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Analytical results and locality map for 82 well water samples from the lower Santa Cruz basin, Pinal County, Arizona

By

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INTRODUCTION

Water from irrigation wells in the lower Santa Cruz basin, Pinal County, Arizona (fig. 1) were sampled in March and April, 1986. The samples were collected so that the chemistry of ground water up valley from the Casa Grande West-Santa Cruz porphyry copper deposit (plate 1) could be compared with ground water near the deposit. Results of studies of well waters within an eight-mile radius of the copper deposit were reported previously (Ficklin and others, 1981; Nowlan and others, 1981). This present study includes samples from as far away as 27 miles from the deposit.

The Casa Grande West-Santa Cruz copper deposit contains at least 318,000,000 metric tons of rock with one percent copper (Mining Engineering, 1979) and is covered by a minimum of 1,000 ft of alluvium. The earlier study by Nowlan and others (1981) suggested that the copper deposit is reflected by the chemistry of ground waters near the deposit. This present study enlarges the geographic area considerably so that waters near the deposit may be studied in a more regional context.

The depth to bedrock in the sampled area ranges from 100 ft in an area west of Casa Grande (Hardt and Cattany, 1965, p. 19) to greater than 9,000 ft near Eloy (Oppenheimer, 1980, map 6). Outcrops of bedrock are at least 1 mile from any sampled well and generally are 4-10 miles away. The major source of water in the wells is unconsolidated alluvium (Konieczski and English, 1979) and few of the wells reach bedrock.

The sampled wells are in a prime agricultural area where ground water withdrawal has been intensive over the last 40 years. The withdrawal has resulted in a general lowering of the water table; the decline has been nearly 500 ft in some areas (Konieczski and English, 1979). The wells sampled in this study range in depth from 100 ft to about 2,000 ft and are generally from 1,000 to 1,500 ft deep. The depth to water ranges from 40 ft to greater than 400 ft. Pumping rates range from 400 to 2,000 gallons per minute.

The area to be sampled was divided into blocks of from 4 to 9 square miles and a well was randomly chosen from each of those blocks. Additional wells were chosen from some blocks so that local variations could be observed.

SAMPLING TECHNIQUES

Samples were collected from 82 wells (plate 1). Most wells had been running for 1 or more days. Fifty ml of water from each well were filtered through a 0.45-micron membrane filter into an acid-rinsed polyethylene bottle and then were acidified to approximately pH 2 with ultrapure, concentrated nitric acid. In addition, a new 250-ml bottle was filled with untreated water.

ANALYTICAL TECHNIQUES

Water temperature and pH were measured at the sample site. All other analyses were done in the U.S. Geological Survey laboratory in Denver, Colorado. Alkalinity, sulfate, chloride, fluoride, nitrate, uranium, and specific conductance were determined using the untreated sample.

Alkalinity is a term used to indicate the total acid-neutralizable constituents in water. Generally the alkalinity is due to carbonate and bicarbonate ions. Calcium, magnesium, sodium, potassium, strontium, silica, aluminum, iron, manganese, silver, arsenic, barium, bismuth, cadmium, cobalt, chromium, copper, lithium, molybdenum, nickel, lead, rubidium, and zinc were

