

87-53-15779

**REPORT ON GEOLOGICAL MAPPING
OF THE SURPRISE MINERAL CLAIM**

Omineca ~~Liard~~ Mining Division
Toodoggone River Area, B.C.
Lat 57° 28'N Long 127° 16'W
NTS 94E/6W

Prepared by
Henry J. Awmack

Owned by **Energex Minerals Ltd.**
Work by **Energex Minerals Ltd.**

GEOLOGICAL BRANCH
ASSESSMENT REPORT

15,779

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**REPORT ON GEOLOGICAL MAPPING
OF THE SURPRISE MINERAL CLAIM
Toodoggone River Area, B.C.**

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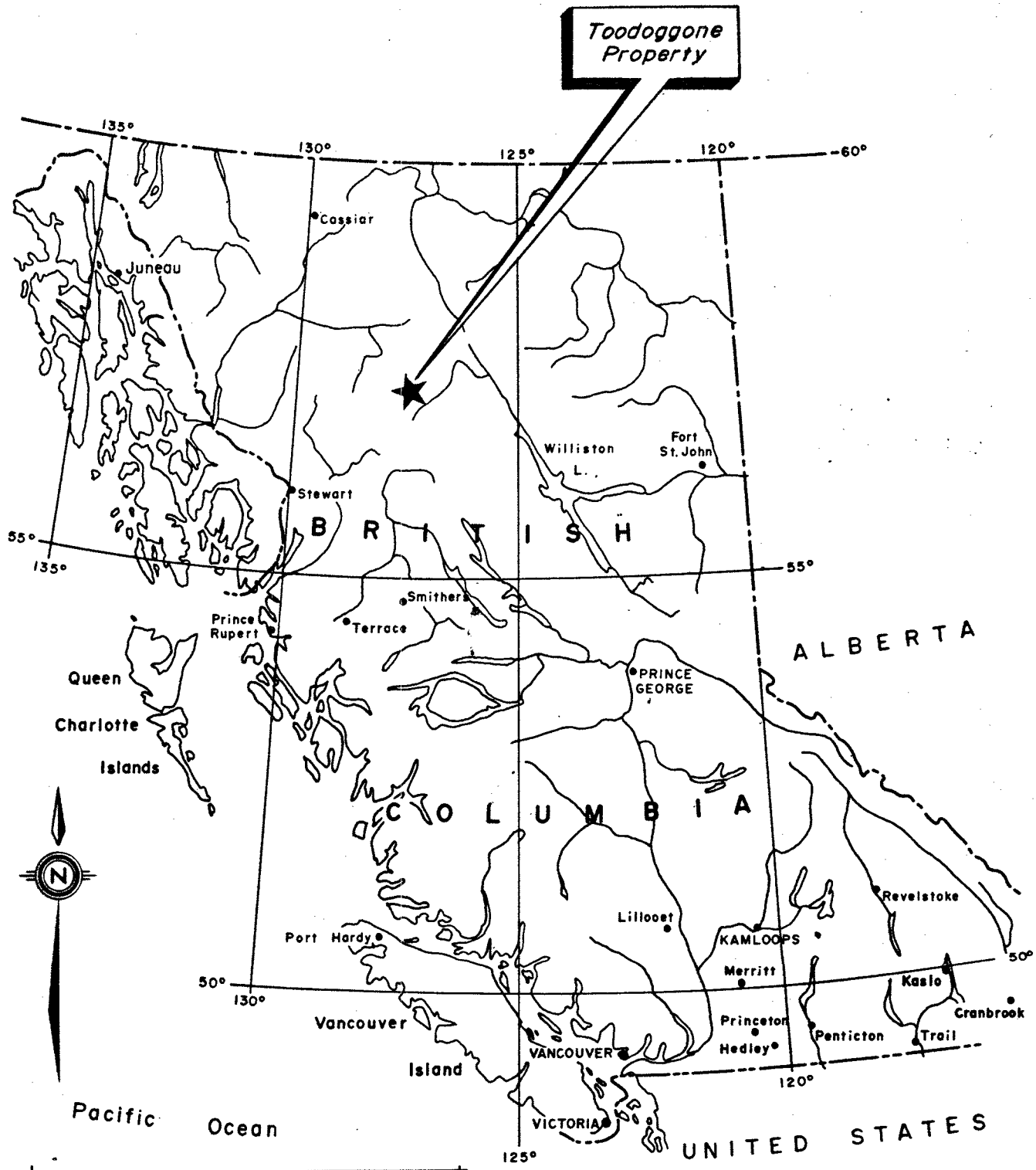
INTRODUCTION

Energex Minerals Ltd. conducted a limited mapping and sampling program on the Surprise claim in 1986, as part of an extensive exploration program on their 26 - claim Al property.

The Surprise claim lies south of Antoine Louis Creek in the Toadogone River area of north-central British Columbia (See Fig.1).

A southwesterly-dipping sequence of andesitic flows and volcanoclastics has been propylitically altered over a large area. Structurally-controlled gold-bearing potassic alteration zones occur within chloritic alteration near the southern edge of the propylitic alteration.

Work done in 1986 consisted of reconnaissance geological mapping, prospecting and sampling. This was followed by mapping and chip sampling of the two newly-discovered potassic alteration zones.



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PROPERTY LOCATION MAP

100 0 100 200 300 400 Km.
100 0 100 200 Mi.

FEB, 1986 FIGURE 1

PROPERTY

The A1 property consists of 26 contiguous modified grid claims, comprising 298 units and 6 fractions. A table of claim data follows:

