'83-561-11448

BILLITON CANADA LTD.

1983 Geochemistry Assessment Report

ELMO CLAIM 11824

NELSON MINING DIVISION 82F/7E

49°23'N 116°33'W

GEOLOGICAL BRANCH
ASSESSMENT REPORT

11,448

Brian J. Paul

10 November,
1983

1983 GEOCHEMISTRY ASSESSMENT REPORT

TITLE	Sanca Creek Property
CLAIM	ELMO
COMMODITIES	W. MO (Cu)
LOCATION	33 km north of Creston Latitude 49°23'N, Longitude 116°33'W Nelson Mining Division 82F/7E
AUTHOR	Brian Paul
FOR	BILLITON CANADA LTD.
WORK PERIOD	June 26, 1983

BILLITON VANCOUVER OFFICE
November 10, 1983

TABLE OF CONTENTS

SUMMARY

The ELMO mineral claim, consisting of 12 units, is located in southeastern British Columbia 33 kilometres north of the community of Creston in the Nelson Mining Division, at 49°23'N latitude and 116°33' W longitude. Access is by paved highway from Creston to Sanca Creek, and by gravel road along Sanca Creek to the northern part of the property. This assessment report presents the results of an orientation soil sampling program on the property conducted on June 26, 1983.

The ELMO mineral claim is underlain in its entirety by the Bayonne Batholith, a large granitic intrusion of early to mid-Cretaceous age which extends across the southern part of Kootenay Lake. The rocks making up the batholith vary widely in composition and texture. Within the claim area, two discrete quartz monzonite intrusive phases are cut to varying degrees by a stockwork of quartz-muscovite (greisen) veinlets. Molybdenite, scheelite, fluorite, magnetite, pyrite and chalcopyrite occur as infrequent assessory minerals within the veinlets.

Fifty B horizon soil samples collected on grid lines crossing the central portion of the claim were analyzed at three different size fractions for silver, copper, molybdenum, lead, tungsten and zinc. Highly anomalous values in molybdenum and tungsten were obtained from an area of known molybdenite mineralization. The results indicate that silver, copper, molybdenum, lead and zinc are concentrated in the finer size fractions (-40 mesh), while tungsten is concentrated in the coarser (-40+80 mesh) fraction.

INTRODUCTION

General Statement

This report presents the results of an orientation soil sampling program on the ELMO mineral claim on June 26, 1983, by B.J. Paul, E.L. Jones and J. Monger of Billiton Canada Ltd.

Location and Access

The ELMO claim is located in southeastern British Columbia,

33 kilometres north of the community of Creston. Approximate geographical coordinates for the centre of the property are 49°23'N latitude, 116°33'W longitude.

Access is by paved highway from Creston to Sanca Creek, and thence by gravel road along Sanca Creek to the northern part of the property.

Topography, Climate

The ELMO claim lies within the Purcell Mountain chain, east of Kootenay Lake. Relief is moderate to severe, with elevations ranging from 1780 to 2320 metres. The claim covers a north-facing double cirque basin to the south of the East Fork of Sanca Creek.

The property, with the exception of the ridge crests, is well-forested. Pine, spruce and tamarack predominate except at the very highest elevations, where alpine larch is the dominant species. The northernmost portions of the property have been partially logged. Exposure is generally good, even in the forested areas, and approaches 100% along and to the immediate north of the ridge crests.

Climatically, the area is relatively dry, although snow cover tends to persist into June. The effective field season in this section of the Purcells extends from mid-June until the beginning of October.

Small streams drain both of the cirque basins throughout the summer, providing an adequate supply of water for camping (or diamond drilling) purposes.

Claim Data

The property consists of the ELMO mineral claim (12 units) which was staked on behalf of BILLITON CANADA LTD. on September 19 and 20, 1982. The claim is located in the Nelson Mining Division. Pertinent claim data is summarized as follows:

Claim	Units	Unit Numbers	Record Number	Location Dates	Record Date
ELMO	12	1-3,14-19,25-27	2843	September 19-20, 1982	October 13, 1982

ELMO CLAIM

SCALE

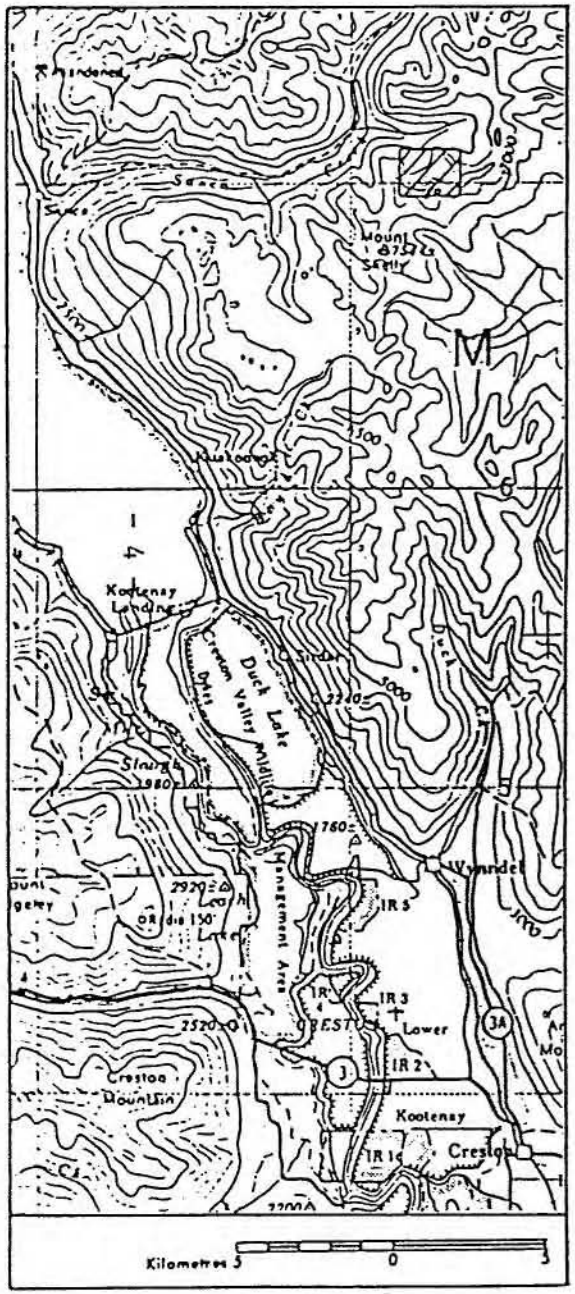
200 100 0 100 200 300 km

BILLITON CANADA LTD.

