |
| Magnesium | 5200.00  | 6625.00  | 4338.00  | 3838.00  | 7500.00  | 7250.00  | 10250.00 | 6875.00  | 3663.00  | 6500.00  |

**Anions (ppm)**

[illegible]

[illegible]

## 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             | L        | L        | L        | L        | L        | L        | L        | L        | U        | U        |
| Quarter              | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        | 1        |
| Month                | 3        | 3        | 3        | 3        | 3        | 3        | 3        | 3        | 3        | 3        |
| Year                 | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       |
|                      |          |          |          |          |          |          |          |          |          |          |
| NUS Sample ID Number | 1034     | 1035     | 1036     | 1037     | 1038     | 1039     | 1040     | 1041     | 1042     | 1043     |
| Laboratory Number    | 78       | 79       | 80       | 81       | 82       | 83       | 84       | 85       | 86       | 87       |
|                      |          |          |          |          |          |          |          |          |          |          |
| Cations (ppm)        |          |          |          |          |          |          |          |          |          |          |
|                      |          |          |          |          |          |          |          |          |          |          |
| Sodium               | 300.00   | 350.00   | 250.00   | 150.00   | 200.00   | 250.00   | 500.00   | 250.00   | 600.00   | 350.00   |
| Potassium            | 21905.00 | 19524.00 | 15238.00 | 14286.00 | 15714.00 | 16190.00 | 17619.00 | 17500.00 | 15000.00 | 13500.00 |
| Calcium              | 20938.00 | 20787.00 | 15963.00 | 15925.00 | 15825.00 | 14100.00 | 18725.00 | 17313.00 | 16950.00 | 16475.00 |
| Magnesium            | 1425.00  | 1888.00  | 1500.00  | 1775.00  | 1200.00  | 1400.00  | 1413.00  | 1338.00  | 1375.00  | 1438.00  |
|                      |          |          |          |          |          |          |          |          |          |          |
| Anions (ppm)         |          |          |          |          |          |          |          |          |          |          |
|                      |          |          |          |          |          |          |          |          |          |          |
| Chloride             | 11600.00 | 8400.00  | 7600.00  | 7600.00  | 8200.00  | 7200.00  | 8000.00  | 10800.00 | 12400.00 | 8800.00  |
| Sulfate              | 9924.00  | 5667.00  | 8106.00  | 13485.00 | 6250.00  | 7159.00  | 6288.00  | 5000.00  | 2800.00  | 800.00   |
| Nitrate              | 124.00   | 144.00   | 98.00    | 171.00   | 169.00   | 258.00   | 253.00   | 170.00   | 393.00   | 153.00   |
| Phosphate            | 1450.00  | 1492.00  | 1699.00  | 1533.00  | 1492.00  | 1243.00  | 1326.00  | 1409.00  | 1782.00  | 1616.00  |
| Fluoride             | 12.00    | 14.00    | 14.00    | 14.00    | 15.00    | 14.00    | 15.00    | 14.00    | 14.00    | 15.00    |

[illegible]

## ARIZONA PUBLIC SERVICE

## 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                 | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       |
| NUS Sample ID Number | 1056     | 1057     | 1058     | 1059     | 1060     | 1061     | 1062     | 1063     | 1064     | 1065     |
| Laboratory Number    | 100      | 101      | 102      | 103      | 104      | 105      | 106      | 107      | 108      | 109      |
| Cations (ppm)        |          |          |          |          |          |          |          |          |          |          |
| -----                |          |          |          |          |          |          |          |          |          |          |
| Sodium               | 400.00   | 350.00   | 350.00   | 700.00   | 250.00   | 263.00   | 421.00   | 316.00   | 421.00   | 316.00   |
| Potassium            | 12500.00 | 12500.00 | 12000.00 | 11000.00 | 13000.00 | 13158.00 | 15263.00 | 13684.00 | 15789.00 | 12632.00 |
| Calcium              | 16063.00 | 18563.00 | 19650.00 | 19625.00 | 17325.00 | 15350.00 | 14563.00 | 17225.00 | 18013.00 | 14138.00 |
| Magnesium            | 1263.00  | 1563.00  | 1650.00  | 2725.00  | 1787.00  | 1588.00  | 2063.00  | 1188.00  | 1338.00  | 1725.00  |
| Anions (ppm)         |          |          |          |          |          |          |          |          |          |          |
| -----                |          |          |          |          |          |          |          |          |          |          |
| Chloride             | 8000.00  | 8000.00  | 6400.00  | 7600.00  | 6200.00  | 6000.00  | 6600.00  | 5400.00  | 8000.00  | 5600.00  |
| Sulfate              | 6417.00  | 417.00   | 6000.00  | 5500.00  | 6417.00  | 5750.00  | 0.00     | 2083.00  | 7538.00  | 0.00     |
| Nitrate              | 204.00   | 260.00   | 188.00   | 159.00   | 164.00   | 153.00   | 90.00    | 145.00   | 216.00   | 133.00   |
| Phosphate            | 1823.00  | 2030.00  | 1989.00  | 1492.00  | 1906.00  | 1616.00  | 1575.00  | 1367.00  | 1823.00  | 1326.00  |
| Fluoride             | 14.00    | 14.00    | 12.00    | 13.00    | 13.00    | 14.00    | 15.00    | 16.00    | 17.00    | 17.00    |



## ARIZONA PUBLIC SERVICE

## 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                 | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       |
| NUS Sample ID Number | 1067     | 1068     | 1069     | 1070     | 1071     | 1072     | 1073     | 1074     | 1075     | 1076     |
| Laboratory Number    | 111      | 112      | 113      | 114      | 115      | 116      | 117      | 118      | 119      | 120      |
| Cations (ppm)        |          |          |          |          |          |          |          |          |          |          |
| Sodium               | 368.00   | 211.00   | 263.00   | 158.00   | 421.00   | 263.00   | 263.00   | 368.00   | 263.00   | 211.00   |
| Potassium            | 13684.00 | 12105.00 | 12105.00 | 7895.00  | 9474.00  | 13684.00 | 12632.00 | 11579.00 | 16842.00 | 16316.00 |
| Calcium              | 17425.00 | 18463.00 | 21588.00 | 21550.00 | 22800.00 | 20913.00 | 16763.00 | 17975.00 | 16663.00 | 17250.00 |
| Magnesium            | 1637.00  | 1413.00  | 1700.00  | 1463.00  | 1425.00  | 1300.00  | 1338.00  | 1775.00  | 1288.00  | 1463.00  |
| Anions (ppm)         |          |          |          |          |          |          |          |          |          |          |
| Chloride             | 11200.00 | 8000.00  | 8800.00  | 7600.00  | 9200.00  | 12000.00 | 8800.00  | 6200.00  | 8800.00  | 8200.00  |
| Sulfate              | 6083.00  | 1667.00  | 2917.00  | 2917.00  | 7273.00  | 5333.00  | 6742.00  | 7227.00  | 5000.00  | 4000.00  |
| Nitrate              | 140.00   | 161.00   | 126.00   | 104.00   | 191.00   | 169.00   | 185.00   | 180.00   | 218.00   | 208.00   |
| Phosphate            | 1657.00  | 1492.00  | 1533.00  | 1285.00  | 1326.00  | 1616.00  | 1533.00  | 1575.00  | 1699.00  | 1865.00  |
| Fluoride             | 17.00    | 18.00    | 16.00    | 16.00    | 16.00    | 16.00    | 16.00    | 15.00    | 14.00    | 15.00    |

# ARIZONA PUBLIC SERVICE

## 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                 | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       |
| NUS Sample ID Number | 1078     | 1079     | 1080     | 1081     | 1082     | 1083     | 1084     | 1085     | 1086     | 1087     |
| Laboratory Number    | 122      | 123      | 124      | 125      | 126      | 127      | 128      | 129      | 130      | 131      |
| Cations (ppm)        |          |          |          |          |          |          |          |          |          |          |
| Sodium               | 48684.00 | 36842.00 | 43421.00 | 40789.00 | 50000.00 | 34211.00 | 44737.00 | 47368.00 | 38158.00 | 38158.00 |
| Potassium            | 20500.00 | 20500.00 | 20500.00 | 12000.00 | 25000.00 | 20000.00 | 19000.00 | 9000.00  | 15000.00 | 21000.00 |
| Calcium              | 10700.00 | 12250.00 | 9175.00  | 7263.00  | 11550.00 | 9575.00  | 10188.00 | 13050.00 | 8050.00  | 11238.00 |
| Magnesium            | 8625.00  | 7250.00  | 6500.00  | 8750.00  | 4713.00  | 5025.00  | 7750.00  | 9625.00  | 7750.00  | 9750.00  |
| Anions (ppm)         |          |          |          |          |          |          |          |          |          |          |
| Chloride             | 43400.00 | 43000.00 | 34200.00 | 39400.00 | 54400.00 | 39600.00 | 42200.00 | 44000.00 | 46200.00 | 49200.00 |
| Sulfate              | 6000.00  | 9773.00  | 7955.00  | 8333.00  | 10774.00 | 10655.00 | 6250.00  | 7667.00  | 12024.00 | 14405.00 |
| Nitrate              | 374.00   | 210.00   | 338.00   | 378.00   | 316.00   | 146.00   | 445.00   | 144.00   | 238.00   | 450.00   |
| Phosphate            | 1865.00  | 2072.00  | 1906.00  | 1616.00  | 1699.00  | 1740.00  | 1657.00  | 1782.00  | 1285.00  | 1616.00  |
| Fluoride             | 11.00    | 9.00     | 9.00     | 12.00    | 9.00     | 11.00    | 10.00    | 9.00     | 14.00    | 9.00     |

## ARIZONA PUBLIC SERVICE

## 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                 | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       |
| -----                |          |          |          |          |          |          |          |          |          |          |
| NUS Sample ID Number | 1101     | 1102     | 1103     | 1104     | 1105     | 1106     | 1107     | 1108     | 1109     | 1110     |
| Laboratory Number    | 817      | 818      | 819      | 820      | 821      | 822      | 823      | 824      | 825      | 826      |
| -----                |          |          |          |          |          |          |          |          |          |          |
| Cations (ppm)        |          |          |          |          |          |          |          |          |          |          |
| -----                |          |          |          |          |          |          |          |          |          |          |
| Sodium               | 350.00   | 350.00   | 500.00   | 350.00   | 400.00   | 450.00   | 300.00   | 300.00   | 400.00   | 300.00   |
| Potassium            | 14500.00 | 12000.00 | 11500.00 | 16500.00 | 16500.00 | 14000.00 | 17000.00 | 12500.00 | 14500.00 | 13000.00 |
| Calcium              | 19325.00 | 24825.00 | 20388.00 | 18263.00 | 16588.00 | 19825.00 | 22900.00 | 21200.00 | 16000.00 | 18988.00 |
| Magnesium            | 1475.00  | 1663.00  | 1038.00  | 1313.00  | 1413.00  | 1538.00  | 1925.00  | 1775.00  | 1763.00  | 1625.00  |
| -----                |          |          |          |          |          |          |          |          |          |          |
| Anions (ppm)         |          |          |          |          |          |          |          |          |          |          |
| -----                |          |          |          |          |          |          |          |          |          |          |
| Chloride             | 6000.00  | 8200.00  | 5800.00  | 8200.00  | 7800.00  | 6400.00  | 7800.00  | 7600.00  | 6200.00  | 6600.00  |
| Sulfate              | 0.00     | 3000.00  | 1500.00  | 8000.00  | 0.00     | 0.00     | 2000.00  | 4500.00  | 0.00     | 4000.00  |
| Nitrate              | 109.00   | 91.00    | 114.00   | 86.00    | 144.00   | 71.00    | 129.00   | 65.00    | 99.00    | 79.00    |
| Phosphate            | 1131.00  | 1218.00  | 1131.00  | 1392.00  | 1566.00  | 1392.00  | 1392.00  | 1131.00  | 1218.00  | 1305.00  |
| Fluoride             | 23.00    | 22.00    | 24.00    | 21.00    | 22.00    | 21.00    | 22.00    | 21.00    | 21.00    | 20.00    |

## 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                 | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       |
| NUS Sample ID Number | 1112     | 1113     | 1114     | 1115     | 1116     | 1117     | 1118     | 1119     | 1120     | 1121     |
| Laboratory Number    | 828      | 829      | 830      | 831      | 832      | 833      | 834      | 835      | 836      | 837      |
| Cations (ppm)        |          |          |          |          |          |          |          |          |          |          |
| Sodium               | 60000.00 | 75000.00 | 50000.00 | 80000.00 | 45000.00 | 65000.00 | 60000.00 | 45000.00 | 75000.00 | 60000.00 |
| Potassium            | 16500.00 | 25000.00 | 16500.00 | 15500.00 | 16500.00 | 27000.00 | 19500.00 | 21500.00 | 16000.00 | 18571.00 |
| Calcium              | 9400.00  | 9700.00  | 7438.00  | 10200.00 | 9675.00  | 11075.00 | 11338.00 | 11800.00 | 9163.00  | 11000.00 |
| Magnesium            | 4800.00  | 4000.00  | 3775.00  | 4763.00  | 4775.00  | 5875.00  | 6500.00  | 5750.00  | 3363.00  | 5125.00  |
| Anions (ppm)         |          |          |          |          |          |          |          |          |          |          |
| Chloride             | 50600.00 | 61000.00 | 51000.00 | 59600.00 | 64000.00 | 60000.00 | 51200.00 | 37000.00 | 70400.00 | 40480.00 |
| Sulfate              | 2500.00  | 8417.00  | 6000.00  | 7000.00  | 9500.00  | 7500.00  | 5417.00  | 2917.00  | 3000.00  | 5227.00  |
| Nitrate              | 244.00   | 600.00   | 191.00   | 140.00   | 228.00   | 290.00   | 129.00   | 129.00   | 88.00    | 248.00   |
| Phosphate            | 1044.00  | 1044.00  | 1131.00  | 1653.00  | 1305.00  | 1044.00  | 1044.00  | 1305.00  | 1218.00  | 1392.00  |
| Fluoride             | 13.00    | 12.00    | 11.00    | 10.00    | 10.00    | 10.00    | 9.00     | 9.00     | 9.00     | 10.00    |

[illegible]

## 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             | 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                 | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       |
| NUS Sample ID Number | 1134     | 1135     | 1136     | 1137     | 1138     | 1139     | 1140     | 1141     | 1142     | 1143     |
| Laboratory Number    | 850      | 851      | 852      | 853      | 854      | 855      | 856      | 857      | 858      | 859      |
| Cations (ppm)        |          |          |          |          |          |          |          |          |          |          |
| -----                |          |          |          |          |          |          |          |          |          |          |
| Sodium               | 400.00   | 450.00   | 400.00   | 300.00   | 250.00   | 350.00   | 350.00   | 476.00   | 571.00   | 381.00   |
| Potassium            | 20500.00 | 16190.00 | 14762.00 | 15238.00 | 16667.00 | 15238.00 | 15714.00 | 17500.00 | 15000.00 | 11000.00 |
| Calcium              | 14438.00 | 13050.00 | 13225.00 | 11513.00 | 14175.00 | 13588.00 | 14263.00 | 14037.00 | 13900.00 | 15788.00 |
| Magnesium            | 1413.00  | 1325.00  | 1175.00  | 1650.00  | 1288.00  | 1663.00  | 1325.00  | 1438.00  | 1313.00  | 1475.00  |
| Anions (ppm)         |          |          |          |          |          |          |          |          |          |          |
| -----                |          |          |          |          |          |          |          |          |          |          |
| Chloride             | 6000.00  | 7000.00  | 6800.00  | 6400.00  | 7400.00  | 8400.00  | 8200.00  | 7400.00  | 8000.00  | 8400.00  |
| Sulfate              | 0.00     | 0.00     | 4591.00  | 7591.00  | 3636.00  | 0.00     | 0.00     | 4500.00  | 1000.00  | 1500.00  |
| Nitrate              | 65.00    | 93.00    | 174.00   | 63.00    | 106.00   | 108.00   | 118.00   | 135.00   | 175.00   | 165.00   |
| Phosphate            | 1392.00  | 1305.00  | 1305.00  | 1392.00  | 1218.00  | 1218.00  | 1392.00  | 1566.00  | 1392.00  | 1305.00  |
| Fluoride             | 14.00    | 12.00    | 12.00    | 11.00    | 11.00    | 11.00    | 12.00    | 18.00    | 18.00    | 19.00    |

## ARIZONA PUBLIC SERVICE

## 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                 | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       |
| NUS Sample ID Number | 1145     | 1146     | 1147     | 1148     | 1149     | 1150     | 1151     | 1152     | 1153     | 1154     |
| Laboratory Number    | 861      | 862      | 863      | 864      | 865      | 866      | 867      | 868      | 869      | 870      |
| Cations (ppm)        |          |          |          |          |          |          |          |          |          |          |
| Sodium               | 571.00   | 381.00   | 333.00   | 333.00   | 333.00   | 381.00   | 381.00   | 333.00   | 333.00   | 381.00   |
| Potassium            | 12000.00 | 14500.00 | 12500.00 | 14000.00 | 16000.00 | 14500.00 | 15000.00 | 15000.00 | 14000.00 | 13500.00 |
| Calcium              | 20375.00 | 16788.00 | 23513.00 | 22063.00 | 19338.00 | 17325.00 | 15588.00 | 20738.00 | 15988.00 | 22475.00 |
| Magnesium            | 2025.00  | 1913.00  | 2688.00  | 1900.00  | 1825.00  | 1713.00  | 1363.00  | 1700.00  | 1488.00  | 1975.00  |
| Anions (ppm)         |          |          |          |          |          |          |          |          |          |          |
| Chloride             | 8400.00  | 8400.00  | 10000.00 | 7800.00  | 8200.00  | 9200.00  | 6800.00  | 8200.00  | 8000.00  | 6600.00  |
| Sulfate              | 2500.00  | 0.00     | 3000.00  | 4000.00  | 3000.00  | 3000.00  | 0.00     | 2000.00  | 500.00   | 1500.00  |
| Nitrate              | 98.00    | 133.00   | 168.00   | 185.00   | 196.00   | 73.00    | 115.00   | 163.00   | 180.00   | 73.00    |
| Phosphate            | 1479.00  | 1566.00  | 1479.00  | 1653.00  | 1826.00  | 1392.00  | 1739.00  | 1826.00  | 1826.00  | 1479.00  |
| Fluoride             | 20.00    | 19.00    | 19.00    | 19.00    | 19.00    | 19.00    | 19.00    | 18.00    | 19.00    | 19.00    |

## ARIZONA PUBLIC SERVICE

## 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                 | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       |
| NUS Sample ID Number | 1156     | 1157     | 1158     | 1159     | 1160     | 1161     | 1162     | 1163     | 1164     | 1165     |
| Laboratory Number    | 872      | 873      | 874      | 875      | 876      | 877      | 878      | 879      | 880      | 881      |
| Cations (ppm)        |          |          |          |          |          |          |          |          |          |          |
| -----                |          |          |          |          |          |          |          |          |          |          |
| Sodium               | 381.00   | 429.00   | 381.00   | 571.00   | 476.00   | 238.00   | 286.00   | 238.00   | 238.00   | 190.00   |
| Potassium            | 16500.00 | 15000.00 | 14500.00 | 20000.00 | 15000.00 | 17000.00 | 18000.00 | 15000.00 | 16000.00 | 16000.00 |
| Calcium              | 16838.00 | 15113.00 | 19338.00 | 16738.00 | 14575.00 | 13200.00 | 12675.00 | 13975.00 | 15525.00 | 13388.00 |
| Magnesium            | 1325.00  | 1625.00  | 1613.00  | 2288.00  | 1550.00  | 1050.00  | 1450.00  | 1050.00  | 1138.00  | 1413.00  |
| Anions (ppm)         |          |          |          |          |          |          |          |          |          |          |
| -----                |          |          |          |          |          |          |          |          |          |          |
| Chloride             | 5800.00  | 6000.00  | 6000.00  | 6800.00  | 4800.00  | 4800.00  | 5600.00  | 6000.00  | 6000.00  | 5600.00  |
| Sulfate              | 500.00   | 0.00     | 0.00     | 0.00     | 0.00     | 7000.00  | 3500.00  | 0.00     | 0.00     | 0.00     |
| Nitrate              | 38.00    | 134.00   | 63.00    | 80.00    | 40.00    | 88.00    | 63.00    | 55.00    | 106.00   | 56.00    |
| Phosphate            | 2174.00  | 1566.00  | 2174.00  | 2174.00  | 1826.00  | 1739.00  | 957.00   | 1913.00  | 1739.00  | 1566.00  |
| Fluoride             | 19.00    | 20.00    | 19.00    | 20.00    | 20.00    | 16.00    | 17.00    | 17.00    | 17.00    | 16.00    |



## ARIZONA PUBLIC SERVICE

## 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                 | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       | 90       |
| NUS Sample ID Number | 1167     | 1168     | 1169     | 1170     | 1171     | 1172     | 1173     | 1174     | 1175     | 1176     |
| Laboratory Number    | 883      | 884      | 885      | 886      | 887      | 888      | 889      | 890      | 891      | 892      |
| Cations (ppm)        |          |          |          |          |          |          |          |          |          |          |
| Sodium               | 286.00   | 286.00   | 238.00   | 190.00   | 190.00   | 333.00   | 333.00   | 429.00   | 286.00   | 238.00   |
| Potassium            | 17500.00 | 11500.00 | 9000.00  | 8000.00  | 8000.00  | 14000.00 | 12000.00 | 10500.00 | 13500.00 | 12000.00 |
| Calcium              | 14488.00 | 17700.00 | 21500.00 | 20750.00 | 20988.00 | 19788.00 | 14713.00 | 17263.00 | 16638.00 | 15650.00 |
| Magnesium            | 1400.00  | 1425.00  | 1825.00  | 1275.00  | 1425.00  | 1700.00  | 1488.00  | 1775.00  | 1325.00  | 1338.00  |
| Anions (ppm)         |          |          |          |          |          |          |          |          |          |          |
| Chloride             | 12400.00 | 7600.00  | 7400.00  | 7200.00  | 8800.00  | 12400.00 | 9800.00  | 9200.00  | 7600.00  | 6800.00  |
| Sulfate              | 4500.00  | 0.00     | 2000.00  | 0.00     | 8500.00  | 4500.00  | 5500.00  | 5500.00  | 500.00   | 0.00     |
| Nitrate              | 163.00   | 101.00   | 123.00   | 60.00    | 75.00    | 85.00    | 80.00    | 65.00    | 118.00   | 54.00    |
| Phosphate            | 1566.00  | 1218.00  | 1218.00  | 957.00   | 957.00   | 1131.00  | 1044.00  | 1131.00  | 1305.00  | 1131.00  |
| Fluoride             | 18.00    | 18.00    | 17.00    | 15.00    | 17.00    | 17.00    | 17.00    | 16.00    | 16.00    | 16.00    |



## Appendix F

### Agricultural Vegetation Data

Agricultural vegetation data were collected during the second, third, and fourth quarters of 1990. Sites 11, 13, 23, 30, and 43 were sampled during the second and third quarters, and sites 11, 13, 23, 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 1990. Cotton boll biomass data were reported during the fourth quarter only. No data were reported as missing during the 1990 data collection.



[illegible]

[illegible]

[illegible]

[illegible]



## Phytomass

[illegible]

[illegible]

[illegible]

[illegible]

**Crop: SHORT STAPLE COTTON**

[illegible]

[illegible]

## ARIZONA PUBLIC SERVICE

## 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                 | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        |
| Row Number           | 21        | 21        | 37        | 37        | 197       | 197       | 201       | 201       | 229       | 229       |
| Plot Number          | 1         | 2         | 3         | 4         | 5         | 6         | 7         | 8         | 9         | 10        |
| Paces From End       | 41        | 180       | 27        | 170       | 248       | 280       | 76        | 163       | 41        | 193       |
| 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   | 9001      | 9002      | 9003      | 9004      | 9005      | 9006      | 9007      | 9008      | 9009      | 9010      |
| Laboratory Boll ID   | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    |
| Boll Biomass (g/m2)  | 470.80    | 380.60    | 489.80    | 440.70    | 752.00    | 757.80    | 734.20    | 591.80    | 616.10    | 507.40    |

## ARIZONA PUBLIC SERVICE

## 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                 | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        |
| Row Number           | 10        | 10        | 135       | 135       | 172       | 172       | 187       | 187       | 225       | 225       |
| Plot Number          | 1         | 2         | 3         | 4         | 5         | 6         | 7         | 8         | 9         | 10        |
| Paces From End       | 112       | 131       | 28        | 87        | 135       | 80        | 27        | 145       | 108       | 137       |
| 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   | 9011      | 9012      | 9013      | 9014      | 9015      | 9016      | 9017      | 9018      | 9019      | 9020      |
| Laboratory Boll ID   | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    |
| Boll Biomass (g/m2)  | 596.50    | 517.20    | 593.40    | 617.30    | 571.30    | 519.30    | 702.60    | 686.30    | 533.60    | 345.30    |



## ARIZONA PUBLIC SERVICE

## Agricultural Vegetation

## Phytomass

Crop: SHORT 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                 | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        |
| Row Number           | 32        | 32        | 47        | 47        | 49        | 49        | 107       | 107       | 242       | 242       |
| Plot Number          | 1         | 2         | 3         | 4         | 5         | 6         | 7         | 8         | 9         | 10        |
| Paces From End       | 215       | 237       | 18        | 237       | 139       | 212       | 67        | 128       | 57        | 223       |
| 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   | 9021      | 9022      | 9023      | 9024      | 9025      | 9026      | 9027      | 9028      | 9029      | 9030      |
| Laboratory Boll ID   | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    |
| Boll Biomass (g/m2)  | 729.60    | 934.50    | 1014.40   | 906.80    | 810.80    | 797.30    | 931.50    | 694.00    | 843.30    | 557.60    |

## ARIZONA PUBLIC SERVICE

## 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                 | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        | 90        |
| Row Number           | 14        | 14        | 27        | 27        | 94        | 94        | 163       | 163       | 179       | 179       |
| Plot Number          | 1         | 2         | 3         | 4         | 5         | 6         | 7         | 8         | 9         | 10        |
| Paces From End       | 120       | 235       | 68        | 237       | 71        | 251       | 114       | 262       | 147       | 236       |
| 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   | 9031      | 9032      | 9033      | 9034      | 9035      | 9036      | 9037      | 9038      | 9039      | 9040      |
| Laboratory Boll ID   | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    | 999999    |
| Boll Biomass (g/m2)  | 718.70    | 678.40    | 825.90    | 73        | 489.30    | 364.80    | 486.70    | 456.40    | 596.90    | 642.10    |

## 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 ( $EC \times 1000$ ), soluble salts, pH, and the concentrations of 17 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 samples (A and B) for the upper and lower levels (U and L). Samples collected during the second, third, and fourth quarters of 1990 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.