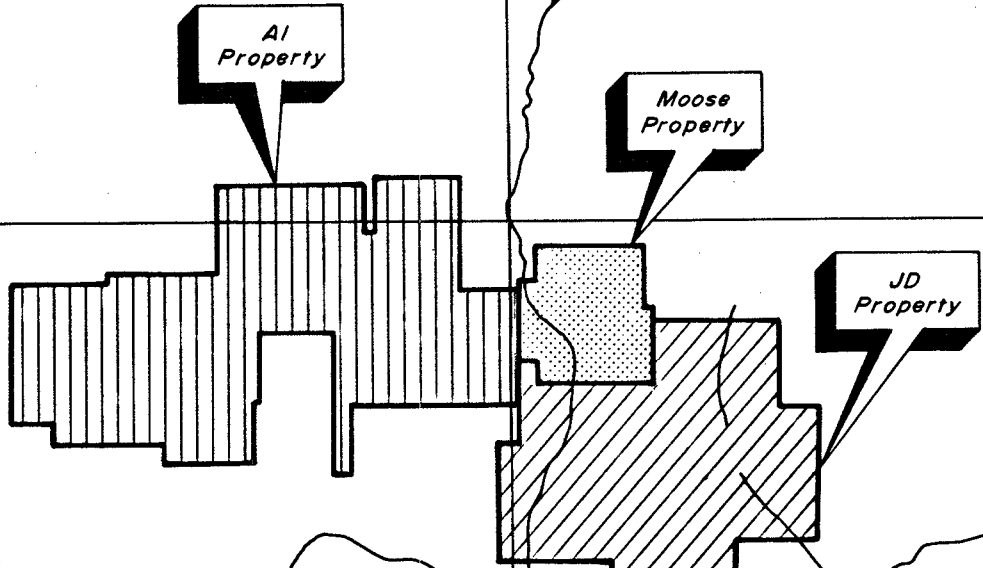
<u>Claim Name</u>	<u>Record #</u>	<u>Record Date</u>	<u>Mining Division</u>	<u># of Units</u>	<u>Current Group</u>	<u>Expiry Date</u>
A1 1	789	12Jun79	Liard	20	Hump 86	1997
A1 2	790	12Jun79	Liard	20	Bonanza86	1997
A1 3	791	12Jun79	Liard	20	Hump 86	1997
A1 4	792	12Jun79	Liard	20	Bonanza86	1996
A1 5	1439	18Jul80	Liard	10	Hump 86	1996
A1 6	1440	18Jul80	Liard	10	Hump 86	1996
A1 7	1871	21Apr81	Liard	16	Hump 86	1996
A1 8	1872	21Apr81	Liard	16	Hump 86	1997
Bert	2012	13Aug81	Liard	20	Bonanza86	1997
Ernie	2011	13Aug81	Liard	20	Bonanza86	1997
Bull	2010	13Aug81	Liard	20	Bonanza86	1996
Hyuk 1 (fr)	3026	11Jul83	Liard	1	Hump 86	1996
Hyuk 2 (fr)	3027	11Jul83	Liard	1	n/a	1996
Hyuk 3 (fr)	3028	11Jul83	Liard	1	Hump 86	1996
Nii	3029	11Jul83	Liard	6	Hump 86	1996
JO (fr)	4272	08Sep81	Omineca	1	Surprise86	1996
RJ (fr)	4273	08Sep81	Omineca	1	Surprise86	1996
Winkle	4099	13Aug81	Omineca	20	Surprise86	1991
Chute	4100	13Aug81	Omineca	18	Surprise86	1991
*Surprise	4098	13Aug81	Omineca	20	Surprise86	1988
Gerome	4097	13Aug81	Omineca	15	Surprise86	1989
Wankle	4095	13Aug81	Omineca	3	Surprise86	1990
Tinkle (fr)	4093	13Aug81	Omineca	1	Surprise86	1989
Was II	6249	29Aug85	Omineca	8	Surprise86	1989
Antoine Louis	4096	13Aug81	Omineca	10	Surprise86	1988

* Subject claim, this report



127°15'

57°30'



Toodoggone Lake

Toodoggone River

Lawyers Property (Serem)

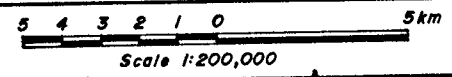
Baker Mine (DuPont)

Sturdee River

Airstrip

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LOCATION MAP
AI, Moose,
& JD Properties



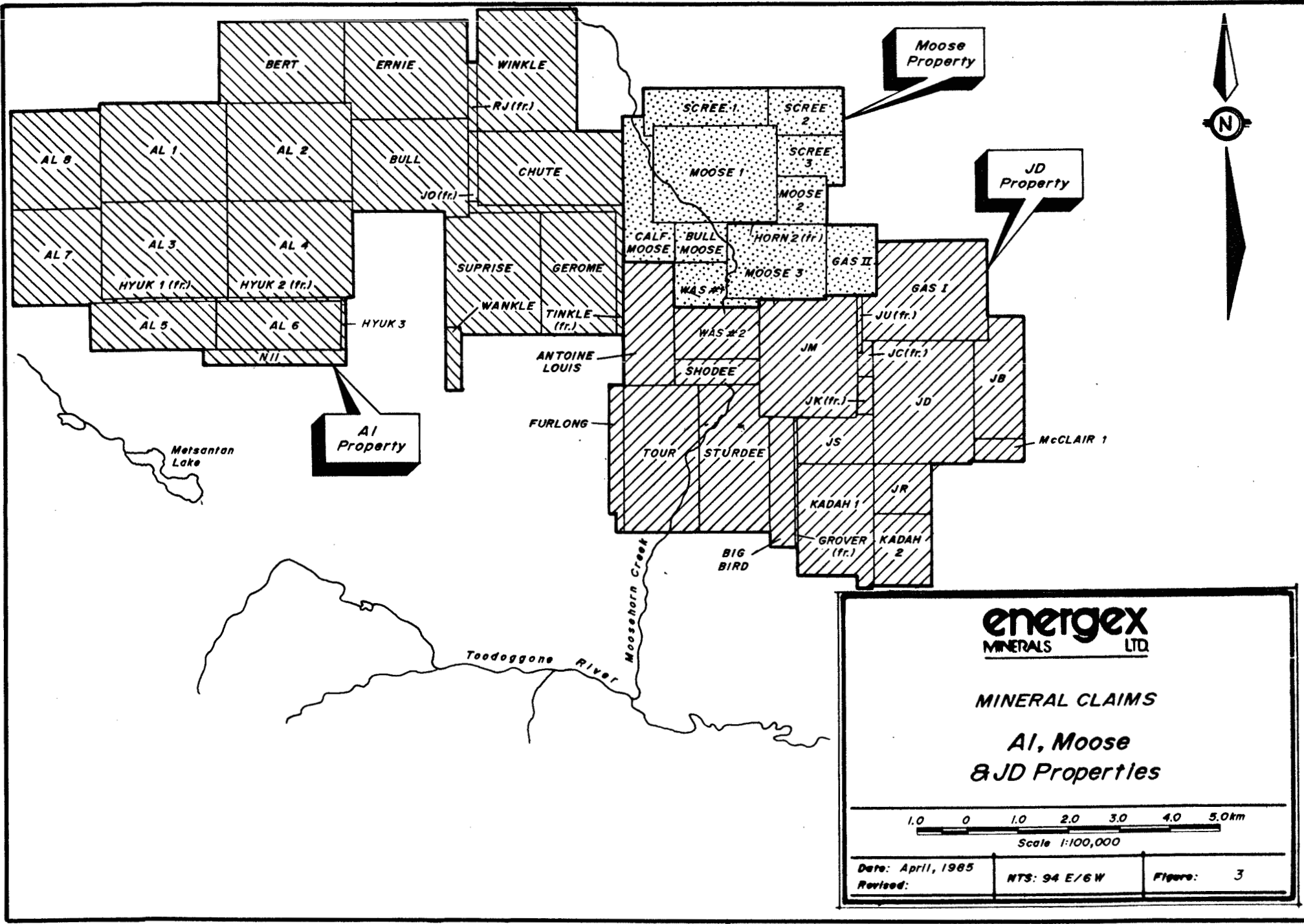
Date: April, 1985	NTS: 94 E/6W	Figure: 2
Revised:		

