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ENVIRONMENT CANADA
CONSERVATION AND PROTECTION
ENVIRONMENTAL PROTECTION
PACIFIC AND YUKON REGION
NORTH VANCOUVER, B.C.

WESTMIN RESOURCES LTD.
PREMIER GOLD MINE
- July 19 and 23, 1990 -

REGIONAL DATA REPORT: DR 91-07

by

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1.0 INTRODUCTION

The Premier Gold Mine is located on the east side of the Cascade Creek Valley in the Salmon River drainage system, about 1 km upstream from the B.C./Alaska border. The mine site is drained by Cooper Creek to the north and west, and Fletcher Creek to the south. The creeks join as Fletcher Creek above the Granduc road and flow into Cascade Creek immediately below the falls (Figure 1). The falls are an impassable barrier to salmon migration. Cascade Creek joins the Salmon River about 1.5 km downstream of the falls and supports chum, pink, coho, and sockeye salmon.

The company operates an open pit mine using cyanide leach to extract gold and silver. The tailings pond is located in the Cascade Creek valley bottom and the upper part of Cascade Creek has been diverted into Lesley Creek. The tailings are discharged using the subaerial technique and the supernatant is generally discharged to Cascade Creek above the falls. However, during the two days of sampling, no discharges of tailings pond supernatant were observed.

2.0 SITE DESCRIPTION

Receiving water sampling stations were established both above and below potential influences of mining operations. Station names and location descriptions are listed below (refer also to Figure 1).

PREMIER GOLD - STATION LOCATIONS - SURVEYS 1987 to 1990

Station name	Station number by year 87	88	89	90
Hovland Ck. u/s Mill	1	-	-	-
Lesley Ck. u/s Mill	2	2	-	-
Fletcher Ck. u/s Waste Dump	-	-	10	10
Cooper Ck. u/s Open Pit	3	3	3[1]	3[1]
Cascade Ck. u/s Tailings Pond	4	4	4	4
Lesley Ck. d/s Mill	5	5	-	5
Hovland Ck.d/s Mill	6	-	-	-
Cooper Ck. u/s Fletcher Ck.	7	7	-	7
Fletcher Ck. d/s Granduc Rd.	8[2]	-	8	8
Monitoring Pond	-	-	11	-
Cascade Ck. d/s Tailings Pond	9	9	9	9
Cascade Ck. d/s Logan Ck.	-	-	-	12
Level 4	-	-	Level 4	-
Level 6	-	Level 6	Level 6	-

[1] Stations moved upstream due to the development of the waste rock dump
[2] Sample at the mouth in 1987; subsequently sampled below Granduc Road

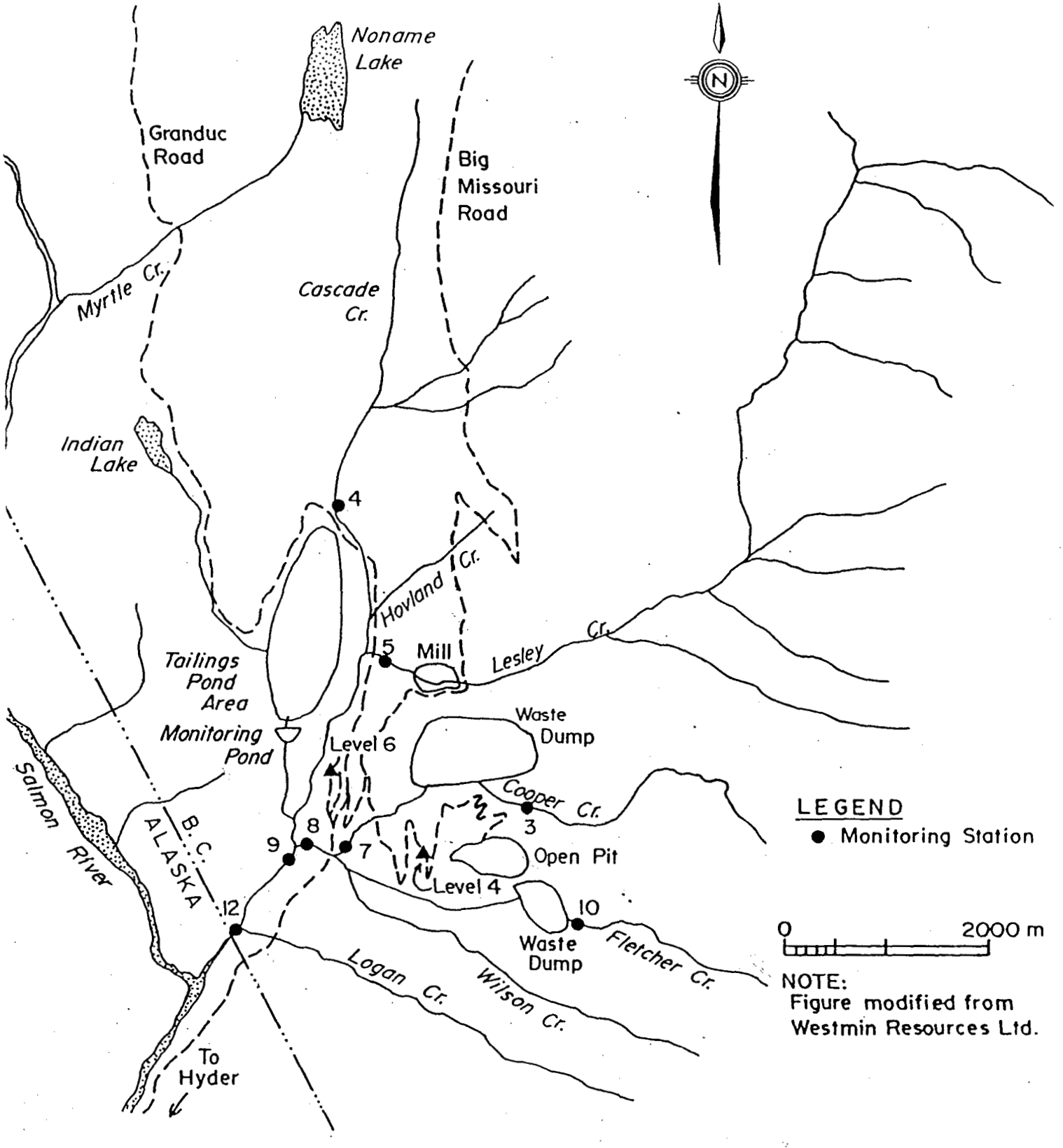


FIGURE 1: RECEIVING WATER SAMPLING STATIONS

3.0 MATERIAL AND METHODS

Water chemistry samples were collected at nine stations, including a mine portal, during a visit to the mine site on July 19, 1991. The following chemical parameters were analysed: alkalinity, pH, total residue, non-filterable residue, and sulphate. The samples were packed with ice until analysed. 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 of sample. All samples were collected with clean polyethylene bottles. Bottles for metal samples were previously acid washed. Hardness was determined from the dissolved metal sample.

Inductively Coupled Argon Plasma (ICAP) Emission Spectroscopy was used for the total and dissolved metal analysis and gave a reading of twenty-six metals. For cadmium, copper, and lead, the samples were re-analysed with the graphite furnace when the values were below two times the detection limit of the ICAP procedure. Analytical methods were in accordance with the Environment Canada, Pacific Region, Environmental Laboratory Manual (Anon., 1979).

Sediment samples were collected from the streambed with a clean acrylic corer with four replicates taken at each site. The samples were transferred into kraft bags and kept cool until analysed. They were air dried, sieved to <150 µm, digested with reverse aqua regia, and analysed for heavy metals using ICAP. A portion of the sediments were ignited at 550°C in a muffle furnace. The loss of weight was noted as volatile residue and the remainder as fixed residue. All results are reported as dry weight.

Sediment sequential extraction was performed at Station 4 in order to evaluate the mobility of metal in the sediment component. The methodology was based on the work of Tessier et al. (1979). Samples were air dried, sieved to <63 µm, and rolled to homogenise. The samples were then weighed into 50 ml centrifuge tubes and subjected to a sequential leaching procedure designed to partition trace metals into the following fractions:

1) F(a): Exchangeable metals. The sediment sample is extracted with 1M $MgCl_2$ initially at pH 7 at room temperature for one hour on a wrist action shaker.

2) F(b): Metals bound to carbonates or specifically adsorbed. The residue from (a) is leached with 1M sodium acetate adjusted to pH 5 with acetic acid at room temperature for five hours on a wrist action shaker.

3) F(c): Metals bound to Fe-Mn oxides. The residue from (b) is extracted at 96°C for six hours with 0.04M $NH_4OH.HCl$ in 25% (vol/vol) acetic acid.

4) F(d): Metals bound to organic matter and sulphides. The residue from (c) is extracted at 85°C for five hours with 0.02M HNO_3 and 30% H_2O_2 adjusted to pH 2 with HNO_3, and then at room temperature with 3.2M NH_4OAc in 20% (vol/vol) HNO_3 on a wrist action shaker.

5) F(e): Residual metals. The original dried samples were weighed in Teflon digestion vessels and digested with HNO_3 and HCl in a microwave oven, resulting in a total fraction (MT). The residual F(e) is calculated as $F(e) = MT - [F(a) + F(b) + F(c) + F(d)]$.

Analysis was performed via Inductively Coupled Argon Plasma (ICAP) Emission Spectroscopy. The internal laboratory reference material TATS-1 was used for this test to evaluate the performance of the procedure.

Statistical analysis consisted of determining averages and standard deviations for the water quality data. One-way analysis of variance was performed on selected sediment data. pH averages were calculated using the concentration of hydrogen ions rather than the pH scale values. Multiple comparison procedures using Tukey's harmonic significant differences were used to produce the various plots. A significant difference was determined when the alpha probability was lower than 5% ($p < 0.05$). Contaminants with values below the detection limit were considered equal to the limit.

4.0 RESULTS

4.1 Water Quality Analysis

The water metal results can be found in Table 1, while the other water quality results are found in Table 2. Alkalinity in the receiving water was lowest at the control station on Cascade Creek upstream of the tailings pond (Station 4) with an average of 9 mg/L. Highest levels were in Fletcher and Cooper Creek, both above and below the mine (21 to 43 mg/L), while the lower part of Cascade Creek had alkalinity levels averaging between 12 and 14 mg/L. pH was slightly alkaline at all stations with averages from 7.3 to 7.9.

The non-filterable residue levels in the receiving environment were usually low; however, Station 12 had one measurement of 604 mg/L. This appears to be an error since the other two replicates were 7 mg/L or less and total residue levels for this station were all between 30 and 40 mg/L.

Station 7 was located downstream of Station 3, Station 10, and the mine adit at Level 4. Concentrations of total aluminum, total copper, total and dissolved iron, total manganese, total lead, total silicon, and total and dissolved zinc were highest at Station 7. Station 8, downstream of the confluence of Cooper Creek and Fletcher Creek, exhibited a reduction in all the parameters mentioned above. Most parameters above detection limit revealed higher concentrations for the downstream station (Station 9) compared to the control station (Station 4); however, these differences were not significant ($p > 0.05$) except for total aluminum and total strontium. Generally there was a small reduction in the water metal content between Stations 9 and 12, except for total chromium and total lead, but these differences are not significant.

