

**PMA RESOURCES INC.
GEOLOGICAL AND GEOCHEMICAL REPORT
ON THE
LAKE I-IV CLAIMS**

OMINECA MINING DIVISION

**LATITUDE: 57 31'N LONGITUDE: 127 05'W
NTS: 94E/11**

**AUTHOR: Josef H. Seywerd, B.Sc., M.B.A.
DATE OF WORK: September 12-17, 1989
DATE OF REPORT: June, 1990**

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**GEOLOGICAL BRANCH
ASSESSMENT REPORT**

20,087

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Introduction:

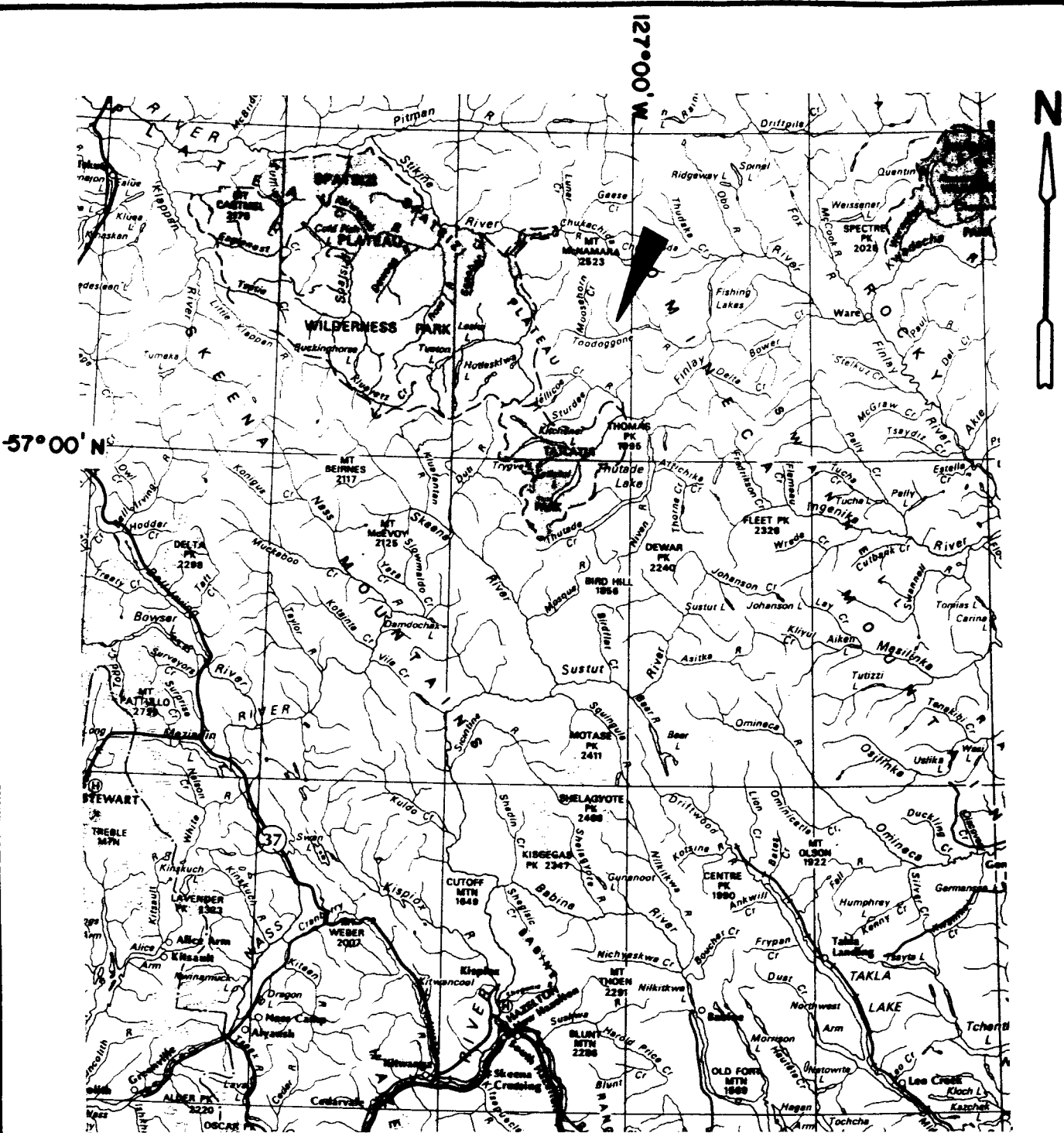
White Geophysical Inc. was commissioned by PMA Resources Inc. to evaluate the Lake I to IV claims in the Toodoggone area of British Columbia. The target of this work was epithermal precious metal deposits. There is one producing gold mine, Cheni Gold Corporation's, Lawyer's mine and one past producer, Dupont's Baker Mine, in the area. Three other gold properties in the area have major ongoing development programs. (see figure 2)

Two Geologists, Dave Dunn and Doug Perkins, were mobilized to the site on 89 09 12. Work was carried out until 89 09 17. Reconnaissance mapping was carried out. A total of 39 soil, 18 rock, 7 silt and 2 pan concentrate samples were taken.

Location and Access:

The Lake Claims are located are located in the Toodoggone River area of north-central B.C., 340 km north of Smithers. The claims are situated east of Breccia Peak and cover Midas Lake and the area to the east, between elevations 1400 and 2300 meters. This area is about 5 km northeast of the JD property of Energex Minerals Limited and 25 km north east of the Lawyers deposit of Cheni Gold Mines Inc.

The claims lie in rugged country above the tree line except for Midas lake which is surrounded by scrub brush. The NTS Reference is 94E/11 (see figures 1 and 2). Access is by fixed wing aircraft from Smithers to the Sturdee Strip or, alternatively, by the Omineca mining road from Mackenzie of Ft. St. James to the Sturdee Strip. Access from the Sturdee Strip to the Lake claims is by helicopter. Historically, a



PMA RESOURCES INC.