LOCATION AND ACCESS

The Al property is situated approximately 300 kilometers north of Smithers, at 57°28'N latitude and 127°22'W longitude. (See Fig.1)

The Toodoggone River area is served by the Sturdee airstrip, which lies 30 kilometers to the southeast of the Al camp. (See Fig.2) The Sturdee strip was built to accommodate Hercules aircraft, which were used to service Dupont's Baker mine.

Access to the property is presently by fixed wing aircraft from Smithers and by helicopter from Sturdee strip. A road linking the Toodoggone area (S.E.R.E.M.'s Lawyers deposit) with the present terminus of the Omineca Mining Road is under consideration by the B.C. Government. If this road is completed, materials and personnel could be trucked to the roadhead and ferried to the Al property by helicopter, a distance of only 18 kilometers.



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MINERAL CLAIMS
AI, Moose
& JD Properties

1.0 0 1.0 2.0 3.0 4.0 5.0km
Scale 1:100,000

Date: April, 1985	NTS: 94 E/6W	Figure: 3
Revised:		

PHYSIOGRAPHY, VEGETATION AND CLIMATE

The Surprise claim covers an upland plateau dipping gently southward with a sharp north-facing glacial escarpment and cirques which drain into Antoine Louis Creek.

The Surprise claim lies above timberline at elevations of 1500 to 1830 meters. Vegetation consists of low scrub and alpine grasses, with small stands of stunted Alpine Fir and krummholz.

The claim is snowbound from early October until mid-June. The short summer season is typically cool and showery. Occasional snow showers occur throughout the summer months but accumulated snow does not linger for long.

PREVIOUS WORK

Early work in the area of the present A1 property consisted of a program of prospecting, hand trenching and rock sampling conducted by Newconnex on the Hump claims. This work, completed in 1973, was directed to the discovery of porphyry-type Cu-Mo deposits and was unsuccessful.

The A1 1-4 claims were staked by Energex Minerals Ltd. in 1979, and were optioned to Texasgulf Canada Ltd. in 1980, together with the Moose and JD properties. Texasgulf completed reconnaissance geochemical and geological surveys in that year, and staked the A1 5-6 claims to cover large alteration zones on the north flank of Metsantan Mountain.

In 1981, more extensive and detailed grid-controlled geochemical surveys were conducted. Additional work included trenching and VLF-EM/magnetometer orientation surveys. The work produced encouraging results; the claim block was further enlarged by the addition of several claims, including the Surprise claim.

The 1982 program consisted of geological mapping and rock geochemistry, reconnaissance and detailed soil geochemistry, IP surveys, backhoe trenching, diamond drilling, and a legal survey of legal corner posts. Drilling and trenching were concentrated on the Bonanza-Ridge alteration zones; additional holes were drilled on the Furlong and Hump zones. The drilling was technically successful but the results were erratic and only moderately encouraging. It became apparent that extensive surface work was needed before mineralized zones were tested by drilling (Sutherland and Clark, 1982).

Accordingly, 1983 was a season of detailed surface exploration which included very extensive backhoe trenching and limited geological mapping and soil sampling. This work resulted in the discovery of the high grade "Verrenass" zone in the Bonanza-Ridge area, and the "Thesis II" mineralization south of the present camp area.

In 1984, extensive backhoe trenching and diamond drilling were conducted on five mineralized zones, including the Verrenas, Ridge and Thesis II, and the newly discovered Thesis III and BV (Barite Vein) zones. The drilling results varied; encouraging high grade intersections were made on the BV and Thesis III zones and assays from the other zones were of moderate grade (von Fersen, 1984).

The A1 property, together with the Moose and JD groups, was returned to Energex Minerals Ltd. in late December 1984. Kidd Creek Mines Limited (formerly Texasgulf Canada Ltd.) retained a 15% net profits interest in the properties.

During the 1985 field season Energex Minerals Ltd. undertook 2613 meters of diamond drilling on the A1 and Moose properties, together with geophysical surveys, detailed geological mapping, backhoe trenching and prospecting on selected areas of the claims.

