TEP did not re-evaluate w/ this data. See 11-16-99 RAP mtg notes.

Superfund Site Prioritization
Site Fact Sheet Summary

1259860 - R8 SDMS

Site Name: **Upper Animas Mining District**

State: **CO**

Current Status: **post-ESI**

Data Source Codes:

Date: 8/4/99

Site Visit Date: SI 8/6 to 10/2/96
ESI 8/11 to 9/16/97

Individual completing form: P. Smith

Technical Factors:

A: Toxicity/Concentration of Contaminants

Upper Animas, ESI data

Contaminant	Source	Media	SI Concentration	Toxicity
Aluminum		surface water	up to 5055 ug/l	
Beryllium		surface water sediment	up to 9 ug/l up to 3.2 mg/kg	
Cadmium		surface water sediment ground water town soil	up to 21.5 ug/l up to 11.2 mg/kg up to 29 ug/l up to 3.7 mg/kg	
Copper	mining town soil	surface water sediment ~~ground water~~	up to 244 ug/l up to 472 mg/kg up to 264 ug/l	
Lead		surface water sediment ground water town soil	up to 302 ug/l up to 3020 mg/kg up to 4.4 ug/l up to 1840 mg/kg	
Manganese		surface water sediment ground water town soil	up to 11,120 ug/l up to 22,800 mg/kg up to 44,800 ug/l up to 3580 mg/kg	
Zinc		surface water sediment town soil	up to 4,809 ug/l up to 1,830 mg/kg up to 939 mg/kg	
Chromium		town soil	up to 102 mg/kg	
Mercury		town soil	up to 0.51 mg/kg	
Silver		town soil	up to 7.3 mg/kg	
PAH's		town soil	up to about 10 mg/kg total	

see attached tables for source concentrations

3. Mobility of contaminants by media, both known and potential:

Releases to ground water and surface water observed. Residential soil and tailings tested. Biggest hits in town soil look like they could be related to the railroad, ineligible (if seen as release from rolling stock).

4. Concentration of waste in source:

see attached tables

5. Have there been historical releases?

yes.

C. Human Population Exposed

1. Distance from contamination to nearest population:

None: **one soil sample in town w. 1820 mg/kg lead**
organics and TICs are likely ineligible under CERCLA

2. Describe any physical or institutional controls which prevent contaminant from contact with receptor:

Tested drinking water sources are reported to be no longer in use or have no exceedances.

3. How many people are actually exposed under current conditions?

One residential soil sample with no residences.

4. How many people are potentially exposed under current conditions?

None

5. How many people are currently exposed at a concentration above a safe level?

None

6. Are drinking water supplies impacted, expected to be impacted, or potentially impacted?

Tested water resources indicate lead, cadmium, and manganese, but the resource is not in routine use.

7. Is solid contamination in residential areas or near schools?

Non-resident soil tested in town had elevated cadmium, chromium, lead, manganese, mercury, zinc, PAHs, and TICs. Many of these could be related to the railroad nearby.

8. By what pathway does exposure occur or potentially occur:

Town soils not tested, but red flags not noted in sample SL-1.

D. Environmental Impacts

1. Describe the sensitive environment or other significant environment threatened, and any designation given this environment by the Federal government or others.

Fishery observed.

2. Name of Federally Designated Endangered species:

Northern Goshawk and Boreal toad possible, but not observed.

3. Who determined that an endangered species, sensitive environment or other significant environment is or will be at risk because of the contamination? What were their recommendations?

USF&W records indicate a possibility. No observations.

4. Are Wetlands impacted?

Not specified, but possible.

5. Are there impacts on high quality fishing waters?

6. Are there impacts on recreation?

none reported

7. Are Gold Book Standards (or other standards) exceeded?

Management Decision Factors

A. State Concerns and Priorities

1. What priority does the State place on this site relative to its other Superfund sites?

There is a very active watershed effort which includes 319 grants.

B. Public/Congressional Concerns

1. Describe public and media level of awareness of site:

local stakeholder group very active in TMDL process.

2. What is the general view of the public concerning the human health and environmental risks posed by the site?

Awareness of fishery concerns.

3. Have Congressional concerns been stated?

not ~~too~~ loudly.

FIGURE 1 Upper Animas Watershed Study Area (USGS Quadrangle excerpt)

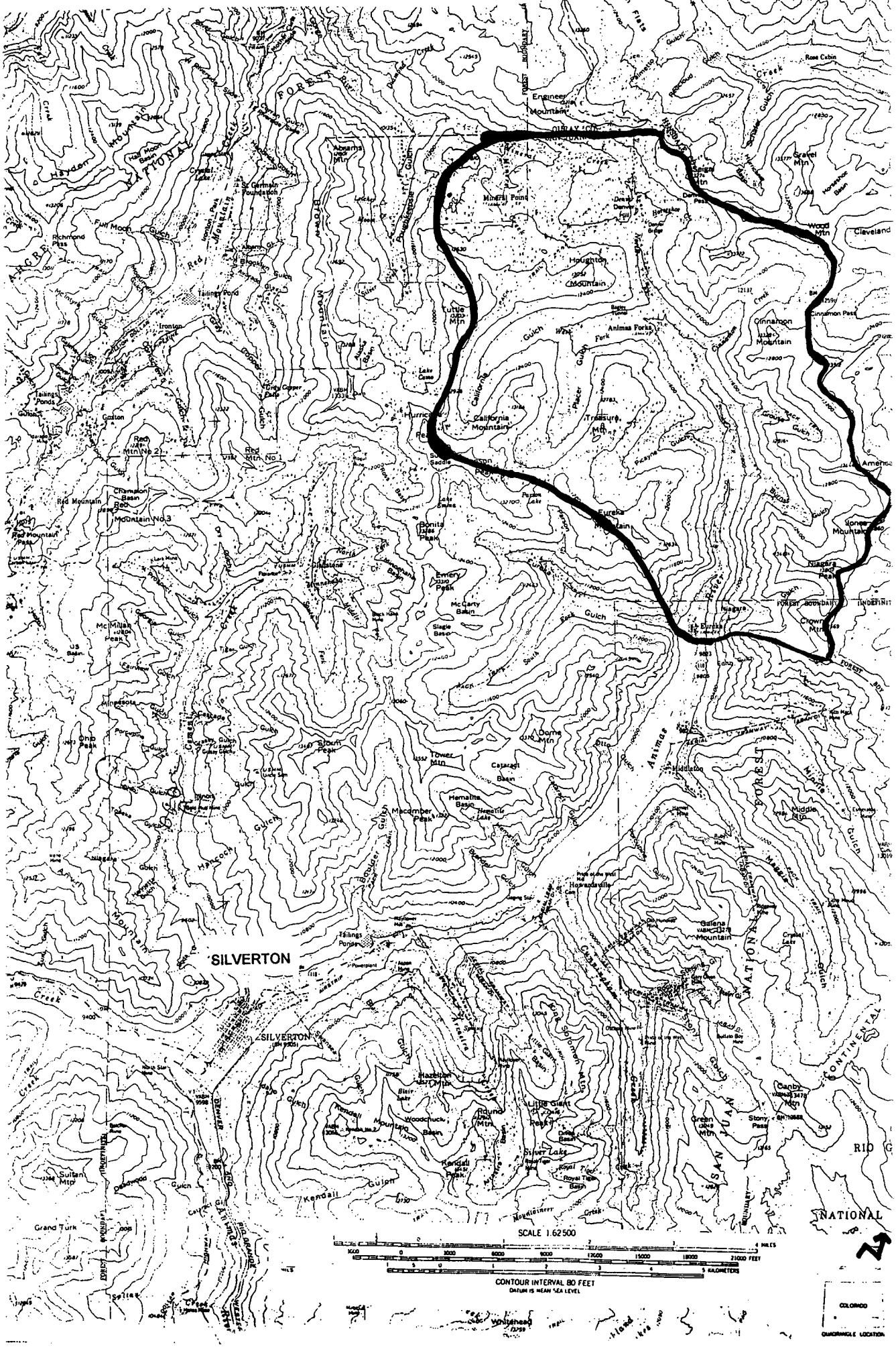


FIGURE 1 **Upper Animas Watershed Study Area (USGS Quadrangle excerpt)**

FIGURE 2 Mine Waste Sampling Locations Sources

Note: "SO-" precedes each enumerated site

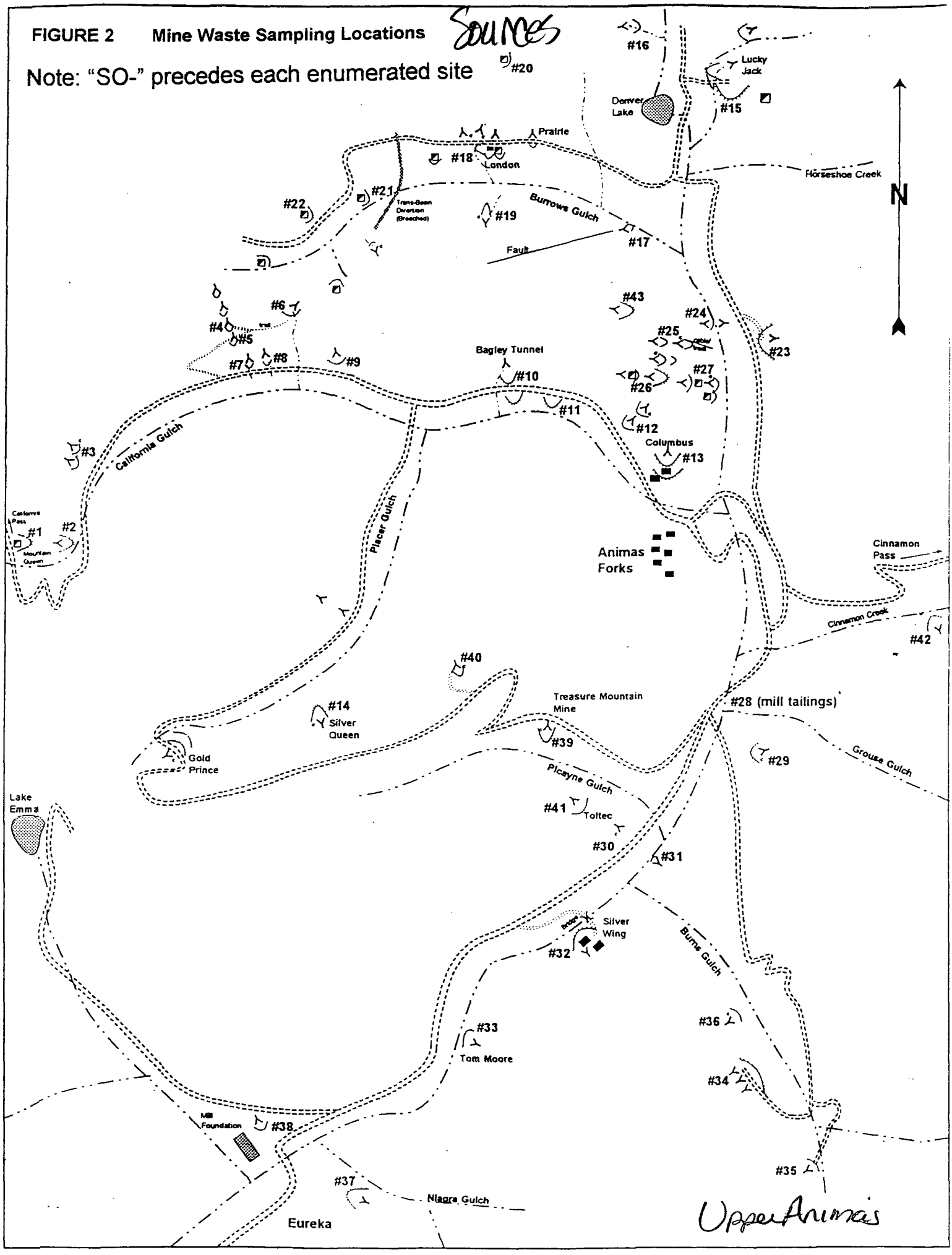


TABLE 1

UPPER ANIMAS SOLID SOURCE SAMPLES
TOTAL METALS ~~PLUS CYANIDE~~
Concentrations in milligrams per kilogram (mg/kg)

Location	SO-01	SO-02	SO-03	SO-04	SO-06	SO-07	SO-08	SO-09	SO-10	SO-11	SO-12
Analyte	Upper Mountian Queen Mine Waste Pile Upper Animas	Lower Mtn Queen Mine Waste Pile Upper Animas	Mine Waste Pile Below CG-2 California Gulch	Unknown Mine Waste Pile California Gulch	Unknown Mine Waste Pile California Gulch	Unknown Mine Waste Pile California Gulch	Unknown Mine Waste Pile California Gulch	Unknown Mine Waste Pile California Gulch	Bagley Tunnel Mine Waste Pile California Gulch	Mine Waste Pile Below Bagley California Gulch	Mine Waste Pile Above Columbus Mine California Gulch
Aluminum	6010	1270	12000	3230	2350	5430	2230	1960	740	2340	5790
Antimony	221	29	24.5	35.2	2.7 B	12.1 B	11.4 B	5.5 B	8.8 B	17.8	2.8 B
Arsenic	255	30.5	108	193	40.1	136	139	58	75.2	90.9	82.1
Barium	716	69.8	79.2	27 B	9.3 B	160	25.5 B	26.7 B	5.6 B	301	267
Beryllium	1 U	0.25 B	3.2	0.58 B	0.24 B	8 B	0.21 U	0.21 U	0.2 U	0.28 B	0.46 B
Cadmium	29.8	1.8	150	37	2.1	28.5	41.9	0.76 B	8.8	0.26 U	6
Calcium	295 B	203	8860	221 B	237 B	5810	2140	182 B	191 B	299 B	390 B
Chromium	4.5	0.42 B	18	1.8 B	0.33 B	2 B	1 B	0.51 B	0.2 U	0.7 B	1.1 B
Cobalt	2.3 B	0.64 B	3.6 B	3 B	0.42 U	5.5 B	0.43 B	0.42 U	0.41 U	0.52 U	0.54 B
Copper	687	148	2080	740	136	523	476	56.3	248	928	421
Iron	56200	9660	48100	29400	6180	27700	22600	8470	14600	31600	16300
Lead	27500	2140	11100	23000	2940	28100	25000	2460	13800	18400	5060
Magnesium	181 B	84.3 B	1590	161 B	119 B	3790	719 B	108 B	76.2 B	116 B	402 B
Manganese	58.5	23.4	66500	76.4	40.3	3850	296	15	54.6	31.3	170
Mercury	0.56 J	1.3 J	2.2 J	0.1 UR	1.8 J	0.11 U	0.1 U	0.62 J	2.1 J	1.2 J	0.77 J
Nickel	1.9 B	0.21 B	1.9 B	2.2 B	0.21 U	2.3 B	0.21 B	0.21 U	0.2 U	0.26 U	0.55 B
Potassium	2730	850 B	4230	2050	1960	1900	1680	1750	927 B	1610	2220
Selenium	28	3.5	24.5	2.3	1.4	2.3	1.8	1.3	1 U	1.3 U	1.1 U
Silver	83	71.7	62.2	62.2	22.5	27.4	27.2	29.3	29.5	54.2	19.1
Sodium	116 B	75.8 B	138	105 B	104 B	108 B	161 B	116 B	86.5 B	102 B	168 B
Thallium	1.3 U	1.3 U	1.4 UJ	1.6 B	2.2	41.7	3.7	1.3 U	1.2 UJ	1.5 U	2.8
Vanadium	5.1 B	0.21 U	10.3 B	4.9 B	0.21 U	8.6 B	6.1 B	0.88 B	0.2 U	0.26 U	11.3
Zinc	3950	660	20900	9290	489	6410	8780	242	2830	561	1270

TABLE 1

UPPER ANIMAS SOLID SOURCE SAMPLES
TOTAL METALS ~~PLUS CYANIDE~~
Concentrations in milligrams per kilogram (mg/kg)

Location	SO-13	SO-14	SO-15	SO-16	SO-17	SO-18	SO-19	SO-20	SO-21	SO-22	SO-24
Analyte	Columbus Mine Waste Pile California Gulch	Silver Queen Mine Waste Pile Placer Gulch	Lucky Jack Mine Waste Pile Upper Animas	Unknown Mine Waste Pile N. of Denver Lake	Unknown Mine Waste Pile Burrows Gulch	London Mine Waste Pile Burrows Gulch	Mine Waste Pile S. of London Mine Burrows Gulch	Mine Waste Pile N. of Prairie Mine Burrows Gulch	Mine Waste Pile N. of Diversion Burrows Gulch	Mine Waste Pile N. side of Burrows Gulch	Mine Waste Pile N. of Cable Tram Upper Animas
Aluminum	6550	2070	1190	2220	2480	1830	3580	4080	2140	919	3010
Antimony	1.1 B	187	109	4 B	12.1 B	24.3	7.9 B	41.9	8.8 B	331	7.3 B
Arsenic	73.3	183	93	57.1	57.5	77.4	50.1	313	98.2	118	167
Barium	289	285	76.2	151	100	26.6 B	34.1 B	36.4 B	65.5	165	65.1
Beryllium	1 B	0.33 B	0.21 U	0.29 B	0.38 B	0.25 B	0.45 B	0.29 B	0.22 B	0.29 B	0.31 B
Cadmium	4.3	19.7	26.3	0.22 U	25.3	10.1	0.85 B	29.2	0.69 B	308	0.22 U
Calcium	420 B	616 B	284 B	252 B	336 B	211 B	316 B	250 B	204 B	169 B	490 B
Chromium	1.1 B	0.81 B	0.63 B	1.6 B	0.21 U	0.21 U	3.5	0.42 B	0.37 B	0.58 B	0.7 B
Cobalt	0.56 B	0.49 B	0.43 U	0.44 U	0.42 U	0.43 U	0.43 U	6.2 B	0.41 U	0.45 B	0.61 B
Copper	282	1360	241	13.7	29.7	167	153	189	23.7	741	272
Iron	16300	57300	5760	8800	4340	9030	14400	49800	12200	10900	35500
Lead	4030	16500	5930	759	1290	3970	3750	8520	2740	42000	4040
Magnesium	257 B	255 B	75.9 B	114 B	129 B	111 B	185 B	144 B	155 B	49.8 B	1090
Manganese	38.7	635	11	12	12.7	11.7	12.3	23.6	22.2	80	363
Mercury	0.88 J	3.8 J	1.6 J	0.56 J	1 J	0.11 U	0.61	0.21 J	0.5 J	0.8 J	1.5 J
Nickel	0.75 B	0.37 B	2.1 U	0.22 U	0.21 U	0.21 U	0.23 J	3.1 B	0.21 U	0.35 B	0.5 B
Potassium	2570	1640	1170	2770	1650	1790	2810	5050	2420	1390	2680
Selenium	1.1 U	6.4	1.6	1.1 U	1 U	1.1 U	5.4	1.1 U	1 U	1.2	1.1 U
Silver	17.5	66.5	27.1	7.5	29.9	59.4	77.4	48.1	16	51.6	38.9
Sodium	125 B	107 B	127 B	95 B	85.7 B	88.5 B	118 B	119 B	113 B	72.2 B	103 B
Thallium	1.3 U	8.8	5.2	4	1.2 U	2.1 B	1.3 U	9.8	1.2 U	1.2 U	4.7
Vanadium	2.4 B	0.22 U	2 B	2 B	0.21 U	0.46 B	0.21 U	0.22 U	0.21 U	0.2 U	0.22 U
Zinc	986	5650	4670	82.6	2280	2320	165	5650	240	53300	184

TABLE 1

UPPER ANIMAS SOLID SOURCE SAMPLES
TOTAL METALS
Concentrations in milligrams per kilogram (mg/kg)

Location	SO-25	SO-26	SO-27	SO-28	SO-29	SO-30	SO-31	SO-32	SO-33	SO-34
Analyte	Mine Waste Pile North of Cable Tram	Mine Waste Pile Southwest of Cable Tram	Mine Waste Pile Southeast of Cable Tram	Mill Tailings North of Grouse Gulch	Mine Waste Pile South of Grouse Gulch	Toltec Mine Waste Pile Upper Animas	Mine Waste Pile East of Toltec Mine	Silver Wing Mine Waste Pile Upper Animas	Tom Moore Mine Waste Pile Upper Animas	Mine Waste Pile N. side of Burrows Gulch
Aluminum	5630	3580	7860	1560	9910	5380	2060	1270	2780	2070
Antimony	6.3 B	9.7 B	2.5 B	30.1	1.6 B	1.2 B	4.7 B	214	9.6 B	23
Arsenic	127	113	94.4	43.4	295	98.6	87.5	712	194	143
Barium	78.6	117	510	563	25.7 B	26.6 B	26.9 B	25.1 B	22.5 B	135
Beryllium	0.32 B	0.5 B	1 B	1.1 B	0.29 B	0.53 B	0.34 B	0.24 B	0.48 B	0.51 B
Cadmium	13.6	6.4	0.22 U	14.6	0.21 U	0.67 B	0.21 U	25.6	4.5	52.8
Calcium	1070 B	432 B	481 B	1390	1920	964 B	235 B	216 B	616 B	187 B
Chromium	3.1	1.5 B	2.9	16.1	3.2	6	0.63 B	2.7	2.8	1 B
Cobalt	2.2 B	0.44 U	0.45 U	2.8 B	4.4 B	10.4	0.42 U	0.69 B	0.53 B	0.41 U
Copper	647	303	86.6	1820	52.9	68.2	32.8	5760	60.3	216
Iron	38200	10300	6970	18500	35200	20800	10200	30000	185200	19500
Lead	9970	6000	1920	12800	1310	438	2580	7960	4650	100000
Magnesium	2090	231 B	176 B	17.7 U	6860	2840	225 B	138 B	420 B	151 B
Manganese	832	28.1	21.5	50400	1510	1510	43.3	50.6	410	91.9
Mercury	1.6 J	2.1 J	0.38 J	3.3 J	0.22 J	1.7 J	0.1 R	0.11 R	0.28 J	0.21 J
Nickel	1.7 B	0.53 B	0.33 B	2 B	2.1 B	2.3 B	0.21 U	1.6 B	0.63 B	0.24 B
Potassium	2840	1540	2210	1140 B	3300	2050	2520	1820	2460	2460
Selenium	1.1 U	1.5	1.1 U	18.3	1 U	1 U	1.4	4.3	1.9	2.5
Silver	46.8	49.8	16.4	109	4.2	2.6	10.2	48	19.7	48.7
Sodium	133 B	88 B	111 B	103 B	132 B	88.7 B	96.6 B	113 B	124 B	107 B
Thallium	7.8	1.3 U	1.3 U	1.6 U	1.2 U	1.2 U	1.3 U	2.8	3.3	4.7
Vanadium	9.4 B	0.22 U	0.22 U	0.26 U	25.3	8.1 B	0.21 U	0.21 U	1.7 B	0.98 B
Zinc	3160	1210	126	3040	162	330	93.4	4980	1230	1850

TABLE 1

UPPER ANIMAS SOLID SOURCE SAMPLES
TOTAL METALS
Concentration in milligrams per kilogram (mg/kg)

Location	SO-36	SO-37	SO-38	SO-39	SO-40	SO-41	SO-43
Analyte	Lower Mine Waste Rock Pile Burns Gulch	Mine Waste Pile in Niagara Gulch	Mine Waste Pile in Lower Eureka Gulch	Treasure Mountain Mine Waste Pile Picayune Gulch	Mine Waste Pile W. of Treasure Mtn Picayune Gulch	Mine Waste Pile West of Toltec Mine	Mine Waste Pile Northwest of Cable Tram
Aluminum	1800	8140	703	4770	1680	1400	4710
Antimony	250	1.7 B	1.8 B	6.2 B	1.1 U	5.5 B	25
Arsenic	324	40.4	10.2	125	79.2	28.3	361
Barium	83.1	75.9	60.3	80.5	27.4 B	16.1 B	44.1
Beryllium	0.23 B	0.56 B	0.2 B	1.3	0.45 B	0.3 B	0.72 B
Cadmium	5.6	5.1	0.66 B	23.6	0.22 U	0.22 U	3
Calcium	206 B	26300	244 B	36200	458 B	222 B	230 B
Chromium	0.39 B	1.3 B	0.21 B	5.8	0.79 B	0.51 B	2.2
Cobalt	0.44 U	1.2 B	12.2	8.6 B	0.43 U	0.44 U	1.5 B
Copper	368	395	208	168	12.7	10.2	448
Iron	11500	29000	119000	24000	13000	3350	47200
Lead	3170	2490	1940	2450	84.7	45.6	7950
Magnesium	155 B	962 B	85.1 B	2570	162 B	94 B	2310
Manganese	6.3	631	97.5	14300	268	7.9	301
Mercury	1.2 J	0.95 J	0.11 R	0.1 U	0.1 R	0.34 J	0.86 J
Nickel	0.22 U	0.38 B	3.8 B	5.5 B	0.7 B	0.22 U	1.4 B
Potassium	1640	3450	1020 B	1970	2320	1740	2070
Selenium	2.4	1 U	1.1	4.2	1.1 U	1.1 U	1 U
Silver	53.7	8.6	40.9	15.5	3.2	8	40.2
Sodium	108 B	352 B	83.7 B	124 B	96.4 B	75.8 B	98.8 B
Thallium	1.3 U	1.3 U	1.2 U	1.3 U	1.3 U	1.3 U	1.2 U
Vanadium	2.1 B	10.4 B	0.2 U	10.4 B	3.3 B	0.41 B	0.2 U
Zinc	1330	1290	564	5030	21.3	7.7	1330

FIGURE 3 Water Quality Sampling Locations

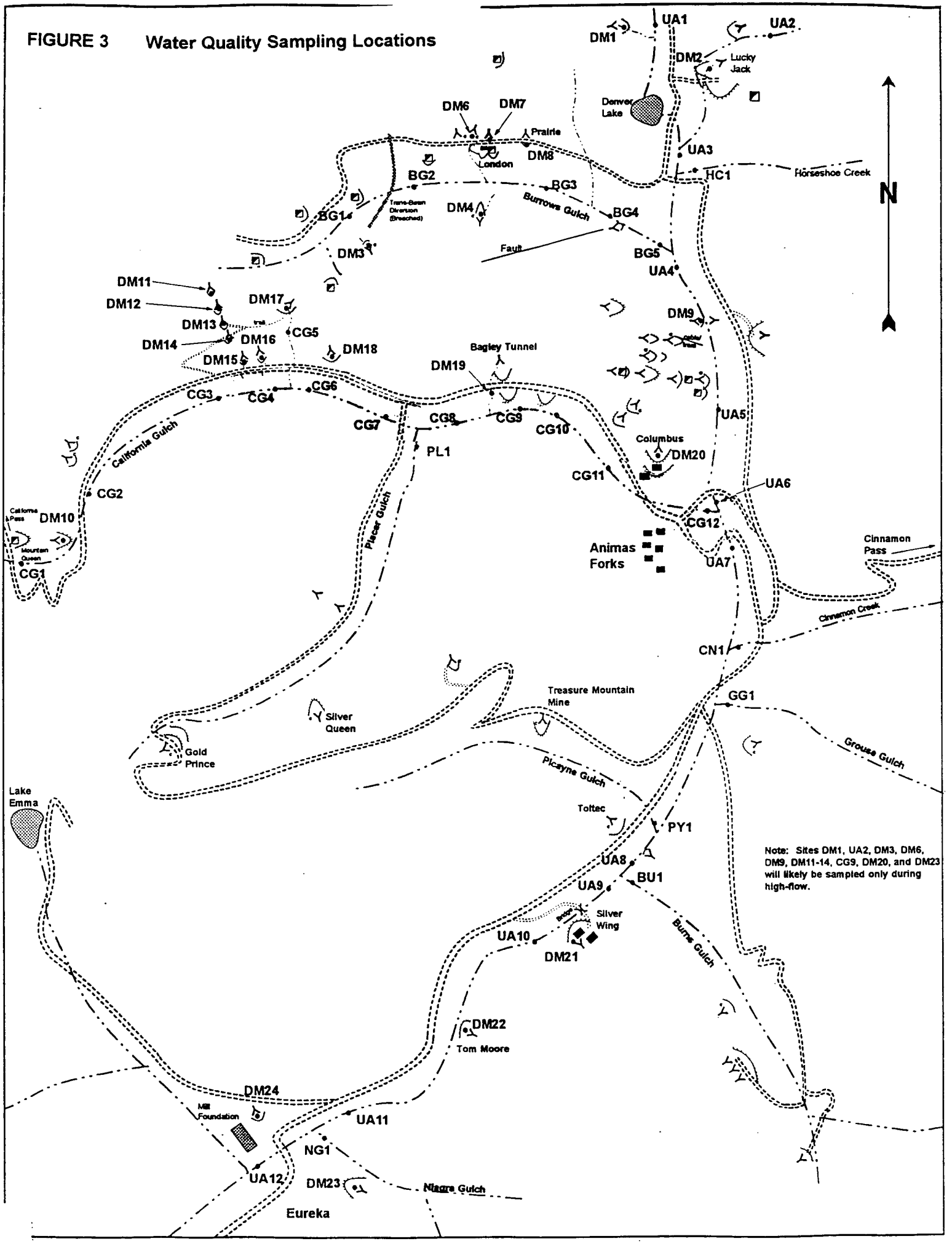


TABLE 4

UPPER ANIMAS SURFACE WATER SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

Location	UA-SW-1	UA-SW-2	UA-SW-3	UA-SW-4	UA-SW-5	UA-SW-6	UA-SW-7	UA-SW-8	UA-SW-9	UA-SW-10	UA-SW-11	UA-SW-12
Analyte	BACKGROUND Upper Animas Above Denver Lake	BACKGROUND Upper Animas Below Lucky Jack	Upper Animas Below Draining Mines DM-1 and DM-2	Animas River Downstream of Burrows Gulch	Animas R. Below DM-9, SO-25-27 & 43	Animas R. Above California G.	Animas R. Below Confluence W/ California G.	Animas R. Above Confluenc With Burns G.	Animas R. Below Confluenc With Burns G.	Animas R. Below Confluenc W/ Silver Wing	Animas R. Above Confluence With Niagara G.	Animas R. Above Confluenc With Eureka G.
Flow (cfs)	0.67	0.29	0.926	2.568	1.957	2.446	5.512	11.18	14.387	14.407	15.115	14.09
pH	7.34	7.6	6.89	5.2	6.01	5.7	5.95	7.42	6.33	7.07	6.86	7.02
Conductivity	79.8	69.7	80	100.2	96.4	73	178	183	153	167	171	184.00
Hardness	35.5	32.2	34	38.4	38.4	39.2	75.8	86.2	77.9	80	83.7	81.70
Aluminum	239	46	U	1899	1323	997	1415	497	414	413	295	319.00
Antimony	U	U	U	U	U	U	U	U	U	U	U	U
Arsenic	4	1.9	U	U	U	U	U	U	U	U	U	U
Barium	13	8	8	13	14	14	15	14	13	13	12	12
Beryllium	U	U	U	1	1	1	2	1	1	1	U	1
Cadmium	U	0.9	0.6	5.6	5	4.5	4.8	2.2	2.2	2.7	2.3	2.2
Chromium	U	U	U	U	U	U	U	U	U	U	U	U
Cobalt	U	U	U	U	U	U	U	U	U	U	U	U
Copper	U	U	U	24	20	16	22	6	11	27	19	21
Iron	628	50	19	44	41	32	158	65	58	71	52	57
Lead	1.2	1.1	U	1.7	9.8	8.5	13	5.9	5.9	4.9	4.9	5
Manganese	80	2	8	999	746	614	3052	1262	986	995	794	790
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	U	U	U	U	U	U	U	U	U	U	U	U
Selenium	U	U	U	U	U	U	U	U	U	U	U	U
Silver	U	U	U	U	U	U	U	U	U	U	U	U
Thallium	U	U	U	U	U	U	U	U	U	U	U	U
Vanadium	U	U	U	U	U	U	U	U	U	U	U	U
Zinc	29	87	81	824	765	765	1198	553	570	589	528	536
Cyanide	NA	NA	NA	8 U	NA	NA	NA	NA	NA	8 U	NA	NA

TABLE 4

UPPER ANIMAS SURFACE WATER SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

