

ANGLO WESTERN MINERALS LTD.
Geological, Geophysical and Geochemical
Report on Groups "C", "D", "E" located
East of Stump Lake,
Kamloops and Nicola M. D's.
50° 23' N. Latitude
120° 19' W. Longitude
by
R. Dunsmore, B.Sc.,

92I/8W

Fieldwork done: May 8 - July 7, 1972
Date of Report: June 10, 1972

4460

ALRAE ENGINEERING

4465

ANGLO WESTERN MINERALS LTD.
Geology, Geochemistry and Geophysics
STUMP LAKE, NICOLA M.D.

Ron Dunsmore
ALRAE ENGINEERING LTD.

JUNE 1972

Department of Mines and Technical Resources ASSESSMENT REPORT NO. <u>4165</u> M.D.

TO PROTECT OUR CLIENTS, THE PUBLIC AND OURSELVES, ALL REPORTS ARE SUBMITTED AS THE CONFIDENTIAL PROPERTY OF CLIENTS AND AUTHORIZATION FOR PUBLICATION OF STATEMENTS, CONCLUSIONS AND EXTRACTS FROM OUR REPORTS MUST RECEIVE OUR WRITTEN APPROVAL

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MAPS TO ACCOMPANY REPORT (in pocket)

#1 (1) Geology - Base - Map	Scale 1" = 400 ft.
#2 (2) Contoured Copper Soil Geochemistry	1" = 400 ft.
#3 (3) Contoured Zinc Soil Geochemistry	1" = 400 ft.
#4 (4) Magnetica	1" = 400 ft.
#5 (5) EM 16 - 2nd Derivative Contoured	1" = 400 ft.
#6 (6) EM 16 - Raw data	1" = 400 ft.

APPENDIX

- (1) Rock Geochemistry analyses
- (2) Grab Sample Assay
- (3) Costs

CONCLUSIONS AND RECOMMENDATIONS

- (1) The outcropping mineralized alteration zone does not appear to have major exploration potential.
- (2) The SW portion of the claim block is of most exploration interest, especially that portion under Stump Lake. It is recommended that further geophysical investigations be put off until the lake is well frozen next winter.
- (3) Five more claims should be witness-staked to cover the lake.
- (4) A simpler horizontal-loop EM be used rather than the EM17.
- (5) The following claims should be grouped: -
Trump 1 - 10, 12 - 20)
Fir 17 - 20, 46)
Wind 35) 36 Claims
Sher 1 - 6, 8, 10, 12, 14, 16)
)
The following claims may be safely dropped: -
Fir 29 - 40, 45, 47, 48)
Wind 36 - 38) 19 Claims
Trump 11)

LOCATION, ACCESS, TOPOGRAPHY

The Stump Lake claims of Anglo-Western Minerals are located at latitude 50° 23' N and longitude 120° 19' W, on the northeast side of Stump Lake, Nicola M.D. The claims lie within two miles of hwy. 85 (Kamloops-Merritt). Access to the claims is by all-weather logging roads.

Topography in the area is generally gently rolling; steepening only in the fault controlled creek valleys. Elevations are from 2433' at Stump Lake to 3200' at the extreme north and east edges of the property. Vegetation is principally short grass with some fields under irrigation. Drainage is generally fault-controlled except in the east where glacial landforms occur. Overburden is generally less than 10' deep. Outcrop and suboutcrop constitute about 15% of the surface.

The property consists of the following 53 claims staked by F. Guardia, A. Wall and J. Randa in mid April 1972.

<u>Claim Name</u>	<u>Record No's.</u>	<u>Min. Div.</u>	<u>Rec. Date</u>
Trump 1 - 8	51718 - 51725	Nicola	April 19/72
Trump 9 - 10	110778- 110779	Kamloops	April 19/72
Trump 11 - 18	51726 - 51733	Nicola	April 19/72
Wind 35 - 38	110750 - 110753	Kamloops	April 18/72
Fir 17 - 20	110712 - 110715	Kamloops	April 18/72
Fir 29 - 40	51868 - 51879	Nicola	April 21/72
Fir 41 - 48	51880 - 51887	Nicola	April 21/72
Sher 1 - 6	51832 - 51837	Nicola	April 21/72
Sher 8	51839	Nicola	April 21/72
Sher 10	51841	Nicola	April 21/72
Sher 12	51843	Nicola	April 21/72
Sher 14	51845	Nicola	April 21/72
Sher 16	51847	Nicola	April 21/72

GENERAL GEOLOGY

The property covers an area underlain by Nicola Gp. volcanics and Cache Creek Gp sediments between the Wild Horse Batholith (Jurassic outcropping 2 miles to the NE), and Mineral Hill (1 1/2 miles SW). Topography is generally fault controlled; the

predominant trends being NE, NNE and WNW. The Stump Lake valley is probably a graben. Fairly typical propylitic alteration occurs from Mineral Hill, in a NE direction to the North end of the claim block. The maximum width of the known alteration zone is 3,000'.

While there has obviously been a fair amount of previous surface work on the alteration and surrounding area, it has not been possible to obtain the results of this work, G.S.C. Memoir 249 (ref. 1) and map fairly accurately reflect the geology of the claim group. The predominant rock-type is Hornblende-Augite Andesite of the (Triassic) Nicola Group. This rock-type has undergone weak to strong propylitic alteration over an area of about 7000' (NE) by 3000'. The alteration zone appears to have been broken up by successive WNW faults which probably moved progressive southern blocks to the west. In this way, it's probable that the alteration zone now lies under Stump Lake on the southern part of the property. The Nicola Group appears to unconformably overlies (1) the Cache Creek Group (Paleozoic) of greenschist facies slates and phyllites, except on the western part of the property where the two units are in fault contact (marked by a quartz-carbonate diatreme). Alteration did not particularly affect the Cache Creek sediments in this area. A few narrow quartz-carbonate diatremes and occasional barren quartz veins are the only apparent effects and these are probably very late phase events.

Both the Cache Creek and Nicola rocks were at least partially covered by basalt flows, breccias, and agglomerates of the Kamloops Group (Miocene). Recent glacial action has scoured most of the property where there is at least 500' of Kamloop Group rock exposed. The eastern part of the claim group is covered by glacial landforms - notably eskers.

Faulting is quite complex, especially in the alteration zone. NE-trending normal faults form a graben with successive westerly blocks being down-dropped to the west. Major WNW (south moved west), NW and E-trending faults also occur. The NE faults bound the alteration zone on the east, and also appear to cut off ENE faults forming a sharply defined "mega-shear zone".

