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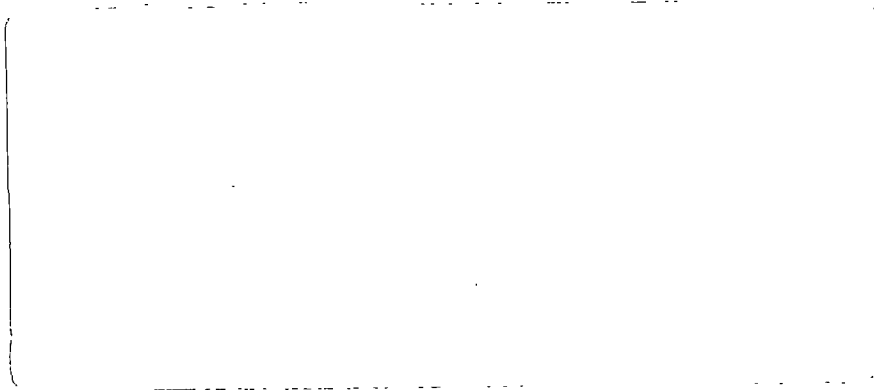
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BASELINE MONITORING
DOME MOUNTAIN PROJECT
- June 21, 1987 -

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and
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March 1992

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Baseline monitoring Dome
Mountain project, June 21, 1987.

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INTRODUCTION

The Dome Mountain Project is located in the Guess Creek drainage basin about 35 kilometres east of Smithers. The gold mine has underground workings on the east slope of Dome Mountain at the 1,400 metre level. Drainage is eastward via Fedral Creek and Guess Creek which joins the Fulton River just upstream of Fulton Lake (Figure 1). Production started in 1991.

Salmon are limited to the lower reaches of Fulton River between Fulton Lake and Babine Lake by a 16 metre high dam. The dam was constructed for flow control and water supply for the DFO Fulton spawning channels for sockeye. This facility provides a major contribution to commercial and native fisheries on the Skeena River, and is approximately 50 km downstream of the Dome Mountain Project. Small natural populations of chinook, coho, and pink also spawn in the Fulton River downstream of the dam. Guess Creek and the lower reaches of Fedral Creek are stable and productive systems for cutthroat trout and, to a lesser extent, Dolly Varden char.

Site description

Station	Location	Remarks
1	Guess Creek upstream	1 km upstream of Betty Creek
2	Fedral Creek upstream	600 metres upstream of Guess Creek
3	Fedral Creek upstream	Downstream of road, just above Guess Creek
4	Guess Creek downstream	Below swampy area
5	Fulton River upstream	At outlet of Chapman Lake