LAKE CLAIMS I-IV

LOCATION MAP

SCALE = 1 : 2 000 000

N.T.S. 94E/II

FIG. I

number of helicopter companies have established summer bases at the Sturdee River airstrip and have been available for casual charter to nearby areas. The nearest road access is the B.C. Department of Mines' Omineca Mining Road from Prince George and Germanson landing which was completed in 1987 to the Sturdee Airstrip and the Lawyers deposit of the Cheni Gold Mine Inc.

Property:

The subject claims are described below and illustrated on Figure 1.

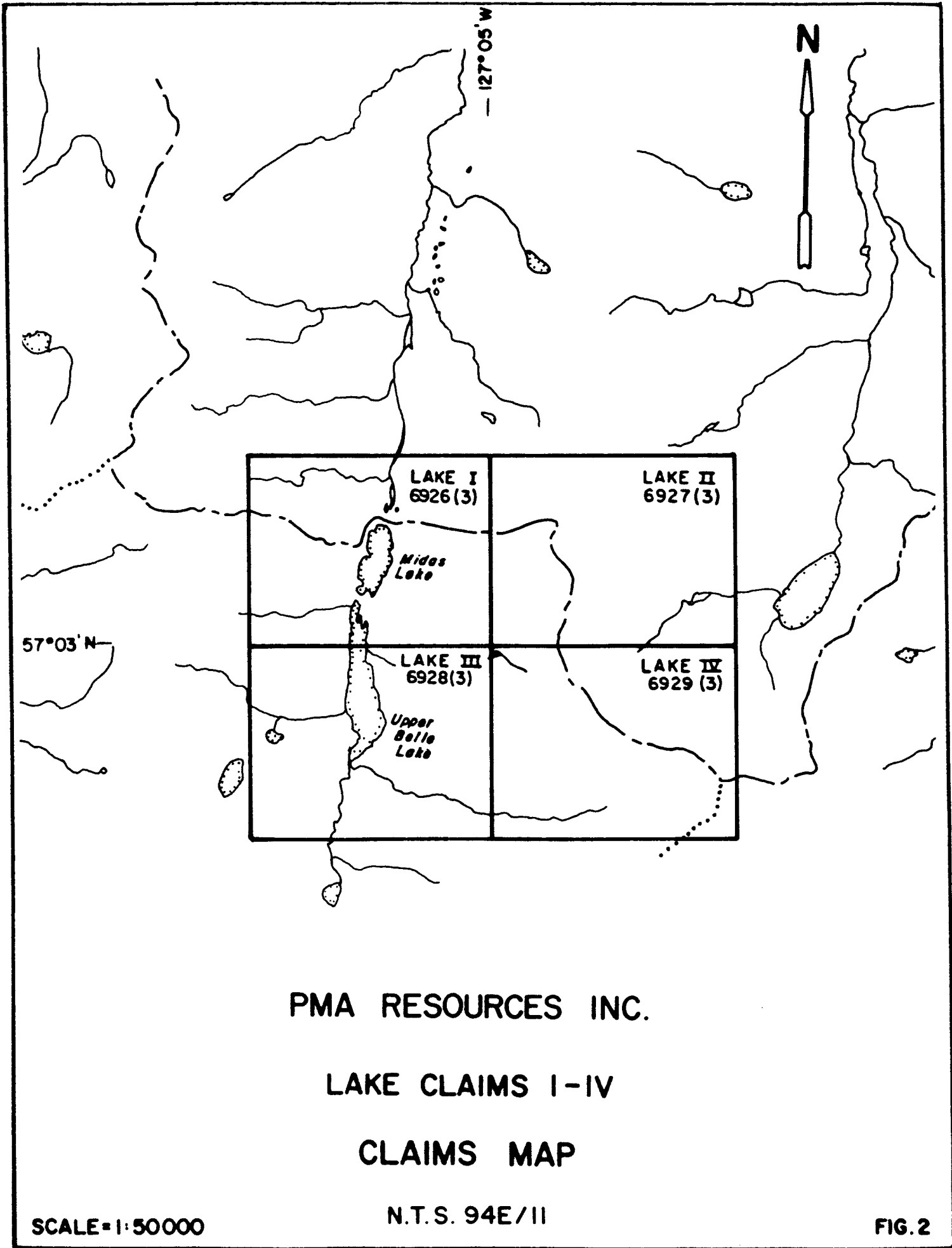
Claim name	Units	Record No.	Record Date
Lake I	20	6926	85 25 03
Lake II	20	6927	85 25 03
Lake III	20	6928	85 25 03
Lake IV	20	6929	85 25 03

The claims were recorded in the name of **Toodoggone Syndicate** and are the subject of an option agreement with **PMA Resources Inc.**

History:

The Toodoggone area was prospected and tested for placer gold in the 1920's and 1930's. A public company, Two Brothers Valley Gold Mines Ltd., undertook considerable test work, including drilling in 1934. Most of this work was directed towards the extensive gravel deposits lying primarily near the junction of McClair Creek and the Toodoggone River.

