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CANADA WIDE MINES
GRANDUC COPPER MINE

EFFLUENT AND WATER QUALITY

August 1981

EPS

V. Osborne

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SUMMARY

Grab sampling of the effluent sand of the receiving basin sediments associated with the operation were taken respectively on August 17, 1981 and August 18, 1981 by EPS personnel R. Hallam and K. Ferguson. The effluent samples consisted of the underground mine water discharged to Leduc River via the mine portal and the mill tailings discharged to the "Tide Lake" basin at the headwaters of the Bowser River system. The second series of samples - from the receiving waters of both drainage systems - consisted of beach sand sediment from eight locations and bedload sediment from four. Overall, analyses were variously carried out for chemical (total and dissolved metals, total alkalinity and pH), physical (total residue, nonfilterable residue), and biological (toxicity bio-assay) parameters.

Table 1, 2, and 3 refer to the receiving basin monitoring. Table 1 presents the sampling program; beach sand sediments were taken at the following locations: (site 1) the Tide Lake - Bowser River tailings outfall, (2) the Leduc River mine portal, (3) the toe of North Leduc Glacier, (4) Bowser River below the confluence with Betty Creek, (5) above Frank Mackie Glacier Lake, (6) above Knipple Lake, (7) Bowser Lake at the western mud flats, and (8) the toe of Berendon Glacier above the tailing outfall. Bedload sediments were obtained at sites corresponding to 1, 2, 5, and 6 above. None of the control point (ie. - Berendon Glacier and North Leduc Glacier), the Betty Creek, or the Bowser Lake sites were sampled for this series. At each station triplicate samples represented by 'a', 'b', and 'c' were taken.

Table 2 lists the total weights and proportionate size fraction composition to the appropriate extent for all samples. Practicality and accuracy of analyses necessitated the use of the smallest particle sizes only; ie, those corresponding to sieve numbers +120, +230 and -230. Bedload sediment from Frank Mackie Lake (site 2-5) consisted almost entirely (100%) of the most minute fraction. Table 3 summarizes the results for total metal analyses; all values are expressed in units of milligrams per litre (mg/l).

Finally, Table 4 summarizes the effluent test results, which include values for pH, NFR, TR, alkalinity, bioassay, total metals, and dissolved metal parameters. Unless otherwise indicated, all results are in mg/l.

EFFLUENTS

The Tide Lake tailing and Leduc River minewater discharges were sampled August 17, 1981. Table 4 summarizes all results for subsequent physical and chemical analyses.

Both discharges recorded alkaline conditions with the pH for the tailings and minewater reporting respectively at 8.4 and 7.8 and total alkalinity at 110.0 and 71.7 mg/l. Previous monitoring conducted under the permit requirements of the 1971-78 Granduc operation produced similar findings of consistently alkaline conditions in both effluents.

Marked differences in quantity and nature of solid content were observed between the two effluents. Total residue in the tailing sample measured 224900 mg/l, consisting almost entirely of suspended solids with the nonfilterable residue at 224600 mg/l. Residues from the mine water discharge totalled a comparatively low 742 mg/l, 30% or 248 mg/l of which corresponded to the suspended or nonfilterable portion. A bioassay on the former proved non-toxic to S. gairdneri.

Total metal concentrations demonstrated some similarity to the residue pattern. Concentrations were generally greater by a factor of approximately 10^2 in the tailing effluent versus the minewater. Differences were noted for several species: Cu (22.5 mg/l vs 3.51 mg/l), As (10.2 vs 0.0392), Mn (109.0 vs 0.85), Ni (3.82 vs 0.05), Pb (26.7 vs 0.139), Se (0.57 vs 0.0087), Ti (215.0 vs 1.23), V (9.91 vs 0.07), Zn (41.3 vs 0.485), Al (2210 vs 14.9), Fe (5660 vs 41.3), Si (1700 vs 31.2), and Mg (1450 vs 17.0). Exceptions to the trend were few: Hg (0.0005 each), Sb 0.0775 and 0.028, and Sr (3.63 and 1.35). Total metal levels were directly related to overall solid content, as they corresponded to NFR magnitude and usually exceeded the dissolved level by a factor of 10^2 - 10^3 .

Further evidence is the relatively consistent pattern for dissolved metal concentration between the two effluents. Despite the discrepancy in NFR readings, dissolved species showed few significant differences. Levels were generally within the same range and only two

species, Al and Fe, were substantially higher in the tailing discharge (1.9 and 3.85, respectively) versus the minewater (0.067 and 0.118). Both Al and Fe relative to other elements are associated at high levels with suspended particulate matter, so that in comparison to the the other less abundant species correspondingly excessive dissolution volumes for Al and Fe would be expected in samples of such elevated NFR content. Exceptions to the above were noted for Sr, Si, Mg, and Ca, which existed at slightly higher concentrations in the minewater. Originating and flowing from the underground mine, the effluent probably undergoes a significant amount of interaction with exposed rock of varying compostion, much of which contain greater levels of such background elements than would the ore or product tailings. Thus the generally equivalent concentrations of dissolved species within the tailing sample were probably attributable to the overall higher solid content which provided increased opportunity for dissolution.

Federally-authorized concentration maximums are specified as following for any mine or mill effluent: T As (1.0), T Cu (0.6), T Pb (0.4), T Ni (1.0), T Zn (1.0), NFR (50.0), and Ra²²⁶ (30.0 pb/l). The latter was not measured for either effluent; otherwise, all limits were exceeded by the tailing, and only NFR and T Cu by the minewater.

Provincially, WMB Permit 249 regulates the following parameters for the tailing discharge: D As (0.1), D Cd (0.05), D Cr (0.1), D Fe (0.3), D Pb (0.1), D Ni (0.5), D Zn (0.5), 96 LC₅₀ (100%), and Flow (19700 cmd). Permit 5993 specifies limits for the mine discharge: pH (6.5-8.5), D Cu (0.1), D Pb (0.1), D Zn (0.5), NFR (75), 96 LC₅₀ (100%), and Flow (6100 cmd). Flow was not measured for either effluent and no bioassay was performed on the latter. Comparison with Table 4 indicates that pH, Cu, Pb and Zn were well within compliance at each site. The minewater exceeded the regulation level for NFR, which reported at 248 mg/l, while the tailings demonstrated an excessive level of Fe at 3.85 mg/l.

Overall the Granduc effluents are meeting about 50% of the requirements. The most excessive levels are present in the tailing discharge and available data indicate reduction in all is probably attainable through a decrease in NFR.

SEDIMENTS

Table 3 summarizes the results for all eight locations of beach sand samples and four locations of bedload samples. Concentration levels and patterns can be examined for each site and for each metal throughout the system. Table 1 lists the sampling program. As Table 2 indicates, triplicates taken from corresponding locations show some variance in particle size composition and relative concentrations due to the fact that 'a', 'b', and 'c' were not collected at identical positions. Although this aspect as well as the non-homogeneous nature of many deposit particles resulted in questionable reliability and uniformity of results, some general conclusions can be made.

Significant variations of concentration between various locations are evident for some metals. Marked differences between the mine water and tailing discharge sites are present for a few species, most of which show higher levels in the mine water sediment versus the tailings sediment and show decreases with distance from discharge locations. Other metals show slightly greater concentrations at the tailings or receiving sites, and many display overall equivalent levels throughout the system. The two sediment sources showed similar concentration ranges for the same metals when taken from corresponding sample points.

BEACH SANDS

Many metals show concentration differences between various locations. Significantly higher levels in the mine portal sands versus the tailing outlet sands are evident for: Cd (approximate overall means of 4.3 versus 1.3, respectively), Cu (2800 vs 790.0), Mo (10.0 vs 3.0), and Zn (950.0 vs 430.0). Less marked discrepancies were found for Ca, Cr, Ni and Pb. Relatively consistent values were seen for Be, Mn, V, Mg, Na, P, Al and Fe. Those species which showed slightly lower levels in the mine portal samples were Ba (250.0 vs 310.0), Sn (48.0 vs 72.0), and Ti (3100 vs 3800).

In general, metals existed to varying degrees at greater concentration in proximity to the tailings discharge; decreases were observed upstream of the effluent sites and with distance downstream. Overall, most values for most sites downstream of site 5 (Frank Mackie Glacier Lake) were within similar concentration ranges and resembled those found at 'control' site 8 (Berendon Glacier). Species showing constant levels or greater concentrations within the receiving system were probably not associated with the ore body and/or affected by mine-related activity to a significant degree. Fluctuations or increases at control (upstream) or downstream locations are likely attributable to differences in host rock composition and therefore weathering input, or the influence of glacial scouring and inflow sources such as Betty, Todd, and Scott creeks.

Copper was characterized by the overall largest variations. The approximate mean concentrations were: site 2 (mine portal) - 2800 mg/l; site 1 (tailings outlet) - 7900; site 5 (Frank Mackie Lake) - 700.0; site 6 (Knipple Lake) - 127; site 3 (North Leduc Glacier) - 132.0; and site 7 (Bowser Mud Flats) - 61.0. Cu was the only species showing this magnitude of fluctuation and differences in particle size - metal concentration relationship between effluent site sands and receiving site sands.

A less marked concentration pattern was seen for many elements; Cd, Zn, Fe, Mn, Pb, Ca and Mg. Very slight trends were evident for Cr,

Mo, Ni, Sn, and Ti. All other metals showed essentially insignificant variation, existing at equivalent level throughout the system, (eg. Na), or fluctuated in a more random fashion suggestive of creek inflow effects. For example, Ba and Sr were unexpectedly high at the downstream mud flat site as well as the Betty Creek site. Other metals were unexpectedly low below the tailings outlet; these were Cr, Ni, Pb, Zn, Na and to some extent, Mg and Fe. It appeared that relatively high readings are contributed to as much through natural background concentrations and processes such as stream flow and glacial scouring as by mine and mill-related influence on deposition.

Particle size and metal concentration were related. Generally, decreasing particle size was associated with increasing metal content. This was true for most sites and elements. The major exception was copper, which showed significant decreases of concentration with decreased particle size at the two effluent locations while the reverse, 'normal' pattern was evident for copper in addition to other species at receiving water stations. Inconsistent patterns of Cu deposition at the head of the Bowser system (ie. - Frank Mackie Lake) suggested an intermediate situation.

Additional general or isolated departures from the normal were shown by a few metals. Primarily, molybdenum displayed only small changes or equivalent levels of concentration regardless of particle size, particle nature, sample site location, or sample site nature. Nickel and zinc both had a consistent pattern only with the effluent, Betty Creek, and Berendon Glacier station sands. Fluctuations inconsistent with the pattern were evident at the other locations. Magnesium showed fluctuations and reversed patterns for the two control sites - North Leduc and Berendon Glaciers. Aluminum existed at an overall constant level throughout the sampling and particle size ranges with the exception of the effluent sands, which showed slight

differences between particles of different size. Cadmium followed the pattern in the effluent samples but showed some degree of fluctuation at other sites. All other metal species showed increased concentration level with decreased particle size for all sites with only a few minor discrepancies.