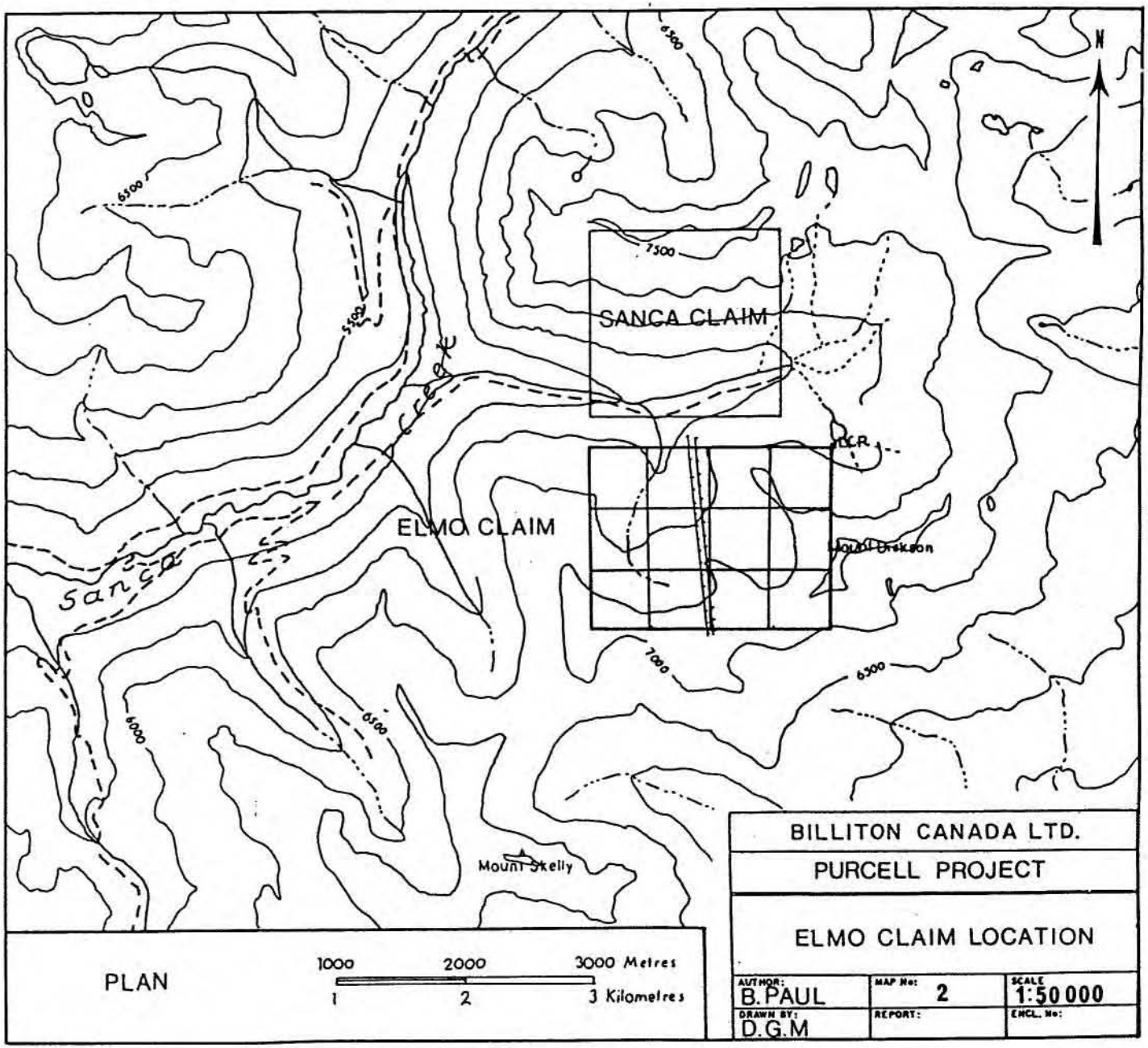
ELMO CLAIMS

LOCATION MAP

AUTHOR: B.J.PAUL	MAP No.: 1	SCALE: 1cm:100km
DRAWN BY: D.G.M	REPORT:	ENCL. No.:



LOCATION MAP



BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM LOCATION

AUTHOR: B.PAUL	MAP No: 2	SCALE 1:50 000
DRAWN BY: D.G.M	REPORT:	ENCL. No:

GEOLOGY

The ELMO mineral claim is underlain in its entirety by rocks of the Bayonne Batholith, a large granitic intrusion of early to mid-Cretaceous age which extends across the southern part of Kootenay Lake. The rocks comprising the batholith vary widely in composition and texture. Within the claim area are two discrete intrusive phases, a fine to medium-grained equigranular quartz monzonite and a coarse-grained equigranular to megacrystic quartz monzonite. Both phases are cut to varying degrees by a stockwork of quartz-muscovite (greisen) veinlets. Molybdenite, scheelite, fluorite, magnetite, pyrite and chalcopyrite occur as infrequent accessory minerals within the quartz-muscovite veinlets, occuring more frequently as the veinlets increase in width in certain areas of the coarse-grained quartz monzonite.

The soils on the property consist primarily of reddish-brown wooded soils and talus fines.

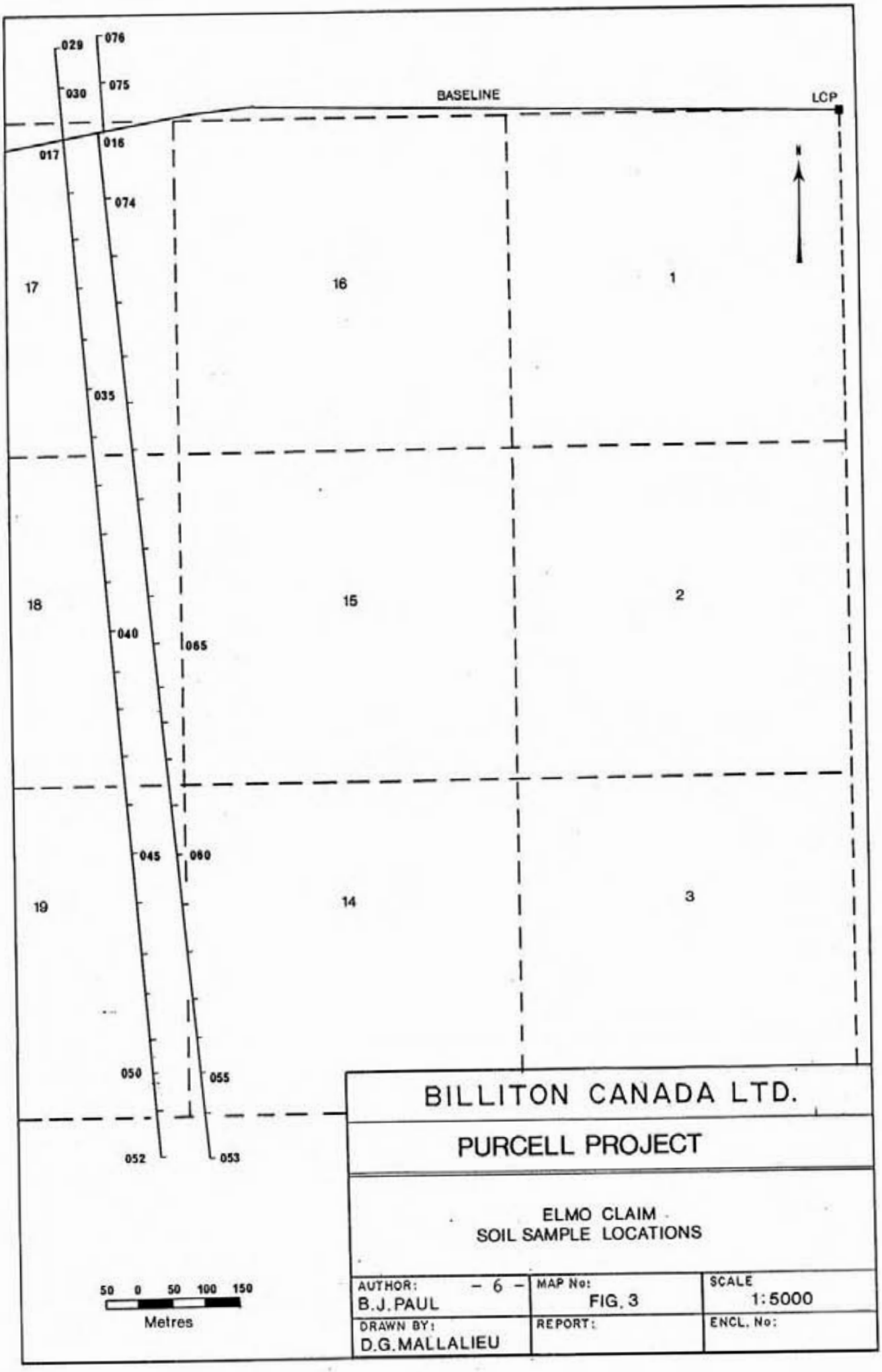
GEOCHEMISTRY

Sampling and Analytical Procedure

Fifty B horizon soil samples were collected at 75 metre intervals along two north-south grid lines crossing the central portion of the property. Sample depths varied from 15 to 25 centimetres, except in areas of extremely coarse talus, where surficial material was collected. The sampling was completed in its entirety on June 26, 1983.

The purpose of the orientation survey was to determine the optimum mesh size of which to run 560 additional samples from the remainder of the property grid. Lines 11 + 25 West and 12 + 00 West were positioned so as to cut across an area containing molybdenite in quartz monzonite talus boulders.

All samples were collected in waterproof kraft envelopes. They were sent via post from Boswell to Terramin Research Laboratories Ltd. in Calgary, Alberta.