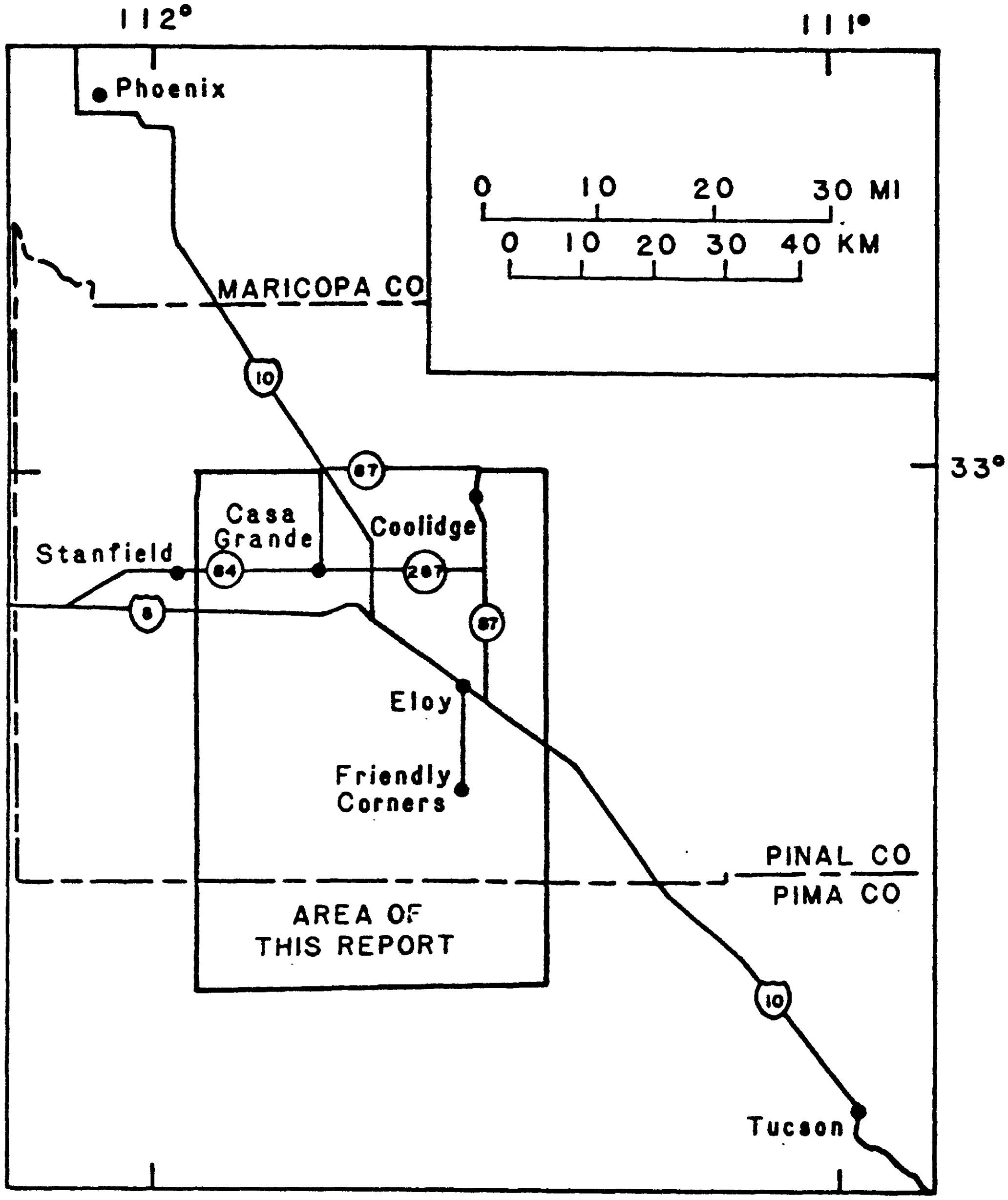

Figure 1. Index map of the lower Santa Cruz basin, Pinal County, Arizona.

determined using the acidified-filtered sample. A complete list of analytical techniques used and a reference for each are listed in table 1.

RESULTS

The sample localities for 82 well-water samples collected from the lower Santa Cruz basin, Arizona, are shown on plate 1; only the numeric part of the sample identification is shown. The analytical results of the 32 constituents that were determined for these samples are shown in table 2. The latitude and longitude for each sample locality are also shown in table 2.

The results of the charge balance shown in table 2 for the 82 samples show good accuracy of analyses. Ionic solutions are electrically neutral. By comparing the sums of the charges for cations against anions, accuracy of analyses can be checked. Fifty-nine of the samples are within 5 percent, 21 within 10 percent, and two samples are within 10.4 percent of electrical neutrality.

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Table 1.--Analytical methods used for water analyses, lower Santa Cruz basin, Arizona

Constituents	Method	Reference
Alkalinity	Gran's plot potentiometric titration	Orion Research, Inc. (1978).
Sulfate, chloride, fluoride, and nitrate	Ion chromatography	Fishman and Pyen (1979).
Uranium	Laser-excited fluorescence	Scintrex Corp. (1979).
Specific conductance	Conductivity bridge	Skougstad et al. (1979), p. 545.
Calcium, magnesium, sodium, potassium, strontium, silica, lithium, and zinc	Flame atomic-absorption spectrophotometry	Perkin-Elmer Corp. (1976).
Aluminum, iron, manganese, silver, arsenic, barium, bismuth, cadmium, cobalt, chromium, copper, molybdenum, nickel, lead, and rubidium	Flameless atomic-absorption spectrophotometry	Perkin-Elmer Corp. (1977).