BEDLOADS

Concentration magnitudes are similar to those of the beach sand samples of corresponding location and all species show similar overall concentration ranges for the two-sediment types. Significantly higher levels in the mine portal bedloads versus the tailing outlet bedloads were observed for Cd (5.5 vs 1.6), Cu (2690 vs 1030), Mo (23.0 vs 5.0) and Zn (1040 vs 537.0). Similar but less marked fluctuations were evident for Ca, Cr, Ni, P, Mg and Sr. Overall equivalent concentrations were suggested by Al, Mn, Si, Na, and Sn. Species showing much lower levels at the mine portal versus the tailing outlet were Pb (270.0 vs 330.0), Sn (48.0 vs 72.0), V (120.0 vs 151.0), Ti (3100 vs 4100), Si (3200 vs 4200), Na (210.0 vs 262.0), Fe (75000 vs 101,500).

Generally, metals showed lowest concentrations at site 2-6, Knipple Lake. Frank Mackie Lake bedloads were characterized in many cases by concentrations that were equivalent to or greater than those found at one or both of the effluent sites. Those species which also decreased significantly to the downstream Knipple Lake location were Ba, Be, Cr, Sn, Ti and Ca.

Copper again showed the greatest degree of variation. The approximate mean concentrations were: site 2-2 (mine portal) - 2690 mg/l; site 2-1 (tailings outlet) - 1030; site 2-5 (Frank Mackie Lake) - 280.0; and 2-6 (Kipple Lake) - 300.0. Other species showed fluctuations similar to those in the beach sands from corresponding locations. The major departures were seen with Si, Sr, and Na, all of which exhibited maximum levels in the downstream receiving samples.

Bedload sediment also showed the decreasing particle size - increasing concentration relationship for all sites. Copper again demonstrated the opposite pattern for both effluent site samples and a subsequent reversal at the two downstream locations. This behaviour indicates that copper deposits are remaining largely within the head-water regions of the Bowser system and any that is carried downstream must be

physically broken down and incorporated along with the natural background sediments at corresponding levels.

A few exceptions to the general pattern were observed. Barium showed a slight tendency toward decreased particle size - decreased concentration at site 2-5; Frank Mackie Lake. Be varied in pattern at 2-5; Cd reversed to decreased size - decreased concentration at 2-5 and was varied and low at 2-6, Knipple Lake. Mn existed at equivalent levels over all particle sizes at Frank Mackie. Mo was generally varied with relatively equivalent levels at Frank Mackie; equivalent and low levels at Knipple. Nickel showed reversal to decreased size - decreased concentration at both receiving sites; Zn reversed at Frank Mackie and varied at Knipple. Finally, Pb varied somewhat at Frank Mackie while Mg and P also showed slight but few variations.

Overall concentration levels and deposition patterns are similar for both sediments. Both show general trends with respect to particle size and metal content and similar exceptions to the norm.

Copper shows an opposite pattern to the normal for all effluent samples and turnover to the general receiving system trend at the earliest downstream spot, Frank Mackie Lake. The indication is that Cu is remaining in proximity to the discharge site and any downstream transport is accompanied by physical degradation and incorporation along with the usual background sediments at levels and in patterns which are indistinguishable from those already present via natural processes. For many elements, equivalent or high levels relative to effluent site results are observed at downstream or control locations, suggesting that levels discharged from mine-related outlets are negligible relative to those naturally present. With the possible exception of Ca, all metals present in the Bowser mud flats are at equivalent or greater concentration than at Berendon Glacier, therefore a small amount of deposition may be occurring downstream. However, other factors are probably affecting metal levels; findings for Cu and other species suggest both that any deposition downstream is on a small scale and that the inflow of Todd and Scott Creeks

as well as sources each as glacial action are significant contributors to the system. Granduc-related deposits do not appear to be a problem at this time in the Bowser River system.

EPS: R. Hallam
K. Ferguson

TABLE 4: GRANDUC EFFLUENTS: AUGUST 17, 1981 (810817)

PARAMETER	EFFLUENT		
	GRANDUC TAILINGS	LEDUC MINEWATER	
pH (rel U)	8.4	7.8	
NFR (mg/l)	224600	248	
TR (mg/l)	224900	742	
T. Alkalinity (mg/l)	111.0	71.7	
Bioassay (%)	0.0 (N.T.)	--	
T. As (mg/l)	10.2	0.0392	
Ba "	27.7	0.227	
Be "	0.0525	< 0.001	
Cd "	< 0.1	< 0.004	
Co "	--	--	
Cr "	4.41	0.0409	
Cu "	22.5	3.51	
Hg "	< 0.0005	< 0.0005	
Mn "	109.0	0.85	
Mo "	0.375	0.088	
Ni "	3.82	0.05	
P "	81.6	0.79	
Pb "	26.7	0.139	
Sb "	< 0.0775	0.0268	
Se "	0.57	0.00879	
Sn "	< 0.775	< 0.005	
Sr "	3.63	1.35	
Ti "	215.0	1.23	
V "	9.91	0.07	
Zn "	41.3	0.485	
Al "	2210	14.9	
Fe "	5660	41.3	
Si "	1700	31.2	
Mg "	1450	17.0	
Na "	25.2	5.48	
Ca "	1520	101.0	

Continued...

TABLE 4: GRANDUC EFFLUENTS: AUGUST 17, 1981 (810817)
 (Continued)

PARAMETER		EFFLUENT	
		GRANDUC TAILINGS	LEDUC MINEWATER
D. As	(mg/l)	0.0375	0.0111
Ba	"	0.0692	0.0387
Be	"	< 0.001	< 0.001
Cd	"	< 0.004	< 0.004
Co	"	< 0.0075	< 0.0075
Cr	"	< 0.0075	< 0.0075
Cu	"	0.0071	< 0.005
Hg	"	< 0.0005	< 0.0005
Mn	"	0.0796	0.0581
Mo	"	< 0.031	0.072
Ni	"	< 0.04	< 0.04
P	"	< 0.15	< 0.15
Pb	"	< 0.04	< 0.04
Sb	"	0.00574	0.00106
Se	"	0.00597	0.00838
Sn	"	< 0.005	< 0.005
Sr	"	0.28	1.24
Ti	"	0.174	0.03
V	"	< 0.02	< 0.02
Zn	"	0.0625	0.0156
Al	"	1.9	0.067
Fe	"	3.85	0.118
Si	"	6.05	31.2
Mg	"	1.29	6.82
Na	"	10.1	5.08
Ca	"	18.6	82.3

TABLE 1: SAMPLING PROGRAM

Sample Date: 81/08/18

Agency: E.P.S

Personnel: R. Hallam, K. Ferguson

Type: Sediment

STATION	SAMPLE LOCATION	SAMPLE NUMBER	SUBSAMPLE NUMBER	SEDIMENT TYPE	EPS LAB NO.	SAMPLE STORAGE
Canada Wide Mines	Mill tailings	1a	1,2,3	Beach sand	810716	Plastic bags
		1b	4,5,6			
		1c	7,8,9			
Canada Wide Mines	Mine water	2a	10,11,12	Beach sand	810716	Plastic bags
		2b	13,14,15			
		2c	16,17,18			
Leduc River	Toe of North Leduc Glacier	3a	26,27,28	Beach sand	810716	Plastic bags
		3b	34,35,36			
		3c	44,45,46			
Bowser River	Below Betty Creek	4a	53,54,55	Beach sand	810716	Plastic bags
		4b	60,61,62			
		4c	68,69,70			
Bowser River	Above Frank Mackie Glacier Lake (1st Lake)	5a	74,75,76	Beach sand	810716	Plastic bags
		5b	83,84,85			
		5c	91,92,93			

Continued....

TABLE 1: SAMPLING PROGRAM (Continued)

STATION	SAMPLE LOCATION	SAMPLE NUMBER	SUBSAMPLE NUMBER	SEDIMENT TYPE	EPS LAB NO.	SAMPLE STORAGE
Bowser River	Above Knipple	6a	97,98,99	Beach sand	810716	Plastic bags
	Glacier Lake (3rd Lake)	6b 6c	106,107,108 115,116,117			
Bowser River	Bowser Lake mud flats at west end	7a 7b 7c	124,125,126 132,133,134 138,139,140	Beach sand	810716	Plastic bags
Bowser River	Toe Berendon Glacier above Tails	8a 8b 8c	142,143,144 146,147,148 150,151,152	Beach sand	810716	Plastic bags
Canada Wide Mines Bowser River	Mill tailings	2 1a 2 1b 2 1c	1,2,3 4,5,6 7,8,9	Bedload	810717	Jam jars
Canada Wide Mines Leduc River	Mine water	2 2a 2 2b 2 2c	10,11,12 13,14,15 16,17,18	Bedload	810717	Jam jars
Bowser River	Above Frank Mackie Glacier Lake (1st Lake)	2 5a 2 5b 2 5c	19 20 21,22	Bedload	810717	Jam jars
Bowser River	Above Knipple Glacier Lake (3rd Lake)	2 6a 2 6b	23,24,25 26,27,28	Bedload	810717	Jam jars

TABLE 2: SIEVE RESULTS

SAMPLE NO.	SAMPLE TYPE	TOTAL SAMPLE WEIGHT (g)	SUBSAMPLE NO.	SIEVE NO.	% SAMPLE RETAINED
1a	Beach sand	306.7	1	+120	0.8
			2	+230	5.2
			3	-230	94.0
1b	Beach sand	217.5	4	+120	1.2
			5	+230	6.3
			6	-230	92.5
1c	Beach sand	321.1	7	+120	3.0
			8	+230	8.4
			9	-230	88.6
2a	Beach sand	129.7	10	+120	4.5
			11	+230	22.3
			12	-230	73.2
2b	Beach sand	230.7	13	+120	4.5
			14	+230	31.3
			15	-230	59.7
2c	Beach sand	126.5	16	+120	19.5
			17	+230	80.5
			18	-230	45.9
3a	Beach sand	229.4	26	+120	21.9
			27	+230	12.4
			28	-230	9.8
3b	Beach sand	294.6	34	+120	13.1
			35	+230	26.4
			36	-230	48.2
3c	Beach sand	275.2	44	+120	17.6
			45	+230	8.0
			46	-230	3.5

TABLE 2: SIEVE RESULTS (Continued)

SAMPLE NO.	SAMPLE TYPE	TOTAL SAMPLE WEIGHT (g)	SUBSAMPLE NO.	SIEVE NO.	% SAMPLE RETAINED
4a	Beach sand	359.9	53	+120	50.1
			54	+230	21.4
			55	-230	9.5
4b	Beach sand	340.5	60	+120	8.0
			61	+230	3.0
			62	-230	0.5
4c	Beach sand	399.4	68	+120	18.0
			69	+230	5.6
			70	-230	0.8
5a	Beach sand	312.7	74	+120	8.1
			75	+230	15.5
			76	-230	92.0
5b	Beach sand	410.2	83	+120	47.7
			84	+230	16.0
			85	-230	13.7
5c	Beach sand	349.3	91	+120	47.4
			92	+230	16.9
			93	-230	12.9
6a	Beach sand	238.3	97	+120	3.0
			98	+230	2.6
			99	-230	87.2
6b	Beach sand	223.0	106	+120	1.4
			107	+230	2.7
			108	-230	71.5
6c	Beach sand	245.8	115	+120	1.4
			116	+230	2.0
			117	-230	87.5