REGIONAL GEOLOGY OF THE TOODOGGONE CAMP

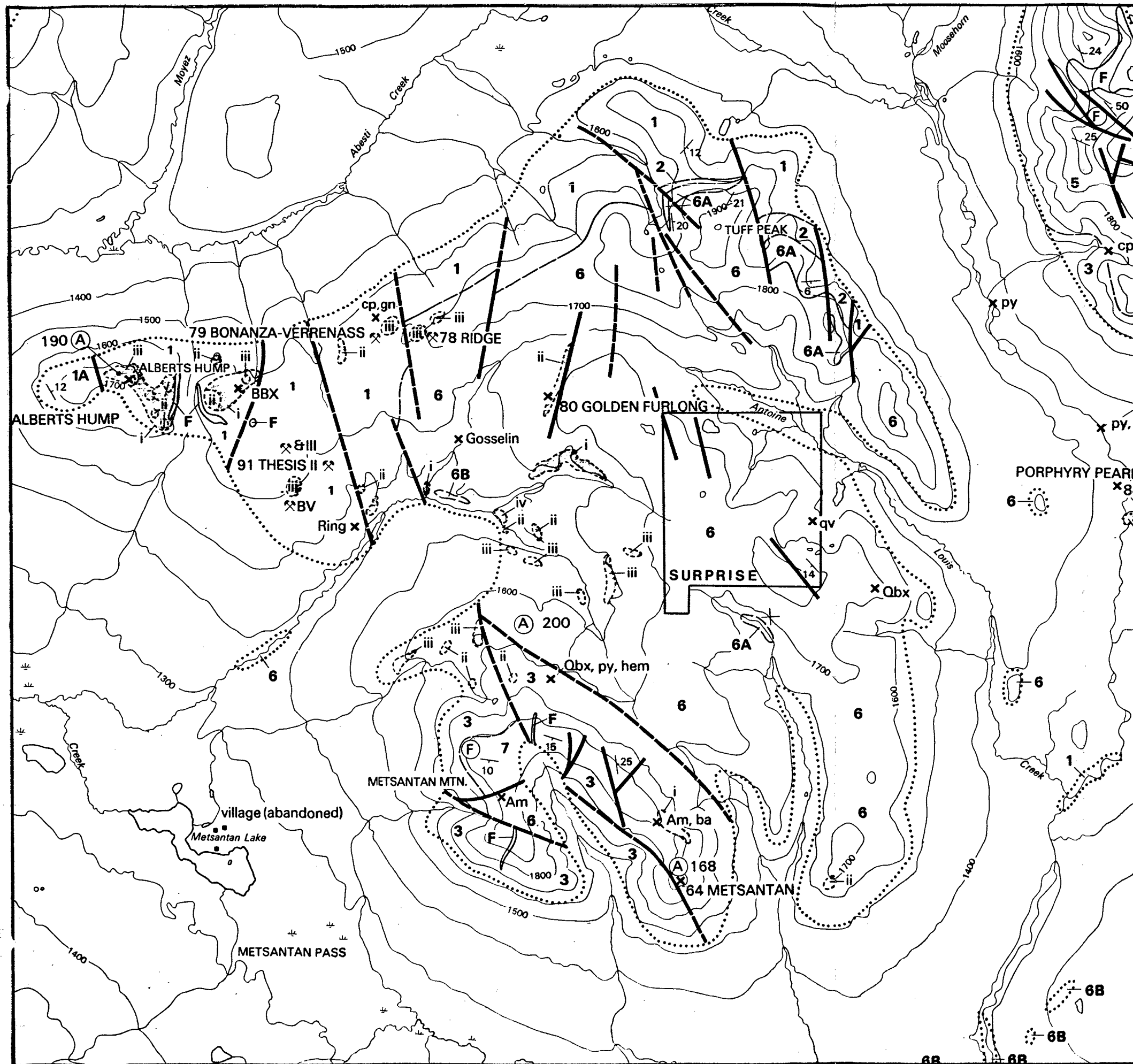
The Toodoggone River area is situated near the eastern margin of the Intermontane tectonic belt. The oldest rocks in the area are late Paleozoic limestones in the vicinity of Baker Mine. These are in fault contact with late Triassic Takla Group volcanic rocks exposed at Baker Mine and east and north of the Moose property.

A volcanic assemblage of Lower Jurassic age, lithologically distinctive from the Hazelton or Takla groups, was first recognized by Carter in 1971, and informally named the "Toodoggone volcanics". These comprise a subaerial pyroclastic assemblage of predominantly andesitic composition (Panteleyev, 1983), which unconformably overlies, or is in fault contact with, older rocks. Toodoggone volcanic rocks are contained in a 100 x 25 kilometer northwest-trending belt extending from Thutade Lake in the south to the Stikine River in the north. Mineral claims owned by Energex straddle the Toodoggone volcanic belt.

The Toodoggone rocks have been subdivided into eight units/formations (Panteleyev, 1982; Diakow, 1983) consisting of interlayered lava flows, ash flows and lapilli and crystal tuffs, with subvolcanic equivalents and associated volcanoclastic and epiclastic rocks. Radiometric ages indicate Toodoggone volcanic rocks were deposited over a 20-million-year span, beginning in the earliest Jurassic (Panteleyev, 1983). Regional geology as mapped by Diakow, Panteleyev and Schroeter (1985) is illustrated in Figure 4.

Toodoggone volcanics and older layered rocks are cut by Omineca granitic intrusives of Early to Middle Jurassic age and by subvolcanic intrusions related to Toodoggone volcanism.

Clastic sedimentary rocks of the Cretaceous - Tertiary Sustut Group overlie older layered rocks near the Stikine River and partly cover the southwestern exposed margin of the Toodoggone volcanic belt.



LEGEND

TOODOGGONE CRYSTAL ASH TUFFS AND FLOWS

7 RECESSIVE, GREY, MAUVE, PURPLE QUARTZOSE PLAGIOCLASE CRYSTAL TUFF, LAPILLI TUFF, AND BRECCIA, WITH LESSER AGGLOMERATE, LAHAR, AND EPI-CLASTIC BEDS; INCLUDES SOME WELDED TUFFS AND PYROXENE HORNBLLENDE FELDSPAR PORPHYRY FLOWS WHICH ARE LOCALLY DOMINANT; SOME MEMBERS CONTAIN NO QUARTZ, PINK WEATHERING WHERE LAUMONTITE IS ABUNDANT

TUFF PEAK FORMATION

6 PALE PURPLE, GREY, AND GREEN BIOTITE AUGITE HORNBLLENDE PLAGIOCLASE PORPHYRY FLOWS; SOME AUTOBRECCIATED FLOWS, MINOR SILLS AND PLUGS, SOME CRYSTAL AND LAPILLI TUFF

6A CONGLOMERATE OR LAHAR DERIVED FROM UNITS 6 AND 6B, WITH GRADED AND CROSSLAMINATED MUDSTONE AND SANDSTONE INTERBEDS; DEBRIS FLOWS, LAPILLI AND CRYSTAL TUFFS