TABLE 2.--ANALYTICAL RESULTS FOR WELL WATER SAMPLES FROM THE LOWER SANTA CRUZ BASIN

Sample	Latitude	Longitud	CA(MG/L)	MG(MG/L)	NA(MG/L)	K(MG/L)	SR(MG/L)	SIO2(MG/	ALK(MG/L	SO4(MG/L	CL(MG/L)
W2256C	32 52 30	111 48 35	116.0	18.0	440	3.0	1.8	48	282	418	337
W2271A	32 54 5	111 41 26	149.0	24.0	165	4.4	6.0	40	140	325	244
W2272A	32 53 27	111 43 22	62.0	12.0	145	3.1	1.1	21	111	203	113
W2273A	32 53 43	111 43 22	29.0	5.4	96	2.2	.5	20	98	125	65
W2274A	32 53 50	111 43 22	71.0	11.0	220	2.7	1.8	45	251	240	116
W2275A	32 54 39	111 38 50	18.0	.5	140	3.5	.4	17	44	148	121
W2276A	32 56 45	111 37 53	6.4	.3	145	1.3	.3	26	84	105	65
W2277A	32 55 3	111 38 41	4.5	.2	130	1.3	.1	28	80	78	62
W2278A	32 53 13	111 39 13	110.0	11.0	140	4.6	2.3	29	92	131	210
W2279A	32 54 24	111 41 18	17.0	2.6	74	2.0	.3	20	110	51	24
W2280A	32 53 42	111 37 43	155.0	13.0	130	5.6	2.9	30	82	225	200
W2281A	32 53 13	111 36 57	330.0	35.0	185	6.7	3.8	36	182	479	346
W2282A	32 53 16	111 37 4	53.0	1.7	140	3.7	.8	23	63	126	125
W2283A	32 56 19	111 33 39	520.0	70.0	455	10.0	7.7	40	195	912	1,200
W2284A	32 56 19	111 32 37	520.0	72.0	560	11.0	10.0	44	198	1,110	1,180
W2285A	32 56 19	111 33 13	550.0	75.0	505	11.0	9.1	43	204	1,040	1,250
W2286A	32 54 33	111 33 3	170.0	21.0	120	4.3	2.0	34	140	185	285
W2287A	32 56 43	111 34 39	520.0	70.0	495	9.7	6.5	38	189	980	1,200
W2288A	32 56 21	111 37 33	125.0	12.0	125	4.7	2.4	38	112	188	198
W2289A	32 51 54	111 35 13	235.0	21.0	105	5.4	2.9	33	115	285	377
W2290A	32 51 5	111 38 42	188.0	20.0	120	5.4	2.6	32	137	209	299
W2291A	32 50 48	111 38 23	213.0	22.0	135	5.3	2.7	36	130	316	291
W2292A	32 51 14	111 40 15	280.0	43.0	215	5.4	5.0	46	109	599	434
W2293A	32 45 49	111 42 49	63.0	7.9	120	3.4	1.3	38	142	128	91
W2294A	32 46 11	111 42 49	47.0	2.0	360	3.6	1.5	28	52	298	269
W2295A	32 46 10	111 41 26	2.5	.2	100	.8	<.1	32	115	66	36
W2296A	32 45 47	111 40 46	1.7	.1	95	.7	<.1	36	124	57	27
W2297A	32 45 47	111 40 16	2.9	.2	92	.6	<.1	32	118	60	26
W2298A	32 37 2	111 39 18	20.0	5.2	75	1.8	.5	31	139	57	38
W2299A	32 37 23	111 39 18	7.7	.8	70	1.2	.2	23	105	43	18
W2300A	32 36 12	111 37 17	31.0	3.5	58	2.5	.5	34	152	49	17
W2301A	32 36 12	111 37 27	15.0	1.9	65	2.2	.3	30	132	46	16
W2302A	32 35 47	111 40 24	26.0	7.6	100	3.0	.5	47	164	87	67
W2303A	32 34 38	111 40 24	33.0	11.0	125	2.8	.7	58	174	128	94
W2304A	32 34 17	111 39 29	15.0	3.3	100	2.1	.3	27	136	77	52
W2305A	32 36 3	111 40 25	25.0	5.7	92	2.9	.6	36	150	74	53
W2306A	32 44 58	111 42 21	7.0	1.0	96	1.4	.1	22	136	51	38
W2307A	32 44 58	111 42 43	82.0	10.0	110	3.3	1.3	27	120	161	126
W2308A	32 44 34	111 42 27	12.0	1.8	92	1.5	.1	23	136	55	39
W2309A	32 46 40	111 44 51	330.0	40.0	295	7.0	4.1	41	242	771	359
W2310A	32 46 40	111 44 23	380.0	46.0	450	7.4	4.5	40	265	1,041	480
W2311A	32 44 6	111 41 30	3.1	.2	95	.9	<.1	19	129	60	35
W2312A	32 44 32	111 41 20	2.5	.2	88	.7	<.1	19	121	54	25
W2313A	32 41 58	111 41 22	16.0	3.6	78	1.8	.3	25	143	50	30
W2314A	32 41 48	111 41 36	23.0	5.9	80	2.1	.3	31	162	58	35