029
076
030
075
BASELINE
LCP
017
016
074
17
16
1
035
18
15
2
040
065
045
060
19
14
3
050
055
052
053
N
50 0 50 100 150
Metres
BILLITON CANADA LTD.
PURCELL PROJECT
ELMO CLAIM
SOIL SAMPLE LOCATIONS
AUTHOR: B.J. PAUL
- 6 -
MAP No: FIG. 3
SCALE 1:5000
DRAWN BY: D.G. MALLALIEU
REPORT:
ENCL. No:

After drying, the samples were sieved to three size fractions (-10+40, -40+80 and -80), all of which were pulverized to -250 mesh. Each fraction was then analyzed for copper, lead, zinc, silver, molybdenum and tungston.

For silver, copper, molybdenum, lead and zinc analyses, a one-half gram of sample was digested in a nitric-perchloric acid mixture for four hours. After dilution to ten millilitres, the sample was analyzed by atomic absorption spectrophotometry.

For tungsten analyses, a one gram sample was fluxed with a KCl-KNO_3-Na_2CO_3 fusion mixture and leached with water. An Aliquot was removed and a colour complex formed with dithiol was measured colorimetrically.

Results

Results from the orientation soil geochemical survey are shown in Figures 4 - 15. No statistical treatment of the results was attempted, but inspection makes possible the following comments:

1. On grid lines 11+25 West and 12+00 West, highly anomalous values in molybdenum and tungsten, anomalous values in copper and silver, and near-background values in lead and zinc were obtained. Peak values were Mo - 460 ppm (-80), W-380 ppm (-10+40), Cu - 960 ppm (-10+40),Ag - 2.5 ppm (-40+80), Pb - 53 ppm (-80) and Zn - 250 ppm (-80). The highly anomolous molybdenum and tungsten results coincide, in part, with the area of known molybdenite mineralization in talus.

2. Inspection of Figures 4-15, as well as tabulation of the "high" values in each set of size fractions, suggests an optimum size fraction for each particular element. Although different size fractions than those used in the orientation study could be considered (say -40 mesh for molybdenum), laboratory preparatory costs would be significantly increased. For this reason, the remaining samples in the survey were run for silver, copper, molybdenum, lead and zinc at -80 mesh (unpulverized), and tungsten at -40+80 mesh (pulverized).

3. Although optimum size fractions do exist, generally speaking,

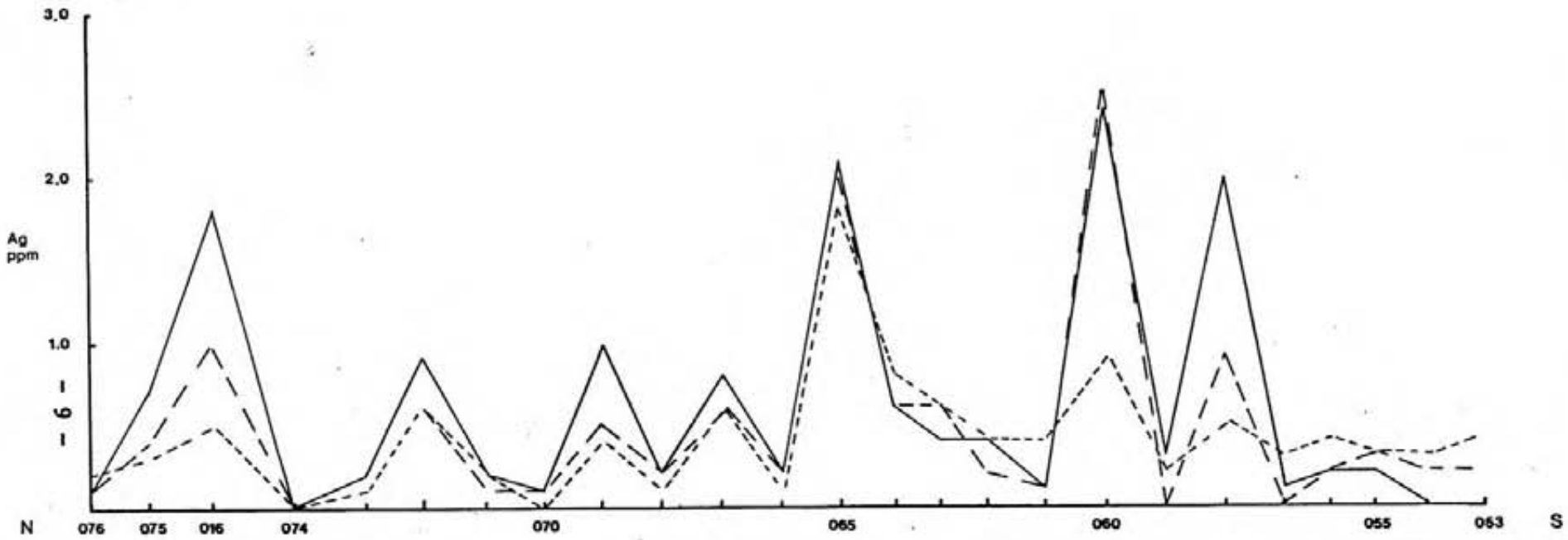
anomalous elemental values show up in all three size fractions.

4. Of note is the apparent concentration of tungsten in the coarser size fractions. This appears to be a common occurrence in the Cordilleran environment when dealing with resistant minerals such as scheelite and cassiterite.

Report by: Brian Paul

Brian J. Paul

November 10, 1983



—————— -10+40 mesh

— — — -40+80 mesh

- - - - - - -80 mesh

100 50 0 50 100 150

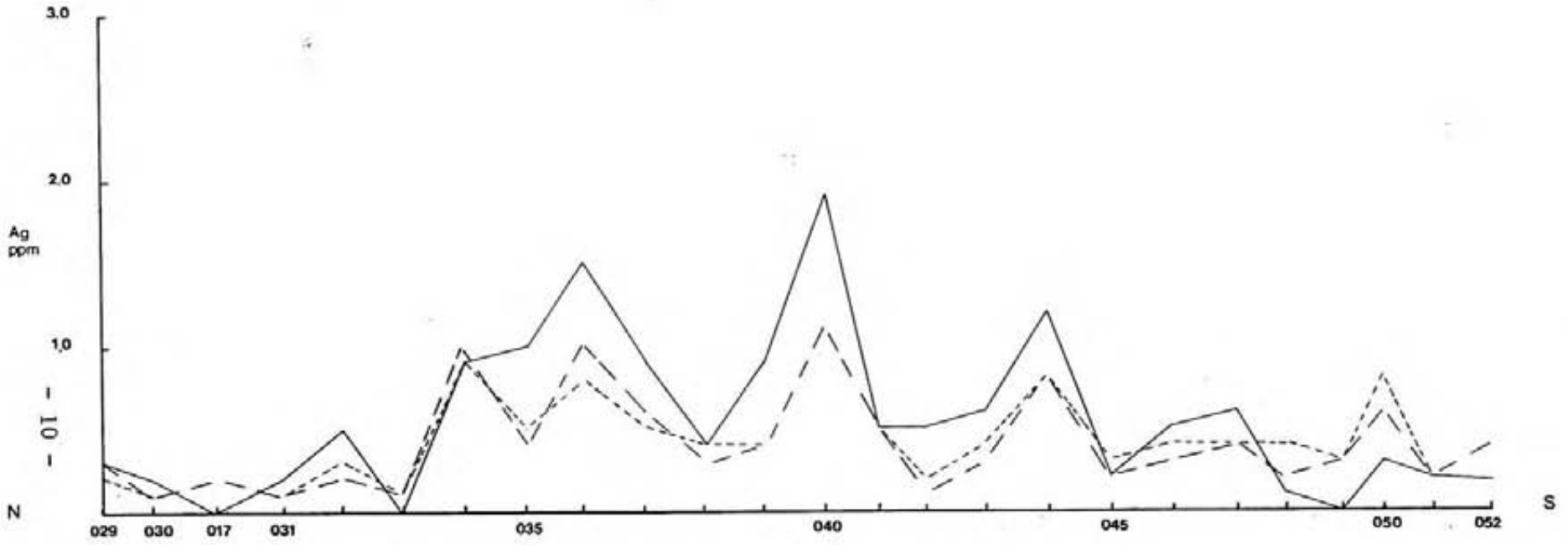
METRES

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 11+25 WEST - SILVER

AUTHOR: B.J. PAUL	MAP No: FIG. 4	SCALE 1:5000
DRAWN BY: D.G.MALLALIEU	REPORT:	ENCL. No:



— — — -10+40 mesh

— — — -40+80 mesh

- - - - - - -80 mesh

100 50 0 50 100 150

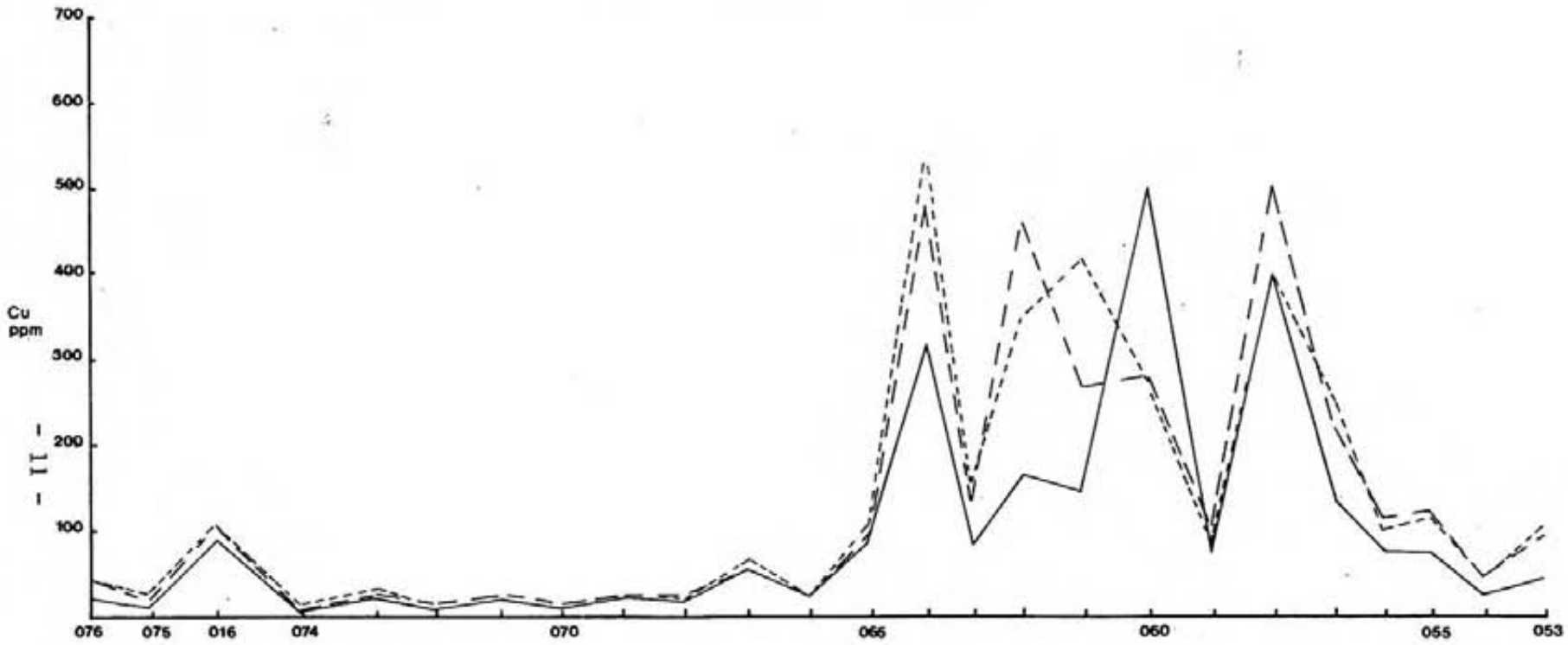
METRES

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 12+00 WEST - SILVER

AUTHOR: B.J. PAUL	MAP No: FIG. 5	SCALE 1:5000
DRAWN BY: D.G.MALLALIEU	REPORT:	ENCL. No:



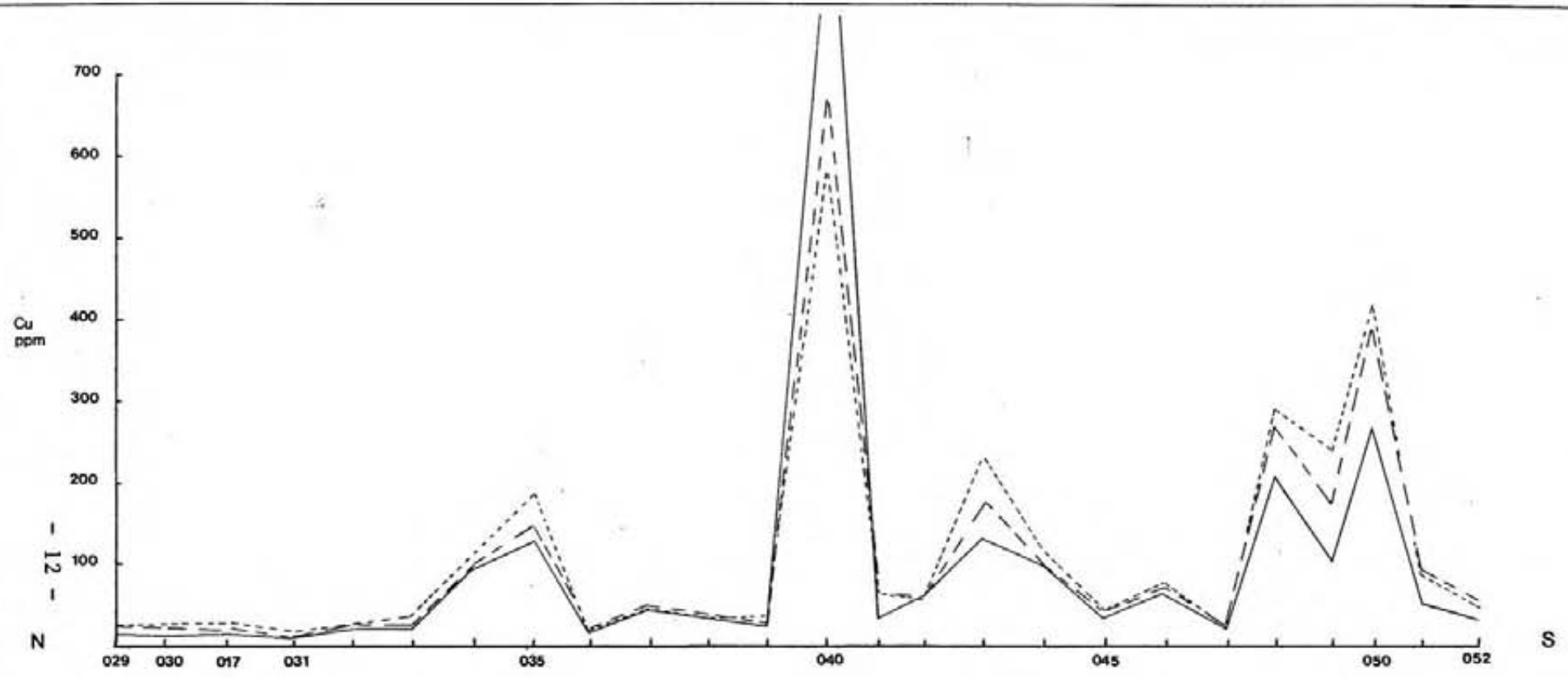
- 11 -

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 11+25 WEST - COPPER

AUTHOR:	MAP No:	SCALE
B.J. PAUL	FIG. 6	1:5000
DRAWN BY:	REPORT:	ENCL. No:
D.G. MALLALIEU		



——— -10+40 mesh

— — — -40+80 mesh

- - - - - - -80 mesh

100 50 0 50 100 150

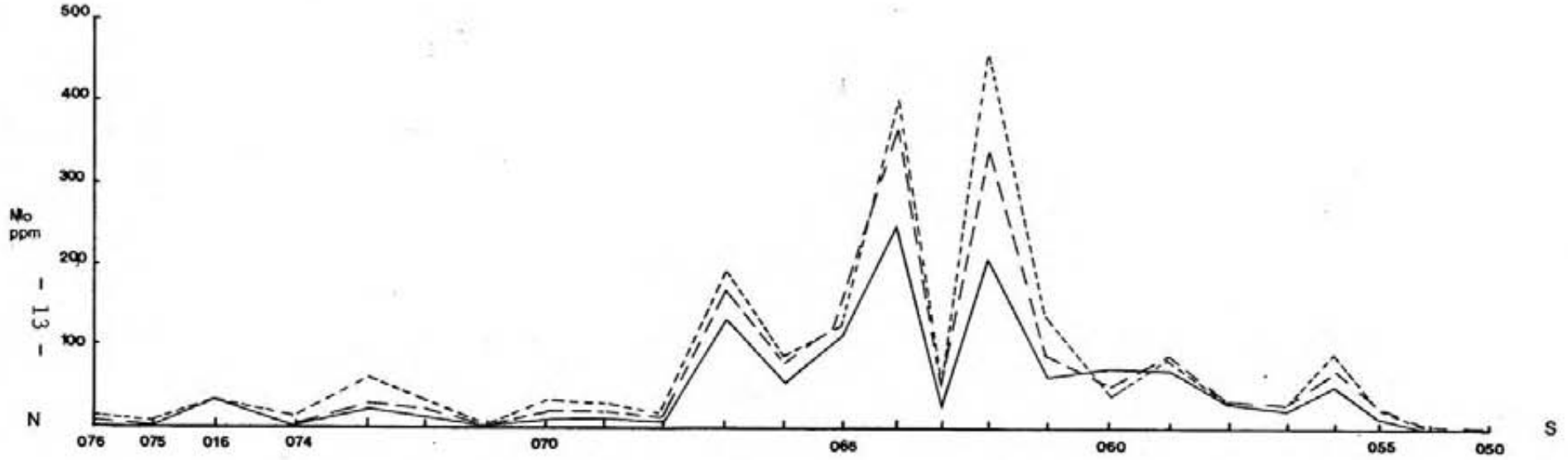
METRES

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 12+00 WEST - COPPER

AUTHOR:	MAP No:	SCALE
B.J. PAUL	FIG. 7	1:5000
DRAWN BY:	REPORT:	ENCL. No:
D.G.MALLALIEU		



——— -10+40 mesh

— — — -40+80 mesh

------- -80 mesh

100 50 0 50 100 150

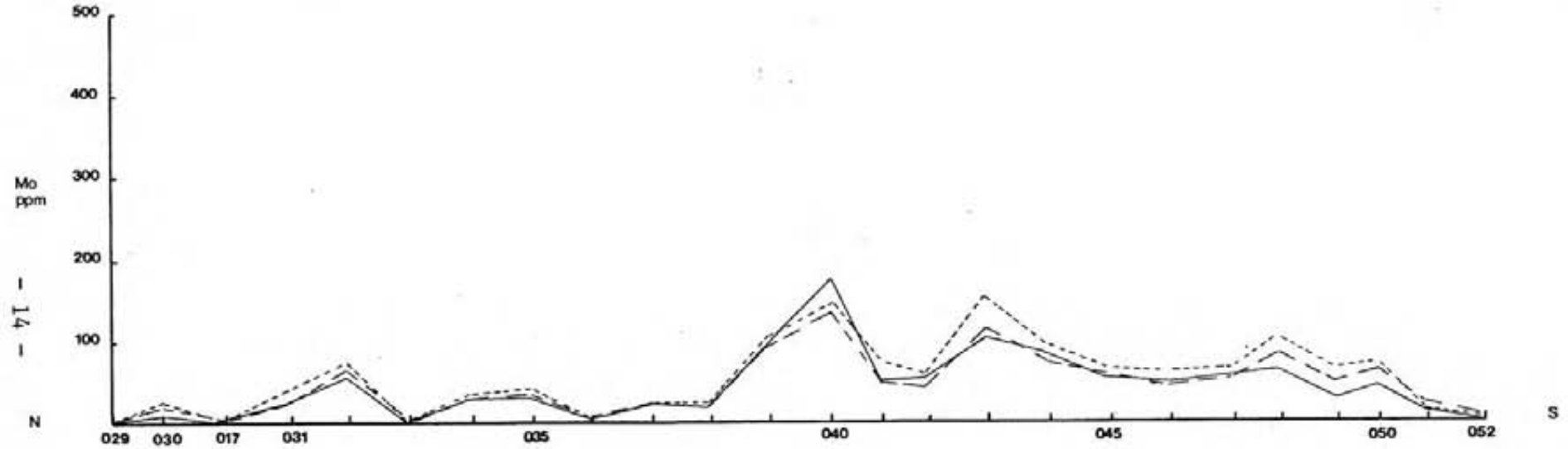
METRES

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 11+25 WEST - MOLYBDENUM

AUTHOR:	MAP No:	SCALE
B.J. PAUL	FIG. 8	1:5000
DRAWN BY:	REPORT:	ENCL. No:
D.G. MALLALIEU		



——— -10+40 mesh

— — — -40+80 mesh