4.2 Total Sediment Analysis

Sediment data is reported in Table 3. The evaluation of the total sediments in the receiving environment is presented in Figures 2 to 6. Sequential extraction results for Station 9 can be found in Table 4.

Station 8, on the lower part of Fletcher Creek, was low in aluminum and arsenic, and high in cadmium, copper, lead, and zinc. Cadmium (10.7

µg/g) and zinc (1375 µg/g) were significantly higher than all other stations. Lead levels were elevated, although not significantly different than Station 12 (557 µg/g).

Samples from Station 4 on upper Cascade Creek had low concentrations of arsenic, calcium, copper, iron, lead, and zinc. Cadmium levels (4.4 µg/g) were elevated for a control station. Aluminum (127.75 mg/g) and manganese (2.375 mg/g) were elevated in the sediments. Manganese was significantly higher than all other stations.

Samples from Station 5 had low concentrations of all metals. Lesley Creek would have no particular metal input into the Cascade Creek system.

Station 9 sediment samples from Cascade Creek had higher concentrations of arsenic in comparison to the upstream stations. The cadmium and zinc levels were low. Evaluation of the sequential extraction results (Table 4) showed that metal contaminants are not biologically available as the exchangeable fraction is low. Some cadmium was released (0.52 µg/g) in the carbonate fraction, as was some copper (4.73 µg/g) while considerable amounts of lead (51.6 µg/g) and zinc (67.9 µg/g) were released. These metals would be easily remobilized should the pH in the river drop.

Samples from Station 12 on Cascade Creek near the US-Canada border did not show any significant difference with Station 9 results. However, arsenic and iron content in the sediment appeared to be more elevated at Station 12.

TABLE 1:

WATER QUALITY - PREMIER GOLD -
JULY 19, 1990

Station Number		TOTICP AG MG/L	DISICP AG MG/L	TOTICP AL MG/L	DISICP AL MG/L	TOTICP AS MG/L	DISICP AS MG/L	TOTICP BA MG/L	DISICP BA MG/L	TOTICP CA MG/L	DISICP CA MG/L	TOTICP CD MG/L	TOTGF CD MG/L	DISICP CD MG/L	DISGF CD MG/L	TOTICP CO MG/L	DISICP CO MG/L
	Repl.1	<.01	<.01	<.05	<.05	<.05	<.05	0.150	0.156	12.2	11.4	<.005	<.0001	<.005	<.0001	<.005	<.005
3	Repl.2	<.01	<.01	<.05	<.05	<.05	<.05	0.150	0.157	12.4	11.5	<.005	<.0001	<.005	<.0001	<.005	<.005
	Repl.3	<.01	<.01	<.05	<.05	<.05	<.05	0.162	0.156	12.5	11.3	<.005	<.0001	<.005	<.0001	<.005	<.005
	Average	-.-	-.-	-.-	-.-	-.-	-.-	0.154	0.156	12.4	11.4	-.-	-.-	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	-.-	-.-	-.-	-.-	0.007	0.001	0.2	0.1	-.-	-.-	-.-	-.-	-.-	-.-
	Repl.1	<.01	<.01	0.09	<.05	<.05	<.05	0.012	0.010	3.4	3.6	<.005	0.0001	<.005	<.0001	<.005	<.005
4	Repl.2	<.01	<.01	0.13	<.05	<.05	<.05	0.025	0.010	3.5	3.6	<.005	<.0001	<.005	<.0001	<.005	<.005
	Repl.3	<.01	<.01	0.13	<.05	<.05	<.05	0.014	0.010	3.8	3.6	<.005	<.0001	<.005	<.0001	<.005	<.005
	Average	-.-	-.-	0.12	-.-	-.-	-.-	0.017	0.010	3.6	3.6	-.-	-.-	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	0.02	-.-	-.-	-.-	0.007	0.000	0.2	0.0	-.-	-.-	-.-	-.-	-.-	-.-
	Repl.1	<.01	<.01	0.36	<.05	<.05	<.05	0.050	0.039	6.9	7.2	<.005	<.0001	<.005	<.0001	<.005	<.005
5	Repl.2	<.01	<.01	0.23	<.05	<.05	<.05	0.045	0.039	6.8	7.2	<.005	<.0001	<.005	<.0001	<.005	<.005
	Repl.3	<.01	<.01	0.25	<.05	<.05	<.05	0.045	0.039	6.8	7.1	<.005	<.0001	<.005	<.0001	<.005	<.005
	Average	-.-	-.-	0.28	-.-	-.-	-.-	0.047	0.039	6.8	7.2	-.-	-.-	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	0.07	-.-	-.-	-.-	0.003	0.000	0.1	0.1	-.-	-.-	-.-	-.-	-.-	-.-
	Repl.1	<.01	<.01	3.43	0.06	<.05	<.05	0.181	0.097	18.8	19.2	<.005	0.0002	<.005	<.0001	<.005	<.005
7	Repl.2	<.01	<.01	3.56	0.07	<.05	<.05	0.187	0.098	20.1	19.3	<.005	0.0002	<.005	<.0001	<.005	<.005
	Repl.3	<.01	<.01	3.41	0.06	<.05	<.05	0.182	0.101	21.0	19.9	<.005	0.0003	<.005	<.0001	<.005	<.005
	Average	-.-	-.-	3.47	0.06	-.-	-.-	0.183	0.099	20.0	19.5	-.-	0.0002	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	0.08	0.01	-.-	-.-	0.003	0.002	1.1	0.4	-.-	0.0001	-.-	-.-	-.-	-.-
	Repl.1	<.01	<.01	0.98	<.05	<.05	<.05	0.109	0.083	12.0	12.7	<.005	0.0001	<.005	<.0001	<.005	<.005
8	Repl.2	<.01	<.01	0.97	<.05	<.05	<.05	0.108	0.082	12.0	12.5	<.005	0.0001	<.005	<.0001	<.005	<.005
	Repl.3	<.01	<.01	0.94	<.05	<.05	<.05	0.111	0.084	12.7	12.7	<.005	<.0001	<.005	<.0001	<.005	<.005
	Average	-.-	-.-	0.96	-.-	-.-	-.-	0.109	0.083	12.2	12.6	-.-	0.0001	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	0.02	-.-	-.-	-.-	0.002	0.001	0.4	0.1	-.-	0.0000	-.-	-.-	-.-	-.-
	Repl.1	<.01	<.01	0.53	<.05	<.05	<.05	0.043	0.026	5.6	5.9	<.005	<.0001	<.005	<.0001	<.005	<.005
9	Repl.2	<.01	<.01	0.51	<.05	0.05	<.05	0.039	0.025	5.8	5.9	<.005	<.0001	<.005	<.0001	<.005	<.005
	Repl.3	<.01	<.01	0.57	<.05	<.05	<.05	0.044	0.026	6.6	5.9	0.006	<.0001	<.005	<.0001	<.005	<.005
	Average	-.-	-.-	0.54	-.-	-.-	-.-	0.042	0.026	6.0	5.9	-.-	-.-	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	0.03	-.-	-.-	-.-	0.003	0.001	0.5	0.0	-.-	-.-	-.-	-.-	-.-	-.-
	Repl.1	<.01	<.01	0.14	<.05	<.05	<.05	0.072	0.074	7.3	7.8	<.005	<.0001	<.005	<.0001	<.005	<.005
10	Repl.2	<.01	<.01	0.05	<.05	<.05	<.05	0.072	0.074	8.5	7.8	<.005	<.0001	<.005	<.0001	<.005	<.005
	Repl.3	<.01	<.01	0.10	<.05	<.05	<.05	0.073	0.074	7.3	7.9	<.005	<.0001	<.005	<.0001	<.005	<.005
	Average	-.-	-.-	0.10	-.-	-.-	-.-	0.072	0.074	7.7	7.8	-.-	-.-	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	0.05	-.-	-.-	-.-	0.001	0.000	0.7	0.1	-.-	-.-	-.-	-.-	-.-	-.-
	Repl.1	<.01	<.01	0.49	<.05	<.05	0.06	0.034	0.019	5.5	5.1	<.005	<.0001	<.005	<.0001	<.005	<.005
12	Repl.2	<.01	<.01	0.44	<.05	<.05	<.05	0.031	0.019	5.1	5.1	<.005	<.0001	<.005	<.0001	<.005	<.005
	Repl.3	<.01	<.01	0.48	<.05	<.05	<.05	0.034	0.019	5.0	5.2	<.005	<.0001	<.005	<.0001	<.005	<.005
	Average	-.-	-.-	0.47	-.-	-.-	-.-	0.033	0.019	5.2	5.1	-.-	-.-	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	0.03	-.-	-.-	-.-	0.002	0.000	0.3	0.1	-.-	-.-	-.-	-.-	-.-	-.-
Level 6		<.01	<.01	0.10	0.20	<.05	<.05	0.033	0.030	72.5	68.4	0.014	0.0160	0.013	0.013	<.005	<.005
Level 6*		-.-	<.01	-.-	0.06	-.-	<.05	-.-	0.030	-.-	64.6	-.-	-.-	0.013	0.013	-.-	<.005
Blank		<.01	<.01	<.05	<.05	<.05	<.05	0.001	<.001	<.1	<.1	<.005	<.0001	<.005	<.0001	<.005	<.005

* Sample acidified prior to filtration

TABLE 1 (cont.):