ALTERATION

Extensive propylitic alteration of the Nicola Group andesites occurs on the western parts of the property (generally W of Baseline 0+00). This alteration is marked by the presence of the following minerals:

- (1) Carbonate - iron, calcium and magnesium carbonates - pervasive and forming veins (probably late-stage).
- (2) Iron oxides - mainly hematite (with minor specularite) and magnetite.
- (3) Epidote-chlorite
- (4) Silica

All alterations appear to grade into one another, and no very distinct zones could be determined. For convenience, the alterations have been broken down to the following sub-types, and general localities have been noted on the geology map: (order is probably youngest to oldest): -

- (1) Corresponds to 3 (on Geology map)
Quartz-Carbonate veins, diatremes
- (2) (3e) Silicified andesite with minor pyrite
- (3) (3d) Silica-Sericite
- (4) (3c) Hematite
- (5) (3b) Epidote-hematite, minor magnetite
- (6) (3a) Pervasive carbonate alteration

A higher level extension of the alteration may occur north and east of B.L.0+00 L45, but lack of outcrop in this area doesn't allow confirmation of this hypothesis. Manganese-impregnated quartz float was found in this area.

The presence of numerous vugs and more or less unaltered country-rock fragments in 3 probably indicates quite a high level of emplacement; perhaps very much later than the propylitic alteration proper.

MINERALIZATION

Mineralization is generally very sparse and is typical of moderate to low temperature, high-level systems. Metallic sulphides and oxides in approximate order of abundance are: -

- (1) Hematite
- (2) Pyrite
- (3) Magnetite
- (4) Chalcopyrite)
- (5) Bornite) weather to malachite and azurite
- (6) Tetrahedrite
- (7) Pyrrhotite
- (8) Sphalerite
- (9) Specularite

Generally these minerals occur as disseminations, with the exception of bornite and specularite which are found (at two locations) as thin veinlets.

The best mineralization to date has been found in the quartz and quartz-carbonate veins of the alteration zone. Assays up to about 1% copper and 4 oz. silver per ton have been obtained from picked samples, but the overall grade of most veins is almost certainly

0.1% Cu. Although more than trace amounts of gold have been found in a few samples, it is not felt to be economically important, due to its probably very restricted occurrence.

ZONING

A crude zoning is apparent in the alteration zone. Copper soil anomalies are "fringed" with zinc anomalies. This is a normal type of zoning and suggests that the visible area of alteration and copper mineralization is not open to lateral extension to the west. It is possible that depth zoning also occurs, but confirmation of this must wait until someone drills a hole in this zone.

GEOCHEMISTRY

1,048 soil samples and 19 rock samples were taken for analysis from a 200' x 400' N-S, E-W grid over most of the claim group. Background determinations for Cu and Zn were made on the basis of observable geology for both the Cache Creek Group and the Nicola Group. The following is a breakdown of the values used in indicating anomalies: -

(1) Cache Creek Group

<u>Copper</u>	<u>Zinc</u>
Background: 0-60 ppm	0-74 ppm
Possible anomalous: 61-70	75-79
Anomalous: 71-90	80-90
Highly anomalous: 91 +	91 +

(2) Nicola Group

Background: 0-80 ppm	0-74 ppm
Possible anomalous: 81-100	75-85
Anomalous: 101-120	86-95
Highly anomalous:	96 +

Soil samples were invariably taken from "B" horizon ranging in depth from 6" to 2.5' below the surface. Analyses were carried out by Fraser Labs, North Vancouver. At least 200 samples were used for each statistical determination.

In the main alteration zone, anomalous Cu geochem is roughly enclosed by a 400γ - above - background magnetic contour. While soil results in this area are notably anomalous, the correlation with the 400 mag-contour is not exact due to the presence within 400γ's of a number of mag. lows. The area of - 400γ mag. readings is not thought by the present writer to constitute more than a 2nd order multiple anomaly due to its small size and its linear nature. The 400γ contour does not enclose known vein-type mineralization.

Other anomalies to the south and west are quite linear and are thought by the writer to be manifestations of very minor mineralization found within the quartz-carbonate diatremes. The copper anomaly to the NE of the main alteration zone is probably related to minor propylitic alteration to the west of the "cut-off" fault. This alteration is very weak, and due to its small size, probably insignificant.

GEOPHYSICS

(1) EM 16

Areas of major interest were covered with this instrument using a 100' station spacing. Negative results were obtained over the main alteration zone, but another area of major interest was indicated (the Wends of lines 688-808). 2nd derivative filtering -was done on the raw data in order to present a contourable value. Unfortunately, the main geophysical anomalies probably lie under Stump Lake on the SW end of the property, and cannot, therefore, be evaluated at this time. Other EM 16 anomalies appear to be

quite strongly linear, reflecting major faults. None of the quartz-carbonate diatremes indicate major conductivity. Two maps are presented with this report; a filtered map; and a raw data map, which is easily profiled.

(2) EM 17

A horizontal loop EM instrument. It was used to check major EM 16 anomalies. Great difficulty was experienced with this instrument due to the prohibitively critical station spacing and coil orientation. Nevertheless, some correlation with EM 16 on the SW end of the property was achieved. Again, the profiles suggest to this writer that the major conductor will be found a few hundred feet out in Stump Lake.

(3) MAGNETOMETER

Two surveys were undertaken, one with a malfunctioning magnetometer, and the other during a period of major magnetic disturbance due to electrical storms (local). Both surveys required a considerable period of time. Generally, there is little correlation with geochemistry, visible geology or with EM 16. Mineralization does not appear to be restricted to a narrow enough γ range to be useful, although at least one of the alterations may be. The epidote-hematite-minor magnetite alteration would appear, from the magnetics, to have a much wider distribution than is observable on surface. Since this alteration generally carries very minor chalcopyrite, its fairly wide possible occurrence seems to restrict very much the potential for discovery of higher-grade copper in this particular alteration zone.