Location	HC-SW-1	BG-SW-1	BG-SW-2	BG-SW-3	BG-SW-4	BG-SW-5	PL-SW-1	CN-SW-1	GG-SW-1	PY-SW-1	BU-SW-1
Analyte	Horseshoe Creek Above Confluence w/ Animas River	BACKGROUND Burrows G. Above Mines	Burrows G. Below Breached Trans-basn diversn	Burrows G. Below London Mine	Burrows G. Below Intermittent Trib	Burrows G. Above Confluence w/Animas River	Placer Gulch Above California G.	Cinnamon Creek Above Confluence W/ Animas R.	Grouse Gulch Above Confluence with Animas R.	Picayune G. Above confluence with Animas R.	Burns G. Above Confluence With Animas R.
Flow (cfs)	0.94	0.268	0.23	0.76	0.788	0.579	0.954	1.832	1.309	2.256	3.645
pH	6.9	4.38	4.65	4.63	4.44	4.88	5.45	6.58	6.53	6.59	7.45
Conductivity	7.6	155	128.00	191	158	160	141	141	170	287	127
Hardness	37.2	28.7	29.7	45.3	43.1	44.5	49.2	78.2	95.5	155	NA
Aluminum	U	7005	3378	6509	5651	5360	1143	U	U	U	U
Antimony	U	U	U	U	U	U	U	U	U	U	U
Arsenic	U	U	U	U	U	U	U	U	U	U	U
Barium	6	18	32	24	22	21	20	8	10	33	8
Beryllium	U	1	1	3	2	2	1	U	U	U	U
Cadmium	U	11.6	11.2	20	14.5	14	2.7	U	U	U	3.4
Chromium	U	U	U	U	U	U	U	U	U	U	U
Cobalt	U	U	U	U	U	6	U	U	U	U	U
Copper	U	42	32	72	63	60	30	U	U	U	16
Iron	15	94	148	150	119	108	678	15	17	63	55
Lead	U	16	11.7	6	5.2	5	88.4	U	U	U	3.3
Manganese	1	3047	1969	3283	2919	2821	924	2	2	14	21
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	U	U	U	11	U	U	U	U	U	U	U
Selenium	U	U	U	U	U	U	U	U	U	U	U
Silver	U	0.2	U	U	U	U	0.4	U	U	U	U
Thallium	U	U U	U	U	U	U	U	U	U	U	U
Vanadium	U	U U	U	U	U	U	U	U	U	U	U
Zinc	31	1969	2265	2510	2196	2148.00	893		12	6	544
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8 U

TABLE 4

UPPER ANIMAS SURFACE WATER SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

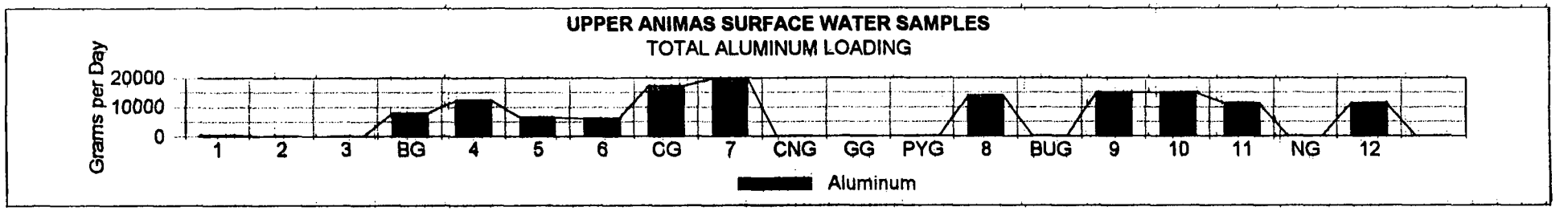
Location	CG-SW-2	CG-SW-3	CG-SW-4	CG-SW-5	CG-SW-6	CG-SW-7	CG-SW-8	CG-SW-9	CG-SW-10	CG-SW-11	CG-SW-12
Analyte	California G. Below Mountain Queen Mine	California G. Above Beginning of White Ppt.	California G. Below Large Group of Draining Mines	Tributary Below DM-17	California G. Below Tributary CG-5	California G. Above Confluence with Placer G.	Califronia G. Below Confluence with Placer G.	Califronia G. Below Bagley T. Mine Drainage	California G. Below Bagley T. Mill Tailings	California G. Below Mines	California G. Above Confluence w/ Animas R.
Flow (cfs)	0.818	1.137	2.099	0.031	2.572	2.524	4.229	5.26	5.145	4.195	4.212
pH	6.61	4.61	6.17	3.69	4.96	6.62	5.64	6.46	6.32	5.6	5.58
Conductivity	273	299	235	643	177	247	197	207	205	211	209
Hardness	151	117	NA	24.1	92.5	107	81.4	91.5	91.6	93.2	NA
Aluminum	1250	5055	4095	2743	4251	4675	2683	1872	1833	1620	1637
Antimony	U	U	U	U	U	U	U	U	U	U	U
Arsenic	U	U	U	U	U	U	U	U	U	U	U
Barium	26	21	16	19	16	17	18	16	17	16	16
Beryllium	3	9	7	1	7	7	4	3	3	3	3
Cadmium	0.9	6.1	4.4	21.5	4.8	5.2	3.9	4.3	4.3	4.9	4.6
Chromium	U	U	U	U	U	U	U	U	U	U	U
Cobalt	U	U	U	U	U	U	U	U	U	U	U
Copper	14	24	19	244	16	18	24	21	21	14	25
Iron	292	262	211	184	296	510	471	317	294	235	229
Lead	1.3	1.4	0.9	302	1.1	8.5	53.3	24.9	20	15.4	15.9
Manganese	1590	11120	8182	1801	8028	7355	4723	4337	4340	4306	4301
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	U	U	U	U	U	U	U	U	U	U	U
Selenium	U	U	U	U	U	U	U	U	U	U	U
Silver	U	U	U	U	U	U	0.2	U	U	U	U
Thallium	U	U	U	U	U	U	U	U	U	U	U
Vanadium	U	U	U	U	U	U	U	U	U	U	U
Zinc	232	1734	1296	4809	1279	1262	1116	1365	1225	1227	1440
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	8 U

TABLE 4

UPPER ANIMAS SURFACE WATER SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

UPPER ANIMAS GAUGING STATIONS				
Location	UA-SW-CC48	UA-SW-M34	UA-SW-A68	UA-SW-A72
Analyte	Cement Creek Above Confluence With Animas River	Mineral Creek Above Confluence With Animas R.	Animas River Above Cement Creek	Animas River Below Confluence With Mineral Creek
Flow (cfs)	18	92	75	234
pH	4.14	7.19	7.63	7.19
Conductivity	595	196.5	173.2	196.5
Hardness				
Aluminum	4320	1360	87.6 B	1000
Antimony	4 U	4 U	4 U	4 U
Arsenic	6 U	6.6 B	6 U	6 U
Barium	21.6 B	24 B	26.4 B	22.6 B
Beryllium	1 U	1 U	1 U	1 U
Cadmium	2 B	1 U	1.4 B	1.2 B
Calcium	138000	431000	42100	50000
Chromium	1 U	1 U	1 U	1 U
Cobalt	12.2 B	3.8 B	2 U	3.2 B
Copper	60.5	52.2	8.4 U	29.5
Iron	6690	2330	287	1720
Lead	25.7	7	3 U	6.6
Magnesium	7420	3630 B	2670 B	3440 B
Manganese	1470	249	981	612
Mercury	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	7.4 RT	1.5 U	1 U	1.2 U
Potassium	1280 B	329	449 B	465 B
Selenium	3 UJ	3 UJ	3 UJ	3 UJ
Silver	1 U	1 U	1 U	1 U
Sodium	3780 B	2090 B	1810 B	2110 B
Thallium	7.4 B	6 U	6 U	6 U
Vanadium	2.1 B	1 U	1 U	1 U
Zinc	646	238	411 RT	336
Cyanide	8 UJ	8 UJ	8 UJ	8 U

TABLE 6a



BG = Burns Gulch
CG = California Gulch
CNG = Cinnamon Gulch
GG = Grouse Gulch
PYG = Picayune Gulch
BUG = Burrows Gulch
NG = Niagara Gulch

TABLE 6b

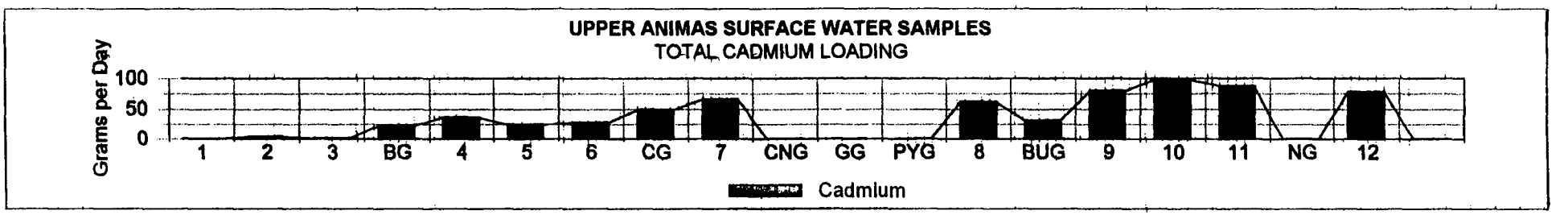

UPPER ANIMAS SURFACE WATER SAMPLES
TOTAL CADMIUM LOADING
Grams per Day
100
50
0
1
2
3
BG
4
5
6
CG
7
CNG
GG
PYG
8
BUG
9
10
11
NG
12
Cadmium

TABLE 6c

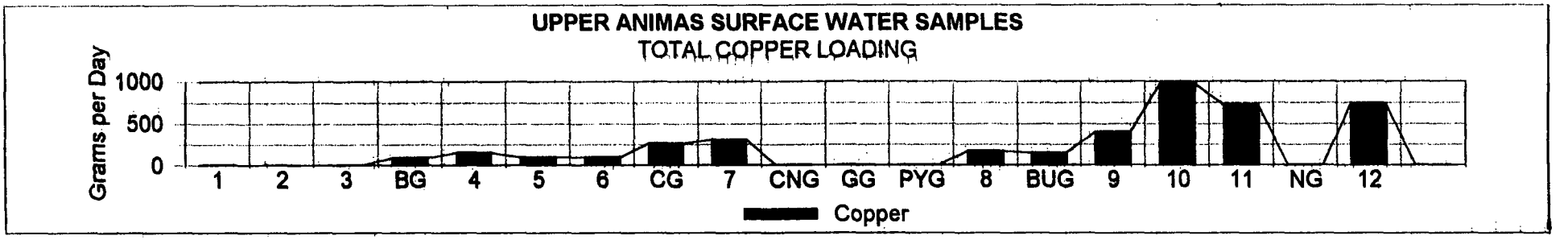

UPPER ANIMAS SURFACE WATER SAMPLES
TOTAL COPPER LOADING
Grams per Day
1000
500
0
1
2
3
BG
4
5
6
CG
7
CNG
GG
PYG
8
BUG
9
10
11
NG
12
Copper

TABLE 6d

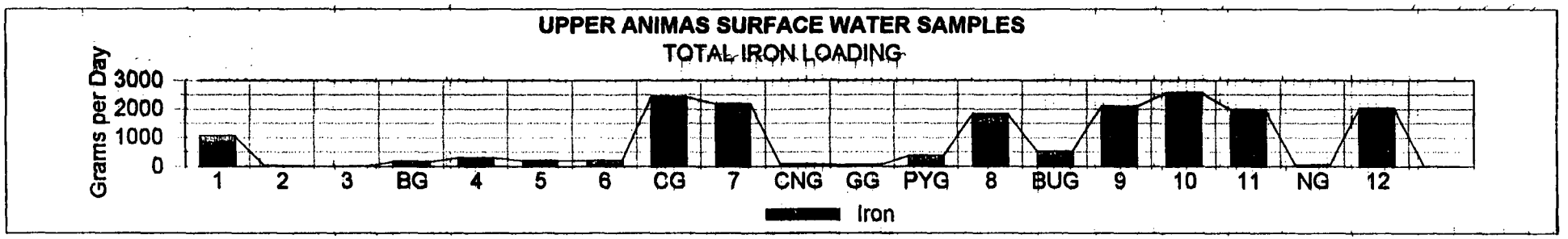

UPPER ANIMAS SURFACE WATER SAMPLES
TOTAL IRON LOADING
Grams per Day
3000
2000
1000
0
1
2
3
BG
4
5
6
CG
7
CNG
GG
PYG
8
BUG
9
10
11
NG
12
Iron

TABLE 6e

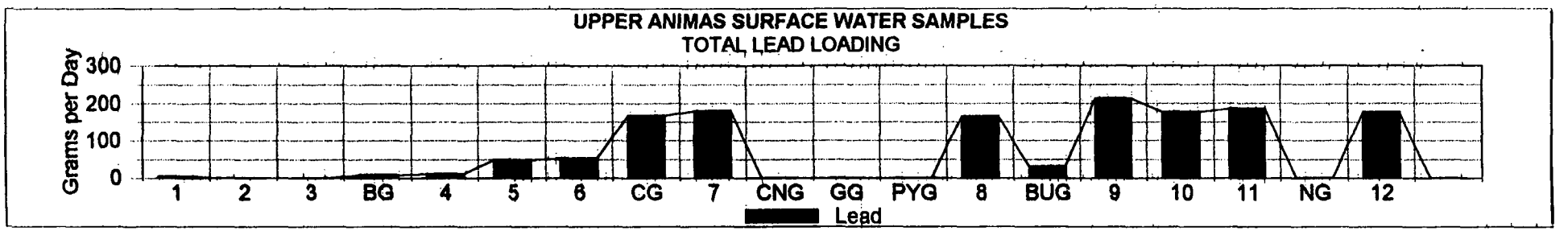

UPPER ANIMAS SURFACE WATER SAMPLES
TOTAL LEAD LOADING
Grams per Day
300
200
100
0
1
2
3
BG
4
5
6
CG
7
CNG
GG
PYG
8
BUG
9
10
11
NG
12
Lead

TABLE 6f

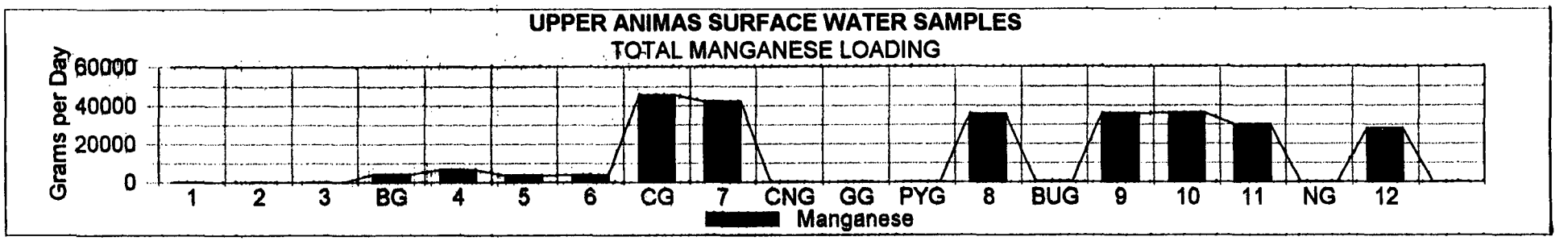

UPPER ANIMAS SURFACE WATER SAMPLES
TOTAL MANGANESE LOADING
Grams per Day
60000
40000
20000
0
1
2
3
BG
4
5
6
CG
7
CNG
GG
PYG
8
BUG
9
10
11
NG
12
Manganese

TABLE 6g

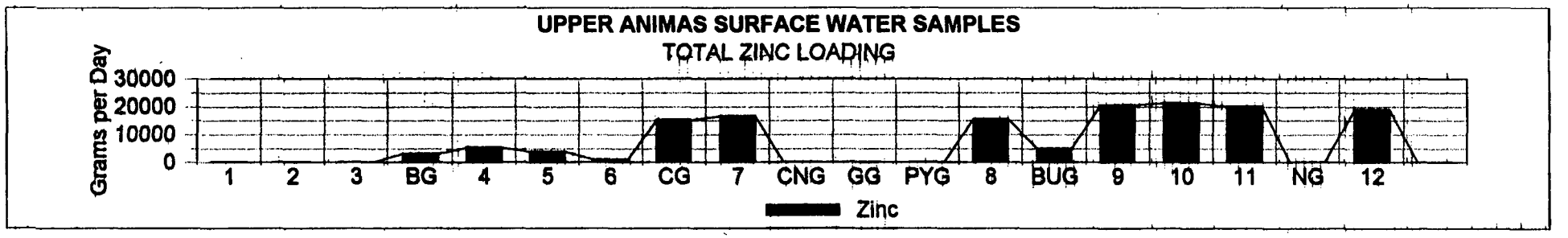
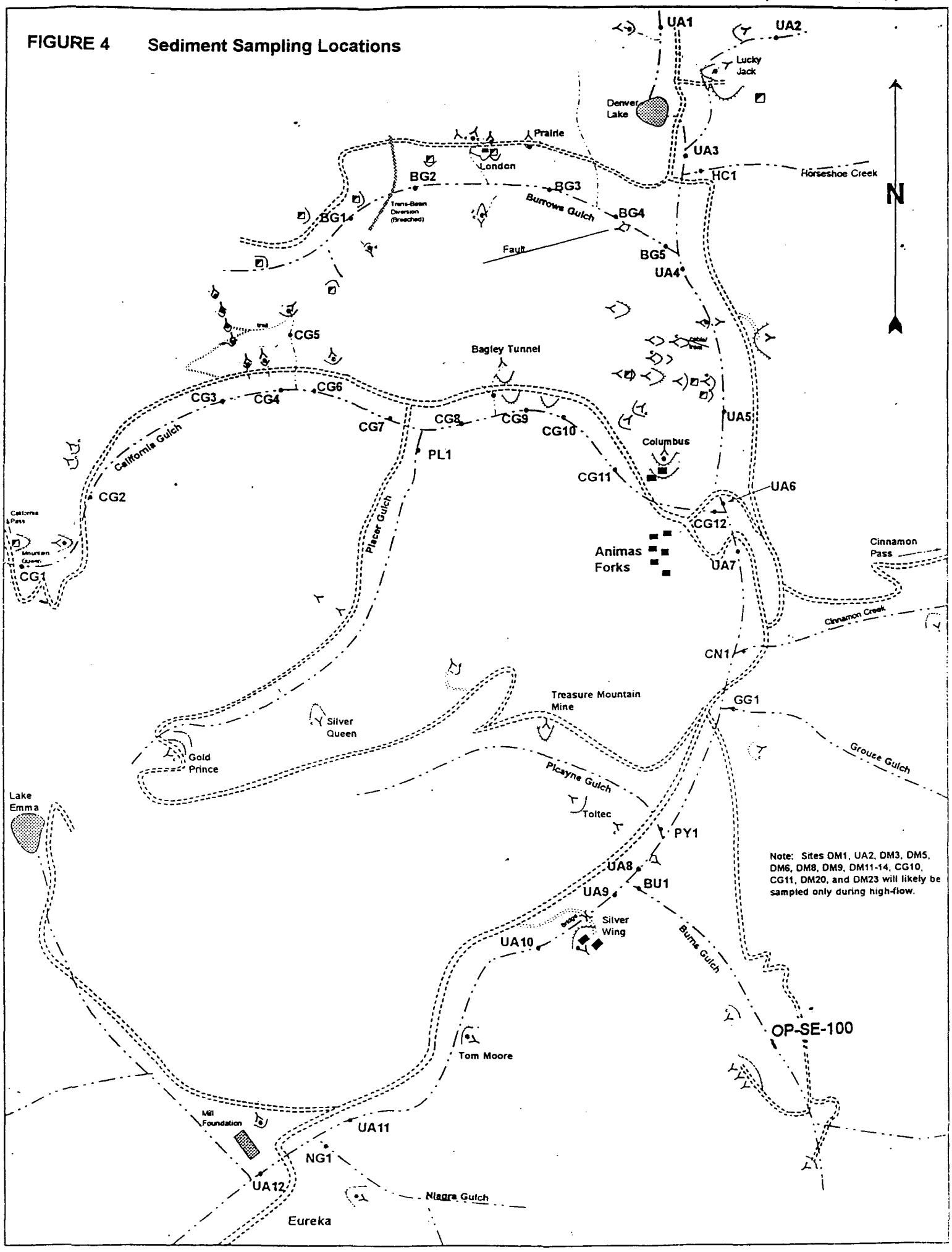

UPPER ANIMAS SURFACE WATER SAMPLES
TOTAL ZINC LOADING
Grams per Day
30000
20000
10000
0
1
2
3
BG
4
5
6
CG
7
CNG
GG
PYG
8
BUG
9
10
11
NG
12
Zinc

FIGURE 4 Sediment Sampling Locations



Note: Sites DM1, UA2, DM3, DM5, DM6, DM8, DM9, DM11-14, CG10, CG11, DM20, and DM23 will likely be sampled only during high-flow.

TABLE 11

UPPER ANIMAS SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)

Location	UA-SE-1	DM-1	UA-SE-2	DM-2	UA-SE-3	HC-SE-1	DM-3	BG-SE-1	SO-21	BG-SE-2	DM 6 & 7
Analyte	BACKGROUND Upper Animas Above Denver Lake	SO-16 Solid and Aq Sources	BACKGROUND Upper Animas Below Lucky Jack	SO-15 Solid and Aq Sources	Upper Animas Beolow Draining Mines DM-1 and DM-2	Horseshoe Cr. Above Confluence W/Animas R.	Aq. Source In Upper Burrows G.	BACKGROUND Burrows Gulch Above Mines	Solid Source Above Diversion Burrows G.	Burrows G. Below Breached Trans-basn diversn	SO-18 Aq. & Solid Sources Burrows G.
Aluminum	7380		5530		6970	6720		6350		9950	
Antimony	1.2 U		1.2 U		1.2 U	1.2 U		3.2 B		1.8 B	
Arsenic	61.5		68.9		58.2	29.2		114		68.9	
Barium	82.6		67.3		60.8	36.4 B		61.3		48.5	
Beryllium	0.65 B		1 B		0.91 B	0.77 B		0.69 B		1 B	
Cadmium	1.4		4.5		5.6	2.4		0.68 B		0.81 B	
Calcium	2740		2160		2250	3260		578 B		762 B	
Chromium	7.2		1.2 B		2.8	2.6		4		2.3 B	
Cobalt	10.4 B		7.9 B		8.1 B	7.4 B		10.7 B		13.1	
Copper	24.1		24.5		26.6	33.1		72.5		62.1	
Iron	28100		18500		21300	14700		32100		31600	
Lead	85.8		109		91.1	100		397		399	
Magnesium	4740		2410		4130	4340		1330		1480	
Manganese	1280		1250		1930	1290		1810		2540	
Mercury	0.12 UJ		0.12 UJ		0.11 UJ	0.13 U		0.12 UJ		0.12 UJ	
Nickel	5 B		2.9 B		3.6 B	7.7 B		1.9 B		2 B	
Potassium	1260		1210 B		1560	1360		2040		1290	
Selenium	1.2 U		1.2 U		1.2 U	1.2 U		1.3 U		1.2 U	
Silver	1.1 B		0.58 B		0.81 B	0.63 B		2.1 B		1.6 B	
Sodium	138 B		113 B		112 B	103 B		108 B		90.2 B	
Thallium	1.4 U		1.5 U		1.4 U	1.4 U		1.5 U		1.5 U	
Vanadium	35.8		22		22.3	13.3		13.4		8.3 B	
Zinc	377		481		603	350		198		351 B	
Cyanide	NA		NA		NA	NA		NA		NA	

TABLE 11

UPPER ANIMAS SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)

Location	DM-4	DM-8	BG-SE-3	BG-SE-4	SO-17	BG-SE-5	UA-SE-4	DM-9	SO-25,26	UA-SE-5	UA-SE-6
Analyte	SO-19 Aq. & Solid Sources London Mine	Aq. Source Prairie Mine Burrows G.	Burrows G. Below London Mine	Burrows G. Below Intermittent Trib	Solid Source Below Fault Burrows G.	Burrows G. Above Confluence w/Animas River	Animas River Dowstream of Burorrows G.	SO-24 Aq. & Solid Sources N. of Cable Tram	SO-27 & 43 Solid Sources Near Cable Tram	Animas R. Below DM-9, SO 25-27&43	Animas R. Above California G.
Aluminum			14600	16500		14500	6480			6620	8950
Antimony			2.4 B	1.1 U		1.1 U	1.3 B			1 U	1.2 U
Arsenic			72.6	49.3		32.5	30.6			39.5	43.6
Barium			77.8	78.9		57.7	28.2 B			34.4 B	60.1
Beryllium			2.7	3		2.3	0.92 B			1.2	1.9
Cadmium			10.6	8.6		6.6	2.7			8.6	
Calcium			696 B	1080 B		963 B	1770			1570	1690
Chromium			6.6	4.4		3.4	4.1			6	308
Cobalt			43.7	25		24.8	6.4 B			11.2	18.4
Copper			269	215		186	54.4			74.8	134
Iron			30900	27400		20400	12100			13100	19300
Lead			627	352		306	86.5			363	527
Magnesium			1540	2350		2430	3490			3750	3990
Manganese			15200	8880		7280	1550			2850	4950
Mercury			0.11 UJ	0.11 U		0.11 UJ	0.11 UJ			0.1 UJ	0.13 UJ
Nickel			6.7 B	6.5 B		5.7 B	4.1 B			5.5 B	6.9 B
Potassium			1260	1630		1180	918 B			825 B	1370
Selenium			4.4	2.2		1.2	1.2 U			1 U	1.2 U
Silver			3.3	2.3		1.9 B	3.3			1 B	2.6
Sodium			106 B	97.1 B		107 B	100 B			89.2 B	108 B
Thallium			1.4 U	1.4 U		1.4 U	1.4 U			1.2 U	2.1 B
Vanadium			8.6 B	10.9 B		8.5 B	11.5 B			18	12.7
Zinc			748	771		578.00	263			877	1080
Cyanide			NA	NA		NA	0.47 UJ			NA	NA

Darken highlighted cells -

TABLE 11

UPPER ANIMAS SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)

Location	SO-1	DM-10	CG-SE-2	SO-3	CG-SE-3	DM11-16	CG-SE-4	DM-17	DM-18	CG-SE-6	CG-SE-7
Analyte	Solid Source Mountain Queen Mine Waste Pile	SO-2 Aq.&Solid Sources Lower Mtn. Queen	California G. Below Mountain Queen Mine	Solid Source Mine Waste Pile Below CG-2	California G. Above Beginning of White Ppt.	SO-4,5,7,8 Aq.&Solid Sources California G.	California G. Below Large Group of Draining Mines	SO-6 Aq.& Solid Sources California G.	SO-9 Aq&Solid Sources California G.	California G. Below Tributary CG-5	California G. Above Confluence with Placer G.
Aluminum			16200		16000		15700			14800	16000
Antimony			1.2 U		1.2 U		1.2 U			1.2 U	1.1 U
Arsenic			23.4		14.3		15.4			25.3	30.1
Barium			79.6		43.5 B		47.9 B			55	59.2
Beryllium			601		3.4		4.5			4.2	5.7
Cadmium			1.2 B		1 B		3.9			2.4	2
Calcium			2030		2390		1960			1520	1710
Chromium			7.1		5.9		4.6			5.8	6.1
Cobalt			15.8		18		15.1			19.8	16.3
Copper			161		176		152			202	187
Iron			43400		33900		30000			30900	35100
Lead			78.6		79.2		164			242	164
Magnesium			8160		7910		6980			6270	7070
Manganese			5460		3090		4080 J			5700 J	6570 J
Mercury			0.12 UJ		0.13 U		0.13 U			0.12 U	0.11 U
Nickel			8.3 B		9.2 B		9.1 B			7.6 B	7.3 B
Potassium			1110 B		857 B		649 B			959 B	858 B
Selenium			1.2 U		1.2 U		1.2 U			1.2 U	1.6
Silver			1.2 B		0.58 B		0.87 B			1.4 B	1.7 B
Sodium			140 B		124 B		134 B			116 B	116 B
Thallium			1.5 U		1.5 U		1.5 U			1.5 U	1.4 U
Vanadium			54.8		37.4		29.9			26.9	27.6
Zinc			423		336		484			467	494
Cyanide			NA		NA		NA			NA	NA

TABLE 11

CEMENT CREEK SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)

Location	PL-SE-1	DM-19	CG-SE-8	SO-11	CG-SE-9	SO-12	CG-SE-10	DM-20	CG-SE-11	CG-SE-12
Analyte	Placer Gulch Above California G.	SO-10 Aq.&Solid Sources Bagley Tunnel	Califronia G. Below Confluence with Placer G.	Solid Source Mine Waste Below Bagley	Califronia G. Below Bagley T. Mine Drainage	Solid Source Mine Waste Above Columbus	California G. Below Bagley T. Mill Tailings	SO-13 Aq.&Solid Sources Columbus Mine	California G. Below Mines	California G. Above Confluence w/ Animas R.
Aluminum	8070		10300		14900		14500		14600	12500
Antimony	3 B		3.4 B		2.4 B		1.3 B		2.5 B	2.4 B
Arsenic	30.3		49.1		45.7		42.4		32	44.6
Barium	448		131		116		118		90	126
Beryllium	3.1		2.5		5		4.6		4.8	5.2
Cadmium	8.9		6		7.9		6.6		4.6	8.6
Calcium	1120 B		1210 B		1510		1870		1800	1550
Chromium	9		7.9		8.8		7.3		8.8	8.6
Cobalt	9.6 B		17.7		27.3		17.5		18.6	27.2
Copper	338		396		472		297		200	334
Iron	20100		24500		31200		31600		32000	28200
Lead	1050		3020		1790		1380		1090	1590
Magnesium	3130		3380		4910		5920		6010	4620
Manganese	31500 J		22800 J		19900 J		11600 J		10700 J	20300 J
Mercury	0.12 U		0.12 U		0.13 U		0.13 U		0.12 U	0.12 U
Nickel	6.5 B		5.4 B		7.5 B		8.9 B		7.5 B	7.5 B
Potassium	544 B		910 B		957 B		895 B		1010 B	1340
Selenium	8.8		6		4.6		2.8		2.8	5.3
Silver	18.9		8.2		6.8		3.8		4.4	6.2
Sodium	85.3 B		101 B		118 B		124 B		106 B	96.3 B
Thallium	1.5 U		1.5 U		1.6 U		1.6 U		1.5 U	1.5 U
Vanadium	11 B		12.8		21.5		24.2		24.6	16.2
Zinc	1150		1040		1400		1020		989	1470
Cyanide	NA		NA		NA		NA		NA	0.57 B

TABLE 11

UPPER ANIMAS SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)

Location	UA-SE-7	CN-SE-1	SO-28	GG-SE-1	SO-29	PY-SE-1	SO-30	SO-31	UA-SE-8	OP-SE-100	BU-SE-1
Analyte	Animas R. Below Confluence W/ California G.	Cinnamon Creek Above Confluence W/ Animas R.	Mill Tailings Above Grouse G.	Grouse Gulch Above Confluence with Animas R.	Mine Waste Pile S. of Grouse G.	Picayune G. Above confluence with Animas R.	Toltec Mine Waste Pile on Animas R.	Mine Waste Across From Toltec Mine	Animas R. Above Confluence With Burns G.	Burns G. Above Mines SO-34 & SO-35	Burns G. Above Confluence With Animas R.
Aluminum	11500	10300		11600		9090			10400	27000	6790
Antimony	1.5 B	1.2 U		1.2 U		1.2 B			1.1 U	2.8 B	32.3
Arsenic	34.5	16.8		46.1		34.2			29.5	113	117
Barium	114	29.7 B		42.8 B		206			112	46.3 B	53.9
Beryllium	3.2	0.77 U		1 B		0.92 B			2.1	5.5	1.5 RT
Cadmium	11.2	0.25 U		0.24 U		0.98 B			4.8	37.6	28.2
Calcium	2530	3230		3070		6570			2740	1140 B	1640
Chromium	6.1	5.3		6.5		5.3			7.2	7.1	4
Cobalt	19.7	9.9 B		12 B		17.8			12.6	13.4	7.8 B
Copper	236	28.7		27.4		38.1			177	1520	2210
Iron	23200	24500		27100		24900			23400	20800	25800
Lead	1050	44.6		33.7		60.3			210	10900	3750
Magnesium	5210	8810		9310		6040			6700	3700	3070
Manganese	8950	1180		1310 J		4740 J			4580	20700	7100 J
Mercury	0.12 U	0.11 U		0.12 U		0.11 U			0.1 UJ	0.11 U	0.11 U
Nickel	7.1 B	5.7 B		6.7 B		9 B			7.7 B	4.6 B	4.3 B
Potassium	1260	937 B		1160 B		870 B			1090 B	1750	1540
Selenium	2.6	1.2 U		1.2 U		1.2 U			1.1 U	6.1	2
Silver	3	0.49 U		0.53 B		3			1.4 B	15.6	14.2
Sodium	114 B	118 B		116 B		103 B			104 B	130	103 B
Thallium	1.5 U	1.5 U		1.5 U		1.6 B			1.3 U	1.4 U	1.5 U
Vanadium	19.4	27.8		30.3		21.1			27.1	21.8	9 B
Zinc	1830	94		126		266			1060	3430	3480
Cyanide	NA	NA		NA		NA			NA	NA	0.49 U