WATER QUALITY - PREMIER GOLD -
JULY 19,1990

Station Number		TOTICP CR MG/L	DISICP CR MG/L	TOTICP CU MG/L	TOTGF CU MG/L	DISICP CU MG/L	DISGF CU MG/L	TOTICP FE MG/L	DISICP FE MG/L	TOTICP K MG/L	DISICP K MG/L	TOTICP MG MG/L	DISICP MG MG/L	TOTICP MN MG/L	DISICP MN MG/L	TOTICP MO MG/L	DISICP MO MG/L
	Repl.1	0.006	<.005	<.005	<.0006	<.005	<.0005	0.027	<.005	<2	<2	0.7	0.8	0.001	<.001	<.01	<.01
3	Repl.2	0.008	<.005	<.005	<.0006	<.005	<.0005	0.014	<.005	<2	<2	0.8	0.8	0.002	<.001	<.01	<. 0 1
	Repl.3	0.007	<.005	<.005	<.0006	<.005	<.0005	0.015	<.005	<2	<2	0.7	0.8	0.002	<.001	<.01	<.01
	Average	0.007	-.-	-.-	-.-	-.-	-.-	0.019	-.-	-.-	-.-	0.7	0.8	0.002	-.-	-.-	-.-
	S.D.	0.001	-.-	-.-	-.-	-.-	-.-	0.007	-.-	-.-	-.-	0.1	0.0	0.001	-.-	-.-	-.-
	Repl.1	0.008	<.005	<.005	<.0006	<.005	<.0005	0.095	<.005	<2	<2	0.5	0.5	0.004	0.002	<.01	<.01
4	Repl.2	0.023	<.005	<.005	0.0019	<.005	<.0005	0.168	<.005	<2	<2	0.5	0.5	0.008	0.002	<.01	<.01
	Repl.3	0.007	<.005	<.005	<.0006	<.005	<.0005	0.119	<.005	3	<2	0.5	0.5	0.006	0.002	<.01	<.01
	Average	0.013	-.-	-.-	-.-	-.-	-.-	0.127	-.-	-.-	-.-	0.5	0.5	0.006	0.002	-.-	-.-
	S.D.	0.009	-.-	-.-	-.-	-.-	-.-	0.037	-.-	-.-	-.-	0.0	0.0	0.002	0.000	-.-	-.-
	Repl.1	<.005	<.005	<.005	0.0010	<.005	<.0005	0.207	<.005	<2	<2	1.0	0.9	0.014	0.005	<.01	<.01
5	Repl.2	<.005	<.005	<.005	0.0021	<.005	<.0005	0.213	<.005	<2	<2	0.9	0.9	0.013	0.005	<.01	<.01
	Repl.3	<.005	<.005	<.005	0.0006	<.005	<.0005	0.208	<.005	<2	<2	0.9	0.9	0.012	0.005	<.01	<.01
	Average	-.-	-.-	-.-	0.0012	-.-	-.-	0.209	-.-	-.-	-.-	0.9	0.9	0.013	0.005	-.-	-.-
	S.D.	-.-	-.-	-.-	0.0008	-.-	-.-	0.003	-.-	-.-	-.-	0.1	0.0	0.001	0.000	-.-	-.-
	Repl.1	<.005	<.005	<.005	0.0050	<.005	<.0005	3.060	0.034	<2	<2	1.7	1.1	0.151	0.043	<.01	<.01
7	Repl.2	0.006	<.005	0.006	0.0055	<.005	<.0005	3.240	0.040	<2	<2	1.8	1.1	0.161	0.044	<.01	<.01
	Repl.3	<.005	<.005	<.005	0.0046	<.005	<.0005	2.940	0.036	<2	<2	1.6	1.1	0.147	0.044	<.01	<.01
	Average	-.-	-.-	-.-	0.0050	-.-	-.-	3.080	0.037	-.-	-.-	1.7	1.1	0.153	-.-	-.-	-.-
	S.D.	-.-	-.-	-.-	0.0005	-.-	-.-	0.151	0.003	-.-	-.-	0.1	0.0	0.007	-.-	-.-	-.-
	Repl.1	0.009	<.005	<.005	0.0022	<.005	<.0005	0.819	0.018	<2	<2	0.9	0.7	0.046	0.015	<.01	<.01
8	Repl.2	<.005	<.005	<.005	0.0015	<.005	<.0005	0.836	0.024	<2	<2	0.9	0.7	0.051	0.015	<.01	<.01
	Repl.3	<.005	<.005	<.005	0.0017	<.005	<.0005	0.834	0.022	<2	<2	0.9	0.7	0.048	0.016	<.01	<.01
	Average	-.-	-.-	-.-	0.0018	-.-	-.-	0.830	0.021	-.-	-.-	0.9	0.7	0.048	0.015	-.-	-.-
	S.D.	-.-	-.-	-.-	0.0004	-.-	-.-	0.009	0.003	-.-	-.-	0.0	0.0	0.003	0.001	-.-	-.-
	Repl.1	0.006	<.005	<.005	0.0020	<.005	<.0005	0.439	0.011	<2	<2	0.7	0.6	0.025	0.007	<.01	<.01
9	Repl.2	0.009	<.005	<.005	0.0008	<.005	<.0005	0.438	0.009	<2	<2	0.7	0.6	0.025	0.007	<.01	<.01
	Repl.3	<.005	<.005	<.005	0.0017	<.005	<.0005	0.519	0.010	<2	<2	0.8	0.6	0.036	0.007	<.01	<.01
	Average	0.008	-.-	-.-	0.0015	-.-	-.-	0.465	0.010	-.-	-.-	0.7	0.6	0.029	0.007	-.-	-.-
	S.D.	0.002	-.-	-.-	0.0006	-.-	-.-	0.046	0.001	-.-	-.-	0.1	0.0	0.006	0.000	-.-	-.-
	Repl.1	0.007	<.005	<.005	0.0017	<.005	<.0005	0.049	0.006	<2	<2	0.3	0.3	0.006	<.001	<.01	<.01
10	Repl.2	0.006	<.005	<.005	0.0008	<.005	<.0005	0.042	0.008	<2	<2	0.3	0.3	0.006	0.001	<.01	<.01
	Repl.3	<.005	<.005	<.005	0.0006	<.005	<.0005	0.059	0.006	<2	<2	0.3	0.3	0.006	<.001	<.01	<.01
	Average	0.007	-.-	-.-	0.0010	-.-	-.-	0.050	0.007	-.-	-.-	0.3	0.3	0.006	-.-	-.-	-.-
	S.D.	0.001	-.-	-.-	0.0006	-.-	-.-	0.009	0.001	-.-	-.-	0.0	0.0	0.000	-.-	-.-	-.-
	Repl.1	0.013	<.005	<.005	0.0015	<.005	<.0005	0.414	<.005	<2	<2	0.7	0.6	0.026	0.005	<.01	<.01
12	Repl.2	0.007	<.005	<.005	0.0031	<.005	<.0005	0.420	<.005	<2	<2	0.7	0.6	0.023	0.005	<.01	<.01
	Repl.3	0.011	<.005	<.005	0.0013	<.005	<.0005	0.442	0.007	<2	<2	0.7	0.6	0.021	0.005	<.01	<.01
	Average	0.010	-.-	-.-	0.0020	-.-	-.-	0.425	-.-	-.-	-.-	0.7	0.6	0.023	0.005	-.-	-.-
	S.D.	0.003	-.-	-.-	0.0010	-.-	-.-	0.015	-.-	-.-	-.-	0.0	0.0	0.003	0.000	-.-	-.-
Level 6	26	0.009	<.005	0.014	0.0150	<.005	0.0017	0.272	<.005	<2	<2	5.2	5.1	0.197	0.195	<.01	<.01
Level 6*	27	-.-	<.005	-.-	-.-	0.014	0.0154	-.-	0.259	-.-	<2	-.-	4.9	-.-	0.190	-.-	<.01
Blank	1	0.008	<.005	<.005	<.0006	<.005	<.0005	0.022	<.005	<2	<2	<.1	<.1	<.001	<.001	<.01	<.01

* sample acidified prior to filtration

TABLE 1 (cont.):

WATER QUALITY - PREMIER GOLD -
JULY 19, 1990

Station Number		TOTICP NA MG/L	DISICP NA MG/L	TOTICP NI MG/L	DISICP NI MG/L	TOTICP P MG/L	DISICP P MG/L	TOTICP PB MG/L	TOTGF PB MG/L	DISICP PB MG/L	DISGF PB MG/L	TOTICP SB MG/L	DISICP SB MG/L	TOTICP SE MG/L	DISICP SE MG/L	TOTICP SI MG/L	DISICP SI MG/L
3	Repl.1	0.8	0.8	<.02	<.02	<.1	<.1	<.05	0.0009	<.05	<.0005	<.05	<.05	<.05	<.05	1.78	1.67
	Repl.2	0.8	0.8	<.02	<.02	<.1	<.1	<.05	0.0008	<.05	<.0005	<.05	<.05	<.05	0.07	1.78	1.78
	Repl.3	0.8	0.7	<.02	<.02	<.1	<.1	<.05	0.0007	<.05	<.0005	<.05	<.05	0.07	<.05	1.76	1.75
	Average	0.8	0.8	-.-	-.-	-.-	-.-	-.-	0.0008	-.-	-.-	-.-	-.-	-.-	-.-	1.77	1.73
	S.D.	0.0	0.1	-.-	-.-	-.-	-.-	-.-	0.0001	-.-	-.-	-.-	-.-	-.-	-.-	0.01	0.06
4	Repl.1	0.3	0.3	<.02	<.02	<.1	<.1	<.05	0.0014	<.05	<.0005	<.05	<.05	<.05	<.05	0.59	0.48
	Repl.2	0.4	0.3	<.02	<.02	<.1	<.1	<.05	0.0014	<.05	<.0005	<.05	<.05	<.05	<.05	0.61	0.48
	Repl.3	0.3	0.3	<.02	<.02	<.1	<.1	<.05	0.0010	<.05	<.0005	<.05	<.05	<.05	<.05	0.64	0.47
	Average	0.3	0.3	-.-	-.-	-.-	-.-	-.-	0.0013	-.-	-.-	-.-	-.-	-.-	-.-	0.61	0.48
	S.D.	0.1	0.0	-.-	-.-	-.-	-.-	-.-	0.0002	-.-	-.-	-.-	-.-	-.-	-.-	0.03	0.01
5	Repl.1	0.3	0.3	<.02	<.02	<.1	<.1	<.05	0.0021	<.05	<.0005	<.05	<.05	<.05	<.05	1.08	0.59
	Repl.2	0.3	0.3	<.02	<.02	<.1	<.1	<.05	0.0025	<.05	<.0005	<.05	<.05	<.05	0.09	0.92	0.59
	Repl.3	0.3	0.3	<.02	<.02	<.1	<.1	<.05	<.0006	<.05	<.0005	<.05	<.05	<.05	<.05	0.94	0.58
	Average	0.3	0.3	-.-	-.-	-.-	-.-	-.-	0.0023	-.-	-.-	-.-	-.-	-.-	-.-	0.98	0.59
	S.D.	0.0	0.0	-.-	-.-	-.-	-.-	-.-	0.0003	-.-	-.-	-.-	-.-	-.-	-.-	0.09	0.01
7	Repl.1	1.0	0.7	<.02	<.02	<.1	<.1	<.05	0.0189	<.05	<.0005	<.05	<.05	<.05	<.05	6.11	1.38
	Repl.2	1.0	0.7	<.02	<.02	<.1	<.1	<.05	0.0178	<.05	0.0007	<.05	<.05	<.05	0.05	6.32	1.38
	Repl.3	1.1	0.7	<.02	<.02	<.1	<.1	<.05	0.0176	<.05	<.0005	<.05	<.05	<.05	<.05	6.13	1.43
	Average	1.0	0.7	-.-	-.-	-.-	-.-	-.-	0.0181	-.-	-.-	-.-	-.-	-.-	-.-	6.19	1.40
	S.D.	0.1	0.0	-.-	-.-	-.-	-.-	-.-	0.0007	-.-	-.-	-.-	-.-	-.-	-.-	0.12	0.03
8	Repl.1	0.7	0.6	<.02	<.02	<.1	<.1	<.05	0.0074	<.05	<.0005	<.05	<.05	<.05	0.05	2.52	1.21
	Repl.2	0.7	0.6	<.02	<.02	<.1	<.1	<.05	0.0089	<.05	<.0005	<.05	<.05	<.05	<.05	2.54	1.20
	Repl.3	0.7	0.6	<.02	<.02	<.1	<.1	<.05	0.0058	<.05	<.0005	<.05	<.05	<.05	<.05	2.51	1.22
	Average	0.7	0.6	-.-	-.-	-.-	-.-	-.-	0.0074	-.-	-.-	-.-	-.-	-.-	-.-	2.52	1.21
	S.D.	0.0	0.0	-.-	-.-	-.-	-.-	-.-	0.0016	-.-	-.-	-.-	-.-	-.-	-.-	0.02	0.01
9	Repl.1	0.4	0.3	<.02	<.02	<.1	<.1	<.05	0.0023	<.05	<.0005	<.05	<.05	<.05	<.05	1.39	0.61
	Repl.2	0.4	0.3	0.05	<.02	<.1	<.1	<.05	0.0012	<.05	<.0005	<.05	<.05	<.05	<.05	1.37	0.61
	Repl.3	0.4	0.4	<.02	<.02	<.1	<.1	<.05	0.0018	<.05	<.0005	<.05	<.05	<.05	<.05	1.50	0.63
	Average	0.4	0.3	-.-	-.-	-.-	-.-	-.-	0.0018	-.-	-.-	-.-	-.-	-.-	-.-	1.42	0.62
	S.D.	0.0	0.1	-.-	-.-	-.-	-.-	-.-	0.0006	-.-	-.-	-.-	-.-	-.-	-.-	0.07	0.01
10	Repl.1	0.7	0.7	<.02	<.02	<.1	<.1	<.05	0.0018	<.05	<.0005	<.05	<.05	<.05	<.05	1.87	1.85
	Repl.2	0.7	0.7	<.02	<.02	<.1	<.1	<.05	<.0006	<.05	<.0005	<.05	<.05	0.13	<.05	1.77	1.84
	Repl.3	0.7	0.7	<.02	<.02	<.1	<.1	<.05	<.0006	<.05	<.0005	<.05	<.05	<.05	<.05	1.83	1.86
	Average	0.7	0.7	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	1.82	1.85
	S.D.	0.0	0.0	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	-.-	0.05	0.01
12	Repl.1	0.3	0.3	<.02	<.02	<.1	<.1	<.05	0.0015	<.05	<.0005	<.05	<.05	<.05	0.05	1.32	0.56
	Repl.2	0.4	0.3	<.02	<.02	<.1	<.1	<.05	0.0027	<.05	<.0005	<.05	<.05	0.06	0.07	1.27	0.56
	Repl.3	0.4	0.3	<.02	<.02	<.1	<.1	<.05	0.0020	<.05	<.0005	<.05	<.05	<.05	<.05	1.33	0.57
	Average	0.4	0.3	-.-	-.-	-.-	-.-	-.-	0.0021	-.-	-.-	-.-	-.-	-.-	0.06	0.03	0.01
	S.D.	0.1	0.0	-.-	-.-	-.-	-.-	-.-	0.0006	-.-	-.-	-.-	-.-	-.-	0.01	0.03	0.01
Level 6		4.1	4.2	<.02	<.02	<.1	<.1	<.05	0.0056	<.05	<.0005	<.05	<.05	<.05	<.05	2.32	2.26
Level 6*		-.-	4.4	-.-	<.02	-.-	<.1	-.-	-.-	<.05	0.0059	-.-	<.05	-.-	<.05	-.-	2.21
Blank		<.1	<.1	<.02	<.02	<.1	<.1	<.05	<.0006	<.05	<.0005	<.05	<.05	<.05	0.09	0.13	<.05

