PANCONTINENTAL RESOURCES (EXPLORATION) PTY LIMITED

REPORT No 89/48

COMBINED ANNUAL REPORT FOR PERIOD 30 OCTOBER 1988 TO 29 OCTOBER 1989, ARLTUNGA PROJECT, NORTHERN TERRITORY FOR EXPLORATION LICENCES 4865, 5156, 5157, 5681, 6105, 6153, 6154, 6219, 6604 & 6665.

VOLUME 2 OF 4 VOLUMES
APPENDICES 1 - 4

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BY J. M. GRAHAM and
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NOVEMBER 1989

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APPENDIX 1

ASSAY RESULTS FOR THE ENDRAS GEOCHEMICAL DATABASE

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm
2501	6	<2	26	63	35	<1	40	<2
2502 ~~2501~~	6	<2	33	260	49	<1	61	9
2503	<2	<2	32	130	63	<1	51	13
2504	<2	<2	34	150	60	<1	50	10
2505	<2	<2	42	74	105	<1	52	8
2506	<2	<2	47	64	73	<1	47	17
2507	<2	<2	42	54	67	<1	44	13
2508	<2	<2	34	48	66	<1	42	5
2509	<2	<2	33	47	55	<1	41	13
2510	<2	<2	32	110	40	<1	49	5
2511	<2	<2	30	86	37	<1	41	8
2512	<2	<2	27	56	49	<1	42	17
2513	<2	<2	31	41	60	<1	40	3
2514	<2	<2	28	35	47	<1	42	10
2515	<2	<2	30	57	56	<1	31	2
2516	<2	<2	28	58	51	<1	27	8
2517	<2	<2	26	56	42	<1	35	9
2518	<2	<2	24	47	46	<1	33	6
2519	27	<2	30	58	41	<1	32	10
2520	7	<2	29	49	29	<1	34	30
2521	4	<2	33	170	50	<1	56	7
2522	3	<2	32	100	46	<1	46	10
2523	<2	<2	31	90	47	<1	47	22
2524	<2	<2	30	77	46	<1	51	6
2525	<2	<2	38	98	79	<1	43	14

METHOD : PM2/3:A1/A2

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm
2526	<2	<2	39	84	62	<1	64	7
2527	<2	<2	35	71	47	<1	57	7
2528	<2	<2	38	58	54	<1	46	15
2529	<2	<2	32	120	44	<1	48	8
2530	<2	<2	32	82	42	<1	55	9
2531	<2	<2	38	64	54	<1	52	8
2532	<2	<2	37	62	53	<1	47	6
2533 ~~2553~~	<2	<2	33	53	51	<1	44	5
2534	<2	<2	32	54	36	<1	37	6
2535	<2	<2	26	46	37	<1	30	8
2536	<2	<2	24	70	32	<1	36	6
2537	<2	<2	30	34	41	<1	27	3
2538	21	<2	31	42	45	<1	30	14
2539	18	<2	39	49	48	<1	32	12
2540	15	<2	34	57	55	<1	40	8
2541	14	<2	30	58	57	1	37	5
2542	<2	<2	42	60	68	<1	44	8
2543	<2	<2	35	62	46	<1	40	14
2544	<2	<2	44	72	74	<1	58	23
2545	<2	<2	43	69	51	<1	47	17
2546	<2	<2	40	65	56	<1	47	14
2547	<2	<2	38	80	47	<1	50	7
2548	<2	<2	30	125	50	<1	52	14
2549	<2	<2	39	120	58	<1	51	11
2550	<2	<2	29	91	41	<1	45	20

METHOD : PM2/3:A1/A2

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm
2551	6	<2	42	80	61	<1	43	7
2552	20	<2	38	95	44	<1	46	11
2553	6	<2	47	90	32	<1	49	27
2554	<2	<2	53	80	64	<1	47	18
2555	3	<2	59	91	69	<1	51	21
2556	3	<2	40	79	40	<1	46	10
2557	<2	<2	43	105	48	<1	58	3
2558	6	<2	41	95	42	<1	57	5
2559	5	<2	39	93	44	<1	51	10
2560	5	<2	48	135	52	<1	66	6
2561	4	<2	49	145	42	<1	71	5
2562	3	<2	47	76	44	<1	46	9
2563	2	<2	43	61	37	<1	51	<2
2564	3	<2	52	70	53	<1	60	<2
2565	2	<2	35	45	41	<1	45	<2
2566	<2	<2	36	53	42	<1	47	6
2567	<2	<2	37	37	42	<1	45	9
2568	<2	<2	43	48	50	<1	54	10
2569	<2	<2	39	49	51	<1	52	9
2570	<2	<2	51	38	54	<1	59	9
2571	<2	<2	49	37	47	<1	53	5
2572	<2	<2	34	51	370	<1	50	10
2573	22	<2	45	93	51	1	50	17
2574	5	<2	49	98	60	<1	55	16
2575	8	<2	44	62	57	1	46	18

METHOD : PM2/3:A1/A2

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm
2576	20	<2	42	68	46	1	43	8
2577	4	<2	43	72	71	<1	42	19
2578	5	<2	52	75	67	<1	49	14
2579	3	<2	49	67	62	1	50	7
2580	<2	<2	51	61	61	1	45	19
2581	<2	<2	45	64	51	<1	43	23
2582	<2	<2	48	59	53	<1	42	13
2583	5	<2	43	49	63	<1	36	14
2584	<2	<2	47	40	59	<1	37	18
2585	<2	<2	44	46	66	<1	40	5
2586	<2	<2	40	51	64	<1	33	8
2587	<2	<2	41	28	58	<1	35	11
2588	<2	<2	37	27	61	<1	40	15
2589	5	<2	46	36	59	<1	41	7
2590	<2	<2	38	21	55	<1	34	10

METHOD : PM2/3:A1/A2

ANALYSIS

SAMPLE MARK	Zn ppm
2501	86
2502	100
2503	105
2504	115
2505	100
2506	96
2507	100
2508	96
2509	82
2510	45
2511	52
2512	62
2513	85
2514	82
2515	66
2516	90
2517	78
2518	68
2519	93
2520	105
2521	125
2522	110
2523	95
2524	89
2525	105

METHOD : A1/A2

ANALYSIS

SAMPLE MARK	Zn ppm
2526	99
2527	83
2528	130
2529	115
2530	110
2531	110
2532	110
2533	105
2534	94
2535	95
2536	92
2537	57
2538	80
3539	86
2540	120
2541	120
2542	125
2543	110
2544	150
2545	130
2546	170
2547	135
2548	170
2549	200
2550	320

METHOD : A1/A2

ANALYSIS

SAMPLE MARK	Zn ppm
2551	120
2552	170
2553	150
2554	190
2555	190
2556	115
2557	155
2558	132
2559	170
2560	215
2561	120
2562	110
2563	125
2564	100
2565	120
2566	150
2567	175
2568	160
2569	160
2570	120
2571	170
2572	165
2573	155
2574	220
2575	170

METHOD : A1/A2

ANALYSIS

SAMPLE MARK	Zn ppm
2576	125
2577	174
2578	160
2579	135
2580	135
2581	120
2582	160
2583	125
2584	215
2585	170
2586	140
2587	135
2588	145
2589	155
2590	175

METHOD : A1/A2

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12th April 1988

Our Ref : D1013/88

REPORT NUMBER D1013/88

CLIENT	:	Endras 2 Pty Ltd
CLIENT REFERENCE	:	Purchase Order 54
REPORT COMPRISING	:	Cover Page Pages 1-8
DATE RECEIVED	:	4th March 1988

A. Ciplys

Alan Ciplys
Manager
AMDEL Limited (N.T.)

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

Analysis code ICP3 Report AC 2987/88 Page I1

NATA Certificate Order No. D1013/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P	Sb
2501	2	150	2.24%	22	230	<2	400	4
2502	2	260	2.66%	42	400	3	1000	4
2503	1	280	2.78%	42	350	3	600	3
2504	2	290	2.60%	40	300	3	800	4
2505	<1	280	3.28%	24	380	<2	550	3
2506	<1	350	3.66%	36	430	<2	550	3
2507	1	310	3.12%	24	370	3	650	3
2508	1	290	2.94%	26	310	<2	750	4
2509	1	280	3.10%	22	520	2	450	4
2510	1	300	2.46%	18	260	<2	320	4
2511	<1	220	2.72%	24	300	<2	300	4
2512	<1	220	2.22%	17	290	3	380	3
2513	<1	220	2.78%	24	380	3	450	3
2514	<1	250	2.86%	22	320	3	400	3
2515	1	250	2.34%	26	270	3	400	4
2516	<1	250	2.42%	22	320	2	500	4
2517	2	240	2.22%	30	270	3	500	4
2518	1	270	2.00%	42	240	3	600	4
2519	<1	200	3.00%	30	380	<2	550	3
2520	<1	240	2.94%	34	390	3	550	4
2521	1	190	2.90%	40	380	3	650	4
2522	1	260	3.40%	55	390	3	700	3
2523	2	190	2.80%	42	290	2	450	5
2524	2	220	2.58%	26	300	2	600	4
2525	2	260	3.10%	30	310	2	850	4
2526	<1	260	3.14%	22	290	<2	360	4
2527	<1	240	2.84%	22	330	<2	450	3
2528	1	280	3.08%	28	410	<2	500	4
2529	<1	290	3.14%	19	310	<2	450	3
2530	<1	240	2.96%	19	320	<2	500	3
2531	<1	400	3.56%	34	440	2	700	<2
2532	<1	430	3.78%	34	440	<2	750	<2
2533	<1	420	3.22%	38	380	3	900	<2
2534	<1	350	2.94%	32	330	<2	650	3
2535	2	300	2.46%	32	310	<2	450	4
2536	2	250	2.74%	34	240	<2	650	4
2537	3	250	2.10%	46	250	<2	450	3
2538	3	240	1.96%	38	330	<2	500	4
2539	2	180	2.42%	24	400	<2	450	4
2540	2	140	2.34%	16	340	3	500	4
Detn limit	(1)	(4)	(50)	(2)	(5)	(2)	(50)	(2)

Analysis code ICP3 | Report AC 2987/88 |

NATA Certificate | Order No. D1013/88 | Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P	Sb
2541	2	140	2.38%	14	320	3	400	3
2542	2	170	2.74%	18	350	<2	360	4
2543	2	190	2.70%	16	330	3	380	4
2544	3	210	3.24%	24	340	2	500	4
2545	2	250	2.90%	20	470	3	500	4
2546	2	270	3.18%	22	470	3	600	3
2547	2	220	3.14%	22	400	2	450	4
2548	2	220	3.34%	30	380	3	380	4
2549	3	300	3.18%	48	380	3	400	4
2550	2	270	2.94%	30	410	3	450	4
2551	2	230	3.08%	28	420	3	550	3
2552	2	170	2.80%	30	350	3	400	4
2553	3	230	3.56%	60	430	3	450	3
2554	2	180	3.76%	48	450	2	500	3
2555	2	250	4.08%	48	580	3	500	3
2556	2	170	2.92%	28	370	2	450	4
2557	2	240	3.00%	32	340	3	650	4
2558	2	200	2.76%	34	320	2	650	4
2559	2	190	2.96%	55	350	3	700	3
2560	2	230	3.48%	60	400	3	800	3
2561	1	280	3.28%	36	440	4	800	3
2562	<1	290	3.58%	34	430	3	1000	<2
2563	2	280	2.68%	22	320	3	1000	4
2564	2	350	3.16%	26	340	4	1150	3
2565	2	180	2.42%	20	290	3	1100	4
2566	1	170	2.72%	15	310	2	600	3
2567	1	240	2.86%	17	340	2	600	3
2568	<1	240	3.20%	14	410	3	700	3
2569	2	200	2.98%	15	380	3	600	3
2570	<1	250	3.72%	22	520	2	650	2
2571	1	240	3.42%	22	520	<2	600	3
2572	1	280	3.50%	24	480	3	750	2
2573	2	240	3.02%	20	490	3	700	4
2574	2	280	3.38%	19	420	2	850	3
2575	2	220	3.34%	22	390	2	700	3
2576	2	200	3.10%	19	420	<2	600	3
2577	2	190	3.16%	20	420	3	450	3
2578	2	240	3.40%	19	500	3	450	3
2579	2	210	3.68%	24	440	<2	340	2
2580	2	190	3.24%	16	420	3	360	3
Detn limit	(1)	(4)	(50)	(2)	(5)	(2)	(50)	(2)

Analysis code ICP3 Report AC 2987/88 Page 13

NATA Certificate Order No. D1013/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P	Sb
2581	2	160	2.78%	14	330	3	400	4
2582	2	160	2.92%	26	380	3	400	3
2583	2	190	3.10%	40	310	3	450	3
2584	3	230	3.16%	50	340	<2	500	3
2585	2	290	3.68%	55	270	3	360	2
2586	3	180	3.26%	60	270	<2	340	3
2587	3	190	2.66%	28	270	3	500	4
2588	3	180	3.06%	30	350	<2	600	3
2589	3	210	3.22%	28	350	3	450	3
2590	2	170	2.98%	22	300	3	400	4
Detn limit	(1)	(4)	(50)	(2)	(5)	(2)	(50)	(2)

Analysis code ICP3 | Report AC 2987/88 |

NATA Certificate | Order No. D1013/88 | Results in ppm

Sample	Sn	W
2501	6	<2
2502	8	<2
2503	10	<2
2504	8	<2
2505	10	<2
2506	10	<2
2507	8	<2
2508	8	<2
2509	8	<2
2510	8	<2
2511	8	<2
2512	8	<2
2513	10	<2
2514	10	<2
2515	8	<2
2516	8	<2
2517	8	<2
2518	8	<2
2519	8	<2
2520	10	<2
2521	10	<2
2522	10	<2
2523	8	<2
2524	8	<2
2525	10	<2
2526	10	<2
2527	8	<2
2528	10	<2
2529	10	<2
2530	8	<2
2531	10	<2
2532	12	<2
2533	12	<2
2534	8	<2
2535	8	<2
2536	8	<2
2537	4	<2
2538	4	<2
2539	6	<2
2540	6	<2
Detn limit	(4)	(2)

Analysis code ICP3 Report AC 2987/88

NATA Certificate Order No. D1013/88 Results in ppm

Sample	Sn	W
2541	6	<2
2542	6	<2
2543	6	<2
2544	8	<2
2545	6	<2
2546	8	<2
2547	8	<2
2548	8	<2
2549	8	<2
2550	8	<2
2551	8	<2
2552	6	<2
2553	8	<2
2554	8	<2
2555	10	<2
2556	6	<2
2557	8	<2
2558	8	<2
2559	8	<2
2560	10	<2
2561	10	<2
2562	10	<2
2563	8	<2
2564	10	<2
2565	8	<2
2566	8	<2
2567	8	<2
2568	8	<2
2569	8	<2
2570	10	<2
2571	8	<2
2572	10	<2
2573	8	<2
2574	8	<2
2575	10	<2
2576	8	<2
2577	8	<2
2578	8	<2
2579	8	<2
2580	8	<2
Detn limit	(4)	(2)

Analysis code ICP3 Report AC 2987/88

NATA Certificate Order No. D1013/88 Results in ppm

Sample	Sn	W
2581	6	<2
2582	8	<2
2583	8	<2
2584	8	<2
2585	10	<2
2586	8	<2
2587	8	<2
2588	8	<2
2589	8	<2
2590	8	<2
Detn limit	(4)	(2)

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29th April 1988

Our Ref : D1094/88

REPORT NUMBER D1094/88

CLIENT :	Endras No. 2 Ltd.
CLIENT REFERENCE :	Order Number 57
REPORT COMPRISING :	Cover Page Pages 1 - 4
DATE RECEIVED :	28th March 1988

A. Ciplys

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This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

Analysis code ICP3 Report AC 2978/88 Page 11

NATA Certificate Order No. D1073/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P	Sb
2201	<1	220	3.78%	26	540	2	280	<2
2202	<1	200	3.42%	28	500	3	580	<2
2203	<1	200	3.42%	24	600	3	440	<2
2204	<1	190	3.74%	24	500	3	460	<2
2205	1	220	4.02%	34	470	3	400	<2
2206	1	210	3.32%	22	450	3	480	<2
2207	3	220	4.38%	24	620	3	500	5
2208	<1	190	3.44%	14	500	3	440	<2
2209	<1	220	3.98%	22	600	3	520	<2
2210	<1	220	3.58%	17	500	2	500	<2
2211	<1	180	3.78%	20	420	2	540	<2
2212	1	200	3.60%	22	370	2	360	<2
2213	1	240	3.90%	34	500	2	400	<2
2214	2	160	3.88%	22	500	1	300	<2
2215	1	150	3.60%	26	480	2	220	2
2216	<1	150	3.62%	32	350	1	140	<2
2217	<1	200	4.12%	34	600	2	260	<2
2218	<1	150	3.10%	17	320	1	220	<2
2219	<1	120	3.42%	20	350	1	220	2
2220	1	150	3.40%	16	470	2	340	2
2221	<1	210	3.38%	24	560	2	460	2
2222	<1	190	3.66%	18	600	2	490	<2
2223	2	290	4.72%	26	820	2	540	6
2224	<1	190	3.42%	20	440	3	440	<2
2225	<1	230	3.54%	24	520	3	480	<2
2226	<1	210	3.82%	24	540	3	460	<2
2227	2	190	3.16%	24	380	2	400	2
2228	<1	160	3.60%	20	340	3	400	<2
2229	<1	180	3.40%	36	390	4	480	<2
2230	1	110	3.24%	30	260	3	240	2
2231	2	160	3.06%	32	540	2	460	2
2232	2	100	2.66%	26	920	2	460	2
2233	2	110	3.16%	36	1050	2	570	3
2234	2	140	3.30%	28	580	3	400	3
2235	2	95	2.92%	30	420	2	540	3
2236	<1	110	3.34%	26	490	3	390	3
2237	1	230	3.48%	22	660	2	560	<2
2238	3	170	2.98%	24	470	2	440	2
2239	2	130	2.84%	15	270	2	400	3
Detn limit	(1)	(2)	(10)	(1)	(2)	(1)	(20)	(2)

Analysis code ICP3 Report AC 2978/88 Page 12

NATA Certificate Order No. D1073/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P	Sb
2240	2	140	2.60%	17	560	2	420	3
2241	3	110	3.02%	16	440	1	280	2
2242	2	70	2.44%	13	270	1	260	3
2243	3	70	2.52%	11	270	1	200	2
2244	3	50	2.16%	20	100	1	220	3
2245	3	70	2.70%	10	150	2	200	4
2246	3	70	2.36%	12	280	1	240	3
2247	3	80	2.94%	9	240	2	280	<2
2248	3	100	3.18%	17	520	2	400	2
2249	3	90	2.72%	14	340	1	280	2
2250	3	75	2.46%	13	230	1	240	3
2251	3	110	2.72%	13	400	1	380	2
2252	3	85	2.74%	18	490	1	280	3
2401	<1	170	2.92%	15	420	1	340	2
2402	<1	230	2.86%	19	330	1	320	<2
2403	2	160	2.52%	16	380	1	320	3
2404	3	120	2.88%	30	390	2	460	3
2405	<1	230	3.82%	26	450	1	360	<2
2406	2	220	3.28%	26	470	1	400	<2
2407	<1	210	2.90%	20	300	1	300	<2
2408	<1	210	3.16%	24.	480	1	420	<2
2409	2	170	2.44%	22	340	2	360	3
2410	3	310	3.92%	38	540	2	520	4
2411	2	190	3.50%	26	380	1	380	2
2412	<1	240	3.28%	22	320	2	440	<2
2413	<1	320	3.20%	26	430	1	380	<2
2414	<1	150	3.04%	38	460	1	440	<2
2415	1	140	2.66%	30	370	1	340	3
2416	<1	160	3.28%	36	440	1	400	<2
2417	2	170	2.50%	30	520	2	400	3
2418	1	130	2.54%	20	660	2	300	2
2419	2	75	2.38%	42	320	1	170	3
2420	2	85	2.92%	24	450	1	200	<2
2421	2	150	1.94%	18	290	2	300	3
2422	3	80	1.78%	46	290	1	200	3
2423	2	100	2.16%	30	280	1	180	3
2424	2	75	1.80%	22	240	1	220	2
2425	2	100	1.88%	28	350	2	360	3
2426	2	180	2.26%	30	350	2	420	4
2427	3	240	3.26%	26	600	2	460	5
Detn limit	(1)	(2)	(10)	(1)	(2)	(1)	(20)	(2)

Analysis code ICP3 Report AC 2978/88

NATA Certificate Order No. D1073/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P	Sb
2428	2	190	2.54%	38	470	2	380	4
2429	3	270	2.78%	46	620	2	720	3
2430	3	350	2.90%	46	740	2	840	3
2431	2	180	2.92%	24	430	2	360	3
2432	3	170	2.82%	36	430	2	320	3
2433	1	290	3.74%	46	720	2	580	<2
2434	1	250	3.38%	34	470	2	460	2
2435	2	290	3.46%	50	640	2	900	2
Detn limit	(1)	(2)	(10)	(1)	(2)	(1)	(20)	(2)

Sample	Sn	W
2201	9	<2
2202	9	<2
2203	9	<2
2204	11	<2
2205	10	<2
2206	9	<2
2207	10	<2
2208	10	<2
2209	11	<2
2210	10	<2
2211	10	<2
2212	9	<2
2213	10	<2
2214	8	<2
2215	9	<2
2216	10	<2
2217	12	<2
2218	10	<2
2219	8	<2
2220	7	<2
2221	9	<2
2222	9	<2
2223	14	<2
2224	9	<2
2225	11	<2
2226	11	<2
2227	8	<2
2228	10	<2
2229	11	<2
2230	9	<2
2231	9	<2
2232	7	<2
2233	9	<2
2234	7	<2
2235	7	<2
2236	9	<2
2237	8	<2
2238	6	<2
2239	7	<2
Detn limit	(2)	(2)

Sample	Sn	W
2240	7	<2
2241	6	<2
2242	6	<2
2243	5	<2
2244	6	<2
2245	6	<2
2246	6	<2
2247	8	<2
2248	7	<2
2249	5	<2
2250	5	<2
2251	7	<2
2252	6	<2
2401	7	<2
2402	9	<2
2403	5	<2
2404	8	<2
2405	11	<2
2406	10	<2
2407	8	<2
2408	9	<2
2409	6	<2
2410	7	<2
2411	9	<2
2412	10	<2
2413	10	<2
2414	9	<2
2415	9	<2
2416	9	<2
2417	6	<2
2418	7	<2
2419	7	<2
2420	7	<2
2421	4	<2
2422	4	<2
2423	4	<2
2424	3	<2
2425	5	<2
2426	6	<2
2427	7	<2
Detn limit	(2)	(2)

Analysis code ICP3 Report AC 2978/88

NATA Certificate Order No. D1073/88 Results in ppm

Sample	Sn	W
2428	6	<2
2429	6	<2
2430	7	<2
2431	7	<2
2432	8	<2
2433	10	<2
2434	8	<2
2435	9	<2
Detn limit	(2)	(2)

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm	Zn ppm
2201	6	<2	27	36	58	<1	30	17	93
2202	<2	<2	25	33	52	<1	30	16	130
2203	<2	<2	30	38	46	<1	35	14	105
2204	<2	<2	25	41	52	<1	36	15	96
2205	<2	<2	29	38	56	<1	33	15	130
2206	<2	<2	22	35	37	<1	28	12	66
2207	<2	<2	16	26	32	<1	20	10	72
2208	<2	<2	33	34	65	<1	29	14	135
2209	<2	<2	27	35	66	<1	24	17	140
2210	<2	<2	24	45	72	<1	37	16	100
2211	<2	<2	25	43	58	<1	38	18	120
2212	<2	<2	24	57	63	<1	44	13	135
2213	<2	<2	29	53	88	<1	40	22	220
2214	<2	<2	28	41	48	<1	37	10	80
2215	<2	<2	23	48	47	<1	34	18	96
2216	<2	<2	29	56	51	<1	43	14	100
2217	<2	<2	23	48	62	<1	38	23	115
2218	<2	<2	25	52	53	<1	38	20	97
2219	<2	<2	21	52	43	<1	39	12	71
2220	<2	<2	23	57	59	<1	42	10	98
2221	<2	<2	24	53	60	<1	41	9	92
2222	<2	<2	23	57	66	<1	44	10	94
2223	<2	<2	19	68	51	<1	40	5	50
2224	<2	<2	17	44	47	<1	27	15	135
2225	<2	<2	18	38	63	<1	28	23	165

METHOD : PM2/3; A1/A2

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm	Zn ppm
2226	6	<2	12	31	50	<1	29	20	135
2227	20	<2	31	47	37	<1	25	15	96
2228	<2	<2	23	46	39	<1	28	14	115
2229	<2	<2	24	48	33	<1	28	13	110
2230	<2	<2	24	68	37	<1	36	46	120
2231	3	<2	29	56	36	<1	32	21	130
2232	<2	<2	28	49	22	<1	31	6	90
2233	<2	<2	23	51	43	<1	30	22	135
2234	<2	<2	32	59	47	<1	25	44	170
2235	11	<2	31	55	43	<1	24	21	105
2236	<2	<2	24	61	39	<1	27	20	125
2237	5	<2	36	80	94	1	39	10	110
2238	6	<2	25	73	43	1	26	16	160
2239	<2	<2	21	65	38	<1	26	15	150
2240	<2	<2	30	68	36	<1	28	22	125
2241	<2	<2	24	69	31	<1	29	19	105
2242	<2	<2	15	68	23	<1	20	20	84
2243	<2	<2	15	57	25	<1	21	17	83
2244	<2	<2	9	53	22	<1	19	15	76
2245	<2	<2	8	36	24	<1	15	7	39
2246	<2	<2	14	60	27	<1	21	15	76
2247	<2	<2	14	67	42	<1	25	15	89
2248	<2	<2	25	54	34	<1	29	17	100
2249	2	<2	21	65	25	<1	24	14	81
2250	<2	<2	15	66	40	<1	20	10	86

METHOD : PM2/3; A1/A2

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm	Zn ppm
2251	<2	<2	20	57	36	<1	25	26	96
2252	<2	<2	22	56	42	<1	27	21	92
2401	<2	<2	23	68	66	<1	39	9	97
2402	75	<2	30	64	16	<1	44	9	78
2403	28	<2	26	60	57	<1	41	20	92
2404	2	<2	26	59	66	<1	40	24	100
2405	<2	<2	32	70	71	<1	44	6	74
2406	<2	<2	30	60	49	<1	42	16	84
2407	<2	<2	27	64	59	<1	44	5	69
2408	<2	<2	29	59	40	<1	40	15	98
2409	10	<2	24	51	31	<1	37	7	76
2410	<2	<2	18	29	63	<1	27	4	40
2411	<2	<2	27	74	51	<1	45	11	77
2412	<2	<2	25	50	57	<1	41	11	73
2413	2	<2	29	52	34	<1	38	7	79
2414	<2	<2	26	60	30	<1	41	12	86
2415	2	<2	22	45	44	<1	35	25	69
2416	<2	<2	25	56	61	<1	39	11	74
2417	2	<2	25	49	28	<1	38	10	115
2418	<2	<2	20	43	22	<1	35	9	66
2419	<2	<2	12	44	31	<1	26	20	72
2420	<2	<2	20	49	36	<1	30	19	68
2421	<2	<2	13	51	19	<1	31	4	53
2422	<2	<2	7	41	13	<1	21	20	56
2423	<2	<2	11	36	20	<1	23	25	65

METHOD : PM2/3;A1/A2

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm	Zn ppm
2424	<2	<2	11	50	16	<1	21	15	47
2425	<2	<2	9	5	13	<1	30	13	60
2426	<2	<2	17	84	31	<1	38	7	70
2427	<2	<2	12	43	50	<1	29	8	40
2428	<2	<2	20	49	42	<1	38	12	83
2429	<2	<2	23	61	67	<1	36	23	99
2430	<2	<2	25	64	63	<1	38	19	105
2431	<2	<2	18	55	50	<1	37	12	76
2432	<2	<2	20	48	36	<1	34	7	68
2433	<2	<2	29	81	83	<1	49	11	100
2434	<2	<2	22	80	40	<1	45	10	75
2435	<2	<2	24	87	67	<1	52	13	105

METHOD : PM2/3;A1/A2

amdel
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Telephone (089) 32 2637
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29th April 1988

Our Ref : D1073/88

REPORT NUMBER D1073/88

CLIENT :	Endras No. 2 Ltd.
CLIENT REFERENCE :	Order Number 56
REPORT COMPRISING :	Cover Page Pages 1 - 4
DATE RECEIVED :	23rd March 1988

A. Ciplys

Alan Ciplys
Manager
AMDEL Limited (N.T.)

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

NATA Certificate Order No. D 1321/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P
2001	<1	95	2.78%	<2	480	<2	270
2002	1	110	2.18%	<2	370	<2	280
2003	5	180	3.02%	<2	720	<2	340
2004	1	130	2.48%	7	470	<2	280
2005	<1	220	3.14%	<2	500	2	660
2006	<1	140	2.16%	4	330	<2	400
2007	<1	150	2.88%	11	480	<2	440
2008	<1	130	2.04%	17	290	<2	350
2009	1	190	2.84%	20	490	<2	480
2010	1	160	2.12%	28	340	<2	390
2011	<1	170	2.42%	32	410	<2	420
2012	<1	170	2.82%	20	450	<2	320
2013	<1	170	2.90%	36	490	2	660
2014	<1	140	2.30%	13	390	<2	400
2015	<1	170	2.46%	15	420	2	620
2016	<1	180	2.90%	22	420	<2	540
2017	<1	150	2.38%	<2	370	2	660
2018	<1	130	2.58%	8	480	<2	430
2019	<1	200	3.02%	7	540	<2	430
2020	<1	95	2.10%	6	280	<2	370
2021	<1	180	2.32%	5	390	2	580
2022	<1	170	2.06%	8	420	<2	390
2023	<1	160	2.38%	<2	390	<2	400
2024	<1	200	3.10%	24	490	<2	420
2025	<1	250	3.26%	19	440	<2	540
2026	2	290	3.34%	60	700	<2	600
2027	<1	180	2.62%	19	440	<2	370
2028	<1	280	3.32%	<2	480	2	580
2029	<1	190	3.96%	<2	600	2	500
2030	<1	120	2.88%	9	350	2	460
2031	1	300	4.40%	24	780	2	640
2032	<1	320	4.30%	9	760	<2	600
2033	<1	300	3.24%	<2	500	3	1100
2034	<1	250	3.22%	<2	540	2	560
2035	<1	190	3.22%	<2	520	<2	760
2036	<1	250	3.38%	<2	500	3	940
2037	1	120	2.24%	<2	430	<2	450
2038	<1	230	3.40%	<2	660	2	620
2039	<1	150	2.98%	<2	620	<2	420
2040	<1	160	2.70%	<2	420	<2	410
Detn limit	(1)	(5)	(5)	(2)	(2)	(2)	(10)

Analysis code GEN 6 Report AC 3454/88

NATA Certificate Order No. D 1321/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P
2041	1	160	3.14%	<2	430	2	600
2042	4	240	2.98%	<2	720	<2	760
2043	1	170	3.40%	<2	560	<2	620
2044	<1	170	2.70%	<2	420	2	620
2045	<1	110	2.80%	<2	430	<2	390
2046	<1	140	3.24%	<2	720	<2	600
2047	<1	160	3.70%	<2	580	2	460
2048	2	140	3.60%	2	700	2	520
2049	2	130	3.40%	13	600	2	420
2050	<1	240	2.72%	<2	480	2	740
2051	4	150	3.14%	10	490	3	500
2052	4	150	2.40%	<2	390	<2	500
2053	2	75	1.96%	<2	170	<2	250
2054	2	120	2.22%	<2	350	<2	620
2055	3	95	2.40%	<2	340	<2	300
2056	1	100	2.08%	<2	450	<2	500
2057	2	130	2.50%	<2	490	<2	400
2058	6	110	2.32%	<2	540	<2	420
2059	2	85	1.78%	<2	310	<2	300
2060	3	120	2.34%	<2	450	<2	330
2061	2	120	2.48%	<2	500	2	350
2062	<1	120	2.36%	<2	410	<2	380
2063	2	110	2.08%	<2	410	<2	310
2064	4	120	3.02%	<2	600	<2	280
2065	2	130	2.38%	<2	400	<2	340
2066	1	110	2.26%	<2	320	<2	290
2067	2	140	3.10%	<2	560	2	400
2068	3	120	2.88%	<2	520	2	390
2069	2	110	3.18%	<2	520	2	430
2070	3	110	3.38%	<2	560	3	380
2071	3	120	3.10%	<2	470	2	240
2072	1	150	2.70%	<2	580	<2	440
2073	2	160	3.34%	<2	640	<2	560
2074	<1	180	2.36%	<2	560	<2	490
2075	1	130	2.52%	<2	450	<2	340
2076	2	110	2.40%	9	350	<2	290
2077	<1	150	2.64%	<2	470	<2	390
2078	<1	190	2.34%	<2	420	4	520
2079	<1	170	3.58%	4	640	2	410
2080	<1	150	4.42%	11	600	3	660
Detn limit	(1)	(5)	(5)	(2)	(2)	(2)	(10)

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NATA Certificate   Order No. D 1321/88   Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P
2081	<1	140	3.68%	16	640	2	540
2082	<1	160	3.16%	9	540	2	480
2083	2	200	3.12%	40	760	3	640
2084	<1	140	3.00%	5	580	2	490
2085	<1	180	4.10%	<2	920	2	640
2086	1	120	2.82%	3	490	<2	470
2087	<1	110	3.30%	22	600	<2	440
2088	<1	120	3.48%	<2	540	3	430
2089	<1	180	3.32%	7	620	<2	520
2090	<1	110	2.82%	4	540	3	560
2091	<1	150	3.32%	6	580	<2	450
2092	<1	95	2.04%	5	400	2	360
2093	<1	180	3.20%	<2	600	2	450
2094	<1	160	3.54%	12	640	3	440
2095	<1	210	3.64%	20	780	2	500
2096	<1	140	3.22%	28	520	3	500
2097	1	120	2.92%	<2	560	<2	400
2098	<1	100	2.62%	22	410	<2	360
2099	<1	150	2.70%	<2	500	<2	440
2100	<1	150	2.76%	<2	580	<2	540
2101	<1	210	3.62%	<2	700	2	520
2102	<1	160	3.18%	8	780	3	410
2103	<1	130	2.98%	6	560	2	440
2104	<1	160	3.32%	<2	620	2	620
2105	3	190	3.14%	90	680	3	600
2106	1	140	3.36%	32	450	<2	330
2107	2	140	3.52%	75	490	3	480
2108	3	150	2.80%	110	580	3	520
2109	3	200	2.96%	80	620	3	460
2110	1	170	3.82%	34	580	3	620
2111	1	130	2.76%	28	480	<2	520
2112	2	100	2.42%	<2	420	<2	330
2113	1	150	2.96%	22	600	3	560
2114	<1	100	3.32%	<2	460	<2	390
2115	2	110	2.64%	60	580	2	540
2116	2	140	2.70%	80	660	2	500
2117	1	110	2.88%	55	540	<2	400
2118	1	110	2.76%	55	540	3	420
2119	2	110	2.98%	55	600	2	460
2120	<1	100	2.28%	<2	390	<2	380
Detn limit	(1)	(5)	(5)	(2)	(2)	(2)	(10)

NATA Certificate Order No. D 1321/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P
2121	<1	110	2.44%	<2	620	3	560
2122	1	120	2.42%	<2	430	<2	270
2123	<1	110	2.58%	<2	490	<2	360
2124	<1	100	2.24%	10	350	6	400
2125	<1	110	2.70%	30	540	4	480
2126	<1	270	3.28%	<2	720	3	740
2127	<1	300	3.42%	6	540	2	820
2128	<1	160	3.04%	<2	390	<2	400
2129	<1	160	2.56%	<2	420	2	430
2130	<1	150	2.76%	<2	350	2	430
2131	<1	280	3.18%	<2	640	2	660
2132	<1	180	3.14%	<2	460	2	490
2133	20	280	3.88%	<2	700	<2	880
2134	<1	220	2.74%	<2	520	2	470
2135	<1	210	3.08%	<2	480	<2	390
2136	<1	100	2.48%	13	500	2	450
2137	<1	160	2.98%	8	540	2	540
2138	<1	140	2.68%	5	460	2	430
2139	<1	130	2.52%	13	660	2	480
2140	<1	120	2.22%	11	600	3	580
2141	<1	160	2.68%	4	760	3	520
2142	<1	120	3.04%	55	540	3	500
2143	<1	110	3.92%	4	520	4	440
2144	<1	100	2.82%	<2	450	3	470
2145	2	130	2.56%	36	440	5	400
2146	2	120	3.14%	30	310	4	170
2147	<1	110	2.82%	20	580	4	490
2148	<1	100	2.24%	17	460	4	410
2149	3	130	3.22%	75	430	5	370
2150	<1	140	3.54%	10	490	5	460
2151	<1	130	3.24%	10	700	5	410
2152	<1	130	3.30%	<2	660	7	500
2153	<1	110	2.64%	6	480	5	310
2154	<1	120	2.92%	<2	470	4	410
2155	<1	110	3.08%	9	430	6	430
2156	2	100	2.96%	55	330	6	440
2157	<1	100	2.94%	12	540	4	400
2158	3	100	2.02%	<2	380	3	270
2159	1	110	2.12%	<2	380	3	380
2160	<1	140	2.66%	<2	380	3	330
Detn limit	(1)	(5)	(5)	(2)	(2)	(2)	(10)

Analysis code GEN 6 Report AC 3454/88

NATA Certificate Order No. D 1321/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P
2161	<1	100	3.06%	<2	540	5	540
2162	<1	100	2.18%	18	390	3	400
2163	1	95	1.90%	17	400	3	420
2164	<1	130	2.76%	11	560	3	410
2165	<1	95	2.08%	4	410	3	350
2166	<1	190	3.36%	<2	460	3	540
2167	<1	130	2.24%	<2	460	3	340
2168	<1	170	2.78%	<2	420	3	420
2169	<1	160	2.70%	<2	430	3	360
2170	<1	180	2.56%	<2	410	3	420
2171	<1	210	2.78%	3	450	3	420
2172	<1	230	2.72%	12	420	3	600
2173	<1	210	3.48%	2	480	3	520
2174	<1	220	2.84%	8	500	5	520
2175	<1	220	2.68%	<2	560	3	350
2176	<1	320	3.38%	4	680	3	700
2177	<1	290	3.36%	9	640	3	540
2178	<1	110	1.58%	<2	290	3	350
2179	<1	180	2.30%	<2	340	3	340
2180	<1	190	2.62%	9	520	3	490
2181	<1	200	2.62%	10	580	3	480
2182	<1	210	3.08%	4	520	3	260
2183	<1	210	2.94%	9	480	3	350
2184	<1	220	3.14%	4	520	3	430
2185	<1	140	2.72%	13	420	3	460
2186	<1	180	3.04%	17	560	3	460
2187	<1	120	2.52%	18	390	3	430
2188	<1	220	2.86%	24	500	4	490
2189	<1	160	2.68%	10	470	3	470
2190	<1	160	2.66%	<2	430	3	390
2191	<1	170	2.54%	5	390	3	470
2192	<1	200	2.80%	<2	330	3	430
2193	<1	160	2.54%	5	420	3	370
2194	<1	210	2.38%	7	410	3	470
2195	<1	170	2.12%	4	360	3	520
2196	<1	130	1.86%	3	320	3	280
2197	<1	190	2.90%	<2	580	4	580
2198	<1	170	2.48%	<2	430	3	430
2199	<1	190	1.88%	5	310	3	390
2200	<1	200	2.18%	<2	320	3	410
Detn limit	(1)	(5)	(5)	(2)	(2)	(2)	(10)

NATA Certificate Order No. D 1321/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P
2334	1	140	2.88%	4	520	3	340
2335	<1	110	1.86%	9	400	3	380
2336	<1	110	3.38%	<2	720	3	420
2337	<1	200	2.96%	<2	470	5	480
2338	<1	190	3.28%	<2	490	3	420
2339	<1	210	3.40%	<2	560	3	480
2340	<1	180	3.00%	<2	580	4	380
2341	<1	290	3.10%	<2	540	4	560
2342	<1	190	3.06%	<2	490	3	420
2343	<1	190	3.30%	<2	520	3	450
2344	2	100	2.58%	<2	330	3	390
2345	2	120	2.80%	6	430	3	280
2346	2	150	2.92%	18	520	3	260
2347	1	110	2.42%	<2	260	3	410
2348	<1	160	3.24%	10	540	3	450
2349	<1	110	3.06%	10	400	<2	440
2350	<1	190	3.16%	7	440	2	340
2351	<1	140	3.14%	3	390	<2	270
2352	<1	160	3.06%	<2	310	<2	320
2353	<1	180	2.90%	<2	440	<2	340
2354	<1	160	2.48%	<2	310	2	340
2355	<1	130	2.48%	<2	420	2	350
2356	<1	140	2.24%	<2	380	<2	280
2357	<1	160	2.74%	2	460	<2	310
2358	<1	140	2.56%	<2	360	<2	330
2359	<1	120	2.32%	<2	380	<2	370
2360	<1	90	2.18%	<2	340	<2	190
2361	<1	95	2.44%	<2	390	<2	260
2362	<1	130	2.34%	<2	360	<2	270
2363	<1	140	2.28%	<2	320	<2	280
2364	<1	100	2.16%	<2	310	<2	200
2365	<1	130	3.22%	<2	480	2	330
2366	<1	130	2.42%	<2	430	<2	280
2367	<1	180	2.76%	<2	470	<2	210
2368	<1	210	2.18%	<2	410	<2	220
2369	<1	160	2.34%	<2	680	<2	210
2370	<1	180	2.62%	<2	560	<2	290
2371	<1	120	1.92%	<2	360	<2	240
2372	<1	140	1.72%	<2	320	<2	210
2373	<1	140	1.90%	<2	310	<2	140
Detn limit	(1)	(5)	(5)	(2)	(2)	(2)	(10)

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NATA Certificate Order No. D 1321/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P
2374	<1	210	2.86%	<2	450	<2	320
2375	<1	150	2.70%	<2	490	<2	270
2376	<1	110	2.66%	<2	440	<2	210
2377	<1	95	2.14%	26	700	<2	190
2378	<1	120	3.28%	<2	440	<2	280
2379	<1	90	2.38%	<2	330	<2	230
2380	<1	130	2.78%	<2	450	2	390
2381	<1	110	2.30%	<2	340	2	300
2382	<1	120	2.64%	<2	340	<2	320
2383	<1	110	2.58%	<2	390	2	300
2384	<1	95	2.54%	<2	290	<2	170
2385	<1	75	2.44%	<2	270	<2	170
2386	<1	90	2.70%	<2	280	<2	280
2387	1	100	2.32%	<2	420	<2	190
2388	<1	100	2.02%	<2	360	<2	120
2389	<1	95	2.26%	<2	560	<2	160
2390	<1	130	2.12%	<2	290	<2	170
2391	<1	180	3.00%	2	470	<2	390
2392	<1	130	2.52%	3	620	2	430
2393	3	120	2.28%	<2	380	2	390
2394	<1	140	2.68%	<2	480	<2	290
2395	<1	180	2.98%	<2	410	<2	280
2396	<1	80	2.10%	<2	220	<2	160
2397	<1	170	2.88%	<2	440	<2	300
2398	1	120	2.22%	<2	380	<2	260
2399	<1	190	2.04%	<2	350	<2	250
2400	2	170	2.44%	<2	440	<2	320
Detn limit	(1)	(5)	(5)	(2)	(2)	(2)	(10)

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NATA Certificate Order No. D 1321/88 Results in ppm

Sample	Sb	Sn	W
2001	6	5	<5
2002	7	5	<5
2003	6	5	<5
2004	6	5	<5
2005	6	5	<5
2006	5	5	<5
2007	7	5	<5
2008	5	5	<5
2009	7	5	<5
2010	5	5	<5
2011	6	5	<5
2012	6	5	<5
2013	7	5	<5
2014	6	5	<5
2015	7	5	<5
2016	7	5	<5
2017	7	5	<5
2018	7	5	<5
2019	7	5	<5
2020	6	5	<5
2021	6	5	<5
2022	6	5	<5
2023	6	5	<5
2024	7	5	<5
2025	8	5	<5
2026	7	5	<5
2027	7	5	<5
2028	5	5	<5
2029	8	5	<5
2030	6	5	<5
2031	9	5	<5
2032	9	5	<5
2033	7	5	<5
2034	8	5	<5
2035	7	5	<5
2036	7	5	<5
2037	4	<5	<5
2038	7	5	<5
2039	5	5	<5
2040	6	5	<5
Detn limit	(2)	(5)	(5)

NATA Certificate Order No. D 1321/88 Results in ppm

Sample	Sb	Sn	W
2041	7	5	<5
2042	5	5	<5
2043	7	5	<5
2044	6	5	<5
2045	6	5	<5
2046	7	5	<5
2047	7	5	<5
2048	8	5	<5
2049	7	5	<5
2050	6	5	<5
2051	9	5	5
2052	6	5	<5
2053	6	5	<5
2054	5	5	<5
2055	6	5	<5
2056	5	5	<5
2057	6	5	<5
2058	7	5	<5
2059	4	<5	<5
2060	6	5	<5
2061	6	5	<5
2062	5	5	<5
2063	4	5	<5
2064	7	5	<5
2065	5	5	<5
2066	6	5	<5
2067	7	5	<5
2068	6	5	<5
2069	6	5	<5
2070	8	5	5
2071	7	5	<5
2072	5	5	<5
2073	7	5	<5
2074	5	5	<5
2075	5	5	<5
2076	5	5	<5
2077	5	5	<5
2078	5	5	<5
2079	7	5	<5
2080	12	10	<5
Detn limit	(2)	(5)	(5)

Analysis code GEN 6 Report AC 3454/88

NATA Certificate Order No. D 1321/88 Results in ppm

Sample	Sb	Sn	W
2081	7	5	<5
2082	7	5	<5
2083	6	5	<5
2084	6	5	<5
2085	7	5	<5
2086	6	5	<5
2087	6	5	<5
2088	6	5	<5
2089	6	5	<5
2090	6	5	<5
2091	6	5	<5
2092	4	<5	<5
2093	6	5	<5
2094	7	5	<5
2095	8	5	<5
2096	7	5	<5
2097	5	5	<5
2098	6	5	<5
2099	6	5	<5
2100	6	5	<5
2101	9	5	<5
2102	6	5	<5
2103	5	5	<5
2104	7	5	<5
2105	7	5	<5
2106	5	5	<5
2107	7	5	<5
2108	7	5	<5
2109	6	5	<5
2110	9	10	<5
2111	5	5	<5
2112	4	5	<5
2113	6	5	<5
2114	6	5	<5
2115	5	5	<5
2116	5	5	<5
2117	6	5	<5
2118	6	5	<5
2119	30	20	<5
2120	5	5	<5
Detn limit	(2)	(5)	(5)

Analysis code GEN 6 Report AC 3454/88

NATA Certificate Order No. D 1321/88 Results in ppm

Sample	Sb	Sn	W
2121	5	5	<5
2122	4	<5	<5
2123	5	5	<5
2124	7	5	<5
2125	6	5	<5
2126	6	5	<5
2127	7	5	<5
2128	6	5	<5
2129	5	5	<5
2130	6	5	<5
2131	7	5	<5
2132	6	5	<5
2133	7	5	<5
2134	5	5	<5
2135	6	5	<5
2136	5	5	<5
2137	6	5	<5
2138	6	5	<5
2139	5	5	<5
2140	5	5	<5
2141	6	5	<5
2142	7	5	<5
2143	7	5	<5
2144	6	5	<5
2145	5	<5	<5
2146	4	<5	<5
2147	5	5	<5
2148	4	<5	<5
2149	5	5	<5
2150	6	5	<5
2151	5	5	<5
2152	6	5	<5
2153	5	5	<5
2154	5	5	<5
2155	5	5	<5
2156	5	5	<5
2157	5	5	<5
2158	3	<5	<5
2159	4	<5	<5
2160	5	5	<5
Detn limit	(2)	(5)	(5)

Analysis code GEN 6 Report AC 3454/88

NATA Certificate Order No. D 1321/88 Results in ppm

Sample	Sb	Sn	W
2161	5	5	<5
2162	4	5	<5
2163	4	<5	<5
2164	5	5	<5
2165	4	<5	<5
2166	5	5	<5
2167	4	<5	<5
2168	5	5	<5
2169	5	5	<5
2170	5	5	<5
2171	5	5	<5
2172	4	5	<5
2173	6	5	<5
2174	7	5	<5
2175	4	5	<5
2176	5	5	<5
2177	5	5	<5
2178	3	<5	<5
2179	4	5	<5
2180	4	5	<5
2181	4	5	<5
2182	5	5	<5
2183	6	5	<5
2184	16	5	<5
2185	6	5	<5
2186	5	5	<5
2187	5	5	<5
2188	7	5	<5
2189	5	5	<5
2190	6	5	<5
2191	6	5	<5
2192	5	5	<5
2193	5	5	<5
2194	5	5	<5
2195	5	5	<5
2196	4	5	<5
2197	4	5	<5
2198	7	5	<5
2199	5	5	<5
2200	4	5	<5
Detn limit	(2)	(5)	(5)

Analysis code GEN 6 Report AC 3454/88

NATA Certificate Order No. D 1321/88 Results in ppm

Sample	Sb	Sn	W
2334	5	5	<5
2335	4	5	<5
2336	5	5	<5
2337	8	10	<5
2338	4	5	<5
2339	5	5	<5
2340	5	5	<5
2341	5	5	<5
2342	5	5	<5
2343	5	5	<5
2344	5	5	<5
2345	4	5	<5
2346	4	5	<5
2347	5	5	<5
2348	5	5	<5
2349	14	5	<5
2350	5	5	<5
2351	6	5	<5
2352	5	5	<5
2353	6	5	<5
2354	5	5	<5
2355	4	5	<5
2356	4	5	<5
2357	5	5	<5
2358	5	5	<5
2359	5	5	<5
2360	5	5	<5
2361	5	5	<5
2362	5	5	<5
2363	4	5	<5
2364	4	5	<5
2365	8	5	<5
2366	5	5	<5
2367	6	5	<5
2368	4	<5	<5
2369	4	5	<5
2370	5	5	<5
2371	4	<5	<5
2372	4	<5	<5
2373	4	<5	<5
Detn limit	(2)	(5)	(5)

Analysis code GEN 6 Report AC 3454/88

NATA Certificate Order No. D 1321/88 Results in ppm

Sample	Sb	Sn	W
2374	7	5	<5
2375	5	5	<5
2376	6	5	<5
2377	5	5	<5
2378	5	5	<5
2379	4	5	<5
2380	4	5	<5
2381	5	5	<5
2382	5	5	<5
2383	4	5	<5
2384	5	5	<5
2385	4	5	<5
2386	4	5	<5
2387	4	5	<5
2388	4	<5	<5
2389	4	5	<5
2390	4	<5	<5
2391	4	5	<5
2392	4	5	<5
2393	4	5	<5
2394	4	5	<5
2395	6	5	<5
2396	3	<5	<5
2397	4	5	<5
2398	3	<5	<5
2399	4	<5	<5
2400	4	<5	<5
Detn limit	(2)	(5)	(5)

Analysis code ICP3　　Report AC 2978/88　　Page 11

NATA Certificate　　Order No. D1094/88　　Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P	Sb
2253	3	50	2.66%	22	490	<2	400	3
2254	8	65	3.04%	24	420	<2	280	4
2255	6	22	2.26%	18	130	<2	300	3
2256	5	50	2.48%	24	490	<2	260	3
2257	3	28	2.34%	28	240	<2	260	9
2258	3	20	2.88%	30	90	<2	300	4
2259	3	75	2.38%	24	400	<2	220	3
2260	3	36	3.14%	28	220	<2	260	13
2261	3	90	2.90%	34	560	<2	200	5
2262	5	32	2.18%	26	240	<2	220	9
2263	2	110	2.70%	32	300	<2	240	5
2264	2	44	3.16%	26	230	<2	240	5
2265	2	65	3.04%	32	460	<2	240	6
2266	3	80	3.26%	40	500	<2	260	6
2267	3	95	2.82%	36	520	2	260	5
2268	2	60	2.64%	28	620	<2	380	5
2269	1	75	2.06%	22	300	2	260	4
2270	2	95	2.16%	26	250	3	340	7
2271	2	130	2.46%	32	350	3	320	6
2272	1	55	1.52%	22	340	3	360	3
2273	2	130	2.54%	34	700	4	450	6
2274	2	70	2.32%	26	440	<2	260	5
2275	1	75	1.82%	22	310	3	400	6
2276	1	50	1.46%	20	350	<2	300	4
2277	1	55	1.62%	20	350	<2	280	5
2278	[illegible]	60	2.12%	28	580	<2	200	5
2279	2	36	1.78%	22	470	<2	320	3
2280	2	46	1.96%	26	380	<2	320	4
2281	2	65	2.06%	24	450	<2	280	5
2282	2	65	1.90%	22	480	<2	260	4
2283	2	75	2.16%	24	480	<2	200	6
2284	2	65	2.06%	26	360	<2	280	6
2285	2	32	2.20%	22	130	<2	220	5
2286	2	28	2.10%	22	120	<2	240	3
2287	2	70	2.38%	32	390	2	180	4
2288	2	85	2.16%	34	520	<2	200	5
2289	4	100	3.36%	55	780	2	180	7
2290	4	120	3.28%	50	700	2	300	8
2291	3	100	3.22%	38	420	2	200	7
2292	3	80	3.00%	38	620	3	400	7
Detn limit	(1)	(4)	(50)	(2)	(5)	(2)	(50)	(2)

Analysis code ICP3 Report AC 2978/88 Page 12

NATA Certificate Order No. D1094/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P	Sb
2293	3	75	3.52%	50	640	<2	280	8
2294	4	55	3.56%	40	350	<2	400	7
2295	4	70	3.58%	40	860	<2	450	7
2296	3	100	3.02%	42	780	<2	240	6
2297	3	140	3.16%	44	720	<2	300	8
2298	3	90	3.06%	44	760	<2	400	8
2299	2	75	2.60%	36	740	<2	300	7
2300	3	95	2.86%	42	600	<2	280	8
2301	2	34	2.42%	28	190	<2	300	6
2302	3	75	2.42%	32	520	<2	260	5
2303	3	95	2.62%	38	540	<2	280	5
2304	3	100	3.24%	44	700	<2	360	7
2305	2	95	2.28%	22	560	<2	340	6
2306	1	38	2.58%	28	190	<2	340	8
2307	3	95	2.96%	34	500	<2	320	7
2308	4	28	2.54%	36	200	<2	260	5
2309	3	34	2.08%	28	240	<2	260	5
2310	2	65	2.42%	28	520	<2	320	6
2311	3	55	2.52%	34	640	<2	320	8
2312	2	30	2.40%	26	140	<2	200	7
2313	2	32	2.34%	30	250	<2	400	6
2314	3	60	2.64%	40	390	<2	500	6
2315	2	28	2.30%	34	150	<2	260	5
2316	3	140	2.86%	40	680	<2	320	7
2317	3	75	2.74%	44	520	<2	320	8
2318	2	55	2.56%	36	260	<2	320	8
2319	2	70	3.10%	34	520	<2	280	7
2320	2	70	2.48%	40	430	<2	280	7
2321	3	44	2.74%	40	240	<2	260	6
2322	2	95	2.70%	36	350	2	240	6
2323	3	100	2.64%	46	520	<2	240	6
2324	2	65	2.54%	32	370	<2	200	8
2325	4	120	2.78%	50	720	3	300	7
2326	4	75	2.72%	50	660	2	360	7
2327	4	150	3.98%	70	920	3	400	11
2328	4	65	3.34%	55	450	2	380	8
2329	2	85	2.34%	24	300	3	200	7
2330	3	140	2.90%	40	580	3	260	8
2331	3	100	3.32%	40	840	3	260	9
2332	3	110	2.98%	40	560	3	220	9
Detn limit	(1)	(4)	(50)	(2)	(5)	(2)	(50)	(2)

Analysis code ICP3 Report AC 2978/88 Page 13

NATA Certificate Order No. D1094/88 Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P	Sb
2333	2	240	3.04%	44	410	3	400	10
Detn limit	(1)	(4)	(50)	(2)	(5)	(2)	(50)	(2)

Analysis code ICP3

NATA Certificate

Report AC 2978/88

Order No. D1094/88

Results in ppm

Sample	Sn	W
2253	3	3
2254	3	2
2255	2	3
2256	3	4
2257	<2	4
2258	3	3
2259	3	3
2260	3	6
2261	4	5
2262	2	4
2263	4	3
2264	5	3
2265	5	4
2266	6	5
2267	4	5
2268	5	4
2269	4	4
2270	5	6
2271	5	5
2272	3	5
2273	5	10
2274	4	5
2275	5	5
2276	4	5
2277	4	6
2278	5	6
2279	3	5
2280	4	6
2281	4	6
2282	4	6
2283	5	5
2284	5	6
2285	4	6
2286	3	5
2287	4	6
2288	4	7
2289	5	7
2290	6	8
2291	6	7
2292	6	6
Detn limit	(2)	(2)

Analysis code ICP3 Report AC 2978/88

NATA Certificate Order No. D1094/88 Results in ppm

Sample	Sn	W
2293	6	8
2294	6	12
2295	6	6
2296	5	6
2297	7	8
2298	7	6
2299	6	6
2300	7	8
2301	5	6
2302	4	6
2303	5	7
2304	6	8
2305	5	6
2306	7	6
2307	5	7
2308	4	7
2309	4	7
2310	5	6
2311	6	8
2312	5	7
2313	6	6
2314	6	11
2315	4	7
2316	6	7
2317	6	8
2318	7	7
2319	6	7
2320	5	8
2321	5	8
2322	5	7
2323	5	8
2324	6	7
2325	5	7
2326	6	8
2327	8	15
2328	7	8
2329	6	8
2330	6	8
2331	8	8
2332	8	9
Detn limit	(2)	(2)

Analysis code ICP3 Report AC 2978/88

NATA Certificate Order No. D1094/88 Results in ppm

Sample	Sn	W
2333-[illegible]	9	8
Detn limit	(2)	(2)

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm	Zn ppm
2253	<2	<2	24	64	24	1	16	23	98
2254	<2	<2	25	48	23	1	22	18	58
2255	2	<2	15	47	21	1	19	13	46
2256	<2	<2	22	55	24	1	18	20	60
2257	<2	<2	14	48	18	1	14	10	47
2258	<2	<2	10	46	20	1	18	13	77
2259	<2	<2	24	55	27	1	17	15	64
2260	<2	<2	20	42	22	<1	18	12	64
2261	<2	<2	26	49	27	1	25	17	85
2262	<2	<2	17	44	21	1	16	11	51
2263	<2	<2	19	52	25	1	21	16	67
2264	3	<2	17	51	25	1	20	15	59
2265	<2	<2	25	46	26	1	21	17	72
2266	<2	<2	27	52	44	1	24	30	100
2267	2	<2	20	60	32	1	23	34	92
2268	<2	<2	28	53	29	1	20	26	94
2269	<2	<2	17	53	27	1	21	29	105
2270	<2	<2	14	56	26	1	23	29	135
2271	3	<2	20	50	37	<1	22	42	115
2272	<2	<2	14	39	25	<1	16	21	66
2273	<2	<2	28	58	48	<1	32	26	185
2274	<2	<2	22	43	26	<1	20	18	76
2275	<2	<2	13	32	26	1	17	17	75
2276	<2	<2	17	28	24	1	17	18	69
2277	<2	<2	16	28	21	<1	13	18	72

METHOD : PM2/2;A1/A2

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm	Zn ppm
2778	<2	<2	26	39	28	<1	20	20	72
2779	<2	<2	22	45	24	1	15	18	73
2780	<2	<2	19	40	23	1	17	18	75
2781	<2	<2	22	47	27	1	19	17	66
2782	<2	<2	23	41	25	1	17	16	95
2783	<2	<2	23	40	23	1	19	20	76
2784	<2	<2	19	42	24	<1	19	16	90
2785	<2	<2	11	37	40	<1	17	34	51
2786	<2	<2	10	63	20	<1	16	9	72
2787	<2	<2	20	67	22	1	22	17	56
2788	<2	<2	26	44	28	1	21	25	57
2789	<2	<2	38	57	38	1	31	31	75
2790	<2	<2	38	75	44	1	33	34	130
2791	<2	<2	29	58	32	1	30	21	99
2792	<2	<2	35	72	41	1	28	26	130
2793	<2	<2	32	75	40	1	22	16	79
2794	<2	<2	32	84	44	1	32	24	94
2795	<2	<2	32	76	41	1	27	28	130
2796	2	<2	35	57	37	1	36	21	54
2797	<2	<2	34	51	40	<1	28	20	82
2798	<2	<2	34	49	40	1	38	26	80
2799	<2	<2	36	46	36	1	25	29	69
2300	<2	<2	30	50	38	1	26	22	74
2301	2	<2	15	43	29	1	20	15	55
2302	<2	<2	27	59	32	1	23	18	52

- METHOD : PM2/2;A1/A2

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm	Zn ppm
2303	<2	<2	27	62	34	1	27	20	69
2304	<2	<2	34	67	42	1	28	22	84
2305	<2	<2	25	54	30	<1	25	17	73
2306	<2	<2	19	47	32	<1	25	13	57
2307	8	<2	32	78	36	1	22	19	57
2308	2	<2	18	50	34	<1	23	11	42
2309	<2	<2	19	70	29	<1	20	11	41
2310	<2	<2	29	46	35	<1	27	16	51
2311	<2	<2	25	73	33	<1	24	20	44
2312	<2	<2	15	39	26	<1	26	20	35
2313	9	<2	22	34	28	<1	20	15	40
2314	<2	<2	26	78	32	<1	28	22	72
2315	<2	<2	18	50	32	<1	22	11	42
2316	<2	<2	28	44	41	<1	23	20	76
2317	<2	<2	27	46	33	<1	23	18	62
2318	<2	<2	18	52	30	<1	23	19	54
2319	<2	<2	28	41	37	<1	26	16	61
2320	<2	<2	26	41	34	<1	26	14	54
2321	2	<2	21	51	32	1	25	17	57
2322	<2	<2	26	43	36	<1	28	29	78
2323	<2	<2	30	42	35	1	25	18	57
2324	2	<2	21	52	33	1	26	14	45
2325	<2	<2	24	72	40	1	26	36	91
2326	2	<2	25	62	39	1	24	27	94
2327	<2	<2	36	90	48	1	42	32	92

METHOD : PM2/2; A1/A2

ANALYSIS

SAMPLE MARK	Au ppb	Bi ppm	Co ppm	Cr ppm	Cu ppm	Mo ppm	Ni ppm	Pb ppm	Zn ppm
2328	<2	<2	20	61	37	1	25	26	76
2329	4	<2	14	62	27	1	23	12	44
2330	<2	<2	24	73	36	1	24	23	67
2331	2	<2	27	66	23	1	26	32	73
2332	<2	<2	19	75	29	1	24	23	58
2333	<2	<2	18	40	88	1	18	19	160

METHOD : PM2/2: A1/A2

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60

Analysis code PM2/3 Report D1321/88 Page G1

Order No. 60 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Mo	Ni
2001	0.003	<2	23	53	39	<1	27
2002	0.002	<2	18	48	26	<1	26
2003	0.002	<2	38	71	95	<1	46
2004	0.002	<2	23	51	34	<1	26
2005	<0.001	<2	30	74	56	<1	40
2006	0.002	<2	18	52	32	<1	27
2007	0.002	<2	23	66	47	<1	32
2008	0.001	<2	16	46	27	<1	27
2009	0.004	<2	25	53	39	<1	27
2010	0.002	<2	15	46	27	<1	22
2011	0.004	<2	20	45	33	<1	28
2012	0.002	<2	24	58	41	<1	33
2013	0.006	<2	25	84	46	<1	38
2014	0.002	<2	19	46	27	<1	29
2015	0.003	<2	22	109	42	<1	47
2016	0.003	<2	23	54	41	<1	32
2017	0.90	<2	20	56	25	<1	31
2018	0.019	<2	22	58	31	<1	30
2019	0.016	<2	26	62	38	<1	38
2020	0.005	<2	17	48	19	<1	29
2021	0.005	<2	20	59	36	<1	31
2022	0.016	<2	19	47	20	<1	28
2023	0.003	<2	18	42	24	<1	27
2024	0.003	<2	25	63	44	<1	32
2025	0.005	<2	27	64	61	<1	39
2026	0.002	<2	33	89	64	<1	43
2027	0.003	<2	23	66	43	<1	27
2028	0.002	<2	30	89	53	<1	34
2029	0.002	<2	38	77	81	<1	31
2030	0.002	<2	22	67	34	<1	21
2031	0.003	<2	40	79	60	<1	27
2032	0.002	<2	39	88	80	<1	28
2033	0.003	<2	22	56	46	<1	48
2034	0.002	<2	26	142	61	<1	62
2035	0.001	<2	26	63	56	<1	39
2036	<0.001	<2	22	59	49	<1	41
2037	<0.001	<2	21	39	37	<1	25
2038	<0.001	<2	31	77	62	1	42
2039	<0.001	<2	30	76	50	<1	39
2040	<0.001	<2	25	71	45	1	35
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(1)	(5)

Analysis code PM2/3 Report D1321/88 Page G2

Order No. 60 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Mo	Ni
2041	0.004	<2	29	74	47	2	43
2042	0.002	<2	41	63	57	<1	37
2043	0.002	<2	32	70	44	1	46
2044	0.018	<2	22	66	41	1	44
2045	0.001	<2	27	79	63	1	38
2046	0.002	<2	29	61	47	2	27
2047	0.002	<2	32	78	56	1	45
2048	<0.001	<2	38	85	65	2	46
2049	<0.001	<2	35	90	48	2	45
2050	0.002	<2	11	46	43	1	35
2051	0.008	<2	26	87	60	4	38
2052	0.005	<2	14	63	43	1	32
2053	0.002	<2	23	50	23	2	16
2054	0.003	<2	18	60	34	<1	28
2055	0.003	<2	15	59	39	1	14
2056	0.012	<2	16	54	29	1	14
2057	0.006	<2	22	64	30	2	22
2058	0.031	<2	19	58	52	1	21
2059	0.004	<2	16	41	38	2	19
2060	0.005	<2	23	56	33	2	19
2061	0.002	<2	18	45	33	1	20
2062	0.003	<2	15	39	31	<1	19
2063	0.007	<2	18	50	31	<1	14
2064	0.005	<2	23	70	32	2	18
2065	0.002	<2	11	41	18	<1	11
2066	0.002	<2	26	62	36	2	16
2067	0.005	<2	32	80	56	2	29
2068	0.004	<2	19	44	45	1	15
2069	0.004	<2	31	76	58	2	29
2070	0.006	<2	26	76	42	4	23
2071	0.002	<2	23	69	37	2	18
2072	0.002	<2	23	66	32	<1	20
2073	<0.001	<2	32	81	35	<1	29
2074	0.001	<2	23	72	30	<1	19
2075	0.001	<2	20	59	26	<1	19
2076	0.002	<2	23	57	28	<1	20
2077	0.001	<2	22	64	38	<1	32
2078	<0.001	<2	27	85	43	<1	36
2079	0.001	<2	32	105	61	<1	42
2080	0.008	<2	34	98	62	<1	38
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(1)	(5)

Analysis code PM2/3 Report D1321/88 Page G3

Order No. 60 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Mo	Ni
2081	0.002	<2	32	75	54	<1	35
2082	<0.001	<2	27	91	54	<1	35
2083	0.002	<2	35	102	59	<1	33
2084	0.002	<2	25	72	47	<1	28
2085	0.001	<2	34	63	75	<1	31
2086	0.001	<2	25	71	51	<1	29
2087	<0.001	<2	30	58	40	<1	23
2088	<0.001	<2	31	66	42	<1	31
2089	<0.001	<2	33	69	45	<1	30
2090	<0.001	<2	25	64	39	<1	20
2091	<0.001	<2	31	72	47	<1	34
2092	<0.001	<2	22	48	36	<1	24
2093	<0.001	<2	29	63	56	<1	34
2094	<0.001	<2	33	59	50	<1	31
2095	<0.001	<2	23	70	57	<1	37
2096	<0.001	<2	<5	57	46	<1	29
2097	<0.001	<2	23	48	37	<1	21
2098	0.004	<2	27	39	34	<1	19
2099	0.001	<2	21	91	51	<1	24
2100	<0.001	<2	17	43	39	<1	24
2101	0.003	<2	36	72	72	<1	38
2102	0.003	<2	25	43	45	<1	24
2103	<0.001	<2	28	40	47	<1	28
2104	<0.001	<2	24	32	57	<1	22
2105	0.003	<2	27	59	45	<1	33
2106	0.001	<2	24	39	67	<1	21
2107	0.001	<2	25	37	61	<1	25
2108	<0.001	<2	20	34	40	<1	22
2109	0.001	<2	25	72	47	<1	32
2110	<0.001	<2	30	94	46	<1	38
2111	<0.001	<2	24	57	41	<1	33
2112	<0.001	<2	22	55	38	<1	23
2113	<0.001	<2	27	68	48	<1	38
2114	<0.001	<2	33	106	44	<1	62
2115	<0.001	<2	16	31	27	<1	14
2116	<0.001	<2	20	39	32	<1	17
2117	<0.001	<2	19	30	27	<1	19
2118	0.004	<2	16	38	28	<1	20
2119	0.001	<2	26	38	167	<1	23
2120	0.012	<2	18	52	30	<1	24
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(1)	(5)

Analysis code PM2/3 Report D1321/88 Page G4

Order No. 60 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Mo	Ni
2121	<0.001	<2	20	42	36	<1	24
2122	<0.001	<2	19	47	34	<1	29
2123	0.001	<2	23	54	32	<1	23
2124	<0.001	<2	14	53	30	<1	27
2125	<0.001	<2	22	47	47	<1	25
2126	0.002	<2	25	40	49	<1	31
2127	0.001	<2	32	62	53	<1	37
2128	<0.001	<2	28	114	69	<1	56
2129	<0.001	<2	23	66	43	<1	28
2130	0.013	<2	19	70	32	<1	27
2131	0.002	<2	31	75	66	<1	32
2132	0.001	<2	19	27	32	<1	12
2133	0.002	<2	42	54	82	<1	34
2134	0.001	<2	28	74	54	<1	23
2135	<0.001	<2	29	78	57	<1	32
2136	0.003	<2	21	50	34	<1	23
2137	0.012	<2	25	67	51	<1	13
2138	<0.001	<2	22	54	39	<1	29
2139	<0.001	<2	22	52	44	<1	29
2140	0.001	<2	25	50	43	<1	33
2141	<0.001	<2	30	48	47	<1	43
2142	<0.001	<2	26	70	44	<1	40
2143	<0.001	<2	32	81	51	<1	44
2144	<0.001	<2	20	73	41	<1	35
2145	0.009	<2	17	45	38	<1	20
2146	0.006	<2	20	68	53	<1	29
2147	0.004	<2	23	72	40	<1	29
2148	0.006	<2	15	40	29	<1	21
2149	0.010	<2	20	62	44	<1	31
2150	0.043	<2	21	60	53	<1	30
2151	0.005	<2	20	58	54	<1	18
2152	0.009	<2	24	86	72	2	46
2153	0.006	<2	18	56	43	1	21
2154	0.005	<2	24	50	145	1	26
2155	0.004	<2	18	59	67	1	28
2156	0.003	<2	14	57	36	1	25
2157	0.003	<2	18	70	34	<1	24
2158	0.003	<2	22	62	29	<1	23
2159	0.003	<2	22	77	33	<1	28
2160	0.003	<2	26	60	39	<1	36
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(1)	(5)

Analysis code PM2/3 Report D1321/88 Page G5

Order No. 60 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Mo	Ni
2161	0.005	<2	30	58	91	<1	31
2162	<0.001	<2	22	63	38	<1	24
2163	0.004	<2	20	68	30	<1	27
2164	0.003	<2	26	56	30	<1	28
2165	0.004	<2	17	42	21	<1	19
2166	0.003	<2	29	67	70	<1	40
2167	0.002	<2	19	58	40	<1	31
2168	0.002	<2	24	70	49	<1	38
2169	0.002	<2	23	71	41	<1	31
2170	0.002	<2	24	106	58	<1	57
2171	0.003	<2	26	92	61	<1	49
2172	0.003	<2	24	67	45	<1	33
2173	0.003	<2	26	68	50	<1	38
2174	0.006	<2	26	110	54	<1	50
2175	<0.001	<2	27	66	44	<1	21
2176	0.003	<2	35	41	57	<1	23
2177	0.003	<2	33	65	54	<1	27
2178	0.002	<2	16	45	33	<1	11
2179	0.001	<2	20	81	54	<1	24
2180	0.002	<2	26	80	63	<1	20
2181	0.002	<2	23	77	57	2	27
2182	0.002	<2	19	118	61	1	39
2183	0.002	<2	22	85	60	<1	33
2184	0.002	<2	26	129	67	1	51
2185	0.003	<2	22	73	68	<1	32
2186	0.010	<2	24	75	51	<1	33
2187	0.002	<2	19	71	43	<1	25
2188	0.003	<2	23	92	59	<1	39
2189	0.002	<2	23	58	50	<1	26
2190	0.002	<2	21	48	60	<1	13
2191	0.003	<2	18	61	55	<1	12
2192	0.002	<2	21	54	65	<1	16
2193	0.002	<2	17	34	23	<1	9
2194	0.002	<2	21	50	35	<1	12
2195	0.003	<2	16	54	40	<1	9
2196	0.001	<2	16	45	22	<1	10
2197	0.002	<2	24	66	32	<1	16
2198	0.002	<2	21	48	33	<1	12
2199	0.001	<2	17	54	31	<1	30
2200	0.002	<2	16	56	29	<1	35
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(1)	(5)

Analysis code PM2/3 Report D1321/88 Page G6

Order No. 60 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Mo	Ni
2334	0.003	<2	22	42	43	<1	26
2335	<0.001	<2	11	48	29	<1	17
2336	<0.001	<2	31	47	42	<1	27
2337	<0.001	<2	22	66	50	<1	34
2338	<0.001	<2	20	40	48	<1	19
2339	0.001	<2	40	51	215	<1	74
2340	<0.001	<2	20	47	51	<1	23
2341	0.001	<2	21	45	66	<1	21
2342	0.001	<2	18	38	44	<1	18
2343	<0.001	<2	26	60	69	<1	23
2344	0.007	<2	16	64	30	<1	16
2345	0.006	<2	17	58	37	<1	16
2346	<0.001	<2	19	45	53	<1	16
2347	0.010	<2	13	64	41	<1	12
2348	0.002	<2	19	43	37	<1	12
2349	<0.001	<2	16	40	41	<1	13
2350	0.002	<2	27	67	46	<1	17
2351	0.003	<2	47	98	48	<1	17
2352	0.013	<2	38	89	71	<1	16
2353	0.002	<2	21	60	41	<1	18
2354	<0.001	<2	18	42	42	<1	19
2355	0.004	<2	20	50	64	<1	18
2356	0.008	<2	<5	29	41	<1	18
2357	0.002	<2	15	38	44	<1	22
2358	0.010	<2	14	35	45	<1	18
2359	0.007	<2	28	72	65	<1	31
2360	0.005	<2	22	59	43	<1	24
2361	0.021	<2	96	44	45	<1	6
2362	0.003	<2	24	56	45	<1	19
2363	0.025	<2	16	40	51	<1	23
2364	0.001	<2	21	46	38	<1	29
2365	0.003	<2	40	90	62	<1	50
2366	0.001	<2	20	45	44	<1	32
2367	0.003	<2	19	40	63	<1	38
2368	0.002	<2	20	42	77	<1	34
2369	0.010	<2	17	41	83	<1	54
2370	0.009	<2	16	35	67	<1	57
2371	<0.001	<2	11	49	45	<1	28
2372	<0.001	<2	18	49	28	<1	22
2373	0.002	<2	23	53	45	<1	28
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(1)	(5)

Analysis code PM2/3 Report D1321/88 Page G7

Order No. 60 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Mo	Ni
2374	<0.001	<2	60	104	66	<1	42
2375	0.002	<2	25	63	49	<1	35
2376	0.001	<2	24	65	45	<1	31
2377	0.001	<2	20	41	40	<1	46
2378	0.021	<2	20	30	41	<1	31
2379	<0.001	<2	19	37	36	<1	23
2380	<0.001	<2	21	52	39	<1	23
2381	<0.001	<2	16	41	33	<1	23
2382	0.001	<2	16	39	30	<1	22
2383	0.002	<2	25	56	33	2	20
2384	0.002	<2	27	66	26	<1	20
2385	<0.001	<2	<5	26	26	<1	18
2386	<0.001	<2	18	63	31	<1	21
2387	0.001	<2	28	69	59	<1	36
2388	<0.001	<2	22	56	35	<1	27
2389	0.002	<2	23	52	38	<1	31
2390	0.001	<2	21	56	34	<1	30
2391	0.002	<2	28	67	51	<1	29
2392	0.002	<2	20	61	40	<1	28
2393	0.002	<2	23	49	53	<1	24
2394	0.002	<2	27	59	52	<1	33
2395	<0.001	<2	28	96	68	<1	44
2396	0.002	<2	18	66	39	<1	29
2397	0.005	<2	32	59	52	<1	29
2398	0.002	<2	22	54	57	<1	28
2399	0,002	<2	23	53	50	<1	30
2400	0.006	<2	22	61	46	<1	32
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(1)	(5)

60

Analysis code PM2/3 Report D1321/88 Page G8

Order No. 60 Results in ppm

Sample	Pb	Zn
2001	12	60
2002	<5	80
2003	13	88
2004	13	64
2005	10	69
2006	5	60
2007	13	84
2008	9	59
2009	19	94
2010	9	84
2011	10	91
2012	13	90
2013	8	114
2014	9	94
2015	13	90
2016	15	106
2017	11	206
2018	10	95
2019	12	96
2020	7	65
2021	11	84
2022	5	82
2023	7	75
2024	11	89
2025	12	90
2026	19	72
2027	11	103
2028	10	121
2029	8	113
2030	<5	75
2031	35	120
2032	19	135
2033	10	120
2034	13	107
2035	10	113
2036	8	121
2037	7	64
2038	12	106
2039	13	87
2040	<5	79
Detn limit	(5)	(2)

Order No. 60 Results in ppm

Sample	Pb	Zn
2041	<5	81
2042	12	85
2043	10	75
2044	<5	77
2045	<5	70
2046	<5	96
2047	5	89
2048	13	111
2049	6	90
2050	<5	86
2051	11	83
2052	6	71
2053	8	57
2054	<5	78
2055	32	88
2056	10	69
2057	12	75
2058	10	81
2059	10	54
2060	9	64
2061	15	59
2062	17	56
2063	13	60
2064	17	78
2065	9	59
2066	11	81
2067	11	122
2068	11	91
2069	26	111
2070	34	83
2071	<5	72
2072	7	60
2073	18	75
2074	11	85
2075	12	60
2076	13	38
2077	9	74
2078	11	72
2079	16	83
2080	20	110
Detn limit	(5)	(2)

Analysis code PM2/3 Report D1321/88

Order No. 60 Results in ppm

Sample	Pb	Zn
2081	15	89
2082	15	78
2083	13	86
2084	11	77
2085	26	105
2086	24	83
2087	21	66
2088	17	78
2089	20	88
2090	14	84
2091	21	88
2092	9	59
2093	10	90
2094	15	90
2095	16	100
2096	15	86
2097	16	69
2098	13	61
2099	9	79
2100	14	84
2101	18	110
2102	19	105
2103	14	68
2104	12	82
2105	13	68
2106	7	57
2107	14	77
2108	10	66
2109	12	77
2110	<5	88
2111	11	99
2112	14	98
2113	14	117
2114	17	86
2115	10	103
2116	13	91
2117	15	112
2118	8	136
2119	14	107
2120	7	82
Detn limit	(5)	(2)

amdel
technology and enterprise

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14th June 1988

Our Ref : D1321/88

REPORT NUMBER D1321/88

CLIENT	:	Endras No. 2 Ltd.
CLIENT REFERENCE	:	Purchase Order 60
REPORT COMPRISING	:	Cover Page Pages G1 - G14 I1 - I14
DATE RECEIVED	:	20th May 1988

Alan Ciplys
Manager
AMDEL Limited (N.T.)

Analysis code GEN6(ICP   Report AC 0086/89   Page I1

NATA Certificate   Order No. D1591/88   Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P
6210	3	65	1.68%	3	1950	5	190
6213	2	440	6.00%	8	1500	6	560
6214	<1	120	4.28%	<2	170	<2	50
6215	<1	210	3.40%	<2	190	<2	160
6216	11	180	3500 0.35%	10	4050	2	130
6217	<1	35	4.62%	4	130	<2	65
6218	<1	40	2.24%	<2	130	<2	410
6221	3	40	1.42%	65	190	3	160
6223	15	45	8400 0.84%	350	130	3	620
6224	4	40	2.72%	6	700	5	760
6225	<1	220	2.58%	26	560	2	110
6230	3	120	1.38%	4	220	<2	65
6231	5	<5	6.95%	6	120	<2	2450
6232	<1	20	13.6%	10	360	<2	180
6233	<1	<5	3.46%	<2	95	<2	45
6234	5	5	6.65%	<2	1.30%	<2	160
6235	4	10	7.55%	<2	310	<2	190
6236	<1	<5	12.0%	6	240	<2	90
Detn limit	(1)	(5)	(5)	(2)	(2)	(2)	(10)

1%

10,000 ppm

Analysis code GEN6(ICP   Report AC 0086/89

NATA Certificate   Order No. D1591/88   Results in ppm

Sample	Sb	Sn	W
6210	2	5	<5
6213	<2	<5	<5
6214	<2	<5	<5
6215	<2	<5	<5
6216	5	<5	<5
6217	<2	<5	<5
6218	2	5	<5
6221	3	<5	<5
6223	9	<5	<5
6224	2	<5	<5
6225	6	10	<5
6230	<2	<5	<5
6231	<2	<5	<5
6232	<2	<5	<5
6233	<2	<5	<5
6234	<2	<5	<5
6235	2	<5	<5
6236	<2	5	<5
Detn limit	(2)	(5)	(5)

Analysis code GEN6 ICP   Report AC 0086/89

NATA Certificate   Order No. D1592/88   Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P
2464	<1	110	3.44%	18	700	<2	660
2465	<1	65	2.22%	12	540	<2	130
2466	<1	100	2.78%	16	470	<2	150
2467	<1	100	3.02%	17	520	<2	280
2468	<1	100	2.06%	20	310	<2	380
2469	<1	100	2.56%	24	410	<2	460
2470	<1	110	2.96%	12	410	2	520
2471	<1	95	2.38%	13	380	<2	440
2472	<1	90	1.66%	18	280	<2	360
2473	<1	130	2.44%	20	540	<2	560
2474	<1	110	2.24%	16	410	<2	470
2475	<1	120	2.70%	14	490	<2	460
2476	<1	120	2.18%	24	430	<2	460
2477	<1	95	2.14%	15	350	<2	460
2478	<1	85	1.86%	14	300	<2	350
2479	<1	100	2.38%	16	410	<2	380
2480	<1	90	2.08%	9	370	<2	400
2481	<1	75	1.74%	8	270	<2	260
2482	<1	120	2.50%	20	480	<2	460
2483	<1	130	2.26%	11	410	<2	320
2484	<1	100	2.54%	10	450	<2	460
2485	<1	70	1.74%	7	380	<2	310
2486	<1	75	1.92%	7	450	<2	460
2487	<1	60	1.70%	12	340	<2	390
2488	<1	85	2.12%	19	340	<2	430
2489	<1	130	1.94%	17	290	<2	330
2490	<1	120	1.92%	24	380	<2	390
2491	<1	140	1.68%	12	400	<2	340
2492	<1	170	2.18%	14	410	<2	470
2493	<1	130	1.88%	14	330	<2	410
2494	<1	110	1.40%	11	270	<2	220
2495	<1	170	1.92%	16	350	<2	310
2496	<1	120	1.46%	11	240	<2	290
2497	<1	160	1.90%	17	340	<2	410
2498	<1	280	1.84%	22	290	<2	430
2499	<1	120	1.44%	17	230	<2	470
2500	<1	130	1.10%	15	220	<2	310
2591	<1	60	9300 0.93%	10	130	<2	200
2592	<1	70	1.06%	10	180	<2	260
2593	<1	90	1.66%	20	270	<2	380
Detn limit	(1)	(5)	(5)	(2)	(2)	(2)	(10)

Analysis code GEN6 ICP　Report AC 0086/89　

NATA Certificate　Order No. D1592/88　Results in ppm

Sample	As	Ba	Fe	La	Mn	Nb	P
2594	<1	120	1.74%	11	270	<2	460
2595	<1	100	1.76%	18	270	<2	390
2596	<1	80	1.36%	16	240	<2	330
2597	<1	75	1.68%	17	260	<2	410
2598	<1	80	2.08%	8	340	<2	740
2599	<1	80	1.34%	8	190	<2	260
2600	<1	85	1.88%	11	320	<2	400
Detn limit	(1)	(5)	(5)	(2)	(2)	(2)	(10)

Analysis code GEN6 ICP   Report AC 0086/89

NATA Certificate   Order No. D1592/88   Results in ppm

Sample	Sb	Sn	W
2464	3	5	<5
2465	3	5	<5
2466	4	5	<5
2467	3	5	<5
2468	<2	5	<5
2469	<2	5	<5
2470	<2	5	<5
2471	<2	5	<5
2472	2	5	<5
2473	<2	5	<5
2474	2	5	<5
2475	2	5	<5
2476	<2	5	<5
2477	2	5	<5
2478	2	5	<5
2479	<2	5	<5
2480	<2	5	<5
2481	2	5	<5
2482	2	5	<5
2483	3	5	<5
2484	3	5	<5
2485	2	5	<5
2486	2	5	<5
2487	2	<5	<5
2488	<2	5	<5
2489	3	5	<5
2490	2	5	<5
2491	2	<5	<5
2492	3	5	<5
2493	3	5	<5
2494	2	<5	<5
2495	<2	5	<5
2496	<2	<5	<5
2497	3	5	<5
2498	3	5	<5
2499	2	5	<5
2500	2	<5	<5
2591	<2	<5	<5
2592	<2	<5	<5
2593	3	5	<5
Detn limit	(2)	(5)	(5)

Analysis code GEN6 ICP Report AC 0086/89

NATA Certificate Order No. D1592/88 Results in ppm

Sample	Sb	Sn	W
2594	2	5	<5
2595	<2	<5	<5
2596	<2	<5	<5
2597	4	5	<5
2598	3	5	<5
2599	<2	<5	<5
2600	3	5	<5
Detn limit	(2)	(5)	(5)

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Order No. 60 | Results in ppm

Sample	Pb	Zn
2121	9	98
2122	6	70
2123	14	63
2124	<5	101
2125	13	108
2126	<5	99
2127	<5	133
2128	10	109
2129	<5	98
2130	8	76
2131	<5	119
2132	<5	89
2133	<5	124
2134	<5	101
2135	<5	98
2136	7	99
2137	9	100
2138	10	104
2139	<5	117
2140	9	153
2141	6	139
2142	6	117
2143	9	127
2144	7	108
2145	6	101
2146	9	85
2147	11	139
2148	9	60
2149	7	73
2150	7	84
2151	7	108
2152	10	138
2153	6	81
2154	10	102
2155	6	89
2156	8	80
2157	8	99
2158	32	69
2159	13	69
2160	6	79
Detn limit	(5)	(2)

Analysis code PM2/3 | Report D1321/88 | Page G12

Order No. 60 | Results in ppm

Sample	Pb	Zn
2161	5	131
2162	8	87
2163	5	76
2164	7	71
2165	6	50
2166	6	87
2167	5	56
2168	6	67
2169	<5	67
2170	7	70
2171	<5	70
2172	7	65
2173	<5	84
2174	10	82
2175	9	65
2176	6	68
2177	12	69
2178	<5	39
2179	7	55
2180	7	61
2181	18	72
2182	17	69
2183	19	78
2184	21	83
2185	11	71
2186	13	94
2187	10	68
2188	15	96
2189	13	88
2190	10	81
2191	11	80
2192	10	79
2193	8	90
2194	7	95
2195	10	80
2196	9	67
2197	14	92
2198	9	87
2199	8	81
2200	8	84
Detn limit	(5)	(2)

Analysis code PM2/3 Report D1321/88 Page G13

Order No. 60 Results in ppm

Sample	Pb	Zn
2334	22	78
2335	16	60
2336	20	92
2337	22	68
2338	20	69
2339	21	57
2340	23	52
2341	18	73
2342	15	117
2343	16	135
2344	19	89
2345	18	83
2346	23	108
2347	19	89
2348	16	122
2349	10	160
2350	18	161
2351	14	111
2352	11	119
2353	14	88
2354	16	94
2355	19	142
2356	18	97
2357	22	108
2358	11	108
2359	12	127
2360	9	105
2361	16	108
2362	13	130
2363	15	144
2364	7	79
2365	12	104
2366	10	76
2367	10	79
2368	10	63
2369	8	63
2370	13	82
2371	12	64
2372	6	60
2373	<5	52
Detn limit	(5)	(2)

Analysis code PM2/3 Report D1321/88 Page G14

Order No. 60 Results in ppm

Sample	Pb	Zn
2374	<5	52
2375	7	49
2376	8	55
2377	12	84
2378	8	68
2379	8	46
2380	12	72
2381	9	76
2382	11	57
2383	12	94
2384	8	42
2385	9	41
2386	<5	69
2387	8	90
2388	<5	59
2389	<5	66
2390	<5	53
2391	11	77
2392	10	98
2393	7	95
2394	8	87
2395	<5	92
2396	<5	74
2397	7	91
2398	9	74
2399	<5	94
2400	12	88
Detn limit	(5)	(2)

CLASSIC COMLABS LTD
Analytical Laboratories (INC. IN W.A.)