# Soil Texture

| Site | Soil Texture               |                             |
|------|----------------------------|-----------------------------|
|      | Upper Level<br>(0 - 15 cm) | Lower Level<br>(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 Data

For Quarter 2/90

| Site | Qr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | EC x<br>1000 | Solu<br>Salts |     | Ca<br>ppm | Mg<br>ppm | Na<br>ppm | Cl<br>ppm | SO4<br>ppm | HCO3<br>ppm | CO3<br>ppm | F<br>ppm | NO3-N<br>ppm | Boron<br>ppm | NH4<br>ppm | PO4-P<br>ppm | k<br>ppm |
|------|----|----|----|-----|-----------|------------|--------------|---------------|-----|-----------|-----------|-----------|-----------|------------|-------------|------------|----------|--------------|--------------|------------|--------------|----------|
|      |    |    |    |     |           |            |              | ppm           | pH  |           |           |           |           |            |             |            |          |              |              |            |              |          |
| 01AL | 2  | 90 | 4  | WET | 888       | 148        | 0.44         | 282           | 8.5 | 45        | 3         | 63        | 42        | 48.0       | 163         | -4.8       | 0.33     | 10.00        | 0.93         | 2.50       | 0.99         | 4        |
| 01AU | 2  | 90 | 4  | WET | 887       | 147        | 0.36         | 230           | 8.5 | 47        | 4         | 32        | 30        | 26.0       | 166         | -4.8       | 0.21     | 7.50         | 0.87         | 3.00       | 1.33         | 8        |
| 01BL | 2  | 90 | 4  | WET | 890       | 150        | 1.60         | 1024          | 8.1 | 217       | 12        | 189       | 156       | 340.0      | 109         | -4.8       | 0.40     | 62.50        | 2.53         | 4.00       | 0.99         | 6        |
| 01BU | 2  | 90 | 4  | WET | 889       | 149        | 1.20         | 768           | 8.2 | 120       | 8         | 118       | 86        | 257.0      | 128         | -4.8       | 0.23     | 41.25        | 2.00         | 3.00       | 1.33         | 11       |
| 02AL | 2  | 90 | 4  | WET | 896       | 156        | 0.44         | 282           | 8.6 | 41        | 6         | 42        | 28        | 27.0       | 201         | -4.8       | 0.24     | 9.38         | 0.73         | 3.00       | 3.32         | 29       |
| 02AU | 2  | 90 | 4  | WET | 895       | 155        | 0.72         | 461           | 9.1 | 20        | 3         | 189       | 84        | 39.0       | 279         | -4.8       | 0.70     | 13.75        | 1.10         | 6.88       | 1.66         | 10       |
| 02BL | 2  | 90 | 4  | WET | 898       | 158        | 0.76         | 486           | 9.0 | 23        | 4         | 211       | 98        | 31.0       | 289         | 9.0        | 0.44     | 14.38        | 1.13         | 5.00       | 3.32         | 15       |
| 02BU | 2  | 90 | 4  | WET | 897       | 157        | 0.40         | 256           | 8.7 | 32        | 5         | 51        | 16        | 27.0       | 237         | -4.8       | 0.22     | 7.50         | 0.87         | 3.00       | 3.98         | 27       |
| 03AL | 2  | 90 | 4  | WET | 948       | 204        | 8.00         | 5120          | 8.8 | 63        | 12        | 2609      | 2440      | 552.0      | 180         | 19.0       | 8.20     | 125.00       | 48.33        | 1.00       | 1.99         | 30       |
| 03AU | 2  | 90 | 4  | WET | 947       | 203        | 2.80         | 1792          | 8.9 | 27        | 4         | 635       | 744       | 57.0       | 227         | 5.0        | 1.70     | 32.50        | 4.00         | 3.00       | 3.32         | 20       |
| 03BL | 2  | 90 | 4  | WET | 950       | 206        | 10.00        | 6400          | 8.7 | 93        | 17        | 2783      | 2592      | 781.0      | 137         | 33.0       | 9.60     | 185.00       | 59.17        | -2.50      | 1.33         | 34       |
| 03BU | 2  | 90 | 4  | WET | 949       | 205        | 4.40         | 2816          | 9.0 | 29        | 4         | 1053      | 1264      | 130.0      | 213         | 26.0       | 4.40     | 60.00        | 25.83        | 1.00       | 2.98         | 28       |
| 04AL | 2  | 90 | 4  | WET | 916       | 176        | 0.36         | 230           | 8.5 | 52        | 4         | 18        | 18        | 20.0       | 166         | -4.8       | 0.36     | 4.00         | 0.69         | -2.50      | 0.33         | 12       |
| 04AU | 2  | 90 | 4  | WET | 915       | 175        | 0.34         | 218           | 8.5 | 50        | 4         | 18        | 16        | 13.0       | 170         | -4.8       | 0.52     | 3.75         | 0.62         | -2.50      | 0.33         | 12       |
| 04BL | 2  | 90 | 4  | WET | 918       | 178        | 0.44         | 282           | 8.3 | 64        | 5         | 24        | 36        | 16.0       | 170         | -4.8       | 0.29     | 6.88         | 0.69         | 0.50       | 0.66         | 12       |
| 04BU | 2  | 90 | 4  | WET | 917       | 177        | 0.38         | 243           | 8.3 | 59        | 4         | 16        | 14        | 23.0       | 189         | -4.8       | 0.29     | 4.38         | 0.62         | 2.00       | 0.33         | 12       |
| 05AL | 2  | 90 | 4  | WET | 904       | 164        | 0.52         | 333           | 9.0 | 23        | 3         | 113       | 16        | 3.0        | 265         | -4.8       | 5.00     | 4.25         | 1.19         | -2.50      | 1.66         | 6        |
| 05AU | 2  | 90 | 4  | WET | 903       | 163        | 0.52         | 333           | 8.8 | 29        | 4         | 93        | 24        | 35.0       | 222         | -4.8       | 3.20     | 6.25         | 1.35         | 1.00       | 1.99         | 12       |
| 05BL | 2  | 90 | 4  | WET | 906       | 166        | 0.80         | 512           | 9.2 | 22        | 4         | 200       | 34        | 36.0       | 308         | 14.0       | 15.00    | 8.13         | 2.46         | -2.50      | 1.33         | 6        |
| 05BU | 2  | 90 | 4  | WET | 905       | 165        | 0.44         | 282           | 8.8 | 30        | 3         | 80        | 12        | -2.5       | 225         | -4.8       | 3.20     | 5.13         | 1.23         | -2.50      | 1.99         | 16       |
| 06AL | 2  | 90 | 4  | WET | 908       | 168        | 0.28         | 179           | 8.4 | 51        | 4         | 34        | 12        | -2.5       | 204         | -4.8       | 0.32     | 4.50         | 0.69         | 5.83       | 1.33         | 4        |
| 06AU | 2  | 90 | 4  | WET | 907       | 167        | 0.28         | 179           | 8.5 | 50        | 4         | 20        | 10        | -2.5       | 175         | -4.8       | 0.44     | 3.88         | 0.54         | 1.00       | 0.66         | 6        |
| 06BL | 2  | 90 | 4  | WET | 910       | 170        | 0.38         | 243           | 8.6 | 39        | 3         | 58        | 14        | -2.5       | 204         | -4.8       | 0.33     | 3.88         | 0.62         | 1.00       | 0.33         | 2        |
| 06BU | 2  | 90 | 4  | WET | 909       | 169        | 0.32         | 205           | 8.4 | 58        | 4         | 18        | 16        | -2.5       | 196         | -4.8       | 0.28     | 5.00         | 0.58         | 4.50       | 1.33         | 6        |
| 07AL | 2  | 90 | 4  | WET | 2         | 260        | 0.56         | 358           | 8.9 | 24        | 5         | 124       | 26        | 43.0       | 275         | 5.0        | 0.30     | 8.75         | 1.80         | 1.25       | 2.65         | 8        |
| 07AU | 2  | 90 | 4  | WET | 1         | 259        | 0.56         | 358           | 8.8 | 27        | 5         | 103       | 20        | -2.5       | 275         | 2.0        | 0.21     | 6.88         | 1.40         | 1.25       | 4.64         | 13       |
| 07BL | 2  | 90 | 4  | WET | 4         | 262        | 0.88         | 563           | 8.8 | 25        | 5         | 171       | 62        | 53.0       | 320         | 2.0        | 4.60     | 15.63        | 2.00         | 1.25       | 2.32         | 6        |
| 07BU | 2  | 90 | 4  | WET | 3         | 261        | 0.64         | 410           | 8.8 | 25        | 4         | 137       | 32        | 43.0       | 284         | 2.0        | 0.31     | 11.25        | 1.70         | 1.25       | 3.65         | 8        |
| 08AL | 2  | 90 | 4  | WET | 940       | 196        | 2.00         | 1280          | 9.7 | 27        | 5         | 460       | 408       | 180.0      | 249         | 37.0       | 1.00     | 25.00        | 5.43         | -2.50      | 3.98         | 20       |
| 08AU | 2  | 90 | 4  | WET | 939       | 195        | 0.84         | 538           | 9.3 | 19        | 4         | 158       | 122       | -2.5       | 237         | 14.0       | 0.66     | 8.13         | 1.07         | -2.50      | 4.31         | 26       |
| 08BL | 2  | 90 | 4  | WET | 942       | 198        | 0.72         | 461           | 8.9 | 27        | 4         | 118       | 140       | 33.0       | 140         | -4.8       | 0.40     | 6.25         | 0.71         | -2.50      | 2.32         | 8        |
| 08BU | 2  | 90 | 4  | WET | 941       | 197        | 0.40         | 256           | 8.6 | 36        | 5         | 38        | 52        | 15.0       | 123         | -4.8       | 3.90     | 5.50         | 0.57         | -2.50      | 1.99         | 12       |
| 09AL | 2  | 90 | 4  | WET | 900       | 160        | 0.36         | 230           | 8.6 | 36        | 7         | 25        | 16        | 12.0       | 199         | -4.8       | 0.21     | 6.25         | 0.80         | 5.00       | 4.64         | 34       |
| 09AU | 2  | 90 | 4  | WET | 899       | 159        | 0.42         | 269           | 8.5 | 55        | 7         | 27        | 12        | -2.5       | 227         | -4.8       | 0.22     | 15.00        | 1.03         | 5.00       | 4.97         | 32       |
| 09BL | 2  | 90 | 4  | WET | 902       | 162        | 0.60         | 384           | 8.4 | 51        | 9         | 40        | 28        | 87.0       | 180         | -4.8       | 0.20     | 18.75        | 1.00         | 7.81       | 4.64         | 50       |
| 09BU | 2  | 90 | 4  | WET | 901       | 161        | 0.32         | 205           | 8.6 | 42        | 6         | 23        | 12        | 27.0       | 199         | -4.8       | 0.20     | 5.63         | 0.93         | 6.88       | 4.31         | 25       |
| 10AL | 2  | 90 | 4  | WET | 892       | 152        | 0.30         | 192           | 8.5 | 41        | 5         | 23        | 20        | 11.0       | 166         | -4.8       | 0.52     | 5.50         | 0.63         | 2.00       | 1.33         | 8        |
| 10AU | 2  | 90 | 4  | WET | 891       | 151        | 0.26         | 166           | 8.6 | 42        | 4         | 13        | 12        | -2.5       | 156         | -4.8       | 0.39     | 5.00         | 0.47         | 4.00       | 1.99         | 10       |
| 10BL | 2  | 90 | 4  | WET | 894       | 154        | 0.46         | 294           | 8.3 | 50        | 6         | 42        | 34        | 32.0       | 168         | -4.8       | 0.42     | 15.63        | 1.13         | 4.00       | 1.33         | 10       |
| 10BU | 2  | 90 | 4  | WET | 893       | 153        | 0.28         | 179           | 8.5 | 46        | 5         | 17        | 12        | -2.5       | 170         | -4.8       | 0.40     | 6.25         | 0.80         | 2.00       | 2.65         | 10       |
| 11AL | 2  | 90 | 4  | WET | 944       | 200        | 1.20         | 768           | 8.7 | 33        | 4         | 220       | 144       | 135.0      | 289         | -4.8       | 13.00    | 6.25         | 1.79         | -2.50      | 0.99         | 26       |
| 11AU | 2  | 90 | 4  | WET | 943       | 199        | 1.20         | 768           | 8.6 | 36        | 4         | 220       | 158       | 135.0      | 272         | -4.8       | 12.00    | 8.75         | 1.93         | -2.50      | 0.99         | 28       |
| 11BL | 2  | 90 | 4  | WET | 946       | 202        | 1.20         | 768           | 8.5 | 42        | 5         | 240       | 170       | 172.0      | 296         | -4.8       | 14.00    | 6.88         | 1.82         | -2.50      | 0.99         | 36       |
| 11BU | 2  | 90 | 4  | WET | 945       | 201        | 1.40         | 896           | 8.5 | 40        | 5         | 240       | 152       | 173.0      | 322         | -4.8       | 13.00    | 6.88         | 2.14         | -2.50      | 0.99         | 36       |

## Raw Soil Sample Data

For Quarter 2/90

| Site | Qr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | EC x<br>1000 | Solu<br>Salts |     | Ca<br>ppm | Mg<br>ppm | Na<br>ppm | Cl<br>ppm | SO4<br>ppm | HCO3<br>ppm | CO3<br>ppm | F<br>ppm | NO3-N<br>ppm | Boron<br>ppm | NH4<br>ppm | PO4-P<br>ppm | k<br>ppm |
|------|----|----|----|-----|-----------|------------|--------------|---------------|-----|-----------|-----------|-----------|-----------|------------|-------------|------------|----------|--------------|--------------|------------|--------------|----------|
|      |    |    |    |     |           |            |              | ppm           | pH  |           |           |           |           |            |             |            |          |              |              |            |              |          |
| 12AL | 2  | 90 | 4  | WET | 932       | 192        | 3.20         | 2048          | 8.3 | 100       | 11        | 640       | 696       | 390.0      | 185         | -4.8       | 5.60     | 75.00        | 2.86         | -2.50      | 3.65         | 84       |
| 12AU | 2  | 90 | 4  | WET | 931       | 191        | 2.50         | 1600          | 8.3 | 86        | 8         | 480       | 510       | 210.0      | 142         | -4.8       | 3.70     | 85.00        | 2.93         | -2.50      | 4.31         | 76       |
| 12BL | 2  | 90 | 4  | WET | 934       | 194        | 3.20         | 2048          | 8.3 | 96        | 10        | 640       | 708       | 282.0      | 137         | -4.8       | 5.40     | 90.00        | 3.50         | -2.50      | 3.98         | 84       |
| 12BU | 2  | 90 | 4  | WET | 933       | 193        | 1.90         | 1216          | 8.6 | 43        | 4         | 340       | 316       | 213.0      | 182         | -4.8       | 4.80     | 45.00        | 2.79         | -2.50      | 3.65         | 52       |
| 13AL | 2  | 90 | 4  | WET | 936       | 332        | 0.84         | 538           | 8.4 | 33        | 4         | 148       | 80        | 64.0       | 289         | -4.8       | 7.00     | 4.13         | 0.80         | 1.00       | 1.99         | 16       |
| 13AU | 2  | 90 | 4  | WET | 935       | 331        | 1.00         | 640           | 8.4 | 33        | 4         | 160       | 98        | 40.0       | 312         | -4.8       | 5.40     | 4.50         | 0.93         | -2.50      | 2.32         | 14       |
| 13BL | 2  | 90 | 4  | WET | 938       | 334        | 0.92         | 589           | 8.4 | 35        | 4         | 160       | 88        | 68.0       | 289         | -4.8       | 6.40     | 4.63         | 0.73         | 1.00       | 2.32         | 14       |
| 13BU | 2  | 90 | 4  | WET | 937       | 333        | 1.00         | 640           | 8.5 | 34        | 4         | 180       | 92        | 40.0       | 315         | -4.8       | 5.20     | 4.38         | 0.73         | -2.50      | 2.65         | 12       |
| 14AL | 2  | 90 | 4  | WET | 884       | 144        | 1.10         | 704           | 8.4 | 56        | 9         | 150       | 96        | 68.0       | 180         | -4.8       | 0.23     | 60.00        | 0.97         | 3.00       | 2.65         | 67       |
| 14AU | 2  | 90 | 4  | WET | 883       | 143        | 0.88         | 563           | 8.6 | 46        | 8         | 69        | 32        | 108.0      | 296         | -4.8       | 0.20     | 42.50        | 2.20         | 4.00       | 0.33         | 132      |
| 14BL | 2  | 90 | 4  | WET | 886       | 146        | 1.26         | 806           | 8.4 | 64        | 10        | 156       | 140       | 87.0       | 175         | -4.8       | 0.22     | 55.00        | 1.07         | 4.00       | 2.65         | 76       |
| 14BU | 2  | 90 | 4  | WET | 885       | 145        | 1.04         | 666           | 8.5 | 48        | 8         | 100       | 72        | 99.0       | 227         | -4.8       | 0.21     | 57.50        | 1.40         | 3.00       | 2.98         | 132      |
| 15AL | 2  | 90 | 4  | WET | 960       | 216        | 0.32         | 205           | 8.3 | 57        | 5         | 12        | 18        | 22.0       | 151         | -4.8       | 0.24     | 9.38         | 0.42         | -2.50      | 1.33         | 10       |
| 15AU | 2  | 90 | 4  | WET | 959       | 215        | 0.28         | 179           | 8.4 | 54        | 4         | 9         | 12        | -2.5       | 175         | -4.8       | 0.32     | 4.00         | 0.42         | -2.50      | 1.66         | 14       |
| 15BL | 2  | 90 | 4  | WET | 962       | 218        | 0.28         | 179           | 8.3 | 55        | 5         | 12        | 16        | 14.0       | 159         | -4.8       | 0.28     | 7.50         | 0.83         | -2.50      | 1.99         | 12       |
| 15BU | 2  | 90 | 4  | WET | 961       | 217        | 0.28         | 179           | 8.4 | 54        | 5         | 9         | 12        | -2.5       | 170         | -4.8       | 0.19     | 4.50         | 0.33         | -2.50      | 1.66         | 14       |
| 16AL | 2  | 90 | 4  | WET | 952       | 208        | 6.40         | 4096          | 8.9 | 64        | 12        | 2435      | 1800      | 479.0      | 289         | 21.0       | 3.10     | 312.50       | 35.83        | 1.00       | 1.66         | 55       |
| 16AU | 2  | 90 | 4  | WET | 951       | 207        | 3.20         | 2048          | 9.0 | 35        | 5         | 635       | 664       | 132.0      | 222         | 16.0       | 1.00     | 100.00       | 14.58        | -2.50      | 4.97         | 38       |
| 16BL | 2  | 90 | 4  | WET | 954       | 210        | 9.00         | 5760          | 9.0 | 50        | 10        | 2609      | 1968      | 419.0      | 237         | 30.0       | 2.20     | 312.50       | 40.83        | -2.50      | 2.32         | 80       |
| 16BU | 2  | 90 | 4  | WET | 953       | 209        | 2.50         | 1600          | 9.0 | 32        | 4         | 565       | 576       | 99.0       | 206         | 14.0       | 0.62     | 90.00        | 9.17         | -2.50      | 6.30         | 46       |
| 17AL | 2  | 90 | 4  | WET | 980       | 236        | 0.56         | 358           | 8.5 | 71        | 20        | 15        | 16        | -2.5       | 246         | -4.8       | 0.18     | 18.13        | 1.92         | 1.43       | 7.29         | 84       |
| 17AU | 2  | 90 | 4  | WET | 979       | 235        | 0.44         | 282           | 8.4 | 75        | 14        | 15        | 12        | -2.5       | 232         | -4.8       | 0.26     | 10.00        | 1.54         | 2.86       | 10.61        | 57       |
| 17BL | 2  | 90 | 4  | WET | 982       | 238        | 0.56         | 358           | 8.5 | 71        | 14        | 15        | 20        | -2.5       | 303         | -4.8       | 0.15     | 11.88        | 1.38         | 1.43       | 8.62         | 76       |
| 17BU | 2  | 90 | 4  | WET | 981       | 237        | 0.68         | 435           | 8.4 | 108       | 20        | 15        | 24        | -2.5       | 336         | -4.8       | 0.14     | 26.25        | 1.81         | 2.50       | 15.25        | 76       |
| 18AL | 2  | 90 | 4  | WET | 62        | 320        | 0.34         | 218           | 8.2 | 61        | 5         | 16        | 16        | 13.0       | 194         | -4.8       | 0.34     | 3.63         | 0.57         | 3.75       | 1.33         | 4        |
| 18AU | 2  | 90 | 4  | WET | 61        | 319        | 0.36         | 230           | 8.2 | 60        | 5         | 14        | 24        | -2.5       | 208         | -4.8       | 0.27     | 4.13         | 0.50         | 2.50       | 1.66         | 8        |
| 18BL | 2  | 90 | 4  | WET | 64        | 322        | 0.32         | 205           | 8.1 | 64        | 5         | 14        | 16        | -2.5       | 208         | -4.8       | 0.30     | 3.38         | 0.57         | 2.50       | 1.33         | 4        |
| 18BU | 2  | 90 | 4  | WET | 63        | 321        | 0.32         | 205           | 8.2 | 58        | 5         | 12        | 12        | -2.5       | 194         | -4.8       | 0.24     | 3.63         | 0.43         | 3.13       | 1.33         | 8        |
| 19AL | 2  | 90 | 4  | WET | 66        | 324        | 0.72         | 461           | 8.7 | 31        | 5         | 52        | 26        | -2.5       | 296         | -4.8       | 0.66     | 6.88         | 0.93         | 3.00       | 4.31         | 116      |
| 19AU | 2  | 90 | 4  | WET | 65        | 323        | 0.56         | 358           | 8.4 | 45        | 6         | 42        | 18        | -2.5       | 241         | -4.8       | 0.30     | 8.13         | 0.40         | 3.00       | 5.30         | 51       |
| 19BL | 2  | 90 | 4  | WET | 68        | 326        | 0.64         | 410           | 8.4 | 44        | 6         | 40        | 22        | 43.0       | 237         | -4.8       | 0.42     | 12.50        | 0.27         | 2.00       | 3.98         | 72       |
| 19BU | 2  | 90 | 4  | WET | 67        | 325        | 0.52         | 333           | 8.5 | 42        | 6         | 22        | 14        | 37.0       | 260         | -4.8       | 0.35     | 5.00         | 0.27         | 5.00       | 4.64         | 91       |
| 20AL | 2  | 90 | 4  | WET | 70        | 328        | 0.66         | 422           | 9.0 | 22        | 5         | 160       | 26        | 2.0        | 341         | 19.0       | 8.00     | 5.00         | 1.20         | 2.00       | 4.31         | 24       |
| 20AU | 2  | 90 | 4  | WET | 69        | 327        | 0.52         | 333           | 8.6 | 29        | 5         | 74        | 20        | -2.5       | 260         | -4.8       | 1.90     | 4.00         | 0.47         | 2.00       | 4.97         | 36       |
| 20BL | 2  | 90 | 4  | WET | 72        | 330        | 0.76         | 486           | 9.0 | 26        | 7         | 160       | 20        | -2.5       | 327         | 33.0       | 7.60     | 5.13         | 1.07         | 0.50       | 4.31         | 22       |
| 20BU | 2  | 90 | 4  | WET | 71        | 329        | 0.56         | 358           | 8.7 | 26        | 5         | 104       | 16        | -2.5       | 296         | 5.0        | 2.70     | 4.88         | 0.13         | 3.00       | 5.97         | 40       |
| 21AL | 2  | 90 | 4  | WET | 30        | 288        | 1.60         | 1024          | 9.2 | 16        | 5         | 380       | 300       | 94.0       | 374         | 28.0       | 0.37     | 8.75         | 3.22         | -2.50      | 3.65         | 32       |
| 21AU | 2  | 90 | 4  | WET | 29        | 287        | 0.40         | 256           | 8.7 | 24        | 5         | 74        | 28        | -2.5       | 244         | -4.8       | 0.18     | 2.75         | 1.11         | -2.50      | 4.97         | 21       |
| 21BL | 2  | 90 | 4  | WET | 32        | 290        | 0.96         | 614           | 9.3 | 17        | 7         | 220       | 108       | -2.5       | 336         | 47.0       | 0.40     | 3.75         | 1.33         | -2.50      | 3.32         | 25       |
| 21BU | 2  | 90 | 4  | WET | 31        | 289        | 0.32         | 205           | 8.7 | 27        | 5         | 52        | 26        | -2.5       | 204         | -4.8       | 0.20     | 2.88         | 1.00         | -2.50      | 4.97         | 19       |
| 22AL | 2  | 90 | 4  | WET | 34        | 292        | 0.28         | 179           | 8.3 | 49        | 5         | 10        | 12        | 13.0       | 166         | -4.8       | 0.48     | 2.88         | 1.00         | -2.50      | 0.99         | 4        |
| 22AU | 2  | 90 | 4  | WET | 33        | 291        | 0.26         | 166           | 8.3 | 46        | 4         | 6         | 12        | 4.0        | 166         | -4.8       | 0.28     | 2.75         | 0.89         | -2.50      | 1.99         | 8        |
| 22BL | 2  | 90 | 4  | WET | 36        | 294        | 0.24         | 154           | 8.3 | 46        | 4         | 10        | 12        | 2.0        | 161         | -4.8       | 0.48     | 2.75         | 1.78         | -2.50      | 1.33         | 4        |
| 22BU | 2  | 90 | 4  | WET | 35        | 293        | 0.20         | 128           | 8.4 | 46        | 4         | 4         | 12        | -2.5       | 161         | -4.8       | 0.27     | 2.44         | 0.89         | -2.50      | 2.32         | 6        |