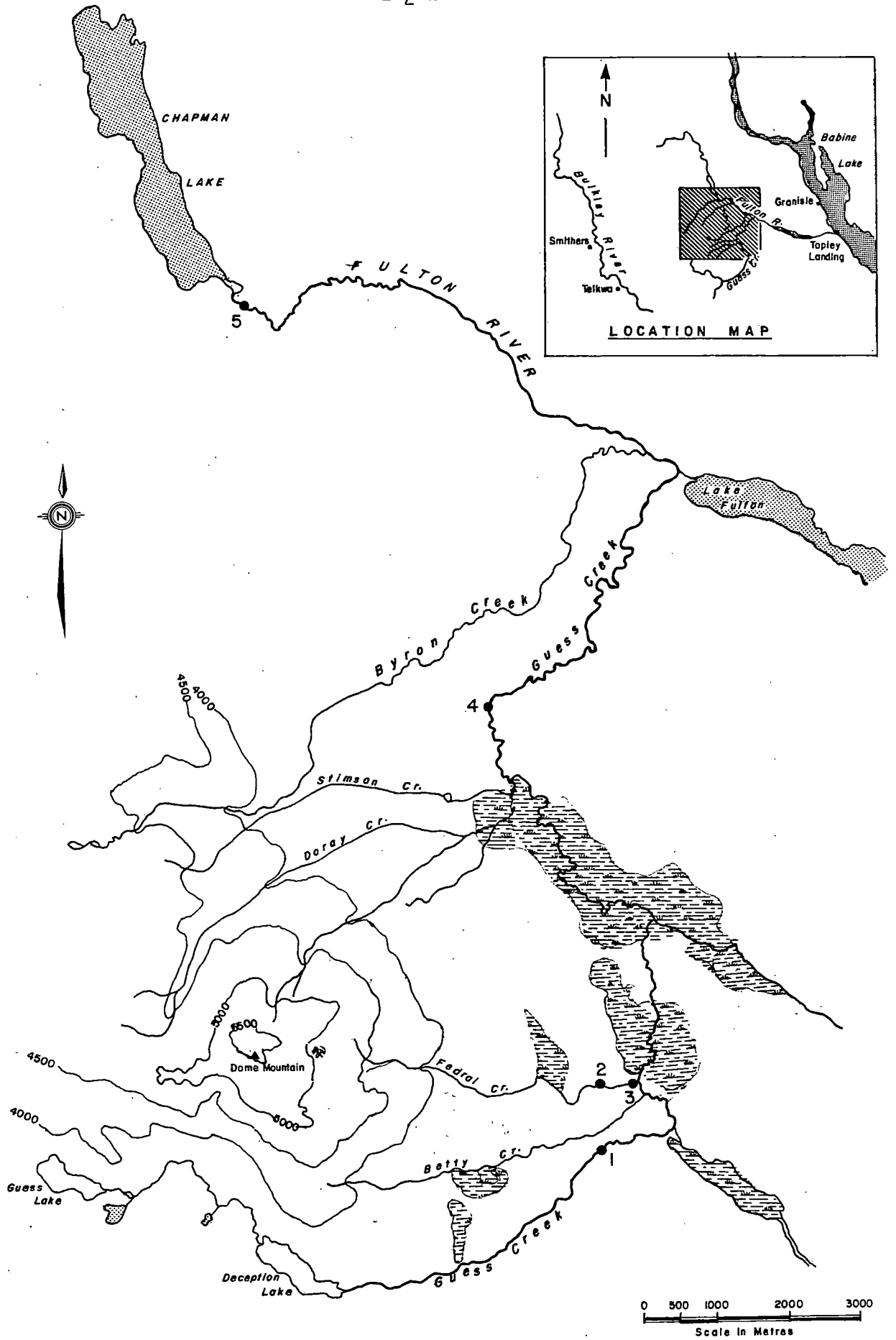


FIGURE 1 RECEIVING WATER SAMPLING STATIONS AT THE DOME MOUNTAIN MINE SITE

MATERIALS AND METHODS

The site was visited on June 21, 1987. Water chemistry samples only were collected at the five stations. Water quality analysis included alkalinity, pH, conductivity, total residues, non-filterable residues, turbidity, sulphate, ammonia, nitrite, nitrite/nitrate, total dissolved nitrogen, total organic and inorganic carbon, cyanide, and thiocyanide. The samples were packed with ice until analysis. Dissolved metals were filtered the same day through a 0.45 micron cellulose nitrate membrane filter. Total and dissolved metals were preserved with 0.5 ml nitric acid per 100 ml. All samples were collected in clean polyethylene bottles. The bottles for metal analysis were previously acid washed. Hardness was determined from the dissolved metal sample.

Inductively Coupled Argon Plasma (ICP) was used for the total and dissolved metal analysis and gave a reading of seventeen metals. Silver was analysed with the graphite furnace. Cadmium, copper, and lead samples were re-analysed with the graphite furnace when the values were below two times the detection limit of the ICP procedure. Analytic procedures were in accordance with the Environment Canada, Pacific Region, Laboratory Manual (Anon., 1979).

RESULTS

The water metal results can be found in Table 1, while the other water quality results are found in Table 2.