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5th September 1988

Our Ref : D1592/88

REPORT NUMBER D1592/88

CLIENT : Endras

CLIENT REFERENCE : Purchase Order 63

REPORT COMPRISING : Cover Page
Pages G1 - G4

DATE RECEIVED : 30th June 1988

Alan Ciplys
Manager
CLASSIC COMLABS LTD. (N.T.)

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

Head Office: Perth Branches in Darwin, Adelaide, Townsville, Kalgoorlie, Meekatharra, Temora, PNG, Indonesia

CLASSIC COMLABS LTD

2600
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Analysis code PM2/3 Report D1592/88 Page G1
A1/2
Order No. 63 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Mo	Ni
2464	0.001	<2	29	76	65	<1	43
2465	<0.001	<2	19	93	53	<1	53
2466	<0.001	<2	23	80	88	<1	64
2467	<0.001	<2	28	120	74	<1	90
2468	<0.001	<2	18	44	50	<1	39
2469	<0.001	<2	15	34	25	<1	21
2470	<0.001	<2	14	38	38	<1	24
2471	<0.001	<2	14	31	26	<1	21
2472	<0.001	<2	11	25	27	<1	20
2473	<0.001	<2	16	32	29	<1	25
2474	<0.001	<2	14	36	28	<1	23
2475	<0.001	<2	23	44	48	<1	39
2476	<0.001	<2	12	26	28	<1	20
2477	<0.001	<2	11	27	21	<1	17
2478	<0.001	<2	10	25	22	<1	17
2479	<0.001	<2	12	25	26	<1	20
2480	<0.001	<2	11	25	25	<1	21
2481	<0.001	<2	10	31	25	<1	21
2482	<0.001	<2	13	27	26	<1	19
2483	0.001	<2	16	69	52	<1	39
2484	<0.001	<2	17	70	46	<1	46
2485	<0.001	<2	13	50	32	<1	29
2486	<0.001	<2	13	44	28	<1	27
2487	<0.001	<2	6	33	21	<1	18
2488	<0.001	<2	8	31	17	<1	19
2489	<0.001	<2	15	48	39	<1	32
2490	<0.001	<2	11	35	30	<1	23
2491	<0.001	<2	13	31	39	<1	20
2492	<0.001	<2	18	51	41	<1	35
2493	<0.001	<2	11	33	34	<1	24
2494	<0.001	<2	10	29	25	<1	20
2495	<0.001	<2	11	29	35	<1	21
2496	<0.001	<2	13	49	35	<1	32
2497	<0.001	<2	17	63	52	<1	37
2498	<0.001	<2	20	92	50	<1	42
2499	<0.001	<2	14	60	36	<1	27
2500	<0.001	<2	10	51	33	<1	38
2591	<0.001	<2	11	49	31	<1	38
2592	0.004	<2	7	32	22	<1	25
2593	<0.001	<2	9	58	32	<1	41
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(1)	(5)

Analysis code PM2/3
A1/2

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Order No. 63

Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Mo	Ni
2594	<0.001	<2	11	39	32	<1	32
2595	<0.001	<2	8	28	21	<1	24
2596	<0.001	<2	7	34	21	<1	26
2597	<0.001	<2	<5	49	24	<1	34
2598	0.011	<2	9	49	35	<1	33
2599	0.14	<2	8	29	26	<1	24
2600	<0.001	<2	8	66	39	<1	49
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(1)	(5)

Analysis code A1/2 Report D1592/88 Page G3

Order No. 63 Results in ppm

Sample	Pb	Zn
2464	8	135
2465	16	89
2466	15	105
2467	22	130
2468	23	140
2469	18	155
2470	18	170
2471	17	130
2472	15	150
2473	16	165
2474	15	160
2475	12	125
2476	16	150
2477	9	105
2478	10	115
2479	14	145
2480	19	155
2481	8	85
2482	9	140
2483	13	125
2484	16	130
2485	11	120
2486	17	105
2487	<5	110
2488	7	115
2489	<5	97
2490	6	105
2491	7	95
2492	<5	84
2493	<5	99
2494	<5	64
2495	<5	74
2496	<5	76
2497	<5	57
2498	<5	120
2499	<5	83
2500	<5	98
2591	<5	71
2592	<5	70
2593	<5	86
Detn limit	(5)	(2)

Analysis code A1/2 Report D1592/88 Page G4

Order No. 63 Results in ppm

Sample	Pb	Zn
2594	<5	81
2595	<5	91
2596	<5	76
2597	<5	69
2598	<5	82
2599	<5	100
2600	<5	60
Detn limit	(5)	(2)

[redacted]

CLASSIC COMLABS LTD
Analytical Laboratories (INC. IN W.A.)

Marjorie Street, Berrimah, Northern Territory 0828
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Telephone: (089) 32 2669; Fax: (089) 32 3531

5th September 1988

Our Ref : D1591/88

REPORT NUMBER D1591/88

CLIENT : Endras

CLIENT REFERENCE : Purchase Order 63

REPORT COMPRISING : Cover Page
Pages G1 & G2

DATE RECEIVED : 30th June 1988

A. Ciplys

Alan Ciplys
Manager
CLASSIC COMLABS LTD. (N.T.)

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

CLASSIC COMLABS LTD

Analysis code PM1/4
A1/2

Report D1591/88

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Order No. 63

Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Mo	Ni
6210	<0.01	<2	<5	13	9	<1	10
6213	<0.01	<2	24	11	37	<1	17
6214	<0.01	<2	18	38	12	<1	18
6215	<0.01	<2	10	22	12	<1	13
6216	<0.01	<2	8	22	8	<1	19
6217	<0.01	<2	10	33	12	<1	18
6218	<0.01	<2	19	38	91	<1	33
6221	<0.01	<2	8	12	9	<1	15
6223	<0.01	<2	8	34	15	<1	32
6224	<0.01	<2	14	17	13	<1	26
6225	0.21	<2	26	50	9750	<1	42
6230	<0.01	<2	13	<5	52	<1	28
6231	<0.01	<2	30	<5	28	<1	20
6232	<0.01	<2	23	6	120	<1	25
6233	<0.01	<2	22	<5	4	<1	20
6234	<0.01	<2	86	<5	25	<1	49
6235	0.60	68	43	12	7.74%	<1	64
6236	<0.01	<2	45	<5	260	<1	21
Detn limit	(0.01)	(2)	(5)	(5)	(2)	(1)	(5)

77,400

13,000

Analysis code A1/2 Report D1591/88 Page G2

Order No. 63 Results in ppm

Sample	Pb	Zn
6210	13	13
6213	17	44
6214	23	55
6215	13	24
6216	20	3
6217	11	17
6218	14	17
6221	26	18
6223	100	43
6224	16	46
6225	19	69
6230	59	3
6231	12	19
6232	19	32
6233	12	19
6234	14	205
6235	43	10
6236	9	16
Detn limit	(5)	(2)

CLASSIC COMLABS LTD
Analytical Laboratories (INC. IN W.A.)

Marjorie Street, Berrimah, Northern Territory 0828
P.O. Box 58, Berrimah, Northern Territory 0828
Telephone: (089) 32 2669; Fax: (089) 32 3531

24th October 1988

Our Ref : 8DN0375

REPORT NUMBER 8DN0375

CLIENT	:	Endras No. 2 Ltd.
CLIENT REFERENCE	:	Purchase Order 71
REPORT COMPRISING	:	Cover Page Pages G1 - G3 Pages 11 - 16
DATE RECEIVED	:	19th September 1988

A Ciplys

Alan Ciplys
Manager
CLASSIC COMLABS LTD. (N.T.)

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

CLASSIC COMLABS LTD

Analysis code AAS9
AAS1/2
Report 8DN0375
Page G1
Order No. 71
Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
2601	0.009	<2	17	39	40	24	11	88
2602	0.016	<2	17	43	58	26	14	100
2603	0.006	<2	22	67	63	40	14	110
2604	0.105,0.090	<2	23	83	61	35	19	135
2605	0.006	<2	17	59	33	29	14	96
2606	0.003	<2	24	74	47	20	14	98
2607	0.006	<2	8	24	20	23	11	89
2608	0.002	<2	10	30	14	22	<5	63
2609	0.013	<2	16	36	35	28	14	145
2610	0.100,0.032	7	16	44	41	26	12	115
2611	0.012	5	19	52	41	30	14	120
2612	0.003	<2	19	35	40	32	14	84
2613	0.005	<2	19	67	41	40	21	97
2614	0.005	<2	14	40	35	28	14	110
2615	0.001	<2	19	58	38	35	15	51
2616	0.001	<2	18	59	41	42	15	81
2617	0.003	<2	12	75	48	47	20	105
2618	0.011	8	10	46	38	28	17	91
2619	0.004	3	12	42	42	29	19	72
2620	0.004	4	19	40	47	29	19	100
2621	0.006	<2	15	45	45	28	18	110
2622	0.007	<2	12	33	29	21	19	77
2623	0.004	8	12	33	35	25	9	68
2624	0.011	6	14	42	32	24	14	89
2625	0.005	3	15	38	40	30	15	87
2626	0.006	5	14	44	39	32	14	91
2627	0.005	<2	15	35	45	31	16	88
2628	0.010	4	14	49	37	35	16	98
2629	0.006	<2	11	30	26	23	9	62
2630	0.004	<2	13	51	40	36	9	64
2631	0.008	<2	9	33	31	24	9	69
2632	0.006	<2	13	33	32	23	12	85
2633	0.008	5	7	36	25	16	17	105
2634	0.006	<2	7	12	23	17	22	79
2635	0.018	3	7	27	31	23	24	94
2636	0.006	3	10	28	37	22	17	93
2637	0.020	<2	10	38	33	23	17	71
2638	0.008	<2	8	28	27	20	17	76
2639	0.017	<2	12	36	30	19	19	115
2640	0.005	<2	13	36	34	18	20	70
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(5)	(5)	(2)

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Analysis code AAS9
AAS1/2

Report 8DN0375

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Order No. 71

Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
2641	0.006	<2	14	35	23	15	22	100
2642	0.005	<2	15	42	36	24	19	72
2643	0.002	<2	14	42	35	25	18	73
2644	0.003	<2	11	39	28	21	18	74
2645	0.005	<2	13	29	24	22	17	63
2646	0.004	6	13	37	28	23	18	73
2647	0.004	<2	12	39	27	23	17	80
2648	0.006	<2	15	42	35	25	21	78
2649	0.006	<2	15	39	45	24	23	110
2650	0.006	<2	11	22	23	18	23	85
2651	0.006	<2	15	35	27	21	24	80
2652	0.008	<2	20	48	31	22	32	110
2653	0.007	<2	16	51	47	27	22	100
2654	0.007	<2	16	46	19	24	27	93
2655	0.010	<2	19	50	67	25	14	92
2656	0.020	<2	21	44	62	28	13	140
2657	0.019	<2	15	26	53	24	25	99
2658	0.004	<2	19	22	55	17	66	165
2659	0.002	<2	12	22	30	17	26	110
2660	0.008	<2	14	26	32	20	22	130
2661	0.002	<2	9	19	26	15	17	84
2662	0.003	<2	10	18	31	17	16	82
2663	0.003	<2	13	13	13	11	12	64
2664	0.008	<2	13	21	25	17	20	155
2665	0.001	<2	10	30	28	19	18	92
2666	0.002	<2	11	36	29	21	20	115
2667	<0.001	<2	8	23	19	14	15	56
2668	0.002	<2	12	33	27	21	21	140
2669	0.002	<2	13	33	27	20	20	71
2670	0.001	<2	10	20	28	20	15	75
2671	0.001	<2	9	23	27	18	15	94
2672	0.003	<2	10	21	25	18	21	105
2673	0.002	<2	16	32	29	21	20	140
2674	0.003	<2	17	39	36	21	22	110
2675	0.003	<2	16	39	30	21	11	120
2676	0.010	<2	20	48	110	28	19	125
2677	0.004	<2	18	33	30	22	17	105
2678	0.003	<2	18	33	32	23	20	140
2679	0.002	2	17	31	32	24	20	96
2680	0.004	<2	22	49	44	32	20	125
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(5)	(5)	(2)

Analysis code AAS9
AAS1/2

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Order No. 71

Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
2681	0.004	<2	14	24	25	16	20	88
2682	0.007	<2	14	28	28	18	18	75
2683	0.004	<2	17	26	25	19	20	74
2684	0.004	<2	14	12	22	16	15	61
2685	0.011	<2	13	18	25	16	14	74
2686	0.003	<2	15	24	29	20	19	88
2687	0.004	<2	19	40	37	23	22	110
2688	0.003	<2	18	26	31	17	24	105
2689	0.002	<2	17	33	24	13	25	115
2690	0.013	<2	15	28	22	15	24	100
2691	0.004	<2	14	35	25	19	23	100
2692	0.003	<2	21	24	38	29	21	87
2693	0.002	<2	15	17	34	24	15	75
2694	<0.001	<2	13	23	28	20	16	73
2695	0.001	<2	11	16	24	17	20	92
2696	0.003	<2	14	14	30	21	16	80
2697	0.002	<2	16	27	31	23	25	120
2698	0.002	<2	16	23	34	21	28	105
2699	0.002	<2	11	18	29	18	21	84
2700	0.001	<2	25	30	30	28	28	110
2701	0.004	<2	15	31	43	27	16	105
2702	0.005	<2	25	73	64	33	23	170
2703	0.010	<2	22	100	60	38	18	120
2704	0.015	<2	14	33	34	14	15	155
2705	0.011	<2	14	31	33	15	16	140
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(5)	(5)	(2)

Analysis code GEN 6 | Report AC 912/89 |

NATA Certificate | Order No. 8DN0375

Sample	As	Ba	Fe	Mn	La	Nb	P
2601	<1	140	2.42	460	26	<2	520
2602	<1	150	2.30	560	22	<2	600
2603	<1	160	3.40	820	36	2	680
2604	<1	110	2.70	580	28	2	640
2605	2	190	2.14	600	42	<2	580
2606	<1	160	3.14	700	38	<2	580
2607	1	110	2.06	350	32	4	640
2608	<1	60	2.12	290	17	<2	240
2609	<1	85	3.12	640	46	2	330
2610	<1	110	2.76	500	36	<2	490
2611	<1	120	3.54	600	40	<2	540
2612	<1	110	2.42	500	28	2	450
2613	<1	120	2.72	520	28	<2	490
2614	<1	140	2.64	410	30	<2	700
2615	<1	100	2.48	460	24	<2	430
2616	<1	140	2.36	500	26	<2	480
2617	<1	120	2.78	480	28	<2	430
2618	1	120	2.36	560	19	<2	420
2619	1	110	2.46	400	20	<2	260
2620	<1	140	3.20	600	42	<2	460
2621	<1	100	2.42	480	28	<2	370
2622	2	110	2.24	400	24	<2	310
2623	<1	120	2.06	370	26	2	450
2624	<1	120	2.04	400	30	2	470
2625	<1	150	2.18	520	30	<2	660
2626	<1	120	2.14	470	28	<2	480
2627	<1	90	2.34	340	30	<2	250
2628	<1	120	2.00	370	30	<2	430
2629	<1	110	1.70	190	24	<2	230
2630	<1	130	1.96	360	24	<2	470
2631	1	110	2.00	400	20	<2	380
2632	<1	120	2.14	360	22	<2	460
2633	3	80	2.08	310	14	<2	390
2634	3	70	1.56	320	12	3	320
2635	3	110	2.06	400	18	3	450
2636	3	95	2.12	420	22	<2	450
2637	2	110	1.90	420	18	<2	350
2638	2	80	1.66	370	13	<2	470
2639	2	75	2.02	250	9	<2	430
2640	2	110	1.88	440	20	<2	460
Detn limit	(1)	(5)	(0.001)	(2)	(2)	(2)	(10)
Units	ppm	ppm	%	ppm	ppm	ppm	ppm

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Analysis code GEN 6 Report AC 912/89

NATA Certificate Order No. 8DN0375

Sample	As	Ba	Fe	Mn	La	Nb	P
2641	3	85	2.30	190	13	<2	280
2642	2	100	2.04	450	19	<2	320
2643	1	110	2.00	460	19	<2	370
2644	1	100	1.62	410	17	<2	400
2645	2	90	1.48	350	15	<2	310
2646	1	110	1.68	420	16	<2	330
2647	1	90	1.94	380	16	<2	300
2648	1	110	2.16	460	19	<2	350
2649	<1	120	2.28	600	24	<2	360
2650	2	90	1.86	520	14	<2	310
2651	1	130	2.30	580	44	<2	260
2652	1	160	2.58	940	42	<2	540
2653	2	130	2.24	520	42	<2	480
2654	2	160	2.04	840	34	<2	520
2655	1	100	1.80	640	24	<2	440
2656	1	95	1.74	600	18	<2	500
2657	3	55	1.58	560	13	2	320
2658	4	65	2.54	840	12	<2	260
2659	2	55	2.64	440	12	2	330
2660	2	60	2.60	450	14	2	390
2661	2	75	2.48	380	12	3	350
2662	3	65	2.14	350	12	4	280
2663	4	35	1.46	220	9	6	190
2664	1	65	2.62	390	11	3	400
2665	<1	95	3.64	390	15	3	300
2666	1	70	3.80	380	9	<2	310
2667	<1	65	2.42	270	11	<2	190
2668	2	160	3.48	430	16	<2	350
2669	2	75	4.44	450	16	<2	220
2670	<1	130	2.78	420	12	2	330
2671	<1	120	2.78	500	13	<2	410
2672	2	100	3.04	370	13	<2	280
2673	<1	110	3.66	460	28	<2	680
2674	<1	130	3.34	370	30	<2	500
2675	<1	140	3.74	540	40	<2	560
2676	<1	110	3.56	520	26	<2	450
2677	<1	120	3.10	440	18	<2	490
2678	<1	130	3.10	420	24	2	660
2679	<1	120	2.80	440	26	2	580
2680	<1	140	3.54	520	32	<2	480
Detn limit	(1)	(5)	(0.001)	(2)	(2)	(2)	(10)
Units	ppm	ppm	%	ppm	ppm	ppm	ppm

Analysis code GEN 6 Report AC 912/89

NATA Certificate Order No. 8DN0375

Sample	As	Ba	Fe	Mn	La	Nb	P
2681	2	55	2.56	350	15	<2	320
2682	2	55	2.70	360	17	<2	220
2683	3	70	2.72	380	15	<2	140
2684	3	85	2.44	310	15	3	190
2685	3	100	2.42	320	12	3	290
2686	2	100	2.84	470	18	2	430
2687	2	85	2.98	470	14	<2	260
2688	2	95	2.66	450	17	<2	280
2689	2	65	2.58	500	12	<2	380
2690	2	40	2.14	320	11	<2	240
2691	2	65	3.14	370	13	<2	330
2692	4	100	3.00	470	20	2	290
2693	3	100	2.58	230	16	<2	320
2694	3	100	2.34	360	15	3	380
2695	3	70	2.08	320	12	3	370
2696	4	90	1.96	260	15	4	300
2697	3	90	2.84	540	20	3	490
2698	3	85	2.60	600	17	2	360
2699	3	85	2.36	360	14	4	390
2700	4	75	3.08	700	16	<2	310
2701	2	100	3.22	360	30	5	440
2702	1	140	3.96	580	42	<2	660
2703	<1	140	3.26	460	32	<2	580
2704	<1	110	3.20	390	30	<2	400
2705	<1	110	3.38	450	36	<2	420
Detn limit	(1)	(5)	(0.001)	(2)	(2)	(2)	(10)
Units	ppm	ppm	%	ppm	ppm	ppm	ppm

Analysis code GEN 6 Report AC 912/89

NATA Certificate Order No. 8DN0375

Sample	Sb	Sn	W	Mo
2601	2	10	<5	2
2602	2	10	<5	2
2603	3	10	<5	2
2604	3	10	<5	2
2605	3	5	<5	3
2606	3	10	<5	2
2607	3	5	<5	2
2608	<2	5	<5	2
2609	<2	10	<5	2
2610	3	10	<5	2
2611	<2	10	<5	2
2612	<2	5	<5	1
2613	<2	5	<5	1
2614	<2	5	<5	1
2615	<2	5	<5	1
2616	2	5	<5	1
2617	<2	5	<5	1
2618	<2	5	<5	1
2619	<2	5	<5	1
2620	<2	5	<5	1
2621	2	5	<5	1
2622	<2	5	<5	1
2623	<2	5	<5	1
2624	2	5	<5	1
2625	<2	5	<5	2
2626	<2	5	<5	1
2627	<2	5	<5	1
2628	2	5	<5	1
2629	<2	5	<5	1
2630	<2	5	<5	<1
2631	<2	5	<5	1
2632	<2	5	<5	1
2633	<2	5	<5	1
2634	2	5	<5	1
2635	<2	5	<5	1
2636	<2	5	<5	1
2637	<2	5	<5	1
2638	<2	5	<5	1
2639	<2	<5	<5	1
2640	2	5	<5	1
Detn limit Units	(2) ppm	(5) ppm	(5) ppm	(1) ppm

Analysis code GEN 6 Report AC 912/89

NATA Certificate Order No. 8DN0375

Sample	Sb	Sn	W	Mo
2641	<2	5	<5	1
2642	<2	5	<5	1
2643	<2	5	<5	1
2644	<2	5	<5	1
2645	<2	5	<5	<1
2646	<2	5	<5	<1
2647	<2	5	<5	1
2648	<2	5	<5	1
2649	<2	5	<5	1
2650	<2	5	<5	1
2651	<2	5	<5	1
2652	<2	5	<5	1
2653	2	5	<5	2
2654	3	5	<5	1
2655	<2	5	<5	1
2656	<2	5	<5	1
2657	2	5	<5	1
2658	<2	5	<5	1
2659	<2	5	<5	1
2660	<2	5	<5	1
2661	<2	5	<5	1
2662	2	5	<5	1
2663	4	5	<5	1
2664	<2	10	<5	1
2665	<2	10	<5	1
2666	<2	5	<5	1
2667	<2	5	<5	<1
2668	<2	5	<5	1
2669	<2	10	<5	1
2670	<2	10	<5	2
2671	<2	10	<5	2
2672	<2	5	<5	1
2673	<2	5	<5	1
2674	<2	5	<5	2
2675	2	5	<5	1
2676	<2	5	<5	1
2677	<2	10	<5	1
2678	<2	10	<5	1
2679	2	5	<5	1
2680	3	10	<5	2
Detn limit	(2)	(5)	(5)	(1)
Units	ppm	ppm	ppm	ppm

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Sample	Sb	Sn	W	Mo
2681	<2	5	<5	1
2682	<2	5	<5	<1
2683	<2	5	<5	<1
2684	2	5	<5	<1
2685	2	5	<5	1
2686	<2	5	<5	1
2687	<2	5	<5	<1
2688	<2	5	<5	<1
2689	<2	5	<5	1
2690	<2	<5	<5	<1
2691	<2	5	<5	1
2692	3	5	<5	1
2693	<2	<5	<5	<1
2694	3	5	<5	1
2695	3	5	<5	1
2696	3	5	<5	1
2697	3	5	<5	1
2698	2	5	<5	1
2699	3	10	<5	2
2700	<2	5	<5	1
2701	4	10	<5	2
2702	2	10	<5	2
2703	3	5	<5	1
2704	<2	5	<5	2
2705	3	10	<5	2
Detn limit	(2)	(5)	(5)	(1)
Units	ppm	ppm	ppm	ppm

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NATA Certificate Order No. 8DN0664

Sample	As	Sn	Mo	W	P	Sb	Ta
2778	5	<5	<3	<5	540	5	<5
2780	<5	<5	<3	<5	360	<5	<5
2781	15	5	<3	<5	580	10	<5
2782	35	<5	<3	<5	200	<5	<5
2783	15	<5	<3	<5	640	5	<5
2784	10	<5	<3	<5	330	<5	<5
2785	5	<5	<3	<5	420	<5	<5
2786	10	<5	<3	<5	230	<5	<5
2787	10	<5	<3	<5	490	5	<5
2788	5	<5	<3	<5	350	<5	<5
2791	20	5	<3	<5	920	5	<5
2792	5	<5	<3	5	900	5	<5
2793	5	<5	<3	<5	760	<5	<5
2794	10	<5	<3	<5	820	<5	<5
2795	5	<5	<3	<5	740	5	<5
2796	5	<5	<3	<5	820	5	<5
2797	10	<5	<3	<5	640	<5	<5
2798	5	<5	<3	<5	470	<5	<5
2799	5	<5	<3	<5	620	<5	5
2800	<5	5	<3	<5	660	5	<5
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(5)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

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Sample	As	Sn	Mo	W	P	Sb	Ta
2801	<5	<5	<3	<5	360	<5	<5
2802	5	<5	<3	<5	420	5	<5
2803	5	<5	<3	<5	420	<5	<5
2804	10	<5	<3	<5	520	<5	<5
2805	5	<5	<3	<5	660	<5	<5
2806	5	<5	<3	<5	600	<5	<5
2807	10	<5	<3	<5	500	<5	<5
2808	10	<5	<3	<5	520	<5	<5
2809	15	<5	<3	<5	540	5	<5
2811	15	<5	4	<5	490	<5	<5
2812	10	<5	<3	<5	380	<5	<5
2813	5	<5	<3	<5	380	<5	<5
2814	10	<5	<3	<5	340	<5	<5
2815	10	<5	<3	<5	370	<5	<5
2816	10	<5	<3	<5	490	5	<5
2817	10	<5	<3	<5	520	5	<5
2818	10	<5	<3	<5	580	5	<5
2819	10	<5	<3	<5	720	<5	<5
2820	10	5	<3	5	490	5	<5
2821	30	10	10	5	660	<5	5
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(5)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

Sample	As	Sn	Mo	W	P	Sb	Ta
2822	15	<5	<3	5	450	5	5
2823	10	<5	<3	5	420	5	<5
2824	20	5	<3	5	470	5	5
2825	10	<5	<3	<5	640	5	<5
2826	10	<5	<3	<5	600	<5	<5
2827	5	5	<3	<5	540	5	<5
2828	<5	15	8	<5	660	<5	<5
2829	15	<5	<3	<5	600	5	<5
2830	15	5	4	<5	820	5	5
2831	10	<5	<3	<5	600	5	<5
2832	15	5	4	5	640	10	5
2833	10	<5	4	5	660	5	5
2834	15	5	4	5	880	5	5
2835	10	5	<3	<5	720	5	5
2836	20	5	4	<5	600	5	5
2839	40	5	10	5	540	10	<5
2840	20	5	6	<5	720	10	<5
2841	15	5	6	5	740	10	5
2842	<5	10	<3	5	820	5	<5
2843	20	<5	<3	5	720	5	<5
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(5)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

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Sample	As	Sn	Mo	W	P	Sb	Ta
2844	15	5	4	<5	620	5	<5
2845	15	<5	<3	<5	620	5	<5
2846	20	5	4	<5	380	10	5
2847	5	10	8	<5	660	10	5
2848	20	5	<3	5	700	10	<5
2849	10	5	4	5	370	5	<5
2850	15	<5	<3	<5	760	5	5
2851	10	<5	<3	<5	600	5	<5
2852	15	<5	<3	<5	600	5	<5
2853	10	<5	<3	<5	740	<5	<5
2854	10	<5	<3	<5	440	5	<5
2855	10	5	<3	5	700	5	<5
2856	15	<5	<3	5	580	5	<5
2857	10	5	<3	10	680	10	5
2869	15	<5	4	<5	420	5	<5
2870	15	<5	<3	5	760	5	<5
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(5)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

CLASSIC COMLABS LTD
Analytical Laboratories (INC. IN W.A.)

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24th October 1988

Our Ref : 8DN0500

REPORT NUMBER 8DN0500

CLIENT	:	Endras No. 2 Ltd.
CLIENT REFERENCE	:	Purchase Order 72
REPORT COMPRISING	:	Cover Page Pages G1 - G3 Pages 11 - 16
DATE RECEIVED	:	4th October 1988

A. Ciplys

Alan Ciplys
Manager
CLASSIC COMLABS LTD. (N.T.)

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

Head Office: Perth Branches in Darwin, Adelaide, Townsville, Kalgoorlie, Meekatharra, Temora, PNG, Indonesia

Analysis code AAS9 Report 8DN0500 Page G1
AAS1/2
Order No. 72 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
2706	0.011	<2	13	72	39	17	21	205
2707	0.011	4	24	55	60	26	21	165
2708	0.004	2	16	41	29	20	16	110
2709	0.004	<2	20	45	31	26	13	96
2710	0.003	<2	21	36	36	25	<5	130
2711	0.009	2	21	35	31	23	15	155
2712	0.002	<2	19	30	36	10	14	115
2713	0.005	4	23	32	31	15	15	195
2714	0.003	<2	20	46	29	28	15	130
2715	0.002	2	16	75	26	28	13	125
2716	0.016	2	22	85	33	34	20	205
2717	0.002	3	19	72	23	26	14	105
2718	0.003	<2	14	61	22	24	14	96
2719	0.003	2	15	47	33	22	19	135
2720	<0.001	<2	18	45	30	22	24	110
2721	0.001	<2	14	57	40	22	17	115
2722	0.001	3	16	60	30	20	20	105
2723	0.001	<2	13	46	27	15	13	72
2724	0.002	<2	13	40	25	13	15	79
2725	0.001	<2	19	45	28	21	23	110
2726	0.002	<2	17	47	31	21	18	98
2727	0.003	2	14	42	28	20	21	96
2728	0.002	3	14	41	32	21	17	110
2729	0.003	<2	19	48	35	22	18	88
2730	0.009	2	20	43	31	28	13	91
2731	0.001	<2	9	41	21	12	11	68
2732	0.003	<2	18	47	31	21	18	115
2733	0.016	3	15	55	39	23	28	200
2734	0.002	<2	16	56	34	22	22	150
2735	0.001	3	10	48	21	12	16	85
2736	0.007	<2	11	50	33	14	17	125
2737	0.006	3	11	47	32	13	20	140
2738	0.011	4	12	78	44	18	21	125
2739	0.004	<2	9	52	25	11	18	78
2740	0.002	2	10	58	30	14	16	110
2741	0.006	2	11	61	41	13	39	190
2742	0.004	<2	21	60	24	24	19	105
2743	0.007	2	19	80	40	26	21	140
2744	0.002	<2	19	78	35	26	21	125
2745	0.005	<2	19	67	38	23	19	135
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(5)	(5)	(2)

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AAS1/2

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Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
2746	0.007	2	21	78	45	25	21	150
2747	0.11	2	19	62	32	24	19	165
2748	0.024	<2	16	63	35	20	23	110
2749	0.12,0.11	2	19	67	33	26	23	160
2750	0.019	2	24	54	31	22	23	125
2751	0.025	<2	22	73	37	24	19	135
2752	0.019	<2	22	62	33	25	28	140
2753	0.010	<2	16	62	30	20	17	110
2754	0.011	<2	19	60	34	24	28	155
2755	0.011	<2	15	52	26	13	19	195
2756	0.005	3	16	52	26	12	23	160
2757	0.006	<2	10	61	24	12	19	130
2758	5.00,10.6	<2	11	61	28	12	22	130
2759	0.034	<2	23	97	83	33	17	135
2760	0.008	2	24	145	40	66	16	95
2761	0.022	<2	22	73	47	35	16	120
2762	0.025	<2	26	94	68	32	26	165
2763	0.025	<2	16	67	42	18	27	150
2764	0.005	<2	16	51	32	21	18	105
2765	0.004	<2	16	48	31	21	16	100
2766	0.005	<2	17	56	38	21	20	135
2767	0.003	<2	19	44	37	20	17	140
2768	0.002	2	17	67	35	18	18	100
2769	0.001	2	17	59	30	18	18	130
2770	<0.001	2	8	35	25	15	14	135
2771	0.002	<2	15	58	31	17	16	165
2772	0.002	4	13	55	26	17	17	83
2773	0.002	2	14	57	33	15	15	100
2774	0.002	2	16	46	31	17	21	145
2775	0.022	3	16	56	39	22	25	130
2776	<0.001	<2	7	14	<2	7	<5	25
2777	0.005	<2	23	80	48	24	22	175
2780	0.004	3	24	66	37	32	22	130
2858	0.18	<2	18	47	43	21	17	180
2859	0.011	3	22	55	43	21	18	185
2860	0.028	<2	16	64	37	19	15	220
2861	0.019	2	32	83	81	28	21	195
2862	0.016	3	27	57	38	23	19	120
2863	0.015	2	12	26	30	11	21	105
2864	0.015	<2	23	61	48	13	30	140
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(5)	(5)	(2)

omit.

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Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
2865	0.003	2	21	52	37	19	18	120
2866	0.003	4	24	71	37	23	14	155
2867	0.002	<2	23	67	41	21	14	175
2868	0.004	<2	20	76	43	24	14	135
AMB40	0.004	4	13	29	25	9	12	66
AMB2500	0.005	<2	29	80	77	32	22	115
Detn limit	(0.001)	(2)	(5)	(5)	(2)	(5)	(5)	(2)

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Sample	As	Ba	Fe	Mn	La	Nb	P
2706	<1	150	4.32	520	55	<2	540
2707	<1	180	4.08	560	46	<2	480
2708	<1	190	3.14	440	36	<2	350
2709	<1	280	3.70	520	36	<2	460
2710	<1	290	3.82	600	42	<2	430
2711	<1	360	3.88	560	46	<2	460
2712	<1	270	3.92	520	36	<2	390
2713	<1	310	4.22	580	36	<2	500
2714	<1	180	3.68	580	38	<2	560
2715	1	170	3.02	420	36	3	300
2716	<1	180	4.34	660	46	<2	580
2717	<1	150	3.46	520	32	<2	390
2718	<1	110	3.08	410	28	<2	320
2719	3	75	2.90	480	22	3	340
2720	3	110	2.96	620	26	3	440
2721	3	85	2.64	460	24	4	350
2722	5	75	2.66	470	22	6	380
2723	3	85	2.58	420	15	3	340
2724	3	90	2.84	500	24	3	340
2725	5	110	2.60	470	22	4	390
2726	4	140	3.00	560	24	3	480
2727	4	80	2.56	470	20	5	370
2728	3	85	2.74	540	20	4	380
2729	3	95	3.64	640	30	<2	310
2730	4	120	2.96	520	26	4	370
2731	4	150	1.78	390	15	6	410
2732	3	110	3.32	500	24	3	400
→ 2733	1	120	3.96	620	30	3	520
2734	4	160	3.10	560	30	4	460
2735	4	160	1.98	330	17	6	380
2736	5	75	2.22	430	20	7	340
2737	3	110	2.64	450	20	3	340
2738	5	250	3.44	580	30	6	540
2739	4	80	2.30	410	16	6	330
2740	3	230	3.44	500	26	5	460
2741	3	95	3.32	540	24	6	540
2742	3	80	1.88	500	18	7	370
2743	1	170	3.98	580	36	3	410
2744	1	150	4.12	580	40	3	410
2745	3	140	3.40	540	30	4	420
Detn limit	(1)	(5)	(0.001)	(2)	(2)	(2)	(10)
Units	ppm	ppm	%	ppm	ppm	ppm	ppm

P034 DAT
ELEMS2.DAT

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Sample	As	Ba	Fe	Mn	La	Nb	P
2746	<1	170	4.50	600	42	3	350
2747	4	150	3.38	430	28	3	370
2748	2	110	3.44	500	24	2	340
2749	2	150	3.56	500	26	2	340
2750	2	85	3.40	600	22	4	560
2751	2	150	4.02	520	38	<2	450
2752	4	120	4.00	740	28	2	380
2753	2	120	3.00	340	28	<2	480
2754	5	110	3.40	500	24	3	340
2755	2	120	3.56	480	22	4	560
2756	2	180	3.56	600	24	<2	400
2757	1	140	3.62	520	26	<2	540
2758	1	150	3.84	370	24	<2	540
2759	<1	120	3.72	450	32	<2	480
2760	<1	130	4.02	620	38	2	410
2761	1	130	3.74	600	38	<2	380
2762	<1	160	4.12	780	44	<2	450
2763	1	140	3.28	520	44	<2	430
2764	4	130	3.38	520	32	2	520
2765	4	130	2.50	460	22	3	360
2766	4	100	3.78	720	28	6	540
2767	4	100	2.54	520	19	<2	360
2768	3	120	3.46	560	28	4	330
2769	2	100	2.72	540	18	2	400
2770	<1	85	2.32	460	13	2	350
2771	<1	120	3.42	740	18	<2	330
2772	2	90	2.58	400	18	<2	520
2773	2	90	2.74	450	20	3	330
2774	4	80	2.38	500	17	<2	360
2775	4	100	3.06	580	24	4	430
2776	2	40	0.018	340	<2	4	520
2777	2	120	4.50	780	38	7	10
2780	8	130	5.15	1350	40	<2	410
2858	3	220	4.16	680	32	<2	480
2859	2	210	3.64	940	44	2	560
2860	1	150	3.26	580	36	<2	520
2861	4	220	4.48	980	40	<2	380
2862	2	170	3.86	940	32	2	470
2863	3	75	1.88	390	13	<2	490
2864	8	180	3.68	740	24	<2	270
Detn limit	(1)	(5)	(0.001)	(2)	(2)	(2)	(10)
Units	ppm	ppm	%	ppm	ppm	ppm	ppm

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Sample	As	Ba	Fe	Mn	La	Nb	P
2865	3	180	3.40	680	34	<2	450
2866	1	210	3.72	720	42	<2	580
2867	1	210	3.64	620	40	<2	540
2868	<1	220	3.34	660	44	<2	620
AMB40	2	95	1.86	80	15	9	100
AMB2500	<1	240	3.98	1100	44	2	660
Detn limit	(1)	(5)	(0.001)	(2)	(2)	(2)	(10)
Units	ppm	ppm	%	ppm	ppm	ppm	ppm

Analysis code GEN 6 Report AC 912/89

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Sample	Sb	Sn	W	Mo
2706	4	15	<5	3
2707	6	15	<5	3
2708	5	10	<5	2
2709	5	15	<5	3
2710	6	15	<5	3
2711	6	15	<5	3
2712	5	15	<5	3
2713	5	15	<5	3
2714	5	15	<5	3
2715	6	15	<5	3
2716	10	20	<5	4
2717	5	10	<5	2
2718	3	10	<5	2
2719	5	10	<5	2
2720	5	10	<5	2
2721	5	10	<5	2
2722	6	10	<5	2
2723	4	10	<5	2
2724	4	10	<5	2
2725	5	10	<5	2
2726	4	10	<5	2
2727	5	10	<5	2
2728	4	10	<5	2
2729	4	10	<5	2
2730	5	10	<5	2
2731	5	10	<5	2
2732	4	10	<5	2
2733	4	15	<5	3
2734	6	10	<5	2
2735	6	10	<5	2
2736	7	10	<5	2
2737	4	10	<5	2
2738	9	15	<5	4
2739	6	10	<5	2
2740	5	15	<5	3
2741	4	15	<5	3
2742	6	10	<5	2
2743	5	15	<5	2
2744	5	15	<5	2
2745	5	10	<5	2
Detn limit	(2)	(5)	(5)	(1)
Units	ppm	ppm	ppm	ppm

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NATA Certificate Order No. 8DN0500

Sample	Sb	Sn	W	Mo
2746	5	15	<5	3
2747	4	10	<5	2
2748	4	10	<5	2
2749	4	15	<5	3
2750	3	10	<5	2
2751	5	10	<5	2
2752	4	10	<5	2
2753	4	10	<5	2
2754	4	10	<5	2
2755	3	10	<5	2
2756	6	10	<5	3
2757	4	10	<5	3
2758	3	10	<5	2
2759	3	15	<5	3
2760	7	15	<5	3
2761	5	10	<5	2
2762	5	10	<5	2
2763	5	10	<5	2
2764	5	10	<5	2
2765	6	10	<5	2
2766	3	10	<5	2
2767	3	5	<5	1
2768	5	10	<5	2
2769	4	10	<5	2
2770	3	10	<5	2
2771	3	10	<5	2
2772	4	10	<5	2
2773	4	10	<5	2
2774	4	10	<5	2
2775	4	5	<5	2
2776	6	10	<5	3
2777	3	<5	<5	<1
2780	4	15	<5	3
2858	4	10	<5	2
2859	4	10	<5	3
2860	3	10	<5	2
2861	3	10	<5	2
2862	3	10	<5	3
2863	<2	5	<5	2
2864	<2	5	<5	1
	5	10	<5	2
Detn limit	(2)	(5)	(5)	(1)
Units	ppm	ppm	ppm	ppm

Analysis code GEN 6 | Report AC 912/89 |

NATA Certificate | Order No. 8DN0500

Sample	Sb	Sn	W	Mo
2865	3	5	<5	2
2866	3	10	<5	2
2867	4	10	<5	2
2868	4	10	<5	3
AMB40	5	5	<5	1
AMB2500	3	15	<5	2
Detn limit	(2)	(5)	(5)	(1)
Units	ppm	ppm	ppm	ppm

CLASSIC COMLABS LTD
Analytical Laboratories (INC. IN W.A.)

Marjorie Street, Berrimah, Northern Territory 0828
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19th June 1989

Your Ref : 8DN0664

REPORT NUMBER 8DN0664

CLIENT : Endras No: 2 Ltd

CLIENT REFERENCE : Purchase Order 73

REPORT COMPRISING : Cover Page
Pages 11 - 18

DATE RECEIVED : 11th November 1988

Alan Ciplys
Manager
CLASSIC COMLABS LTD. (N.T.)

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

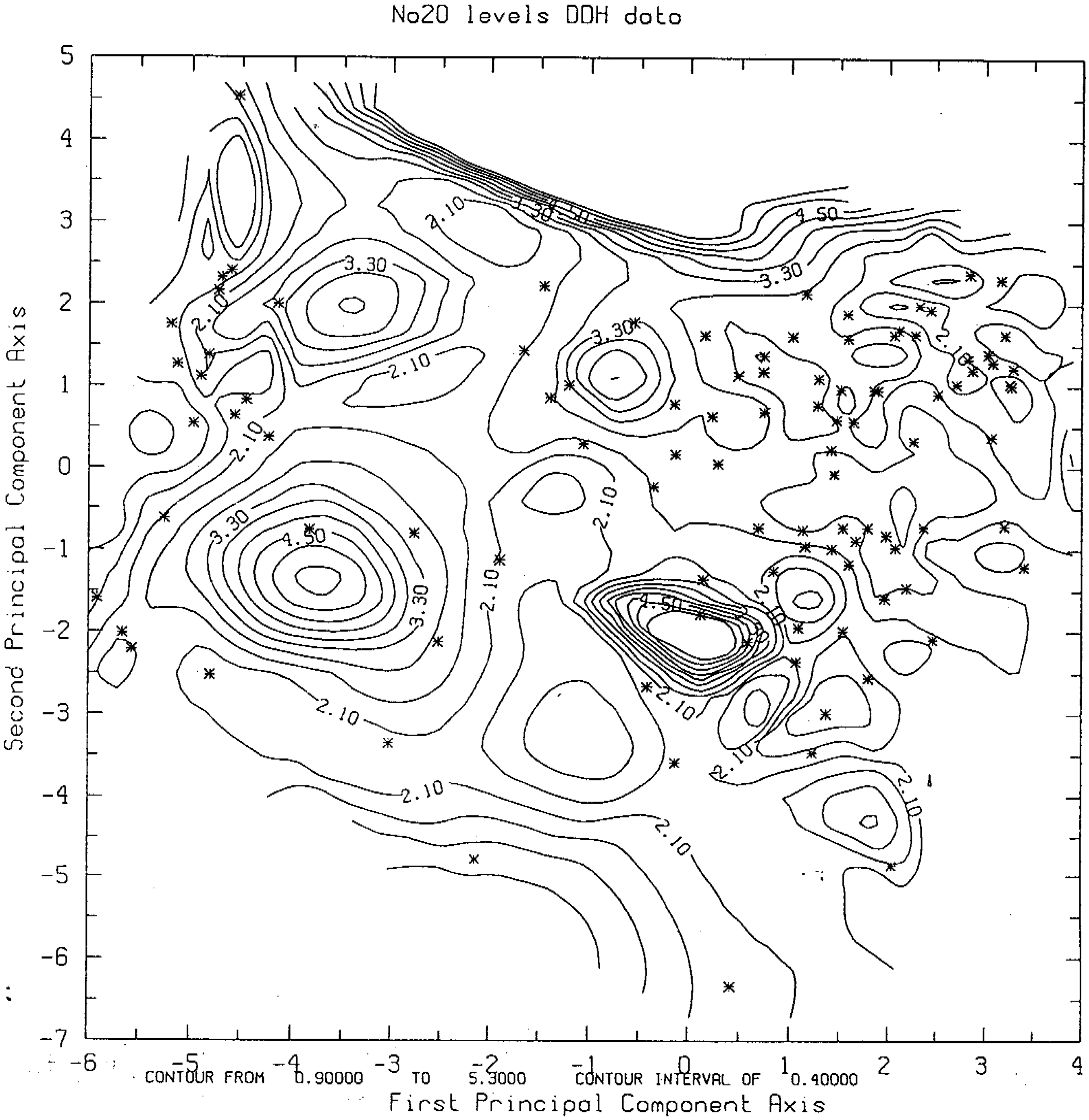

Fig. 30. Diamond drill core data. Projection of data onto the first and second principal component planes, with Na_2O values contoured.

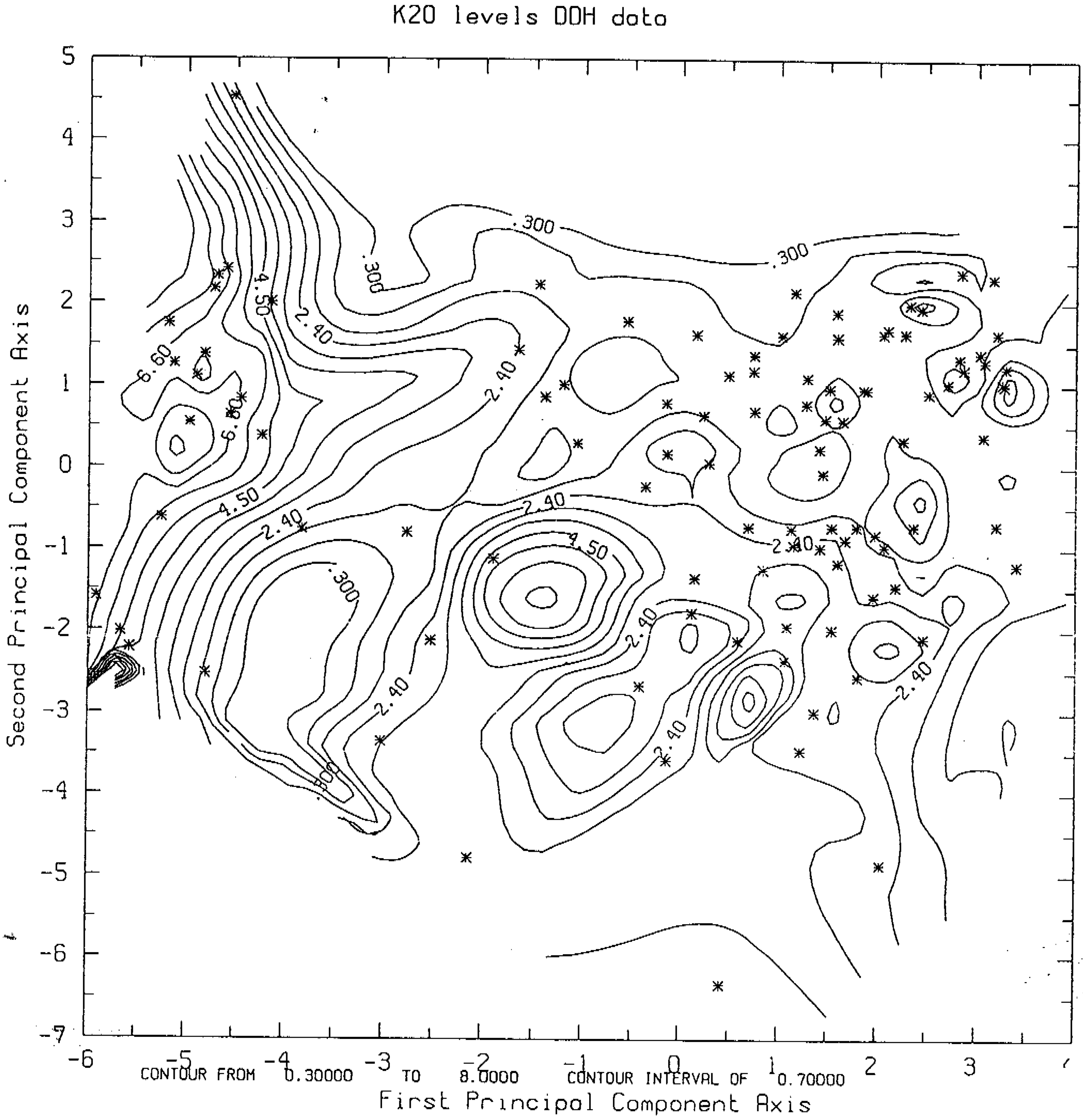

Fig. 31. Diamond drill core data. Projection of data onto the first and second principal component planes, with K_2O values contoured.

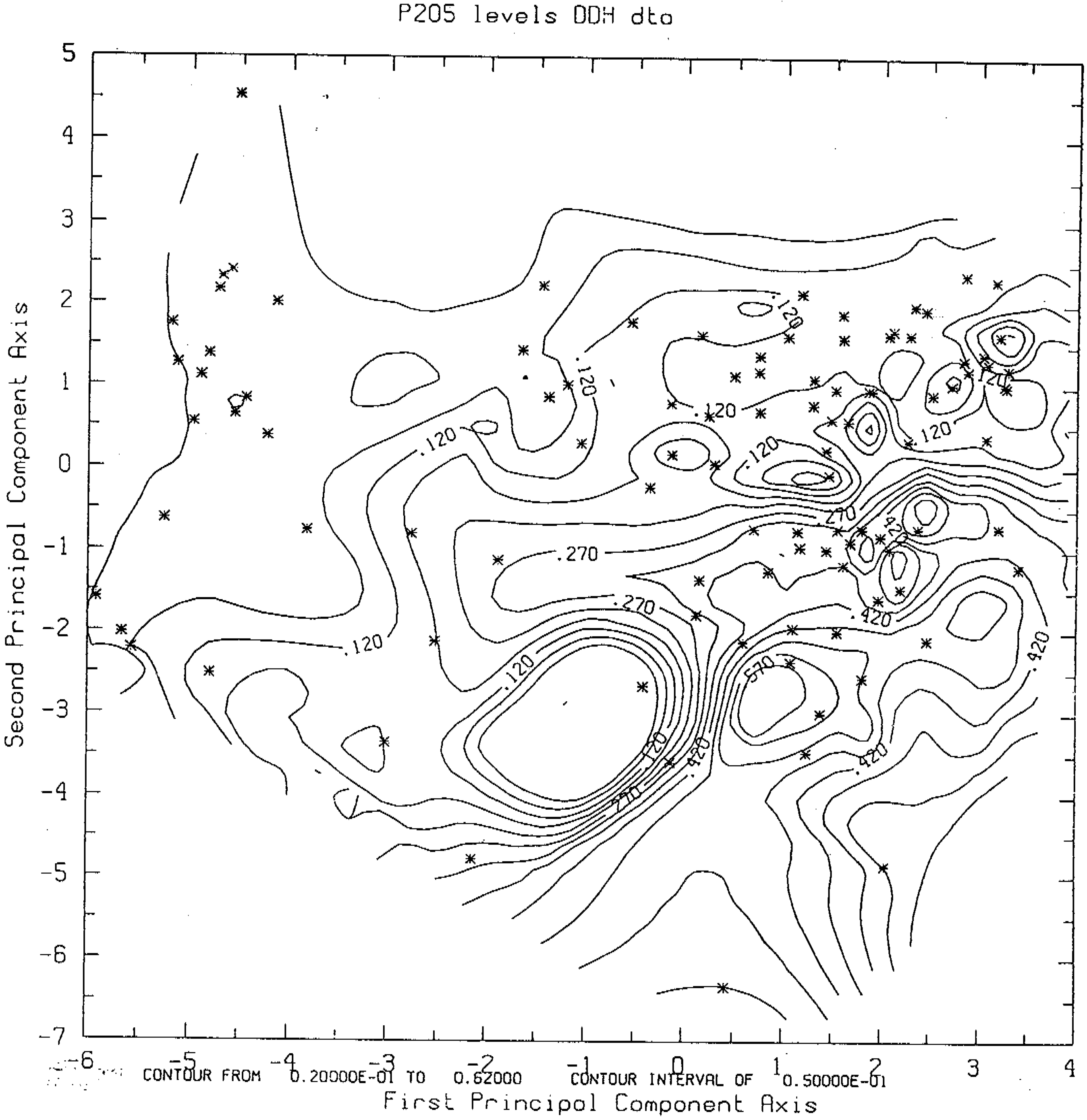

Fig. 32. Diamond drill core data. Projection of data onto the first and second principal component planes, with P_2O_5 values contoured.

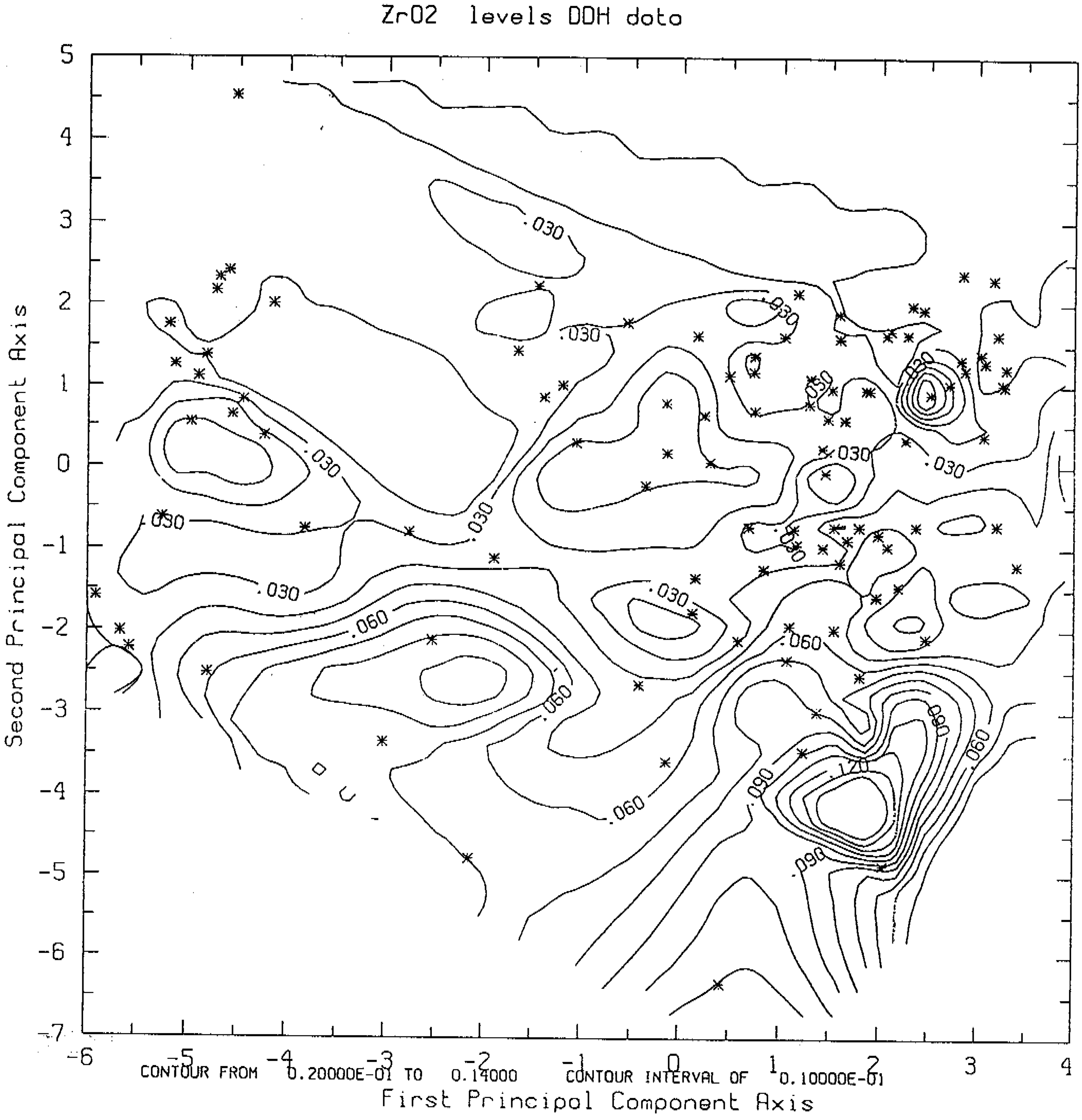

Fig. 33. Diamond drill core data. Projection of data onto the first and second principal component planes, with ZrO_2 values contoured.

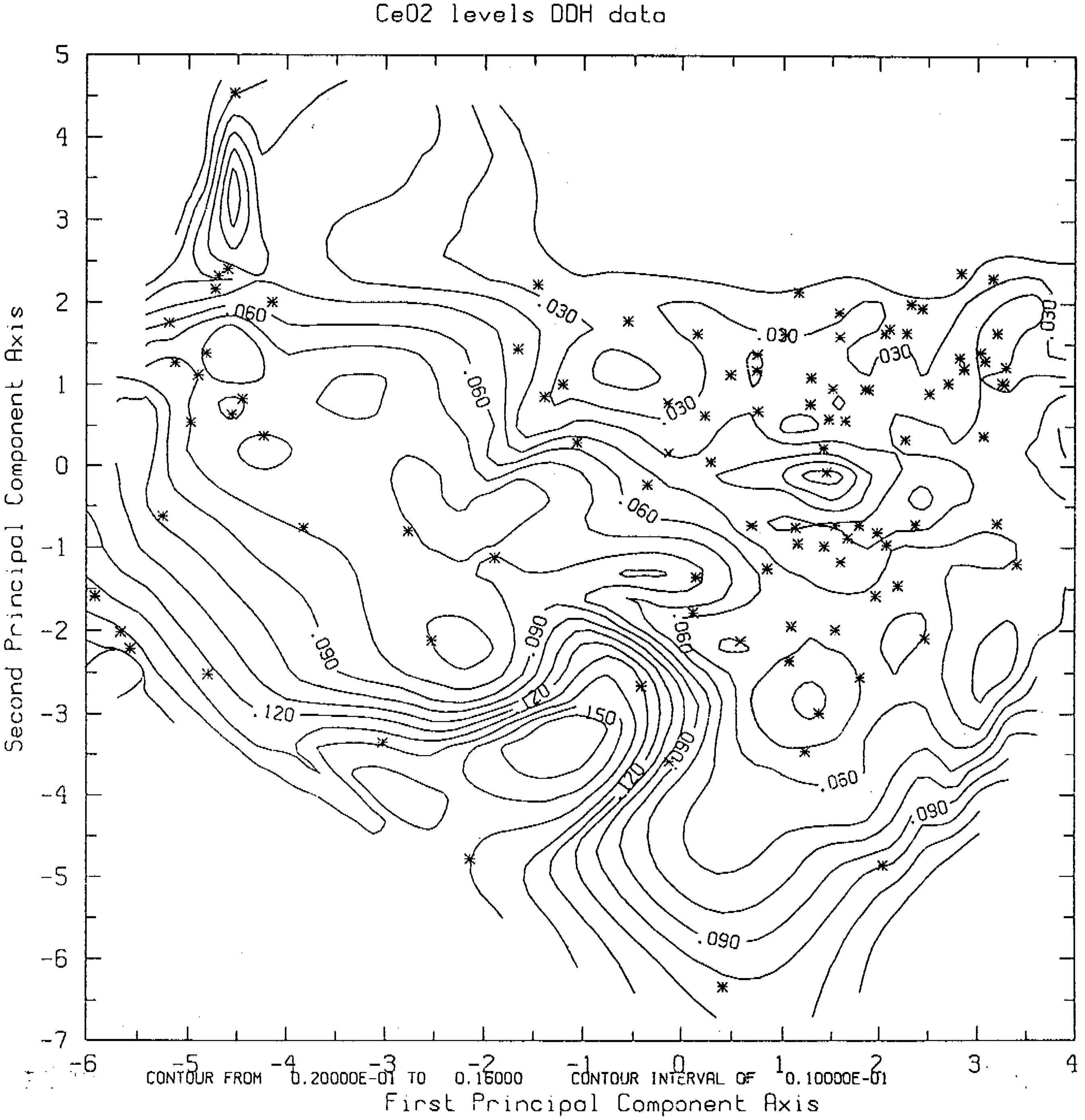

Fig. 34. Diamond drill core data. Projection of data onto the first and second principal component planes, with CeO_2 values contoured.

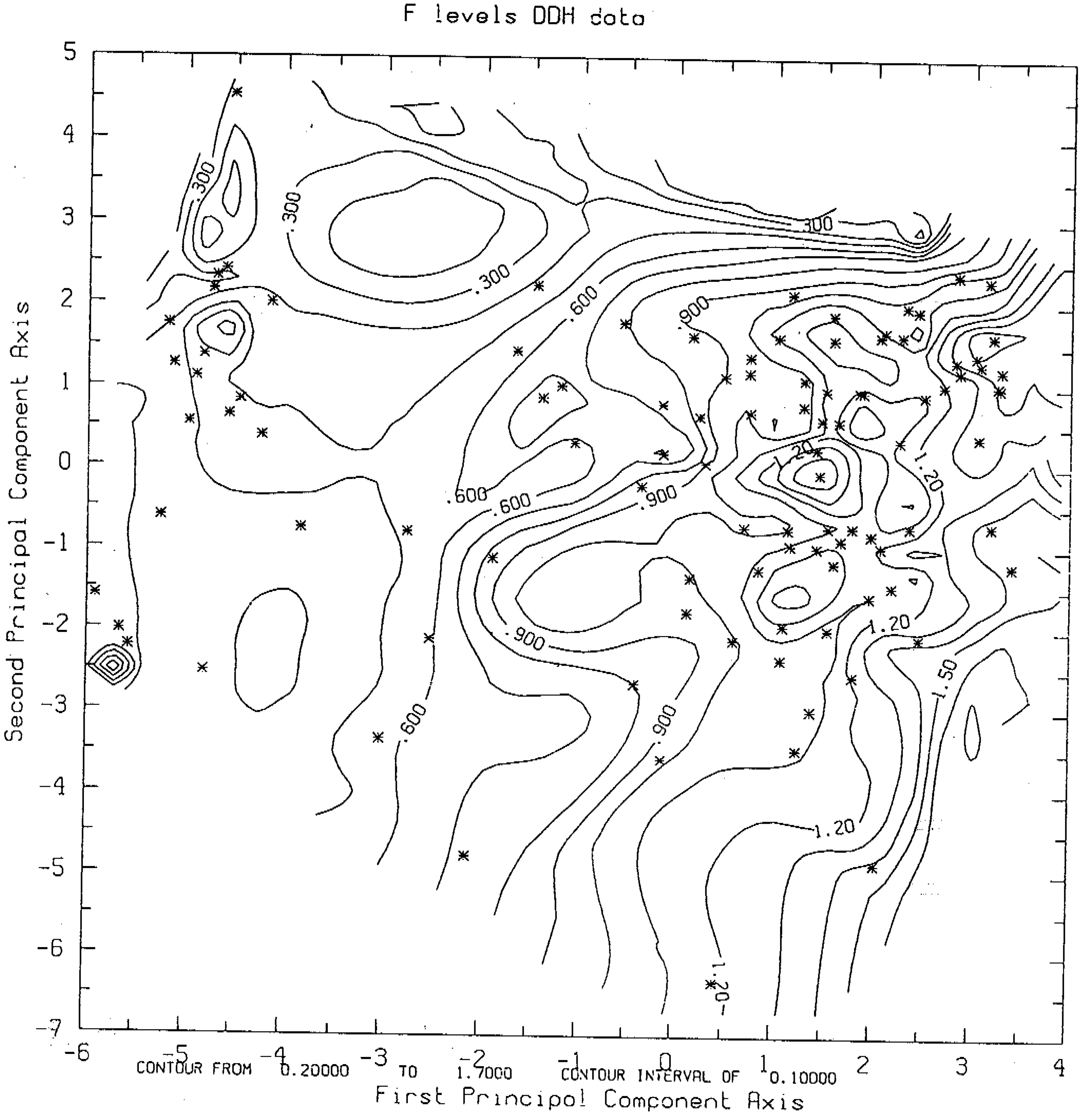

Fig. 35. Diamond drill core data. Projection of data onto the first and second principal component planes, with F^- values contoured.

As in most silicate petrology, variation in silica levels act as a framework on which the variation of all other elements can be explained. Figure 25 shows a general fall of SiO_2 concentrations from left to right, with a pronounced cluster occurring in the top left corner with SiO_2 levels ranging from about 52% to 58%. Outliers are caused by more subtle variations occurring in other elements, except for sample 16.40 m which contains substantially higher SiO_2 through quartz veining. Little is learnt on an examination of the Al_2O_3 variations, although samples 34.0 m and 4.12 m indicate relatively high Al_2O_3 values. (Take no notice of the contouring on the edges of the sample cluster that does not include any sample points. The contours are computer drawn and in such space the computer tends to compute erroneous contouring.)

The Fe_2O_3 variation shows a similar trend with high-SiO_2 rocks tending to have less than 3% Fe_2O_3 and the low-SiO_2 rocks containing over 10% Fe_2O_3. Again, the central island about (-0.5,-2.0) causes the only disturbance to an even trend of increasing Fe_2O_3, from left to right.

This is again observed in the case of MgO and CaO concentrations shown in Figs. 28 and 29. Low-SiO_2 rocks contain about 5% MgO and over 8% CaO, and high-SiO_2 rocks contain less than 2% MgO and 3% CaO. The central island again tends to have higher MgO and CaO levels.

Silica-rich rocks tend to be either Na_2O- or K_2O-enriched (Figs. 30 and 31). The silica-poor rocks contain about the same amounts of Na_2O as the Na_2O-poor, SiO_2-rich rocks. The central island cluster is relatively rich in Na_2O. Apart from the SiO_2-rich rocks, in which relatively large amounts of K_2O (presumably K-feldspar dominates), K_2O variation is almost constant throughout the projection.

Higher P_2O_5 levels (Fig. 32) tend to occur towards the bottom right-hand side of the projection, which is a trend contrary to all others so far described. Although relatively high values are recorded in the low-SiO_2 rocks, many higher values (0.42%) are recorded in the outliers of this area.

The same, but even less distinct, trends occur for ZrO_2 (Fig. 33), with relatively high values again being recorded in the bottom-right-hand corner of the projection.

Very relevant and interesting trends can be observed for the CeO_2 contours shown in Fig. 34. Relatively high CeO_2 values are found to occur in some SiO_2-rich rocks, to encompass part of the central island and include the outliers in the bottom right-hand corner of the projection. The area of high CeO_2 is shown in Fig. 34.

Samples containing high rare-earth concentrations are gathered together for comparison in Table 33.

Table 33. A selection of bulk assays of core samples all of which contain relatively high rare-earth concentrations (%).

	22.70	82.25	80.70	72.20	14.30	14.80	45.30
SiO_2	70.62	74.66	62.68	55.60	53.53	48.71	45.39
TiO_2	0.28	0.52	0.79	1.35	1.23	1.62	1.60
Al_2O_3	14.51	10.60	13.58	14.34	15.82	16.77	14.60
Fe_2O_3	1.48	4.35	6.69	11.56	11.06	11.60	16.31
MnO	0.03	0.05	0.11	0.16	0.12	0.14	0.23
MgO	0.73	1.47	3.37	4.64	3.06	4.29	6.24
CaO	2.13	2.97	4.50	6.41	5.78	4.99	8.05
Na_2O	2.30	1.90	1.98	2.06	2.05	2.16	2.29
K20	5.37	1.35	3.32	1.80	3.51	4.41	1.97
P_2O_5	0.03	0.15	0.13	0.12	0.49	0.61	0.37
La_2O_3	0.07	0.07	0.08	0.06	0.04	0.06	0.07
CeO_2	0.15	0.13	0.15	0.11	0.07	0.11	0.13
Y_2O_3	0.01	0.01	0.01	0.02	0.02	0.02	0.04
ThO_2	0.02	0.03	0.02	0.02	0.02	0.02	0.02
F-	0.55	0.43	0.59	0.87	1.11	1.25	1.53
Total	99.76	99.36	98.95	99.60	99.75	99.64	100.70

The main rock types, as defined by their clustering on the projection, are grouped in Table 34.

Table 34. The main rock types identified by the principal component analysis of the diamond drill core (%).

	16.00	71.00	80.70	4.12	95.40	14.80	45.30
SiO_2	69.43	72.32	62.68	53.23	50.87	48.71	45.39
TiO_2	0.30	0.56	0.79	1.37	1.13	1.62	1.60
Al_2O_3	15.85	13.43	13.58	15.88	13.05	16.77	14.60
Fe_2O_3	2.15	1.23	6.69	11.98	13.44	11.60	16.31
MnO	0.04	0.02	0.11	0.14	0.23	0.14	0.23
MgO	0.81	0.44	3.37	2.99	6.47	4.29	6.24
CaO	2.96	1.06	4.50	4.81	9.23	4.99	8.05
Na_2O	4.63	1.49	1.98	2.04	1.94	2.16	2.29
K_2O	1.48	7.61	3.32	4.29	1.34	4.41	1.97
P_2O_5	0.05	0.02	0.13	0.61	0.10	0.61	0.37
La_2O_3	0.05	0.02	0.08	0.03	0.02	0.06	0.07
CeO_2	0.08	0.05	0.15	0.05	0.02	0.11	0.13
Y_2O_3	0.00	0.01	0.01	0.01	0.01	0.02	0.04
ZrO_2	0.03	0.05	0.07	0.07	0.02	0.12	0.03
ThO_2	0.02	0.01	0.02	0.01	0.01	0.02	0.02
F-	0.46	0.34	0.59	1.02	0.96	1.25	1.53
Total	100.19	99.07	98.95	99.60	99.75	99.64	100.70

These rocks could be described as follows:

16.00 m:	SiO_2-rich (about 70%) and Na_2O-rich. Low in MgO, Fe_2O_3, TiO_2, P_2O_5, and can contain significant allanite.
71.00 m:	SiO_2-rich (about 70%) and K_2O-rich. Low in most other elements including rare-earths.
80.70 m:	Lower SiO_2 (about 62%). Na_2O, K_2O, TiO_2, MgO, Na_2O, K_2O, and P_2O_5 are all neither low or high.

4.12 m: An example of the rocks belonging to the central cluster. Lower SiO_2 (55%) and moderately high levels of TiO_2, Fe_2O_3, MnO, MgO, CaO and K_2O.

95.40 m: A typical rare-earth-free amphibolite. Low SiO_2 values (about 50%), and high values of TiO_2, Fe_2O_3, CaO, MnO, MgO, and low in alkalies.

45.30 m and 14.80 m: Similar to amphibolites but rich in rare-earths and P_2O_5. Very low SiO_2 levels (< 50%).

The four different rock types shown in Fig. 24 illustrate the fact that it is possible to find pegmatitic rocks which are rich in free quartz and in rare earths, pegmatitic rocks which have very low levels of rare earths, amphibolites rich in rare earths and amphibolites which are barren in these elements.

The rare earths are contained in allanite and no monazite was found in any of this suite. The allanite of the amphibolites differs from that found in the pegmatites. Although both appear to be primary (i.e. the allanite appears to have developed with the other major constituents of the rock and not to have been placed there along veins), the amphibolite allanite occurs as small grains, and the thorium levels are much lower. However, the allanite-bearing amphibolites are not homogeneous rocks and it is possible that material which included rare earths was intruded into barren amphibolites, as was probably the case for the allanite pegmatites.

THE MINERALOGY AND CHEMISTRY OF HEAVY MINERAL SAND SAMPLES

Monazite is a mineral resistant to weathering and occurs in concentrations of about one percent in most commercially-exploited heavy mineral sand deposits in Australia. On recognition of significant monazite mineralization in this area, CSIRO suggested that the sands downstream should be investigated. As a result, Dr. Murrell carried out a brief survey of the Hale River, which constitutes the main drainage system, and during this survey he collected four pan concentrates which are described as follows;

(i) Bronco Bone, 50 km downstream, (sample 2898),

(ii) Numery Horse Paddock, 80 km downstream, (sample 2899),

(iii) No. 2 bore - head of fan, 105 km downstream, (sample 2900),

(iv) Numery South Boundary, 115 km downstream, (sample 2901).

A magnetic separation, which roughly divided the samples into three equal lots, was analyzed by XRF for the usual set of elements and the results are presented in Table 35. Samples of the grains were also mounted in resin, polished and examined by SEM. The proportions of different minerals was determined by point counting, identifying each grain by EDS. The weight-percent of each mineral present in each fraction, together with the total number of grains counted, are presented in Table 36.

Table 35. *BRONCO BONE.* Results of XRF analysis (%).

	(1)	(2)	(3)	(4)	(5)	(6)
SiO_2	25.29	25.34	41.12	41.29	63.06	63.45
TiO_2	8.14	8.16	1.37	1.40	1.84	1.83
Al_2O_3	11.77	11.78	15.25	15.34	11.07	11.02
Fe_2O_3*	47.75	47.48	20.67	20.58	4.43	4.44
MnO	1.51	1.50	0.93	0.93	0.11	0.12
MgO	4.29	4.32	7.64	7.63	4.60	4.71
CaO	3.46	3.44	10.83	10.76	10.70	10.66
Na_2O	0.45	0.45	0.80	0.93	1.02	0.88
K_2O	0.33	0.33	0.59	0.59	1.13	1.14
P_2O_5	0.07	0.06	0.07	0.07	0.42	0.41
F^-	0.95	0.91	0.39	0.49	0.08	0.19
Y_2O_3	0.02	0.01	0.02	0.02	0.02	0.02
ZrO_2	0.01	0.01	0.02	0.01	0.20	0.21
LaO_2	0.05	0.06	0.04	0.04	0.03	0.02
CeO_2	0.07	0.08	0.05	0.05	0.04	0.04
ThO_2	0.02	0.02	0.02	0.01	0.02	0.02
LOF	0.00	0.00	0.06	0.16	1.06	1.30
Total	104.18	103.95	99.85	100.28	99.84	100.45

* Fe_2O_3 are qualitative estimates.

(1) 2889 A/1 }Magnetic
(2) 2889 A/2 } "
(3) 2889 B/1 }Mid-magnetic
(4) 2889 B/2 } " "
(5) 2889 C/1 }Least magnetic
(6) 2889 C/2 } " "

Table 35 (cont.). *NUMERY HORSE PADDOCK*. Results of XRF analysis (%).

	(7)	(8)	(9)	(10)	(11)	(12)
SiO_2	12.74	12.66	37.64	37.28	56.82	56.71
TiO_2	12.03	11.94	2.07	2.03	1.55	1.57
Al_2O_3	6.86	6.72	18.16	18.07	12.38	12.37
Fe_2O_3*	68.91	68.00	31.04	30.81	9.23	9.24
MnO	1.38	1.37	2.26	2.26	0.34	0.35
MgO	2.23	2.16	6.16	6.07	5.16	5.10
CaO	1.27	1.25	5.13	5.00	10.63	10.61
Na_2O	0.32	0.04	0.42	0.09	1.10	0.69
K_2O	0.09	0.08	0.20	0.19	0.86	0.87
P_2O_5	0.07	0.07	0.08	0.09	0.42	0.42
F^-	1.25	1.22	0.54	0.49	0.57	0.44
Y_2O_3	0.01	0.01	0.05	0.05	0.04	0.04
ZrO_2	0.01	0.01	0.02	0.01	0.63	0.64
LaO_2	0.07	0.06	0.05	0.04	0.13	0.12
CeO_2	0.09	0.09	0.06	0.06	0.22	0.23
ThO_2	0.02	0.02	0.02	0.02	0.08	0.08
LOF	0.00	0.00	0.00	0.00	0.74	0.74
Total	107.34	105.69	103.88	102.55	100.90	100.22

* Fe_2O_3 are qualitative estimates.

(7) 2890 A/1 }Magnetic
(8) 2899 A/2 } "
(9) 2899 B/1 }Mid-magnetic
(10) 2899 B/2 } " "
(11) 2899 C/ }Least magnetic
(12) 2899 C/2 } " "

Table 35 (cont.). *No. 2 BORE*. Results of XRF analysis.

	(13)	(14)	(15)	(16)	(17)	(18)
SiO_2	9.49	9.53	37.14	37.16	63.42	63.44
TiO_2	12.90	12.53	3.03	3.01	1.44	1.44
Al_2O_3	4.74	4.70	15.88	15.69	11.24	11.06
Fe_2O_3*	74.54	72.81	29.69	29.66	7.30	7.25
MnO	1.02	0.99	1.61	1.62	0.25	0.25
MgO	1.77	1.63	6.50	6.50	4.08	3.97
CaO	1.09	1.09	6.76	6.74	8.41	8.37
Na_2O	0.61	0.00	0.59	0.29	0.74	0.56
K_2O	0.14	0.13	0.41	0.40	1.02	1.02
P_2O_5	0.05	0.06	0.09	0.10	0.36	0.37
F-	1.44	0.89	0.44	0.54	0.47	0.26
Y_2O_3	0.01	0.01	0.04	0.04	0.03	0.03
ZrO_2	0.02	0.02	0.02	0.03	0.67	0.69
LaO_2	0.07	0.06	0.05	0.05	0.08	0.08
CeO_2	0.10	0.09	0.08	0.07	0.15	0.15
ThO_2	0.02	0.02	0.02	0.02	0.05	0.05
LOF	0.00	0.00	0.00	0.00	0.98	1.00
Total	108.02	104.56	102.36	101.92	100.70	99.99

* Fe_2O_3 are qualitative estimates.

(13) 2900 A/1 }Magnetic
(14) 2900 A/2 } "
(15) 2900 B/1 }Mid-magnetic
(16) 2900 B/2 } " "
(17) 2900 C/1 }Least magnetic
(18) 2900 C/2 } " "

Table 35 (cont.). *NUMERY SOUTH BOUNDARY*. Results of XRF analysis.

	(19)	(20)	(21)	(22)	(23)	(24)
SiO_2	6.76	6.62	34.13	34.22	59.74	63.45
TiO_2	13.65	13.44	4.29	15.92	1.82	1.83
Al_2O_3	3.68	3.65	15.90	34.14	11.37	11.02
Fe_2O_3*	82.18	79.63	34.32	1.84	6.75	4.44
MnO	0.92	0.91	1.83	5.62	0.20	0.12
MgO	1.19	1.32	5.79	5.46	4.36	4.71
CaO	0.68	0.68	5.47	0.16	9.90	10.66
Na_2O	0.00	0.19	0.46	0.25	0.94	0.88
K_2O	0.06	0.06	0.23	4.26	0.83	1.14
P_2O_5	0.06	0.04	0.10	0.11	0.63	0.41
F^-	1.47	1.42	0.54	0.75	0.35	0.19
Y_2O_3	0.01	0.01	0.04	0.05	0.05	0.02
ZrO_2	0.02	0.02	0.02	0.03	1.22	0.21
LaO_2	0.05	0.06	0.06	0.05	0.21	0.02
CeO_2	0.08	0.09	0.09	0.08	0.39	0.04
ThO_2	0.02	0.02	0.02	0.03	0.13	0.02
LOF	0.00	0.00	0.00	0.00	1.12	1.30
Total	110.83	108.19	103.30	102.97	100.01	100.45

* Fe_2O_3 are qualitative estimates.

(19) 2901 A/1 }Magnetic
(20) 2901 A/2 } "
(21) 2901 B/1 }Mid-magnetic
(22) 2901 B/2 } " "
(23) 2901 C/1 }Least magnetic
(24) 2901 C/2 } " "

Each sample exhibits a different mineralogy.

2898 *Magnetic fraction.*

The sample consists mainly of magnetite (24.5 wt%) or titanomagnetite (19.5 wt%), which indicates that the sand is fresh and not weathered. There is also 19.8 wt% ilmenite and 6.5 wt% garnet.

Mid-magnetic fraction.
Mainly amphibole and epidote, with about 5 wt% garnet.

Least magnetic fraction.
Mainly quartz (20.7 wt%) and garnet (19.9 wt%) The sample also contains about 2 wt% zircon.

2899 *Magnetic fraction.*
Similar to 2898 but with higher proportions of magnetites (about 70 wt%).

Mid-magnetic fraction.
Over 50 wt% garnet and no amphibole. Minor amounts of ilmenite and magnetite.

Least magnetic fraction.
The sample contains about 4 wt% monazite and 5 wt% zircon, together with 12.7 wt% garnet.

2900 *Magnetic fraction.*
Similar to 2899.

Mid-magnetic fraction.
An amphibole- and epidote-rich fraction.

Least magnetic fraction.
Mainly quartz (33.7 wt%) and epidote (17.1 wt%) with 2 wt% monazite and 4 wt% zircon.

2901 *Magnetic fraction.*
Similar to the previous two samples.

Mid-magnetic fraction.
Few particles determined.

Least magnetic fraction.
A very wide range of minerals with pyroxene (21 wt%), amphibole (15 wt%), and quartz (16.3 wt%) the major minerals. The sample also contains about 6.5 wt% zircon and 1.9 wt% monazite.

The mineralogy and chemistry of the four samples are encouraging in that, should very large deposits of such material occur, ilmenite, zircon, monazite, garnet and perhaps magnetite are all commercially important.

It is strongly recommend that the Hale river system should be investigated further.

Table 36. Results of the SEM examinations of the minerals found in the grains (wt%).

	MAGNETIC FRACTION			
	Sample			
Mineral	2898	2899	2900	2901
Magnetite	24.51	41.94	37.52	50.09
Ti-magnetite	19.49	29.09	32.40	25.04
Amphibole	11.62	6.31	2.99	3.05
Ilmenite	19.83	17.18	16.61	17.45
Pyroxene	7.75	1.13	2.99	2.04
Epidote	6.38	-	2.91	1.44
Garnet	5.67	1.34	-	-
Quartz	2.51	0.38	0.76	-
Kaolinite	1.41	-	0.76	0.26
Biotite	0.44	-	0.91	0.31
Ca-Al-Si	0.40	-	-	-
(Ca,Mn,Fe)AlSi	-	1.62	-	-
Plagioclase	-	0.38	-	-
Clay(?)	-	0.38	-	-
Sphene	-	0.25	0.29	-
Scapolite	-	-	0.49	-
Apatite	-	-	-	0.31
Unknown	-	-	1.35	-
Total	100.01	100.00	99.98	99.99
No. of grains counted	170	284	215	183

Table 36 (cont.). Results of the SEM examinations of the minerals found in the grains (wt%).

MID-MAGNETIC FRACTION

Mineral	Sample 2898	 2899	 2900	 2901
Magnetite	-	2.29	2.90	n.d.
Ti-magnetite	6.40	4.57	9.01	n.d.
Amphibole	52.62	-	36.86	n.d.
Ilmenite	1.35	4.84	6.30	n.d.
Pyroxene	6.86	5.46	13.11	n.d.
Epidote	20.30	29.07	24.03	n.d.
Garnet	5.46	53.77	2.82	n.d.
Quartz	0.64	-	1.45	n.d.
Kaolinite	1.92	-	-	n.d.
Biotite	3.81	-	1.73	n.d.
Sphene	-	-	1.34	n.d.
Scapolite	-	-	0.46	n.d.
Feldspar	0.64	-	-	n.d.
Total	100.00	100.00	100.01	
No. of grains counted	125	62	153	

Table 36 (cont.). Results of the SEM examinations of the minerals found in the grains (wt%).

	LEAST MAGNETIC FRACTION Sample			
Mineral	2898	2899	2900	2901
Magnetite	-	0.98	-	-
Amphibole	8.04	17.65	9.19	15.03
Ilmenite	-	1.04	-	-
Pyroxene	14.34	7.07	9.19	20.68
Epidote	9.20	18.78	17.05	14.67
Garnet	19.91	12.65	-	6.73
Quartz	20.73	20.74	33.68	16.29
Kaolinite	2.90	0.49	-	1.02
Biotite	0.51	-	1.07	-
Plagioclase	9.13	6.91	7.70	5.78
Sphene	5.17	3.99	3.86	1.38
Scapolite	-	-	6.72	-
Apatite	1.12	-	-	0.61
Feldspar	3.84	-	3.85	9.46
Monazite	-	4.46	3.40	1.85
Zircon	3.32	5.24	3.33	6.51
Muscovite	0.46	-	0.96	-
Cr-spinel	0.84	-	-	-
Chlorite	0.49	-	-	-
Total	100.00	100.00	100.00	100.01
No. of grains counted	177	166	93	162

CONCLUSIONS

As a result of the studies described in this report, it is evident that the rare-earth mineralization in this locality is much more complicated than was originally described. Now the following three types of rare-earth mineralization have been identified;

1) Allanite pegmatites occurring in small (several metres) wide pods. The allanite occurs as large crystals and the thorium content is relatively high.

2) Allanite amphibolites, with the allanite occurring in much smaller crystals with similar compositions except for much lower thorium levels.

3) Monazite amphibolites or granulites associated with biotite and garnet.

The nature of the rare-earth mineralization occurring in the rocks of the diamond drill core and in the rocks of the thorium anomalies suggest that rare earths have been introduced both in the form of coarse-grained pegmatites and finer-grained, more basic rocks similar in bulk composition to amphibolites. If this is so, then it is necessary to postulate some external origin of all the rare earths. It is possible that with partial melting of the monazite-bearing granulites or amphibolites, and subsequent mixing with carbonatite (thus introducing calcium?), the monazite was converted to allanite and apatite. The amount of calcium needed would be small, from a comparison of rare-earth-free and rare-earth-containing rocks of this class.

The extent of the monazite-bearing granulites or amphibolites and the relationship between the carbonatites and rare-earth mineralization needs to be defined in more detail. What is the extent and nature of the allanite mineralization in relationship to the carbonatites? There is some evidence to suggest that allanite-rich rocks are associated with carbonatites, but no allanite bearing carbonatites have yet been identified.

The nomenclature used in this and previous reports needs to be tightened from that which is more applicable to preliminary field surveys. The term *pegmatites* has been used loosley to include granites and in some cases rocks which could be more correctly called migmatites. The term *amphibolites* has been used too widely to include rocks which contain no amphibole.

The mineralogy and geochemistry of the thorium anomalies is still not sufficiently well understood. It is recommended that more detailed surveys be undertaken in the two areas - Pighole and Corapaira - so that a better understanding of the cause of the anomalies can be obtained.

Detailed examination of the diamond drill core has shown that there is more than one type of pegmatite or migmatite intruded into amphibolite. Some contain signficant quantities of allanite and, more commonly, others, which are usually more SiO_2-rich, contain very little. More insight may be gained into the nature of the rare-earth-containing and rare-earth-barren intrusions by studying the diamond drill core in detail. Knowing the characteristics of the rocks that contain rare-earth elements, it may be possible to deduce the relationships between the various intruding rocks.

For commercial exploitation, it is essential to discover much larger allanite-rich pegmatite bodies, or substantial quantities of monazite-bearing amphibolites. Selective mining would be difficult to undertake, but sorting by radiation levels of lump material might be feasible. Larger masses of allanite-bearing pegmatite need to be discovered and it is recommened that the most likely method of acheiving these aims is to carry out sytematic surface geological mapping, first to a 1:25,000 scale and then in areas of interest to a 1:5,000 scale. Prior to this mapping, a 1:25,000 topographical map with further 1:5,000 topographical maps of selected areas needs to be constructed.

If large reserves of the weathered biotite-garnet-monazite rock named the "hot clay" could be proved, these would likely be commercially attractive because very high grades of monazite have been produced by very simple physical beneficiation.

The identification of monazite-bearing rocks and monazite- and zircon-bearing heavy mineral sands, has important and wider implications. It is strongly recommended that more detailed surveys be conducted to evaluate heavy mineral sand deposits.

There is no doubt that the allanite mineralization in the areas is exceptionally extensive. In addition, it is now known that allanite decomposes or weathers very easily. It is possible that an examination of the clay reaction in the river system draining the area of rare-earth mineralization may lead to the discovery of rare-earth containing clays.

REFERENCES

[1] Frost, M.T., Harrowfield, I.R., Tassios S., Tsambourakis G., and Wilson B.W. (1988): "A description of a rare-earth prospect near White Range in the Northern Territory". MCC 821, February 1988.

[2] Mineral Facts and Figures, 1985 Edition, U.S. Dept. Interior, Bureau of Mines, Bulletin No. 671, 1985, p. 651.