## Raw Soil Sample Data

For Quarter 2/90

| Site | Qr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | EC x<br>1000 | Solu<br>Salts |     | Ca<br>ppm | Mg<br>ppm | Na<br>ppm | Cl<br>ppm | SO4<br>ppm | HCO3<br>ppm | CO3<br>ppm | F<br>ppm | NO3-N<br>ppm | Boron<br>ppm | NH4<br>ppm | PO4-P<br>ppm | k<br>ppm |
|------|----|----|----|-----|-----------|------------|--------------|---------------|-----|-----------|-----------|-----------|-----------|------------|-------------|------------|----------|--------------|--------------|------------|--------------|----------|
|      |    |    |    |     |           |            |              | ppm           | pH  |           |           |           |           |            |             |            |          |              |              |            |              |          |
| 23AL | 2  | 90 | 4  | WET | 968       | 224        | 1.10         | 704           | 8.6 | 43        | 4         | 255       | 144       | 110.0      | 303         | -4.8       | 8.00     | 9.38         | 1.69         | 1.43       | 2.65         | 8        |
| 23AU | 2  | 90 | 4  | WET | 967       | 223        | 1.40         | 896           | 8.5 | 56        | 6         | 345       | 252       | 228.0      | 241         | -4.8       | 7.00     | 16.88        | 2.00         | 0.71       | 3.32         | 8        |
| 23BL | 2  | 90 | 4  | WET | 970       | 226        | 0.82         | 525           | 8.7 | 46        | 4         | 255       | 132       | 110.0      | 308         | -4.8       | 9.00     | 7.50         | 1.62         | 1.07       | 2.98         | 6        |
| 23BU | 2  | 90 | 4  | WET | 969       | 225        | 1.40         | 896           | 8.6 | 47        | 5         | 309       | 212       | 150.0      | 284         | -4.8       | 5.80     | 14.38        | 1.92         | 0.71       | 2.98         | 8        |
| 24AL | 2  | 90 | 4  | WET | 956       | 212        | 1.20         | 768           | 8.5 | 40        | 5         | 261       | 142       | 64.0       | 194         | -4.8       | 3.50     | 52.50        | 1.58         | -2.50      | 2.32         | 24       |
| 24AU | 2  | 90 | 4  | WET | 955       | 211        | 1.24         | 794           | 8.4 | 48        | 7         | 226       | 156       | 52.0       | 175         | -4.8       | 2.20     | 47.50        | 1.58         | -2.50      | 1.33         | 38       |
| 24BL | 2  | 90 | 4  | WET | 958       | 214        | 0.84         | 538           | 8.7 | 26        | 4         | 226       | 68        | 33.0       | 241         | 5.0        | 4.80     | 28.75        | 1.25         | -2.50      | 0.99         | 14       |
| 24BU | 2  | 90 | 4  | WET | 957       | 213        | 0.72         | 461           | 8.7 | 28        | 4         | 136       | 48        | 32.0       | 251         | -4.8       | 3.00     | 25.00        | 1.50         | 1.00       | 2.32         | 32       |
| 25AL | 2  | 90 | 4  | WET | 920       | 180        | 1.60         | 1024          | 8.1 | 119       | 23        | 180       | 124       | 300.0      | 156         | -4.8       | 1.70     | 35.00        | 1.46         | 1.00       | 0.99         | 24       |
| 25AU | 2  | 90 | 4  | WET | 919       | 179        | 2.30         | 1472          | 7.9 | 221       | 42        | 180       | 172       | 480.0      | 322         | -4.8       | 1.30     | 57.50        | 1.62         | 5.00       | 1.66         | 51       |
| 25BL | 2  | 90 | 4  | WET | 922       | 182        | 1.80         | 1152          | 8.1 | 161       | 32        | 180       | 168       | 330.0      | 166         | -4.8       | 1.40     | 70.00        | 1.08         | 1.00       | 0.99         | 32       |
| 25BU | 2  | 90 | 4  | WET | 921       | 181        | 2.00         | 1280          | 8.0 | 176       | 34        | 200       | 180       | 340.0      | 161         | -4.8       | 1.30     | 70.00        | 1.31         | 3.00       | 0.99         | 38       |
| 26AL | 2  | 90 | 4  | WET | 14        | 272        | 0.32         | 205           | 8.4 | 48        | 4         | 16        | 20        | 6.0        | 154         | -4.8       | 0.50     | 3.75         | 0.67         | 1.00       | 1.33         | 2        |
| 26AU | 2  | 90 | 4  | WET | 13        | 271        | 0.28         | 179           | 8.5 | 47        | 4         | 9         | 18        | -2.5       | 147         | -4.8       | 0.35     | 3.63         | 0.78         | 1.00       | 1.99         | 4        |
| 26BL | 2  | 90 | 4  | WET | 16        | 274        | 0.38         | 243           | 8.4 | 51        | 5         | 29        | 40        | -2.5       | 161         | -4.8       | 0.58     | 4.00         | 0.56         | 2.00       | 2.32         | 2        |
| 26BU | 2  | 90 | 4  | WET | 15        | 273        | 0.28         | 179           | 8.4 | 48        | 4         | 11        | 12        | -2.5       | 168         | -4.8       | 0.35     | 3.00         | 0.44         | 3.00       | 1.99         | 6        |
| 27AL | 2  | 90 | 4  | WET | 912       | 172        | 2.00         | 1280          | 9.1 | 26        | 2         | 460       | 170       | 500.0      | 312         | 14.0       | 11.00    | 15.63        | 5.31         | -2.50      | 1.66         | 10       |
| 27AU | 2  | 90 | 4  | WET | 911       | 171        | 0.86         | 550           | 9.2 | 24        | 4         | 200       | 70        | 71.0       | 289         | 7.0        | 4.60     | 11.88        | 2.00         | -2.50      | 1.99         | 14       |
| 27BL | 2  | 90 | 4  | WET | 914       | 174        | 1.00         | 640           | 9.6 | 29        | 12        | 260       | 33        | -2.5       | 252         | 52.0       | 12.00    | 5.25         | 2.31         | -2.50      | 1.33         | 16       |
| 27BU | 2  | 90 | 4  | WET | 913       | 173        | 0.76         | 486           | 9.3 | 26        | 8         | 180       | 26        | 4.0        | 348         | 19.0       | 4.40     | 5.63         | 2.69         | -2.50      | 2.32         | 14       |
| 28AL | 2  | 90 | 4  | WET | 984       | 240        | 0.80         | 512           | 8.9 | 25        | 3         | 200       | 70        | 114.0      | 270         | -4.8       | 1.10     | 8.13         | 1.77         | 1.07       | 0.66         | 4        |
| 28AU | 2  | 90 | 4  | WET | 983       | 239        | 0.50         | 320           | 9.0 | 23        | 3         | 116       | 20        | 31.0       | 303         | 5.0        | 2.00     | 5.50         | 1.77         | 1.43       | 1.66         | 8        |
| 28BL | 2  | 90 | 4  | WET | 986       | 242        | 0.88         | 563           | 8.8 | 29        | 3         | 218       | 80        | 125.0      | 241         | -4.8       | 1.10     | 8.13         | 1.46         | 0.36       | 1.33         | 6        |
| 28BU | 2  | 90 | 4  | WET | 985       | 241        | 0.52         | 333           | 9.1 | 25        | 5         | 106       | 16        | -2.5       | 312         | 5.0        | 2.15     | 2.88         | 1.38         | -2.50      | 1.33         | 8        |
| 30AL | 2  | 90 | 4  | WET | 972       | 228        | 1.60         | 1024          | 8.5 | 39        | 7         | 345       | 252       | 227.0      | 265         | -4.8       | 5.20     | 9.38         | 2.15         | 0.71       | 0.99         | 8        |
| 30AU | 2  | 90 | 4  | WET | 971       | 227        | 1.60         | 1024          | 8.4 | 54        | 9         | 345       | 248       | 247.0      | 275         | -4.8       | 5.00     | 13.12        | 1.85         | 1.43       | 1.33         | 14       |
| 30BL | 2  | 90 | 4  | WET | 974       | 230        | 1.80         | 1152          | 8.4 | 49        | 8         | 364       | 316       | 228.0      | 244         | 2.0        | 4.70     | 7.50         | 1.92         | 1.07       | 0.66         | 10       |
| 30BU | 2  | 90 | 4  | WET | 973       | 229        | 1.50         | 960           | 8.4 | 41        | 7         | 345       | 262       | 218.0      | 263         | 2.0        | 5.40     | 8.75         | 2.00         | 0.71       | 1.33         | 10       |
| 31AL | 2  | 90 | 4  | WET | 18        | 276        | 1.10         | 704           | 9.1 | 23        | 3         | 218       | 136       | 86.0       | 289         | 9.0        | 7.40     | 14.38        | 2.44         | 0.50       | 1.66         | 4        |
| 31AU | 2  | 90 | 4  | WET | 17        | 275        | 1.20         | 768           | 9.1 | 23        | 4         | 255       | 100       | 125.0      | 312         | 9.0        | 0.48     | 25.00        | 3.89         | 1.50       | 2.65         | 8        |
| 31BL | 2  | 90 | 4  | WET | 20        | 278        | 1.30         | 832           | 9.0 | 23        | 2         | 291       | 180       | 120.0      | 275         | 9.0        | 9.60     | 9.38         | 2.89         | -2.50      | 0.66         | 4        |
| 31BU | 2  | 90 | 4  | WET | 19        | 277        | 1.10         | 704           | 9.2 | 25        | 3         | 273       | 124       | 144.0      | 303         | 7.0        | 8.00     | 10.63        | 4.33         | 1.00       | 1.33         | 6        |
| 32AL | 2  | 90 | 4  | WET | 22        | 280        | 1.50         | 960           | 9.0 | 23        | 2         | 309       | 172       | 144.0      | 265         | 9.0        | 9.60     | 19.38        | 3.00         | 1.00       | 0.66         | 2        |
| 32AU | 2  | 90 | 4  | WET | 21        | 279        | 1.30         | 832           | 9.1 | 24        | 4         | 255       | 124       | 99.0       | 284         | 5.0        | 5.20     | 27.50        | 4.00         | 0.50       | 1.66         | 6        |
| 32BL | 2  | 90 | 4  | WET | 24        | 282        | 1.60         | 1024          | 9.0 | 24        | 2         | 382       | 228       | 190.0      | 260         | 9.0        | 11.00    | 25.00        | 4.11         | 2.00       | 0.66         | 2        |
| 32BU | 2  | 90 | 4  | WET | 23        | 281        | 2.00         | 1280          | 9.0 | 26        | 2         | 455       | 232       | 310.0      | 279         | 5.0        | 10.00    | 42.50        | 5.22         | 3.00       | 1.33         | 4        |
| 33AL | 2  | 90 | 4  | WET | 26        | 284        | 0.18         | 115           | 8.4 | 38        | 4         | 6         | 14        | -2.5       | 123         | -4.8       | 0.20     | 2.63         | 1.33         | -2.50      | 3.98         | 6        |
| 33AU | 2  | 90 | 4  | WET | 25        | 283        | 0.18         | 115           | 8.3 | 37        | 4         | 6         | 14        | -2.5       | 118         | -4.8       | 0.19     | 3.25         | 1.56         | -2.50      | 7.62         | 6        |
| 33BL | 2  | 90 | 4  | WET | 28        | 286        | 0.18         | 115           | 8.5 | 38        | 4         | 8         | 14        | -2.5       | 128         | -4.8       | 0.19     | 2.06         | 1.78         | -2.50      | 2.98         | 6        |
| 33BU | 2  | 90 | 4  | WET | 27        | 285        | 0.18         | 115           | 8.3 | 37        | 4         | 6         | 14        | 6.0        | 116         | -4.8       | 0.14     | 2.44         | 1.89         | 1.25       | 8.62         | 8        |
| 34AL | 2  | 90 | 4  | WET | 988       | 244        | 0.40         | 256           | 8.6 | 27        | 2         | 45        | 56        | 15.0       | 144         | -4.8       | 0.19     | 3.00         | 0.25         | 2.50       | 0.33         | 4        |
| 34AU | 2  | 90 | 4  | WET | 987       | 243        | 0.26         | 166           | 8.5 | 46        | 4         | 8         | 16        | 11.0       | 137         | -4.8       | 0.18     | 2.75         | 0.15         | 1.25       | 0.66         | 6        |
| 34BL | 2  | 90 | 4  | WET | 990       | 246        | 0.28         | 179           | 8.4 | 55        | 5         | 8         | 16        | 12.0       | 168         | -4.8       | 0.21     | 2.75         | 0.30         | 2.50       | 0.99         | 8        |
| 34BU | 2  | 90 | 4  | WET | 989       | 245        | 0.26         | 166           | 8.5 | 51        | 4         | 6         | 12        | 16.0       | 154         | -4.8       | 0.19     | 2.50         | 0.30         | 1.25       | 1.99         | 10       |

## Raw Soil Sample Data

For Quarter 2/90

| Site | Qr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | EC x<br>1000 | Solu<br>Salts |     | Ca<br>ppm | Mg<br>ppm | Na<br>ppm | Cl<br>ppm | SO4<br>ppm | HCO3<br>ppm | CO3<br>ppm | F<br>ppm | NO3-N<br>ppm | Boron<br>ppm | NH4<br>ppm | PO4-P<br>ppm | k<br>ppm |
|------|----|----|----|-----|-----------|------------|--------------|---------------|-----|-----------|-----------|-----------|-----------|------------|-------------|------------|----------|--------------|--------------|------------|--------------|----------|
|      |    |    |    |     |           |            |              | ppm           | pH  |           |           |           |           |            |             |            |          |              |              |            |              |          |
| 35AL | 2  | 90 | 4  | WET | 992       | 248        | 0.20         | 128           | 8.6 | 39        | 3         | 6         | 12        | -2.5       | 109         | -4.8       | 0.16     | 2.63         | 0.40         | -2.50      | 2.98         | 6        |
| 35AU | 2  | 90 | 4  | WET | 991       | 247        | 0.18         | 115           | 8.8 | 32        | 3         | 4         | 10        | 2.0        | 85          | -4.8       | 0.12     | 2.13         | 0.10         | -2.50      | 4.64         | 8        |
| 35BL | 2  | 90 | 4  | WET | 994       | 250        | 0.18         | 115           | 8.8 | 33        | 3         | 4         | 14        | 2.0        | 97          | -4.8       | 0.14     | 2.31         | 0.15         | -2.50      | 3.65         | 6        |
| 35BU | 2  | 90 | 4  | WET | 993       | 249        | 0.18         | 115           | 8.7 | 33        | 3         | 4         | 10        | -2.5       | 99          | -4.8       | 0.12     | 2.25         | 0.10         | -2.50      | 4.64         | 6        |
| 36AL | 2  | 90 | 4  | WET | 996       | 252        | 1.10         | 704           | 8.3 | 79        | 6         | 171       | 138       | 150.0      | 144         | -4.8       | 0.60     | 13.75        | 0.70         | -2.50      | 0.33         | 6        |
| 36AU | 2  | 90 | 4  | WET | 995       | 251        | 0.28         | 179           | 8.5 | 41        | 4         | 15        | 20        | 8.0        | 151         | -4.8       | 0.13     | 2.63         | 0.10         | -2.50      | 0.66         | 8        |
| 36BL | 2  | 90 | 4  | WET | 998       | 254        | 0.36         | 230           | 8.7 | 28        | 2         | 65        | 18        | -2.5       | 199         | 2.0        | 0.42     | 2.63         | 0.30         | 2.50       | 0.33         | 2        |
| 36BU | 2  | 90 | 4  | WET | 997       | 253        | 0.28         | 179           | 8.4 | 48        | 4         | 11        | 20        | -2.5       | 156         | -4.8       | 0.21     | 2.75         | 0.20         | 3.75       | 0.66         | 8        |
| 37AL | 2  | 90 | 4  | WET | 1000      | 256        | 0.32         | 205           | 8.4 | 61        | 4         | 11        | 12        | 2.0        | 170         | -4.8       | 0.23     | 4.88         | 0.50         | -2.50      | 0.99         | 2        |
| 37AU | 2  | 90 | 4  | WET | 999       | 255        | 0.24         | 154           | 8.4 | 56        | 3         | 6         | 16        | -2.5       | 170         | -4.8       | 0.21     | 2.44         | 0.20         | -2.50      | 1.66         | 4        |
| 37BL | 2  | 90 | 4  | WET | 1002      | 258        | 0.28         | 179           | 8.4 | 46        | 4         | 11        | 14        | -2.5       | 161         | -4.8       | 0.23     | 4.00         | 0.75         | -2.50      | 0.66         | 2        |
| 37BU | 2  | 90 | 4  | WET | 1001      | 257        | 0.26         | 166           | 8.4 | 60        | 4         | 6         | 14        | -2.5       | 178         | -4.8       | 0.20     | 2.50         | 0.40         | 1.25       | 1.33         | 8        |
| 38AL | 2  | 90 | 4  | WET | 54        | 312        | 1.30         | 832           | 9.0 | 15        | 2         | 300       | 120       | 95.0       | 386         | 42.0       | 1.40     | 10.63        | 1.79         | 3.75       | 2.32         | 2        |
| 38AU | 2  | 90 | 4  | WET | 53        | 311        | 0.56         | 358           | 8.9 | 19        | 3         | 130       | 28        | 41.0       | 279         | 19.0       | 0.28     | 4.75         | 0.50         | 3.75       | 2.65         | 4        |
| 38BL | 2  | 90 | 4  | WET | 56        | 314        | 1.10         | 704           | 9.1 | 17        | 2         | 240       | 98        | 77.0       | 350         | 40.0       | 0.50     | 10.63        | 1.07         | 2.50       | 1.99         | 2        |
| 38BU | 2  | 90 | 4  | WET | 55        | 313        | 0.40         | 256           | 8.6 | 21        | 3         | 100       | 20        | 10.0       | 289         | 5.0        | 0.29     | 4.75         | 0.64         | 7.81       | 2.65         | 6        |
| 39AL | 2  | 90 | 4  | WET | 58        | 316        | 2.70         | 1728          | 8.5 | 34        | 5         | 560       | 558       | 276.0      | 208         | 2.0        | 0.54     | 15.00        | 2.50         | 1.25       | 1.99         | 6        |
| 39AU | 2  | 90 | 4  | WET | 57        | 315        | 0.94         | 602           | 8.3 | 38        | 4         | 180       | 208       | 16.0       | 192         | 2.0        | 0.24     | 7.50         | 0.50         | 3.75       | 1.66         | 8        |
| 39BL | 2  | 90 | 4  | WET | 60        | 318        | 2.70         | 1728          | 8.5 | 38        | 7         | 580       | 616       | 249.0      | 208         | 5.0        | 1.00     | 18.13        | 4.64         | 3.75       | 0.99         | 6        |
| 39BU | 2  | 90 | 4  | WET | 59        | 317        | 0.56         | 358           | 8.5 | 29        | 3         | 96        | 56        | 16.0       | 232         | 2.0        | 0.21     | 4.50         | 0.93         | 2.50       | 1.66         | 8        |
| 40AL | 2  | 90 | 4  | WET | 924       | 184        | 0.32         | 205           | 8.6 | 43        | 4         | 26        | 16        | 46.0       | 147         | -4.8       | 0.20     | 3.75         | 0.57         | -2.50      | 2.32         | 10       |
| 40AU | 2  | 90 | 4  | WET | 923       | 183        | 0.32         | 205           | 8.5 | 39        | 5         | 32        | 16        | -2.5       | 185         | -4.8       | 0.20     | 3.50         | 0.86         | 1.25       | 2.32         | 14       |
| 40BL | 2  | 90 | 4  | WET | 926       | 186        | 0.40         | 256           | 8.4 | 58        | 5         | 54        | 20        | 90.0       | 142         | -4.8       | 0.18     | 6.25         | 0.64         | -2.50      | 2.65         | 50       |
| 40BU | 2  | 90 | 4  | WET | 925       | 185        | 0.34         | 218           | 8.7 | 46        | 4         | 20        | 14        | -2.5       | 180         | -4.8       | 0.16     | 3.38         | 0.96         | -2.50      | 2.65         | 24       |
| 41AL | 2  | 90 | 4  | WET | 10        | 268        | 1.80         | 1152          | 9.0 | 21        | 2         | 364       | 344       | 112.0      | 241         | 9.0        | 1.20     | 15.63        | 9.11         | 1.00       | 0.33         | 6        |
| 41AU | 2  | 90 | 4  | WET | 9         | 267        | 0.70         | 448           | 8.5 | 38        | 4         | 91        | 116       | 18.0       | 168         | -4.8       | 0.29     | 6.00         | 1.00         | 1.00       | 0.66         | 6        |
| 41BL | 2  | 90 | 4  | WET | 12        | 270        | 2.20         | 1408          | 8.9 | 24        | 3         | 509       | 562       | 112.0      | 194         | 14.0       | 1.60     | 16.88        | 9.33         | 2.00       | 0.33         | 4        |
| 41BU | 2  | 90 | 4  | WET | 11        | 269        | 0.52         | 333           | 8.6 | 36        | 3         | 71        | 76        | 13.0       | 170         | -4.8       | 0.32     | 5.25         | 1.22         | 2.00       | 0.33         | 6        |
| 42AL | 2  | 90 | 4  | WET | 50        | 308        | 0.40         | 256           | 8.1 | 66        | 5         | 20        | 32        | 25.0       | 204         | -4.8       | 0.26     | 5.00         | 0.57         | 5.00       | 1.99         | 11       |
| 42AU | 2  | 90 | 4  | WET | 49        | 307        | 0.32         | 205           | 8.2 | 59        | 4         | 10        | 16        | -2.5       | 206         | -4.8       | 0.30     | 2.88         | 0.50         | 3.75       | 2.32         | 15       |
| 42BL | 2  | 90 | 4  | WET | 52        | 310        | 0.28         | 179           | 8.2 | 62        | 4         | 10        | 16        | -2.5       | 189         | -4.8       | 0.21     | 3.25         | 0.50         | 3.75       | 1.33         | 4        |
| 42BU | 2  | 90 | 4  | WET | 51        | 309        | 0.24         | 154           | 8.2 | 62        | 4         | 8         | 18        | -2.5       | 185         | -4.8       | 0.20     | 2.88         | 0.46         | 3.75       | 1.33         | 6        |
| 43AL | 2  | 90 | 4  | WET | 46        | 304        | 1.60         | 1024          | 8.4 | 62        | 12        | 280       | 220       | 299.0      | 388         | -4.8       | 1.40     | 5.75         | 1.50         | 6.41       | 4.97         | 17       |
| 43AU | 2  | 90 | 4  | WET | 45        | 303        | 1.60         | 1024          | 8.2 | 66        | 18        | 300       | 284       | 279.0      | 369         | -4.8       | 1.70     | 11.25        | 1.71         | 8.75       | 5.64         | 13       |
| 43BL | 2  | 90 | 4  | WET | 48        | 306        | 1.60         | 1024          | 8.4 | 68        | 14        | 300       | 246       | 336.0      | 376         | -4.8       | 1.60     | 6.25         | 1.57         | 5.94       | 3.98         | 15       |
| 43BU | 2  | 90 | 4  | WET | 47        | 305        | 1.60         | 1024          | 8.3 | 60        | 15        | 300       | 270       | 296.0      | 367         | -4.8       | 1.60     | 9.38         | 2.43         | 5.94       | 5.30         | 17       |
| 44AL | 2  | 90 | 4  | WET | 928       | 188        | 0.48         | 307           | 9.1 | 22        | 4         | 76        | 24        | 27.0       | 241         | 9.0        | 0.25     | 3.38         | 1.57         | -2.50      | 3.32         | 56       |
| 44AU | 2  | 90 | 4  | WET | 927       | 187        | 0.40         | 256           | 8.7 | 35        | 5         | 30        | 24        | 22.0       | 180         | -4.8       | 0.12     | 5.38         | 0.64         | -2.50      | 3.98         | 48       |
| 44BL | 2  | 90 | 4  | WET | 930       | 190        | 0.92         | 589           | 8.6 | 35        | 7         | 110       | 146       | 26.0       | 156         | -4.8       | 0.25     | 18.13        | 0.93         | -2.50      | 3.98         | 72       |
| 44BU | 2  | 90 | 4  | WET | 929       | 189        | 0.36         | 230           | 8.7 | 31        | 5         | 24        | 20        | -2.5       | 185         | -4.8       | 0.17     | 3.13         | 0.71         | -2.50      | 2.98         | 48       |
| 45AL | 2  | 90 | 4  | WET | 976       | 232        | 1.30         | 832           | 9.3 | 17        | 2         | 327       | 120       | 140.0      | 364         | 28.0       | 8.20     | 15.63        | 2.54         | 0.71       | 0.99         | 2        |
| 45AU | 2  | 90 | 4  | WET | 975       | 231        | 0.80         | 512           | 9.4 | 23        | 2         | 236       | 30        | 3.0        | 407         | 33.0       | 4.40     | 5.63         | 1.85         | 0.71       | 1.33         | 4        |
| 45BL | 2  | 90 | 4  | WET | 978       | 234        | 1.20         | 768           | 9.5 | 14        | 10        | 309       | 62        | 90.0       | 398         | 37.0       | 7.60     | 13.75        | 4.08         | 0.71       | 0.99         | 2        |
| 45BU | 2  | 90 | 4  | WET | 977       | 233        | 0.76         | 486           | 9.4 | 17        | 2         | 255       | 28        | -2.5       | 454         | 28.0       | 4.40     | 5.63         | 3.08         | 0.71       | 1.33         | 6        |