Metals at or near the detection limit in all samples include dissolved aluminium, cadmium, dissolved chromium, dissolved copper, lead, mercury, dissolved molybdenum, silver, tin, titanium, and zinc. Measurable mercury in replicate 1 from Station 5 and titanium in replicate 3 from Station 2 may be due to contamination. NFR was <5 at all sites and total residues were similar (58 - 72 mg/l). Measureable metals were low at all sites, with the highest sample concentrations tending to be at Fulton River upstream (Station 5). These included total chromium (0.027 mg/l), total copper (0.0023 mg/l), iron (0.418 mg/l), magnesium (3 mg/l), manganese (0.058 mg/l), sodium (2.1 mg/l), and strontium (0.091 mg/l). However, calcium (9.2 mg/l) was lowest at Station 5. Fedral Creek upstream (Station 2) had the highest levels of total aluminium (0.28 mg/l), barium (0.059 mg/l), total molybdenum (0.01 mg/l), and silicon (3 mg/l). All these metal levels are low compared to other areas of northwest B.C.

Water samples from all sites were soft and of neutral pH. Cyanides were undetectable; nitrogen and carbon compounds low. The parameters are those of a pristine environment.

Table 1

Water Quality - Dome Mountain Project
June 21, 1987

Station	TOTGF	DISGF	TOTICP	DISICP	TOTICP	DISICP	TOTICP	DISICP	TOTICP	TOTGF	DISICP	DISGF	TOTICP	DISICP	
	AG	AG	AL	AL	BA	BA	CA	CA	CD	CD	CD	CD	CR	CR	
	MG/L	MG/L	NG/L	NG/L	NG/L	NG/L	NG/L	NG/L	NG/L	NG/L	NG/L	NG/L	NG/L	NG/L	
1	Repl. 1	<0.0001	<0.0001	<0.05	<0.05	0.032	0.023	14.8	10.7	<0.002	<0.0001	<0.002	<0.0001	0.012	<0.005
	Repl. 2	<0.0001	<0.0001	0.09	<0.05	0.032	0.023	15.1	10.8	<0.002	<0.0001	<0.002	<0.0001	0.016	<0.005
	Repl. 3	<0.0001	<0.0001	0.07	<0.05	0.030	0.023	14.8	10.3	<0.002	<0.0001	<0.002	<0.0001	<0.005	<0.005
	Average	---	---	0.08	--	0.031	0.023	14.9	10.6	--	---	--	---	0.014	--