APPENDIX A

SAMPLE DETAILS

SAMPLE LIST (NEW SAMPLES)

6133 - 6145	(RUN 5, 090):	Pighole Creek anomaly, Sites 01-09
6146 - 6151	(RUN 4, 152):	North-East fence anomaly, Sites 10-15.
6152	(RUN 6):	Junction between allanite-bearing "pyroxenite" and allanite-bearing "pegmatite" adjacent carbonatite, REE Soils.
6153	(RUN 5, 090):	Th + K area, west Pighole Tank, Site 17.
6154 - 6166	(RUN 4, 147):	Conapaira anomaly, Sites 18-25 (Thorium/Magnetite area).
6167 - 6171	(RUN 2, 179):	Canteen Creek anomaly, Sites 26-29
6172 - 6179	(RUN 2, 183):	Paradise Yard East anomaly, Sites 30-32.
6180 - 6183	(RUN 2, 183):	South Bank anomaly (circular intrusion) Sites 33 & 34
6184 - 6187	(RUN 4, 148):	Magnetite + Thorium (sites 35 & 36) low level, extensive Thorium, Duffer N, sites 37 & 38.
6188	(RUN 3, 169):	Ambalindum anomaly, pan concentrate next to sillimanite and alteration (gneissic area in middle).
6192 - 6194	(RUN 1, 195):	Anomalies adjacent to "Tertiary" ironstones, sites 41-43.
6195 - 6203	(RUN 2, 183):	Paradise West/McLesh's Yd track Northern anomaly, sites 44-57. Around basic plug which cuts foliation in granites but is itself cut by allanite-bearing pegmatites.

6204 - 6209	Rock associations, all containing allanite, Rare Earths south.
6211 - 6212	Muller Flat anomaly.
6219 - 6220	These samples were collected by Bluey Bruce.
6226 - 6227	Rare Earths 1 and 2
6228	A very radioactive thorium source collected by Lindsay Johansen from his rare-earths area. This appears to be a very different material.

Mt Dorren sheet.

3084	Paradise Well, allanite-rich rock.
3149	Hale river, magnetite rich rock.
6228	No description
6275	Magnetite allanite near Kato, 100m East of the 1st drill hole.
6276	Thorium anomaly, west of the RE investigated area.
6277	Gully bottom, bellow Thorium anomaly. Coarse allanite, adjacent dolerite/amphibolite (6277B).
6278	50 m further down. Garnet- bearing, layered rock (6278A), adjacent unsheared amphibolite/dolerite (6278B).
6279	Allanite/magnetite zone. Chlorite zone, east of origin.
6280	Hale River. Weathered deposits.

6281	Magnetite rich rock, with chlorite (?). Same area.
6282	Serpentinite from chlorite schist(?), RE's southern end.
3084	Apatite-rich rock, Paradise Well.
3149	Magnetite-rich rock, Hale River.

Description of diamond drill core

No.	Wt (g)	No.	Wt (g)
90	603.5	99	797.8
91	1031.9	100A	1092.0
92	1508.1	100B	1677.5
93	1619.3	101A	1252.5
95	1304.5	101B	1493.3
96	765.2	102	825.1
97	1126.7	98	836.0

Petrographical description of the drillcore.

Depth in meters	Comments
4.12 - 15.80 m.	Section dominated by fine- to medium-grained amphibolite or biotite amphibolite. Quartz and/or feldspar concentrations forming bands or patches of varied thickness are common and demonstrate the shistosity of the rock.
15.80 - 29.40 m.	Medium- to coarse-grained granite. Pink feldspar, dirty white plagioclase. The almost colourless quartz and the black biotite are the main minerals. Allanite grains (up to 5 cm) are clearly visible in many parts of the core.

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AAS1/2
Order No. 73 　　　Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
2778	0.034	<2	17	80	29	20	18	155
2779	0.004	2	10	75	17	14	12	96
2780	0.001	<2	29	90	38	31	23	135
2781	0.001	<2	27	85	40	30	25	215
2782	<0.001	<2	19	75	30	23	17	91
2783	0.001	5	20	110	39	28	22	210
2784	0.001	<2	17	95	66	29	21	160
2785	<0.001	<2	15	80	37	19	15	185
2786	0.001	<2	14	80	38	23	13	110
2787	0.016	4	21	85	36	17	18	210
2788	0.007	<2	25	85	36	31	21	165
2789	<0.001	8	12	75	15	25	13	82
2790	0.003	<2	20	80	29	25	21	120
2791	0.002	<2	30	110	56	31	17	140
2792	0.001	<2	30	110	41	34	16	180
2793	<0.001	<2	26	100	34	30	21	130
2794	0.002	<2	24	100	40	32	16	84
2795	0.002	3	28	100	61	32	39	125
2796	<0.001	3	27	140	51	43	25	205
2797	<0.001	<2	27	90	63	29	24	180
2798	<0.001	<2	25	80	54	26	19	180
2799	0.003	<2	17	60	32	21	22	165
2800	0.010	<2	21	85	47	26	19	215
2801	0.12	<2	17	75	30	19	26	205
2802	0.002	<2	21	100	37	30	18	215
2803	0.002	<2	15	85	32	27	20	185
2804	0.001	<2	20	95	42	34	17	160
2805	0.002	<2	19	80	36	28	18	230
2806	0.001	<2	19	80	42	26	29	240
2807	<0.001	<2	25	80	40	33	20	160
2808	<0.001	<2	19	80	34	24	16	160
2809	<0.001	<2	14	80	31	27	22	100
2810	<0.001	<2	18	70	39	22	26	115
2811	<0.001	<2	12	40	24	20	16	77
2812	<0.001	3	14	40	50	15	24	59
2813	<0.001	2	15	80	26	20	16	140
2814	0.009	2	13	65	23	16	19	88
2815	0.005	<2	24	95	31	35	24	100
2816	0.003	<2	24	90	51	35	19	110
2817	0.006	<2	21	110	44	36	18	120
Detn limit	(0.001)	(2)	(5)	(10)	(2)	(5)	(5)	(2)

Analysis code AAS9 Report 8DN0664 Page G2
AAS1/2
Order No. 73 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
2818	0.003	<2	19	100	34	32	19	110
2819	0.001	<2	24	100	47	36	17	135
2820	<0.001	3	16	70	34	23	15	140
2821	<0.001	2	20	90	46	31	17	130
2822	0.002	<2	18	85	55	27	14	130
2823	0.001	<2	20	65	52	24	19	140
2824	0.001	<2	20	75	60	25	15	140
2825	<0.001	<2	15	75	29	20	17	170
2826	<0.001	3	19	80	29	25	19	135
2827	<0.001	<2	15	60	43	16	17	135
2828	<0.001	<2	18	95	38	26	16	120
2829	<0.001	<2	21	100	32	28	19	145
2830	0.24	<2	26	120	44	38	17	135
2831	0.012	<2	28	110	43	41	18	115
2832	<0.001	<2	25	110	46	35	20	125
2833	<0.001	9	24	120	57	26	18	140
2834	0.001	4	21	150	50	52	16	165
2835	<0.001	5	22	150	64	45	21	175
2836	<0.001	<2	23	120	50	42	16	140
2837	0.004	<2	22	150	54	55	16	155
2838	<0.001	<2	26	85	55	33	14	105
2839	<0.001	4	21	85	68	36	14	115
2840	0.001	4	24	100	48	38	19	105
2841	<0.001	<2	25	90	42	42	21	110
2842	<0.001	4	27	110	45	42	21	115
2843	0.014	<2	26	85	43	32	17	110
2844	<0.001	6	22	95	35	32	17	110
2845	<0.001	<2	24	100	36	35	16	90
2846	<0.001	3	22	100	49	40	15	75
2847	<0.001	5	23	140	56	53	12	98
2848	0.001	3	20	100	44	33	19	120
2849	<0.001	<2	17	45	34	22	24	78
2850	0.026	<2	17	80	33	24	30	105
2851	0.012	3	23	55	32	25	19	86
2852	0.013	<2	16	70	30	20	15	97
2853	0.002	<2	16	70	32	23	18	110
2854	0.001	5	17	95	47	20	20	160
2855	0.003	<2	13	80	49	17	18	115
2856	0.003	2	16	85	46	18	25	160
2857	0.004	7	15	95	47	18	23	150
2869	<0.001	2	23	100	53	38	18	155
2870	0.003	<2	26	110	92	35	16	170
Detn limit	(0.001)	(2)	(5)	(10)	(2)	(5)	(5)	(2)

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15th December 1988

Our Ref : 8DN0664

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CLIENT : Endras No: 2 Ltd.

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Pages G1 & G2

DATE RECEIVED : 1st November 1988

A. Ciplys

Alan Ciplys
Manager
CLASSIC COMLABS LTD. (N.T.)

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

Analysis code AAS10 Report 9DN0102 Page G1
AAS1
Order No. 74 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
2871	0.045	<2	21	80	42	47	16	88
2872	0.015	<2	22	30	120	26	18	155
2873	0.008	<2	21	30	61	32	13	135
2874	0.013	<2	21	35	49	32	10	110
2875	0.005	<2	20	50	47	29	10	87
2876	0.011	<2	23	35	67	28	14	135
2877	0.008	<2	26	45	47	44	35	105
2878	0.003	<2	26	30	51	48	14	110
2879	0.003	<2	25	35	32	38	14	92
2880	0.003	<2	30	65	64	42	15	120
2881	0.004	<2	25	50	44	35	16	165
2882	0.004	<2	20	20	38	30	13	97
2883	0.005	<2	23	25	36	35	13	98
2884	0.008	<2	19	15	46	26	20	135
2885	0.005	<2	20	15	52	26	15	110
2886	0.010	2	24	25	63	32	14	160
2887	0.013	2	22	25	54	31	14	140
2888	0.009	<2	23	25	45	30	14	115
2889	0.007	<2	23	30	12	33	13	110
2890	0.006	<2	20	35	64	40	12	145
2891	0.012	<2	23	30	45	33	15	155
2892	0.019	<2	20	30	42	37	10	58
2902	0.004	3	19	20	99	28	17	69
2903	0.012	3	21	25	78	25	11	105
2904	0.012	<2	18	25	73	31	39	96
2905	0.017	<2	25	25	60	33	25	105
2906	0.004	<2	25	25	49	39	14	115
2907	0.005	<2	27	35	78	38	12	105
2908	0.005	<2	29	30	55	35	14	75
2909	0.005	<2	30	35	58	44	17	88
2910	0.004	<2	31	35	60	41	25	105
2911	0.004	<2	23	20	57	34	18	105
2912	0.006	<2	36	30	67	43	13	120
2913	0.003	<2	26	25	56	40	14	93
2914	0.002	<2	21	55	41	30	11	66
2915	0.002	<2	24	25	42	33	13	79
2916	0.011	<2	32	30	61	41	16	85
2917	0.003	2	22	20	72	32	16	125
2918	0.004	<2	27	25	59	34	15	81
2919	0.003	<2	30	30	72	39	15	88
Detn limit	(0.001)	(2)	(5)	(10)	(2)	(5)	(5)	(2)

Analysis code AAS10 Report 9DN0102 Page G2
AAS1
Order No. 74 Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
2920	0.003	2	24	65	50	33	11	80
2921	0.002	<2	22	25	60	28	15	100
2922	0.003	<2	27	20	51	33	14	92
2923	0.004	2	28	25	62	34	15	77
2924	0.004	<2	28	25	65	35	16	110
2925	0.003	<2	29	20	92	33	19	115
2926	0.003	2	25	20	69	33	15	110
2927	0.004	<2	25	25	65	31	21	125
2928	0.002	<2	24	30	63	34	12	81
2929	0.003	<2	30	30	69	39	17	100
2930	0.003	<2	28	35	58	38	22	125
2931	0.002	<2	17	15	28	20	15	74
2932	0.002	<2	24	20	60	33	12	77
2933	0.004	3	25	25	56	30	15	88
2934	0.002	2	22	20	51	30	10	76
2935	0.006	2	22	20	48	29	15	88
2936	0.002	<2	27	50	62	31	19	98
2937	0.003	<2	28	55	67	36	15	69
2938	0.005	<2	28	30	59	40	17	100
2939	0.003	<2	28	15	36	23	14	83
2940	0.002	<2	25	55	31	27	9	46
2941	0.002	<2	23	25	50	37	10	96
2942	0.002	<2	23	30	48	32	16	93
2943	0.002	2	28	40	82	36	17	105
2944	0.002	<2	23	30	52	31	12	86
2945	0.002	2	28	50	70	42	15	98
2946	0.001	2	28	35	46	34	12	120
2947	0.001	3	28	40	55	33	16	97
2948	<0.001	<2	24	60	47	30	13	92
2949	0.002	2	27	35	73	39	15	100
2950	0.003	<2	27	25	68	32	11	78
2951	0.002	<2	28	40	76	36	14	75
2952	0.002	<2	26	55	51	34	12	110
2953	0.002	<2	30	85	44	44	15	105
2954	<0.001	<2	21	50	41	30	9	84
2955	0.002	2	27	60	42	35	13	110
2956	0.004	2	27	60	39	34	14	105
2957	0.003	4	25	55	35	31	13	74
2958	<0.001	4	23	40	51	28	11	110
2959	0.001	4	26	50	63	34	11	110
Detn limit	(0.001)	(2)	(5)	(10)	(2)	(5)	(5)	(2)

Analysis code AAS10
AAS1

Report 9DN0102

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Order No. 74

Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
2960	0.003	<2	22	55	47	38	11	91
2961	0.002	3	23	95	58	39	14	115
2962	0.002	6	19	60	28	26	11	80
2963	0.003	2	24	60	32	13	12	72
2964	<0.001	<2	10	<10	20	18	7	14
2965	<0.001	4	19	30	24	<5	6	51
2966	<0.001	4	26	10	16	14	<5	28
2967	0.002	5	26	20	28	22	7	43
2968	<0.001	<2	11	<10	22	18	7	33
2969	0.002	2	18	20	19	21	10	46
2970	0.003	3	11	25	29	21	7	30
2971	<0.001	3	21	40	32	29	7	46
2972	<0.001	4	10	15	19	18	6	28
2973	<0.001	3	9	90	30	17	10	41
2974	<0.001	3	15	55	29	26	11	51
2975	0.003	3	20	65	29	25	11	54
2976	0.001	2	24	60	34	26	11	42
2977	0.002	<2	20	60	34	25	8	46
2978	0.002	<2	13	30	34	23	7	45
2979	0.002	2	14	25	27	23	9	49
2980	0.002	<2	22	65	39	24	15	58
2981	0.002	2	10	65	40	21	11	64
2982	0.001	<2	25	50	57	27	8	59
2983	0.002	<2	27	55	49	31	9	64
2984	0.002	<2	12	70	31	19	13	50
2985	0.056	2	22	60	34	30	13	70
2986	0.005	3	24	55	27	42	13	100
2987	0.092	<2	22	55	29	30	19	78
2988	0.037	3	18	30	30	32	21	105
2989	0.007	5	30	45	45	36	35	120
2990	0.003	<2	21	40	49	32	36	81
2991	0.006	<2	22	35	39	29	25	100
2992	0.004	5	25	40	45	30	24	105
2993	0.004	<2	19	35	31	25	17	79
2994	0.005	2	16	35	28	27	20	63
2995	0.004	2	19	30	28	27	26	72
2996	0.003	3	22	35	39	30	18	82
2997	0.004	2	20	30	35	25	10	83
2998	0.006	<2	18	35	32	22	12	56
2999	0.005	2	20	45	43	24	11	86
Detn limit	(0.001)	(2)	(5)	(10)	(2)	(5)	(5)	(2)

Analysis code AAS10
AAS1

Report 9DN0102

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Order No. 74

Results in ppm

Sample	Au	Bi	Co	Cr	Cu	Ni	Pb	Zn
3000	0.002	<2	17	30	27	20	9	83
3001	0.003	3	22	50	35	26	11	84
10001	0.002	<2	19	30	27	22	9	33
10002	0.003	3	27	45	44	30	13	65
10003	0.002	8	28	45	74	39	13	80
10004	0.003	8	27	40	40	29	14	54
10005	0.007	<2	23	40	38	29	10	48
10006	0.002	<2	27	45	36	23	18	57
10007	0.002	<2	20	40	30	25	10	43
10008	0.002	<2	24	40	37	27	11	46
10009	0.002	<2	25	40	35	32	11	59
10010	0.001	<2	23	55	34	31	11	74
10011	0.002	<2	26	40	45	32	12	79
10012	0.004	<2	26	45	43	33	10	78
10013	0.004	<2	25	35	40	34	8	83
10014	0.003	<2	21	40	51	29	11	70
10015	0.002	<2	17	40	46	32	14	92
Detn limit	(0.001)	(2)	(5)	(10)	(2)	(5)	(5)	(2)

CLASSIC COMLABS LTD
Analytical Laboratories (INC. IN W.A.)

Marjorie Street, Berrimah, Northern Territory 0828
P.O. Box 58, Berrimah, Northern Territory 0828
Telephone: (089) 32 2669; Fax: (089) 32 3531

7th April 1989

Your Ref : 9DN0102

REPORT NUMBER 9DN0102

CLIENT :	**Endras No: 2 Ltd**
CLIENT REFERENCE :	Purchase Order 74
REPORT COMPRISING :	Cover Page Pages G1 - G4
DATE RECEIVED :	6th February 1989

A Ciplys

Alan Ciplys
Manager
CLASSIC COMLABS LTD. (N.T.)

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

Sample	Ba	Mn	Fe	Nb	La
2778	130	430	2.90	<3	18
2780	80	860	2.96	<3	20
2781	100	1100	3.08	<3	26
2782	100	450	2.84	<3	16
2783	90	620	2.62	<3	18
2784	50	180	2.74	<3	22
2785	70	310	2.82	<3	18
2786	130	210	2.98	<3	16
2787	130	390	2.54	<3	14
2788	120	660	2.80	<3	18
2791	230	960	3.42	<3	30
2792	180	960	3.20	<3	40
2793	170	700	2.86	<3	50
2794	260	840	2.78	<3	40
2795	170	580	2.76	<3	34
2796	200	620	3.18	<3	36
2797	220	580	3.20	<3	32
2798	110	350	1.40	<3	18
2799	170	450	2.02	<3	32
2800	170	660	2.80	<3	32
Detn limit	(2)	(2)	(0.005)	(3)	(3)
Units	ppm	ppm	%	ppm	ppm

Sample	Ba	Mn	Fe	Nb	La
2801	150	470	1.54	<3	30
2802	150	450	2.44	<3	40
2803	140	380	1.88	<3	28
2804	170	490	2.48	<3	36
2805	170	660	2.50	<3	46
2806	140	520	2.12	<3	38
2807	150	620	2.76	<3	48
2808	130	450	2.64	<3	26
2809	130	540	2.18	<3	24
2811	100	680	2.82	<3	30
2812	70	430	2.44	<3	12
2813	110	270	2.36	<3	22
2814	140	340	2.30	<3	22
2815	150	500	3.28	<3	40
2816	150	580	3.20	<3	50
2817	120	520	3.00	<3	34
2818	140	460	3.04	<3	48
2819	200	560	3.22	<3	48
2820	140	440	2.62	<3	42
2821	180	580	4.36	<3	50
Detn limit	(2)	(2)	(0.005)	(3)	(3)
Units	ppm	ppm	%	ppm	ppm

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 8DN0664

Sample	Ba	Mn	Fe	Nb	La
2822	150	430	2.94	<3	42
2823	160	410	2.58	<3	44
2824	190	470	3.28	<3	48
2825	160	460	2.90	<3	50
2826	130	460	2.56	<3	46
2827	150	540	2.96	<3	48
2828	160	500	3.50	<3	48
2829	170	500	3.10	<3	48
2830	170	680	3.54	<3	44
2831	150	500	2.82	<3	44
2832	170	580	3.62	<3	44
2833	150	600	3.74	<3	40
2834	190	640	3.84	<3	30
2835	110	560	3.30	<3	32
2836	170	680	3.82	<3	40
2839	180	640	4.78	<3	42
2840	220	900	4.72	<3	44
2841	210	960	4.52	<3	42
2842	160	800	4.46	<3	36
2843	230	760	3.72	<3	40
Detn limit	(2)	(2)	(0.005)	(3)	(3)
Units	ppm	ppm	%	ppm	ppm

NATA Certificate Order No. 8DN0664

Sample	Ba	Mn	Fe	Nb	La
2844	190	560	3.30	<3	46
2845	170	600	3.42	<3	36
2846	140	540	4.26	<3	60
2847	190	740	6.30	<3	75
2848	160	540	3.96	<3	44
2849	100	500	3.00	<3	26
2850	150	740	3.54	<3	24
2851	130	400	3.42	<3	30
2852	150	460	3.06	<3	34
2853	170	560	2.92	<3	40
2854	130	500	3.20	<3	60
2855	150	540	3.34	<3	75
2856	190	540	3.20	<3	85
2857	170	400	3.54	<3	95
2869	190	560	4.04	<3	65
2870	160	740	3.50	<3	42
Detn limit	(2)	(2)	(0.005)	(3)	(3)
Units	ppm	ppm	%	ppm	ppm

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 9DN0102

Sample	Mn	Fe	Ta	Nb	La
2871	500	3.38	<5	<5	46
2872	620	3.90	<5	<5	44
2873	640	3.66	<5	<5	55
2874	620	3.36	<5	<5	50
2875	520	3.08	<5	<5	42
2876	780	4.24	<5	<5	40
2877	450	4.00	<5	<5	55
2878	640	3.54	<5	<5	50
2879	600	3.48	<5	<5	60
2880	740	4.12	5	<5	60
2881	880	4.78	5	<5	85
2882	580	3.20	<5	<5	60
2883	580	3.50	<5	<5	55
2884	620	4.20	5	<5	90
2885	420	3.64	<5	<5	70
2886	760	4.04	<5	<5	65
2887	660	3.66	<5	<5	55
2888	660	4.30	<5	<5	120
2889	700	3.82	<5	<5	85
2890	760	4.22	5	<5	100
Detn limit	(2)	(0.005)	(5)	(5)	(3)
Units	ppm	%	ppm	ppm	ppm

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 9DN0102

Sample	Mn	Fe	Ta	Nb	La
2891	800	3.94	<5	<5	70
2892	500	2.84	<5	<5	40
2902	480	3.72	5	<5	36
2903	640	4.04	<5	<5	32
2904	580	4.16	<5	<5	38
2905	580	4.02	<5	<5	28
2906	1050	4.40	5	<5	34
2907	880	4.52	5	<5	30
2908	860	4.42	5	<5	65
2909	880	4.20	5	<5	65
2910	940	4.58	5	<5	100
2911	900	3.58	<5	<5	42
2912	1100	5.15	5	<5	75
2913	800	4.30	5	<5	60
2914	640	3.00	<5	<5	44
2915	700	3.56	<5	<5	48
2916	1050	4.26	5	<5	75
2917	760	3.86	5	<5	75
2918	880	3.82	<5	<5	65
2919	920	4.62	<5	<5	80
Detn limit	(2)	(0.005)	(5)	(5)	(3)
Units	ppm	%	ppm	ppm	ppm

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NATA Certificate | Order No. 9DN0102

Sample	Mn	Fe	Ta	Nb	La
2920	640	3.42	<5	<5	60
2921	980	3.70	<5	<5	65
2922	820	3.92	<5	<5	70
2923	800	4.20	<5	<5	90
2924	900	3.70	<5	<5	65
2925	1950	4.28	<5	<5	60
2926	1000	4.10	<5	<5	80
2927	980	4.30	<5	<5	110
2928	680	4.00	<5	<5	75
2929	1250	3.90	<5	<5	80
2930	880	4.02	<5	<5	48
2931	560	2.74	<5	<5	65
2932	840	3.64	<5	<5	70
2933	840	4.30	<5	<5	55
2934	780	3.70	<5	<5	65
2935	780	3.60	<5	<5	60
2936	960	3.70	<5	<5	80
2937	720	4.06	<5	<5	85
2938	840	3.76	<5	<5	65
2939	600	2.56	<5	<5	65
Detn limit	(2)	(0.005)	(5)	(5)	(3)
Units	ppm	%	ppm	ppm	ppm

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 9DN0102

Sample	Mn	Fe	Ta	Nb	La
2940	390	2.04	<5	<5	36
2941	620	4.06	<5	<5	50
2942	820	3.26	<5	<5	55
2943	1000	4.14	<5	<5	75
2944	780	3.36	<5	<5	65
2945	780	4.04	<5	<5	75
2946	700	4.76	5	<5	55
2947	880	4.12	<5	<5	75
2948	740	4.00	<5	<5	75
2949	940	4.52	<5	<5	70
2950	760	3.94	<5	<5	60
2951	860	3.80	<5	<5	100
2952	780	3.70	<5	<5	70
2953	900	4.16	<5	<5	90
2954	640	3.78	<5	<5	110
2955	1000	4.22	5	<5	80
2956	800	3.78	<5	<5	60
2957	660	3.68	<5	<5	60
2958	760	3.90	<5	<5	95
2959	840	4.22	5	<5	75
Detn limit	(2)	(0.005)	(5)	(5)	(3)
Units	ppm	%	ppm	ppm	ppm

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 9DN0102

Sample	Mn	Fe	Ta	Nb	La
2960	640	3.52	<5	<5	60
2961	1000	4.50	5	<5	80
2962	560	2.74	<5	<5	50
2963	840	3.20	<5	<5	70
2964	1650	1.78	<5	<5	18
2965	1800	3.52	<5	<5	20
2966	2050	1.42	<5	<5	20
2967	1350	1.84	<5	<5	18
2968	1600	2.10	<5	<5	16
2969	2200	2.48	<5	<5	20
2970	1100	2.52	<5	<5	18
2971	1000	2.00	<5	<5	20
2972	1350	1.88	<5	<5	16
2973	410	5.30	<5	<5	12
2974	760	3.62	<5	<5	24
2975	860	3.94	<5	<5	30
2976	860	3.44	<5	<5	32
2977	800	3.10	<5	<5	24
2978	1350	2.76	<5	<5	22
2979	1800	3.16	<5	<5	22
Detn limit	(2)	(0.005)	(5)	(5)	(3)
Units	ppm	%	ppm	ppm	ppm

Sample	Mn	Fe	Ta	Nb	La
2980	1100	4.44	<5	<5	32
2981	330	4.28	<5	<5	70
2982	780	3.68	<5	<5	38
2983	840	3.88	<5	<5	34
2984	520	5.15	<5	<5	22
2985	620	3.18	<5	<5	50
2986	780	3.86	5	<5	75
2987	720	3.40	<5	<5	70
2988	680	3.64	<5	<5	55
2989	920	4.68	<5	<5	60
2990	580	3.74	<5	<5	55
2991	700	3.96	<5	<5	48
2992	800	3.94	<5	<5	55
2993	640	3.56	<5	<5	40
2994	540	3.00	<5	<5	44
2995	540	3.14	<5	<5	60
2996	700	3.94	<5	<5	50
2997	560	4.14	<5	<5	46
2998	390	3.46	<5	<5	46
2999	560	3.78	<5	<5	44
Detn limit	(2)	(0.005)	(5)	(5)	(3)
Units	ppm	%	ppm	ppm	ppm

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 9DN0102

Sample	Mn	Fe	Ta	Nb	La
3000	760	3.34	<5	<5	36
3001	700	4.48	<5	<5	46
10001	880	2.70	<5	<5	18
10002	840	4.30	<5	<5	30
10003	880	3.94	<5	<5	34
10004	1000	3.94	<5	<5	30
10005	820	3.72	<5	<5	26
10006	1200	4.12	<5	<5	34
10007	680	2.98	<5	<5	28
10008	920	3.46	<5	<5	26
10009	920	3.74	<5	<5	30
10010	980	4.38	<5	<5	34
10011	820	3.86	<5	<5	26
10012	920	4.06	<5	<5	32
10013	1450	3.30	<5	<5	30
10014	1200	4.52	<5	<5	55
10015	780	2.24	<5	<5	18
Detn limit	(2)	(0.005)	(5)	(5)	(3)
Units	ppm	%	ppm	ppm	ppm

[redacted]

CLASSIC COMLABS LTD

Analytical Laboratories (INC. IN W.A.)

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2nd August 1989

Your Ref : 9DN0102

REPORT NUMBER 9DN0102 FINAL

CLIENT	:	**Endras No: 2 Ltd**
CLIENT REFERENCE	:	Purchase Order 74
REPORT COMPRISING	:	Cover Page Pages I9 - I22
DATE RECEIVED	:	6th February 1989

A Ciplys

Alan Ciplys
Manager
CLASSIC COMLABS LTD. (N.T.)

This report relates specifically to the sample(s) tested in so far as that the sample(s) is truly representative of the sample source as supplied.

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 9DN0102

Sample	As	Sn	Mo	W	P	Sb	Ba
2871	5	<5	<3	<5	680	<5	150
2872	10	5	<3	5	920	<5	180
2873	5	<5	<3	<5	800	5	180
2874	5	<5	<3	5	700	5	180
2875	<5	<5	<3	<5	560	<5	130
2876	<5	<5	<3	<5	1200	5	150
2877	10	<5	<3	<5	780	5	200
2878	<5	<5	<3	<5	1350	5	360
2879	<5	<5	<3	<5	660	5	240
2880	5	<5	<3	<5	900	5	250
2881	10	<5	<3	<5	840	5	220
2882	<5	<5	<3	<5	780	5	160
2883	<5	<5	<3	<5	580	5	180
2884	5	<5	<3	<5	1200	<5	180
2885	<5	<5	<3	<5	660	<5	160
2886	10	<5	<3	<5	1000	5	190
2887	5	<5	<3	<5	640	5	180
2888	<5	5	<3	5	940	<5	180
2889	5	<5	<3	5	740	5	190
2890	10	5	<3	5	1750	5	220
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 9DN0102

Sample	As	Sn	Mo	W	P	Sb	Ba
2891	10	<5	<3	5	960	5	230
2892	<5	<5	<3	<5	620	<5	200
2902	5	<5	<3	<5	500	5	160
2903	<5	<5	<3	<5	620	5	250
2904	10	<5	<3	<5	760	5	190
2905	10	<5	<3	<5	780	5	160
2906	5	<5	<3	<5	1050	5	240
2907	10	5	<3	5	840	<5	210
2908	<5	<5	<3	<5	840	5	210
2909	<5	<5	<3	<5	800	5	290
2910	5	<5	<3	<5	1100	<5	340
2911	<5	<5	<3	5	880	<5	220
2912	5	<5	<3	5	1100	5	360
2913	5	<5	<3	<5	700	5	260
2914	<5	<5	<3	<5	720	<5	200
2915	5	<5	<3	<5	780	5	230
2916	<5	<5	<3	<5	540	5	270
2917	5	<5	<3	<5	820	<5	160
2918	<5	<5	<3	5	880	5	280
2919	<5	5	<3	<5	860	10	300
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 9DN0102

Sample	As	Sn	Mo	W	P	Sb	Ba
2920	<5	<5	<3	<5	860	5	230
2921	<5	<5	<3	<5	1150	5	190
2922	<5	<5	<3	5	800	5	220
2923	<5	<5	<3	<5	780	10	240
2924	5	<5	<3	<5	780	5	240
2925	<5	<5	<3	5	1500	5	320
2926	5	<5	<3	5	1150	10	220
2927	5	<5	<3	<5	820	5	230
2928	<5	<5	<3	<5	720	5	190
2929	5	<5	<3	5	760	5	270
2930	<5	<5	<3	<5	760	5	290
2931	<5	<5	<3	<5	620	<5	140
2932	<5	<5	<3	5	1000	5	240
2933	<5	<5	<3	<5	740	5	200
2934	<5	<5	<3	5	860	5	260
2935	<5	<5	<3	<5	980	5	220
2936	<5	<5	<3	<5	1150	5	310
2937	<5	<5	<3	<5	680	5	270
2938	5	<5	<3	5	980	5	250
2939	5	<5	<3	<5	820	5	210
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

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NATA Certificate　　Order No. 9DN0102

Sample	As	Sn	Mo	W	P	Sb	Ba
2940	<5	<5	<3	<5	520	<5	120
2941	<5	5	<3	<5	920	10	32
2942	<5	<5	<3	<5	860	5	200
2943	<5	<5	<3	<5	980	5	300
2944	5	<5	<3	<5	860	5	210
2945	5	<5	<3	<5	780	10	150
2946	<5	<5	<3	5	1050	10	210
2947	5	5	<3	<5	820	5	250
2948	5	<5	<3	<5	1100	5	210
2949	<5	<5	<3	<5	1050	10	65
2950	5	<5	<3	<5	1100	5	270
2951	10	<5	<3	<5	840	5	210
2952	5	<5	<3	<5	760	5	230
2953	10	<5	<3	<5	920	10	270
2954	10	<5	<3	5	520	5	110
2955	10	<5	<3	<5	1600	5	370
2956	10	<5	<3	<5	940	10	270
2957	5	<5	<3	<5	780	<5	230
2958	10	<5	<3	5	1200	5	290
2959	<5	<5	<3	<5	980	5	290
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 9DN0102

Sample	As	Sn	Mo	W	P	Sb	Ba
2960	5	<5	<3	<5	820	10	200
2961	5	<5	<3	<5	1050	5	240
2962	10	5	<3	<5	920	5	180
2963	5	<5	<3	<5	620	5	220
2964	10	<5	<3	<5	95	5	180
2965	5	<5	<3	<5	220	5	250
2966	5	<5	<3	<5	200	<5	160
2967	10	<5	<3	<5	440	<5	100
2968	15	<5	<3	<5	280	<5	150
2969	10	<5	<3	<5	400	5	190
2970	<5	<5	<3	<5	210	5	150
2971	<5	<5	<3	<5	130	<5	170
2972	10	<5	<3	<5	300	<5	170
2973	<5	<5	4	<5	470	10	310
2974	<5	<5	<3	<5	210	5	270
2975	<5	<5	<3	<5	340	5	210
2976	5	<5	<3	<5	230	5	150
2977	10	<5	<3	<5	500	<5	160
2978	10	<5	<3	<5	370	5	140
2979	10	<5	<3	<5	360	5	190
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 9DN0102

Sample	As	Sn	Mo	W	P	Sb	Ba
2980	5	<5	<3	<5	660	5	260
2981	<5	5	<3	<5	280	10	200
2982	<5	<5	<3	<5	310	5	120
2983	<5	<5	<3	<5	290	5	170
2984	<5	5	4	<5	290	10	250
2985	5	<5	<3	<5	580	<5	250
2986	15	5	4	<5	720	5	290
2987	<5	<5	<3	<5	700	5	240
2988	<5	<5	4	<5	740	5	170
2989	<5	<5	4	<5	980	10	320
2990	<5	<5	4	<5	290	5	170
2991	<5	<5	<3	<5	560	10	190
2992	<5	<5	4	<5	700	10	300
2993	<5	<5	<3	<5	560	5	160
2994	5	<5	<3	<5	540	5	190
2995	5	<5	<3	<5	480	5	150
2996	5	<5	<3	<5	660	10	200
2997	<5	5	<3	<5	580	5	190
2998	<5	<5	<3	<5	330	<5	150
2999	10	<5	<3	<5	500	<5	180
Detn limit Units	(5) ppm	(5) ppm	(3) ppm	(5) ppm	(5) ppm	(5) ppm	(2) ppm

Analysis code GEN 6 Report AC 2609/89

NATA Certificate Order No. 9DN0102

Sample	As	Sn	Mo	W	P	Sb	Ba
3000	5	<5	<3	<5	580	<5	190
3001	<5	<5	<3	<5	740	10	170
10001	10	<5	<3	<5	180	<5	110
10002	<5	<5	<3	<5	350	<5	170
10003	<5	<5	<3	<5	520	5	180
10004	<5	5	<3	<5	340	5	160
10005	<5	<5	<3	<5	250	<5	170
10006	<5	<5	<3	<5	520	<5	130
10007	10	<5	<3	<5	300	<5	90
10008	<5	<5	<3	<5	260	<5	150
10009	<5	<5	<3	5	220	<5	130
10010	<5	<5	<3	<5	480	5	170
10011	<5	<5	<3	<5	500	5	180
10012	<5	<5	<3	<5	410	5	180
10013	<5	<5	4	<5	370	<5	180
10014	<5	<5	<3	<5	720	5	260
10015	5	<5	<3	<5	310	<5	130
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

CLASSIC COMLABS LTD

Analytical Laboratories (INC. IN W.A.)

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15th August 1989

Our Ref : 9DN0769

REPORT NUMBER 9DN0769

CLIENT : Pancontinental Mining Limited

CLIENT REFERENCE : Purchase Order 84

REPORT COMPRISING : Cover Sheet
Pages G1 - G10
Pages I1 - I20

DATE RECEIVED : 28th June 1989

A Ciplys

Alan CIPLYS
Manager
CLASSIC COMLABS LTD

EXPLORATION DIVISION				
Date Rec'd 14/8	ORIGINAL		COPY	
	TO	SIG.	TO	SENT
ARC				
ROM	X			
MTJ				
DJL				
DRW				
GAE	X	GAE		
LFW				
JMG	X			
RJV				
BE				
KMW				
CR				
AGF				
SER				
GGL			DENV	
OPS			KAL	
LEGAL			CITY	
FILE				

ENTERE

This report relates specifically to the sample(s) tested in as that the sample(s) is truly representative of the sample as supplied.

Analysis code AAS9 Report 9DN0769 Page G1
AAS1
Order No. 84 Results in ppm

Sample	Bi	Co	Cr	Cu	Ni	Pb	Zn	Au
10016	<2	19	30	44	29	9	77	0.004
10017	<2	16	25	45	23	11	70	0.001
10018	<2	23	35	42	28	10	76	0.002
10019	<2	20	30	52	28	11	69	<0.001
10020	<2	26	40	38	36	12	71	0.002
10021	2	32	35	53	39	16	73	0.001
10022	<2	19	45	63	27	18	205	0.002
10023	<2	20	40	54	28	20	240	0.005
10024	<2	28	50	30	40	12	84	<0.001
10025	<2	20	30	<2	28	9	51	<0.001
10026	<2	20	35	42	26	11	61	<0.001
10027	<2	22	35	42	29	12	72	0.001
10028	<2	23	35	2	27	13	72	<0.001
10029	<2	22	45	31	35	8	63	0.005
10030	<2	18	20	37	21	10	58	0.001
10031	<2	21	25	40	26	10	62	0.001
10032	<2	16	25	34	22	8	60	<0.001
10033	<2	18	25	40	25	9	65	0.001
10034	<2	21	25	55	30	14	81	<0.001
10035	2	23	35	47	40	8	85	<0.001
10036	2	20	25	38	26	6	70	<0.001
10037	<2	15	20	31	26	7	47	0.001
10038	<2	13	20	31	23	9	52	<0.001
10039	<2	17	25	41	24	9	63	0.001
10040	2	18	25	36	24	10	65	0.001
10041	<2	18	30	30	25	9	65	<0.001
10042	<2	16	20	39	21	10	60	0.002
10043	<2	20	25	34	23	11	65	0.001
10044	<2	21	35	39	24	10	64	0.003
10045	<2	23	35	42	25	12	78	0.001
10046	<2	21	40	44	27	11	71	<0.001
10047	<2	18	35	5	30	10	83	0.001
10048	<2	21	45	40	32	11	79	0.004
10049	<2	19	30	<2	22	11	71	0.002
10050	<2	25	35	55	32	14	83	0.001
10051	<2	23	35	52	28	14	97	0.001
10052	<2	28	30	58	32	16	125	0.001
10053	2	29	35	64	34	19	105	0.003
10054	2	22	30	53	34	15	130	0.001
10055	<2	23	35	48	33	6	125	<0.001
Detn limit	(2)	(5)	(10)	(2)	(5)	(5)	(2)	(0.001)

Analysis code AAS9 Report 9DN0769 Page G2
AAS1
Order No. 84 Results in ppm

Sample	Bi	Co	Cr	Cu	Ni	Pb	Zn	Au
10056	<2	26	35	58	36	<5	105	<0.001
10057	<2	31	40	61	37	<5	105	0.003
10058	<2	21	30	71	26	9	69	0.001
10059	2	19	30	45	28	8	69	<0.001
10060	<2	20	30	39	24	13	74	<0.001
10061	<2	21	30	49	27	11	78	<0.001
10062	2	16	25	27	20	8	58	0.001
10063	<2	22	35	46	33	14	82	<0.001
10064	<2	19	30	42	27	8	57	0.003
10065	<2	21	35	42	27	13	90	<0.001
10066	<2	23	30	53	30	10	86	<0.001
10067	<2	21	35	40	27	11	71	<0.001
10068	2	21	30	40	26	11	84	<0.001
10069	<2	24	40	48	26	7	69	<0.001
10070	2	21	40	38	31	8	71	<0.001
10071	2	25	40	62	35	9	105	<0.001
10072	<2	31	35	71	35	15	130	<0.001
10073	3	20	35	44	28	14	90	<0.001
10074	2	18	30	35	23	9	70	<0.001
10075	<2	13	25	30	22	9	55	<0.001
10076	<2	15	25	30	20	10	58	0.003
10077	<2	16	25	27	19	9	52	0.001
10078	<2	14	25	31	19	9	56	<0.001
10079	<2	14	10	10	17	6	50	0.001
10080	<2	15	25	28	19	11	61	<0.001
10081	<2	22	35	44	29	10	76	<0.001
10082	<2	20	35	35	23	9	59	<0.001
10083	<2	19	30	23	27	8	79	<0.001
10084	<2	18	35	33	27	<5	98	<0.001
10085	2	21	35	34	27	11	120	<0.001
10086	<2	24	25	36	24	9	72	<0.001
10087	<2	23	35	36	25	10	77	<0.001
10088	2	23	40	41	28	18	82	<0.001
10089	<2	21	40	41	29	11	71	<0.001
10090	<2	20	40	39	30	11	79	<0.001
10091	<2	21	45	45	37	13	110	<0.001
10092	<2	16	20	34	23	7	61	<0.001
10093	2	11	25	27	19	<5	58	<0.001
10094	2	<5	20	24	16	<5	54	<0.001
10095	2	9	30	33	16	9	59	<0.001
Detn limit	(2)	(5)	(10)	(2)	(5)	(5)	(2)	(0.001)

CLASSIC COMLABS LTD
Analytical Laboratories (INC. IN W.A.)

Analysis code AAS9 Report 9DN0769 Page G3
AAS1
Order No. 84 Results in ppm

Sample	Bi	Co	Cr	Cu	Ni	Pb	Zn	Au
10096	<2	17	30	42	22	8	55	0.005
10097	<2	22	35	40	23	11	74	<0.001
10098	2	19	25	35	25	10	70	<0.001
10099	<2	14	25	31	17	9	64	<0.001
10100	<2	15	25	30	19	9	64	<0.001
10101	2	17	25	33	26	10	88	<0.001
10102	<2	18	15	24	23	6	53	<0.001
10103	<2	15	10	23	23	7	54	<0.001
10104	<2	17	15	25	25	7	62	<0.001
10105	2	18	25	25	25	10	72	<0.001
10106	<2	16	25	37	25	10	69	<0.001
10107	<2	53	35	56	43	10	97	<0.001
10108	2	23	35	38	27	10	69	<0.001
10109	3	26	40	55	28	15	110	<0.001
10110	<2	25	25	50	27	15	105	<0.001
10111	3	26	40	55	33	13	130	<0.001
10112	2	24	40	42	29	13	120	<0.001
10113	<2	20	25	42	30	9	77	<0.001
10114	<2	24	30	33	29	14	110	<0.001
10115	<2	24	25	38	26	17	135	<0.001
10116	<2	25	35	48	30	27	125	<0.001
10117	<2	21	20	24	20	13	105	<0.001
10118	2	27	35	38	31	18	105	0.003
10119	2	29	25	44	26	10	77	<0.001
10120	<2	25	25	55	31	10	105	<0.001
10121	3	26	25	28	25	12	90	<0.001
10122	<2	20	30	23	26	6	75	<0.001
10123	2	30	40	47	40	10	140	<0.001
10124	2	19	45	35	25	12	86	0.006
10125	2	20	45	46	25	20	93	0.001
10126	3	27	50	96	34	12	140	<0.001
10127	<2	29	55	82	33	13	175	<0.001
10128	<2	22	35	64	29	12	130	<0.001
10129	<2	20	30	47	25	10	80	<0.001
10130	<2	24	20	65	33	10	130	<0.001
10131	<2	29	45	31	30	17	130	<0.001
10132	3	30	45	32	32	19	145	<0.001
10133	<2	28	70	59	37	12	120	<0.001
10134	<2	41	40	66	66	12	110	<0.001
10135	<2	28	<10	57	40	10	110	<0.001
Detn limit	(2)	(5)	(10)	(2)	(5)	(5)	(2)	(0.001)

Analysis code AAS9 Report 9DN0769 Page G4
AAS1
Order No. 84 Results in ppm

Sample	Bi	Co	Cr	Cu	Ni	Pb	Zn	Au
10136	<2	22	50	42	31	14	96	<0.001
10137	<2	28	50	59	35	12	86	<0.001
10138	<2	27	35	62	37	11	135	<0.001
10139	2	24	20	90	30	18	155	<0.001
10140	<2	30	30	105	30	22	175	<0.001
10141	<2	26	35	86	26	20	155	0.007
10142	<2	15	35	26	16	7	71	<0.001
10143	3	29	45	69	40	11	130	<0.001
10144	<2	16	35	48	30	9	100	<0.001
10145	3	31	45	<2	37	18	140	<0.001
10146	<2	29	50	79	40	14	115	<0.001
10147	<2	21	45	49	32	10	78	<0.001
10148	<2	27	40	34	41	13	165	<0.001
10149	<2	24	35	56	28	12	170	<0.001
10150	<2	23	40	52	28	16	175	<0.001
10151	<2	22	35	53	27	16	155	<0.001
10152	3	8	50	67	35	17	110	<0.001
10153	<2	33	35	74	31	16	105	<0.001
10154	<2	26	40	68	35	11	105	<0.001
10155	<2	33	60	71	45	13	155	<0.001
10156	<2	23	25	46	30	9	75	0.015
10157	<2	23	30	97	31	11	85	0.004
10158	<2	26	35	87	37	10	115	<0.001
10159	<2	24	35	55	33	11	86	<0.001
10160	<2	25	45	50	33	14	86	0.019
10161	<2	22	40	47	29	12	80	0.004
10162	<2	27	45	63	40	14	110	0.003
10163	<2	26	40	60	31	14	150	0.002
10164	<2	12	40	52	29	13	100	0.014
10165	<2	16	35	47	26	12	98	0.004
10166	<2	22	60	55	38	12	98	0.004
10167	<2	30	55	60	42	11	125	<0.001
10168	<2	29	40	67	37	11	120	<0.001
10169	<2	26	70	56	44	11	110	0.006
10170	<2	30	60	77	44	10	135	0.003
10171	<2	26	60	44	43	12	98	0.017
10172	<2	20	35	44	27	11	85	0.001
10173	<2	22	30	56	28	19	140	<0.001
10174	<2	30	35	91	16	11	120	0.002
10175	<2	29	45	48	13	10	96	<0.001
Detn limit	(2)	(5)	(10)	(2)	(5)	(5)	(2)	(0.001)

Analysis code AAS9 Report 9DN0769 Page G5
AAS1
Order No. 84 Results in ppm

Sample	Bi	Co	Cr	Cu	Ni	Pb	Zn	Au
10176	<2	27	40	61	35	11	115	0.002
10177	<2	23	35	58	30	9	100	0.006
10178	2	19	40	55	28	11	100	0.002
10179	2	18	45	57	34	14	145	0.015
10180	2	7	30	47	26	8	92	0.002
10181	<2	18	35	58	30	10	145	0.001
10182	<2	21	45	66	45	9	155	0.001
10183	<2	20	40	56	35	8	130	0.006
10184	2	20	50	56	38	10	145	0.005
10185	<2	20	45	65	22	13	140	0.006
10186	<2	19	35	83	24	16	195	0.003
10187	<2	20	30	63	25	15	195	0.006
10188	<2	15	25	35	22	11	195	0.026
10189	<2	16	35	51	28	12	145	0.004
10190	<2	16	30	59	25	10	97	0.003
10191	<2	16	25	58	22	8	67	0.003
10192	<2	14	20	24	22	7	180	0.002
10193	<2	16	25	71	24	11	220	<0.001
10194	<2	20	25	64	24	11	145	0.027
10195	<2	19	25	72	26	8	160	<0.001
10196	<2	24	25	86	29	8	150	0.014
10197	<2	19	30	66	33	15	155	0.065
10198	<2	22	35	77	31	9	130	0.024
10199	<2	17	35	90	36	11	135	0.008
10200	<2	14	25	55	28	8	105	0.003
10201	<2	20	40	83	52	7	110	<0.001
10202	<2	18	40	60	38	9	110	0.007
10203	3	17	35	60	39	9	130	0.009
10204	<2	20	40	73	37	11	175	0.001
10205	<2	22	40	93	43	8	140	0.002
10206	<2	23	35	76	35	10	185	0.005
10207	<2	21	35	59	40	13	175	0.005
10208	<2	20	40	65	36	12	170	0.008
10209	<2	19	20	59	33	8	105	0.003
10210	<2	17	10	55	33	10	87	0.002
10211	<2	21	50	56	33	15	140	0.007
10212	<2	21	40	66	36	11	120	0.002
10213	2	20	50	52	41	<5	115	0.001
10214	2	17	45	85	47	7	135	0.130
10215	<2	19	30	38	28	<5	100	0.002
Detn limit	(2)	(5)	(10)	(2)	(5)	(5)	(2)	(0.001)

Analysis code AAS9 Report 9DN0769 Page G6
AAS1
Order No. 84 Results in ppm

Sample	Bi	Co	Cr	Cu	Ni	Pb	Zn	Au
10216	<2	18	40	67	36	9	135	<0.001
10217	<2	17	35	61	41	6	120	<0.001
10218	<2	13	35	65	37	8	105	0.006
10219	<2	14	40	67	37	8	97	<0.001
10220	<2	9	50	25	12	8	36	<0.001
10221	<2	12	35	16	23	13	175	<0.001
10222	2	20	40	62	37	10	135	0.006
10223	<2	15	55	50	48	8	87	<0.001
10224	<2	16	20	41	16	21	175	0.001
10225	<2	13	15	33	16	10	165	<0.001
10226	<2	16	20	34	17	10	175	<0.001
10227	<2	21	45	65	33	<5	165	<0.001
10228	<2	14	30	35	21	7	150	<0.001
10229	<2	18	30	34	24	9	130	<0.001
10230	<2	17	35	31	23	9	63	<0.001
10231	<2	23	40	42	29	10	77	<0.001
10232	<2	13	30	34	20	9	74	<0.001
10233	<2	17	30	56	20	6	55	<0.001
10234	<2	16	35	34	33	8	75	<0.001
10235	<2	13	40	48	21	<5	45	<0.001
10236	<2	16	30	63	22	7	67	<0.001
10237	<2	11	35	40	15	8	61	<0.001
10238	<2	12	35	38	24	9	70	<0.001
10239	5	23	60	50	46	6	85	<0.001
10240	<2	18	40	47	30	11	100	<0.001
10241	<2	14	35	56	31	9	77	<0.001
10242	<2	19	50	50	37	12	97	<0.001
10243	<2	19	45	48	34	10	82	<0.001
10244	<2	21	40	78	42	9	115	<0.001
10245	<2	17	40	52	35	11	105	<0.001
10246	<2	16	35	48	36	9	95	<0.001
10247	<2	17	35	49	37	9	88	<0.001
10248	<2	18	35	44	33	10	68	<0.001
10249	<2	18	15	39	30	11	91	<0.001
10250	2	20	40	61	35	19	86	<0.001
10251	<2	19	50	51	34	12	66	<0.001
10252	<2	20	45	52	28	10	61	<0.001
10253	<2	18	40	54	32	9	66	0.002
10254	2	19	50	49	34	11	93	<0.001
10255	<2	21	50	56	33	9	95	<0.001
Detn limit	(2)	(5)	(10)	(2)	(5)	(5)	(2)	(0.001)

Analysis code AAS9 Report 9DN0769
AAS1
Order No. 84 Results in ppm

Sample	Bi	Co	Cr	Cu	Ni	Pb	Zn	Au
10256	<2	19	40	53	28	10	91	0.001
10257	<2	<5	60	66	50	10	85	<0.001
10258	<2	18	35	53	27	8	83	<0.001
10259	<2	18	35	60	32	9	99	0.012
10260	<2	15	65	105	87	<5	115	0.001
10261	<2	18	30	56	51	6	115	0.012
10262			Listed Not Received					
10263	<2	23	40	82	32	12	75	0.007
10264	<2	20	35	69	28	13	105	0.006
10265	<2	14	35	37	25	10	53	<0.001
10266	<2	24	45	48	27	31	78	0.003
10267	<2	19	50	46	37	8	79	0.004
10268	<2	19	40	53	30	17	98	0.004
10269	<2	25	50	50	35	15	115	0.001
10270	<2	33	65	30	49	12	125	0.001
10271	<2	30	55	69	41	15	110	0.034
10272	<2	19	55	52	35	9	73	<0.001
10273	<2	20	50	49	39	8	70	<0.001
10274	<2	21	60	34	40	9	82	<0.001
10275	<2	21	65	64	52	9	72	<0.001
10276	<2	25	75	67	45	16	89	<0.001
10277	<2	<5	65	47	36	9	74	<0.001
10278	3	28	80	58	25	9	125	<0.001
10279	<2	19	55	49	35	12	98	<0.001
10280	<2	24	70	79	46	11	115	<0.001
10281	<2	29	75	78	43	14	135	<0.001
10282	<2	21	65	55	39	12	94	<0.001
10283	<2	38	190	87	77	24	170	<0.001
10284	3	27	60	53	37	14	130	<0.001
10285	<2	31	80	60	43	17	130	<0.001
10286	<2	26	50	64	32	12	93	<0.001
10287	<2	26	65	62	52	12	73	<0.001
10288	<2	28	60	67	46	13	78	<0.001
10289	<2	26	50	83	44	8	79	<0.001
10290	<2	23	45	58	36	8	77	<0.001
10291	<2	34	50	84	44	14	110	<0.001
10292	<2	27	45	64	43	12	98	<0.001
10293	2	29	40	93	44	17	140	<0.001
10294	<2	20	40	52	36	14	88	<0.001
10295	<2	18	30	59	34	16	100	0.002
Detn limit	(2)	(5)	(10)	(2)	(5)	(5)	(2)	(0.001)

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AAS1

Order No. 84 Results in ppm

Sample	Bi	Co	Cr	Cu	Ni	Pb	Zn	Au
10296	<2	19	35	71	37	14	82	0.002
10297	<2	19	35	62	35	16	80	0.001
10298	<2	25	50	65	49	9	90	<0.001
10299	<2	23	50	63	45	8	89	<0.001
10300	<2	20	35	73	36	6	86	<0.001
10301	<2	20	50	61	44	7	93	<0.001
10302	<2	26	55	59	45	11	100	<0.001
10303	<2	19	50	57	41	7	83	0.001
10304	<2	16	35	72	30	9	130	<0.001
10305	2	26	45	69	45	11	100	<0.001
10306	<2	15	30	64	28	9	115	<0.001
10307	<2	10	20	46	19	6	120	0.005
10308	<2	10	20	59	21	6	130	0.003
10309	<2	20	25	69	27	7	130	0.018
10310	<2	20	30	67	26	8	100	0.013
10311	<2	18	35	75	28	7	89	0.005
10312	<2	18	35	160	25	6	91	0.13
10313	2	26	40	76	38	10	86	0.002
10314	<2	25	45	63	42	15	110	0.002
10315	2	14	40	52	26	9	75	0.004
10316	<2	25	40	115	29	<5	50	0.006
10317	<2	15	35	49	24	<5	61	0.004
10318	<2	15	45	54	22	9	69	0.006
10319	<2	15	40	54	23	8	66	0.001
10320	2	24	30	58	27	30	81	<0.001
10321	<2	17	30	63	29	15	69	0.001
10322	<2	22	35	42	26	22	80	<0.001
10323	<2	18	35	40	21	13	67	<0.001
10324	<2	15	30	44	20	26	69	0.009
10325	2	13	25	37	21	18	66	<0.001
10326	<2	14	30	39	20	20	71	0.003
10327	<2	19	35	41	25	15	67	<0.001
10328	3	11	35	31	19	16	87	<0.001
10329	<2	17	40	44	23	15	75	<0.001
10330	<2	10	35	18	14	11	56	<0.001
10331	<2	14	30	39	24	20	88	0.006
10332	<2	16	30	41	22	17	77	<0.001
10333	<2	15	35	50	25	21	69	<0.001
10334	<2	19	35	47	28	20	91	0.002
10335	<2	14	35	25	17	16	79	<0.001
Detn limit	(2)	(5)	(10)	(2)	(5)	(5)	(2)	(0.001)

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AAS1
Order No. 84 Results in ppm

Sample	Bi	Co	Cr	Cu	Ni	Pb	Zn	Au
10336	<2	17	35	50	22	24	82	0.011
10337	<2	11	25	42	19	24	73	0.010
10338	<2	<5	25	34	17	10	59	<0.001
10339	<2	<5	25	33	17	10	57	0.001
10340	3	17	20	47	18	10	84	0.013
10341	<2	24	25	64	29	10	95	0.001
10342	<2	23	25	63	27	14	87	0.002
10343	<2	24	35	67	29	12	100	<0.001
10344	3	19	20	53	19	14	85	0.001
10345	4	24	20	41	24	9	74	<0.001
10346	3	30	30	89	30	16	89	<0.001
10347	<2	39	30	135	35	17	94	<0.001
10348	4	16	20	25	22	8	42	<0.001
10349	<2	25	25	32	20	21	88	<0.001
10350	3	17	20	25	18	19	70	<0.001
10351	2	25	20	31	19	21	82	<0.001
10352	<2	21	15	31	17	22	72	0.001
10353	<2	24	20	38	22	19	82	0.001
10354	<2	20	20	30	17	21	92	<0.001
10355	<2	16	20	28	16	21	90	<0.001
10356	2	20	20	34	23	23	115	<0.001
10357	<2	14	15	22	20	19	91	<0.001
10358	<2	25	20	34	24	28	73	0.002
10359	<2	24	20	26	22	41	92	0.001
10360	<2	12	20	21	16	21	60	0.001
10361	<2	25	<10	27	33	11	66	0.001
10362	<2	27	35	41	35	15	68	0.010
10363	<2	29	40	42	35	17	68	0.005
10364	3	33	35	40	41	10	61	0.001
10365	<2	26	45	34	46	18	52	<0.001
10366	2	18	30	28	27	12	35	<0.001
10367	2	24	25	22	35	8	64	0.001
10368	<2	26	<10	27	43	9	82	<0.001
10369	<2	27	<10	31	42	9	67	<0.001
10370	<2	25	<10	52	38	8	60	<0.001
10371	<2	30	<10	56	42	10	100	<0.001
10372	<2	25	30	48	35	8	99	<0.001
10373	3	23	25	39	17	8	120	<0.001
10374	2	26	25	47	20	8	98	<0.001
10375	<2	24	<10	38	35	7	89	<0.001
Detn limit	(2)	(5)	(10)	(2)	(5)	(5)	(2)	(0.001)

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AAS1

Order No. 84 Results in ppm

Sample	Bi	Co	Cr	Cu	Ni	Pb	Zn	Au
10376	<2	22	35	31	27	13	105	<0.001
10377	<2	29	35	38	36	10	97	0.001
10378	<2	27	35	42	35	14	105	0.004
10379	<2	26	30	30	31	13	88	<0.001
10380	<2	26	30	36	35	12	120	0.004
10381	<2	26	30	32	31	15	96	<0.001
10382	<2	25	30	31	30	7	105	<0.001
10383	<2	25	25	26	25	6	89	<0.001
10384	2	24	20	24	24	<5	110	<0.001
10385	<2	21	35	27	25	17	105	<0.001
10386	<2	19	25	17	20	23	76	0.001
10387	2	20	30	19	23	20	89	0.001
10388	<2	18	35	19	20	17	91	<0.001
2893	<2	15	30	13	19	17	135	<0.001
2894	<2	34	25	30	27	16	145	<0.001
2895	<2	27	25	21	27	16	130	<0.001
2896	<2	30	30	24	29	20	160	0.001
2897	<2	28	20	20	28	13	115	0.001
W1	<2	24	28	22	35	<5	51	0.005
Detn limit	(2)	(5)	(10)	(2)	(5)	(5)	(2)	(0.001)

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Sample	As	Sn	Mo	W	P	Sb	Ba
10016	<5	<5	4	<5	470	5	170
10017	<5	<5	<3	<5	390	5	140
10018	<5	<5	<3	<5	500	<5	170
10019	<5	<5	<3	<5	370	<5	160
10020	<5	5	<3	<5	450	5	160
10021	<5	<5	<3	<5	620	5	210
10022	5	<5	4	5	540	10	130
10023	<5	5	6	5	680	10	110
10024	<5	<5	4	<5	700	10	340
10025	5	<5	<3	<5	460	5	200
10026	5	<5	4	<5	450	5	180
10027	<5	5	4	<5	640	5	220
10028	<5	<5	<3	<5	520	10	190
10029	5	<5	4	5	700	5	250
10030	<5	<5	<3	<5	450	5	140
10031	<5	<5	<3	<5	420	5	150
10032	<5	<5	<3	<5	410	5	140
10033	<5	<5	<3	<5	330	10	140
10034	5	<5	4	<5	450	10	190
10035	<5	<5	<3	<5	560	10	200
10036	<5	<5	<3	<5	760	<5	220
10037	<5	<5	<3	<5	230	<5	150
10038	5	<5	<3	<5	470	5	140
10039	5	5	4	<5	310	5	160
10040	<5	<5	<3	<5	420	<5	150
10041	<5	<5	<3	<5	430	5	150
10042	5	<5	<3	<5	270	<5	120
10043	5	5	<3	<5	400	5	160
10044	<5	<5	<3	<5	300	5	130
10045	<5	<5	<3	<5	360	5	180
10046	<5	<5	<3	<5	470	5	150
10047	<5	<5	<3	<5	720	<5	180
10048	5	<5	<3	<5	720	5	210
10049	<5	<5	<3	<5	470	5	130
10050	5	<5	4	<5	900	10	240
10051	<5	5	4	<5	700	5	190
10052	5	5	4	<5	1100	5	240
10053	5	<5	<3	<5	880	5	220
10054	5	<5	<3	<5	1100	<5	230
10055	15	<5	4	<5	1250	5	220
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

Sample	As	Sn	Mo	W	P	Sb	Ba
10056	15	5	<3	5	680	<5	230
10057	5	5	4	<5	920	<5	230
10058	10	<5	4	<5	350	<5	150
10059	5	<5	4	<5	380	<5	150
10060	10	<5	<3	<5	430	<5	180
10061	10	5	4	<5	420	<5	180
10062	10	<5	<3	<5	300	<5	140
10063	10	5	4	<5	470	<5	200
10064	5	5	4	<5	370	<5	150
10065	10	<5	<3	<5	460	<5	210
10066	10	5	4	<5	600	<5	190
10067	10	<5	4	<5	420	5	170
10068	10	<5	<3	<5	450	5	170
10069	10	5	4	<5	280	<5	130
10070	10	<5	4	<5	500	<5	150
10071	10	<5	4	5	470	5	190
10072	10	5	<3	<5	860	<5	230
10073	10	<5	<3	<5	480	<5	160
10074	10	<5	<3	<5	330	<5	130
10075	5	<5	<3	<5	220	<5	110
10076	10	<5	4	<5	260	<5	120
10077	5	<5	<3	5	240	<5	110
10078	5	<5	<3	<5	240	<5	110
10079	<5	<5	<3	<5	370	<5	75
10080	5	<5	<3	<5	390	<5	170
10081	5	<5	<3	<5	230	5	160
10082	<5	<5	<3	<5	250	5	100
10083	<5	<5	<3	<5	150	5	160
10084	<5	5	<3	<5	220	<5	100
10085	<5	<5	<3	<5	350	5	120
10086	<5	<5	<3	<5	270	5	110
10087	<5	5	<3	<5	260	5	130
10088	<5	<5	<3	<5	240	10	160
10089	<5	5	<3	<5	240	10	160
10090	<5	5	<3	<5	240	5	140
10091	5	5	<3	<5	260	10	190
10092	5	<5	<3	<5	190	5	190
10093	<5	<5	<3	<5	110	5	210
10094	<5	<5	<3	<5	100	<5	160
10095	<5	<5	<3	<5	180	5	190
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

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Sample	As	Sn	Mo	W	P	Sb	Ba
10096	<5	<5	<3	<5	180	5	160
10097	<5	<5	<3	<5	270	5	230
10098	<5	<5	4	<5	210	5	200
10099	5	<5	<3	<5	200	5	140
10100	5	<5	<3	<5	230	5	160
10101	<5	5	<3	<5	310	<5	180
10102	<5	<5	<3	<5	460	5	140
10103	<5	<5	<3	<5	200	5	130
10104	<5	<5	<3	<5	210	<5	150
10105	<5	<5	<3	<5	310	<5	140
10106	<5	<5	<3	<5	220	5	150
10107	<5	<5	4	<5	220	5	50
10108	<5	<5	<3	<5	230	5	220
10109	<5	<5	4	<5	960	5	190
10110	<5	<5	4	<5	560	5	190
10111	<5	<5	4	<5	350	5	180
10112	<5	<5	4	<5	560	10	170
10113	5	<5	<3	<5	410	5	190
10114	<5	<5	4	<5	1000	5	340
10115	5	<5	4	<5	900	5	320
10116	5	<5	<3	<5	940	5	400
10117	<5	<5	<3	<5	1100	5	260
10118	<5	<5	<3	<5	600	5	190
10119	5	<5	<3	<5	420	5	140
10120	<5	<5	4	<5	520	5	140
10121	<5	<5	4	<5	500	5	150
10122	<5	<5	<3	<5	270	<5	85
10123	5	<5	<3	<5	290	10	180
10124	<5	<5	<3	<5	260	10	230
10125	<5	<5	<3	<5	350	10	260
10126	<5	5	4	<5	880	5	200
10127	<5	<5	4	<5	940	5	250
10128	<5	<5	<3	5	560	10	190
10129	<5	<5	<3	<5	600	5	12
10130	<5	<5	4	<5	920	5	220
10131	<5	<5	4	<5	1050	5	250
10132	<5	<5	4	<5	1150	5	260
10133	<5	5	4	<5	660	5	210
10134	<5	<5	4	<5	760	5	390
10135	<5	<5	4	<5	1100	<5	370
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

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Sample	As	Sn	Mo	W	P	Sb	Ba
10136	5	<5	4	<5	560	5	230
10137	<5	<5	4	<5	600	5	230
10138	<5	5	6	<5	520	5	290
10139	<5	<5	4	<5	980	5	300
10140	5	<5	4	5	1200	<5	350
10141	5	<5	<3	<5	860	<5	310
10142	5	<5	<3	<5	380	5	130
10143	<5	<5	4	5	840	10	260
10144	<5	<5	<3	<5	820	10	240
10145	<5	<5	4	<5	900	5	300
10146	5	<5	4	<5	700	<5	240
10147	<5	<5	4	<5	460	<5	180
10148	<5	<5	4	5	1000	5	220
10149	<5	5	<3	<5	800	5	190
10150	<5	<5	4	<5	1050	5	240
10151	<5	5	4	<5	880	5	240
10152	5	<5	<3	5	760	5	270
10153	10	<5	4	<5	940	5	320
10154	<5	<5	<3	<5	600	5	190
10155	<5	<5	<3	<5	820	<5	290
10156	<5	<5	<3	<5	540	<5	200
10157	<5	<5	<3	<5	800	<5	220
10158	5	<5	<3	<5	680	<5	260
10159	<5	5	4	<5	490	<5	190
10160	<5	<5	<3	<5	540	<5	190
10161	<5	<5	<3	5	500	<5	180
10162	5	5	<3	<5	660	<5	220
10163	5	5	<3	<5	640	<5	230
10164	<5	<5	<3	<5	580	<5	190
10165	5	<5	<3	<5	520	<5	170
10166	<5	<5	4	5	480	<5	220
10167	<5	<5	<3	<5	680	<5	250
10168	5	<5	<3	<5	900	<5	220
10169	<5	<5	<3	<5	760	<5	260
10170	<5	10	6	<5	540	<5	240
10171	<5	5	4	<5	500	<5	190
10172	5	5	<3	<5	480	<5	180
10173	<5	5	<3	<5	580	<5	200
10174	5	<5	<3	<5	680	5	130
10175	<5	5	4	<5	700	<5	290
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

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Sample	As	Sn	Mo	W	P	Sb	Ba
10176	<5	<5	4	5	820	<5	300
10177	<5	<5	<3	5	720	<5	210
10178	5	5	<3	<5	540	<5	190
10179	30	5	6	5	680	5	200
10180	10	<5	<3	<5	580	<5	160
10181	<5	5	<3	<5	580	<5	190
10182	5	<5	<3	<5	560	<5	250
10183	<5	<5	<3	5	720	<5	190
10184	<5	5	4	<5	960	<5	210
10185	20	<5	<3	<5	520	<5	130
10186	10	<5	<3	5	640	<5	210
10187	15	5	<3	5	880	<5	190
10188	5	<5	<3	5	490	<5	130
10189	5	5	<3	<5	640	<5	180
10190	<5	5	<3	<5	760	<5	180
10191	10	<5	<3	<5	660	<5	150
10192	5	5	<3	<5	820	<5	180
10193	<5	<5	<3	5	720	<5	220
10194	<5	<5	<3	<5	700	<5	180
10195	<5	<5	<3	<5	680	<5	160
10196	<5	5	<3	5	880	<5	270
10197	<5	<5	<3	5	1050	5	270
10198	<5	5	<3	<5	620	<5	210
10199	<5	5	<3	5	680	<5	210
10200	<5	<5	<3	5	350	5	160
10201	<5	<5	<3	<5	430	5	220
10202	<5	<5	<3	<5	980	<5	200
10203	<5	5	<3	5	1250	<5	230
10204	<5	5	<3	<5	820	5	160
10205	<5	5	<3	<5	980	5	210
10206	<5	<5	<3	<5	680	<5	200
10207	<5	<5	<3	<5	1000	5	200
10208	<5	<5	<3	<5	540	<5	190
10209	<5	<5	<3	<5	560	<5	220
10210	<5	5	<3	5	580	<5	230
10211	<5	5	<3	<5	920	<5	240
10212	<5	5	<3	<5	580	5	200
10213	<5	<5	<3	<5	1200	5	250
10214	<5	<5	<3	<5	1150	5	240
10215	5	<5	<3	5	1250	<5	330
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

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Sample	As	Sn	Mo	W	P	Sb	Ba
10216	<5	<5	4	<5	1100	5	160
10217	<5	5	<3	<5	980	<5	160
10218	<5	<5	<3	<5	720	<5	190
10219	<5	5	<3	<5	780	<5	170
10220	<5	<5	<3	<5	1100	5	270
10221	<5	<5	<3	5	1150	<5	160
10222	<5	<5	<3	5	1100	<5	180
10223	<5	<5	<3	<5	390	<5	190
10224	<5	5	<3	5	700	<5	100
10225	<5	<5	<3	<5	500	<5	140
10226	<5	<5	<3	5	840	<5	240
10227	<5	5	<3	<5	840	5	270
10228	<5	5	<3	<5	800	5	200
10229	<5	10	<3	<5	1250	5	310
10230	<5	<5	<3	<5	230	5	90
10231	<5	<5	<3	<5	280	5	150
10232	<5	<5	<3	<5	250	5	110
10233	<5	<5	<3	<5	180	5	85
10234	<5	<5	<3	<5	310	<5	110
10235	<5	<5	<3	<5	190	<5	95
10236	<5	<5	<3	<5	180	<5	520
10237	5	5	<3	<5	190	<5	95
10238	<5	5	<3	<5	200	<5	85
10239	<5	<5	<3	<5	320	<5	180
10240	<5	5	<3	<5	320	<5	130
10241	<5	<5	<3	<5	230	<5	120
10242	<5	5	<3	<5	390	<5	160
10243	<5	<5	<3	<5	290	<5	140
10244	<5	<5	<3	<5	440	<5	150
10245	<5	<5	<3	<5	640	<5	150
10246	<5	5	<3	<5	420	<5	150
10247	<5	5	<3	<5	320	<5	150
10248	<5	<5	<3	<5	310	<5	160
10249	<5	5	<3	<5	400	<5	160
10250	<5	5	<3	<5	640	<5	180
10251	<5	<5	<3	<5	400	<5	190
10252	<5	5	<3	<5	320	<5	190
10253	<5	<5	<3	5	600	<5	150
10254	<5	5	<3	<5	330	<5	180
10255	<5	5	<3	<5	270	<5	170
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

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Sample	As	Sn	Mo	W	P	Sb	Ba
10256	<5	<5	<3	<5	370	<5	150
10257	<5	<5	<3	<5	540	<5	180
10258	<5	<5	<3	<5	640	<5	250
10259	<5	<5	<3	<5	760	<5	220
10260	<5	<5	<3	<5	540	<5	130
10261	5	<5	<3	<5	560	<5	140
10263	<5	5	<3	<5	820	5	140
10264	<5	<5	<3	<5	920	<5	210
10265	<5	5	<3	<5	640	<5	170
10266	<5	5	<3	<5	900	<5	320
10267	<5	<5	<3	<5	840	<5	190
10268	<5	5	<3	<5	900	<5	280
10269	<5	5	<3	<5	1200	<5	340
10270	<5	5	<3	<5	1550	<5	440
10271	<5	5	<3	<5	1300	<5	460
10272	<5	5	<3	<5	1100	<5	260
10273	<5	<5	<3	<5	1100	<5	260
10274	<5	<5	<3	<5	820	<5	260
10275	<5	<5	<3	<5	960	<5	210
10276	5	<5	<3	<5	1200	5	290
10277	<5	5	<3	<5	960	<5	270
10278	15	<5	4	<5	1350	<5	270
10279	5	5	<3	<5	1100	<5	240
10280	<5	5	<3	<5	1100	<5	260
10281	<5	<5	<3	<5	1400	<5	310
10282	5	<5	<3	<5	940	<5	290
10283	10	<5	6	<5	1400	<5	540
10284	<5	<5	<3	5	1200	<5	310
10285	<5	5	6	<5	1100	<5	350
10286	<5	5	4	<5	980	<5	180
10287	<5	<5	<3	<5	740	<5	420
10288	<5	<5	<3	<5	500	<5	280
10289	<5	5	<3	<5	520	<5	270
10290	<5	<5	4	<5	410	<5	230
10291	<5	<5	4	<5	840	<5	330
10292	<5	5	<3	<5	580	<5	290
10293	<5	5	4	5	840	<5	320
10294	<5	5	<3	<5	250	<5	230
10295	<5	<5	<3	5	700	<5	250
10296	<5	5	4	<5	360	<5	270
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

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Sample	As	Sn	Mo	W	P	Sb	Ba
10297	<5	<5	4	5	620	<5	260
10298	<5	<5	<3	5	620	<5	260
10299	<5	5	4	<5	540	<5	270
10300	<5	5	<3	<5	520	<5	320
10301	<5	<5	<3	<5	620	<5	250
10302	<5	5	4	<5	780	<5	250
10303	<5	<5	<3	5	540	<5	230
10304	<5	<5	<3	5	620	<5	160
10305	<5	5	<3	<5	450	<5	220
10306	<5	5	4	<5	760	<5	270
10307	<5	5	<3	<5	620	<5	130
10308	<5	<5	4	<5	1000	<5	170
10309	<5	5	4	<5	660	<5	230
10310	<5	5	4	<5	660	<5	220
10311	<5	<5	4	5	390	<5	230
10312	<5	5	<3	<5	660	<5	190
10313	<5	5	<3	<5	380	<5	180
10314	<5	5	<3	<5	490	<5	190
10315	<5	<5	<3	<5	430	<5	220
10316	<5	5	<3	<5	640	<5	160
10317	5	<5	<3	<5	380	<5	120
10318	5	5	<3	<5	400	<5	180
10319	<5	5	<3	<5	430	<5	180
10320	10	5	<3	<5	580	<5	240
10321	5	5	<3	<5	760	<5	230
10322	<5	5	4	<5	620	<5	200
10323	<5	5	<3	<5	430	<5	240
10324	5	5	<3	<5	460	<5	300
10325	10	<5	<3	<5	430	<5	180
10326	5	<5	<3	<5	480	<5	170
10327	<5	<5	<3	<5	540	<5	210
10328	<5	<5	<3	<5	700	<5	250
10329	<5	5	<3	<5	540	<5	180
10330	<5	<5	<3	<5	280	<5	70
10331	5	<5	<3	<5	450	<5	170
10332	<5	<5	<3	<5	380	<5	220
10333	<5	<5	<3	<5	620	<5	170
10334	5	<5	4	<5	460	<5	210
10335	<5	<5	<3	<5	580	<5	180
10336	<5	5	4	<5	500	5	200
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

Sample	As	Sn	Mo	W	P	Sb	Ba
10337	5	<5	<3	<5	430	<5	180
10338	5	<5	<3	<5	400	<5	150
10339	<5	<5	<3	<5	350	<5	140
10340	5	5	4	<5	660	<5	150
10341	<5	<5	<3	<5	460	<5	180
10342	<5	<5	<3	<5	380	<5	170
10343	<5	5	<3	<5	280	<5	160
10344	<5	<5	<3	<5	490	<5	150
10345	<5	<5	4	<5	280	<5	300
10346	<5	5	<3	<5	520	10	180
10347	<5	5	4	<5	420	5	220
10348	<5	5	<3	<5	270	<5	100
10349	<5	5	4	<5	460	<5	140
10350	<5	5	<3	<5	370	5	160
10351	5	5	<3	<5	480	<5	160
10352	<5	<5	<3	<5	370	<5	140
10353	<5	5	<3	<5	250	<5	120
10354	<5	<5	<3	<5	480	<5	140
10355	<5	5	<3	<5	380	5	140
10356	<5	<5	<3	<5	600	<5	170
10357	<5	<5	<3	<5	480	<5	200
10358	<5	<5	<3	<5	540	<5	170
10359	<5	<5	<3	<5	780	5	150
10360	<5	<5	<3	<5	540	<5	120
10361	<5	5	<3	<5	1050	5	400
10362	<5	<5	4	<5	940	<5	330
10363	<5	5	4	<5	1050	5	280
10364	<5	<5	<3	5	720	<5	260
10365	5	5	<3	<5	760	<5	340
10366	<5	5	<3	<5	490	<5	200
10367	<5	5	<3	<5	600	<5	170
10368	<5	5	<3	5	700	<5	210
10369	<5	5	<3	<5	760	<5	200
10370	<5	5	<3	<5	700	<5	180
10371	10	5	<3	5	720	<5	220
10372	<5	5	<3	<5	720	<5	200
10373	5	<5	<3	5	680	<5	190
10374	5	5	<3	<5	520	<5	200
10375	<5	<5	<3	5	740	<5	190
10376	<5	<5	<3	<5	480	<5	120
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

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Sample	As	Sn	Mo	W	P	Sb	Ba
10377	5	<5	<3	<5	580	<5	180
10378	<5	<5	<3	<5	720	<5	230
10379	<5	5	<3	<5	640	<5	180
10380	<5	5	<3	5	940	<5	210
10381	<5	<5	<3	<5	800	<5	210
10382	<5	<5	<3	<5	760	<5	200
10383	<5	<5	<3	<5	780	<5	160
10384	5	5	<3	<5	540	<5	120
10385	5	5	<3	5	700	<5	200
10386	<5	<5	<3	<5	430	<5	160
10387	5	<5	<3	<5	350	5	110
10388	5	5	<3	<5	860	<5	190
2893	10	<5	<3	<5	620	<5	140
2894	5	<5	<3	<5	580	<5	200
2895	<5	<5	<3	<5	620	<5	170
2896	5	<5	<3	<5	760	<5	180
2897	5	<5	<3	<5	470	5	160
W1	<5	<5	<3	<5	230	<5	210
Detn limit	(5)	(5)	(3)	(5)	(5)	(5)	(2)
Units	ppm	ppm	ppm	ppm	ppm	ppm	ppm

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Sample	Mn	Fe	Ta	Nb	Zr	Y	La
10016	820	3.08	<5	<3	<2	12	20
10017	700	2.30	<5	<3	<2	12	24
10018	920	3.26	<5	<3	3	18	32
10019	840	3.22	<5	<3	<2	17	30
10020	940	3.94	<5	<3	4	24	42
10021	1150	2.92	<5	<3	3	14	26
10022	800	4.30	<5	<3	4	20	28
10023	920	4.72	5	<3	6	24	34
10024	860	3.96	<5	<3	4	16	70
10025	520	2.78	<5	<3	<2	11	50
10026	600	3.26	<5	<3	4	17	46
10027	800	3.80	<5	<3	4	20	50
10028	760	3.56	<5	<3	3	17	44
10029	640	3.38	<5	<3	5	10	70
10030	600	2.80	<5	<3	3	15	24
10031	620	3.28	<5	<3	3	17	30
10032	580	3.04	<5	<3	<2	17	34
10033	540	3.22	<5	<3	3	18	30
10034	680	3.72	<5	<3	3	22	38
10035	640	3.40	<5	<3	3	11	40
10036	520	3.16	<5	<3	4	11	50
10037	470	2.36	<5	<3	<2	10	36
10038	480	3.08	<5	<3	3	14	32
10039	560	3.32	<5	<3	3	19	34
10040	680	3.12	<5	<3	3	17	30
10041	680	3.10	<5	<3	3	18	32
10042	440	2.72	<5	<3	3	17	26
10043	620	3.18	<5	<3	3	19	34
10044	560	2.94	<5	<3	3	14	26
10045	780	3.58	<5	<3	4	24	38
10046	620	3.40	<5	<3	4	16	42
10047	500	3.38	<5	<3	5	13	40
10048	620	3.46	<5	<3	5	11	60
10049	600	2.80	<5	<3	3	13	32
10050	860	3.64	<5	<3	5	16	50
10051	840	3.56	<5	<3	4	18	40
10052	1200	4.10	5	<3	5	24	48
10053	1000	3.90	<5	<3	5	22	60
10054	1100	2.92	<5	<3	4	16	44
10055	1200	4.34	5	<3	5	38	36
Detn limit	(2)	(0.005)	(5)	(3)	(2)	(2)	(3)
Units	ppm	%	ppm	ppm	ppm	ppm	ppm

Sample	Mn	Fe	Ta	Nb	Zr	Y	La
10056	1150	3.86	<5	<3	5	26	42
10057	1300	4.46	5	<3	5	30	38
10058	620	3.20	<5	<3	4	19	32
10059	660	2.98	<5	<3	4	18	28
10060	660	3.46	<5	<3	5	24	38
10061	860	3.66	<5	<3	5	24	32
10062	540	2.86	<5	<3	3	17	28
10063	900	3.86	<5	<3	5	26	42
10064	600	3.22	<5	<3	4	22	30
10065	860	3.76	<5	<3	5	24	40
10066	740	3.46	<5	<3	3	24	36
10067	700	3.54	<5	<3	5	22	34
10068	720	3.40	<5	<3	4	20	32
10069	600	3.30	<5	<3	3	10	28
10070	700	3.28	<5	<3	3	16	30
10071	960	3.80	<5	<3	4	20	36
10072	1150	4.10	<5	<3	5	24	40
10073	680	3.22	<5	<3	4	18	28
10074	520	2.96	<5	<3	4	17	28
10075	420	2.30	<5	<3	<2	13	20
10076	520	2.78	<5	<3	3	15	24
10077	450	2.24	<5	<3	<2	12	20
10078	450	2.52	<5	<3	<2	14	22
10079	430	2.10	<5	<3	<2	9	55
10080	480	2.54	<5	<3	3	10	32
10081	640	2.96	<5	<3	4	30	34
10082	520	2.82	<5	<3	3	19	26
10083	580	2.50	<5	<3	<2	14	18
10084	640	3.94	<5	<3	4	28	40
10085	700	3.20	<5	<3	4	19	28
10086	760	2.84	<5	<3	3	14	18
10087	540	3.04	<5	<3	3	26	32
10088	600	3.80	<5	<3	4	22	34
10089	660	3.88	<5	<3	4	22	32
10090	660	3.38	<5	<3	3	24	34
10091	880	3.88	<5	<3	4	34	44
10092	880	3.26	<5	<3	3	15	18
10093	240	2.74	<5	<3	<2	9	12
10094	380	2.44	<5	<3	<2	11	12
10095	300	3.28	<5	<3	3	12	14
Detn limit	(2)	(0.005)	(5)	(3)	(2)	(2)	(3)
Units	ppm	%	ppm	ppm	ppm	ppm	ppm

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Sample	Mn	Fe	Ta	Nb	Zr	Y	La
10096	600	3.56	<5	<3	3	16	16
10097	860	4.24	<5	<3	4	20	24
10098	880	3.54	<5	<3	3	18	22
10099	520	3.24	<5	<3	3	16	22
10100	720	3.42	<5	<3	3	15	20
10101	1300	3.00	<5	<3	3	22	26
10102	1300	2.60	<5	<3	3	15	18
10103	1300	2.40	<5	<3	<2	15	18
10104	1400	2.58	<5	<3	<2	17	18
10105	700	3.24	<5	<3	4	19	30
10106	940	3.46	<5	<3	<2	20	24
10107	1300	4.52	<5	<3	2	60	46
10108	540	3.58	<5	<3	3	19	36
10109	960	4.26	<5	<3	6	20	44
10110	860	3.78	<5	<3	6	30	55
10111	680	4.18	<5	<3	5	24	75
10112	920	4.50	<5	<3	5	17	36
10113	480	3.60	<5	<3	3	15	42
10114	820	3.72	<5	<3	4	12	60
10115	760	3.72	<5	<3	5	13	70
10116	920	4.32	<5	<3	6	18	85
10117	940	3.60	<5	<3	5	15	100
10118	860	4.42	5	<3	3	16	44
10119	920	4.34	5	<3	4	20	26
10120	600	4.16	5	<3	5	24	36
10121	1050	3.40	<5	<3	3	18	24
10122	360	3.30	<5	<3	3	13	12
10123	540	5.10	5	<3	5	65	75
10124	410	4.44	<5	<3	3	20	30
10125	540	5.15	<5	<3	6	22	36
10126	980	4.78	<5	<3	5	26	48
10127	1100	4.98	<5	<3	9	30	75
10128	760	4.64	<5	<3	5	28	42
10129	680	3.26	<5	<3	5	24	42
10130	660	3.68	<5	<3	4	30	60
10131	920	5.25	<5	<3	7	28	120
10132	1250	5.55	<5	<3	8	30	150
10133	920	4.96	<5	<3	6	22	55
10134	1000	5.35	<5	<3	6	24	100
10135	800	4.60	<5	<3	6	20	80
Detn limit	(2)	(0.005)	(5)	(3)	(2)	(2)	(3)
Units	ppm	%	ppm	ppm	ppm	ppm	ppm

Sample	Mn	Fe	Ta	Nb	Zr	Y	La
10136	800	4.56	<5	<3	5	26	48
10137	920	4.48	<5	<3	5	22	50
10138	920	4.82	<5	<3	6	12	85
10139	1900	3.96	<5	<3	5	26	60
10140	2250	4.10	<5	<3	5	28	65
10141	1450	4.02	<5	<3	5	22	60
10142	360	2.98	<5	<3	<2	13	46
10143	960	6.00	<5	<3	7	80	85
10144	920	4.30	<5	<3	4	28	55
10145	1300	4.80	<5	<3	6	32	60
10146	1000	4.92	<5	<3	6	30	46
10147	640	3.60	<5	<3	4	17	32
10148	1000	3.82	<5	<3	5	17	60
10149	820	3.44	<5	<3	3	19	50
10150	940	4.32	<5	<3	7	22	80
10151	880	4.16	<5	<3	5	22	80
10152	900	4.30	<5	<3	7	26	70
10153	1500	4.56	<5	<3	5	30	55
10154	800	4.28	<5	<3	4	24	42
10155	1200	4.56	<5	<3	4	28	55
10156	470	3.28	<5	<3	3	28	48
10157	620	2.90	<5	4	3	26	50
10158	800	4.10	<5	<3	5	24	55
10159	760	3.70	<5	<3	4	22	36
10160	740	3.50	<5	<3	4	20	34
10161	700	3.38	<5	<3	4	20	34
10162	720	4.36	<5	<3	5	22	50
10163	780	3.56	<5	<3	4	22	42
10164	700	3.74	<5	<3	5	24	36
10165	620	3.42	<5	<3	4	20	32
10166	700	3.62	<5	<3	4	19	55
10167	920	3.94	<5	<3	5	18	60
10168	760	3.56	<5	<3	4	15	50
10169	780	4.14	<5	<3	6	19	65
10170	900	4.98	5	<3	6	24	44
10171	760	3.78	<5	<3	4	22	38
10172	660	3.32	<5	<3	4	18	32
10173	1000	2.96	<5	<3	4	26	60
10174	860	3.52	<5	<3	4	14	26
10175	740	5.35	<5	<3	6	20	65
Detn limit	(2)	(0.005)	(5)	(3)	(2)	(2)	(3)
Units	ppm	%	ppm	ppm	ppm	ppm	ppm

Sample	Mn	Fe	Ta	Nb	Zr	Y	La
10176	920	4.76	<5	<3	5	18	60
10177	680	3.38	<5	<3	3	22	42
10178	660	3.24	<5	<3	3	17	34
10179	880	3.58	<5	<3	4	20	40
10180	540	3.08	<5	<3	4	13	30
10181	540	3.18	<5	<3	3	15	34
10182	500	3.58	<5	<3	3	10	38
10183	560	3.66	<5	<3	4	16	36
10184	560	3.58	<5	<3	5	15	40
10185	680	3.24	<5	<3	3	11	90
10186	1100	3.58	<5	<3	5	20	46
10187	1250	3.00	<5	<3	4	15	26
10188	740	2.58	<5	<3	3	9	16
10189	1050	3.00	<5	<3	4	14	26
10190	920	2.84	<5	<3	3	17	26
10191	820	2.44	<5	<3	3	11	22
10192	1200	2.32	<5	<3	3	14	28
10193	1100	2.50	<5	<3	3	15	36
10194	1250	2.96	<5	<3	4	15	28
10195	920	2.84	<5	<3	3	13	22
10196	1500	3.82	5	<3	5	22	38
10197	1550	3.40	<5	<3	4	19	36
10198	1100	4.12	5	<3	4	26	42
10199	580	3.42	<5	<3	4	30	50
10200	390	3.14	<5	<3	3	22	44
10201	520	4.10	<5	<3	4	14	44
10202	660	3.84	5	<3	6	18	42
10203	560	3.96	<5	<3	4	36	100
10204	640	3.98	5	<3	5	22	85
10205	660	4.04	5	<3	5	20	60
10206	680	3.56	5	<3	5	19	75
10207	760	3.76	<5	<3	7	36	110
10208	760	3.96	5	<3	4	26	48
10209	620	3.46	<5	<3	3	22	48
10210	840	4.30	5	<3	5	28	46
10211	880	4.10	5	<3	6	16	75
10212	700	3.58	5	<3	4	22	42
10213	620	3.46	<5	<3	6	15	55
10214	380	3.68	5	<3	4	16	50
10215	660	3.92	<5	<3	7	17	75
Detn limit	(2)	(0.005)	(5)	(3)	(2)	(2)	(3)
Units	ppm	%	ppm	ppm	ppm	ppm	ppm

Sample	Mn	Fe	Ta	Nb	Zr	Y	La
10216	720	4.10	5	<3	5	34	110
10217	420	3.06	<5	<3	3	17	60
10218	620	3.40	5	<3	4	24	46
10219	560	3.28	5	<3	3	20	48
10220	660	3.50	5	<3	7	18	75
10221	680	3.58	<5	<3	7	46	140
10222	640	3.72	5	<3	6	19	70
10223	310	2.66	<5	<3	2	13	30
10224	430	3.12	5	<3	7	55	150
10225	490	2.66	<5	<3	3	24	65
10226	800	3.80	5	<3	5	20	70
10227	560	3.78	5	<3	5	18	44
10228	460	3.56	5	<3	5	16	50
10229	820	4.50	5	<3	8	30	85
10230	680	3.28	<5	<3	4	24	24
10231	980	3.96	5	<3	3	38	36
10232	520	3.52	<5	<3	3	22	22
10233	350	2.84	<5	<3	2	19	16
10234	640	2.66	5	<3	3	20	20
10235	330	3.20	<5	<3	3	18	18
10236	260	3.40	<5	<3	<2	17	14
10237	250	3.00	<5	<3	2	13	16
10238	340	3.28	<5	<3	<2	15	18
10239	620	4.56	<5	<3	4	38	28
10240	840	3.72	<5	<3	3	22	24
10241	460	2.82	<5	<3	3	15	16
10242	940	4.38	<5	<3	4	24	22
10243	780	3.54	<5	<3	3	19	22
10244	620	2.98	<5	<3	<2	16	14
10245	580	3.06	<5	<3	3	18	20
10246	560	2.98	<5	<3	4	11	16
10247	580	2.84	<5	<3	3	11	16
10248	800	3.22	<5	<3	3	13	18
10249	980	3.36	<5	<3	3	16	20
10250	1000	2.96	<5	<3	3	15	18
10251	780	3.28	<5	<3	3	18	26
10252	960	3.86	<5	<3	4	24	32
10253	660	3.32	<5	<3	4	22	34
10254	860	4.24	<5	<3	3	24	30
10255	780	4.12	<5	<3	4	26	32
Detn limit	(2)	(0.005)	(5)	(3)	(2)	(2)	(3)
Units	ppm	%	ppm	ppm	ppm	ppm	ppm

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Sample	Mn	Fe	Ta	Nb	Zr	Y	La
10256	720	3.78	<5	<3	4	20	24
10257	560	3.08	<5	<3	4	15	50
10258	580	3.56	<5	<3	4	14	50
10259	580	3.02	<5	<3	4	14	42
10260	450	2.60	<5	<3	3	9	20
10261	390	2.76	<5	<3	4	16	55
10263	780	3.90	<5	<3	5	19	26
10264	740	3.50	<5	<3	4	19	44
10265	390	3.22	<5	<3	4	14	34
10266	460	4.34	5	<3	5	24	60
10267	490	3.46	<5	<3	4	11	44
10268	860	3.78	<5	<3	4	20	65
10269	1050	4.44	<5	<3	5	17	70
10270	1350	4.88	5	<3	5	19	65
10271	1200	4.70	5	<3	6	15	48
10272	680	3.54	<5	<3	4	14	55
10273	700	3.54	<5	<3	4	14	50
10274	700	4.08	<5	<3	3	17	55
10275	620	3.92	<5	<3	4	15	55
10276	880	4.90	5	<3	5	22	95
10277	600	3.82	5	<3	4	12	60
10278	920	5.10	5	<3	6	20	80
10279	700	4.24	5	<3	4	18	75
10280	840	4.82	5	<3	5	16	60
10281	800	5.50	5	<3	6	34	110
10282	560	4.70	<5	<3	7	20	100
10283	1250	6.95	5	<3	6	20	160
10284	1100	5.85	5	<3	8	18	140
10285	1200	6.35	5	<3	11	28	150
10286	780	5.30	<5	<3	7	28	110
10287	920	4.78	5	<3	5	28	70
10288	1050	4.98	5	<3	5	30	60
10289	1000	6.25	5	<3	6	36	55
10290	940	4.88	5	<3	5	32	48
10291	1500	5.85	5	<3	5	38	75
10292	1050	5.05	<5	<3	4	30	60
10293	1500	5.60	5	<3	4	26	40
10294	860	4.46	<5	<3	4	20	32
10295	980	3.90	<5	<3	4	19	34
10296	840	4.70	<5	<3	5	20	40
Detn limit	(2)	(0.005)	(5)	(3)	(2)	(2)	(3)
Units	ppm	%	ppm	ppm	ppm	ppm	ppm

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Sample	Mn	Fe	Ta	Nb	Zr	Y	La
10297	1150	4.36	<5	<3	5	19	30
10298	940	5.55	5	<3	5	24	24
10299	980	4.70	5	<3	4	20	20
10300	640	5.05	<5	<3	3	22	22
10301	520	4.96	5	<3	5	22	22
10302	1150	5.95	5	<3	5	36	30
10303	760	5.20	5	<3	4	26	26
10304	820	4.40	<5	<3	4	42	34
10305	1600	4.50	<5	<3	4	28	28
10306	1050	5.40	5	<3	8	50	55
10307	700	4.30	<5	<3	6	32	28
10308	700	4.74	<5	<3	5	40	40
10309	1250	5.45	<5	<3	6	70	50
10310	1000	5.10	<5	<3	6	65	46
10311	700	5.35	<5	<3	5	60	44
10312	1100	5.55	5	<3	7	50	38
10313	800	5.65	5	<3	5	55	65
10314	1100	5.00	<5	<3	5	60	55
10315	660	5.90	5	<3	5	24	24
10316	470	4.96	<5	<3	5	65	48
10317	740	6.20	5	<3	5	28	30
10318	660	5.75	5	<3	5	30	26
10319	860	5.55	5	<3	7	28	28
10320	820	4.26	<5	<3	5	26	40
10321	450	4.16	<5	<3	5	22	36
10322	740	4.38	<5	<3	6	22	50
10323	700	3.82	<5	<3	4	28	60
10324	720	3.60	<5	<3	5	28	40
10325	620	3.36	<5	<3	3	24	30
10326	680	3.70	<5	<3	4	26	38
10327	900	4.38	<5	<3	5	30	55
10328	660	3.60	<5	<3	<2	32	44
10329	820	4.28	<5	<3	4	32	42
10330	140	3.68	<5	<3	4	24	32
10331	640	3.72	<5	<3	4	26	36
10332	700	3.56	<5	<3	3	30	38
10333	680	4.02	<5	<3	5	32	42
10334	880	4.12	<5	<3	5	34	48
10335	780	3.82	<5	<3	4	28	38
10336	800	4.36	<5	<3	6	34	50
Detn limit	(2)	(0.005)	(5)	(3)	(2)	(2)	(3)
Units	ppm	%	ppm	ppm	ppm	ppm	ppm

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Sample	Mn	Fe	Ta	Nb	Zr	Y	La
10337	680	3.98	<5	<3	5	34	48
10338	490	3.14	<5	<3	4	24	34
10339	420	3.58	<5	<3	4	24	38
10340	450	4.12	<5	<3	5	38	40
10341	1050	3.78	<5	<3	4	26	24
10342	940	4.86	<5	<3	6	44	46
10343	740	4.60	<5	<3	4	24	26
10344	700	3.54	<5	<3	4	36	34
10345	1050	4.50	<5	<3	3	26	30
10346	860	5.40	<5	<3	5	44	40
10347	1000	5.60	<5	<3	5	65	40
10348	290	2.40	<5	<3	<2	13	42
10349	760	3.44	<5	<3	<2	36	46
10350	450	2.84	<5	<3	4	26	32
10351	720	3.22	<5	<3	5	24	32
10352	400	3.08	<5	<3	5	24	34
10353	580	3.42	<5	<3	6	30	40
10354	580	3.20	<5	<3	7	26	36
10355	580	3.02	<5	<3	6	28	34
10356	720	3.44	<5	<3	5	36	46
10357	470	2.60	<5	<3	4	18	20
10358	520	3.54	<5	<3	7	22	30
10359	640	3.84	<5	<3	6	22	32
10360	320	2.94	<5	<3	6	15	28
10361	660	4.10	<5	<3	5	14	65
10362	680	4.14	<5	<3	3	15	90
10363	920	4.56	<5	<3	4	18	70
10364	800	4.14	5	<3	4	15	50
10365	760	4.48	<5	<3	7	15	65
10366	520	2.92	<5	<3	5	9	55
10367	680	3.90	<5	<3	4	24	48
10368	660	4.02	5	<3	5	24	48
10369	780	4.26	<5	<3	5	24	46
10370	720	4.14	5	<3	5	26	48
10371	880	4.58	5	<3	5	28	55
10372	680	3.96	<5	<3	4	24	44
10373	680	4.02	5	<3	6	28	50
10374	720	4.12	5	<3	4	32	55
10375	760	4.02	5	<3	4	26	42
10376	440	2.68	<5	<3	3	26	50
Detn limit	(2)	(0.005)	(5)	(3)	(2)	(2)	(3)
Units	ppm	%	ppm	ppm	ppm	ppm	ppm

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Sample	Mn	Fe	Ta	Nb	Zr	Y	La
10377	640	3.52	5	<3	4	24	38
10378	660	3.68	5	<3	5	32	55
10379	490	2.92	<5	<3	4	22	55
10380	560	3.92	<5	<3	5	28	70
10381	640	3.22	<5	<3	5	28	70
10382	540	3.12	<5	<3	4	24	70
10383	620	3.12	<5	<3	4	26	100
10384	560	2.78	<5	<3	4	24	80
10385	540	3.00	<5	<3	4	24	44
10386	640	3.66	<5	<3	8	60	120
10387	450	2.90	<5	<3	4	55	120
10388	560	3.40	5	<3	5	26	80
2893	430	3.04	<5	<3	5	17	34
2894	680	3.66	<5	<3	4	18	65
2895	700	3.34	<5	<3	4	17	60
2896	720	3.48	<5	<3	4	17	60
2897	580	3.20	<5	<3	4	15	50
Wi	190	3.12	<5	<3	3	11	30
Detn limit	(2)	(0.005)	(5)	(3)	(2)	(2)	(3)
Units	ppm	%	ppm	ppm	ppm	ppm	ppm

MPC/M-0

CSIRO
AUSTRALIA

Division of Mineral Products

PROGRESS REPORT ON THE STUDIES OF THE MINERALOGY AND GEOCHEMISTRY OF THE RARE-EARTH MINERALIZATION NEAR WHITE RANGE

M.T. Frost, G. Tsambourakis and S. Tassios.