REFERENCES

- (1) G.S.C. Memoir 249 - Geology and Mineral Deposits of Nicola Map-Area, British Columbia; W.E. Cockfield.
- (2) Mining Geology, H.E. McKinstry.
- (3) Wallrock Alteration, Meyer and Hemley, Economic Geology.
- (4) Lateral and Vertical Alteration-Mineralization Zoning in Porphyry Ore Deposits; Economic Geology, June-July, 1973.
- (5) Contouring of VLF-EM Data; D.C. Fraser, Geophysics, Vol. 34, No. 6 (December 1969).
- (6) Near Surface Gold Deposits, Geologiya Rudnykh Mestorozhdenii, Vol. 13, No. 3 (1971) 3-14 by I.S. Rozhkov. (English translation from Russian.)

APPENDIX (3)

COSTS

Costs incurred in the 1972 exploration program were as follows:

<u>Personnel and job</u>	<u>Days</u>	<u>Dates</u>	<u>Gross Salary & per diem</u>	<u>Total</u>
R.G. Jury, P.Eng. Supervision		May June July Aug.		\$900.00
F. Guardia, P.Eng. Supervision	2 <u>4</u> 6	May Aug. 8-11	\$77.27	463.67
R. Dunsmore, B.Sc. Geologist	24 20 <u>1</u> 45	May 8-31 June 1-15 " 20-24 July 7	54.08	2433.75
J. Randa Geophysicist	1 10 <u>22</u> 33	April May 17/8 24-31 June 1-22	56.21	1854.89
D. Boulton Line Cutting, Geochem.	15 <u>17</u> 32	May 17-31 June 1-15 21, 22	57.68	1842.92
A. Wall Line Cutting, Geochem.	1 11 <u>2</u> 14	April May 5-7, 17/8 May 26-31 June 1, 2	49.48	692.73
D. Reinke Line Cutting	12 <u>2</u> 14	May 20-31 June 1-2	53.89	754.31
L. Phillips, B.A.Sc. Line Cutting Geochem.	4 <u>3</u> 9	June 8, 11, " 13, 22	62.07	248.28
K. Coswan Line Cutting	6 <u>3</u> 9	May 15-20 " 27-29	62.90	566.13
B. Guest Line Cutting	1	June 22	31.02	31.02
H. Carey Cook	8 <u>15</u> 23	May 24-31 June 1-15	50.26	1156.11
Total Salaries				\$10,943.81

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APPENDIX (3)

COSTS cont'd

Supplies and Rentals:

(instruments, trucks etc.)

April - June

\$ 2,813.96

Disbursements:

(travel expenses, freight,
expediting)

"

1,353.04

Geochemical Analyses

(Fraser Labs. - N. Vancouver
R. Samuels, Assayer)

"

2,728.40

Grand Total: \$17,839.21

Declared before me at the City

Vancouver

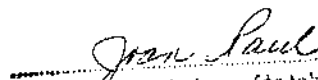
Province of British Columbia this 7th

day of March, 1973

Respectfully submitted,



R. Dunsmore, B.Sc.

 Sub-mining Recorder

A Commissioner for taking Affidavits within British Columbia or
A Notary Public in and for the Province of British Columbia.


R.G. Jury, P. Eng.

ALRAE ENGINEERING LTD. CONSULTING ENGINEERS & GEOLOGISTS, VANCOUVER, CANADA	
ANGLO-WESTERN MINERALS LTD.	
STUMP LAKE, NICOLA M. D.	
GEOLOGY	
SCALE: 1" = 400'	DESIGNED: R. DUNSMORE
DATE: JUNE 10, 1972	DRAWN: R. DUNSMORE
REVISED:	CHECKED:
	MAP NO:

To accompany geological, geophysical and geochemical report on the Wind, Fir, Sher, Trump and SR claims, Stump Lake, Nicola and Kamloops Mining Divisions by R. Dunsmore dated June 10, 1972 and endorsed by R. Jury, P. Eng.

R. Dunsmore
R. Dunsmore

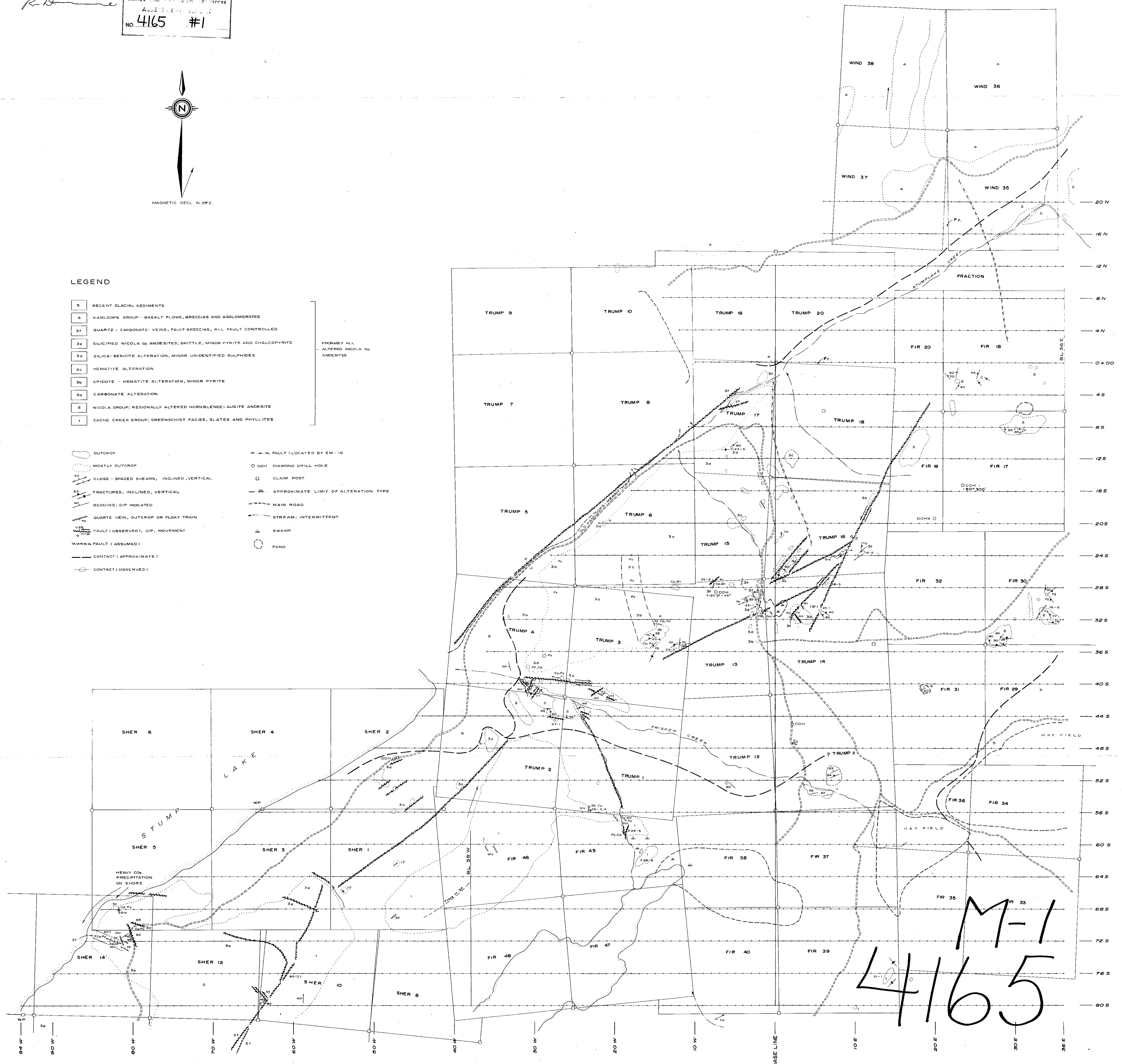
Division of
Mines and Technical Resources
ASSESSMENT REPORT
NO. 4165 #1