## Raw Soil Sample Data

For Quarter 2/90

| Site | Qtr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | Na<br>exchg<br>Meq/<br>100gm | K<br>exchg<br>Meq/<br>100gm | Ca<br>exchg<br>Meq/<br>100gm | Mg<br>exchg<br>Meq/<br>100gm | Total<br>P<br>ppm |
|------|-----|----|----|-----|-----------|------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------|
| 01AL | 2   | 90 | 4  | WET | 888       | 148        | 0.82                         | 0.59                        | 35.43                        | 1.81                         | 9999.99           |
| 01AU | 2   | 90 | 4  | WET | 887       | 147        | 0.55                         | 0.85                        | 34.93                        | 2.14                         | 9999.99           |
| 01BL | 2   | 90 | 4  | WET | 890       | 150        | 1.65                         | 0.61                        | 39.17                        | 1.95                         | 9999.99           |
| 01BU | 2   | 90 | 4  | WET | 889       | 149        | 1.14                         | 0.83                        | 35.68                        | 1.89                         | 9999.99           |
| 02AL | 2   | 90 | 4  | WET | 896       | 156        | 0.60                         | 1.71                        | 31.94                        | 3.35                         | 9999.99           |
| 02AU | 2   | 90 | 4  | WET | 895       | 155        | 2.20                         | 1.02                        | 29.19                        | 3.00                         | 9999.99           |
| 02BL | 2   | 90 | 4  | WET | 898       | 158        | 2.11                         | 1.39                        | 30.19                        | 3.45                         | 9999.99           |
| 02BU | 2   | 90 | 4  | WET | 897       | 157        | 0.64                         | 1.61                        | 30.56                        | 3.53                         | 9999.99           |
| 03AL | 2   | 90 | 4  | WET | 948       | 204        | 18.23                        | 1.24                        | 20.35                        | 2.30                         | 9999.99           |
| 03AU | 2   | 90 | 4  | WET | 947       | 203        | 7.46                         | 1.29                        | 23.27                        | 2.14                         | 9999.99           |
| 03BL | 2   | 90 | 4  | WET | 950       | 206        | 20.71                        | 1.24                        | 22.01                        | 2.28                         | 9999.99           |
| 03BU | 2   | 90 | 4  | WET | 949       | 205        | 12.61                        | 1.46                        | 23.27                        | 2.03                         | 9999.99           |
| 04AL | 2   | 90 | 4  | WET | 916       | 176        | 0.27                         | 0.86                        | 29.07                        | 1.36                         | 9999.99           |
| 04AU | 2   | 90 | 4  | WET | 915       | 175        | 0.27                         | 0.86                        | 29.82                        | 1.42                         | 9999.99           |
| 04BL | 2   | 90 | 4  | WET | 918       | 178        | 0.50                         | 0.92                        | 31.06                        | 1.50                         | 9999.99           |
| 04BU | 2   | 90 | 4  | WET | 917       | 177        | 0.27                         | 0.89                        | 29.32                        | 1.42                         | 9999.99           |
| 05AL | 2   | 90 | 4  | WET | 904       | 164        | 1.28                         | 0.67                        | 24.83                        | 1.75                         | 9999.99           |
| 05AU | 2   | 90 | 4  | WET | 903       | 163        | 1.14                         | 0.84                        | 24.38                        | 1.77                         | 9999.99           |
| 05BL | 2   | 90 | 4  | WET | 906       | 166        | 2.29                         | 0.65                        | 23.75                        | 1.52                         | 9999.99           |
| 05BU | 2   | 90 | 4  | WET | 905       | 165        | 0.87                         | 0.92                        | 23.69                        | 1.75                         | 9999.99           |
| 06AL | 2   | 90 | 4  | WET | 908       | 168        | 0.41                         | 0.46                        | 32.56                        | 1.64                         | 9999.99           |
| 06AU | 2   | 90 | 4  | WET | 907       | 167        | 0.32                         | 0.65                        | 32.31                        | 1.81                         | 9999.99           |
| 06BL | 2   | 90 | 4  | WET | 910       | 170        | 0.82                         | 0.44                        | 32.56                        | 1.69                         | 9999.99           |
| 06BU | 2   | 90 | 4  | WET | 909       | 169        | 0.27                         | 0.54                        | 29.82                        | 1.64                         | 9999.99           |
| 07AL | 2   | 90 | 4  | WET | 2         | 260        | 1.35                         | 0.49                        | 24.14                        | 3.31                         | 9999.99           |
| 07AU | 2   | 90 | 4  | WET | 1         | 259        | 1.13                         | 0.71                        | 24.03                        | 3.35                         | 9999.99           |
| 07BL | 2   | 90 | 4  | WET | 4         | 262        | 1.87                         | 0.49                        | 22.87                        | 3.58                         | 9999.99           |
| 07BU | 2   | 90 | 4  | WET | 3         | 261        | 1.57                         | 0.54                        | 24.00                        | 3.56                         | 9999.99           |
| 08AL | 2   | 90 | 4  | WET | 940       | 196        | 5.49                         | 1.02                        | 19.64                        | 1.29                         | 9999.99           |
| 08AU | 2   | 90 | 4  | WET | 939       | 195        | 1.92                         | 1.38                        | 22.23                        | 1.75                         | 9999.99           |
| 08BL | 2   | 90 | 4  | WET | 942       | 198        | 1.24                         | 0.44                        | 19.62                        | 1.23                         | 9999.99           |
| 08BU | 2   | 90 | 4  | WET | 941       | 197        | 0.50                         | 0.46                        | 20.03                        | 1.25                         | 9999.99           |
| 09AL | 2   | 90 | 4  | WET | 900       | 160        | 0.41                         | 1.58                        | 27.57                        | 2.98                         | 9999.99           |
| 09AU | 2   | 90 | 4  | WET | 899       | 159        | 0.46                         | 1.58                        | 30.56                        | 3.10                         | 9999.99           |
| 09BL | 2   | 90 | 4  | WET | 902       | 162        | 0.55                         | 1.88                        | 27.07                        | 2.94                         | 9999.99           |
| 09BU | 2   | 90 | 4  | WET | 901       | 161        | 0.41                         | 1.46                        | 29.07                        | 2.84                         | 9999.99           |
| 10AL | 2   | 90 | 4  | WET | 892       | 152        | 0.37                         | 0.61                        | 27.94                        | 1.91                         | 9999.99           |
| 10AU | 2   | 90 | 4  | WET | 891       | 151        | 0.27                         | 0.61                        | 27.20                        | 1.71                         | 9999.99           |
| 10BL | 2   | 90 | 4  | WET | 894       | 154        | 0.50                         | 0.56                        | 25.57                        | 1.81                         | 9999.99           |
| 10BU | 2   | 90 | 4  | WET | 893       | 153        | 0.37                         | 0.61                        | 25.45                        | 1.73                         | 9999.99           |
| 11AL | 2   | 90 | 4  | WET | 944       | 200        | 3.21                         | 2.56                        | 27.94                        | 2.51                         | 9999.99           |
| 11AU | 2   | 90 | 4  | WET | 943       | 199        | 3.02                         | 2.56                        | 28.69                        | 2.47                         | 9999.99           |
| 11BL | 2   | 90 | 4  | WET | 946       | 202        | 2.98                         | 2.56                        | 28.32                        | 2.51                         | 9999.99           |
| 11BU | 2   | 90 | 4  | WET | 945       | 201        | 2.98                         | 2.56                        | 28.32                        | 2.55                         | 9999.99           |

## Raw Soil Sample Data

For Quarter 2/90

| Site | Qtr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | Na<br>exchg<br>Meq/<br>100gm | K<br>exchg<br>Meq/<br>100gm | Ca<br>exchg<br>Meq/<br>100gm | Mg<br>exchg<br>Meq/<br>100gm | Total<br>P<br>ppm |
|------|-----|----|----|-----|-----------|------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------|
| 12AL | 2   | 90 | 4  | WET | 932       | 192        | 5.04                         | 2.56                        | 23.75                        | 1.54                         | 9999.99           |
| 12AU | 2   | 90 | 4  | WET | 931       | 191        | 4.12                         | 2.30                        | 24.08                        | 1.52                         | 9999.99           |
| 12BL | 2   | 90 | 4  | WET | 934       | 194        | 5.04                         | 2.30                        | 22.70                        | 1.52                         | 9999.99           |
| 12BU | 2   | 90 | 4  | WET | 933       | 193        | 3.34                         | 2.30                        | 22.45                        | 1.36                         | 9999.99           |
| 13AL | 2   | 90 | 4  | WET | 936       | 332        | 1.74                         | 1.24                        | 22.62                        | 1.81                         | 9999.99           |
| 13AU | 2   | 90 | 4  | WET | 935       | 331        | 1.91                         | 1.10                        | 22.55                        | 1.69                         | 9999.99           |
| 13BL | 2   | 90 | 4  | WET | 938       | 334        | 1.87                         | 1.19                        | 22.47                        | 1.81                         | 9999.99           |
| 13BU | 2   | 90 | 4  | WET | 937       | 333        | 2.00                         | 1.08                        | 22.43                        | 1.71                         | 9999.99           |
| 14AL | 2   | 90 | 4  | WET | 884       | 144        | 1.42                         | 3.58                        | 29.44                        | 3.16                         | 9999.99           |
| 14AU | 2   | 90 | 4  | WET | 883       | 143        | 0.78                         | 5.85                        | 29.19                        | 3.93                         | 9999.99           |
| 14BL | 2   | 90 | 4  | WET | 886       | 146        | 1.37                         | 3.33                        | 27.20                        | 2.88                         | 9999.99           |
| 14BU | 2   | 90 | 4  | WET | 885       | 145        | 1.01                         | 5.61                        | 28.44                        | 3.53                         | 9999.99           |
| 15AL | 2   | 90 | 4  | WET | 960       | 216        | 0.25                         | 0.79                        | 23.88                        | 1.15                         | 9999.99           |
| 15AU | 2   | 90 | 4  | WET | 959       | 215        | 0.17                         | 1.00                        | 24.46                        | 1.25                         | 9999.99           |
| 15BL | 2   | 90 | 4  | WET | 962       | 218        | 0.21                         | 0.87                        | 23.50                        | 1.25                         | 9999.99           |
| 15BU | 2   | 90 | 4  | WET | 961       | 217        | 0.21                         | 0.95                        | 26.20                        | 1.25                         | 9999.99           |
| 16AL | 2   | 90 | 4  | WET | 952       | 208        | 18.23                        | 1.32                        | 22.62                        | 2.67                         | 9999.99           |
| 16AU | 2   | 90 | 4  | WET | 951       | 207        | 7.46                         | 1.32                        | 21.63                        | 1.77                         | 9999.99           |
| 16BL | 2   | 90 | 4  | WET | 954       | 210        | 19.47                        | 1.61                        | 22.58                        | 2.53                         | 9999.99           |
| 16BU | 2   | 90 | 4  | WET | 953       | 209        | 5.39                         | 1.24                        | 21.00                        | 1.52                         | 9999.99           |
| 17AL | 2   | 90 | 4  | WET | 980       | 236        | 0.38                         | 5.39                        | 29.07                        | 4.15                         | 9999.99           |
| 17AU | 2   | 90 | 4  | WET | 979       | 235        | 0.38                         | 3.77                        | 24.80                        | 2.88                         | 9999.99           |
| 17BL | 2   | 90 | 4  | WET | 982       | 238        | 0.34                         | 4.58                        | 24.14                        | 3.93                         | 9999.99           |
| 17BU | 2   | 90 | 4  | WET | 981       | 237        | 0.34                         | 3.77                        | 29.07                        | 4.19                         | 9999.99           |
| 18AL | 2   | 90 | 4  | WET | 62        | 320        | 0.30                         | 0.59                        | 28.57                        | 1.64                         | 9999.99           |
| 18AU | 2   | 90 | 4  | WET | 61        | 319        | 0.26                         | 0.81                        | 28.69                        | 1.73                         | 9999.99           |
| 18BL | 2   | 90 | 4  | WET | 64        | 322        | 0.30                         | 0.62                        | 29.44                        | 1.85                         | 9999.99           |
| 18BU | 2   | 90 | 4  | WET | 63        | 321        | 0.39                         | 0.75                        | 24.40                        | 1.36                         | 9999.99           |
| 19AL | 2   | 90 | 4  | WET | 66        | 324        | 0.74                         | 6.47                        | 21.97                        | 2.26                         | 9999.99           |
| 19AU | 2   | 90 | 4  | WET | 65        | 323        | 0.57                         | 2.82                        | 22.52                        | 1.87                         | 9999.99           |
| 19BL | 2   | 90 | 4  | WET | 68        | 326        | 0.52                         | 3.58                        | 22.42                        | 1.91                         | 9999.99           |
| 19BU | 2   | 90 | 4  | WET | 67        | 325        | 0.35                         | 4.61                        | 22.39                        | 2.16                         | 9999.99           |
| 20AL | 2   | 90 | 4  | WET | 70        | 328        | 2.00                         | 1.56                        | 20.37                        | 2.24                         | 9999.99           |
| 20AU | 2   | 90 | 4  | WET | 69        | 327        | 0.83                         | 1.51                        | 19.45                        | 1.83                         | 9999.99           |
| 20BL | 2   | 90 | 4  | WET | 72        | 330        | 2.44                         | 1.79                        | 21.27                        | 2.36                         | 9999.99           |
| 20BU | 2   | 90 | 4  | WET | 71        | 329        | 1.09                         | 1.84                        | 20.78                        | 2.22                         | 9999.99           |
| 21AL | 2   | 90 | 4  | WET | 30        | 288        | 4.35                         | 1.54                        | 21.73                        | 1.99                         | 9999.99           |
| 21AU | 2   | 90 | 4  | WET | 29        | 287        | 0.91                         | 1.24                        | 23.94                        | 2.30                         | 9999.99           |
| 21BL | 2   | 90 | 4  | WET | 32        | 290        | 2.74                         | 1.54                        | 21.54                        | 1.93                         | 9999.99           |
| 21BU | 2   | 90 | 4  | WET | 31        | 289        | 0.57                         | 0.97                        | 24.15                        | 2.49                         | 9999.99           |
| 22AL | 2   | 90 | 4  | WET | 34        | 292        | 0.22                         | 0.38                        | 24.43                        | 0.95                         | 9999.99           |
| 22AU | 2   | 90 | 4  | WET | 33        | 291        | 0.22                         | 0.51                        | 23.18                        | 0.95                         | 9999.99           |
| 22BL | 2   | 90 | 4  | WET | 36        | 294        | 0.26                         | 0.38                        | 24.16                        | 0.95                         | 9999.99           |
| 22BU | 2   | 90 | 4  | WET | 35        | 293        | 0.17                         | 0.41                        | 22.90                        | 0.88                         | 9999.99           |

## Raw Soil Data

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| Site | Qtr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | Na<br>exchg<br>Meq/<br>100gm | K<br>exchg<br>Meq/<br>100gm | Ca<br>exchg<br>Meq/<br>100gm | Mg<br>exchg<br>Meq/<br>100gm | Total<br>P<br>ppm |
|------|-----|----|----|-----|-----------|------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------|
| 23AL | 2   | 90 | 4  | WET | 968       | 224        | 3.31                         | 1.18                        | 27.44                        | 2.47                         | 9999.99           |
| 23AU | 2   | 90 | 4  | WET | 967       | 223        | 5.30                         | 1.13                        | 27.07                        | 2.57                         | 9999.99           |
| 23BL | 2   | 90 | 4  | WET | 970       | 226        | 3.48                         | 1.28                        | 27.69                        | 2.61                         | 9999.99           |
| 23BU | 2   | 90 | 4  | WET | 969       | 225        | 5.30                         | 1.31                        | 27.69                        | 2.63                         | 9999.99           |
| 24AL | 2   | 90 | 4  | WET | 956       | 212        | 2.28                         | 1.79                        | 24.79                        | 2.14                         | 9999.99           |
| 24AU | 2   | 90 | 4  | WET | 955       | 211        | 1.70                         | 1.97                        | 24.08                        | 1.97                         | 9999.99           |
| 24BL | 2   | 90 | 4  | WET | 958       | 214        | 2.49                         | 1.61                        | 27.82                        | 2.49                         | 9999.99           |
| 24BU | 2   | 90 | 4  | WET | 957       | 213        | 1.65                         | 2.56                        | 23.79                        | 2.06                         | 9999.99           |
| 25AL | 2   | 90 | 4  | WET | 920       | 180        | 1.74                         | 1.32                        | 27.82                        | 3.49                         | 9999.99           |
| 25AU | 2   | 90 | 4  | WET | 919       | 179        | 1.65                         | 1.73                        | 28.32                        | 3.90                         | 9999.99           |
| 25BL | 2   | 90 | 4  | WET | 922       | 182        | 1.92                         | 1.61                        | 30.81                        | 4.44                         | 9999.99           |
| 25BU | 2   | 90 | 4  | WET | 921       | 181        | 1.83                         | 1.58                        | 29.44                        | 4.09                         | 9999.99           |
| 26AL | 2   | 90 | 4  | WET | 14        | 272        | 0.44                         | 0.51                        | 29.32                        | 1.42                         | 9999.99           |
| 26AU | 2   | 90 | 4  | WET | 13        | 271        | 0.28                         | 0.56                        | 27.07                        | 1.09                         | 9999.99           |
| 26BL | 2   | 90 | 4  | WET | 16        | 274        | 0.51                         | 0.38                        | 27.44                        | 1.32                         | 9999.99           |
| 26BU | 2   | 90 | 4  | WET | 15        | 273        | 0.32                         | 0.61                        | 23.49                        | 1.05                         | 9999.99           |
| 27AL | 2   | 90 | 4  | WET | 912       | 172        | 5.49                         | 0.86                        | 22.67                        | 1.17                         | 9999.99           |
| 27AU | 2   | 90 | 4  | WET | 911       | 171        | 2.47                         | 1.13                        | 22.92                        | 1.25                         | 9999.99           |
| 27BL | 2   | 90 | 4  | WET | 914       | 174        | 4.58                         | 0.94                        | 22.14                        | 1.19                         | 9999.99           |
| 27BU | 2   | 90 | 4  | WET | 913       | 173        | 2.43                         | 1.08                        | 23.10                        | 1.29                         | 9999.99           |
| 28AL | 2   | 90 | 4  | WET | 984       | 240        | 4.92                         | 0.92                        | 29.94                        | 1.89                         | 9999.99           |
| 28AU | 2   | 90 | 4  | WET | 983       | 239        | 2.04                         | 1.23                        | 29.32                        | 1.66                         | 9999.99           |
| 28BL | 2   | 90 | 4  | WET | 986       | 242        | 2.91                         | 1.20                        | 32.68                        | 1.83                         | 9999.99           |
| 28BU | 2   | 90 | 4  | WET | 985       | 241        | 2.31                         | 1.25                        | 28.82                        | 1.81                         | 9999.99           |
| 30AL | 2   | 90 | 4  | WET | 972       | 228        | 6.05                         | 1.25                        | 29.32                        | 3.29                         | 9999.99           |
| 30AU | 2   | 90 | 4  | WET | 971       | 227        | 5.67                         | 1.41                        | 30.19                        | 3.45                         | 9999.99           |
| 30BL | 2   | 90 | 4  | WET | 974       | 230        | 5.67                         | 1.18                        | 28.07                        | 3.10                         | 9999.99           |
| 30BU | 2   | 90 | 4  | WET | 973       | 229        | 5.67                         | 1.31                        | 28.69                        | 3.21                         | 9999.99           |
| 31AL | 2   | 90 | 4  | WET | 18        | 276        | 2.03                         | 0.38                        | 21.61                        | 0.92                         | 9999.99           |
| 31AU | 2   | 90 | 4  | WET | 17        | 275        | 2.61                         | 0.56                        | 21.02                        | 1.21                         | 9999.99           |
| 31BL | 2   | 90 | 4  | WET | 20        | 278        | 2.49                         | 0.41                        | 21.74                        | 0.95                         | 9999.99           |
| 31BU | 2   | 90 | 4  | WET | 19        | 277        | 2.57                         | 0.51                        | 21.27                        | 1.01                         | 9999.99           |
| 32AL | 2   | 90 | 4  | WET | 22        | 280        | 2.57                         | 0.26                        | 22.37                        | 1.11                         | 9999.99           |
| 32AU | 2   | 90 | 4  | WET | 21        | 279        | 2.24                         | 0.44                        | 22.03                        | 1.23                         | 9999.99           |
| 32BL | 2   | 90 | 4  | WET | 24        | 282        | 2.94                         | 0.26                        | 21.63                        | 1.05                         | 9999.99           |
| 32BU | 2   | 90 | 4  | WET | 23        | 281        | 3.95                         | 0.38                        | 21.18                        | 1.13                         | 9999.99           |
| 33AL | 2   | 90 | 4  | WET | 26        | 284        | 0.17                         | 0.15                        | 6.21                         | 0.41                         | 9999.99           |
| 33AU | 2   | 90 | 4  | WET | 25        | 283        | 0.13                         | 0.18                        | 5.48                         | 0.41                         | 9999.99           |
| 33BL | 2   | 90 | 4  | WET | 28        | 286        | 0.13                         | 0.20                        | 10.95                        | 0.55                         | 9999.99           |
| 33BU | 2   | 90 | 4  | WET | 27        | 285        | 0.13                         | 0.18                        | 5.39                         | 0.45                         | 9999.99           |
| 34AL | 2   | 90 | 4  | WET | 988       | 244        | 0.50                         | 0.44                        | 26.20                        | 0.97                         | 9999.99           |
| 34AU | 2   | 90 | 4  | WET | 987       | 243        | 0.21                         | 0.59                        | 26.82                        | 1.21                         | 9999.99           |
| 34BL | 2   | 90 | 4  | WET | 990       | 246        | 0.21                         | 0.49                        | 23.96                        | 1.03                         | 9999.99           |
| 34BU | 2   | 90 | 4  | WET | 989       | 245        | 0.21                         | 0.61                        | 24.38                        | 1.11                         | 9999.99           |

## Raw Soil Sample Data

For Quarter 2/90

| Site | Qtr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | Na<br>exchg<br>Meq/<br>100gm | K<br>exchg<br>Meq/<br>100gm | Ca<br>exchg<br>Meq/<br>100gm | Hg<br>exchg<br>Meq/<br>100gm | Total<br>P<br>ppm |
|------|-----|----|----|-----|-----------|------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------|
| 35AL | 2   | 90 | 4  | WET | 992       | 248        | 0.17                         | 0.28                        | 14.77                        | 0.66                         | 9999.99           |
| 35AU | 2   | 90 | 4  | WET | 991       | 247        | 0.17                         | 0.28                        | 11.65                        | 0.49                         | 9999.99           |
| 35BL | 2   | 90 | 4  | WET | 994       | 250        | 0.17                         | 0.28                        | 12.29                        | 0.58                         | 9999.99           |
| 35BU | 2   | 90 | 4  | WET | 993       | 249        | 0.12                         | 0.26                        | 11.96                        | 0.53                         | 9999.99           |
| 36AL | 2   | 90 | 4  | WET | 996       | 252        | 1.44                         | 0.59                        | 30.56                        | 1.85                         | 9999.99           |
| 36AU | 2   | 90 | 4  | WET | 995       | 251        | 0.29                         | 1.02                        | 32.81                        | 2.55                         | 9999.99           |
| 36BL | 2   | 90 | 4  | WET | 998       | 254        | 0.87                         | 0.54                        | 30.31                        | 1.64                         | 9999.99           |
| 36BU | 2   | 90 | 4  | WET | 997       | 253        | 0.29                         | 1.10                        | 32.93                        | 2.51                         | 9999.99           |
| 37AL | 2   | 90 | 4  | WET | 1000      | 256        | 0.21                         | 0.31                        | 28.44                        | 0.95                         | 9999.99           |
| 37AU | 2   | 90 | 4  | WET | 999       | 255        | 0.17                         | 0.41                        | 26.82                        | 0.97                         | 9999.99           |
| 37BL | 2   | 90 | 4  | WET | 1002      | 258        | 0.21                         | 0.26                        | 27.44                        | 1.09                         | 9999.99           |
| 37BU | 2   | 90 | 4  | WET | 1001      | 257        | 0.17                         | 0.54                        | 27.44                        | 1.17                         | 9999.99           |
| 38AL | 2   | 90 | 4  | WET | 54        | 312        | 9.57                         | 0.40                        | 34.18                        | 3.82                         | 9999.99           |
| 38AU | 2   | 90 | 4  | WET | 53        | 311        | 3.22                         | 0.62                        | 35.18                        | 3.33                         | 9999.99           |
| 38BL | 2   | 90 | 4  | WET | 56        | 314        | 7.83                         | 0.51                        | 32.56                        | 3.41                         | 9999.99           |
| 38BU | 2   | 90 | 4  | WET | 55        | 313        | 2.11                         | 0.65                        | 36.43                        | 3.53                         | 9999.99           |
| 39AL | 2   | 90 | 4  | WET | 58        | 316        | 6.09                         | 0.40                        | 27.20                        | 3.08                         | 9999.99           |
| 39AU | 2   | 90 | 4  | WET | 57        | 315        | 2.01                         | 0.62                        | 30.56                        | 2.67                         | 9999.99           |
| 39BL | 2   | 90 | 4  | WET | 60        | 318        | 5.65                         | 0.35                        | 25.82                        | 3.12                         | 9999.99           |
| 39BU | 2   | 90 | 4  | WET | 59        | 317        | 1.30                         | 0.81                        | 29.94                        | 2.49                         | 9999.99           |
| 40AL | 2   | 90 | 4  | WET | 924       | 184        | 0.64                         | 1.10                        | 25.07                        | 1.66                         | 9999.99           |
| 40AU | 2   | 90 | 4  | WET | 923       | 183        | 0.60                         | 1.25                        | 28.19                        | 2.26                         | 9999.99           |
| 40BL | 2   | 90 | 4  | WET | 926       | 186        | 0.46                         | 1.13                        | 24.50                        | 1.54                         | 9999.99           |
| 40BU | 2   | 90 | 4  | WET | 925       | 185        | 0.46                         | 1.74                        | 19.06                        | 1.07                         | 9999.99           |
| 41AL | 2   | 90 | 4  | WET | 10        | 268        | 3.56                         | 0.49                        | 24.43                        | 1.46                         | 9999.99           |
| 41AU | 2   | 90 | 4  | WET | 9         | 267        | 0.99                         | 0.61                        | 27.57                        | 1.52                         | 9999.99           |
| 41BL | 2   | 90 | 4  | WET | 12        | 270        | 4.75                         | 0.36                        | 24.50                        | 1.29                         | 9999.99           |
| 41BU | 2   | 90 | 4  | WET | 11        | 269        | 0.87                         | 0.64                        | 28.19                        | 1.56                         | 9999.99           |
| 42AL | 2   | 90 | 4  | WET | 50        | 308        | 0.30                         | 0.62                        | 26.95                        | 1.21                         | 9999.99           |
| 42AU | 2   | 90 | 4  | WET | 49        | 307        | 0.22                         | 0.70                        | 25.70                        | 1.07                         | 9999.99           |
| 42BL | 2   | 90 | 4  | WET | 52        | 310        | 0.26                         | 0.30                        | 26.82                        | 1.03                         | 9999.99           |
| 42BU | 2   | 90 | 4  | WET | 51        | 309        | 0.22                         | 0.40                        | 27.32                        | 1.09                         | 9999.99           |
| 43AL | 2   | 90 | 4  | WET | 46        | 304        | 3.00                         | 1.08                        | 26.20                        | 4.29                         | 9999.99           |
| 43AU | 2   | 90 | 4  | WET | 45        | 303        | 2.74                         | 0.73                        | 23.96                        | 4.38                         | 9999.99           |
| 43BL | 2   | 90 | 4  | WET | 48        | 306        | 2.91                         | 0.92                        | 25.57                        | 4.03                         | 9999.99           |
| 43BU | 2   | 90 | 4  | WET | 47        | 305        | 2.96                         | 0.94                        | 24.76                        | 4.46                         | 9999.99           |
| 44AL | 2   | 90 | 4  | WET | 928       | 188        | 1.97                         | 6.91                        | 23.99                        | 2.86                         | 9999.99           |
| 44AU | 2   | 90 | 4  | WET | 927       | 187        | 0.50                         | 4.10                        | 23.94                        | 2.34                         | 9999.99           |
| 44BL | 2   | 90 | 4  | WET | 930       | 190        | 1.79                         | 5.63                        | 24.44                        | 3.04                         | 9999.99           |
| 44BU | 2   | 90 | 4  | WET | 929       | 189        | 0.55                         | 4.61                        | 24.34                        | 2.59                         | 9999.99           |
| 45AL | 2   | 90 | 4  | WET | 976       | 232        | 7.19                         | 0.65                        | 23.79                        | 2.26                         | 9999.99           |
| 45AU | 2   | 90 | 4  | WET | 975       | 231        | 5.30                         | 0.65                        | 23.55                        | 2.12                         | 9999.99           |
| 45BL | 2   | 90 | 4  | WET | 978       | 234        | 7.19                         | 0.62                        | 23.25                        | 1.89                         | 9999.99           |
| 45BU | 2   | 90 | 4  | WET | 977       | 233        | 6.05                         | 0.81                        | 23.53                        | 2.08                         | 9999.99           |