6B FLOWS SIMILAR TO UNIT 6 BUT CONTAINING SPARSE ORTHOCLASE MEGACRYSTS

LAWYERS—METSANTAN QUARTZOSE ANDESITE

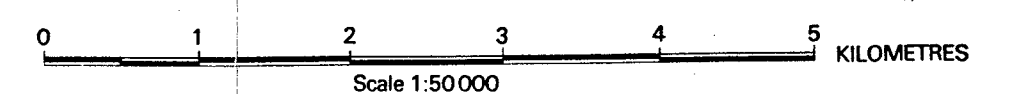
3 GREEN TO GREY QUARTZOSE PYROXENE (?) BIOTITE HORNBLLENDE PLAGIOCLASE PORPHYRY FLOWS AND TUFFS, QUARTZ CONTENT RANGES FROM NEGLIGIBLE TO ABOUT 3 PER CENT, IN THE NORTH FLOWS PREDOMINATE WITH LOCAL FLOW BRECCIA, LAPILLI TUFF, AND RARE WELDED TUFF UNITS; TOWARD THE SOUTH ASH FLOWS ARE COMMON, INCLUDING RARE SURGE DEPOSITS, THE UNIT CONTAINS EXTENSIVE ZONES OF EPIDOTIZED, PYRITIC ROCK WITH CHARACTERISTIC SALMON, PINK, AND ORANGE PLAGIOCLASE CRYSTALS

MOYEZ CREEK VOLCANICLASTICS

2 CONGLOMERATE WITH SOME GRANITIC CLASTS, GRADED, CROSS-BEDDED GREYWACKE, WELL-BEDDED CRYSTAL TUFF, EPICLASTIC SEDIMENTS; LOCAL LAMINATED CALCAREOUS SILT (MARL), RARE THIN LIMESTONE AND CHERT; LOCAL COARSE LANDSLIDE DEBRIS AND LAHAR, IN PART OR TOTALLY EQUIVALENT TO UNIT 6A

ADDOOGATCHO CREEK FORMATION

1 PALE REDDISH GREY TO DARK RED-BROWN QUARTZOSE BIOTITE HORNBLLENDE PHYRIC ASH FLOWS; THE ROCKS CONTAIN MINOR SANIDINE AND RARE AUGITE, WELDING IS WIDESPREAD AND RANGES FROM INCIPIENT TO EUTAXITIC; LOCALLY ORANGE TO BROWN VITROPHYRIC CLASTS ARE COMMON, INCLUDES LAPILLI TUFF AND BRECCIA UNITS AS WELL AS MINOR LAYERED GROUND SURGE DEPOSITS



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**METSANTAN AREA
REGIONAL GEOLOGY**

After Diakow, Pantaleyev and Schroeter
(1985)

Date: Jan 1987	NTS 94E/6W	Figure: 4
Revised:		

Structurally controlled, northwest-trending lineaments believed responsible for the channelling of ore-bearing fluids can be traced for many kilometers by landsat and air photo linears connecting many of the area's most significant precious metal deposits (Baker, Lawyers, Moosehorn Canyon, Metsantan, Bonanza, etc.).

GEOLOGY & MINERALIZATION

The Surprise claim is underlain by Toodoggone volcanics of the Tuff Peak Formation (See Fig.5). These have been sub-divided into flows (Unit 6) and volcaniclastics (Unit 6A), which are generally conformable and dip gently to the southwest.

Unit 6 comprises purple and brown feldspar-biotite-hornblende porphyry flows. The flows are massive and generally fresh in appearance. Hematitic flow-top breccias are rare.

Unit 6A contains grey to greybrown crystal tuffs, lapilli tuffs, tuffbreccias and rare welded tuffs. They are andesitic in composition, generally contain feldspar, biotite and hornblende phenocrysts and appear comagmatic with the Unit 6 flows.

A large, roughly circular alteration zone extends from the eastern half of the Surprise claim eastward onto the Gerome claim. Three alteration types have been mapped over an area 2100m in diameter forming a roughly concentric pattern (See Fig.5). These alteration types are:

1. Propylitic: Contains up to 10% epidote in matrix along with minor chlorite and rare specularite. Phenocrysts are little altered and primary textures are preserved. Propylitic alteration covers the majority of the altered area.
2. Chloritic: Contains remnant pink feldspar phenocrysts in a medium-grained green to brown chloritic matrix with minor magnetite. Epidote is absent. Chloritic alteration is confined to a 400m x 600m area along the southern boundary of the altered region.
3. Potassic: Contains remnant pink feldspar phenocrysts in a pink Kspar-quartz matrix with 1% fine-grained disseminated pyrite and cut by numerous vuggy quartz veinlets. Intense fracturing accompanies the

potassic alteration and influences the orientation and extent of the potassic alteration zones.

Two zones of potassic alteration (collectively termed the 'Cirque Zone') have been mapped within the chloritic alteration (See Fig.6). One trends 110° for at least 300 meters with exposed widths up to 25 meters. Alteration intensity increases with fracturing, which is oriented predominantly $110/80$ N and $010/70$ W. The most intense alteration and the highest precious metal values occur along a small scarp, possibly a fault, which forms the northern boundary of the exposed alteration zone. Eight of fourteen grab and chip samples taken from this zone contained more than 100 ppb Au. One chip sample ran 2100 ppb Au and 25.2 ppm Ag over 5.0 meters. Another grab sample ran 2500 ppb Au and 25.3 ppm Ag.

The second potassic alteration zone trends discontinuously at 005° for 85 meters from a point 75 meters north of the first zone but has yielded no significant precious metal values.

CONCLUSIONS AND RECOMMENDATIONS

The Cirque zone of potassic alteration with associated precious metal mineralization appears very similar to the Golden Lion prospect of Newmont Exploration of Canada Limited, some 12 km to the north. Their zone 3, described as an intrusive body with strong potassic-siliceous alteration and a quartz stockwork, has drill-indicated reserves of 2,265,000 tons containing 0.028 oz/ton Au, 0.14 oz/t Ag and 0.49% Zn + Pb.

That deposit has a strike length of 254 meters, widths ranging from 12 to 50 meters and has been drilled to 92 meters depth. (Macauley, 1985). The alteration type, dimensions and grade are very comparable to the Cirque zone as presently mapped, and a deposit of similar tonnage and grade could be expected at the Cirque.