February 1989

APPENDIX 2

CSIRO DIVISION OF MINERAL PRODUCTS REPORT No MPC/M-067

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CONTENTS

EXECUTIVE SUMMARY

This report describes the progress in geochemical and mineralogical research of the rare-earth-mineralized area near White Range. A recently conducted aerial survey indicated thorium anomalies in the area, and some initial attempts have been made to understand and define their mineralogy and petrology. The second part of this report is a detailed analysis of samples of diamond drill core taken from an intersection through a series of allanite-rich pods.

A new analytical service named *Bequerel Laboratories* has been assessed. It is proposed that in this stage of exploration, samples of interest be analyzed for a range of rare-earth elements by Bequerel and that at the same time CSIRO conduct XRF analyses for a wide range of elements which would include common mineral-forming elements, and also zircon and thorium.

Bulk assays of over one-hundred samples from the thorium anomalies indicated that there is a wide range of rocks including SiO_2-rich pegmatites, migmatites, amphibolites and carbonatites. About 15% of the samples contained greater than 0.3% CeO_2, 26% more than 0.11% CeO_2 and 76% more than 0.05% CeO_2. Very few rocks collected from the thorium anomalies contain significant amounts of light rare-earths or thorium, and more work is needed to understand their nature.

Principal component analyses suggested eight silicate-rich subdivisions. Rocks containing between 63-69% SiO_2 usually contain significant amounts of rare earths, but some amphibolites also contain rare earths. In the latter case monazite was identified. This is the first time monazite has been reported from rocks of known location in this area.

A sample named "hot clay" was found to be very rich in rare earths and to consist of monazite, garnet, plagioclase, and biotite, with significant amounts of zircon and iron ore. However, no clay minerals were identified in this sample. If significant reserves of this rock were to be proved, then the prospect would become a very promising source of rare earths from monazite.

Very detailed mineralogical studies of samples from the diamond drill core identified two different types of allanite:

(a) Allanite occurring in SiO_2-rich rocks as very large grains with weathered rims of varied thickness and composition. Such allanite has relatively high ThO_2 levels (1.2%) and, when fresh, contains less SiO_2 and more Fe_2O_3.

(b) Less-common, allanite is found in amphibolites as small grains containing only about 0.5% ThO_2.

Electron microprobe analyses of all major minerals including felspar, amphibole, pyroxene, epidote, apatite, sphene, and calcite show very low levels of rare earths.

Principal component analyses of the bulk assays of samples taken at regular one metre intervals identified SiO_2-rich rocks rich in Na_2O or K_2O, and confirm that it is possible to find pegmatites, migmatites and amphibolites which are both rare-earth rich or rare-earth poor. No monazite was found in this suite of rocks. The nature of the rare-earth mineralization occurring in the diamond drill core samples suggests that the rare earths have been introduced both in the form of coarse-grained pegmatites and finer-grained, more basic rocks, similar in bulk composition to amphibolites. It is suggested (M.T. Frost) that the allanite-rich rocks may have been formed by partial melting of the monazite-bearing granulites or amphibolites.

This work, therefore, extends the range of rare-earth mineralization to (1) allanite-rich pegmatites or migmatites, (2) allanite-containing amphibolites, and (3) monazite-containing amphibolites.

For commercial exploitation of the allanite-bearing rocks it is essential to discover larger pods. It is recommended that a detailed program be carried out involving 1:25,000 topographical and geological mapping, with more detailed geological mapping (at 1:5,000) of specific areas, and further diamond drilling in selected areas.

Because of the discovery of significant amounts of monazite, which is found in Australia in heavy mineral sands, it was suggested that a survey of downstream sediments be undertaken. Four samples have been examined and show promising levels of monazite, zircon, ilmenite and garnet. It is strongly recommend that these sands be further prospected.

INTRODUCTION

This report describes the progress that has occurred in research related to the rare-earth mineralization that has been identified in an area close to the White Range gold deposit. The work is a continuation of the work described in an earlier report [1] in which the mineralogy and chemistry of about one hundred surface samples were described. The report also describes investigations into the most suitable and economical means of performing chemical analyses for all rare-earth elements.

Since the completion of the earlier studies, an aerial survey was carried out to monitor radiation levels and, in particular, thorium radiation levels over the area. This survey showed that thorium anomalies occurred over a wide-ranging area which was much larger than the area originally surveyed. As part of an initial program to understand and define the mineralogical and petrological nature of these areas, Dr. Murrell collected surface samples from some of these anomalies and the subsequent preliminary studies of these samples are described in this report.

At present, it is very difficult to define these areas accurately, but it is understood that a 1:25,000 topographical map is planned. When this is available it will be possible to map - and therefore relate - these areas to the topography and to the main geological features of the area.

One important question that this report begins to answer is whether these thorium anomalies contain rare-earth minerals in significant proportions, and whether these contain minerals other than allanite.

The second part of this report relates to the diamond drilling that was carried out in an attempt to define the extent of the allanite-rich rocks found in the area defined by S68 in Fig. 2 of the earlier report [1]. Originally, about two metres of core was examined but after a visit by Dr. Frost earlier this year, it was decided to examine samples taken at regular, one-metre intervals along the whole length of the core.

It was hoped that our knowledge of the mineralogy and geochemistry of these rocks would be significantly increased by such a study. Firstly, it was considered possible that surface allanite would be weathered much more than that found in rocks at depth, and it was important to learn if there were differences in composition. Secondly, our earlier work shows that there are silicarich rocks that contain little allanite and it is of interest to understand more fully the relationship between these two types of rocks. Finally, there had been some evidence that suggested that allanite occurred in the amphibolites as well as in the acid pegmatitic rocks. A study of fresh drill core would indicate whether this was so.

Finally, this report describes the discovery of monazite-rich and monazite-bearing rocks. No monazite-bearing rocks were reported in our earlier reports and their occurrence immediately suggested that there might be accumulations of heavy-mineral concentrates down-stream, containing monazite and perhaps other valuable minerals. Dr. Murrell provided four samples taken from the Hale River and its delta system and the mineralogy of these samples are described.

SAMPLES AND THEIR LOCATION

Sample code numbers and their location (when known) are described in Appendix A. The information on sample locations is, as yet, very uncertain and it was reluctantly decided to delay any description of their location until their positions had been defined on the 1:25,000 topographical map. Samples 90-103 were sent to this Division by Mr. Bruce and their locations are unknown.

A complete section of halved diamond drill core (RE1) from 88.95 m to 91.41 m was studied in detail. Samples from every one metre from the same hole were delivered to the Division and a description of these samples is also given in Appendix A.

ANALYTICAL METHODS

X-ray fluorescence methods for determining the following elements were improved or developed;

Si, Al, Ti, Fe, Mg, Mn, Ca, K,

Na, Ce, La, Zr, F, P, Y and Th,

Previous bulk chemical analyses did not include fluorine.

During the last few months a new analytical service named *Bequerel Laboratories* commenced business in Australia. This service offered analyses by Neutron Activiation analysis (NAA) using relatively large samples (10g) at relatively cheap rates ($10 per sample) and faster turn-arounds than conventional NAA methods.

The rare-earth elements La, Ce, Sm, Y, Nd and Lu are offered by Bequerel as part of a twenty-seven-element package costing $10 per package. The other elements in this set are;

Au, Sb, AS, Ba, Cs, Cr,

Co, Hf, Ir, Fe, Mo, Rb,

Ru, Sc, Se, Ag, Ta, Th,

W, U, and Zn.

Although offering only six rare-earth elements, they are spread over the whole range, so that the rare-earth distributions of allanite, monazite, xenotime and rare-earth clays can be measured and distinguished by considering the relative levels of these six elements. It was therefore considered that the Bequerel 27-element package would be a very useful first assay for an exploration program, especially if combined with an XRF analysis of the following elements;

Si, Ti, Al, Fe,Mn, Mg, Ca, Na,
K, F, P, Zr, Th, Ce, La, and Y,

These elements would determine the specific nature of the rock and the levels of zircon and apatite present.

It was decided, therefore, that this service should be assessed and, as a result, Bequerel were commissioned to analyse twenty samples that had been previously analysed by conventional NAA, ICP and, in some cases, XRF. The results of these analyses are illustrated in Figs. 1 to 10. These plots show the variation of each element as measured by the Bequerel NAA method and either XRF, conventional NAA, or ICP.

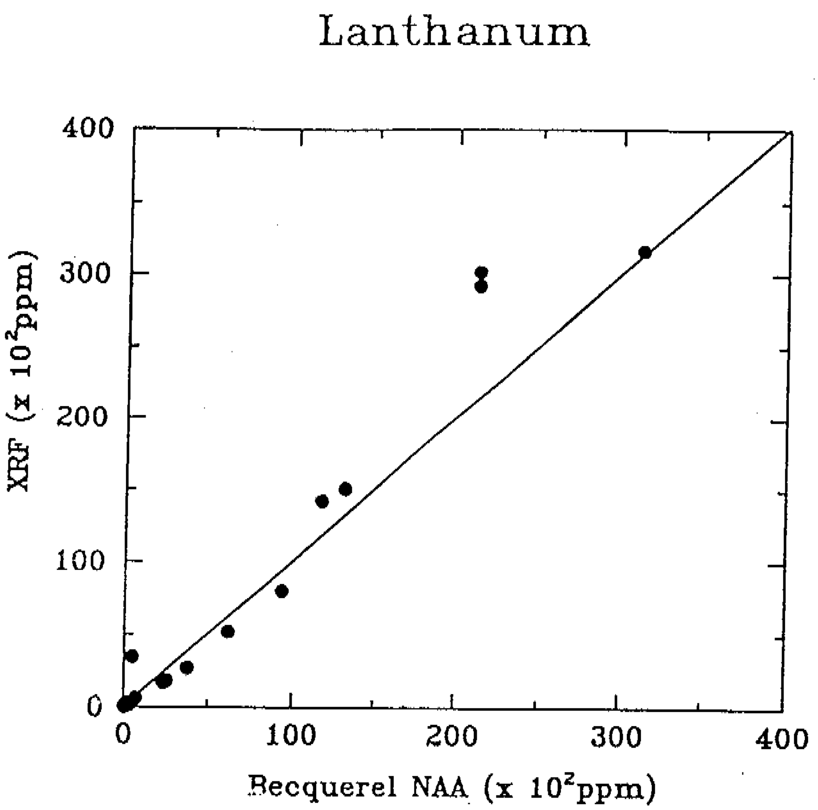


Fig. 1. A comparison between concentrations of lanthanum determined by the Bequerel NAA method and by XRF.

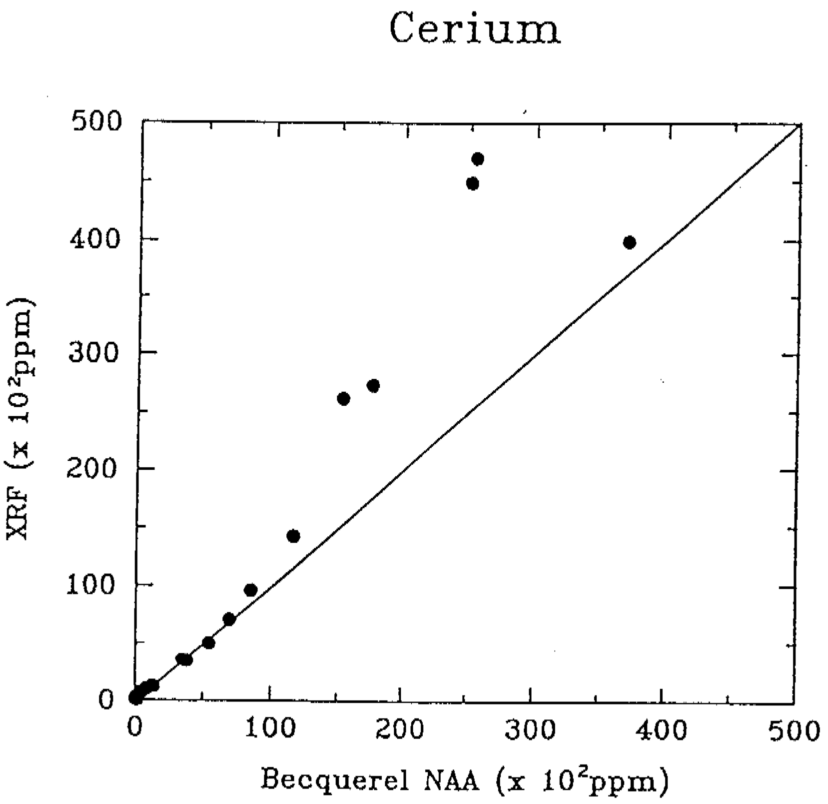


Fig. 2. A comparison between concentrations of cerium determined by the Bequerel NAA method and by XRF.

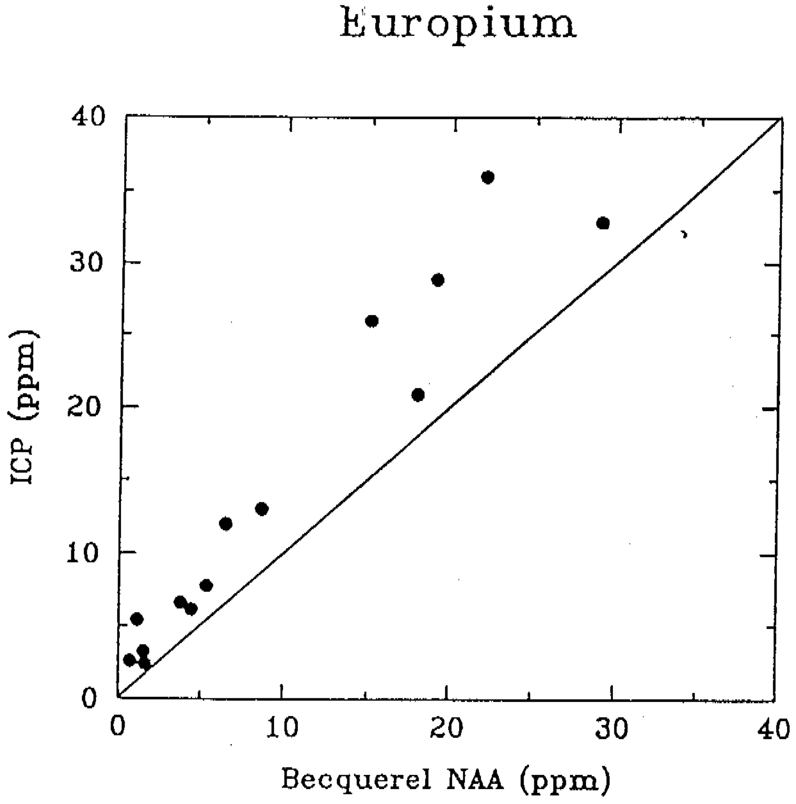


Fig. 3. A comparison between concentrations of europium determined by the Bequerel NAA method and by ICP.

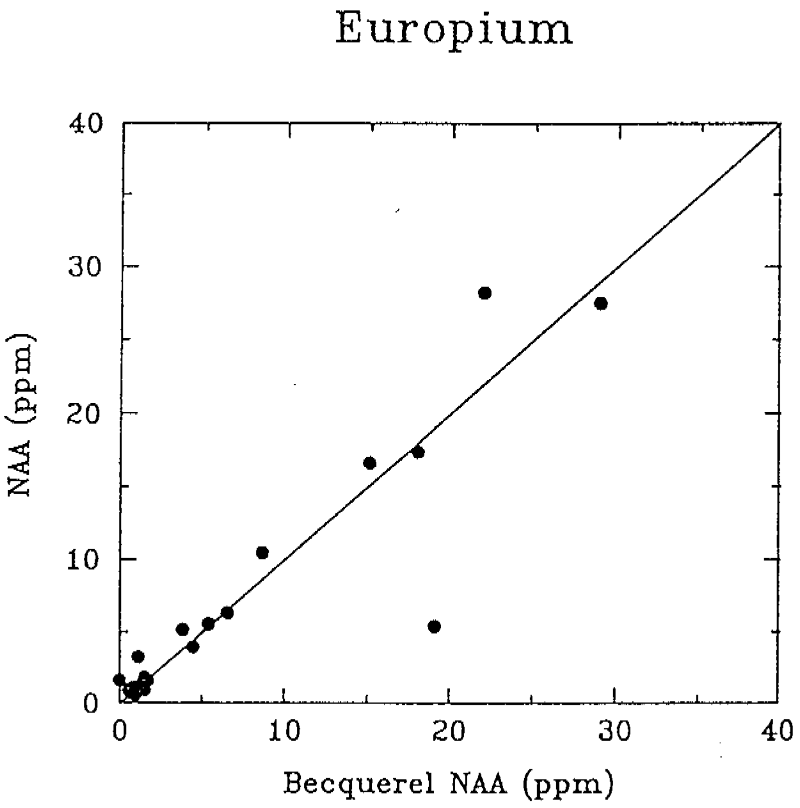


Fig. 4. A comparison between concentrations of europium determined by the Bequerel NAA method and by conventional NAA.

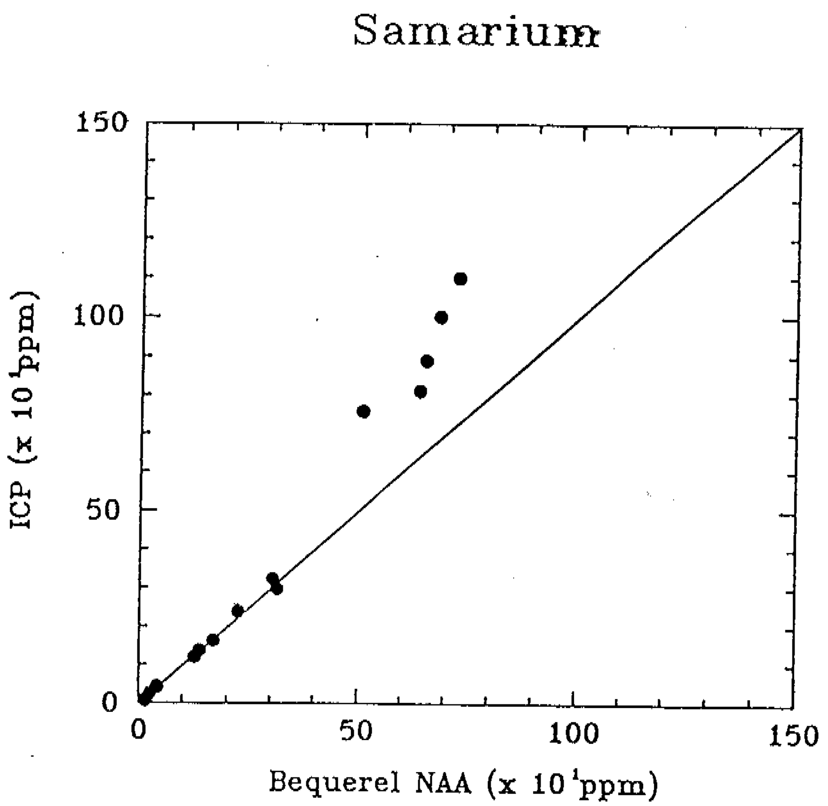


Fig. 5. A comparison between concentrations of samarium determined by the Bequerel NAA method and by ICP.

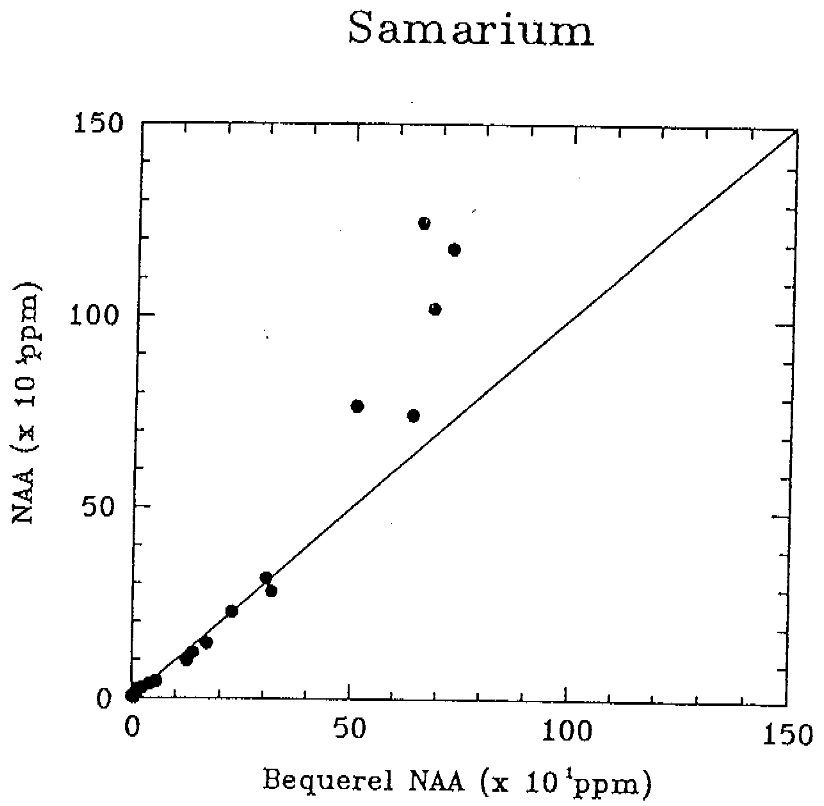


Fig. 6. A comparison between concentrations of samarium determined by the Bequerel NAA method and by conventional NAA.

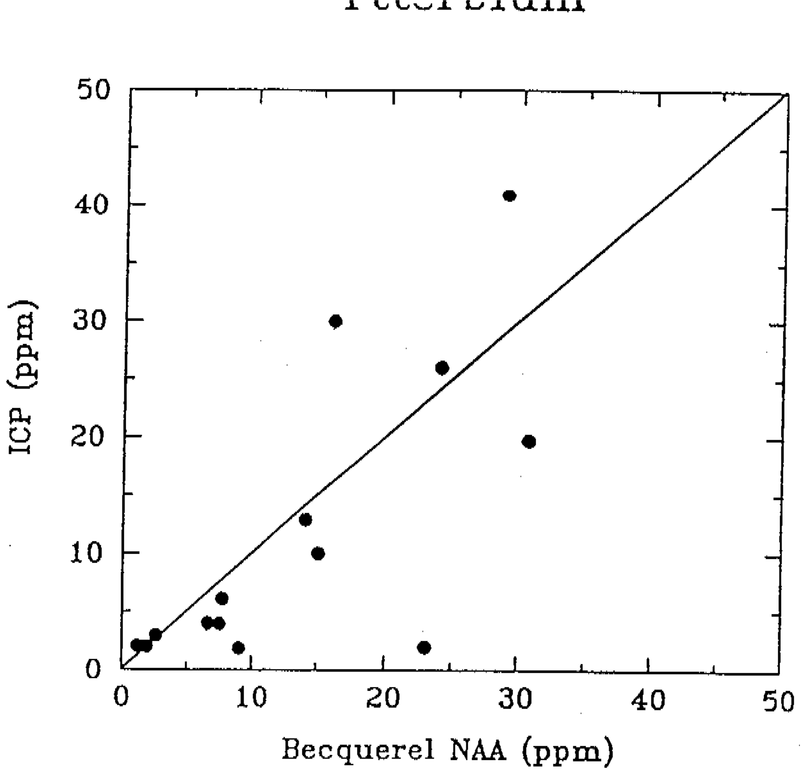


Fig. 7. A comparison between concentrations of yttrium determined by the Bequerel NAA method and by ICP.

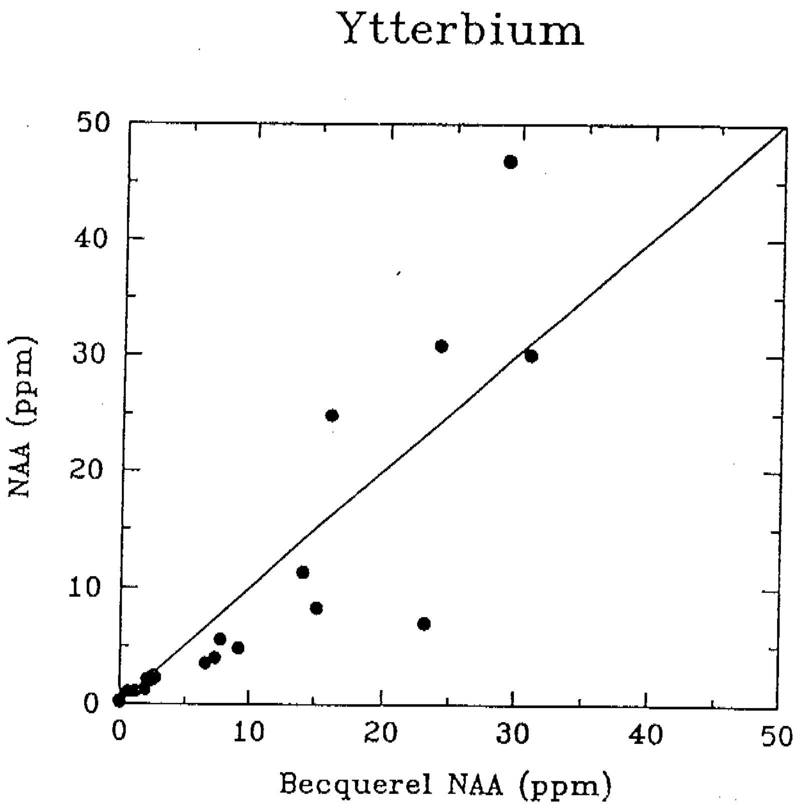


Fig. 8. A comparison between concentrations of yttrium determined by the Bequerel NAA method and by conventional NAA.

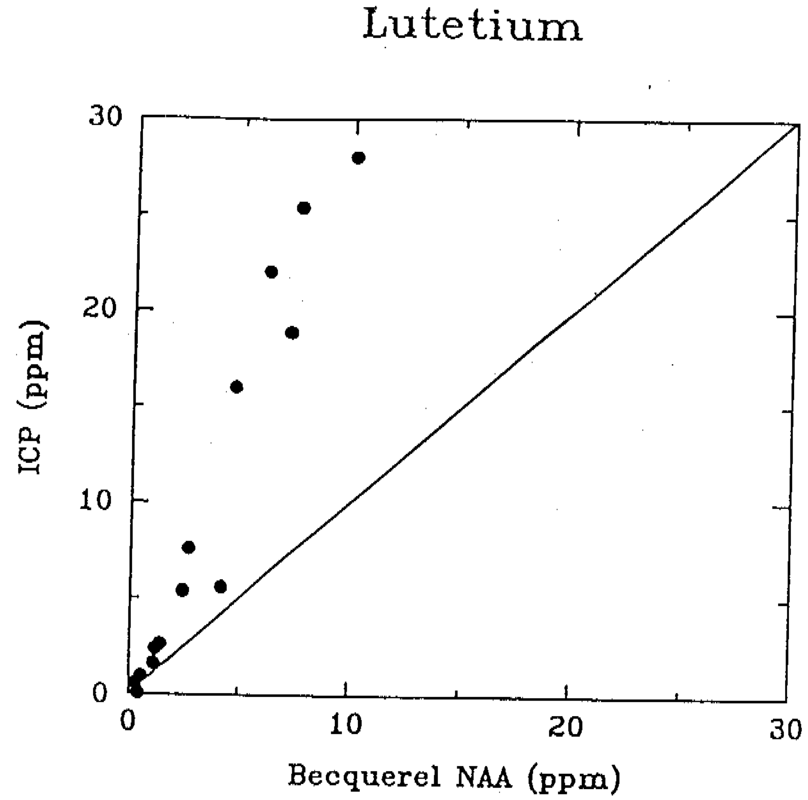


Fig. 9. A comparison between concentrations of lutetium determined by the Bequerel NAA method and by ICP.

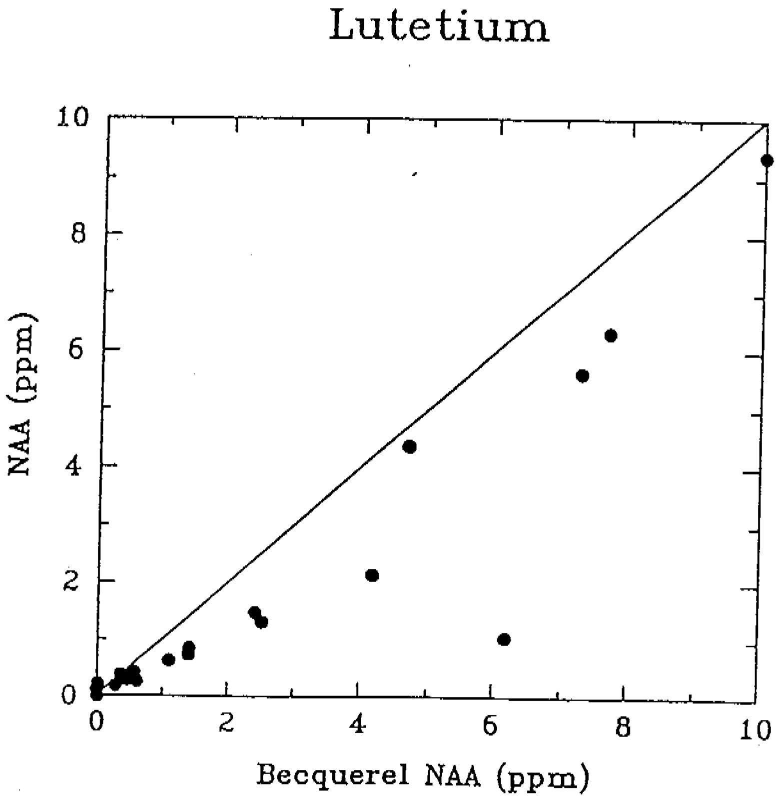


Fig. 10. A comparison between concentrations of lutetium determined by the Bequerel NAA method and by conventional NAA.

The results show particularly large differences between determinations using different methods at high concentrations. For example, Figs. 1 and 2 show the Bequerel NAA versus XRF analyses for lanthanum and cerium respectively and, in both cases, Bequerel underestimates the levels compared with XRF. The previous report [1] described very satisfactory agreement between XRF and conventional NAA for these two elements, which cause us to suspect the accuracy of the Bequerel results.

The europium NAA (conventional) and Bequerel NAA results agree well (Fig. 4), except for one outlier, but the ICP determinations are all too high (Fig. 3).

When the concentrations are high (> 500 ppm), samarium levels measured by both Bequerel and ICP are both higher than those levels recorded using conventional NAA (Figs. 5 and 6). Good agreement occurs when the concentrations are low.

A feature of both the ICP and conventional NAA plots for yttrium against results by Bequerel (Figs. 7 and 8) is that the amount of scatter is much higher than any similar plot shown in the earlier report.

In the case of the lutetium results, there is a much better agreement between the two NAA methods than there is between the results by Bequerel and those by ICP, where very signficant differences are observed (Fig. 9). The Bequerel results are a little lower than those measured by conventional NAA (Fig. 10).

Bequerel responded to these results by pointing out that samples very rich in rare earths "cause problems routinely, as in our *gold + 26 package.*" However, although they claimed that the detection limits are considerably increased by high concentrations, they did not account for the systematic differences in results when their methods were used for lanthanum, cerium, europium and samarium determinations, and the increased scatter in the case of the yttrium results.

We intend to have analysed most of the samples that are reported here and, as XRF analyses have been already completed, it will be possible to inform Bequerel before they complete their analyses of the general level of rare-earth elements present. Hopefully, this will enable them to produce results with less bias.

The Bequerel package which includes rare-earth elements has several advantages. First, it offers a range of rare-earth elements from light to heavy, and the determination of gold is included. Second, Bequerel charge much less than any other laboratory and they also claim that theirs is much faster than other NAA methods. The disadvantage is that the Bequerel method does not analyse, in one package, all rare-earth elements and there are difficulties in accurately analysing a very wide range of rare-earth concentrations. Also, if an exploration program was based only on such a set, then very important additional geochemical information would be missed, such as the level of zirconium or phosphorus.

Analysis by XRF for the elements already defined would, in most cases, be a satisfactory first analytical method. The cerium and lanthanum levels would determine the general rare-earth level in a sample and the concentrations of the remaining elements would allow the rock-type to be determined. Low totals would indicate that there were high concentrations of elements that had not been analyzed. However, this method would be unsuitable for any exploration for rare-earth-rich clays or xenotime-rich rocks, which reportedly contain very low levels of light rare-earths.

It is therefore proposed that in these early stages of exploration both XRF and Bequerel analyses be carried-out on all rock samples (i.e. from the rocks from thorium anomalies, from allanite-rich rocks, from carbonatites and from clays). Complete rare-earth analyses would be conducted in cases of particular interest.

The Division has the capability to develop in-house methods (using ion chromatography) for complete rare-earth analyses and it is proposed to carry out some developmental work in the next quarter towards this end.

Sample preparation for bulk assaying would be carried-out most efficiently at White Range. It is suggested that between one to two kilograms of a sample be crushed to below 4 mm. A sample of 100 g should be riffled from this crushed rock and pulverized. The pulverized material, together with a representative lump for sectioning, would be sent to the Division for assaying by XRF and analysis by XRD. Also, it would be very desirable for the Division to be sent about 500g of coarsely-crushed material, in case it was found necessary to examine heavy or magnetic fractions.

Alternatively, sample preparation could be carried out by Amdel. In this case, much time would be saved if samples were sent directly from White Range to Amdel, and the subsequently prepared samples then sent to the Division.

RESULTS OF BULK ASSAYS OF SAMPLES FROM THE THORIUM ANOMALIES.

Appendices B and C present the bulk assays for the surface samples and the drill core samples respectively. The loss on ignitions (LOI) have not as yet been completed. Therefore, loss on fusion (LOF) is given. Loss on fusion results when the sample is fused to make a glass bead for analysis by XRF. During LOF the sample is oxidised, but at the same time S and CO_2 are released and, as a consequence, LOF values can only be used as a guide.

Bequerel analyses for these samples have not been completed and so only lanthanum and cerium are presented.

A more detailed analysis of rare-earth elements and LOIs will be presented in the next report.

ANALYSES OF BULK ASSAYS OF SAMPLES FROM THE THORIUM ANOMALIES

The wide range of rock types is appreciated by scanning the assays presented in Appendix B.

Samples 6192, 6205, 6206, 6207, 6282 90, 99, 103, 1010 and 1011 are all rich in carbonate.

In the case of the predominantly silica- or iron-rich samples, mean values are of diminished value because of the wide spread and the non-normality of the distribution. However, the following observations can be made.

SiO_2: Mean 66.8%. Most analyses fall within the range 65-70% (granite-type rocks). Silica levels higher than about 70% contain substantial quartz, often in veins. Some samples that are predominantly composed of ferromagnesian silicates record SiO_2 levels of 45-55%. Values lower than this are generally rich in iron oxides (e.g. samples 3149, 6192, 6278A and 6278B, 6281, and 90).

Al_2O_3: Mean 13.0%. The SiO_2-rich rocks contain between 11-16% Al_2O_3, and when SiO_2 drops to nearer 50%, Al_2O_3 rises to about 21%, reflecting the increase in plagioclase and the reduction in free quartz. This relationship also accounts for there being a positive correlation between sodium and aluminium. The levels of Al_2O_3 vary widely in iron-rich rocks and are low in carbonatites.

TiO_2: Mean 0.4%. TiO_2 levels are usually lowest in leucocratic rocks, and highest in melanocratic iron-rich rocks and some carbonate-rich rocks. TiO_2 levels tend to be higher when rare earths, P_2O_5, F, and ZrO_2 are also high. High levels are usually indicative of the presence of biotite, ilmenite, sphene, manganoilmenite and titanomagnetite.

Fe_2O_3: Mean 6.6%. In predominantly SiO_2-rich rocks, Fe_2O_3 levels range from about 1-2%. Mafic rocks contain about 10-14%, due to the increased amounts of minerals such as biotite, amphibole and iron oxides. Carbonatites(?) usually contain between 5 and 10% Fe_2O_3. (e.g sample 6204, 5.5% and sample 1010, 8.8%). Fe_2O_3 is positively correlated with F (0.6%) but, surprisingly, there is no positive correlation between rare-earth elements and iron.

MnO: Mean 0.1%. MnO is normally lowest in SiO_2-rich rocks (< 0.05%) and highest in silicate-rich, silica-poor rocks. No positive correlations are measured between MnO and other elements.

MgO: Mean 1.45%. MgO levels are usually lower than 1% in granitic rocks and between 3-12% in silica-poor, ferromagnesian-rich rocks. MgO levels in iron-oxide-rich rocks are not usually below 1%.

CaO: Mean 3.2%. Levels usually range from about 1 to 3% in silica-rich rocks. This is directly related to the anorthite content of the plagioclase, and the presence of epidote, amphibole and carbonate. When SiO_2 is lower, levels range widely from about 3% to 18% (e.g. sample 6151). High CaO and MgO levels are common.

Na_2O: Mean 1.9%. Silica-rich rocks contain about 1.5-2.0% Na_2O and the silica-poor, silicate-rich rocks usually contain over 3%. Na_2O and Al_2O_3 are strongly correlated, indicating that Na_2O-levels are determined mainly by plagioclase content in a sample.

K_2O: Mean 3.6%. Most leucocratic rocks contain K_2O levels of about 5-6% and most silica-poor, silicate rocks contain under 1% K_2O.

P_2O_5: Mean 0.2%. Variation in P_2O_5 levels range across all rock types. Highest values (about 2%) are found in silica-poor rocks but occasionally higher values are recorded in silica-rich rocks(e.g. sample 6172, 0.36% P_2O_5). P_2O_5 is positively correlated with zirconia, rare earths, and F (apatite?).

F^-: Mean 0.7%. F^- levels are lowest in silica-rich (< 1%) rocks and increase as SiO_2 decreases (> 2% when SiO_2 < 46%). High F^- levels are usually recorded with high rare earths (indicating the presence of fluorocarbonate or apatite), P_2O_5 and Fe_2O_3 levels.

Y_2O_3: Mean 0.02%. Y_2O_3 levels vary depending on the amount of rare-earth minerals and/or apatite present in the sample. However, monazite has propor-tionally more Y_2O_3 than has allanite or apatite. The Y_2O_3/Ce_2O_3 ratio for rocks known from earlier studies to be rich in allanite lies in the range 0.01 to 0.03. It is inter-esting to note that this ratio varies widely between samples. Samples 3149, 6134, 6138, 6141, 6142, 6144, 6169, 6188, 6212, 6280, and 103 all record Y_2O_3/CeO_3 ratios much higher than 0.03, whereas samples 6152, 6158, 6164B, 6169, 6172, 6194, 6205, 6208, 6211, 6226, 6228, 6275, 7277A, 92, 93, and 1001 all have ratios much closer to that expected for allanite-bearing rocks.

Allanites generally can contain highly variable amounts of Y_2O_3 (see p. 95 of [1]), but wide variations are less likely within one suite of rocks or in one province. It may prove to be worthwhile to determine Y_2O_3 more accurately so that this ratio could be used as a rare-earth-mineral indicator.

Also, the proportions of heavy rare-earth elements are significantly different in monazites and allanites, so that the Bequerel rare-earth analyses may prove to be useful in determining monazite-rich and allanite-rich rocks.

It is interesting that Y_2O_3 and TiO_2 are positively correlated. This may mean that Y_2O_3 enters ilmenite or, perhaps, sphene, but the electron microprobe analyses presented in Tables 26 and 27 do not support the idea.

ZrO_2: Mean 0.11%. Silica-rich rocks contain little ZrO_2 (0.05-0.3%) but lower silica (about 60-65% SiO_2), silicate-rich rocks sometimes contain higher proportions (0.6-1.3%). Higher ZrO_2 tends to be positively correlated with higher levels of P_2O_5 and rare earths.

La_2O_3 & CeO_2: Mean 0.096 and 0.18% respectively. A break-down of the number of samples containing various levels of CeO_2 is as follows;

> 0.3% CeO_2 or about 3% allanite: 15%.

> 0.11% CeO_2 or 1% allanite: 26%.

> 0.05% CeO_2 or 0.5% allanite: 76%.

The relationship between rare-earth levels and location is summarized in Table 1. The results show that considerable variation exists between different anomalies. For example, the North East Fence amomaly records no significant rare-earth concentrations. The Site 17 and the junction between the allanite-bearing "pyroxenite" and the carbonatite, although only one sample each, record high cerium values. Only two samples out of fourteen from the Conapaira anomaly give high cerium values. The Canteen Creek anomaly cerium levels are all low except for one, as are the levels from the Paradise East anomaly. Only in the case of the samples from the Pighole Anomaly is there a significant number of CeO_2-rich samples.

Table 1. Rare-earth concentrations and the locations of samples.

Anomaly	No. Samples	No. of CeO_2-rich samples
Pighole	14	6
NE Fence	6	0
Pyroxenite/ carbonatite	1	1
Site 17	1	1
Corapaira	14	2
Canteen Crk.	4	1
Paradise E.	8	1
South Bank	4	0
Duffer N etc.	4	0
Ambalindum	1	1
Fe-stones	3	1
Paradise West	9	0
6204-6209	6	1
Muller flat	2	2
Bruce collection	2	0
6226-6227	2	1
Johansen	1	1

From this table it can be seen that very few rocks collected from the thorium anomalies contain significant amounts of light rare-earths or thorium. It must be assumed, therefore, that either the wrong type of rocks are being collected or the thorium anomalies are defined by such sensitive methods that, although relatively high levels of thorium are observed, the amounts of thorium-rich minerals over the areas are insignificant. More work is needed to understand the nature of these anomalies.

ThO_2: Mean. 0.05% Thorium levels are very strongly correlated with rare-earth levels. For example, when $CeO_2 > 16\%$, the ThO_2 concentration is found to be 3.96%.

PRINCIPAL COMPONENT ANALYSIS OF THE BULK ASSAYS OF THE THORIUM ANOMALIES

Principal component analysis allows the wide range of compositions to be systematically grouped. An analysis of all bulk assays except those very rich in either iron or carbonatites(?), results in 50% of the observed variation being accountable in the first and second components.

Figures 11 to 21 are projections of the composition onto the first and second principal component planes, and illustrate how ten of the most important elements relate to these projections. The coordinates for each sample are given in Appendix D. In each figure, the asterisks represent the composition of one sample. Contours (e.g. for SiO_2 in Fig. 11 and Al_2O_3 in Fig. 12), are computer-drawn. The reference numbers for samples which have unusual compositions, and are thus outliers, are shown on Fig. 11, together with representative samples from clusters. For example, sample 6205, because of its unusual composition, plots near the extreme bottom-left-hand corner (+14,-4), and sample 6155 is one representative sample from the main cluster found on the right-hand-side middle (+2,-1).

Figure 11 illustrates that the main cluster of rock compositions falls in the high-SiO_2 region (+2,-1) and there is a smaller cluster at about (-1,+2.5) which represents ferromagnesian or mafic rocks, presently termed amphi-bolites. Sample 98 is a very Fe-rich sample, 6205 a very SiO_2-poor, rare-earth- and P_2O_5-rich sample, and 6188 a monazite-containing, Al_2O_3 and CaO-poor variety. Samples containing significant rare-earths are enclosed in the 0.02 contour to the left of the main SiO_2-rich cluster (0,+1), and below and to the left of the same cluster (-6 to -2,-2).

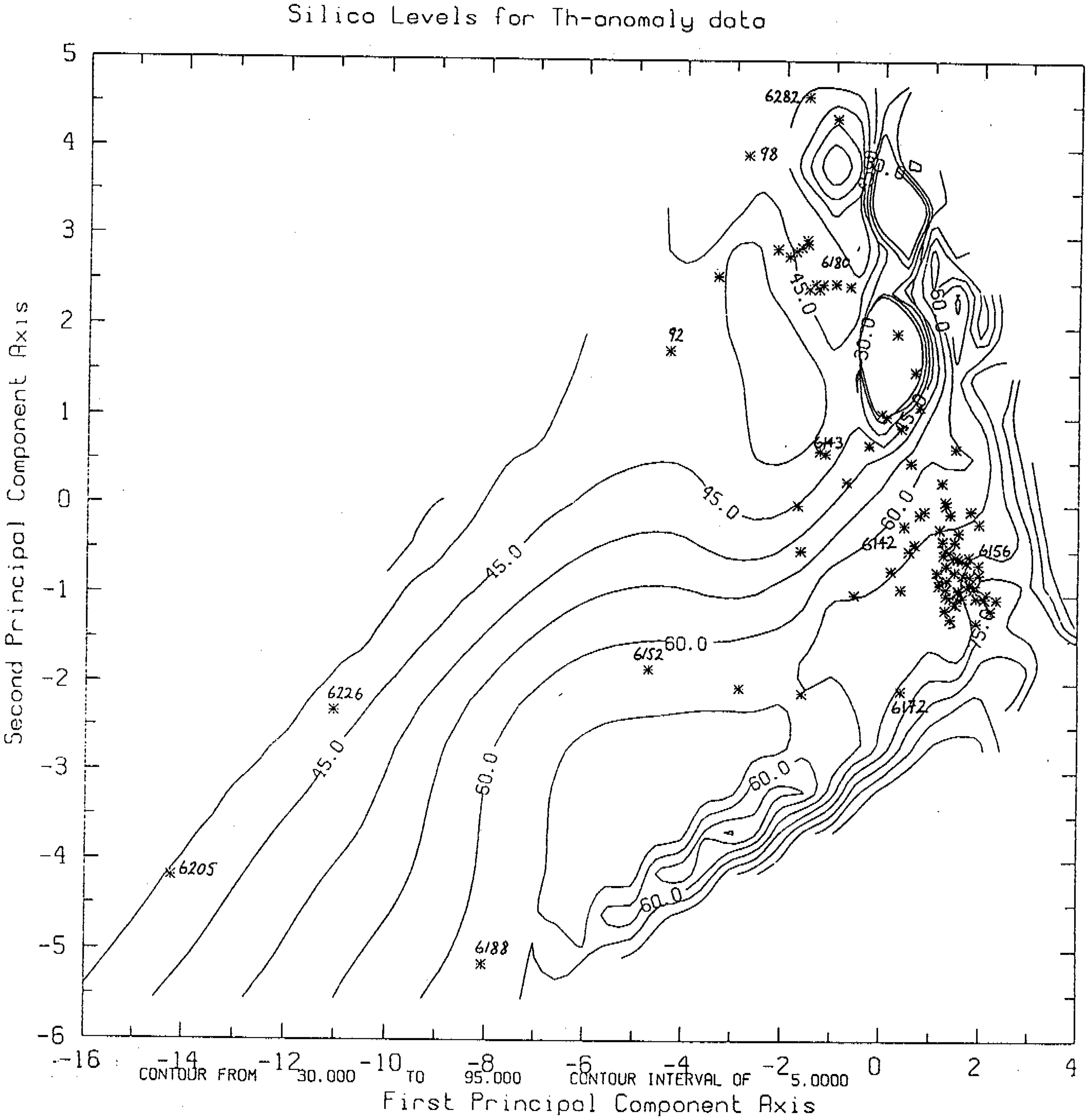


Fig. 11. Thorium anomaly data. Projection of data onto the first and second principal component planes, with SiO_2 values contoured. Outliers and representative samples from clusters are defined.

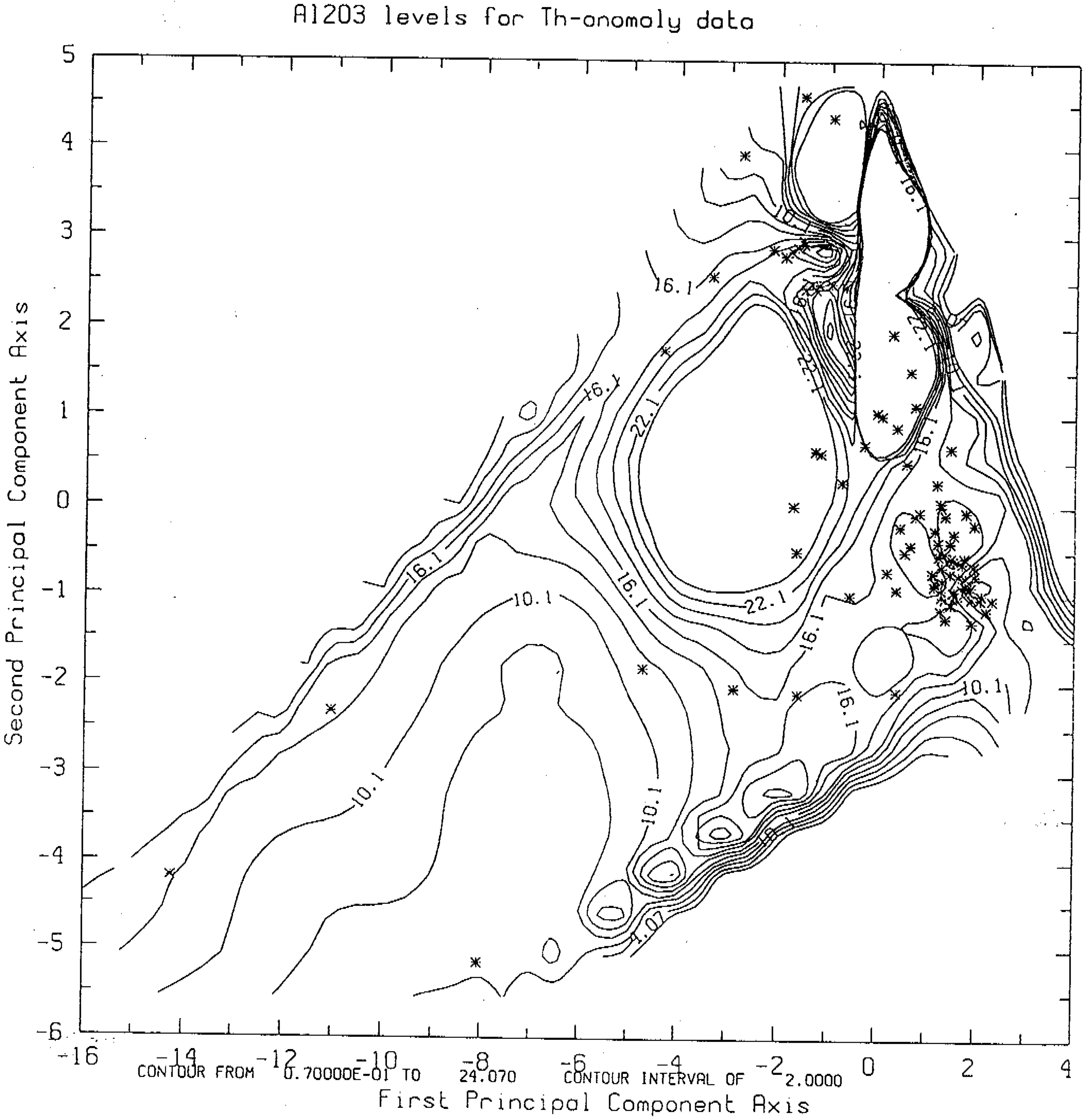


Fig. 12. Thorium anomaly data. Projection of data onto the first and second principal component planes, with Al_2O_3 values contoured.

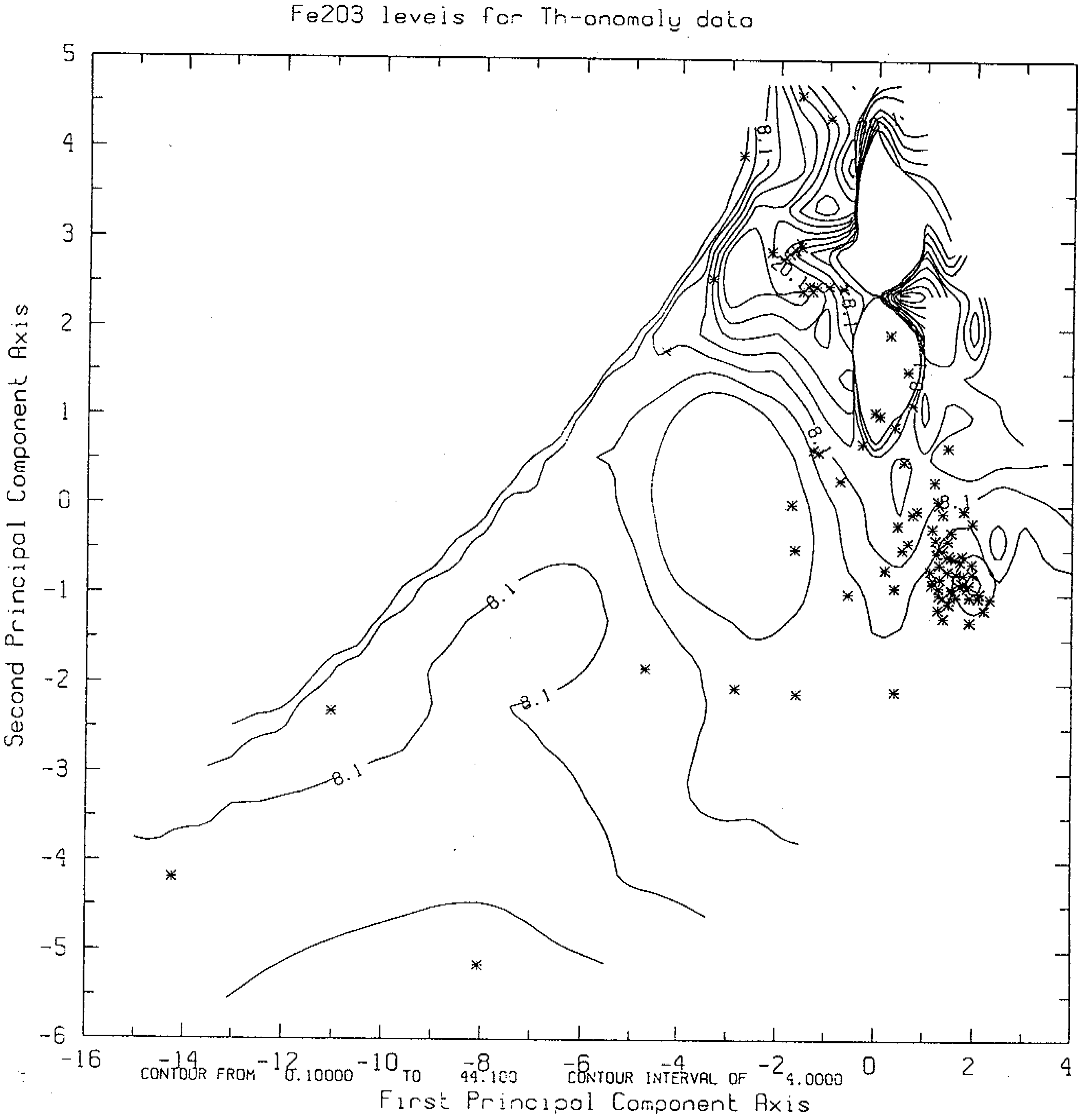


Fig. 13. Thorium anomaly data. Projection of data onto the first and second principal component planes, with Fe_2O_3 values contoured.

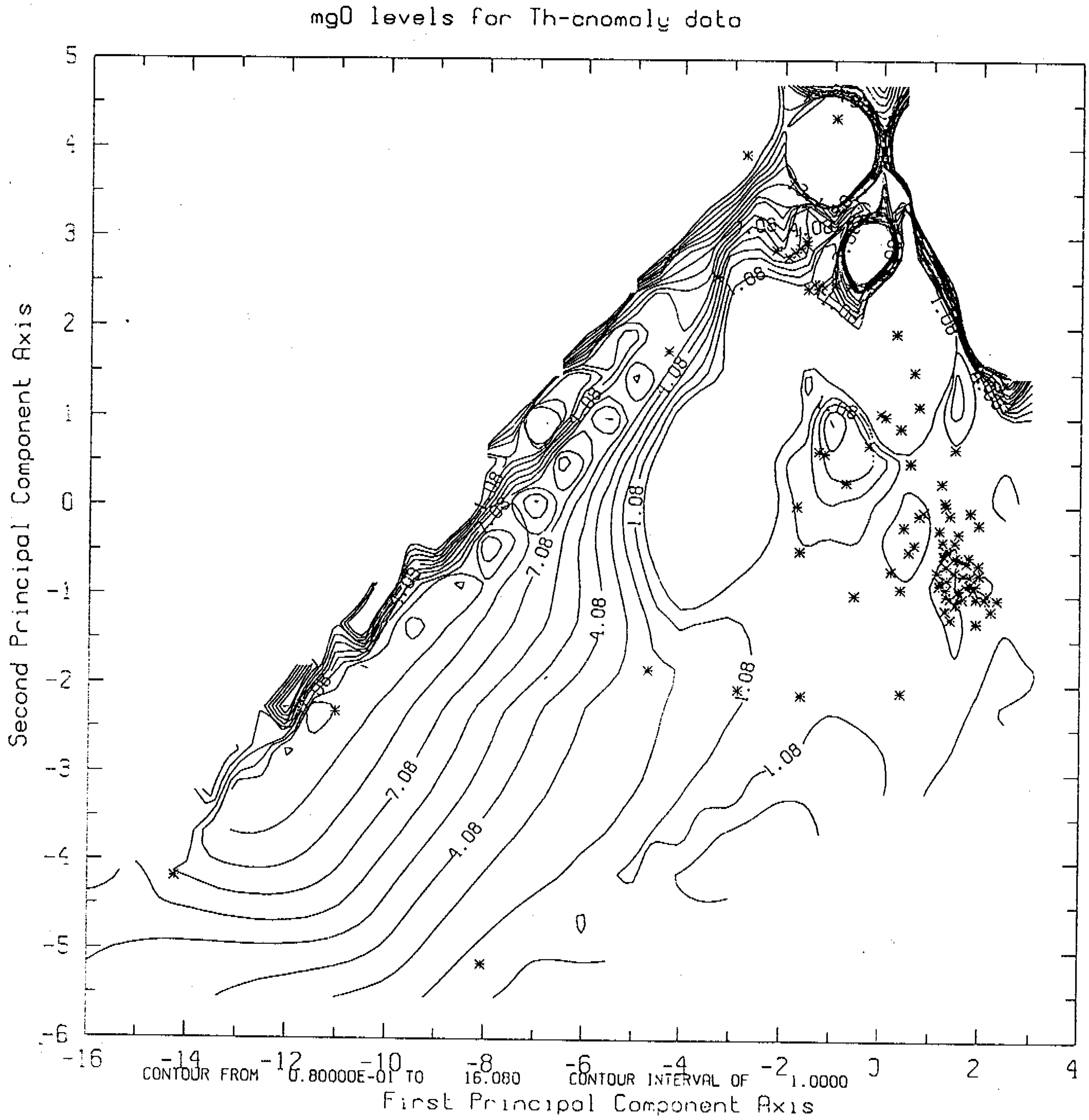


Fig. 14. Thorium anomaly data. Projection of data onto the first and second principal component planes, with MgO values contoured.

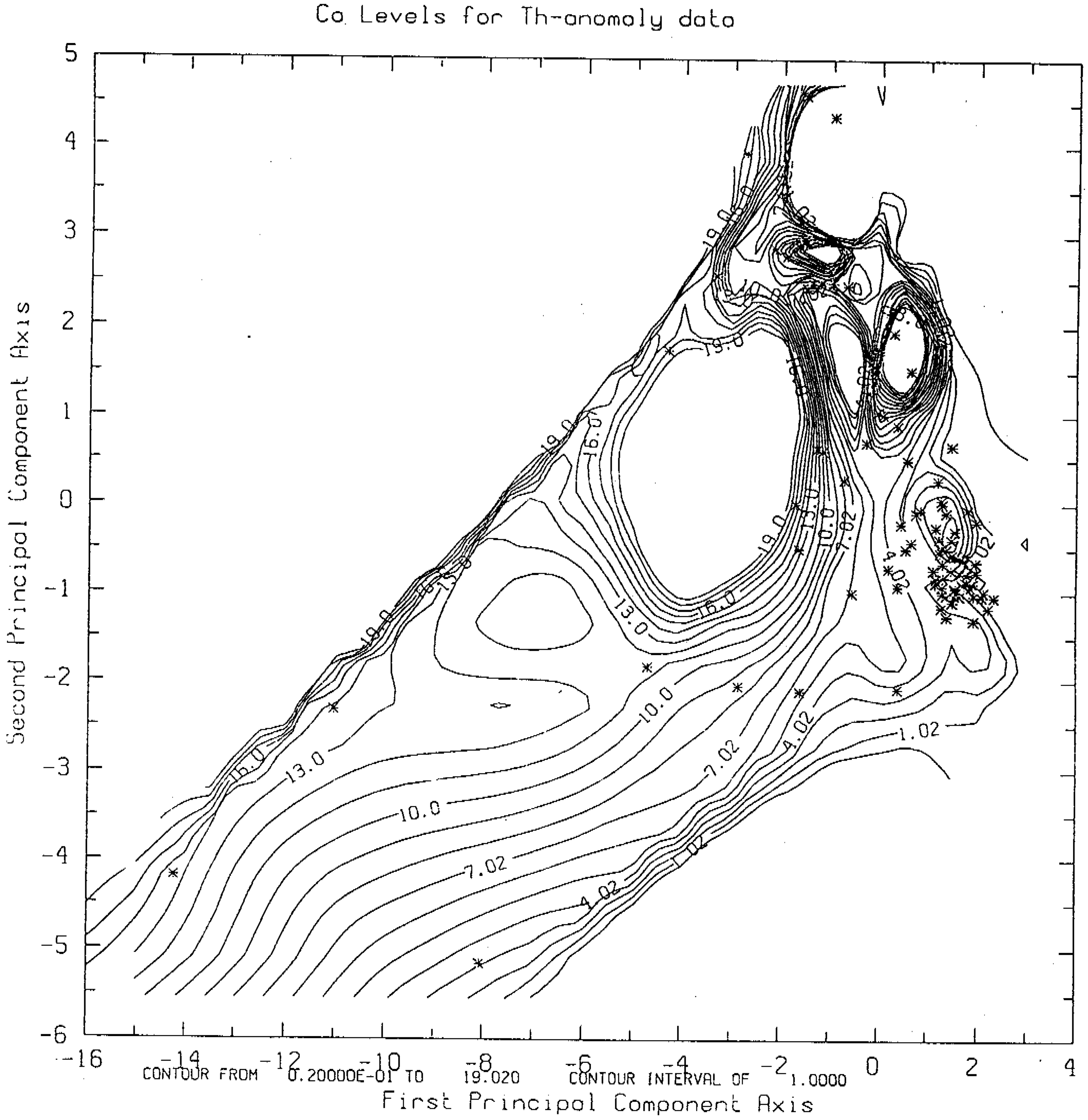


Fig. 15. Thorium anomaly data. Projection of data onto the first and second principal component planes, with CaO values contoured.

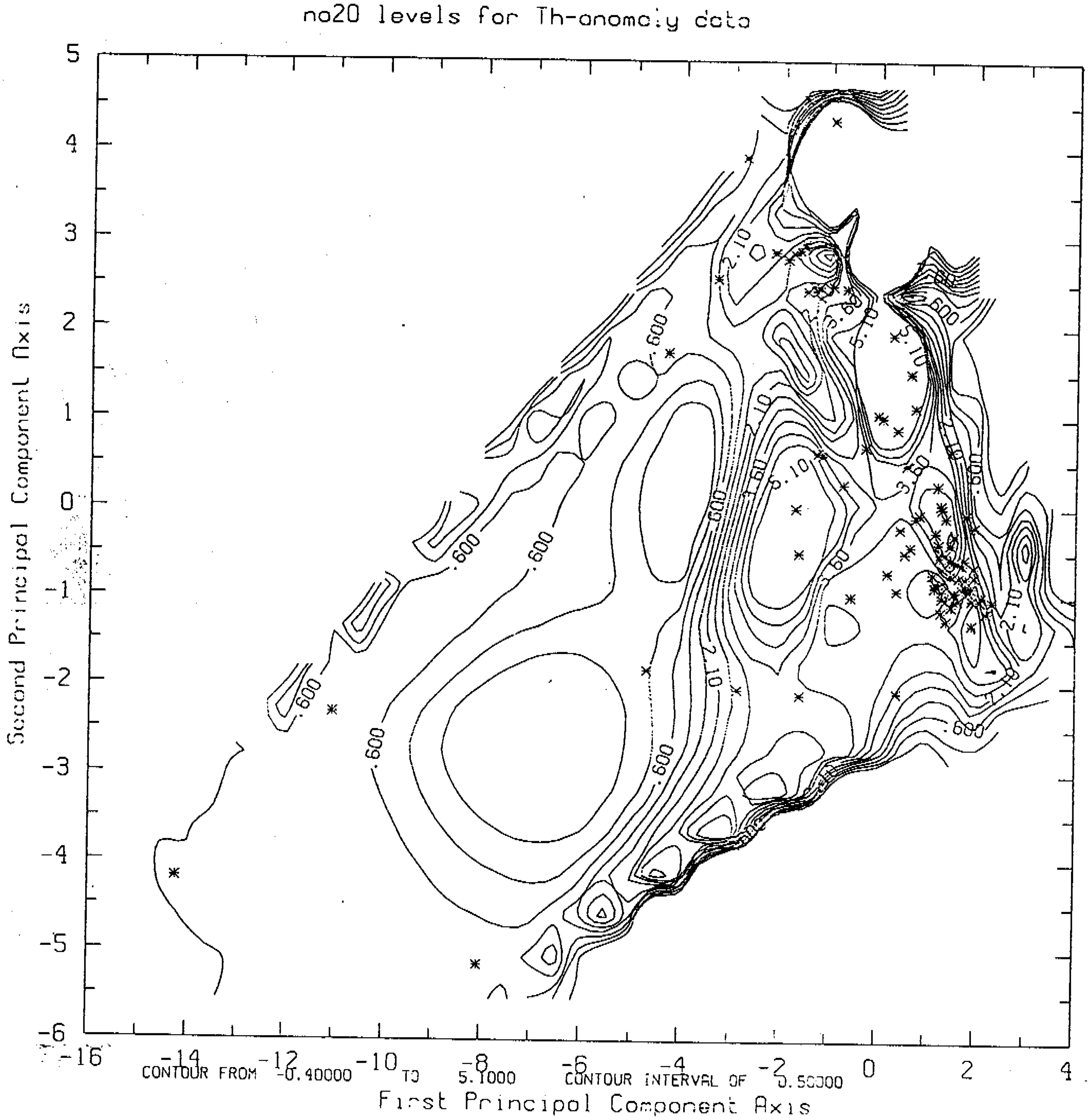


Fig. 16. Thorium anomaly data. Projection of data onto the first and second principal component planes, with Na_2O values contoured.

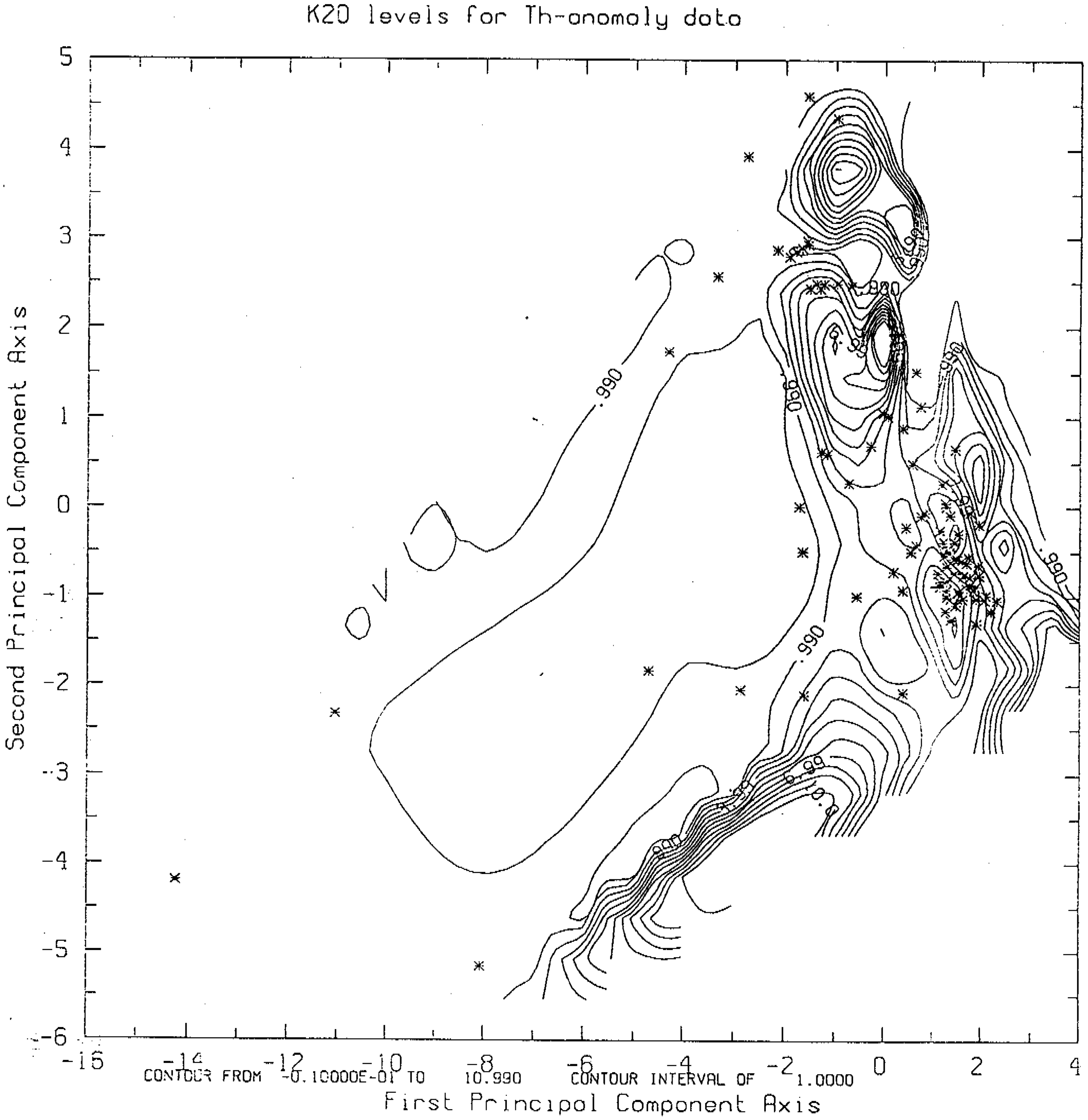


Fig. 17. Thorium anomaly data. Projection of data onto the first and second principal component planes, with K_2O values contoured.

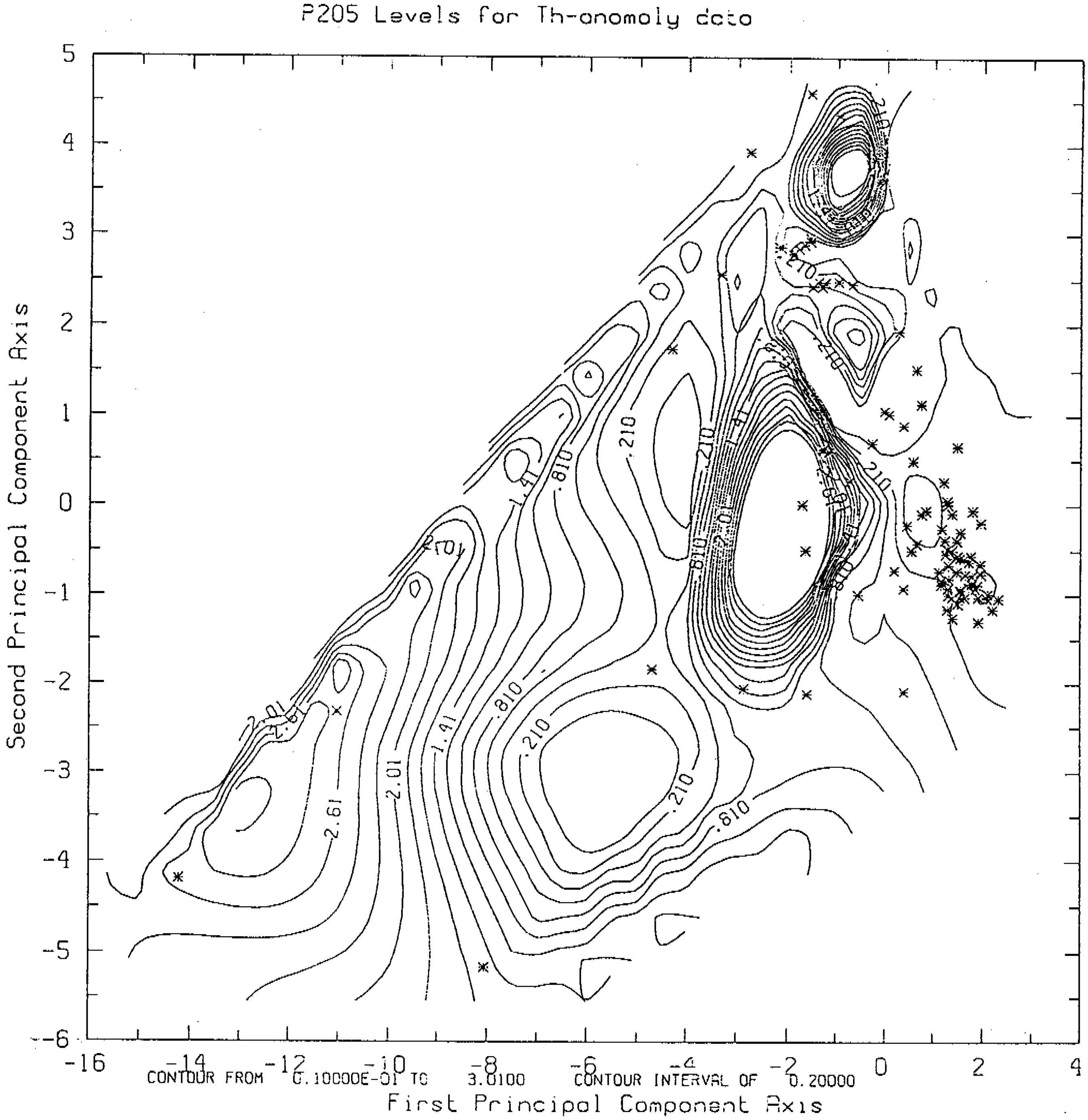


Fig. 18. Thorium anomaly data. Projection of data onto the first and second principal component planes, with P_2O_5 values contoured.

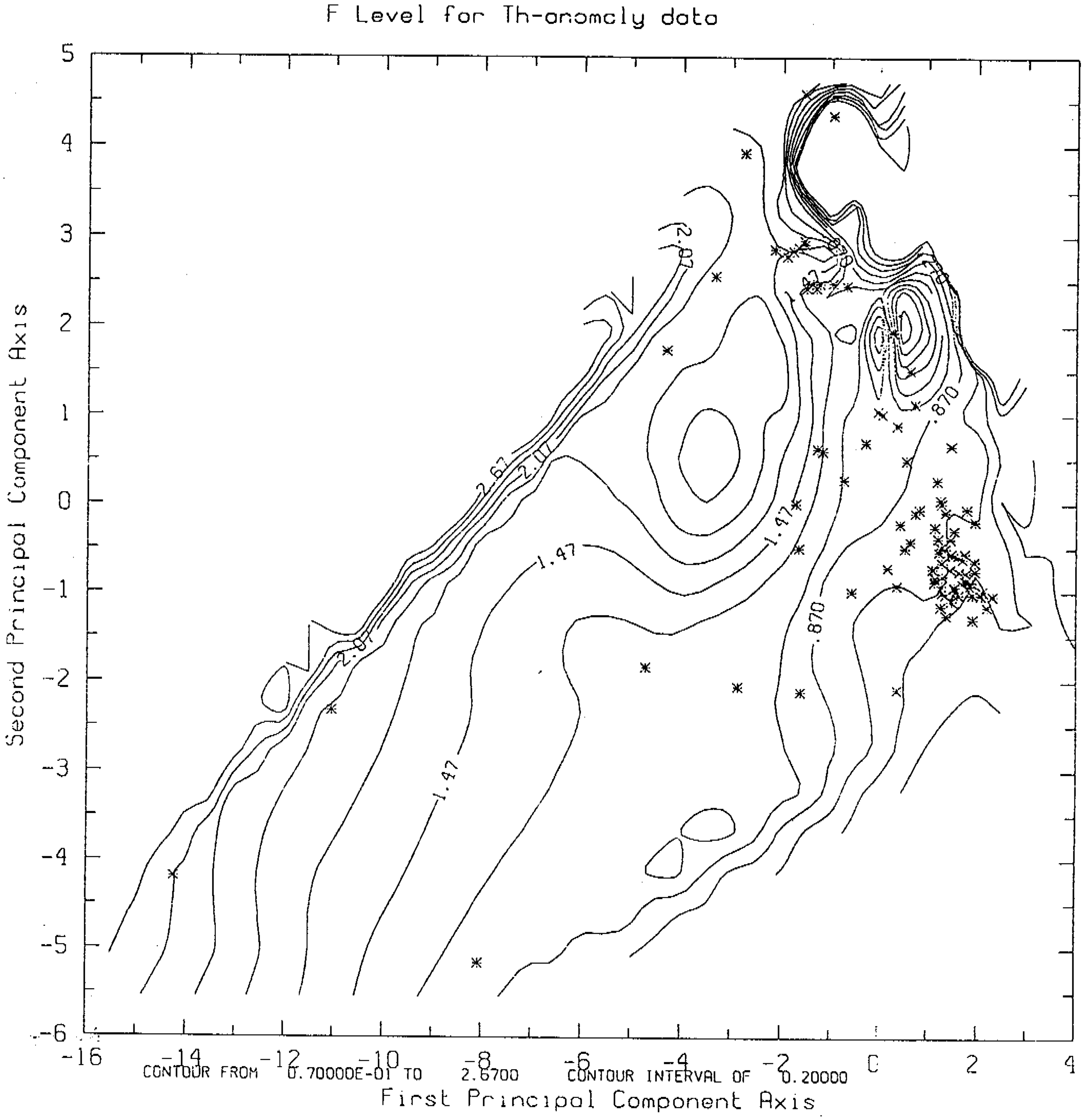


Fig. 19. Thorium anomaly data. Projection of data onto the first and second principal component planes, with F^- values contoured.