TABLE 11

UPPER ANIMAS SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)

Location	UA-SE-9	DM21	UA-SE-10	DM-22	UA-SE-11	DM-24	NG-SE-1	DM-23	UA-SE-12
Analyte	Animas R. Below Confluence With Burns G.	SO-32 AQ&Solid Sources Silver Wing Mine	Animas R. Below Confluence W/ Silver Wing	SO-33 Aq.& Solid Sources Tom Moore Mine	Animas R. Above Confluence With Niagara G.	SO-38 Aq.& Solid Sources Lower Eureka G.	Niagara G. Above Confluence With Animas R.	SO-37 Aq.& Solid Sources Mine S. of Niagara G.	Animas R. Above Confluence With Eureka G.
Aluminum	12400		8990		9420		3670		7980.00
Antimony	1.5 B		1.2 U		2.3 B		1.1 U		2.1 B
Arsenic	48.2		33.6		43.8		8.9		59.9
Barium	79.9		50.7		81.7		15.4 B		66.2
Beryllium	2.2		1.6		1.9		0.6 B		1.7
Cadmium	10.3		4.2		10.9		0.54 B		8.2
Calcium	3060		2410		2320		1850		2220
Chromium	7.8		5.9		6.2		1.6 B		4.8
Cobalt	15.4		10.8 B		12.4		3.6 B		11.5 B
Copper	225		145		313		35.1		287
Iron	27400		21800		19900		10100		22300
Lead	576		672		585		95.7		1370
Magnesium	7360		6250		5960		2850		5270
Manganese	6400		3610		5850		963 J		4780
Mercury	0.13 UJ		0.12 UJ		0.11 UJ		0.1 U		0.12 UJ
Nickel	9.1 B		6.4 B		8.2 B		1.6 B		6.9 B
Potassium	1880		977 B		1240		366 B		1060 B
Selenium	1.3 U		1.2 U		1.9		1.1 U		1.2 U
Silver	2.2 B		1.1 B		2.3 B		0.62 B		2.2 B
Sodium	128 B		113 B		119 B		97.6 B		108 B
Thallium	1.6 U		1.4 U		1.4 U		1.3 U		1.4 U
Vanadium	31.8		22.6		21.2		6.8 B		20.3
Zinc	1690		804		1650		150		1300
Cyanide	NA		0.44 UJ		NA		NA		NA

TABLE 11

UPPER ANIMAS SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)
Page 7 of 7

	UPPER ANIMAS GAUGING STATIONS			
Location	UA-SE-CC48	UA-SE-M34	UA-SE-A68	UA-SE-A72
Analyte	Cement Creek Above Confluence With Animas River	Mineral Creek Above Confluence With Animas R.	Animas River Above Cement Creek	Animas River Below Confluence With Mineral Creek
Aluminum	8860	12500	7600	9720
Antimony	6.3 B	2.6 B	2.1 B	1.7 B
Arsenic	40	32.1	13.5	31.4
Barium	371	116	154	134
Beryllium	0.79 U	1.5	0.92 B	1.1 U
Cadmium	0.3 U	6.7	4.6	2.9
Calcium	1580	2590	2620	2250
Chromium	3.6	5.8	4.7	4.8
Cobalt	9.5 B	44.5	9.1 B	13.5
Copper	58.7	473	193	206
Iron	41900	40500	21600	39900
Lead	310	510	770	664
Magnesium	3760	2690	5020	4460
Manganese	744 J	4540 J	4090 J	2900
Mercury	0.15 U	0.33	0.11 U	0.13 UJ
Nickel	4.5 B	9.8 B	10.2	5.3 B
Potassium	1890	1780	1310	1550
Selenium	1.5 U	1.3 U	1.2 U	1.3 U
Silver	2.9 U	2.1 U	3 U	3.2
Sodium	173 B	251 B	117 B	166 B
Thallium	1.8 U	1.5 U	1.5 U	1.5 U
Vanadium	24.9	23.3	17.7	27.4
Zinc	176	620	1070	807
Cyanide	0.58 U	0.52 U	0.47 U	0.52 UJ

FIGURE 5 **Ground Water Well, Upper Animas Gauging Station, and Residential Soil Sampling Locations**

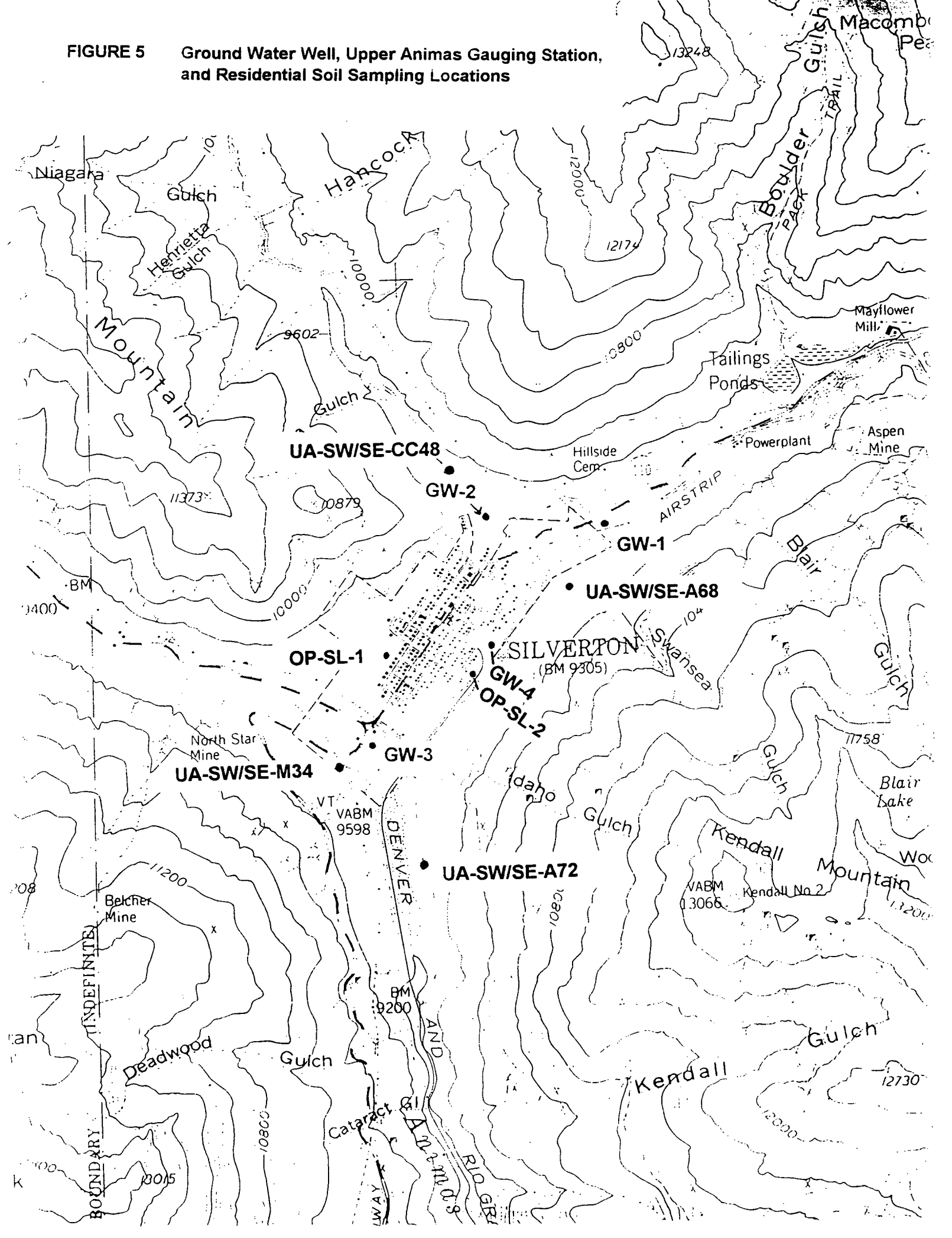


TABLE 13

SILVERTON RESIDENTIAL SOIL SAMPLES
TOTAL METALS AND NUTRIENTS
Concentrations in milligrams per kilogram
Page 1 of 1

Location	OP-SL-1	OP-SL-2
Analyte	Residential Soil North of Reese Street	Residential Soil East of 10th & Bluff
Aluminum	14000	7190
Antimony	1.4 U	4.8 B
Arsenic	13.4	27.9
Barium	264	395
Beryllium	0.87 B	0.8 U
Cadmium	0.39 B	3.7
Calcium	5410	4350
Chromium	8.8	102
Cobalt	5.6 B	11.8 B
Copper	95.8	264
Iron	21700	36100
Lead	205	1840
Magnesium	4100	2610
Manganese	575 J	3580 J
Mercury	0.14 U	0.51
Nickel	8.6 B	8 B
Potassium	2490	2220
Selenium	10.8	1.3
Silver	2.1 U	7.3
Sodium	166 B	147 B
Thallium	1.6 U	1.5 U
Vanadium	22.6	27.1
Zinc	126	939
Cyanide	NA	NA

TABLE 14

UPPER ANIMAS RESIDENTIAL SOIL SAMPLES
ORGANIC COMPOUNDS
Concentrations in Micrograms per Kilogram (ug/kg)

Location	OP-SL-1	OP-SL-2
Analyte	Residential Soil North of 857 Reese Street	Residential Soil at 10th & Bluff
VOLATILE ORGANIC COMPOUNDS		
Toluene	0.9 J	0.4 J
SEMIVOLATILE ORGANIC COMPOUNDS		
Dibenzofuran		110 J
Fluorene		66 J
Anthracene		120 J
Carbazole		140 J
Fluoranthene		1200
Pyrene		1100
Benzo (a) anthracene		680 J
Chrysene		860
Benzo (b) fluoranthene		1400
Benzo (k) fluoranthene		460 J
Benzo (a) pyrene		790 J
Indeno (1,2,3 - cd- pyrene		900
Dibenz (a,h) anthrazene		260 J
Benzo (g,h,i) perylene		850
Napthalene		150 J
2-Methylnaphthalene		180 J
Acenaphthylene		130 J
PESTICIDE OGRANICS		
Heptachlor		2.3 J
Aldrin	0.32 J	1.2 J
Heptachlor epoxide		0.79 J
4,4' DDE	0.38 J	3.1 J
Endrin	0.18 J	4.5 J
4,4'DDT		4.1 J
Methoxychlor	1 J	

TABLE 15

ANIMAS RIVER GROUND WATER WELLS SAMPLES
TOTAL METALS AND NUTRIENTS
Concentrations in micrograms per liter (ug/L)

Location		GW-1	GW-3	GW-4
Analyte		Monitoring Well in Campground Along Animas R.	Monitoring Well Above Confluence With Mineral Cr.	Monitoring Well Near Old Landfill Along Animas R.
Flow (cfs)		NA	NA	NA
pH		6.15	5.88	4.59
Conductivity		1280	141	330
Hardness				
Aluminum		438	127 U	1350
Antimony		4 U	4 U	4 U
Arsenic		6 U	6 U	6 U
Barium		40.7 B	17.3 B	14.9 B
Berylium		1 U	1 U	1 U
Cadmium		29	1 U	4.7 B
Calcium		239000	26200	51000
Chromium		8.1 B	1 U	1 U
Cobalt		2.7 B	2 U	2 U
Copper		28	15.3 B	49.1
Iron		467	144	56.6 U
Lead		4.4	3 U	3 U
Magnesium		14100	2250 B	2870
Manganese		44800	27.5	273
Mercury		0.2 U	0.02 U	0.2 U
Nickel		23.4 B	1.7 U	3.1 U
Potassium		8290	368 B	1650 B
Selenium		20.1 J	3 UJ	3 UJ
Silver		7.4 B	1 U	1 U
Sodium		9820	1610	2200 B
Thallium		13.7	6 U	6 U
Vanadium		1 U	1 U	1 U
Zinc		5330	280	1010
Cyanide		8 U	8 U	8 U

TABLE 16

UPPER ANIMAS GROUND WATER MONITORING SAMPLES
ORGANIC COMPOUNDS
Concentrations in micrograms per kilogram (ug/kg)

Location	GW-1	GW-3	GW-4
Analyte	GW Monitoring Well In Silverton Campground	GW Monitoring Well North of Sewage Treatment Plant	GW Monitoring Well In Old Landfill Location
VOLATILE ORGANIC COMPOUNDS			
Methylene Chloride	0.5 J		1 J
Trichloroethene	0.2 J		
Toluene		0.6 J	

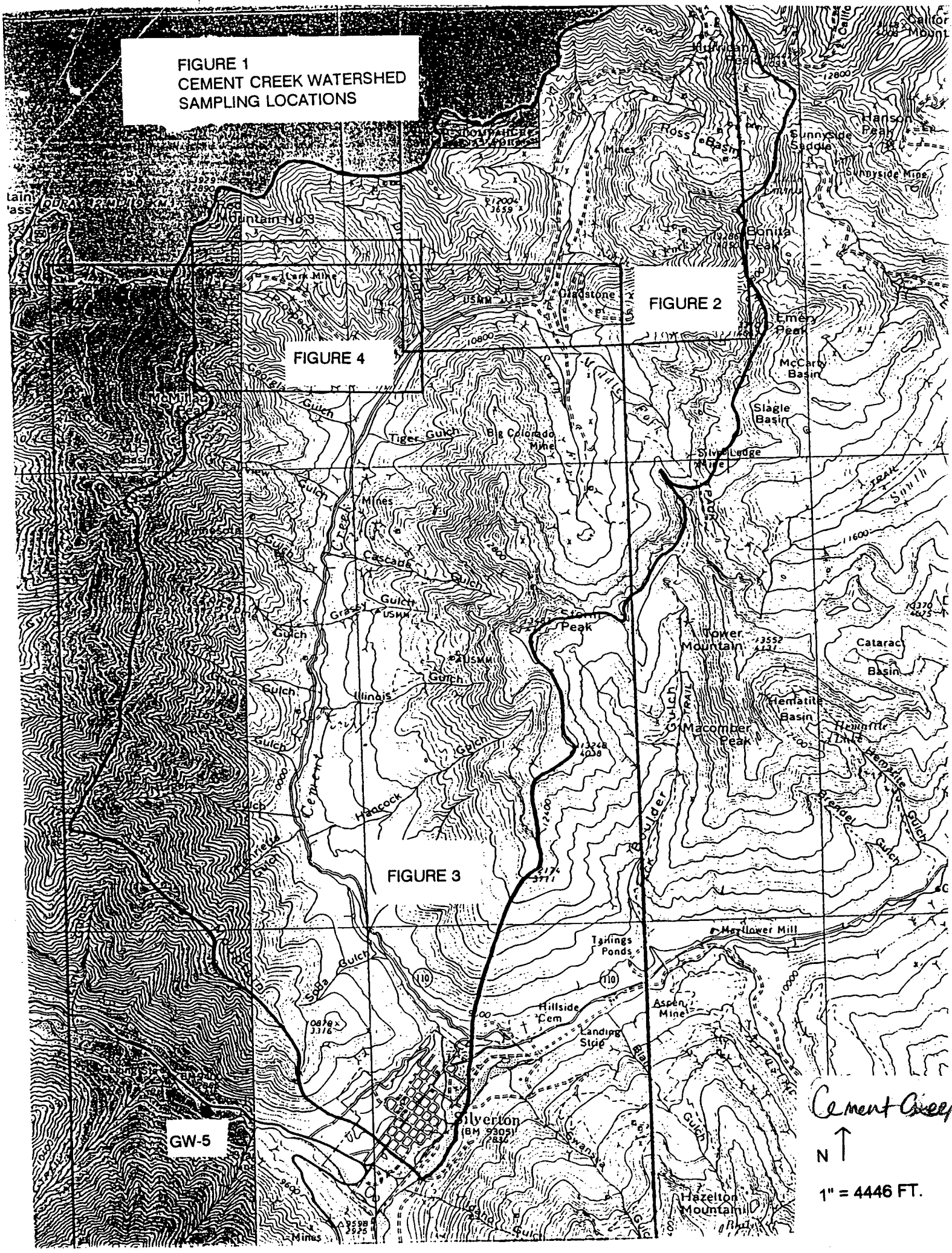


FIGURE 1
CEMENT CREEK WATERSHED
SAMPLING LOCATIONS
FIGURE 2
FIGURE 3
FIGURE 4
GW-5
Ross Basin
Sunnyside Saddle
Hanson Peak
Sunnyside Mine
Bonita Peak
Emery Peak
McCarty Basin
Slagle Basin
Silver Ledge Mine
Big Colorado Mine
Tiger Gulch
Cascade Gulch
Grassy Gulch
Storm Peak
Tower Mountain
Cataract Basin
Hematite Basin
Macomber Peak
Hematite Lake
Hancock
Tailings Ponds
Mayflower Mill
Hillside Cem
Landing Strip
Aspen Mine
Silverton
Hazelton Mountain
Cement Creek
N
1" = 4446 FT.

Cement Creek, SI data

Contaminant	Source	Media	SI Concentration	Toxicity
Aluminum		surface water	up to 62,206 ug/l	
Cadmium		surface water	up to 112 ug/l	
Copper	mining	surface water	up to 6292 ug/l	
Iron		surface water	up to 88,912 ug/l	
Lead		surface water sediment	up to 1,027.4ug/l up to 7,230 mg/kg	
Manganese		surface water	up to 11,208 ug/l	
Nickel		surface water	up to 80.7 ug/l	
Zinc		surface water sediment	up to 28,243 ug/l up to 8,254 mg/kg	
Chromium		surface water	up to 18 ug/l	
Cobalt		surface water sediment	up to 116 ug/l up to 477 mg/kg	
Antimony		sediment	up to 48.8 mg/kg	
Magnesium		sediment	up to 9580 mg/kg	
Vanadium		sediment	up to 43.8 mg/kg	
Arsenic		sediment	up to 600 mg/kg	
Mercury		sediment	up to 0.43 mg/kg	
Silver		sediment	up to 10.6 mg/kg	

see attached tables for source concentrations

B. Site Characteristics

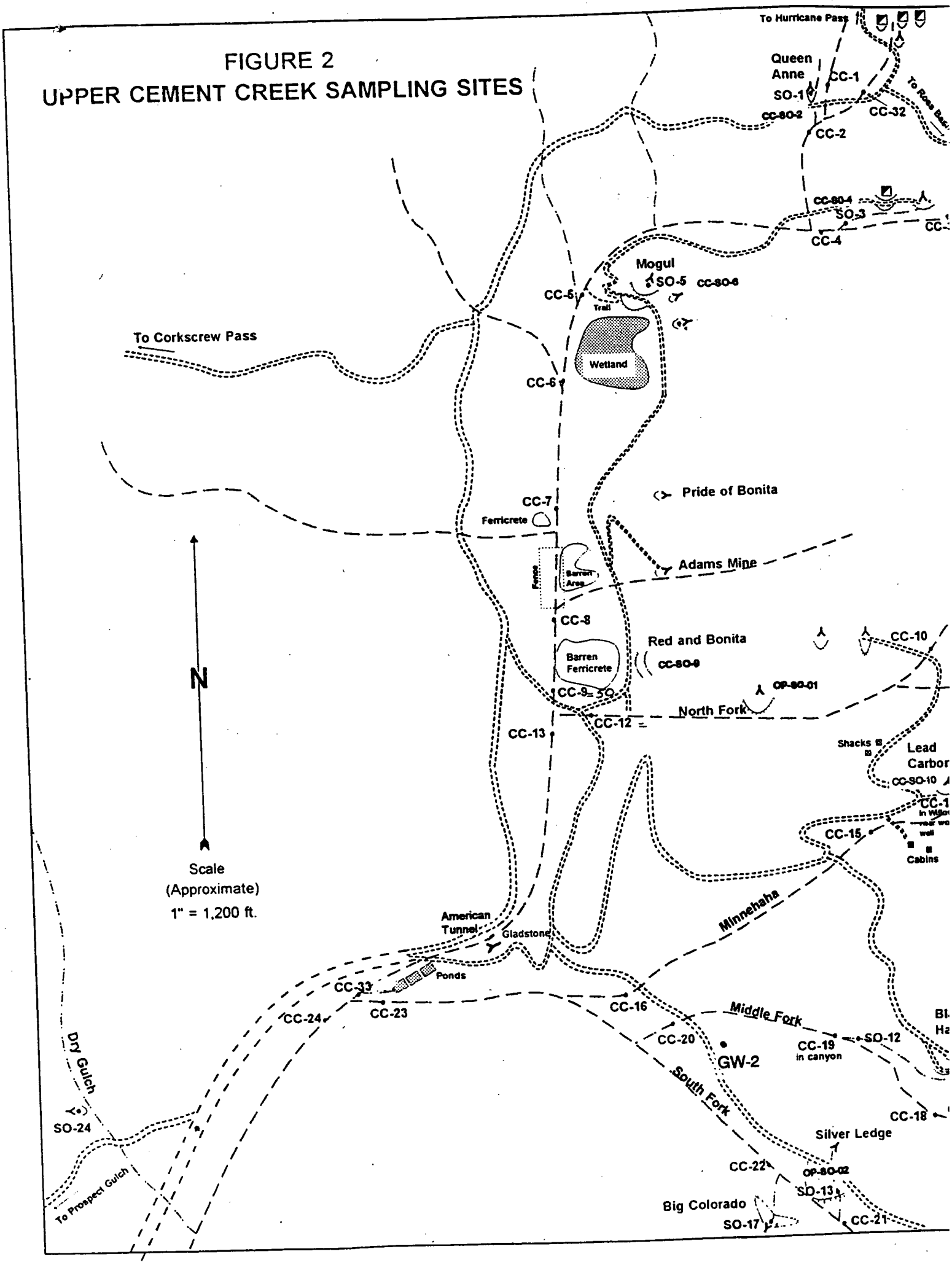
1. Any conditions that are currently causing or may cause the project site to be unstable:

Piles and adits uncontained with respect to air, soil exposure, ground water and surface water. Loading into creeks observed.

2. Volume or area of contaminated area:

see prior write-ups

FIGURE 2
UPPER CEMENT CREEK SAMPLING SITES



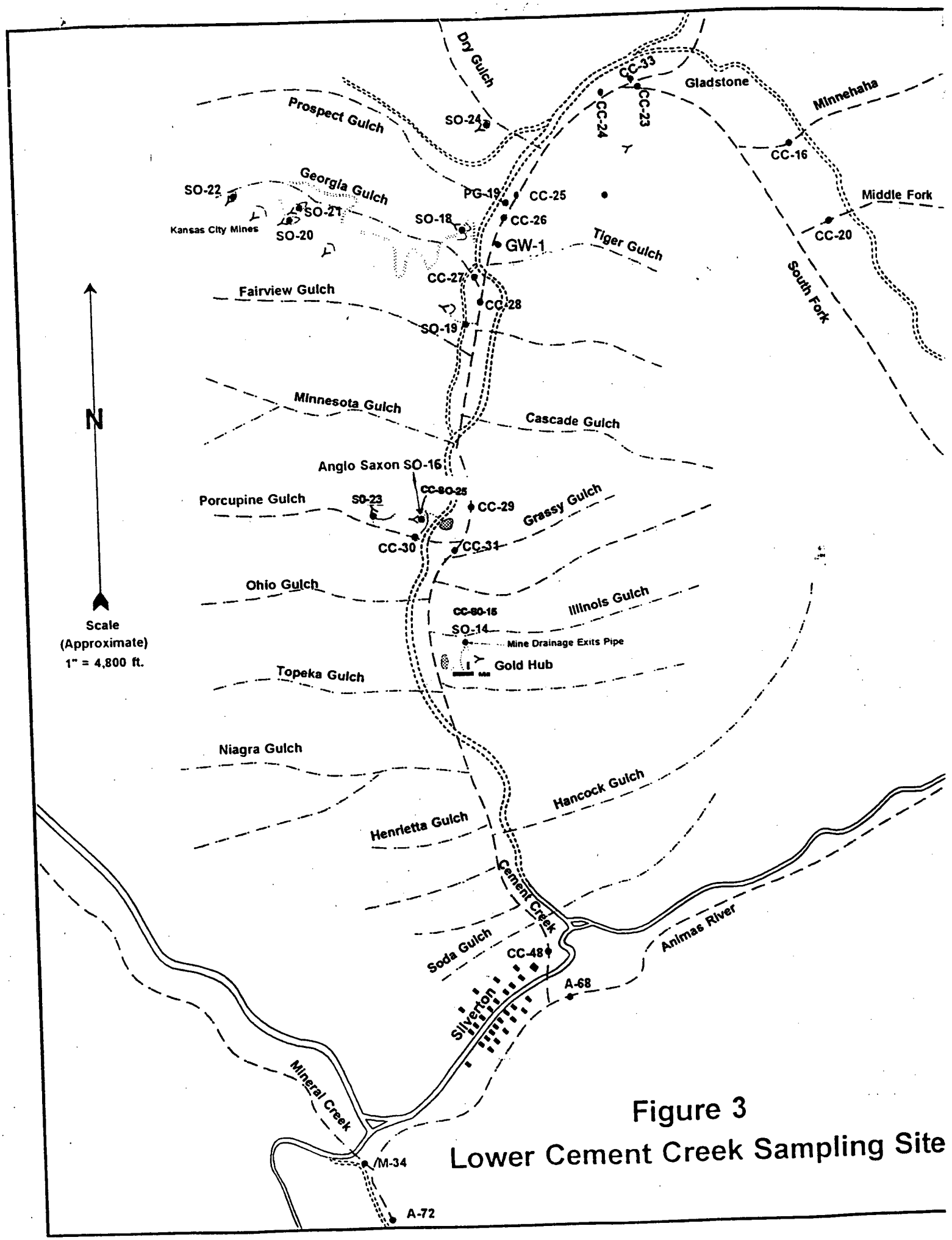


Figure 3
Lower Cement Creek Sampling Site

FIGURE 4
PROSPECT GULCH SAMPLING SITES

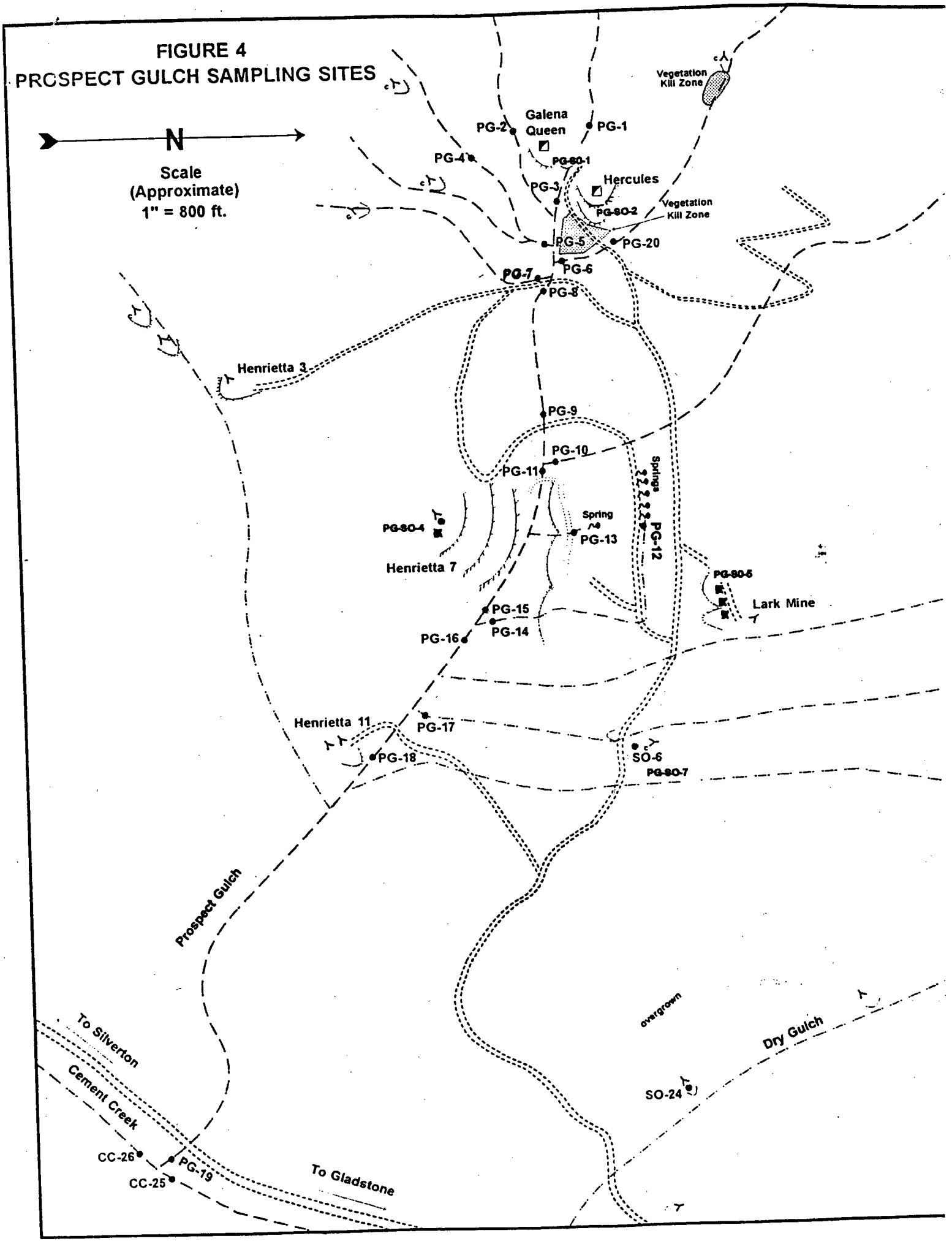
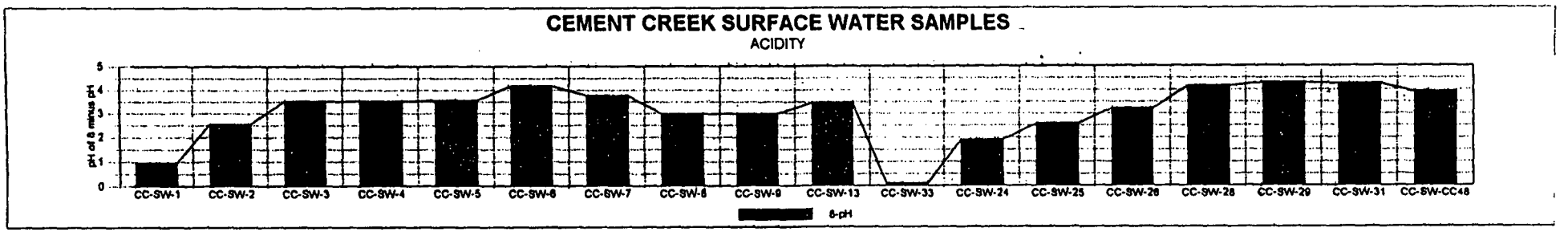
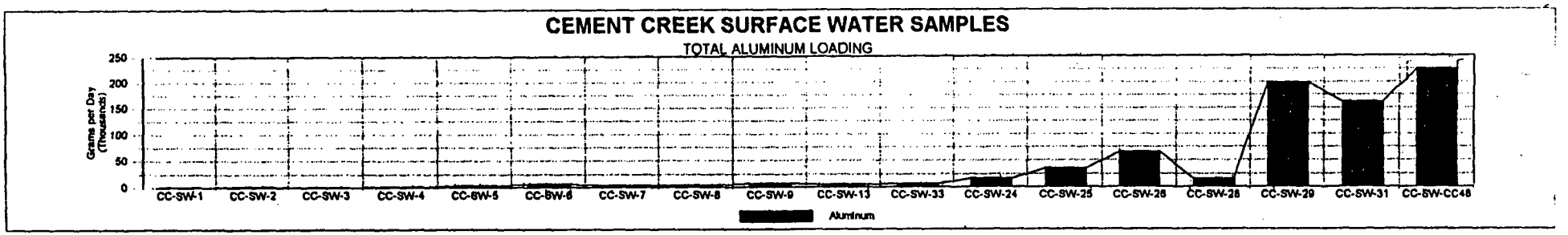