The Porphyry Pearl deposit, four kilometers east of the Cirque zone, is another Au-Cu-Pb-Zn-Ag porphyry deposit characterized by potassic, chloritic and lesser sericite-pyrite alteration, with quartz \pm magnetite / hematite \pm pyrite \pm sphalerite / galena / chalcopyrite \pm anhydrite \pm carbonate veining. Drill assays range up to 0.8 oz/ton Au with 1% combined Cu-Pb-Zn over short intervals, and exceed 100 ppb Au for tens of meters (Sutherland and Clark, 1983). Again, the similarity in alteration with the Cirque zone should be noted as an indication of its potential for size and grade.

The area of mapped alteration on the Surprise and Gerome claims is very large. The limited mapping and sampling carried out in the 1986 field season was not sufficient to discard the possibility of other auriferous potassic alteration zones within the chloritic and propylitic alteration or peripheral gold-silver veins. In particular, quartz veining noted by Diakow, Panteleyev and Schroeter (1985) 400m northeast and a quartz breccia 1200 meters southeast of the Cirque zone, must be investigated.

It is recommended that a program of rock and soil geochemistry be conducted over the area of chloritic alteration and that intensive prospecting and mapping be done throughout the altered area and to the east of known alteration.

Chloritic alteration will show a strong positive magnetic response, so zones of potassic alteration within the chloritic alteration should be characterized by relative magnetic lows. It is recommended that a magnetometer survey be conducted over the soil grid to delineate known potassic alteration zones and to discover new ones.

Potassic alteration, with its fine-grained disseminated pyrite, should be highly chargeable and moderately resistive under induced polarization. An IP survey may eventually be warranted to delineate and extend eastward the Cirque zone and to test any new zones discovered through prospecting, mapping and soil geochemistry.

Exposure in the main potassic alteration zone is quite good. However, trenching or a series of short drill holes should test the unexposed rocks abutting the intensely altered and mineralized scarp to the north. Two 35 meter holes are recommended, collared 10 meters south of sample sites 86HA-164 and 86HA-161 and dipping -45° towards 020° . Further drilling may be warranted, depending on results.

APPENDIX 1
STATEMENT OF EXPENDITURES

APPENDIX 1

STATEMENT OF EXPENDITURES

Field Personnel:

Henry Awmack: Aug 14/86 - Jan 30/87
6 days x \$200/day

\$ 1200.00

Food and Accommodation:

6 man days x \$50/day

300.00

Helicopter Support:

Long Beach Helicopters:

Aug 28/86 Invoice #7/86) 0.4 hrs x \$547.40 =
) 0.3 hrs x \$547.40 =

218.96

164.22

Laboratory Analysis:

33 samples x \$11.50 379.50

Freight (Via PWA)

33 samples x 2 kg x \$2.47/kg 163.02

Report Preparation:

Henry Awmack 4 man days x \$200/day
Drafting and materials 200.00

800.00

\$3425.70

APPENDIX 2
ROCK SAMPLE DESCRIPTIONS

Toodoggone Gold Camp
SAMPLE RESULTS

Area: _____

Zone: Tuff PEAK

Sample No.	Width (m)	Au (ppb)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Location/ Description
EGHA-107	Grabs - Talus	ND	0.3				Fspar porph; highly chloritized, oxidized 1% vuggy clear white qtz stringers. 1% dissem py. Minor calcite. 300 m S of A.L. CK 29850N 24160E
EGHA-110	Felsenmeer	10	0.6				Hematitic flow top breccia: weakly hematitic bi → limo to; fspars → clay. Ridgetop; el 1772 - 30050N 22450E
EGHA-111	^{20p Grab} Felsenmeer 28450N 23000E	10	0.9				AsAs Adularia(?) - qtz. Plag → saussurite. 1% fg. dissem py. Rare vuggy qtz stringers
EGHA-112	Fels - Grab	ND	0.5				Same as HA-111. 10% vuggy qtz. Abdt adularia
EGHA-113	Fels 28250N 23000E	ND	0.9		15	32	AsAs Adularia(?) - qtz. Rare vuggy qtz stringers. Tr. galena. Yellow stain El 5670'
EGHA-114	Fels 28650N 23200E	15	1.9		8	10	AsAs Adularia(?) - qtz. 2% dissem fg py; 10% vuggy qtz w goethite. Local soft yellow in vugs. Black stain in swarc. El 5730', in ck 100m below lalo.

Toodoggone Gold Camp
SAMPLE RESULTS

Area: _____

Zone: ANTOINE LOUIS JULY 30/86

Sample No.	Width (m)	Au (ppb)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Location/ Description
EG HA-117	Floct 1 small bldr	170	3.0				As: Dk grey-br qtz (sl. vuggy) brecciated AsAs (adularia-qtz). Frags surrounded by qtz completely argillized. Goethite. 29970N 23240E
EG HA-118	c/c Grab over 10m 28710N 23990E	40	5.2				Kspars porph w. propylitic alteration (20% chl 5% ap; 1% fg py; tr cpy, sphal. Rare vuggy qtz (\pm calcite) stringers, w. Kspar selvages.
EG HA-119	c/c Grab over 5m x 5m	30	6.9				As: Stringers join to form qtz-breccia. Vuggy sugar qtz (95%) brecciated angular gray silicious frags. Goethite, hemat. 28710N 23990E
EG HA-120	c/c Grab over 20m	1610	23.6				AsAs Kspar-altered porph w. white to olive-gray sugar qtz (few vugs) stringers. Goethite. 28700N 24050E

oodoggone Gold Camp
AMPLE RESULTS

Sample No	Width (m)	Au (ppb)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Location/ Description
80HA-161	46 ^m @ 0° chip	2100	25.2				Buff fspcr porph; potassic alteration (Kspcr + py + Qtz stringers) 1% fg py; 2% glassy calc. less Qtz stringers (mainly vuggy w crystals to 5mm). Plag → scussenite (mineral) 1m E of 80HA-120 flag.
80HA-162	35 ^m @ 0° chip	70	20				Same rock as HA-161 N.W. end is 15m @ 272° from N end of HA-161
80HA-163	31 ^m @ 0°	90	1.2				Same N end 31m @ 276° from N end HA-161 Highly fractured.
80HA-164	Grab	2500	253				Same as HA-161, but w. 50% Qtz in stringer stockwork. Scurp trends 100°/E/W 42m @ 280° from N end HA-161
80HA-165	10 ^m @ 0° chip	145	2.9				Same as HA-161. Qtz stringers decrease to south. N. end 12m @ 282° from HA-164.
80HA-166	10 ^m @ 0° chip	35	2.8				Same as HA-161 - m @ 105° to N end HA-161
80HA-167	61 ^m @ 0° chip	95	48				Same as HA-161. Prominent fractures at 100°/155 and 010°/E/W N end 29m @ 084 from HA-161