TABLE 2.--ANALYTICAL RESULTS FOR WELL WATER SAMPLES FROM THE LOWER SANTA CRUZ BASIN--Continued

Sample	F(MG/L)	NO3(MG/L	AL(UG/L)	FE(UG/L)	MN(UG/L)	AG(UG/L)	AS(UG/L)	BA(UG/L)	BI(UG/L)	CD(UG/L)	CO(UG/L)
W2256C	3.0	12.0	40	8	.7	.10	13.0	19	<1.0	<.1	2.6
W2271A	1.3	13.0	25	13	2.0	.08	1.5	60	<1.0	<.1	1.7
W2272A	1.1	4.8	35	6	.5	.09	18.0	30	<1.0	.1	1.4
W2273A	.8	3.3	50	11	1.0	.05	17.0	16	<1.0	.8	1.4
W2274A	1.7	13.0	63	21	4.4	.12	14.0	30	<1.0	.1	2.2
W2275A	1.5	1.6	84	7	1.1	.16	5.9	28	<1.0	.2	1.0
W2276A	3.6	2.1	71	8	.5	.11	13.0	14	<1.0	<.1	1.0
W2277A	3.3	1.3	73	5	.7	.10	9.5	13	<1.0	<.1	<1.0
W2278A	.6	10.0	46	10	1.6	.05	4.1	75	<1.0	<.1	1.5
W2279A	.9	1.8	20	3	.4	.06	12.0	27	<1.0	<.1	1.1
W2280A	.5	10.0	32	60	1.0	.06	1.8	77	<1.0	.1	1.5
W2281A	1.2	16.0	29	34	1.8	.09	<1.0	37	<1.0	.3	1.5
W2282A	.7	3.6	70	5	.5	.06	1.2	27	<1.0	.1	1.7
W2283A	2.0	18.0	25	25	1.0	.16	9.0	77	1.2	1.9	1.6
W2284A	2.1	17.0	28	19	2.1	.16	10.0	63	2.2	2.2	1.5
W2285A	2.3	19.0	98	30	2.0	.16	9.7	70	2.2	2.2	1.2
W2286A	.5	12.0	20	7	.5	.04	2.6	53	<1.0	.3	2.5
W2287A	2.0	25.0	40	45	1.2	.17	11.0	45	<1.0	2.0	1.5
W2288A	.5	8.1	17	55	2.2	.07	2.4	69	<1.0	.1	1.6
W2289A	.7	9.7	18	45	3.1	.08	2.6	78	<1.0	.3	1.4
W2290A	.6	14.0	20	6	.4	.06	3.0	45	<1.0	.2	1.5
W2291A	.7	15.0	47	25	.3	.07	2.8	42	<1.0	.3	2.0
W2292A	1.0	10.0	45	46	1.7	.10	2.5	46	<1.0	.4	1.7
W2293A	.5	9.1	49	15	1.4	.04	2.9	64	<1.0	.1	2.5
W2294A	.9	16.0	28	9	1.4	.14	3.3	40	<1.0	.2	1.8
W2295A	1.8	2.6	60	8	.2	.08	1.7	8	<1.0	<.1	<1.0
W2296A	1.7	1.4	60	6	2.1	.06	52.0	6	<1.0	<.1	<1.0
W2297A	1.8	1.6	67	4	.3	.05	41.0	5	<1.0	<.1	<1.0
W2298A	.9	2.4	50	6	.4	.05	15.0	18	<1.0	<.1	1.5
W2299A	1.1	2.1	36	9	.4	.05	22.0	13	<1.0	<.1	<1.0
W2300A	.8	1.4	45	10	.5	.04	14.0	57	<1.0	<.1	1.4
W2301A	.8	1.0	58	10	1.1	.05	18.0	24	<1.0	<.1	1.0
W2302A	1.7	3.8	31	5	.4	.08	14.0	12	<1.0	.1	<1.0
W2303A	2.5	3.1	55	20	.5	.03	13.0	18	<1.0	<.1	<1.0
W2304A	2.6	2.2	48	14	1.4	.08	15.0	19	<1.0	.1	<1.0
W2305A	1.0	3.4	24	5	.2	.05	16.0	39	<1.0	.1	1.4
W2306A	.9	1.9	22	4	.1	.04	9.0	55	<1.0	.1	<1.0
W2307A	.4	9.8	35	10	.3	.05	5.6	46	<1.0	.1	1.7
W2308A	.8	2.2	45	7	.3	.05	9.4	60	<1.0	<.1	<1.0
W2309A	1.1	38.0	22	10	.5	.10	2.2	43	<1.0	.3	2.1
W2310A	1.3	42.0	37	19	.9	.14	3.7	41	<1.0	1.0	2.0
W2311A	.9	1.9	57	12	.3	.06	16.0	19	<1.0	.1	<1.0
W2312A	1.0	1.5	54	5	.6	.04	22.0	11	<1.0	<.1	<1.0
W2313A	1.0	1.7	32	3	.1	.04	12.0	7	<1.0	<.1	1.1
W2314A	1.1	1.9	28	4	1.4	.12	11.0	12	<1.0	<.1	1.0