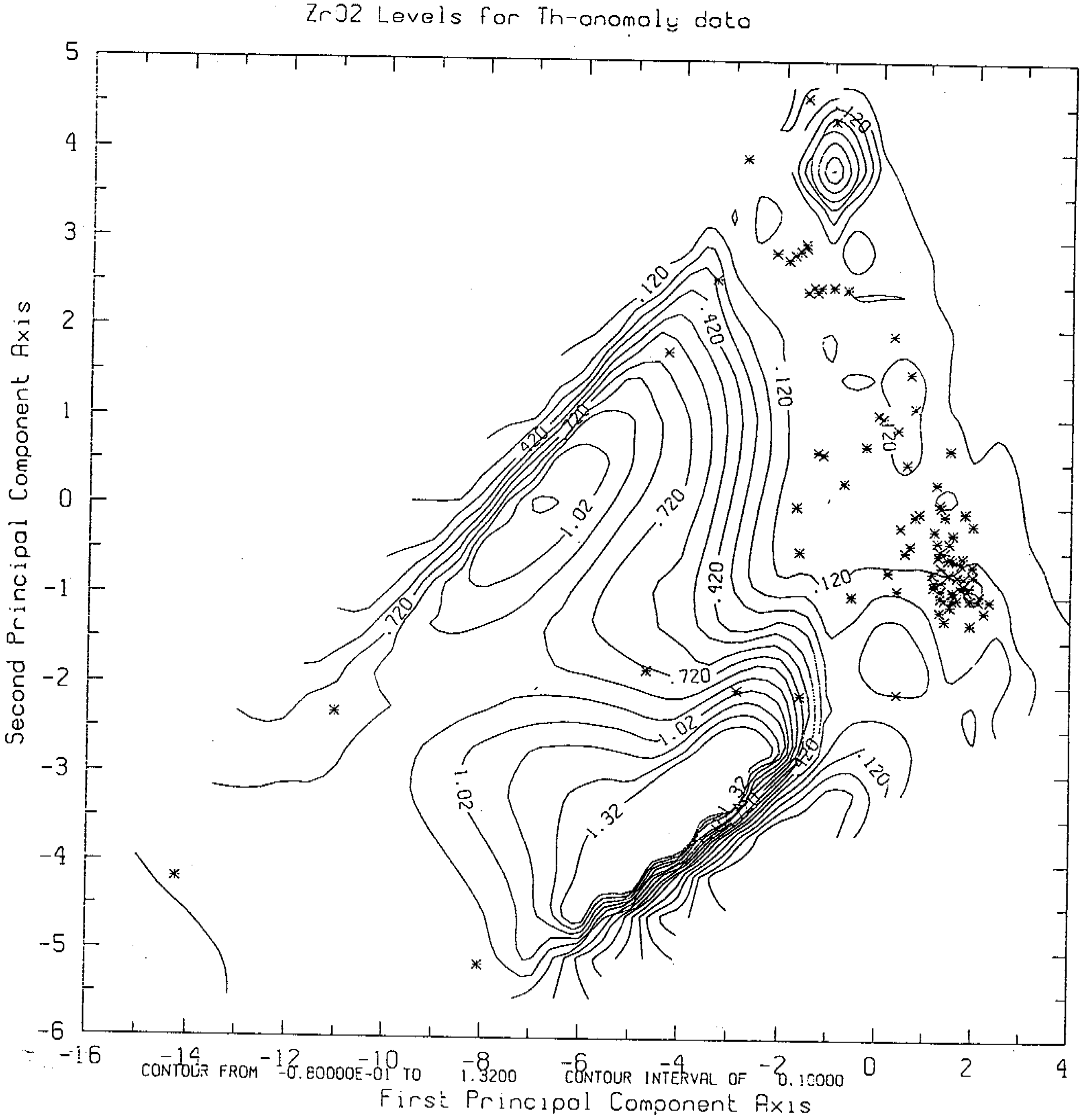


Fig. 20. Thorium anomaly data. Projection of data onto the first and second principal component planes, with ZrO_2 values contoured.

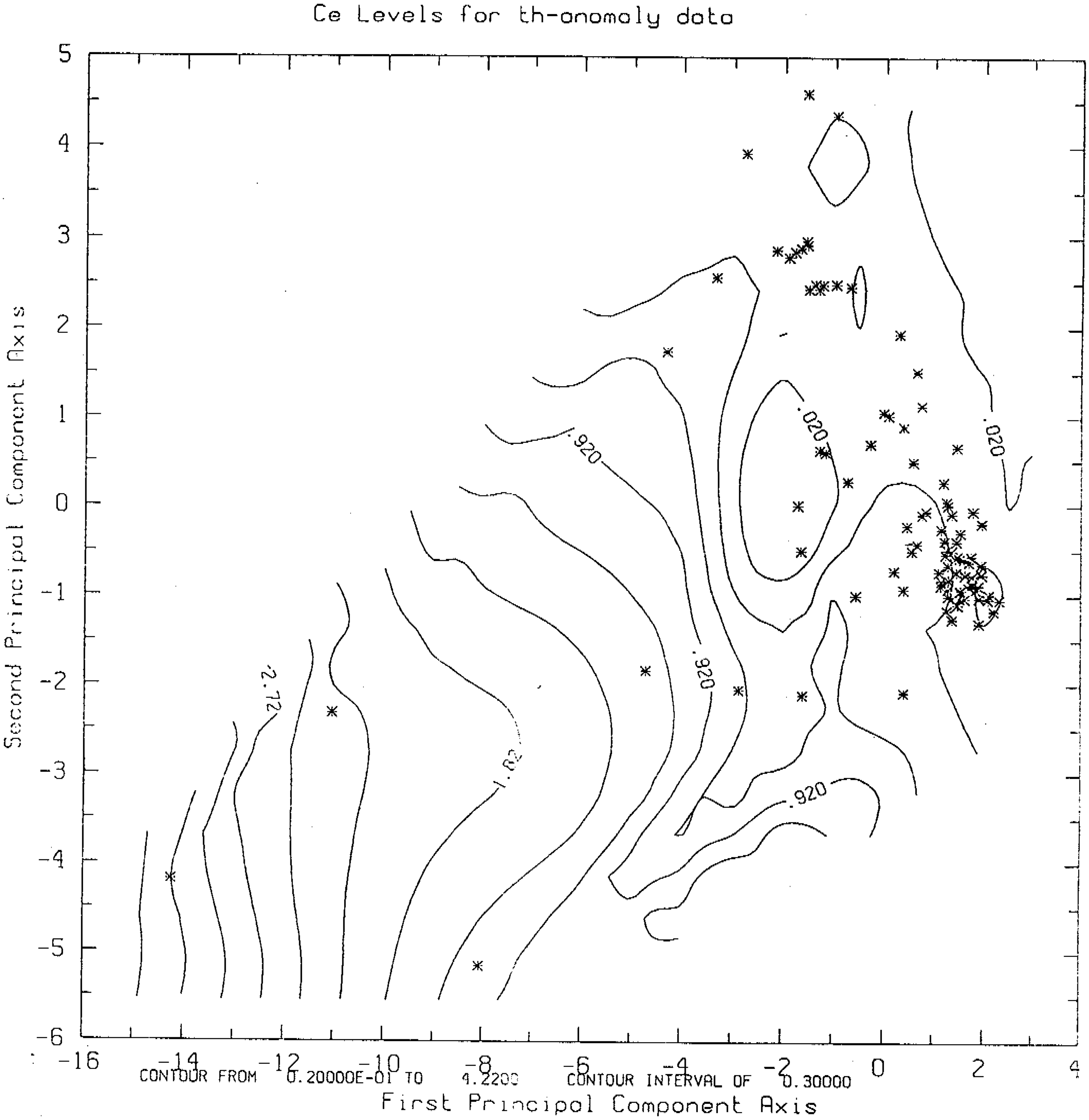


Fig. 21. Thorium anomaly data. Projection of data onto the first and second principal component planes, with CeO_2 values contoured.

The results of the analyses of the eight main rock-types are presented in Table 2.

Table 2. Selected analyses from samples from the thorium anomalies (%).

	samples							
	6156	6152	6142	6180	6226	6143	6205	6188
SiO_2	73.93	64.60	67.93	49.87	41.21	49.45	63.62	37.70
TiO_2	0.03	1.15	0.05	0.82	1.64	1.57	4.41	1.97
Al_2O_3	13.49	10.63	17.14	17.88	12.12	20.55	4.81	13.11
Fe_2O_3	0.36	5.77	2.64	10.10	7.42	10.63	16.07	9.73
MnO	0.01	0.09	0.07	0.17	0.15	0.10	0.22	0.34
MgO	0.24	2.15	0.92	7.90	10.24	3.60	0.92	5.31
CaO	2.66	9.89	4.95	9.55	14.08	4.53	0.77	16.02
Na_2O	2.77	0.17	3.64	2.47	1.02	3.26	0.94	0.42
K_2O	2.92	0.05	0.05	0.46	0.24	3.96	0.64	0.43
P_2O_5	0.02	0.12	0.15	0.08	2.99	0.22	1.71	2.50
ZrO_2	0.09	0.87	0.06	0.02	0.81	0.06	0.84	0.98
Y_2O_3	0.00	0.05	0.01	0.00	0.07	0.01	0.44	0.07
La_2O_3	0.01	0.70	0.07	0.02	1.36	0.11	0.61	2.19
CeO_2	0.02	1.32	0.14	0.02	2.49	0.21	1.35	4.00
ThO_2	0.03	0.25	0.07	0.01	0.39	0.08	0.27	0.58
F-	0.07	1.16	0.60	1.16	1.95	0.96	1.10	2.59
LOF	0.80	2.08	0.50	0.72	3.08	0.48	0.36	3.42
Total	99.46	101.1	99.78	100.3	101.3	99.77	99.06	101.4
Th/Ce	-	0.18	0.50	-	0.16	0.40	0.20	0.15

The following conclusions can be made from an examination of the above data.

1) Rocks containing over 69% SiO_2 contain very little rare earths, except for one rock containing 89% which consists predominantly of quartz veining.

2) Rocks containing between about 63-69% SiO_2 usually contain significant amounts of rare earths (see Fig. 21). The analyses within this range are shown in Table 3.

Table 3. Rare-earth concentrations in rocks containing between 63 and 69% SiO_2 (%).

Sample No.	SiO_2	CeO_2
6164A	68.92	0.12
6150	68.70	0.03
6161	67.95	0.04
6142	67.93	0.14
6169	67.46	0.13
6158	66.07	0.12
6152	64.60	1.32
6194	63.42	0.66
6186	64.13	0.03
6188	63.12	1.35
6186	64.13	0.03

This group of rocks contains either high CaO and low P_2O_5 (e.g. sample 6152) or lower CaO and relatively high P_2O_5 (e.g. samples 6142 and 6188). This difference may be due to the former containing allanite and the latter containing monazite.

4) Some low-silica rocks, which can conveniently be called amphibolites, contain significant amounts of rare-earth elements which are present as monazite. For example, in sample 6143, monazite has been recognized as large (500 um) grains. Sample 6226 is rich in rare earths but contains significant quantities of CaO as well as P_2O_5, and may contain allanite.

5) It is possible that rocks such as 6143 to a large extent cause the thorium anomalies. Monazite contains about 55% more thorium for the same amount of rare earths as does allanite. It is therefore possible that, by selecting acid rocks in order to discover allanite-rich rocks, the main cause of the high thorium levels has been missed.

How do bulk assays presented in this report compare with those described in the last major report [1]? First, the quartz-rich rocks containing significant amounts of rare earths as allanite are very similar (e.g. sample S25). Rocks very rich in quartz giving SiO_2 values of about 70% again contain very low levels of rare earths. Rocks containing very high proportions of allanite (>10%) have similar compositions to amphibolites in that SiO_2, Al_2O_3, TiO_2, Fe_2O_3, P_2O_5 and ZrO_2 are all similar, but MgO and alkalis are generally higher in monazite-containing amphibolite rocks.

THE MINERALOGY OF THE ROCKS FROM THE THORIUM ANOMALIES OF SURFACE ROCKS

Most of the one-hundred samples have been sectioned and a detailed mineralogical and petrographical investigation is proceding. Appendix B describes the main minerals present in each sample. Electron microprobe analyses of selected minerals are now being carried out and will be reported in the next report.

Silica-rich rocks (SiO_2 > 69%) contain large proportions of quartz, K-feldspar, plagioclase and minor amounts of mica, zircon and apatite.

As silica decreases (SiO_2 64-69%) allanite is found more frequently. Other accessory minerals include apatite, zircon and mica.

Amphibolites are composed of amphibole and plagioclase. Quartz, biotite and garnet are minor or rare components. Monazite, apatite, and zircon are rare.

A sample named "hot clay" was found to consist of plagioclase, garnet and biotite with significant amounts of zircon and monazite. Screening the +2 mm fraction and carrying out a simple magnetic separation on the -2 mm fraction resulted in a concentrate enriched in monazite. X-ray diffraction analyses indicated that the sample contained no clay. A bulk assay for the material is given in Table 4, together with assays for the monazite fraction and the magnetic fraction. Table 5 presents electron microprobe data for the analysis of monazite.

Table 4. Chemical data for the sample named "hot clay" (%).

	Bulk (%)	Beneficiated faction (%)	Magnetic fraction (%)
SiO_2	67.35	34.26	15.68
TiO2	0.16	0.24	2.35
Al_2O_3	15.75	12.17	7.75
Fe_2O_3	2.75	1.58	67.53
MnO	0.08	0.17	0.89
CaO	5.76	4.79	1.10
Na_2O	2.65	3.28	1.32
K_2O	1.34	0.64	0.84
P_2O_5	0.40	11.97	0.64
ZrO_2	0.07	0.93	0.08
La_2O_3	0.16	4.87	0.36
CeO_2	0.33	10.41	0.68
Y_2O_3	0.03	0.91	0.05
ThO_2	0.09	2.06	0.16
F-	0.70	1.41	0.01
LOF	2.68	1.70	1.06
Total	101.23	92.11*	102.35

* Also includes significant amounts of heavier rare-earth elements.

Table 5. Electron microprobe analyses of monazite and xenotime (%) from a sample named "hot clay".

	monazite	SD	max.	xenotime
SiO_2	0.523	0.343	1.94	0.911
CaO	1.701	0.131	1.885	1.150
P_2O_5	27.995	0.391	28.528	28.575
F^-	0.235	0.038	0.235	n.d.
La_2O_3	12.552	0.303	13.057	9.579
CeO_2	28.955	0.462	29.865	22.788
Pr_2O_3	2.821	0.056	2.936	2.362
Nd_2O_3	10.863	0.321	11.464	8.631
Sm_2O_3	2.101	0.104	2.293	1.728
Gd_2O_3	1.666	0.106	1.855	2.493
Y_2O_3	2.883	0.230	3.262	12.974
ThO_2	7.479	0.615	8.501	8.333
Total	99.82			99.524

U, Ti, Fe^{3+}, Mn, Mg, Na, K, Cl measured and found to be less than 0.001%.

Monazite is a rare-earth phosphate with a cerium-selective composition, although there is considerable variation in the relative proportions of the individual light rare earths. In addition to rare earths, monazite contains thorium (2-30%) through the following substitutions:

$$Th^{4+} + Si^{4+} = REE^{3+} + P^{5+},$$

$$Th^{4+} + Ca^{2+} = 2REE^{3+}. \qquad \text{where REE = rare-earth element.}$$

That is, monazite can contain isomorphous molecules of thorite/huttonite - ($ThSiO_4$) - and cheralite $(Th,Ca)PO_4$. Apparently, the monazite lattice has little difficulty in accepting rare-earth ions with ionic radii between those of Ce and Ca, and the smallest which can fill the (La,Ce) position without strain are of the size of Gd and Tb. Beyond this limit selectivity is probably very strong.

Yttrium can also be included in the monazite lattice in amounts between 1 and 11%.

Table 6 compares the normalized rare-earth oxide concentrations of several commercially-exploited monazites.

Table 6. A comparison of different monazites. (Normalized rare-earth oxides). Data quoted from Minerals Facts and Problems, 1985. [2].

	Australian					*White*
	East	*West*	Florida	India	China	*Range*
La_2O_3	20.20	23.90	17.47	23.70	23.35	20.30
CeO_2	45.30	46.03	43.73	46.00	45.69	46.82
Pr_6O_{11}	5.40	5.05	4.98	5.50	4.16	4.56
Nd_2O_3	18.30	17.38	17.47	20.00	15.74	17.56
Sm_2O_3	4.60	2.53	4.87	4.00	3.05	3.39
Gd_2O_3	2.00	1.49	6.56	-	2.03	2.70
Y_2O_3	2.10	2.41	3.18	-	3.03	4.66

The heavy rare-earth elements have not yet been determined, so that the quoted normalized rare-earth oxides for the "hot clay" sample are likely to be a little too high.

Of course, more work is required on the chemistry of the monazite in this area. In addition, it is important to measure the rare-earth concentrations in the garnet that has been identified with the monazite in this weathered rock.

Biotite and magnetite are associated with the monazite. If there are considerable reserves of this weathered rock then the prospect would become a very promising source of rare earths from monazite.

DETAILED MINERALOGICAL STUDIES ON DIAMOND DRILL CORE SAMPLES

The interval 88.95 to 91.41 m, which was considered to be typical of the different rock types, was studied in detail. Figure 22 is a coloured photograph of the halved core and Fig. 23 shows four typical rocks taken from the intervals 88.95, 90.22, 91.05 and 91.33 m. Type-A contains significant quantities of white feldspar irregularly distributed in a grey matrix consisting of finer-grained biotite, plagioclase and chlorite. Type-B is a typical pegmatite rock with large colourless quartz crystals irregularly distributed amongst pinkish feldspar and ferromagnesian minerals including allanite. Type-C is a pegmatite amphibolite interface (migmatite?), and Type-D is a more typical amphibolite with veining of white feldspar. The bulk assays of these four rocks are presented in Table 32 and their compositions discussed in the following section titled *"Statistical Analyses of Diamond Drill Core Bulk Assays"*.

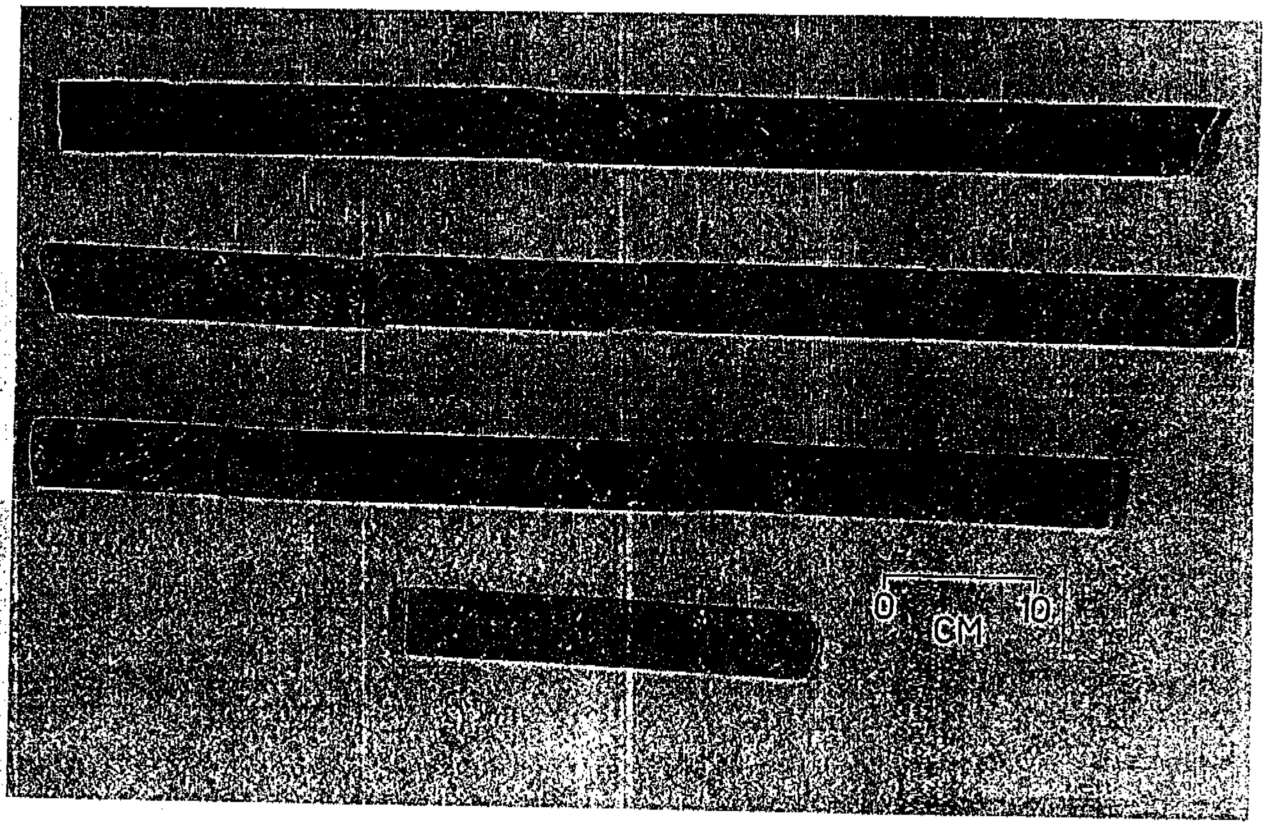


Fig. 22. Photograph of halved diamond drill core from the interval 99.95 to 91.41m. The end shown at the bottom of the picture is the core at 88.95m. The locations of the four rocks, enlarged and shown in Figure 23, are marked.

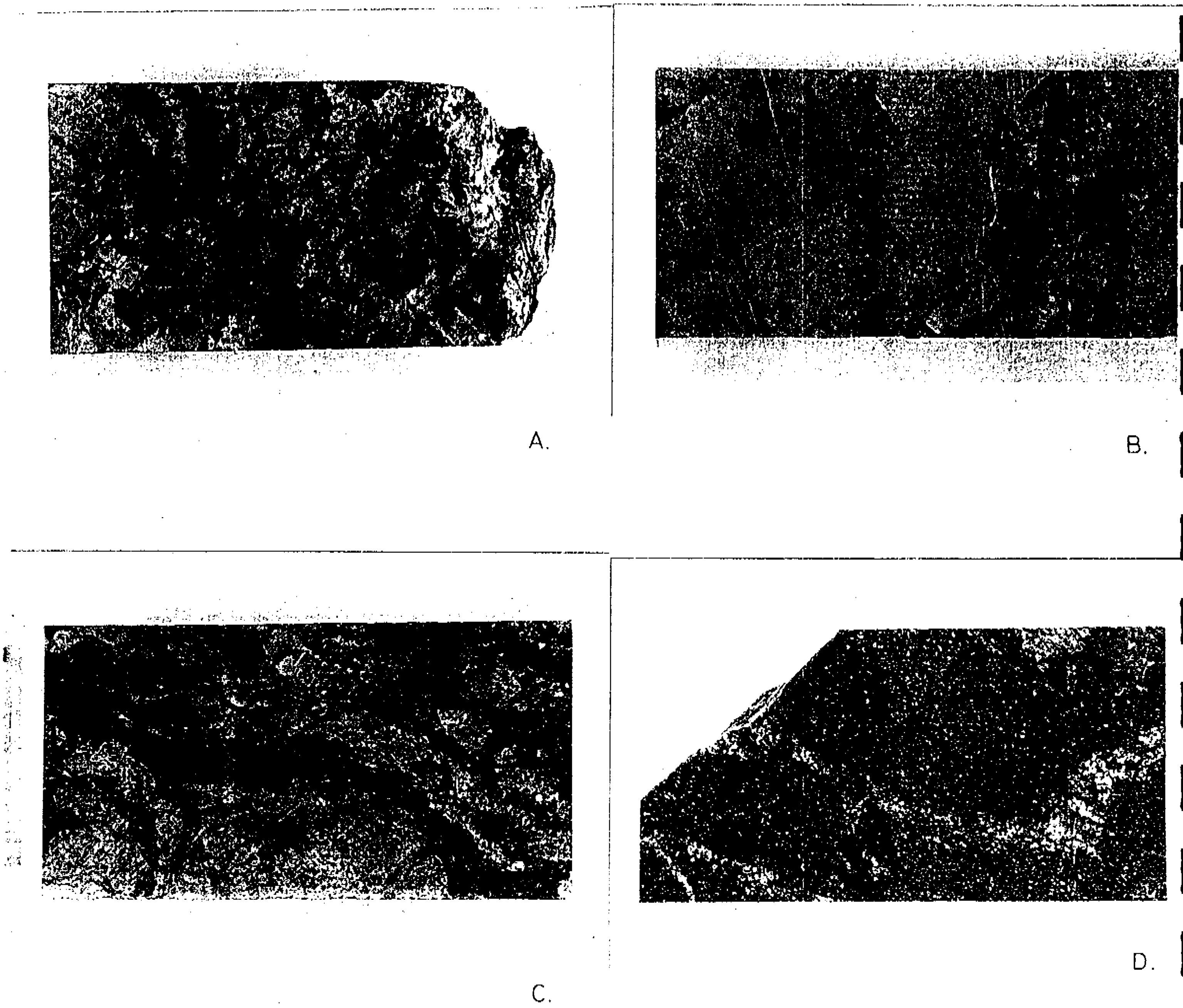


Fig. 23. The four different rock types found in the diamond drill core. Type A consists of white feldspar irregularly dispersed in quartz. Type B is a typical allanite-bearing, coarse-grained rock consiting mainly of quartz and alkali feldspar, named pegmatite in this report. Type C is an example of the commonly-occurring mixture of quartz-rich rocks and amphibolites. Type D is a more homogeneous amphibolite.

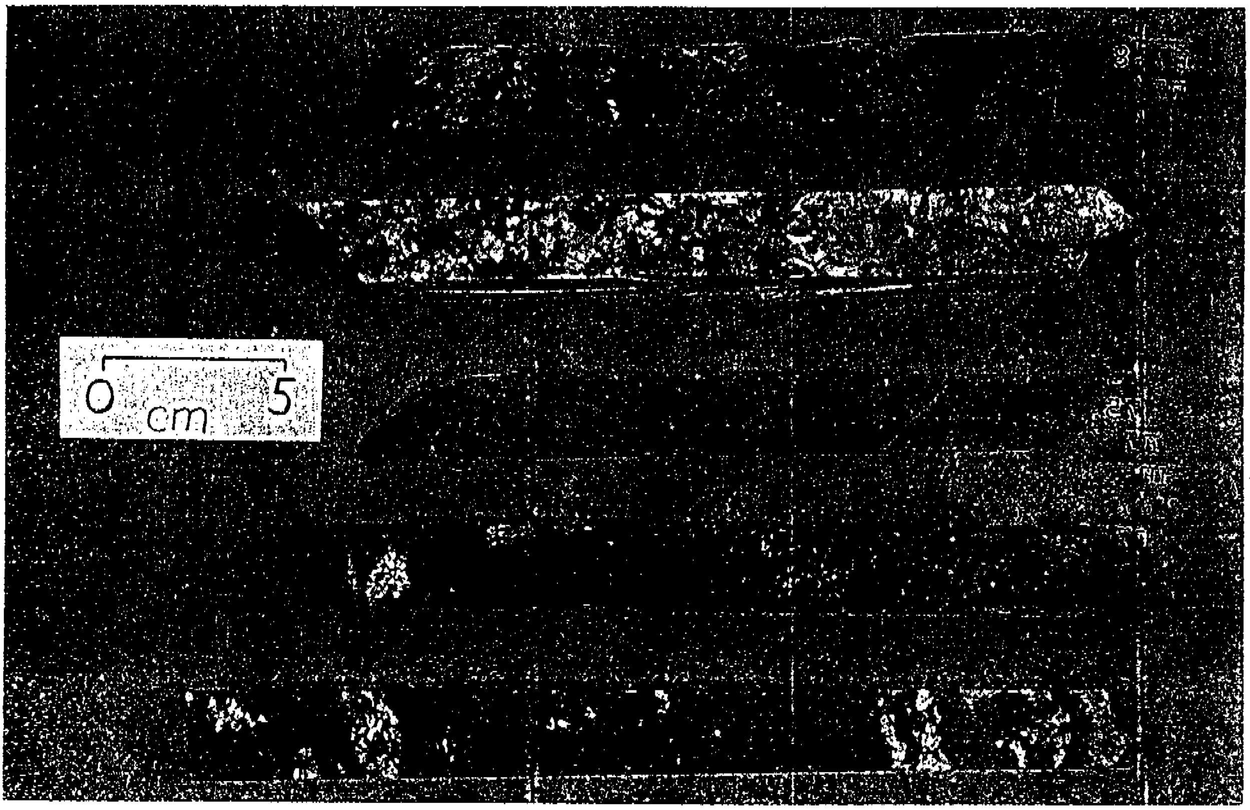


Fig. 24. Photographs of five different rock types found in the diamond drill core samples.

Thin sections of rock taken from across the whole interval were also made. Table 7 presents the details of the samples prepared. The mineralogy of each sample is described in Table 8.

Table 7. Sample list and details of diamond drill core.

No.	Code	Depth (m)	*A*	*B*	Sections crushed and photographed	Weight (g)	
1	MF748	88.95	+	*	)(A) 88.95-89.05 m	74.1	Fr 35
2	MF749	89.06	-	*	)		
3	MF750	89.26	-				
4	MF751	89.37	-	*			
5	MF752	89.48	-	*			
6	MF753	89.63	-				
7	MF754	89.70	-				
8	MF755	89.80	-	*			
9	MF756	89.90	+				
10	MF757	90.05	+		)		
11	MF758	90.22	+	*	)(B) 90.20-90.30 m	186.9	Fr 32
12	MF759	90.40	+	*	)		
13	MF760	90.62	+	*			
14	MF761	90.76	+				
15	MF762	90.86	+	*	)		
16	MF763	91.05	+	*	)(C) 90.95-91.05 m	189.6	Fr 30
17	MF764	91.13	+		)		
18	MF765	91.26	-		)		
19	MF766	91.33	-		)(D) 91.25-91.35 m	91.6	Fr 33
20	MF767	91.41	-	*	)		

A = Allanite (Identified under the microscope).
B = Allanite (Identified using electron microprobe).
* The sections (10 cm each) were sent to AMDEL for crushing and milling for bulk chemical analyses and X-ray diffraction studies.

Table 8. Mineralogy of diamond drill core samples.

Sample	748	749	750	751	752	753	754	755	756
Qtz	X	X	X	X	X	X	X	X	X
Fld	X	X	X	X	X	*	X	X	X
Plg	X	*	*	X	X	X	*	*	X
Bio	X	X	X	X	X	X	X	X	X
Musc	x	*	*	*	*	*	*	*	*
Amph					X	X		X	
Pyr						*		*	
Chl	X	X	X	X	*	X	X	X	X
Epd	*	X	*	*	*	*	*	X	*
All	*								
Mag	*	*						*	
Clc	*	*	*	*	*	*	*	*	*
Sph	X	*	*	*	*	*	*	*	*
Ilm	*	*		*	*			*	
Zir	*	*		*	*	*	*	*	*
Apa	*	*	*	*	*	*	*	*	*
Pyr	*	*	*	*	*	*	*	*	*
Chalc	*	*	*	*	*	*	*	*	*
Sph		*		*		*			
Gal	*								
Cass		*							
Millerite						*			
Cu_xS_x								*	
Thorite								*	

X Abundant mineral components

* Less common or rare minerals.

Table 8 (cont.). Mineralogy of diamond drill core samples.

Sample	756	757	758	759	760	761	762	763	764	765	766	767
Qtz	X	X	X	X	X	X	X	X	X	X	X	X
Fld	X	X	X	X	*	X	*	X	X	*	*	*
Plg	X	*	*	X	X	*	X	*	*	X	X	X
Bio	X	X	X	X	X	*	X	*	X	X	x	X
Musc	*		X	?	*	*	*	*	*	*	X	*
Amph						X	X			X	X	X
Pyr											*	*
Chl	X	*	*	*	X	X	X	X	X	X	*	X
Epd	*	*	*	*	X	*	*	*	*	X	*	*
All		*	*	*	*	*		*	*			
Mag								*				*
Clc	*	*	*			X	*	*		*	*	*
Sph	*	*	*	*	*	*	*	*	*	X	*	*
Ilm			*	*	*			*			*	*
Zir	*	*	*	*	X	*	*	*	*		*	*
Apa	*			*	*	*	*	*	*	*		*
Pyr	*		*	*	*	*	*	*	*	*	*	*
Chalc	*	*	*			*	*	*	*	*	*	*
Sph											*	
Gal												
Cass												
Milierite												
Cu_xS_x												
Thorite												

X Abundant mineral components
* Less common or rare minerals.

The minerals identified are:

Sample A: *Main minerals;* quartz, feldspar, plagioclase.
Less abundant; biotite.
Minor minerals; chlorite, calcite.
Possible; kaolinite.

Sample B: *Main minerals;* quartz, feldspar.
Less abundant; plagioclase, muscovite.
Minor minerals; calcite, chlorite.
Possible; kaolinite.

Sample C: *Main minerals;* quartz, feldspar, plagioclase,biotite, chlorite.
Minor mineral; calcite.
Possible; allanite, epidote, pyroxene, kaolinite.

Sample D: *Main minerals;* quartz, amphibole, chlorite.
Less abundant; chlorite, plagioclase.
Minor minerals; Calcite.
Possible; apatite, pyroxene, pyrite, kaolinite.

MICROPROBE ANALYSES

Analyses were performed using a Cameca electron microprobe operating at an accelerating potential of 20 kV and a probe current of 20 nA, for the elements Si, Ti, Al, Fe, Mn, Mg, Ca, P, Na, K, F, Cl, and of 50 nA for all rare earths. The total counting time for each of the rare earth elements was 80 s. The concentrations of the rare-earth elements La, Pr, Nd, Sm and Y were measured. It is not possible to measure other rare-earth elements by electron microprobe.

The following minerals were identified and, in most cases, analyzed. The sequence of crystallization of minerals can often be determined.

Quartz: Very abundant primary mineral, rarely recrystallised. The interstitial grains often show undulose extinction. Myrmekite-type textures were observed in samples dominated by quartz and feldspar.

K-Feldspar: Very abundant primary or recrystallised mineral. Some grains were identified as microcline and others as perthite. The majority of the grains are xenomorphic, partially weathered, and are either microcline or perthite. The two types often co-exist. Muscovite (Table 13), a common secondary mineral, is a product of the decomposition of the feldspar. Table 9 presents the electron micro-probe analyses of K-feldspars, which shows that the mineral is a very pure K-feldspar. Chemical analyses of the Na-plagioclase contained in the perthite are presented in Table 11, Type D).

Table 9. Electron microprobe analyses of feldspar (%).

	748	749	751	753	755	758	759
SiO_2	63.28	64.93	63.18	63.71	64.39	64.25	63.10
Al_2O_3	18.10	18.06	17.80	18.26	17.28	18.40	18.48
Fe_2O_3	0.05	0.01	0.13	0.12	0.01	0.01	0.02
MgO	0.00	0.00	0.00	0.00	0.01	0.00	0.01
CaO	0.01	0.00	0.00	0.00	0.00	0.00	0.06
Na_2O	0.43	0.41	0.65	0.21	0.58	0.37	0.78
K_2O	15.93	16.22	16.05	15.75	15.93	16.15	16.50
F^-	0.02	0.01	0.03	0.00	0.04	0.00	0.00
La_2O_3	0.000	–	0.004	–	0.005	0.003	0.018
CeO_2	0.088	–	0.038	–	0.086	0.057	0.030
Pr_2O_3	0.000	–	0.006	–	0.006	0.000	0.011
Nd_2O_3	0.000	–	0.021	–	0.000	0.000	0.022
Sm_2O_3	0.019	–	0.025	–	0.060	0.001	0.000
ThO_2	0.000	–	0.007	–	0.000	0.000	0.001
Total	97.927	99.640	97.941	98.050	98.397	99.241	99.032

Table 9 (cont.). Electron microprobe analyses of feldspar (%).

	760	761	762	763	765	766	average
SiO_2	63.53	64.06	63.11	63.84	64.67	63.52	63.81
Al_2O_3	18.95	17.71	18.42	18.03	18.65	18.29	18.18
Fe_2O_3	0.02	0.09	0.00	0.03	0.16	0.22	0.07
MgO	0.01	0.03	0.00	0.00	0.04	0.00	0.00
CaO	0.00	0.01	0.00	0.00	0.34	0.00	0.03
Na_2O	0.86	0.55	0.00	0.56	0.70	0.06	0.47
K_2O	16.26	16.11	15.87	16.05	14.92	16.68	16.03
F^-	0.02	0.03	0.00	0.00	0.08	0.00	0.02
La_2O_3	0.000	0.010	0.010	0.000	0.000	0.019	0.006
CeO_2	0.087	0.042	0.080	0.050	0.027	0.007	0.053
Pr_2O_3	0.001	0.000	0.030	0.000	0.012	0.000	0.006
Nd_2O_3	0.018	0.013	0.020	0.027	0.021	0.000	0.013
Sm_2O_3	0.056	0.023	0.000	0.024	0.016	0.000	0.020
ThO_2	0.004	0.006	0.007	0.008	0.009	0.020	0.005
Total	99.816	98.684	97.547	98.619	99.645	98.816	98.713

Formulae on the basis of 8 oxygen atoms:

Si^{4+}	2.992	
Al^{3+}	1.005	
Fe^{3+}	0.002	3.999
Ca^{2+}	0.002	
Na^{+}	0.043	
K^{+}	0.959	1.004
F^{-}	0.003	

Plagioclase: An abundant primary or secondary mineral. It is present as albite (< 5% anorthite content) in perthite (Table 11, Type D) or as individual grains of oligo-clase or andesine. The oligoclase present (25% An-content) is probably a primary mineral representing the original plagioclase composition of this "granitic" material (Table 11, Type C). The andesine (30-45% anorthite content) may be a secondary mineral formed through the introduction of Ca. (Table 10, Type A).

Table 10. Plagioclase (andesine) Type-A (40%-An)

	752	753	755	766	average
SiO_2	57.30	58.06	57.68	58.97	58.00
Al_2O_3	25.69	25.88	25.87	25.51	25.74
Fe_2O_3	0.05	0.07	0.04	0.05	0.05
MnO	0.00	0.00	0.00	0.00	0.00
MgO	0.00	0.00	0.00	0.00	0.00
CaO	8.11	8.10	8.28	8.26	8.19
Na_2O	7.00	7.56	6.96	7.24	7.19
K_2O	0.09	0.13	0.13	0.07	0.10
F^-	0.01	0.07	0.00	0.05	0.03
La_2O_3	nd	0.000	0.000	0.014	0.004
CeO_2	nd	0.026	0.000	0.022	0.016
Pr_2O_3	nd	0.042	0.000	0.001	0.011
Nd_2O_3	nd	0.000	0.023	0.000	0.007
Sm_2O_3	nd	0.015	0.037	0.005	0.019
ThO_2	nd	0.000	0.012	0.001	0.004
Total	98.25	99.953	99.032	100.193	99.361

Table 10 (cont.). Plagioclase (andesine) Type-B (35% An) (%).

	748	760	763	average
SiO_2	58.03	58.85	58.26	58.38
Al_2O_3	25.82	25.27	25.06	25.38
Fe_2O_3	0.06	0.04	0.03	0.04
MnO	0.01	0.02	0.00	0.01
MgO	0.00	0.00	0.02	0.00
CaO	7.89	7.22	7.70	7.60
Na_2O	8.04	8.37	8.32	8.24
K_2O	0.11	0.13	0.11	0.11
F^-	0.07	0.03	0.00	0.03
La_2O_3	0.016	0.012	0.006	0.011
CeO_2	0.000	0.009	0.000	0.003
Pr_2O_3	0.006	0.011	0.000	0.006
Nd_2O_3	0.000	0.018	0.018	0.010
Sm_2O_3	0.000	0.011	0.006	0.006
ThO_2	0.000	0.004	0.007	0.004
Total	100.52	99.995	99.537	99.830

Formulae on the basis of 8 oxygen atoms:

	Type-A		Type-B	
Si^{4+}	2.615		2.625	
Al^{3+}	1.366		1.345	
Fe^{3+}	0.002	3.983	0.001	3.971
Ca^{2+}	0.396		0.366	
Na^{+}	0.628		0.718	
K^{+}	0.006	1.030	0.006	1.090
F^-	0.004		0.004	

Table 11. Plagioclase Type-C (25%-An)

	751	758	759	767	average
SiO_2	65.03	62.84	59.93	60.50	62.07
Al_2O_3	19.64	21.32	22.80	23.44	21.80
Fe_2O_3	0.14	0.03	0.10	0.23	0.12
MnO	0.02	0.00	0.00	0.00	0.00
MgO	0.00	0.01	0.00	0.05	0.01
CaO	4.44	4.37	3.76	5.67	4.56
Na_2O	8.37	8.67	10.44	8.74	9.05
K_2O	0.15	0.12	0.13	0.15	0.14
F^-	0.02	0.00	0.02	0.00	0.01
La_2O_3	0.000	0.000	0.065	0.010	0.018
CeO_2	0.023	0.005	0.000	0.013	0.010
Pr_2O_3	0.000	0.005	0.007	0.015	0.007
Nd_2O_3	0.000	0.000	0.003	0.000	0.000
Sm_2O_3	0.008	0.016	0.005	0.000	0.007
ThO_2	0.000	0.002	0.010	0.000	0.003
Total	97.841	97.388	97.270	98.818	97.805

Table 11 (cont.). Electron microprobe analyses of plagioclase, Type-D (5%-An)

	749	761	762	765	average
SiO_2	68.18	65.91	67.56	68.35	67.50
Al_2O_3	19.73	20.37	19.37	19.87	19.83
Fe_2O_3	0.03	0.14	0.19	0.29	0.16
MnO	0.03	0.01	0.00	0.51	0.14
MgO	0.00	0.07	0.03	0.00	0.02
CaO	0.49	0.57	0.34	0.83	0.56
Na_2O	10.49	10.09	10.70	9.59	10.12
K_2O	0.14	1.20	0.44	0.11	0.47
F-	0.03	0.00	0.05	0.00	0.02
La_2O_3	0.013	0.000	0.000	0.053	0.016
CeO_2	0.016	0.026	0.010	0.003	0.013
Pr_2O_3	0.022	0.000	0.001	0.043	0.016
Nd_2O_3	0.000	0.029	0.014	0.000	0.011
Sm_2O_3	0.009	0.000	0.010	0.000	0.005
ThO_2	0.013	0.000	0.000	0.001	0.003
Total	98.793	98.415	98.715	99.650	98.884

Formulae on the basis of 8 oxygen atoms:

	Type-C		Type-D	
Si^{4+}	2.811		2.981	
Al^{3+}	1.164		1.019	
Fe^{3+}	0.004	3.979	-	4.00
Al^{3+}	-		0.013	
Fe^{3+}	-		0.005	
Mn^{2+}	-		0.005	
Ca^{2+}	0.221		0.026	
Na^{+}	0.795		0.866	
K^{+}	0.008	1.024	0.026	0.941
F^{-}	0.001		0.003	

Biotite: Biotite is one of the less abundant primary minerals, which in many cases has been completely chloritised. In some cases it is curved or bent due to stress and shows a strong pleochroism in green or brown colour tones. Table 12 present electron microprobe analyses of a selection of biotites.

Table 12. Electron microprobe analyses of biotites (%).

	748	749	751	752	753	755	758
SiO_2	34.52	36.37	35.56	35.53	37.13	36.57	36.26
TiO_2	2.81	2.50	3.04	2.09	1.75	1.96	3.10
Al_2O_3	15.84	15.88	15.02	14.75	15.73	15.21	15.59
Fe_2O_3	25.54	25.32	24.07	23.73	19.43	22.61	24.97
MnO	0.17	0.06	0.17	0.47	0.35	0.27	0.17
MgO	8.07	7.86	8.46	9.98	12.38	10.16	8.67
CaO	0.02	0.01	0.01	0.01	0.02	0.01	0.01
Na_2O	0.06	0.08	0.07	0.09	0.08	0.07	0.08
K_2O	9.12	9.81	9.91	9.83	9.64	9.91	10.24
F^-	0.21	0.18	0.17	0.23	0.53	0.25	0.26
Cl^-	0.29	0.31	0.25	0.31	0.21	0.26	0.26
La2O3	0.007	0.000	0.007	0.010	0.006	0.000	0.010
CeO_2	0.017	0.028	0.007	0.007	0.038	0.040	0.012
Pr_2O_3	0.001	0.016	0.008	0.000	0.027	0.008	0.026
Nd_2O_3	0.009	0.016	0.006	0.005	0.006	0.026	0.015
Sm_2O_3	0.022	0.035	0.020	0.003	0.000	0.002	0.012
Y_2O_3	0.005	0.002	0.000	0.000	0.000	0.000	0.000
ThO_2	0.013	0.005	0.005	0.004	0.013	0.005	0.005
Total	96.724	98.482	96.783	97.049	97.340	97.361	99.690

Table 12 (cont.). Electron microprobe analyses of biotites (%).

	759	760	763	765	766	767	average
SiO_2	35.94	36.80	36.21	36.65	36.80	35.26	36.12
TiO_2	2.41	2.21	2.47	2.17	2.25	1.76	2.35
Al_2O_3	15.67	15.60	15.22	15.47	14.66	15.08	15.36
Fe_2O_3	24.66	24.74	24.30	24.02	21.25	22.62	23.63
MnO	0.19	0.21	0.20	0.14	0.25	0.22	0.22
MgO	9.44	9.69	8.88	9.44	11.06	11.99	9.70
CaO	0.02	0.00	0.03	0.00	0.02	0.06	0.02
Na_2O	0.12	0.07	0.11	0.08	0.10	0.12	0.08
K_2O	10.03	10.35	9.93	9.91	9.93	8.89	9.81
F^-	0.25	0.50	0.35	0.45	0.41	0.24	0.31
Cl^-	0.27	0.28	0.29	0.32	0.26	0.23	0.27
La2O3	0.014	0.021	0.007	0.001	0.013	0.049	0.011
CeO_2	0.015	0.018	0.020	0.023	0.044	0.000	0.020
Pr_2O_3	0.012	0.012	0.056	0.000	0.000	0.019	0.014
Nd_2O_3	0.013	0.000	0.001	0.016	0.014	0.032	0.012
Sm_2O_3	0.013	0.022	0.000	0.011	0.013	0.022	0.013
Y_2O_3	0.000	0.002	0.000	0.001	0.000	0.000	0.001
ThO_2	0.004	0.003	0.007	0.007	0.005	0.011	0.006
Total	99.071	100.528	98.081	98.709	97.079	96.603	97.947
H_2O^+ (estimated)							1.500

Formulae on the basis of 24 oxygen atoms:

Si^{4+}	5.485	
$Al3^+$	2.515	8.000
Ti^{4+}	0.268	
Al^{3+}	0.234	
Fe^{3+}	2.700	
Mn^{2+}	0.028	
Mg^{2+}	2.196	5.426
Ca^{2+}	0.003	
Na^+	0.024	
K^+	1.901	
REE	0.005	1.933
F^-	0.149	
Cl^-	0.069	
$(OH)^-$	2.026	2.244

Muscovite: Found as a secondary mineral from the weathering of the feldspar. Table 13 presents electron microprobe analyses of a selection of muscovites.

Table 13. Electron microprobe analyses of muscovites (%).

	748	761	762	average	758
SiO_2	45.96	46.30	45.78	46.01	46.57
TiO_2	0.11	0.24	0.43	0.26	0.08
Al_2O_3	29.47	32.20	29.88	30.51	36.65
Fe_2O_3	5.67	3.14	5.04	4.61	0.59
MnO	0.01	0.00	0.08	0.03	0.00
MgO	1.57	1.17	2.57	1.77	0.57
CaO	0.03	0.00	0.00	0.01	0.00
Na_2O	0.14	0.21	0.09	0.14	0.21
K_2O	10.55	9.98	9.96	10.16	10.98
P_2O_5	0.03	0.07	0.07	0.08	0.01
F^-	0.08	0.00	0.00	0.03	0.00
La_2O_3	0.009	0.000	0.004	0.003	0.004
CeO_2	0.015	0.152	0.000	0.005	0.010
Pr_2O_3	0.010	0.000	0.052	0.020	0.007
Nd_2O_3	0.005	0.018	0.000	0.007	0.011
Sm_2O_3	0.019	0.012	0.004	0.011	0.000
ThO_2	0.000	0.012	0.000	0.004	0.000
Total	93.678	93.504	93.960	93.660	95.692
H_2O^+ (estimated)				4.000	4.000

Formulae on the basis of 24 oxygen atoms:

	I		II	
Si^{4+}	6.331		6.204	
Al^{3+}	1.669	8.000	1.796	8.000
Ti^{4+}	0.027		0.008	
Al^{3+}	3.179		3.958	
Fe^{3+}	0.477		0.059	
Mn^{2+}	0.003		0.000	
Mg^{2+}	0.363	4.049	0.113	4.138
Ca^{2+}	1.001		0.000	
$Na+$	0.037		0.054	
K^{+}	1.783	1.821	1.866	1.920
F^{-}	0.013		0.000	
$(OH)^{-}$	3.671	3.689	3.554	3.554

Chlorite: Abundant secondary mineral, from chloritisation of biotite and/or amphibole. It is the direct product of the chloritisation of the biotite. It has low TiO_2 and K_2O which were used in the formation of sphene, muscovite and microcline. The electron microprobe analyses of chlorite is presented in Table 14.

Table 14. Electron microprobe analyses of chlorites(%).

	748	749	751	755	758	759	760
SiO_2	25.47	26.68	27.42	27.18	25.87	27.53	25.94
TiO_2	0.60	0.20	0.20	0.17	0.01	0.14	0.04
Al_2O_3	17.79	17.92	16.34	17.30	19.14	16.51	17.92
Fe_2O_3	31.23	35.47	32.16	30.07	33.94	33.33	33.77
MnO	0.27	0.40	0.30	0.41	0.30	0.34	0.38
MgO	12.10	11.15	12.28	14.67	12.88	13.78	12.49
CaO	0.50	0.13	0.20	0.07	0.01	0.07	0.05
Na_2O	0.07	0.08	0.04	0.00	0.00	0.04	0.02
K_2O	0.28	0.08	0.20	0.18	0.04	0.08	0.06
P_2O_5	0.27	0.08	0.00	0.00	0.00	0.01	0.00
F-	0.03	0.04	0.02	0.05	0.02	0.08	0.00
La_2O_3	0.004	0.000	0.031	0.017	0.014	0.000	0.020
CeO_2	0.010	0.015	0.029	0.000	0.019	0.027	0.017
Pr_2O_3	0.008	0.000	0.012	0.008	0.015	0.010	0.015
Nd_2O_3	0.012	0.001	0.027	0.047	0.000	0.011	0.028
Sm_2O_3	0.010	0.032	0.000	0.043	0.019	0.000	0.004
ThO_2	0.009	0.000	0.002	0.000	0.000	0.001	0.014
Total	88.669	92.290	89.287	90.236	92.281	91.957	90.753

Table 14 (cont.). Electron microprobe analyses of chlorites(%).

	761	762	763	765	average
SiO_2	25.96	25.56	26.26	26.70	26.41
TiO_2	0.05	0.03	0.03	0.09	0.13
Al_2O_3	17.60	17.88	17.69	17.75	17.62
Fe_2O_3	33.44	33.75	33.45	33.11	33.06
MnO	0.39	0.37	0.43	0.27	0.35
MgO	12.00	11.92	12.32	12.66	12.57
CaO	0.02	0.03	0.03	0.02	0.10
Na_2O	0.00	0.02	0.04	0.01	0.03
K_2O	0.00	0.01	0.04	0.27	0.11
P_2O_5	0.00	0.00	0.01	0.00	0.03
F-	0.06	0.06	0.06	0.07	0.04
La_2O_3	0.017	0.009	0.004	0.033	0.013
CeO_2	0.027	0.012	0.014	0.015	0.017
Pr_2O_3	0.014	0.012	0.038	0.029	0.019
Nd_2O_3	0.000	0.023	0.010	0.012	0.015
Sm_2O_3	0.000	0.024	0.032	0.020	0.017
ThO_2	0.009	0.010	0.002	0.000	0.004
Total	89.585	89.716	90.437	91.040	90.531

Amphibole: This is abundant both as a primary and secondary mineral. Green and bluish-green-coloured amphibole are abundant in the "amphibolitic" rocks, and rare in all others. Table 15 presents the chemical compositions of the two types identified. The one type has a higher TiO2- and K2O-content, and lower Fe2O3-content than the other (greenish and bluish-green). The chemical formulae corresponds well with that of the green hornblende.

Table 15. Electron microprobe analyses of amphiboles (%)

	752	753	755	765	766	767	average
SiO_2	40.98	42.57	42.09	41.01	41.98	41.93	41.76
TiO_2	1.75	1.04	1.46	1.92	1.79	1.39	1.56
Al_2O_3	11.54	11.21	11.25	11.62	11.31	11.39	11.38
Fe_2O_3	20.91	18.62	19.62	20.58	19.47	19.94	19.85
MnO	0.31	0.53	0.25	0.00	0.30	0.34	0.29
MgO	8.07	9.53	9.05	8.14	8.68	8.70	8.69
CaO	11.48	11.91	11.86	11.43	11.60	11.77	11.67
Na_2O	1.70	1.56	1.64	1.67	1.68	1.66	1.65
K_2O	1.87	1.51	1.59	1.86	1.80	1.65	1.71
F^-	0.09	0.11	0.10	0.14	0.16	0.17	0.13
Cl^-	0.44	0.26	0.36	0.35	0.28	0.26	0.32
La_2O_3	0.006	0.008	0.007	0.009	0.047	0.007	0.014
CeO_2	0.036	0.022	0.008	0.026	0.010	0.022	0.021
Pr_2O_3	0.006	0.008	0.000	0.008	0.004	0.014	0.006
Nd_2O_3	0.023	0.018	0.018	0.009	0.013	0.012	0.015
Sm_2O_3	0.018	0.006	0.014	0.029	0.011	0.007	0.014
Y_2O_3	0.036	0.003	0.007	0.031	0.010	0.006	0.015
ThO_2	0.007	0.003	0.000	0.000	0.018	0.001	0.010
Total	99.272	98.918	99.324	98.832	99.163	99.269	99.105

Table 15 (cont.). Electron microprobe analyses of amphiboles (%).

	765	766	average
SiO_2	41.28	42.48	41.88
TiO_2	0.15	0.05	0.10
Al_2O_3	12.28	11.10	11.69
Fe_2O_3	20.91	18.62	19.62
MnO	0.00	0.40	0.20
MgO	7.91	8.67	8.29
CaO	11.68	11.66	11.67
Na_2O	1.84	1.73	1.78
K_2O	1.38	1.16	1.27
F-	0.10	0.19	0.15
Cl^-	0.44	0.23	0.33
La_2O_3	0.003	0.012	0.012
CeO_2	0.000	0.009	0.004
Pr_2O_3	0.002	0.000	0.001
Nd_2O_3	0.022	0.000	0.011
Sm_2O_3	0.029	0.007	0.018
Y_2O_3	0.000	0.000	0.000
ThO2	0.000	0.000	0.000
Total	99.68	99.17	99.42

Formulae on the basis of 24 oxygen atoms:

	I		II	
Si^{4+}	6.371		6.381	
Al^{3+}	1.629	8.000	1.619	8.000
Ti^{4+}	0.178		0.011	
Al^{3+}	0.417		0.480	
Fe^{3+}	2.279		2.523	
Mn^{2+}	0.037		0.026	
Mg^{2+}	1.976	4.888	1.883	4.923
Ca^{2+}	1.908		1.905	
Na^{+}	0.488		0.526	
K^{+}	0.333	2.729	0.247	2.678
$F-$	0.063		0.072	
$Cl-$	0.083	0.146	0.082	0.154

Pyroxene: A rare primary mineral, which is also common as inclusions in amphibole. A pale-green-coloured pyroxene has been identified in a number of sections associated with amphibole (oblong (needle-shaped) inclusions in amphibole, which are well orientated, parallel to the main cleavage of amphibole). Electron microprobe analyses of pyroxenes are presented in Table 16. The chemical formulae corresponds to a Ca-deficient diopsidic augite.

Table 16. Electron microprobe analyses of pyroxene (%).

	753	766	767	average
SiO_2	51.08	51.66	51.99	51.57
TiO_2	0.13	0.08	0.35	0.18
Al_2O_3	1.18	1.44	1.12	1.25
Fe_2O_3	11.79	12.51	11.80	12.03
MnO	0.62	0.48	0.46	0.52
MgO	11.43	11.68	11.94	11 68
CaO	22.45	21.82	22.68	22.31
Na_2O	0.44	0.44	0.50	0.46
K_2O	0.00	0.01	0.01	0.01
F-	0.02	0.00	0.00	0.00
La_2O_3	0.010	0.006	0.009	0.008
CeO_2	0.041	0.000	0.028	0.023
Pr_2O_3	0.000	0.000	0.000	0.000
Nd_2O_3	0.003	0.039	0.026	0.022
Sm_2O_3	0.000	0.029	0.000	0.010
Y_2O_3	0.000	0.000	0.000	0.000
ThO_2	0.000	0.000	0.005	0.001
Total	99.194	100.194	100.918	100.074

Table 16 (cont.). Electron microprobe analyses of pyroxene (%).

	755	766	767	average
SiO_2	54.40	54.11	53.77	54.09
TiO_2	0.16	0.08	0.00	0.08
Al_2O_3	2.54	1.44	1.92	1.97
Fe_2O_3	14.68	15.53	15.54	15.25
MnO	0.34	0.35	0.40	0.36
MgO	14.68	15.53	15.54	15.25
CaO	12.38	12.76	12.37	12.50
Na_2O	0.43	0.28	0.45	0.37
K_2O	0.18	0.08	0.10	0.12
F-	0.16	0.12	0.06	0.11
La_2O_3	0.028	0.010	0.000	0.012
CeO_2	0.016	0.009	0.000	0.008
Pr_2O_3	0.000	0.002	0.000	0.000
Nd_2O_3	0.000	0.013	0.013	0.008
Sm_2O_3	0.000	0.016	0.000	0.005
Y_2O_3	0.000	0.000	0.000	0.000
ThO_2	0.007	0.000	0.000	0.002
Total	99.781	97.910	97.733	98.445

Formulae on the basis of 6 oxygen atoms:

	I		II	
Si^{4+}	1.917		1.977	
Al^{3+}	0.055		0.023	
Fe^{3+}??	0.028	2.000	-	2.00
Ti^{4+}	0.005		0.002	
Al^{3+}	-		0.062	
Fe^{3+}	0.308		0.373	
Mn^{2+}	0.016		0.011	1.79
Mg^{2+}	0.647		0.831	
Ca^{2+}	0.888		0.490	
Na^{+}	0.033		0.026	
K^{+}	0.000	1.897	0.006	1.801
F^{-}	-		0.01	

Epidote: An abundant secondary mineral. Epidote has been identified in most samples, and is often related to allanite. Electron microprobe analyses of epidote are presented in Tables 17 and 18. "Rings" of epidote around allanite are not common, however, composition zoning with a rare-earth-rich centre has been observed (Table 19).

Table 17. Epidote Type-I, without rare earths.

	748	752	753	755	758	760
SiO_2	37.78	38.26	37.98	38.21	38.55	36.88
TiO_2	0.09	0.09	0.09	0.09	0.06	0.06
Al_2O_3	23.67	23.35	23.93	23.82	22.78	23.22
Fe_2O_3	11.17	12.35	11.63	11.78	11.88	13.23
MnO	0.15	0.12	0.25	0.13	0.10	0.16
MgO	0.04	0.02	0.02	0.02	0.01	0.05
CaO	23.19	23.52	23.38	23.55	24.66	23.20
Na_2O	0.00	0.00	0.00	0.01	0.01	0.01
P_2O_5	0.01	0.00	0.00	0.02	0.04	0.07
F^-	0.00	0.00	0.01	0.00	0.00	0.00
La_2O_3	0.048	0.000	0.007	0.000	0.093	0.774
CeO_2	0.023	0.030	0.000	0.000	0.085	1.380
Pr_2O_3	0.000	0.044	0.043	0.000	0.011	0.128
Nd_2O_3	0.002	0.000	0.011	0.022	0.021	0.356
Sm_2O_3	0.029	0.003	0.015	0.015	0.000	0.055
Y_2O_3	0.000	0.039	0.001	0.035	0.000	0.024
ThO_2	0.000	0.016	0.007	0.000	0.000	0.173
Total	96.202	97.842	97.374	97.702	98.300	99.770

Table 17 (cont.). Epidote Type-I, without rare earths.

	761	762	763	766	767
SiO_2	38.14	37.11	38.00	37.62	38.10
TiO_2	0.12	0.20	0.10	0.11	0.07
Al_2O_3	23.52	23.33	23.21	23.11	23.68
Fe_2O_3	11.20	11.92	12.10	12.24	11.87
MnO	0.06	0.13	0.11	0.14	0.21
MgO	0.03	0.02	0.05	0.04	0.03
CaO	23.88	22.98	23.03	23.29	23.44
Na_2O	0.00	0.01	0.01	0.00	0.00
P_2O_5	0.02	0.01	0.02	0.01	0.03
F^-	0.00	0.01	0.00	0.01	0.00
La_2O_3	0.121	0.035	0.010	0.010	0.000
CeO_2	0.220	0.045	0.102	0.106	0.035
Pr_2O_3	0.017	0.004	0.034	0.113	0.020
Nd_2O_3	0.110	0.043	0.095	0.004	0.013
Sm_2O_3	0.000	0.012	0.036	0.223	0.006
Y_2O_3	0.000	0.000	0.276	0.016	0.035
ThO_2	0.006	0.003	0.000	0.001	0.007
Total	97.444	95.862	97.183	97.043	97.546

Table 17 (cont.). Epidote Type-I, without rare earths.

	average	751	759	763	Formulae on the basis of 13 oxygen atoms.	
SiO_2	37.87	36.86	38.84	37.51	Si^{4+}	3.050
TiO_2	0.09	0.10	0.00	0.00	Ti^{4+}	0.005
Al_2O_3	23.42	20.36	28.29	17.71	Al^{3+}	2.223
Fe_2O_3	11.94	16.06	6.64	19.87	Fe^{3+}	0.724
MnO	0.19	0.06	0.82	0.02	Mn^{2+}	0.013
MgO	0.03	0.01	0.00	0.02	Mg^{2+}	0.004
CaO	23.46	23.10	24.66	23.05	Ca^{2+}	2.024
Na_2O	0.00	0.02	0.01	0.01		
P_2O_5	0.02	0.00	0.00	0.00		
F-	0.00	0.06	0.02	0.06		
La_2O_3	0.100	0.015	0.000	0.013	La^{3+}	0.003
CeO_2	0.184	0.011	0.006	0.000	Ce^{3+}	0.005
Pr_2O_3	0.037	0.018	0.016	0.000	Pr^{3+}	0.001
Nd_2O_3	0.061	0.021	0.000	0.022	Nd^{3+}	0.002
Sm_2O_3	0.036	0.007	0.016	0.000	Sm^{3+}	0.001
Y_2O_3	0.039				Y^{3+}	0.002
ThO_2	0.019	0.007	0.012	0.000		
Total	97.496	96.709	99.330	98.285		
H_2O^+ (estimated)				1.500	$(OH)^-$	0.806

Table 18. Epidote Type II, with rare earths.

	759	760	763	average
SiO_2	34.23	34.82	34.19	34.41
TiO2	0.09	0.09	0.07	0.08
Al_2O_3	21.46	21.10	20.22	20.93
Fe_2O_3	12.84	13.19	12.42	12.81
MnO	0.17	0.07	0.20	0.15
MgO	0.11	0.16	0.22	0.16
CaO	20.72	20.52	18.89	20.04
Na_2O	0.01	0.00	0.02	0.01
K_2O	0.00	0.02	0.00	0.01
F-	0.00	0.07	0.14	0.07
La_2O_3	1.657	0.750	0.436	0.947
CeO_2	3.041	1.420	2.311	2.257
Pr_2O_3	0.203	0.159	0.392	0.251
Nd_2O_3	0.672	0.350	2.403	1.141
Sm_2O_3	0.032	0.052	0.571	0.218
Y_2O_3	0.048	0.018	0.588	0.218
ThO_2	0.388	0.237	0.000	0.208
TOTAL	95.671	93.026	93.071	93.910
H_2O^+ (estimated)				1.500

Formulae on the basis of 6 oxygen atoms	
Si^{4+}	2.977
Ti4+	0.005
Al^{3+}	2.134
Fe^{3+}	0.834
Mn^{2+}	0.011
Mg^{2+}	0.021
Ca^{2+}	1.858
Na^+	0.002
K^+	0.001
F-	0.019
La^{3+}	0.030
Ce^{3+}	0.071
Pr^{3+}	0.008
Nd^{3+}	0.035
Sm^{3+}	0.006
Y^{3+}	0.010
Th^{4+}	0.004

Table 19. The composition of zoned epidote

	746		747		765	
	centre	rim	centre	rim	centre	rim
SiO_2	30.35	37.41	36.72	33.28	32.87	37.94
TiO_2	0.18	0.15	0.18	0.02	0.12	0.08
Al_2O_3	15.19	23.26	21.16	8.05	19.81	23.02
Fe_2O_3	14.24	11.87	12.69	19.44	12.93	13.17
MnO	0.31	0.13	0.00	0.00	0.00	0.04
MgO	0.49	0.00	0.50	0.00	0.34	0.01
CaO	13.76	23.05	20.71	34.49	17.27	23.41
Na_2O	0.03	0.01	0.03	0.03	0.02	0.01
K_2O	0.00	0.00	0.45	0.00	0.01	0.01
P_2O_5	0.10	0.01	0.04	0.01	0.01	0.00
F-	0.09	0.00	0.00	2.12	0.08	0.00
La_2O_3	2.778	0.214	3.555	0.000	0.602	0.012
CeO_2	3.863	0.410	1.924	0.000	2.498	0.015
Pr_2O_3	0.229	0.000	0.050	0.006	0.409	0.016
Nd_2O_3	0.606	0.043	0.188	0.000	1.346	0.001
Sm_2O_3	0.047	0.000	0.027	0.001	0.575	0.020
Y_2O_3	0.081	0.000	0.179	0.000	1.523	0.003
ThO_2	0.010	0.010	0.000	0.000	0.019	0.007
Total	82.354	96.567	98.403	97.447	90.432	97.764

Clinozoisite: Rare secondary mineral (only one grain observed). Electron microprobe analyses are presented in Table 20.

Table 20. Clinozoisite electron microprobe analyses (%).

	748	749
SiO_2	38.41	44.36
Al_2O_3	29.55	22.89
Fe_2O_3	2.94	1.71
MnO	0.08	0.00
MgO	0.00	0.01
CaO	24.07	27.72
K_2O	0.00	0.01
F-	0.00	0.04
La_2O_3	0.025	nd
CeO_2	0.038	nd
Pr2O3	0.009	nd
Nd_2O_3	0.012	nd
Total	95.134	

Allanite: Allanite has been identified in almost every sample as probably a secondary mineral. It has been observed in both larger grains (up to 1 mm) and micrograins 20-30 um across. The larger grains consist of a core (85-95 vol%), inconsistently surrounded by a "rim" of varied thickness. The composition of the core is consistent but there is a variation in the composition of the "rims", which have higher SiO_2 and ThO_2, and lower CaO and Fe_2O_3 levels. The sum of all the analysed elements is also notably different. The micrograins are fresh, with a ThO_2-content less than 0.5%. The formulae of the different allanite types analysed (i.e. fresh, core, rims and decomposed) presented in Tables 21, 22 and 23, are calculated in two ways (Table 24). First, the formulae are calculated on the basis of no water and F^-, and secondly, by assuming stoichiometric water (allanite contains approximately 1.65% $H2O^+$). The formulae of the fresh allanite (including estimated water) is:

$$(Ca_{1.215},Mn_{0.02}, La_{0.22},Ce_{0.43},Pr_{0.035},Nd_{0.08},Sm_{0.01},$$
$$Y_{0.01},Th_{0.025})\ (Mg_{0.175},Ti_{0.03}),$$
$$(Al_{1.425},\ Fe^{3+}_{1.085})[(Si_{2.835},Al_{0.165})\ O_{12}](OH,\ F_{0.06}).$$

Table 21. The five classes of allanites defined in the previous report [1] (%).

	A	B	C	D	E
SiO2	38.63	32.02	32.64	34.31	48.21
TiO2	1.03	0.90	0.65	0.82	1.90
Al_2O_3	15.43	16.09	17.19	16.40	16.08
Fe_2O_3	8.25	13.51	14.04	11.65	5.13
MnO	0.00	0.26	0.23	0.26	0.01
MgO	0.58	1.14	0.98	0.84	0.23
CaO	7.22	10.78	12.48	10.13	4.24
F-	0.25	0.16	0.13	0.19	0.15
La_2O_3	4.36	5.99	5.23	5.20	1.65
CeO_2	10.82	11.75	10.53	11.14	3.54
Pr_2O_3	0.96	0.96	0.88	0.96	0.43
Nd_2O_3	3.31	3.14	2.96	3.29	1.49
Sm_2O_3	0.41	0.28	0.29	0.34	0.23
Y_2O_3	0.24	0.13	0.13	0.19	0.07
ThO_2	2.46	1.54	1.35	1.75	3.68
Total	93.95	98.65	99.71	97.47	87.04

Table 21. (cont). Allanites of Group B and C previously defined in the earlier report [1] averaged and the remaining groups rearranged (%)

	B+C	D	A	E
SiO_2	32.33	34.31	38.63	48.21
TiO_2	0.77	0.82	1.03	1.90
Al_2O_3	16.64	16.40	15.43	16.08
Fe_2O_3	13.77	11.65	8.25	5.13
MnO	0.24	0.26	0.00	0.01
MgO	1.06	0.84	0.58	0.23
CaO	11.63	10.13	7.22	4.24
F-	0.14	0.19	0.25	0.15
La_2O_3	5.61	5.20	4.36	1.65
CeO_2	11.14	11.14	10.82	3.54
Nd_2O_3	3.05	3.29	3.31	1.49
Pr_2O_3	0.92	0.96	0.96	0.43
Y_2O_3	0.13	0.19	0.24	0.07
ThO_2	1.445	1.75	2.46	3.68

Table 21. (cont.). Electron microprobe analyses of allanites from the diamond core samples (%).

	Small Fresh	Core	Large Rims	Alt'd
SiO_2	29.87	29.10	32.38	37.76
TiO_2	0.57	0.41	1.30	1.32
Al_2O_3	15.11	13.86	11.81	13.06
Fe_2O_3	12.90	14.83	5.66	4.04
MnO	0.24	0.22	0.28	0.34
MgO	0.83	1.21	0.38	0.35
CaO	12.77	11.62	6.80	7.12
Na2O	0.08	0.03	0.03	0.11
K_2O	0.03	0.00	0.18	0.74
F-	0.21	0.20	0.51	0.26
La_2O_3	5.48	6.06	5.84	4.06
CeO_2	11.48	12.13	13.39	10.22
Pr_2O_3	0.98	1.05	1.19	0.07
Nd_2O_3	2.88	2.25	3.60	2.71
Sm_2O_3	0.36	0.34	0.43	0.43
Y_2O_3	0.17	0.15	0.18	0.22
ThO_2	0.46	1.21	2.10	2.48

Table 22. Electron microprobe analyses of small, fresh allanite grains (%).

	752(a)	752(b)	755	762	763	767
$SiO2$	29.89	29.11	30.94	30.15	29.67	29.44
TiO_2	0.28	0.45	0.81	0.42	0.51	0.96
Al_2O_3	16.22	14.89	15.04	15.06	14.65	14.80
Fe_2O_3	13.19	13.91	11.22	13.37	13.94	11.76
MnO	0.10	0.24	0.30	0.22	0.22	0.36
MgO	0.69	0.96	0.78	0.85	0.96	0.73
CaO	13.88	12.72	12.63	12.36	12.09	12.97
Na_2O	0.03	0.01	0.20	0.06	0.06	0.14
K_2O	0.00	0.00	0.05	0.01	0.06	0.07
P_2O_5	0.02	0.02	0.05	0.01	0.02	0.03
F^-	0.13	0.10	0.30	0.19	0.30	0.22
La_2O_3	3.685	5.263	5.865	4.916	6.538	6.586
CeO_2	10.883	12.032	11.663	11.749	11.843	10.699
Pr_2O_3	1.140	1.053	0.877	1.146	0.942	0.747
Nd_2O_3	3.749	2.989	2.279	3.609	2.921	1.748
Sm_2O_3	0.581	0.439	0.221	0.453	0.278	0.212
Y_2O_3	0.307	0.203	0.105	0.184	0.121	0.110
ThO_2	0.036	0.171	0.592	0.224	1.159	0.553
Total	94.811	94.560	93.922	94.981	96.282	92.135

Table 22. (cont.) Mean and minimum and maximum compositions of fresh small grains of allanite(%).

	Mean	Min.	Max.
SiO_2	29.87	29.11	30.94
TiO_2	0.57	0.28	0.96
Al_2O_3	15.11	14.65	16.22
Fe_2O_3	12.90	11.22	13.94
MnO	0.24	0.10	0.36
MgO	0.83	0.69	0.96
CaO	12.77	12.09	13.88
Na_2O	0.08	0.01	0.20
K_2O	0.03	0.00	0.07
P_2O_5	0.02	0.01	0.05
F^-	0.21	0.10	0.30
La_2O_3	5.475	3.685	6.586
CeO_2	11.478	10.699	12.032
Pr_2O_3	0.984	0.747	1.146
Nd_2O_3	2.882	1.748	3.749
Sm_2O_3	0.364	0.212	0.581
Y_2O_3	0.172	0.105	0.307
ThO_2	0.456	0.036	1.159
Total	94.441		
H_2O^+	1.700	(estimated)	

Table 23. Large allanite grains partially decomposed (altered or weathered rim) (%).

	748	748	751	758	760	761	average
SiO_2	28.44	28.79	28.50	30.33	28.56	29.99	29.10
TiO_2	1.01	0.84	0.94	0.00	0.08	0.38	0.41
Al_2O_3	12.81	13.51	12.77	15.04	13.59	15.45	13.86
Fe_2O_3	15.51	15.05	15.18	14.23	15.00	14.04	14.83
MnO	0.21	0.22	0.22	0.22	0.25	0.22	0.22
MgO	1.41	1.26	1.29	1.26	1.30	0.75	1.21
CaO	11.15	11.50	11.23	10.89	11.53	13.41	11.62
Na_2O	0.04	0.05	0.04	0.00	0.04	0.03	0.03
K_2O	0.00	0.01	0.00	0.00	0.00	0.00	0.00
P_2O_5	0.05	0.04	0.01	0.00	0.02	0.00	0.02
F-	0.31	0.34	0.17	0.00	0.24	0.14	0.20
La_2O_3	6.841	6.388	6.474	6.355	6.386	3.914	6.059
CeO_2	12.954	12.036	12.390	12.013	11.840	11.824	12.126
Pr_2O_3	1.003	0.974	1.036	0.972	0.964	1.336	1.047
Nd_2O_3	2.903	2.990	3.220	2.799	2.756	4.801	2.245
Sm_2O_3	0.270	0.268	0.279	0.317	0.337	0.571	0.340
Y_2O_3	0.107	0.156	0.128	0.136	0.166	0.189	0.147
ThO_2	1.448	1.349	1.414	1.290	1.593	0.160	1.209
Total	96.466	95.771	95.291	95.852	94.652	97.205	94.673
H_2O+ (estimated)							1.70

Table 23. (cont.). Weathered rims of large allanite grains partially decomposed (altered or weathered rim) (%).

	Mean	748	749	751
SiO_2	32.98	31.86	32.32	32.38
TiO_2	1.32	1.40	1.20	1.30
Al_2O_3	12.15	11.56	11.73	11.81
Fe_2O_3	5.82	5.73	5.45	5.66
MnO	0.22	0.37	0.25	0.28
MgO	0.44	0.35	0.36	0.38
CaO	6.07	7.97	6.36	6.80
Na_2O	0.04	0.02	0.03	0.03
K_2O	0.17	0.20	0.18	0.18
P_2O_5	0.05	0.13	0.02	0.06
F^-	0.64	0.43	0.46	0.51
La_2O_3	6.440	5.079	6.015	5.844
CeO_2	14.841	11.615	13.713	13.389
Pr_2O_3	1.255	1.087	1.234	1.192
Nd_2O_3	3.843	3.050	3.898	3.597
Sm_2O_3	0.456	0.406	0.434	0.432
Y_2O_3	0.167	0.149	0.216	0.177
ThO_2	1.856	2.088	2.350	2.098
Total	88.758	83.494	86.220	86.119
H_2O (estimated)				10.00

Table 23. (cont.). Decomposed patches of large allanite grains partially decomposed (altered or weathered rim) (%).

	748	759	760	762	Mean
SiO_2	39.15	37.87	35.28	38.76	37.76
TiO_2	1.75	1.22	1.09	1.21	1.32
Al_2O_3	12.95	13.50	12.78	13.03	13.06
Fe_2O_3	4.84	4.26	4.54	2.52	4.04
MnO	0.40	0.40	0.27	0.31	0.34
MgO	0.41	0.41	0.37	0.23	0.35
CaO	7.79	7.36	6.34	7.00	7.12
Na_2O	0.19	0.13	0.05	0.06	0.12
K_2O	1.96	0.47	0.26	0.29	0.74
P_2O_5	0.07	0.04	0.02	0.04	0.04
F-	0.10	0.38	0.42	0.16	0.26
La_2O_3	3.306	4.528	5.113	3.306	4.063
CeO_2	7.871	11.163	12.054	9.802	10.222
Pr_2O_3	0.672	1.047	1.100	0.966	0.946
Nd_2O_3	1.873	3.188	2.308	3.462	2.708
Sm_2O_3	0.237	0.492	0.460	0.537	0.431
Y_2O_3	0.111	0.243	0.240	0.294	0.222
ThO_2	2.307	2.602	2.396	2.608	2.478
Total	85.987	89.303	85.091	84.585	86.220
H2O+ (estimated)					10.00

Table 24. Allanite formulae.
Formulae A to D calculated on the basis of 13 O-atoms. Formulae E to H calculated on the basis of estimated H_2O^+.

	A	B	C	D	E	F	G	H
Si^{4+}	2.96	3.56	3.88	3.00	2.84	2.78	3.07	2.88
Ti^{4+}	0.03	0.11	0.10	0.05	0.03	0.09	0.08	0.04
Al^{3+}	1.66	1.53	1.58	1.79	1.59	1.19	1.25	1.72
Fe^{3+}	1.14	0.47	0.32	0.98	1.09	0.37	0.25	0.94
Mn^{2+}	0.02	0.03	0.03	0.02	0.02	0.02	0.03	0.02
Mg^{2+}	0.19	0.06	0.06	0.13	0.18	0.05	0.04	0.12
Ca^{2+}	1.27	0.80	0.79	1.37	1.22	0.63	0.62	1.32
Na^{+}	0.01	0.01	0.01	0.02	0.01	0.01	0.02	0.02
K^{+}	nd	0.03	0.01	0.01	nd	0.02	0.08	0.01
p^{5+}	nd	nd	nd	nd	nd	nd	0.01	0.01
F^{-}	0.07	0.18	0.09	0.07	0.06	0.14	0.07	0.07
La^{3+}	0.23	0.24	0.16	0.20	0.22	0.19	0.12	0.20
Ce^{3+}	0.45	0.54	0.39	0.42	0.43	0.42	0.31	0.41
Pr^{3+}	0.04	0.05	0.04	0.04	0.04	0.04	0.03	0.04
Nd^{3+}	0.08	0.14	0.10	0.11	0.08	0.11	0.08	0.10
Sm^{3+}	0.01	0.02	0.02	0.02	0.01	0.01	0.01	0.01
Y^{3+}	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Th^{4+}	0.03	0.05	0.06	0.01	0.03	0.04	0.05	0.01
$(OH)^{-}$	nd	nd	nd	nd	1.11	5.72	5.43	1.03

Calcite: A minor but ubiquitous secondary mineral. All polished thin sections studied contained calcite. It is a secondary mineral which has been formed, not only from the alteration of An-rich plagioclase, but also from a direct inflow of calcium and CO_2-containing solutions (from the carbonatite?). It may be of importance for the understanding of the genesis of the deposit, but it has no commercial value.

Table 25. Electron microprobe analyses of calcite (%).

	748	752	767
SiO_2	0.00	0.44	0.14
Fe_2O_3	0.19	0.92	0.47
MnO	0.45	0.00	0.54
MgO	0.06	0.46	0.22
CaO	54.54	54.02	55.05
Na_2O	0.00	0.03	0.02
P_2O_5	0.00	0.03	0.02
F-	0.00	0.00	0.11
La_2O_3	0.003	0.008	nd
CeO_2	0.000	0.030	nd
Pr_2O_3	0.000	0.022	nd
Nd_2O_3	0.012	0.024	nd
Sm_2O_3	0.071	0.033	nd
Y_2O_3	0.003	0.003	nd
ThO_2	0.016	0.000	nd
Total	55.345	56.020	56.57

<u>Magnetite</u>: Rare primary or secondary mineral.

<u>Ilmenite</u>: Rare primary or secondary mineral.

Table 26. Electron microprobe analyses of ilmenite (%).

	748	749	751	763	average
SiO_2	0.06	0.03	0.17	0.00	0.06
TiO_2	49.02	48.30	48.69	48.49	48.62
FeO	44.05	45.28	43.69	44.66	44.42
MnO	3.28	0.83	4.07	4.08	3.06
MgO	0.04	0.00	0.01	0.05	0.02
CaO	0.08	0.93	0.14	0.14	0.32
K_2O	0.16	0.01	0.00	0.00	0.04
P_2O_5	0.01	0.03	0.00	0.00	0.01
F^-	0.03	0.00	0.00	0.10	0.04
Pr_2O_3	0.001	nd	nd	0.014	0.004
Nd_2O_3	0.030	nd	nd	0.000	0.007
Sm_2O_3	0.009	nd	nd	0.057	0.016
ThO_2	0.003	nd	nd	0.002	0.001
Total	96.783	95.41	96.77	97.593	96.618

Sphene: An abundant secondary mineral, ubiquitous but more common in association with biotite and chlorite. Electron microprobe analyses are presented in Table 27.

Table 27. Electron microprobe analyses of sphene (%).

	748	753	755	758
SiO_2	30.38	30.54	30.99	30.32
TiO_2	34.56	34.99	35.32	35.60
Al_2O_3	1.84	1.97	1.98	2.03
Fe_2O_3	1.11	1.00	1.15	0.66
MnO	0.04	0.00	0.05	0.06
CaO	28.26	28.55	28.79	29.00
Na_2O	0.00	0.01	0.03	0.02
K_2O	0.01	0.02	0.10	0.00
P_2O_5	0.02	0.02	0.04	0.09
F-	0.35	0.38	0.25	0.36
La_2O_3	0.000	0.024	0.005	0.012
CeO_2	0.066	0.000	0.062	0.003
Pr_2O_3	0.000	0.000	0.000	0.002
Nd_2O_3	0.000	0.027	0.000	0.045
Sm_2O_3	0.023	0.001	0.017	0.000
Y_2O_3	0.016	0.035	0.054	0.000
ThO_2	0.000	0.000	0.000	0.007
Total	96.675	97.967	98.838	98.209

Table 27 (cont.). Electron microprobe analyses of sphene(%).

	759	760	761	762	765	average
SiO_2	30.06	30.82	31.26	30.53	30.69	30.51
TiO_2	35.68	36.56	33.87	34.54	33.71	34.98
Al_2O_3	1.68	1.52	3.21	2.85	3.33	2.27
Fe_2O_3	0.87	0.88	1.29	0.95	1.12	1.00
MnO	0.04	0.02	0.02	0.00	0.00	0.02
CaO	28.98	29.27	28.90	28.76	28.14	28.74
Na_2O	0.00	0.00	0.00	0.00	0.02	0.01
K_2O	0.00	0.00	0.01	0.00	0.01	0.02
P_2O_5	0.00	0.02	0.03	0.00	0.00	0.02
F-	0.41	0.43	0.82	0.93	0.39	0.48
La_2O_3	0.009	0.012	0.023	0.000	0.000	0.009
CeO_2	0.048	0.058	0.010	0.025	0.000	0.030
Pr_2O_3	0.000	0.056	0.046	0.004	0.000	0.012
Nd_2O_3	0.000	0.010	0.000	0.006	0.071	0.017
Sm_2O_3	0.000	0.013	0.000	0.000	0.000	0.006
Y_2O_3	0.019	0.044	0.000	0.000	0.000	0.018
ThO_2	0.014	0.003	0.013	0.000	0.000	0.004
Total	97.810	99.716	99.502	98.595	97.418	98.146

Apatite: A primary mineral. Apatite is less common than in the previously studied samples [1]. The grains are usually small and difficult to recognize under the microscope. The electron microprobe analyses (Table 28), indicate that the fluorine concentration can be as much as 4.19% F^-, with a average of 2.12% F^-. The ThO_2-content is very low (less than 0.03%), but the yttrium content is high (up to 0.423%) and it could become an economically important by-product.

Table 28. Electron microprobe analyses of apatite (%).

	749	752	753	755	761
SiO_2	0.04	0.05	0.21	0.16	0.12
Fe_2O_3	0.03	0.35	0.20	0.30	0.06
MnO	0.00	0.08	0.06	0.05	0.05
MgO	0.04	0.00	0.01	0.00	0.00
CaO	53.61	54.37	55.11	55.25	54.43
Na_2O	0.45	0.01	0.02	0.03	0.06
K_2O	0.28	0.00	0.00	0.01	0.00
P_2O_5	39.09	39.68	41.18	40.60	41.27
F-	4.19	1.20	1.79	1.79	1.86
Cl^-	0.17	0.17	0.20	0.15	0.31
La_2O_3	0.000	0.049	0.050	0.008	0.000
CeO_2	0.000	0.249	0.215	0.080	0.056
Pr_2O_3	0.003	0.021	0.000	0.025	0.020
Nd_2O_3	0.000	0.162	0.118	0.022	0.070
Sm_2O_3	0.000	0.047	0.015	0.003	0.020
Y_2O_3	0.163	0.423	0.159	0.118	0.139
ThO_2	0.000	0.000	0.000	0.005	0.000
Total	98.066	96.861	99.337	98.601	98.465

Table 28. (cont.). Electron microprobe analyses of apatite(%).

	762	763	765	767	average
SiO_2	0.44	0.39	0.34	0.07	0.20
Fe_2O_3	0.26	0.25	0.23	0.37	0.23
MnO	0.05	0.06	0.05	0.07	0.05
MgO	0.03	0.01	0.01	0.00	0.01
CaO	54.56	54.96	54.41	54.87	54.62
Na_2O	0.01	0.03	0.01	0.02	0.07
K_2O	0.00	0.01	0.08	0.01	0.04
P_2O_5	40.24	39.97	39.80	41.34	40.35
F^-	1.75	2.15	2.74	1.65	2.12
Cl^-	0.20	0.19	0.18	0.18	0.19
La_2O_3	0.018	0.047	0.033	0.015	0.024
CeO_2	0.230	0.252	0.161	0.000	0.138
Pr_2O_3	0.054	0.027	0.037	0.000	0.021
Nd_2O_3	0.158	0.237	0.105	0.000	0.097
Sm_2O_3	0.098	0.070	0.054	0.019	0.036
Y_2O_3	0.417	0.181	0.163	0.123	0.209
ThO_2	0.024	0.006	0.000	0.000	0.004
Total	98.539	98.840	98.403	98.737	98.409

Zircon: Rare primary mineral. Zircon is found unaltered and no metamict grains have been observed. Table 29 presents electron microprobe analyses of some zircons, showing that the ThO_2 content is low and the Y_2O_3 content relatively high. Thorite associated with zircon was identified in section MF755 (see Table 29).

Table 29. Zircon and thorite

	zircon		thorite
	755	763	755
SiO_2	34.40	34.91	21.54
TiO_2	0.13	0.02	nd
Al_2O_3	0.79	0.00	1.69
Fe_2O_3	1.15	0.24	0.69
MnO	0.00	0.00	0.07
MgO	0.02	0.01	0.02
CaO	0.71	0.06	1.30
K_2O	0.06	0.01	nd
P_2O_5	0.06	0.00	0.08
F-	0.00	0.00	0.43
La_2O_3	0.020	0.009	nd
CeO_2	0.017	0.000	4.074
Pr_2O_3	0.000	0.039	0.453
La_2O_3	0.000	0.000	1.395
Nd_2O_3	0.000	0.000	2.591
Sm_2O_3	0.000	0.000	0.751
Y_2O_3	0.178	0.227	1.162
ThO_2	0.069	0.036	46.800
Total	37.604	35.561	83.046

Sulphides: Sulphides were observed in all sections. Pyrite and chalcopyrite are the only ones observed under the microscope. Other sulphides such as sphalerite, galena, NiS_x and Cu_xS_x were observed using the microprobe's backscattered-electron facility. Pyrite is by far the most common, and it has been observed as small hypidiomorphic grains, as well as in cracks.