* sample acidified prior to filtration

TABLE 1 (cont.):

WATER QUALITY - PREMIER GOLD -
JULY 19, 1990

Station Number		TOTICP SN MG/L	DISICP SN MG/L	TOTICP SR MG/L	DISICP SR MG/L	TOTICP TI MG/L	DISICP TI MG/L	TOTICP V MG/L	DISICP V MG/L	TOTICP ZN MG/L	DISICP ZN MG/L
	Repl.1	<.05	<.05	0.121	0.127	<.002	<.002	<.01	<.01	<.002	0.005
3	Repl.2	<.05	<.05	0.120	0.127	<.002	<.002	<.01	<.01	<.002	<.002
	Repl.3	<.05	<.05	0.126	0.125	<.002	<.002	<.01	<.01	<.002	<.002
	Average	-.-	-.-	0.122	0.126	-.-	-.-	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	0.003	0.001	-.-	-.-	-.-	-.-	-.-	-.-
	Repl.1	<.05	<.05	0.037	0.037	<.002	<.002	<.01	<.01	<.002	<.002
4	Repl.2	0.06	<.05	0.037	0.037	<.002	<.002	<.01	<.01	<.002	<.002
	Repl.3	<.05	<.05	0.038	0.037	<.002	<.002	<.01	<.01	<.002	<.002
	Average	-.-	-.-	0.037	0.037	-.-	-.-	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	0.001	0.000	-.-	-.-	-.-	-.-	-.-	-.-
	Repl.1	<.05	<.05	0.063	0.063	<.002	<.002	<.01	<.01	<.002	0.006
5	Repl.2	<.05	<.05	0.064	0.063	<.002	<.002	<.01	<.01	0.002	<.002
	Repl.3	<.05	<.05	0.064	0.062	<.002	<.002	<.01	<.01	<.002	<.002
	Average	-.-	-.-	0.064	0.063	-.-	-.-	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	0.001	0.001	-.-	-.-	-.-	-.-	-.-	-.-
	Repl.1	<.05	<.05	0.122	0.112	<.002	0.002	<.01	<.01	0.049	0.010
7	Repl.2	<.05	<.05	0.126	0.112	<.002	<.002	<.01	<.01	0.052	0.010
	Repl.3	<.05	<.05	0.119	0.116	<.002	<.002	<.01	<.01	0.054	0.009
	Average	-.-	-.-	0.122	0.113	-.-	-.-	-.-	-.-	0.052	0.010
	S.D.	-.-	-.-	0.004	0.002	-.-	-.-	-.-	-.-	0.003	0.001
	Repl.1	<.05	<.05	0.092	0.091	<.002	<.002	<.01	<.01	0.018	0.007
8	Repl.2	<.05	<.05	0.093	0.089	<.002	<.002	<.01	<.01	0.016	0.007
	Repl.3	0.05	<.05	0.096	0.092	<.002	<.002	<.01	<.01	0.016	0.008
	Average	-.-	-.-	0.094	0.091	-.-	-.-	-.-	-.-	0.017	0.007
	S.D.	-.-	-.-	0.002	0.002	-.-	-.-	-.-	-.-	0.001	0.001
	Repl.1	<.05	<.05	0.056	0.055	<.002	<.002	<.01	<.01	0.009	0.008
9	Repl.2	<.05	<.05	0.057	0.054	<.002	<.002	<.01	<.01	0.007	0.007
	Repl.3	0.05	<.05	0.061	0.055	<.002	<.002	<.01	<.01	0.007	0.007
	Average	-.-	-.-	0.058	0.055	-.-	-.-	-.-	-.-	0.008	0.007
	S.D.	-.-	-.-	0.003	0.001	-.-	-.-	-.-	-.-	0.001	0.001
	Repl.1	0.08	<.05	0.060	0.063	<.002	<.002	<.01	<.01	<.002	<.002
10	Repl.2	<.05	<.05	0.060	0.063	<.002	<.002	<.01	<.01	<.002	<.002
	Repl.3	<.05	<.05	0.060	0.063	<.002	<.002	<.01	<.01	<.002	<.002
	Average	-.-	-.-	0.060	0.063	-.-	-.-	-.-	-.-	-.-	-.-
	S.D.	-.-	-.-	0.000	0.000	-.-	-.-	-.-	-.-	-.-	-.-
	Repl.1	0.06	<.05	0.055	0.051	<.002	<.002	<.01	<.01	0.008	0.007
12	Repl.2	0.05	<.05	0.053	0.051	<.002	<.002	<.01	<.01	0.009	0.007
	Repl.3	<.05	<.05	0.053	0.051	<.002	<.002	<.01	<.01	0.006	0.007
	Average	0.06	-.-	0.054	0.051	-.-	-.-	-.-	-.-	0.008	0.007
	S.D.	0.01	-.-	0.001	0.000	-.-	-.-	-.-	-.-	0.002	0.000
Level 6		<.05	<.05	1.090	1.080	<.002	<.002	<.01	<.01	1.390	0.998
Level 6*		-.-	<.05	-.-	1.050	-.-	<.002	-.-	<.01	-.-	1.240
Blank	1	<.05	<.05	<.001	<.001	<.002	<.002	<.01	<.01	<.002	0.008

* sample acidified prior to filtration

TABLE 2: WATER QUALITY, IMMEDIATES ANALYSIS - PREMIER GOLD - JULY 19, 1990

Station Number		ALK MG/L	DISICP HC MG/L	DISICP HT MG/L	PH REL.U.	NFR MG/L	TR MG/L	SO4 MG/L
	Repl.1	32	31.6	31.8	7.6	<5	50	3.3
3	Repl.2	32	32.0	32.2	7.6	<5	47	3.7
	Repl.3	32	31.4	31.6	7.6	<5	60	3.6
	Average	32	31.7	31.9	7.6	---	52	3.5
	S.D.	0	0.3	0.3	0.0	---	7	0.2
	Repl.1	9	11.0	11.1	7.0	<5	20	3.2
4	Repl.2	8	11.0	11.1	7.0	<5	20	3.3
	Repl.3	9	11.2	11.3	7.1	<5	20	3.3
	Average	9	11.1	11.2	7.0	---	20	3.3
	S.D.	1	0.1	0.1	0.1	---	0	0.1
	Repl.1	19	21.7	21.8	7.5	<5	30	4.1
5	Repl.2	18	21.9	22.1	7.5	<5	30	3.9
	Repl.3	18	21.4	21.6	7.5	<5	30	3.3
	Average	18	21.7	21.8	7.5	---	30	3.8
	S.D.	1	0.3	0.3	0.0	---	0	0.4
	Repl.1	43	52.4	53.0	7.7	40	160	10.5
7	Repl.2	42	52.6	53.2	7.8	40	140	10.9
	Repl.3	42	54.3	54.9	7.9	50	140	11.5
	Average	42	53.1	53.7	7.8	43	147	11.0
	S.D.	1	1.0	1.0	0.1	6	12	0.5
	Repl.1	30	34.6	35.0	7.9	9	70	6.8
8	Repl.2	30	34.1	34.5	8.1	11	70	6.5
	Repl.3	30	34.6	34.9	7.7	9	70	6.3
	Average	30	34.4	34.8	7.9	10	70	6.5
	S.D.	0	0.3	0.3	0.2	1	0	0.3
	Repl.1	14	17.3	17.6	7.3	<5	40	4.1
9	Repl.2	14	17.2	17.4	7.3	5	50	4.2
	Repl.3	14	17.3	17.6	7.3	<5	40	4.2
	Average	14	17.3	17.5	7.3	---	43	4.2
	S.D.	0	0.1	0.1	0.0	---	6	0.1
	Repl.1	21	20.7	20.8	7.4	<5	40	2.6
10	Repl.2	21	20.8	21.0	7.4	<5	40	3.2
	Repl.3	22	21.1	21.2	7.4	<5	40	2.6
	Average	21	20.9	21.0	7.4	---	40	2.8
	S.D.	1	0.2	0.2	0.0	---	0	0.3
	Repl.1	12	15.1	15.3	7.3	<5	30	3.8
12	Repl.2	12	15.1	15.3	7.3	604	40	3.8
	Repl.3	12	15.4	15.5	7.2	7	40	3.8
	Average	12	15.2	15.4	7.3	306	37	3.8
	S.D.	0	0.2	0.1	0.1	422	6	0.0
Level 6		102	192.0	196.0	8.2	613	280	132.0
Level 6*		---	182.0	186.0	-.-	---	---	-.-
Blank		<1	<.4	<.4	5.5	<5	<10	0.7