TABLE 2.--ANALYTICAL RESULTS FOR WELL WATER SAMPLES FROM THE LOWER SANTA CRUZ BASIN--Continued

Sample	CR(UG/L)	CU(UG/L)	LI(UG/L)	MO(UG/L)	NI(UG/L)	PB(UG/L)	RB(UG/L)	U(UG/L)	ZN(UG/L)	SP.COND.	PH	TEMP. C
W2266C	7	1.4	165	38.0	1.0	.9	.4	30.0	20	2,200	7.5	23
W2271A	7	1.4	260	3.4	<1.0	.5	.1	44.0	38	1,600	7.5	25
W2272A	20	1.1	88	5.1	<1.0	.7	1.9	16.0	17	1,040	8.2	29
W2273A	19	1.0	46	6.4	1.3	1.0	.3	5.5	9	600	8.1	30
W2274A	10	1.0	125	15.0	1.3	.9	.2	44.0	11	1,260	7.5	25
W2275A	60	1.3	70	20.0	1.7	1.0	1.2	1.1	6	710	8.6	33
W2276A	20	1.1	170	10.0	1.4	.8	.6	2.9	4	670	8.8	36
W2277A	36	1.0	138	12.0	<1.0	.8	.4	1.3	3	600	9.0	36
W2278A	6	1.6	98	2.2	1.3	1.0	1.1	9.5	15	1,240	7.6	25
W2279A	24	2.0	25	10.0	1.3	.7	.2	4.3	16	420	8.2	32
W2280A	7	2.4	88	3.1	1.3	.8	1.2	10.0	16	1,400	7.5	26
W2281A	7	3.6	56	2.0	1.3	1.0	.2	20.0	20	2,250	7.1	25
W2282A	36	1.0	140	15.0	2.1	1.3	.6	15.0	6	890	8.3	34
W2283A	9	1.0	265	4.4	1.7	1.7	.5	64.0	10	3,600	7.2	25
W2284A	11	1.8	315	4.2	1.3	1.7	.7	84.0	11	3,800	7.3	25
W2285A	10	1.0	310	4.4	2.2	1.6	.5	74.0	11	3,800	7.3	25
W2286A	8	<1.0	82	3.0	<1.0	1.0	<.1	9.5	9	1,420	7.4	27
W2287A	5	<1.0	195	4.6	2.2	1.4	.2	30.0	10	3,700	7.2	25
W2288A	3	<1.0	67	1.9	2.0	1.0	.1	8.3	7	1,180	7.5	27
W2289A	3	<1.0	50	2.1	1.2	1.1	<.1	6.7	10	1,650	7.3	26
W2290A	2	<1.0	72	1.4	<1.0	1.0	.4	10.0	8	1,500	7.2	24
W2291A	3	<1.0	74	2.2	<1.0	1.1	<.1	9.0	6	1,550	7.4	24
W2292A	5	1.0	110	7.1	1.0	1.0	.5	24.0	8	2,200	7.3	25
W2293A	6	<1.0	100	3.0	<1.0	2.0	<.1	12.0	7	850	7.7	27
W2294A	16	<1.0	350	2.0	<1.0	1.5	4.0	2.3	4	1,650	8.1	31
W2295A	28	1.0	96	4.7	<1.0	.5	.3	2.7	3	430	9.2	34
W2296A	40	<1.0	96	7.7	2.0	.2	.6	2.7	3	400	9.3	39
W2297A	31	<1.0	85	7.2	1.0	<.1	.4	3.5	2	400	9.1	36
W2298A	18	<1.0	58	9.1	<1.0	.9	.3	5.5	4	440	8.3	27
W2299A	16	<1.0	66	5.2	<1.0	.2	.1	4.1	2	340	8.7	25
W2300A	6	<1.0	50	5.9	<1.0	1.1	.1	5.1	7	400	7.7	26
W2301A	11	<1.0	60	5.6	1.4	.3	.2	5.9	4	400	8.1	27
W2302A	15	1.0	115	8.9	<1.0	1.0	4.9	7.5	7	620	7.9	29
W2303A	14	<1.0	140	23.0	2.0	1.3	3.2	5.5	7	780	7.8	30
W2304A	21	<1.0	110	9.7	2.0	.3	1.2	4.0	4	560	8.1	30
W2305A	15	1.0	98	6.5	<1.0	.8	3.0	9.5	7	570	7.8	27
W2306A	21	<1.0	76	4.5	<1.0	.2	1.0	8.5	5	480	8.4	32
W2307A	10	<1.0	94	3.6	<1.0	1.5	.9	11.0	8	970	7.6	29
W2308A	20	<1.0	76	4.8	1.0	.3	.9	8.0	9	520	8.3	32
W2309A	13	1.0	96	3.7	1.0	1.2	1.1	60.0	9	2,600	7.3	25
W2310A	11	2.2	122	4.2	1.0	1.5	1.6	60.0	10	3,200	7.2	24
W2311A	20	<1.0	50	4.4	<1.0	1.2	.5	6.1	4	450	8.8	31
W2312A	26	1.0	60	4.9	1.0	.2	.5	4.7	3	420	9.0	32
W2313A	20	<1.0	64	8.5	1.2	.5	.7	6.0	4	450	8.1	30
W2314A	18	<1.0	78	9.6	<1.0	1.1	.8	8.0	6	500	8.0	31