TABLE 2: SIEVE RESULTS (Continued)

SAMPLE NO.	SAMPLE TYPE	TOTAL SAMPLE WEIGHT (g)	SUBSAMPLE NO.	SIEVE NO.	% SAMPLE RETAINED
7a	Beach sand	188.3	124	+120	10.8
			125	+230	11.7
			126	-230	27.7
7b	Beach sand	410.3	132	+120	11.9
			133	+230	1.2
			134	-230	0.8
7c	Beach sand	316.3	138	+120	30.4
			139	+230	28.5
			140	-230	38.8
8a	Beach sand	325.2	142	+120	31.0
			143	+230	32.0
			144	-230	33.9
8b	Beach sand	407.1	146	+120	32.2
			147	+230	40.5
			148	-230	25.1
8c	Beach sand	290.2	150	+120	25.8
			151	+230	26.6
			152	-230	44.1
2 1a	Bedload	227.4	1	+120	16.4
			2	+230	16.8
			3	-230	64.7
2 1b	Bedload	236.4	4	+120	17.4
			5	+230	20.5
			6	-230	60.6
2 1c	Bedload	255.6	7	+120	16.6
			8	+230	23.6
			9	-230	57.5

TABLE 2: SIEVE RESULTS (Continued)

SAMPLE NO.	SAMPLE TYPE	TOTAL SAMPLE WEIGHT (g)	SUBSAMPLE NO.	SIEVE NO.	% SAMPLE RETAINED
2 2a	Bedload	146.9	10	+120	5.5
			11	+230	20.3
			12	-230	73.5
2 2b	Bedload	207.9	13	+120	7.2
			14	+230	15.8
			15	-230	76.6
2 2c	Bedload	133.1	16	+120	1.6
			17	+230	20.1
			18	-230	78.3
2 5a	Bedload	25.8	--	--	--
			--	--	--
			19	-230	100.0
2 5b	Bedload	374.0	--	--	--
			--	--	--
			20	-230	100.0
2 5c	Bedload	345.9	--	--	--
			21	+230	11.0
			22	-230	100.0
2 6a	Bedload	29.9	23	+120	20.4
			24	+230	2.7
			25	-230	45.8
2 6b	Bedload	6.2	26	+120	12.9
			27	+230	3.2
			28	-230	6.5

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 1a - 2a)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 1a - 2a)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ni	Pb	Sn	Sr	V	Zn	Tl
1a	1	+120	20.1	178.0	60.1	53.1	85.9	294.0	2570.0
	2	+230	25.8	192.0	80.9	64.3	109.0	306.0	3760.0
	3	-230	69.9	478.0	73.6	82.0	188.0	664.0	4690.0
	\bar{x}		38.6	282.67	71.53	66.47	127.63	421.33	3673.33
	S.D.		27.26	169.3	10.55	14.57	53.54	210.24	1062.65
Range			(20.0-72.4)	(177.0-497.0)	(57.4-80.9)	(48.2-85.8)	(80.5-196.0)	(287.0-690.0)	(2450.0-4760.0)
1b	4	+120	20.6	159.0	58.7	46.8	89.7	241.0	2910.0
	5	+230	29.2	199.0	82.0	66.5	119.0	363.0	4020.0
	6	-230	65.8	469.0	80.0	72.4	176.0	650.0	4840.0
	\bar{x}		38.53	275.67	73.57	61.90	128.23	418.0	3923.33
	S.D.		24.002	168.62	12.91	13.41	43.88	209.97	986.62
Range			(20.6-67.5)	(156.0-469.0)	(53.6-84.4)	(44.6-72.0)	(85.6-177.0)	(219.0-647.0)	(2760.0-4900.0)
1c	7	+120	19.0	165.0	55.9	53.6	84.8	243.0	2840.0
	8	+230	38.0	225.0	79.2	62.8	129.0	440.0	4080.0
	9	-230	66.9	477.0	77.8	73.3	181.0	662.0	4850.0
	\bar{x}		41.3	289.0	70.97	63.23	131.6	448.33	3926.67
	S.D.		24.12	165.55	13.067	9.86	48.153	209.62	1018.69
Range			(16.4-67.7)	(136.0-482.0)	(48.7-79.5)	(45.0-76.2)	(72.1-185.0)	(190.0-667.0)	(2440.0-4890.0)
2a	10	+120	37.9	188.0	38.4	71.4	109.0	665.0	2520.0
	11	+230	37.0	137.0	53.9	74.2	113.0	470.0	3050.0
	12	-230	82.3	373.0	73.3	98.4	152.0	1490.0	4460.0
	\bar{x}		52.4	232.67	55.2	81.33	124.67	875.0	3343.33
	S.D.		25.898	124.18	17.486	14.86	23.76	541.46	1002.71
Range			(34.2-82.5)	(132.0-376.0)	(37.5-73.5)	(71.3-99.0)	(108.0-153.0)	(448.0-1510.0)	(2480.0-4490.0)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 1a - 2a)

SAMPLE	SUBSAMPLE	SIEVE NO.	Si	Mg	P	Ca	Na	Al	Fe
1a	1	+120	3470.0	10700.0	692.0	19100.0	217.0	17100.0	37600.0
	2	+230	3460.0	13100.0	811.0	26600.0	235.0	21400.0	54500.0
	3	-230	8000.0	25100.0	1460.0	32700.0	487.0	39000.0	112000.0
	\bar{x}		4976.67	16300.0	987.67	26133.33	313.0	25833.33	68033.33
S.D.			2618.29	7714.92	413.36	6312.0	150.96	11603.59	39002.61
	Range		(2900.0-8200.0)	(10200-26200)	(633.0-1510)	(18700-31000)	(184.0-508.0)	(16100-40700)	(36100-116000)
	1b	4	+120	4170.0	11500.0	684.0	19500.0	213.0	18600.0
		5	+230	4140.0	13900.0	940.0	27500.0	266.0	23000.0
\bar{x}		6	-230	8700.0	24000.0	1400.0	30100.0	379.0	36800.0
				16466.67	1008.0	25700.0	286.0	26133.33	70566.67
	S.D.		2624.1	6633.50	362.81	5524.49	84.79	9495.96	33634.26
	Range		(3660.0-10100)	(11000-24100)	(656.0-1410)	(18800-30200)	(206.0-382.0)	(18200-37000)	(39100-108000)
1c	7	+120	2870.0	10600.0	636.0	20100.0	< 164.0	17300.0	40400.0
	8	+230	3890.0	14100.0	993.0	26800.0	252.0	23000.0	79500.0
	9	-230	9170.0	24100.0	1400.0	30100.0	419.0	37200.0	111000.0
	\bar{x}		5310.0	16266.67	1009.67	25666.67	278.33	25833.33	76966.67
S.D.			3381.54	7005.95	382.28	5995.42	129.52	10248.08	35368.11
	Range		(2050.0-10200)	(8880.0-24400)	(481.0-1400)	(16700-30700)	(<81.2-426.0)	(14600-38000)	(33800-112000)
	2a	10	+120	4090.0	16200.0	904.0	28600.0	245.0	21400.0
		11	+230	3380.0	16900.0	853.0	34000.0	250.0	23200.0
\bar{x}		12	-230	3580.0	19700.0	2120.0	45000.0	280.0	28300.0
				3683.33	17600.0	1292.33	31300.0	258.33	24300.0
	S.D.		366.106	1852.03	717.23	3818.38	18.93	3579.11	37025.53
	Range		(2920.0-4430.0)	(15800-19800)	(827.0-2120)	(27900-45300)	(244.0-281.0)	(21200-29400)	(48400-117000)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2b - 3b)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ba	Be	Cd	Cr	Cu	Mn	Mo
2b	13	+120	220.0	0.573	2.5	69.4	3790.0	1120.0	18.8
	14	+230	212.0	0.787	2.93	59.0	3440.0	1270.0	9.73
	15	-230	386.0	1.56	8.35	60.7	1230.0	1350.0	11.4
	\bar{x}		272.67	0.973	4.59	63.03	2820.0	1246.67	13.31
	S.D.		98.23	0.519	3.26	5.58	1388.06	116.76	4.83
Range			(210.0-389.0)	(0.525-1.66)	(2.42-8.49)	(57.8-74.0)	(1200-3860)	(1070-1370)	(8.61-27.9)
	16	+120	184.0	0.494	1.88	57.9	3270.0	998.0	10.7
	17	+230	202.0	0.686	2.37	58.8	3840.0	1260.0	7.93
	18	-230	340.0	1.02	8.89	56.9	942.0	1260.0	2.72
	\bar{x}		242.0	0.733	4.38	57.87	2684.0	1172.67	7.12
S.D.			85.35	0.266	3.91	0.95	1535.30	151.27	4.05
	Range		(182.0-356.0)	(0.485-1.08)	(1.76-9.41)	(56.8-60.7)	(824.0-4010)	(995.0-1290)	(2.49-12.0)
3a	26	+120	83.5	1.19	< 0.652	66.4	74.2	725.0	< 2.45
	27	+230	84.9	1.53	< 0.644	60.8	92.7	686.0	< 2.42
	28	-230	98.7	1.53	< 0.658	64.0	225.0	752.0	< 2.46
	\bar{x}		89.03	1.42	< 0.651	63.73	130.63	721.0	< 2.435
	S.D.		8.40	0.196	0.007	2.81	82.25	33.18	0.021
Range			(59.0-108.0)	(1.18-1.57)	(<0.635->0.662)	(59.7-68.9)	(71.8-235.0)	(673.0-771.0)	(2.38->2.48)
	3b	34	+120	87.0	1.09	< 0.648	58.0	96.0	712.0
	35	+230	82.3	1.05	< 0.659	50.6	93.5	647.0	< 2.47
	36	-230	83.0	1.57	< 0.64	52.6	147.0	683.0	< 2.4
	\bar{x}		84.1	1.24	< 0.649	53.73	112.17	680.67	< 2.43
S.D.			2.54	0.289	0.0095	3.83	30.19	32.56	0.035
	Range		(70.8-99.4)	(0.825-1.81)	(<0.633->0.66)	(46.7-60.3)	(87.9-150.0)	(589.0-751.0)	(2.37->2.48)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2b - 3b)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ni	Pb	Sn	Sr	V	Zn	Ti
2b	13	+120	41.1	200.0	39.3	79.5	113.0	564.0	2550.0
	14	+230	43.5	173.0	46.3	84.0	113.0	625.0	2900.0
	15	-230	94.0	495.0	60.9	98.6	143.0	1800.0	4250.0
	\bar{x}		59.53	289.33	48.83	87.37	123.0	996.33	3233.33
	S.D.		29.87	178.62	11.02	9.98	17.32	696.66	897.68
Range		(39.8-95.6)	(170.0-500.0)	(37.7-63.9)	(75.6-101.0)	(109.0-146.0)	(554.0-1820)	(2440.0-4360.0)	
	16	+120	35.5	155.0	38.1	69.3	101.0	451.0	2260.0
	17	+230	38.5	152.0	48.2	85.7	110.0	562.0	2810.0
	18	-230	93.7	514.0	45.3	92.9	133.0	1970.0	3490.0
	\bar{x}		55.9	273.67	43.87	82.63	114.67	994.33	2853.33
S.D.		32.77	208.14	5.20	12.09	16.50	846.77	616.14	
	Range	(34.9-95.4)	(146.0-539.0)	(37.3-50.5)	(68.7-93.5)	(100.0-136.0)	(443.0-2050)	(2210.0-3560.0)	
3a	26	+120	37.0	8.63	77.4	83.2	104.0	63.7	3800.0
	27	+230	34.6	11.3	87.8	91.5	101.0	66.8	4190.0
	28	-230	34.5	29.2	104.0	118.0	110.0	76.2	4850.0
	\bar{x}		35.37	16.38	89.73	97.57	105.0	68.9	4280.0
	S.D.		1.415	11.185	13.405	18.18	4.58	6.509	530.75
Range		(33.1-38.3)	(7.7-30.6)	(77.0-105.0)	(81.2-119.0)	(98.9-110.0)	(57.3-77.1)	(3790.0-4920.0)	
	3b	34	+120	32.4	24.6	72.9	103.0	101.0	66.5
	35	+230	24.2	18.1	71.7	112.0	94.5	63.3	3490.0
	36	-230	22.6	21.8	104.0	136.0	112.0	56.5	4470.0
	\bar{x}		26.4	21.5	82.87	117.0	102.5	62.1	3956.67
S.D.		5.26	3.26	18.31	17.06	8.85	5.11	706.92	
	Range	(22.4-32.5)	(12.3-34.6)	(59.4-104.0)	(95.8-142.0)	(87.0-115.0)	(55.0-66.6)	(2970.0-4780.0)	