FIGURE 6

CEMENT CREEK: ALUMINUM LOADING vs. ACIDITY vs. SEDIMENT CONCENTRATION





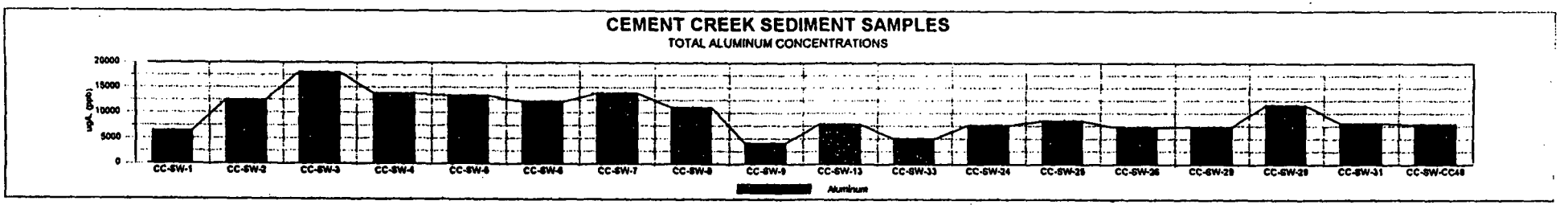


FIGURE 7
CEMENT CREEK: ALUMINUM LOADING vs. ACIDITY vs. SEDIMENT CONCENTRATION

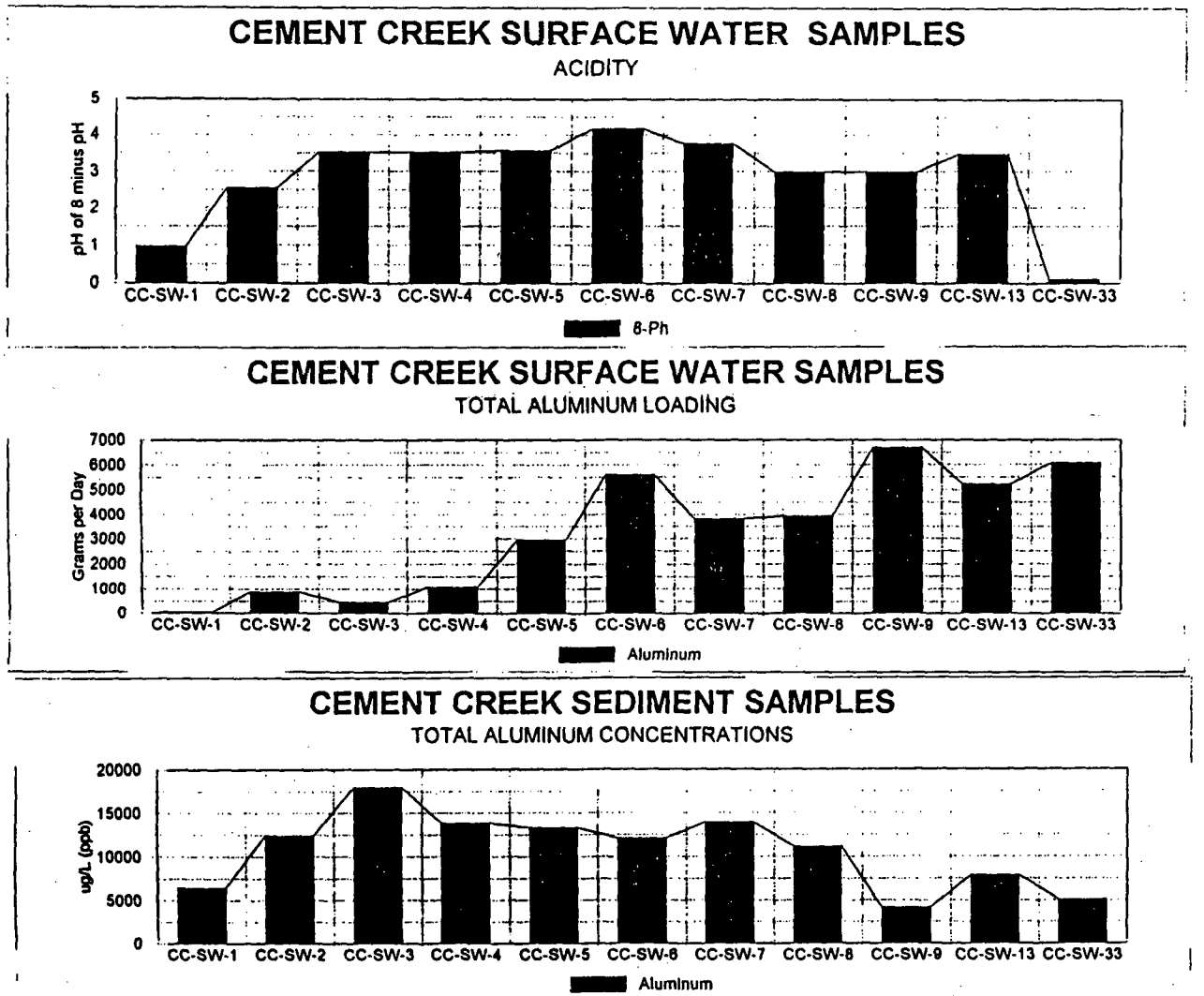


FIGURE 8
CEMENT CREEK: ALUMINUM LOADING vs. ACIDITY vs. SEDIMENT CONCENTRATION

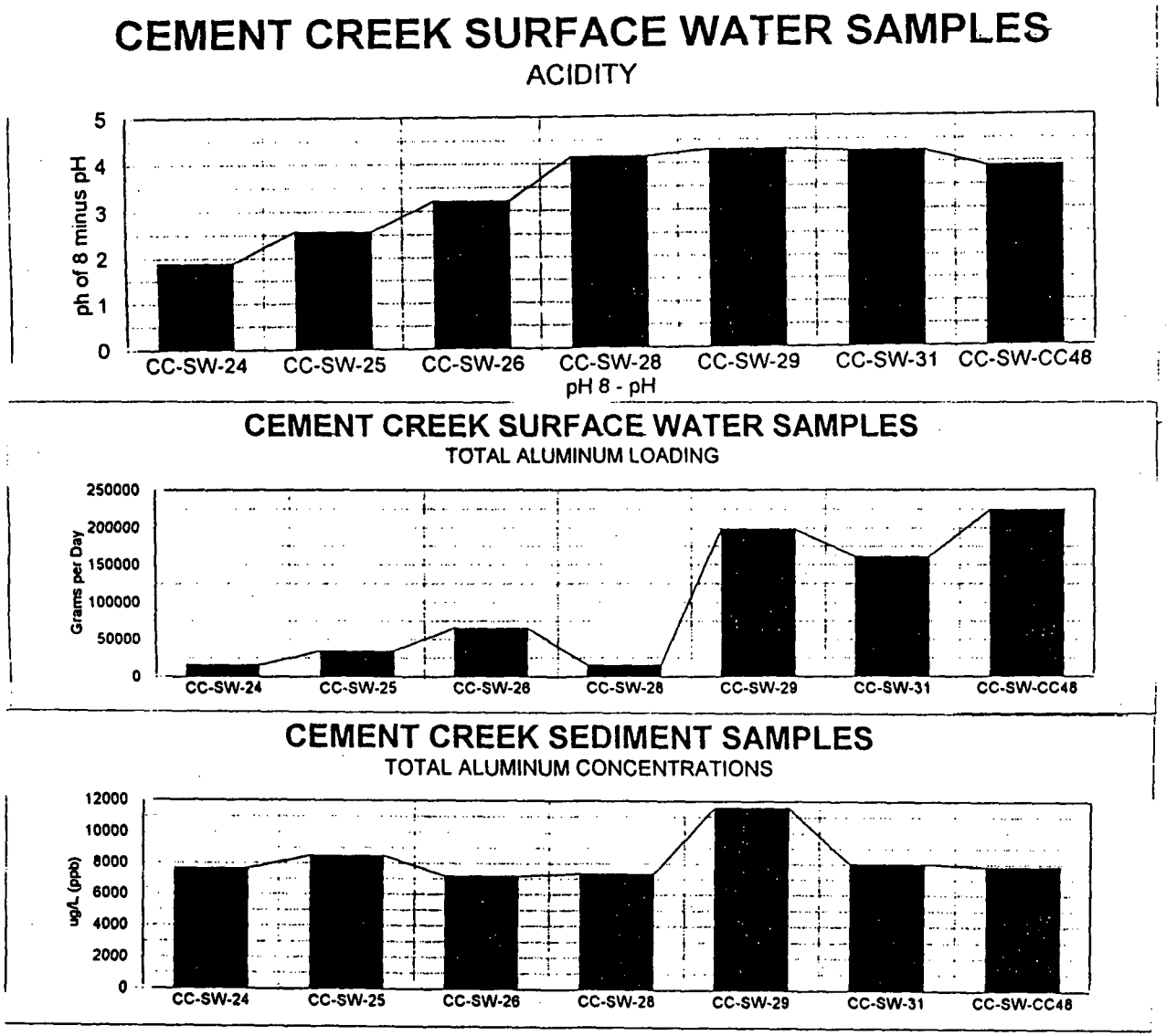
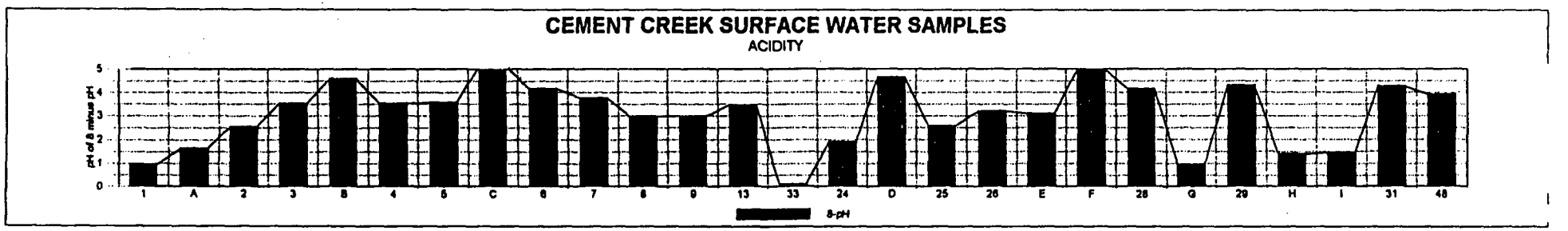


FIGURE 9
CEMENT CREEK SURFACE WATER: ALUMINUM LOADING vs. ACIDITY
INCLUDING AQUEOUS SOURCE LOADINGS



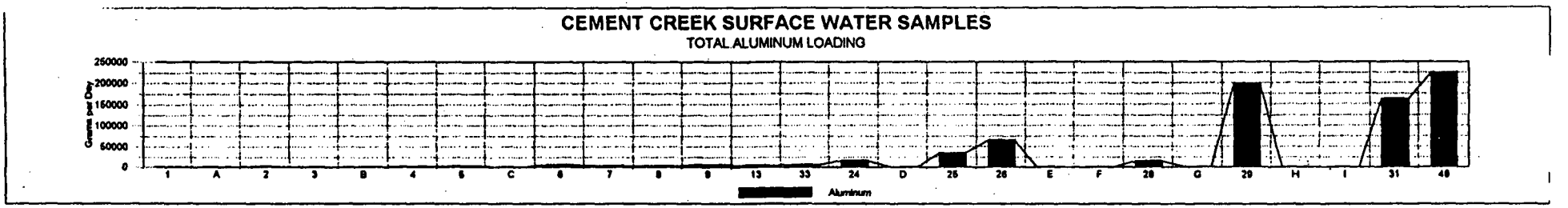
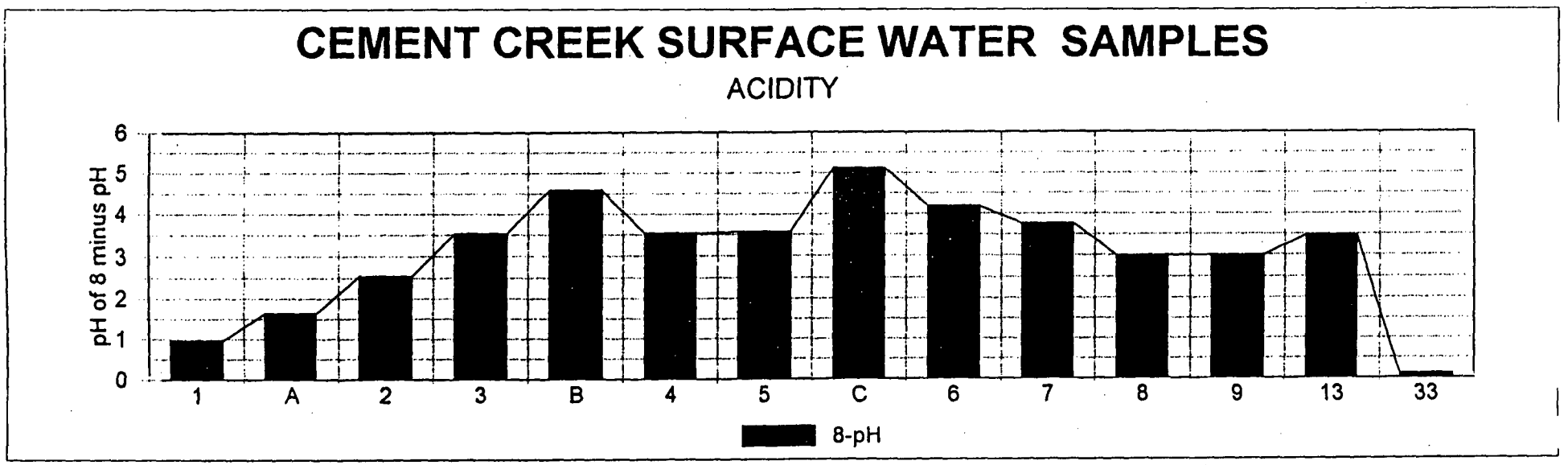


FIGURE 10
CEMENT CREEK SURFACE WATER: ALUMINUM LOADING vs. ACIDITY
INCLUDING AQUEOUS SOURCE LOADINGS



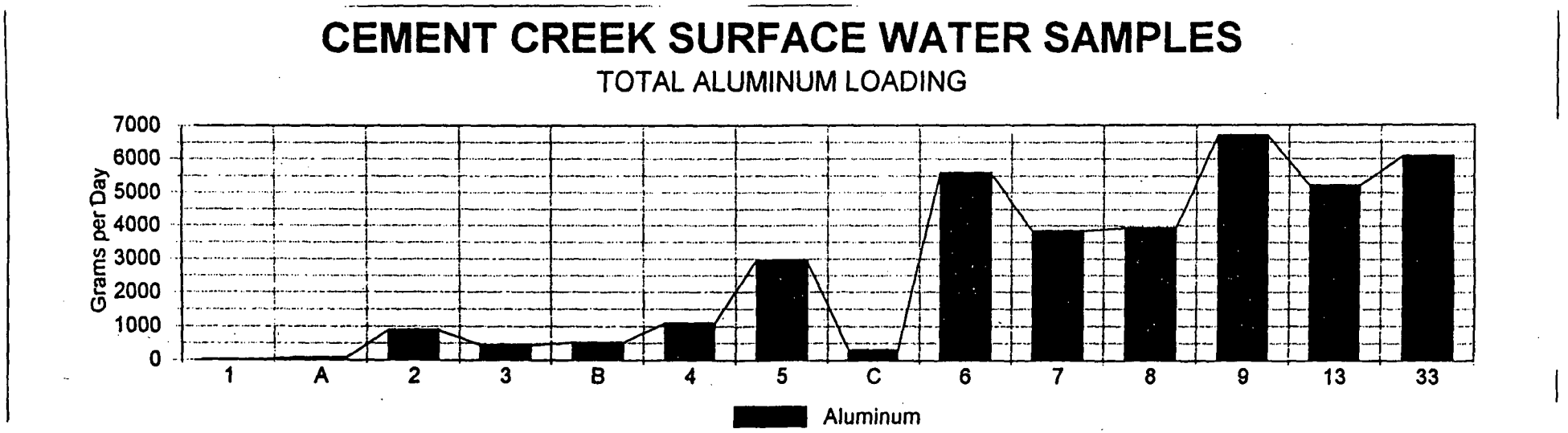
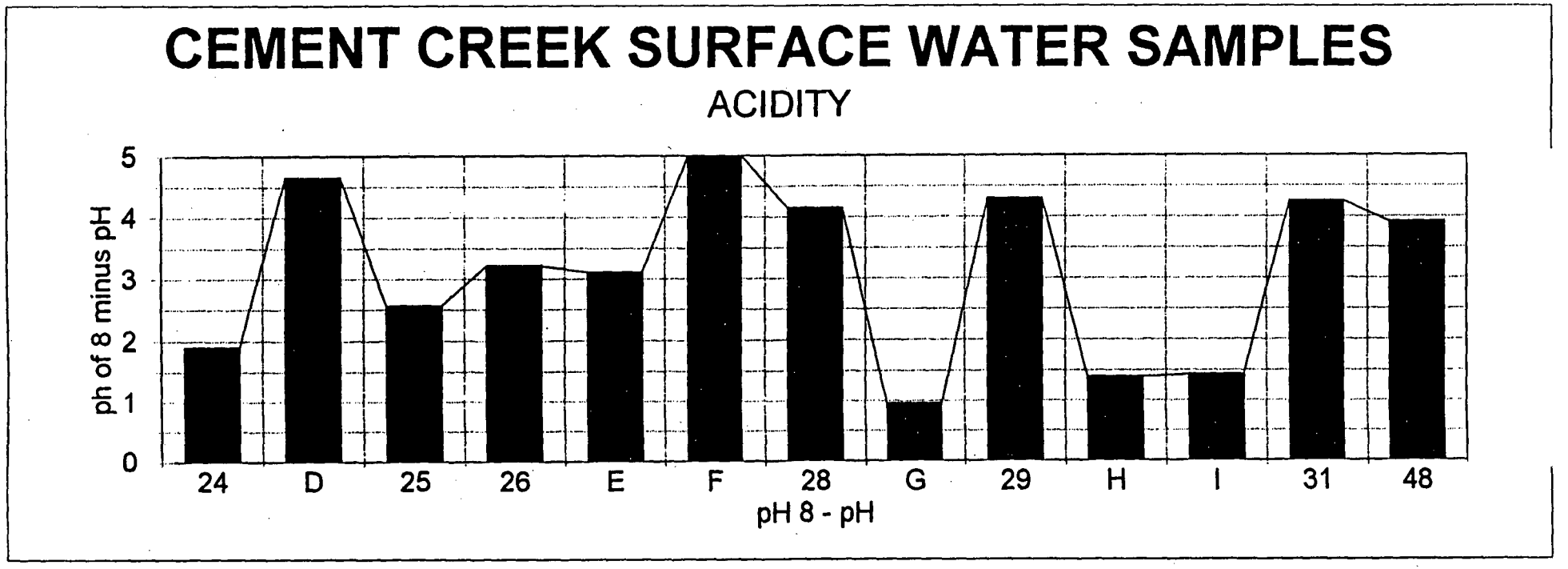


FIGURE 11
CEMENT CREEK SURFACE WATER: ALUMINUM LOADING vs. ACIDITY
INCLUDING AQUEOUS SOURCE LOADINGS



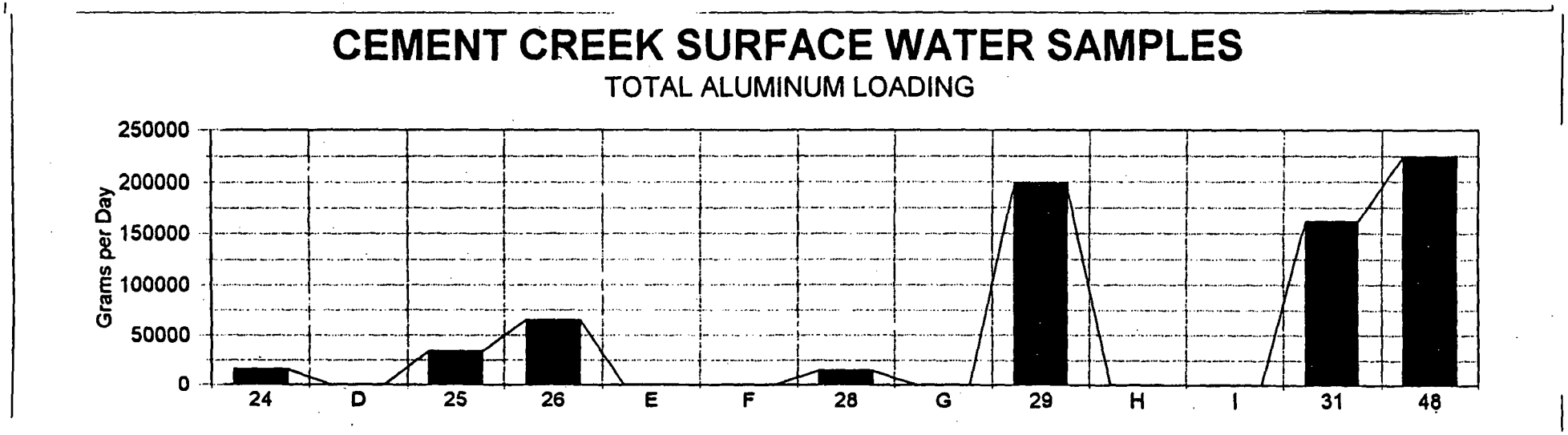
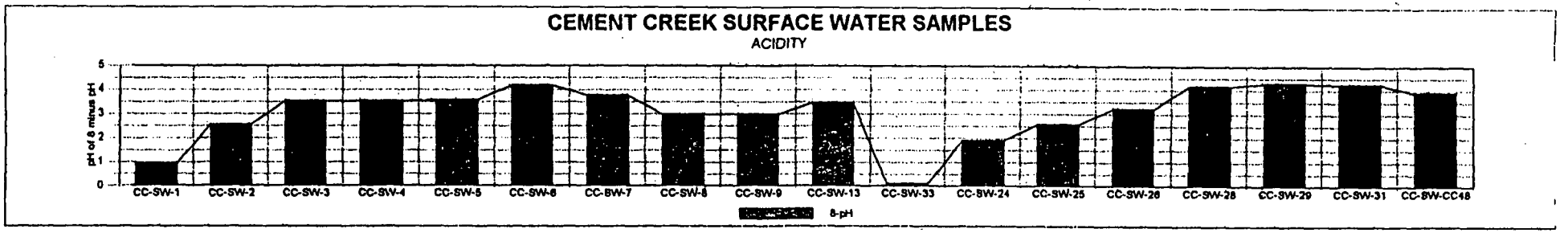
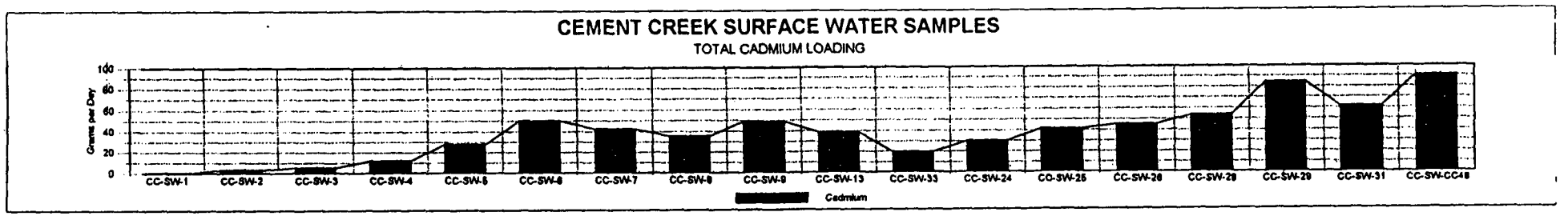


FIGURE 12
CEMENT CREEK: CADMIUM LOADING vs. ACIDITY vs. SEDIMENT CONCENTRATION





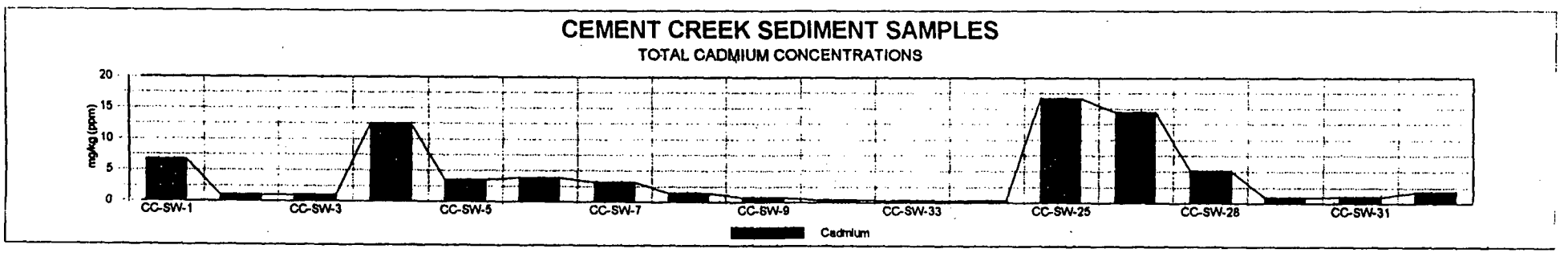
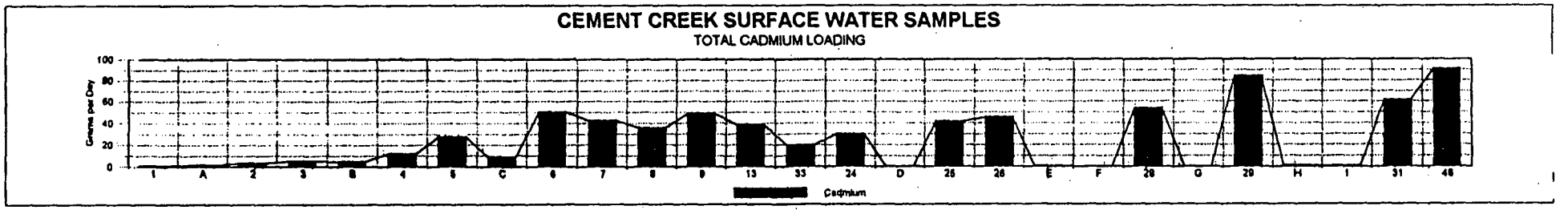


FIGURE 13
CEMENT CREEK SURFACE WATER: CADMIUM LOADING vs. ACIDITY
INCLUDING AQUEOUS SOURCE LOADINGS



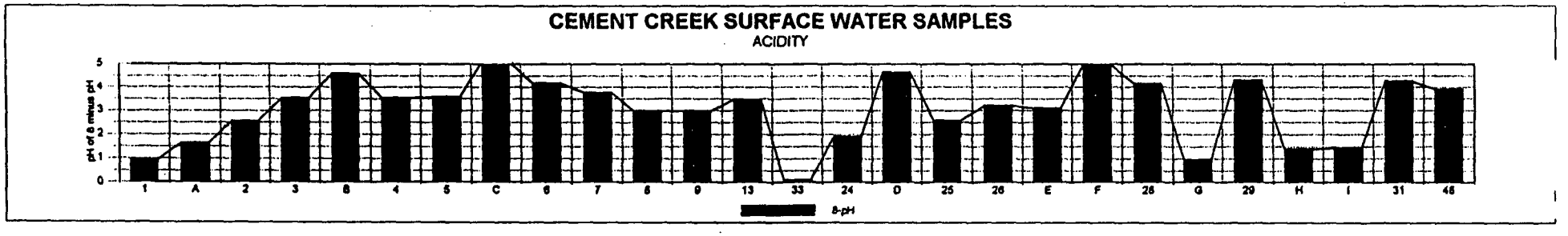
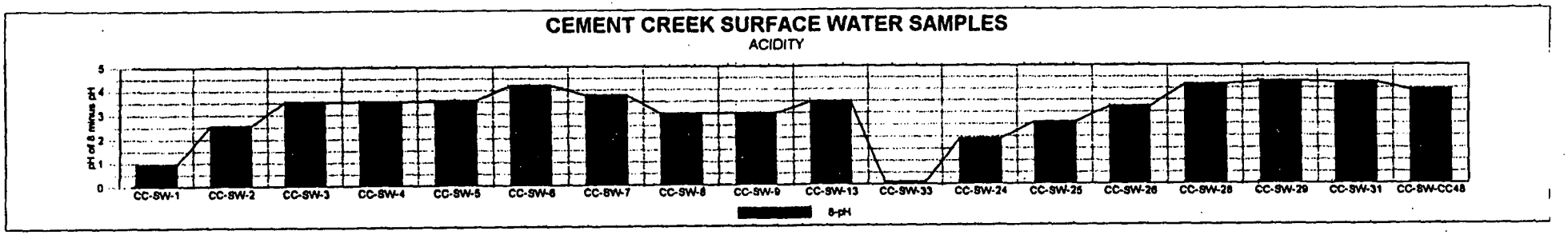
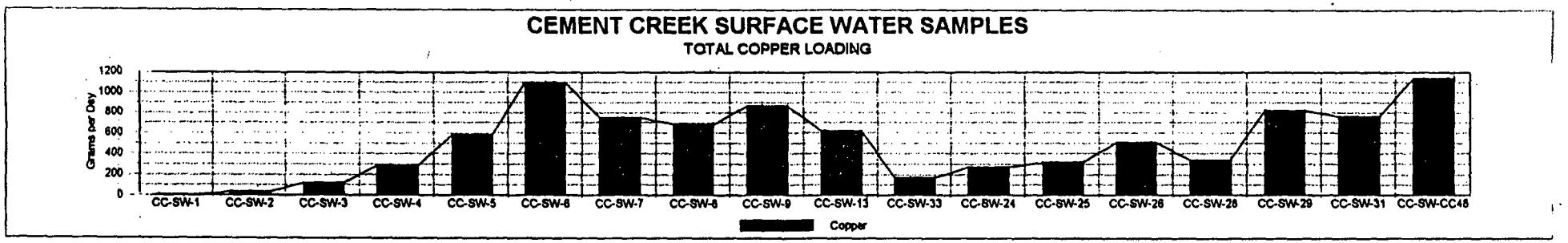


FIGURE 14
CEMENT CREEK: COPPER LOADING vs. ACIDITY vs. SEDIMENT CONCENTRATION





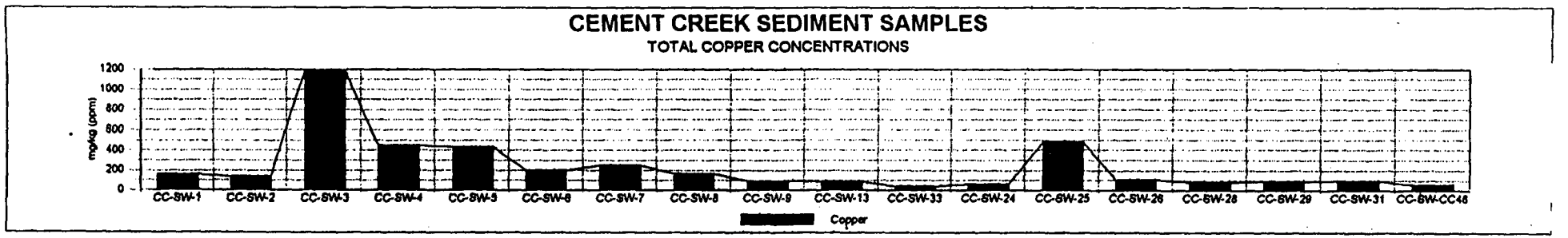
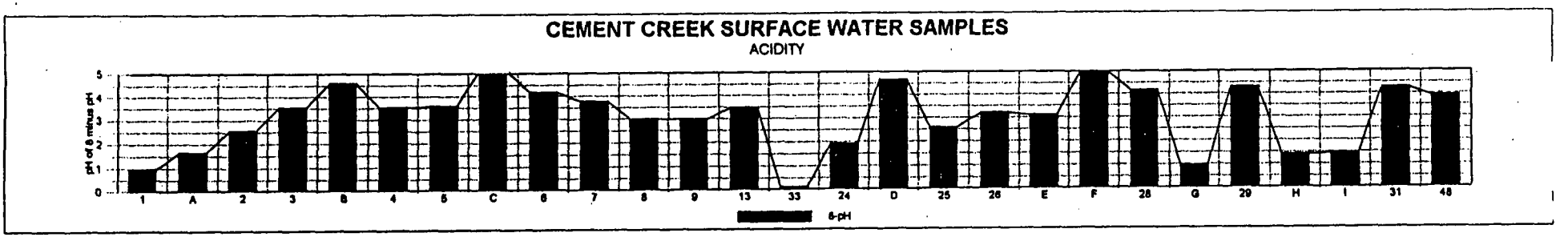