* sample acidified prior to filtration

TABLE 3:

SEDIMENT QUALITY - PREMIER GOLD -
JULY 23, 1990

Station Number		SEDIC AG UG/G	SEDICP AL UG/G	SEDICP AS UG/G	SEDICP BA UG/G	SEDICP BE UG/G	SEDICP CA UG/G	SEDICP CD UG/G	SEDICP CO UG/G	SEDICP CR UG/G	SEDICP CU UG/G	SEDICP FE UG/G	SEDHG HG UG/G	SEDICP K UG/G	SEDICP MG UG/G	SEDICP MN UG/G
	Repl.1	2	13800	73	644	0.6	5340	3.7	<20	13.0	46.4	43900	0.370	2300	6190	2690
	Repl.2	<2	12700	62	520	0.6	4750	3.9	<20	13.0	44.9	42600	0.300	1700	5960	2390
4	Repl.3	<2	11700	41	562	0.4	4120	3.8	<20	13.0	39.5	40600	0.240	900	5790	1840
	Repl.4	<2	12900	77	645	0.5	5690	6.2	<20	13.0	42.2	43200	0.330	2400	5880	2580
	Average	---	12775	63	593	0.5	4975	4.4	---	13.0	43.3	42575	0.310	1825	5955	2375
	S.D.	---	862	16	62	0.1	689	1.2	---	0.0	3.0	1419.8	0.055	690	171	378
	Repl.1	10	12600	93	403	0.5	5860	4.2	<20	10.0	63.3	57200	0.260	600	7070	1050
	Repl.2	9	12000	110	311	0.4	6840	4.2	<20	7.7	51.4	57400	0.250	<300	7010	962
5	Repl.3	4	12300	45	265	0.5	8700	3.4	<20	7.4	33.4	52500	0.180	700	7130	955
	Repl.4	2	12100	10	296	0.5	5380	2.0	<20	8.5	31.9	36900	0.110	400	7020	1020
	Average	6	12250	65	319	0.5	6695	3.5	---	8.4	45.0	51000	0.200	567	7058	997
	S.D.	4	265	46	59	0.0	1468	1.0	---	1.2	15.1	9668.85	0.070	153	55	46
	Repl.1	10	11800	30	437	0.4	6890	6.9	<20	7.1	62.1	43000	0.140	800	6530	1220
	Repl.2	19	11900	64	540	0.4	6780	12.0	<20	7.0	104.0	51700	0.210	<300	6160	1390
8	Repl.3	23	10700	49	516	0.4	7630	12.0	<20	7.1	114.0	50900	0.230	500	5570	1280
	Repl.4	27	12100	56	436	0.4	8020	12.0	<20	7.3	113.0	60800	0.067	2000	6280	1350
	Average	20	11625	50	482	0.4	7330	10.7	---	7.1	98.3	51600	0.162	1100	6135	1310
	S.D.	7	629	15	54	0.0	595	2.5	---	0.1	24.5	7282.4	0.074	794	407	75
	Repl.1	2	11500	66	250	0.3	10500	2.0	<20	3.7	40.6	50500	0.049	<300	6870	1160
	Repl.2	5	14000	86	347	0.6	5770	3.9	<20	7.4	66.9	60500	4.170	2000	6490	1370
9	Repl.3	10	11600	130	275	0.4	8250	5.6	<20	5.3	98.0	78600	0.140	1900	6370	1150
	Repl.4	10	12600	100	338	0.4	8010	4.6	<20	5.6	90.5	70600	0.130	1000	6550	1280
	Average	7	12425	96	303	0.4	8133	4.0	---	5.5	74.0	65050	1.122	1633	6570	1240
	S.D.	4	1162	27	47	0.1	1934	1.5	---	1.5	25.9	12204	2.032	551	214	105
	Repl.1	8	12500	74	415	0.4	7060	4.5	<20	5.6	62.7	58200	0.130	1900	6730	1130
	Repl.2	18	11300	206	245	0.5	6420	3.4	20	3.1	104.0	100000	<.02	900	5940	1070
12	Repl.3	7	12600	96	304	0.4	6730	2.8	<20	5.0	50.9	59700	5.570	800	6430	1120
	Repl.4	9	11500	179	215	0.4	7220	2.9	20	3.0	82.7	92100	0.130	<300	6170	1130
	Average	11	11975	139	295	0.4	6858	3.4	20	4.2	75.1	77500	1.943	1200	6318	1113
	S.D.	5	670	64	88	0.0	356	0.8	0	1.3	23.3	21669.8	3.141	608	340	29

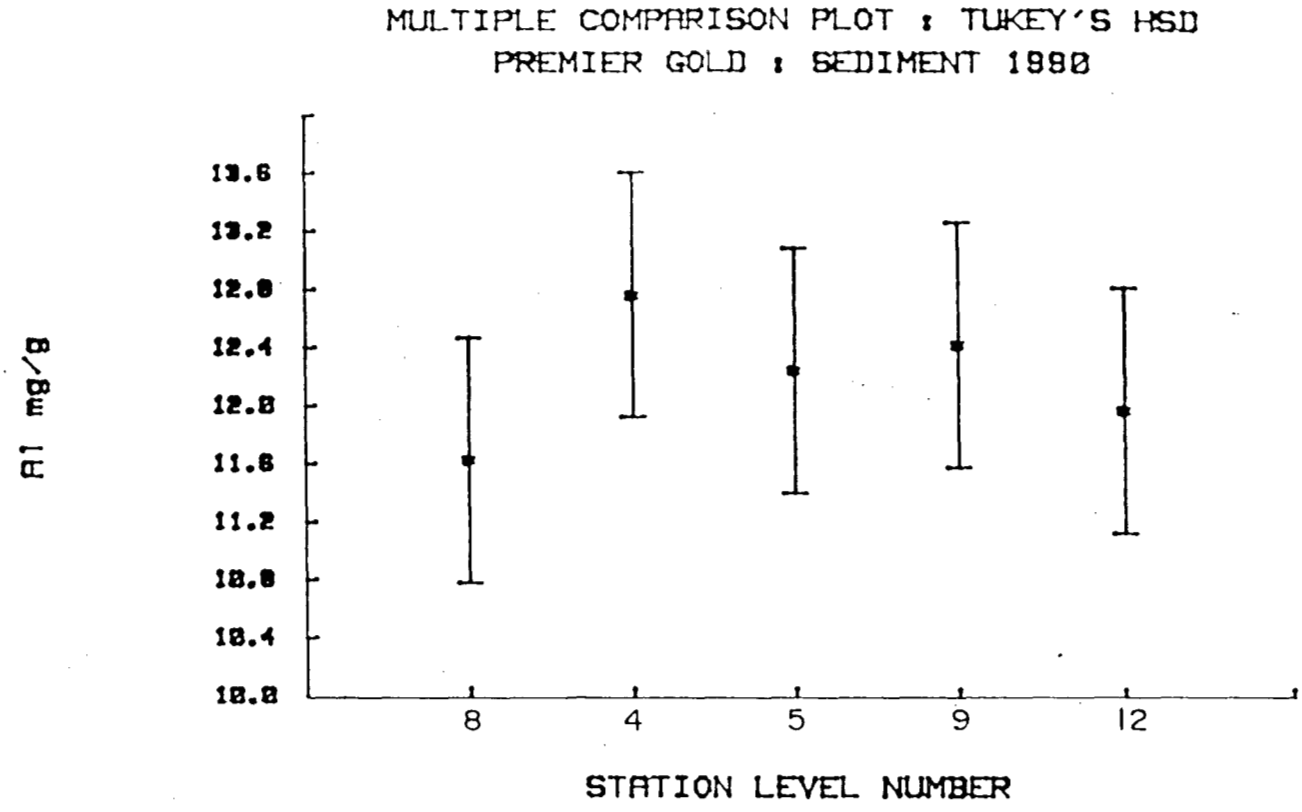
TABLE 3 (cont.):

SEDIMENT QUALITY - PREMIER GOLD -
JULY 23, 1990

Station Number		SEDICP MO UG/G	SEDICP NA UG/G	SEDICP NI UG/G	SEDICP P UG/G	SEDICP PB UG/G	SEDICP SB UG/G	SEDICP SI UG/G	SEDICP SN UG/G	SEDICP SR UG/G	SEDICP TI UG/G	SEDICP V UG/G	SEDICP ZN UG/G	SFR MG/KG	SVR MG/KG
	Repl.1	2	100	19	1400	244	10	767	<8	38.4	104	30	542	970000	29800
	Repl.2	4	100	24	1300	232	18	764	<8	34.5	82	28	534	974000	25600
4	Repl.3	3	80	21	1300	216	<8	713	<8	30.2	81	26	481	981000	19000
	Repl.4	4	100	23	1300	240	9	743	<8	40.0	93	29	525	974000	25900
	Average	3	95	22	1325	233	12	747	---	35.8	90	28	521	974750	25075
	S.D.	1	10	2	50	12	5	25	---	4.4	11	2	27	4573	4479
	Repl.1	4	200	24	1200	276	<8	833	<8	34.0	518	53	680	973000	27400
	Repl.2	4	100	20	1200	363	20	846	<8	36.1	487	50	681	973000	26700
5	Repl.3	3	90	10	1200	190	<8	818	<8	41.4	538	51	495	980000	20200
	Repl.4	3	80	17	1000	90	10	885	<8	28.3	326	39	306	981000	19300
	Average	4	118	18	1150	230	15	846	---	35.0	467	48	541	976750	23400
	S.D.	1	56	6	100	117	7	29	---	5.4	96	6	179	4349	4240
	Repl.1	5	100	10	1100	305	<8	797	<8	37.8	519	43	951	981000	19300
	Repl.2	3	100	20	1300	611	20	900	<8	39.3	501	43	1450	976000	23700
8	Repl.3	3	60	20	1200	686	10	940	<8	41.1	387	36	1630	977000	23000
	Repl.4	2	90	10	1200	627	10	891	<8	43.8	614	52	1470	971000	28800
	Average	3	88	15	1200	557	13	882	---	40.5	505	44	1375	976250	23700
	S.D.	1	19	6	82	171	6	61	---	2.6	93	7	294	4113	3910
	Repl.1	2	60	9	1400	120	<8	1020	<8	40.7	200	30	351	979000	21100
	Repl.2	4	100	20	1300	223	9	968	<8	32.7	390	47	609	971000	28800
9	Repl.3	4	80	10	1300	427	10	968	<8	35.9	451	49	753	966000	33800
	Repl.4	4	100	10	1500	302	10	980	<8	37.2	442	48	630	971000	29300
	Average	4	85	12	1375	268	10	984	---	36.6	371	44	586	971750	28250
	S.D.	1	19	5	96	130	1	25	---	3.3	117	9	169	5377	5270
	Repl.1	2	100	10	1400	247	<8	848	<8	36.9	453	43	654	979000	21100
	Repl.2	7	100	18	1300	463	19	1130	<8	32.2	485	58	659	961000	38800
12	Repl.3	3	80	10	1400	209	<8	865	<8	33.6	392	42	562	978000	22400
	Repl.4	6	100	20	1300	498	10	1020	<8	32.9	400	48	619	955000	44900
	Average	5	95	15	1350	354	15	966	---	33.9	433	48	624	968250	31800
	S.D.	2	10	5	58	147	6	134	---	2.1	44	7	45	12093	11881