TABLE 2.--ANALYTICAL RESULTS FOR WELL WATER SAMPLES FROM THE LOWER SANTA CRUZ BASIN--Continued

Sample	CHAR BAL
W2256C	6.6
W2271A	1.5
W2272A	5.6
W2273A	-.1
W2274A	5.3
W2275A	-1.5
W2276A	8.6
W2277A	9.7
W2278A	9.8
W2279A	9.0
W2280A	10.4
W2281A	9.0
W2282A	10.4
W2283A	-4.3
W2284A	-3.0
W2285A	-4.1
W2286A	3.8
W2287A	-3.9
W2288A	5.3
W2289A	-1.3
W2290A	3.5
W2291A	-1.7
W2292A	.6
W2293A	8.1
W2294A	9.9
W2295A	2.7
W2296A	1.8
W2297A	1.7
W2298A	1.2
W2299A	4.6
W2300A	4.3
W2301A	2.1
W2302A	-1.5
W2303A	-1.7
W2304A	-.5
W2305A	1.7
W2306A	2.2
W2307A	3.9
W2308A	2.5
W2309A	3.1
W2310A	3.4
W2311A	-1.2
W2312A	1.2
W2313A	2.5
W2314A	2.3

TABLE 2.-- ANALYTICAL RESULTS FOR WELL WATER SAMPLES FROM THE LOWEP SANTA CRUZ BASIN--Continued

Sample	Latitude	Longitud	CA(MG/L)	MG(MG/L)	NA(MG/L)	K(MG/L)	SR(MG/L)	SIO2(MG/	ALK(MG/L	SO4(MG/L	CL(MG/L)
W2315A	32 38 17	111 38 36	18.0	3.0	70	2.6	.3	21	133	48	27
W2316A	32 37 55	111 38 17	10.0	.7	65	2.5	.2	20	98	48	17
W2317A	32 37 25	111 40 24	22.0	3.2	78	2.4	.6	29	115	66	40
W2318A	32 33 54	111 39 27	23.0	8.1	85	2.5	.4	36	164	64	47
W2319A	32 35 42	111 35 12	3.0	.2	80	1.0	<.1	23	113	50	16
W2320A	32 35 46	111 35 2	37.0	4.3	57	2.5	.5	32	160	42	20
W2321A	32 51 28	111 51 39	53.0	13.0	92	2.1	.8	30	116	113	130
W2322A	32 51 28	111 52 8	41.0	9.2	80	2.1	.5	28	119	71	93
W2323A	32 50 34	111 34 33	222.0	18.0	96	5.4	2.6	31	88	243	302
W2324A	32 50 35	111 34 44	206.0	19.0	86	5.0	2.0	33	112	202	286
W2325A	32 50 35	111 33 23	176.0	20.0	80	4.1	1.6	32	123	172	239
W2326A	32 50 35	111 32 56	196.0	25.0	80	4.0	1.8	35	159	243	253
W2327A	32 50 10	111 33 3	105.0	12.0	66	3.4	1.0	32	141	119	135
W2328A	32 50 37	111 31 1	164.0	22.0	82	4.2	1.9	34	114	116	332
W2329A	32 52 7	111 30 48	190.0	30.0	130	4.7	2.7	36	166	252	340
W2330A	32 51 59	111 30 27	114.0	15.0	125	4.1	1.7	34	160	148	208
W2331A	32 53 11	111 28 58	93.0	12.0	145	4.4	2.0	40	176	160	174
W2332A	32 52 7	111 27 59	61.0	9.2	200	3.2	1.4	35	248	183	127
W2333A	32 52 38	111 27 52	188.0	24.0	315	5.6	4.3	52	183	548	367
W2334A	32 52 20	111 48 37	300.0	40.0	275	3.6	3.3	38	247	662	451
W2335A	32 52 40	111 48 36	89.0	15.0	500	2.9	1.5	54	338	408	375
W2336A	32 48 49	111 35 33	85.0	8.0	130	3.6	1.1	30	126	63	205
W2337A	32 48 36	111 35 15	57.0	5.6	57	2.7	.5	30	131	63	74
W2338A	32 45 48	111 39 37	2.2	.1	98	.5	<.1	29	113	69	30
W2339A	32 36 17	111 36 11	2.7	.2	80	.8	<.1	21	105	54	23
W2340A	32 36 46	111 36 13	11.0	1.0	75	1.7	.2	24	119	47	27
W2341A	32 36 47	111 36 38	4.1	.4	75	1.2	.1	19	110	48	21
W2342A	32 37 58	111 37 19	17.0	1.3	100	1.6	.3	28	94	91	51
W2343A	32 40 7	111 36 10	48.0	5.2	59	2.8	.6	30	155	59	33
W2344A	32 39 42	111 35 35	89.0	11.0	74	3.3	.9	30	158	106	84
W2345A	32 39 55	111 35 48	35.0	3.7	58	2.6	.5	29	152	55	26
W2346A	32 37 45	111 31 59	20.0	1.1	76	2.1	.3	28	123	51	30
W2347A	32 37 31	111 32 1	20.0	1.1	70	2.2	.3	28	133	50	17
W2348A	32 37 8	111 33 3	32.0	2.4	73	2.6	.4	33	154	62	23
W2349A	32 36 14	111 32 22	27.0	2.0	71	2.5	.4	31	149	55	20
W2350A	32 36 14	111 33 30	20.0	1.8	75	2.2	.3	31	138	56	19
W2351A	32 48 25	111 33 21	143.0	13.0	71	3.9	1.3	32	112	110	225