Gold-Silver mineralization was discovered on the Chappelle

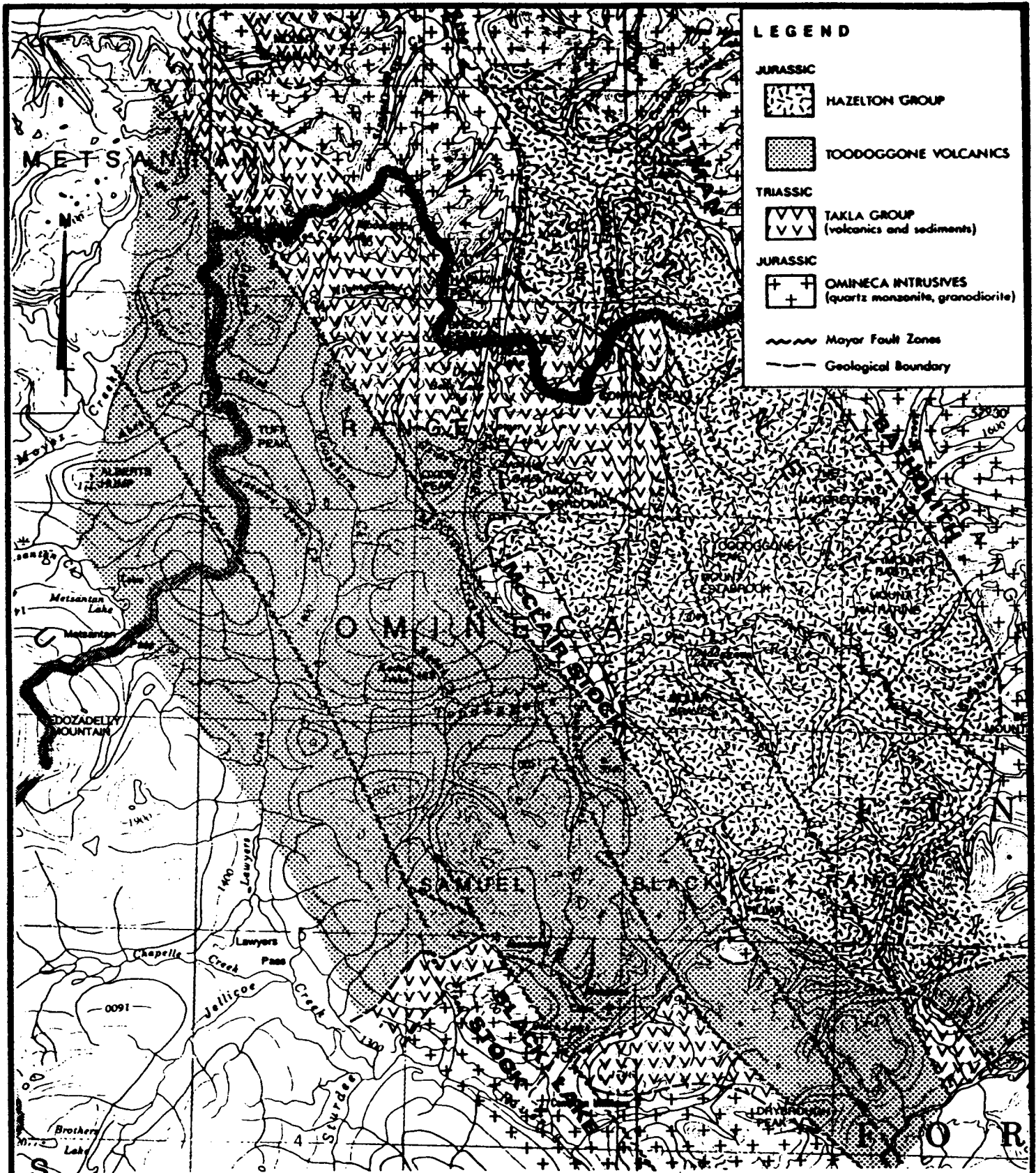


(Baker Mine) property by Kenco Exploration (Western Ltd. in 1969. Numerous other gold-silver discoveries were made in the 1970's and the 1980's, including the lawyers deposit which was discovered by Kennco in 1973 and optioned by SEREM Ltd. in 1979. Although at this time only a small portion of the whole belt has been explored at depth, seven properties now show outlined gold-silver reserves. Of these, the three best known ones are: Baker Mines (Multinational) 52,000 tonne 1.07 oz/tonne Au, 23.2 oz, tonne Ag; Lawyers (SEREM Inc.) 561,000 tons 0.21 oz/tonne Au, 7.1 oz/tonne Ag; (Al Energex Minerals Ltd.) 160,000 tons 0.37 oz/tonne Au, Subsequently the Lawyers reserves were increased to 1,400,000 tons of unknown grade.

A regional program, constituting of a survey of over 10 000 line km of airborne magnetometer and VLF-electromagnetometer was conducted in the Toodoggone Gold area in 1986 By Western Geophysical Aero Data Ltd. This data was used to guide reconnaissance work, and follow up geological reconnaissance work, and follow up geological mapping and soil sampling in 1987.

During the 1960's, Phelps Dodge held a large block of claims centered on Mt. Gordonia which lies south of the Lake Claims. The northern parts of this block may have overlapped with the southern Margins of the Lake III and IV claims. There is no public record of the work done during this period.

Reconnaissance work by D. L. Cooke in the vicinity of Oxide Creek, which lies southwest of the Lake claims, indicated the presence of monzonite intrusive rocks containing pyrite and chalcoppyrite. A large gossan has been locate along the



LEGEND

JURASSIC
 [Symbol: Small irregular shapes] HAZELTON GROUP

[Symbol: Small dots] TOODOGGONE VOLCANICS

TRIASSIC
 [Symbol: Small 'V' shapes] TAKLA GROUP (volcanics and sediments)

JURASSIC
 [Symbol: Small crosses] OMINECA INTRUSIVES (quartz monzonite, granodiorite)

[Symbol: Wavy line] Major Fault Zones

[Symbol: Solid line] Geological Boundary

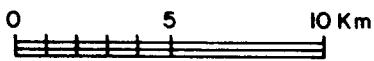
PMA RESOURCES INC.

LAKE CLAIMS I-IV

REGIONAL GEOLOGY

N.T.S. 94E/II

FIG. 3



margins of the intrusions on both sides of Oxide Creek, and it extends as far north as the Bell #3 claim. Although rock and stream sediment samples from the area were then assayed for copper and molybdenum, little attention was directed to analyses for gold.