Pyrite: Minor secondary mineral (hydrothermal?).

Chalcopyrite: Rare secondary mineral (hydrothermal?).

Sphalerite: Rare secondary mineral (hydrothermal?).

Galena: Rare secondary mineral (hydrothermal?).

Cassiterite: Rare primary mineral.

Thorite: Rare primary mineral (hydrothermal?).

$Cu_{(x)}S_{(x)}$: Rare secondary mineral (hydrothermal?).

NiS_x: Rare secondary mineral (hydrothermal?).

REE-oxides: Minor secondary deposits in cracks. REE oxides precipitated in cracks are common. These contain around 6-7% CaO and can be subdivided into the fluorine-rich and the fluorine-poor group. The fluorine-poor group sometimes contains high levels of lanthanum, but sometimes contains lower levels of lanthanum but higher cerium, praseodimium, neodimium and samarium. Tables 30 and 31 present electron microprobe analyses of some of these oxide veins. The SiO_2 and Al_2O_3 contents are probably due to interference from neighboring grains of silicates, for the amounts vary according to the size of the material analysed. The SiO_2 content is probably less than 0.5 (wt%), and the amounts of TiO_2 and Al_2O_3 are negligible.

Table 30. REE Oxides or carbonates I
(Low fluorine content).

	TYPE A						TYPE B	
	748	751	758	761	763	765	749	762
SiO_2	6.01	3.69	4.65	1.70	1.83	17.75	1.67	5.67
TiO_2	0.00	0.03	0.01	0.06	0.03	0.02	0.00	0.27
Al_2O_3	0.08	0.58	0.06	1.01	0.37	0.02	0.59	0.33
Fe_2O_3	0.00	1.17	0.00	0.51	0.08	0.00	0.00	0.04
MgO	0.05	0.12	0.02	0.00	0.03	0.01	0.01	0.02
CaO	6.80	7.21	5.19	6.50	6.03	8.56	6.33	6.40
Na_2O	0.01	0.01	0.00	0.01	0.20	0.03	0.05	0.06
K_2O	0.04	0.01	0.03	0.25	0.08	0.00	0.72	0.14
P_2O_5	0.13	0.00	0.01	0.00	0.00	0.00	0.01	0.00
F^-	1.57	1.81	2.62	1.81	1.80	1.55	1.76	3.18
La_2O_3	24.26	23.60	23.10	23.96	23.30	13.77	17.07	17.13
CeO_2	28.81	33.78	34.25	28.83	32.24	22.50	38.79	34.91
Pr_2O_3	1.91	2.37	2.30	1.66	2.12	1.88	3.44	2.96
Nd_2O_3	5.59	7.47	6.72	3.96	6.81	3.95	10.11	10.87
Sm_2O_3	20.10	0.48	0.51	0.07	0.34	0.60	0.86	0.94
Y_2O_3	0.00	0.01	0.00	0.02	0.00	0.06	0.00	0.01
ThO_2	0.00	0.08	0.00	0.02	0.00	0.01	0.46	0.00
Total	75.35	82.42	79.47	70.37	75.30	70.71	81.86	82.92

Table 31. REE-fluorocarbonates (High fluorine content)

	749	755	762	765
SiO_2	8.04	6.81	0.68	4.75
Al_2O_3	2.90	1.85	0.06	1.91
Fe_2O_3	0.00	0.38	0.29	0.00
MgO	0.02	0.09	0.00	0.01
CaO	3.63	5.64	3.59	3.43
Na_2O	1.47	0.67	0.02	0.06
K_2O	0.12	0.10	0.03	2.27
P_2O_5	0.06	0.00	0.06	0.07
F^-	16.83	17.97	17.95	18.23
La_2O_3	13.901	15.271	21.722	21.309
CeO_2	22.477	24.102	33.861	29.372
Pr_2O_3	1.872	2.138	3.067	2.303
Nd_2O_3	7.365	8.280	13.691	5.286
Sm_2O_3	0.994	0.610	1.978	1.064
Y_2O_3	0.353	0.111	0.384	0.232
ThO_2	0.000	1.392	0.000	0.000
Total	80.032	85.414	97.383	90.296

STATISTICAL ANALYSES OF DIAMOND DRILL CORE BULK ASSAYS

Bulk assays for the four samples from the two metres of core studied in detail are presented in Table 32. Samples B and C contain about 2.0% and 1.3% allanite respectively.

Table 32. Bulk assays of the four samples of core taken from interval 89 to 91.3 m (%).

	A 748	B 758	C 763	D 766
SiO_2	74.80	71.08	64.97	53.52
TiO_2	0.35	0.31	0.89	1.23
Al_2O_3	13.14	13.17	13.36	12.93
Fe_2O_3	1.76	1.61	5.54	12.48
MnO	0.74	0.03	0.09	0.20
MgO	0.74	0.76	2.37	5.98
CaO	2.62	1.09	2.98	7.14
Na_2O	2.46	1.50	1.86	1.64
K_2O	3.22	1.50	1.86	1.64
ZrO_2	0.06	0.10	0.07	0.03
Y_2O_3	0.01	0.01	0.01	0.01
La_2O_3	0.02	0.13	0.07	0.03
CeO_2	0.05	0.25	0.13	0.04
ThO_2	0.01	0.04	0.03	0.01
F^-	0.00	0.40	0.19	0.43
LOF	0.00	0.94	3.18	1.70
Total	99.25	99.07	100.02	99.77

The bulk assays for the 102 samples, taken at regular one-metre intervals along the whole core, are presented in Appendix C. About 18 cm of core was delivered to the Division as two quarters. One quartered sample was sent to Amdel and crushed and pulverized for assaying. The second quarter was kept for mineralogical examination.

As illustrated in Figs. 22 to 24, the rocks vary considerably from green amphibolite-type rocks to coarse-grained pegmatites. There are many indications of veining and intermixing. In order to investigate geochemical trends, a principal component analysis was carried out. This analysis showed that 64% of the variation could be accounted for from the first and second principal components and the analysis of chemical variation was therefore based on this projection. The coordinates for each analysis, projected onto the first and second principal axis planes, are given in Appendix E. As in the analysis of the rocks from the thorium anomalies, mean values of chemical variables are of little significance. Examination of the data in Appendix C shows that SiO_2 varies from 74% to 45%. Figures 25 to 35 show how the chemical analyses project onto the first and second principal component planes. Each figure contours a different element, which allows the reader to appreciate how the compositions cluster and how these clusters are related to individual concentrations of different elements. Outliers are defined in Fig. 25 and samples typical of clusters are also defined.

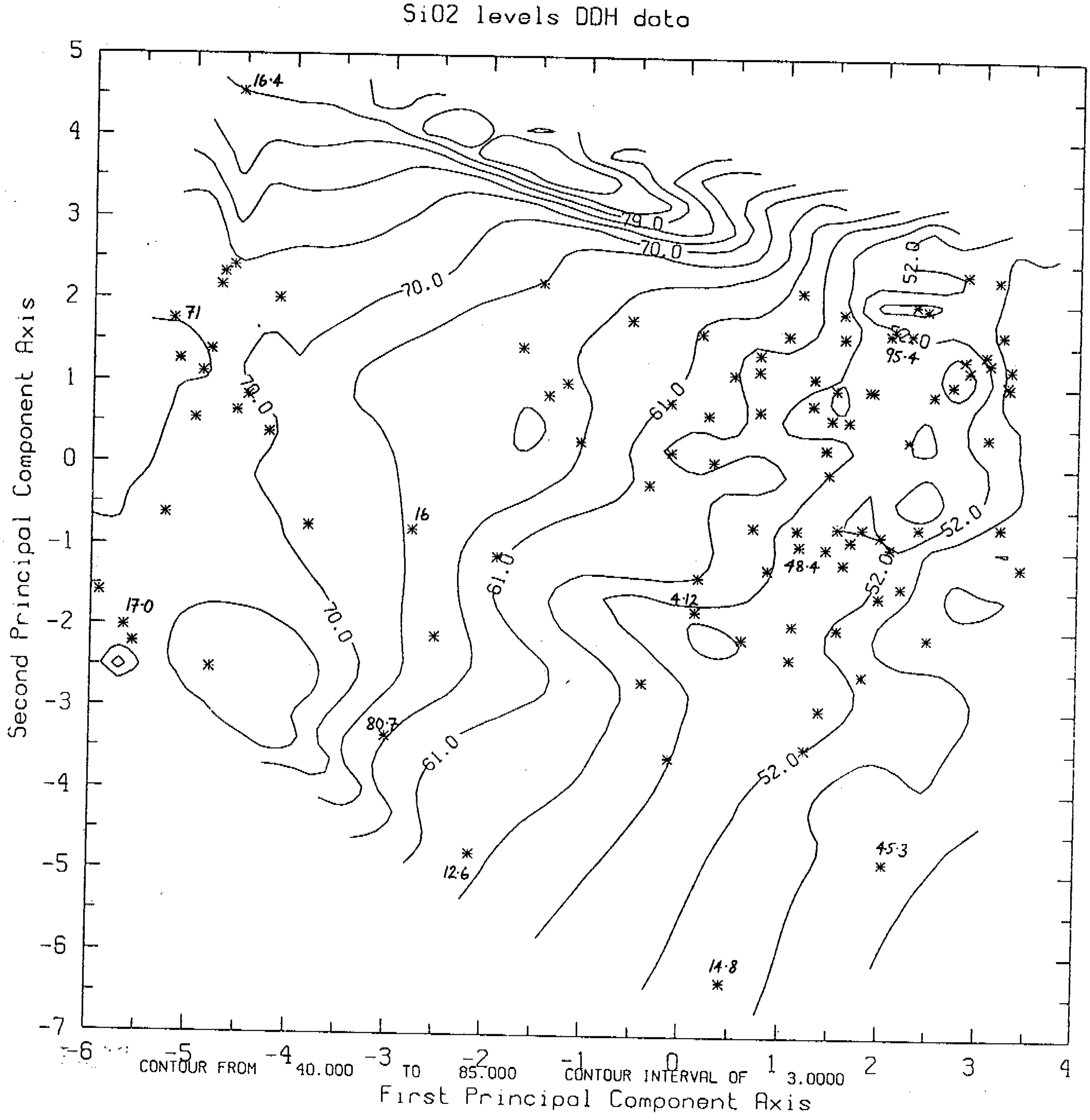


Fig. 25. Diamond drill core data. Projection of data onto the first and second principal component planes, with SiO_2 values contoured. Outliers and representative samples from clusters are defined.

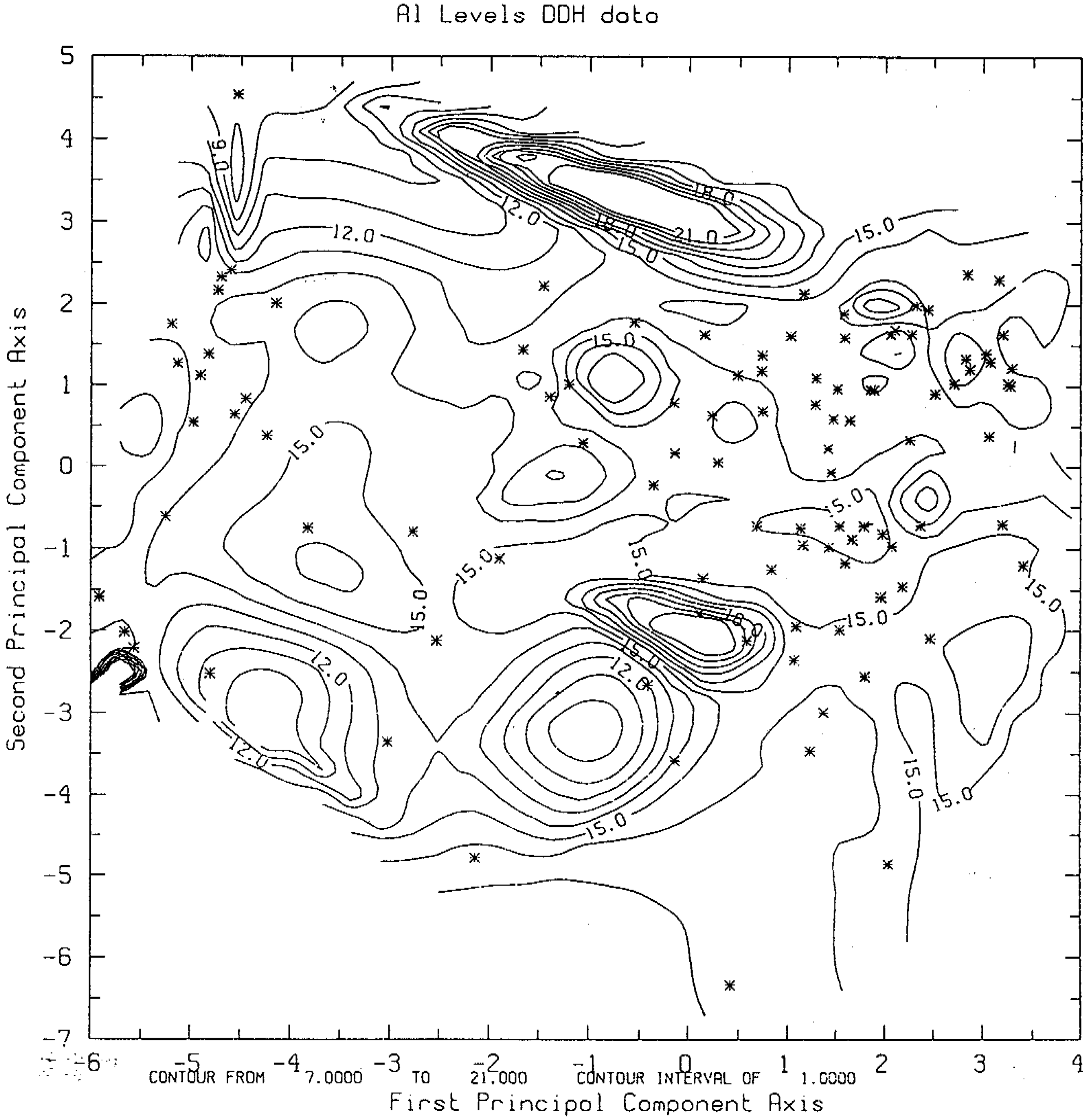


Fig. 26. Diamond drill core data. Projection of data onto the first and second principal component planes, with Al_2O_3 values contoured.

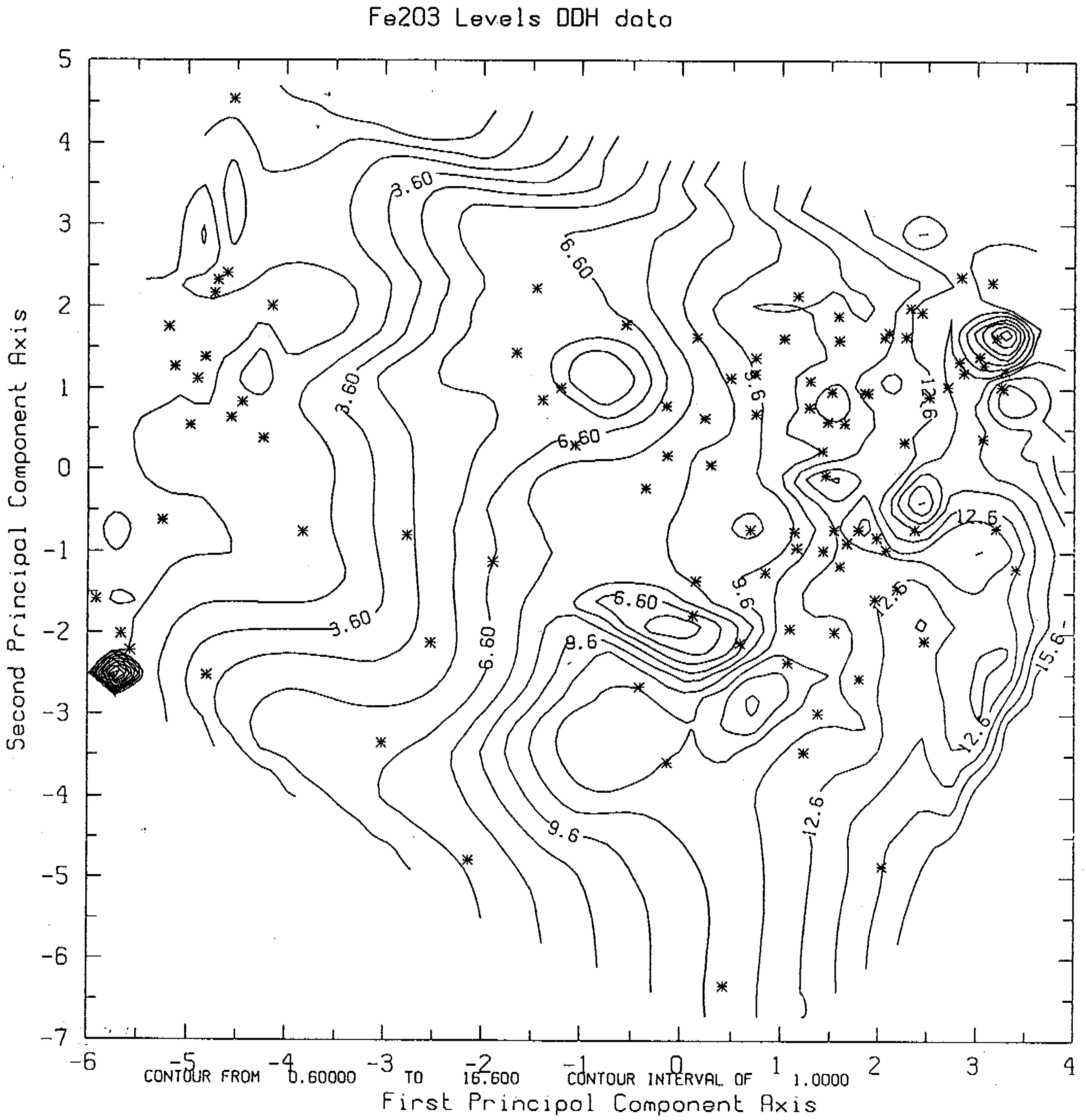


Fig. 27. Diamond drill core data. Projection of data onto the first and second principal component planes, with Fe_2O_3 values contoured.

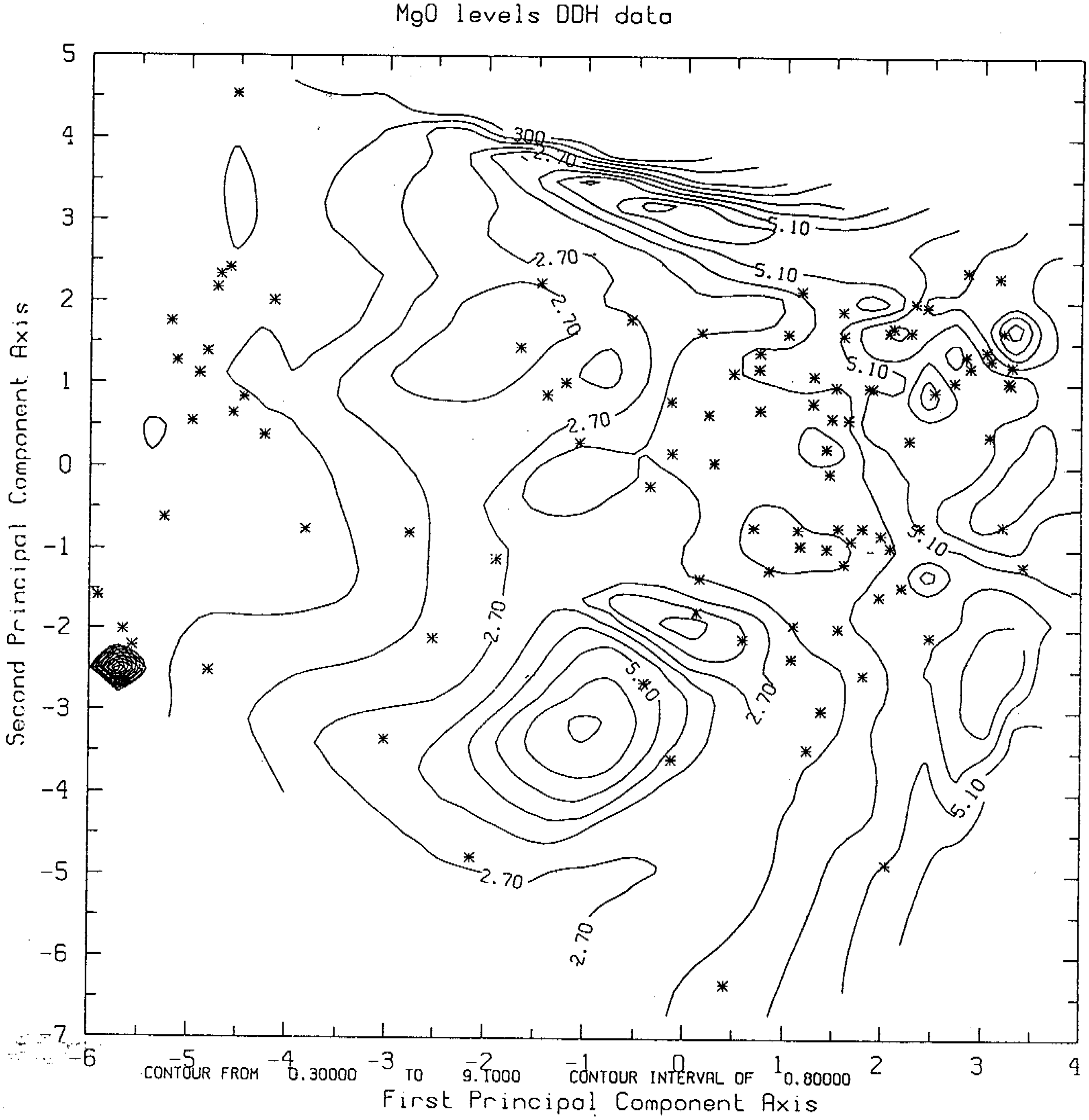


Fig. 28. Diamond drill core data. Projection of data onto the first and second principal component planes, with MgO values contoured.

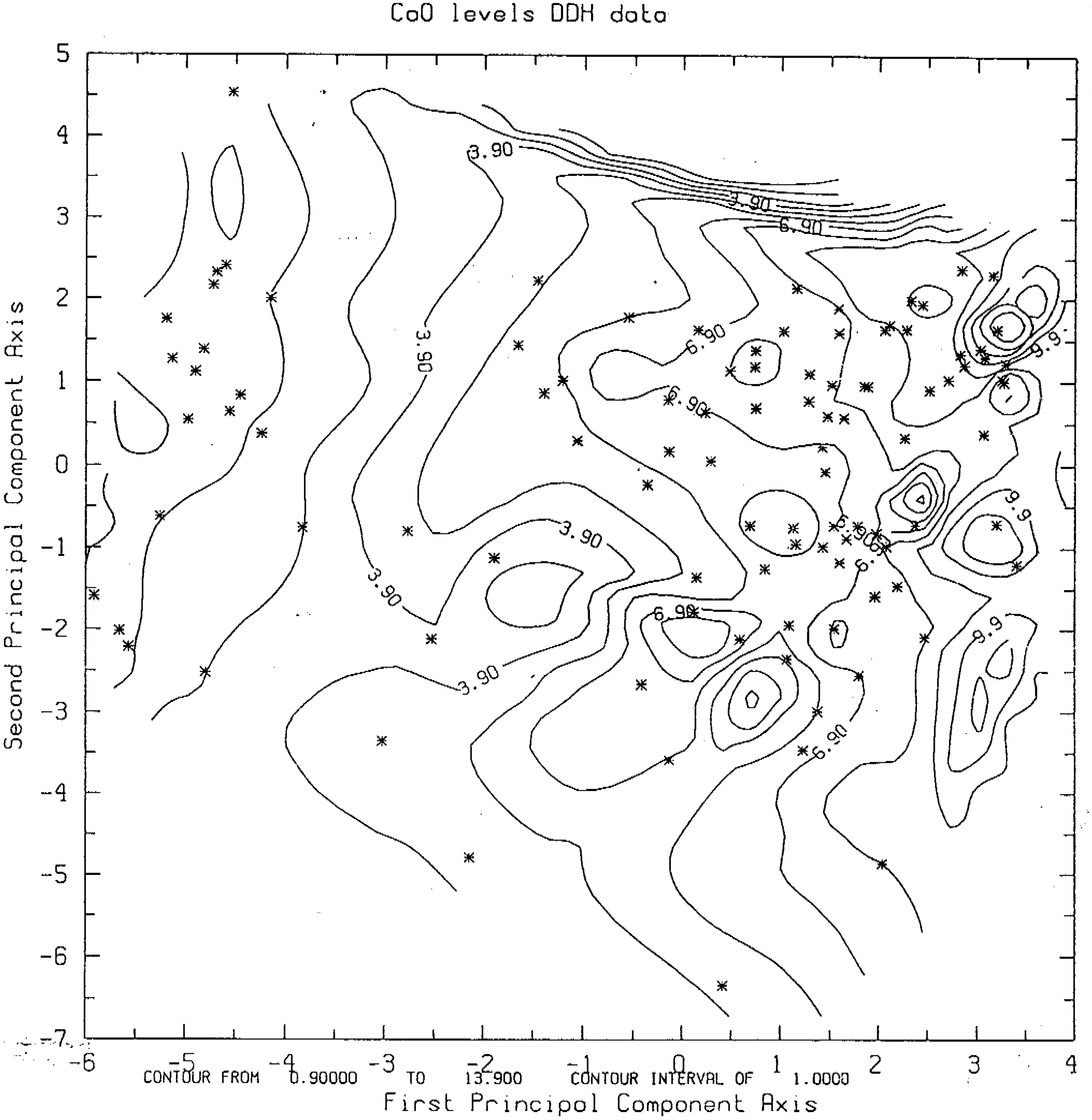
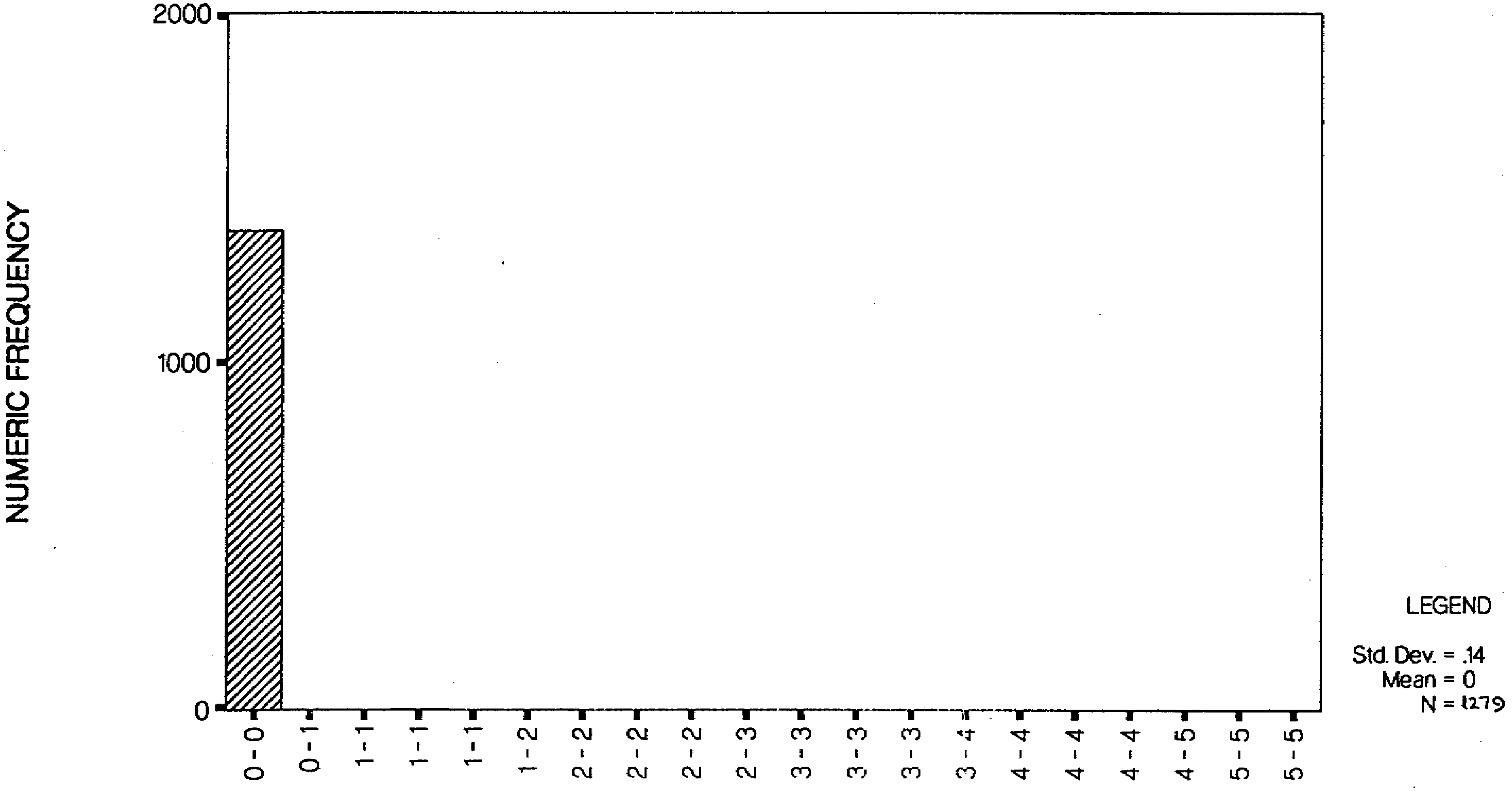


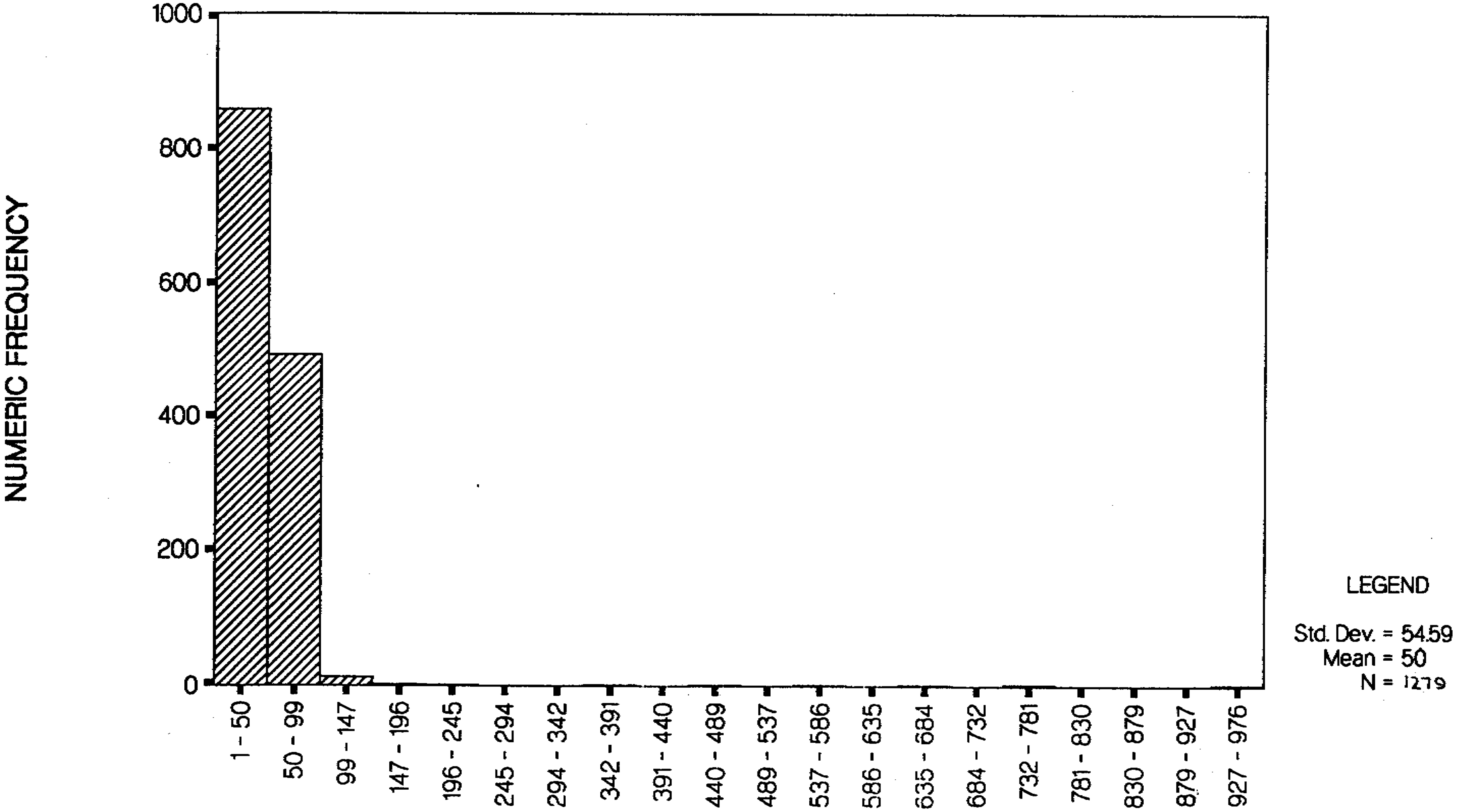
Fig. 29. Diamond drill core data. Projection of data onto the first and second principal component planes, with CaO values contoured.

APPENDIX 3
FREQUENCY HISTOGRAMS FOR THE ENDRAS GEOCHEMICAL DATABASE

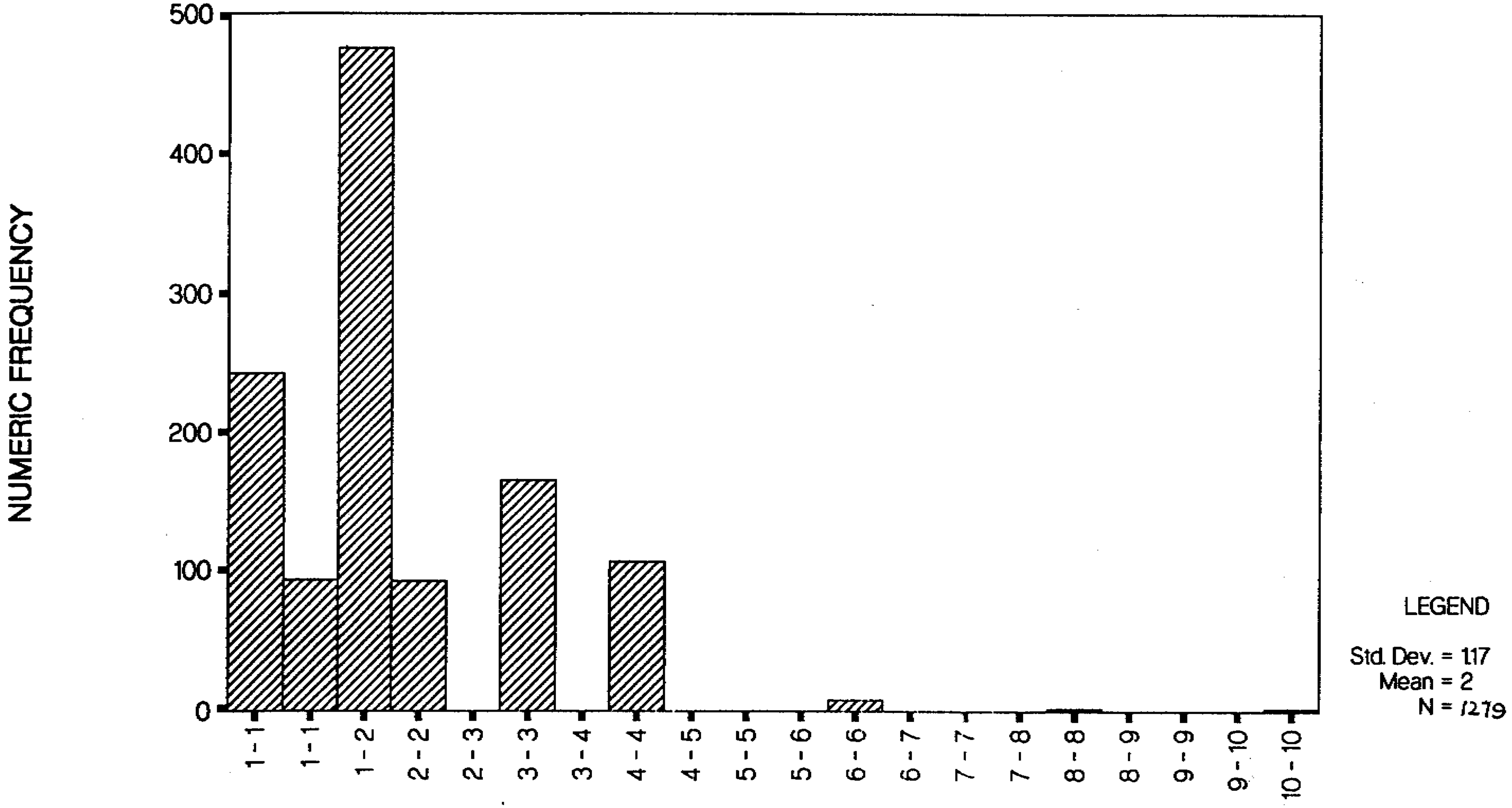
HISTOGRAM OF ASSAY VALUES
FOR AU (PPM)



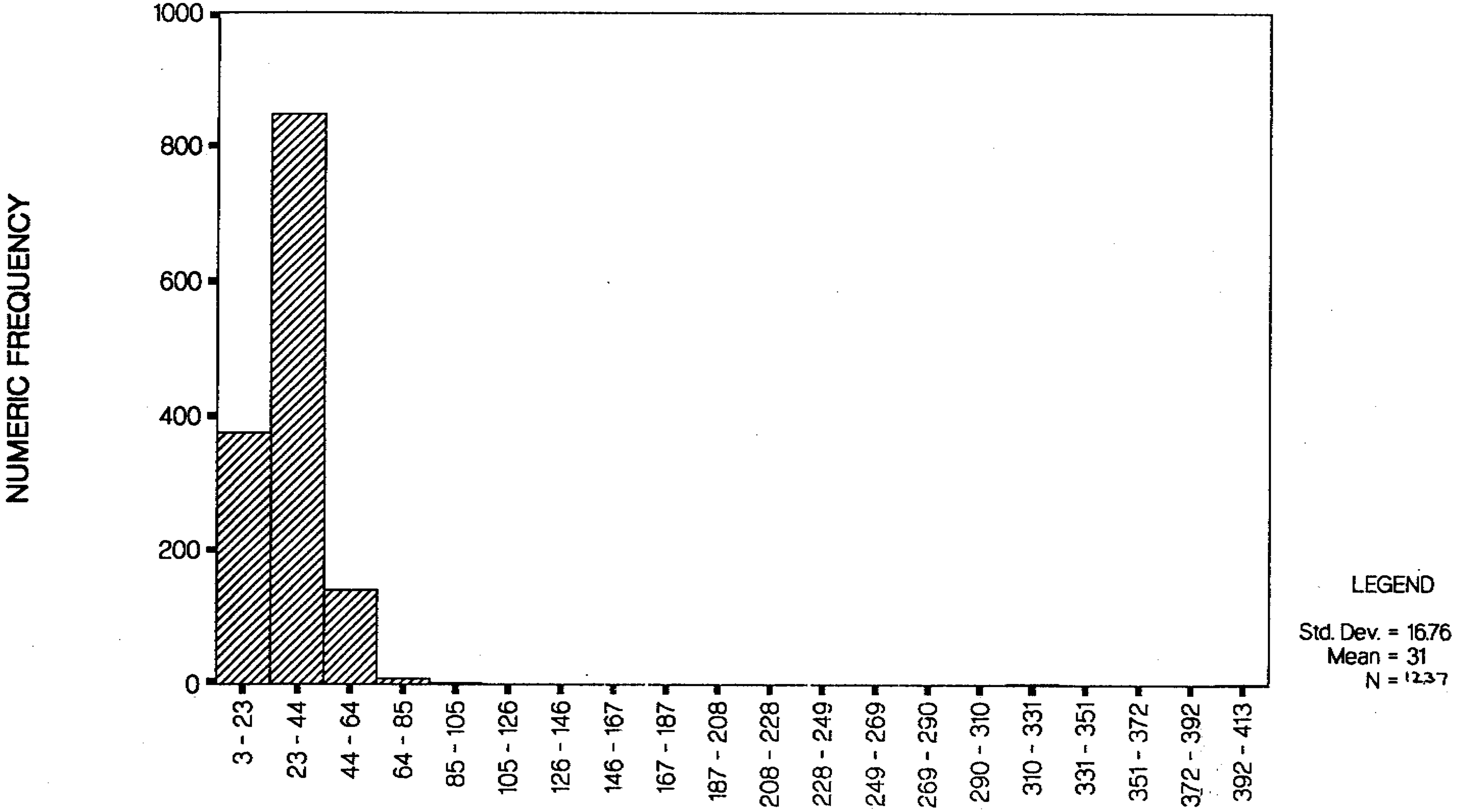
HISTOGRAM OF ASSAY VALUES FOR CU (PPM)



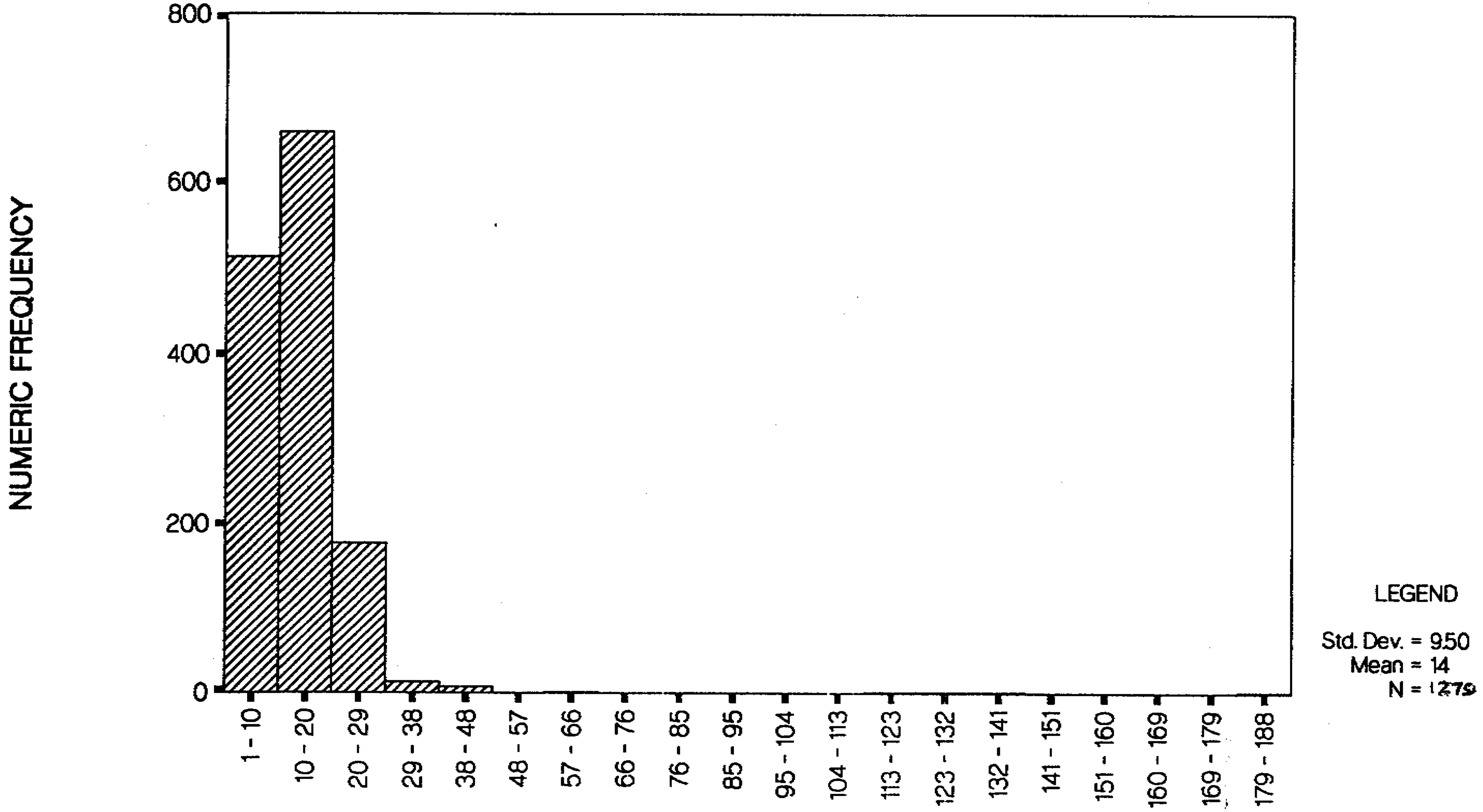
HISTOGRAM OF ASSAY VALUES FOR MO (PPM)



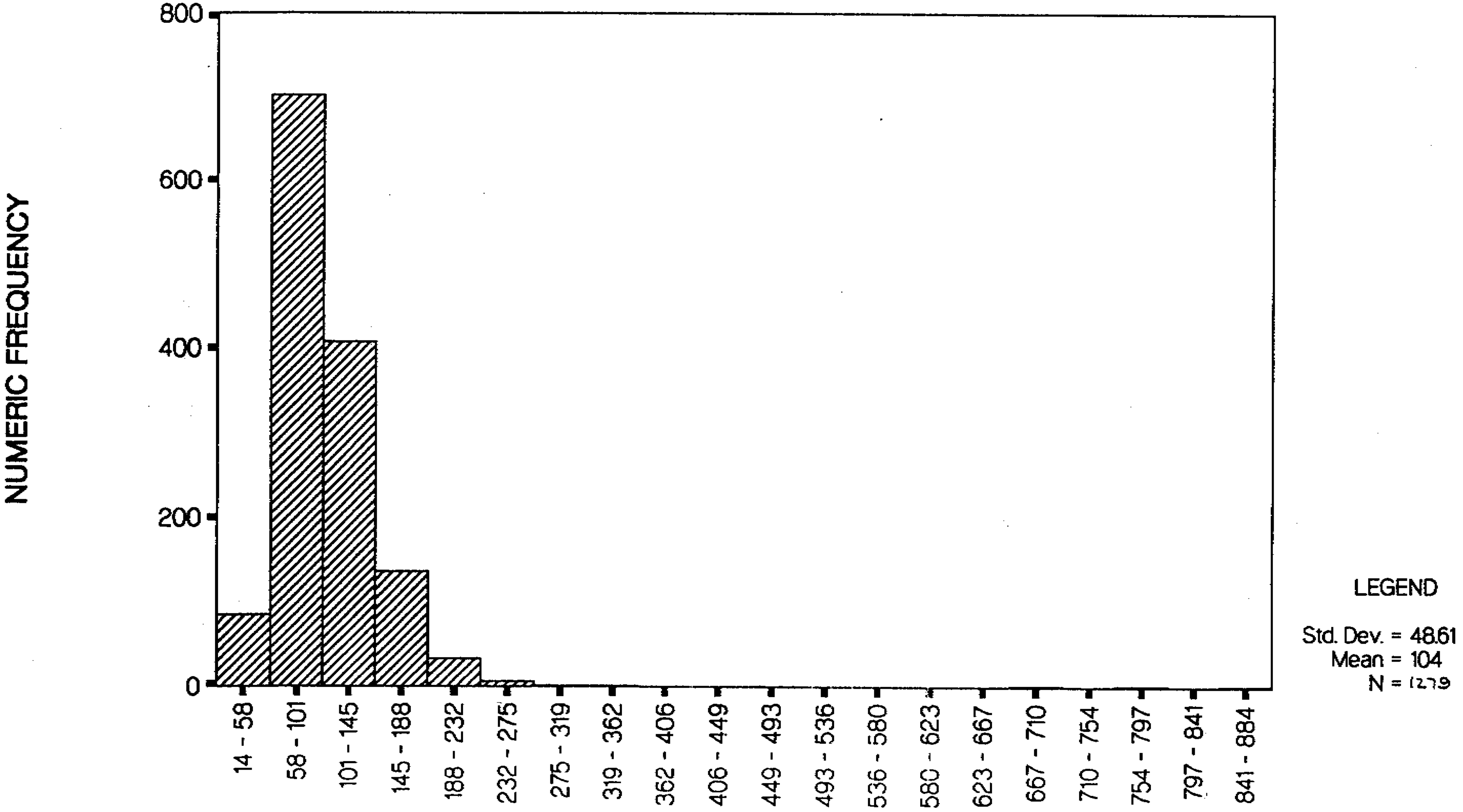
HISTOGRAM OF ASSAY VALUES
FOR NI (PPM)



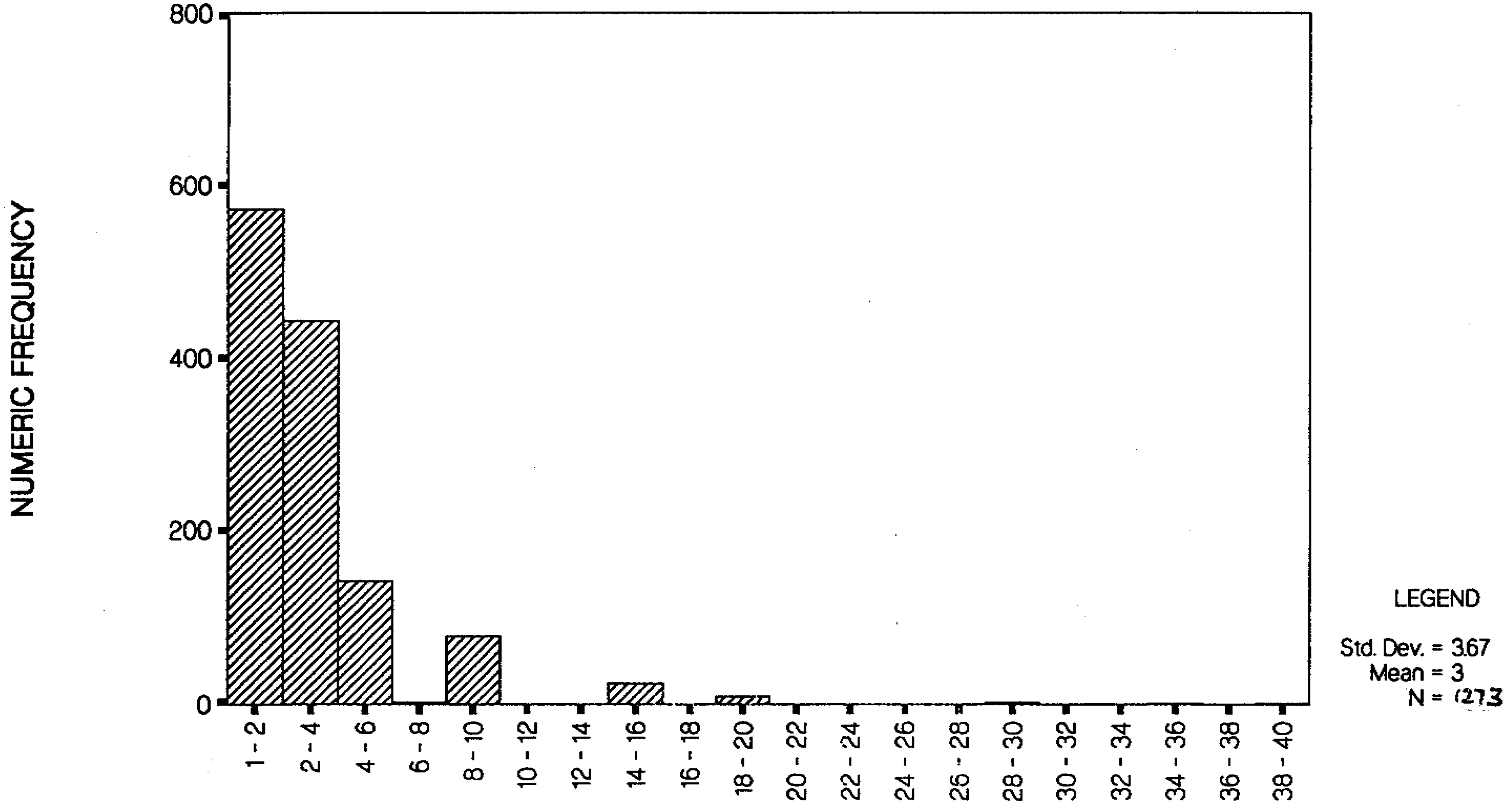
HISTOGRAM OF ASSAY VALUES FOR PB (PPM)



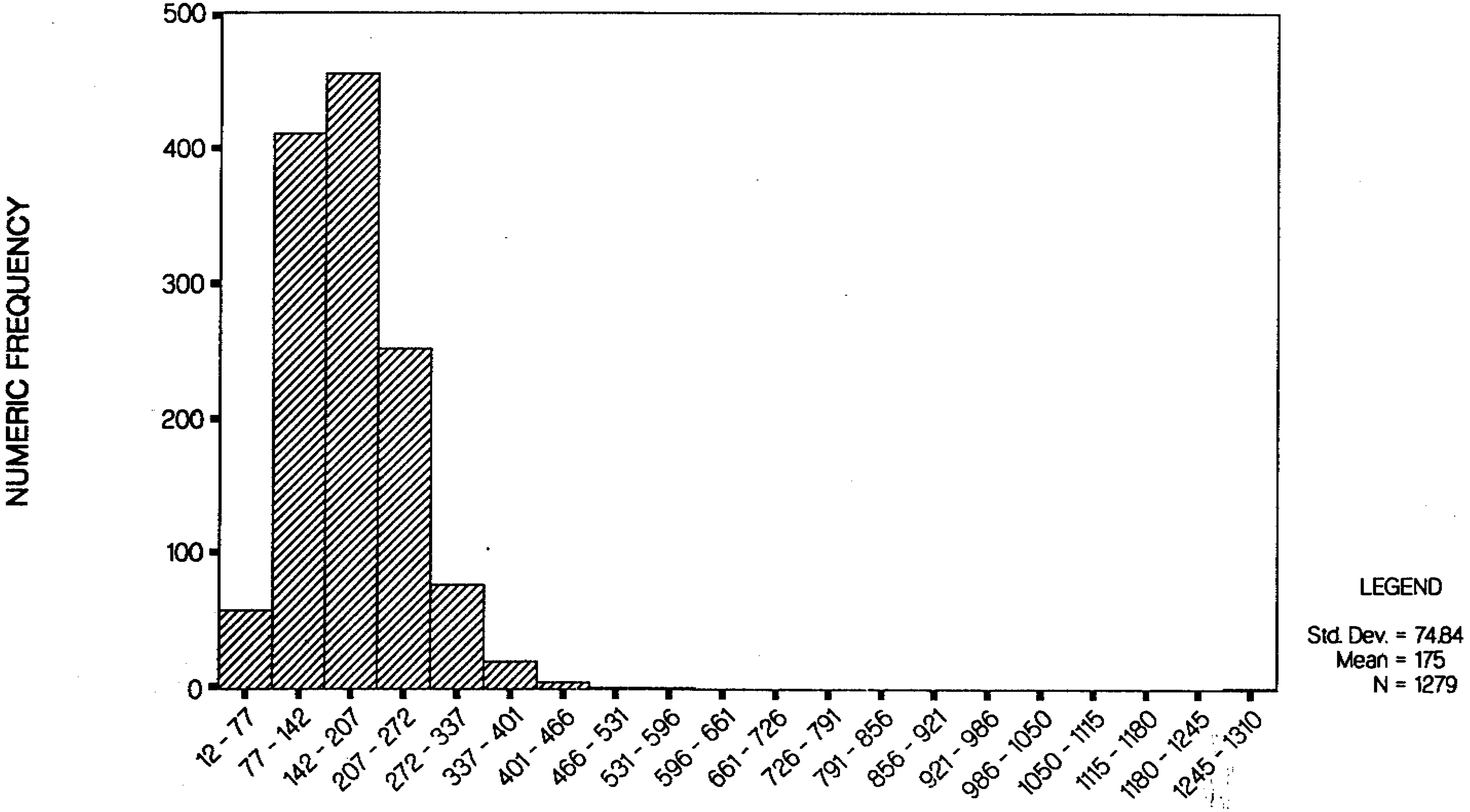
HISTOGRAM OF ASSAY VALUES FOR ZN (PPM)



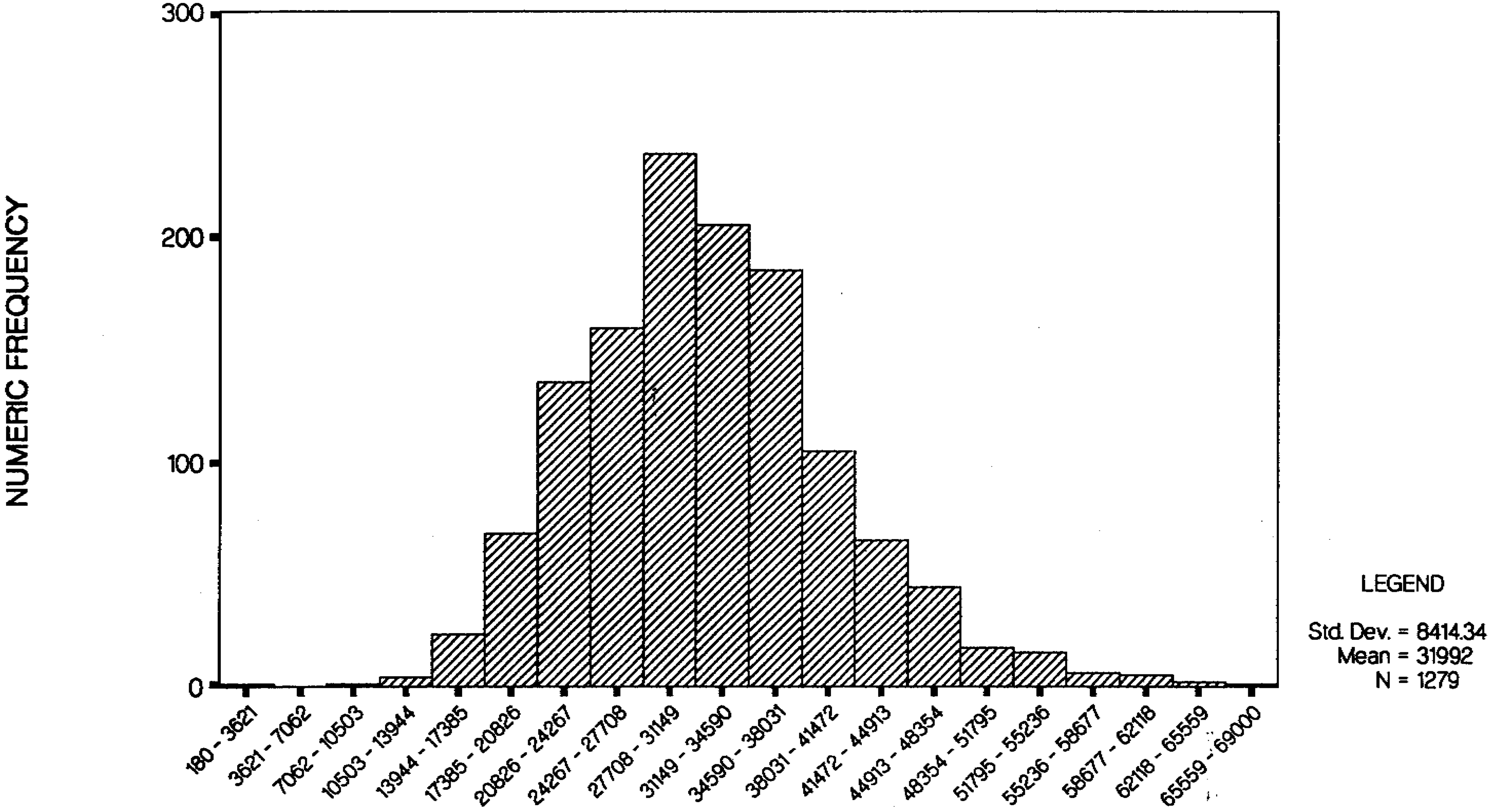
HISTOGRAM OF ASSAY VALUES
FOR AS (PPM)



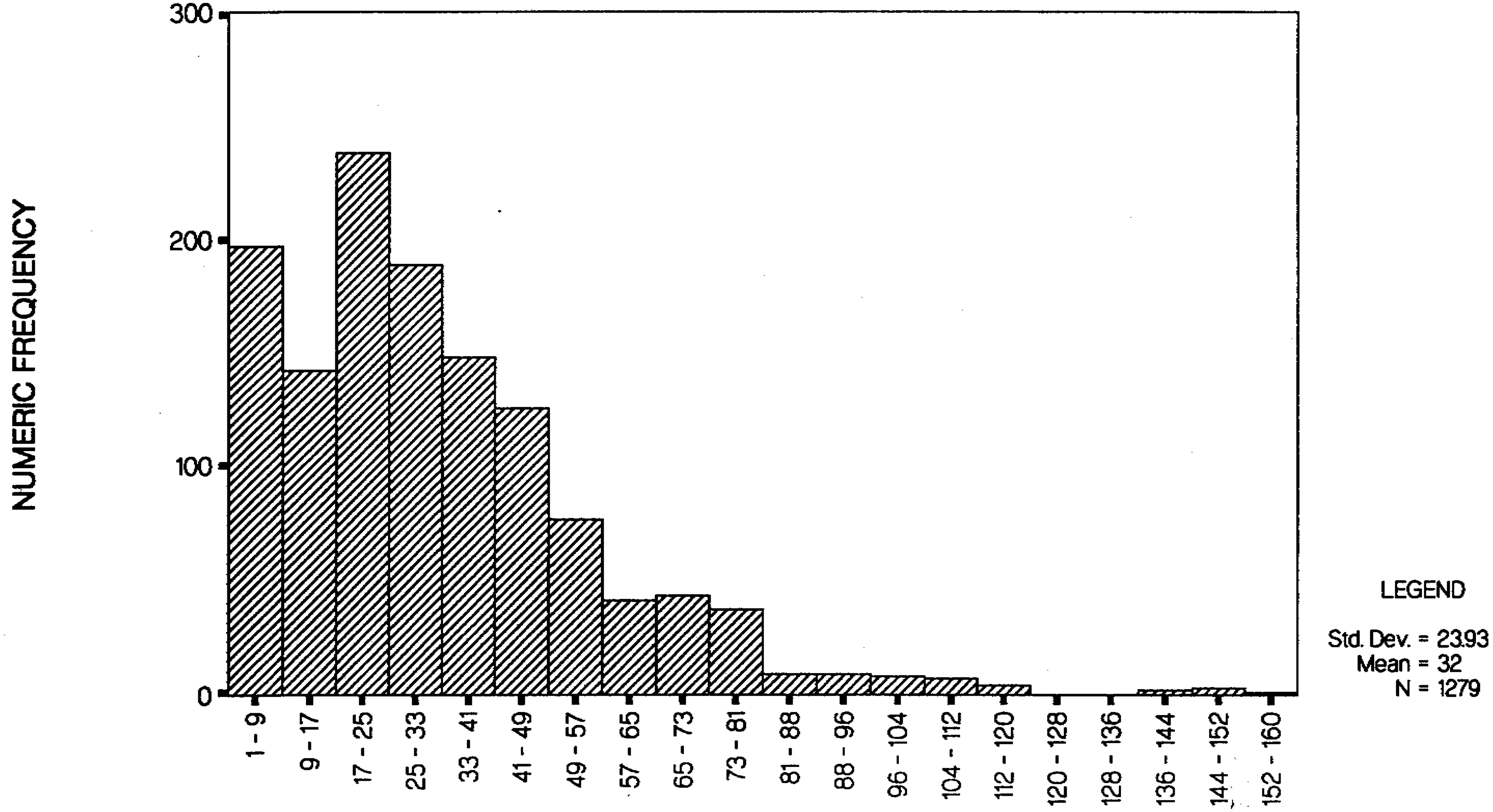
HISTOGRAM OF ASSAY VALUES
FOR BA (PPM)

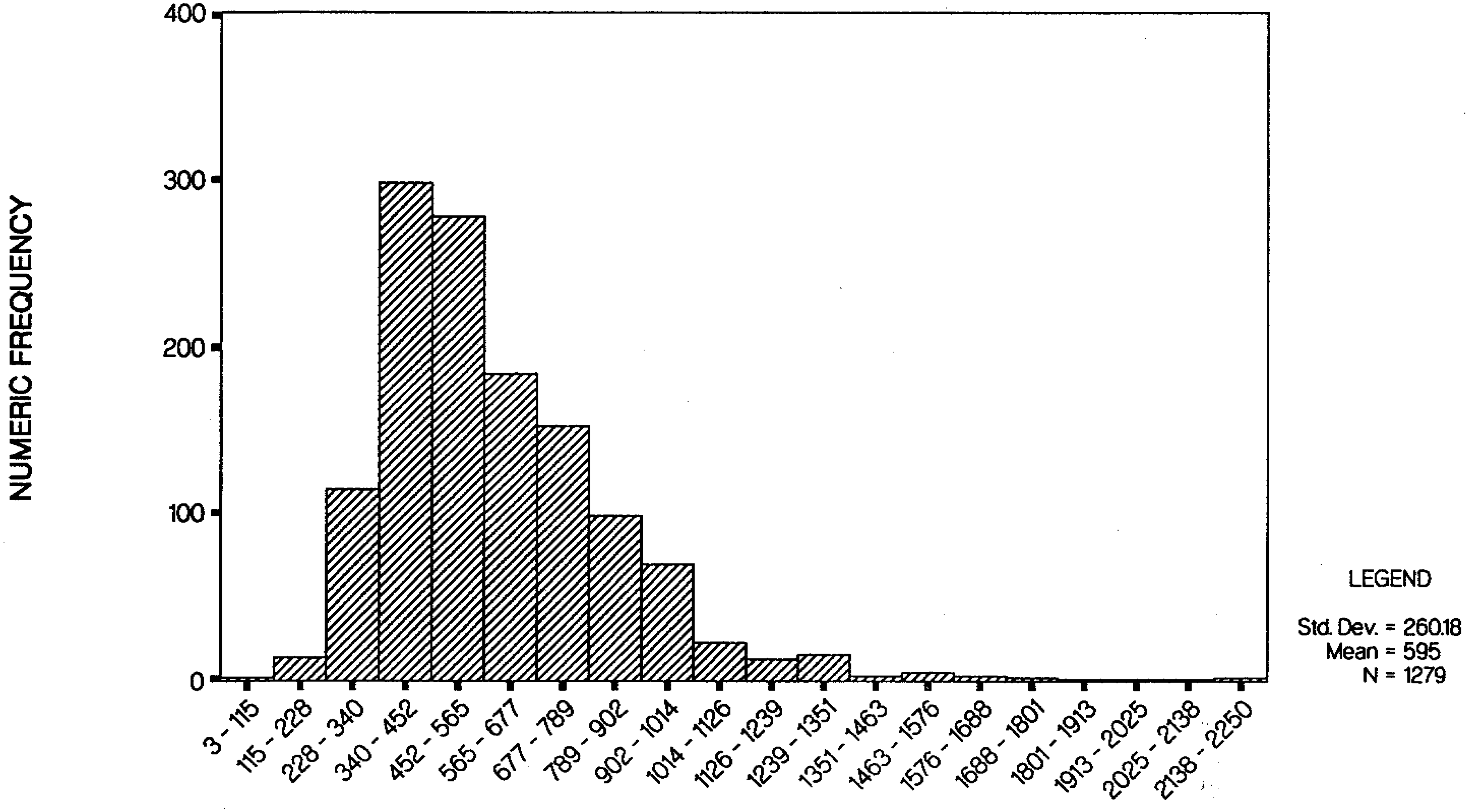


HISTOGRAM OF ASSAY VALUES
FOR FE (PPM)



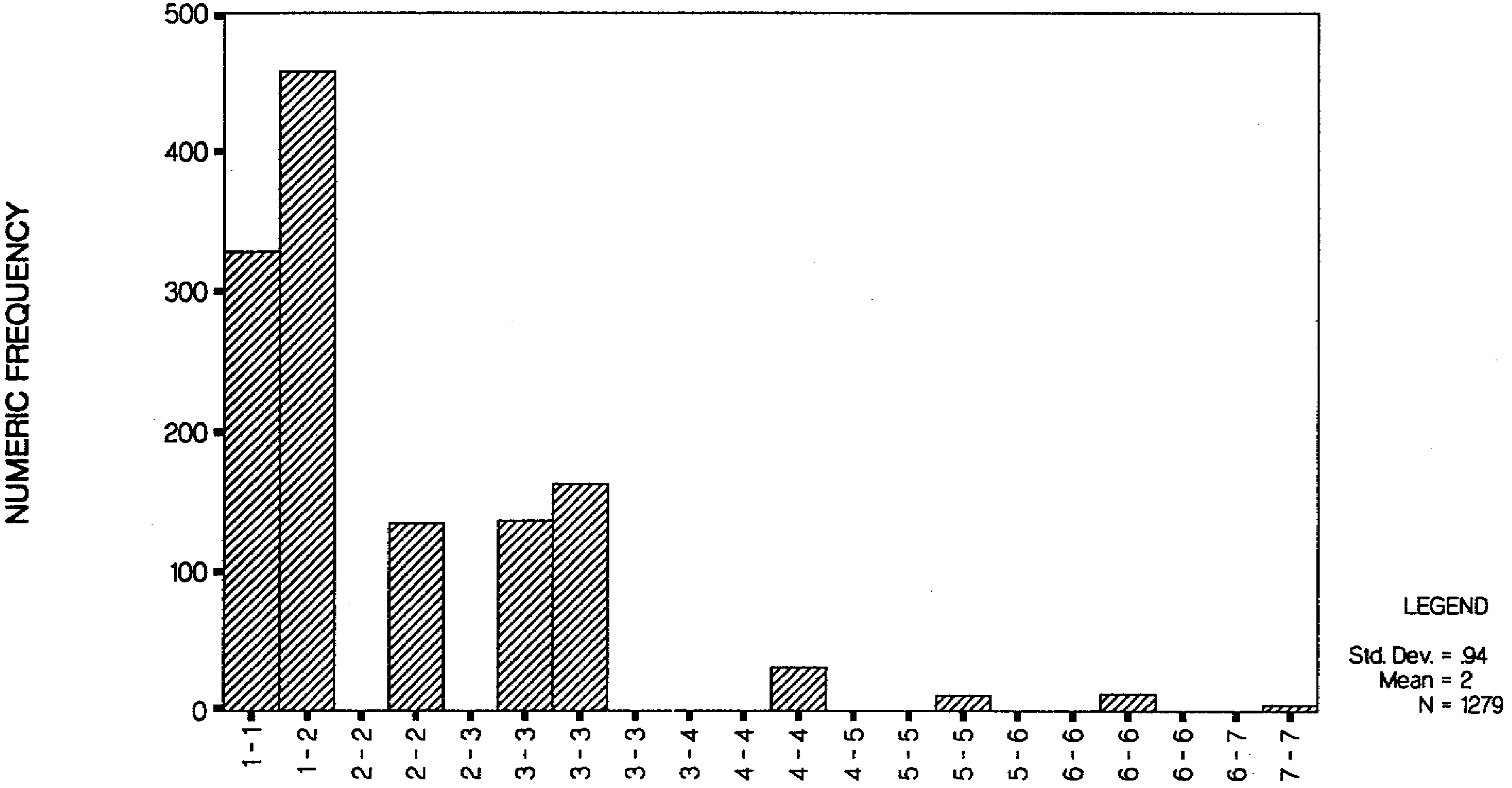
HISTOGRAM OF ASSAY VALUES FOR LA (PPM)



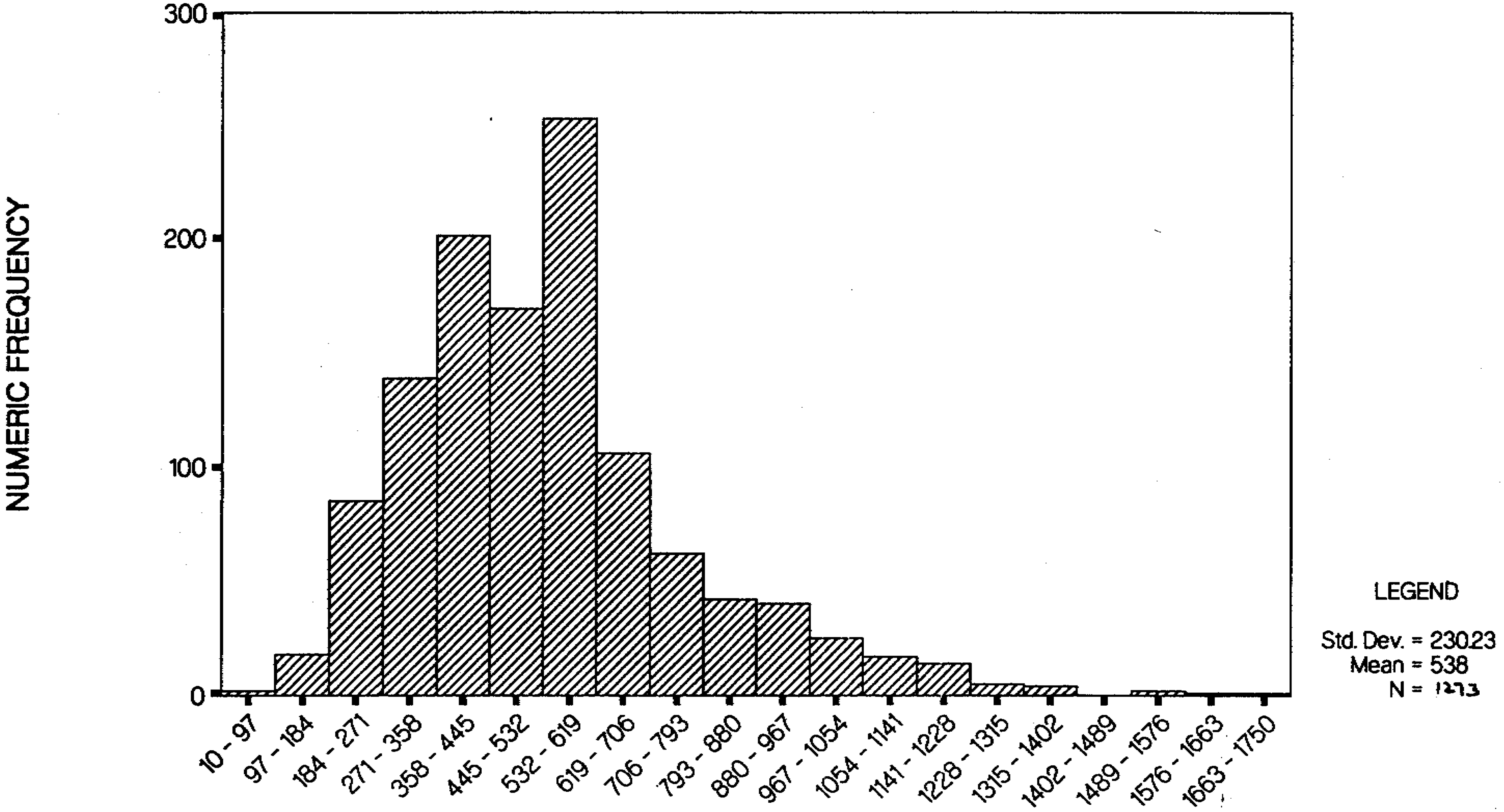


HISTOGRAM OF ASSAY VALUES
FOR MN (PPM)

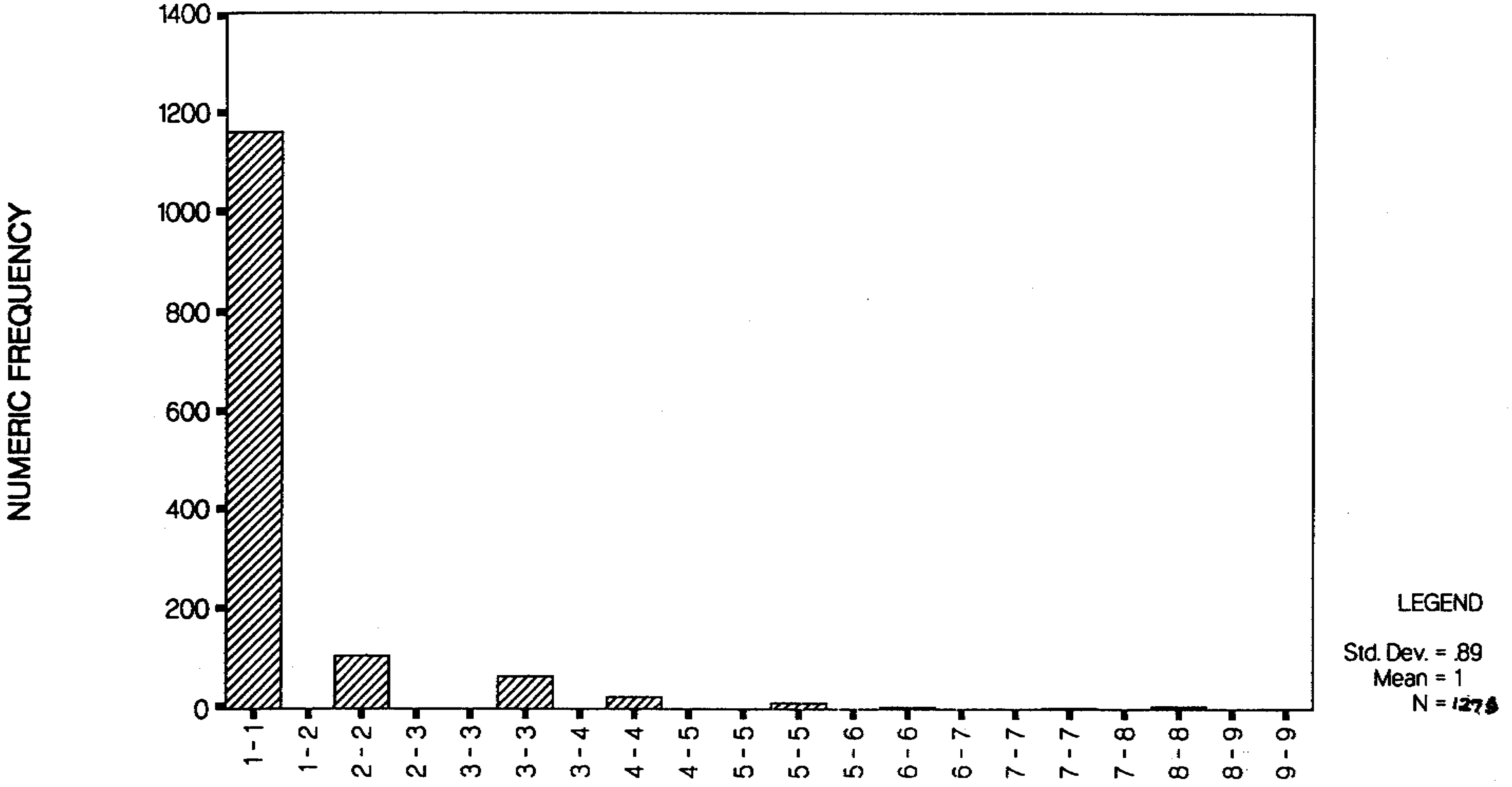
HISTOGRAM OF ASSAY VALUES FOR NB (PPM)



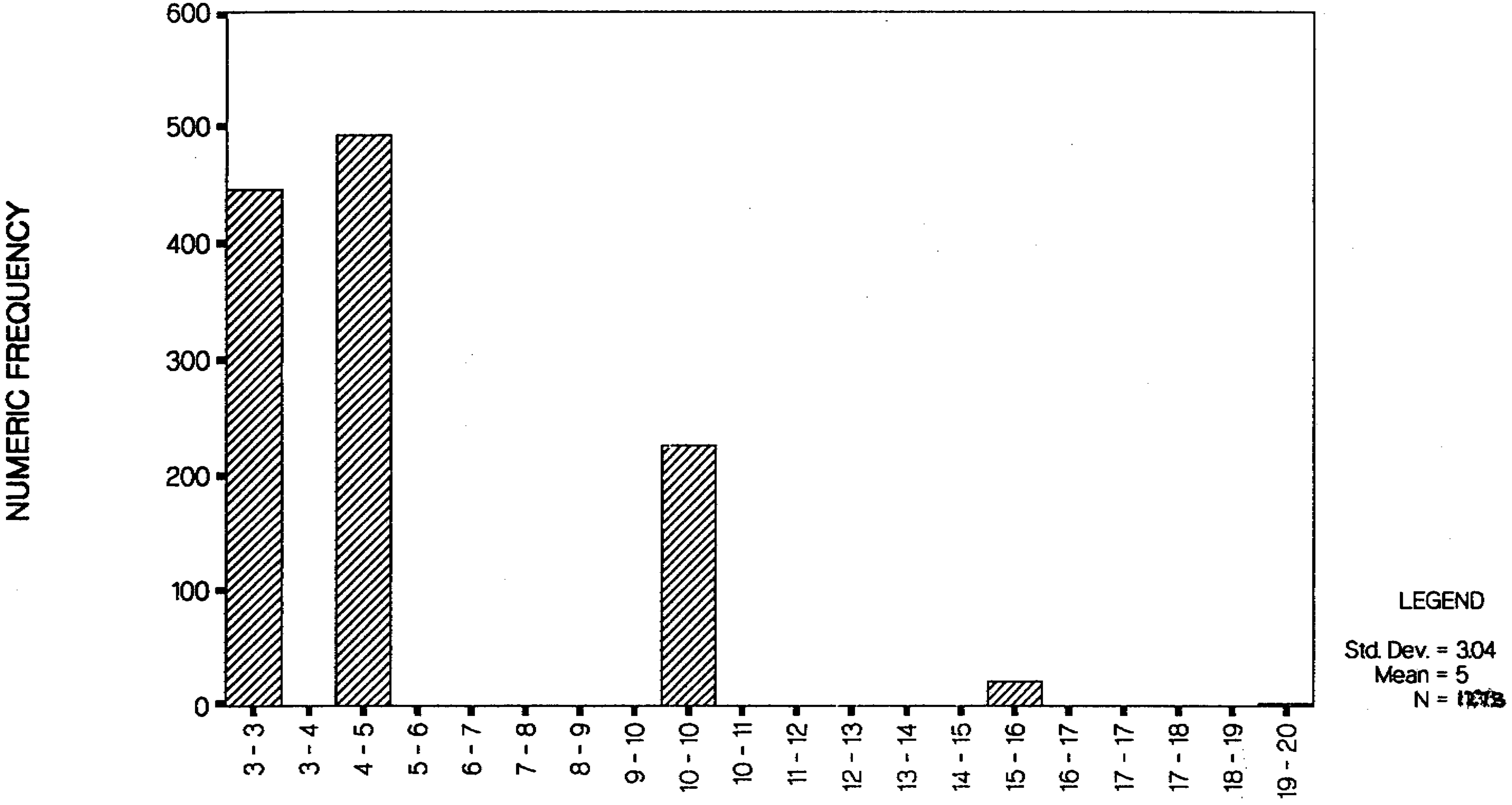
HISTOGRAM OF ASSAY VALUES
FOR P (PPM)



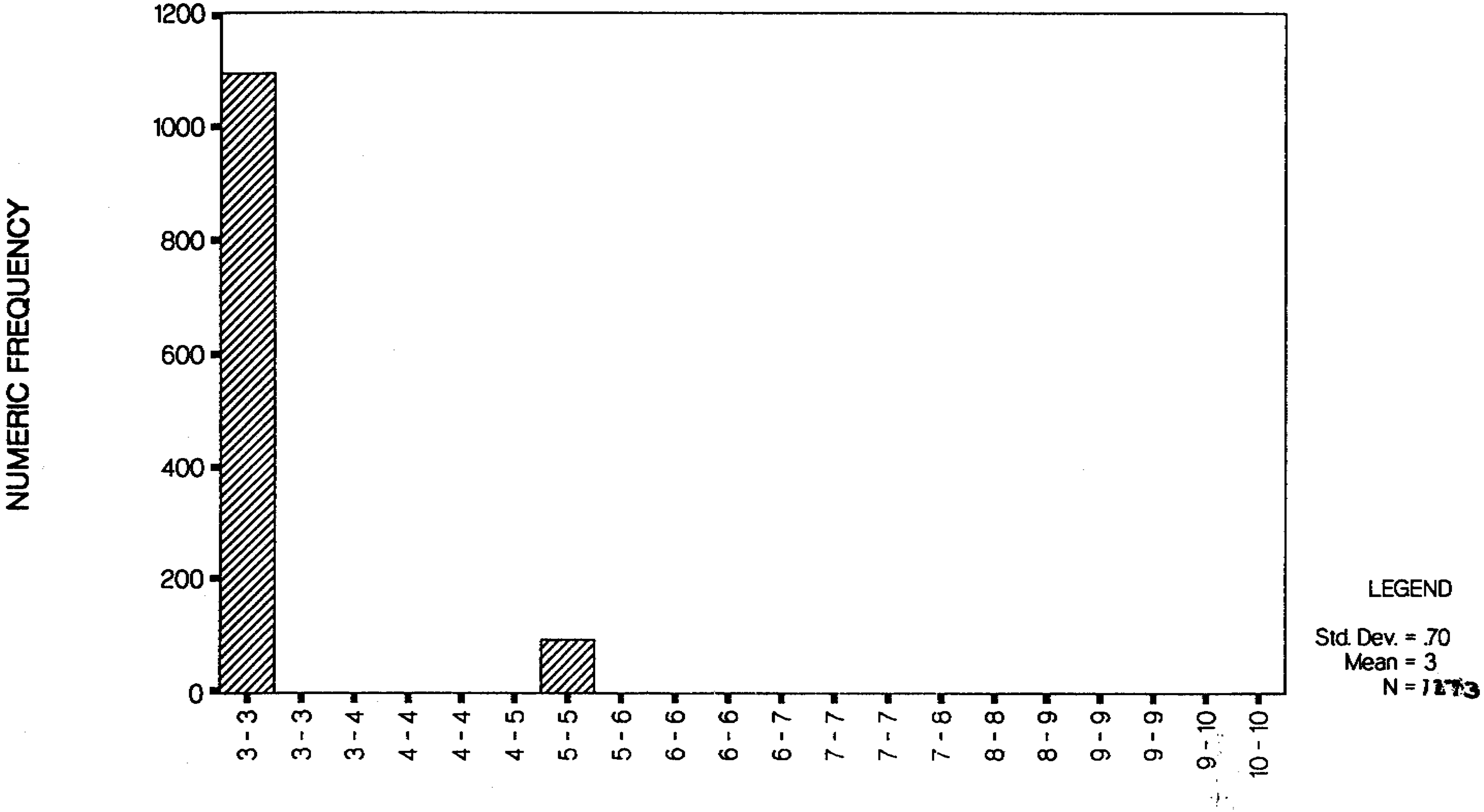
HISTOGRAM OF ASSAY VALUES
FOR BI (PPM)



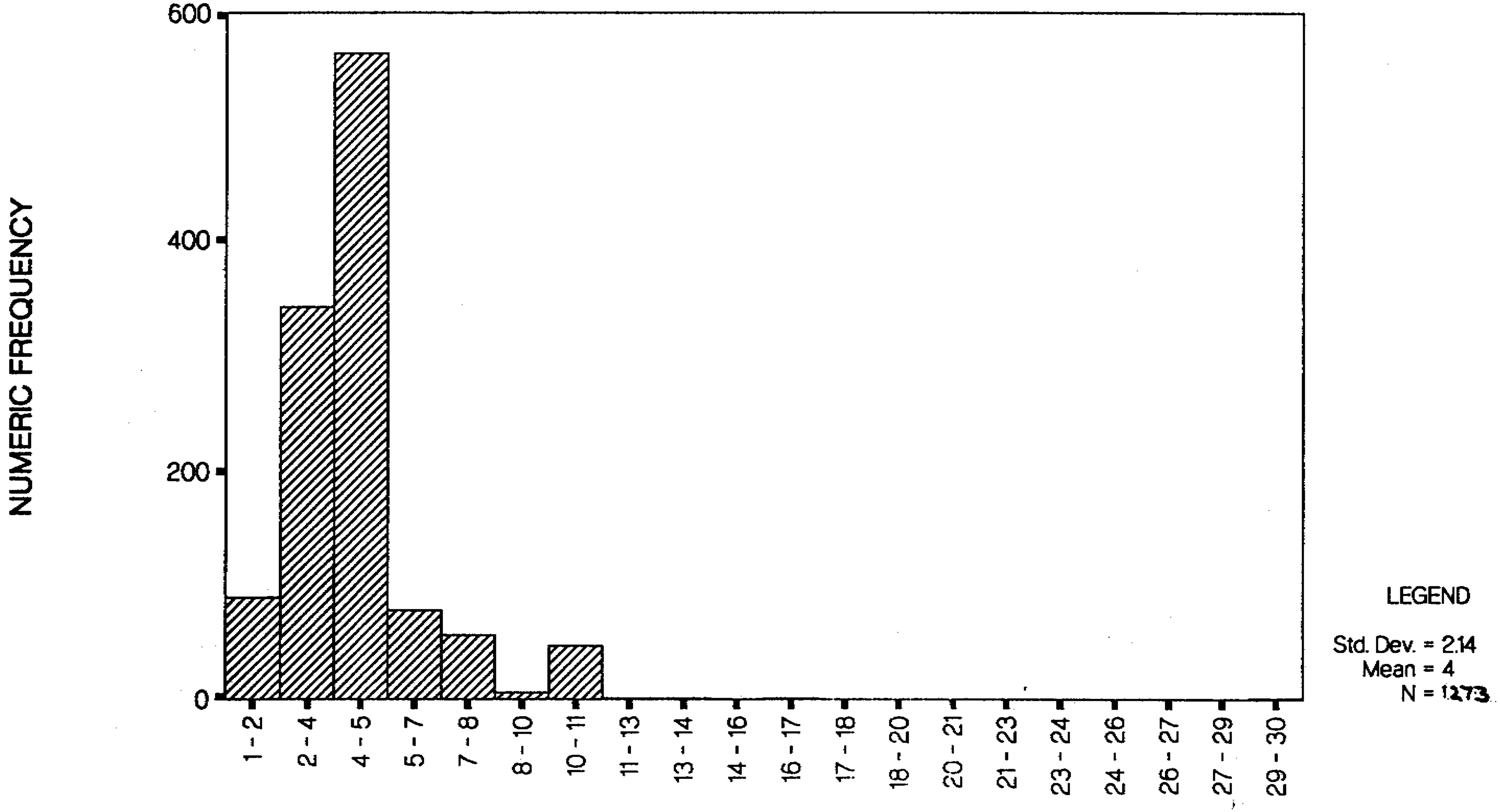
HISTOGRAM OF ASSAY VALUES
FOR SN (PPM)