MAGNETIC DECL. N 39° E.

LEGEND

- | | | | |
|----|--|--|--|
| 5 | RECENT GLACIAL SEDIMENTS | | |
| 4 | KAMLOOPS GROUP - BASALT FLOWS, BRECCIAS AND AGGLOMERATES | | |
| 31 | QUARTZ - CARBONATE VEINS, FAULT BRECCIAS, ALL FAULT CONTROLLED | | |
| 34 | SILICIFIED NICOLA Gp ANDESITES, BRITTLE, MINOR PYRITE AND CHALCOPYRITE | | PROBABLY ALL ALTERED NICOLA Gp ANDESITES |
| 3d | SILICA-SERICITE ALTERATION, MINOR UNIDENTIFIED SULPHIDES | | |
| 3c | HEMATITE ALTERATION | | |
| 3b | EPIDOTE - HEMATITE ALTERATION, MINOR PYRITE | | |
| 3a | CARBONATE ALTERATION | | |
| 2 | NICOLA GROUP: REGIONALLY ALTERED HORNBLende-AUGITE ANDESITE | | |
| 1 | CACHE CREEK GROUP: GREENSCHIST FACIES, SLATES AND PHYLLITES | | |
-
- | | | | |
|--|---|--|--------------------------------------|
| | OUTCROP | | FAULT (LOCATED BY EM-16) |
| | MOSTLY OUTCROP | | DDH DIAMOND DRILL HOLE |
| | CLOSE-SPACED SHEARS, INCLINED, VERTICAL | | CLAIM POST |
| | FRACTURES, INCLINED, VERTICAL | | APPROXIMATE LIMIT OF ALTERATION TYPE |
| | BEDDINGS, DIP INDICATED | | MAIN ROAD |
| | QUARTZ VEIN, OUTCROP OR FLOAT TRAIN | | STREAM, INTERMITTENT |
| | FAULT (OBSERVED), DIP, MOVEMENT | | SWAMP |
| | FAULT (ASSUMED) | | POND |
| | CONTACT (APPROXIMATE) | | |
| | CONTACT (OBSERVED) | | |



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ANGLO-WESTERN MINERALS LTD.

STUMP LAKE, NICOLA M.D.

EM-16
SECOND DERIVATIVE FILTER

SCALE: 1" = 400'

DESIGNED: R. DUNSMORE

DATE: JUNE 10, 1972

DRAWN: R. DUNSMORE

REVISED:

CHECKED:

MAP NO

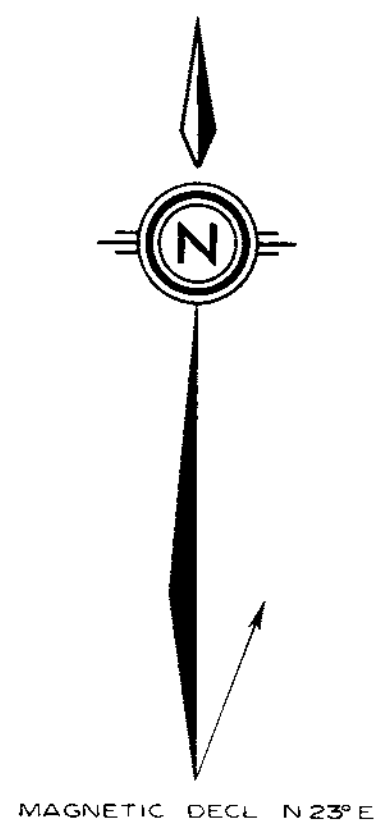
NOTE: To accompany Geological, Geophysical and Geochemical Report, ANGLO-WESTERN MINERALS LTD. Stump Lake, Nicola M.D.
OPERATOR: D. Boulton
INSTRUMENT: GEONICS EM16
FREQUENCY: (KHz): 16.60 (Seattle)
DIRECTION TO STATION: S.W.
DIRECTION FACED WHILE READING: NW

Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO 4165 MAP #5



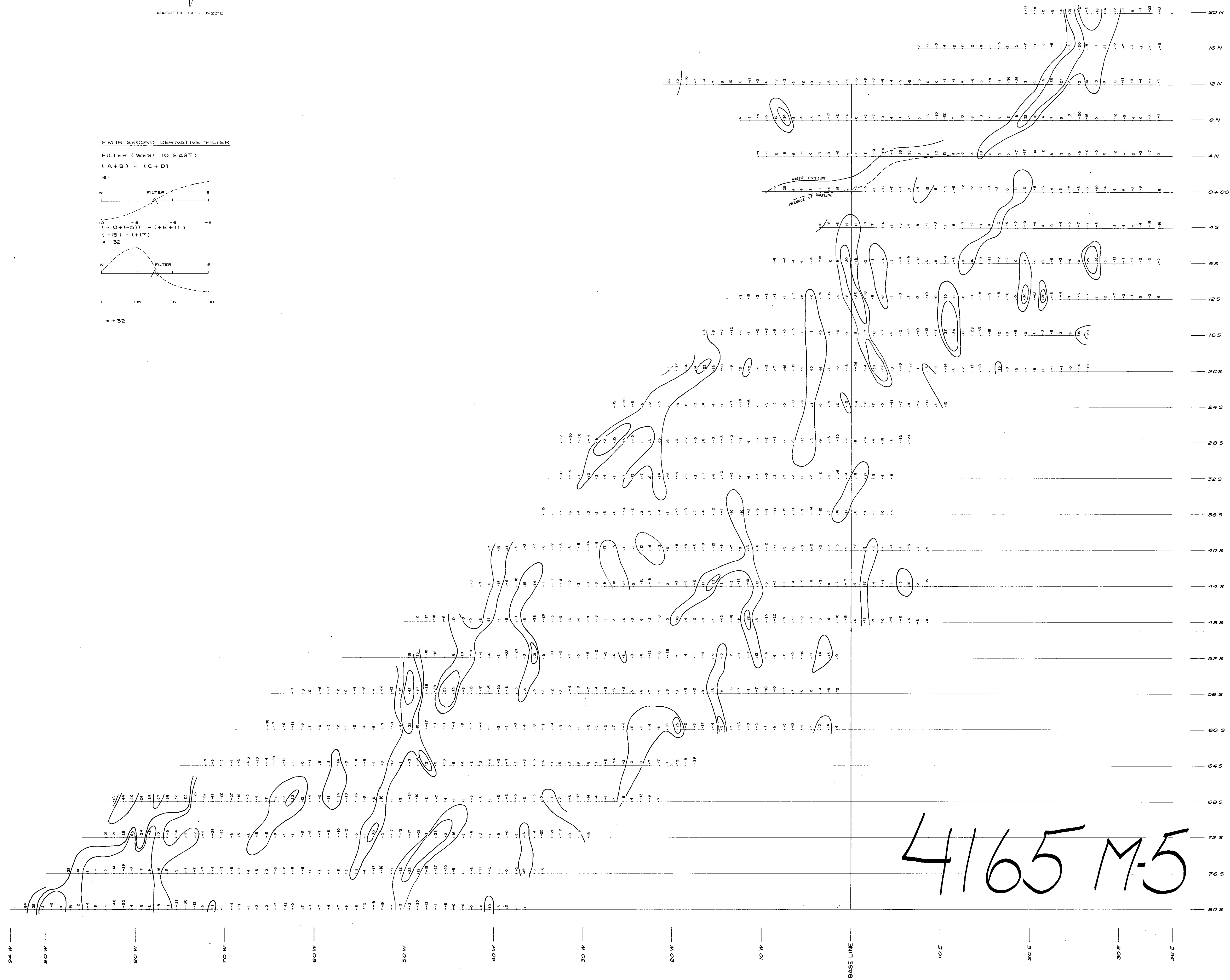
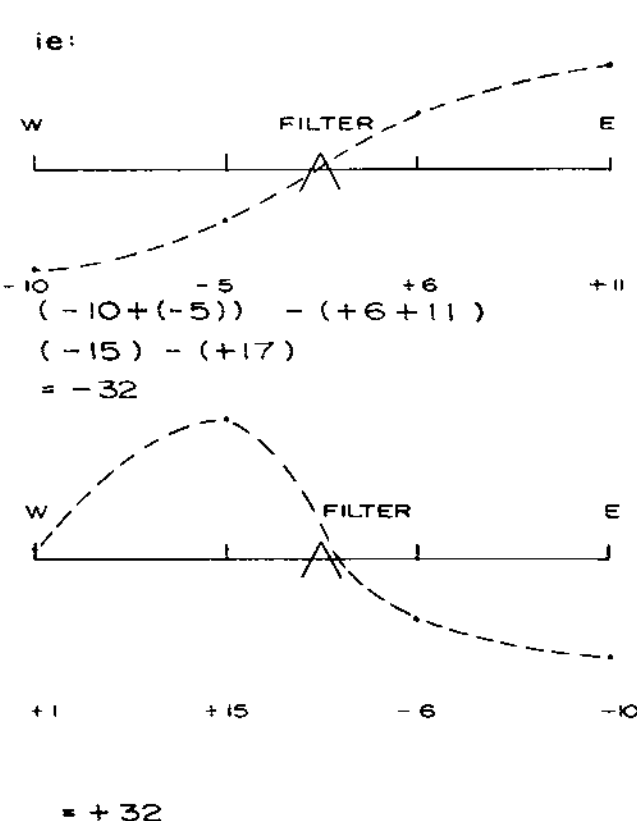
To accompany geological, geophysical and geochemical report on the Wind, Fir, Sher, Trump and SR claims, Stump Lake, Nicola and Kamloops Mining Divisions by R. Dunsmore dated June 10, 1972 and endorsed by R. Jury, P. Eng.

R. Jury
R. Dunsmore



EM 16 SECOND DERIVATIVE FILTER

FILTER (WEST TO EAST)
(A+B) - (C+D)



4165 M-5

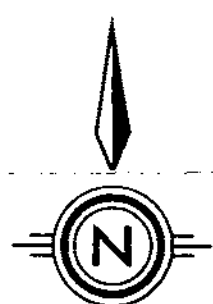
NOTE:

To accompany geological, geophysical and geochemical report on the Wind, Fir, Sher, Trump and SR Claims, Stump Lake, Nicola and Kamloops Mining Divisions by R. Dunsmore dated June 10, 1972 and endorsed by R. J. Jary, P. Eng.