## Raw Soil Sample Data

For Quarter 3/90

| Site | Qr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | EC x<br>1000 | Solu<br>Salts |     | Ca<br>ppm | Mg<br>ppm | Na<br>ppm | Cl<br>ppm | SO4<br>ppm | HCO3<br>ppm | CO3<br>ppm | F<br>ppm | NO3-N<br>ppm | Boron<br>ppm | NH4<br>ppm | PO4-P<br>ppm | k<br>ppm |
|------|----|----|----|-----|-----------|------------|--------------|---------------|-----|-----------|-----------|-----------|-----------|------------|-------------|------------|----------|--------------|--------------|------------|--------------|----------|
|      |    |    |    |     |           |            |              | ppm           | pH  |           |           |           |           |            |             |            |          |              |              |            |              |          |
| 01AL | 3  | 90 | 7  | DRY | 90        | 486        | 6.80         | 4352          | 7.8 | 968       | 54        | 420       | 1250      | 138.0      | 62          | -4.8       | 0.27     | 300.00       | 1.00         | 2.50       | -0.30        | 13       |
| 01AU | 3  | 90 | 7  | DRY | 89        | 485        | 4.80         | 3072          | 7.8 | 810       | 46        | 260       | 870       | 42.0       | 71          | -4.8       | 0.18     | 243.75       | 0.73         | 5.00       | -0.30        | 23       |
| 01BL | 3  | 90 | 7  | DRY | 92        | 488        | 3.60         | 2304          | 7.9 | 538       | 31        | 180       | 564       | 84.0       | 76          | -4.8       | 0.20     | 210.00       | 0.73         | 2.50       | 1.39         | 19       |
| 01BU | 3  | 90 | 7  | DRY | 91        | 487        | 1.30         | 832           | 8.2 | 155       | 11        | 64        | 186       | 15.0       | 92          | -4.8       | 0.17     | 60.00        | 0.60         | 2.50       | 0.35         | 13       |
| 02AL | 3  | 90 | 7  | DRY | 94        | 490        | 1.80         | 1152          | 9.0 | 26        | 4         | 360       | 372       | 67.0       | 222         | 5.0        | 0.58     | 20.63        | 1.60         | -2.50      | 3.48         | 20       |
| 02AU | 3  | 90 | 7  | DRY | 93        | 489        | 0.36         | 230           | 8.7 | 39        | 6         | 32        | 14        | 13.0       | 180         | -4.8       | 0.27     | 5.63         | 0.73         | 1.25       | 3.13         | 28       |
| 02BL | 3  | 90 | 7  | DRY | 96        | 492        | 0.80         | 512           | 8.8 | 30        | 5         | 136       | 104       | 8.0        | 213         | 2.0        | 0.48     | 13.12        | 0.93         | -2.50      | 1.74         | 18       |
| 02BU | 3  | 90 | 7  | DRY | 95        | 491        | 0.36         | 230           | 8.7 | 38        | 6         | 38        | 14        | 18.0       | 182         | -4.8       | 0.27     | 5.25         | 0.93         | -2.50      | 2.44         | 24       |
| 03AL | 3  | 90 | 7  | DRY | 74        | 470        | 14.00        | 8960          | 8.7 | 200       | 26        | 3400      | 3420      | 1040.0     | 142         | -4.8       | 8.40     | 160.00       | 43.33        | 1.25       | 1.04         | 34       |
| 03AU | 3  | 90 | 7  | DRY | 73        | 469        | 6.00         | 3840          | 8.8 | 60        | 7         | 1300      | 1540      | 183.0      | 187         | 9.0        | 2.60     | 65.00        | 17.33        | 2.50       | 1.39         | 29       |
| 03BL | 3  | 90 | 7  | DRY | 76        | 472        | 10.00        | 6400          | 8.8 | 93        | 13        | 2400      | 2420      | 640.0      | 161         | 5.0        | 10.00    | 120.00       | 47.33        | 1.25       | 1.04         | 29       |
| 03BU | 3  | 90 | 7  | DRY | 75        | 471        | 2.20         | 1408          | 9.0 | 52        | 5         | 480       | 492       | -2.5       | 211         | 9.0        | 2.70     | 30.00        | 2.67         | 2.50       | 1.74         | 51       |
| 04AL | 3  | 90 | 7  | DRY | 106       | 502        | 0.32         | 205           | 8.4 | 56        | 4         | 12        | 12        | 13.0       | 161         | -4.8       | 0.31     | 3.88         | 0.80         | -2.50      | 0.70         | 10       |
| 04AU | 3  | 90 | 7  | DRY | 105       | 501        | 0.34         | 218           | 8.4 | 58        | 5         | 12        | 8         | 8.0        | 170         | -4.8       | 0.28     | 7.50         | 0.60         | 1.25       | 0.35         | 14       |
| 04BL | 3  | 90 | 7  | DRY | 108       | 504        | 0.76         | 486           | 8.3 | 87        | 7         | 58        | 156       | 41.0       | 140         | -4.8       | 0.25     | 14.38        | 0.60         | -2.50      | 1.04         | 20       |
| 04BU | 3  | 90 | 7  | DRY | 107       | 503        | 0.32         | 205           | 8.5 | 56        | 5         | 14        | 16        | 15.0       | 156         | -4.8       | 0.33     | 5.13         | 0.53         | -2.50      | 0.70         | 14       |
| 05AL | 3  | 90 | 7  | DRY | 110       | 506        | 0.56         | 358           | 8.7 | 35        | 4         | 148       | 104       | -2.5       | 211         | -4.8       | 6.40     | 13.75        | 1.33         | -2.50      | 1.39         | 16       |
| 05AU | 3  | 90 | 7  | DRY | 109       | 505        | 0.56         | 358           | 8.5 | 55        | 6         | 58        | 44        | 19.0       | 189         | -4.8       | 2.30     | 13.75        | 1.20         | -2.50      | 1.74         | 22       |
| 05BL | 3  | 90 | 7  | DRY | 112       | 508        | 0.96         | 614           | 8.7 | 40        | 4         | 180       | 128       | 38.0       | 213         | -4.8       | 4.60     | 26.25        | 1.73         | -2.50      | 1.74         | 20       |
| 05BU | 3  | 90 | 7  | DRY | 111       | 507        | 0.48         | 307           | 8.6 | 42        | 5         | 64        | 40        | -2.5       | 185         | -4.8       | 2.70     | 13.12        | 1.00         | -2.50      | 2.09         | 26       |
| 06AL | 3  | 90 | 7  | DRY | 102       | 498        | 2.90         | 1856          | 8.4 | 80        | 5         | 540       | 610       | 240.0      | 147         | -4.8       | 0.30     | 30.00        | 4.67         | -2.50      | 0.70         | 4        |
| 06AU | 3  | 90 | 7  | DRY | 101       | 497        | 0.72         | 461           | 8.8 | 32        | 4         | 134       | 92        | -2.5       | 211         | -4.8       | 0.30     | 13.12        | 1.40         | -2.50      | 1.39         | 10       |
| 06BL | 3  | 90 | 7  | DRY | 104       | 500        | 0.36         | 230           | 8.5 | 52        | 4         | 34        | 14        | -2.5       | 192         | -4.8       | 0.33     | 6.25         | 0.93         | 1.25       | 0.70         | 2        |
| 06BU | 3  | 90 | 7  | DRY | 103       | 499        | 0.32         | 205           | 8.5 | 47        | 4         | 22        | 6         | -2.5       | 163         | -4.8       | 0.25     | 5.63         | 0.87         | 1.25       | 1.04         | 6        |
| 07AL | 3  | 90 | 7  | DRY | 142       | 538        | 1.10         | 704           | 9.0 | 23        | 4         | 240       | 132       | 106.0      | 246         | 9.0        | 4.00     | 16.25        | 2.33         | 1.00       | 1.74         | 8        |
| 07AU | 3  | 90 | 7  | DRY | 141       | 537        | 0.60         | 384           | 9.0 | 23        | 3         | 132       | 40        | 28.0       | 249         | 9.0        | 2.80     | 12.50        | 2.13         | 1.00       | 3.13         | 8        |
| 07BL | 3  | 90 | 7  | DRY | 144       | 540        | 0.60         | 384           | 8.8 | 28        | 5         | 99        | 34        | 36.0       | 225         | -4.8       | 2.60     | 14.38        | 1.07         | 1.00       | 3.13         | 12       |
| 07BU | 3  | 90 | 7  | DRY | 143       | 539        | 0.56         | 358           | 8.7 | 30        | 6         | 86        | 28        | 28.0       | 232         | -4.8       | 2.10     | 18.13        | 1.00         | 3.00       | 3.13         | 20       |
| 08AL | 3  | 90 | 7  | DRY | 150       | 546        | 2.00         | 1280          | 9.2 | 26        | 4         | 440       | 462       | 140.0      | 170         | 9.0        | 0.82     | 13.75        | 4.00         | -2.50      | 2.44         | 14       |
| 08AU | 3  | 90 | 7  | DRY | 149       | 545        | 0.36         | 230           | 8.8 | 35        | 5         | 36        | 32        | -2.5       | 147         | -4.8       | 0.37     | 6.13         | 0.40         | 1.00       | 3.13         | 16       |
| 08BL | 3  | 90 | 7  | DRY | 152       | 548        | 1.40         | 896           | 9.3 | 22        | 3         | 300       | 294       | 52.0       | 170         | 12.0       | 0.70     | 13.12        | 0.80         | -2.50      | 2.09         | 10       |
| 08BU | 3  | 90 | 7  | DRY | 151       | 547        | 0.72         | 461           | 9.1 | 24        | 5         | 132       | 112       | 2.0        | 170         | 19.0       | 0.50     | 9.38         | 0.73         | -2.50      | 2.78         | 18       |
| 09AL | 3  | 90 | 7  | DRY | 98        | 494        | 0.64         | 410           | 8.5 | 47        | 9         | 62        | 84        | 20.0       | 168         | -4.8       | 0.27     | 17.50        | 0.80         | -2.50      | 2.44         | 44       |
| 09AU | 3  | 90 | 7  | DRY | 97        | 493        | 0.36         | 230           | 8.5 | 52        | 7         | 20        | 12        | 9.0        | 204         | -4.8       | 0.28     | 6.88         | 1.00         | 3.75       | 1.74         | 26       |
| 09BL | 3  | 90 | 7  | DRY | 100       | 496        | 0.68         | 435           | 8.5 | 50        | 10        | 58        | 92        | 12.0       | 173         | -4.8       | 0.21     | 13.75        | 0.73         | 1.25       | 2.44         | 42       |
| 09BU | 3  | 90 | 7  | DRY | 99        | 495        | 0.40         | 256           | 8.6 | 48        | 7         | 28        | 8         | -2.5       | 199         | -4.8       | 0.26     | 8.13         | 0.93         | 1.25       | 2.78         | 28       |
| 10AL | 3  | 90 | 7  | DRY | 82        | 478        | 0.48         | 307           | 8.5 | 58        | 7         | 38        | 40        | 22.0       | 118         | -4.8       | 0.68     | 14.38        | 0.60         | 1.25       | 0.35         | 10       |
| 10AU | 3  | 90 | 7  | DRY | 81        | 477        | 0.32         | 205           | 8.5 | 55        | 5         | 12        | 38        | -2.5       | 135         | -4.8       | 0.52     | 6.88         | 0.60         | 1.25       | 0.70         | 11       |
| 10BL | 3  | 90 | 7  | DRY | 84        | 480        | 0.52         | 333           | 8.5 | 58        | 6         | 44        | 54        | 20.0       | 140         | -4.8       | 0.66     | 10.00        | 0.67         | 1.25       | 0.35         | 13       |
| 10BU | 3  | 90 | 7  | DRY | 83        | 479        | 0.28         | 179           | 8.6 | 55        | 5         | 8         | 6         | 7.0        | 151         | -4.8       | 0.50     | 5.63         | 0.53         | 1.25       | 0.70         | 17       |
| 11AL | 3  | 90 | 7  | DRY | 154       | 550        | 2.20         | 1408          | 8.5 | 40        | 4         | 440       | 360       | 221.0      | 284         | 7.0        | 13.00    | 16.88        | 3.50         | 2.00       | 1.74         | 36       |
| 11AU | 3  | 90 | 7  | DRY | 153       | 549        | 1.90         | 1216          | 8.5 | 43        | 6         | 380       | 320       | 213.0      | 322         | 19.0       | 13.00    | 16.25        | 3.29         | 3.00       | 1.04         | 34       |
| 11BL | 3  | 90 | 7  | DRY | 156       | 552        | 2.20         | 1408          | 8.5 | 45        | 5         | 440       | 352       | 244.0      | 246         | 9.0        | 12.00    | 26.25        | 3.79         | 3.00       | 1.04         | 36       |
| 11BU | 3  | 90 | 7  | DRY | 155       | 551        | 2.40         | 1536          | 8.4 | 48        | 5         | 460       | 386       | 251.0      | 222         | 9.0        | 12.50    | 30.00        | 3.79         | 3.00       | 1.39         | 38       |

## Raw Soil Sample Data

For Quarter 3/90

| Site | Qr | Yr | Mn | Sea | Solu   |         |           |           |     |        |        |        |        |         |          |         |       |           |           |         |           |       |  |  |
|------|----|----|----|-----|--------|---------|-----------|-----------|-----|--------|--------|--------|--------|---------|----------|---------|-------|-----------|-----------|---------|-----------|-------|--|--|
|      |    |    |    |     | Id Num | Lab Num | EC x 1000 | 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  | 90 | 7  | DRY | 182    | 578     | 2.70      | 1728      | 8.3 | 76     | 8      | 463    | 496    | 218.0   | 213      | 2.0     | 6.40  | 80.00     | 2.85      | 3.00    | 2.78      | 78    |  |  |
| 12AU | 3  | 90 | 7  | DRY | 181    | 577     | 2.20      | 1408      | 8.4 | 74     | 8      | 180    | 380    | 136.0   | 211      | -4.8    | 3.70  | 67.50     | 4.62      | 3.00    | 3.13      | 78    |  |  |
| 12BL | 3  | 90 | 7  | DRY | 184    | 580     | 2.80      | 1792      | 8.2 | 133    | 13     | 400    | 582    | 167.0   | 170      | -4.8    | 5.20  | 77.50     | 2.38      | 2.00    | 2.44      | 88    |  |  |
| 12BU | 3  | 90 | 7  | DRY | 183    | 579     | 2.20      | 1408      | 8.3 | 87     | 8      | 320    | 402    | 97.0    | 178      | -4.8    | 5.60  | 62.50     | 2.38      | 1.00    | 3.13      | 74    |  |  |
| 13AL | 3  | 90 | 7  | DRY | 186    | 582     | 0.60      | 384       | 8.6 | 29     | 4      | 138    | 64     | 31.0    | 289      | 9.0     | 12.00 | 3.63      | 0.92      | -2.50   | 1.04      | 38    |  |  |
| 13AU | 3  | 90 | 7  | DRY | 185    | 581     | 0.72      | 461       | 8.8 | 29     | 9      | 132    | 72     | 17.0    | 308      | 5.0     | 7.00  | 3.75      | 1.00      | -2.50   | 1.74      | 42    |  |  |
| 13BL | 3  | 90 | 7  | DRY | 188    | 584     | 0.72      | 461       | 8.6 | 32     | 7      | 116    | 64     | 15.0    | 237      | 9.0     | 10.50 | 2.88      | 0.77      | -2.50   | 1.04      | 18    |  |  |
| 13BU | 3  | 90 | 7  | DRY | 187    | 583     | 0.76      | 486       | 8.8 | 26     | 5      | 130    | 68     | 22.0    | 256      | 9.0     | 6.80  | 3.63      | 1.00      | -2.50   | 2.09      | 22    |  |  |
| 14AL | 3  | 90 | 7  | DRY | 86     | 482     | 0.76      | 486       | 8.5 | 54     | 7      | 76     | 38     | 52.0    | 166      | -4.8    | 0.35  | 31.25     | 0.87      | 1.25    | 0.70      | 51    |  |  |
| 14AU | 3  | 90 | 7  | DRY | 85     | 481     | 0.72      | 461       | 8.5 | 62     | 9      | 42     | 24     | 100.0   | 50       | -4.8    | 0.28  | 21.88     | 1.80      | 3.75    | 1.74      | 100   |  |  |
| 14BL | 3  | 90 | 7  | DRY | 88     | 484     | 2.40      | 1536      | 8.2 | 176    | 29     | 180    | 338    | 76.0    | 121      | -4.8    | 0.21  | 105.00    | 0.80      | 2.50    | 1.04      | 150   |  |  |
| 14BU | 3  | 90 | 7  | DRY | 87     | 483     | 1.60      | 1024      | 8.5 | 53     | 14     | 118    | 78     | 133.0   | 211      | -4.8    | 0.21  | 85.00     | 1.87      | 1.25    | 2.78      | 229   |  |  |
| 15AL | 3  | 90 | 7  | DRY | 158    | 554     | 0.32      | 205       | 8.4 | 47     | 5      | 6      | 14     | 9.0     | 137      | -4.8    | 0.42  | 5.75      | 0.57      | -2.50   | 1.04      | 12    |  |  |
| 15AU | 3  | 90 | 7  | DRY | 157    | 553     | 0.36      | 230       | 8.3 | 52     | 5      | 6      | 12     | 9.0     | 144      | -4.8    | 0.50  | 6.88      | 0.64      | 1.00    | 1.39      | 16    |  |  |
| 15BL | 3  | 90 | 7  | DRY | 160    | 556     | 0.36      | 230       | 8.4 | 47     | 5      | 8      | 16     | 17.0    | 147      | -4.8    | 0.56  | 7.19      | 0.79      | -2.50   | 1.39      | 20    |  |  |
| 15BU | 3  | 90 | 7  | DRY | 159    | 555     | 0.30      | 192       | 8.4 | 44     | 4      | 4      | 12     | -2.5    | 144      | -4.8    | 0.30  | 5.63      | 0.57      | -2.50   | 1.39      | 18    |  |  |
| 16AL | 3  | 90 | 7  | DRY | 78     | 474     | 12.00     | 7680      | 8.9 | 89     | 17     | 3000   | 2700   | 500.0   | 211      | -4.8    | 2.60  | 362.50    | 26.67     | 1.25    | 1.04      | 67    |  |  |
| 16AU | 3  | 90 | 7  | DRY | 77     | 473     | 3.80      | 2432      | 8.9 | 60     | 6      | 760    | 868    | 65.0    | 151      | -4.8    | 0.74  | 115.00    | 19.33     | 1.25    | 3.13      | 51    |  |  |
| 16BL | 3  | 90 | 7  | DRY | 80     | 476     | 14.00     | 8960      | 8.9 | 91     | 16     | 3600   | 3140   | 680.0   | 234      | -4.8    | 2.20  | 312.50    | 44.00     | -2.50   | 1.39      | 120   |  |  |
| 16BU | 3  | 90 | 7  | DRY | 79     | 475     | 6.40      | 4096      | 8.9 | 72     | 8      | 1380   | 1640   | 138.0   | 142      | -4.8    | 0.58  | 200.00    | 13.33     | 1.25    | 3.83      | 93    |  |  |
| 17AL | 3  | 90 | 7  | DRY | 206    | 602     | 0.80      | 512       | 8.3 | 82     | 18     | 12     | 12     | -2.5    | 279      | -4.8    | 0.25  | 38.75     | 1.71      | 3.75    | 5.57      | 124   |  |  |
| 17AU | 3  | 90 | 7  | DRY | 205    | 601     | 0.64      | 410       | 8.3 | 92     | 15     | 10     | 20     | -2.5    | 310      | -4.8    | 0.29  | 31.25     | 1.93      | 7.14    | 11.83     | 90    |  |  |
| 17BL | 3  | 90 | 7  | DRY | 208    | 604     | 0.48      | 307       | 8.6 | 58     | 7      | 32     | 12     | -2.5    | 230      | -4.8    | 0.20  | 10.63     | 1.43      | 5.00    | 8.70      | 66    |  |  |
| 17BU | 3  | 90 | 7  | DRY | 207    | 603     | 0.48      | 307       | 8.2 | 75     | 9      | 8      | 12     | -2.5    | 246      | -4.8    | 0.21  | 13.12     | 1.21      | 9.29    | 10.44     | 54    |  |  |
| 18AL | 3  | 90 | 7  | DRY | 214    | 610     | 0.28      | 179       | 8.6 | 52     | 5      | 18     | 18     | -2.5    | 161      | -4.8    | 0.40  | 4.13      | 0.46      | 1.00    | 1.39      | 4     |  |  |
| 18AU | 3  | 90 | 7  | DRY | 213    | 609     | 0.28      | 179       | 8.5 | 52     | 4      | 22     | 12     | -2.5    | 161      | -4.8    | 0.26  | 4.75      | 0.46      | 2.00    | 1.04      | 14    |  |  |
| 18BL | 3  | 90 | 7  | DRY | 216    | 612     | 0.30      | 192       | 8.6 | 54     | 4      | 22     | 18     | -2.5    | 166      | -4.8    | 0.42  | 3.50      | 0.62      | 1.00    | 0.70      | 6     |  |  |
| 18BU | 3  | 90 | 7  | DRY | 215    | 611     | 0.28      | 179       | 8.5 | 58     | 5      | 18     | 12     | -2.5    | 166      | -4.8    | 0.26  | 3.88      | 0.46      | 2.00    | 0.70      | 10    |  |  |
| 19AL | 3  | 90 | 7  | DRY | 210    | 606     | 0.48      | 307       | 8.5 | 52     | 8      | 20     | 14     | -2.5    | 251      | -4.8    | 0.40  | 11.25     | 1.21      | 5.00    | 2.09      | 74    |  |  |
| 19AU | 3  | 90 | 7  | DRY | 209    | 605     | 0.40      | 256       | 8.3 | 55     | 7      | 16     | 16     | -2.5    | 199      | -4.8    | 0.28  | 12.50     | 0.71      | 6.07    | 2.78      | 44    |  |  |
| 19BL | 3  | 90 | 7  | DRY | 212    | 608     | 0.48      | 307       | 8.6 | 47     | 7      | 26     | 16     | -2.5    | 256      | -4.8    | 0.52  | 13.75     | 0.93      | 3.75    | 2.09      | 88    |  |  |
| 19BU | 3  | 90 | 7  | DRY | 211    | 607     | 0.44      | 282       | 8.4 | 61     | 9      | 18     | 10     | -2.5    | 237      | -4.8    | 0.29  | 15.00     | 0.71      | 5.00    | 2.09      | 60    |  |  |
| 20AL | 3  | 90 | 7  | DRY | 218    | 614     | 0.56      | 358       | 9.4 | 25     | 7      | 109    | 12     | -2.5    | 246      | 23.0    | 3.70  | 3.88      | 1.54      | 2.00    | 2.78      | 28    |  |  |
| 20AU | 3  | 90 | 7  | DRY | 217    | 613     | 0.44      | 282       | 9.1 | 26     | 4      | 72     | 16     | -2.5    | 201      | 5.0     | 2.50  | 4.13      | 0.92      | 2.00    | 3.48      | 32    |  |  |
| 20BL | 3  | 90 | 7  | DRY | 220    | 616     | 0.56      | 358       | 9.3 | 19     | 4      | 99     | 30     | -2.5    | 208      | 23.0    | 4.40  | 5.13      | 1.85      | 2.00    | 2.09      | 24    |  |  |
| 20BU | 3  | 90 | 7  | DRY | 219    | 615     | 0.44      | 282       | 9.0 | 31     | 5      | 66     | 16     | -2.5    | 187      | 5.0     | 2.30  | 5.50      | 1.00      | 3.00    | 2.78      | 32    |  |  |
| 21AL | 3  | 90 | 7  | DRY | 222    | 618     | 0.72      | 461       | 9.1 | 21     | 4      | 150    | 120    | -2.5    | 237      | 5.0     | 0.34  | 4.13      | 0.77      | 2.00    | 1.39      | 24    |  |  |
| 21AU | 3  | 90 | 7  | DRY | 221    | 617     | 0.32      | 205       | 8.8 | 30     | 5      | 46     | 20     | -2.5    | 161      | 2.0     | 0.44  | 4.75      | 0.46      | 2.00    | 2.78      | 16    |  |  |
| 21BL | 3  | 90 | 7  | DRY | 224    | 620     | 1.20      | 768       | 9.4 | 18     | 3      | 240    | 216    | 20.0    | 222      | 19.0    | 0.37  | 10.00     | 1.00      | 3.00    | 1.04      | 28    |  |  |
| 21BU | 3  | 90 | 7  | DRY | 223    | 619     | 0.36      | 230       | 8.9 | 29     | 5      | 54     | 28     | -2.5    | 187      | 5.0     | 0.27  | 4.50      | 0.54      | 3.00    | 2.44      | 28    |  |  |
| 22AL | 3  | 90 | 7  | DRY | 226    | 622     | 0.24      | 154       | 8.7 | 43     | 3      | 18     | 14     | -2.5    | 125      | -4.8    | 0.35  | 2.63      | 0.31      | 2.00    | 0.35      | 6     |  |  |
| 22AU | 3  | 90 | 7  | DRY | 225    | 621     | 0.24      | 154       | 8.7 | 45     | 4      | 16     | 20     | -2.5    | 123      | -4.8    | 0.25  | 3.50      | 0.23      | 2.00    | 0.35      | 10    |  |  |
| 22BL | 3  | 90 | 7  | DRY | 228    | 624     | 0.24      | 154       | 8.6 | 46     | 4      | 18     | 10     | -2.5    | 114      | -4.8    | 0.32  | 2.13      | 0.31      | 2.00    | -0.30     | 6     |  |  |
| 22BU | 3  | 90 | 7  | DRY | 227    | 623     | 0.24      | 154       | 8.7 | 43     | 4      | 18     | 16     | -2.5    | 123      | -4.8    | 0.26  | 3.25      | 0.23      | 2.00    | 0.35      | 10    |  |  |