During 1977, Cominco limited discovered stratabound base metal sulphides north of Contact Peak. This mineralization is now covered by Lake I and Lake II claims.

In 1986 reconnaissance work by D. L. Cooke in the Lake claims indicated that the greater portion of the Lake I to Lake IV claims (which lie on and East of Midas Lake) are underlain by intermediate to basic flows and pyroclastics of the Takla group.

A major fault structure runs north - south along the valley in which the Upper Belle Lake and Midas Lake occur (Gabrielse, et al, 1976). This fault separates Takla rocks on the east from Hazelton rocks on the west. The portion of the Lake claims which lie west of Midas Lake, consist of andesitic pyroclastic rocks of the Hazelton Group. The Takla sequence is also separated from the Hazelton Group along the northern boundary of the property by an east-west fault.

Regional Geology and Mineralization

(According to Cooke 1988)

The Toadogone River epithermal precious metal district occurs near the eastern Margin of the Intermontane tectonic belt. It extends for more than 100 kilometers from McConnel Creek to the Stikine River as a 20 kilometer wide zone of volcanic, sedimentary and intrusive rocks. The oldest rocks

in the area are the Asitka limestones, argillites and cherts of Permian age.

The Asitka group are usually in fault contact with Takla volcanic rocks of upper Triassic age. The Takla is characterized by their volcanoclastic sedimentary equivalents.

The volcanic rocks lying stratigraphically above the Takla Group have been classified under two headings : the Toodoggone and the Hazelton.

The Toodoggone group is of Lower jurassic age and is equivalent to the base of the Hazelton Group (Panteleyev, 1984). The Toodoggone volcanics consist predominantly of subaerial dacite latite trachyte and rhyolite pyroclastic rocks more than 500 meters in thickness, which unconformably overlies the Takla.

The majority of epithermal precious metal occurrences in the area are in the Toodoggone volcanic rocks. However, the Baker deposit occurs in Takla Volcanic rocks.

The Toodoggone volcanics are bordered on the east side and are in fault contact with the Hazelton Group, consisting of intermediate volcanics, conglomerates, breccia, lahar and abundant pink feldspar and porphyr dikes and sills. These rocks range in age from Lower Jurassic to upper Jurassic and may include members of the Toodoggone group.

Acid to intermediate stocks and plugs of jurassic age intruded into the sedimentary and volcanic rocks of the area.

The Toodoggone Group exhibits at least four types of precious metal mineralization, the most common of which is epithermal in origin. The epithermal deposits occur as massive quartz veins such as at the Baker Mine, or as silicified zones and amethystine breccia zones such as at the Lawyers deposit. They are generally close to major northwest faults and are associated with siliceous volcanic centers, exhalative vents and zones of alteration within the Toodoggone volcanics. Quartz, barite and carbonate are the chief gangue minerals. The vein minerals are acanthite, pyrite, electrum, chalcopyrite, native gold, sphalerite and galena. Grades range from 0.1 to 1.0 oz/T Au and 1.0 to 20.0 oz/T Ag.

Property Geology

The greater portion of the Lake I to IV claims, which lie on and east of Midas Lake, is underlain by intermediate to basic flows and pyroclastics of the Takla group. A major fault structure runs North-South along the valley in which the Upper Belle and Midas Lake occur (Gabrielse, et. al., 1976). This fault separates Takla rocks on the east from Hazelton rocks on the west.

That portion of the Lake claims that lie west of Midas lake consists of andesitic pyroclastic rocks of the Hazelton Group. The Takla sequence is also separated from the Hazelton group along the northern boundary of the property by an east-west fault. A series of limey beds, together with laminated tuffaceous mudstone, tuffs cherts, and rhyolites occur within the Takla Group, and strike northwesterly across the property for a distance of about 3.5 kilometers. These rocks are intruded by a biotite granodiorite stock, resulting in development of abundant skarn mineralization within the

favourable limey beds over widths in excess of 40 meters. The skarn mineralization appears to be stratabound.

Toodoggone volcanic rocks were reported in 1987 from an area to the east of Upper Belle Lake in the southern part of the lake property (Bekdache and Seywerd, 1987, pp. 10). Siliceous to quartzitic masses have been mapped within this package of volcanic rocks.

1989 WORK PROGRAM

The 1989 work program for the Lake claims was carried out in the area surrounding Belle and Midas Lakes. This area had been relatively unexplored due to the ruggedness of the terrain. Reconnaissance work included: Mapping at a scale of 1:500, rock sampling, geochemical sampling, pan concentrates, and silt sampling.

A two line Grid was placed (Grid A) in a large cirque on the western periphery of the property. The lines ran approximately parallel in a north-south direction. These lines were soil sampled at 25 meter intervals to the B-C horizon border. Two samples, (0+00N,1+00W) and (0+00N,0+75W) yielded values anomalous in gold, 530 and 360 PPB respectively.

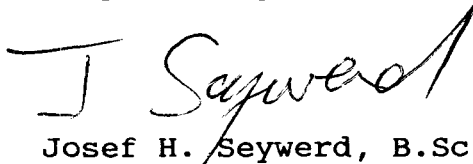
A 275 meter line along the western shore of Upper Belle Lake was soil sampled at 25 meter intervals but revealed no anomalous values. Silt sampling was done on numerous creeks in the drainage. No anomalous values resulted from the seven samples taken. Two pan concentrates did not yield anything of significance. Eighteen rock and float samples also did not yield anything of significance.

CONCLUSIONS AND RECOMMENDATIONS

The area around Upper Belle and Midas lakes is extremely rugged and requires much more detailed exploration to properly assess. More detailed mapping and geochemical or rock sampling is required.