	S.D.	---	---	0.01	--	0.001	0.000	0.2	0.3	--	---	--	---	0.003	--
2	Repl. 1	<0.0001	<0.0001	0.26	<0.05	0.058	0.042	19.2	13.6	<0.002	<0.0001	<0.002	<0.0001	0.029	<0.005
	Repl. 2	<0.0001	<0.0001	0.30	<0.05	0.059	0.043	19.2	13.4	<0.002	0.0001	<0.002	<0.0001	<0.005	<0.005
	Repl. 3	<0.0001	<0.0001	0.28	<0.05	0.060	0.042	19.0	13.4	<0.002	<0.0001	<0.002	<0.0001	<0.005	<0.005
	Average	---	---	0.28	--	0.059	0.042	19.1	13.5	--	---	--	---	--	--
	S.D.	---	---	0.02	--	0.001	0.001	0.1	0.1	--	---	--	---	--	--
3	Repl. 1	<0.0001	<0.0001	<0.05	<0.05	0.051	0.036	12.0	8.6	<0.002	0.0006	<0.002	<0.0001	0.017	<0.005
	Repl. 2	<0.0001	<0.0001	<0.05	<0.05	0.048	0.036	11.5	8.6	<0.002	<0.0001	<0.002	<0.0001	<0.005	<0.005
	Repl. 3	<0.0001	<0.0001	0.06	<0.05	0.050	0.038	12.3	8.0	<0.002	<0.0001	<0.002	<0.0001	<0.005	<0.005
	Average	---	---	--	--	0.050	0.037	11.9	8.4	--	---	--	---	--	--
	S.D.	---	---	--	--	0.002	0.001	0.4	0.3	--	---	--	---	--	--
4	Repl. 1	<0.0001	<0.0001	0.11	<0.05	0.035	0.027	14.9	9.7	<0.002	<0.0001	<0.002	<0.0001	<0.005	<0.005
	Repl. 2	<0.0001	<0.0001	0.07	<0.05	0.037	0.027	14.8	9.6	<0.002	<0.0001	<0.002	<0.0001	<0.005	<0.005
	Repl. 3	<0.0001	<0.0001	<0.05	<0.05	0.036	0.027	13.9	10.1	<0.002	<0.0001	<0.002	<0.0001	<0.005	<0.005
	Average	---	---	0.09	--	0.036	0.027	14.5	9.8	--	---	--	---	--	--
	S.D.	---	---	0.03	--	0.001	0.000	0.6	0.3	--	---	--	---	--	--
5	Repl. 1	<0.0001	<0.0001	0.09	0.07	0.030	0.021	8.8	6.8	<0.002	0.0007	<0.002	<0.0001	<0.005	<0.005
	Repl. 2	<0.0001	<0.0001	0.13	0.09	0.034	0.021	9.3	6.9	<0.002	<0.0001	<0.002	<0.0001	0.043	<0.005
	Repl. 3	<0.0001	<0.0001	0.21	0.09	0.032	0.022	9.6	7.0	<0.002	0.0002	<0.002	<0.0001	0.010	<0.005
	Average	---	---	0.14	0.08	0.032	0.021	9.2	6.9	--	0.0005	--	---	0.027	--
	S.D.	---	---	0.06	0.01	0.002	0.001	0.4	0.1	--	0.0004	--	---	0.023	--