TABLE 4: SEDIMENT SEQUENTIAL EXTRACTION - STATION 9, CASCADE CREEK BELOW FLETCHER CREEK - JULY 23, 1990

Metals (µg/g)	Exchange-able	Carbonates	Fe+Mn Oxide	Organic & Sulphides	Residual	Total
Ag	<0.4	<0.4	<0.4	<0.4	10	10
Al	4	115	611	661	11000	12400
As	<2	<2	2	27	111	140
Ba	32.6	83.9	60.9	5.18	126	309
Be	<0.04	0.06	0.2	<0.04	<0.24	0.5
Ca	945	4230	170	1970	1600	8910
Cd	<0.2	0.52	0.4	<0.2	<1.58	2.5
Co	<4	<4	<4	<4	<20	<20
Cr	0.5	<0.2	0.61	<0.2	5.89	7
Cu	<0.2	4.73	4.5	27.3	30.9	67.4
Fe	<2	123	4980	7600	60100	72800
K	<80	<80	1900	<80	<80	1000
Mn	7.59	355	187	20.3	620	1190
Mo	<0.4	<0.4	<0.4	0.6	9.4	10
Ni	<0.8	1	<0.8	1	<8	10
P	<4	<4	78	1420	<4	1500
Pb	<2	51.6	41.7	25	180	298
Sb	<2	<2	4	<2	<4	<8
Sn	<2	<2	<2	<2	<8	<8
Sr	5.87	14.2	2.2	5.92	12.3	40.5
Ti	<0.08	<0.08	<0.08	5.65	413	419
V	<0.4	<0.4	2	1	42	45
Zn	<0.08	67.9	38.4	23.6	411	541



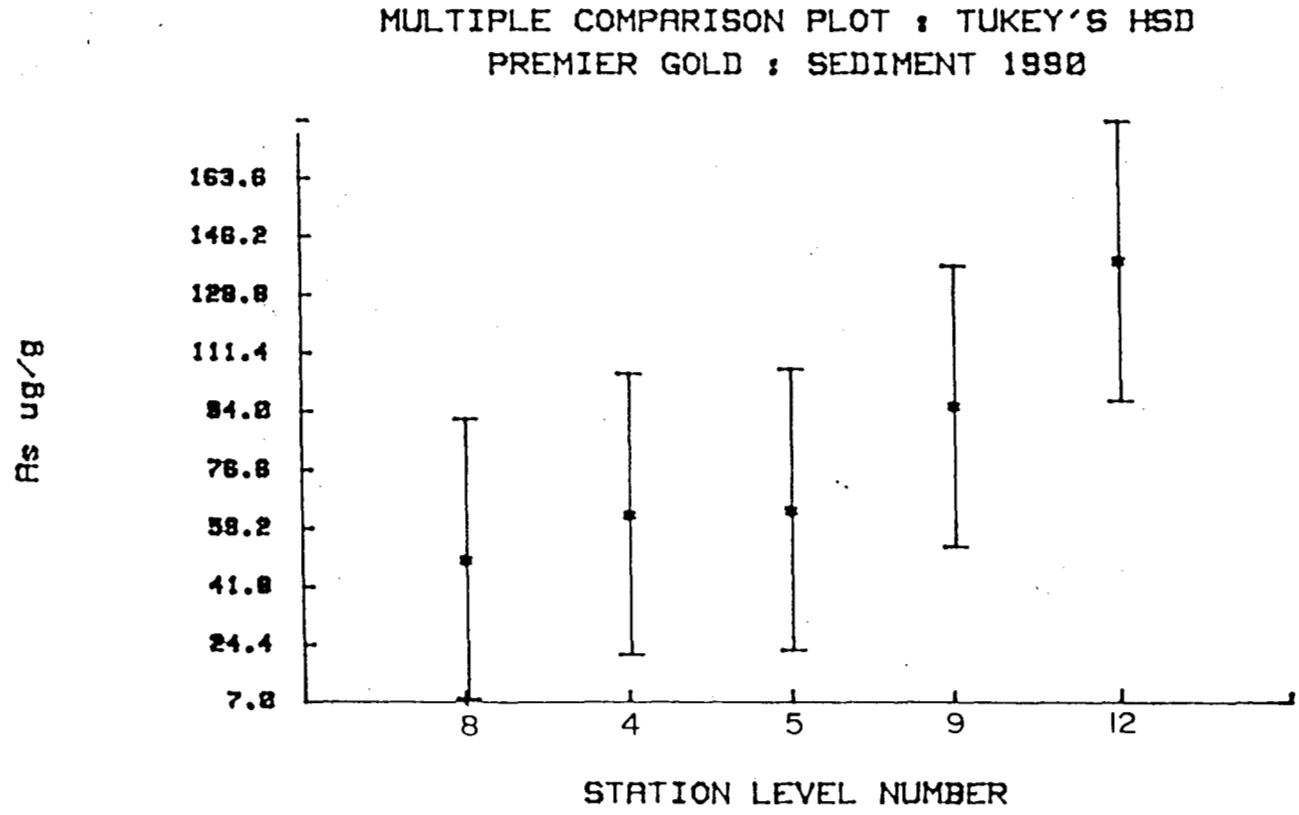
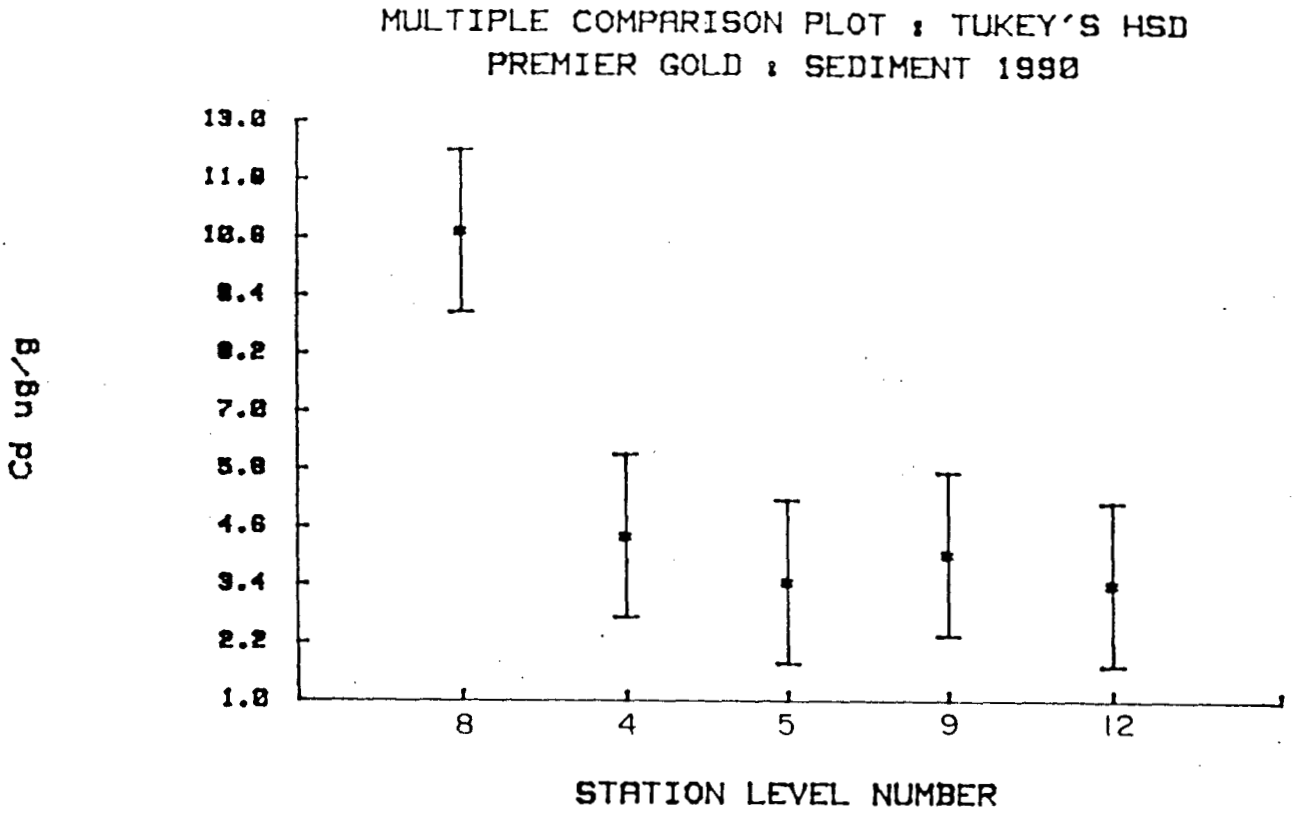