## Raw Soil Data

For Quarter 3/90

| Site | Qr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | EC x<br>1000 | Solu         |     | Ca<br>ppm | Mg<br>ppm | Na<br>ppm | Cl<br>ppm | SO4<br>ppm | HCO3<br>ppm | CO3<br>ppm | F<br>ppm | NO3-N<br>ppm | Boron<br>ppm | NH4<br>ppm | PO4-P<br>ppm | k<br>ppm |
|------|----|----|----|-----|-----------|------------|--------------|--------------|-----|-----------|-----------|-----------|-----------|------------|-------------|------------|----------|--------------|--------------|------------|--------------|----------|
|      |    |    |    |     |           |            |              | Salts<br>ppm | pH  |           |           |           |           |            |             |            |          |              |              |            |              |          |
| 23AL | 3  | 90 | 7  | DRY | 194       | 590        | 1.50         | 960          | 8.5 | 58        | 7         | 300       | 248       | 134.0      | 267         | 5.0        | 8.40     | 8.44         | 1.50         | 6.07       | 1.04         | 12       |
| 23AU | 3  | 90 | 7  | DRY | 193       | 589        | 3.00         | 1920         | 8.1 | 110       | 15        | 600       | 600       | 386.0      | 208         | -4.8       | 5.60     | 55.00        | 1.93         | 7.14       | 1.04         | 20       |
| 23BL | 3  | 90 | 7  | DRY | 196       | 592        | 1.40         | 896          | 8.4 | 58        | 7         | 280       | 244       | 143.0      | 265         | -4.8       | 8.00     | 12.50        | 1.57         | 5.00       | 1.04         | 14       |
| 23BU | 3  | 90 | 7  | DRY | 195       | 591        | 4.00         | 2560         | 8.0 | 215       | 26        | 720       | 896       | 404.0      | 213         | -4.8       | 5.20     | 65.00        | 1.86         | 5.00       | 1.74         | 24       |
| 24AL | 3  | 90 | 7  | DRY | 162       | 558        | 0.96         | 614          | 8.6 | 31        | 4         | 150       | 64        | 37.0       | 211         | 12.0       | 2.80     | 45.00        | 1.71         | -2.50      | 2.09         | 32       |
| 24AU | 3  | 90 | 7  | DRY | 161       | 557        | 0.92         | 589          | 8.6 | 35        | 5         | 142       | 62        | -2.5       | 218         | 12.0       | 2.40     | 38.75        | 1.50         | -2.50      | 1.74         | 44       |
| 24BL | 3  | 90 | 7  | DRY | 164       | 560        | 0.80         | 512          | 8.7 | 37        | 6         | 180       | 74        | 65.0       | 204         | 5.0        | 3.90     | 37.50        | 1.50         | -2.50      | 2.09         | 16       |
| 24BU | 3  | 90 | 7  | DRY | 163       | 559        | 0.88         | 563          | 8.6 | 29        | 4         | 120       | 40        | -2.5       | 237         | 9.0        | 2.90     | 27.50        | 1.50         | -2.50      | 2.09         | 38       |
| 25AL | 3  | 90 | 7  | DRY | 174       | 570        | 2.20         | 1408         | 8.0 | 204       | 36        | 240       | 248       | 491.0      | 185         | -4.8       | 1.40     | 77.50        | 1.23         | 4.00       | 2.09         | 34       |
| 25AU | 3  | 90 | 7  | DRY | 173       | 569        | 1.60         | 1024         | 8.1 | 156       | 27        | 142       | 76        | 1018.0     | 253         | -4.8       | 1.30     | 46.25        | 1.38         | 8.21       | 3.48         | 50       |
| 25BL | 3  | 90 | 7  | DRY | 176       | 572        | 0.64         | 410          | 8.3 | 58        | 13        | 51        | 26        | 143.0      | 251         | -4.8       | 0.98     | 15.63        | 1.08         | 5.00       | 1.04         | 24       |
| 25BU | 3  | 90 | 7  | DRY | 175       | 571        | 0.96         | 614          | 8.1 | 84        | 15        | 84        | 44        | 227.0      | 206         | -4.8       | 2.20     | 15.00        | 0.62         | 3.00       | 1.74         | 24       |
| 26AL | 3  | 90 | 7  | DRY | 138       | 534        | 0.44         | 282          | 8.6 | 35        | 3         | 48        | 44        | -2.5       | 159         | -4.8       | 0.46     | 3.63         | 0.47         | 1.00       | 0.70         | 4        |
| 26AU | 3  | 90 | 7  | DRY | 137       | 533        | 0.24         | 154          | 8.5 | 43        | 4         | 97        | 18        | -2.5       | 137         | -4.8       | 0.34     | 4.50         | 0.33         | 3.00       | 1.04         | 6        |
| 26BL | 3  | 90 | 7  | DRY | 140       | 536        | 0.44         | 282          | 8.5 | 45        | 4         | 18        | 36        | 16.0       | 130         | -4.8       | 0.30     | 3.13         | 0.33         | -2.50      | -0.30        | 4        |
| 26BU | 3  | 90 | 7  | DRY | 139       | 535        | 0.36         | 230          | 8.5 | 43        | 4         | 8         | 14        | -2.5       | 135         | -4.8       | 0.25     | 3.00         | 0.27         | 1.00       | 0.70         | 6        |
| 27AL | 3  | 90 | 7  | DRY | 114       | 510        | 3.60         | 2304         | 8.8 | 43        | 3         | 740       | 504       | 800.0      | 234         | -4.8       | 9.20     | 52.50        | 8.33         | 5.00       | 2.09         | 14       |
| 27AU | 3  | 90 | 7  | DRY | 113       | 509        | 1.00         | 640          | 9.0 | 25        | 3         | 180       | 232       | -2.5       | 189         | 23.0       | 4.40     | 21.88        | 2.33         | 1.25       | 2.44         | 12       |
| 27BL | 3  | 90 | 7  | DRY | 116       | 512        | 1.10         | 704          | 9.4 | 26        | 8         | 260       | 128       | 22.0       | 350         | 33.0       | 13.00    | 15.63        | 2.73         | -2.50      | 1.39         | 16       |
| 27BU | 3  | 90 | 7  | DRY | 115       | 511        | 0.56         | 358          | 9.1 | 37        | 10        | 122       | 32        | -2.5       | 246         | 19.0       | 3.10     | 12.50        | 1.47         | 1.25       | 3.13         | 30       |
| 28AL | 3  | 90 | 7  | DRY | 198       | 594        | 0.64         | 410          | 8.9 | 23        | 3         | 133       | 32        | 53.0       | 275         | 9.0        | 2.50     | 11.25        | 1.64         | 5.00       | 0.35         | 10       |
| 28AU | 3  | 90 | 7  | DRY | 197       | 593        | 0.52         | 333          | 8.9 | 24        | 3         | 108       | 16        | -2.5       | 298         | 9.0        | 2.20     | 6.56         | 1.36         | 8.21       | 0.70         | 22       |
| 28BL | 3  | 90 | 7  | DRY | 200       | 596        | 0.72         | 461          | 8.9 | 26        | 4         | 154       | 56        | 4.0        | 298         | 14.0       | 2.10     | 7.81         | 2.21         | 3.75       | 0.35         | 10       |
| 28BU | 3  | 90 | 7  | DRY | 199       | 595        | 0.48         | 307          | 8.7 | 32        | 4         | 84        | 16        | -2.5       | 256         | 9.0        | 1.40     | 10.31        | 1.00         | 11.43      | 0.70         | 10       |
| 30AL | 3  | 90 | 7  | DRY | 190       | 586        | 2.00         | 1280         | 8.6 | 40        | 6         | 380       | 326       | 245.0      | 270         | -4.8       | 7.40     | 11.88        | 2.54         | 1.00       | 0.70         | 12       |
| 30AU | 3  | 90 | 7  | DRY | 189       | 585        | 2.20         | 1408         | 8.5 | 46        | 7         | 463       | 398       | 327.0      | 265         | -4.8       | 7.00     | 16.88        | 3.23         | 2.00       | 0.35         | 14       |
| 30BL | 3  | 90 | 7  | DRY | 192       | 588        | 1.00         | 640          | 8.6 | 42        | 7         | 200       | 136       | 87.0       | 234         | 9.0        | 6.40     | 8.75         | 1.54         | -2.50      | 0.35         | 20       |
| 30BU | 3  | 90 | 7  | DRY | 191       | 587        | 1.10         | 704          | 8.6 | 35        | 5         | 200       | 126       | 122.0      | 246         | 5.0        | 6.80     | 10.00        | 1.46         | 1.00       | -0.30        | 8        |
| 31AL | 3  | 90 | 7  | DRY | 262       | 658        | 2.00         | 1280         | 9.1 | 24        | 3         | 440       | 320       | 295.0      | 208         | 19.0       | 6.00     | 30.00        | 4.00         | 1.67       | 0.70         | 8        |
| 31AU | 3  | 90 | 7  | DRY | 261       | 657        | 1.90         | 1216         | 9.2 | 25        | 2         | 420       | 248       | 314.0      | 256         | 14.0       | 5.80     | 31.25        | 5.00         | 1.67       | 1.74         | 10       |
| 31BL | 3  | 90 | 7  | DRY | 264       | 660        | 1.40         | 896          | 9.2 | 31        | 3         | 320       | 204       | 126.0      | 256         | 7.0        | 5.60     | 25.00        | 3.70         | 1.67       | 1.04         | 8        |
| 31BU | 3  | 90 | 7  | DRY | 263       | 659        | 1.40         | 896          | 9.1 | 24        | 3         | 320       | 200       | 165.0      | 256         | 14.0       | 5.80     | 31.88        | 4.40         | 1.67       | 1.39         | 10       |
| 32AL | 3  | 90 | 7  | DRY | 258       | 654        | 0.88         | 563          | 9.5 | 23        | 8         | 240       | 57        | 106.0      | 410         | 62.0       | 14.50    | 5.00         | 2.70         | 1.67       | 0.35         | 40       |
| 32AU | 3  | 90 | 7  | DRY | 257       | 653        | 0.80         | 512          | 9.6 | 21        | 15        | 240       | 55        | 60.0       | 426         | 7.0        | 8.80     | 4.00         | 2.40         | -2.50      | 0.70         | 61       |
| 32BL | 3  | 90 | 7  | DRY | 260       | 656        | 0.76         | 486          | 9.4 | 18        | 6         | 220       | 66        | 63.0       | 331         | 8.0        | 8.00     | 4.00         | 1.50         | 1.67       | 0.70         | 63       |
| 32BU | 3  | 90 | 7  | DRY | 259       | 655        | 0.72         | 461          | 9.5 | 18        | 5         | 200       | 65        | 43.0       | 308         | 12.0       | 4.40     | 4.63         | 2.00         | 1.67       | 1.04         | 20       |
| 33AL | 3  | 90 | 7  | DRY | 254       | 650        | 0.18         | 115          | 8.8 | 32        | 3         | 8         | 10        | 1.0        | 99          | -4.8       | 0.26     | 2.88         | 0.10         | 1.67       | 4.87         | 10       |
| 33AU | 3  | 90 | 7  | DRY | 253       | 649        | 0.18         | 115          | 8.8 | 29        | 3         | 6         | 10        | -2.5       | 95          | -4.8       | 0.31     | 3.13         | -0.08        | 1.67       | 5.57         | 12       |
| 33BL | 3  | 90 | 7  | DRY | 256       | 652        | 0.18         | 115          | 8.9 | 29        | 3         | 6         | 12        | -2.5       | 90          | -4.8       | 0.22     | 2.50         | -0.08        | 1.67       | 3.13         | 10       |
| 33BU | 3  | 90 | 7  | DRY | 255       | 651        | 0.18         | 115          | 8.9 | 29        | 3         | 6         | 12        | 1.0        | 95          | -4.8       | 0.24     | 2.06         | 0.10         | -2.50      | 4.87         | 10       |
| 34AL | 3  | 90 | 7  | DRY | 118       | 514        | 0.32         | 205          | 8.4 | 54        | 4         | 18        | 30        | 22.0       | 151         | -4.8       | 0.29     | 5.25         | 0.33         | -2.50      | 1.04         | 8        |
| 34AU | 3  | 90 | 7  | DRY | 117       | 513        | 0.32         | 205          | 8.4 | 50        | 4         | 10        | 30        | 23.0       | 156         | -4.8       | 0.39     | 5.50         | 0.20         | -2.50      | 1.39         | 14       |
| 34BL | 3  | 90 | 7  | DRY | 120       | 516        | 0.28         | 179          | 8.5 | 52        | 4         | 8         | 14        | 17.0       | 137         | -4.8       | 0.22     | 4.88         | 0.27         | -2.50      | 0.70         | 6        |
| 34BU | 3  | 90 | 7  | DRY | 119       | 515        | 0.30         | 192          | 8.4 | 56        | 4         | 8         | 24        | 21.0       | 147         | -4.8       | 0.21     | 5.00         | 0.33         | -2.50      | 1.39         | 10       |

## Raw Soil Sample Data

For Quarter 3/90

| Site | Qr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | EC x<br>1000 | Solu<br>Salts |     | Ca<br>ppm | Mg<br>ppm | Na<br>ppm | Cl<br>ppm | SO4<br>ppm | HCO3<br>ppm | CO3<br>ppm | F<br>ppm | NO3-N<br>ppm | Boron<br>ppm | NH4<br>ppm | PO4-P<br>ppm | k<br>ppm |
|------|----|----|----|-----|-----------|------------|--------------|---------------|-----|-----------|-----------|-----------|-----------|------------|-------------|------------|----------|--------------|--------------|------------|--------------|----------|
|      |    |    |    |     |           |            |              | ppm           | pH  |           |           |           |           |            |             |            |          |              |              |            |              |          |
| 35AL | 3  | 90 | 7  | DRY | 122       | 518        | 0.18         | 115           | 8.6 | 38        | 3         | 6         | 8         | -2.5       | 97          | -4.8       | 0.21     | 4.50         | 0.27         | -2.50      | 3.13         | 10       |
| 35AU | 3  | 90 | 7  | DRY | 121       | 517        | 0.20         | 128           | 8.5 | 43        | 3         | 6         | 10        | -2.5       | 114         | -4.8       | 0.21     | 5.00         | 0.40         | -2.50      | 3.13         | 12       |
| 35BL | 3  | 90 | 7  | DRY | 124       | 520        | 0.20         | 128           | 8.5 | 44        | 3         | 6         | 20        | 2.0        | 99          | -4.8       | 0.29     | 5.00         | 0.27         | -2.50      | 3.83         | 12       |
| 35BU | 3  | 90 | 7  | DRY | 123       | 519        | 0.24         | 154           | 8.5 | 42        | 3         | 6         | 22        | 15.0       | 104         | -4.8       | 0.17     | 5.38         | 0.20         | -2.50      | 4.17         | 20       |
| 36AL | 3  | 90 | 7  | DRY | 126       | 522        | 0.60         | 384           | 8.4 | 53        | 4         | 76        | 80        | 20.0       | 137         | -4.8       | 0.28     | 23.13        | 0.67         | -2.50      | -0.30        | 8        |
| 36AU | 3  | 90 | 7  | DRY | 125       | 521        | 0.60         | 384           | 8.4 | 72        | 6         | 32        | 126       | 11.0       | 102         | -4.8       | 0.20     | 13.75        | 0.40         | -2.50      | 1.04         | 12       |
| 36BL | 3  | 90 | 7  | DRY | 128       | 524        | 0.40         | 256           | 8.4 | 60        | 5         | 32        | 38        | 35.0       | 151         | -4.8       | 0.24     | 8.13         | 0.40         | -2.50      | 0.70         | 8        |
| 36BU | 3  | 90 | 7  | DRY | 127       | 523        | 0.32         | 205           | 8.5 | 50        | 5         | 18        | 14        | 4.0        | 140         | -4.8       | 0.22     | 7.50         | 0.40         | -2.50      | 0.35         | 16       |
| 37AL | 3  | 90 | 7  | DRY | 130       | 526        | 0.28         | 179           | 8.5 | 58        | 3         | 8         | 14        | -2.5       | 163         | -4.8       | 0.25     | 4.63         | 0.33         | -2.50      | 0.35         | 2        |
| 37AU | 3  | 90 | 7  | DRY | 129       | 525        | 0.28         | 179           | 8.4 | 60        | 4         | 6         | 14        | -2.5       | 151         | -4.8       | 0.20     | 5.88         | 0.40         | -2.50      | 1.39         | 8        |
| 37BL | 3  | 90 | 7  | DRY | 132       | 528        | 0.30         | 192           | 8.4 | 63        | 4         | 14        | 16        | 3.0        | 154         | -4.8       | 0.22     | 9.38         | 0.47         | -2.50      | 0.35         | 4        |
| 37BU | 3  | 90 | 7  | DRY | 131       | 527        | 0.26         | 166           | 8.5 | 56        | 4         | 6         | 6         | 3.0        | 156         | -4.8       | 0.21     | 5.25         | 0.40         | -2.50      | 1.04         | 8        |
| 38AL | 3  | 90 | 7  | DRY | 246       | 642        | 1.20         | 768           | 9.4 | 13        | 5         | 240       | 72        | 97.0       | 284         | 47.0       | 0.81     | 17.50        | 1.94         | 5.00       | 3.83         | 2        |
| 38AU | 3  | 90 | 7  | DRY | 245       | 641        | 0.64         | 410           | 9.2 | 19        | 7         | 128       | 20        | 27.0       | 239         | 19.0       | 0.34     | 9.38         | 0.69         | 5.00       | 3.48         | 4        |
| 38BL | 3  | 90 | 7  | DRY | 248       | 644        | 0.84         | 538           | 9.2 | 14        | 4         | 240       | 100       | 75.0       | 270         | 28.0       | 0.76     | 25.00        | 1.19         | 1.25       | 3.83         | 4        |
| 38BU | 3  | 90 | 7  | DRY | 247       | 643        | 0.56         | 358           | 9.1 | 29        | 6         | 116       | 20        | 18.0       | 220         | 14.0       | 0.31     | 11.25        | 0.63         | 2.50       | 3.13         | 4        |
| 39AL | 3  | 90 | 7  | DRY | 250       | 646        | 2.00         | 1280          | 8.8 | 28        | 4         | 400       | 468       | 62.0       | 151         | 5.0        | 0.33     | 20.63        | 1.75         | -2.50      | 1.74         | 6        |
| 39AU | 3  | 90 | 7  | DRY | 249       | 645        | 1.10         | 704           | 8.6 | 30        | 5         | 200       | 228       | 11.0       | 166         | 5.0        | 0.23     | 12.50        | 0.75         | 1.25       | 3.13         | 8        |
| 39BL | 3  | 90 | 7  | DRY | 252       | 648        | 0.96         | 614           | 9.0 | 17        | 2         | 200       | 144       | 42.0       | 185         | 9.0        | 0.39     | 15.63        | 1.50         | 1.25       | 2.44         | 4        |
| 39BU | 3  | 90 | 7  | DRY | 251       | 647        | 0.64         | 410           | 8.9 | 19        | 3         | 122       | 56        | 27.0       | 180         | 12.0       | 0.32     | 11.88        | 0.75         | -2.50      | 2.09         | 6        |
| 40AL | 3  | 90 | 7  | DRY | 170       | 566        | 0.60         | 384           | 8.3 | 71        | 8         | 38        | 28        | 118.0      | 156         | -4.8       | 0.32     | 9.38         | 0.64         | -2.50      | 2.44         | 14       |
| 40AU | 3  | 90 | 7  | DRY | 169       | 565        | 0.52         | 333           | 8.4 | 61        | 6         | 30        | 20        | 44.0       | 175         | -4.8       | 0.44     | 15.00        | 0.71         | -2.50      | 2.09         | 22       |
| 40BL | 3  | 90 | 7  | DRY | 172       | 568        | 0.68         | 435           | 8.3 | 85        | 9         | 38        | 46        | 133.0      | 142         | -4.8       | 0.22     | 10.31        | 0.79         | -2.50      | 1.74         | 18       |
| 40BU | 3  | 90 | 7  | DRY | 171       | 567        | 0.44         | 282           | 8.5 | 52        | 6         | 34        | 16        | -2.5       | 194         | -4.8       | 0.26     | 10.00        | 0.71         | -2.50      | 2.09         | 18       |
| 41AL | 3  | 90 | 7  | DRY | 146       | 542        | 2.80         | 1792          | 8.5 | 54        | 6         | 560       | 746       | 101.0      | 166         | -4.8       | 0.37     | 32.50        | 2.53         | 2.00       | 0.35         | 12       |
| 41AU | 3  | 90 | 7  | DRY | 145       | 541        | 1.60         | 1024          | 8.2 | 112       | 11        | 260       | 500       | 8.0        | 123         | -4.8       | 0.27     | 23.75        | 0.60         | 2.00       | 0.35         | 20       |
| 41BL | 3  | 90 | 7  | DRY | 148       | 544        | 2.00         | 1280          | 8.6 | 39        | 4         | 380       | 452       | 99.0       | 123         | -4.8       | 0.50     | 20.00        | 2.07         | -2.50      | -0.30        | 10       |
| 41BU | 3  | 90 | 7  | DRY | 147       | 543        | 0.84         | 538           | 8.3 | 76        | 8         | 97        | 212       | 20.0       | 118         | -4.8       | 0.23     | 12.50        | 0.47         | 2.00       | 0.35         | 18       |
| 42AL | 3  | 90 | 7  | DRY | 242       | 638        | 0.28         | 179           | 8.6 | 51        | 4         | 22        | 18        | -2.5       | 144         | -4.8       | 0.28     | 5.63         | 0.44         | 6.67       | 1.04         | 4        |
| 42AU | 3  | 90 | 7  | DRY | 241       | 637        | 0.34         | 218           | 8.5 | 55        | 4         | 24        | 18        | -2.5       | 166         | -4.8       | 0.29     | 6.00         | 0.44         | 22.92      | 1.04         | 10       |
| 42BL | 3  | 90 | 7  | DRY | 244       | 640        | 0.32         | 205           | 8.5 | 58        | 4         | 20        | 24        | -2.5       | 151         | -4.8       | 0.27     | 6.56         | 0.44         | 1.25       | 1.39         | 6        |
| 42BU | 3  | 90 | 7  | DRY | 243       | 639        | 0.32         | 205           | 8.5 | 52        | 4         | 22        | 20        | -2.5       | 159         | -4.8       | 0.31     | 7.19         | 0.44         | 2.50       | 1.39         | 8        |
| 43AL | 3  | 90 | 7  | DRY | 238       | 634        | 1.10         | 704           | 8.7 | 41        | 9         | 200       | 118       | 123.0      | 232         | 14.0       | 1.70     | 9.38         | 1.50         | 2.50       | 3.48         | 8        |
| 43AU | 3  | 90 | 7  | DRY | 237       | 633        | 1.30         | 832           | 8.5 | 47        | 13        | 220       | 156       | 144.0      | 324         | -4.8       | 2.15     | 18.13        | 2.06         | 3.75       | 5.22         | 14       |
| 43BL | 3  | 90 | 7  | DRY | 240       | 636        | 1.20         | 768           | 8.6 | 41        | 10        | 220       | 140       | 172.0      | 265         | 7.0        | 2.00     | 10.00        | 1.81         | 2.50       | 3.13         | 10       |
| 43BU | 3  | 90 | 7  | DRY | 239       | 635        | 1.40         | 896           | 8.5 | 55        | 16        | 240       | 176       | 203.0      | 286         | -4.8       | 2.00     | 19.38        | 1.94         | 3.75       | 5.22         | 14       |
| 44AL | 3  | 90 | 7  | DRY | 178       | 574        | 1.30         | 832           | 8.7 | 34        | 7         | 180       | 170       | 28.0       | 194         | 2.0        | 0.22     | 45.00        | 2.08         | 1.00       | 3.83         | 122      |
| 44AU | 3  | 90 | 7  | DRY | 177       | 573        | 0.60         | 384           | 8.6 | 43        | 6         | 42        | 54        | 27.0       | 178         | -4.8       | 0.18     | 17.50        | 0.85         | 4.00       | 3.13         | 70       |
| 44BL | 3  | 90 | 7  | DRY | 180       | 576        | 1.50         | 960           | 8.4 | 52        | 10        | 360       | 248       | 21.0       | 170         | -4.8       | 1.60     | 62.50        | 2.15         | -2.50      | 2.44         | 116      |
| 44BU | 3  | 90 | 7  | DRY | 179       | 575        | 0.44         | 282           | 8.6 | 35        | 6         | 26        | 32        | -11.0      | 196         | -4.8       | 0.13     | 8.75         | 0.92         | 1.00       | 3.13         | 66       |
| 45AL | 3  | 90 | 7  | DRY | 202       | 598        | 1.10         | 704           | 9.3 | 17        | 4         | 280       | 48        | 62.0       | 419         | 37.0       | 8.20     | 18.75        | 2.79         | 2.50       | -0.30        | 22       |
| 45AU | 3  | 90 | 7  | DRY | 201       | 597        | 0.92         | 589           | 9.2 | 25        | 7         | 260       | 28        | 7.0        | 417         | 37.0       | 5.40     | 15.63        | 2.93         | 2.50       | 0.70         | 8        |
| 45BL | 3  | 90 | 7  | DRY | 204       | 600        | 0.88         | 563           | 9.2 | 18        | 4         | 240       | 32        | 6.0        | 412         | 37.0       | 6.00     | 16.25        | 2.64         | 3.75       | 0.35         | 6        |
| 45BU | 3  | 90 | 7  | DRY | 203       | 599        | 0.76         | 486           | 9.1 | 27        | 4         | 180       | 16        | -2.5       | 402         | 33.0       | 3.00     | 11.88        | 1.86         | 6.07       | 0.70         | 14       |