Table 1, cont.

Water Quality - Dome Mountain Project
June 21, 1987

Station		TOTICP	TOTGF	DISICP	DISGF	TOTICP	DISICP	TOTHG	TOTICP	DISICP	TOTICP	DISICP	TOTICP	DISICP	TOTICP	DISICP
		CU	CU	CU	CU	FE	FE	HG	MG	MG	MN	MN	MO	MO	NA	NA
		MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
1	Repl. 1	<0.005	0.0011	<0.0005	0.0005	0.129	0.036	<0.00005	2.2	1.6	0.032	0.002	<0.005	<0.005	1.4	1.1
	Repl. 2	0.010	---	<0.0005	0.0009	0.153	0.038	<0.00005	2.2	1.6	0.037	0.003	<0.005	<0.005	1.3	1.1
	Repl. 3	<0.005	0.0016	<0.0005	0.0012	0.121	0.034	<0.00005	2.1	1.5	0.015	0.003	0.007	<0.005	1.2	1.1
	Average	--	0.0014	--	0.0009	0.134	0.036	---	2.2	1.6	0.028	0.003	--	--	1.3	1.1
	S.D.	--	0.0004	--	0.0004	0.017	0.002	---	0.1	0.1	0.012	0.001	--	--	0.1	0.0
2	Repl. 1	<0.005	0.0016	<0.0005	<0.0005	0.279	0.021	<0.00005	2.2	1.5	0.061	<0.001	0.011	<0.005	1.0	0.9
	Repl. 2	<0.005	0.0020	<0.0005	<0.0005	0.297	0.016	<0.00005	2.2	1.6	0.008	0.002	0.006	<0.005	1.0	1.0
	Repl. 3	<0.005	0.0020	<0.0005	<0.0005	0.250	0.021	<0.00005	2.2	1.6	0.009	0.001	0.012	<0.005	1.2	1.0
	Average	--	0.0019	---	---	0.275	0.019	---	2.2	1.6	0.026	0.002	0.010	--	1.1	1.0
	S.D.	--	0.0002	---	---	0.024	0.003	---	0.0	0.1	0.030	0.001	0.003	--	0.1	0.1
3	Repl. 1	<0.005	0.0028	<0.0005	<0.0005	0.146	0.040	<0.00005	2.3	1.6	0.049	0.005	0.006	<0.005	1.7	1.2
	Repl. 2	<0.005	<0.0005	<0.0005	<0.0005	0.089	0.041	<0.00005	2.2	1.6	0.011	0.006	<0.005	<0.005	1.6	1.1
	Repl. 3	<0.005	0.0008	<0.0005	<0.0005	0.126	0.035	<0.00005	2.3	1.6	0.015	0.007	<0.005	<0.005	1.6	1.6
	Average	--	0.0018	--	---	0.120	0.039	---	2.3	1.6	0.025	0.006	--	--	1.6	1.3
	S.D.	--	0.0014	--	---	0.029	0.003	---	0.1	0.0	0.021	0.001	--	--	0.1	0.3
4	Repl. 1	<0.005	0.0017	<0.0005	0.0008	0.215	0.082	<0.00005	2.2	1.5	0.013	0.005	0.005	<0.005	1.2	1.4
	Repl. 2	<0.005	0.0020	<0.0005	0.0009	0.246	0.079	<0.00005	2.3	1.5	0.012	0.006	<0.005	<0.005	1.6	1.4
	Repl. 3	<0.005	0.0010	<0.0005	0.0009	0.210	0.088	<0.00005	2.2	1.5	0.012	0.006	<0.005	<0.005	1.7	1.2
	Average	--	0.0016	--	0.0009	0.224	0.093	---	2.2	1.5	0.012	0.006	--	--	1.5	1.3
	S.D.	--	0.0005	--	0.0001	0.020	0.005	---	0.1	0.0	0.001	0.001	---	---	0.3	0.1
5	Repl. 1	<0.005	0.0032	<0.0005	0.0010	0.360	0.155	0.00090	2.9	2.1	0.016	0.004	<0.005	<0.005	2.2	1.3
	Repl. 2	<0.005	0.0017	<0.0005	0.0011	0.417	0.160	0.00006	3.0	2.1	0.116	0.005	<0.005	<0.005	2.2	1.2
	Repl. 3	<0.005	0.0020	<0.0005	0.0011	0.478	0.159	<0.00005	3.0	2.1	0.043	0.006	<0.005	<0.005	2.0	1.3
	Average	--	0.0023	--	0.0011	0.418	0.158	0.00048	3.0	2.1	0.058	0.005	--	--	2.1	1.3
	S.D.	--	0.0008	--	0.0001	0.059	0.003	0.00059	0.1	0.0	0.052	0.001	--	--	0.1	0.1