Toodoggone Gold Camp
SAMPLE RESULTS

Area: _____

Zone: CIRQUE AUG 19/86

Sample No.	Width (m)	Au (ppb)	Ag (ppm)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Location/ Description
EGHA-173	Grab	15	1.7				Fspar-ph. porph w. Kspar-gtz flooding py, hairline gtz stringers.
EGHA-174	Chip 3cm @ 055°	10	1.0				As for HA-173; few gtz stringers; 2% saussureite after plaq. E end is 17m @ 090° from HA-173
EGHA-175	Chip 3cm @ 090°	5	0.8				As for HA-173, 2% gtz stringers no vugs, no saussureite E end is 13m @ 32° from E end HA-174
EGHA-176	Chip 5.2cm @ 090°	5	0.7				As for HA-173. 1% gtz stringers, no vugs, no saussureite. E end is 14m @ 350° from E end HA-174
EGHA-177	Grab o/c	10	0.8				Transition rock (Kspar-act in matrix) w. abt gtz stringers, some vuggy. 3m @ 096° from HA-176
EGHA-178	Grab o/c	60	3.7				Fspar porph: Kspar phases in matrix w. minor lg py. Abt gtz stringers w. vugs veinlets. Highly fractured (c42/82SE) 200m
EGHA-179	Grab o/c	85	4.5				Kspar-altered w. 10% gtz in stringer structure Abt vugs w. 2mm gtz & abt quartz 2% 24
EGHA-180	Grab o/c	5	0.7				Silicified porph w/o Kspar flooding in chert.

APPENDIX 3
ANALYTICAL PROCEDURES

MIN-EN Laboratories Ltd.

Specialists in Mineral Environments

Corner 15th Street and Bewicke
705 WEST 15TH STREET
NORTH VANCOUVER, B.C.
CANADA V7M 1T2

GOLD GEOCHEMICAL ANALYSIS BY MIN-EN LABORATORIES LTD.

Geochemical samples for Gold processed by Min-En Laboratories Ltd., at 705 W. 15th St., North Vancouver Laboratory employing the following procedures.

After drying the samples at 95°C soil and stream sediment samples are screened by 80 mesh sieve to obtain the minus 80 mesh fraction for analysis. The rock samples are crushed and pulverized by ceramic plated pulverizer.

A suitable sample weight 5.0 or 10.0 grams are pretreated with HNO_3 and HClO_4 mixture.

After pretreatments the samples are digested with Agua Regia solution, and after digestion the samples are taken up with 25% HCl to suitable volume.

Further oxidation and treatment of at least 75% of the original sample solutions are made suitable for extraction of gold with Methyl Iso-Butyl Ketone.

With a set of suitable standard solution gold is analysed by Atomic Absorption instruments. The obtained detection limit is 0.005 ppm (5ppb).

MIN-EN Laboratories Ltd.

Specialists in Mineral Environments

Corner 15th Street and Bewicke
705 WEST 15TH STREET
NORTH VANCOUVER, B.C.
CANADA V7M 1T2

GEOCHEMICAL ANALYSIS PROCEDURE FOR

Pb, Zn and Ag:

Samples are dried at 95°C. Soils and stream sediments are screened by 80 mesh sieve to obtain the minus 80 mesh fraction for analysis.

All rock samples are crushed by jaw crusher and pulverized by ceramic plated pulverizer.

1. 1.000 gram sample is weighed into 25x200 test tube.
2. Add 2 ml of HNO₃ and let it set for 15 minutes and then add 5 ml of HClO₄.
3. Place test tubes on sandbath for 6 hours and elevate temperature to 200°C.
4. Take the test tubes off cool and dilute to 25 ml.
5. Read samples on Atomic Absorption Spectrophotometer.
6. Background correction can be carried out on Pb and Silver if it is requested.
7. Standards are digested along with each set of samples and calibrations checked.



VANGEOCHEM LAB LIMITED

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1521 PEMBERTON AVE.
NORTH VANCOUVER, B.C. V7P 2S3
(604) 986-5211 TELEX: 04-352578

BRANCH OFFICE
1630 PANDORA ST.
VANCOUVER, B.C. V5L 1L6
(604) 251-5656

FEB 2 - 1987

January 27th, 1987

TO:

ENERGEX MINERALS LIMITED
703 - 850 West Hastings St.
Vancouver, B.C. V6C 1E1

FROM:

Vangeochem Lab Limited
1521 Pemberton Avenue
North Vancouver, British Columbia
V7P 2S3

SUBJECT: Analytical procedure used to determine hot acid soluble for Cu, Pb, Zn and Ag in geochemical silt and soil samples.

1. Method of Sample Preparation

- (a) Geochemical soil, silt or rock samples were received at the laboratory in high wet-strength, 4" x 6", Kraft paper bags. Rock samples would be received in poly ore bags.
- (b) Dried soil and silt samples were sifted by hand using an 8" diameter, 80-mesh, stainless steel sieve. The plus 80-mesh fraction was rejected. The minus 80-mesh fraction was transferred into a new bag for subsequent analyses.
- (c) Dried rock samples were crushed using a jaw crusher and pulverized to 100-mesh or finer by using a disc mill. The pulverized samples were then put in a new bag for subsequent analyses.

2. Method of Digestion

- (a) 0.50 gram portions of the minus 80-mesh samples were used. Samples were weighed out using an electronic balance.
- (b) Samples were heated in testtubes, on a sand bath in a Nitric and Perchloric concentrated acid solution (15% and 85% by volume respectively).
- (c) A minimum of 5000 ppm solution of $AlCO_3$ was added to each sample when Mo analyses were required. Digested samples were diluted with demineralized water to a



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fixed volume. The samples were agitated to obtain a homogeneous solution.