## Raw Soil Data

For Quarter 3/90

| Site | Qtr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | Na<br>exchg<br>Meq/<br>100gm | K<br>exchg<br>Meq/<br>100gm | Ca<br>exchg<br>Meq/<br>100gm | Mg<br>exchg<br>Meq/<br>100gm | Total<br>P<br>ppm |
|------|-----|----|----|-----|-----------|------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------|
| 01AL | 3   | 90 | 7  | DRY | 90        | 486        | 2.28                         | 0.49                        | 50.52                        | 2.24                         | 9999.99           |
| 01AU | 3   | 90 | 7  | DRY | 89        | 485        | 1.53                         | 0.77                        | 49.90                        | 2.47                         | 9999.99           |
| 01BL | 3   | 90 | 7  | DRY | 92        | 488        | 1.24                         | 0.77                        | 46.28                        | 2.22                         | 9999.99           |
| 01BU | 3   | 90 | 7  | DRY | 91        | 487        | 0.91                         | 1.34                        | 62.75                        | 3.39                         | 9999.99           |
| 02AL | 3   | 90 | 7  | DRY | 94        | 490        | 4.78                         | 1.37                        | 24.45                        | 3.08                         | 9999.99           |
| 02AU | 3   | 90 | 7  | DRY | 93        | 489        | 0.48                         | 1.46                        | 27.07                        | 2.88                         | 9999.99           |
| 02BL | 3   | 90 | 7  | DRY | 96        | 492        | 1.74                         | 1.40                        | 29.19                        | 3.84                         | 9999.99           |
| 02BU | 3   | 90 | 7  | DRY | 95        | 491        | 0.61                         | 1.40                        | 23.79                        | 3.19                         | 9999.99           |
| 03AL | 3   | 90 | 7  | DRY | 74        | 470        | 18.23                        | 0.98                        | 34.56                        | 2.59                         | 9999.99           |
| 03AU | 3   | 90 | 7  | DRY | 73        | 469        | 9.11                         | 1.12                        | 23.47                        | 2.22                         | 9999.99           |
| 03BL | 3   | 90 | 7  | DRY | 76        | 472        | 15.74                        | 1.07                        | 20.97                        | 2.28                         | 9999.99           |
| 03BU | 3   | 90 | 7  | DRY | 75        | 471        | 4.97                         | 1.19                        | 34.31                        | 2.59                         | 9999.99           |
| 04AL | 3   | 90 | 7  | DRY | 106       | 502        | 0.26                         | 0.74                        | 27.69                        | 1.23                         | 9999.99           |
| 04AU | 3   | 90 | 7  | DRY | 105       | 501        | 0.22                         | 0.90                        | 29.69                        | 1.40                         | 9999.99           |
| 04BL | 3   | 90 | 7  | DRY | 108       | 504        | 0.65                         | 1.02                        | 30.31                        | 1.46                         | 9999.99           |
| 04BU | 3   | 90 | 7  | DRY | 107       | 503        | 0.26                         | 0.97                        | 28.94                        | 1.42                         | 9999.99           |
| 05AL | 3   | 90 | 7  | DRY | 110       | 506        | 1.52                         | 0.67                        | 21.94                        | 1.69                         | 9999.99           |
| 05AU | 3   | 90 | 7  | DRY | 109       | 505        | 0.65                         | 0.92                        | 22.57                        | 1.89                         | 9999.99           |
| 05BL | 3   | 90 | 7  | DRY | 112       | 508        | 1.48                         | 0.90                        | 21.96                        | 1.75                         | 9999.99           |
| 05BU | 3   | 90 | 7  | DRY | 111       | 507        | 0.65                         | 1.02                        | 22.09                        | 1.73                         | 9999.99           |
| 06AL | 3   | 90 | 7  | DRY | 102       | 498        | 5.22                         | 0.46                        | 26.82                        | 1.69                         | 9999.99           |
| 06AU | 3   | 90 | 7  | DRY | 101       | 497        | 1.78                         | 0.79                        | 29.19                        | 1.79                         | 9999.99           |
| 06BL | 3   | 90 | 7  | DRY | 104       | 500        | 0.52                         | 0.41                        | 32.56                        | 1.87                         | 9999.99           |
| 06BU | 3   | 90 | 7  | DRY | 103       | 499        | 0.39                         | 0.59                        | 30.19                        | 1.73                         | 9999.99           |
| 07AL | 3   | 90 | 7  | DRY | 142       | 538        | 2.83                         | 0.59                        | 23.91                        | 3.93                         | 9999.99           |
| 07AU | 3   | 90 | 7  | DRY | 141       | 537        | 1.65                         | 0.67                        | 23.23                        | 3.51                         | 9999.99           |
| 07BL | 3   | 90 | 7  | DRY | 144       | 540        | 1.04                         | 0.61                        | 22.21                        | 3.06                         | 9999.99           |
| 07BU | 3   | 90 | 7  | DRY | 143       | 539        | 1.00                         | 0.90                        | 22.95                        | 3.56                         | 9999.99           |
| 08AL | 3   | 90 | 7  | DRY | 150       | 546        | 3.52                         | 0.64                        | 19.70                        | 1.48                         | 9999.99           |
| 08AU | 3   | 90 | 7  | DRY | 149       | 545        | 0.48                         | 0.61                        | 20.01                        | 1.50                         | 9999.99           |
| 08BL | 3   | 90 | 7  | DRY | 152       | 548        | 2.70                         | 0.59                        | 19.51                        | 1.34                         | 9999.99           |
| 08BU | 3   | 90 | 7  | DRY | 151       | 547        | 1.35                         | 0.84                        | 20.83                        | 1.73                         | 9999.99           |
| 09AL | 3   | 90 | 7  | DRY | 98        | 494        | 0.96                         | 3.07                        | 30.19                        | 3.97                         | 9999.99           |
| 09AU | 3   | 90 | 7  | DRY | 97        | 493        | 0.39                         | 1.48                        | 27.82                        | 2.98                         | 9999.99           |
| 09BL | 3   | 90 | 7  | DRY | 100       | 496        | 0.70                         | 1.58                        | 22.27                        | 2.77                         | 9999.99           |
| 09BU | 3   | 90 | 7  | DRY | 99        | 495        | 0.48                         | 1.40                        | 23.83                        | 2.79                         | 9999.99           |
| 10AL | 3   | 90 | 7  | DRY | 82        | 478        | 0.46                         | 0.63                        | 27.32                        | 2.26                         | 9999.99           |
| 10AU | 3   | 90 | 7  | DRY | 81        | 477        | 0.21                         | 0.63                        | 31.81                        | 1.95                         | 9999.99           |
| 10BL | 3   | 90 | 7  | DRY | 84        | 480        | 0.46                         | 0.65                        | 31.56                        | 1.81                         | 9999.99           |
| 10BU | 3   | 90 | 7  | DRY | 83        | 479        | 0.17                         | 0.70                        | 29.44                        | 1.58                         | 9999.99           |
| 11AL | 3   | 90 | 7  | DRY | 154       | 550        | 5.65                         | 2.56                        | 30.69                        | 2.16                         | 9999.99           |
| 11AU | 3   | 90 | 7  | DRY | 153       | 549        | 4.78                         | 2.30                        | 31.06                        | 2.24                         | 9999.99           |
| 11BL | 3   | 90 | 7  | DRY | 156       | 552        | 5.22                         | 2.56                        | 30.94                        | 2.24                         | 9999.99           |
| 11BU | 3   | 90 | 7  | DRY | 155       | 551        | 5.65                         | 2.56                        | 31.19                        | 2.18                         | 9999.99           |

## Raw Soil Sample Data

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| Site | Qtr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | Na<br>exchg<br>Meq/<br>100gm | K<br>exchg<br>Meq/<br>100gm | Ca<br>exchg<br>Meq/<br>100gm | Mg<br>exchg<br>Meq/<br>100gm | Total<br>P<br>ppm |
|------|-----|----|----|-----|-----------|------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------|
| 12AL | 3   | 90 | 7  | DRY | 182       | 578        | 3.39                         | 2.82                        | 24.65                        | 1.83                         | 9999.99           |
| 12AU | 3   | 90 | 7  | DRY | 181       | 577        | 2.70                         | 2.56                        | 24.71                        | 1.77                         | 9999.99           |
| 12BL | 3   | 90 | 7  | DRY | 184       | 580        | 2.83                         | 2.82                        | 25.82                        | 1.89                         | 9999.99           |
| 12BU | 3   | 90 | 7  | DRY | 183       | 579        | 2.36                         | 2.56                        | 25.95                        | 1.79                         | 9999.99           |
| 13AL | 3   | 90 | 7  | DRY | 186       | 582        | 1.69                         | 1.48                        | 28.07                        | 2.38                         | 9999.99           |
| 13AU | 3   | 90 | 7  | DRY | 185       | 581        | 1.82                         | 1.23                        | 27.82                        | 2.26                         | 9999.99           |
| 13BL | 3   | 90 | 7  | DRY | 188       | 584        | 1.65                         | 1.38                        | 24.26                        | 2.08                         | 9999.99           |
| 13BU | 3   | 90 | 7  | DRY | 187       | 583        | 1.99                         | 1.23                        | 28.69                        | 2.32                         | 9999.99           |
| 14AL | 3   | 90 | 7  | DRY | 86        | 482        | 0.87                         | 2.82                        | 34.06                        | 3.10                         | 9999.99           |
| 14AU | 3   | 90 | 7  | DRY | 85        | 481        | 0.50                         | 4.61                        | 36.05                        | 3.97                         | 9999.99           |
| 14BL | 3   | 90 | 7  | DRY | 88        | 484        | 1.28                         | 4.10                        | 35.18                        | 3.56                         | 9999.99           |
| 14BU | 3   | 90 | 7  | DRY | 87        | 483        | 0.99                         | 6.75                        | 27.44                        | 4.60                         | 9999.99           |
| 15AL | 3   | 90 | 7  | DRY | 158       | 554        | 0.26                         | 0.84                        | 24.76                        | 1.42                         | 9999.99           |
| 15AU | 3   | 90 | 7  | DRY | 157       | 553        | 0.26                         | 0.95                        | 24.88                        | 1.34                         | 9999.99           |
| 15BL | 3   | 90 | 7  | DRY | 160       | 556        | 0.26                         | 0.95                        | 24.46                        | 1.46                         | 9999.99           |
| 15BU | 3   | 90 | 7  | DRY | 159       | 555        | 0.26                         | 1.13                        | 23.81                        | 1.32                         | 9999.99           |
| 16AL | 3   | 90 | 7  | DRY | 78        | 474        | 18.64                        | 1.29                        | 29.69                        | 3.00                         | 9999.99           |
| 16AU | 3   | 90 | 7  | DRY | 77        | 473        | 5.39                         | 1.22                        | 31.06                        | 1.83                         | 9999.99           |
| 16BL | 3   | 90 | 7  | DRY | 80        | 476        | 22.37                        | 1.87                        | 31.56                        | 2.96                         | 9999.99           |
| 16BU | 3   | 90 | 7  | DRY | 79        | 475        | 8.29                         | 1.39                        | 28.94                        | 1.69                         | 9999.99           |
| 17AL | 3   | 90 | 7  | DRY | 206       | 602        | 0.30                         | 5.63                        | 32.06                        | 4.71                         | 9999.99           |
| 17AU | 3   | 90 | 7  | DRY | 205       | 601        | 0.30                         | 4.35                        | 32.93                        | 4.27                         | 9999.99           |
| 17BL | 3   | 90 | 7  | DRY | 208       | 604        | 0.26                         | 4.61                        | 30.94                        | 3.00                         | 9999.99           |
| 17BU | 3   | 90 | 7  | DRY | 207       | 603        | 0.26                         | 3.07                        | 32.06                        | 2.73                         | 9999.99           |
| 18AL | 3   | 90 | 7  | DRY | 214       | 610        | 0.30                         | 0.51                        | 24.15                        | 1.62                         | 9999.99           |
| 18AU | 3   | 90 | 7  | DRY | 213       | 609        | 0.26                         | 0.87                        | 24.93                        | 1.40                         | 9999.99           |
| 18BL | 3   | 90 | 7  | DRY | 216       | 612        | 0.30                         | 0.59                        | 24.91                        | 1.52                         | 9999.99           |
| 18BU | 3   | 90 | 7  | DRY | 215       | 611        | 0.26                         | 0.74                        | 24.39                        | 1.50                         | 9999.99           |
| 19AL | 3   | 90 | 7  | DRY | 210       | 606        | 0.35                         | 4.10                        | 30.19                        | 2.30                         | 9999.99           |
| 19AU | 3   | 90 | 7  | DRY | 209       | 605        | 0.35                         | 2.56                        | 27.57                        | 2.01                         | 9999.99           |
| 19BL | 3   | 90 | 7  | DRY | 212       | 608        | 0.48                         | 4.61                        | 31.19                        | 2.34                         | 9999.99           |
| 19BU | 3   | 90 | 7  | DRY | 211       | 607        | 0.35                         | 3.33                        | 28.19                        | 2.06                         | 9999.99           |
| 20AL | 3   | 90 | 7  | DRY | 218       | 614        | 1.44                         | 1.43                        | 19.02                        | 1.93                         | 9999.99           |
| 20AU | 3   | 90 | 7  | DRY | 217       | 613        | 0.78                         | 1.25                        | 18.41                        | 1.66                         | 9999.99           |
| 20BL | 3   | 90 | 7  | DRY | 220       | 616        | 1.22                         | 1.28                        | 18.87                        | 1.91                         | 9999.99           |
| 20BU | 3   | 90 | 7  | DRY | 219       | 615        | 0.70                         | 1.15                        | 18.55                        | 1.62                         | 9999.99           |
| 21AL | 3   | 90 | 7  | DRY | 222       | 618        | 1.39                         | 1.05                        | 19.05                        | 1.81                         | 9999.99           |
| 21AU | 3   | 90 | 7  | DRY | 221       | 617        | 0.48                         | 0.72                        | 21.16                        | 1.95                         | 9999.99           |
| 21BL | 3   | 90 | 7  | DRY | 224       | 620        | 2.38                         | 1.33                        | 17.85                        | 1.60                         | 9999.99           |
| 21BU | 3   | 90 | 7  | DRY | 223       | 619        | 0.57                         | 1.08                        | 20.35                        | 2.03                         | 9999.99           |
| 22AL | 3   | 90 | 7  | DRY | 226       | 622        | 0.22                         | 0.33                        | 21.15                        | 0.82                         | 9999.99           |
| 22AU | 3   | 90 | 7  | DRY | 225       | 621        | 0.22                         | 0.46                        | 20.53                        | 0.80                         | 9999.99           |
| 22BL | 3   | 90 | 7  | DRY | 228       | 624        | 0.17                         | 0.33                        | 20.65                        | 0.76                         | 9999.99           |
| 22BU | 3   | 90 | 7  | DRY | 227       | 623        | 0.17                         | 0.44                        | 20.43                        | 0.78                         | 9999.99           |

## Raw Soil Sample Data

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| Site | Qtr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | Na<br>exchg<br>Meq/<br>100gm | K<br>exchg<br>Meq/<br>100gm | Ca<br>exchg<br>Meq/<br>100gm | Mg<br>exchg<br>Meq/<br>100gm | Total<br>P<br>ppm |
|------|-----|----|----|-----|-----------|------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------|
| 23AL | 3   | 90 | 7  | DRY | 194       | 590        | 3.07                         | 0.95                        | 31.69                        | 2.49                         | 9999.99           |
| 23AU | 3   | 90 | 7  | DRY | 193       | 589        | 6.09                         | 0.97                        | 30.94                        | 2.61                         | 9999.99           |
| 23BL | 3   | 90 | 7  | DRY | 196       | 592        | 3.11                         | 1.10                        | 31.06                        | 2.38                         | 9999.99           |
| 23BU | 3   | 90 | 7  | DRY | 195       | 591        | 7.83                         | 1.00                        | 35.68                        | 3.00                         | 9999.99           |
| 24AL | 3   | 90 | 7  | DRY | 162       | 558        | 1.83                         | 1.83                        | 23.63                        | 2.03                         | 9999.99           |
| 24AU | 3   | 90 | 7  | DRY | 161       | 557        | 1.57                         | 1.94                        | 22.99                        | 1.95                         | 9999.99           |
| 24BL | 3   | 90 | 7  | DRY | 164       | 560        | 2.22                         | 1.41                        | 24.39                        | 2.08                         | 9999.99           |
| 24BU | 3   | 90 | 7  | DRY | 163       | 559        | 1.44                         | 1.99                        | 23.45                        | 2.08                         | 9999.99           |
| 25AL | 3   | 90 | 7  | DRY | 174       | 570        | 2.07                         | 1.48                        | 31.81                        | 4.50                         | 9999.99           |
| 25AU | 3   | 90 | 7  | DRY | 173       | 569        | 1.37                         | 2.02                        | 32.93                        | 4.60                         | 9999.99           |
| 25BL | 3   | 90 | 7  | DRY | 176       | 572        | 0.74                         | 1.66                        | 27.82                        | 4.48                         | 9999.99           |
| 25BU | 3   | 90 | 7  | DRY | 175       | 571        | 1.05                         | 1.56                        | 30.44                        | 3.99                         | 9999.99           |
| 26AL | 3   | 90 | 7  | DRY | 138       | 534        | 0.87                         | 0.46                        | 24.63                        | 1.29                         | 9999.99           |
| 26AU | 3   | 90 | 7  | DRY | 137       | 533        | 0.30                         | 0.54                        | 21.82                        | 1.13                         | 9999.99           |
| 26BL | 3   | 90 | 7  | DRY | 140       | 536        | 0.57                         | 0.49                        | 28.57                        | 1.44                         | 9999.99           |
| 26BU | 3   | 90 | 7  | DRY | 139       | 535        | 0.30                         | 0.56                        | 24.03                        | 1.29                         | 9999.99           |
| 27AL | 3   | 90 | 7  | DRY | 114       | 510        | 6.96                         | 0.77                        | 19.49                        | 1.01                         | 9999.99           |
| 27AU | 3   | 90 | 7  | DRY | 113       | 509        | 2.17                         | 0.97                        | 20.56                        | 1.23                         | 9999.99           |
| 27BL | 3   | 90 | 7  | DRY | 116       | 512        | 4.78                         | 0.92                        | 20.70                        | 1.25                         | 9999.99           |
| 27BU | 3   | 90 | 7  | DRY | 115       | 511        | 1.57                         | 1.18                        | 21.24                        | 1.44                         | 9999.99           |
| 28AL | 3   | 90 | 7  | DRY | 198       | 594        | 2.44                         | 1.05                        | 38.05                        | 2.01                         | 9999.99           |
| 28AU | 3   | 90 | 7  | DRY | 197       | 593        | 2.00                         | 1.31                        | 34.43                        | 1.95                         | 9999.99           |
| 28BL | 3   | 90 | 7  | DRY | 200       | 596        | 3.11                         | 0.84                        | 37.30                        | 1.89                         | 9999.99           |
| 28BU | 3   | 90 | 7  | DRY | 199       | 595        | 1.35                         | 1.08                        | 36.43                        | 1.91                         | 9999.99           |
| 30AL | 3   | 90 | 7  | DRY | 190       | 586        | 4.35                         | 0.97                        | 32.06                        | 3.60                         | 9999.99           |
| 30AU | 3   | 90 | 7  | DRY | 189       | 585        | 6.09                         | 1.23                        | 29.57                        | 3.76                         | 9999.99           |
| 30BL | 3   | 90 | 7  | DRY | 192       | 588        | 3.22                         | 1.00                        | 28.44                        | 3.23                         | 9999.99           |
| 30BU | 3   | 90 | 7  | DRY | 191       | 587        | 2.78                         | 1.02                        | 29.07                        | 3.27                         | 9999.99           |
| 31AL | 3   | 90 | 7  | DRY | 262       | 658        | 3.25                         | 0.51                        | 17.73                        | 0.88                         | 9999.99           |
| 31AU | 3   | 90 | 7  | DRY | 261       | 657        | 3.07                         | 0.59                        | 17.56                        | 0.86                         | 9999.99           |
| 31BL | 3   | 90 | 7  | DRY | 264       | 660        | 2.39                         | 0.54                        | 18.56                        | 0.95                         | 9999.99           |
| 31BU | 3   | 90 | 7  | DRY | 263       | 659        | 2.66                         | 0.61                        | 18.54                        | 1.09                         | 9999.99           |
| 32AL | 3   | 90 | 7  | DRY | 258       | 654        | 2.39                         | 0.33                        | 18.86                        | 0.97                         | 9999.99           |
| 32AU | 3   | 90 | 7  | DRY | 257       | 653        | 1.96                         | 0.33                        | 17.56                        | 0.86                         | 9999.99           |
| 32BL | 3   | 90 | 7  | DRY | 260       | 656        | 1.87                         | 0.33                        | 19.10                        | 0.99                         | 9999.99           |
| 32BU | 3   | 90 | 7  | DRY | 259       | 655        | 1.83                         | 0.36                        | 18.69                        | 1.11                         | 9999.99           |
| 33AL | 3   | 90 | 7  | DRY | 254       | 650        | 0.13                         | 0.26                        | 4.53                         | 0.35                         | 9999.99           |
| 33AU | 3   | 90 | 7  | DRY | 253       | 649        | 0.13                         | 0.26                        | 4.55                         | 0.35                         | 9999.99           |
| 33BL | 3   | 90 | 7  | DRY | 256       | 652        | 0.17                         | 0.28                        | 5.43                         | 0.37                         | 9999.99           |
| 33BU | 3   | 90 | 7  | DRY | 255       | 651        | 0.17                         | 0.26                        | 5.10                         | 0.37                         | 9999.99           |
| 34AL | 3   | 90 | 7  | DRY | 118       | 514        | 0.26                         | 0.56                        | 23.08                        | 1.11                         | 9999.99           |
| 34AU | 3   | 90 | 7  | DRY | 117       | 513        | 0.17                         | 0.67                        | 22.38                        | 1.07                         | 9999.99           |
| 34BL | 3   | 90 | 7  | DRY | 120       | 516        | 0.17                         | 0.51                        | 22.94                        | 1.07                         | 9999.99           |
| 34BU | 3   | 90 | 7  | DRY | 119       | 515        | 0.17                         | 0.64                        | 23.42                        | 1.13                         | 9999.99           |

## Raw Soil Sample Data

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| Site | Qtr | Yr | Mn | Sea | Id<br>Num | Lab<br>Num | Na<br>exchg<br>Meq/<br>100gm | K<br>exchg<br>Meq/<br>100gm | Ca<br>exchg<br>Meq/<br>100gm | Mg<br>exchg<br>Meq/<br>100gm | Total<br>P<br>ppm |
|------|-----|----|----|-----|-----------|------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------|
| 35AL | 3   | 90 | 7  | DRY | 122       | 518        | 0.13                         | 0.31                        | 12.96                        | 0.58                         | 9999.99           |
| 35AU | 3   | 90 | 7  | DRY | 121       | 517        | 0.17                         | 0.41                        | 14.45                        | 0.68                         | 9999.99           |
| 35BL | 3   | 90 | 7  | DRY | 124       | 520        | 0.17                         | 0.41                        | 13.44                        | 0.64                         | 9999.99           |
| 35BU | 3   | 90 | 7  | DRY | 123       | 519        | 0.17                         | 0.49                        | 12.84                        | 0.62                         | 9999.99           |
| 36AL | 3   | 90 | 7  | DRY | 126       | 522        | 0.87                         | 0.84                        | 31.19                        | 2.10                         | 9999.99           |
| 36AU | 3   | 90 | 7  | DRY | 125       | 521        | 0.35                         | 1.20                        | 30.94                        | 2.51                         | 9999.99           |
| 36BL | 3   | 90 | 7  | DRY | 128       | 524        | 0.44                         | 0.82                        | 30.06                        | 1.89                         | 9999.99           |
| 36BU | 3   | 90 | 7  | DRY | 127       | 523        | 0.26                         | 0.82                        | 28.69                        | 2.01                         | 9999.99           |
| 37AL | 3   | 90 | 7  | DRY | 130       | 526        | 0.22                         | 0.38                        | 25.00                        | 1.01                         | 9999.99           |
| 37AU | 3   | 90 | 7  | DRY | 129       | 525        | 0.17                         | 0.54                        | 22.70                        | 0.97                         | 9999.99           |
| 37BL | 3   | 90 | 7  | DRY | 132       | 528        | 0.22                         | 0.33                        | 24.84                        | 1.03                         | 9999.99           |
| 37BU | 3   | 90 | 7  | DRY | 131       | 527        | 0.17                         | 0.59                        | 24.78                        | 1.11                         | 9999.99           |
| 38AL | 3   | 90 | 7  | DRY | 246       | 642        | 9.94                         | 0.59                        | 37.05                        | 3.21                         | 9999.99           |
| 38AU | 3   | 90 | 7  | DRY | 245       | 641        | 3.31                         | 0.59                        | 39.55                        | 3.41                         | 9999.99           |
| 38BL | 3   | 90 | 7  | DRY | 248       | 644        | 6.96                         | 0.56                        | 38.05                        | 3.45                         | 9999.99           |
| 38BU | 3   | 90 | 7  | DRY | 247       | 643        | 2.22                         | 0.61                        | 45.28                        | 3.31                         | 9999.99           |
| 39AL | 3   | 90 | 7  | DRY | 250       | 646        | 4.78                         | 0.59                        | 29.82                        | 3.00                         | 9999.99           |
| 39AU | 3   | 90 | 7  | DRY | 249       | 645        | 2.44                         | 0.77                        | 32.19                        | 2.38                         | 9999.99           |
| 39BL | 3   | 90 | 7  | DRY | 252       | 648        | 2.78                         | 0.56                        | 31.06                        | 3.25                         | 9999.99           |
| 39BU | 3   | 90 | 7  | DRY | 251       | 647        | 1.62                         | 0.61                        | 30.81                        | 2.51                         | 9999.99           |
| 40AL | 3   | 90 | 7  | DRY | 170       | 566        | 0.65                         | 1.13                        | 28.07                        | 1.93                         | 9999.99           |
| 40AU | 3   | 90 | 7  | DRY | 169       | 565        | 0.61                         | 1.70                        | 30.44                        | 1.95                         | 9999.99           |
| 40BL | 3   | 90 | 7  | DRY | 172       | 568        | 0.70                         | 1.38                        | 28.07                        | 1.93                         | 9999.99           |
| 40BU | 3   | 90 | 7  | DRY | 171       | 567        | 0.61                         | 1.38                        | 29.07                        | 1.87                         | 9999.99           |
| 41AL | 3   | 90 | 7  | DRY | 146       | 542        | 4.35                         | 0.51                        | 22.14                        | 1.44                         | 9999.99           |
| 41AU | 3   | 90 | 7  | DRY | 145       | 541        | 1.70                         | 0.72                        | 22.95                        | 1.64                         | 9999.99           |
| 41BL | 3   | 90 | 7  | DRY | 148       | 544        | 2.91                         | 0.59                        | 22.13                        | 1.52                         | 9999.99           |
| 41BU | 3   | 90 | 7  | DRY | 147       | 543        | 0.83                         | 0.77                        | 22.64                        | 1.71                         | 9999.99           |
| 42AL | 3   | 90 | 7  | DRY | 242       | 638        | 0.30                         | 0.41                        | 25.00                        | 1.11                         | 9999.99           |
| 42AU | 3   | 90 | 7  | DRY | 241       | 637        | 0.30                         | 0.59                        | 25.11                        | 1.23                         | 9999.99           |
| 42BL | 3   | 90 | 7  | DRY | 244       | 640        | 0.26                         | 0.46                        | 25.90                        | 1.07                         | 9999.99           |
| 42BU | 3   | 90 | 7  | DRY | 243       | 639        | 0.26                         | 0.59                        | 23.69                        | 1.15                         | 9999.99           |
| 43AL | 3   | 90 | 7  | DRY | 238       | 634        | 1.78                         | 0.74                        | 22.60                        | 3.43                         | 9999.99           |
| 43AU | 3   | 90 | 7  | DRY | 237       | 633        | 1.96                         | 0.92                        | 22.80                        | 4.50                         | 9999.99           |
| 43BL | 3   | 90 | 7  | DRY | 240       | 636        | 1.78                         | 0.69                        | 21.79                        | 3.35                         | 9999.99           |
| 43BU | 3   | 90 | 7  | DRY | 239       | 635        | 1.96                         | 0.84                        | 22.39                        | 4.23                         | 9999.99           |
| 44AL | 3   | 90 | 7  | DRY | 178       | 574        | 1.99                         | 6.91                        | 27.94                        | 3.27                         | 9999.99           |
| 44AU | 3   | 90 | 7  | DRY | 177       | 573        | 0.61                         | 3.84                        | 28.57                        | 2.84                         | 9999.99           |
| 44BL | 3   | 90 | 7  | DRY | 180       | 576        | 1.82                         | 6.40                        | 26.95                        | 3.23                         | 9999.99           |
| 44BU | 3   | 90 | 7  | DRY | 179       | 575        | 0.52                         | 4.61                        | 28.19                        | 2.88                         | 9999.99           |
| 45AL | 3   | 90 | 7  | DRY | 202       | 598        | 6.09                         | 0.64                        | 32.31                        | 2.28                         | 9999.99           |
| 45AU | 3   | 90 | 7  | DRY | 201       | 597        | 5.65                         | 0.79                        | 32.56                        | 2.69                         | 9999.99           |
| 45BL | 3   | 90 | 7  | DRY | 204       | 600        | 6.09                         | 0.74                        | 32.19                        | 2.67                         | 9999.99           |
| 45BU | 3   | 90 | 7  | DRY | 203       | 599        | 3.25                         | 0.87                        | 32.06                        | 3.02                         | 9999.99           |