Table 1, cont.

Water Quality - Dome Mountain Project
June 21, 1987

Station		TOTICP	TOTGF	DISICP	DISGF	TOTICP	DISICP	TOTICP	DISICP	TOTICP	DISICP	TOTICP	DISICP	TOTICP	DISICP
		PB MG/L	PB MG/L	PB MG/L	PB MG/L	SI MG/L	SI MG/L	SN MG/L	SN MG/L	SR MG/L	SR MG/L	TI MG/L	TI MG/L	ZN MG/L	ZN MG/L
1	Repl. 1	<0.02	<0.0005	<0.02	<0.0005	2.3	1.7	<0.01	<0.01	0.059	0.046	<0.002	<0.002	<0.002	<0.002
	Repl. 2	<0.02	<0.0005	<0.02	<0.0005	2.3	1.7	<0.01	<0.01	0.059	0.045	<0.002	<0.002	<0.002	0.013
	Repl. 3	<0.02	<0.0005	<0.02	<0.0005	2.2	1.6	0.02	<0.01	0.057	0.044	<0.002	<0.002	<0.002	<0.002
	Average	--	---	--	---	2.3	1.7	--	--	0.058	0.045	--	--	--	--
	S.D.	--	---	--	---	0.1	0.1	--	--	0.001	0.001	--	--	--	--
2	Repl. 1	<0.02	<0.0005	<0.02	<0.0005	2.9	2.0	<0.01	<0.01	0.079	0.064	0.003	<0.002	0.004	<0.002
	Repl. 2	0.02	<0.0005	<0.02	<0.0005	3.1	2.1	<0.01	0.01	0.080	0.064	0.006	<0.002	0.002	<0.002
	Repl. 3	0.02	<0.0005	<0.02	<0.0005	3.1	2.1	<0.01	<0.01	0.082	0.062	0.028	<0.002	0.003	<0.002
	Average	0.02	---	--	---	3.0	2.1	--	--	0.080	0.063	0.012	--	0.003	--
	S.D.	0.00	---	--	---	0.1	0.1	--	--	0.002	0.001	0.014	--	0.001	--
3	Repl. 1	<0.02	<0.0005	<0.02	<0.0005	2.7	2.1	<0.01	<0.01	0.054	0.041	<0.002	<0.002	0.004	<0.002
	Repl. 2	<0.02	<0.0005	<0.02	<0.0005	2.7	2.0	<0.01	<0.01	0.052	0.040	<0.002	<0.002	<0.002	<0.002
	Repl. 3	<0.02	<0.0005	<0.02	<0.0005	2.8	2.1	<0.01	<0.01	0.054	0.042	<0.002	<0.002	<0.002	<0.002
	Average	--	---	--	---	2.7	2.1	--	--	0.053	0.041	--	--	--	--
	S.D.	--	---	--	---	0.1	0.1	--	--	0.001	0.001	--	--	--	--
4	Repl. 1	<0.02	<0.0005	<0.02	<0.0005	2.4	1.8	<0.01	<0.01	0.058	0.045	<0.002	<0.002	<0.002	<0.002
	Repl. 2	<0.02	<0.0005	<0.02	<0.0005	2.5	1.8	<0.01	<0.01	0.062	0.045	<0.002	<0.002	<0.002	<0.002
	Repl. 3	<0.02	<0.0005	<0.02	<0.0005	2.4	1.8	<0.01	<0.01	0.060	0.046	<0.002	<0.002	<0.002	<0.002
	Average	--	---	--	---	2.4	1.8	--	--	0.060	0.045	--	--	--	--
	S.D.	--	---	--	---	0.1	0.0	--	--	0.002	0.001	--	--	--	--
5	Repl. 1	<0.02	0.0013	<0.02	<0.0005	2.5	1.8	0.02	<0.01	0.090	0.067	<0.002	<0.002	0.003	<0.002
	Repl. 2	<0.02	<0.0005	0.02	<0.0005	2.6	1.8	<0.01	<0.01	0.092	0.067	<0.002	<0.002	0.005	0.002
	Repl. 3	<0.02	<0.0005	<0.02	<0.0005	2.7	1.8	<0.01	<0.01	0.090	0.068	0.003	<0.002	0.005	0.005
	Average	--	---	--	---	2.6	1.8	--	--	0.091	0.067	--	--	0.005	0.004
	S.D.	--	---	--	---	0.1	0.0	--	--	0.001	0.001	--	--	0.002	0.002

Table 2

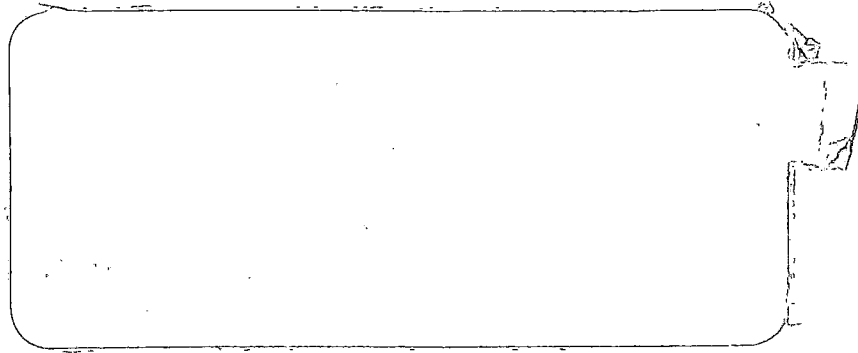
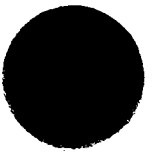
Water Quality - Dome Mountain Project
June 21, 1987