FIGURE 15
CEMENT CREEK SURFACE WATER: COPPER LOADING vs. ACIDITY
INCLUDING AQUEOUS SOURCE LOADINGS



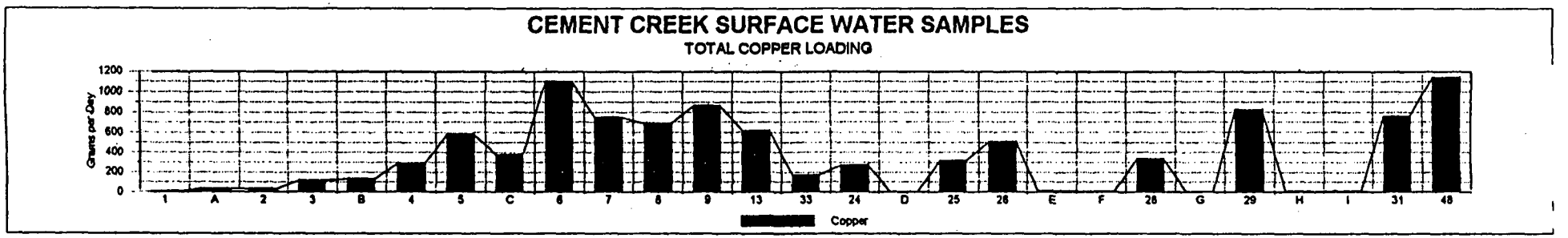
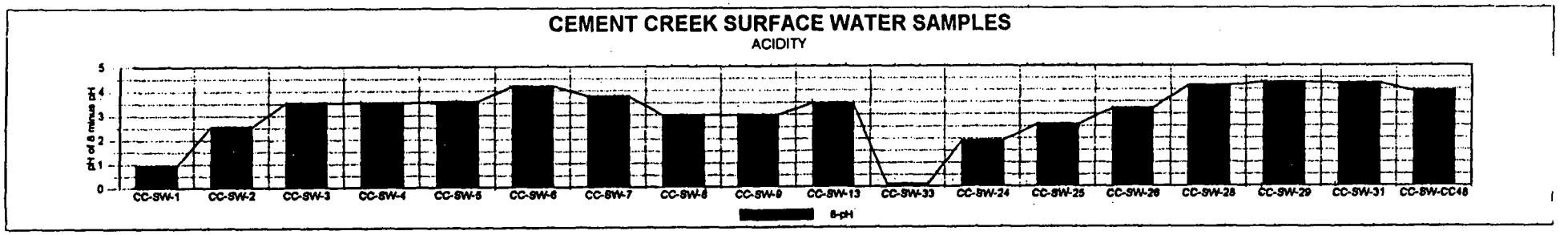
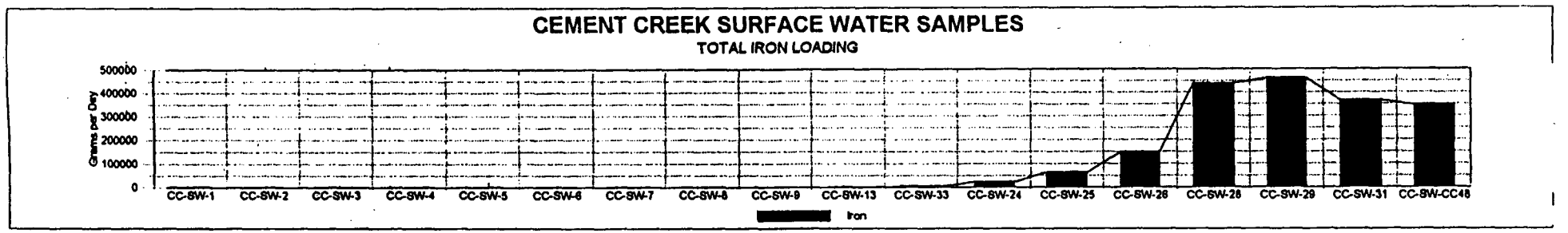


FIGURE 16
CEMENT CREEK: IRON LOADING vs. ACIDITY vs. SEDIMENT CONCENTRATION





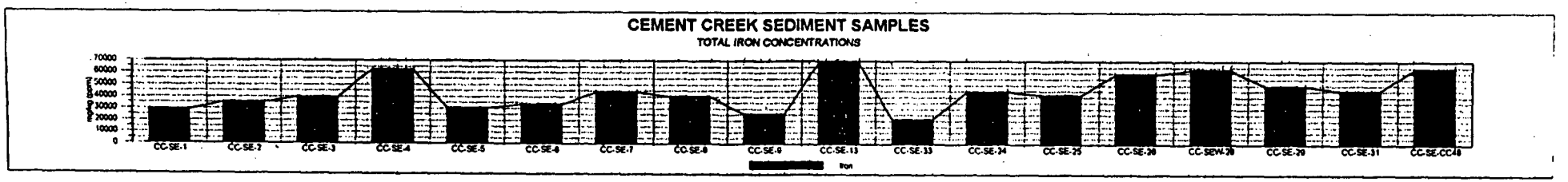


FIGURE 17

CEMENT CREEK: IRON LOADING vs. ACIDITY vs. SEDIMENT CONCENTRATION

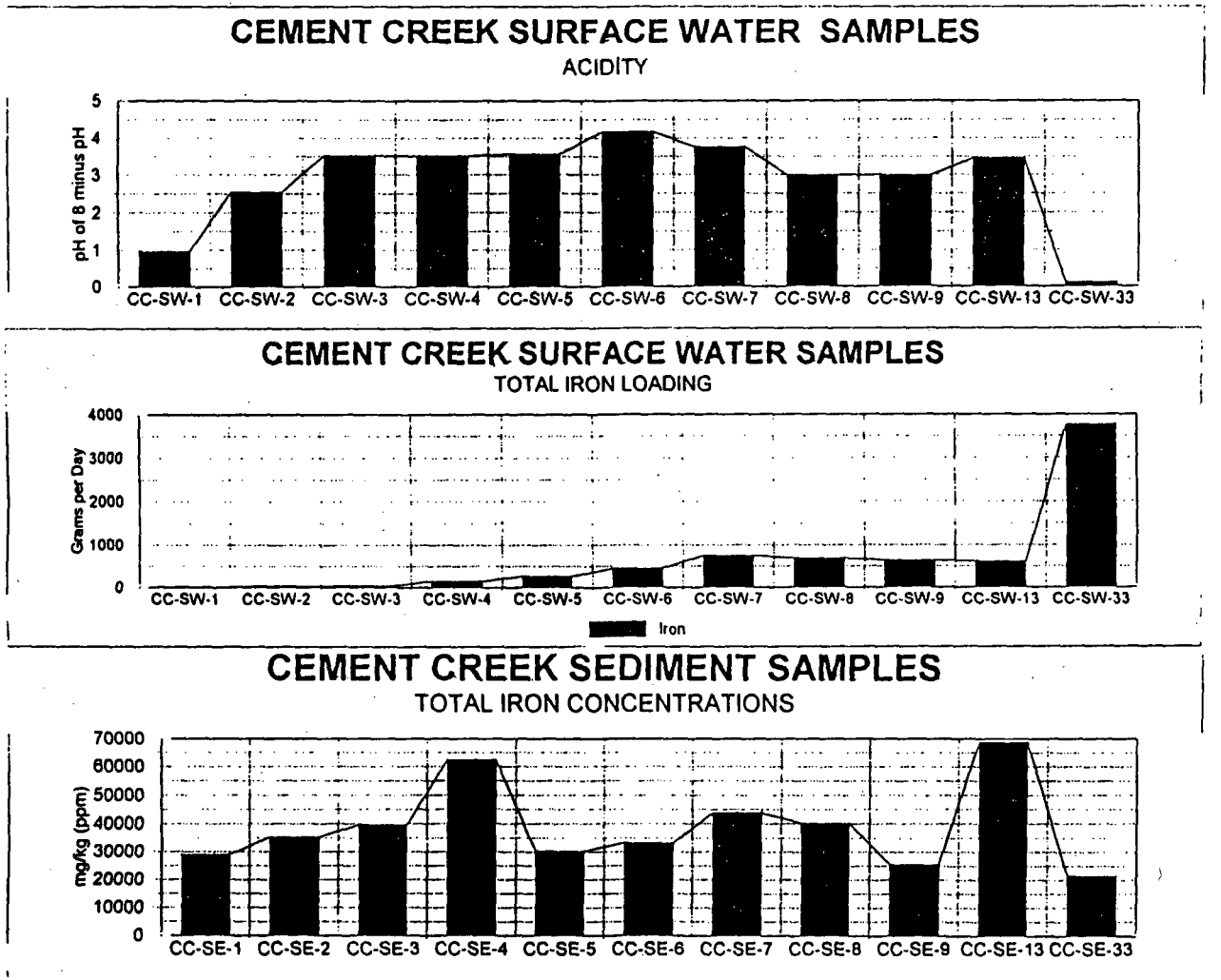
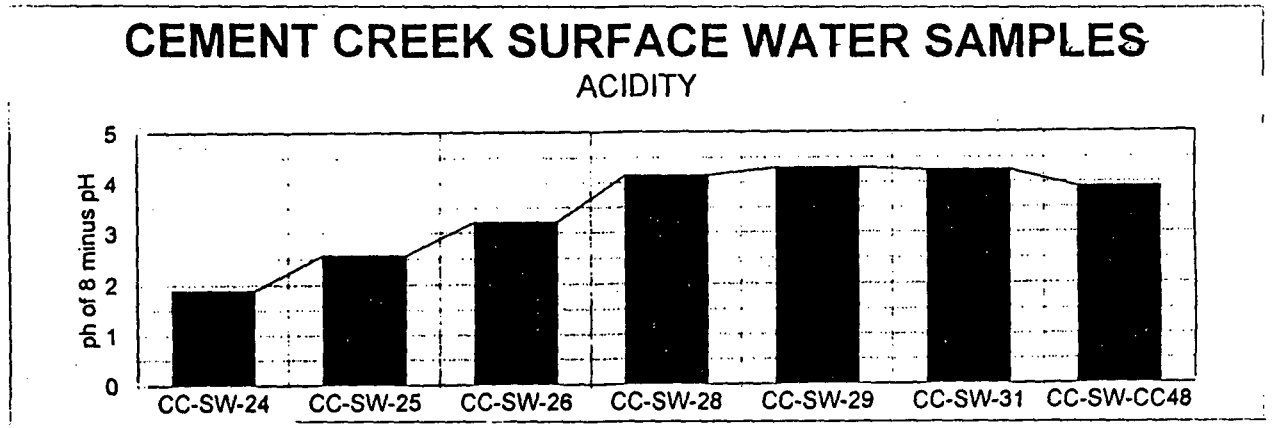
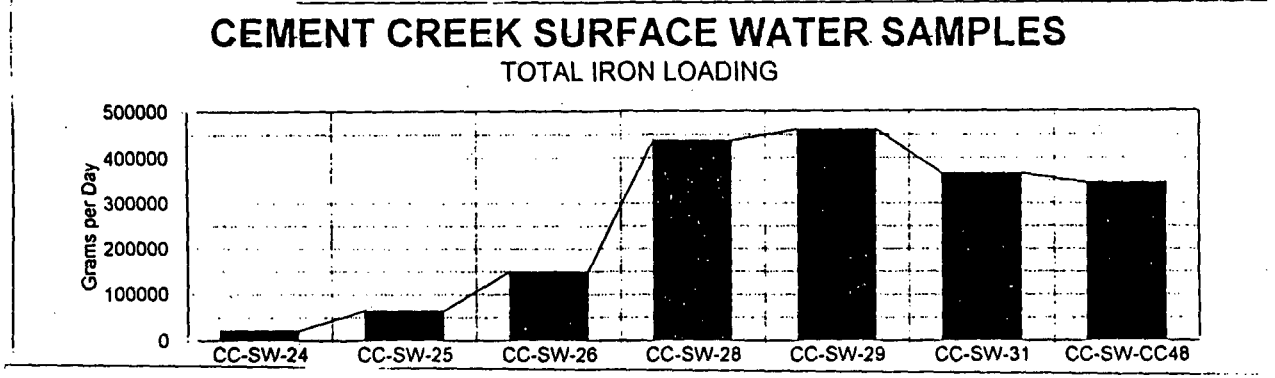


FIGURE 18
CEMENT CREEK: IRON LOADING vs. ACIDITY vs. SEDIMENT CONCENTRATION





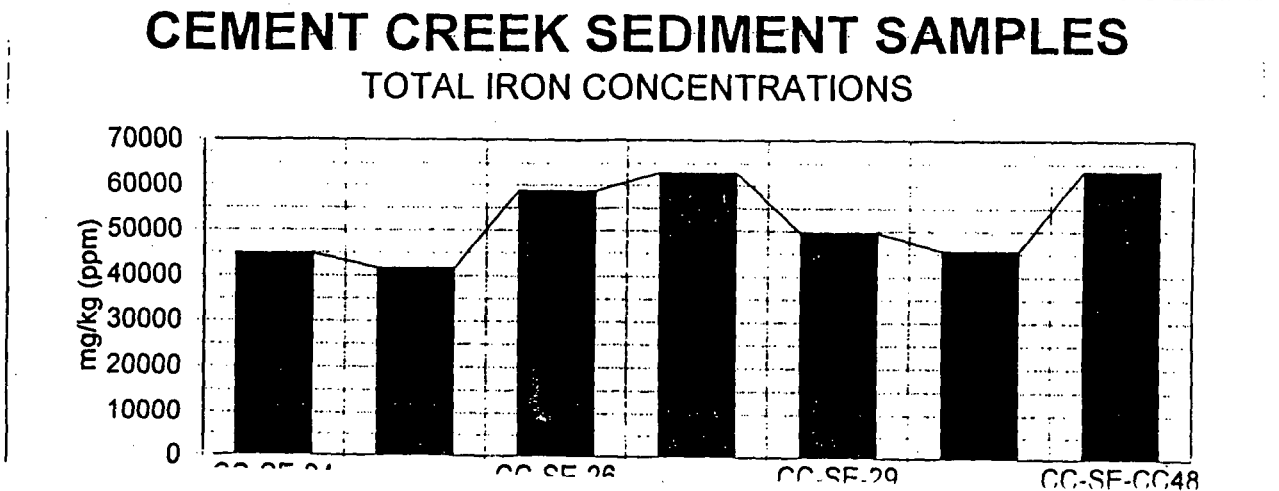
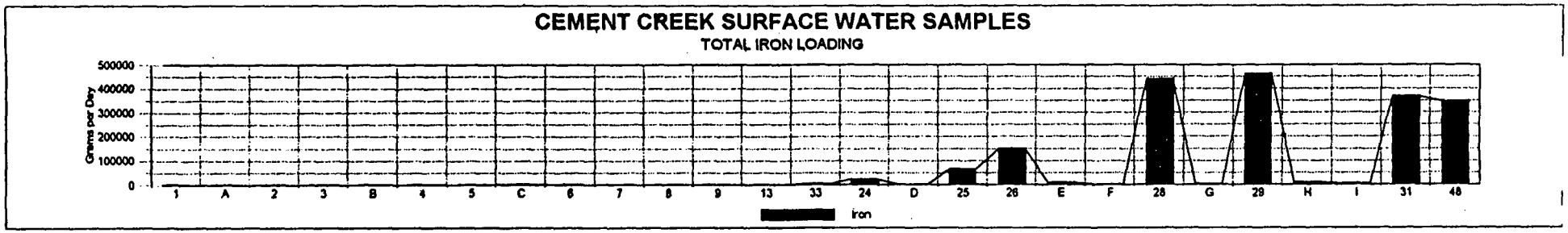


FIGURE 19
CEMENT CREEK SURFACE WATER: IRON LOADING vs. ACIDITY
INCLUDING AQUEOUS SOURCE LOADINGS



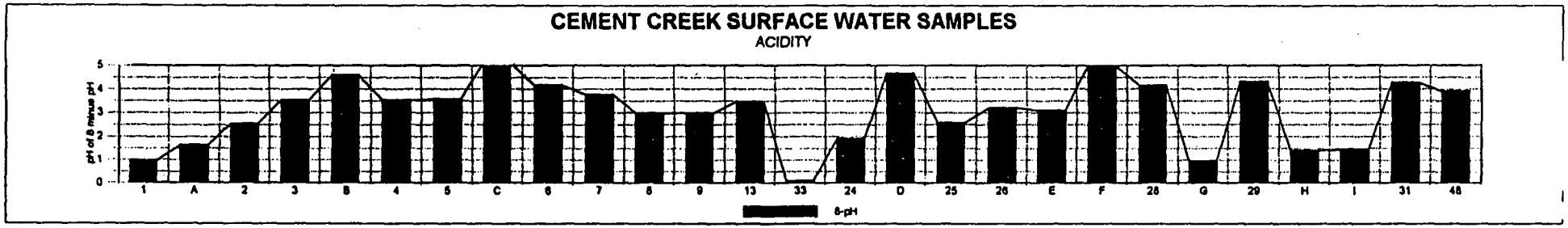
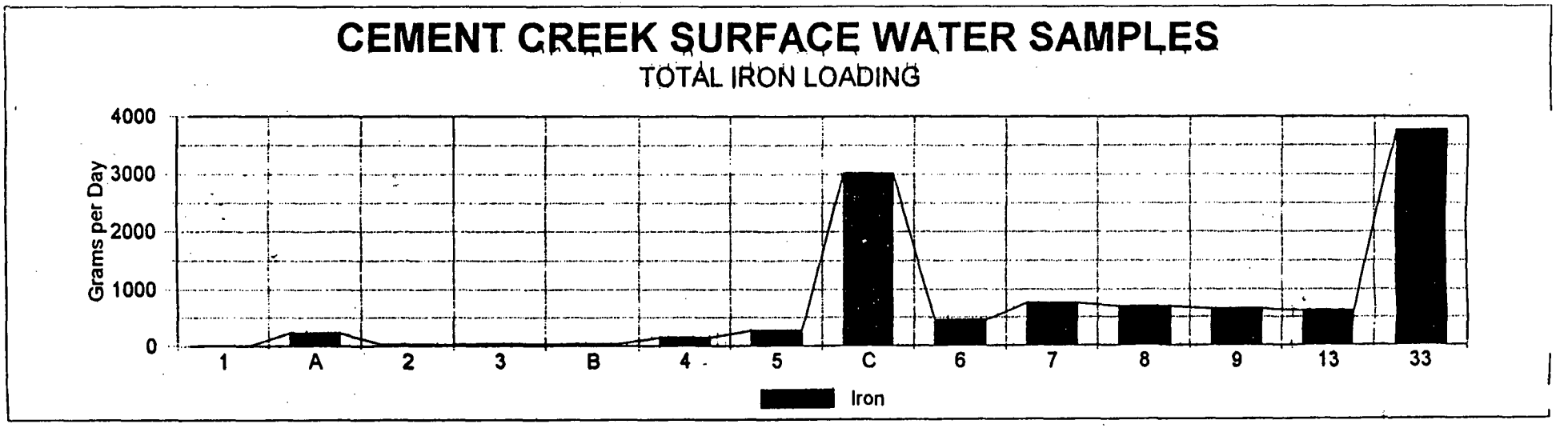


FIGURE 20
CEMENT CREEK SURFACE WATER: IRON LOADING vs. ACIDITY
INCLUDING AQUEOUS SOURCE LOADINGS



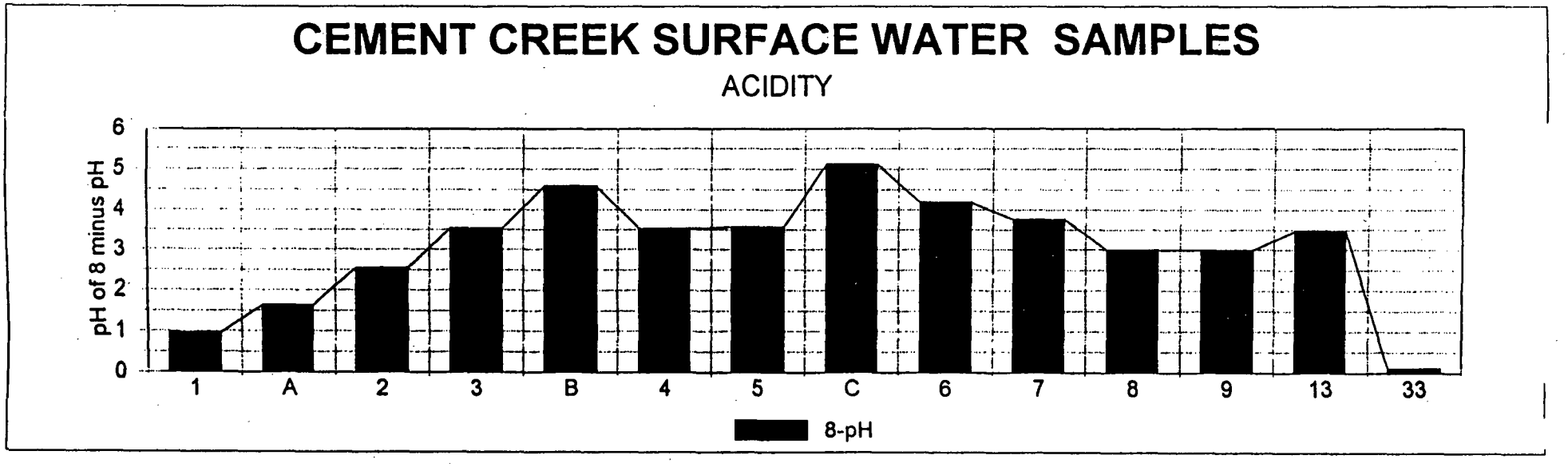
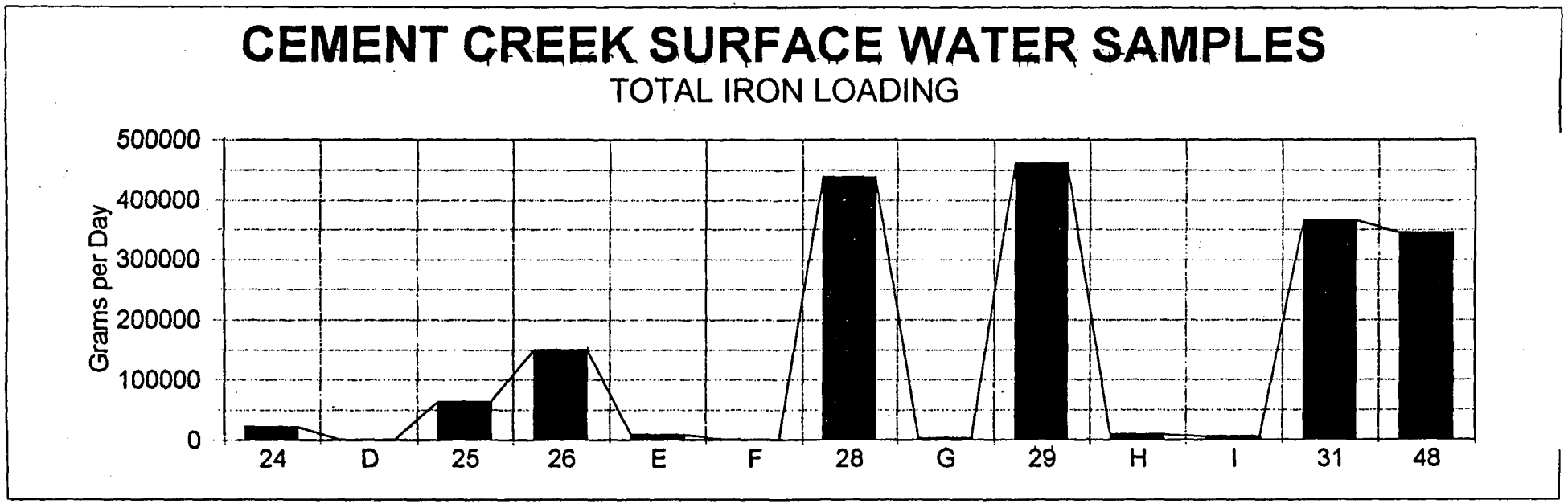


FIGURE 21
CEMENT CREEK SURFACE WATER: IRON LOADING vs. ACIDITY
INCLUDING AQUEOUS SOURCE LOADINGS



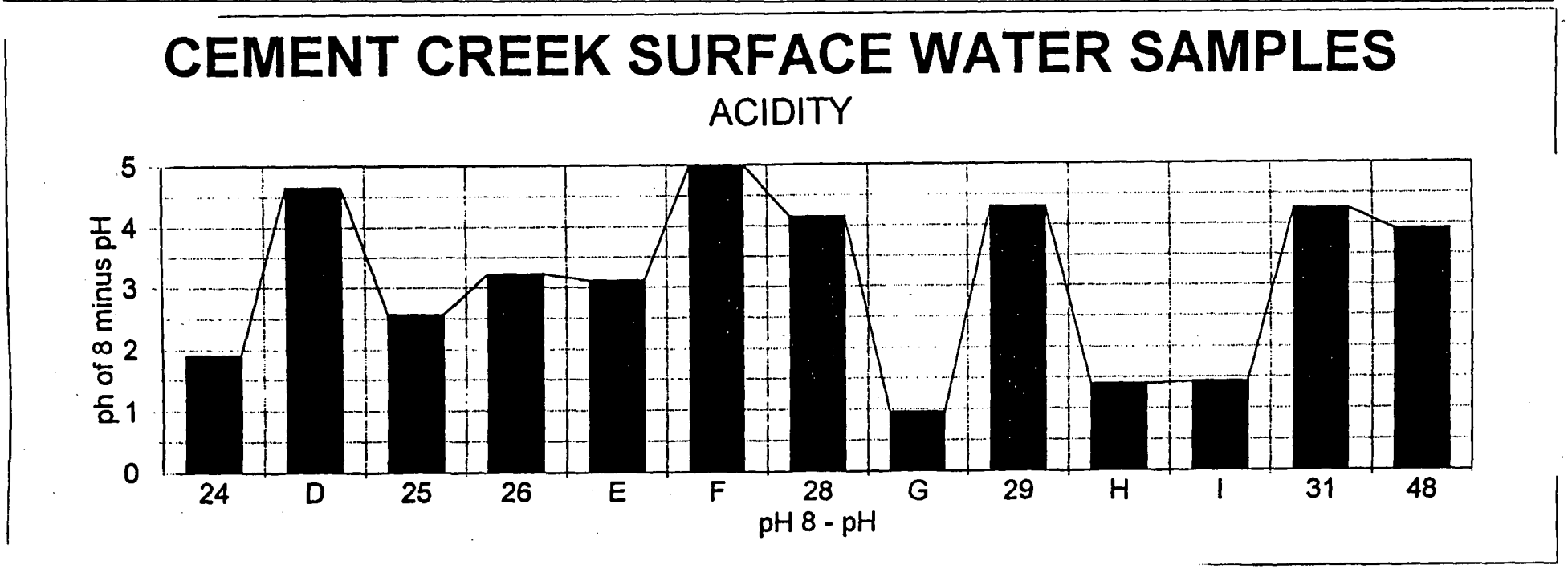
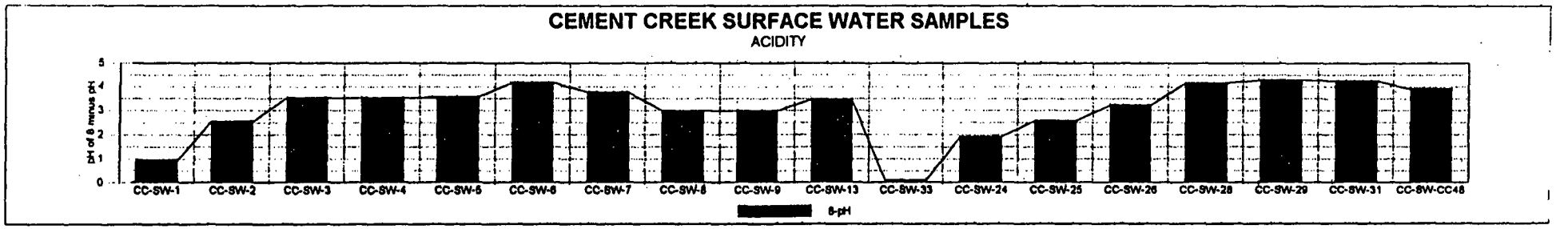
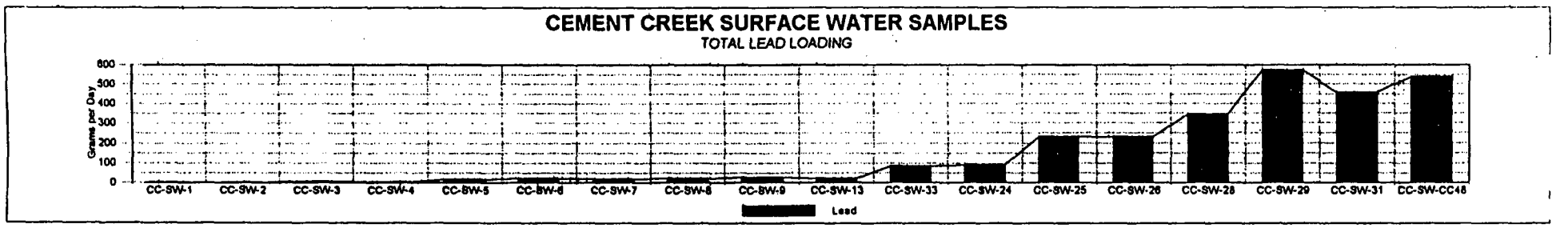


FIGURE 22
CEMENT CREEK: LEAD LOADING vs. ACIDITY vs. SEDIMENT CONCENTRATION





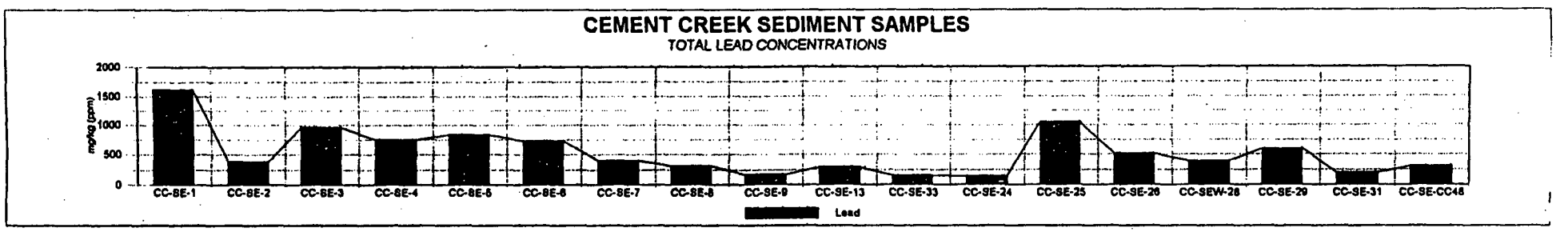
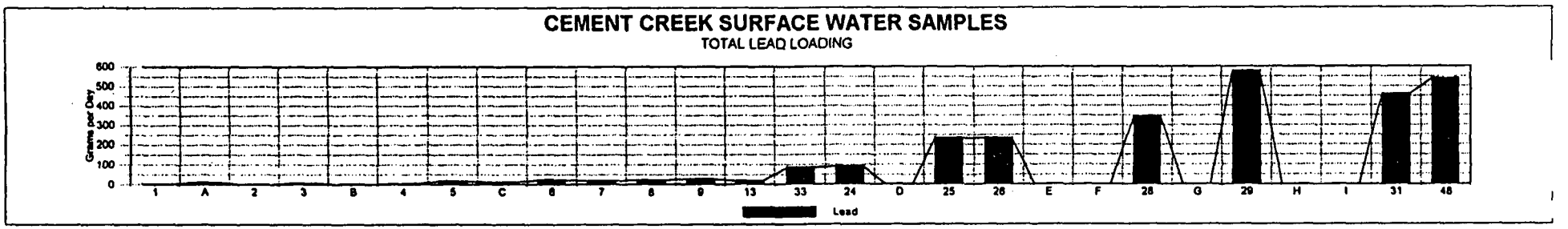