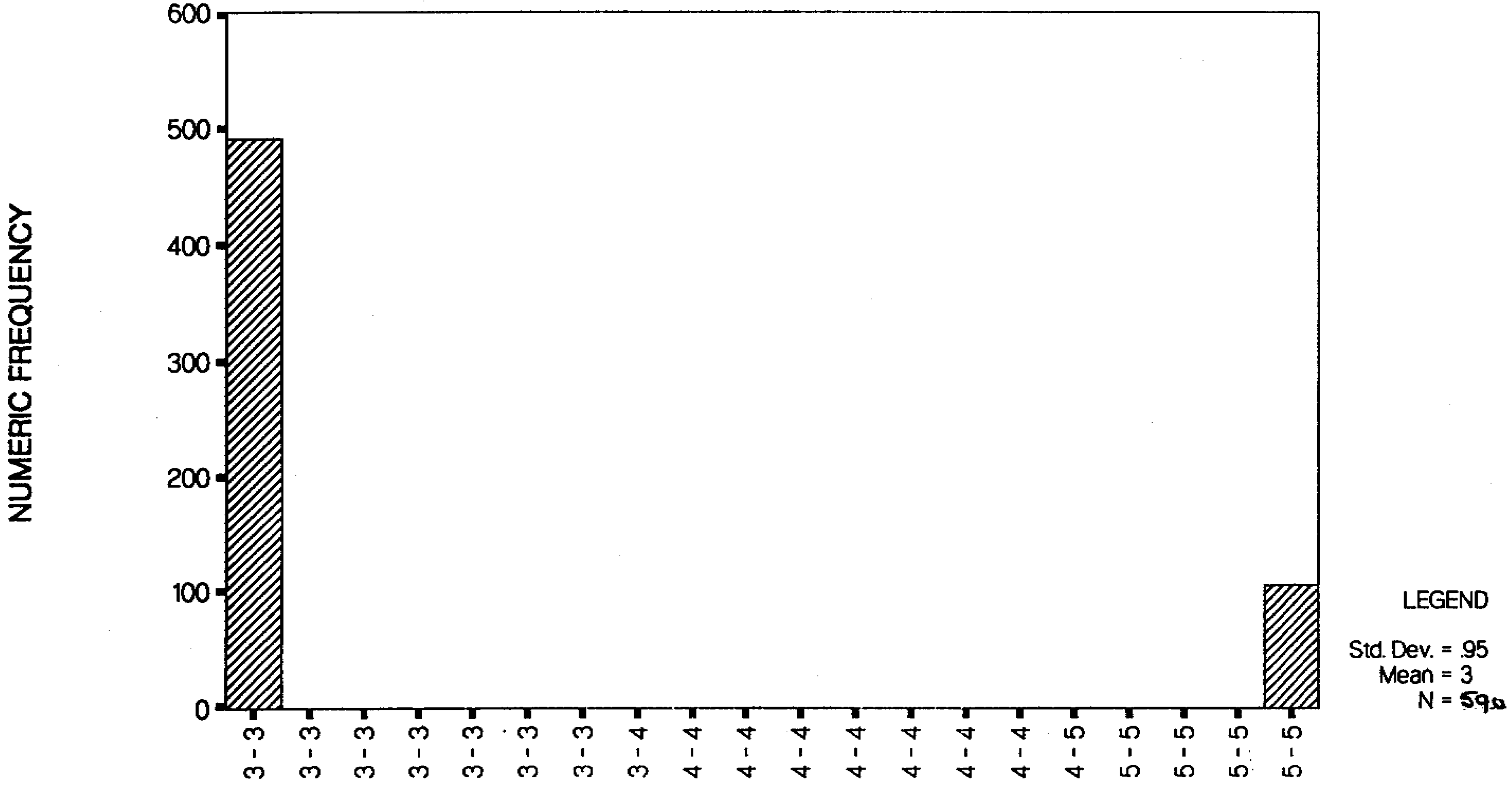
HISTOGRAM OF ASSAY VALUES FOR W (PPM)



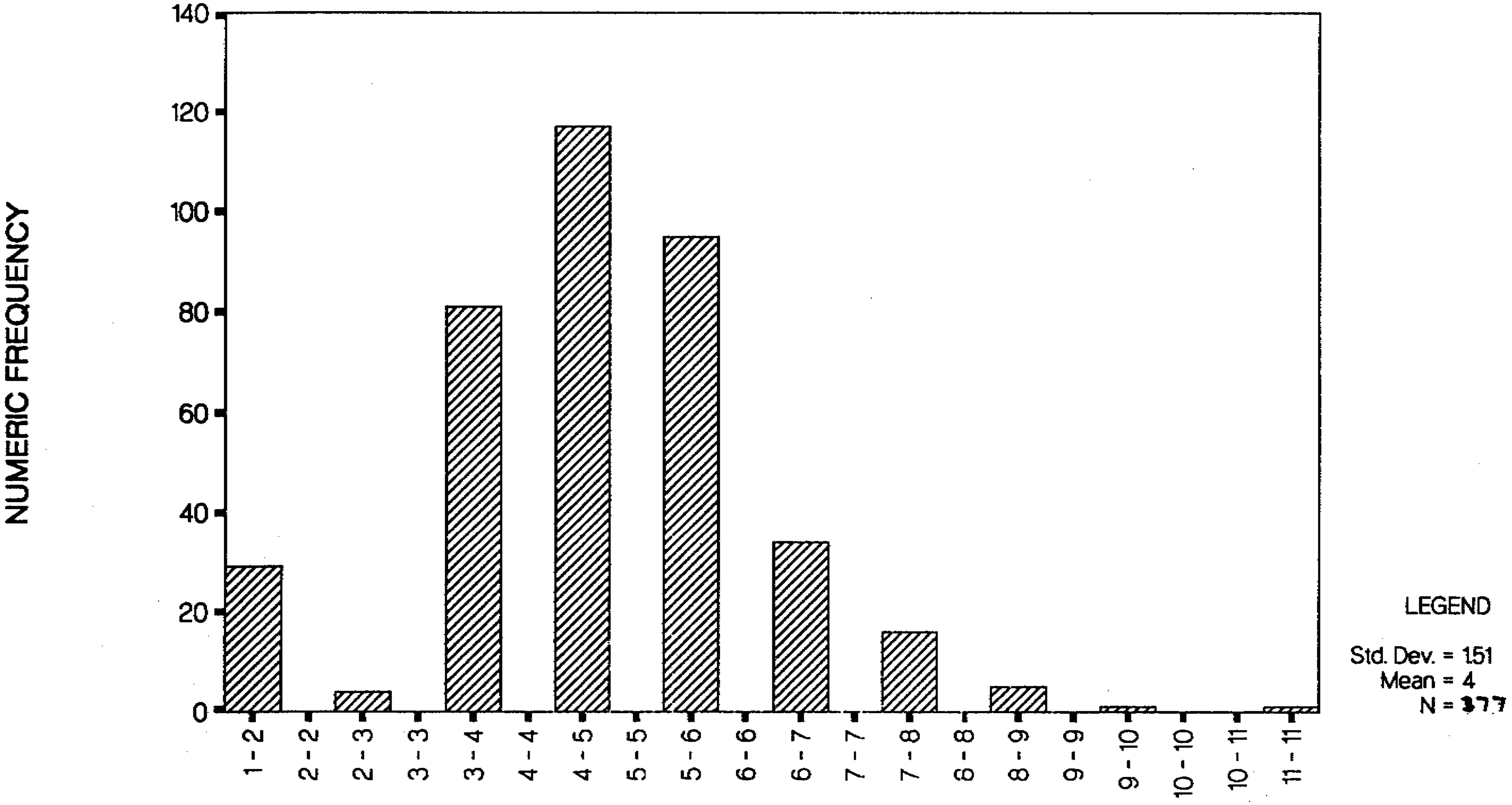
HISTOGRAM OF ASSAY VALUES
FOR SB (PPM)



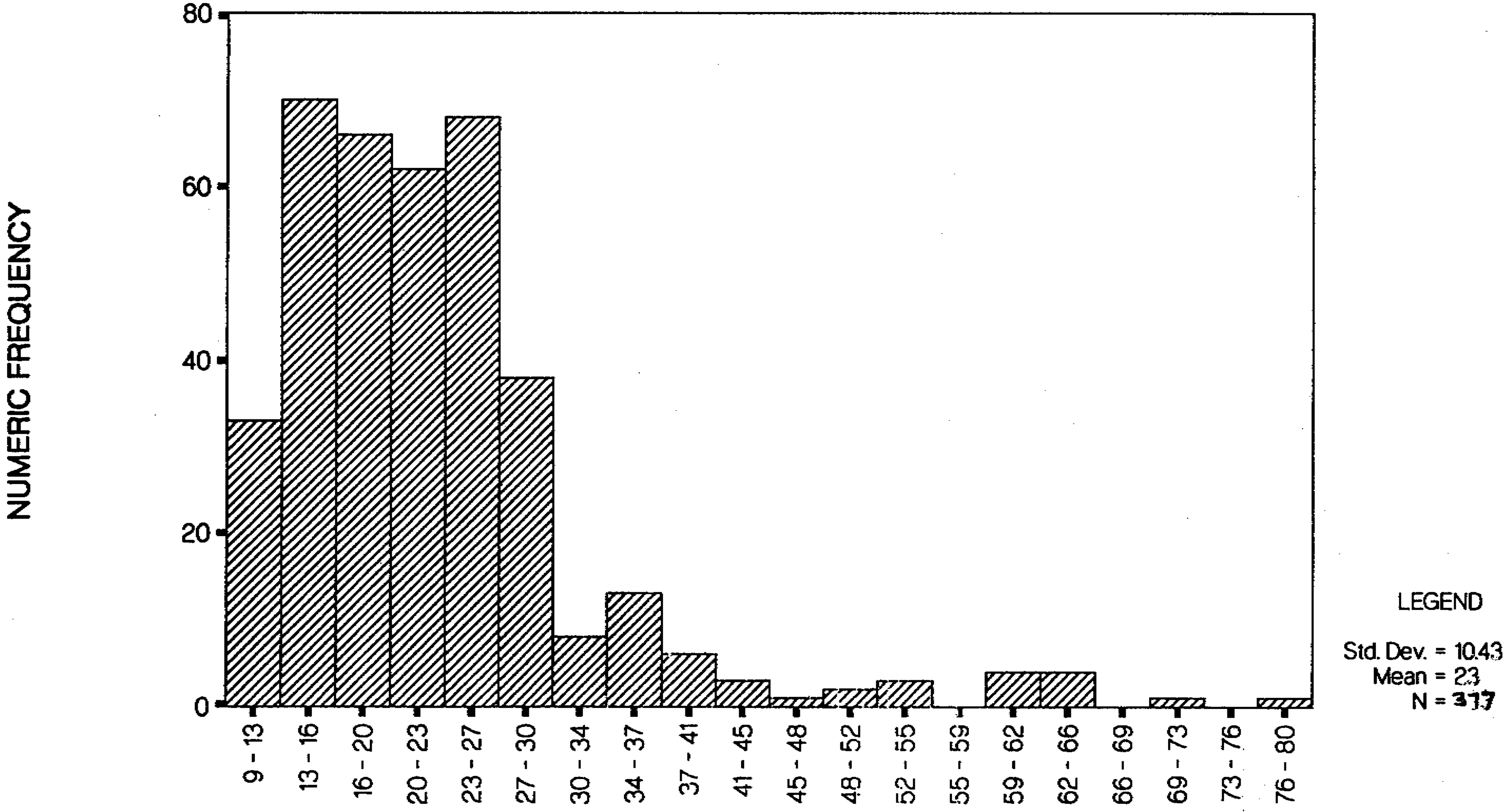
HISTOGRAM OF ASSAY VALUES FOR TA (PPM)



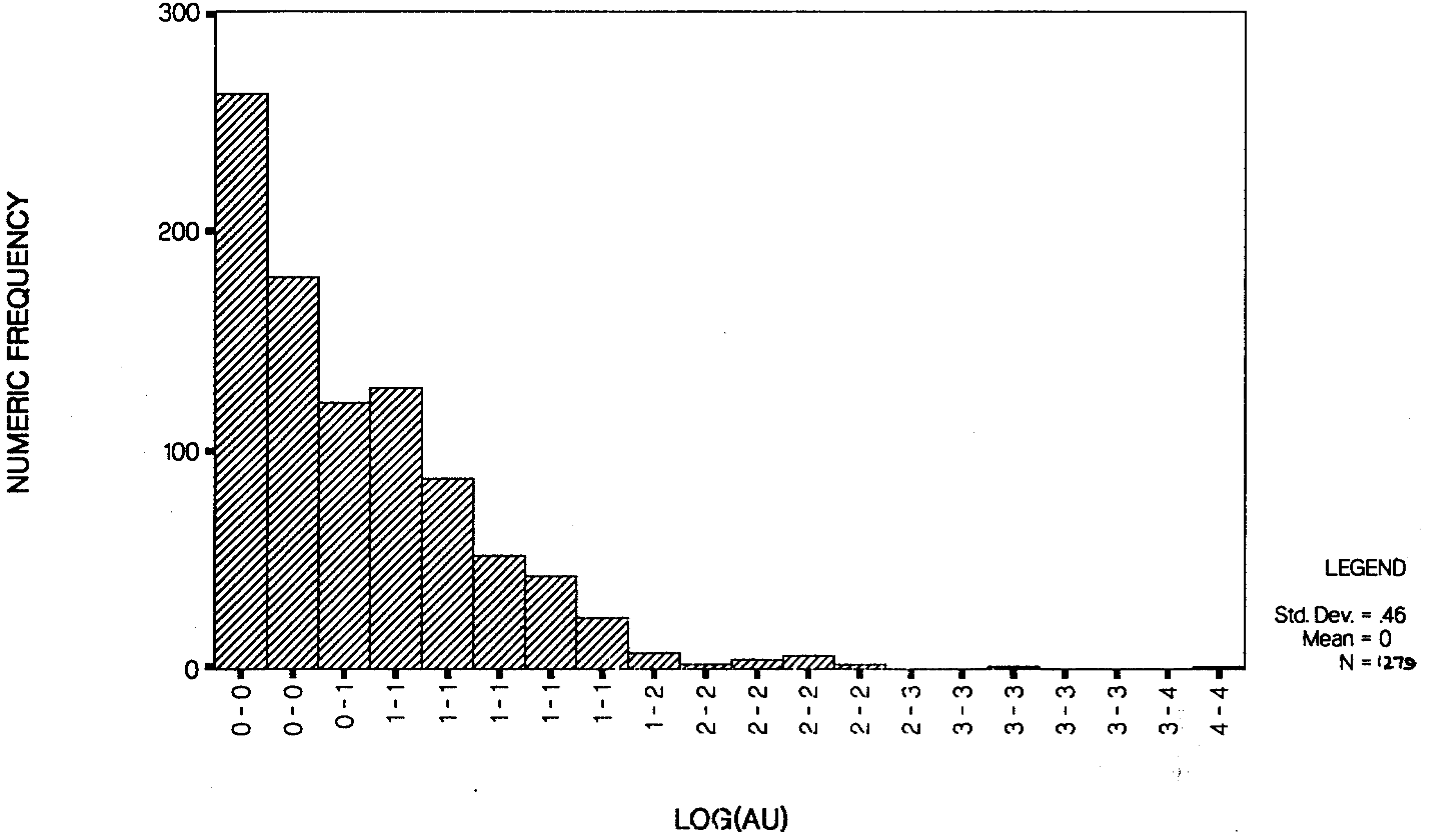
HISTOGRAM OF ASSAY VALUES
FOR ZR (PPM)



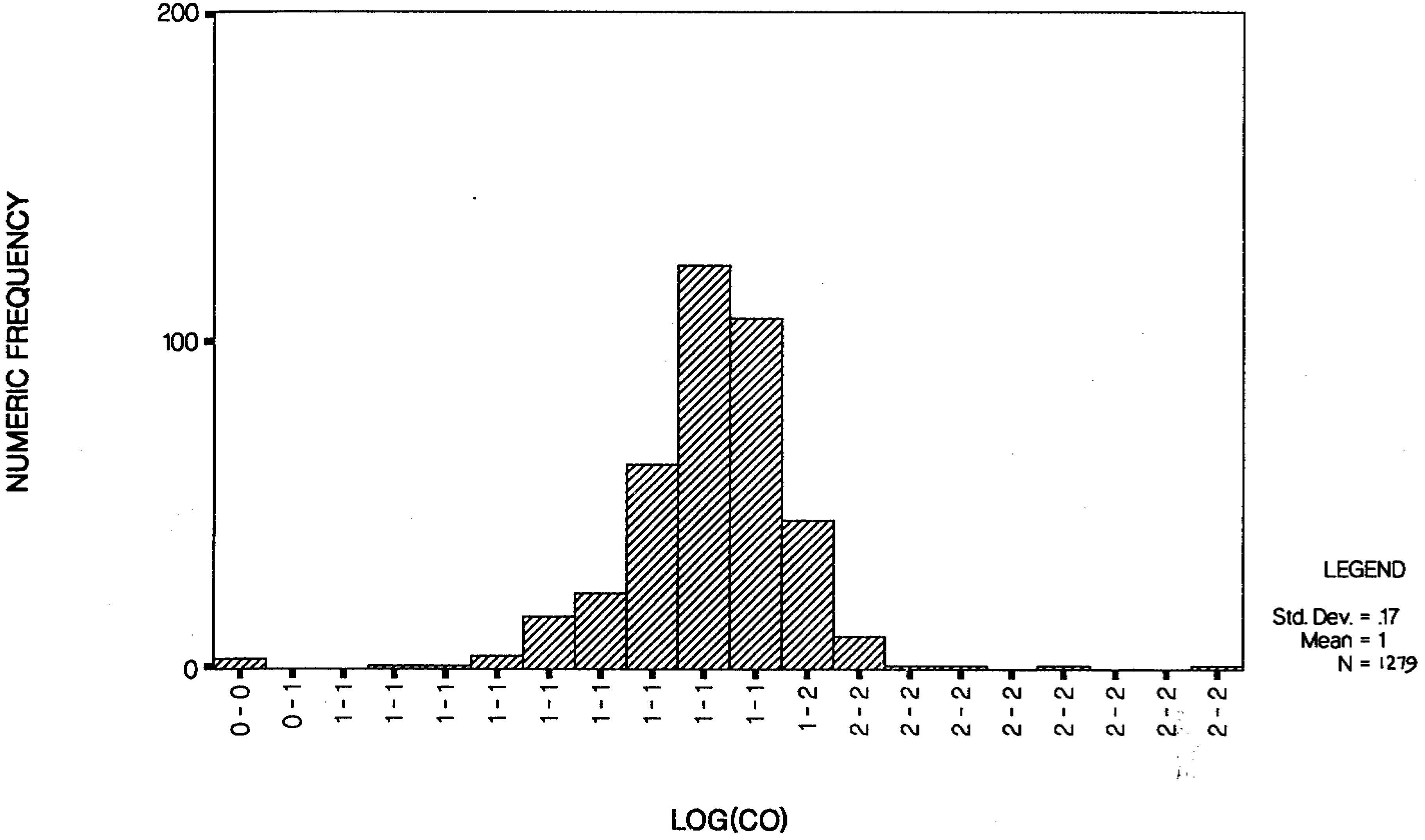
HISTOGRAM OF ASSAY VALUES FOR Y (PPM)



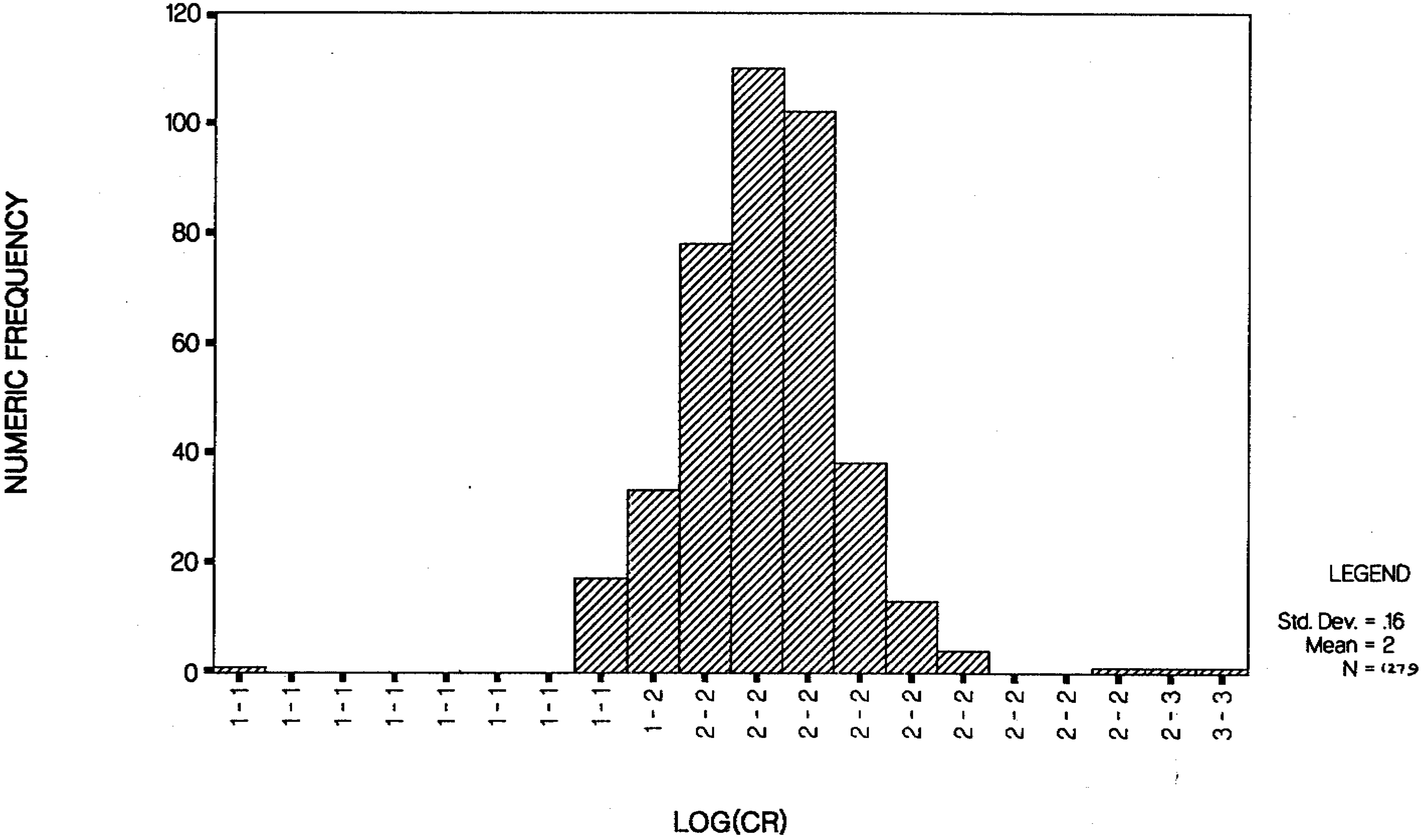
HISTOGRAM OF ASSAY VALUES FOR LAU (PPB)



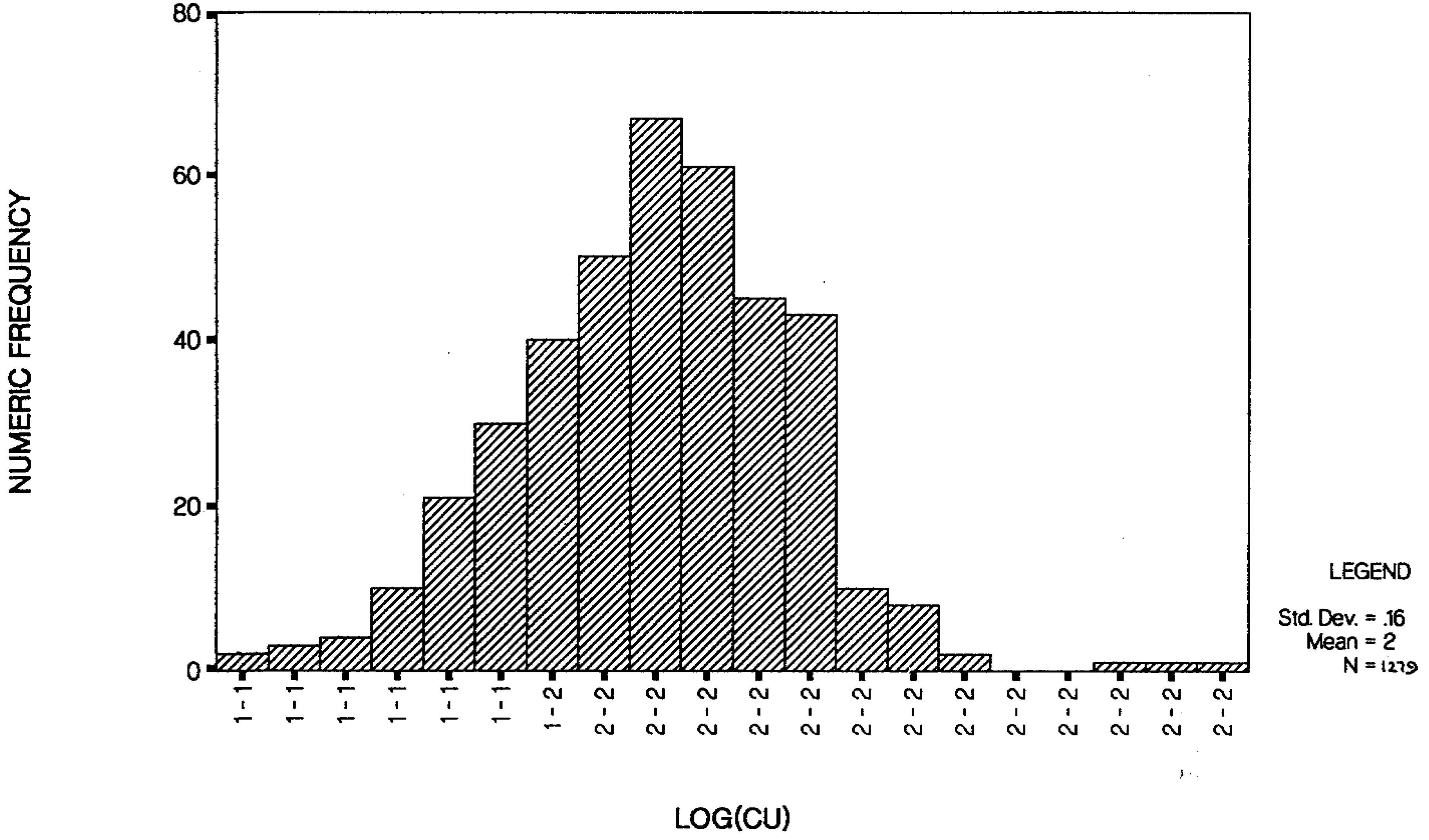
HISTOGRAM OF ASSAY VALUES
FOR LCO (PPM)



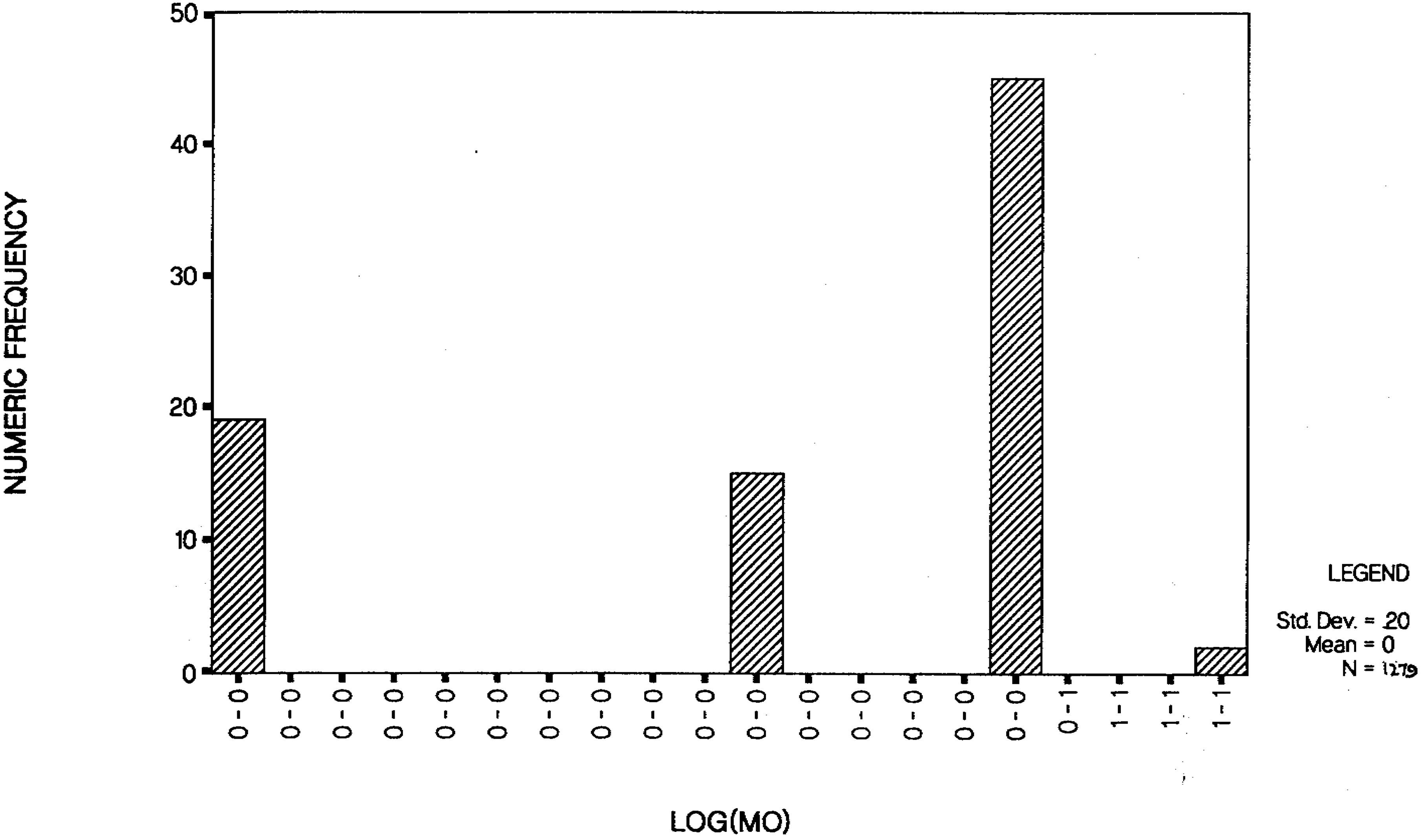
HISTOGRAM OF ASSAY VALUES
FOR LCR (PPM)



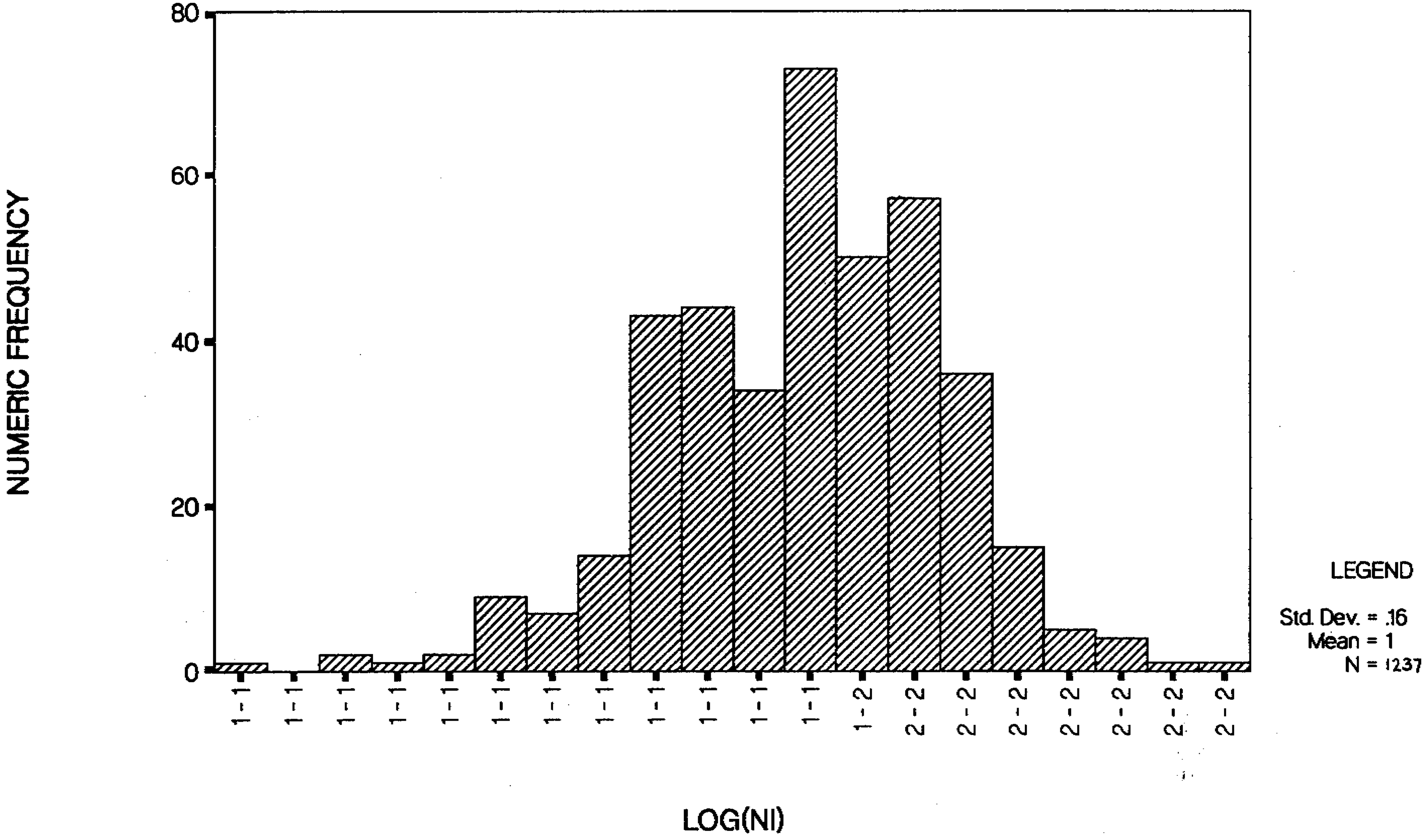
HISTOGRAM OF ASSAY VALUES FOR LCU (PPM)



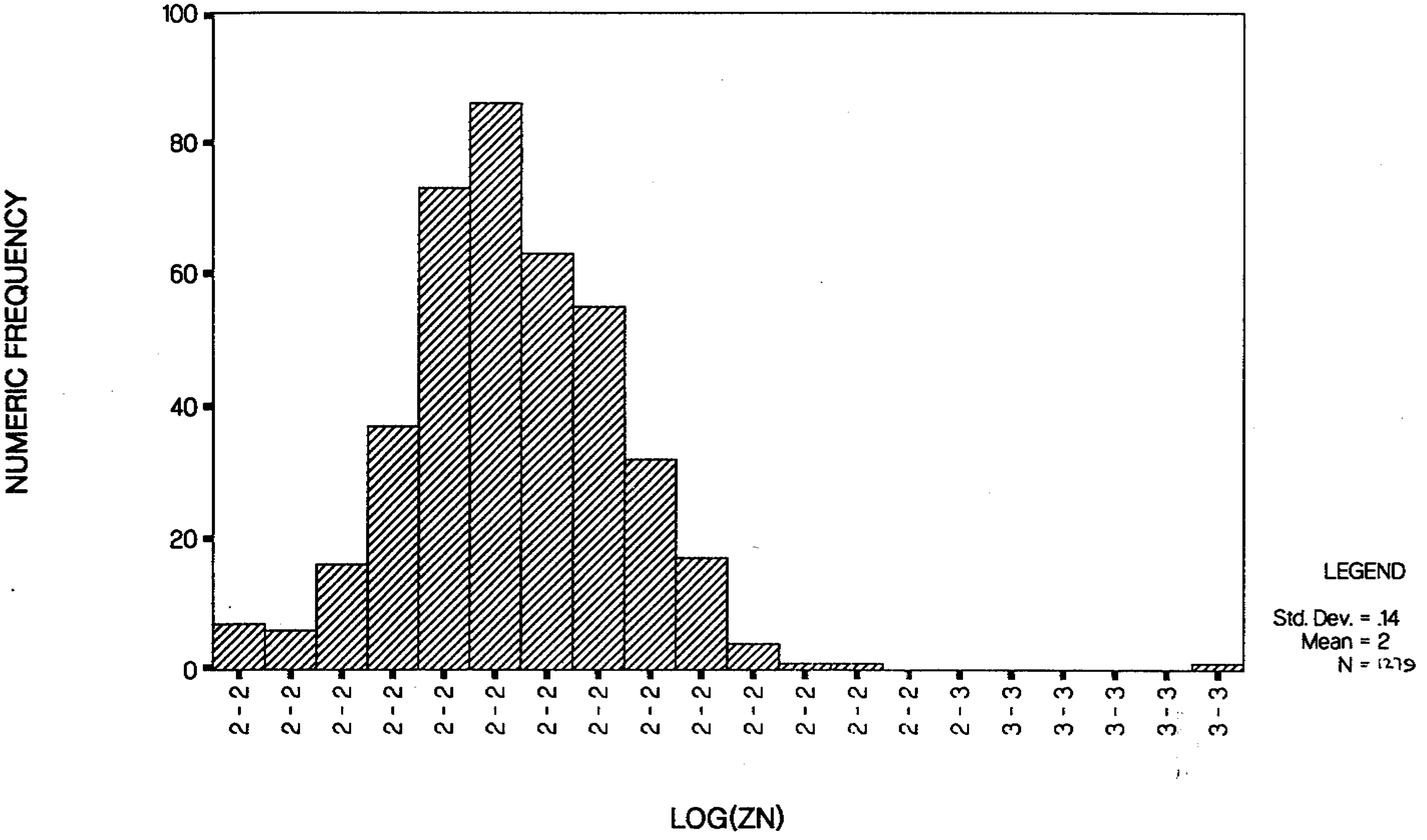
HISTOGRAM OF ASSAY VALUES
FOR LMO (PPM)



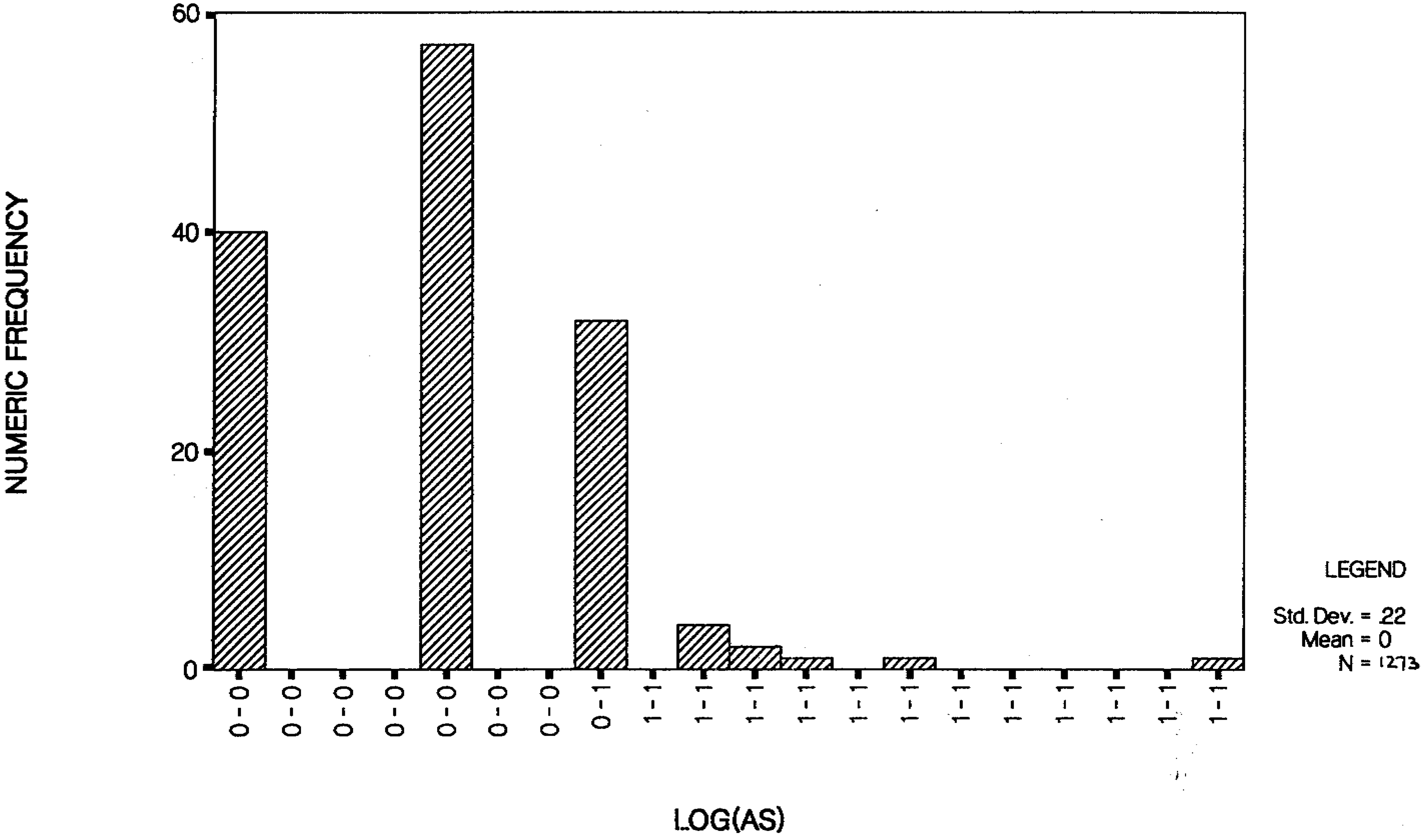
HISTOGRAM OF ASSAY VALUES FOR LNI (PPM)



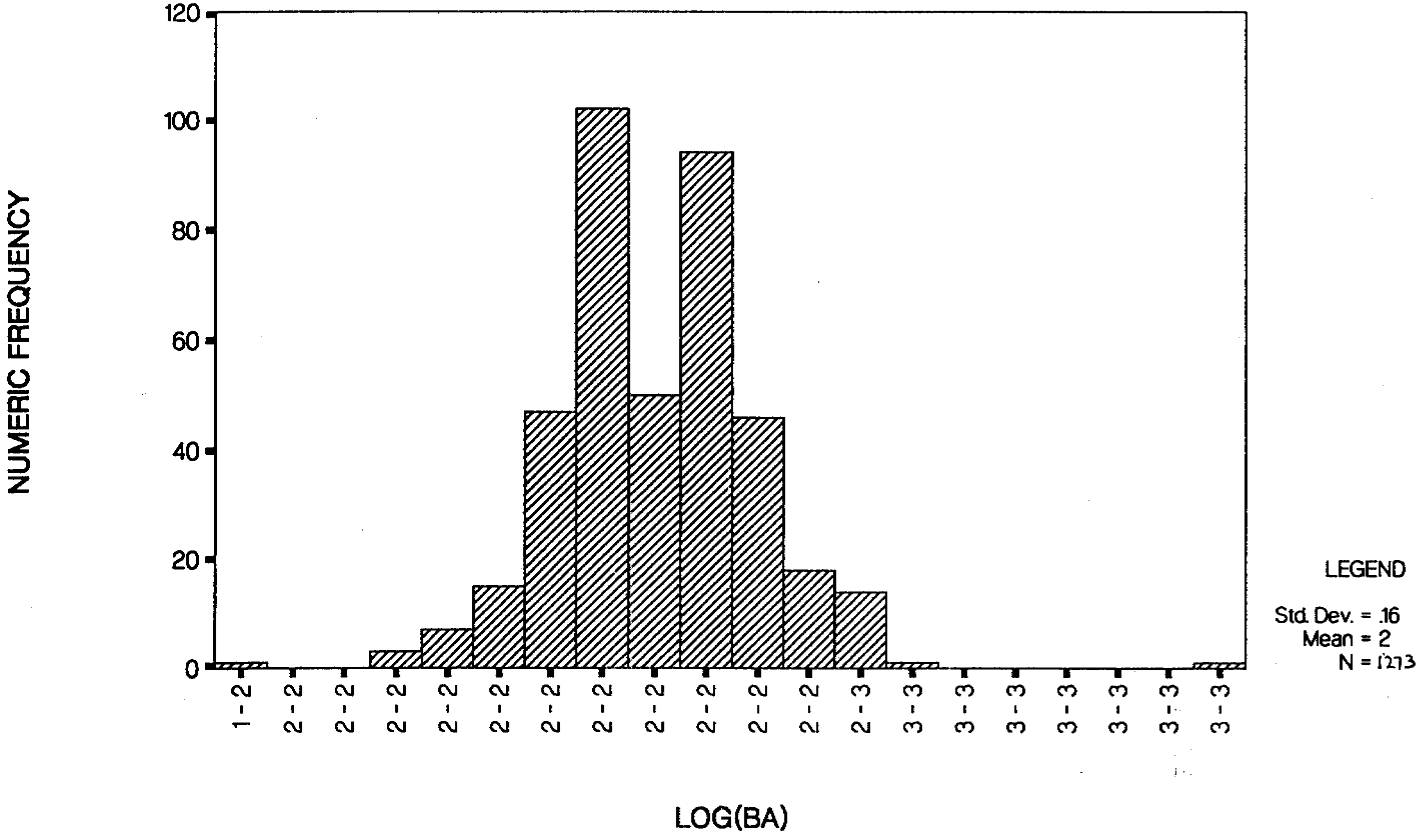
HISTOGRAM OF ASSAY VALUES
FOR LZN (PPM)



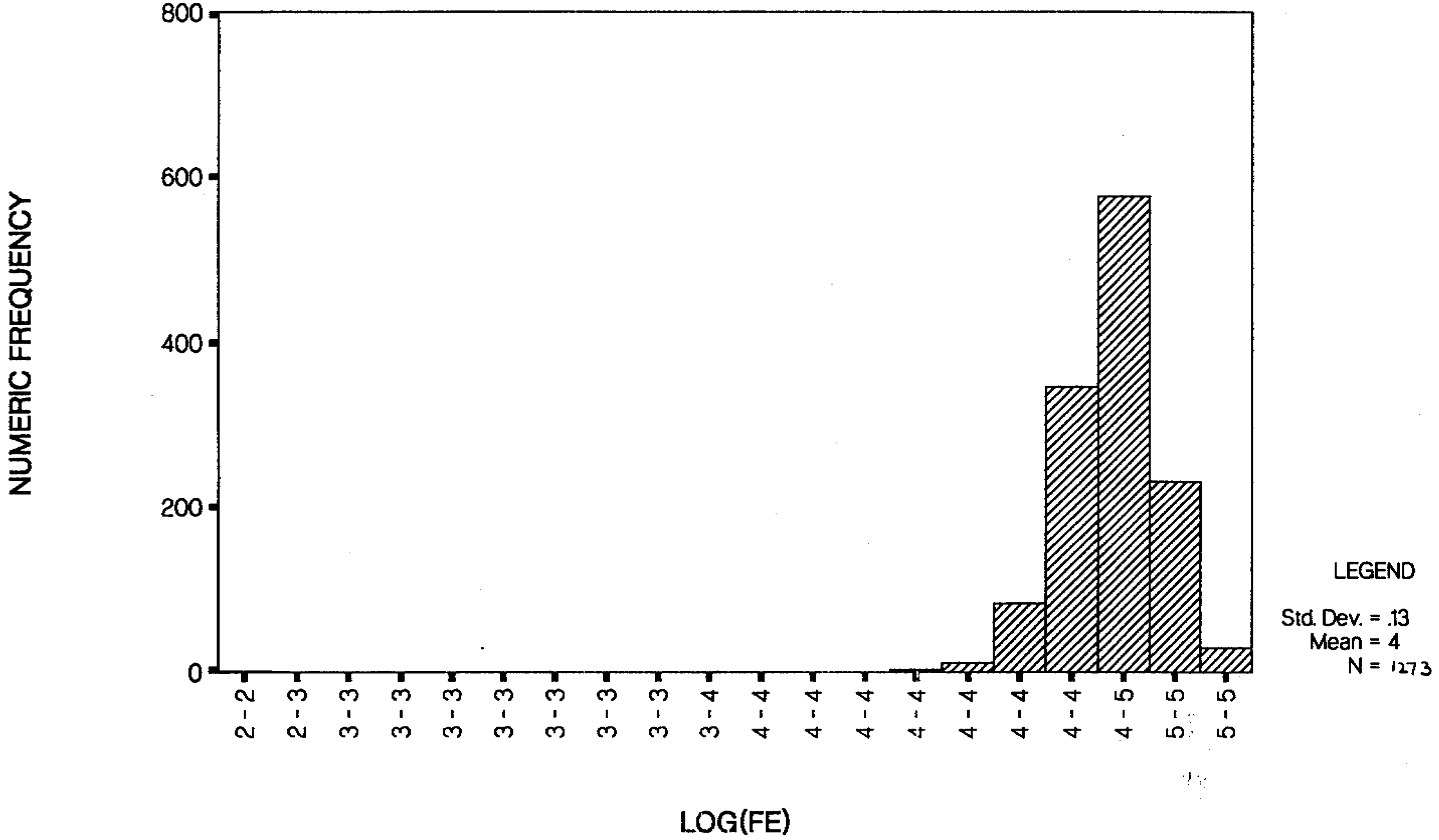
HISTOGRAM OF ASSAY VALUES
FOR LAS (PPM)



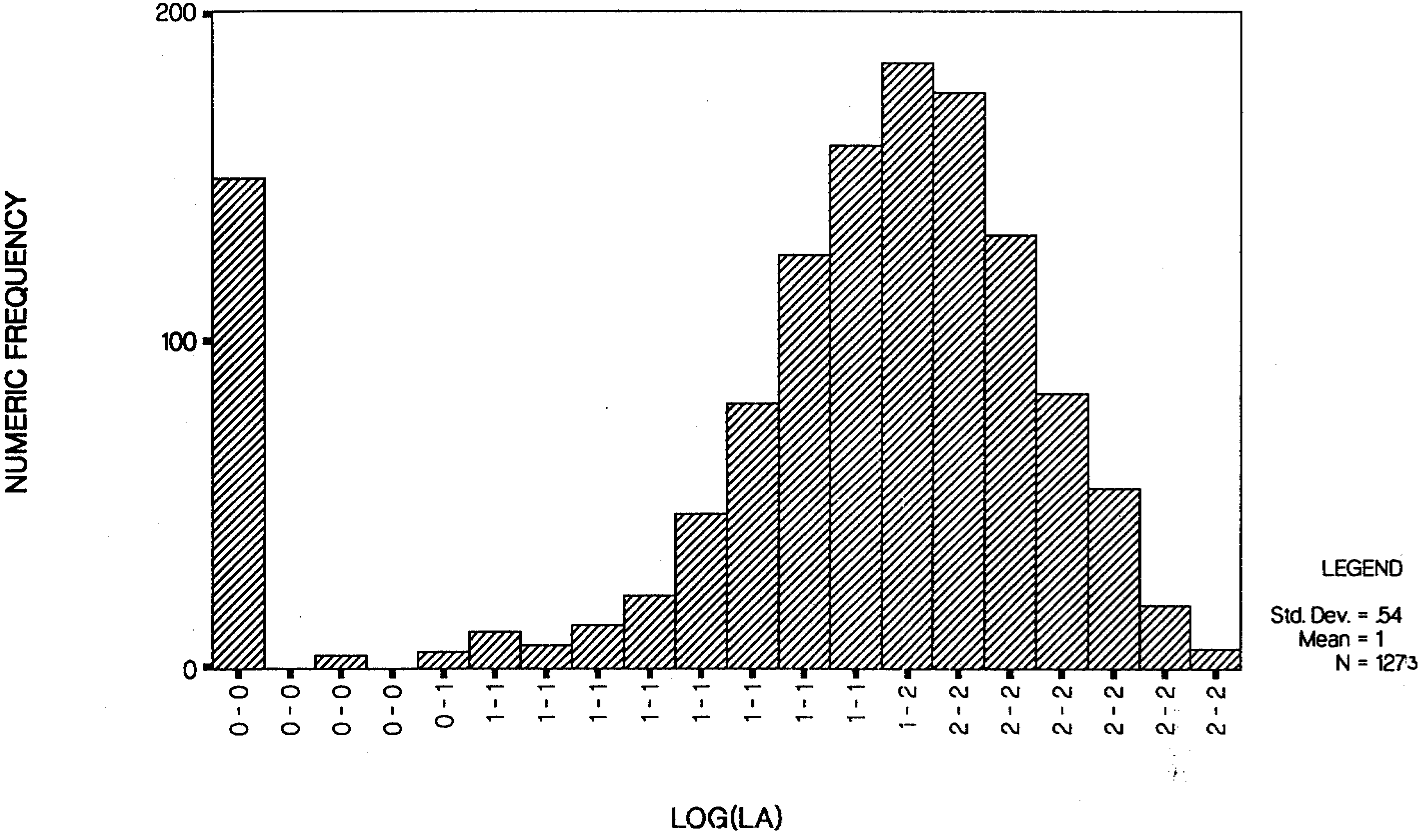
HISTOGRAM OF ASSAY VALUES FOR LBA (PPM)



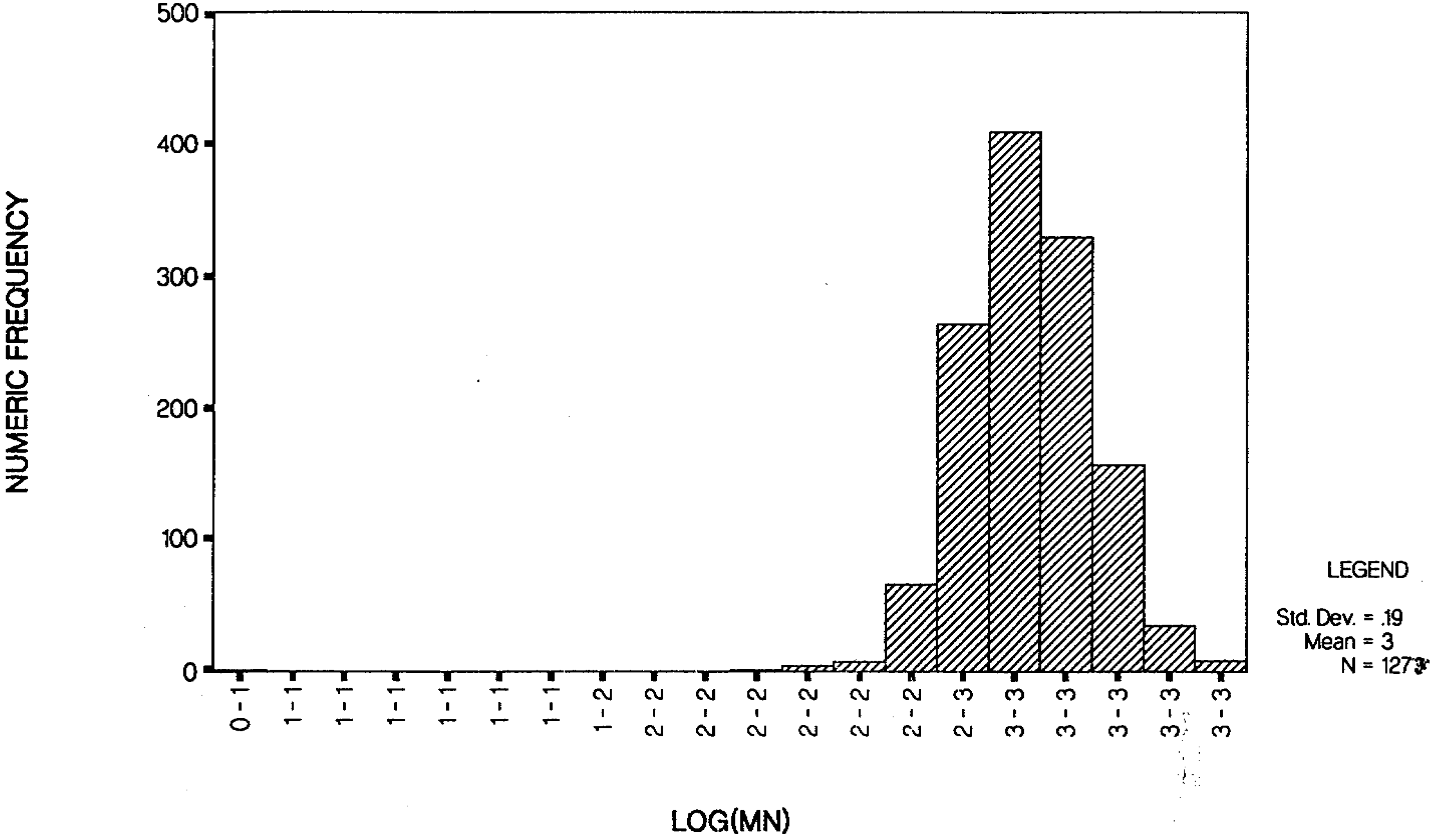
HISTOGRAM OF ASSAY VALUES FOR LFE (PPM)



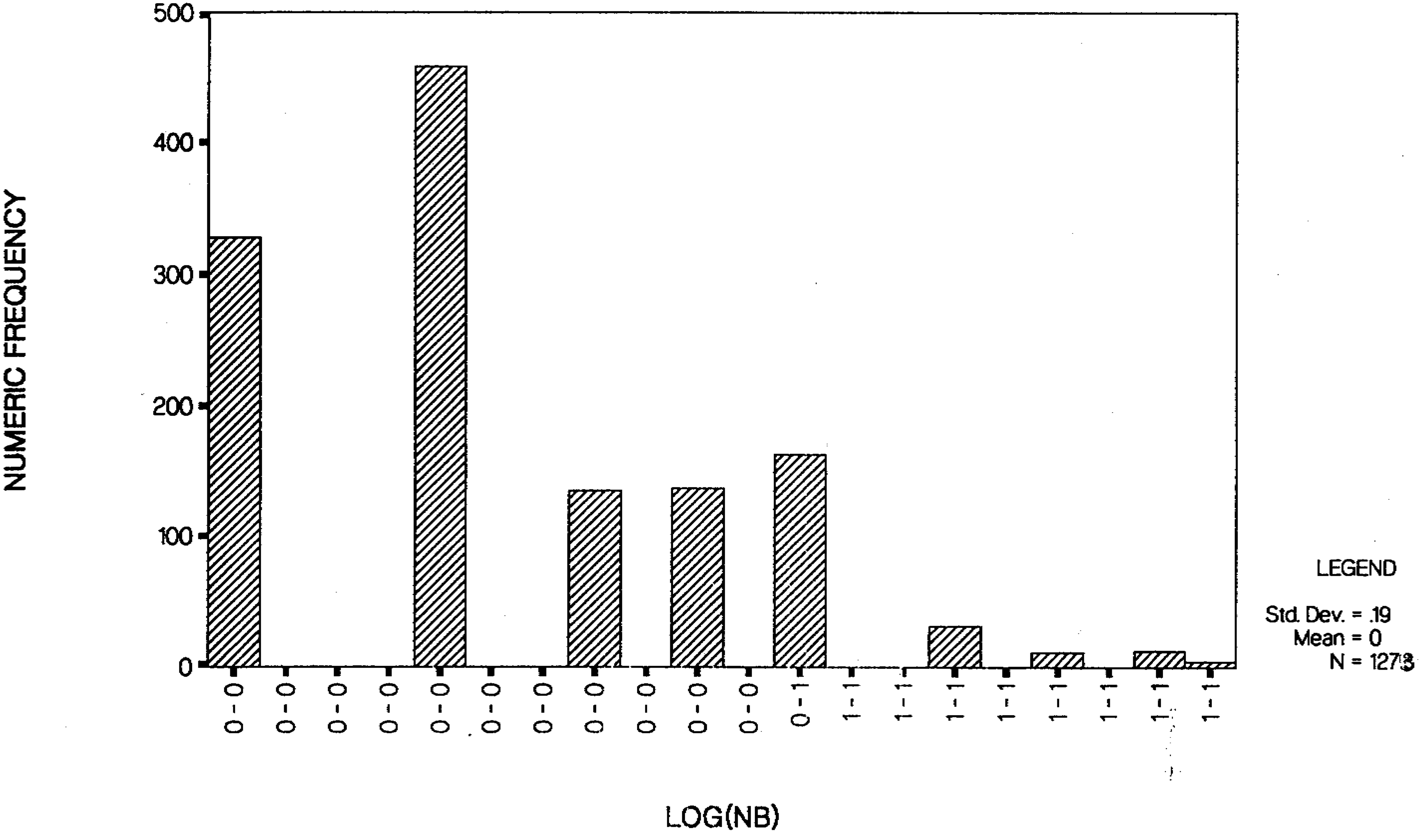
HISTOGRAM OF ASSAY VALUES
FOR LLA (PPM)



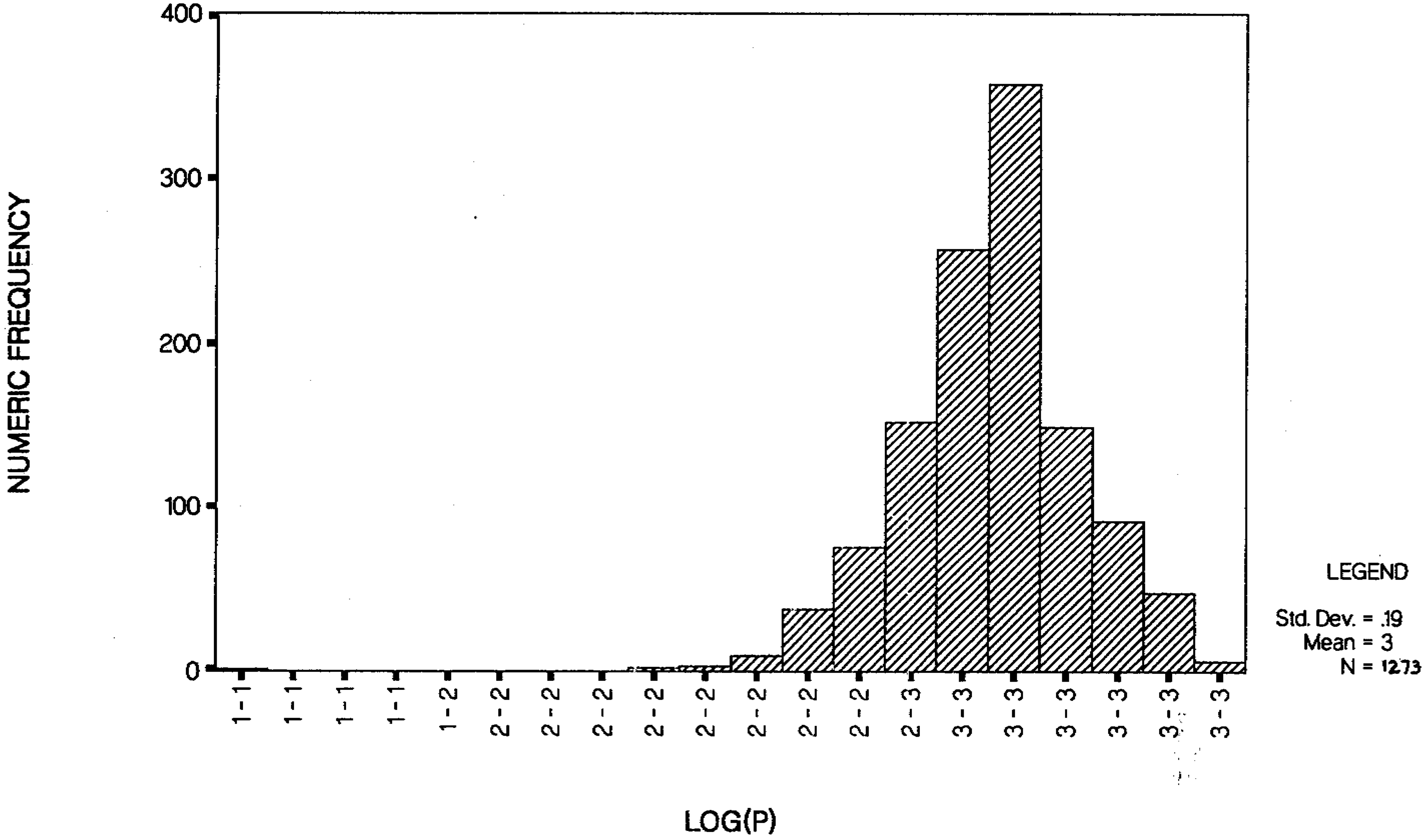
HISTOGRAM OF ASSAY VALUES
FOR LMN (PPM)



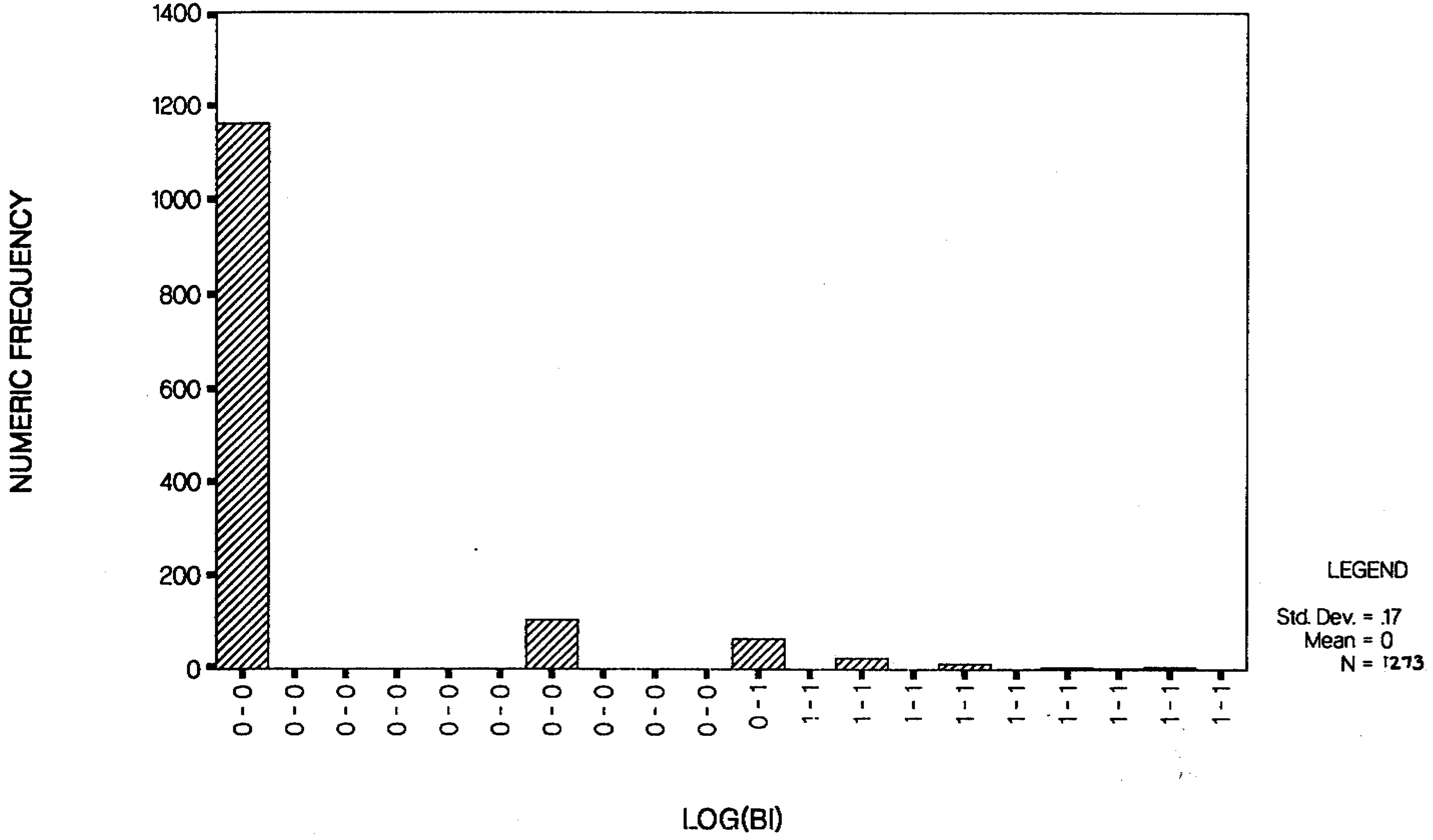
HISTOGRAM OF ASSAY VALUES
FOR LNB (PPM)



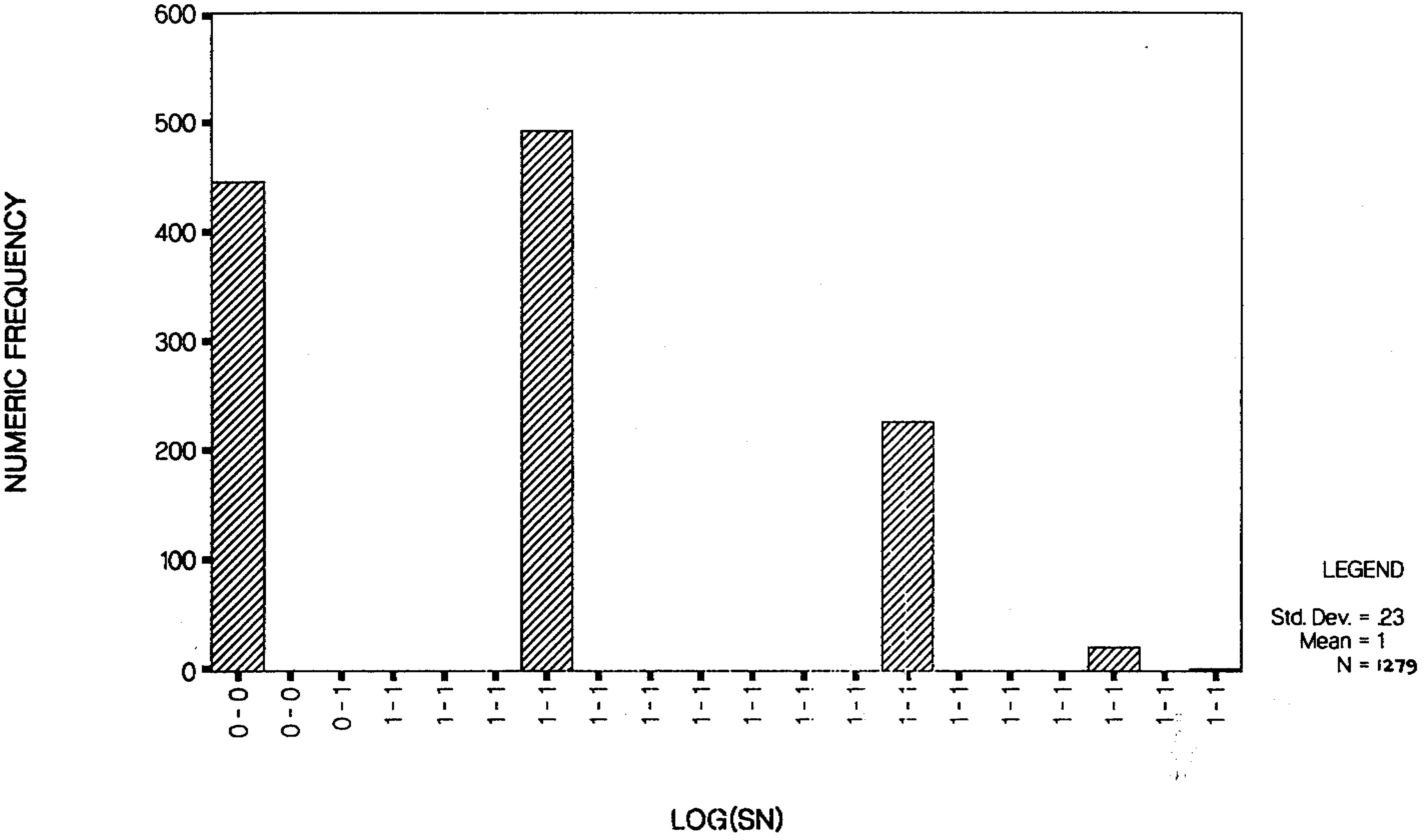
HISTOGRAM OF ASSAY VALUES FOR LP (PPM)



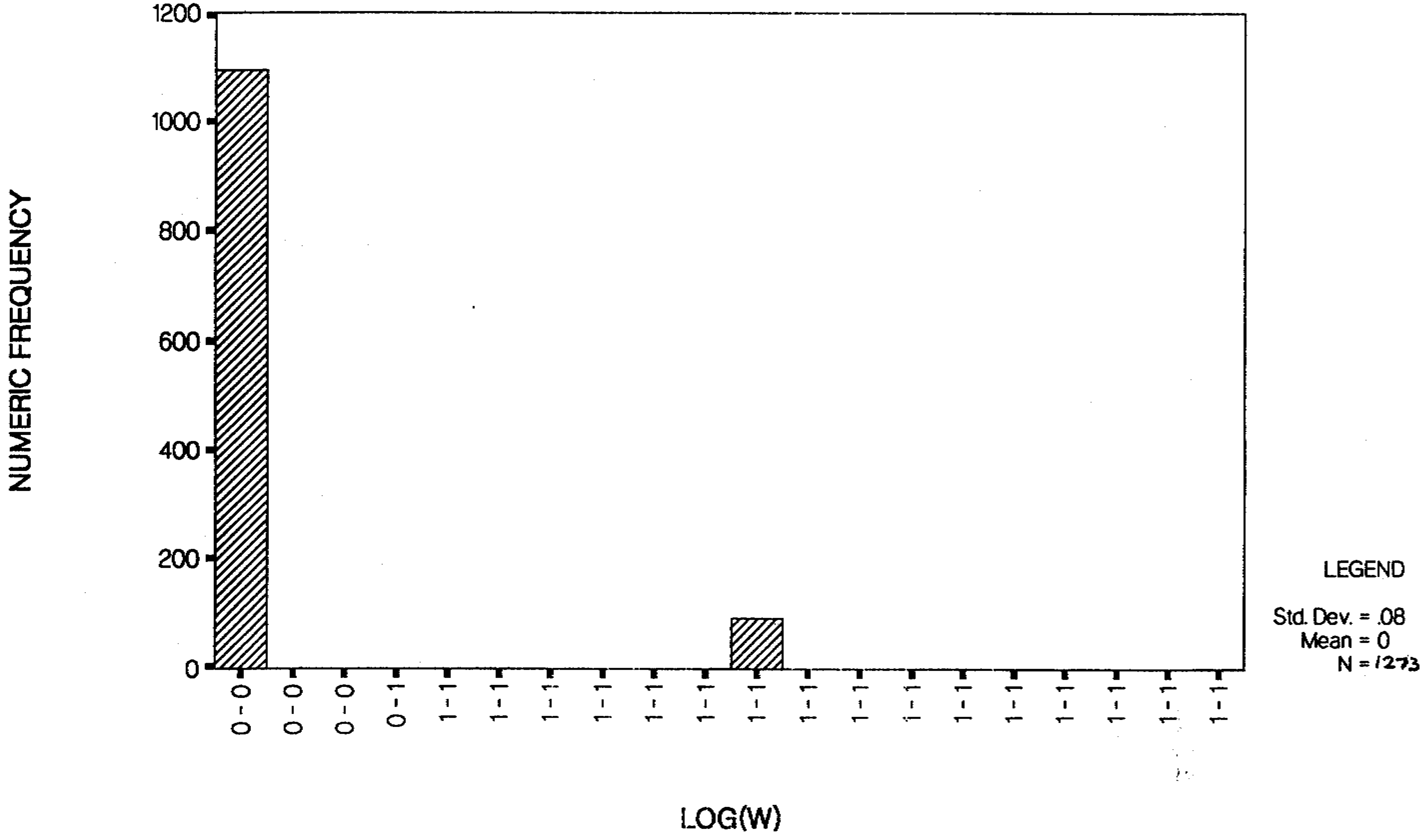
HISTOGRAM OF ASSAY VALUES FOR LBI (PPM)



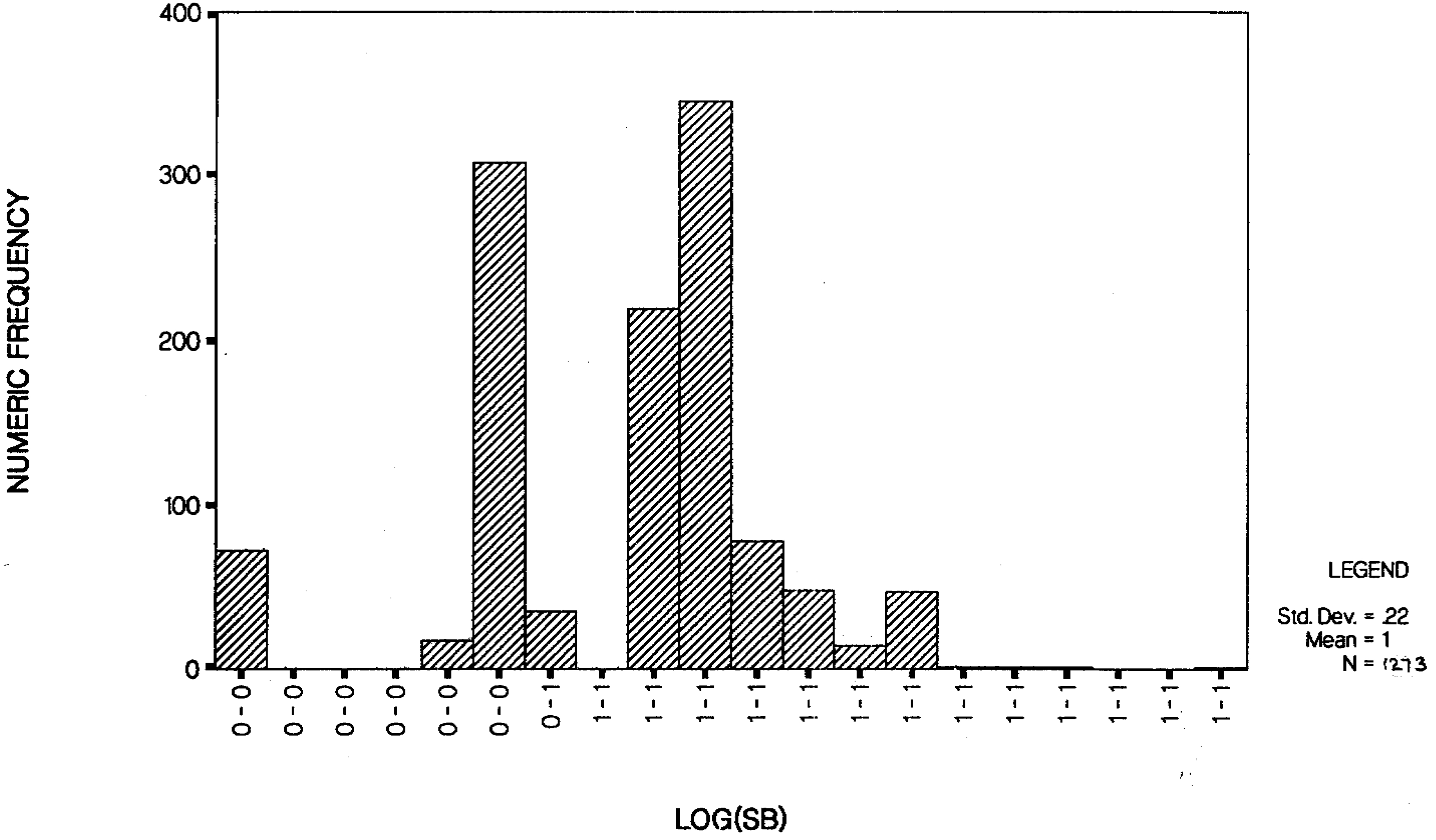
HISTOGRAM OF ASSAY VALUES
FOR LSN (PPM)



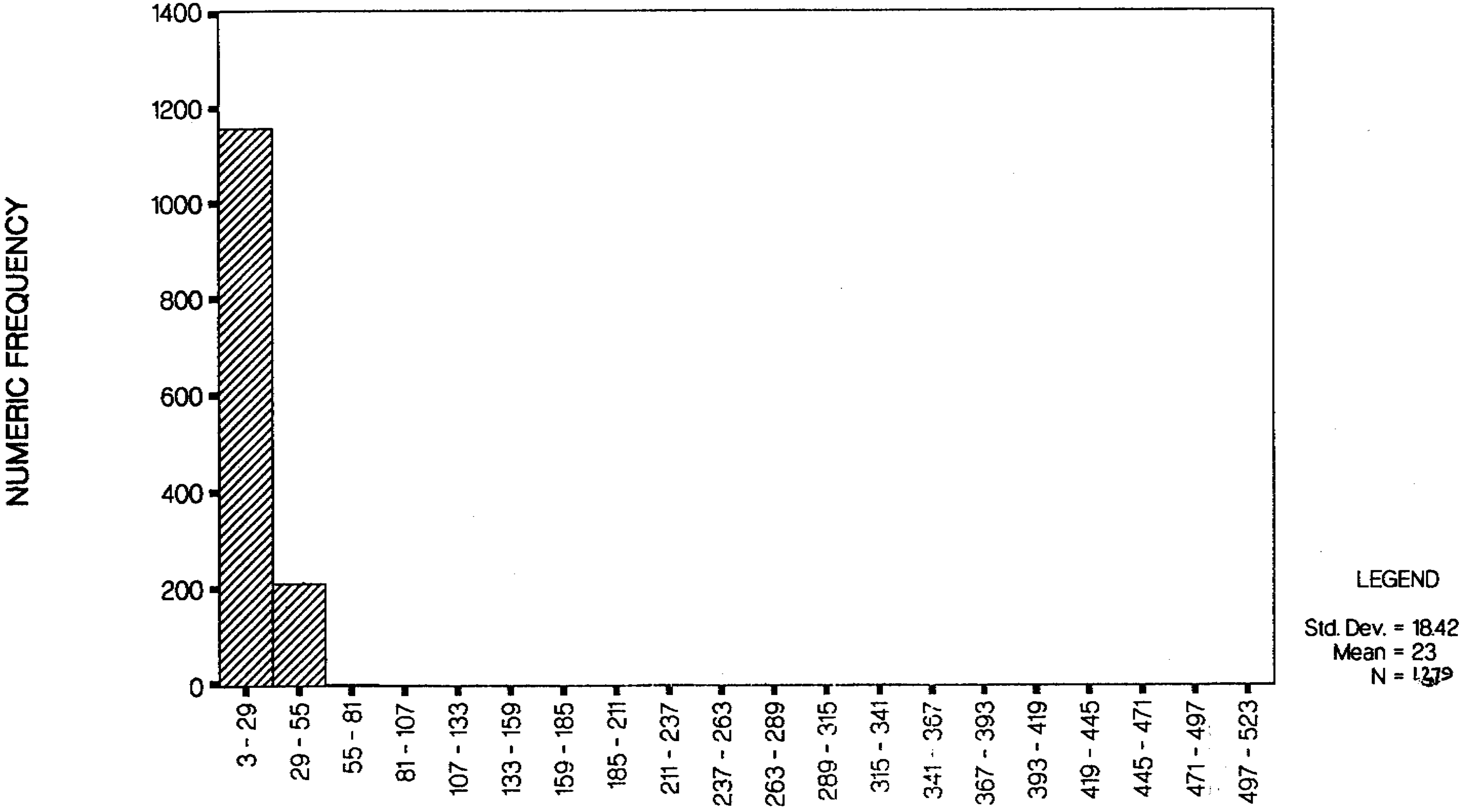
HISTOGRAM OF ASSAY VALUES FOR LW (PPM)



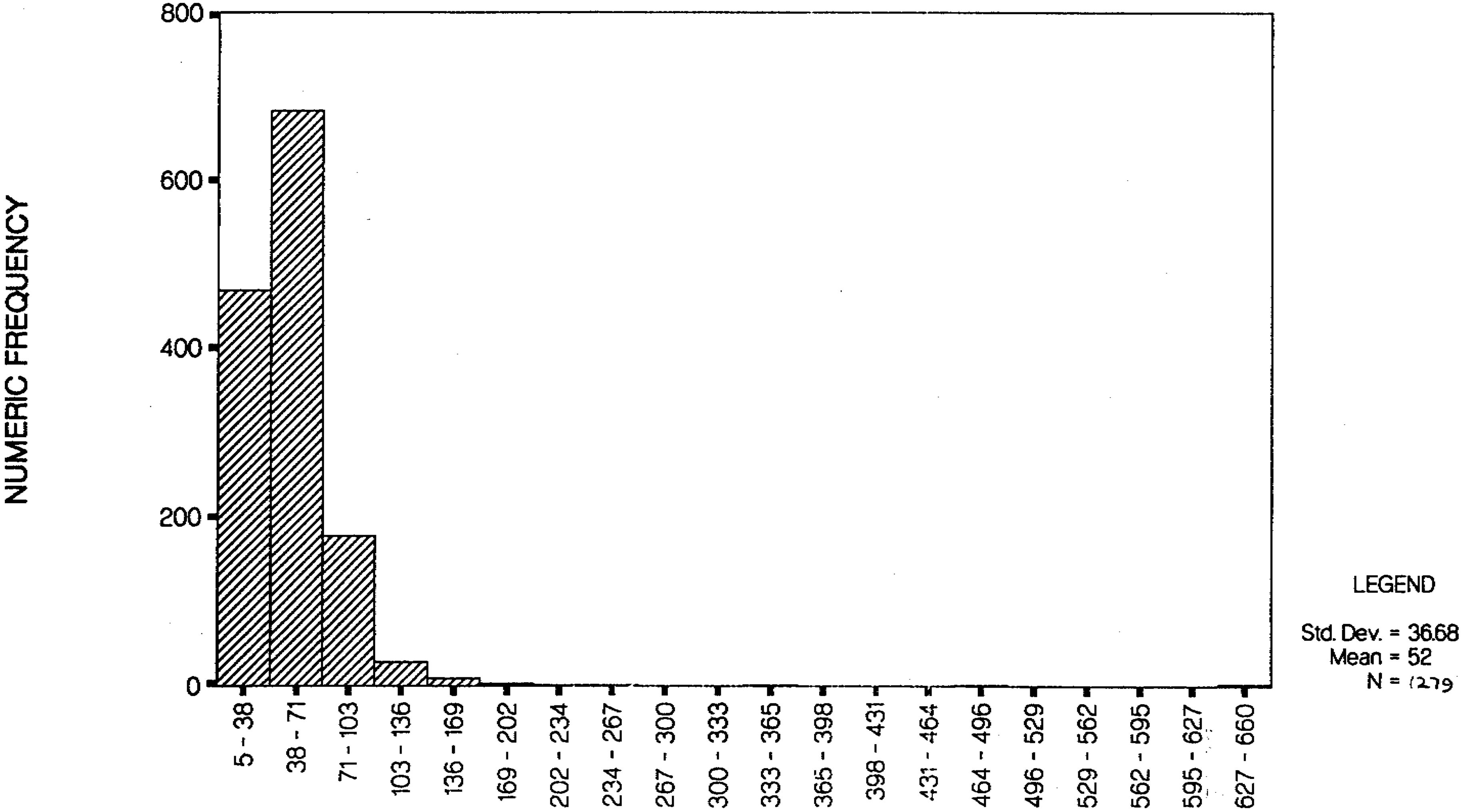
HISTOGRAM OF ASSAY VALUES FOR LSB (PPM)



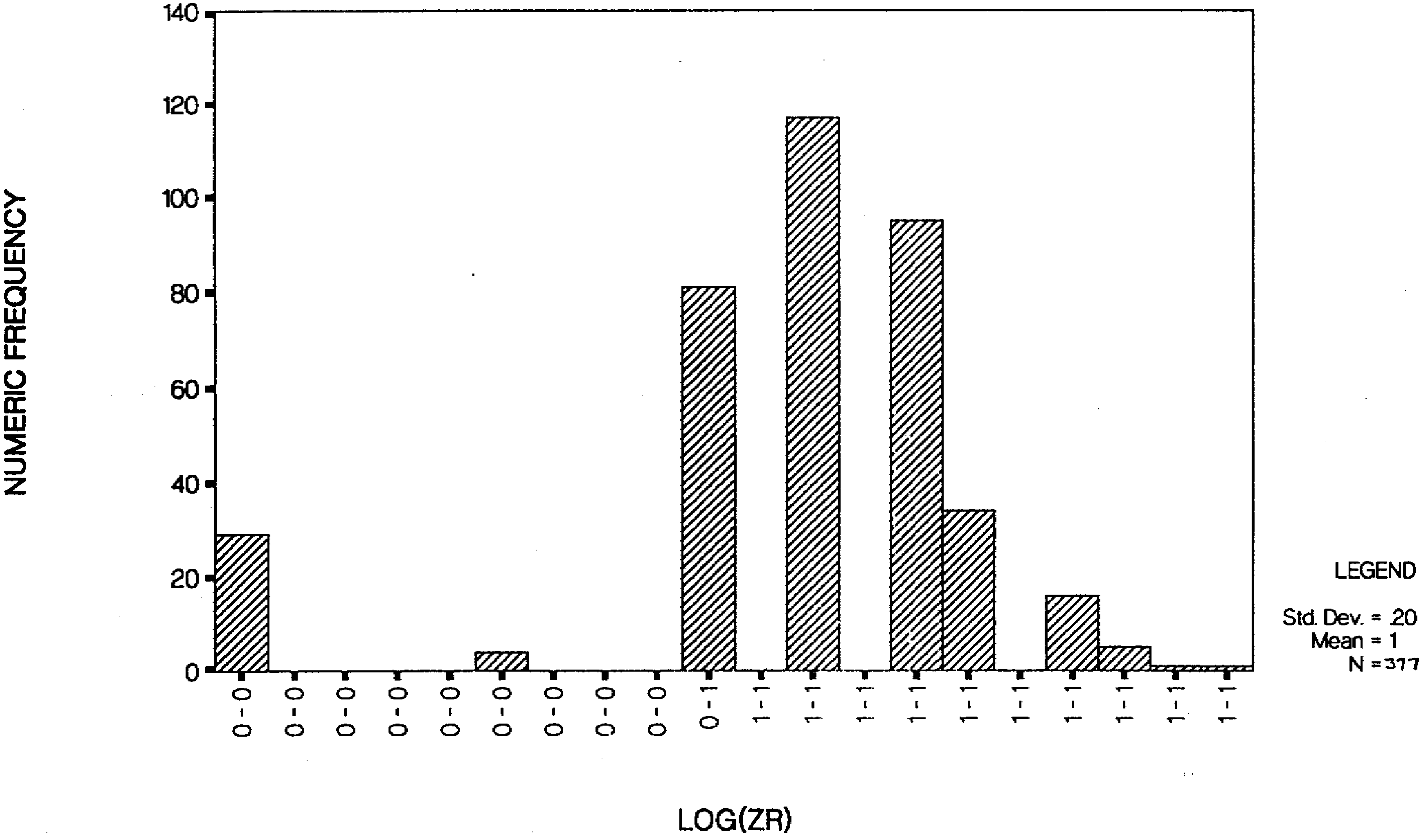
HISTOGRAM OF ASSAY VALUES
FOR CO (PPM)



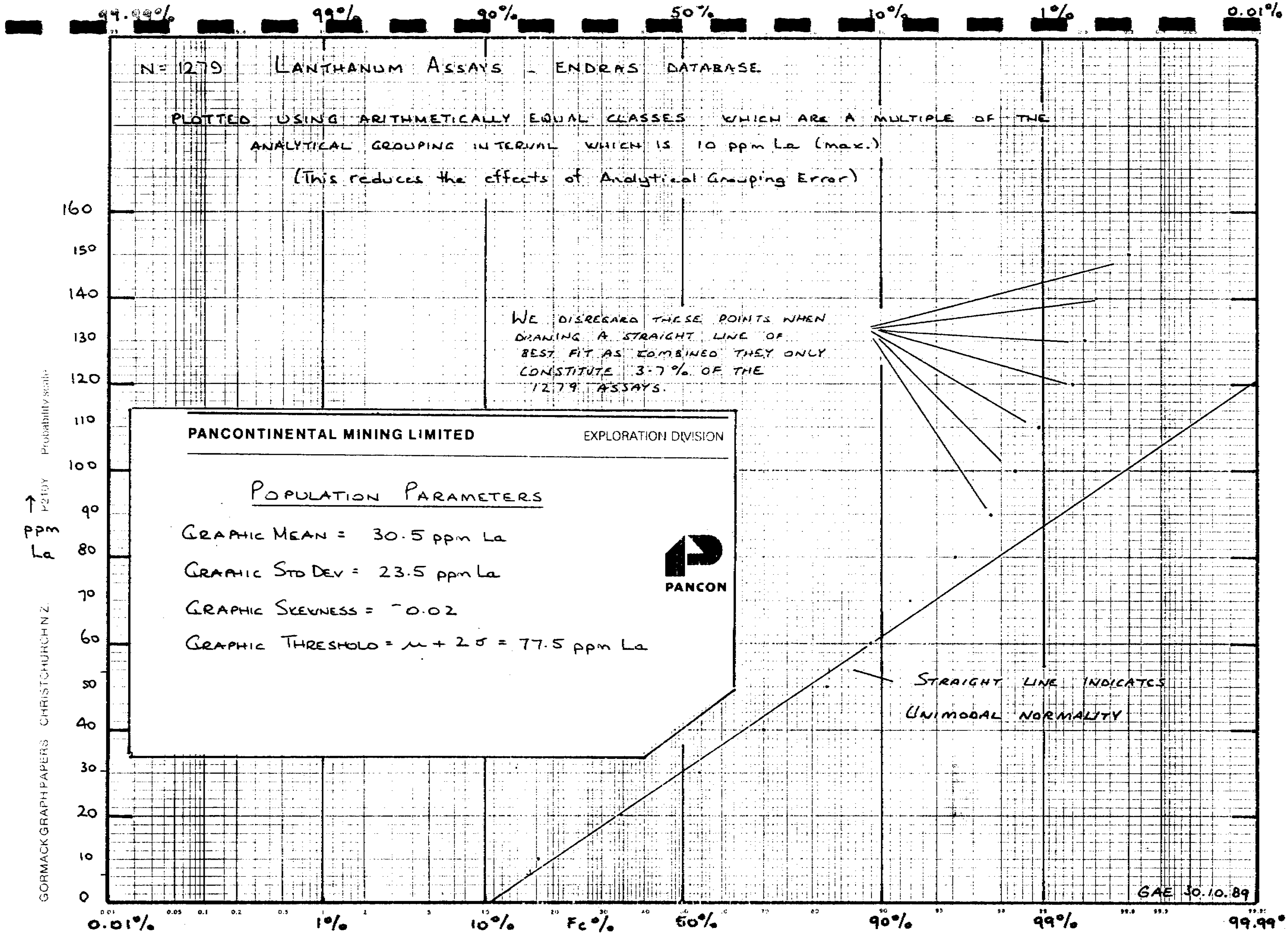
HISTOGRAM OF ASSAY VALUES
FOR CR (PPM)



HISTOGRAM OF ASSAY VALUES
FOR LZR (PPM)



APPENDIX 4
PROBABILITY PLOTS FOR SELECTED ELEMENTS FOR THE ENDRAS GEOCHEMICAL DATABASE



N= 1279 LANTHANUM ASSAYS - ENDRAS DATABASE

PLOTTED USING ARITHMETICALLY EQUAL CLASSES WHICH ARE A MULTIPLE OF THE ANALYTICAL GROUPING INTERVAL WHICH IS 10 ppm La (max.)