TABLE 2.-- ANALYTICAL RESULTS FOR WELL WATER SAMPLES FROM THE LOWER SANTA CRUZ BASIN--Continued

Sample	F(MG/L)	NO3(MG/L	AL(UG/L)	FE(UG/L)	MN(UG/L)	AG(UG/L)	AS(UG/L)	BA(UG/L)	BI(UG/L)	CD(UG/L)	CO(UG/L)
W2315A	.7	1.5	43	5	1.1	.05	14.0	5	<1.0	<.1	1.3
W2316A	.8	.9	22	3	.1	.05	15.0	10	<1.0	<.1	<1.0
W2317A	.8	4.2	31	6	.1	.10	12.0	37	<1.0	<.1	1.1
W2318A	1.5	2.2	58	5	.7	.12	16.0	26	<1.0	<.1	1.0
W2319A	3.2	.7	68	6	2.0	.07	24.0	7	<1.0	<.1	<1.0
W2320A	.7	4.0	11	3	.5	.04	15.0	77	<1.0	<.1	1.5
W2321A	.6	4.3	18	7	.2	.03	11.0	13	<1.0	<.1	1.0
W2322A	.5	5.6	44	3	1.2	.05	9.2	11	<1.0	.1	1.5
W2323A	.7	9.6	23	40	1.7	.14	1.8	35	<1.0	.1	1.3
W2324A	.6	8.2	14	7	.2	.09	<1.0	83	<1.0	.1	1.0
W2325A	.5	8.9	59	24	.4	.09	3.8	59	<1.0	.1	1.0
W2326A	.6	10.0	44	17	.3	.09	2.4	55	<1.0	.1	1.1
W2327A	.4	5.6	15	9	1.2	.10	4.0	53	<1.0	<.1	1.3
W2328A	.6	12.0	15	13	.3	.08	2.2	180	<1.0	.1	<1.0
W2329A	.7	7.6	13	18	.2	.05	2.2	76	<1.0	.1	1.1
W2330A	.7	2.2	17	16	.2	.07	3.2	54	<1.0	.1	1.3
W2331A	.9	4.2	58	72	1.4	.08	7.8	61	<1.0	.1	1.4
W2332A	1.8	2.3	19	6	.5	.09	10.0	26	<1.0	.2	1.4
W2333A	1.5	5.6	21	20	.4	.14	8.2	36	<1.0	.2	1.1
W2334A	1.0	9.3	33	13	140.0	.12	2.2	35	<1.0	1.0	1.1
W2335A	3.3	12.0	21	12	.9	.14	23.0	22	<1.0	.6	1.8
W2336A	.5	5.6	22	18	4.2	.10	2.6	110	<1.0	.3	1.2
W2337A	.7	3.5	17	6	.4	.06	9.1	77	<1.0	.1	1.8
W2338A	3.0	1.0	84	10	.3	.07	54.0	14	<1.0	.1	<1.0
W2339A	2.5	.8	74	6	.5	.06	40.0	8	<1.0	<.1	<1.0
W2340A	1.0	1.9	38	7	.2	.05	20.0	20	<1.0	.1	<1.0
W2341A	1.4	1.3	56	8	.1	.09	24.0	9	<1.0	.1	<1.0
W2342A	2.6	5.0	52	9	.3	.09	23.0	21	<1.0	<.1	1.3
W2343A	.5	7.3	16	4	.1	.05	6.8	93	<1.0	<.1	2.3
W2344A	.5	2.5	15	5	.1	.10	4.6	79	<1.0	<.1	2.0
W2345A	.6	3.1	31	7	1.5	.03	8.8	71	<1.0	<.1	1.3
W2346A	.9	1.8	41	9	1.7	.08	22.0	54	<1.0	<.1	1.2
W2347A	.7	1.0	16	6	1.0	.03	16.0	67	<1.0	<.1	1.4
W2348A	.8	2.8	31	6	1.5	.03	12.0	75	<1.0	<.1	1.8
W2349A	.7	2.7	29	4	.2	.03	14.0	65	<1.0	.1	2.1
W2350A	.6	1.0	43	6	.4	.05	21.0	55	<1.0	<.1	1.3
W2351A	.8	6.0	25	20	.9	.09	1.0	90	<1.0	<.1	2.9