R. J. Jary

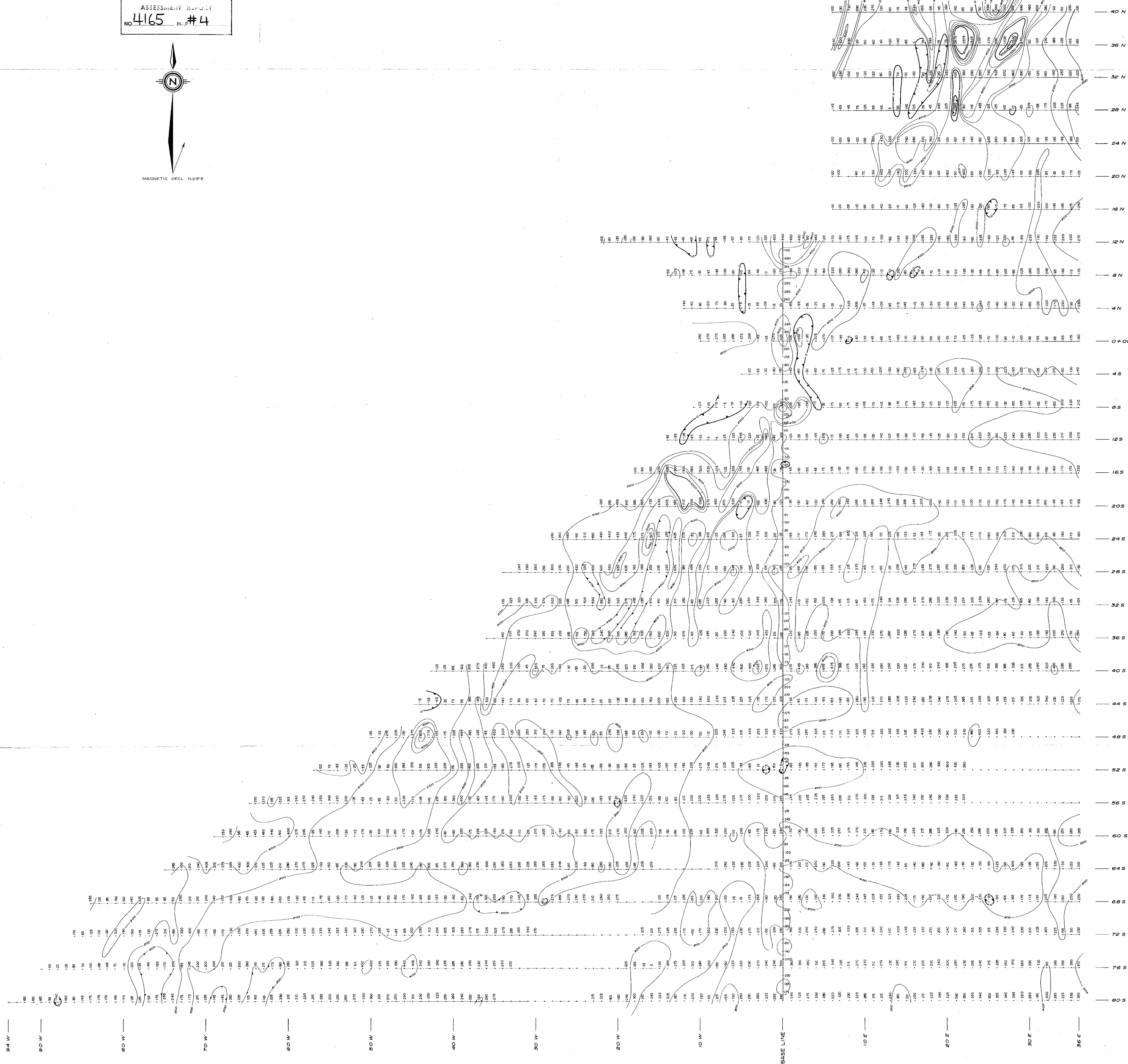
R. D.

Boundaries of
Mines and Mineral Resources
ASSESSMENT REPORT
NO. 4165 M. #4



MAGNETIC DECL. N 23° E

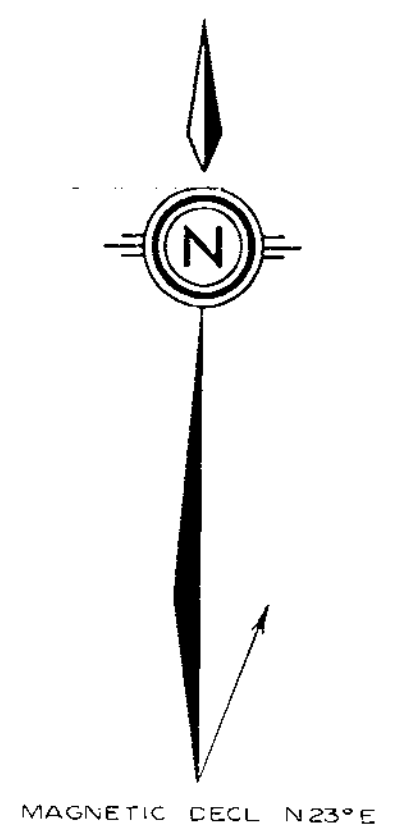
M-4
4165



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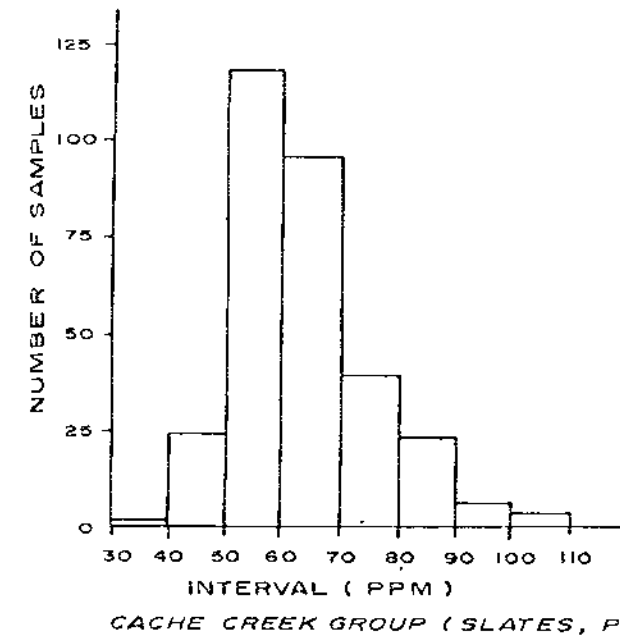
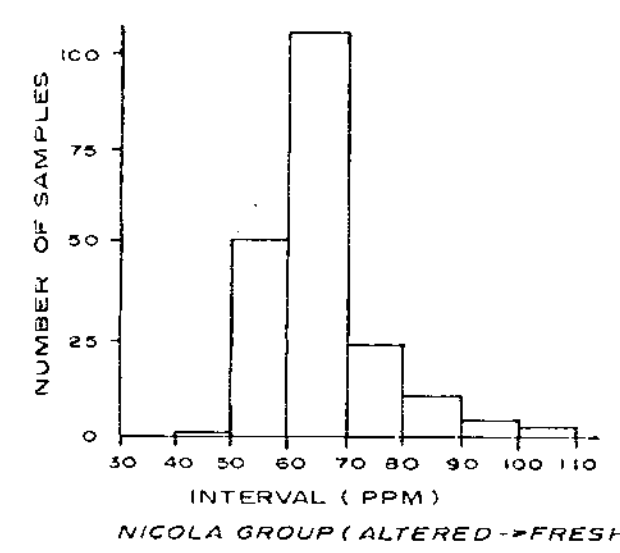
R. Dunsmore
R.D.