There are many unexplored gossens on the western periphery of the property. Future work programs should focus on the anomalous soil samples at positions (0+00N,1+00W) and (0+00N,0+75W) on Grid A. Smaller soil grids with line spacing of 50 meters and a sample interval of 25 meters should be centered on these positions to delineate the anomalous zone. This should be followed by IP surveys which have had great success in delineating barite and silica hosted sulphide deposits in this area.

Respectfully Submitted,



Josef H. Seywerd, B.Sc., M.B.A.

COST BREAKDOWN:

<u>Personnel</u>	<u>Dates</u>	<u>Wages</u> <u>per Diam</u>	<u>Total</u>
D. Dunn	Sept.12-Sept.17	\$ 500.00	\$3000.00
D. Perkins	Sept.12-Sept.17	\$ 400.00	2400.00
Mobilization and demobilization			\$2500.00
Assay rock ans soil samples			\$1500.00
Room and Board 12 mandays @ 75.00/manday			\$ 900.00
Helicopter support			\$2100.00
Data analysis and report writing			\$2500.00
Drafting and Reproduction.....			<u>\$1900.00</u>
Total			\$16,800.00

Bibliography

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- Carter, N.C., 1971: Toodoggone River Area; B.C. Ministry of Energy, Mines and Petroleum Resources> (BCMEMP), G.E.M. 1971, pp.63-70
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Pezzot, E. T., and White, G., 1986: Geophysical Report on the Airborne VLF-Electromagnetometer and magnetometer survey, Lake I-IV claims, Omineca M.D., for PMA Technologies Inc.

Schroeter, T.G., Toodoggone River (94E); BCMEMPR 1981,

Geological Fieldwork 1980, paper 1981-1 pp. 124-131 1982,

Geological Fieldwork 1981, paper 1982-1 pp. 122-133 1983,

Geological Fieldwork 1982, paper 1983-1 pp. 125-133 1984,

Geological Fieldwork 1983, paper 1984-1 pp. 134-135 1985,

Geological Fieldwork 1984, paper 1985-1 pp. 291-297

STATEMENT OF QUALIFICATIONS

Profession: Geologist

Education: University of British Columbia B.Sc, Geological
Science, 1985

York University, Master of Business
Administration, 1989

Experience: Three season geological assistant for Noranda
Explorations Ltd. NWT and British Columbia.
Mapping, Rock Sampling, Trenching, geochemical
sampling, Track-etch surveys, Scintillometer
surveys and Induced polarization surveys.

One year geologist on geophysical crew, White
Geophysical Inc. Mapping, geochemical sampling,
rock sampling and interpretation of geological
and geophysical data. 1986

One summer project geologist/coordinator.
Mapping and interpreting geologic and
geophysical data. Supervision and direction of
exploration program in Toodoggone Area. Reports
and recommendations, 1987

Appendix A - Sampling Methodology and Rock Sample Descriptions

The 1989 soil samples taken from the Lake claims were sampled at 25 meter intervals. The soils were dug from a depth of 10 to 20 centimeters. The soil collected consisted of a poorly developed "B" horizon and the top of the "C" horizon. Coarse Material was removed. The soil was placed in standard kraft soil sample bags, dried and shipped to the lab. Rock chips were placed in standard plastic sample bags and shipped to the lab.

Rock Samples Descriptions

106185 106186 Silt Sample: Country rock is Syenite,
Elevation 1705 meters

106187 Float: andesite with chloritic and kspar alteration,

106188 Float: Vuggy Quartz with 2 percent pyrite

106189 Grab: Silicified volcanics sampled over 2m of a rusty
shear

106190-91 Silt: Fifty percent volcanics and fifty percent
intrusives

106192 Silt: Elevation 1510 m

106193 Pan Concentrate: 1510 m

106194 Grab: Silicified pyritic material from shear zone

106195 106196 Float: Andesite and Rhyolite pyroclastics. 10%

K feldspar

106197 Float: Silicified pyritic andesite from large gossen,
2% pyrite

106198: Grab: Silicified hematite stained andesite with 10%
pyrite from large gossen

106199 Chip Samples: 1m sampled over fault zone. Country
rock is silicified hematite stained volcanics with 1%
pyrite

106200 Float: Quartz potassium feldspar rich float

106201 Pan Concentrate: Host rock is potassium altered
volcanics

106202 same as LS01 Silt Sample: Host rock is potassium
altered volcanics

106203 Rock Chips: A gossen sampled over 2m. Fractures in the
gossen 185/90 and 90/90 106204 Rock Chip: Rusty shear,
185/90

106205 Rock Chips: Dacite to Rhyolite, 1-2 percent pyrite,
140 degree strike

106206 same as LTF05 Rock Chips: Fine tallus comprising of
Dacite, Fault 170/86E

106207 same as LS02 Silt: From fault that strikes 155/90,
poor sample

106208 to 106210 same as LTF01 to LTF03 Float: Pyritic tuff
and dacite taken from talus

106211 same as LTF04 Rock Chip: Grey green fine volcanics,
occasionally rusty, elevation 1700 meters

Appendix B - Assay Certificates

GEOCHEMICAL ANALYSIS CERTIFICATE

PMA Resources FILE # 90-0446 Page 1
 210 - 11751 Bridgeport Rd., Richmond BC V6X 1T5