TABLE 2.--ANALYTICAL RESULTS FOR WELL WATER SAMPLES FROM THE LOWER SANTA CRUZ BASIN--Continued

Sample	CR(UG/L)	CU(UG/L)	LI(UG/L)	MO(UG/L)	NI(UG/L)	PB(UG/L)	RB(UG/L)	U(UG/L)	ZN(UG/L)	SP.COND.	PH	TEMP. C
W2315A	16	1.1	47	8.8	<1.0	.6	.9	4.8	5	420	8.1	27
W2316A	22	<1.0	46	5.5	<1.0	<.1	.9	2.8	5	350	8.4	28
W2317A	13	<1.0	92	3.9	<1.0	.5	.7	6.8	6	480	8.1	26
W2318A	13	<1.0	94	8.9	<1.0	.8	1.7	7.0	7	530	7.9	32
W2319A	20	<1.0	63	7.5	<1.0	.1	.5	4.4	3	400	9.1	34
W2320A	4	1.3	42	5.8	<1.0	1.2	.5	5.5	8	480	7.7	26
W2321A	22	<1.0	64	5.6	<1.0	1.0	2.0	5.7	8	750	7.8	27
W2322A	21	1.7	54	4.4	<1.0	1.2	1.6	5.5	6	680	8.0	27
W2323A	3	2.0	50	2.5	1.5	1.1	.6	5.0	10	1,750	7.5	27
W2324A	3	1.1	42	2.3	<1.0	1.0	.4	5.8	14	1,650	7.5	26
W2325A	2	1.7	52	2.2	1.1	.7	.4	6.0	10	1,460	7.4	27
W2326A	3	<1.0	60	1.7	1.0	.8	.8	9.2	11	1,550	7.3	25
W2327A	5	1.2	42	2.4	<1.0	1.0	.2	5.5	9	980	7.5	27
W2328A	3	<1.0	84	3.5	1.1	.8	.5	5.3	13	1,490	7.5	26
W2329A	2	1.2	122	3.4	<1.0	.6	.3	12.0	8	1,750	7.3	24
W2330A	3	1.1	124	4.3	<1.0	.6	.4	13.0	6	1,240	7.4	25
W2331A	10	<1.0	160	3.9	<1.0	1.0	.5	28.0	3	1,200	7.3	26
W2332A	11	1.0	148	10.0	<1.0	.5	.9	26.0	4	1,220	7.3	25
W2333A	13	<1.0	232	10.0	<1.0	.8	.6	24.0	8	2,250	7.3	25
W2334A	4	<1.0	106	4.6	1.3	1.1	.5	22.0	1,600	2,600	7.2	24
W2335A	8	1.0	210	27.0	<1.0	1.1	.5	26.0	20	2,400	7.5	23
W2336A	2	<1.0	56	5.0	<1.0	1.1	.1	3.0	22	1,120	7.6	28
W2337A	3	<1.0	30	3.2	<1.0	1.5	.2	3.0	15	610	7.7	28
W2338A	41	<1.0	84	7.2	1.0	.3	.3	2.0	3	480	9.2	39
W2339A	20	<1.0	45	6.9	<1.0	.6	.3	2.2	3	420	9.2	34
W2340A	26	<1.0	52	5.1	<1.0	.4	.2	3.5	6	440	8.7	30
W2341A	25	<1.0	42	4.4	<1.0	.2	.3	2.7	2	400	8.9	30
W2342A	24	1.1	88	6.6	<1.0	.6	.4	3.2	5	560	8.6	27
W2343A	4	<1.0	42	4.1	<1.0	1.4	.4	5.0	10	570	7.6	27
W2344A	2	<1.0	42	4.7	<1.0	1.4	.3	6.0	11	900	7.5	26
W2345A	5	1.1	44	4.2	<1.0	1.1	.3	4.7	6	500	7.8	26
W2346A	11	<1.0	50	5.5	<1.0	.3	.6	3.2	7	440	8.0	29
W2347A	8	1.0	48	4.5	<1.0	.4	.6	3.5	5	400	7.9	29
W2348A	4	<1.0	50	4.4	<1.0	1.0	.4	4.1	6	480	7.7	28
W2349A	6	<1.0	47	4.2	<1.0	.7	.4	4.1	6	440	7.8	29
W2350A	12	<1.0	47	6.1	1.3	.6	.4	3.3	4	420	8.0	31
W2351A	3	<1.0	32	2.1	<1.0	1.3	.2	2.5	7	1,040	7.6	27

TABLE 2.-- ANALYTICAL RESULTS FOR WELL WATER SAMPLES FROM THE LOWER SANTA CRUZ BASIN--Continued

Sample	CHAR BAL
W2315A	3.1
W2316A	4.5
W2317A	3.4
W2318A	1.1
W2319A	2.0
W2320A	6.6
W2321A	-1.5
W2322A	1.4
W2323A	5.2
W2324A	4.9
W2325A	5.7
W2326A	1.5
W2327A	2.7
W2328A	-.7
W2329A	.1
W2330A	3.5
W2331A	3.5
W2332A	4.1
W2333A	.6
W2334A	-.7
W2335A	4.8
W2336A	6.9
W2337A	1.9
W2338A	.9
W2339A	.1
W2340A	2.1
W2341A	.5
W2342A	2.4
W2343A	6.0
W2344A	9.0
W2345A	2.1
W2346A	5.3
W2347A	5.5
W2348A	5.1
W2349A	4.9
W2350A	5.3
W2351A	3.6