Department of
Mines and Technical Resources
ASSESSMENT REPORT
NO. 4165 #3



M-3
4165

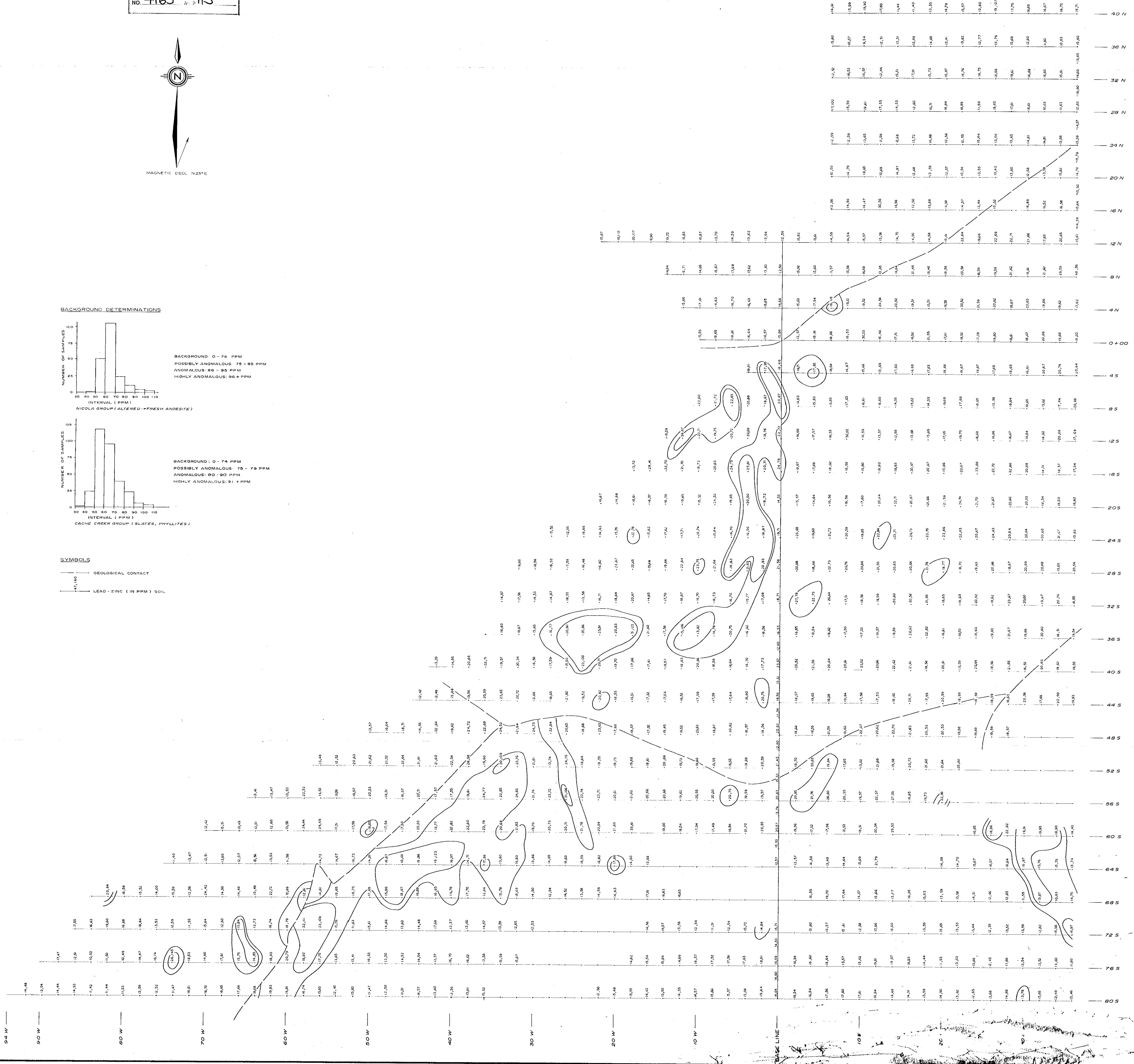
BACKGROUND DETERMINATIONS



SYMBOLS

— GEOLOGICAL CONTACT

— LEAD-ZINC (IN PPM) SOIL



ALRAE ENGINEERING LTD.

CONSULTING ENGINEERS & GEOLOGISTS, VANCOUVER, CANADA

ANGLO-WESTERN MINERALS LTD.

STUMP LAKE, NICOLA M. D.

Cu-Ag GEOCHEMISTRY
(Cu COULURED)

SCALE: 1" = 400'

DESIGNED: R. DUNSMORE

DATE: JUNE 10, 1972

DRAWN: R. DUNSMORE

REVISED:

CHECKED:

MAP NO

To accompany geological, geophysical and geochemical report on the Wind, Fir, Sher, Trump and SR claims, Stump Lake, Nicola and Kamloops Mining Divisions by R. Dunsmore dated June 10, 1972 and endorsed by R. J. Jurek, P. Eng.