FIGURE 2: SEDIMENT MULTIPLE COMPARISON PLOT - PREMIER GOLD 1990 - Al, As



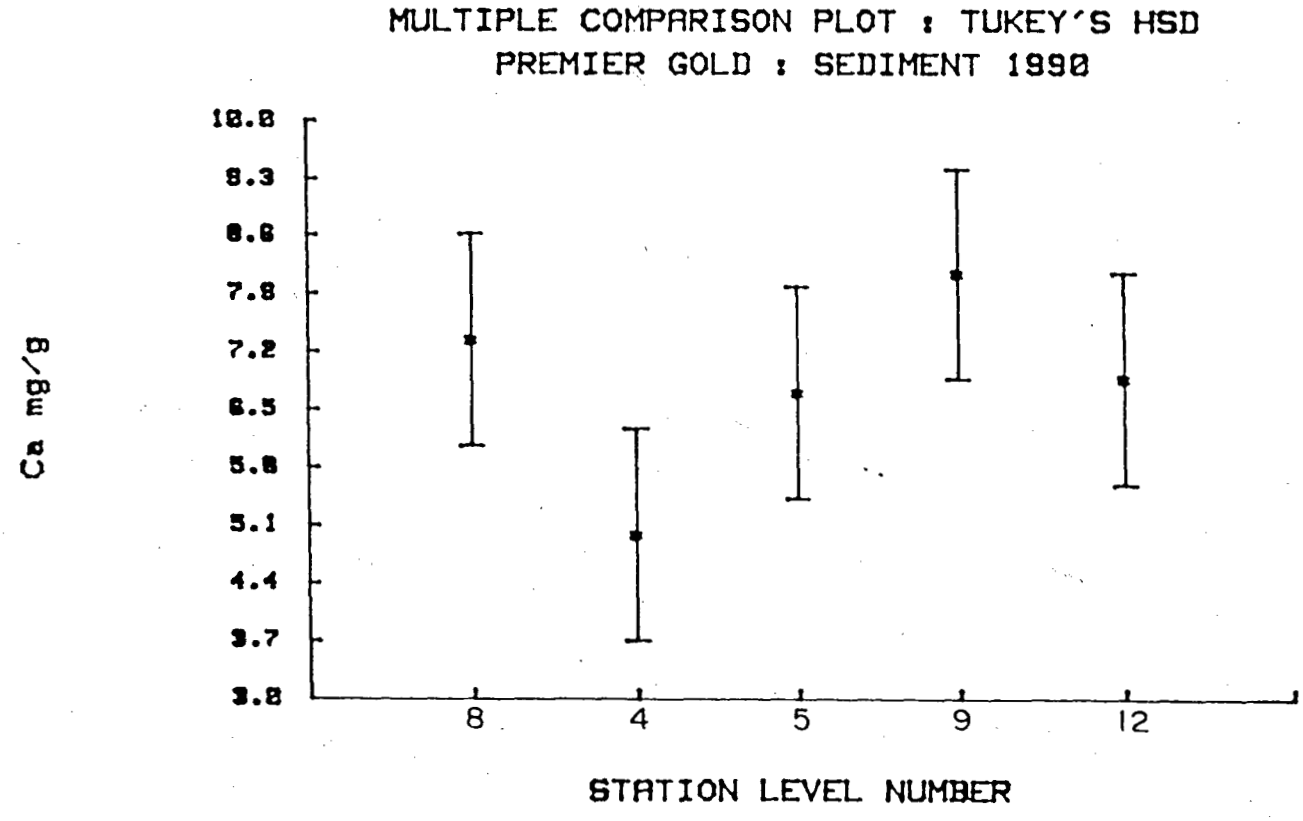
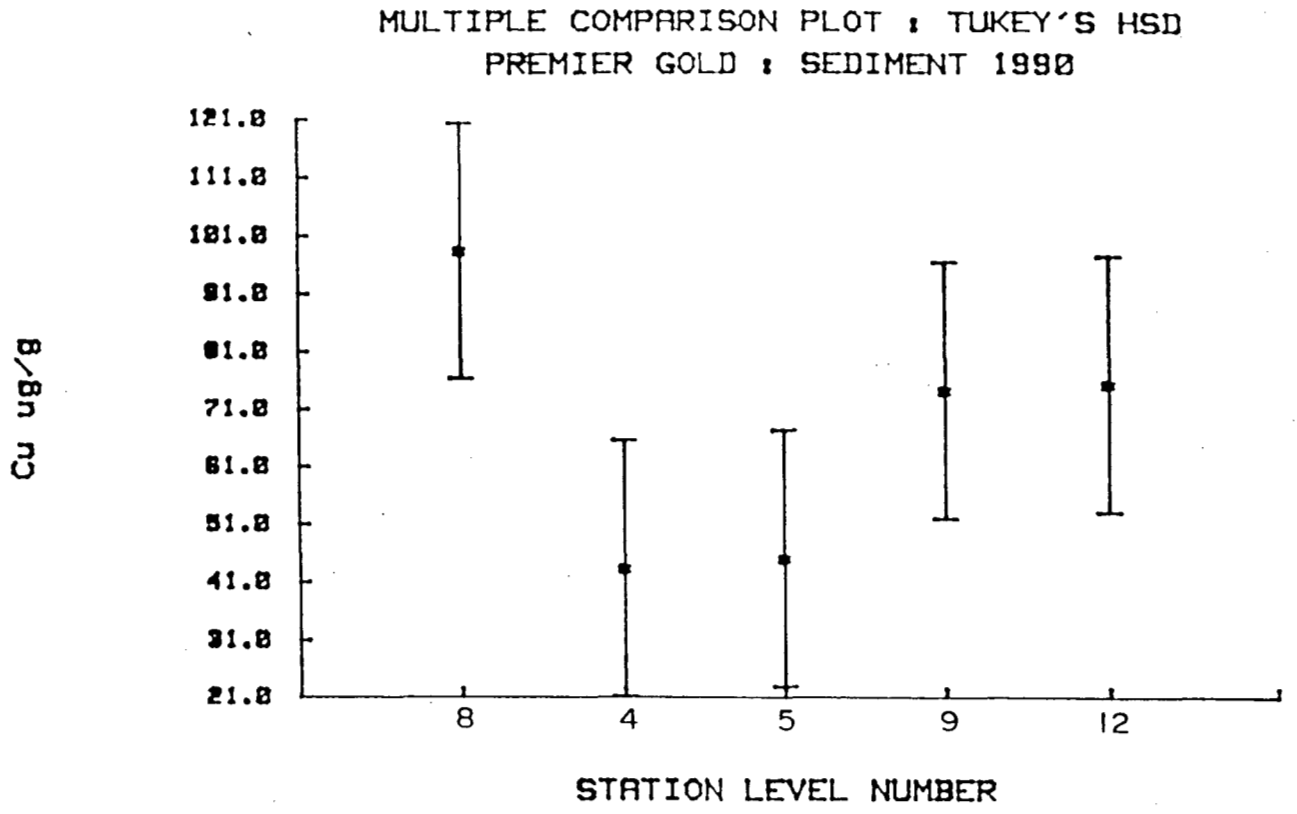


FIGURE 3: SEDIMENT MULTIPLE COMPARISON PLOT - PREMIER GOLD 1990 - Ca, Cd



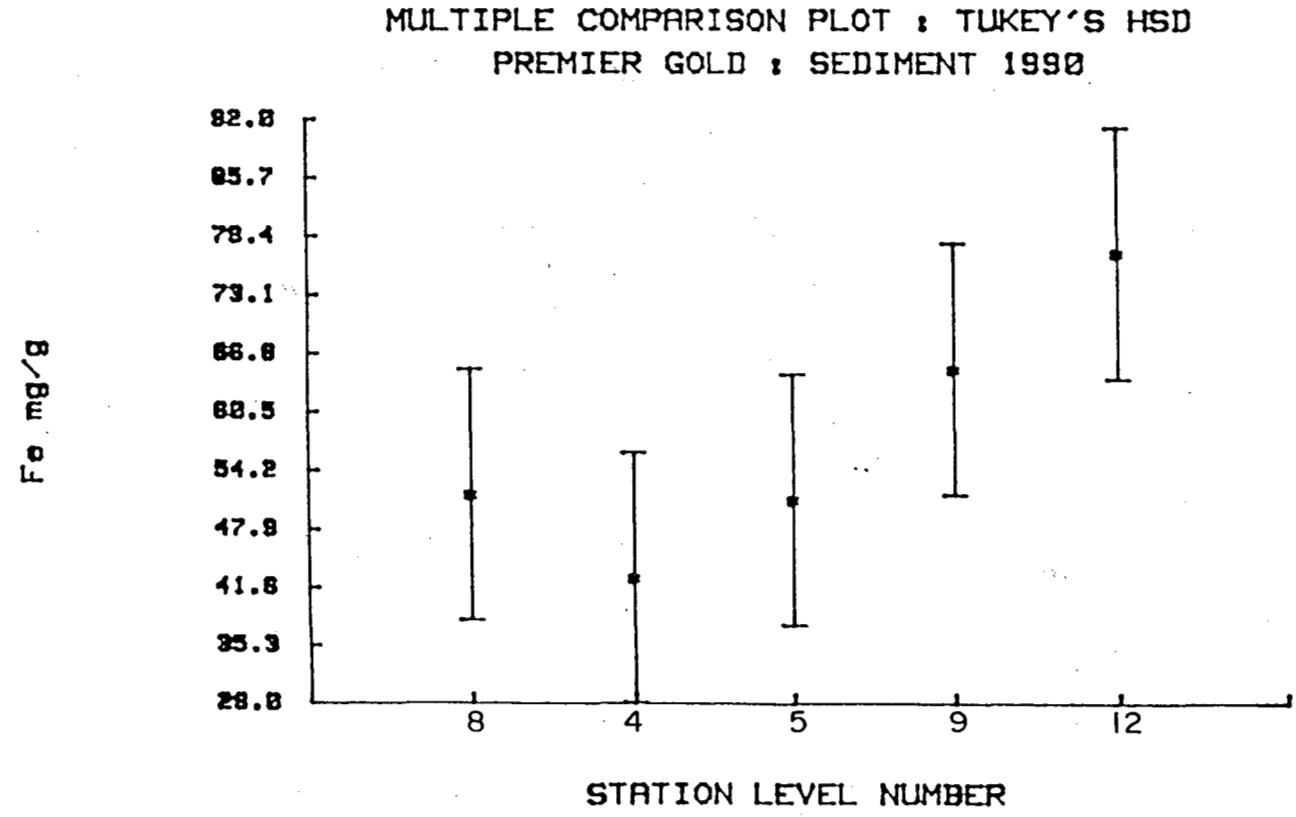
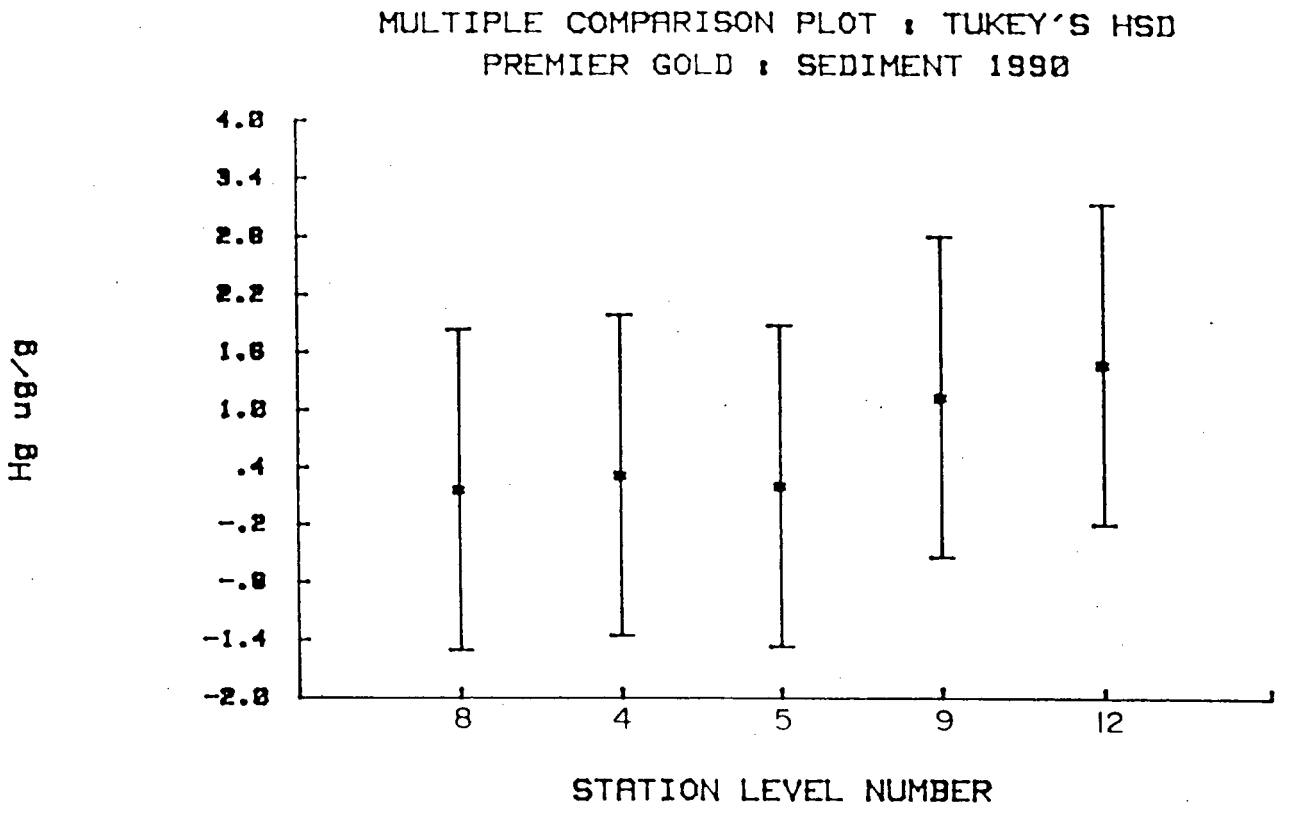