SAMPLE#	Cu ppm	Pb ppm	Ag ppm	As ppm	Au* ppb
1+50N 1+00W	34	57	.4	20	6
1+25N 1+00W	46	90	.9	28	15
1+00N 1+00W	29	47	.2	36	2
0+75N 1+00W	37	44	.4	19	4
0+50N 1+00W	48	50	.5	19	12
0+25N 1+00W	34	59	.3	15	7
0+00N 4+00W	40	48	.2	16	530
0+00N 3+00W	28	33	.3	18	4
0+00N 2+75W	20	23	.3	19	4
0+00N 2+50W	17	18	.2	10	2
0+00N 2+25W	36	38	1.0	20	3
0+00N 2+00W	22	33	.5	11	1
0+00N 1+75W	30	37	.4	22	7
0+00N 1+50W	11	20	.2	15	3
0+00N 1+25W	15	20	.3	13	25
0+00N 1+00W	13	17	.1	11	2
0+00N 0+75W	24	37	.3	11	360
0+00N 0+50W	29	37	.4	17	3
0+00N 0+25W	35	43	.3	20	3
0+00N 0+00W	33	42	.3	19	4
0+25S 0+25E	33	17	.2	14	4
0+50S 0+50E	39	31	.2	18	9
0+75S 0+50E	26	18	.2	8	1
1+00S 0+50E	26	29	.2	16	3
1+25S 0+25E	32	34	.5	22	5
1+50S 0+50E	38	41	.6	27	5
1+75S 0+50E	37	49	.4	26	75
LAKE 1	22	33	.5	14	4
LAKE 2	32	36	.9	19	3
LAKE 3	29	46	1.4	27	6
LAKE 4	31	23	.4	20	3
LAKE 5	20	23	.2	8	3
LAKE 6	9	11	.2	8	2
LAKE 7	18	15	.2	8	6
LAKE 8	26	33	.3	21	2
LAKE 9	20	27	.4	20	2
STD C/AU-S	57	44	7.3	45	53

ICP - .500 GRAM SAMPLE IS DIGESTED WITH 3ML 3-1-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR AND IS DILUTED TO 10 ML WITH WATER. THIS LEACH IS PARTIAL FOR MN FE SR CA P LA CR MG BA TI B W AND LIMITED FOR NA K AND AL. AU DETECTION LIMIT BY ICP IS 3 PPM.
 - SAMPLE TYPE: P1-P2 SOIL P3 PAN CONC. P4 ROCK AU* ANALYSIS BY ACID LEACH/AA FROM 10 GM SAMPLE.

P-pulverized.

SIGNED BY *C. Leong* D. TOYE, C. LEONG, J. WANG; CERTIFIED B.C. ASSAYERS

SAMPLE#	Cu ppm	Pb ppm	Ag ppm	As ppm	Au* ppb
LAKE 10	11	16	.1	11	5
LAKE 11	30	32	.3	20	2
LAKE 12	26	19	.1	15	1
LTF 01	117	369	1.3	21	1
LTF 02 P	63	234	.6	20	4
LTF 03 P	137	465	.3	16	5
LTF 04	138	414	.1	4	4
LTF 05	29	30	.1	10	2
LS 01 P	21	18	.3	6	5
LS 02	51	28	.1	10	6
106186 H P	55	82	.9	10	4
106191 H P	58	46	.4	20	3
106192 H P	19	22	.2	6	2
106195 H P	21	22	.5	6	4
STD C/AU-S	58	42	6.9	41	51

SAMPLE#	Cu ppm	Pb ppm	Ag ppm	As ppm	Au* ppb
106185 H	34	43	.2	12	980
106190 H	40	25	.1	19	12
106193 H	3	6	.3	6	5
106196 H	8	10	.2	7	2
106201 H	17	12	.1	9	101
STD C/AU-S	58	38	7.2	42	48

SAMPLE#	Cu ppm	Pb ppm	Ag ppm	As ppm	Au* PPB
106187 H	12	9	.8	80	21
106188 H	36	80	1.7	19	7
106189 H	55	101	3.6	5	1
106194 H	2	3	.1	9	1
106197 H	46	13	.3	3	1
106198 H	17	15	.9	66	1
106199 H	16	61	.4	24	1
106200 H	5	6	1.0	11	2
106203 H	8	16	.6	2	9
106204 H	5	13	.8	2	14
106205 H	4	6	.1	7	1
FINE SPEC	56	2580	382.0 ✓	14	820
STD C/AU-R	60	37	7.3	44	495

✓ ASSAY RECOMMENDED

PMA RESOURCES INC.

LAKE 1 - 4 CLAIMS

OMINECA MINING DIVISION, B. C.