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2b - 3b)

SAMPLE	SUBSAMPLE	SIEVE NO.	Si	Mg	P	Ca	Na	Al	Fe
2b	13	+120	2120.0	17500.0	957.0	34700.0	242.0	22500.0	52700.0
	14	+230	2060.0	16900.0	1080.0	43500.0	233.0	23200.0	62300.0
	15	-230	1930.0	16200.0	2350.0	44600.0	255.0	24900.0	124000.0
	\bar{x}		2036.67	16866.67	1462.33	40933.33	243.33	23533.33	79566.67
S.D.	97.125		650.64	771.20	5426.17	11.06	1234.23	38692.68	
	Range	(1790-2300)	(16000-18300)	(918.0-2380)	(33100-45200)	(223.0-1370)	(21500-25400)	(51000-125000)	
2c	16	+120	2530.0	15500.0	841.0	32800.0	201.0	19700.0	42700.0
	17	+230	2090.0	16500.0	1040.0	44800.0	242.0	22600.0	54600.0
	18	-230	2420.0	13700.0	2470.0	43000.0	221.0	21400.0	127000.0
	\bar{x}		2346.67	15233.33	1450.33	40200.0	221.33	21233.33	74766.67
S.D.	228.98		1418.92	888.64	6471.48	20.50	1457.17	45625.03	
	Range	(1520-3200)	(13300-16900)	(825.0-2580)	(32600-45100)	(200.0-267.0)	(19500-23300)	(42700-131000)	
3a	26	+120	2950.0	17000.0	838.0	25100.0	473.0	25600.0	37000.0
	27	+230	2890.0	14900.0	893.0	26400.0	538.0	23600.0	38300.0
	28	-230	3420.0	13100.0	1390.0	37400.0	602.0	22600.0	43700.0
	\bar{x}		3086.67	15000.0	1040.33	29633.33	537.67	29633.33	39666.67
S.D.	290.23		1951.92	304.07	6757.46	64.50	1527.525	3552.93	
	Range	(2360-3690)	(12800-17200)	(791.0-1420)	(24100-38200)	(442.0-619.0)	(22200-25900)	(36200-446000)	
3b	34	+120	3160.0	14900.0	995.0	24300.0	446.0	22900.0	35800.0
	35	+230	3260.0	12200.0	1400.0	24100.0	556.0	20300.0	33100.0
	36	-230	4010.0	10300.0	1850.0	35500.0	657.0	19500.0	38500.0
	\bar{x}		3476.67	12466.67	1415.0	27966.67	553.0	20900.0	35800.0
S.D.	464.58		2311.56	427.70	6524.82	105.53	177.64	2700.0	
	Range	(2660-4050)	(10200-157000)	(940.0-1850)	(21900-36200)	(410.0-674.0)	(18300-24100)	(30900-39100)	

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 3c - 4c)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ba	Be	Cd	Cr	Cu	Mn	Mo
3c	44	+120	60.1	1.63	< 0.647	59.7	131.0	672.0	<2.43
	45	+230	75.3	1.4	< 0.662	55.7	133.0	619.0	<2.48
	46	-230	119.0	2.25	< 0.658	66.0	203.0	737.0	<2.47
\bar{x}			84.8	1.76	< 0.656	60.47	155.67	676.0	<2.46
S.D.			30.58	0.44	0.0078	5.19	41.00	59.10	0.026
Range			(46.6-124.0)	(1.18-2.29)	(<0.639-0.667)	(54.7-66.6)	(93.0-209.0)	(613.0-748.0)	(2.4-2.5)
4a	53	+120	167.0	0.873	< 0.653	16.4	354.0	820.0	<3.77
	54	+230	228.0	1.45	< 0.837	17.4	606.0	878.0	<2.48
	55	-230	487.0	1.45	0.96	23.6	795.0	975.0	<2.5
\bar{x}			294.0	1.26	< 0.817	19.133	585.0	891.0	<2.92
S.D.			169.90	0.333	0.154	3.90	221.25	78.31	0.74
Range			(163.0-497.0)	(0.858-1.63)	(<0.641-1.12)	(15.7-24.3)	(316.0-813.0)	(811.0-982.0)	(2.43-5.1)
4b	60	+120	162.0	0.311	< 0.655	7.51	45.4	889.0	<2.46
	61	+230	290.0	0.485	< 0.657	8.73	68.7	954.0	<2.46
	62	-230	959.0	1.09	< 0.656	17.9	493.0	1130.0	<2.46
\bar{x}			470.33	0.629	< 0.656	11.38	202.37	991.0	<2.46
S.D.			428.01	0.409	0.001	5.68	251.97	124.69	0.0
Range			(144.0-993.0)	(0.292-1.12)	(<0.649-0.662)	(7.49-18.0)	(34.3-512.0)	(864.0-1140)	(2.44-2.48)
4c	68	+120	202.0	0.431	< 0.662	7.5	18.0	887.0	<2.48
	69	+230	811.0	1.17	< 0.657	9.55	104.0	935.0	<2.46
	70	-230	1860.0	0.444	9.6	29.0	338.0	1190.0	<2.42
\bar{x}			957.67	0.682	< 3.64	15.35	153.33	1004.0	<2.45
S.D.			838.67	0.423	5.16	11.87	165.61	162.86	0.03
Range			(151.0-1880)	(0.315-1.19)	(<0.654-9.87)	(7.32-29.6)	(15.1-342.0)	(843.0-1210)	(2.35-2.49)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 3c - 4c)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ni	Pb	Sn	Sr	V	Zn	Ti
3c	44	+120	37.3	13.3	84.0	80.3	111.0	60.7	4230.0
	45	+230	33.5	32.6	70.4	74.3	100.0	65.8	3660.0
	46	-230	34.4	42.1	104.0	112.0	121.0	78.0	4970.0
\bar{x}			35.067	29.33	86.13	88.87	110.67	68.17	4286.67
S.D.			1.99	14.675	16.90	20.26	10.50	8.89	656.84
Range			(31.3-37.5)	(9.0-56.1)	(65.0-104.0)	(71.8-114.0)	(93.3-121.0)	(56.9-79.8)	(3330.0-5000.0)
4a	53	+120	7.9	37.9	48.1	95.8	91.1	163.0	2610.0
	54	+230	18.5	61.1	63.8	121.0	123.0	300.0	3500.0
	55	-230	39.1	113.0	57.5	118.0	145.0	342.0	3540.0
\bar{x}			21.83	70.67	56.47	111.6	119.7	268.33	3216.67
S.D.			15.865	38.45	7.90	13.765	27.10	93.607	525.77
Range			(<6.58-40.3)	(36.2-116.0)	(46.1-69.5)	(95.7-133.0)	(88.2-151.0)	(131.0-350.0)	(2550.0-3750.0)
4b	60	+120	< 6.55	< 6.55	< 16.4	76.5	41.8	76.4	1110.0
	61	+230	< 6.57	6.98	23.0	111.0	56.0	84.3	1670.0
	62	-230	7.96	29.9	53.3	142.0	90.2	158.0	2940.0
\bar{x}			< 7.03	< 14.48	< 30.9	109.83	62.67	106.23	1906.67
S.D.			0.81	13.36	19.68	32.77	24.88	45.00	937.67
Range			(<6.49-9.44)	(<6.49-32.8)	(<16.2-54.6)	(72.6-142.0)	(39.6-90.9)	(73.9-163.0)	(1040.0-2960.0)
4c	68	+120	< 6.62	< 6.62	< 19.9	93.7	49.1	79.2	1480.0
	69	+230	< 6.57	12.9	53.4	149.0	94.0	108.0	3030.0
	70	-230	17.6	48.8	68.0	183.0	374.0	161.0	4860.0
\bar{x}			< 10.26	< 22.77	< 47.1	141.9	172.37	116.07	3123.33
S.D.			6.35	22.76	24.66	45.07	176.06	41.49	1691.93
Range			(<6.54-18.4)	(<6.62-52.5)	(<16.6-74.8)	(79.3-183.0)	(45.5-380.0)	(76.3-161.0)	(1260.0-5130.0)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 3c - 4c)