FIGURE 4: SEDIMENT MULTIPLE COMPARISON PLOT - PREMIER GOLD 1990 - Cu, Fe



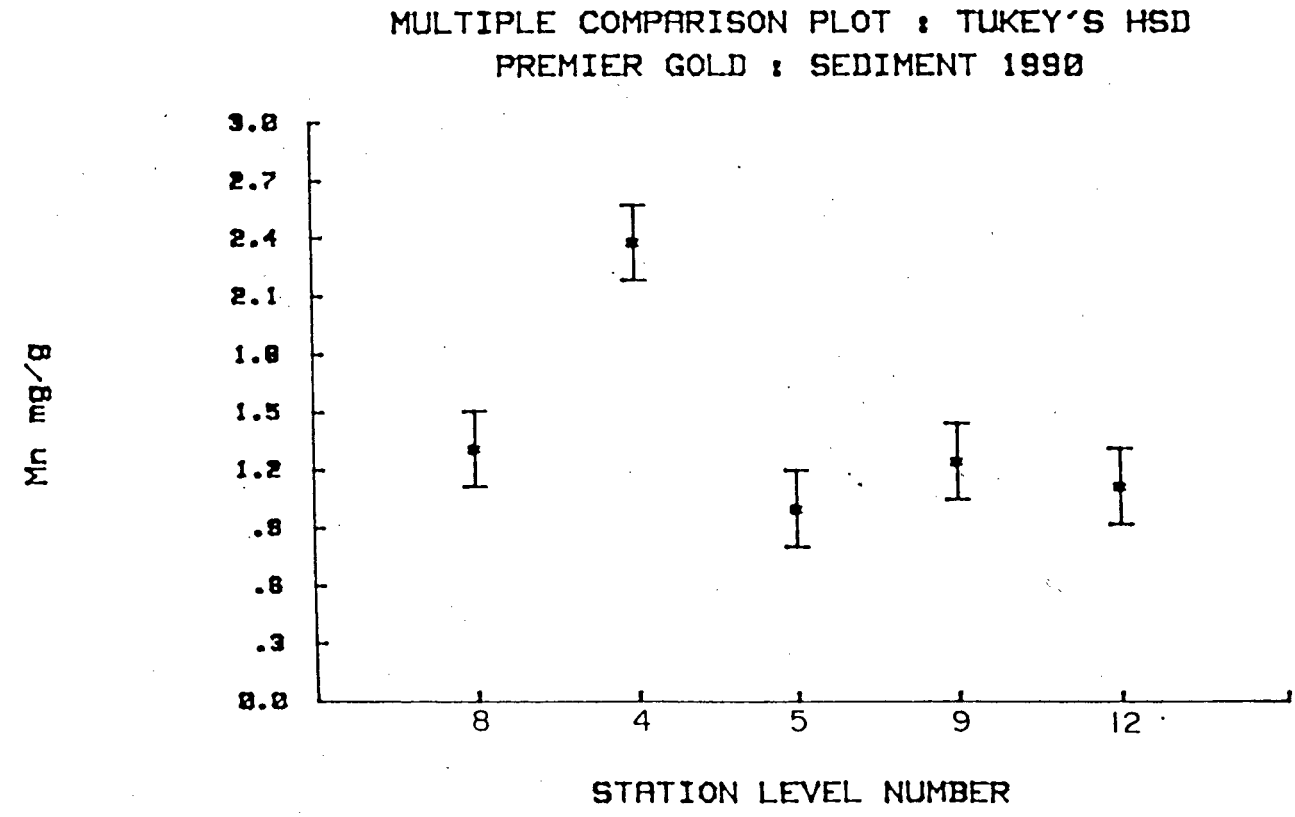
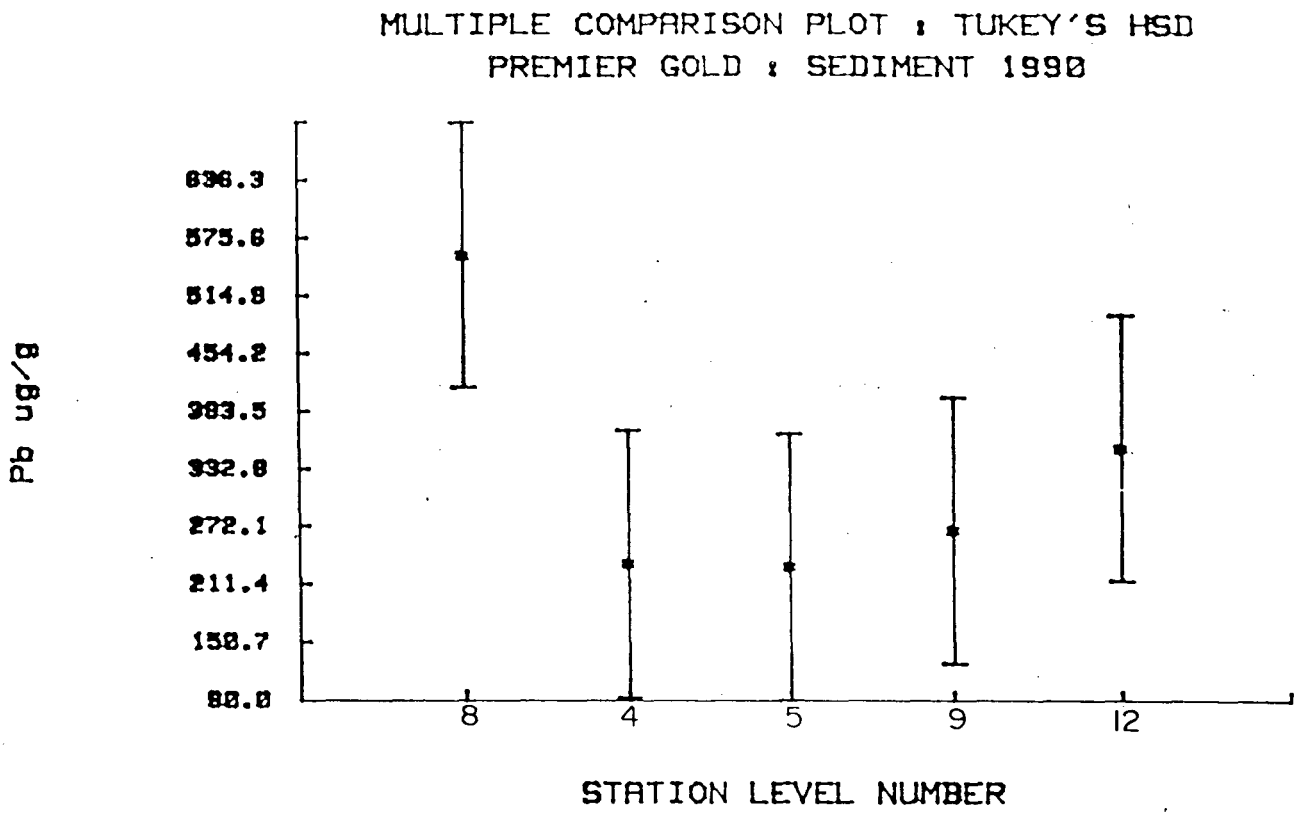


FIGURE 5: SEDIMENT MULTIPLE COMPARISON PLOT - PREMIER GOLD 1990 - Hg, Mn



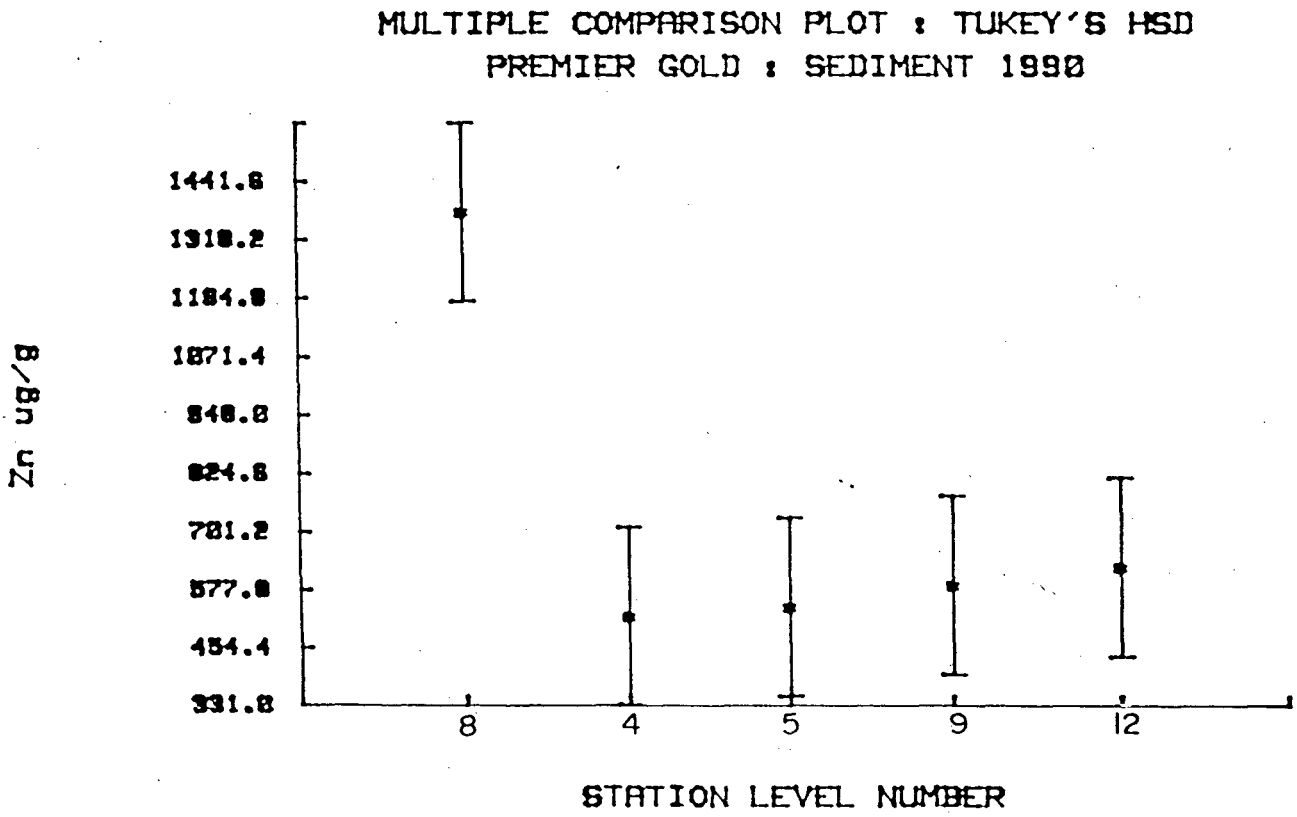


FIGURE 6: SEDIMENT MULTIPLE COMPARISON PLOT - PREMIER GOLD 1990 - Pb, Zn

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