FIGURE 23
CEMENT CREEK SURFACE WATER: LEAD LOADING vs. ACIDITY
INCLUDING AQUEOUS SOURCE LOADINGS



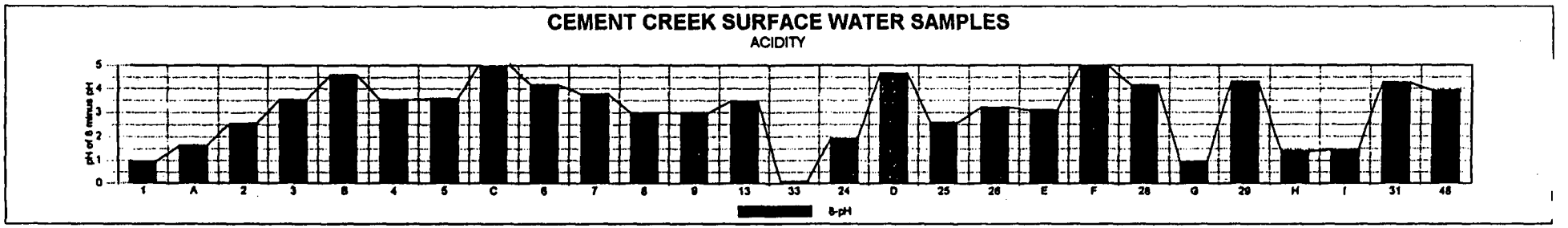
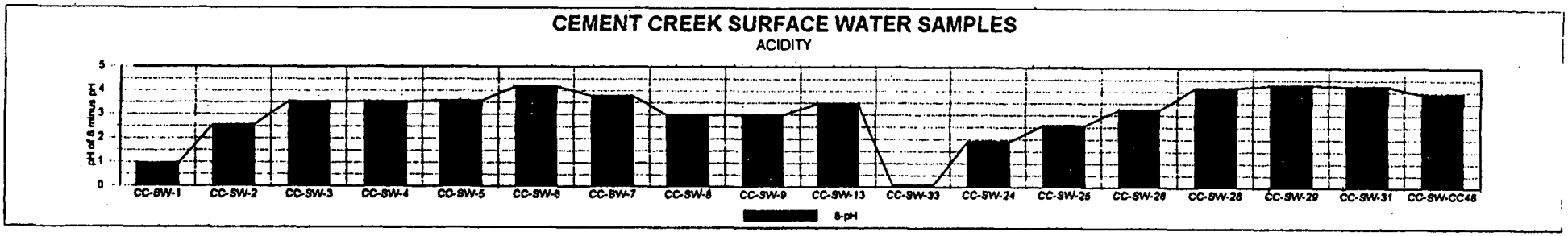
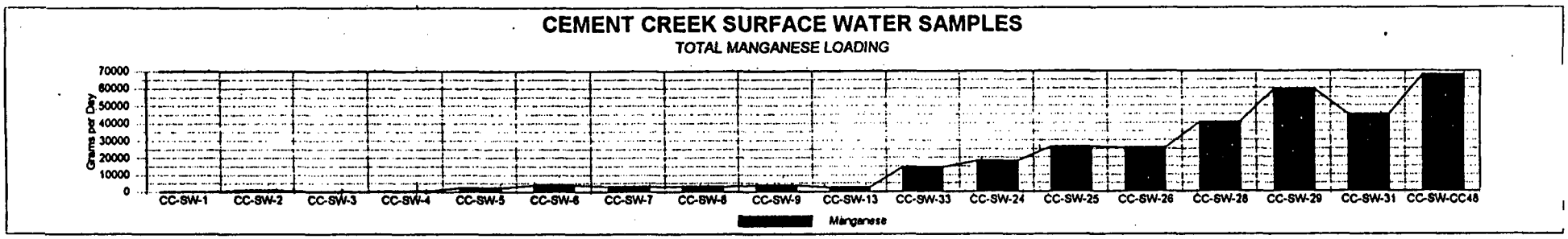


FIGURE 24
CEMENT CREEK: MANGANESE LOADING vs. ACIDITY vs. SEDIMENT CONCENTRATION





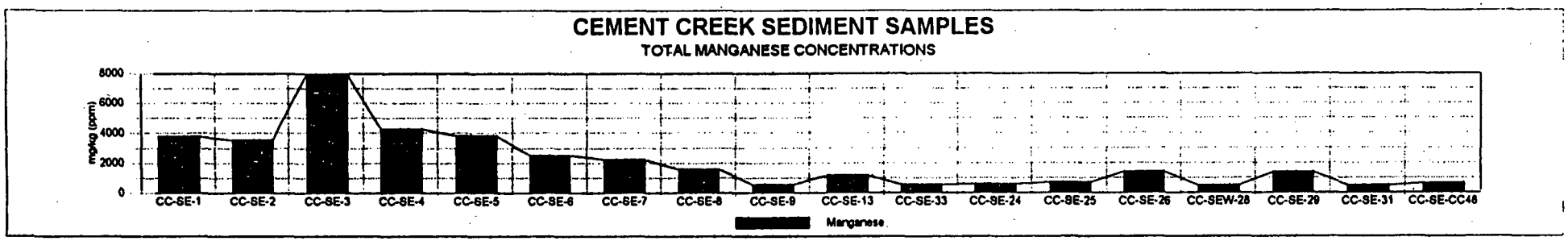
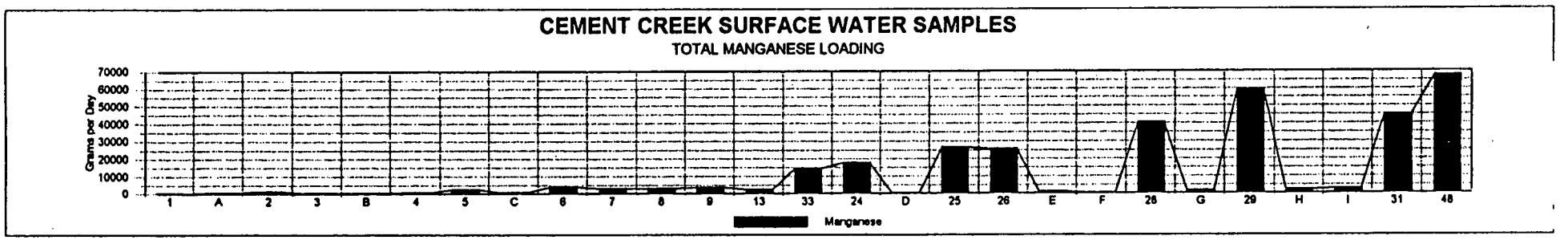


FIGURE 25
CEMENT CREEK SURFACE WATER: MANGANESE LOADING vs. ACIDITY
INCLUDING AQUEOUS SOURCE LOADINGS



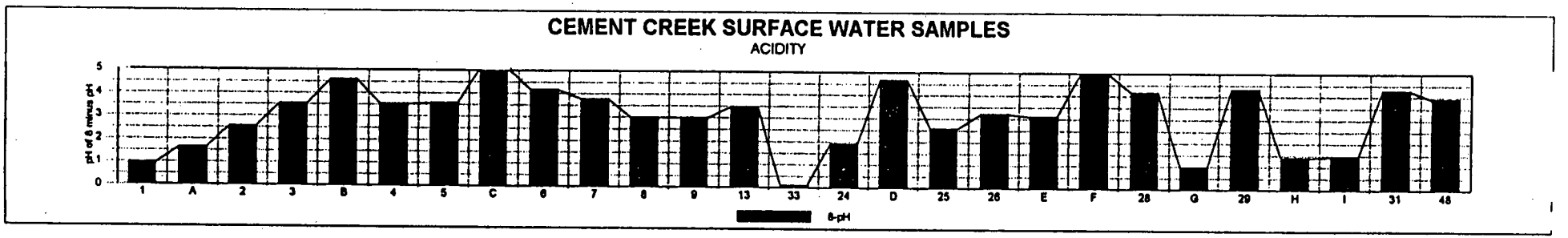
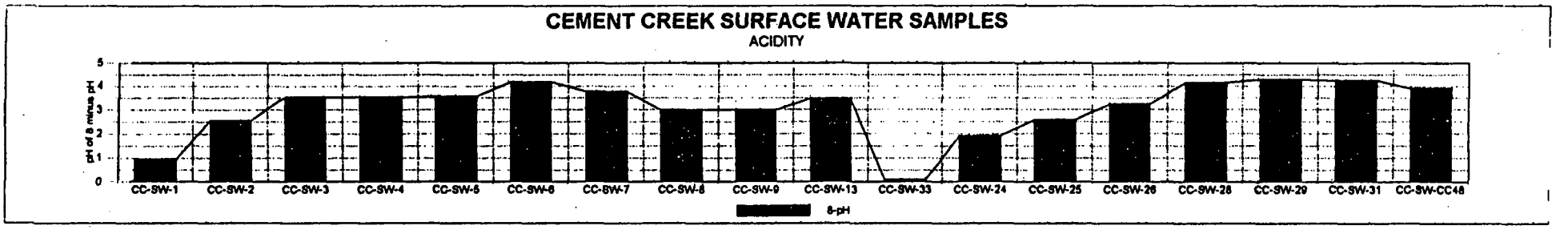
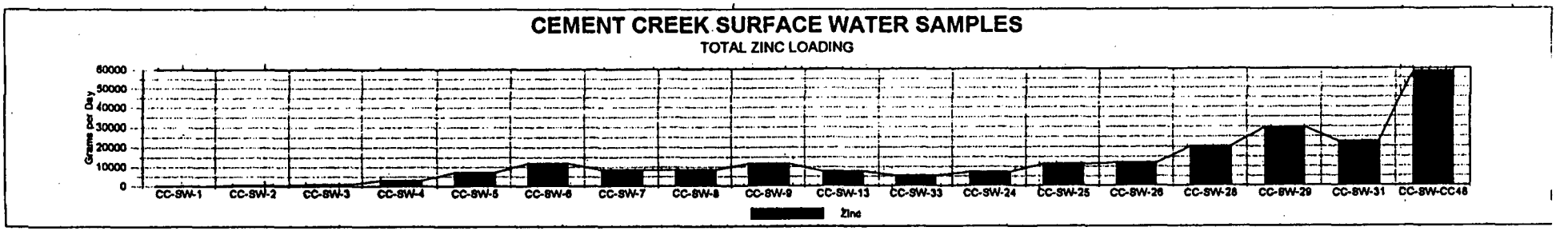


FIGURE 26
CEMENT CREEK: ZINC LOADING vs. ACIDITY vs. SEDIMENT CONCENTRATION





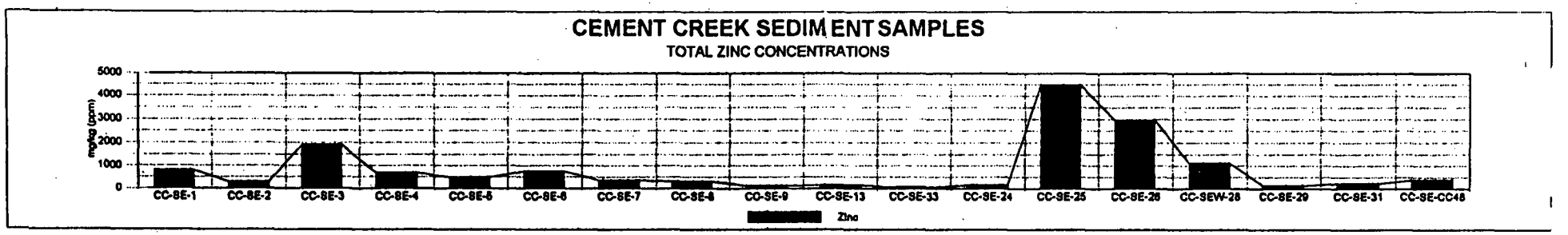
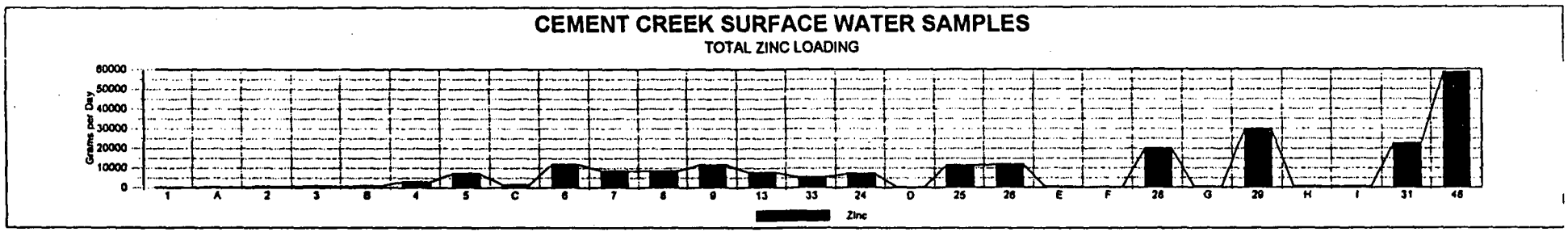


FIGURE 27
CEMENT CREEK SURFACE WATER: ZINC LOADING vs. ACIDITY
INCLUDING AQUEOUS SOURCE LOADINGS



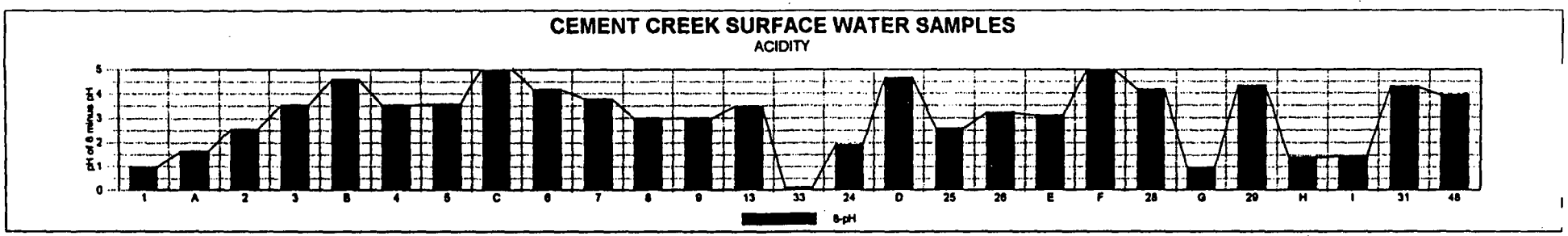


TABLE 1

CEMENT CREEK SOLID SOURCE SAMPLES
TOTAL METALS
Concentrations in milligrams per kilogram (mg/kg)

	UPPER CEMENT CREEK				MINNEHAHA	MID FORK	LOWER CEMENT CREEK	
Location	CC-SO-2	CC-SO-4	CC-S0-6	CC-SO-9	CC-SO-10	CC-SO-11	CC-SO-15	CC-SO-25
Analyte	Queen Anne Mine Waste Rock Pile	Rose Basin Unnamed Mine Waste Rock Pile	Mogul Mine Waste Rock Pile	Red & Bonita Mine Waste Pile	Lead Carbonate Mine Waste Pile	Middle Fork Unnamed Mine Waste Rock Pile	Gold Hub Mine Waste Rock Pile	Anglo Saxon Mine Waste Rock Pile
Aluminum	1410	1450	850	819	820	611	1530	1230
Antimony	5.8 B	48.8	41.3	0.61 U	8 B	9.6 B	1.5 B	3.2 B
Arsenic	132 J	97.1 J	23.7 J	3 J	13.5 J	10 J	9.1 J	20.7 J
Barium	527	73.4	102	138	21.7 B	19.1 B	23.1 B	149
Berylium	0.46 B	0.43 B	0.23 B	0.21 B	0.21 U	0.21 U	0.21 U	0.25 B
Cadmium	2.9	35.6	176	0.2 U	1.5	2.8	0.87 B	0.39 B
Calcium (D)	577 B	242 B	127 B	126 B	190 B	175 B	229 B	1660
Chromium	0.3 B	0.66 B	0.42 B	0.25 B	0.21 U	0.21 U	0.38 B	1.3 B
Cobalt	0.67 B	3.5 BJ	0.21 U	0.2 U	0.75 B	0.41 B	6.4 B	1.4 B
Copper	117	3470	1050	7.1	119	456	336	63.7
Iron	26800	46900	18400	2370	72210	21600	29900	8930
Lead	3100	15700	24400	961	4650	36000	633	168
Magnesium	143 B	100 B	24.9 B	34 B	36.4 B	144 B	936 B	1470
Manganese	137 J	104 J	373 J	4.1 J	16 J	134 J	150 J	45.5 J
Mercury	2.3 J	0.85 J	0.64 J	0.32 J	0.11 UR	0.14 J	0.1 UR	0.1 UR
Nickel	0.23 B	0.58 BJ	0.21 U	0.2 U	0.71 B	0.21 U	5.1 B	0.44 B
Potassium	1370	2350	631 B	421 B	646 B	513 B	1510	739 B
Selenium	5.2	4.6	5	1	2	17	4	3.4
Silver	23 B	115	102	1.7 B	17.7	38.2	5.2	1.6 B
Sodium	167 B	209 B	216 B	152 B	220 B	248 B	176 B	201 B
Thallium	1.7 B	2.5	1.4 B	0.41 U	0.43 U	0.43 U	1.6 B	0.74 B
Vanadium	4.6 B	9.2 B	2.2 B	1.5 B	2.4 B	10.7	5.1 B	9.8 B
Zinc	715 J	9240 J	5800 J	25.8 J	393 J	731 J	172 J	31.2 J

TABLE 1

CEMENT CREEK SOLID SOURCE SAMPLES
TOTAL METALS
Concentrations in milligrams per kilogram (mg/kg)

	NORTH FORK	MIDDLE FORK	PROSPECT GULCH				
Location	OP-SO-1	OP-SO-2	PG-S0-1	PG-SO-2	PG-SO-4	PG-SO-5	PG-SO-7
Analyte	Upper Gold King Mine Waste Rock Pile	Silver Ledge Mine Waste Rock Pile	Galena Queen Mine Waste Rock Pile	Hercules Mine Waste Pile	Henrietta (7) Mine Waste Pile	Lark Mine Waste Rock Pile	Joe & John's Mine Waste Rock Pile
Aluminum	1690	4300	1280	524	1360	430	1050
Antimony	15.6	0.62 U	26.8	32	40.5	45.6	41.9
Arsenic	25 J	4.3 J	106 J	154 J	130 J	62.2 J	324 J
Barium	72.3	8.3 B	159	48	260	308	413
Beryllium	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
Cadmium	1.4	0.21 U	27.7	112	6.1	8.7	5.3
Calcium (D)	446 B	219 B	139 B	81.9 B	546 V	71.8 B	99.5 B
Chromium	1.4 B	2.7	0.44 B	0.38 B	0.21 U	5.4	1.7 B
Cobalt	0.71 B	0.79 B	0.21 U	0.21 U	1.6 B	0.47 B	0.48 B
Copper	252	5.3	220	335	295	99.9	447
Iron	18400	6310	6670	15400	23500	3680	18900
Lead	3380	172	17300	74000	16000	2560	7310
Magnesium	1060	6010	29.8 B	18.1 B	224 B	8.3 B	81.2 B
Manganese	322 J	244 J	10.5 J	22.6 J	42.4 J	0.87 BJ	5.1 J
Mercury	0.47 J	0.2 J	0.67 J	1.6 J	0.3 J	0.81 J	1 J
Nickel	0.21 U	0.9 B	0.21 U	0.21 U	0.29 B	0.56 B	0.21 U
Potassium	1070	431 B	734 B	799 B	1560	435 B	1210
Selenium	3.1	0.98 B	5.4	9.1	6.4	3.4	12.7
Silver	24.8	2.1	39.1	61.7	76.5	18.1	64.8
Sodium	363 B	185 B	170 B	164 B	209 B	154 B	194 B
Thallium	1.7 B	0.91 B	0.85 B	0.95 B	0.98 B	0.43 U	1.1 B
Vanadium	10.6	11.5	2.6 B	2.9 B	5.7 B	1.8 B	9 B
Zinc	366 J	33.8 J	7560 J	22300 J	1550 J	2070 J	1580 J

TABLE 2

CEMENT CREEK AQUEOUS SOURCE SAMPLES
TOTAL METALS, DISSOLVED NUTRIENTS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

	UPPER CEMENT CREEK			MIDDLE FORK	S. FORK CEMENT CR		
Location	SO-1	CC-SO-3	SO-5	S0-12	SO-13	SO-17	S0-24
Analyte	SOURCE SAMPLE QUEEN ANNE MINE	SOURCE SAMPLE ROSS BASIN UNNAMED MINE	SOURCE SAMPLE MOGUL MINE DRAINAGE	SOURCE SAMPLE BLACK HAWK MINE DRAINAGE	SOURCE SILVER LEDGE MINE	SOURCE BIG COLORADO MINE	SOURCE SAMPLE DRY GULCH ADIT DRAINAGE
Flow (cfs)	0.05	0.02	0.02	0.2	0.89	0.04	0
pH	6.37	3.43	2.89	7.29	6.28	4.56	3.36
Conductivity	301	510	1098	1200	1050	825	469
Hardness	113	85.1	226	694	578	337	55.5
Aluminum	614	10085	5243	106	1014	7346	10960
Antimony	BD	BD	BD	BD	BD	BD	BD
Arsenic	BD	BD	17.3	BD	2.1	8.7	BD
Barium	15.3	22.7	8.8	9.4	10.2	2.4	1.9
Beryllium	BD	BD	4.7	BD	1.6	1.8	1
Cadmium	10.9	86.7	148	2.5	2.4	6.7	9.5
Calcium (D)	40.6	21.09	83.53	259.2	216.8	319.3	4.9
Chromium	BD	BD	BD	BD	4.7	BD	BD
Cobalt	8.5	13.8	27.3	5	17	63	26.8
Copper	231.6	2613.4	6422.8	11.2	15.7	25.9	57.4
Iron	1816.6	824.3	51192	2206.1	15638	78415	18266
Lead	81.6	39.4	206.22	5.9	5.2	1.7	1.8
Magnesium (D)	2.8	7.87	4.2	11.35	8.98	13.01	10.5
Manganese	1190.8	7284.7	9742.7	2742.3	2405.2	2323.3	848.7
Mercury	NA	NA	NA	NA	NA	NA	NA
Nickel	BD	13.1	15.1	BD	BD	40.1	13.8
Potassium (D)	BD	BD	1	1.1	BD	2.8	BD
Selenium	BD	BD	BD	BD	BD	BD	BD
Silver	NA	NA	NA	NA	NA	NA	NA
Sodium (D)	0.98	0.96	3.32	3.32	3.71	3.93	2.32
Thallium	BD	BD	BD	BD	BD	BD	BD
Vanadium	BD	BD	BD	BD	3.2	BD	BD
Zinc	2027.8	16485	28091	717.9	704.8	2780.5	802.2
Cyanide	NA	NA	NA	NA	NA	NA	NA

TABLE 2

CEMENT CREEK AQUEOUS SOURCE SAMPLES
TOTAL METALS, DISSOLVED NUTRIENTS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

						PROSPECT G.
Location	SO-18	SO-20	SO-19	S0-16	SO-23	PG-SO-6
Analyte	SOURCE PROSPECT G. ADIT	SOURCE KANSAS CITY MINE	SOURCE GEORGIA GULCH ADIT	SOURCE ANGLO SAXON MINE	SOURCE PORCUPINE G. ADIT	Joe & John's Mine Drainage
Flow (cfs)	0.07	0	0.38	0.09	0.09	9.49
pH	4.9	3.02	7.05	6.61	6.58	3.86
Conductivity	1464	1431	1501	1692	1526	772
Hardness	590	352	855	880	795	450
Aluminum	1758	9976	BD	356	442	13352
Antimony	BD	BD	BD	8.4	BD	BD
Arsenic	12.1	54.2	3.1	BD	5.2	7.5
Barium	4.8	2.4	9.7	12.1	12.6	9.8
Beryllium	1.7	2.5	BD	2.2	1.4	BD
Cadmium	1.8	35.4	BD	3.6	2.4	2.3
Calcium (D)	207	119.7	331.8	319.3	291.1	165.6
Chromium	BD	BD	BD	BD	BD	BD
Cobalt	32.1	BD	BD	42.2	36.2	17.3
Copper	44.2	2137.3	BD	14.3	29.3	14.4
Iron	53721	61240	3701.9	39290	23829	18827
Lead	0.8	124.61	BD	8.9	4.4	14.7
Magnesium (D)	17.7	12.85	6.43	20.19	16.52	8.75
Manganese	4511.2	32659.1	1687.7	9173.9	11094	1732.6
Mercury	NA	NA	NA	NA	NA	NA
Nickel	22.5	34.8	BD	12.1	BD	13.4
Potassium (D)	2.4	BD	BD	3.5	1.3	3.3
Selenium	BD	BD	BD	BD	BD	BD
Silver	NA	NA	NA	NA	NA	NA
Sodium (D)	5.06	0.99	7.9	9.19	8.82	3.18
Thallium	BD	BD	BD	BD	BD	BD
Vanadium	BD	BD	BD	BD	BD	BD
Zinc	978.6	8254	171.7	2780.5	2085.1	863.5
Cyanide	NA	NA	NA	NA	NA	NA

TABLE 3

CEMENT CREEK SURFACE WATER AND SEDIMENT SAMPLES
ORGANIC COMPOUNDS ABOVE DETECTION

LOCATION		COMPOUNDS		
		METHYLENE CHLORIDE	ACETONE	TOC
CC-SW-06	Cement Creek Below Mogul Mine			< 1 mg/L
CC-SE-06	Cement Creek Below Mogul Mine	4 ug/kg	BD	
CC-SW-12	North Fork Below Gold King Mine			1 mg/L
CC-SE-12	North Fork Below Gold King Mine	4 ug/kg	BD	
CC-SE-24	Cement Creek Below South Fork	10 ug/kg	7 ug/kg	
CC-SW-24	Cement Creek Below South Fork	2 ug/L	BD	<1 mg/L
CC-SW-31	Cement Creek Below Porcupine Gulch			<1 mg/L
CC-SW-36	Duplicate of CC-SW-06			<1 mg/L
CC-SW-37	Rinsate	2 ug/L	BD	<1 mg/L
CC-SW-40	Rinsate	2 ug/L	BD	
CC-SW-39	Rinsate	2 ug/L	BD	
PG-SW 03	Prospect Gulch Below Galena Queen Mine	3 ug/L	3 ug/L	2 mg/L
PG-SW-15	Prospect Gulch Below Henrietta Mine			<1 mg/L

Note, all other organic compounds measured were below detection limits.

TABLE 4

CEMENT CREEK SURFACE WATER SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

	UPPER CEMENT CREEK										
Location	CC-SW-1	SO-1	CC-SW-2	CC-SW-3	SO-3	CC-SW-4	CC-SW-5	SO-5	CC-SW-6	CC-SW-7	CC-SW-8
Analyte	BACKGROUND Cement Creek Above Queen Anne	AQ SOURCE	Cement Creek Below Queen Anne	BACKGROUND Ross Basin Trib Above Unnamed Mine	AQ SOURCE	Ross Basin Trib Below Unnamed Mine	Cement Creek Above Mogul and S. Mogul Mines	AQ SOURCE	Cement Creek Below Mogul & S. Mogul Mines	Cement Creek Above Corkscrew G. Above Ferricrete	Cement Creek Below Corkscrew G. Below Ferricrete
Flow (cfs)	0.08		0.11	0.63		0.52	1.42		1.84	1.42	1.45
pH	7.05		5.46	4.47		4.47	4.73		3.83	4.24	5.01
Conductivity	189		394	187		182	210		225	250	359
Hardness	83.3		162	83.3		74.7	86.6		85.2	102	112
Aluminum	40		3224	284		840	818		1241	1114	1168
Antimony	BD		BD	BD		BD	BD		BD	BD	BD
Arsenic	BD		BD	BD		BD	BD		BD	BD	BD
Barium	28.2		31.5	26.9		28.4	29.4		29	27.5	26
Beryllium	BD		BD	BD		BD	BD		BD	BD	BD
Cadmium	1.2		11.5	3.3		9.4	7.9		11.1	12.2	10
Chromium	BD		BD	BD		BD	BD		BD	BD	BD
Cobalt	BD		BD	BD		BD	BD		BD	BD	BD
Copper	6.2		116	74.6		223.5	166.4		244	215.1	192.6
Iron	16.7		104	27		118.7	77.1		100.7	113.3	50.9
Lead	BD		2.8	3.6		3.3	4.6		4.8	5.6	6.3
Manganese	1.8		4402.9	120.4		521.4	690.4		864.4	832.3	792.3
Mercury	NA		NA	NA		NA	NA		NA	NA	NA
Nickel	BD		11.9	BD		BD	BD		BD	BD	BD
Selenium	BD		BD	BD		BD	BD		BD	BD	BD
Silver	NA		NA	NA		NA	NA		NA	NA	NA
Thallium	BD		BD	BD		BD	BD		BD	BD	BD
Vanadium	BD		BD	BD		BD	BD		BD	BD	BD
Zinc	215.2		2260	517.3		2136.2	2007.3		2614.5	2397	2372
Cyanide	NA		NA	NA		NA	NA		2.7 U	NA	NA

TABLE 4

CEMENT CREEK SURFACE WATER SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

	CEMENT CREEK		NORTH FORK OF CEMENT CREEK		MINNEHAHA CREEK		MIDDLE FORK OF CEMENT CR.		
Location	CC-SW-9	CC-SW-13	CC-SW-10	CC-SW-12	CC-SW-15	CC-SW-16	SO-12	CC-SW-19	CC-SW-20
Analyte	Cement Creek Below Red & Bonita Mine	Cement Creek Below Confluence with North Fork	BACKGROUND North Fork Above Gold King Mine	North Fork Below Gold King Mine	Minnehaha Creek Below Lead-Carbonate Mill	Minnehaha Creek Above Confluence With South Fork	AQ SOURCE	Middle Fork Below Black Hawk Mine	Middle Fork Above confluence With South Fork
Flow (cfs)	1.79	1.15	NA	0.2	0.05	0.16		0.62	0.44
pH	4.32	4.54	NA	2.68	4.24	6.46		6.68	6.87
Conductivity	361	376	NA	2090	190	143		646	580
Hardness	114	117	NA	262	57.8	61.7		330	304
Aluminum	1524	1849	1050	62206	3185	46		212	291
Antimony	BD	BD	3	BD	BD	BD		BD	BD
Arsenic	BD	BD	3	5.2	BD	BD		BD	BD
Barium	26.3	25.8	66.3	2.5	25.2	12.9		13	13
Beryllium	BD	BD	1	5.8	BD	BD		BD	BD
Cadmium	11.1	13.5	1.5	112	11.6	0.5		1.5	1
Chromium	BD	BD	1	18	BD	BD		BD	BD
Cobalt	BD	BD	12.4	116	BD	6.8		BD	BD
Copper	196.8	217.6	5.2	6292	268.4	6.3		13.7	12.9
Iron	146.8	218.2	1440	88912	3877	67		789.8	720.6
Lead	6.4	7.3	3.6	3.5	170.7	1.8		2.4	1.7
Manganese	812.6	861.9	2180	11208	728.3	3.3		808.1	399.5
Mercury	NA	NA	0.2	NA	NA	NA		NA	NA
Nickel	BD	BD	17.9	80.7	BD	BD		BD	BD
Selenium	BD	BD	4	BD	BD	BD		BD	BD
Silver	NA	NA	1	NA	NA	NA		NA	NA
Thallium	BD	BD	6.8	BD	BD	BD		BD	BD
Vanadium	BD	BD	1	BD	BD	BD		BD	BD
Zinc	2618.6	2700.3	212	21932	2557.5	93		368.7	236
Cyanide	NA	NA	NA	5.4 U	NA	NA		NA	NA

TABLE 4

CEMENT CREEK SURFACE WATER SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

	SOUTH FORK OF CEMENT CREEK					CEMENT CREEK				
Location	CC-SW-21	S0-13	SO-17	CC-SW-22	CC-SW-23	CC-SW-33	CC-SW-24	SO-24	CC-SW-25	CC-SW-26
Analyte	BACKGROUND S. Fork Above Silver Ledge Mine	AQ SOURCE	AQ SOURCE	South Fork Below Silver Ledge Mine	South Fork Above Confluence with Cement Cr.	Cement Creek Above Confluence With South Fork	Cement Creek Below Confluence With South Fork	AQ SOURCE	Cement Creek Below Confluence With Dry Gulch Adit	Cement Creek Below Confluence With Prospect G.
Flow (cfs)	0.38			1.36	2.27	2.88	4.36		6.5	7.09
pH	6.32			5.71	5.6	7.9	6.11		5.44	4.79
Conductivity	180			658	738	1567	1227		1071	1119
Hardness	82			337	294	694	500		444	406
Aluminum	492			2153	1957	661	1445		2148	3746
Antimony	BD			BD	BD	BD	BD		BD	BD
Arsenic	BD			BD	BD	BD	BD		BD	1.6
Barium	10.2			9.9	11.1	12.8	11.9		10.8	10
Beryllium	BD			BD	BD	BD	BD		BD	BD
Cadmium	BD			2.2	2.6	2.8	2.8		2.6	2.6
Chromium	BD			BD	BD	BD	BD		BD	4.3
Cobalt	BD			16	13.3	BD	5.8		7.7	14.3
Copper	6.5			27.1	29.9	23.9	25.2		19.7	28.9
Iron	120.9			6637.3	3216.9	531.6	2021.4		4023.5	6559.9
Lead	BD			2.5	2.3	11.9	8.4		14.5	13.3
Manganese	59			1276.1	1659.7	2850.6	1671.6		1846.9	1458.9
Mercury	NA			NA	NA	NA	NA		NA	NA
Nickel	BD			BD	BD	BD	BD		BD	BD
Selenium	BD			BD	BD	BD	BD		BD	BD
Silver	NA			NA	NA	NA	NA		NA	NA
Thallium	BD			BD	BD	BD	BD		BD	BD
Vanadium	BD			3	BD	BD	BD		BD	BD
Zinc	41			451.8	707.1	724.9	659.1		706.3	678.7
Cyanide	NA			NA	NA	NA	2.2 U		NA	NA