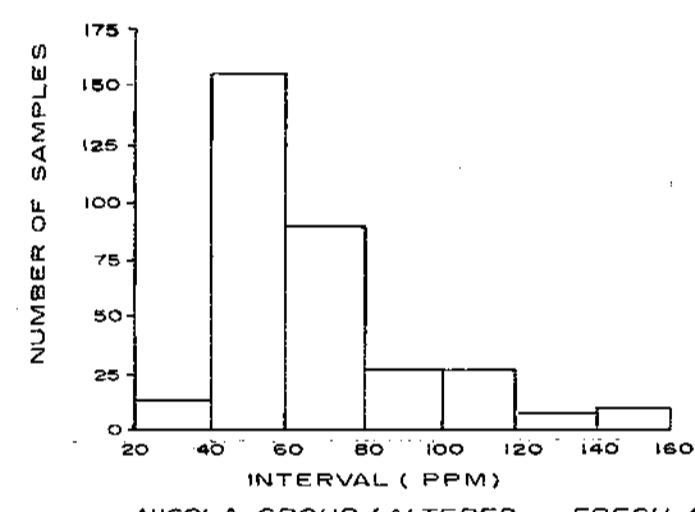
R. J. Jurek
R. Dunsmore

Department of
Mines and Technical Resources
Assessment Report
NO. 4165 Map #2

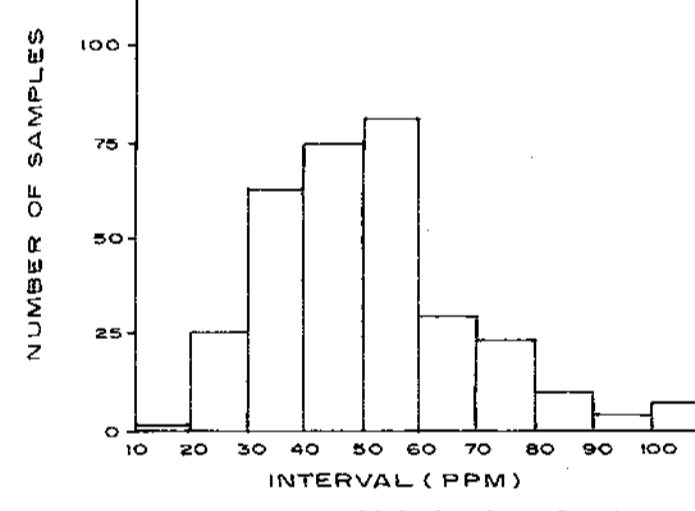


MAGNETIC DECL. N. 23° E

BACKGROUND DETERMINATIONS FOR COPPER



BACKGROUND: 0 - 80 PPM
POSSIBLY ANOMALOUS: 81 - 100 PPM
ANOMALOUS: 101 - 120 PPM
HIGHLY ANOMALOUS: 121 + PPM

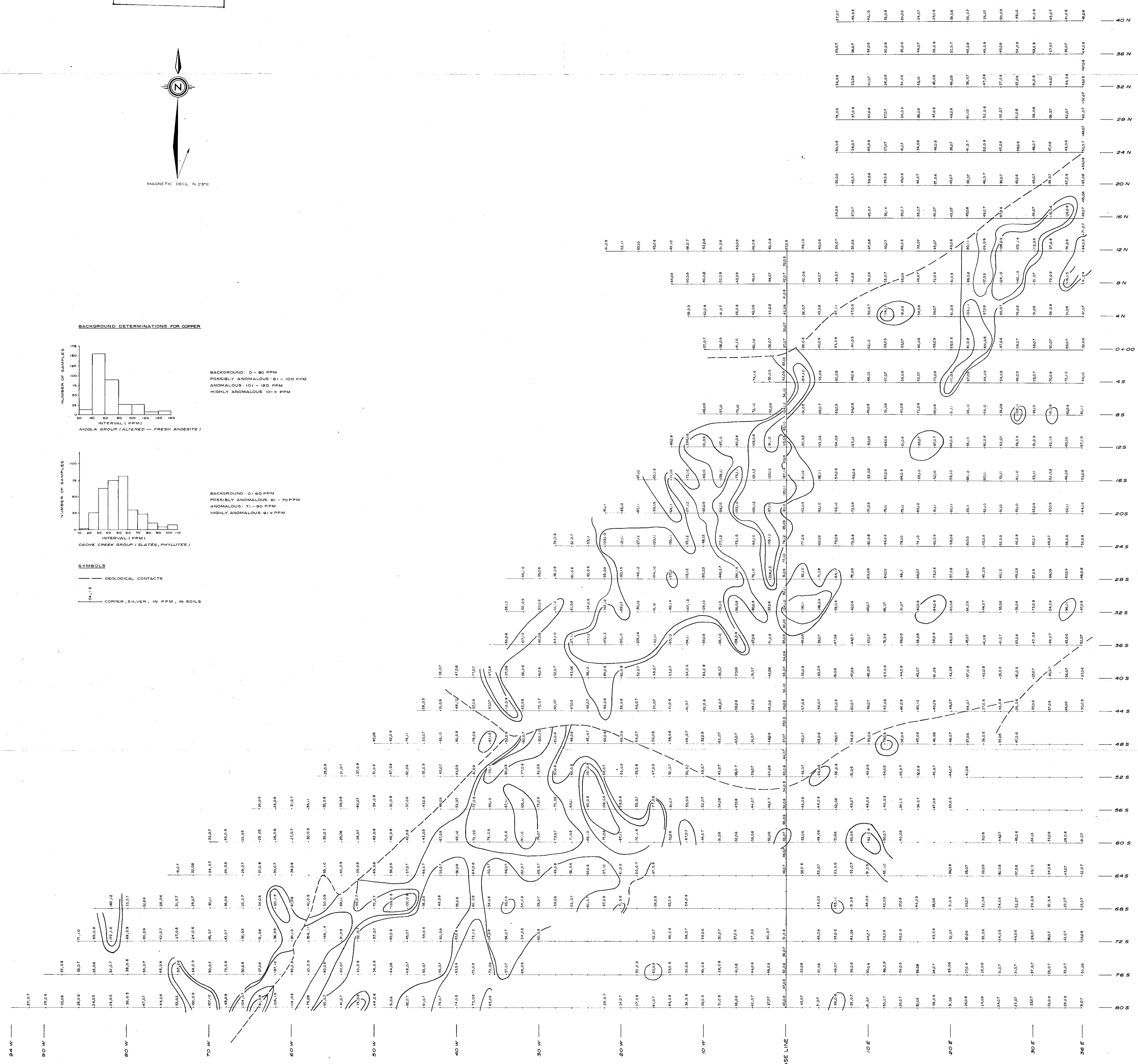


BACKGROUND: 0 - 60 PPM
POSSIBLY ANOMALOUS: 61 - 70 PPM
ANOMALOUS: 71 - 90 PPM
HIGHLY ANOMALOUS: 91 + PPM

SYMBOLS

— GEOLOGICAL CONTACTS

— COPPER, SILVER, IN PPM, IN SOILS



M-2
4165

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CONSULTING ENGINEERS & GEOLOGISTS, VANCOUVER, CANADA

ANGLO-WESTERN MINERALS LTD.

STUMP LAKE, NICOLA M.D.

**EM-16
IN-PHASE, QUADRATURE**

SCALE: 1" = 400'

DESIGNED: R. DUNSMORE

DATE: JUNE 10, 1972

DRAWN: R. DUNSMORE

REVISED:

CHECKED:
MAP NO

NOTE: To accompany Geological, Geophysical and Geochemical Report, ANGLO-WESTERN MINERALS LTD., Stump Lake, Nicola M.D.

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MAGNETIC DECL. N 23° E

4165 M-6