Station	ALK	COND	pH	DISICP HC	DISICP HT	TOC	TIC	NH3	NO2	NO2,3	TDN	TR	NFR	TURB	CN	CNS	SO4	
	MG/L	UMHO/C	REL.U.	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	FTU	MG/L	MG/L	MG/L	
1	Repl. 1	33.5	73	7.5	33.2	33.5	7	5	0.020	<0.005	<0.005	0.22	66	<5	0.33	<0.03	<0.5	8
	Repl. 2	34.0	73	7.5	33.5	33.8	7	5	0.016	<0.005	<0.005	0.23	65	<5	0.28	<0.03	<0.5	8
	Repl. 3	34.0	73	7.5	32.1	32.4	7	5	0.015	<0.005	0.005	0.23	71	<5	0.28	<0.03	<0.5	20
	Average	33.8	73	7.5	32.9	33.2	7	5	0.017	--	--	0.23	67	-	0.30	--	--	12
	S.D.	0.3	0	0.0	0.7	0.7	0	0	0.003	--	--	0.01	3	-	0.03	--	--	7
2	Repl. 1	42.3	88	7.7	40.3	40.5	4	7	0.014	<0.005	<0.005	0.18	73	<5	1.50	<0.03	<0.5	8
	Repl. 2	42.6	90	7.6	39.7	39.9	4	7	0.015	<0.005	<0.005	0.18	74	<5	1.50	<0.03	<0.5	8
	Repl. 3	42.8	90	7.7	39.8	40.1	4	7	0.015	<0.005	<0.005	0.19	70	<5	1.50	<0.03	<0.5	20
	Average	42.6	89	7.7	39.9	40.2	4	7	0.015	--	--	0.18	72	-	1.50	--	--	12
	S.D.	0.3	1	0.1	0.3	0.3	0	0	0.001	--	--	0.01	2	-	0.00	--	--	7
3	Repl. 1	29.9	60	7.0	28.0	28.2	10	5	0.016	<0.005	0.007	0.30	60	<5	0.18	<0.03	<0.5	7
	Repl. 2	29.9	60	7.0	27.8	28.1	10	5	0.016	<0.005	0.008	0.31	56	<5	0.13	<0.03	<0.5	7
	Repl. 3	29.9	60	7.1	26.5	26.5	10	5	0.028	<0.005	0.009	0.32	71	<5	0.23	0.03	<0.5	7
	Average	29.9	60	7.0	27.4	27.6	10	5	0.020	--	0.008	0.31	62	-	0.18	--	--	7
	S.D.	0.0	0	0.1	0.8	1.0	0	0	0.007	--	0.001	0.01	8	-	0.05	--	--	0
4	Repl. 1	33.0	70	7.5	30.5	30.6	9	5	0.023	<0.005	<0.005	0.29	63	<5	0.53	<0.03	<0.5	7
	Repl. 2	33.0	70	7.6	30.2	30.3	9	5	0.022	<0.005	<0.005	0.30	62	<5	0.48	<0.03	<0.5	7
	Repl. 3	33.5	70	7.6	31.4	31.7	7	5	0.021	<0.005	<0.005	0.31	62	<5	0.48	<0.03	<0.5	7
	Average	33.2	70	7.6	30.7	30.9	8	5	0.022	--	--	0.30	62	-	0.50	--	--	7
	S.D.	0.3	0	0.1	0.6	0.7	1	0	0.001	--	--	0.01	1	-	0.03	--	--	0
5	Repl. 1	25.8	58	7.2	25.6	26.4	10	4	0.026	<0.005	0.073	0.41	62	<5	0.65	<0.03	<0.5	8
	Repl. 2	25.8	58	7.2	25.7	26.6	10	4	0.025	<0.005	0.072	0.40	54	<5	0.63	<0.03	<0.5	8
	Repl. 3	25.8	58	7.2	26.0	26.8	10	4	0.026	<0.005	0.075	0.41	59	<5	0.58	<0.03	<0.5	8
	Average	25.8	58	7.2	25.8	26.6	10	4	0.026	--	0.073	0.41	58	-	0.62	--	--	8
	S.D.	0.0	0	0.0	0.2	0.2	0	0	0.001	--	0.002	0.01	4	-	0.04	--	--	0

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