TABLE 4

CEMENT CREEK SURFACE WATER SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

Location	CC-SW-26	SO-18	SO-20	CC-SW-28	SO-19	CC-SW-29	SO-16	SO-23	CC-SW-30	SO-23	CC-SW-31	CC-SW-CC48
Analyte	Cement Creek Below Confluence With Prospect G.	AQ SOURCE	AQ SOURCE	Cement Creek Below Confluence With Georgia Gulch	AQ SOURCE	Cement Creek Above Confluence With Porcupine G.	AQ SOURCE	AQ SOURCE	Porcupine G. Above Confluence With Cement Creek	AQ SOURCE	Cement Creek Below Confluence With Porcupine G.	Cement Creek Above Confluence With Animas River
Flow (cfs)	7.09			9.49		13.72			0.14		11.89	17.64
pH	4.79			3.86		3.71			4.45		3.76	4.1
Conductivity	1119			772		805			197.00		820	790
Hardness	406			450		452			90.10		442	439
Aluminum	3746			6319		5882			2114.00		5538	5183
Antimony	BD			BD		BD			BD		BD	BD
Arsenic	1.6			7.5		4.5			BD		4.6	2.1
Barium	10			9.8		10.6			27		9.9	12.4
Beryllium	BD			BD		BD			BD		BD	BD
Cadmium	2.6			2.3		2.5			2.5		2.1	2.1
Chromium	4.3			BD		BD			BD		BD	BD
Cobalt	14.3			17.3		17.2			9.9		11.6	13.1
Copper	28.9			14.4		24.4			46.8		26	26.3
Iron	8559.9			18827		13694			457.8		12569	7992.6
Lead	13.3			14.7		17.1			4.6		15.7	12.4
Manganese	1458.9			1732.6		1756.2			869.9		1637.5	1558.9
Mercury	NA			NA		NA			NA		NA	NA
Nickel	BD			13.4		BD			BD		BD	BD
Selenium	BD			BD		BD			BD		BD	BD
Silver	NA			NA		NA			NA		NA	NA
Thallium	BD			BD		BD			BD		BD	BD
Vanadium	BD			BD		5.1			BD		BD	BD
Zinc	678.7			863.5		861.6			590.1		764.8	877.4
Cyanide	NA			NA		NA			NA		NA	NA

TABLE 4

CEMENT CREEK SURFACE WATER SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

PROSPECT GULCH											
Location	PG-SW-1	PG-SW-2	S0-1	PG-SW-3	PG-SW-4	PG-SW-5	PG-SW-6	PG-SW-7	PG-SW-8	PG-SW-9	PG-SW-10
Analyte	Prospect Gulch Above the Galena Queen Mine	Prospect Gulch Above the Galena Queen Mine	AQ SOURCE	Prospect Gulch Below the Galena Queen Mine	Tributary to Prospect Gulch	Tributary With Acid Drainage	Tributary With Hercules Mine Waste	Tributary With Acid Drainage	Prospect Gulch Below Tributaries With Acid Drainage	Prospect G. Below Mineralized Canyon Above Hernietta Mine	Mineralized Trib Above Henrietta Mine Complex
Flow (cfs)	0	0.01		0	0.00	0.01	0	0	0.02	0.05	0.01
pH	4.48	4.46		2.73	5.46	6	3.62	3.67	3.95	3.61	3.66
Conductivity	112	194		1073	585	490	256	575	772.00	414	363
Hardness	37.3	72.1		49	256	199	44.8	201	138.00	135	90.3
Aluminum	40	638		6955	482	93	1861	3379	1279.00	1920	8028
Antimony	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Arsenic	BD	BD		2.3	BD	BD	BD	BD	BD	BD	BD
Barium	62.3	42.9		35.6	44.4	43.7	56.8	36.2	42.3	45.9	52.9
Beryllium	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Cadmium	BD	BD		111	1.5	0.5	4.3	1.5	7.8	7.9	BD
Chromium	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Cobalt	6.5	5.9		23.3	7.6	BD	11.9	17.7	9.6	10.5	27.4
Copper	25.5	BD		3116.6	55.2	BD	140.1	130.6	186	171.2	22.8
Iron	18.7	1034.1		18050	324.1	369.4	1056.1	802.1	552.6	919.8	235
Lead	BD	2.5		1027.4	BD	BD	155.9	17	72.77	62.6	41.2
Manganese	28.9	172.3		494.7	149.4	67.6	244.9	939.1	322.5	345.7	1035.6
Mercury	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
Nickel	BD	BD		12.4	BD	13.4	BD	BD	BD	BD	20.4
Selenium	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Silver	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
Thallium	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Vanadium	BD	BD		BD	3.3	BD	BD	BD	BD	BD	BD
Zinc	21.8	44.9		28243	985.1	191.2	797.2	231.3	1720.8	1750.9	171.4
Cyanide	NA	NA		2 U	NA	NA	NA	NA	NA		NA

TABLE 4

CEMENT CREEK SURFACE WATER SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in micrograms per liter (ug/L)

	PROSPECT GULCH				UPPER ANIMAS GAUGING STATIONS			
Location	PG-SW-11	PG-SW-16	SO-6	PG-SW-18	CC-SW-CC48	CCM34	CCA68	CCA72
Analyte	Prospect Gulch Below Mineralized Tributaries	Prospect Gulch Below the Henrietta Mine	AQ SOURCE	Prospect Gulch Below Joe & John's Mine	Cement Creek Above Confluence With Animas River	Mineral Creek Above Confluence With Animas R.	Animas River Above Cement Creek	Animas River Below Confluence With Mineral Creek
Flow (cfs)	0.05	0.05		0.04	17.64	51	55	127
pH	3.33	3.08		2.82	4.1	7.7	8.35	7.97
Conductivity	351	741		694	790	313	273	377
Hardness	125	130		122	439	168	125	186
Aluminum	2731	6289		6034	5183	2222	69	1530
Antimony	BD	BD		BD	BD	BD	BD	BD
Arsenic	BD	1.9		BD	2.1	BD	BD	2.1
Barium	40.8	29.8		27.9	12.4	24.2	24.9	22.3
Beryllium	BD	BD		BD	BD	BD	BD	BD
Cadmium	6.3	12.6		12.8	2.1	1.1	1.5	1.5
Chromium	BD	BD		BD	BD	BD	BD	BD
Cobalt	8.6	25.9		25.2	13.1	7.6	BD	BD
Copper	162.7	676.9		616.8	26.3	33.6	BD	18.2
Iron	270	15458		9842	7992.6	3244.2	98.5	2235.8
Lead	63	124.61		103.25	12.4	5.8	1.4	4.3
Manganese	421.8	772.5		751.3	1558.9	298.7	672.3	618.6
Mercury	NA	NA		NA	NA	NA	NA	NA
Nickel	BD	16.3		13.9	BD	BD	BD	BD
Selenium	BD	BD		BD	BD	BD	BD	BD
Silver	NA	NA		NA	NA	NA	NA	NA
Thallium	BD	BD		BD	BD	BD	BD	BD
Vanadium	BD	BD		BD	BD	BD	BD	BD
Zinc	1615.4	2913.3		3020.6	677.4	286.6	431.8	416.1
Cyanide	NA	2 U		NA	NA	NA	NA	NA

TABLE 5

CEMENT CREEK SURFACE WATER SAMPLES
DISSOLVED METALS AND DISSOLVED NUTRIENTS
Concentrations in micrograms per liter (ug/L)

	UPPER CEMENT CREEK										
Location	CC-SW-1	SO-1	CC-SW-2	CC-SW-3	SO-3	CC-SW-4	CC-SW-5	SO-5	CC-SW-6	CC-SW-7	CC-SW-8
Analyte	BACKGROUND Cement Creek Above Queen Anne	AQ SOURCE	Cement Creek Below Queen Anne	BACKGROUND Ross Basin Trib Above Unnamed Mine	AQ SOURCE	Ross Basin Trib Below Unnamed Mine	Cement Creek Above Mogul and S. Mogul Mines	AQ SOURCE	Cement Creek Below Mogul & S. Mogul Mines	Cement Creek Above Corkscrew G. Above Ferricrete	Cement Creek Below Corkscrew G. Below Ferricrete
Flow (cfs)	0.08		0.11	0.63		0.52	1.42		1.84	1.42	1.45
pH	7.05		5.46	4.47		4.47	4.73		3.83	4.24	5.01
Conductivity	189		394	187		182	210		225	250	359
Hardness	83.3		162	83.3		74.7	86.6		85.2	102	112
Aluminum	BD		3331	BD		451	699		1149	1128	1139
Antimony	BD		BD	BD		BD	BD		BD	BD	BD
Arsenic	BD		BD	BD		BD	BD		BD	BD	BD
Barium	26.8		31	26.2		26.6	28		27.4	23.2	23.4
Beryllium	BD		BD	BD		BD	BD		BD	BD	BD
Cadmium	0.8		12.3	2.9		10.3	11.5		11.7	11.1	10.2
Calcium	28.61		53.87	29.33		25.37	29.21		28.8	35.51	39.99
Chromium	BD		BD	BD		BD	BD		BD	BD	BD
Cobalt	BD		BD	BD		BD	BD		BD	BD	BD
Copper	BD		114.2	39.8		220.2	168.6		237.7	202.9	183.4
Iron	BD		BD	BD		5.6	BD		33.9	50.9	29.8
Lead	BD		1.4	BD		2.3	3.8		3.6	5	5.4
Magnesium	2.87		6.79	2.45		2.76	3.32		3.23	3.12	3.06
Manganese	1		4492.6	121.5		517.5	704.6		874.8	806.9	760.8
Mercury	NA		NA	NA		NA	NA		NA	NA	NA
Nickel	BD		14.9	BD		BD	BD		BD	BD	BD
Potassium	BD		BD	BD		BD	BD		BD	BD	BD
Selenium	BD		BD	BD		BD	BD		BD	BD	BD
Silver	NA		NA	NA		NA	NA		NA	NA	NA
Sodium	0.14		1.13	0.85		0.91	0.83		0.9	1.13	1.18
Thallium	BD		BD	BD		BD	BD		BD	BD	BD
Vanadium	BD		BD	BD		BD	BD		BD	BD	BD
Zinc	225		2419	537.3		3248.4	2160.4		2727.7	2447.6	2391.6
Cyanide	NA		NA	NA		NA	NA		NA	NA	NA

TABLE 5

CEMENT CREEK SURFACE WATER SAMPLES
DISSOLVED METALS AND DISSOLVED NUTRIENTS
Concentrations in micrograms per liter (ug/L)

			N FORK OF CEMENT CREEK		MINNEHAHA CREEK		MIDDLE FORK OF CEMENT CREEK		
Location	CC-SW-9	CC-SW-13	CC-SW-10	CC-SW-12	CC-SW-15	CC-SW-16	SO-12	CC-SW-19	CC-SW-20
Analyte	Cement Creek Below Red & Bonita Mine	Cement Creek Below Confluence with North Fork	BACKGROUND North Fork Above Gold King	North Fork Below Gold King Mine	Minnehaha Creek Below Lead-Carbonate Mill	Minnehaha Creek Above Confluence With South Fork	AQ SOURCE	Middle Fork Below Black Hawk Mine	Middle Fork Above confluence With South Fork
Flow (cfs)	1.79	1.15	NA	0.2	0.05	0.16		0.62	0.44
pH	4.32	4.54	NA	2.68	4.24	6.46		6.68	6.87
Conductivity	361	376	NA	2090	190	143		646	580
Hardness	114	117	NA	262	57.8	61.7		330	304
Aluminum	1416	1788	NA	58773	2772	BD		108	BD
Antimony	BD	BD	NA	BD	BD	BD		BD	BD
Arsenic	BD	BD	NA	4.4	BD	BD		BD	BD
Barium	23.3	22.6	NA	1.6	21.6	10.7		12.3	12
Beryllium	BD	BD	NA	5.3	BD	BD		BD	BD
Cadmium	11	11	NA	100	9.6	BD		1.4	0.9
Calcium	40.51	41.13	NA	50.79	19.09	22.01		121.8	112.1
Chromium	BD	9.4	NA	14.2	BD	BD		BD	BD
Cobalt	BD	BD	NA	1.6	9.3	BD		5.7	BD
Copper	182.3	210.1	NA	5959.6	242.6	BD		11.9	BD
Iron	46.7	142.4	NA	80355	857.6	8.5		13.4	50.8
Lead	6.2	6.1	NA	1.7	108.3	BD		1.8	BD
Magnesium	3.07	3.26	NA	32.85	2.45	1.64		6.17	5.94
Manganese	774.1	832.6	NA	10569.5	681.3	1.3		717.2	329.9
Mercury	NA	NA	NA	NA	NA	NA		NA	NA
Nickel	BD	11.8	NA	82.2	BD	BD		BD	BD
Potassium	1.3	BD	NA	BD	BD	BD		BD	BD
Selenium	BD	BD	NA	BD	BD	BD		BD	BD
Silver	NA	NA	NA	NA	NA	NA		NA	NA
Sodium	1.68	1.29	NA	2.95	1.37	0.98		1.82	1.82
Thallium	BD	BD	NA	BD	BD	BD		BD	BD
Vanadium	BD	5.4	NA	BD	BD	BD		4.8	BD
Zinc	2673.2	2545.3	NA	19950	2328.3	75.5		298.2	196.3
Cyanide	NA	NA	NA	NA	NA	NA		NA	NA

TABLE 5

CEMENT CREEK SURFACE WATER SAMPLES
DISSOLVED METALS AND DISSOLVED NUTRIENTS
Concentrations in micrograms per liter (ug/L)

	SOUTH FORK OF CEMENT CREEK					CEMENT CREEK				
Location	CC-SW-21	S0-13	SO-17	CC-SW-22	CC-SW-23	CC-SW-33	CC-SW-24	SO-24	CC-SW-25	CC-SW-26
Analyte	BACKGROUND S. Fork Above Silver Ledge Mine	AQ SOURCE	AQ SOURCE	South Fork Below Silver Ledge Mine	South Fork Above Confluence with South Fork	Cement Creek Above Confluence With South Fork	Cement Creek Below Confluence With South Fork	AQ SOURCE	Cement Creek Below Confluence With Dry Gulch Adit	Cement Creek Below Confluence With Prospect G.
Flow (cfs)	0.38			1.36	2.27	2.88	4.36		6.5	7.09
pH	6.32			5.71	5.6	7.9	6.11		5.44	4.79
Conductivity	180			658	738	1567	1227		1071	1119
Hardness	82			337	294	694	500		444	406
Aluminum	95			861	895	369	384		1256	3195
Antimony	BD			BD	BD	BD	BD		BD	BD
Arsenic	BD			BD	BD	BD	BD		BD	BD
Barium	9.6			7.8	9.6	11.7	10.9		10.9	10
Beryllium	BD			BD	BD	BD	BD		BD	BD
Cadmium	BD			1.7	2.2	1.4	2		1.9	2
Calcium	29.94			124.9	108.1	284	188.1		165.9	150.3
Chromium	BD			BD	8.1	BD	BD		BD	BD
Cobalt	BD			BD	16.8	BD	7.1		9.7	BD
Copper	7.4			11.5	28.5	BD	9.1		14.3	10
Iron	25.3			5207	2008	39.4	868.1		2831.7	7100.7
Lead	BD			BD	BD	BD	BD		1.3[illegible]	6.7
Magnesium	1.75			6.12	5.69	8.49	7.4		7.33	7.52
Manganese	58.8			1310.5	1845.4	1990.9	1641.3		1597.3	1460.8
Mercury	NA			NA	NA	NA	NA		NA	NA
Nickel	BD			BD	BD	BD	BD		BD	BD
Potassium	BD			BD	1.4	BD	1.9		BD	BD
Selenium	BD			BD	BD	BD	BD		BD	BD
Silver	NA			NA	NA	NA	NA		NA	NA
Sodium	1.24			2.92	2.5	3.59	3.13		3.13	3.09
Thallium	BD			BD	BD	BD	BD		BD	BD
Vanadium	BD			BD	3.6	BD	BD		BD	BD
Zinc	47.4			441	690.3	317.8	611.1		645.8	701.9
Cyanide	NA			NA	NA	NA	NA		NA	NA

TABLE 5

CEMENT CREEK SURFACE WATER SAMPLES
DISSOLVED METALS AND DISSOLVED NUTRIENTS
Concentrations in micrograms per liter (ug/L)

Location	CC-SW-26	SO-18	SO-20	CC-SW-28	SO-19	CC-SW-29	SO-16	SO-23	CC-SW-30	CC-SW-31	CC-SW-CC48
Analyte	Cement Creek Below Confluence With Prospect G.	AQ SOURCE	AQ SOURCE	Cement Creek Below Confluence With Georgia Gulch	AQ SOURCE	Cement Creek Above Confluence With Porcupine G.	AQ SOURCE	AQ SOURCE	Porcupine G. Above Confluence With Cement Creek	Cement Creek Below Confluence With Porcupine G.	Cement Creek Above Confluence With Animas River
Flow (cfs)	7.09			9.49		13.72			0.14	11.89	17.64
pH	4.79			3.86		3.71			4.45	3.76	4.1
Conductivity	1119			772		805			197.00	820	790
Hardness	406			450		452			90.10	442	439
Aluminum	3195			6042		5812			1673.00	5648	5001
Antimony	BD			46.9		BD			BD	BD	BD
Arsenic	BD			3.2		1.1			BD	4.6	BD
Barium	10			9.5		9.6			24.6	17.9	10.6
Beryllium	BD			1.3		BD			BD	1.9	BD
Cadmium	2			1.7		1.9			1.9	1.9	1.8
Calcium	150.3			165.6		167			27.67	163.1	162.6
Chromium	BD			BD		BD			BD	BD	BD
Cobalt	BD			26		13			8	7.9	16.3
Copper	10			34.1		28.8			43.7	16.9	30.6
Iron	7100.7			16868		11624			92.1	10742	5304.7
Lead	6.7			10.5		13.5			1.7	13.1	10.3
Magnesium	7.52			8.75		8.58			5.1	8.35	8.04
Manganese	1460.6			1723		1771.1			856.6	1592.3	1543.5
Mercury	NA			NA		NA			NA	NA	NA
Nickel	BD			19.9		12.5			BD	16.4	16.5
Potassium	BD			3.3		2.9			BD	BD	2.9
Selenium	BD			BD		BD			BD	BD	BD
Silver	NA			NA		NA			NA	NA	NA
Sodium	3.09			3.19		3.38			1.69	3.39	3.71
Thallium	BD			BD		BD			BD	BD	BD
Vanadium	BD			BD		5.1			3.1	BD	BD
Zinc	701.9			833.9		834.3			565.7	775.5	653.5
Cyanide	NA			NA		NA			NA	NA	NA

TABLE 5

CEMENT CREEK SURFACE WATER SAMPLES
DISSOLVED METALS AND DISSOLVED NUTRIENTS
Concentrations in micrograms per liter (ug/L)

PROSPECT GULCH											
Location	PG-SW-1	PG-SW-2	S0-1	PG-SW-3	PG-SW-4	PS-SW-5	PG-SW-6	PG-SW-7	PG-SW-8	PG-SW-9	PG-SW-10
Analyte	Prospect Gulch Above the Galena Queen Mine	Prospect Gulch Above the Galena Queen Mine	AQ SOURCE	Prospect Gulch Below the Galena Queen Mine	Tributary to Prospect Gulch	Tributary With Acid Drainage	Tributary With Hercules Mine Waste	Tributary With Acid Drainage	Prospect Gulch Below Tributaries With Acid Drainage	Prospect G. Below Mineralized Canyon Above Hernietta Mine	Mineralized Trib Above Henrietta Mine Complex
Flow (cfs)	0	0.01		0	0.00	0.01	0	0	0.02	0.05	0.01
pH	4.48	4.46		2.73	5.46	6	3.62	3.67	3.95	3.61	3.66
Conductivity	112	194		1073	585	490	256	575	772.00	414	363
Hardness									138.00	135	90.3
Aluminum	BD	244		6827	62	98	1903	3268	1265.00	1617	7944
Antimony	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Arsenic	BD	BD		1.6	BD	BD	BD	BD	BD	BD	BD
Barium	55.4	37.5		32.7	40.9	40.4	53.7	26.8	38.2	38.8	50
Beryllium	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Cadmium	BD	BD		114	1.4	BD	4.2	1.2	6.9	7.2	BD
Calcium	11.79	23.63		13.06	88.86	69.36	13.97	62.5	46.37	45.25	24.93
Chromium	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Cobalt	BD	BD		14.6	BD	BD	BD	9.4	BD	BD	18.8
Copper	18.7	BD		3087.8	BD	BD	139.5	125	180	178.6	21.2
Iron	19.7	209		17864	BD	298.3	955.6	633.9	455.9	250.5	193.3
Lead	BD	0.9		1011.5	BD	BD	167.1	16.1	68.6	57.9	41.5
Magnesium	1.91	3.19		3.98	8.26	6.23	2.41	10.85	5.4	5.33	6.82
Manganese	24.3	164		483.1	137.6	64.6	246.9	901.2	309.5	353.1	1015.4
Mercury	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
Nickel	BD	BD		16.3	BD	13.4	BD	10.1	BD	11.5	17.5
Potassium	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Selenium	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Silver	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
Sodium	0.93	1.04		1.15	1.48	1.26	0.76	0.58	1.02	1.03	0.39
Thallium	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Vanadium	BD	BD		BD	BD	BD	BD	BD	BD	BD	BD
Zinc	28.3	35.6		29211	542.4	195.8	841.6	239.3	1741.2	1909.7	187.8
Cyanide	NA	NA		NA	NA	NA	NA	NA	NA		NA

TABLE 5

CEMENT CREEK SURFACE WATER SAMPLES
DISSOLVED METALS AND DISSOLVED NUTRIENTS
Concentrations in micrograms per liter (ug/L)

	PROSPECT GULCH				UPPER ANIMAS GAUGING STATIONS			
Location	PG-SW-11	PG-SW-16	SO-6	PG-SW-18	CC-SW-CC48	CCM34	CCA68	CCA72
Analyte	Prospect Gulch Below Mineralized Tributaries	Prospect Gulch Below the Henrietta Mine	AQ SOURCE	Prospect Gulch Below Joe & John's Mine	Cement Creek Above Confluence With Animas River	Mineral Creek Above Confluence With Animas R.	Animas River Above Cement Creek	Animas River Below Confluence With Mineral Creek
Flow (cfs)	0.05	0.05		0.04	17.64	51	55	127
pH	3.33	3.08		2.82	4.1	7.7	8.35	7.97
Conductivity	351	741		694	790	313	273	377
Hardness	125	130		122	439	168	125	186
Aluminum	2392	6450		6343	5001	BD	BD	BD
Antimony	BD	BD		BD	BD	BD	BD	BD
Arsenic	BD	BD		BD	BD	BD	BD	BD
Barium	37.2	27.5		27.6	10.6	22.8	22.4	20.2
Beryllium	BD	BD		BD	BD	BD	BD	BD
Cadmium	6.5	13.9		14.6	1.8	0.8	1.1	1.2
Calcium	41.19	40.58		37.57	162.6	59.56	45.97	67.65
Chromium	BD	BD		BD	BD	BD	BD	BD
Cobalt	7.3	17		18.7	16.3	7.6	BD	BD
Copper	163.1	689.9		639.8	30.6	7.9	BD	4.2
Iron	247.1	2630.8		10672	5304.7	1979.7	28.6	1156
Lead	61.4	106.9		104.6	10.3	BD	BD	BD
Magnesium	5.3	7.03		6.84	8.04	4.61	2.52	4.05
Manganese	414	793.7		770.2	1543.5	306.6	678	599.6
Mercury	NA	NA		NA	NA	NA	NA	NA
Nickel	12.2	12.6		17.1	16.5	BD	BD	BD
Potassium	BD	BD		BD	2.9	1.3	BD	BD
Selenium	BD	BD		BD	BD	BD	BD	BD
Silver	NA	NA		NA	NA	NA	NA	NA
Sodium	0.94	0.95		0.93	3.71	2.63	1.93	2.53
Thallium	BD	BD		BD	BD	BD	BD	BD
Vanadium	BD	BD		BD	BD	BD	BD	BD
Zinc	1684.9	3125.3		3253.6	653.5	268.8	422.7	376
Cyanide	NA	NA		NA	NA	NA	NA	NA

TABLE 6

CEMENT CREEK SURFACE WATER AND AQUEOUS SOURCE SAMPLES
TOTAL METALS LOADING
Reported in Grams per Day

	UPPER CEMENT CREEK										
Location	CC-SW-1	SO-1	CC-SW-2	CC-SW-3	SO-3	CC-SW-4	CC-SW-5	SO-5	CC-SW-6	CC-SW-7	CC-SW-8
Analyte	BACKGROUND Cement Creek Above Queen Anne	AQ SOURCE Q. ANNE	Cement Creek Below Queen Anne	BACKGROUND Ross Basin Trib Above Unnamed Mine	AQ SOURCE IO NAM	Ross Basin Trib Below Unnamed Mine	Cement Creek Above Mogul and S. Mogul Mines	AQ SOURCE MOGUL	Cement Creek Below Mogul & S. Mogul Mines	Cement Creek Above Corkscrew G. Above Ferricrete	Cement Creek Below Corkscrew G. Below Ferricrete
Flow (cfs)	0.08	0.05	0.11	0.63	0.02	0.52	1.42	0.02	1.84	1.42	1.45
pH	7.05	6.37	5.46	4.47	3.43	4.47	4.73	2.89	3.83	4.24	5.01
Conductivity	189	301	394	187	510	182	210	1098	225	250	359
Hardness	83.3	113	162	83.3	85.1	74.7	86.6	226	85.2	102	112
Aluminum	7.84	0	884.67	439.75	0	1078.39	2937.81	0	5591.39	3878.34	3928.03
Antimony	0	6.88	0	0	2.78	0	0	3.23	0	0	0
Arsenic	0	0	0	0	0	0	0	1.02	0	0	0
Barium	5.53	1.99	8.634	41.65	1.17	36.46	101.99	0.52	130.66	95.74	92.17
Beryllium	0	0	0	0	0	0	0	0.28	0	0	0
Cadmium	0.24	1.42	3.16	5.11	4.46	12.07	27.41	8.7	50.01	42.27	35.45
Chromium	0	0	0	0	0	0	0	0	0	0	0
Cobalt	0	1.1	0	0	0.71	0	0	1.61	0	0	0
Copper	1.22	30.1	31.83	115.51	135	286.93	577.27	378	1099.35	748.86	682.8
Iron	3.27	236	28.54	41.81	42.4	152.39	267.48	3010	453.71	394.45	180.45
Lead	0	10.6	0.77	5.57	1.98	4.24	15.96	12.1	21.63	19.5	22.33
Manganese	0.35	155	1208.16	186.43	375	669.37	2395.14	573	3984.71	2897.61	2808.82
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	0	0	3.27	0	0.67	0	0	0.89	0	0	0
Selenium	0	0	0	0	0	0	0	0	0	0	0
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0	0	0	0	0	0	0	0	0	0	0
Vanadium	0	0	0	0	0	0	0	0	0	0	0
Zinc	42.18	263	620.14	800.99	848	2742.45	6963.73	1652	11779.8	8345.04	8409.1
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6

CEMENT CREEK SURFACE WATER AND AQUEOUS SOURCE SAMPLES
TOTAL METALS LOADING
Reported in Grams per Day

	CEMENT CREEK			NORTH FORK OF CEMENT CREEK		MINNEHAHA CREEK		MIDDLE FORK OF CEMENT CREEK		
Location	CC-SW-8	CC-SW-9	CC-SW-13	CC-SW-10	CC-SW-12	CC-SW-15	CC-SW-16	SO-12	CC-SW-19	CC-SW-20
Analyte	Cement Creek Below Corkscrew G. Below Ferricrete	Cement Creek Below Red & Bonita Mine	Cement Creek Below Confluence with North Fork	BACKGROUND North Fork Above Gold King Mine	North Fork Below Gold King Mine	Minnehaha Creek Below Lead-Carbonate Mill	Minnehaha Creek Above Confluence With South Fork	AQ SOURCE B. Hawk	Middle Fork Below Black Hawk Mine	Middle Fork Above confluence With South Fork
Flow (cfs)	1.45	1.79	1.15	NA	0.2	0.05	0.16	0.2	0.62	0.44
pH	5.01	4.32	4.54	NA	2.68	4.24	6.46	7.29	6.68	6.87
Conductivity	359	361	376	NA	2090	190	143	1200	646	580
Hardness	112	114	117	NA	262	57.8	61.7	694	330	304
Aluminum	3928.03	6690.97	5218.62	UD	30480.94	390.16	18.03	51.94	322.55	313.7
Antimony	0	0	0	UD	0	0	0	0	0	0
Arsenic	0	0	0	UD	2.55	0	0	0	0	0
Barium	92.17	115.47	72.82	UD	1.23	3.09	5.06	4.61	19.78	14.01
Beryllium	0	0	0	UD	2.84	0	0	0	0	0
Cadmium	35.45	48.73	38.1	UD	54.88	1.42	0.2	1.23	2.28	1.08
Chromium	0	0	0	UD	8.82	0	0	0	0	0
Cobalt	0	0	0	UD	56.84	0	2.67	2.45	0	0
Copper	682.8	864.03	614.15	UD	3083.37	32.88	2.47	5.49	20.84	13.91
Iron	180.45	644.51	615.85	UD	43566.88	474.93	26.26	1081	1201.64	776.81
Lead	22.33	28.1	20.6	UD	1.72	20.91	0.71	2.89	3.65	1.83
Manganese	2808.82	3567.64	2432.63	UD	5492.07	89.22	1.29	1344	1229.48	430.66
Mercury	NA	NA	NA	UD	NA	NA	NA	NA	NA	NA
Nickel	0	0	0	UD	39.54	0	0	0	0	0
Selenium	0	0	0	UD	0	0	0	0	0	0
Silver	NA	NA	NA	UD	NA	NA	NA	NA	NA	NA
Thallium	0	0	0	UD	0	0	0	0	0	0
Vanadium	0	0	0	UD	0	0	0	0	0	0
Zinc	8409.1	11497.58	7621.33	UD	10746.68	313.29	36.46	351.8	560.96	254.41
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6

CEMENT CREEK SURFACE WATER AND AQUEOUS SOURCE SAMPLES
TOTAL METALS LOADING
Reported Ion Grams per Day

	SOUTH FORK OF CEMENT CREEK					CEMENT CREEK					
Location	CC-SW-21	SO-13	SO-17	CC-SW-22	CC-SW-23	CC-SW-13	CC-SW-33	CC-SW-24	SO-24	CC-SW-25	CC-SW-26
Analyte	BACKGROUND S. Fork Above Silver Ledge Mine	AQ SOURCE S. Ledge	AQ SOURCE Big CO	South Fork Below Silver Ledge Mine	South Fork Above Confluence with Cement Creek	Cement Creek Below Confluence with North Fork	Cement Creek Above Confluence With South Fork	Cement Creek Below Confluence With South Fork	AQ SOURCE Dry Gulch	Cement Creek Below Confluence With Dry Gulch Adit	Cement Creek Below Confluence With Prospect G.
Flow (cfs)	0.38	0.89	0.04	1.36	2.27	1.15	2.88	4.36	0.00245	6.5	7.09
pH	6.32	6.28	4.56	5.71	5.6	4.54	7.9	6.11	3.36	5.44	4.79
Conductivity	180	1050	825	658	738	376	1567	1227	469	1071	1119
Hardness	82	578	337	337	294	117	694	500	55.5	444	406
Aluminum	458.05	2211	647.9	7173.8	10883.86	5218.62	6075.22	15435.5	67.13	34206.9	65106.6
Antimony	0	0	0	0	0	0	0	0	0	0	0
Arsenic	0	4.58	0.77	0	0	0	0	0	0	0	27.81
Barium	9.5	22.24	0.21	32.99	61.73	72.82	90.32	127.12	0.01	171.99	173.8
Beryllium	0	3.49	0.16	0	0	0	0	0	0.01	0	0
Cadmium	0	5.23	0.59	7.33	14.46	38.1	19.76	29.91	0.06	41.41	45.19
Chromium	0	10.25	0	0	0	0	0	0	0	0	74.74
Cobalt	0	37.07	5.56	53.31	73.97	0	0	61.96	0.16	122.62	248.54
Copper	6.05	34.23	2.28	90.3	166.29	614.15	168.64	269.19	0.35	313.72	502.29
Iron	112.56	34099	6916	22115.48	17890.79	615.85	3750.97	21592.6	111.88	64074.24	149469
Lead	0	11.34	0.15	8.33	12.79	20.6	83.97	89.73	0.01	230.91	231.16
Manganese	54.93	5255	204.9	4251.97	9230.42	2432.63	14470.4	17856	5.2	26226.88	25356.1
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	0	0	3.54	0	0	0	0	0	0.08	0	0
Selenium	0	0	0	0	0	0	0	0	0	0	0
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0	0	0	0	0	0	0	0	0	0	0
Vanadium	0	0	0.59	10	0	0	0	0	0	0	0
Zinc	38.17	1537	95.86	1505.4	3932.54	7621.33	5114.89	7040.51	4.91	11247.83	11796
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6