- - - - - - -80 mesh

100 50 0 50 100 150

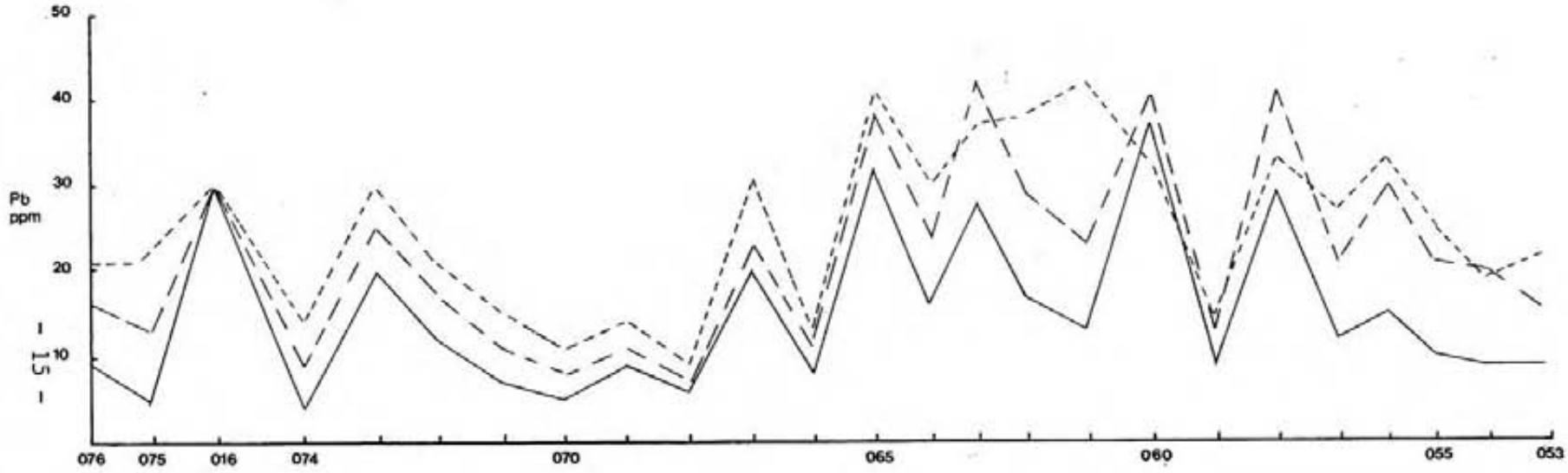
METRES

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 12+00 WEST - MOLYBDENUM

AUTHOR:	MAP No:	SCALE
B.J. PAUL	FIG. 9	1:5000
DRAWN BY:	REPORT:	ENCL. No:
D.G. MALLALIEU		



——— -10+40 mesh

— — — -40+80 mesh

- - - - - - -80 mesh

100 50 0 50 100 150

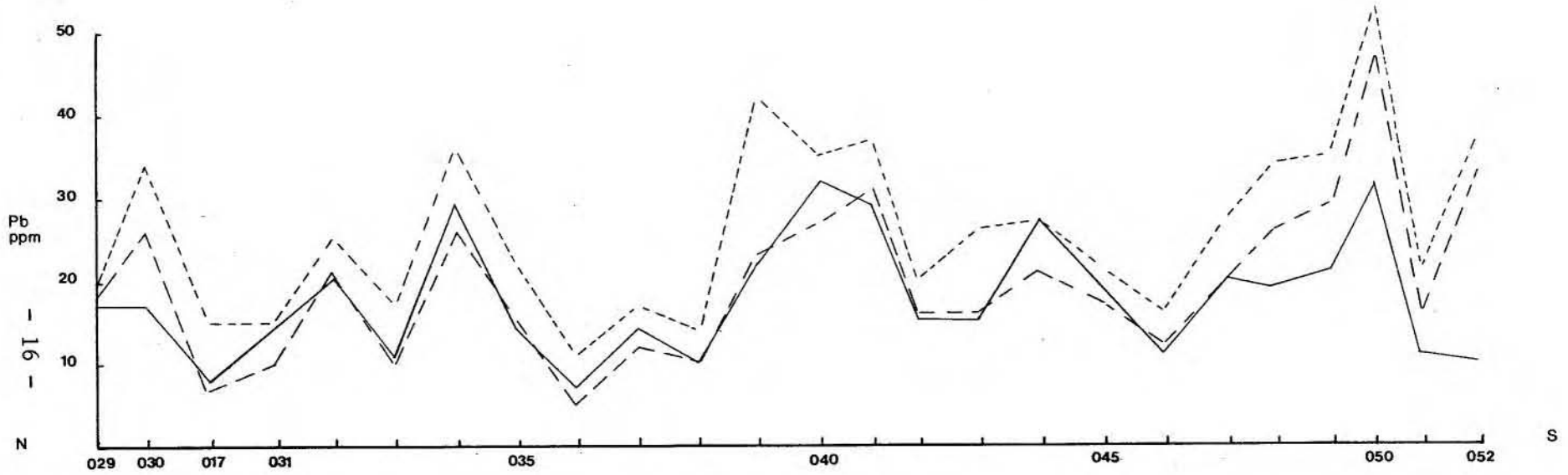
METRES

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 11+25 WEST - LEAD

AUTHOR: B.J. PAUL	MAP No: FIG. 10	SCALE 1:5000
DRAWN BY: D.G.MALLALIEU	REPORT:	ENCL. No:



——— -10+40 mesh

— — — -40+80 mesh

------- -80 mesh

100 50 0 50 100 150

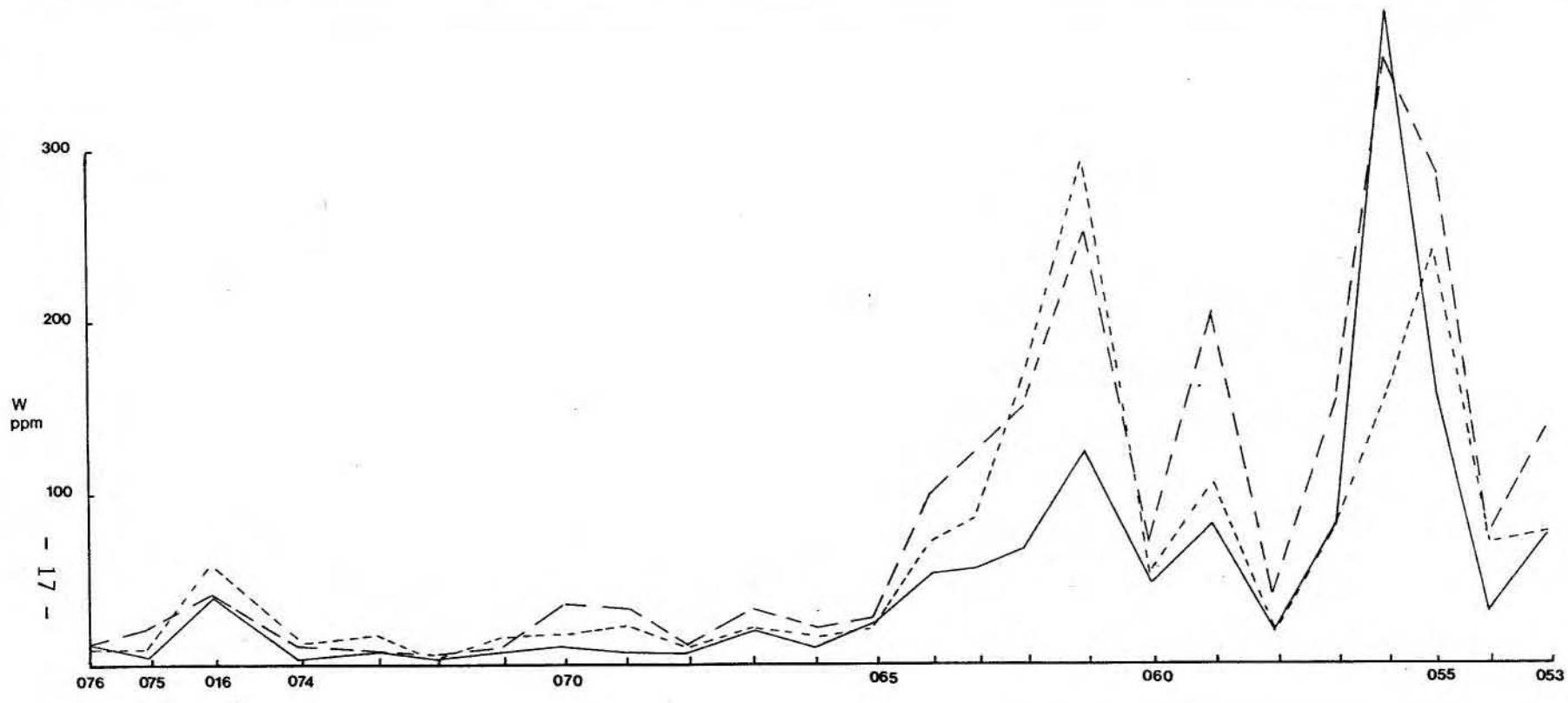
METRES

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 12+00 WEST - LEAD

AUTHOR: B.J. PAUL	MAP No: FIG. 11	SCALE 1:5000
DRAWN BY: D.G.MALLALIEU	REPORT:	ENCL. No:



——— -10+40 mesh

— — — -40+80 mesh

- - - - - - -80 mesh

100 50 0 50 100 150

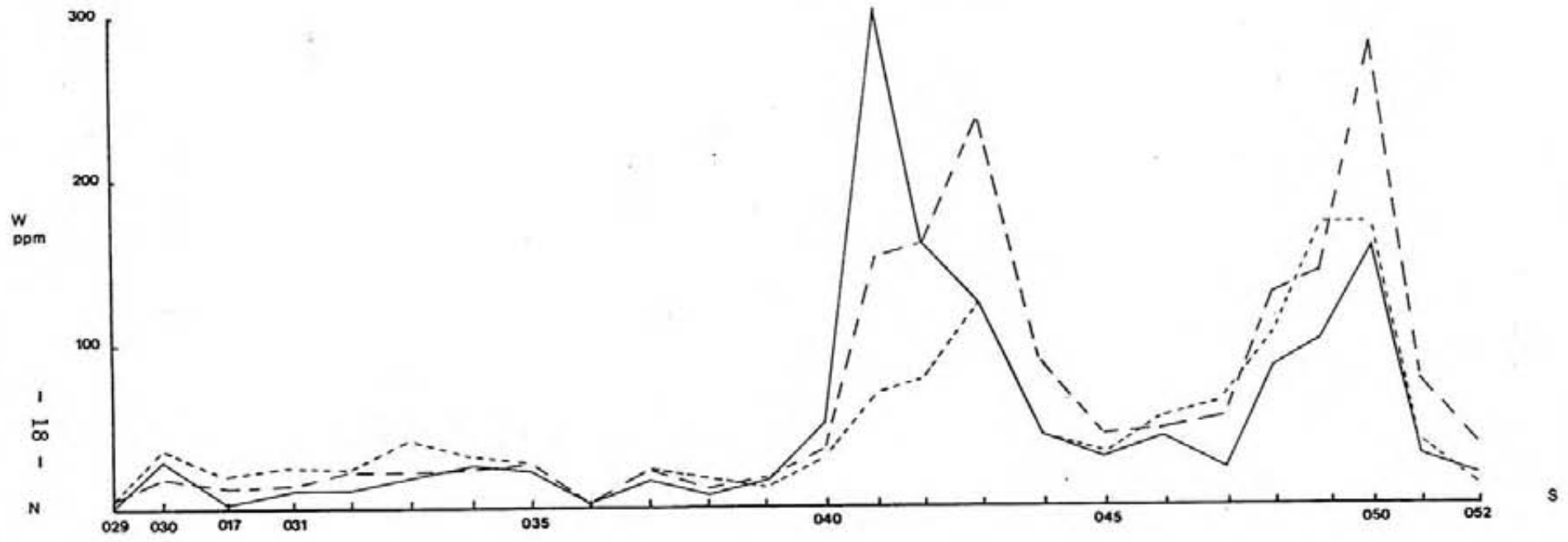
METRES

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 11+25 WEST - TUNGSTEN

AUTHOR: B.J. PAUL	MAP No: FIG. 12	SCALE 1:5000
DRAWN BY: D.G. MALLALIEU	REPORT:	ENCL. No:



——— -10+40 mesh

— — — -40+80 mesh

- - - - - - -80 mesh

100 50 0 50 100 150

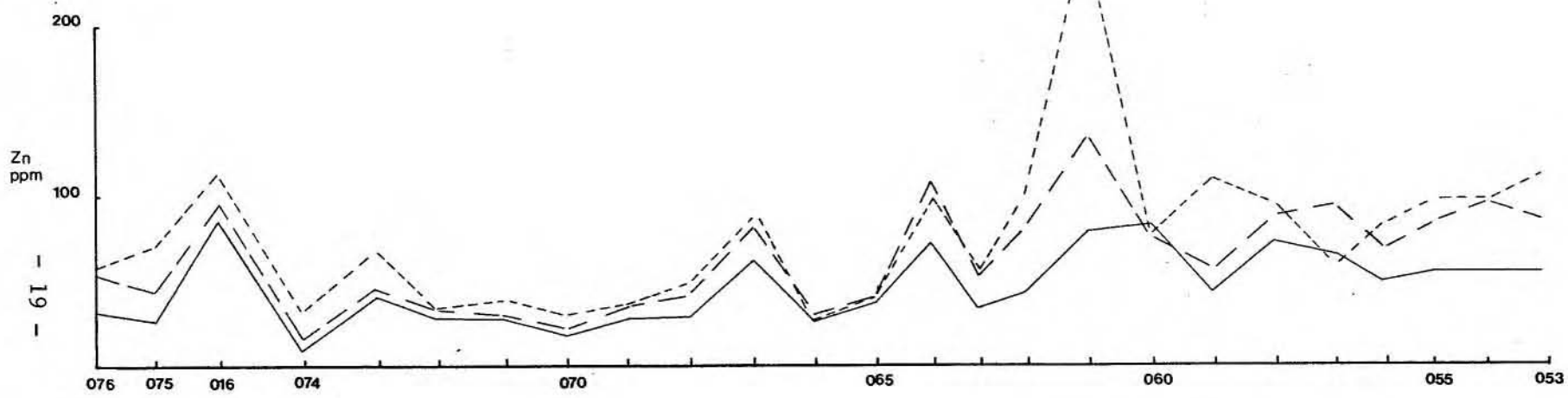
METRES

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 12+00 WEST - TUNGSTEN

AUTHOR: B.J. PAUL	MAP No: FIG. 13	SCALE 1:5000
DRAWN BY: D.G.MALLALIEU	REPORT:	ENCL. No:



——— -10+40 mesh

— — — -40+80 mesh

- - - - - - -80 mesh

100 50 0 50 100 150

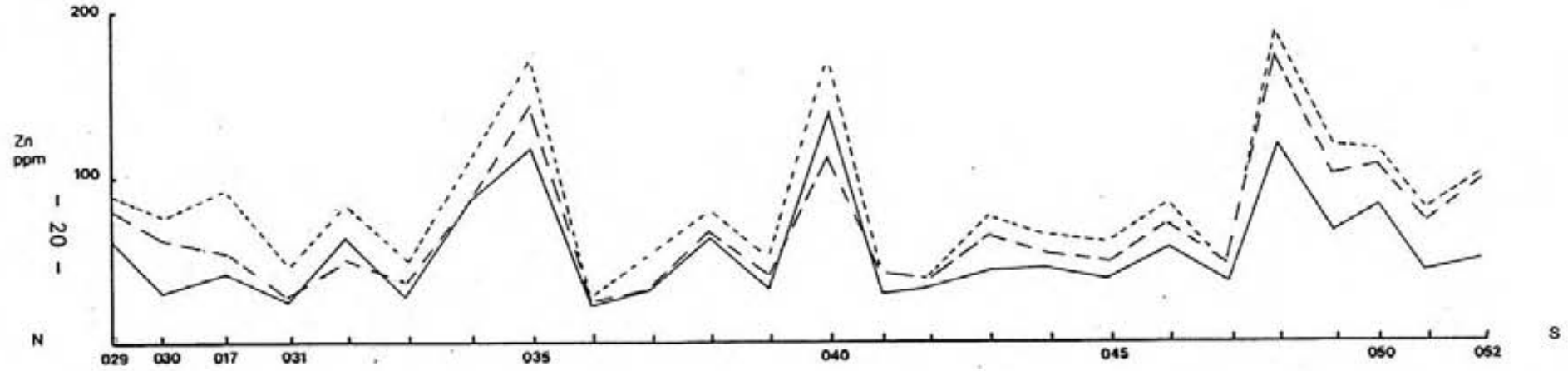
METRES

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 11+25 WEST - ZINC

AUTHOR:	MAP No:	SCALE
B.J. PAUL	FIG. 14	1:5000
DRAWN BY:	REPORT:	ENCL. No:
D.G.MALLALIEU		



——— -10+40 mesh

— — — -40+80 mesh

- - - - - - -80 mesh

100 50 0 50 100 150

METRES

BILLITON CANADA LTD.

PURCELL PROJECT

ELMO CLAIM
LINE 12+00 WEST - ZINC

AUTHOR: B.J. PAUL	MAP No: FIG. 15	SCALE 1:5000
DRAWN BY: D.G. MALLALIEU	REPORT:	ENCL. No:

APPENDIX I

ANALYTICAL RESULTS

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 83-148

Billiton Canada
Brian Paul

Date

Client Project 933 Orientation

Sample No.	Ag ppm	Cu ppm	Mo ppm	Pb ppm	W ppm	Zn ppm
-10+40 mesh 83-016	1.8	90	37	30	40	85
017	-0.1	14	1	8	4	41
029	0.3	15	1	17	2	60
030	0.2	12	10	17	29	29
031	0.2	10	28	14	12	24
032	0.5	20	58	21	11	62
033	-0.1	21	-1	11	19	26
034	0.9	95	30	29	26	85
035	1.0	130	31	14	23	117
036	1.5	16	5	7	3	21
037	0.9	45	23	14	16	32
038	0.4	37	20	10	7	61
039	0.9	28	100	22	16	31
040	1.9	960	177	32	51	139
041	0.5	37	52	29	304	28
042	0.5	63	54	15	160	32
043	0.6	131	103	15	123	43
044	1.2	99	85	27	43	44
045	0.2	35	55	19	30	37
046	0.5	67	50	11	42	56
047	0.6	22	58	20	22	35
048	0.1	210	64	19	84	118
049	-0.1	106	30	21	100	67
050	0.3	270	46	31	158	82
051	0.2	54	17	11	30	43

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(403) 276-8668 Telex 03-821172 CGY