## Raw Soil Data

For Quarter 4/90

| Site | Qr | Yr | Mn | Sea  | Id<br>Num | Lab<br>Num | EC x<br>1000 | Solu<br>Salts |     | Ca<br>ppm | Mg<br>ppm | Na<br>ppm | Cl<br>ppm | SO4<br>ppm | HCO3<br>ppm | CO3<br>ppm | F<br>ppm | NO3-N<br>ppm | Boron<br>ppm | NH4<br>ppm | PO4-P<br>ppm | k<br>ppm |
|------|----|----|----|------|-----------|------------|--------------|---------------|-----|-----------|-----------|-----------|-----------|------------|-------------|------------|----------|--------------|--------------|------------|--------------|----------|
|      |    |    |    |      |           |            |              | ppm           | pH  |           |           |           |           |            |             |            |          |              |              |            |              |          |
| 07AL | 4  | 90 | 11 | POST | 286       | 986        | 0.72         | 461           | 9.0 | 27        | 4         | 140       | 54        | 34.0       | 261         | 2.0        | 2.70     | 21.88        | 2.04         | 5.00       | 3.20         | 6        |
| 07AU | 4  | 90 | 11 | POST | 285       | 985        | 0.56         | 358           | 8.8 | 36        | 5         | 86        | 16        | -2.5       | 221         | -4.8       | 1.60     | 28.75        | 1.67         | 1.67       | 5.82         | 22       |
| 07BL | 4  | 90 | 11 | POST | 288       | 988        | 0.86         | 550           | 8.9 | 30        | 4         | 150       | 68        | 3.0        | 225         | -4.8       | 2.00     | 45.00        | 2.08         | 5.00       | 2.91         | 10       |
| 07BU | 4  | 90 | 11 | POST | 287       | 987        | 0.84         | 538           | 8.7 | 38        | 6         | 126       | 48        | 33.0       | 208         | -4.8       | 1.75     | 50.00        | 2.42         | 5.83       | 4.07         | 20       |
| 11AL | 4  | 90 | 11 | POST | 278       | 978        | 1.90         | 1216          | 8.8 | 50        | 6         | 400       | 268       | 234.0      | 296         | 2.0        | 11.00    | 23.13        | 3.25         | 1.67       | 1.16         | 24       |
| 11AU | 4  | 90 | 11 | POST | 277       | 977        | 2.20         | 1408          | 8.6 | 50        | 4         | 460       | 370       | 269.0      | 225         | -4.8       | 8.20     | 36.25        | 3.75         | 3.33       | 1.16         | 30       |
| 11BL | 4  | 90 | 11 | POST | 280       | 980        | 1.70         | 1088          | 8.8 | 47        | 4         | 300       | 248       | 209.0      | 261         | -4.8       | 11.00    | 32.50        | 3.17         | -2.50      | 1.16         | 26       |
| 11BU | 4  | 90 | 11 | POST | 279       | 979        | 1.50         | 960           | 8.7 | 47        | 4         | 340       | 300       | 251.0      | 256         | -4.8       | 12.00    | 33.75        | 3.58         | -2.50      | 0.87         | 30       |
| 12AL | 4  | 90 | 11 | POST | 294       | 994        | 3.80         | 2432          | 8.2 | 195       | 18        | 580       | 816       | 236.0      | 130         | -4.8       | 4.00     | 105.00       | 1.75         | 7.50       | 3.20         | 86       |
| 12AU | 4  | 90 | 11 | POST | 293       | 993        | 2.80         | 1792          | 8.3 | 150       | 13        | 400       | 608       | 156.0      | 128         | -4.8       | 3.20     | 100.00       | 2.92         | 6.67       | 3.49         | 80       |
| 12BL | 4  | 90 | 11 | POST | 296       | 996        | 3.80         | 2432          | 8.3 | 185       | 17        | 660       | 936       | 236.0      | 130         | -4.8       | 3.40     | 125.00       | 2.42         | 8.33       | 2.62         | 88       |
| 12BU | 4  | 90 | 11 | POST | 295       | 995        | 3.00         | 1920          | 8.4 | 113       | 10        | 500       | 668       | 196.0      | 132         | -4.8       | 3.10     | 100.00       | 3.25         | 6.67       | 3.49         | 80       |
| 13AL | 4  | 90 | 11 | POST | 290       | 990        | 1.10         | 704           | 8.7 | 37        | 6         | 220       | 152       | 97.0       | 285         | -4.8       | 6.80     | 5.63         | 2.04         | 5.00       | 1.46         | 22       |
| 13AU | 4  | 90 | 11 | POST | 289       | 989        | 1.00         | 640           | 8.7 | 48        | 6         | 180       | 104       | 96.0       | 327         | -4.8       | 4.40     | 7.50         | 0.83         | 3.33       | 1.75         | 18       |
| 13BL | 4  | 90 | 11 | POST | 292       | 992        | 1.10         | 704           | 8.7 | 35        | 5         | 220       | 184       | 81.0       | 221         | -4.8       | 9.20     | 6.88         | 1.83         | 5.00       | 1.46         | 20       |
| 13BU | 4  | 90 | 11 | POST | 291       | 991        | 0.92         | 589           | 8.8 | 35        | 4         | 180       | 118       | 68.0       | 252         | -4.8       | 5.80     | 16.25        | 1.67         | 5.00       | 1.75         | 14       |
| 23AL | 4  | 90 | 11 | POST | 298       | 998        | 1.10         | 704           | 8.6 | 46        | 5         | 180       | 102       | 167.0      | 373         | 4.0        | 5.40     | 6.56         | 2.00         | 3.75       | 2.33         | 12       |
| 23AU | 4  | 90 | 11 | POST | 297       | 997        | 2.20         | 1408          | 8.1 | 151       | 22        | 380       | 256       | 518.0      | 548         | -4.8       | 3.60     | 10.31        | 1.82         | 5.00       | 3.78         | 28       |
| 23BL | 4  | 90 | 11 | POST | 300       | 1000       | 0.96         | 614           | 8.6 | 33        | 3         | 160       | 107       | 115.0      | 287         | -4.8       | 8.00     | 5.38         | 1.45         | 2.50       | 1.75         | 6        |
| 23BU | 4  | 90 | 11 | POST | 299       | 999        | 1.00         | 640           | 8.6 | 33        | 4         | 160       | 104       | 133.0      | 291         | 4.0        | 4.40     | 6.56         | 1.55         | 2.50       | 2.04         | 8        |
| 24AL | 4  | 90 | 11 | POST | 282       | 982        | 1.20         | 768           | 8.9 | 35        | 4         | 200       | 126       | 98.0       | 212         | -4.8       | 4.20     | 40.00        | 1.50         | -2.50      | 1.46         | 12       |
| 24AU | 4  | 90 | 11 | POST | 281       | 981        | 0.92         | 589           | 8.8 | 41        | 5         | 152       | 74        | 65.0       | 201         | -4.8       | 2.60     | 46.25        | 1.92         | -2.50      | 2.33         | 32       |
| 24BL | 4  | 90 | 11 | POST | 284       | 984        | 1.10         | 704           | 8.8 | 35        | 4         | 180       | 104       | 83.0       | 216         | -4.8       | 3.80     | 33.75        | 1.83         | -2.50      | 1.75         | 14       |
| 24BU | 4  | 90 | 11 | POST | 283       | 983        | 0.68         | 435           | 8.8 | 38        | 6         | 108       | 80        | 30.0       | 225         | -4.8       | 2.20     | 20.63        | 1.67         | -2.50      | 2.33         | 30       |
| 25AL | 4  | 90 | 11 | POST | 318       | 1018       | 2.00         | 1280          | 8.3 | 108       | 21        | 152       | 202       | 326.0      | 124         | -4.8       | 1.85     | 50.00        | 0.85         | 3.33       | 1.46         | 26       |
| 25AU | 4  | 90 | 11 | POST | 317       | 1017       | 1.80         | 1152          | 8.3 | 91        | 16        | 160       | 96        | 455.0      | 132         | -4.8       | 1.70     | 45.00        | 0.92         | 1.67       | 1.75         | 30       |
| 25BL | 4  | 90 | 11 | POST | 320       | 1020       | 1.70         | 1088          | 8.3 | 133       | 25        | 144       | 178       | 96.0       | 119         | -4.8       | 1.80     | 62.50        | 1.08         | 3.33       | 1.46         | 22       |
| 25BU | 4  | 90 | 11 | POST | 319       | 1019       | 2.00         | 1280          | 8.3 | 143       | 26        | 146       | 156       | 266.0      | 115         | -4.8       | 1.50     | 36.25        | 1.15         | 1.67       | 2.62         | 32       |
| 28AL | 4  | 90 | 11 | POST | 302       | 1002       | 0.84         | 538           | 8.9 | 26        | 2         | 160       | 82        | 122.0      | 168         | 4.0        | 1.05     | 17.81        | 1.36         | 2.50       | 1.46         | 6        |
| 28AU | 4  | 90 | 11 | POST | 301       | 1001       | 0.48         | 307           | 9.2 | 21        | 2         | 101       | 10        | -2.5       | 313         | 18.0       | 1.80     | 8.13         | 2.45         | 2.50       | 1.46         | 12       |
| 28BL | 4  | 90 | 11 | POST | 304       | 1004       | 0.68         | 435           | 8.9 | 19        | 2         | 146       | 72        | 82.0       | 172         | 4.0        | 1.00     | 23.75        | 1.45         | 1.25       | 1.16         | 6        |
| 28BU | 4  | 90 | 11 | POST | 303       | 1003       | 0.52         | 333           | 9.2 | 26        | 3         | 103       | 8         | -2.5       | 238         | 13.0       | 1.45     | 10.63        | 1.73         | 2.50       | 1.46         | 16       |
| 30AL | 4  | 90 | 11 | POST | 310       | 1010       | 1.30         | 832           | 8.7 | 25        | 3         | 240       | 180       | 367.0      | 241         | 4.0        | 5.80     | 18.75        | 1.73         | 5.00       | 0.87         | 6        |
| 30AU | 4  | 90 | 11 | POST | 309       | 1009       | 1.20         | 768           | 8.6 | 35        | 5         | 220       | 148       | 157.0      | 234         | 4.0        | 5.00     | 24.38        | 1.91         | 5.00       | 0.87         | 8        |
| 30BL | 4  | 90 | 11 | POST | 312       | 1012       | 1.60         | 1024          | 8.6 | 45        | 6         | 220       | 250       | 388.0      | 223         | 4.0        | 5.20     | 15.63        | 1.91         | 6.88       | 0.87         | 10       |
| 30BU | 4  | 90 | 11 | POST | 311       | 1011       | 1.30         | 832           | 8.6 | 38        | 5         | 240       | 180       | 198.0      | 256         | 4.0        | 5.20     | 15.00        | 1.91         | 6.88       | 1.16         | 10       |
| 31AL | 4  | 90 | 11 | POST | 334       | 1034       | 1.20         | 768           | 9.6 | 31        | 5         | 248       | 96        | 88.0       | 328         | 8.0        | 16.00    | 11.25        | 2.77         | 1.67       | 1.75         | 6        |
| 31AU | 4  | 90 | 11 | POST | 333       | 1033       | 1.10         | 704           | 9.6 | 26        | 9         | 210       | 72        | -2.5       | 322         | 17.0       | 3.80     | 32.50        | 2.54         | 1.67       | 3.20         | 20       |
| 31BL | 4  | 90 | 11 | POST | 336       | 1036       | 1.40         | 896           | 9.6 | 26        | 5         | 267       | 150       | 161.0      | 331         | 22.0       | 11.50    | 13.75        | 4.38         | 1.67       | 2.04         | 16       |
| 31BU | 4  | 90 | 11 | POST | 335       | 1035       | 1.10         | 704           | 9.6 | 34        | 10        | 152       | 69        | 4.0        | 353         | 10.0       | 7.20     | 27.50        | 2.85         | 3.33       | 2.62         | 16       |
| 32AL | 4  | 90 | 11 | POST | 314       | 1014       | 1.00         | 640           | 9.5 | 18        | 2         | 200       | 60        | 177.0      | 300         | 9.0        | 11.00    | 10.63        | 1.73         | -2.50      | 0.87         | 2        |
| 32AU | 4  | 90 | 11 | POST | 313       | 1013       | 0.88         | 563           | 9.6 | 17        | 2         | 180       | 60        | 75.0       | 274         | 13.0       | 6.60     | 11.88        | 2.27         | 1.25       | 1.46         | 4        |
| 32BL | 4  | 90 | 11 | POST | 316       | 1016       | 0.88         | 563           | 9.5 | 19        | 4         | 180       | 64        | 90.0       | 247         | 13.0       | 10.00    | 7.50         | 1.55         | 1.25       | 1.16         | 6        |
| 32BU | 4  | 90 | 11 | POST | 315       | 1015       | 0.76         | 486           | 9.6 | 15        | 3         | 160       | 48        | 12.0       | 247         | 13.0       | 6.80     | 8.44         | 2.27         | 1.25       | 1.16         | 4        |

# Raw Soil Sample Data

For Quarter 4/90

| Site | Qr | Yr | Mn | Sea  | Id<br>Num | Lab<br>Num | EC x<br>1000 | Solu<br>Salts |     | Ca<br>ppm | Mg<br>ppm | Na<br>ppm | Cl<br>ppm | SO4<br>ppm | HCO3<br>ppm | CO3<br>ppm | F<br>ppm | NO3-N<br>ppm | Boron<br>ppm | NH4<br>ppm | PO4-P<br>ppm | k<br>ppm |
|------|----|----|----|------|-----------|------------|--------------|---------------|-----|-----------|-----------|-----------|-----------|------------|-------------|------------|----------|--------------|--------------|------------|--------------|----------|
|      |    |    |    |      |           |            |              | ppm           | pH  |           |           |           |           |            |             |            |          |              |              |            |              |          |
| 43AL | 4  | 90 | 11 | POST | 346       | 1046       | 2.60         | 1664          | 8.6 | 63        | 17        | 500       | 488       | 503.0      | 236         | 4.0        | 1.90     | 10.00        | 3.09         | 5.83       | 4.07         | 14       |
| 43AU | 4  | 90 | 11 | POST | 345       | 1045       | 1.90         | 1216          | 8.3 | 81        | 22        | 300       | 324       | 235.0      | 311         | -4.8       | 2.40     | 38.75        | 3.27         | 10.83      | 6.40         | 16       |
| 43BL | 4  | 90 | 11 | POST | 348       | 1048       | 2.20         | 1408          | 8.7 | 58        | 13        | 380       | 404       | 383.0      | 223         | 4.0        | 2.20     | 6.88         | 3.00         | 5.00       | 2.62         | 10       |
| 43BU | 4  | 90 | 11 | POST | 347       | 1047       | 1.50         | 960           | 8.3 | 57        | 14        | 220       | 224       | 195.0      | 300         | -4.8       | 2.00     | 35.00        | 2.73         | 9.17       | 6.40         | 12       |
| 45AL | 4  | 90 | 11 | POST | 306       | 1006       | 1.10         | 704           | 9.7 | 17        | 2         | 180       | 50        | 58.0       | 360         | 51.0       | 9.60     | 13.12        | 3.82         | -2.50      | 1.16         | 6        |
| 45AU | 4  | 90 | 11 | POST | 305       | 1005       | 0.68         | 435           | 9.4 | 18        | 3         | 160       | 22        | -2.5       | 300         | 13.0       | 2.20     | 16.88        | 1.55         | 2.50       | 1.75         | 8        |
| 45BL | 4  | 90 | 11 | POST | 308       | 1008       | 0.96         | 614           | 9.6 | 17        | 3         | 200       | 61        | 4.0        | 283         | 43.0       | 7.60     | 19.38        | 2.91         | 1.25       | 0.87         | 4        |
| 45BU | 4  | 90 | 11 | POST | 307       | 1007       | 0.64         | 410           | 9.5 | 17        | 9         | 160       | 8         | -2.5       | 381         | 30.0       | 2.80     | 15.00        | 1.73         | 1.25       | 1.16         | 8        |



## Raw Soil Data

For Quarter 4/90

| Site | Qtr | Yr | Mn | Sea  | Id<br>Num | Lab<br>Num | Na<br>exchg<br>Meq/<br>100gm | K<br>exchg<br>Meq/<br>100gm | Ca<br>exchg<br>Meq/<br>100gm | Mg<br>exchg<br>Meq/<br>100gm | Total<br>P<br>ppm |
|------|-----|----|----|------|-----------|------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------|
| 07AL | 4   | 90 | 11 | POST | 286       | 986        | 1.78                         | 0.56                        | 20.43                        | 3.16                         | 9999.99           |
| 07AU | 4   | 90 | 11 | POST | 285       | 985        | 0.91                         | 0.95                        | 20.07                        | 2.49                         | 9999.99           |
| 07BL | 4   | 90 | 11 | POST | 288       | 988        | 1.48                         | 0.61                        | 19.92                        | 2.51                         | 9999.99           |
| 07BU | 4   | 90 | 11 | POST | 287       | 987        | 1.13                         | 0.76                        | 18.59                        | 2.40                         | 9999.99           |
| 11AL | 4   | 90 | 11 | POST | 278       | 978        | 4.78                         | 2.05                        | 20.80                        | 1.81                         | 9999.99           |
| 11AU | 4   | 90 | 11 | POST | 277       | 977        | 4.78                         | 2.30                        | 21.20                        | 1.95                         | 9999.99           |
| 11BL | 4   | 90 | 11 | POST | 280       | 980        | 3.91                         | 2.05                        | 21.06                        | 1.73                         | 9999.99           |
| 11BU | 4   | 90 | 11 | POST | 279       | 979        | 4.35                         | 2.30                        | 21.02                        | 1.77                         | 9999.99           |
| 12AL | 4   | 90 | 11 | POST | 294       | 994        | 3.48                         | 2.05                        | 18.76                        | 1.36                         | 9999.99           |
| 12AU | 4   | 90 | 11 | POST | 293       | 993        | 2.48                         | 2.00                        | 17.55                        | 1.15                         | 9999.99           |
| 12BL | 4   | 90 | 11 | POST | 296       | 996        | 4.35                         | 2.30                        | 21.33                        | 1.56                         | 9999.99           |
| 12BU | 4   | 90 | 11 | POST | 295       | 995        | 3.18                         | 2.05                        | 17.70                        | 1.07                         | 9999.99           |
| 13AL | 4   | 90 | 11 | POST | 290       | 990        | 2.22                         | 1.56                        | 18.35                        | 1.79                         | 9999.99           |
| 13AU | 4   | 90 | 11 | POST | 289       | 989        | 1.70                         | 1.23                        | 19.46                        | 1.69                         | 9999.99           |
| 13BL | 4   | 90 | 11 | POST | 292       | 992        | 2.09                         | 1.43                        | 18.26                        | 1.66                         | 9999.99           |
| 13BU | 4   | 90 | 11 | POST | 291       | 991        | 1.87                         | 1.08                        | 18.66                        | 1.48                         | 9999.99           |
| 23AL | 4   | 90 | 11 | POST | 298       | 998        | 3.04                         | 1.28                        | 21.31                        | 1.85                         | 9999.99           |
| 23AU | 4   | 90 | 11 | POST | 297       | 997        | 3.18                         | 1.33                        | 16.35                        | 1.66                         | 9999.99           |
| 23BL | 4   | 90 | 11 | POST | 300       | 1000       | 2.87                         | 1.02                        | 22.92                        | 1.83                         | 9999.99           |
| 23BU | 4   | 90 | 11 | POST | 299       | 999        | 2.87                         | 1.00                        | 20.66                        | 2.08                         | 9999.99           |
| 24AL | 4   | 90 | 11 | POST | 282       | 982        | 2.87                         | 1.36                        | 23.27                        | 1.83                         | 9999.99           |
| 24AU | 4   | 90 | 11 | POST | 281       | 981        | 1.61                         | 1.97                        | 19.16                        | 1.60                         | 9999.99           |
| 24BL | 4   | 90 | 11 | POST | 284       | 984        | 2.22                         | 1.36                        | 20.26                        | 1.75                         | 9999.99           |
| 24BU | 4   | 90 | 11 | POST | 283       | 983        | 1.44                         | 2.30                        | 20.27                        | 1.77                         | 9999.99           |
| 25AL | 4   | 90 | 11 | POST | 318       | 1018       | 1.83                         | 1.59                        | 22.97                        | 3.58                         | 9999.99           |
| 25AU | 4   | 90 | 11 | POST | 317       | 1017       | 1.56                         | 1.46                        | 20.65                        | 2.96                         | 9999.99           |
| 25BL | 4   | 90 | 11 | POST | 320       | 1020       | 1.56                         | 1.36                        | 22.59                        | 3.25                         | 9999.99           |
| 25BU | 4   | 90 | 11 | POST | 319       | 1019       | 1.37                         | 1.43                        | 19.36                        | 2.75                         | 9999.99           |
| 28AL | 4   | 90 | 11 | POST | 302       | 1002       | 2.83                         | 1.08                        | 22.08                        | 1.56                         | 9999.99           |
| 28AU | 4   | 90 | 11 | POST | 301       | 1001       | 1.78                         | 1.20                        | 25.20                        | 1.54                         | 9999.99           |
| 28BL | 4   | 90 | 11 | POST | 304       | 1004       | 2.65                         | 1.08                        | 21.83                        | 1.62                         | 9999.99           |
| 28BU | 4   | 90 | 11 | POST | 303       | 1003       | 1.91                         | 1.28                        | 22.45                        | 1.58                         | 9999.99           |
| 30AL | 4   | 90 | 11 | POST | 310       | 1010       | 3.44                         | 1.00                        | 16.90                        | 1.79                         | 9999.99           |
| 30AU | 4   | 90 | 11 | POST | 309       | 1009       | 3.09                         | 1.02                        | 18.82                        | 1.97                         | 9999.99           |
| 30BL | 4   | 90 | 11 | POST | 312       | 1012       | 3.91                         | 1.08                        | 19.59                        | 2.14                         | 9999.99           |
| 30BU | 4   | 90 | 11 | POST | 311       | 1011       | 3.13                         | 1.02                        | 16.17                        | 1.71                         | 9999.99           |
| 31AL | 4   | 90 | 11 | POST | 334       | 1034       | 2.74                         | 0.44                        | 12.84                        | 0.58                         | 9999.99           |
| 31AU | 4   | 90 | 11 | POST | 333       | 1033       | 2.13                         | 0.90                        | 17.51                        | 0.78                         | 9999.99           |
| 31BL | 4   | 90 | 11 | POST | 336       | 1036       | 3.26                         | 0.59                        | 15.32                        | 0.76                         | 9999.99           |
| 31BU | 4   | 90 | 11 | POST | 335       | 1035       | 2.52                         | 0.90                        | 11.31                        | 0.68                         | 9999.99           |
| 32AL | 4   | 90 | 11 | POST | 314       | 1014       | 2.44                         | 0.20                        | 13.81                        | 0.72                         | 9999.99           |
| 32AU | 4   | 90 | 11 | POST | 313       | 1013       | 2.03                         | 0.23                        | 13.02                        | 0.64                         | 9999.99           |
| 32BL | 4   | 90 | 11 | POST | 316       | 1016       | 2.40                         | 0.20                        | 13.69                        | 0.72                         | 9999.99           |
| 32BU | 4   | 90 | 11 | POST | 315       | 1015       | 1.78                         | 0.20                        | 16.39                        | 0.76                         | 9999.99           |

# Raw Soil Sample Data

For Quarter 4/90

| Site | Qtr | Yr | Mn | Sea  | Id<br>Num | Lab<br>Num | Na<br>exchg<br>Meq/<br>100gm | K<br>exchg<br>Meq/<br>100gm | Ca<br>exchg<br>Meq/<br>100gm | Hg<br>exchg<br>Meq/<br>100gm | Total<br>P<br>ppm |
|------|-----|----|----|------|-----------|------------|------------------------------|-----------------------------|------------------------------|------------------------------|-------------------|
| 43AL | 4   | 90 | 11 | POST | 346       | 1046       | 3.48                         | 0.77                        | 15.87                        | 3.39                         | 9999.99           |
| 43AU | 4   | 90 | 11 | POST | 345       | 1045       | 2.43                         | 0.82                        | 14.10                        | 3.19                         | 9999.99           |
| 43BL | 4   | 90 | 11 | POST | 348       | 1048       | 4.35                         | 0.67                        | 13.31                        | 2.73                         | 9999.99           |
| 43BU | 4   | 90 | 11 | POST | 347       | 1047       | 2.24                         | 0.74                        | 13.34                        | 2.98                         | 9999.99           |
| 45AL | 4   | 90 | 11 | POST | 306       | 1006       | 4.35                         | 0.59                        | 14.75                        | 1.21                         | 9999.99           |
| 45AU | 4   | 90 | 11 | POST | 305       | 1005       | 3.00                         | 0.72                        | 16.14                        | 1.48                         | 9999.99           |
| 45BL | 4   | 90 | 11 | POST | 308       | 1008       | 3.91                         | 0.56                        | 16.50                        | 1.23                         | 9999.99           |
| 45BU | 4   | 90 | 11 | POST | 307       | 1007       | 3.04                         | 0.74                        | 21.39                        | 1.77                         | 9999.99           |

8-31-90

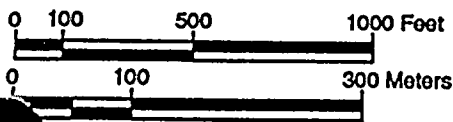
PUNGS-90-7-18

MONITORING SITE 11

0 100 500 1000 Feet  
0 100 300 Meters



H-1. Color infrared imagery for monitoring site 11



H-2. Color infrared imagery for monitoring site 13