SAMPLE	SUBSAMPLE	SIEVE NO.	Si	Mg	P	Ca	Na	Al	Fe
3c	44	+120	3830.0	15400.0	873.0	23700.0	428.0	23400.0	50400.0
	45	+230	3710.0	13300.0	975.0	23600.0	409.0	20000.0	49200.0
	46	-230	4070.0	12800.0	1490.0	36600.0	536.0	21100.0	55400.0
	\bar{x}		3870.0	13833.33	1112.67	27966.67	457.67	21500.0	51666.67
	S.D.		183.30	1379.61	330.74	7476.85	68.50	1734.935	3288.36
Range			(3610-4240)	(12500-15800)	(839.0-1510)	(23300-37200)	(402.0-544.0)	(19700-23500)	(43500-55400)
	4a	53	+120	3750.0	11000.0	888.0	17400.0	173.0	20800.0
	54	+230	3680.0	10800.0	1050.0	21600.0	153.0	21200.0	63400.0
	55	-230	4340.0	10500.0	1380.0	25100.0	163.0	19600.0	97000.0
	\bar{x}			3923.33	10766.67	1106	21366.67	163.0	20533.33
S.D.			362.54	251.66	250.74	3855.30	10.0	832.67	29404.99
	Range		(8380-4400)	(10400-11200)	(863.0-1380)	(17300-25500)	(131.0-181.0)	(18800-22500)	(37300-98500)
	4b	60	+120	2790.0	7940.0	856.0	16700.0	103.0	17800.0
	61	+230	4470.0	8600.0	942.0	18600.0	178.0	22100.0	40800.0
	62	-230	4730.0	10000.0	1600.0	24700.0	198.0	24000.0	61700.0
\bar{x}			3996.67	8846.67	1132.67	20000.0	159.67	21300.0	45566.67
	S.D.		1053.06	1051.92	407.00	4179.71	50.08	3176.48	14356.30
	Range		(2630-5220)	(7740-10100)	(813.0-1620)	(15900-25000)	(97.4-200.0)	(17000-24000)	(33000-61900)
	4c	68	+120	3600.0	8190.0	869.0	14400.0	129.0	20100.0
	69	+230	3520.0	7850.0	1390.0	18300.0	117.0	21100.0	63400.0
\bar{x}	70	-230	3880.0	6060.0	2480.0	19600.0	200.0	18200.0	165500.0
	S.D.		3666.67	7366.67	1579.67	17433.33	159.67	19800.0	88666.67
	Range		189.03	1144.30	822.08	2906.17	44.86	1473.09	67353.50
			(2850-4340)	(5940-8510)	(833.0-2540)	(13000-19800)	(111.0-213.0)	(18000-21700)	(35400-169000)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 5a - 6a)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ba	Be	Cd	Cr	Cu	Mn	Mo
5a	74	+120	312.0	1.02	3.79	34.8	649.0	1310.0	3.54
	75	+230	286.0	0.902	4.61	33.3	602.0	1170.0	2.73
	76	-230	262.0	1.32	1.7	31.9	364.0	1040.0	< 2.46
\bar{x}			286.67	1.08	3.37	33.33	538.33	1173.33	< 2.91
S.D.			25.01	0.216	1.50	1.45	152.79	135.031	0.562
Range			(244.0-327.0)	(0.88-1.53)	(1.64-4.73)	(30.1-36.2)	(352.0-656.0)	(992.0-1340)	(2.44-4.15)
5b	83	+120	165.0	0.861	< 0.656	29.3	717.0	762.0	11.3
	84	+230	210.0	0.899	2.1	30.3	932.0	839.0	15.0
	85	-230	356.0	1.39	2.23	32.3	777.0	912.0	< 2.92
\bar{x}			243.67	1.05	< 1.66	30.63	808.67	837.67	< 9.74
S.D.			99.85	0.295	0.874	1.53	110.94	75.01	6.19
Range			(162.0-359.0)	(0.831-1.4)	(0.647-2.34)	(27.9-32.7)	(716.0-939.0)	(751.0-921.0)	(<2.5-17.2)
5c	91	+120	161.0	1.21	< 0.725	29.4	749.0	804.0	7.11
	92	+230	230.0	1.31	1.75	29.9	867.0	792.0	7.86
	93	-230	352.2	1.46	1.53	33.3	658.0	806.0	< 2.47
\bar{x}			247.67	1.33	< 1.33	30.87	758.0	800.67	< 5.81
S.D.			96.72	0.126	0.54	2.12	104.79	7.57	2.92
Range			(160.0-358.0)	(1.13-1.47)	(0.635-1.83)	(28.3-33.7)	(657.0-894.0)	(785.0-917.0)	(2.45-10.5)
6a	97	+120	124.0	0.53	< 0.778	31.1	109.0	709.0	< 2.48
	98	+230	186.0	0.579	0.703	32.1	137.0	764.0	< 2.48
	99	-230	192.0	1.0	0.974	35.1	139.0	974.0	< 2.47
\bar{x}			167.33	0.763	< 0.818	32.77	128.33	815.67	< 2.48
S.D.			37.65	0.258	0.140	2.08	16.77	139.85	0.006
Range			(123.0-193.0)	(0.515-1.02)	(<0.664-0.997)	(30.4-35.7)	(106.0-142.0)	(693.0-993.0)	(<2.46-2.49)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 5a - 6a)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ni	Pb	Sn	Sr	V	Zn	Ti
5a	44	+120	51.2	172.0	37.0	111.0	121.0	583.0	2710.0
	45	+230	44.6	144.0	38.1	79.0	124.0	918.0	2580.0
	46	-230	34.6	126.0	59.1	107.0	125.0	366.0	3330.0
\bar{x}									
S.D.			43.47	147.33	44.73	99.0	123.33	622.33	2873.33
Range			8.36	23.18	12.45	17.44	2.082	278.09	400.79
			(34.1-53.0)	(122.0-176.0)	(35.7-66.6)	(78.7-117.0)	(118.0-132.0)	(352.0-931.0)	(2540.0-3620.0)
5b	53	+120	19.6	69.5	45.9	69.1	100.0	205.0	2580.0
	54	+230	40.1	85.5	38.0	78.4	154.0	483.0	2810.0
	55	-230	59.7	116.0	55.3	114.0	158.0	494.0	3490.0
\bar{x}									
S.D.			39.8	90.33	46.4	87.17	137.33	394.0	2960.0
Range			20.05	23.62	8.66	23.70	32.39	163.77	473.18
			(19.4-61.0)	(61.8-120.0)	(38.0-55.6)	(67.6-116.0)	(98.2-159.0)	(201.0-512.0)	(2540.0-3490.0)
5c	60	+120	20.4	76.0	61.0	80.5	107.0	209.0	3120.0
	61	+230	32.6	85.3	55.0	95.0	143.0	437.0	3300.0
	62	-230	48.3	84.9	54.5	122.0	183.0	390.0	3630.0
\bar{x}									
S.D.			33.77	82.07	56.83	99.17	144.33	345.33	3350.0
Range			13.99	5.26	3.62	21.06	38.02	120.38	258.86
			(20.3-50.8)	(70.8-89.7)	(53.7-54.8)	(79.0-125.0)	(105.0-185.0)	(192.0-444.0)	(2980.0-3640.0)
6a	68	+120	30.7	20.7	< 16.6	55.2	72.1	180.0	1200.0
	69	+230	31.2	32.6	23.2	71.7	77.9	165.0	1490.0
	70	-230	27.6	38.8	52.0	92.3	93.4	169.0	2690.0
\bar{x}									
S.D.			29.83	30.7	< 30.6	73.07	81.13	171.33	1793.33
Range			1.95	9.20	18.82	18.59	11.012	7.77	789.96
			(25.4-32.2)	(20.4-39.5)	(46.5-52.5)	(54.7-92.6)	(70.9-95.6)	(160.0-200.0)	(1170.0-2720.0)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 5a - 6a)

SAMPLE	SUBSAMPLE	SIEVE NO.	Si	Mg	P	Ca	Na	Al	Fe
5a	74	+120	2850.0	11700.0	1120.0	36100.0	278.0	22000.0	68900.0
	75	+230	3430.0	11200.0	888.0	24400.0	243.0	20000.0	74300.0
	76	-230	4300.0	11500.0	1510.0	30700.0	273.0	21100.0	70300.0
\bar{x}				3530.0	11466.67	1172.67	30400	264.67	71166.66
S.D.				725.19	251.66	314.33	5855.77	18.93	1001.66
Range			(2530-4880)	(11000-11900)	(864.0-1560)	(23900-32300)	(231.0-315.0)	(19600-22600)	(67400-75400)
5b	83	+120	2670.0	11000.0	866.0	17100.0	190.0	19500.0	39600.0
	84	+230	3540.0	10400.0	981.0	19800.0	226.0	19100.0	105000.0
	85	-230	3740.0	9870.0	1460.0	25900.0	247.0	20100.0	113000.0
\bar{x}				3316.67	10423.33	1102.33	20933.33	221.0	19577.67
S.D.				568.89	565.36	315.04	4508.14	28.83	85866.67
Range			(2580-3820)	(9730-11100)	(839.0-1490)	(16600-26000)	(178.0-256.0)	(18900-20200)	40267.27
5c	91	+120	2890.0	11500.0	952.0	19200.0	222.0	20700.0	41700.0
	92	+230	3140.0	9960.0	1110.0	21300.0	222.0	19800.0	87600.0
	93	-230	2710.0	8510.0	1550.0	24900.0	245.0	18900.0	134000.0
\bar{x}				2913.33	9900.0	1204.0	22933.33	229.67	19800.0
S.D.				215.95	1495.23	309.88	3234.71	13.28	900.0
Range			(2480-3290)	(8480-11600)	(950.0-1550)	(18400-25000)	(207.0-255.0)	(18600-20900)	(38200-115000)
6a	97	+120	3830.0	9800.0	942.0	9260.0	230.0	21500.0	35500.0
	98	+230	3330.0	9740.0	970.0	22100.0	295.0	21700.0	36800.0
	99	-230	4860.0	11300.0	1470.0	18200.0	332.0	20900.0	43100.0
\bar{x}				4006.67	10280.0	1127.33	16520.0	285.67	21366.67
S.D.				780.15	883.85	297.09	6582.80	51.14	416.33
Range			(2910-5020)	(9280-11500)	(914.0-1500)	(9150-23100)	(214.0-348.0)	(20650-22600)	(34900- 43800)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 6b - 7b)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ba	Be	Cd	Cr	Cu	Mn	No
6b	106	+120	125.0	0.492	1.13	35.4	129.0	818.0	< 2.42
	107	+230	172.0	0.542	0.755	30.4	107.0	888.0	< 2.46
	108	-230	260.0	1.2	0.963	37.1	143.0	1080.0	< 2.4
\bar{x}			185.67	0.761	0.949	34.3	126.33	928.67	< 2.43
S.D.			68.53	0.384	0.188	3.48	18.15	135.65	0.031
Range			(121.0-264.0)	(0.474-1.23)	(0.707-1.49)	(28.8-38.5)	(105.0-143.0)	(791.0-1090)	(<2.36-<2.47)
6c	115	+120	133.0	0.604	< 0.676	31.1	118.0	773.0	4.45
	116	+230	231.0	0.546	0.932	28.9	128.0	840.0	< 2.45
	117	-230	228.0	1.12	0.959	37.2	135.0	1020.0	< 2.48
\bar{x}			197.33	0.757	< 0.856	32.4	127.0	877.67	< 3.13
S.D.			55.73	0.316	0.156	4.3	8.54	127.735	1.146
Range			(130.0-236.0)	(0.546-1.13)	(<0.633-1.06)	(28.1-37.4)	(116.0-140.0)	(767.0-1020)	(<2.41-<4.47)
7a	124	+120	286.0	0.386	< 0.544	35.4	50.3	867.0	< 2.42
	125	+230	382.0	0.453	< 0.68	29.93	56.4	908.0	< 2.43
	126	-230	511.0	0.869	0.771	24.1	94.6	1040.0	< 2.46
\bar{x}			393.0	0.569	< 0.698	29.93	67.1	938.33	< 2.43
S.D.			112.90	0.262	0.065	6.17	24.01	90.40	0.021
Range			(270.0-520.0)	(0.377-0.875)	(<0.629-0.875)	(23.9-39.5)	(48.4-98.8)	(825.0-1060)	(<2.36-<2.48)
7b	132	+120	240.0	0.48	< 0.842	29.9	45.6	781.0	< 2.44
	133	+230	1060.0	0.626	1.04	28.6	61.1	848.0	< 2.47
	134	-230	806.0	0.772	< 0.681	25.5	94.0	996.0	< 3.2
\bar{x}			702.0	0.626	0.854	28.0	66.9	875.0	< 2.70
S.D.			419.78	0.146	0.180	2.26	24.72	110.014	0.43
Range			(219.0-1140)	(0.465-0.836)	(<0.658-1.02)	(24.3-31.2)	(36.7-94.1)	(763.0-1030)	(<2.39-<3.93)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 6b - 7b)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ni	Pb	Sn	Sr	V	Zn	Ti
6b	106	+120	36.1	32.6	18.6	46.6	68.3	206.0	1220.0
	107	+230	32.7	24.7	18.1	56.0	66.3	158.0	1360.0
	108	-230	27.8	37.9	56.8	105.0	101.0	167.0	2920.0
	\bar{x}		32.2	31.73	31.17	69.2	78.53	177.0	1833.33
	S.D.		4.17	6.64	22.20	31.36	19.48	25.515	943.68
6c	Range	(27.0-37.4)	(23.7-38.8)	(16.4-57.0)	(45.6-106.0)	(62.7-102.0)	(154.0-237.0)	(1180.0-2930.0)	
		115	+120	29.5	17.3	19.1	59.1	70.8	154.0
		116	+230	27.7	18.6	21.2	74.1	72.2	146.0
		117	-230	28.4	30.3	56.2	93.5	99.6	1530.0
		\bar{x}		28.53	22.07	32.17	75.57	80.87	2900.0
7a	Range	S.D.	0.907	7.16	20.84	17.25	16.24	6.56	1926.67
		Range	(26.3-30.1)	(16.8-30.4)	(19.0-57.6)	(57.8-95.0)	(70.6-99.7)	(139.0-159.0)	847.72
		\bar{x}	124	+120	34.0	13.8	<16.1	67.5	70.9
		S.D.	125	+230	25.3	18.4	<16.9	80.1	77.5
		Range	126	-230	21.4	18.7	36.1	112.0	84.3
7b	Range	\bar{x}		26.9	16.97	23.03	86.53	77.57	2210.0
		S.D.	6.45	2.75	11.32	22.94	6.70	3.21	1415.67
		Range	(19.9-34.7)	(13.3-22.3)	(<15.7-36.3)	(65.7-114.0)	(69.7-86.5)	(118.0-132.0)	708.97
		\bar{x}	132	+120	24.9	7.48	<16.3	83.7	83.8
		S.D.	133	+230	21.4	11.2	19.8	113.0	160.0
7b	Range	Range	134	-230	23.0	18.0	27.9	121.0	142.0
		\bar{x}		23.1	12.23	<21.33	105.9	91.7	1626.67
		S.D.	1.75	5.33	5.95	19.64	18.65	17.09	209.84
		Range	(21.1-25.1)	(7.32-18.7)	(<15.9-29.5)	(77.7-125.0)	(76.3-115.0)	(120.0-188.0)	(1380.0-1870.0)
		\bar{x}							

(continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 6b - 7b)

SAMPLE	SUBSAMPLE	SIEVE NO.	Si	Mg	P	Ca	Na	Al	Fe
6b	106	+120	4500.0	9030.0	942.0	7640.0	189.0	18900.0	37800.0
	107	+230	4230.0	8950.0	962.0	10000.0	218.0	19100.0	36700.0
	108	-230	4760.0	11400.0	1520.0	17300.0	352.0	23800.0	46700.0
	\bar{x}		4496.67	9793.33	1141.33	11646.67	253.0	20600.0	40400.0
	S.D.		265.02	1391.99	328.09	5036.12	86.95	2773.08	5483.61
Range			(3720-4900)	(8650-11500)	(910.0-1530)	(7400-17400)	(170.0-365.0)	(1780-24100)	(35500-47100)
	6c	115	+120	4400.0	9520.0	995.0	10700.0	226.0	19200.0
	116	+230	4550.0	9290.0	1010.0	18400.0	232.0	19000.0	36900.0
	117	-230	4650.0	11000.0	1520.0	14600.0	331.0	22900.0	45200.0
	\bar{x}		4533.33	9936.67	1175.0	14566.67	263.0	20366.67	39800.0
S.D.	S.D.		125.83	928.03	298.87	3850.108	58.97	2196.21	4680.81
	Range		(4260-4680)	(8990-11000)	(980.0-1530)	(10500-18800)	(204.0-336.0)	(18900-23300)	(35900-45200)
7a	124	+120	4730.0	9790.0	1010.0	14800.0	165.0	21600.0	38800.0
	125	+230	4530.0	9610.0	1030.0	15600.0	173.0	21700.0	41000.0
	126	-230	4710.0	9210.0	1360.0	18600.0	208.0	20700.0	45900.0
	\bar{x}		4656.67	9536.67	1133.33	16333.33	182.0	2133.33	41900.0
	S.D.		110.15	296.87	196.55	2003.33	22.87	550.76	3634.56
Range			(4470-4920)	(9010-10000)	(987.0-1390)	(14200-19000)	(146.0-219.0)	(20400-22600)	(38200-46700)
	7b	132	+120	4350.0	10700.0	1150.0	13200.0	153.0	22600.0
	133	+230	4560.0	9640.0	1080.0	16800.0	141.0	21800.0	55800.0
	134	-230	4280.0	9290.0	1190.0	18000.0	181.0	20600.0	44400.0
	\bar{x}		4396.67	9876.67	1140.0	16000.0	158.33	21666.67	48400.0
S.D.	S.D.		145.72	734.19	55.68	2498.0	20.53	1006.64	6415.61
	Range		(4030-4760)	(9000-11000)	(1060-1210)	(12500-18500)	(126.0-202.0)	(19600-23800)	(42700- 56400)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 7c - 8c)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ba	Be	Cd	Cr	Cu	Mn	Mo
7c	138	+120	208.0	0.434	0.736	35.4	48.6	1010.0	< 2.46
	139	+230	382.0	0.598	< 0.727	27.1	41.9	961.0	< 2.43
	140	-230	608.0	1.1	0.884	24.7	61.7	1090.0	< 2.76
\bar{x}			399.33	0.711	< 0.782	29.07	50.13	1020.33	< 2.55
S.D.			200.56	0.347	0.088	5.61	10.071	65.12	0.182
Range			(198.0-622.0)	(0.41-1.19)	(<0.647-0.946)	(23.1-36.8)	(41.3-64.7)	(927.0-1130)	(<2.42-3.04)
8a	142	+120	88.6	0.355	< 0.76	23.5	64.7	774.0	< 2.48
	143	+230	109.0	0.302	0.818	23.6	65.8	711.0	< 2.46
	144	-230	158.0	0.385	1.53	26.5	127.0	784.0	< 2.46
\bar{x}			118.53	0.347	< 1.036	24.53	85.83	756.33	< 2.47
S.D.			35.67	0.042	0.429	1.704	35.66	39.58	0.001
Range			(82.3-167.0)	(0.262-0.406)	(<0.662-1.54)	(22.8-26.5)	(63.4-130.0)	(694.0-786.0)	(<2.44-<2.48)
8b	146	+120	80.5	0.336	< 0.656	23.6	65.7	816.0	< 2.46
	147	+230	107.0	0.332	0.99	22.8	74.5	738.0	< 2.47
	148	-230	188.0	0.447	1.71	27.4	149.0	835.0	< 2.48
\bar{x}			125.17	0.368	< 1.12	24.23	96.4	796.33	< 2.47
S.D.			56.00	0.68	0.54	2.90	45.76	51.40	0.010
Range			(76.7-200.0)	(0.295-0.45)	(<0.656-1.73)	(21.7-27.7)	(64.9-150.0)	(699.0-850.0)	(<2.46-<2.5)
8c	150	+120	75.7	0.281	< 0.662	22.6	86.0	849.0	< 2.48
	151	+230	93.7	0.24	0.768	21.6	84.4	755.0	< 2.48
	152	-230	164.0	0.33	1.42	25.2	141.0	831.0	< 2.42
\bar{x}			111.13	0.284	0.95	23.133	103.8	811.67	< 2.46
S.D.			46.66	0.045	0.41	1.86	32.23	49.89	0.035
Range			(71.9-165.0)	(0.231-0.353)	(0.66-1.43)	(21.6-25.6)	(76.1-132.0)	(748.0-877.0)	(<2.40-<2.49)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 7c - 8c)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ni	Pb	Sn	Sr	V	Zn	Ti
7c	138	+120	36.0	11.1	< 16.4	68.7	66.8	132.0	836.0
	139	+230	23.9	12.1	16.9	90.8	77.3	121.0	1400.0
	140	-230	22.8	18.4	43.8	126.0	91.0	128.0	2520.0
\bar{x}			27.57	13.87	< 25.7	95.17	78.37	127.0	1585.33
S.D.			7.32	3.96	15.68	28.90	12.14	5.57	857.16
Range			(21.2-38.4)	(10.8-19.7)	(<16.1-46.5)	(67.0-133.0)	(65.7-96.2)	(121.0-137.0)	(810.0-2640.0)
8a	142	+120	11.6	7.94	18.2	95.0	75.5	89.4	1310.0
	143	+230	14.2	11.8	< 16.4	98.7	74.0	96.6	1260.0
	144	-230	19.3	17.6	< 16.4	121.0	77.8	140.0	1420.0
\bar{x}			15.03	12.45	< 17.0	104.9	75.77	108.67	1330.0
S.D.			3.92	4.86	1.039	14.06	1.914	27.37	81.85
Range			(10.9-20.6)	(7.59-18.3)	(<16.2-19.9)	(92.7-121.0)	(72.7-78.1)	(76.8-144.0)	(1250.0-1430.0)
8b	146	+120	12.3	7.29	16.4	101.0	77.5	84.6	1310.0
	147	+230	14.3	13.5	< 16.5	97.5	72.5	108.0	1190.0
	148	-230	22.2	19.9	< 16.6	134.0	79.6	153.0	1470.0
\bar{x}			16.27	13.56	< 16.5	110.83	76.53	115.2	1323.33
S.D.			5.24	6.30	0.10	20.14	3.65	37.764	140.48
Range			(12.1-23.5)	(6.89-23.0)	(<16.4- 16.7)	(95.2-136.0)	(71.1-80.5)	(83.1-156.0)	(1180.0-1500.0)
8c	150	+120	15.5	10.8	< 16.6	106.0	69.9	98.3	903.0
	151	+230	16.0	11.5	< 16.5	96.4	66.8	106.0	952.0
	152	-230	21.1	17.7	< 16.1	123.0	72.2	139.0	1210.0
\bar{x}			17.53	13.33	16.4	108.47	69.63	114.433	1021.667
S.D.			3.099	3.798	0.264	13.47	2.710	21.621	164.931
Range			(15.0-21.2)	(9.9-18.0)	(<16.0- 16.6)	(95.0-124.0)	(66.5-72.3)	(82.5-146.0)	(871.0-1220.0)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 7c - 8c)