CEMENT CREEK SURFACE WATER AND AQUEOUS SOURCE SAMPLES
TOTAL METALS LOADING
Reported in Grams per Day

	CEMENT CREEK										
Location	CC-SW-26	SO-18	SO-20	CC-SW-28	SO-19	CC-SW-29	SO-16	SO-23	CC-SW-30	CC-SW-31	CC-SW-CC48
Analyte	Cement Creek Below Confluence With Prospect G.	AQ SOURCE Pros.G. Adit	AQ SOURCE Kansas C	Cement Creek Below Confluence With Georgia Gulch	AQ SOURCE Below GA G.	Cement Creek Above Confluence With Porcupine G.	AQ SOURCE Anglo Saxon	AQ SOURCE Porcupine	Porcupine G. Above Confluence With Cement Creek	Cement Creek Below Confluence With Porcupine G.	Cement Creek Above Confluence With Animas River
Flow (cfs)	7.09	0.07	0.0006	9.49	0.38	13.72	0.09		0.14	11.89	17.64
pH	4.79	4.9	3.02	3.86	7.05	3.71	6.61		4.45	3.76	4.1
Conductivity	1119	1464	1431	772	1501	805	1692		197.00	820	790
Hardness	406	590	352	450	855	452	880		90.10	442	439
Aluminum	65106.6	310.11	14.66	14687.98	0	197761	80.24		730.28	161378.98	223998.89
Antimony	0	0	0	0	0	0	0		0	0	0
Arsenic	27.81	2.13	0.08	174.31	2.92	151.3	1.89		0	134.05	90.76
Barium	173.8	0.85	0	227.76	9.13	356.39	2.73		9.33	288.49	535.9
Beryllium	0	0.3	0	0	0	0	0.5		0	0	0
Cadmium	45.19	0.32	0.05	53.45	0	84.05	0.81		0.86	61.19	90.76
Chromium	74.74	0	0	0	0	0	0		0	0	0
Cobalt	248.54	5.66	0.08	402.06	0	578.29	9.51		3.42	343.86	566.16
Copper	502.29	7.8	3.14	334.67	0	820.36	3.22		16.17	757.65	1136.63
Iron	149469	9476.38	90.02	437552.66	3482.75	460411	8855.97		158.15	366264.43	345424.19
Lead	231.16	0.14	0.18	341.64	0	574.93	2.01		1.59	457.5	535.9
Manganese	25356.1	795.78	48.01	40266.84	1587.79	59045.8	2067.8		300.51	44803.21	67372.54
Mercury	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Nickel	0	3.97	0.05	311.43	0	0	2.73		0	0	0
Selenium	0	0	0	0	0	0	0		0	0	0
Silver	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Thallium	0	0	0	0	0	0			0	0	0
Vanadium	0	0	0	0	0	171.47	0		0	0	0
Zinc	11796	172.63	12.13	20068.34	161.54	29640.6	626.72		203.85	22286.5	29275.87
Cyanide	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA

TABLE 6

CEMENT CREEK SURFACE WATER SAMPLES
TOTAL METALS LOADING
Reported in Grams per Day

PROSPECT GULCH											
Location	PG-SW-1	PG-SW-2	SO-1	PG-SW-3	PG-SW-4	PS-SW-5	PG-SW-6	PG-SW-7	PG-SW-8	PG-SW-9	PG-SW-10
Analyte	Prospect Gulch Above the Galena Queen Mine	Prospect Gulch Above the Galena Queen Mine	AQ SOURCE	Prospect Gulch Below the Galena Queen Mine	Tributary to Prospect Gulch	Tributary With Acid Drainage	Tributary With Hercules Mine Waste	Tributary With Acid Drainage	Prospect Gulch Below Tributaries With Acid Drainage	Prospect G. Below Mineralized Canyon Above Henrietta Mine	Mineralized Trib Above Henrietta Mine Complex
Flow (cfs)	0	0.01		0	0.00	0.01	0	0	0.02	0.05	0.01
pH	4.48	4.46		2.73	5.46	6	3.62	3.67	3.95	3.61	3.66
Conductivity	112	194		1073	585	490	256	575	772.00	414	363
Hardness	37.3	72.1		49	256	199	44.8	201	138.00	135	90.3
Aluminum	0.08	7.82		20.45	0.94	1.14	3.65	26.49	75.83	239.9	98.34
Antimony	0	0		0	0	0	0	0	0	0	0
Arsenic	0	0		0.01	0	0	0	0	0	0	0
Barium	0.12	0.53		0.1	0.09	0.54	0.11	0.28	2.51	5.74	0.65
Beryllium	0	0		0	0	0	0	0	0	0	0
Cadmium	0	0		0.33	0	0.01	0.01	0.01	0.46	0.99	0
Chromium	0	0		0	0	0	0	0	0	0	0
Cobalt	0.01	0.07		0.07	0.01	0	0.02	0.14	0.57	1.31	0.34
Copper	0.05	0		9.16	0.11	0	0.27	1.02	11.03	21.39	0.28
Iron	0.04	12.67		53.07	0.64	4.53	2.07	6.29	32.76	114.93	2.88
Lead	0	0.03		3.02	0	0	0.31	0.13	4.31	7.82	0.5
Manganese	0.06	2.11		1.45	0.29	0.83	0.48	7.36	19.12	43.2	12.69
Mercury	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
Nickel	0	0		0.04	0	0	0	0	0	0	0.25
Selenium	0	0		0	0	0	0	0	0	0	0
Silver	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0	0		0	BD	0	0	BD	0	0	0
Vanadium	0	0		0	0.01	0	0	BD	0	0	0
Zinc	0.04	0.55		83.03	1.93	2.34	1.56	1.81	102.03	218.77	2.1
Cyanide	NA	NA		NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6

CEMENT CREEK SURFACE WATER AND AQUEOUS SOURCE SAMPLES
TOTAL METALS LOADING
Reported In Grams per Day

	PROSPECT GULCH				UPPER ANIMAS GAUGING STATIONS			
Location	PG-SW-11	PG-SW-16	SO-6	PG-SW-18	CC-SW-CC48	CC-SW-M34	CC-SW-A68	CC-SW-A72
Analyte	Prospect Gulch Above the Henrietta Mine	Prospect Gulch Below the Henrietta Mine	AQ SOURCE Joe & Johns	Prospect Gulch Below Joe & John's Mine	Cement Creek Above Confluence With Animas River	Mineral Creek Above Confluence With Animas R.	Animas River Above Cement Creek	Animas River Below Confluence With Mineral Creek
Flow (cfs)	0.05	0.05	0.0001	0.04	17.64	51	55	127
pH	3.33	3.08	2.71	2.82	4.1	7.7	8.35	7.97
Conductivity	351	741	1350	694	790	313	273	377
Hardness	125	130	12.5	122	439	168	125	186
Aluminum	261.4	770.4	3.27	606.12	223998.89	277638.9	9297.75	476059.5
Antimony	0	0	0	0	0	0	0	0
Arsenic	0	0.23	0.01	0	90.76	0	0	0
Barium	4.5	3.65	0	2.8	535.9	3023.79	3355.28	6938.65
Beryllium	0	0	0	0	0	0	0	0
Cadmium	0.69	1.53	0.01	1.29	90.76	137.45	202.13	466.73
Chromium	0	0	0	0	0	0	0	0
Cobalt	0.95	3.17	0.01	2.53	566.16	949.62	0	0
Copper	17.94	82.92	0.12	61.96	1136.63	4198.32	0	5662.93
Iron	29.77	1893.61	15.13	988.63	345424.19	405362.79	13272.88	695669.17
Lead	6.95	12.05	0.13	10.37	535.9	724.71	188.65	1337.95
Manganese	46.5	94.63	0.07	75.47	67372.54	37322.57	90592.43	192477.39
Mercury	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	0	2	0.01	1.4	0	0	0	0
Selenium	0	0	0	0	0	0	0	0
Silver	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0	0	0	0	0	0	0	0
Vanadium	0	0	0	0	0	0	0	0
Zinc	178.1	356.88	2.48	303.42	29275.87	35810.67	58185.05	129469.52
Cyanide	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 7

CEMENT CREEK SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)

	UPPER CEMENT CREEK							
Location	CC-SE-1	CC-SE-2	CC-SE-3	CC-SE-4	CC-SE-5	CC-SE-6	CC-SE-7	CC-SE-8
Analyte	BACKGROUND Cement Creek Above Queen Anne	Cement Creek Below Queen Anne	BACKGROUND Ross Basin Trib Above Unnamed Mine	Ross Basin Trib Below Unnamed Mine	Cement Creek Above Mogul and S. Mogul Mines	Cement Creek Below Mogul & S. Mogul Mines	Cement Creek Above Corkscrew G. Above Ferricrete	Cement Creek Below Corkscrew G. Below Ferricrete
Aluminum	6420	12400	18000	13800	13300	12100 J	13900	11100
Antimony	0.76 U	0.94 B	0.67 U	1.1 B	2 B	1.6 B	0.65 UJ	1.3 BJ
Arsenic	119 J	37.3	33.5 J	54.1 J	30.6 J	31 J	28.6	25.6
Barium	75.7	84.5	80.3	51.2 B	44.6 B	45 B	54.6	56.1
Beryllium	1.6	1 B	1.6	0.69 B	0.86 B	0.61 B	0.72 B	0.45 B
Cadmium	6.7	1 B	12.4	3.5	3.8	3.1	1.4	0.77 B
Calcium	1690	1750	2230	1680	1490	1540	1990	1420
Chromium	2.9	8	7.5	7.4	7	4.7	8.4	5.8
Cobalt	14.8	14.1	23.6	20.2	14.5	13.3	12	8.6 B
Copper	158	137	1190	446	432	200 J	250	161
Iron	28800	35200	39600	62400	30300	33200	43800	40100
Lead	1610	377	961	747	834	722 J	395	307
Magnesium	2530	7770	10200	8760	8300	8500 J	8710	6820
Manganese	3770	3530	7970 J	4260 J	3810 J	2500 J	2220 J	1570 J
Mercury	0.13 U	0.12 U	0.11 U	0.13 U	0.12 U	0.13 U	0.11 U	0.12 U
Nickel	6.3 B	6 B	12.3	7.9 BJ	6.3 B	5.5 B	5.1 BJ	3.8 B
Potassium	1010 B	1120 B	636 B	867 B	626 B	879 B	734 B	632 B
Selenium	1.3	1.4	2	1.5	1.7	1.6	1.6	1.8
Silver	0.87 B	1.4 B	0.97 B	1.9 B	1.5 B	1.6 B	1 B	1.6 B
Sodium	168 B	190 B	172 B	170 BJ	166 B	214 B	217 B	212 B
Thallium	12.4	11.6	23.1	14.7	12.1	9.2	8.6	6.6
Vanadium	6.4 B	23.4	33.4	40.1	23	22	28.6	24.6
Zinc	795 J	274 J	1880 J	672 J	475 J	749	340 J	308 J
Cyanide	NA	NA	NA	NA	NA	0.13 U	NA	NA

TABLE 7

CEMENT CREEK SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)

	CEMENT CREEK			N. FORK OF CEMENT CR		MINNEHAHA CREEK		MIDDLE FORK OF CEMENT CREEK			
Location	CC-SE-8	CC-SE-9	CC-SE-13	CC-SE-10	CC-SE-12	CC-SE-15	CC-SE-16	CC-SE-17	CC-SE-18	CC-SE-19	CC-SE-20
Analyte	Cement Creek Below Corkscrew G. Below Ferricrete	Cement Creek Below Red & Bonita Mine	Cement Creek Below Confluence with North Fork	BACKGROUND North Fork Above Gold King Mine	North Fork Below Gold King Mine	Minnehaha Creek Below Lead-Carbonate Mill	Minnehaha Creek Above Confluence With South Fork	BACKGROND Middle F. Above Unnamed Waste	Middle Fork Below Unnamed Waste Rock Pile	Middle Fork Below Black Hawk Mine	Middle Fork Above confluence With South Fork
Aluminum	11100	4140	7890	13300	9660 J	3570	13800	20200	8950	15900	12000
Antimony	1.3 BJ	0.76 UJ	0.7 UJ	0.69 UJ	0.92 B	7.1 BJ	0.72 UJ	0.66 UJ	0.65 UJ	0.79 UJ	0.69 UJ
Arsenic	25.6	4.8	22.4	4.8	65.6 J	13.9	10.6	51.6	8.8	26.6	14.6
Barium	56.1	19.5 B	72.6	63.8	65.2	49.4 B	54.9	90.1	49.6	35.7 B	38.7 B
Beryllium	0.45 B	0.25 U	0.3 B	0.65 B	0.37 B	0.44 U	0.54 B	1.2	0.57 B	1.5	1 B
Cadmium	0.77 B	0.27 B	0.38 B	0.24 B	0.6 B	7.1	2.7	2.9	0.89 B	4	4.1
Calcium	1420	435 B	725 B	3990	1250	536 B	2690	2110	2840	2670	2420
Chromium	5.8	1.8 B	3	5.1	5.6	2.6 B	6.9	8	3.3	4.7	8.3
Cobalt	8.6 B	2.4 B	6 B	10.6 B	7.3 B	4.6 B	16.1	29.5	10.9	19.7	19.4
Copper	161	91.6	83.9	49.9	87 J	181	181	657	165	284	233
Iron	40100	25500	68600	36500	72300	39100	42200	58100	20000	33700	29200
Lead	307	170	291	21.8	713 J	2220	225	666	164	160	138
Magnesium	6820	1990	4350	7120	5870 J	824 B	9580	11800	5760	9860	9100
Manganese	1570 J	559 J	1160 J	663 J	624 J	329 J	1420 J	3660 J	1400 J	3510 J	2640 J
Mercury	0.12 U	0.43	0.12 U	0.12 U	0.12 U	0.22 U	0.12 U	0.11 U	0.11 U	0.13 U	0.11 U
Nickel	3.8 B	0.97 B	3.8 BJ	7.3 B	2.5 BJ	0.5 B	7.4 B	10.6	6 B	10.8	11.4
Potassium	632 B	238 B	615 B	1370	1140 B	605 B	838 B	1380	730 B	622 B	479 B
Selenium	1.8	1 U	3.3	0.92 U	3.8	5.8 U	1.7	2.6	0.9 B	1 U	1.7
Silver	1.6 B	2.1 B	0.84 B	0.23 U	1.6 B	15.3	0.76 B	4	0.92 B	1.1 B	0.39 B
Sodium	212 B	237 B	224 B	326 B	316 B	450 B	285 B	238 B	181 B	190 B	177 B
Thallium	6.6	2.6	6.9	3.2	5.2	2.5 B	5.6	13.1	4.8	12.1	9
Vanadium	24.6	8 B	26.4	26.4	40.9	8.1 B	43.8	46.7	20.8	30.5	34.7
Zinc	308 J	133 J	147 J	106 J	174	1810 J	789 J	569 J	217 J	1090 J	990 J
Cyanide	NA	NA	NA	NA	0.12 U	NA	NA	NA	NA	NA	NA

TABLE 7

CEMENT CREEK SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogrram (mg/kg)

	SOUTH FORK			CEMENT CREEK				
Location	CC-SE-21	CC-SE-22	CC-SE-23	CC-SE-13	CC-SE-33	CC-SE-24	CC-SE-25	CC-SE-26
Analyte	BACKGROUND S. Fork Above Silver Ledge Mine	South Fork Below Silver Ledge Mine	South Fork Above Confluence with Cement Creek	Cement Creek Below Confluence with North Fork	Cement Creek Above Confluence With South Fork	Cement Creek Below Confluence With South Fork	Cement Creek Below Confluence With Dry Gulch Adit	Cement Creek Below Confluence With Prospect G.
Aluminum	5890	5990	6990	7890	5090	7660 J	8470	7170
Antimony	0.66 UJ	0.68 UJ	0.68 UJ	0.7 UJ	0.67 U	0.7 U	0.97 BJ	1.7 BJ
Arsenic	9.1	16.7	8.5	22.4	10.7 J	15.8 J	17.3	29.5
Barium	50.7	75.5	30 B	72.6	23.1 B	22.1 B	36.8 B	68.2
Beryllium	0.51 B	0.65 B	0.51 B	0.3 B	0.22 U	0.28 B	0.27 B	0.28 B
Cadmium	0.22 B	0.23 U	0.23 U	0.38 B	0.35 B	0.36 B	16.6	14.4
Calcium	1030 B	1400	1030 B	725 B	1680	1380	1840	1400
Chromium	2.3	3.4	2.9	3	2.3	8.2	4.6	3.4
Cobalt	8.9 B	3.3 BJ	3.1 B	6 B	4.1 B	6.1 B	4 B	6.1 B
Copper	37	48.9	48.8	83.9	42.9 J	59.3 J	477	105
Iron	31100	46200	30800	68600	21300	44700	41600	58800
Lead	36	69.4	55.6	291	153 J	142 J	1040	505
Magnesium	3020	2750	4470	4350	3120	5150 J	5400	4450
Manganese	478 J	342 J	599 J	1160 J	547 J	563 J	701 J	1420 J
Mercury	0.11 U	0.11 U	0.11 U	0.12 U	0.11 U	0.12 U	0.12 U	0.12 U
Nickel	3.2 B	0.84 BJ	0.95 B	3.8 BJ	2.1 B	2.5 BJ	2.6 B	1.7 BJ
Potassium	887 B	1280	652 B	615 B	484 B	476 B	747 B	863 B
Selenium	1.7	2.8	1.6	3.3	0.89 UJ	2.4	2.1	2.8
Silver	0.23 B	0.35 B	0.23 U	0.84 B	0.5 B	0.75 B	8.5	1.8 B
Sodium	230 B	379 B	181 B	224 B	154 B	191 B	235 B	210 B
Thallium	2.7	2.9 J	3.1	6.9	2.1 B	3.7	3.7	6.8
Vanadium	18.7	20.9	18.8	26.4	12.3	24.4	35.4	26.6
Zinc	79.2 J	55.6 J	78.6 J	147 J	70.3	146	4460 J	2940 J
Cyanide	NA	NA	NA	NA	NA	0.12 U	NA	NA

TABLE 7

CEMENT CREEK SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)

Location	CC-SE-26	CC-SE-27	CC-SE-28	CC-SE-29	CC-SE-30	CC-SE-31	CC-SE-CC48
Analyte	Cement Creek Below Confluence With Prospect G.	Georgia Gulch Above Confluence With Cement Cr	Cement Creek Below Confluence With Georgia G.	Cement Creek Above Confluence With Porcupine G.	Porcupine Gulch Above Confluence With Cement Creek	Cement Creek Below Confluence With Porcupine G.	Cement Creek Above Confluence With Animas River
Aluminum	7170	10200	7340	11600	5030.00	8010 J	7820
Antimony	1.7 BJ	0.63 UJ	2.6 U	1.7 U	1.6 U	1.3 U	2 U
Arsenic	29.5	29.6	49 J	27.3 J	40.6 J	27.6 J	38.1 J
Barium	68.2	104	51	48.7 B	81	38.8 B	131
Beryllium	0.28 B	0.76 B	0.32 B	0.4 B	0.42 B	0.27 B	0.33 B
Cadmium	14.4	1.7	5.1	0.86 BJ	3.6	1 BJ	1.7 J
Calcium	1400	1540	1290	1810	1310	1270	1350
Chromium	3.4	3.5	4.7	5.4	0.079 B	7.2	6.1
Cobalt	6.1 B	12.2	4.6 BJ	11.4 B	10.8 B	5 B	6.5 B
Copper	105	189	79 J	90 J	60.2 J	94.5 J	58.4 J
Iron	58800	30300	62900	49500	27600	45600	63400
Lead	505	475	384 J	590 J	1040 J	196 J	297 J
Magnesium	4450	6010	4580	7850	2980	5720 J	4520
Manganese	1420 J	1910 J	488 J	1370 J	1920 J	470 J	605 J
Mercury	0.12 U	0.11 U	0.12 U	0.13 U	0.13 U	0.11 U	0.12 U
Nickel	1.7 BJ	6.6 B	1.8 B	4.4 BJ	0.74 B	2.9 BJ	2.2 BJ
Potassium	863 B	806 B	938 B	761 B	665 B	621 B	1090 B
Selenium	2.8	1.6	3.3 J	1.9 J	1.7 J	2.2	2.6 J
Silver	1.8 B	0.9 B	1.1 B	0.89 B	2.8	1.9 B	1.2 B
Sodium	210 B	210 B	221 B	272 B	188 B	194 B	244 B
Thallium	6.6	7	3.7	5.4	6.6	2.9	3.9
Vanadium	26.6	19.4	33	27.6	20.12	29.7	30.9
Zinc	2940 J	395 J	1110	136	904	222	369
Cyanide	NA	NA	NA	NA	NA	0.11 U	NA

TABLE 7

CEMENT CREEK SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)

PROSPECT GULCH										
Location	PG-SE-1	PG-SE-2	PG-SE-3	PG-SE-4	PS-SE-5	PG-SE-6	PG-SE-7	PG-SE-8	PG-SE-9	PG-SE-10
Analyte	Prospect Gulch Above the Galena Queen Mine	Prospect Gulch Above the Galena Queen Mine	Prospect Gulch Below the Galena Queen Mine	Tributary to Prospect Gulch	Tributary With Acid Drainage	Tributary With Hercules Mine Waste	Tributary With Acid Drainage	Prospect Gulch Below Tributaries With Acid Drainage	Prospect G. Below Mineralized Canyon Above Hernietta Mine	Mineralized Trib Above Henrietta Mine Complex
Aluminum	7040	3630	2030	16400 J	15900	4340	10100	5390.00	3080	2390
Antimony	0.85 U	1.7 U	48.8	0.8 U	0.74 U	9.3 B	5.2 B	2.9 U	2.7 U	2.8 U
Arsenic	52.3 J	59.6 J	600 J	14.8 J	14.3 J	68.9 J	137 J	99.3 J	84.9 J	42.3 J
Barium	83.7	84	62.8	85.2	78.9	52.5	32 B	69.8	22.9 B	62.5
Beryllium	0.43 B	0.39 B	0.25 U	1.4	1.2 B	0.24 U	0.59 B	0.37 B	0.24 U	0.26 U
Cadmium	0.53 B	0.65 BJ	29.2	3.1	2.5	0.34 B	0.44 B	1.6	1.2	0.26 U
Calcium	1780	1090 B	141 B	3880	3760	235 B	1730	837 B	831 B	218 B
Chromium	3	1.9 B	3.7	2.9	2.6	3	5.5 B	2.8	2.3 B	2.3 B
Cobalt	13.3 B	6.2 BJ	1.3 B	26.3	18.2	0.93 B	9.8 J	6.1 B	3.3 B	0.64 B
Copper	74.2 J	48.8 J	1080 J	62.5 J	57.6 J	40.6 J	112	98.4 J	169 J	12.9 J
Iron	41800	79100	33900	34300	39700	42100	38700 J	45500	18800	21300
Lead	68 J	260 J	7230 J	50.4 J	40.8 J	121 J	325	326 J	199 J	191 J
Magnesium	3280	756 B	456 B	5390 J	6500	1460	4750 J	1570	1320	613 B
Manganese	779 J	375 J	98.5 J	3420 J	1400 J	73.2 J	394 U	467 J	147 J	87.6 J
Mercury	0.14 U	0.13 U	0.34	0.13 U	0.12 U	0.12 U	0.12 U	0.13 U	0.12 U	0.13 U
Nickel	4.8 B	0.37 B	0.25 U	12.4	12.3	0.24 U	5.4 B	1.5 B	1.3 B	0.26 U
Potassium	1070 B	838 B	770 B	1340	1240	844 B	1080 B	899 B	414 B	1190 B
Selenium	2.1 J	3.9 J	3.7 J	1.1 U	1 BJ	2.9 J	2.2 J	3.1 J	1.7 J	4.3 J
Silver	0.28 U	0.49 B	10.6	0.27 U	0.25 U	0.24 U	3.3	1.3 B	1.6 B	0.92 B
Sodium	204 B	205 B	18201.9 B	269 B	210 B	164 B	160 B	175 B	129 B	153 B
Thallium	3.5	4.4	6780 B	11.2	5.3	1.9 B	2.4 B	3.2	0.85 B	0.88 B
Vanadium	19.2	21.1	9.1 B	23.5	24.2	16.6	22.3	16	7.2 B	9.8 B
Zinc	90.3	43.6	8254	734	634	20.3	98.1	340	386	15.6
Cyanide	NA	NA	NA	0.14 BJ	NA	NA	NA	NA	NA	NA

TABLE 7

CEMENT CREEK SEDIMENT SAMPLES
TOTAL METALS PLUS CYANIDE
Concentrations in milligrams per kilogram (mg/kg)

	PROSPECT GULCH						UPPER ANIMAS GAUGING STATIONS			
Location	PG-SE-11	PG-SE-14	PG-SE-15	PG-SE-16	PG-SE-18	PG-SE-19	CCSECC48	CCSEM34	CCSEA68	CCSEA72
Analyte	Prospect Gulch Below Mineralized Tributaries	Springs after seeping through Henrietta Waste	Prospect Gulch Below Henrietta Waste Pile	Prospect Gulch Below the Henrietta Mine Seep	Prospect Gulch Below Joe & John's Mine	Prospect Gulch Above Confluence With Cement Creek	Cement Creek Above Confluence With Animas River	Mineral Creek Above Confluence With Animas R.	Animas River Above Cement Creek	Animas River Below Confluence With Mineral Creek
Aluminum	4350	4230	4790	3770 J	4440	3950	7820	11500	7820	10700
Antimony	1.8 J	4.7 J	3.3 UJ	3.3 U	5.3 B	4.9 B	2 U	0.86 BU	2.6 BU	401 BU
Arsenic	65.1 J	389	48.2	98.1 J	76.9 J	101 J	38.1 J	29.9 J	17.3 J	33.5 J
Barium	41.8 B	201	93.2	99.8	72.5	73.4	131	121	107	151
Beryllium	0.26 U	0.26 U	0.26 U	0.26 U	0.23 U	0.24 U	0.33 B	0.7 B	0.87 B	0.93 B
Cadmium	0.61 B	2.3	5.7	331 B	0.37 B	0.84 B	1.7 J	1.7	10.1	3.6
Calcium	1100 B	235	715	711 B	409 B	397 B	1350	2450	2490	2970
Chromium	1.3 B	2.7	2.3	1.8 B	2.4	2.1 B	6.1	3.3	5.1	7
Cobalt	6 B	1.4 J	4.2	3.1 B	4.2 BJ	1.7 BJ	6.5 B	17.1	11 B	15.5
Copper	59.8 J	73.6	41.1	63.9 J	57.3 J	62.7 J	58.4 J	161 J	263 J	242 J
Iron	36200	93800	34400	40000	44400	68900	63400	40500	21200	46100
Lead	216 J	503	536	333 J	336 J	340 J	297 J	189 J	1580 J	805 J
Magnesium	1850	1360	1880	1460 J	1430	1710	4520	3780	4710	5200
Manganese	284 J	114 J	316 J	206 J	289 J	210 J	605 J	928 J	7410 J	3300 J
Mercury	0.13 U	0.17 U	0.13 U	0.13 U	0.13 U	0.12 U	0.12 U	0.12 U	0.13 U	0.13 U
Nickel	0.87 B	0.26 U	2.2	0.47 B	0.76 BJ	0.24 U	2.2 BJ	4.8 B	5.2 B	5 B
Potassium	774 B	1650	875	752 B	950 B	873 B	1090 B	799 B	1240 B	1110 B
Selenium	2.7 J	3.2 J	1.8	3.9	2.6 J	1.7 J	2.6 J	1.8 J	1 UJ	1.8 J
Silver	6.2	2.7	3.7	1.4 B	1.3 B	1.7 B	1.2 B	0.41 B	6.7	2.3 B
Sodium	160 B	247	234	197 B	189 B	188 B	244 B	216 B	239 B	223 B
Thallium	1.9 B	4.9 J	2.8	2.6	3.1 J	4.1 J	3.9	4	22.5	11.1
Vanadium	12.9 B	30.8	13.7	15.1	14.6	33.7	30.9	20.3	19.9	28.3
Zinc	79.6	450 J	1190 J	56.7	79.6	256	369	528	1830	901
Cyanide	NA	NA	NA	0.13 U	NA	NA	NA	NA	NA	NA

Table 8

Cement Creek Watershed
Drinking Water Sources
Total and Dissolved Metals

Analytes,	GW-1 Cement Cr., 1 mi. below Prospect G.		GW-2 Mid Fork Cement Cr. **Surface water**		GW-3 Animas R., 1 mi. above Howardsville		GW-4 **Draining adit in** Cunningham Gulch		GW-5 Mineral Cr., 1 mi. Above Animas R.		MCL / ACTION LEVEL
ug/l	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	
Aluminum	1420	1030	164 u	23 u	23	23	23	23	660	632	n/a
Antimony	5	5	5	5	5	5	5	5	5	5	6
Arsenic	8	8	8	8	8	8	8	8.8 u	8	8	50
Barium	37.1	34.6	8 j	5.5 j	7.7 j	10.7 j	7 j	6 j	47.5	48.1	2000
Beryllium	1	1	1	1	1	1	1	1	1	1	4
Cadmium	1	1	1	1	1	1	9.9	12.4	2.1	1.6	5
Calcium	90700	89700	98000	123000	328000	459000	56400	67500	21800	12100	n/a
Chromium	1	1	1	1	1	1	1	1	1	1	100
Cobalt	5.4	1.4	1	1	1	1	1	1	9.8	8.9	n/a
Copper	37 j	4	15 u	4	4	4	4	4	46	12 u	1300
Iron	5680	4630	447	1380	1830	23	26.7	23	2320	923	n/a
Lead	23.1	12.1	2	2	10.2	7.2	103	19.4	85.4	19.1	15
Magnesium	5490	5490	4990	6130	7900	9810	2750	3930	3020	1580	n/a
Manganese	504	490	352	378	1540	2130	6.2	4.3	790	754	200
Mercury	0.2 u	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2
Nickel	5 u	1.3 u	1.7 u	1.2 u	1	1	1	1.2	8.7 u	3.4 u	100
Potassium	1130 u	1240 u	298 u	382 u	3390	2020	654 u	4500	1470 u	1230 u	n/a
Selenium	4	4	4	4	10.2	9.8	4	5.2	4	4	50
Silver	2	2	2	2	2	2	2	2	2	2	n/a
Sodium	3760 j	3600	1560 uj	1500 u	22700 j	15300	1780 uj	8650	4540 j	2380	n/a
Thallium	9 u	9 u	9 u	9 u	9 u	9 u	9 u	9 u	9 u	9 u	0.5
Vanadium	1.1 u	6 u	1	1	2.4 u	22.2	1	1	1	1	n/a
Zinc	630 j	602	240	349	28.5 j	37.6	1660 j	2320	521 j	344	n/a

Shaded areas depict those concentrations exceeding the MCL/Action Level.

DATA VALIDATION AND INTERPRETATION

The laboratory acquired data were validated by the EPA Environmental Services Assistance Team (ESAT). The following data qualifiers were assigned:

- "U" - The analyte was not detected. (Qualified by laboratory software).
- "J" - The assigned value is an estimate because the quality control criteria were not met.
- "UJ" - The analyte was not detected and the reported value is estimated because the quality control criteria were not met.
- "B" "BD" - The analyte was detected at a level below the contract required detection limit (CRDL) but above the method detection limit (MDL), therefore the associated value is an estimate. The presence of the compound is reliable.
- "BJ" - The value is estimated because the analyte was detected at a concentration below the CRDL and because the quality control criteria were not met.
- "R" - The data are rejected.
- "NA" - Indicates that the anlayte was not sampled/analyzed for.

Analytes present at "elevated" concentrations are highlighted in the summary tables. A concentration is considered to be "elevated" if the following are true:

- The concentration of a particular analyte in a sample is three times greater than the background concentration; and greater than or equal to five times any blank sample concentrations.
- If the analyte is not detected in the background sample, the concentration is greater than the sample quantitation limit for both the sample and the background sample.