GEOLOGY AND SOIL, ROCK,
PAN CONCENTRATE
SAMPLE LOCATION MAP

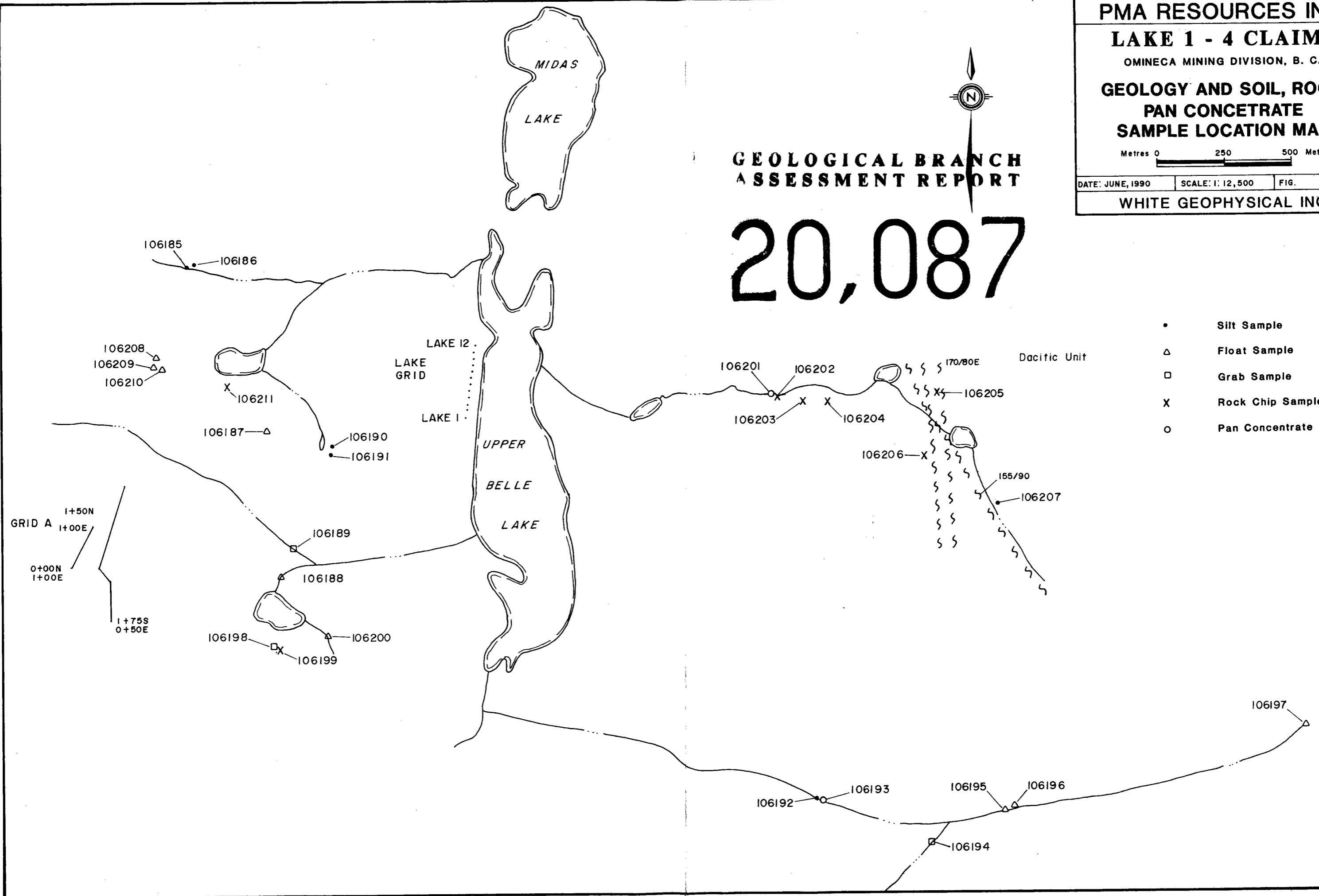
Metres 0 250 500 Metres

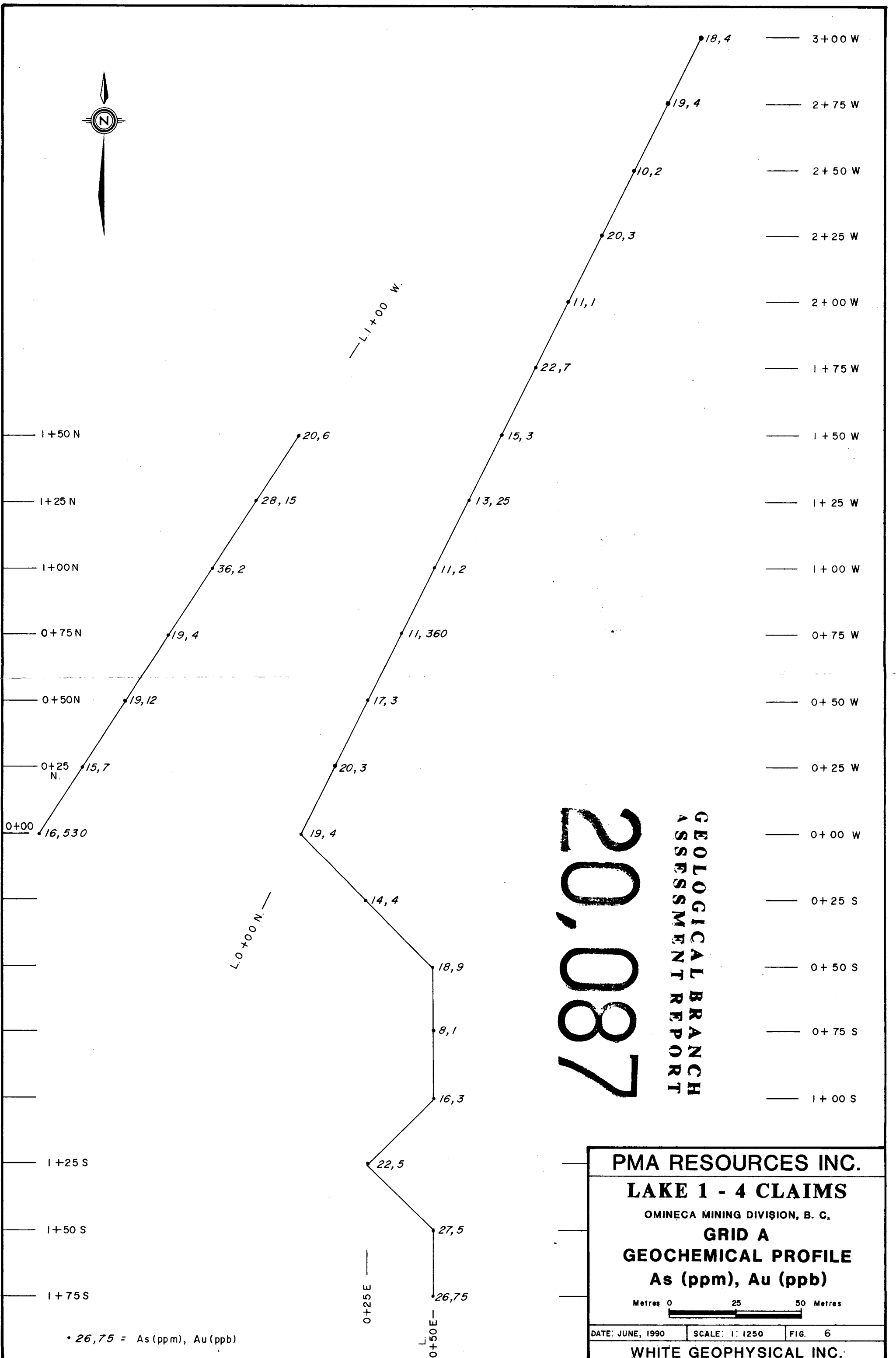
DATE: JUNE, 1990 SCALE: 1: 12,500 FIG. 5

WHITE GEOPHYSICAL INC.