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 83-148 Date

Client Project Page 2/6

Sample No.	Ag ppm	Cu ppm	Mo ppm	Pb ppm	W ppm	Zn ppm
-10+40 mesh 83-052	0.2	33	5	10	17	50
053	-0.1	47	2	9	75	55
054	-0.1	27	3	9	30	55
055	0.2	75	19	10	161	55
056	0.2	75	55	15	380	48
057	0.1	135	24	12	85	65
058	2.0	400	35	29	18	72
059	0.3	72	73	9	81	44
060	2.4	500	76	37	47	83
061	0.1	149	66	13	123	79
062	0.4	168	210	17	66	43
063	0.4	82	29	28	56	34
064	0.6	320	250	16	52	71
065	2.1	82	115	32	25	37
066	0.2	25	60	8	10	26
067	0.8	54	136	20	20	61
068	0.2	17	10	6	6	29
069	1.0	25	16	9	8	28
070	0.1	12	14	5	12	17
071	0.2	21	3	7	9	27
072	0.9	11	19	12	4	27
073	0.2	22	29	20	9	40
074	-0.1	4	3	4	3	9
075	0.7	11	3	5	5	26
076	-0.1	20	4	9	12	30

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 83-148 Date

Client Project 933 Page 3/6

Sample No.	Ag ppm	Cu ppm	Mo ppm	Pb ppm	W ppm	Zn ppm
-40+80 mesh 83-016	1.0	102	37	30	42	96
017	0.2	21	4	12	13	54
029	0.3	23	4	18	5	79
030	0.1	21	20	26	18	62
031	0.1	12	25	10	14	27
032	0.2	24	66	21	22	74
033	0.1	28	5	10	22	36
034	1.0	100	30	26	23	85
035	0.4	150	33	15	27	141
036	1.0	21	8	5	4	24
037	0.6	50	24	12	23	32
038	0.3	38	20	10	11	65
039	0.4	29	91	23	17	39
040	1.1	670	134	27	35	111
041	0.5	64	49	31	152	41
042	0.1	62	45	16	160	38
043	0.3	179	116	16	234	63
044	0.8	101	75	21	87	53
045	0.2	43	58	17	44	48
046	0.3	73	47	12	46	70
047	0.4	27	66	20	54	45
048	0.2	270	82	26	128	171
049	0.3	175	50	29	141	100
050	0.6	390	66	47	281	106
051	0.2	98	23	16	76	73

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TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 83-148 Date

Client Project 933 Page 4/6

Sample No.	Ag ppm	Cu ppm	Mo ppm	Pb ppm	W ppm	Zn ppm
-40+80 mesh 83-052	0.4	59	10	33	36	98
053	0.2	94	1	15	137	86
054	0.2	49	6	20	75	95
055	0.3	122	30	21	287	84
056	0.2	115	76	30	351	68
057	-0.1	220	31	21	154	94
058	0.9	500	38	41	40	87
059	-0.1	105	91	13	205	56
060	2.5	280	56	40	70	76
061	0.1	270	93	23	250	160
062	0.2	460	340	29	152	82
063	0.6	132	54	42	123	52
064	0.6	480	370	24	99	107
065	2.0	92	121	38	27	40
066	0.2	27	81	11	22	30
067	0.6	67	170	23	32	80
068	0.2	22	16	7	12	42
069	0.5	28	22	11	33	35
070	0.1	14	21	8	35	22
071	0.1	23	4	11	11	29
072	0.6	13	26	17	6	33
073	0.1	26	30	20	8	45
074	-0.1	8	5	9	13	16
075	0.4	20	5	13	22	44
076	0.1	40	10	16	12	54

14, 2235 - 30th Avenue N.E., Calgary, Alberta T2E 7C7
(403) 276-8668 Telex 03-821172 CGY

TERRAMIN RESEARCH LABS LTD.

ANALYTICAL REPORT

Job # 83-148 Date

Client Project 933 Page 5/6

Sample No.	Ag ppm	Cu ppm	Mo ppm	Pb ppm	W ppm	Zn ppm
-80 mesh 83-016	0.5	105	34	30	60	113
017	0.2	29	5	15	20	92
029	0.2	25	2	20	5	88
030	0.1	26	27	34	36	75
031	0.1	18	42	15	25	45
032	0.3	27	77	25	18	83
033	0.1	37	6	17	41	49
034	1.0	116	37	36	32	109
035	0.5	189	42	22	27	171
036	0.8	19	8	11	2	27
037	0.5	48	25	17	18	54
038	0.4	38	24	14	17	79
039	0.4	35	103	42	12	50
040	1.1	580	148	35	31	170
041	0.5	67	72	37	69	40
042	0.2	58	60	20	76	38
043	0.4	230	156	26	123	75
044	0.8	120	96	27	42	64
045	0.3	46	67	21	32	60
046	0.4	78	61	16	53	84
047	0.4	26	69	27	64	44
048	0.4	290	104	34	105	187
049	0.3	240	67	35	170	118
050	0.8	420	73	53	172	115
051	0.2	89	19	21	37	80

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ANALYTICAL REPORT

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Sample No.		Ag ppm	Cu ppm	Mo ppm	Pb ppm	W ppm	Zn ppm
-80 mesh	83-052	0.4	50	8	37	12	102
	053	0.4	103	3	22	76	96
	054	0.3	47	8	19	70	97
	055	0.3	114	29	25	240	83
	056	0.4	100	93	33	158	57
	057	0.3	250	32	27	79	95
	058	0.5	400	36	33	19	110
	059	0.2	82	89	14	105	55
	060	0.9	260	41	32	52	75
	061	0.4	420	142	42	292	250
	062	0.4	350	460	38	169	97
	063	0.6	153	61	37	85	55
	064	0.8	530	410	30	70	100
	065	1.8	103	130	41	22	40
	066	0.1	22	89	13	16	26
	067	0.6	68	192	31	22	89
	068	0.1	21	20	9	10	48
	069	0.4	26	31	14	23	36
	070	-0.1	17	36	11	18	30
	071	0.2	27	5	15	17	39
	072	0.6	14	32	21	6	34
	073	0.1	32	62	30	18	69
	074	-0.1	16	19	14	12	33
	075	0.3	25	10	21	11	70
	076	0.2	40	17	21	10	59

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APPENDIX II

SUMMARY OF EXPENSES

A.	Salaries	
	B. Paul (Field Geologist) one day @ $105/day	$ 105.00
	E. Jones (Geological Assistant) one day @ $75/day	75.00
	J. Monger (Geological Assistant) one day @ $65/day	65.00
		245.00
B.	Food and Accommodation	
	3 man-days @ $15/man day	45.00
C.	Transportation	
	Gasoline for company truck	25.00
D.	Analytical Costs	
	150 sample preparations @ $2.35/sample	352.50
	150 Cu/Pb/Zn/Ag/Mo Analyses @ $3.90/sample	585.00
	150 W Analyses @ $4.60/sample	690.00
		1,627.50
E.	Sample Shipping	13.00
F.	Report Cost/Miscellaneous (includes salaries, map reproduction)	450.00
	TOTAL:	$ 2,405.50

APPENDIX III

STATEMENT OF QUALIFICATIONS

I, Brian J. Paul, with a business address of 460 The Station, 601 Cordova Street West, Vancouver, British Columbia, V6B 1G1, do hereby certify that I have supervised and carried out the field work, and have assessed and interpreted the geochemical data from the ELMO mineral claim.

I also certify that:

1. I am a graduate of the University of Western Ontario, London, Ontario (Hons. B.Sc. Geology, 1976)

2. I am currently enrolled in a graduate program (M.Sc. Geology) at the University of Manitoba, Winnipeg, Manitoba

3. I have engaged in the study and practice of mineral exploration since 1973, the relevant details of which are listed below:

1973/1974	Junior Geological Assistant, Ontario Division of Mines, N.W. Ontario.
1975	Temporary Geologist, Union Carbide Exploration, north-central British Columbia
1976/1977	Graduate Assistant, University of Manitoba, southeast and north-central Manitoba, South Dakota
1978	Temporary Geologist, AMAX Minerals Exploration, Yukon and British Columbia
1979/1983	Field Geologist, Billiton Canada Ltd., Yukon, British Columbia and New Brunswick