SAMPLE	SUBSAMPLE	SIEVE NO.	Si	Mg	P	Ca	Na	Al	Fe
7c	138	+120	4950.0	10100.0	1090.0	15200.0	198.0	22200.0	39000.0
	139	+230	4060.0	9660.0	1090	17300.0	172.0	21800.0	41600.0
	140	-230	4210.0	9340.0	1470.0	20000.0	226.0	21600.0	50200.0
	\bar{x}		4406.67	9700.0	1216.67	17500.0	198.67	21866.67	43600.0
	S.D.		476.48	381.58	219.39	2406.24	27.01	305.80	5861.74
Range		(3610-4980)	(8960-10400)	(1050-1530)	(15100-20800)	(165.0-237.0)	(20400-23600)	(38000-52400)	
	8a	142	+120	3050.0	10900.0	919.0	23300.0	185.0	17100.0
	143	+230	3640.0	10000.0	962.0	22800.0	188.0	16700.0	33900.0
	145	-230	3640.0	10300.0	1330.0	28000.0	217.0	17000.0	42800.0
	\bar{x}		3443.33	10400.0	1070.33	24700.0	199.67	16933.33	36000.0
S.D.		340.64	458.26	225.903	2868.80	16.17	208.17	6030.75	
	Range	(3050-3760)	(9820-11100)	(911.0-1340)	(22500-28100)	(178.0-218.0)	(16500-17700)	(30500-43500)	
	8b	146	+120	3130.0	11400.0	1000.0	24300.0	209.0	17400.0
	147	+230	3060.0	10300.0	992.0	23700.0	177.0	16000.0	35800.0
	148	-230	3730.0	10800.0	1550.0	30900.0	250.0	17400.0	46500.0
S.D.	\bar{x}		3306.67	10833.33	1180.57	26300.0	212.0	16933.33	38233.33
	Range	368.284	643.17	319.88	394.97	36.592	808.29	7358.22	
		(2820-3920)	(9800-11800)	(933.0-1570)	(22700-31500)	(171.0-258.0)	(15800-18000)	(31100-46800)	
	8c	150	+120	2820.0	11600.0	1040.0	26400.0	186.0	16300.0
	151	+230	3170.0	10400.0	977.0	24200.0	168.0	15200.0	33700.0
S.D.	152	-230	3640.0	10700.0	1430.0	30100.0	216.0	16100.0	41600.0
	Range		3210.0	10900.0	1149.0	26900.0	190.0	15866.67	36266.67
		411.46	624.5	245.38	2981.61	24.25	385.95	4619.884	
		(2790-3690)	(10300-11900)	(974.0-1460)	(23900-30600)	(165.0-221.0)	(15100-16800)	(32700-42500)	

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2-1a - 2-2a)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ba	Be	Cd	Cr	Cu	Mn	No
2 1a	1	+120	244.0	1.41	0.755	38.0	1550.0	1010.0	9.75
	2	+230	248.0	1.57	1.76	38.6	1070.0	1100.0	7.75
	3	-230	395.0	2.05	1.91	55.0	570.0	1510.0	< 2.45
	\bar{x}		295.67	1.677	1.475	43.867	1063.33	1206.667	6.65
	S.D.		86.048	0.333	0.628	9.646	490.03	266.52	3.77
Range			(234.0-402.0)	(1.26-2.07)	(<0.656-2.0)	(37.2-55.7)	(566.0-1590)	(962.0-1530)	(2.44-11.1)
	2 1b	4	+120	235.0	1.45	< 0.65	35.5	1490.0	955.0
	5	+230	231.0	1.19	2.0	36.7	1020.0	1050.0	8.3
	6	-230	397.0	2.0	1.95	55.5	505.0	1500.0	< 2.46
	\bar{x}		287.67	1.55	1.90	42.57	1005.0	1168.33	6.187
S.D.			94.706	0.414	0.963	11.22	492.67	291.13	3.24
	Range		(226.0-404.0)	(1.13-2.06)	(0.639-2.13)	(33.8-55.5)	(498.0-1600)	(907.0-1520)	(2.44-9.8)
2 1c	7	+120	245.0	1.59	0.735	37.5	1570.0	1000.0	< 4.94
	8	+230	241.0	1.46	1.97	38.1	965.0	1090.0	3.16
	9	-230	410.0	2.14	2.15	57.0	565.0	1540.0	< 2.5
	\bar{x}		298.67	1.73	1.62	44.2	1033.33	1210.0	3.53
	S.D.		96.44	0.36	0.77	11.09	505.97	289.31	1.26
Range			(237.0-422.0)	(1.35-2.2)	(0.733-2.2)	(35.9-58.3)	(498.0-1600)	(970.0-1580)	(2.5-7.49)
	2 2a	10	+120	190.0	0.705	2.37	61.5	3840.0	1010.0
	11	+230	207.0	0.92	3.06	57.5	3450.0	1260.0	17.2
	12	-230	375.0	1.86	7.1	60.5	1870.0	1470.0	27.6
	\bar{x}		257.33	1.162	4.18	59.83	3053.33	1246.67	22.3
S.D.			102.26	0.614	2.55	2.082	1043.18	230.29	5.20
	Range		(189.0-379.0)	(0.698-1.87)	(2.31-7.12)	(55.6-63.0)	(1710-3850)	(997.0-1480)	(14.6-28.4)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2-1a - 2-2a)

SAMPLE	SUBSAMPLE	STIEVE NO.	Ni	Pb	Sn	Sr	V	Zn	Ti
2 1a	1	+120	25.8	218.0	70.0	38.9	112.0	355.0	3550.0
	2	+230	40.2	269.0	65.0	50.5	149.0	580.0	3800.0
	3	-230	80.0	505.0	81.5	65.0	190.0	695.0	4860.0
	\bar{x}		48.667	330.67	72.167	44.7	150.33	543.33	4070.0
S.D.			28.074	153.115	8.461	8.20	39.02	172.94	69.55
Range			(23.9-80.5)	(192.0-510.0)	(62.5-82.0)	(36.9-67.3)	(108.0-195.0)	(351.0-707.0)	(3380.0-4900.0)
2 1b	4	+120	23.8	217.0	70.5	41.5	109.0	326.0	3560.0
	5	+230	38.6	251.0	53.0	45.9	148.0	610.0	3360.0
	6	-230	78.5	510.0	79.5	67.0	191.0	675.0	4850.0
	\bar{x}		46.97	326.0	67.69	51.49	149.33	537.0	3923.33
S.D.			28.29	160.25	13.475	13.63	41.02	185.60	808.72
Range			(22.4-90.4)	(211.0-513.0)	(53.1-79.7)	(38.6-68.3)	(103.0-192.0)	(305.0-680.0)	(3250.0-4850.0)
2 1c	7	+120	26.5	216.0	79.0	45.7	115.0	337.0	3910.0
	8	+230	43.5	279.0	62.5	54.5	151.0	560.0	3680.0
	9	-230	83.0	525.0	83.5	69.0	195.0	700.0	5050.0
	\bar{x}		51.0	340.0	75.0	56.4	153.67	532.33	4213.33
S.D.			28.99	163.28	11.06	11.77	40.07	180.08	733.64
Range			(25.5-94.3)	(205.0-545.0)	(58.3-86.7)	(42.8-70.8)	(111.0-200.0)	(325.0-717.0)	(3620.0-5170.0)
2 2a	10	+120	35.9	149.0	34.9	71.0	102.0	565.0	2270.0
	11	+230	39.9	153.0	41.6	32.5	112.0	725.0	2680.0
	12	-230	74.0	421.0	68.5	96.0	144.0	1640.0	4190.0
	\bar{x}		49.93	241.0	48.33	83.17	119.33	976.67	3046.67
S.D.			20.94	155.90	17.78	12.51	21.94	580.01	1011.15
Range			(34.8-77.6)	(146.0-425.0)	(34.8-68.9)	(68.5-97.7)	(102.0-144.0)	(545.0-1640.0)	(2250.0-4220.0)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2-1a - 2-2a)

SAMPLE	SUBSAMPLE	SIEVE NO.	Si	Mg	P	Ca	Na	Al	Fe
2 1a	1	+120	3860.0	13900.0	925.0	18200.0	193.0	21100.0	60500.0
	2	+230	4660.0	13200.0	1060.0	22800.0	220.0	21500.0	105000.0
	3	-230	5000.0	20100.0	1450.0	28200.0	389.0	31500.0	139000.0
	\bar{x}		4506.67	15733.33	1145.0	23066.67	267.33	24700.0	101500.0
S.D.	585.2		3797.81	272.63	5005.33	106.23	5892.37	39366.86	
	Range	(3590-5540)	(12900-20400)	(875.0-1460)	(17400-28800)	(164.0-389.0)	(20300-32100)	(58200-140000)	
2 1b	4	+120	3750.0	13000.0	855.0	18300.0	206.0	20700.0	57000.0
	5	+230	3970.0	12500.0	1080.0	22100.0	215.0	20200.0	107000.0
	6	-230	4150.0	20000.0	1410.0	28200.0	367.0	31700.0	137000.0
	\bar{x}		3956.67	15166.67	1115.0	22866.67	262.67	24200.0	100333.3
S.D.	200.33		4193.25	279.15	4994.33	90.47	6500.0	40414.52	
	Range	(3590-4340)	(12300-20300)	(801.0-1440)	(17400-28600)	(197.0-372.0)	(19500-32100)	(54800-138000)	
2 1c	7	+120	3750.0	13400.0	905.0	19400.0	183.0	21800.0	61000.0
	8	+230	3660.0	12700.0	1070.0	23100.0	192.0	21500.0	108000.0
	9	-230	4220.0	20600.0	1470.0	29000.0	393.0	32800.0	140000.0
	\bar{x}		3876.67	15566.67	1148.33	23833.33	256.0	25366.67	103000.0
S.D.	300.72		437.02	290.53	4841.83	118.73	6439.20	397636.63	
	Range	(3350-4970)	(12600-21200)	(872.0-1510)	(18600-29700)	(161.0-428)	(21800-33700)	(59100-142000)	
2 2a	10	+120	3390.0	16200.0	940.0	31400.0	198.0	20700.0	46200.0
	11	+230	3280.0	16500.0	1210.0	43100.0	219.0	22600.0	62500.0
	12	-230	3080.0	18300.0	2250.0	45800.0	227.0	27300.0	109000.0
	\bar{x}		3250.0	17000.0	1466.67	40100.0	214.67	23533.33	72566.67
S.D.	157.16		1135.78	691.69	7654.41	14.98	3397.55	32587.78	
	Range	(2920-3440)	(16000-18400)	(935.0-2290)	(30600-46500)	(190.0-246.0)	(20500-27500)	(46200-111000)	