GEOLOGICAL BRANCH
ASSESSMENT REPORT

20,087

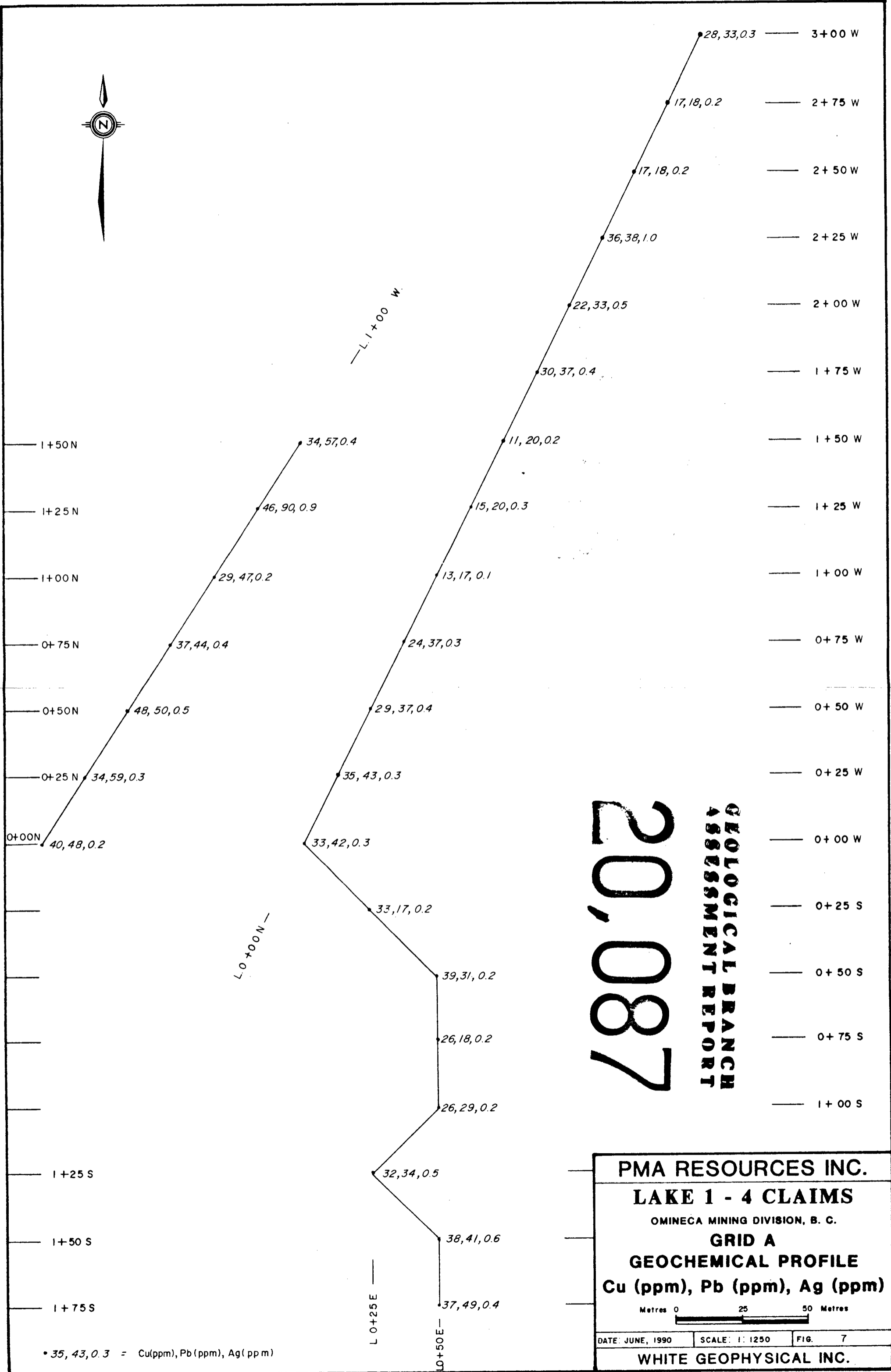
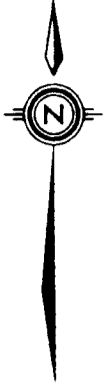




20,087
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ASSESSMENT REPORT

• 26,75 = As (ppm), Au (ppb)

PMA RESOURCES INC.		
LAKE 1 - 4 CLAIMS		
OMINECA MINING DIVISION, B. C.		
GRID A		
GEOCHEMICAL PROFILE		
As (ppm), Au (ppb)		
Metres 0 25 50 Metres		
DATE: JUNE, 1990	SCALE: 1: 1250	FIG. 6
WHITE GEOPHYSICAL INC.		



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GEOLOGICAL BRANCH
ASSESSMENT REPORT

PMA RESOURCES INC.
LAKE 1 - 4 CLAIMS
 OMINECA MINING DIVISION, B. C.
GRID A
GEOCHEMICAL PROFILE
 Cu (ppm), Pb (ppm), Ag (ppm)

Metres 0 25 50 Metres

DATE: JUNE, 1990 SCALE: 1:1250 FIG. 7

WHITE GEOPHYSICAL INC.

* 35, 43, 0.3 = Cu(ppm), Pb (ppm), Ag (ppm)