(This reduces the effects of Analytical Grouping Error)

WE DISREGARD THESE POINTS WHEN DRAWING A STRAIGHT LINE OF BEST FIT AS COMBINED THEY ONLY CONSTITUTE 3·7% OF THE 1279 ASSAYS.

PANCONTINENTAL MINING LIMITED EXPLORATION DIVISION

PANCON

POPULATION PARAMETERS

GRAPHIC MEAN = 30.5 ppm La

GRAPHIC STD DEV = 23.5 ppm La

GRAPHIC SKEWNESS = ⁻0.02

GRAPHIC THRESHOLD = $\mu + 2\sigma$ = 77.5 ppm La

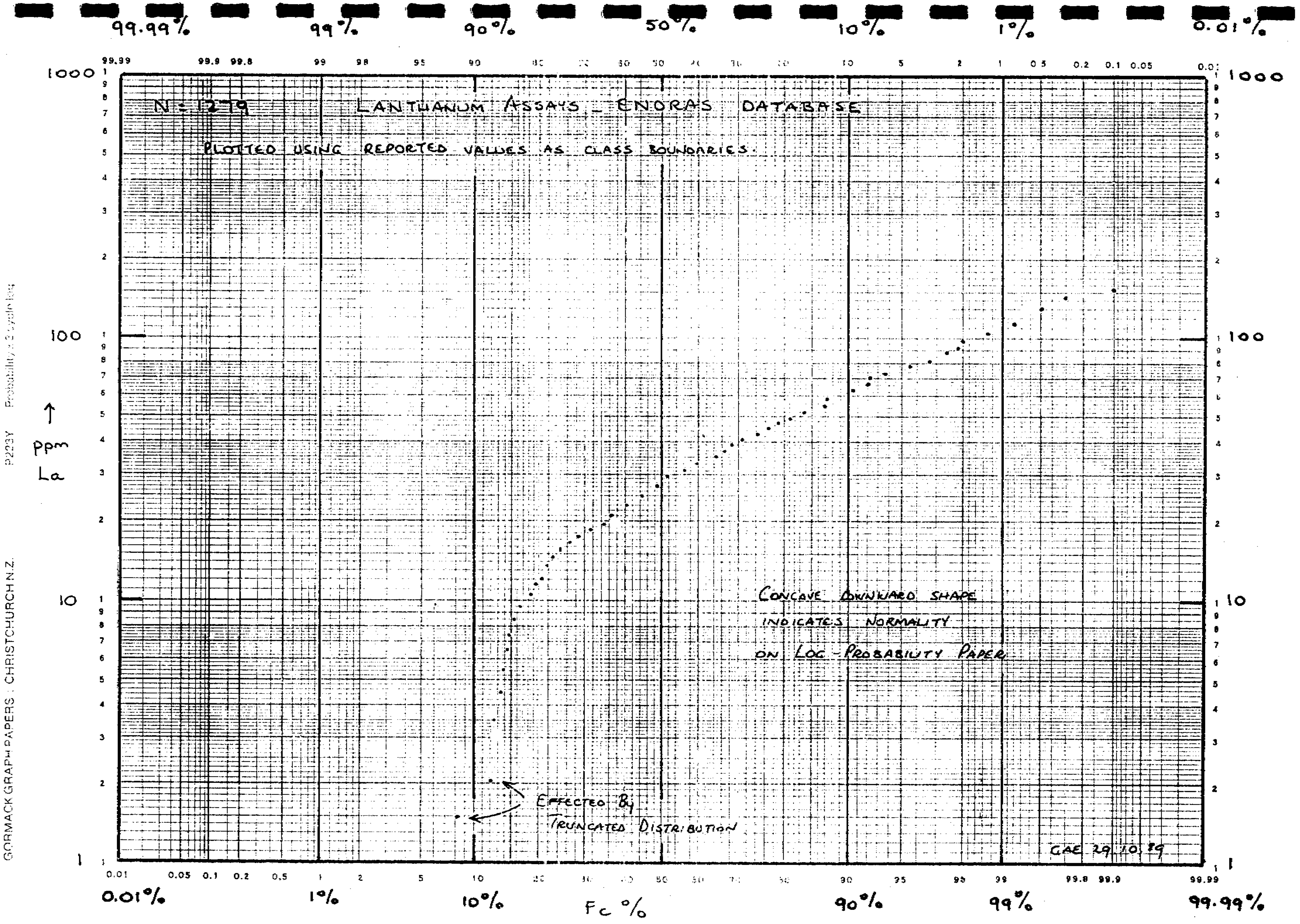
STRAIGHT LINE INDICATES UNIMODAL NORMALITY

GAE 30.10.89

TABLE A3.1

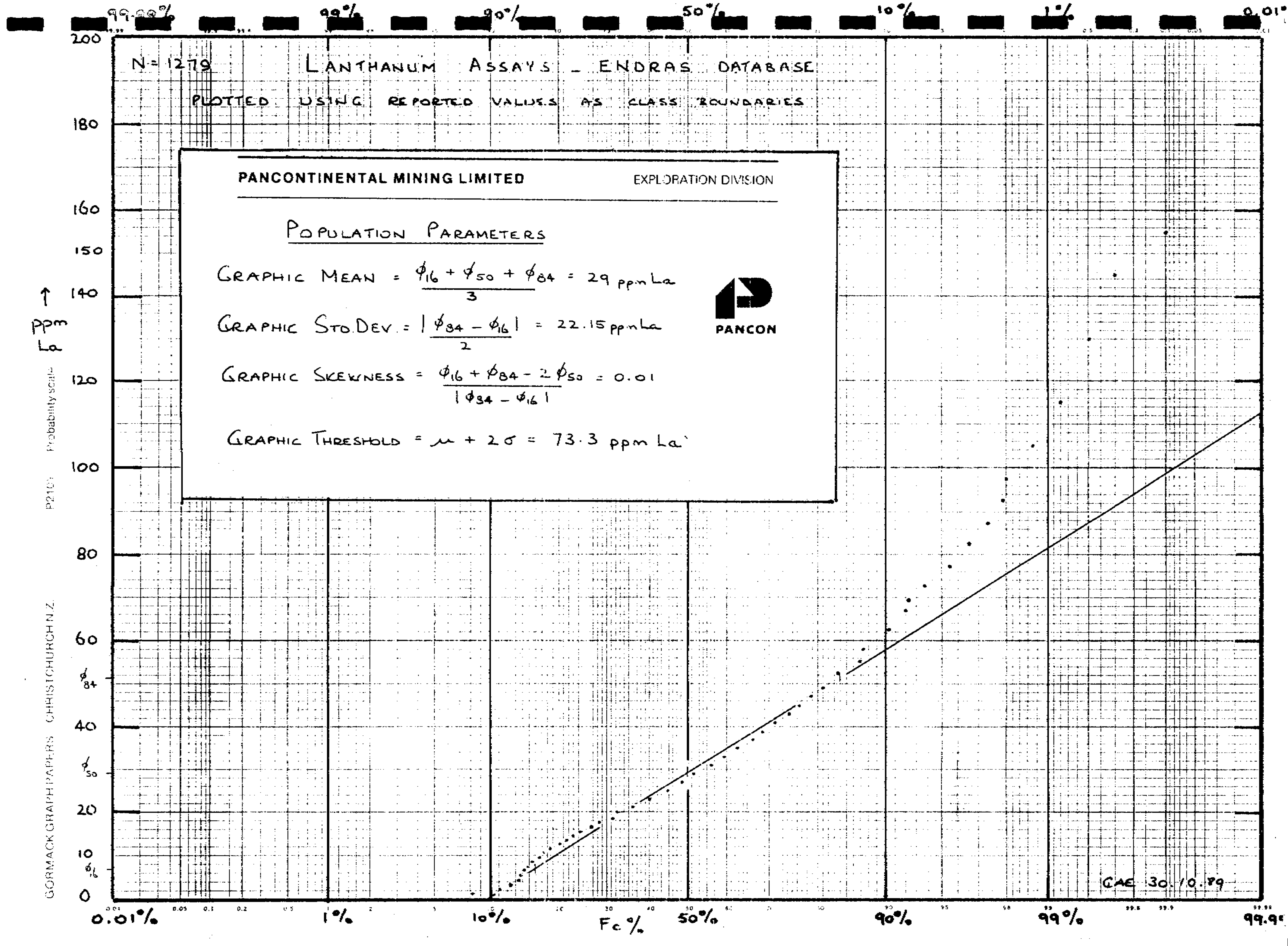
CLASS FREQUENCY TABLE (La Assays)
(to accompany probability plot)

Class (ppm La)	Frequency	Cumulative Frequency	Cumulative % Frequency
0-10	223	223	17.4
10-20	221	444	34.7
20-30	248.5	692.5	54.1
30-40	203	895.5	70.0
40-50	160.5	1056	82.6
50-60	79	1135	88.7
60-70	53.5	1188.5	92.9
70-80	40.5	1229	96.1
80-90	19	1248	97.6
90-100	10	1258	98.4
100-110	7.5	1265.5	98.9
110-120	5.5	1271	99.4
120-130	2	1273	99.5
130-140	1	1274	99.6
140-150	2.5	1276.5	99.8
150-160	2.5	1279	100.00



LANTHANUM ASSAYS - ENDRAS DATABASE

PLOTTED USING REPORTED VALUES AS CLASS BOUNDARIES



PANCONTINENTAL MINING LIMITED EXPLORATION DIVISION

POPULATION PARAMETERS

GRAPHIC MEAN $= \dfrac{\phi_{16} + \phi_{50} + \phi_{84}}{3} = 29$ ppm La

GRAPHIC STD.DEV. $= \dfrac{|\phi_{84} - \phi_{16}|}{2} = 22.15$ ppm La

GRAPHIC SKEWNESS $= \dfrac{\phi_{16} + \phi_{84} - 2\phi_{50}}{|\phi_{84} - \phi_{16}|} = 0.01$

GRAPHIC THRESHOLD $= \mu + 2\sigma = 73.3$ ppm La

PANCON

N = 1279   NIOBIUM ASSAYS - ENDRAS DATABASE

PLOTTED USING REPORTED VALUES AS CLASS FREQUENCIES

PANCONTINENTAL MINING LIMITED EXPLORATION DIVISION

PANCON

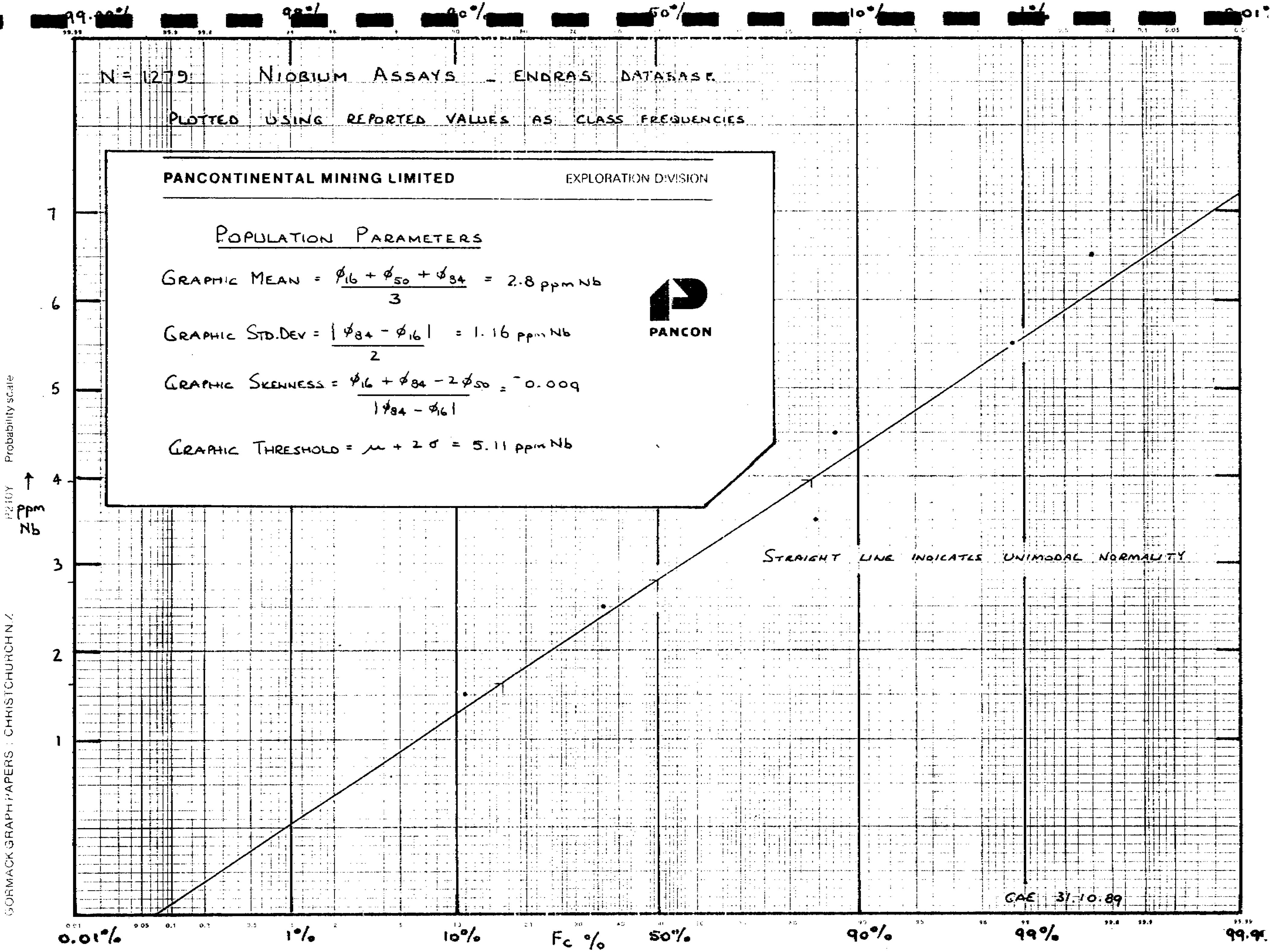
POPULATION PARAMETERS

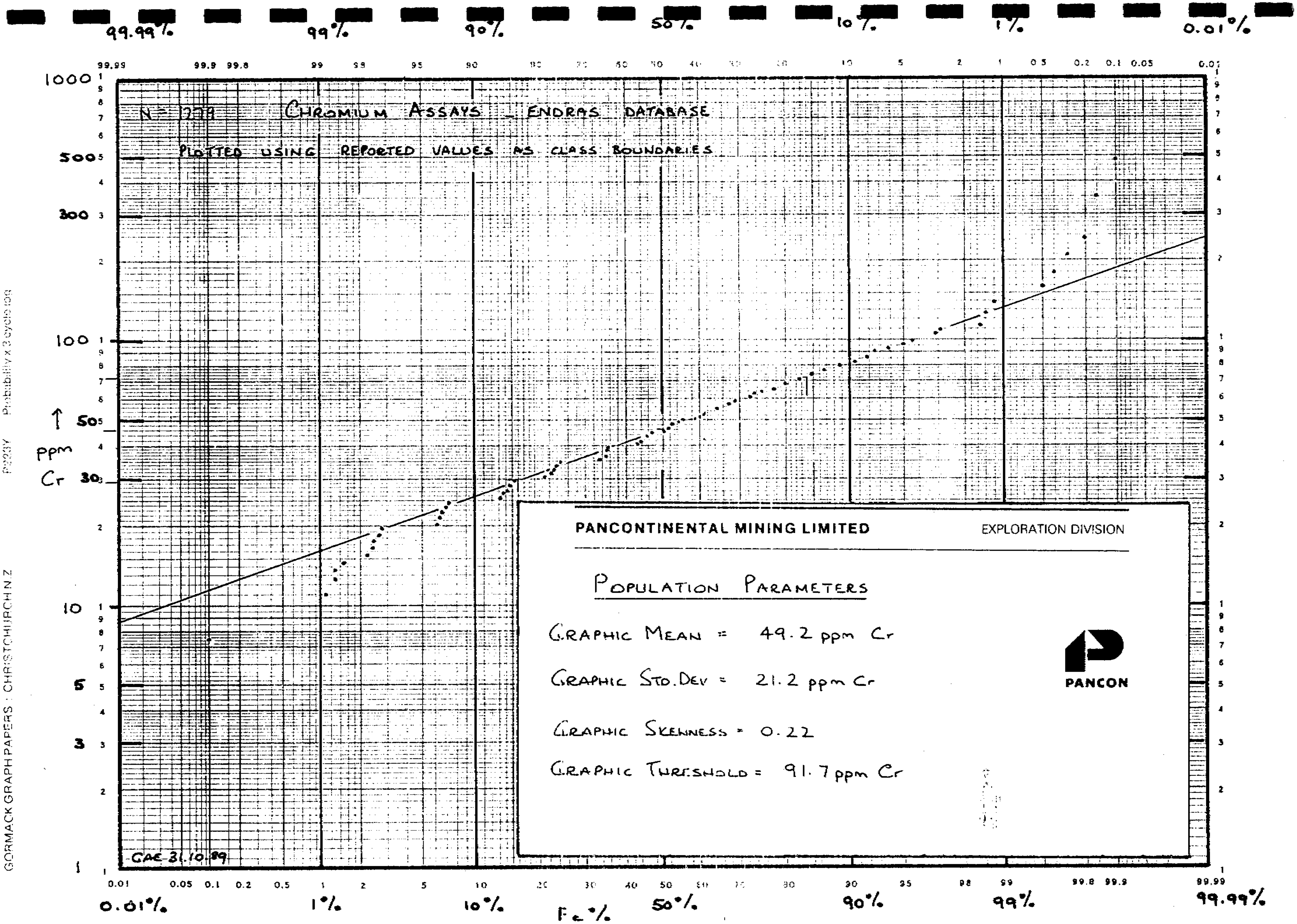
GRAPHIC MEAN = $\frac{\phi_{16} + \phi_{50} + \phi_{84}}{3}$ = 2.8 ppm Nb

GRAPHIC STD.DEV = $\frac{|\phi_{84} - \phi_{16}|}{2}$ = 1.16 ppm Nb

GRAPHIC SKEWNESS = $\frac{\phi_{16} + \phi_{84} - 2\phi_{50}}{|\phi_{84} - \phi_{16}|}$ = $^{-}0.009$

GRAPHIC THRESHOLD = $\mu + 2\sigma$ = 5.11 ppm Nb





N = 1278 CHROMIUM ASSAYS _ ENDRAS DATABASE

PLOTTED USING REPORTED VALUES AS CLASS BOUNDARIES

GAE 31.10.89

PANCONTINENTAL MINING LIMITED EXPLORATION DIVISION

POPULATION PARAMETERS

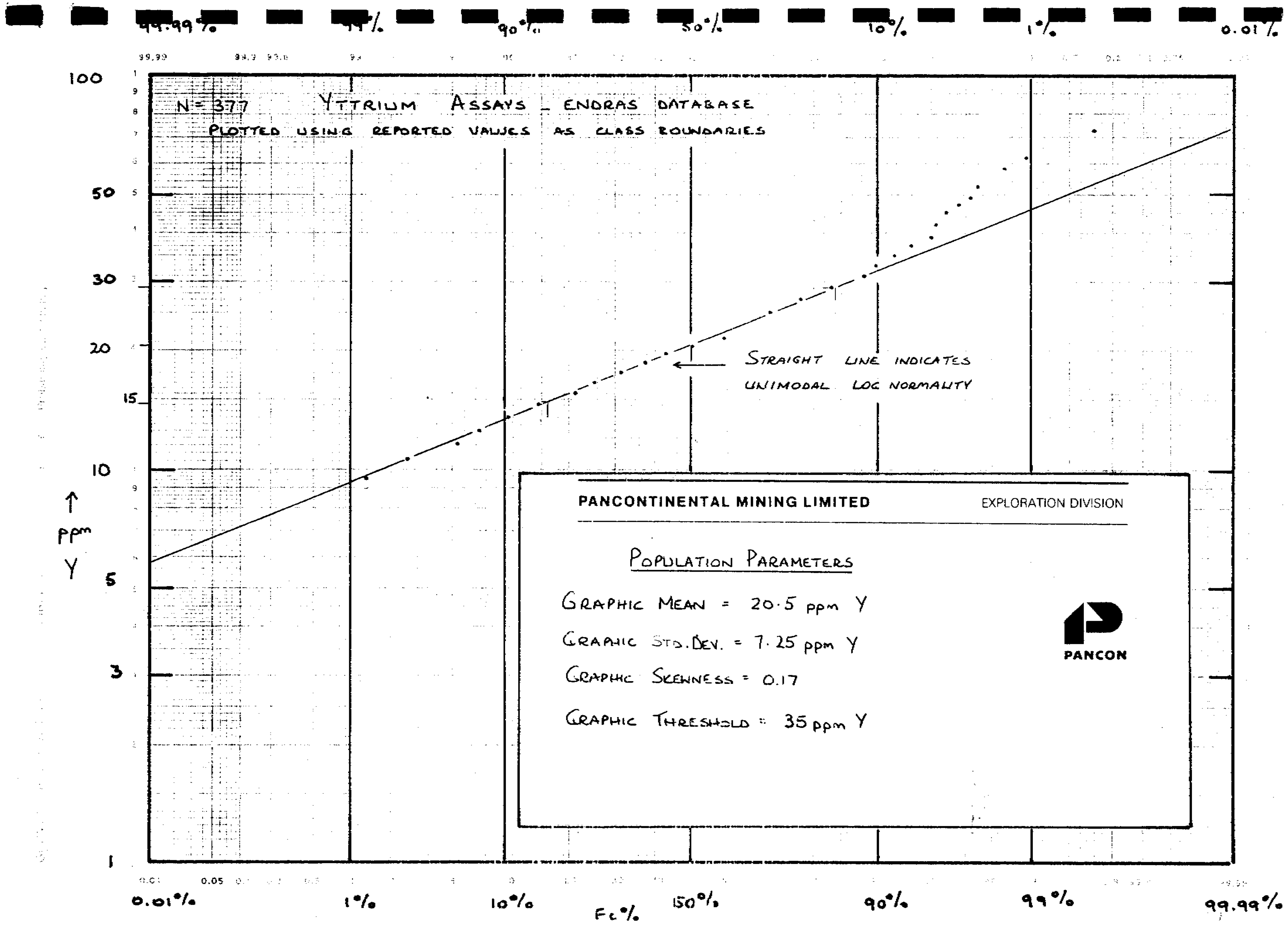
GRAPHIC MEAN = 49.2 ppm Cr

GRAPHIC STD. DEV = 21.2 ppm Cr

GRAPHIC SKEWNESS = 0.22

GRAPHIC THRESHOLD = 91.7 ppm Cr

PANCON



N = 377 YTTRIUM ASSAYS _ ENDRAS DATABASE

PLOTTED USING REPORTED VALUES AS CLASS BOUNDARIES

PANCONTINENTAL MINING LIMITED EXPLORATION DIVISION

POPULATION PARAMETERS

GRAPHIC MEAN = 20.5 ppm Y

GRAPHIC STD. DEV. = 7.25 ppm Y

GRAPHIC SKEWNESS = 0.17

GRAPHIC THRESHOLD = 35 ppm Y

PANCON

6204 - 6209	Rock associations, all containing allanite, Rare Earths south.
6211 - 6212	Muller Flat anomaly.
6219 - 6220	These samples were collected by Bluey Bruce.
6226 - 6227	Rare Earths 1 and 2
6228	A very radioactive thorium source collected by Lindsay Johansen from his rare-earths area. This appears to be a very different material.

Mt Dorren sheet.

3084	Paradise Well, allanite-rich rock.
3149	Hale river, magnetite rich rock.
6228	No description
6275	Magnetite allanite near Kato, 100m East of the 1st drill hole.
6276	Thorium anomaly, west of the RE investigated area.
6277	Gully bottom, bellow Thorium anomaly. Coarse allanite, adjacent dolerite/amphibolite (6277B).
6278	50 m further down. Garnet- bearing, layered rock (6278A), adjacent unsheared amphibolite/dolerite (6278B).
6279	Allanite/magnetite zone. Chlorite zone, east of origin.
6280	Hale River. Weathered deposits.

6281	Magnetite rich rock, with chlorite (?). Same area.
6282	Serpentinite from chlorite schist(?), RE's southern end.
3084	Apatite-rich rock, Paradise Well.
3149	Magnetite-rich rock, Hale River.

Description of diamond drill core

No.	Wt (g)	No.	Wt (g)
90	603.5	99	797.8
91	1031.9	100A	1092.0
92	1508.1	100B	1677.5
93	1619.3	101A	1252.5
95	1304.5	101B	1493.3
96	765.2	102	825.1
97	1126.7	98	836.0

Petrographical description of the drillcore.

Depth in meters	Comments
4.12 - 15.80 m.	Section dominated by fine- to medium-grained amphibolite or biotite amphibolite. Quartz and/or feldspar concentrations forming bands or patches of varied thickness are common and demonstrate the shistosity of the rock.
15.80 - 29.40 m.	Medium- to coarse-grained granite. Pink feldspar, dirty white plagioclase. The almost colourless quartz and the black biotite are the main minerals. Allanite grains (up to 5 cm) are clearly visible in many parts of the core.

29.40 - 55.00 m.	Section dominated by amphibolite and biotite-amphibolite with numerous migmatite sections. Migmatitic components. At 50.80 m, patches of pyrite and chalcopyrite are clearly visible.
55.00 - 55.30 m.	Small medium- to coarse-grained granite section (band or small patch). It contains mainly feldspar and quartz.
55.30 - 70.90 m.	Amphibolite ranging from fine- to medium-grained, with some biotite and/or quartz-containing sections. Small bands or patches of sulphides (pyrite and chalcopyrite are common in the following depths:
63.20 - 63.60 m.	"veins" or "patches" in amphibolite.
64.70 m.	"veinlets" in small granite patches.
65.75 m.	"bands" in amphibolite.
70.90 - 71.20 m.	Medium- to coarse-grained granite with similar mineralization to the above-mentioned ones. A 3-4 mm allanite grain is clearly visible at 71.00 m.
71.20 - 87.60 m.	Fine- to medium-grained amphibolite or biotite-amphibolite. Chlorite is another visible mineral. Migmatitic sections are common.
87.60 - 93.00 m.	Medium- to coarse-grained granite. A 5-6 mm allanite grain is clearly visible at 88.35 m.
93.00 - 100.20 m.	Amphibolite. Similar to the ones described above.

Sample weights of Drillcore

Depth(m)	Wt(g)	Depth(m)	wt(g)	Depth(m)	wt(g)
4.12	189.6	17.00	172.6	29.50	215.2
6.75	231.9	18.60	178.6	30.20	198.8
8.00	287.1	19.15	148.9	31.20	253.2
8.70	305.8	20.00	182.8	32.00	180.5
9.60	283.0	21.00	207.1	32.84	216.1
10.40	238.4	21.70	220.8	34.00	172.5
11.00	319.7	22.70	198.3	34.30	181.5
12.00	225.6	23.90	185.7	35.10	147.8
12.60	224.5	24.65	231.9	36.50	273.4
14.30	169.4	25.25	163.3	37.60	198.6
14.80	210.7	26.60	152.1	38.60	352.2
16.00	230.8	27.50	220.4	39.25	314.3
16.40	194.7	28.60	249.6	40.10	297.9

Sample weights of Drillcore

Depth(m)	Wt(g)	Depth(m)	wt(g)	Depth(m)	wt(g)
41.40	224.7	63.60	193.6	85.30	305.5
42.00	351.8	64.80	324.7	86.35	165.6
42.90	192.5	65.75	239.9	87.45	339.8
43.90	308.0	66.75	179.5	88.45	153.0
44.40	274.7	67.85	278.6	91.90	224.0
45.30	295.7	68.80	314.7	92.90	277.9
47.10	235.3	69.80	255.2	93.90	315.0
48.10	181.5	70.50	367.1	94.20	213.5
48.40	278.0	71.00	149.9	95.40	249.0
49.30	347.6	72.10	235.4	96.10	381.9
50.90	194.0	72.20	244.7	97.60	334.7
51.30	169.1	73.90	207.6	98.60	269.1
52.00	185.5	74.90	344.3	99.20	355.7
53.00	205.7	75.45	185.3	100.20	333.3
54.15	370.3	76.90	303.0		
55.25	216.9	77.70	295.3		
56.20	137.1	79.50	310.1		
57.20	332.4	79.70	215.5		
58.10	323.0	80.70	235.7		
58.80	273.7	81.80	266.0		
60.22	340.2	82.25	209.5		
61.00	239.1	83.30	327.3		
62.20	372.4	84.00	285.3		
63.30	196.5	84.70	297.6		

APPENDIX B

BULK ASSAYS OF ROCK SAMPLES FROM THE THORIUM ANOMALIES

	3084.00	3149.00	6133.00	6134.00	6135.00	6136.00	6137.00
SiO_2	49.74	37.95	72.63	72.06	76.91	73.93	70.00
Al_2O_3	21.58	16.98	13.94	14.85	12.64	13.49	14.63
Fe_2O_3	11.64	29.74	0.70	1.07	1.00	0.96	2.77
MnO	4.12	0.45	0.02	0.03	0.03	0.02	0.02
MgO	3.10	1.09	0.47	0.48	0.34	0.37	0.21
CaO	3.40	7.19	1.65	1.93	2.72	0.92	0.68
Na_2O	3.57	2.69	2.25	2.86	3.16	1.82	2.06
K_2O	1.77	0.66	6.23	4.62	1.50	6.30	7.90
TiO_2	0.06	0.77	0.11	0.08	0.08	0.14	0.24
P_2O_5	0.14	0.89	0.10	0.11	0.07	0.10	0.07
F^-	0.97	1.80	0.58	0.40	0.42	0.38	0.37
Y_2O_3	0.06	0.04	0.02	0.01	0.01	0.01	0.01
ZrO_2	0.02	0.07	0.08	0.09	0.09	0.07	0.06
LaO_2	0.03	0.18	0.05	0.06	0.04	0.04	0.03
CeO_2	0.06	0.33	0.09	0.11	0.07	0.08	0.07
ThO_2	0.02	0.09	0.04	0.06	0.03	0.04	0.04
LOF	0.00	1.66	0.82	1.24	0.96	1.08	0.50
Total	100.27	102.58	99.77	100.06	100.06	99.76	99.66

	6138.00	6139.00	6140.00	6141.00	6142.00	6143.00	6144.00
SiO_2	71.55	72.44	74.58	72.37	67.93	49.45	50.27
Al_2O_3	13.60	14.02	13.06	14.80	17.14	20.55	21.88
Fe_2O_3	2.81	1.26	1.43	1.81	2.64	10.63	8.97
MnO	0.03	0.02	0.02	0.03	0.07	0.10	0.11
MgO	0.35	0.35	0.22	0.72	0.92	3.60	3.10
CaO	0.80	1.10	0.97	3.78	4.95	4.53	5.07
Na_2O	1.69	2.02	1.69	3.50	3.64	3.26	3.86
K_2O	6.37	6.78	6.48	0.87	0.85	3.96	3.18
TiO_2	0.27	0.15	0.11	0.20	0.05	1.57	1.14
P_2O_5	0.13	0.07	0.04	0.14	0.15	0.22	0.20
F^-	0.46	0.40	0.44	0.53	0.60	0.96	0.91
Y_2O_3	0.01	0.01	0.01	0.01	0.01	0.01	0.02
ZrO_2	0.09	0.06	0.05	0.04	0.06	0.06	0.05
LaO_2	0.06	0.04	0.02	0.07	0.07	0.11	0.11
CeO_2	0.12	0.07	0.04	0.14	0.14	0.21	0.21
ThO_2	0.06	0.04	0.02	0.07	0.07	0.08	0.09
LOF	1.12	0.90	0.52	0.74	0.50	0.48	1.20
Total	99.52	99.73	99.68	99.81	99.78	99.77	100.36

	6145.00	6146.00	6147.00	6148.00	6149.00	6150.00	6151.00
SiO_2	75.87	74.57	72.62	73.22	76.56	68.70	47.98
Al_2O_3	13.62	13.47	14.29	13.75	11.31	14.12	20.30
Fe_2O_3	1.48	0.68	0.85	0.97	4.15	4.37	10.20
MnO	0.05	0.02	0.04	0.01	0.03	0.05	0.10
MgO	0.64	0.33	0.34	0.18	0.21	0.64	0.49
CaO	0.39	1.14	1.11	0.16	1.88	1.11	18.33
Na_2O	2.55	2.15	2.50	1.33	3.86	1.69	0.13
K_2O	3.11	6.01	6.33	9.30	0.90	7.03	0.14
TiO_2	0.06	0.08	0.08	0.06	0.15	0.19	0.27
P_2O_5	0.06	0.08	0.10	0.03	0.02	0.06	0.09
F-	0.39	0.40	0.49	0.41	0.34	0.65	1.66
Y_2O_3	0.01	0.01	0.01	0.01	0.01	0.01	0.00
ZrO_2	0.06	0.05	0.13	0.09	0.12	0.09	0.05
LaO_2	0.02	0.02	0.02	0.01	0.02	0.01	0.04
CeO_2	0.04	0.03	0.03	0.02	0.02	0.03	0.07
ThO_2	0.02	0.02	0.06	0.05	0.04	0.03	0.04
LOF	1.86	0.68	0.96	0.52	0.84	1.20	2.20
Total	100.22	99.76	99.95	100.13	100.46	99.99	102.08

	6152.00	6153.00	6154.00	6155.00	6156.00	6157.00	6158.00
SiO_2	64.60	73.34	73.17	58.96	75.93	73.31	66.07
Al_2O_3	10.63	13.81	13.37	15.01	13.49	14.94	17.62
Fe_2O_3	5.77	0.86	2.95	10.37	0.36	0.89	2.36
MnO	0.09	0.02	0.03	0.08	0.01	0.02	0.03
MgO	2.15	0.31	0.51	2.76	0.24	0.45	1.08
CaO	9.89	1.04	1.54	1.62	2.66	2.44	3.17
Na_2O	0.17	2.19	2.14	1.35	2.77	2.88	3.43
K_2O	0.05	6.46	4.82	5.64	2.92	4.07	4.18
TiO_2	1.15	0.12	0.16	0.77	0.03	0.09	0.23
P_2O_5	0.12	0.12	0.02	0.05	0.02	0.05	0.14
F-	1.16	0.31	0.40	0.88	0.07	0.35	0.40
Y_2O_3	0.05	0.01	0.01	0.01	0.00	0.01	0.01
ZrO_2	0.87	0.16	0.07	0.04	0.09	0.09	0.12
LaO_2	0.70	0.05	0.01	0.02	0.01	0.03	0.06
CeO_2	1.32	0.10	0.02	0.03	0.02	0.05	0.12
ThO_2	0.25	0.06	0.04	0.02	0.03	0.06	0.15
LOF	2.08	0.94	0.98	2.42	0.80	0.96	1.12
Total	101.05	99.90	100.24	100.04	99.46	100.68	100.32

	6159.00	6160.00	6161.00	6162.00	6163.00	8164.00	9164.00
SiO_2	49.89	58.18	67.95	77.51	72.03	68.92	72.99
Al_2O_3	13.64	15.27	12.44	8.74	14.55	15.18	13.84
Fe_2O_3	12.11	16.10	8.74	7.60	0.64	1.16	3.27
MnO	0.22	0.06	0.03	0.03	0.02	0.02	0.02
MgO	12.22	0.39	0.25	0.20	0.35	0.66	0.38
CaO	9.17	3.22	0.98	1.64	1.27	0.56	0.51
Na_2O	2.03	3.37	1.57	1.69	2.11	1.39	1.36
K_2O	0.33	1.65	5.69	0.88	6.53	9.30	4.86
TiO_2	0.73	0.37	0.21	0.16	0.08	0.32	0.10
P_2O_5	0.07	0.03	0.04	0.03	0.10	0.14	0.11
F^-	1.06	0.84	0.49	0.34	0.33	0.45	0.33
Y_2O_3	0.00	0.00	0.01	0.00	0.02	0.01	0.02
ZrO_2	0.02	0.09	0.07	0.08	0.06	0.03	0.08
LaO_2	0.02	0.03	0.02	0.01	0.03	0.06	0.02
CeO_2	0.03	0.04	0.04	0.02	0.06	0.12	0.06
ThO_2	0.01	0.06	0.05	0.03	0.04	0.04	0.05
LOF	0.62	1.30	0.82	1.22	1.24	0.68	1.54
Total	102.19	101.02	99.39	100.18	99.44	99.04	99.53

	6165.00	6166.00	6168.00	6169.00	6170.00	6171.00	6172.00
SiO_2	74.27	49.20	49.18	67.46	74.34	74.28	89.27
Al_2O_3	13.37	18.53	14.38	17.72	13.91	13.86	4.25
Fe_2O_3	1.98	5.35	13.73	2.14	0.62	1.08	1.77
MnO	0.02	0.30	0.26	0.01	0.02	0.02	0.02
MgO	0.29	3.11	8.34	0.69	0.19	0.16	0.10
CaO	0.70	15.85	11.29	0.63	1.27	0.82	0.76
Na_2O	1.83	2.97	1.03	0.62	3.26	3.91	0.40
K_2O	4.85	0.69	0.39	5.66	4.48	5.06	0.69
TiO_2	0.08	0.08	1.07	0.31	0.10	0.18	0.10
P_2O_5	0.08	0.17	0.11	0.13	0.02	0.06	0.36
F^-	0.42	1.45	1.35	0.61	0.25	0.54	0.21
Y_2O_3	0.01	0.00	0.00	0.01	0.01	0.01	0.02
ZrO_2	0.09	0.06	0.02	0.03	0.06	0.08	0.32
LaO_2	0.02	0.02	0.02	0.06	0.01	0.03	0.16
CeO_2	0.04	0.02	0.03	0.13	0.02	0.06	0.31
ThO_2	0.04	0.01	0.01	0.04	0.01	0.04	0.17
LOF	1.08	2.22	0.00	2.84	0.44	0.42	0.48
Total	99.17	100.01	101.20	99.07	99.02	100.59	99.38

	6173.00	6174.00	6175.00	6176.00	6177.00	6178.00	6179.00
SiO_2	74.41	76.02	69.71	71.69	73.33	71.24	73.10
Al_2O_3	13.44	12.36	13.71	14.40	13.64	14.83	13.12
Fe_2O_3	3.72	3.69	1.32	0.44	1.74	0.35	2.13
MnO	0.01	0.02	0.01	0.02	0.03	0.01	0.02
MgO	0.45	0.55	0.18	0.24	0.52	0.24	0.20
CaO	0.08	0.08	0.12	0.21	1.69	0.37	0.83
Na_2O	2.76	0.56	1.18	1.21	1.97	1.30	1.39
K_2O	3.04	3.75	9.83	10.14	5.45	10.07	7.33
TiO_2	0.21	0.17	0.08	0.05	0.17	0.04	0.11
P_2O_5	0.04	0.05	0.02	0.03	0.04	0.03	0.04
F^-	0.30	0.60	0.41	0.34	0.40	0.43	0.39
Y_2O_3	0.00	0.00	0.01	0.01	0.01	0.01	0.01
ZrO_2	0.04	0.05	0.01	0.03	0.05	0.03	0.10
LaO_2	0.02	0.01	0.01	0.01	0.02	0.01	0.03
CeO_2	0.03	0.03	0.03	0.03	0.03	0.03	0.05
ThO_2	0.02	0.02	0.01	0.01	0.01	0.01	0.02
LOF	1.64	2.10	0.46	0.52	0.86	0.86	0.84
Total	100.21	100.09	97.09	99.37	99.96	99.86	99.71

	6180.00	6181.00	6182.00	6183.00	6184.00	6185.00	6186.00
SiO_2	49.87	74.03	73.16	75.45	74.38	72.41	64.13
Al_2O_3	17.88	13.53	13.49	12.69	13.45	13.20	12.86
Fe_2O_3	10.10	0.84	1.37	1.20	1.32	5.10	11.99
MnO	0.17	0.03	0.03	0.02	0.24	0.03	0.03
MgO	7.90	0.44	0.47	0.27	0.31	1.45	0.36
CaO	9.55	0.23	1.30	1.50	0.75	0.34	0.19
Na_2O	2.47	1.60	1.88	2.45	2.15	0.19	3.44
K_2O	0.46	7.25	5.94	5.08	5.95	1.95	1.80
TiO_2	0.82	0.05	0.11	0.04	0.03	0.25	1.27
P_2O_5	0.08	0.11	0.05	0.10	0.05	0.04	0.02
F^-	1.16	0.43	0.40	0.42	0.48	0.27	0.48
Y_2O_3	0.00	0.01	0.01	0.01	0.01	0.01	0.00
ZrO_2	0.02	0.06	0.04	0.22	0.03	0.03	0.02
LaO_2	0.02	0.05	0.01	0.03	0.01	0.01	0.02
CeO_2	0.02	0.08	0.03	0.06	0.02	0.02	0.03
ThO_2	0.01	0.07	0.01	0.06	0.01	0.01	0.01
LOF	0.72	1.22	0.98	0.82	1.02	1.94	2.98
Total	101.25	100.03	99.30	100.42	100.19	97.27	99.63

	6187.00	6188.00	6192.00	6193.00	6194.00	6195.00	6196.00
SiO_2	75.40	63.62	23.69	76.77	63.42	74.99	72.18
Al_2O_3	13.37	4.81	7.20	12.27	16.68	11.82	10.50
Fe_2O_3	0.53	16.07	57.58	0.80	3.13	2.16	6.56
MnO	0.03	0.22	0.09	0.02	0.03	0.01	0.03
MgO	0.26	0.92	0.34	0.32	1.20	0.22	0.28
CaO	1.01	0.77	0.13	1.15	1.74	0.09	0.22
Na_2O	2.34	0.94	0.20	2.59	3.30	0.93	1.06
K_2O	5.47	0.64	0.08	3.80	5.70	8.04	7.10
TiO_2	0.05	4.41	0.84	0.18	0.75	0.10	0.27
P_2O_5	0.01	1.70	0.08	0.07	0.69	0.02	0.02
F-	0.24	1.10	1.74	0.40	0.83	0.44	0.50
Y_2O_3	0.01	0.44	0.00	0.01	0.04	0.01	0.01
ZrO_2	0.03	0.84	0.04	0.25	0.22	0.07	0.09
LaO_2	0.01	0.61	0.07	0.04	0.31	0.01	0.02
CeO_2	0.02	1.35	0.07	0.07	0.66	0.02	0.03
ThO_2	0.01	0.27	0.03	0.02	0.23	0.03	0.03
LOF	1.16	0.36	10.28	0.96	0.92	0.94	0.76
Total	99.93	99.06	102.46	99.72	99.86	99.90	99.65

	6197.00	6198.00	6199.00	6200.00	6201.00	6202.00	6203.00
SiO_2	72.26	73.82	73.31	75.14	52.75	75.08	85.17
Al_2O_3	11.66	14.14	13.81	13.90	14.19	11.96	7.66
Fe_2O_3	7.49	1.57	0.50	1.50	11.55	3.40	0.10
MnO	0.04	0.02	0.02	0.03	0.21	0.03	0.01
MgO	0.27	0.23	0.21	0.43	9.74	0.27	0.14
CaO	0.80	2.48	0.43	0.15	7.99	1.04	0.22
Na_2O	3.14	2.62	1.82	2.69	2.36	1.53	1.02
K_2O	2.33	3.80	8.65	3.67	0.36	4.62	4.50
TiO_2	0.28	0.08	0.04	0.11	0.83	0.13	0.02
P_2O_5	0.03	0.03	0.16	0.06	0.08	0.06	0.03
F-	0.49	0.53	0.46	0.31	1.08	0.51	0.10
Y_2O_3	0.01	0.01	0.01	0.00	0.00	0.01	0.01
ZrO_2	0.21	0.06	0.03	0.10	0.02	0.12	0.03
LaO_2	0.02	0.02	0.01	0.02	0.02	0.03	0.01
CeO_2	0.03	0.03	0.02	0.04	0.02	0.06	0.02
ThO_2	0.12	0.03	0.02	0.03	0.01	0.08	0.01
LOF	1.70	0.90	0.92	1.74	0.46	1.24	0.84
Total	100.87	100.37	100.41	99.95	101.68	100.16	99.88

	6204.00	6205.00	6206.00	6207.00	6208.00	6209.00	6211.00
SiO_2	9.68	37.70	4.20	66.32	72.59	48.01	68.00
Al_2O_3	1.28	13.11	0.54	12.29	13.31	18.30	15.92
Fe_2O_3	5.52	9.73	5.20	12.24	1.49	11.88	4.30
MnO	0.46	0.34	0.53	0.07	0.03	0.21	0.04
MgO	15.27	5.31	18.37	0.56	0.65	0.61	0.35
CaO	30.30	16.02	29.03	0.51	1.92	17.71	4.60
Na_2O	0.49	0.42	0.32	0.00	3.45	0.10	2.79
K_2O	0.04	0.43	0.00	4.08	2.17	0.25	0.77
TiO_2	0.06	1.97	0.05	0.27	0.15	0.35	0.18
P_2O_5	0.03	2.50	0.05	0.06	0.06	0.17	0.37
F^-	2.66	2.59	2.21	0.57	0.25	1.56	0.55
Y_2O_3	0.00	0.07	0.00	0.00	0.00	0.00	0.02
ZrO_2	0.00	0.98	0.00	0.01	0.03	0.01	0.33
LaO_2	0.02	2.19	0.02	0.02	0.03	0.03	0.19
CeO_2	0.02	4.00	0.04	0.03	0.06	0.04	0.36
ThO_2	0.01	0.58	0.01	0.01	0.01	0.01	0.11
LOF	36.43	3.42	41.05	3.46	2.26	1.60	0.74
Total	102.26	101.36	101.62	100.51	98.45	100.84	99.61

	6212.00	6219.00	6220.00	6226.00	6227.00	6228.00	6229.00
SiO_2	53.77	70.58	54.07	41.21	58.45	18.12	84.80
Al_2O_3	22.12	13.42	8.16	12.12	15.90	7.55	5.73
Fe_2O_3	3.33	5.90	31.44	7.42	12.12	0.27	2.54
MnO	0.15	0.08	0.33	0.15	0.10	0.11	0.02
MgO	1.41	0.31	0.72	10.24	0.51	0.38	0.19
CaO	8.94	2.90	1.74	14.08	3.14	1.07	0.11
Na_2O	4.87	1.76	1.10	1.02	3.78	2.13	0.00
K_2O	1.19	2.73	0.86	0.24	2.25	0.04	1.87
TiO_2	0.05	0.22	0.84	1.64	1.31	1.69	0.25
P_2O_5	2.21	0.13	0.08	2.99	0.09	22.17	0.07
F^-	1.05	0.55	1.23	1.95	0.86	3.86	0.24
Y_2O_3	0.02	0.01	0.00	0.07	0.00	1.02	0.00
ZrO_2	0.03	0.10	0.01	0.81	0.14	1.29	0.03
LaO_2	0.06	0.04	0.05	1.36	0.04	7.51	0.01
CeO_2	0.13	0.08	0.07	2.49	0.06	15.96	0.03
ThO_2	0.04	0.02	0.02	0.39	0.02	3.96	0.01
LOF	0.68	0.90	0.04	3.08	1.02	3.30	0.00
Total	100.04	99.72	100.74	101.26	99.80	90.44	95.89

	6275.00	6276.00	8277.00	9277.00	8278.00	9278.00	6279.00
SiO_2	58.38	74.02	68.07	50.43	50.00	47.94	59.79
Al_2O_3	15.57	13.42	13.94	14.09	8.93	13.00	11.96
Fe_2O_3	11.94	1.50	2.94	12.76	20.04	17.46	15.33
MnO	0.10	0.02	0.04	0.24	0.61	0.40	0.07
MgO	0.45	0.40	1.16	6.51	2.91	5.76	0.31
CaO	3.30	1.18	2.03	9.03	3.52	9.70	0.29
Na_2O	3.29	2.34	2.40	2.38	1.29	1.92	1.12
K_2O	3.17	5.33	5.42	1.59	1.97	0.84	7.64
TiO_2	1.14	0.23	0.62	1.27	0.52	1.85	1.08
P_2O_5	0.05	0.05	0.20	0.17	0.83	0.19	0.04
F-	0.88	0.37	0.63	1.16	1.17	1.44	0.86
Y_2O_3	0.01	0.01	0.01	0.00	0.00	0.00	0.00
ZrO_2	0.03	0.05	0.17	0.03	0.02	0.03	0.02
LaO_2	0.25	0.02	0.16	0.03	0.03	0.03	0.04
CeO_2	0.44	0.04	0.31	0.03	0.05	0.04	0.06
ThO_2	0.06	0.02	0.05	0.01	0.01	0.01	0.01
LOF	1.14	0.74	1.56	1.50	4.74	0.90	0.52
Total	100.21	99.73	99.73	101.22	96.64	101.50	99.14

	6280.00	6281.00	6282.00	90.00	91.00	92.00	93.00
SiO_2	62.50	24.78	44.37	42.41	88.99	43.07	66.02
Al_2O_3	16.93	5.33	9.03	0.55	2.29	19.76	15.34
Fe_2O_3	3.30	63.13	7.68	31.43	5.97	8.03	2.39
MnO	0.10	0.11	0.24	0.06	0.03	0.10	0.04
MgO	0.75	0.89	6.07	0.30	0.22	5.27	0.67
CaO	6.56	0.68	16.44	0.26	0.11	18.24	6.10
Na_2O	2.89	0.56	0.10	0.84	0.00	0.76	3.39
K_2O	1.44	1.13	0.96	0.07	0.68	0.11	1.09
TiO_2	0.23	3.07	0.96	0.04	0.04	0.41	0.37
P_2O_5	0.64	0.03	0.13	0.16	0.04	0.12	0.72
F-	0.80	2.06	1.58	1.24	0.38	1.82	1.10
Y_2O_3	0.06	0.00	0.00	0.00	0.00	0.02	0.02
ZrO_2	0.10	0.05	0.03	0.00	0.02	0.62	1.27
LaO_2	0.25	0.07	0.02	0.04	0.01	0.34	0.28
CeO_2	0.53	0.08	0.04	0.04	0.02	0.53	0.52
ThO_2	0.15	0.02	0.01	0.01	0.01	0.11	0.11
LOF	3.06	1.38	13.59	6.41	1.26	2.74	1.86
Total	100.29	103.39	101.25	83.87	100.08	102.06	101.30

	95.00	96.00	97.00	98.00	99.00	800.00	900.00
SiO_2	70.39	84.25	91.17	48.56	42.91	75.44	54.77
Al_2O_3	3.15	0.07	0.20	1.61	4.67	2.18	23.02
Fe_2O_3	20.41	13.41	5.58	41.65	10.11	17.78	1.95
MnO	0.04	0.03	0.03	0.08	0.31	0.08	0.06
MgO	0.30	0.13	0.08	0.35	1.98	0.21	0.67
CaO	0.13	0.02	0.02	0.46	19.68	0.10	8.22
Na_2O	0.00	0.00	0.00	0.00	1.18	0.00	5.82
K_2O	0.89	0.00	0.04	0.30	0.18	0.59	1.03
TiO_2	0.13	0.01	0.03	0.09	0.11	0.21	0.08
P_2O_5	0.11	0.03	0.06	0.28	0.05	0.12	0.83
F^-	0.93	0.37	0.21	1.45	2.00	0.72	0.98
Y_2O_3	0.00	0.00	0.00	0.00	0.00	0.00	0.02
ZrO_2	0.02	0.01	0.00	0.00	0.01	0.00	0.06
LaO_2	0.03	0.02	0.02	0.04	0.02	0.02	0.34
CeO_2	0.04	0.02	0.04	0.05	0.02	0.03	0.62
ThO_2	0.01	0.01	0.01	0.02	0.01	0.01	0.15
LOF	3.50	1.70	1.04	6.38	19.13	2.96	1.68
Total	100.10	100.10	98.53	101.32	102.38	100.45	100.28

	801.00	901.00	102.00	103.00
SiO_2	40.93	47.76	49.41	39.17
Al_2O_3	6.92	8.81	6.23	16.25
Fe_2O_3	8.79	18.19	11.48	9.94
MnO	0.10	0.39	0.33	0.45
MgO	4.69	4.23	15.11	3.12
CaO	19.09	11.97	12.15	21.01
Na_2O	1.49	1.00	1.05	0.46
K_2O	0.91	0.46	0.42	0.19
TiO_2	5.07	2.73	1.07	1.94
P_2O_5	0.08	0.32	0.15	0.67
F^-	1.82	1.62	1.60	1.95
Y_2O_3	0.23	0.01	0.01	0.29
ZrO_2	0.03	0.03	0.02	0.09
LaO_2	0.04	0.03	0.02	0.07
CeO_2	0.09	0.04	0.03	0.12
ThO_2	0.01	0.01	0.01	0.06
LOF	11.10	4.74	2.04	5.58
Total	101.37	102.33	101.14	101.36

APPENDIX C

BULK ASSAYS OF DRILL CORE (RE1) SAMPLES

	4.12	6.75	8.00	8.70	9.60	10.40	11.00
SiO_2	53.23	53.17	53.85	50.34	52.95	47.28	51.61
TiO_2	1.37	1.15	1.24	1.07	1.30	1.14	0.92
Al_2O_3	15.88	15.95	15.09	16.47	14.11	15.81	15.66
Fe_2O_3	11.98	11.47	12.26	11.26	12.70	13.60	11.04
MnO	0.14	0.15	0.17	0.16	0.21	0.20	0.17
MgO	2.99	3.24	3.21	4.20	4.58	4.96	3.95
CaO	4.81	6.27	6.66	7.33	7.05	7.84	7.95
Na_2O	2.04	3.07	3.35	2.90	3.13	2.75	2.60
K_2O	4.29	2.52	1.73	2.59	2.06	2.36	2.54
P_2O_5	0.61	0.57	0.47	0.56	0.42	0.46	0.52
F^-	1.05	1.08	1.12	1.21	1.14	1.19	1.03
Y_2O_3	0.01	0.02	0.01	0.03	0.01	0.02	0.02
ZrO_2	0.07	0.07	0.06	0.06	0.05	0.03	0.06
LaO_2	0.03	0.03	0.02	0.03	0.03	0.03	0.03
CeO_2	0.05	0.04	0.04	0.06	0.04	0.06	0.05
ThO_2	0.01	0.01	0.01	0.01	0.01	0.01	0.01
LOF	1.58	1.60	1.26	1.72	1.14	1.74	1.96
Total	100.14	100.40	100.55	99.99	100.93	99.48	100.13

	12.00	12.60	14.30	14.80	16.00	16.40	17.00
SiO_2	50.48	57.31	53.53	48.71	69.43	83.91	71.17
TiO_2	1.32	1.02	1.23	1.62	0.30	0.12	0.19
Al_2O_3	14.86	17.26	15.82	16.77	15.85	7.57	14.55
Fe_2O_3	13.29	6.76	11.06	11.60	2.15	0.99	1.19
MnO	0.18	0.08	0.12	0.14	0.04	0.02	0.02
MgO	4.53	2.55	3.06	4.29	0.81	0.35	0.55
CaO	7.55	4.05	5.78	4.99	2.96	1.63	1.59
Na_2O	2.39	3.49	2.05	2.16	4.63	2.01	2.61
K_2O	2.26	3.60	3.51	4.41	1.48	0.99	5.33
P_2O_5	0.41	0.38	0.49	0.61	0.05	0.02	0.06
F^-	1.31	0.77	1.11	1.25	0.46	0.28	0.53
Y_2O_3	0.02	0.01	0.02	0.02	0.00	0.00	0.01
ZrO_2	0.10	0.07	0.07	0.12	0.03	0.02	0.03
LaO_2	0.03	0.07	0.04	0.06	0.05	0.01	0.06
CeO_2	0.06	0.14	0.07	0.11	0.08	0.02	0.15
ThO_2	0.01	0.02	0.02	0.02	0.02	0.01	0.02
LOF	1.16	2.06	1.78	2.78	1.86	1.60	1.56
Total	99.94	99.63	99.75	99.64	100.19	99.56	99.61

	18.60	19.15	20.00	21.00	21.70	22.70	23.90
SiO_2	74.31	71.38	71.98	72.58	71.61	70.62	71.36
TiO_2	0.47	0.22	0.17	0.19	0.30	0.28	0.30
Al_2O_3	11.07	13.76	14.11	13.73	13.47	14.51	13.87
Fe_2O_3	2.40	1.08	1.24	0.96	1.42	1.48	1.56
MnO	0.04	0.02	0.03	0.02	0.02	0.03	0.02
MgO	1.10	0.61	0.62	0.52	0.73	0.73	0.49
CaO	0.94	1.22	1.87	1.38	1.09	2.13	1.37
Na_2O	0.91	1.82	2.99	2.23	1.67	2.30	2.08
K_2O	6.26	6.83	3.65	6.20	6.92	5.37	6.87
P_2O_5	0.03	0.04	0.03	0.04	0.02	0.03	0.10
F^-	0.42	0.47	0.37	0.62	0.57	0.51	0.55
Y_2O_3	0.01	0.00	0.00	0.00	0.01	0.01	0.01
ZrO_2	0.02	0.02	0.02	0.02	0.03	0.03	0.05
LaO_2	0.01	0.01	0.02	0.03	0.06	0.07	0.02
CeO_2	0.06	0.05	0.05	0.08	0.14	0.15	0.06
ThO_2	0.01	0.01	0.01	0.01	0.02	0.02	0.01
LOF	1.50	1.72	2.68	1.48	1.54	1.50	1.28
Total	99.55	99.27	99.86	100.08	99.61	99.76	100.00

	24.65	25.25	26.60	27.50	28.60	29.50	30.20
SiO_2	70.21	69.48	73.93	74.08	71.53	60.05	56.18
TiO_2	0.34	0.58	0.14	0.29	0.25	0.89	1.26
Al_2O_3	14.59	13.67	13.39	12.69	13.99	15.44	15.04
Fe_2O_3	1.75	2.74	0.69	1.28	1.38	7.10	9.48
MnO	0.02	0.03	0.02	0.02	0.03	0.09	0.13
MgO	0.82	1.37	0.45	0.67	0.69	2.77	3.47
CaO	2.12	1.23	1.73	1.11	1.87	2.85	5.63
Na_2O	2.42	1.32	2.18	1.48	2.16	1.85	2.54
K_2O	5.29	6.83	5.28	6.38	5.71	5.74	2.94
P_2O_5	0.05	0.04	0.02	0.02	0.03	0.28	0.40
F^-	0.53	0.47	0.53	0.44	0.47	0.93	1.04
Y_2O_3	0.01	0.01	0.01	0.01	0.01	0.01	0.01
ZrO_2	0.04	0.02	0.02	0.02	0.03	0.04	0.04
LaO_2	0.03	0.03	0.03	0.03	0.04	0.04	0.04
CeO_2	0.07	0.08	0.08	0.08	0.10	0.08	0.07
ThO_2	0.01	0.01	0.01	0.01	0.02	0.01	0.01
LOF	1.66	1.36	1.30	1.18	1.66	1.94	2.78
Total	99.96	99.28	99.81	99.79	99.96	100.11	101.07

	31.20	32.00	32.84	34.00	34.30	35.10	36.50
SiO_2	53.88	49.59	52.88	51.97	48.49	49.34	48.57
TiO_2	1.23	1.52	1.04	0.55	1.36	1.24	1.18
Al_2O_3	14.08	15.13	15.03	20.89	15.49	14.59	16.18
Fe_2O_3	11.60	12.25	11.58	6.90	12.47	10.82	12.87
MnO	0.16	0.20	0.17	0.10	0.16	0.18	0.15
MgO	4.09	4.53	4.75	1.52	4.40	6.10	3.90
CaO	6.18	8.00	6.90	8.04	7.09	8.95	7.96
Na_2O	1.30	2.74	2.54	5.28	2.04	1.81	1.41
K_2O	3.68	2.55	2.60	1.51	3.93	2.91	3.05
P_2O_5	0.38	0.50	0.36	0.35	0.51	0.37	0.38
F^-	1.31	1.25	1.25	0.97	1.34	1.42	1.14
Y_2O_3	0.02	0.01	0.02	0.01	0.02	0.01	0.02
ZrO_2	0.05	0.05	0.03	0.03	0.04	0.05	0.14
LaO_2	0.03	0.03	0.03	0.03	0.03	0.03	0.03
CeO_2	0.05	0.05	0.05	0.05	0.06	0.05	0.06
ThO_2	0.01	0.01	0.01	0.01	0.01	0.01	0.01
LOF	2.88	3.06	1.18	2.08	2.80	2.50	3.10
Total	100.92	101.46	100.41	100.27	100.23	100.36	100.15

	37.60	38.60	39.25	40.10	41.40	42.00	42.90
SiO_2	52.50	52.11	48.66	48.25	62.74	47.96	52.80
TiO_2	1.25	1.04	0.83	1.42	0.77	1.53	1.33
Al_2O_3	15.03	15.64	14.85	15.23	13.04	13.01	13.83
Fe_2O_3	11.97	10.71	10.72	11.67	7.67	14.81	12.44
MnO	0.16	0.18	0.20	0.17	0.12	0.24	0.20
MgO	4.05	4.08	6.47	3.82	3.03	6.11	4.87
CaO	6.43	7.63	11.14	9.41	5.75	8.81	8.58
Na_2O	2.57	3.20	2.34	2.65	2.95	2.24	2.66
K_2O	2.39	1.68	1.39	1.13	1.35	2.56	1.41
P_2O_5	0.34	0.41	0.40	0.37	0.13	0.14	0.19
F^-	1.10	1.17	1.39	1.19	0.86	1.40	1.23
Y_2O_3	0.01	0.01	0.01	0.01	0.00	0.00	0.00
ZrO_2	0.05	0.05	0.05	0.04	0.03	0.02	0.02
LaO_2	0.03	0.02	0.03	0.03	0.02	0.03	0.03
CeO_2	0.04	0.04	0.05	0.05	0.03	0.04	0.04
ThO_2	0.01	0.01	0.01	0.01	0.01	0.01	0.01
LOF	2.00	2.62	2.12	4.50	2.42	2.84	1.46
Total	99.94	100.61	100.68	99.96	100.91	101.74	101.13

	43.90	44.40	45.30	45.75	47.10	48.10	48.40
SiO_2	47.56	48.35	45.39	54.81	52.47	51.88	51.82
TiO_2	1.53	1.21	1.60	0.95	1.09	1.22	1.37
Al_2O_3	14.64	16.68	14.60	13.40	14.41	14.91	14.25
Fe_2O_3	14.62	11.68	16.31	10.57	12.16	11.36	12.31
MnO	0.24	0.17	0.23	0.17	0.19	0.18	0.18
MgO	5.48	3.25	6.24	4.20	4.55	4.30	4.69
CaO	9.38	10.41	8.05	8.12	7.65	8.54	7.33
Na_2O	2.65	2.48	2.29	3.02	2.98	3.29	3.07
K_2O	1.75	1.09	1.97	0.33	1.43	1.62	2.00
P_2O_5	0.37	0.49	0.24	0.15	0.23	0.25	0.29
F-	1.53	1.57	1.68	1.17	1.17	1.25	1.14
Y_2O_3	0.01	0.02	0.04	0.01	0.01	0.01	0.02
ZrO_2	0.04	0.05	0.03	0.03	0.03	0.06	0.05
LaO_2	0.03	0.03	0.07	0.02	0.03	0.03	0.03
CeO_2	0.04	0.04	0.13	0.04	0.05	0.05	0.05
ThO_2	0.01	0.01	0.02	0.01	0.01	0.01	0.01
LOF	1.32	3.46	1.80	4.56	2.56	2.72	2.32
Total	101.22	100.99	100.70	101.56	101.02	101.68	100.95

	49.30	50.90	51.30	52.00	53.00	54.15	55.25
SiO_2	60.53	47.89	47.93	53.81	54.42	57.41	63.09
TiO_2	0.91	1.68	0.96	1.16	1.09	1.11	0.37
Al_2O_3	12.91	14.47	10.33	13.84	13.20	12.97	17.63
Fe_2O_3	9.97	15.57	10.98	11.89	10.75	10.98	3.72
MnO	0.15	0.28	0.19	0.19	0.17	0.18	0.07
MgO	3.17	5.37	4.07	4.61	3.96	4.67	1.68
CaO	6.80	9.21	9.75	7.39	7.58	7.24	7.02
Na_2O	2.45	2.27	1.60	2.60	2.28	2.38	4.35
K_2O	0.90	1.06	1.36	1.41	1.75	1.43	0.56
P_2O_5	0.16	0.36	0.10	0.22	0.15	0.11	0.15
F-	0.94	1.50	1.03	1.18	0.89	1.23	0.69
Y_2O_3	0.00	0.01	0.00	0.01	0.01	0.00	0.00
ZrO_2	0.04	0.05	0.03	0.03	0.03	0.02	0.03
LaO_2	0.02	0.04	0.02	0.03	0.03	0.03	0.02
CeO_2	0.03	0.05	0.03	0.04	0.03	0.03	0.02
ThO_2	0.01	0.01	0.01	0.01	0.01	0.01	0.01
LOF	0.36	1.18	12.65	2.48	4.22	1.02	1.04
Total	99.34	101.00	101.06	100.90	100.57	100.83	100.46

	56.20	57.20	58.10	58.80	60.22	61.00	62.20
SiO_2	58.30	47.32	48.82	58.79	48.24	48.67	48.88
TiO_2	0.83	1.53	1.50	1.00	1.52	1.42	1.48
Al_2O_3	15.35	13.07	13.03	13.58	13.04	12.59	13.01
Fe_2O_3	8.69	15.72	15.04	9.71	15.09	14.91	14.65
MnO	0.14	0.25	0.26	0.17	0.25	0.25	0.23
MgO	3.67	6.97	6.53	4.16	6.52	7.03	6.97
CaO	7.15	9.39	10.02	7.50	10.66	9.32	9.24
Na_2O	3.29	2.25	2.72	2.91	2.60	2.49	2.49
K_2O	1.26	1.13	0.87	0.93	0.85	1.47	1.16
P_2O_5	0.12	0.13	0.13	0.10	0.13	0.15	0.12
F-	1.02	1.30	1.46	1.13	1.38	1.36	1.46
Y_2O_3	0.01	0.01	0.00	0.00	0.00	0.00	0.00
ZrO_2	0.03	0.03	0.03	0.03	0.03	0.02	0.02
LaO_2	0.02	0.03	0.03	0.03	0.03	0.03	0.03
CeO_2	0.04	0.05	0.04	0.03	0.04	0.03	0.03
ThO_2	0.01	0.01	0.01	0.01	0.01	0.01	0.01
LOF	0.82	1.82	0.96	0.88	0.94	1.24	1.94
Total	100.77	101.01	101.45	100.96	101.31	101.00	101.72

	63.30	63.60	64.80	65.75	66.75	67.85	68.80
SiO_2	49.59	51.04	53.53	47.26	52.52	52.27	52.50
TiO_2	1.49	1.21	1.14	1.24	1.47	1.44	0.92
Al_2O_3	13.18	12.34	12.56	11.91	12.68	13.76	13.63
Fe_2O_3	14.68	13.69	12.81	15.88	14.19	13.70	11.36
MnO	0.25	0.23	0.19	0.25	0.25	0.23	0.21
MgO	6.41	5.89	4.85	5.97	5.61	5.43	6.50
CaO	9.75	9.42	8.44	11.93	9.48	8.23	8.75
Na_2O	2.49	2.32	2.35	1.77	2.28	2.74	2.46
K_2O	1.21	1.53	1.19	0.67	0.98	1.35	1.65
P_2O_5	0.14	0.13	0.10	0.13	0.13	0.16	0.09
F-	1.66	1.29	1.13	1.53	1.29	1.29	1.11
Y_2O_3	0.00	0.00	0.01	0.00	0.01	0.01	0.00
ZrO_2	0.02	0.02	0.03	0.02	0.02	0.03	0.02
LaO_2	0.03	0.03	0.03	0.03	0.03	0.03	0.03
CeO_2	0.03	0.03	0.03	0.04	0.04	0.04	0.03
ThO_2	0.01	0.01	0.01	0.01	0.01	0.01	0.01
LOF	0.66	0.78	2.32	0.00	0.50	0.52	1.64
Total	101.60	99.98	100.71	98.65	101.49	101.22	100.90

	69.80	70.50	71.00	72.10	72.20	73.90	74.90
SiO_2	59.98	58.48	72.32	65.72	55.60	66.18	54.49
TiO_2	0.69	1.07	0.18	0.56	1.35	0.68	0.87
Al_2O_3	14.54	14.44	13.43	14.34	13.31	14.73	15.05
Fe_2O_3	7.85	9.35	1.23	5.84	11.56	4.73	9.46
MnO	0.14	0.15	0.02	0.09	0.16	0.06	0.15
MgO	4.01	3.97	0.44	2.40	4.64	1.84	4.48
CaO	7.06	6.61	1.06	5.75	6.41	4.81	7.29
Na_2O	2.91	2.75	1.49	3.05	2.06	3.00	2.75
K_2O	1.29	1.48	7.61	1.15	1.80	1.49	2.08
P_2O_5	0.10	0.10	0.02	0.06	0.12	0.19	0.37
F^-	0.83	1.08	0.34	0.73	0.87	0.53	1.02
Y_2O_3	0.01	0.01	0.01	0.02	0.02	0.00	0.02
ZrO_2	0.05	0.05	0.02	0.03	0.05	0.03	0.03
LaO_2	0.02	0.03	0.02	0.02	0.06	0.05	0.03
CeO_2	0.03	0.05	0.05	0.03	0.11	0.08	0.04
ThO_2	0.01	0.01	0.01	0.01	0.02	0.02	0.01
LOF	0.86	0.70	0.82	0.94	1.00	1.20	1.88
Total	100.38	100.33	99.07	100.73	99.15	99.60	100.01

	75.45	76.90	77.70	79.50	79.70	80.70	81.80
SiO_2	47.21	52.48	48.16	54.16	56.64	62.68	56.51
TiO_2	0.55	1.18	1.20	0.88	0.88	0.79	0.90
Al_2O_3	13.75	13.61	13.90	13.48	14.73	13.58	13.48
Fe_2O_3	9.70	12.00	14.20	10.97	8.70	6.69	9.92
MnO	0.20	0.21	0.24	0.19	0.15	0.11	0.17
MgO	8.60	5.44	6.64	5.07	3.93	3.37	4.60
CaO	13.08	8.88	10.20	8.02	6.44	4.50	8.31
Na_2O	2.74	2.99	3.12	2.87	2.73	1.98	2.13
K_2O	1.29	1.50	1.40	1.31	2.95	3.32	1.46
P_2O_5	0.27	0.12	0.21	0.14	0.24	0.13	0.09
F^-	1.46	1.02	1.23	1.17	0.71	0.59	0.94
Y_2O_3	0.00	0.01	0.00	0.01	0.01	0.01	0.01
ZrO_2	0.02	0.03	0.02	0.03	0.05	0.07	0.02
LaO_2	0.02	0.03	0.02	0.02	0.02	0.08	0.03
CeO_2	0.04	0.04	0.04	0.03	0.04	0.15	0.04
ThO_2	0.01	0.01	0.01	0.01	0.01	0.02	0.01
LOF	3.38	1.58	1.30	0.56	0.94	0.88	0.84
Total	102.33	101.10	101.89	98.93	99.17	98.95	99.44

	82.25	83.30	84.00	84.70	85.30	86.35	87.45
SiO_2	74.66	59.10	64.97	56.25	52.63	48.30	62.48
TiO_2	0.52	0.90	0.89	1.05	0.98	1.08	0.68
Al_2O_3	10.60	14.96	14.73	13.31	13.52	13.62	13.99
Fe_2O_3	4.35	8.48	5.46	10.90	11.74	13.85	7.07
MnO	0.05	0.13	0.07	0.18	0.21	0.23	0.11
MgO	1.47	3.41	2.33	5.27	6.55	7.25	3.36
CaO	2.97	5.84	3.79	7.50	9.33	8.17	5.91
Na_2O	1.90	2.64	2.54	2.05	2.46	1.86	2.61
K_2O	1.35	2.29	3.05	1.77	1.39	2.89	1.40
P_2O_5	0.15	0.19	0.18	0.09	0.10	0.10	0.14
F^-	0.43	0.92	0.62	0.88	1.11	1.14	0.62
Y_2O_3	0.01	0.01	0.01	0.01	0.00	0.00	0.01
ZrO_2	0.06	0.05	0.09	0.03	0.07	0.02	0.05
LaO_2	0.07	0.03	0.04	0.02	0.02	0.02	0.03
CeO_2	0.13	0.05	0.07	0.04	0.03	0.03	0.05
ThO_2	0.03	0.01	0.02	0.01	0.01	0.01	0.01
LOF	0.62	1.48	1.52	1.92	2.00	2.88	2.66
Total	99.36	100.49	100.36	101.29	102.18	101.45	101.17

	88.45	91.90	92.90	93.90	94.20	95.40	96.10
SiO_2	70.94	71.83	64.97	49.60	66.71	50.87	52.84
TiO_2	0.38	0.40	0.58	1.10	0.82	1.13	0.97
Al_2O_3	13.13	13.16	13.61	13.55	12.62	13.05	13.20
Fe_2O_3	1.93	2.07	6.00	14.05	6.33	13.44	11.48
MnO	0.03	0.03	0.10	0.25	0.10	0.23	0.22
MgO	1.00	0.86	2.83	7.22	2.62	6.47	6.20
CaO	1.03	1.09	5.32	9.63	4.90	9.23	7.93
Na_2O	1.11	1.39	2.63	2.10	2.49	1.94	1.90
K_2O	7.74	7.40	2.06	1.29	1.06	1.34	1.82
P_2O_5	0.02	0.03	0.07	0.09	0.05	0.10	0.38
F^-	0.49	0.29	0.59	1.06	0.43	0.96	0.80
Y_2O_3	0.01	0.01	0.01	0.00	0.01	0.01	0.01
ZrO_2	0.05	0.02	0.03	0.02	0.03	0.02	0.04
LaO_2	0.03	0.01	0.02	0.02	0.01	0.02	0.02
CeO_2	0.08	0.04	0.04	0.03	0.02	0.02	0.03
ThO_2	0.01	0.01	0.01	0.01	0.01	0.01	0.01
LOF	0.78	0.44	0.66	0.38	1.02	0.98	0.86
Total	98.78	99.08	99.51	100.43	99.23	99.82	98.70

	97.60	98.60	99.20	100.20
SiO_2	48.46	48.94	55.54	51.45
TiO_2	1.16	1.14	0.93	1.08
Al_2O_3	13.27	13.23	13.81	13.45
Fe_2O_3	14.22	14.03	10.51	13.16
MnO	0.26	0.26	0.20	0.24
MgO	6.77	6.71	5.13	6.67
CaO	11.34	11.65	9.05	9.24
Na_2O	2.21	2.32	2.60	2.63
K_2O	0.85	0.74	1.01	1.09
P_2O_5	0.12	0.11	0.08	0.11
F^-	0.96	1.29	0.89	1.11
Y_2O_3	0.00	0.00	0.00	0.00
ZrO_2	0.02	0.02	0.02	0.02
LaO_2	0.01	0.01	0.02	0.02
CeO_2	0.02	0.02	0.02	0.02
ThO_2	0.01	0.01	0.01	0.01
LOF	0.02	0.32	0.12	0.26
Total	99.70	100.82	99.94	100.57

APPENDIX D

PRINCIPAL COMPONENT DATA FROM THORIUM ANOMALY BULK ASSAYS

Projected coordinates of the thorium anomaly bulk assay data from the principal component analysis.

sample	x	y
3084	-1.0681	2.4979
3149	-3.4354	2.5771
6133	1.1902	-0.90723
6134	1.0666	-0.81330
6135	1.1529	-0.52379
6136	1.4328	-0.92347
6137	1.5270	-1.0097
6138	1.0532	-0.86698
6139	1.4614	-0.91832
6140	1.6840	-0.85285
6141	0.56357	-0.40727
6142	0.35474	-0.20534
6143	-1.3683	0.63576
6144	-1.2575	0.61130
6145	1.3749	-0.37625
6146	1.6650	-0.85942
6147	1.2819	-1.0064
6148	1.8133	-1.2887
6149	1.1849	-0.46894
6150	1.1264	-0.36996
6151	-2.0040	2.8018
6152	-4.8077	-1.8223
6153	1.2899	-1.2432
6154	1.3469	-0.55974
6155	-0.16660E-01	1.0320
6156	1.6783	-0.76262
6157	1.2124	-0.80122
6158	0.28982	-0.91036
6159	-1.6399	2.9395
6160	-0.11470	1.0647
6161	1.0638	-0.24102
6163	1.1765	0.68027E-01
6164A	1.4375	-0.93575
6164B	1.3875	-1.0807
6165	1.2070	-0.64426
6166	1.3742	-0.71716
6167	-1.4732	2.4978
6168	-1.8775	2.8593
6169	0.66682	-0.80545E-01
6170	1.8006	-0.86959
6171	1.4247	-1.0024
6172	0.29765	-2.0685
6173	1.4468	-0.27769
6174	1.1979	0.25408E-01
7175	2.0095	-0.96923
6176	2.1070	-1.1486
6177	1.5197	-0.57686
6178	1.9868	-1.0191

sample	x	y
6179	1.6136	-0.88692
6180	-1.4027	2.4444
6181	1.4005	-1.0774
6182	1.6154	-0.60584
6183	1.1847	-1.1428
6184	1.6579	-0.54215
6185	1.1046	0.27992
6186	0.28141	0.90400
6187	1.8687	-0.74475
6188	-8.1640	-5.1450
6193	1.2064	-0.98551
6194	-1.7009	-2.0963
6195	1.7577	-0.91100
6196	1.3877	-0.54595
6197	0.45401	-0.48254
6198	1.2735	-0.48242
6199	1.8067	-1.0071
6200	1.4373	-0.56413
6201	-1.3276	2.4935
6202	1.0161	-0.71903
6203	2.2208	-1.0287
6205	-14.334	-4.1741
6207	0.65187	1.1450
6208	1.2796	-0.72857E-01
6209	-1.7615	2.8994
6211	-0.65221	-0.97891
6212	-1.7988	0.21887E-01
6219	0.75268	-0.42652E-01
6220	-0.77581	2.4693
6226	-11.142	-2.3051
6227	-0.37282	0.70703
6229	1.8491	-0.63422
6275	-0.81469	0.28958
6276	1.5448	-0.74977
6277a	0.97131E-01	-0.70454
6277b	-1.6025	2.4451
6278a	-1.6599	2.9829
6278b	-2.2476	2.8769
6279	0.48515	0.50725
6280	-1.7378	-0.48336
6282	-1.0614	4.3670
91	1.6959	-0.4158E-01
92	-4.4095	1.75137
93	-2.9534	-2.0396
95	0.18965	1.9517
96	1.3785	0.66969
97	1.8615	-0.17681
98	-1.6478	4.6100
100	0.55257	1.5291
102	-2.8490	3.9448

APPENDIX E

PRINCIPAL COMPONENT DATA FOR DDH BULK ASSAYS

Coordinates of each bulk assay of DDH data from the principal component analysis projected onto the first and second principal component plane.

Sample depth (m)	x	y
4.12	0.53	-2.10
6.75	1.02	-2.34
8.00	1.37	-0.96
8.70	1.32	-2.97
9.60	1.74	-0.71
10.40	1.91	-1.57
11.00	1.04	-1.93
12.00	1.75	-2.54
12.60	-2.19	-4.77
14.30	-0.19	-3.57
14.80	0.37	-6.32
16.00	-3.88	-0.74
16.40	-4.58	4.55
17.00	-5.71	-2.00
18.60	-4.65	2.42
19.15	-4.74	2.34
20.00	-4.20	2.03
21.00	-4.87	1.39
21.70	-5.96	-1.57
22.70	-5.62	-2.20
23.90	-4.61	0.66
24.65	-4.29	0.40
25.25	-4.50	0.85
26.60	-4.95	1.31
27.50	-5.18	1.28
28.60	-5.31	-0.61
29.50	-1.95	-1.11
30.20	0.09	-1.34
31.20	0.79	-1.23
32.00	2.14	-1.44
32.84	1.11	-0.93
34.00	0.67	-1.76
34.30	1.49	-1.97
35.10	1.93	-0.81
36.50	1.18	-3.45
37.60	1.08	-0.74
38.60	1.49	-0.71
39.25	2.32	-0.71
40.10	2.02	-0.95
41.40	-0.61	1.80
42.00	2.66	1.04
42.90	1.80	0.97
43.90	3.14	-0.69
44.40	2.41	-2.07
45.30	1.99	-4.84
45.75	1.23	0.78
47.10	1.41	-0.06
48.10	1.62	-0.87
48.40	1.55	-1.15
49.30	0.16	1.64
50.90	3.36	-1.19
51.30	1.53	1.91
52.00	1.37	0.24
53.00	0.69	0.70
54.15	0.98	1.63
55.25	-1.26	1.03
56.20	0.18	0.65
57.20	3.02	0.40
58.10	3.22	1.02
58.80	0.69	1.39
60.22	3.20	1.04
61.00	2.98	1.41
62.20	3.02	1.31
63.30	3.24	1.24
63.60	2.23	1.65
64.80	1.46	0.97
65.75	3.15	1.65
66.75	2.47	0.93
67.85	2.21	0.35
68.80	1.54	1.60
69.80	-0.20	0.81
70.50	0.24	0.07
71.00	-5.24	1.77
72.10	-1.45	0.88
72.20	-0.47	-2.64
73.90	-2.82	-0.78

(cont.)

Sample depth (m)	x	y
74.90	0.64	-0.71
75.45	2.78	1.34
76.90	1.60	0.59
77.70	2.82	1.22
79.50	1.24	1.11
79.70	-0.19	0.19
80.79	-3.08	-3.33
81.80	0.44	1.15
82.25	-4.85	-2.50
83.30	-0.41	-0.21
84.00	-2.58	-2.10
84.70	0.68	1.19
85.30	1.84	0.96
86.35	2.05	1.70
87.45	-1.12	0.31
88.45	-5.02	0.56
91.90	-4.78	2.18
92.90	-1.72	1.45
93.90	2.40	1.95
94.90	-1.51	2.24
95.40	2.01	1.65
96.10	1.42	0.61
97.60	2.79	2.38
98.60	3.11	2.31
99.20	1.11	2.14
100.2	2.28	2.01