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2-2b - 2-5c)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ba	Be	Cd	Cr	Cu	Mn	Mo
2 2b	13	+120	292.0	112.0	4.45	75.0	2900.0	1230.0	39.6
	14	+230	217.0	0.835	11.1	54.5	3170.0	1170.0	21.8
	15	-230	370.0	1.94	7.55	64.0	1910.0	1490.0	28.7
	\bar{x}		293.0	1.30	7.70	64.5	2660.0	1296.67	30.03
	S.D.		76.50	0.574	3.33	10.26	663.4	170.10	8.98
Range		(193.0-386.0)	(0.717-2.05)	(2.23-19.9)	(49.5-78.8)	(1870-3410)	(1050-1550)	(18.8-42.9)	
2 2c	16	+120	182.0	0.685	1.3	63.0	2750.0	985.0	18.9
	17	+230	207.0	1.01	2.83	59.0	3500.0	1270.0	17.1
	18	-230	354.0	1.33	8.7	59.5	1770.0	1360.0	20.9
	\bar{x}		247.67	1.01	4.28	60.5	2673.33	1205.0	18.97
	S.D.		92.93	0.322	3.91	2.18	867.54	195.77	1.90
Range		(178.0-358.0)	(0.664-1.52)	(1.23-8.88)	(57.5-63.4)	(1590-3590)	(945.0-1390)	(15.4-23.7)	
2 5a	19	-230	223.0	1.4	1.04	26.7	358.0	1040.0	< 2.46
	Range	(281.0-227)	(1.19-1.6)	(0.938-1.14)	(26.6-26.8)	(356.0-359.0)	(1030-1040)	(<2.44-<2.47)	
2 5b	20	-230	214.0	1.34	0.81	25.9	164.0	1100.0	< 2.46
	Range	(208.0-220.0)	(1.22-1.46)	(0.782-0.839)	(25.1-26.6)	(158.0-169.0)	(1060-1130)	(<2.44-<2.47)	
	\bar{x}								
2 5c	21	+230	304.0	0.69	3.13	28.2	660.0	1090.0	2.49
	22	-230	208.0	1.32	0.68	26.1	158.0	1090.0	<2.49
	\bar{x}		256.0	1.003	1.906	27.1	409.0	1090.0	2.495
	S.D.		56.645	0.36	1.416	1.36	289.88	11.55	0.094
Range		(205.0-318.0)	(0.638-1.32)	(<.664-3.24)	(25.9-28.9)	(155.0-666.0)	(1080-1100)	(<2.38-2.49)	

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2-2b - 2-5c)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ni	Pb	Sn	Sr	V	Zn	Ti
2 2b	13	+220	58.0	307.0	48.6	82.0	126.0	1030.0	3070.0
	14	+230	37.5	155.0	37.3	79.0	103.0	650.0	2500.0
	15	-220	76.0	445.0	70.0	99.0	148.0	1650.0	4290.0
	\bar{x}		57.17	302.33	51.97	86.67	125.67	1110.0	3286.67
	S.D.		19.26	145.06	16.61	10.79	22.50	504.78	914.46
Range		(33.9-78.8)	(135.0-469.0)	(33.4-74.5)	(70.7-103.0)	(93.3-154.0)	(548.0-1720)	(2250-4450)	
	2 2c	16	+120	31.1	123.0	38.1	66.5	99.5	444.0
	17	+230	38.7	149.0	46.8	82.0	111.0	695.0	2900.0
	18	-230	82.0	530.0	47.5	87.5	139.0	1960.0	3450.0
	\bar{x}		50.6	267.33	44.13	78.67	116.5	1033.0	2853.33
S.D.		27.46	227.85	5.24	10.89	20.32	812.56	621.32	
	Range	(29.9-84.0)	(110.0-553.0)	(36.5-55.0)	(64.8-92.3)	(96.2-145.0)	(427.0-2020)	(2140-3730)	
2 5a	19	-230	22.0	67.5	65.5	123.0	97.0	219.0	3310.0
			(20.4-23.5)	(65.4-59.1)	(58.4-72.4)	(116.0-129.0)	(93.3-101.0)	(214.0-224.0)	(3120-3490)
	\bar{x}		(14.8-21.1)	(44.0-47.0)	(63.5-70.7)	(134.0-143.0)	(92.5-101.0)	(154.0-164.0)	(3140-3490)
	S.D.								
	Range								
2 5b	20	-230	18.0	45.5	67.0	139.0	97.0	159.0	3320.0
			(14.8-21.1)	(44.0-47.0)	(63.5-70.7)	(134.0-143.0)	(92.5-101.0)	(154.0-164.0)	(3140-3490)
	\bar{x}								
	S.D.								
	Range								
2 5c	21	+230	29.1	74.0	36.2	90.0	79.5	250.0	1800.0
	22	-230	17.4	41.6	62.5	135.0	95.5	154.0	3240.0
	\bar{x}		23.2	57.9	49.3	112.45	87.425	201.5	2517.5
	S.D.		6.80	18.84	15.18	26.05	9.05	56.36	828.55
	Range	(16.4-29.2)	(41.0-75.1)	(34.9-63.3)	(89.4-136.0)	(79.2-95.8)	(153.0-262.0)	(2140-3730)	(1790-3230)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2-2b - 2-5c)

SAMPLE	SUBSAMPLE	SIEVE NO.	Si	Mg	P	Ca	Na	Al	Fe
2 2b	13	+120	2630.0	1900.0	1360.0	36100.0	213.0	25100.0	70000.0
	14	+230	2180.0	15400.0	1080.0	40500.0	154.0	21200.0	56000.0
	15	-230	3220.0	18700.0	2300.0	46800.0	233.0	27600.0	109000.0
%			2676.67	17700.0	1580.0	41133.33	200.0	24633.33	78333.33
S.D.			521.57	1997.50	639.06	5378.04	41.07	3225.4	27465.13
Range			(1860-3790)	(13900-19500)	(932.0-2420)	(35100-49000)	(111.0-265.0)	(19100-28800)	(49500-11400)
2 2c	16	+120	3710.0	16000.0	835.0	31200.0	214.0	20400.0	40500.0
	17	+230	2680.0	16300.0	1250.0	43000.0	210.0	22700.0	61000.0
	18	-230	4280.0	16000.0	2650.0	43400.0	224.0	23400.0	121000.0
%			3556.67	16100.0	1578.33	39200.0	216.0	22166.67	74166.67
S.D.			810.95	173.20	951.0	6931.09	7.21	1569.5	41834.0
Range			(2300-4420)	(15500-16600)	(809.0-2720)	(30100-45200)	(182.0-250.0)	(19800-24200)	(38700-12300)
2 5a	19	-230	4240.0	10800.0	1700.0	30900.0	290.0	20200.0	47100.0
Range			(4210-4260)	(10700-10900)	(1660-1740)	(30800-30900)	(286.0-293.0)	(19800-20600)	(47000-47200)
2 5b	20	-230	4670.0	11100.0	1710.0	33600.0	336.0	21200.0	43400.0
Range			(4620-4720)	(10700-11500)	(1650-1760)	(32400-34700)	(332.0-339.0)	(20500-21900)	(42000-44700)
2 5c	10	+230	4130.0	11100.0	825.0	24000.0	217.0	18900.0	38900.0
	11	-230	5100.0	11100.0	1720.0	33400.0	342.0	20800.0	43100.0
%			4617.5	11100.0	1271.25	28675.0	279.0	19850.0	41000.0
S.D.			574.13	115.47	518.44	5459.78	72.56	1100.0	2532.46
Range			(4090-5200)	(11000-11200)	(819.0-1740)	(23800-33600)	(213.0-350.0)	(18900-20900)	(38100-43500)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2-6a - 2-6b)

SAMPLE	SUBSAMPLE	SIIEVE NO.	Ba	Be	Cd	Cr	Cu	Mn	Mn
2 6a	23	+120	104.0	0.464	< 0.65	29.5	86.0	735.0	< 2.44
	24	+230	137.0	0.54	< 0.715	32.9	315.0	835.0	< 2.41
	25	-230	232.0	0.995	0.775	33.1	261.0	1200.0	< 2.47
	\bar{x}		157.5	0.666	0.714	31.82	220.5	920.67	2.44
S.D.			59.53	0.258	0.103	1.89	107.13	218.47	0.029
	Range		(103.0-234.0)	(0.456-1.02)	(<0.643-0.891)	(29.3-33.8)	(86.0-315.0)	(730.0-1230)	(<2.41-<2.48)
	26	+120	113.0	0.397	< 0.66	28.4	122.0	775.0	< 2.48
	27	+230	111.0	< 0.345	< 1.38	31.1	600.0	725.0	< 5.15
2 6b	28	-230	248.0	1.075	1.07	37.2	386.5	1300.0	< 2.485
	\bar{x}		157.17	0.606	1.04	32.23	369.5	932.67	3.38
	S.D.		70.41	0.366	0.32	4.06	214.2	286.04	1.39
	Range		(110.0-252.0)	(0.345-1.14)	(<0.662-<1.38)	(28.3-37.9)	(122.0-600.0)	(724.0-1330)	(<2.48-<5.17)

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2-6a - 2-6b)

SAMPLE	SUBSAMPLE	SIEVE NO.	Ni	Pb	Sn	Sr	V	Zn	Ti
2-6a	23	+120	35.4	22.1	< 16.3	36.0	63.5	160.0	1080.0
	24	+230	35.0	36.3	24.1	51.5	70.0	175.0	1350.0
	25	-230	27.4	60.5	53.5	95.5	96.0	177.0	2540.0
D. Range			32.57	39.58	31.32	60.97	76.37	170.17	1653.33
	4.14		17.41	17.58	27.59	15.34	9.02	694.80	
		(26.3-35.9)	(22.0-62.2)	(<16.3-54.5)	(36.0-96.0)	(63.0-96.4)	(159.0-182.0)	(1070-2570)	
2-6b	26	+120	36.6	27.8	< 16.6	31.2	55.5	185.0	730.0
	27	+230	35.0	44.2	< 34.5	37.9	63.0	357.0	915.0
	28	-230	30.75	68.45	63.0	99.15	104.5	204.0	2710.0
D. Range			34.12	46.8	38.03	56.08	74.32	248.67	1451.83
	2.76		18.33	21.03	33.54	23.69	84.41		
	(30.6-36.6)	(27.6-70.0)	(<16.6-66.2)	(31.1-102.0)	(55.5-107.0)	(185.0-359.0)	(727.0-2780)		

(Continued)

TABLE 3: TOTAL METAL CONCENTRATIONS (mg/l) - (Samples 2-6a - 2-6b)

SAMPLE	SUBSAMPLE	SIEVE NO.	Si	Mg	P	Ca	Na	Al	Fe
2 6a	23	+120	4230.0	9800.0	970.0	6150.0	184.0	19100.0	36500.0
	24	+230	4850.0	10500.0	1060.0	9050.0	228.0	20200.0	39600.0
	25	-230	4720.0	12700.0	1490.0	18400.0	352.0	23900.0	45800.0
\bar{x}			4558.33	10975.0	1172.83	11800.0	254.67	21066.67	40633.33
S.D.			308.05	1355.58	251.18	5713.5	78.15	2264.21	4307.05
Range			(4100-4890)	(9760-13000)	(961.0-1540)	(6090-18800)	(184.0-360.0)	(19100-24300)	(36200-47000)
2 6b	26	+120	3390.0	9200.0	940.0	5050.0	151.0	18100.0	34600.0
	27	+230	6000.0	9400.0	895.0	6450.0	197.0	19000.0	36600.0
	28	-230	5965.0	13800.0	1610.0	18750.0	445.5	26350.0	49750.0
\bar{x}			5116.67	10795.0	1148.33	10083.33	264.17	21133.33	40316.67
S.D.			1343.85	2337.77	358.68	6748.31	142.77	4080.03	7391.46
Range			(3330-6080)	(9160-14100)	(893.0-1640)	(5050-19200)	(149.0-467.0)	(18000-27000)	(34600-56800)