3. Method of Analyses

Cu, Pb, Zn, and Ag concentrations were determined using a Techtron Atomic Absorption Spectrophotometer Model AA5 with their respective hollow cathode lamps. The digested samples were directly aspirated into an air and acetylene mixture flame. The results, in parts per million, were calculated by comparing them to a set of standards used to calibrate the atomic absorption units.

4. Background Correction

A hydrogen continuum lamp was used to correct the Ag background interferences..

5. Analysts

The analyses were supervised or determined by either Mr. Conway Chun or Mr. Eddie Tang, and, the laboratory staff.

Eddie Tang
VANGEOCHEM LAB LIMITED



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FROM:

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1521 Pemberton Avenue
North Vancouver, British Columbia
V7P 2S3

FEB 2 - 1987

SUBJECT: Analytical procedure used to determine Aqua Regia soluble gold in geochemical samples

1. Method of Sample Preparation

- (a) Geochemical soil, silt or rock samples were received at the laboratory in high wet-strength, 4" x 6", Kraft paper bags. Rock samples would be received in poly ore bags.
- (b) Dried soil and silt samples were sifted by hand using an 8" diameter, 80-mesh, stainless steel sieve. The plus 80-mesh fraction was rejected. The minus 80-mesh fraction was transferred into a new bag for subsequent analyses.
- (c) Dried rock samples were crushed using a jaw crusher and pulverized to 100-mesh or finer by using a disc mill. The pulverized samples were then put in a new bag for subsequent analyses.

2. Method of Digestion

- (a) 5.00 to 10.00 grams of the minus 80-mesh portion of the samples were used. Samples were weighed out using an electronic micro-balance and deposited into beakers.
- (b) Using a 20 ml solution of Aqua Regia (3:1 solution of HCl to HNO₃), each sample was vigorously digested over a hot plate.
- (c) The digested samples were filtered and the washed pulps were discarded. The filtrate was then reduced in volume to about 5 ml.



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- (d) Au complex ions were then extracted into a di-isobutyl ketone and thiourea medium (Anion exchange liquids "Aliquot 336").
- (e) Separatory funnels were used to separate the organic layer.

3. Method of Detection

The detection of Au was performed with a Techtron model AA5 Atomic Absorption Spectrophotometer with a gold hollow cathode lamp. The results were read out onto a strip chart recorder. A hydrogen lamp was used to correct any background interferences. The gold values, in parts per billion, were calculated by comparing them with a set of gold standards.

4. Analysts

The analyses were supervised or determined by Mr. Conway Chun or Mr. Eddie Tang and his laboratory staff.

Eddie Tang
VANGEOCHEM LAB LIMITED

APPENDIX 4
ANALYSIS CERTIFICATES



VANGEOCHEM LAB LIMITED

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BRANCH OFFICE
1630 PANDORA ST.
VANCOUVER, B.C. V5L 1L6
(604) 251-5656

REPORT NUMBER: 860343GA

JOB NUMBER: 860343

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PAGE 1 OF 1

SAMPLE #

Pb	Zn	Ag	Au
ppm	ppm	ppm	ppb

86-HA-107	--	--	.3	nd
86-HA-110	--	--	.6	10
86-HA-111	--	--	.9	10
86-HA-112	--	--	.5	nd
86-HA-113	15	32	.9	nd
86-HA-114	8	10	1.9	15
86-HA-117	--	--	3.0	170
86-HA-118	--	--	5.2	40
86-HA-119	--	--	6.9	30
86-HA-120	--	--	23.6	1610

DETECTION LIMIT

nd = none detected

2 1

-- = not analysed

0.1 5

is = insufficient sample

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E: (604)980-5814 OR (604)988-4524

TELEX: VIA USA 7601067 UC

Certificate of GEOCHEM

Company: ENERBEX MINERALS
Project: 036
Attention: AL CAMP/LOUISE ECCLES

File: 6-699
Date: SEPT 2/86
Type: ROCK GEOCHEM

We hereby certify the following results for samples submitted.

Sample Number	AG PPM	AU PFB
B6HA161	25.2	2100
B6HA162	2.0	70
B6HA163	1.2	90
B6HA164	25.3	2500
B6HA165	2.9	145
B6HA166	2.8	35
B6HA167	4.8	95
B6HA168	1.2	10
B6HA169	5.6	160
B6HA170	12.0	230
B6HA171	4.2	25
B6HA172	1.0	5
B6HA173	1.7	15
B6HA174	1.0	10
B6HA175	0.8	5
B6HA176	0.7	5
B6HA177	0.8	10
B6HA178	3.7	60
B6HA179	4.5	85
B6HA180	0.7	5
B6HA181	8.6	175
B6HA182	3.0	30
B6HA183	21.4	435

Certified by _____


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APPENDIX 5
BIBLIOGRAPHY

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- Carter, N. (1972): Toodoggone River Area and Chappelle, Geology, Exploration, and Mining in British Columbia 1971, p.63-70.
- Diakow, L.J., Pantaleyev, A., and Schroeter, T.DG. (1985): Geology of the Toodoggone River Area, NTS 94E; British Columbia Ministry of Energy, Mines and Petroleum Resources, Preliminary Map 61.
- Macauley, T.N. (1985): Joint Venture Proposal for Golden Lion Project; Private report for Newmont Exploration of Canada Limited.
- Panteleyev, A. (1983): Geology between Toodoggone and Sturdee Rivers; British Columbia Ministry of Energy, Mines and Petroleum Resources, Geological Fieldwork, 1982, Paper 198301, p. 142-148.
- Rodgers, T. (1972): Report on Geology and Geochemistry of the Met, San, and Tan Groups for Sumac Mines Ltd.; British Columbia Ministry of Energy, Mines and Petroleum Resources, Assessment Report No. 4060.
- _____ and Scott, T. C. (1973): Report on Geology and Geochemistry of the Met, San and Tan Groups for Sullivan and Rodgers; British Columbia Ministry of Energy, Mines and Petroleum Resources, Assessment Report No. 4681.
- Sutherland, I. G. and Clark, J. R. (1982): Report on Geological Mapping and Geochemical Sampling on the Al Property; British Columbia Ministry of Energy, Mines and Petroleum Resources, Assessment Report No. 10226.
- _____ (1982): Final Report on the Moose Property; Private report for Kidd Creek Mines Ltd.
- Sutherland, I. G. (1982): Report on Geology, Geochemistry and Diamond Drilling on the Bull, Chute, Surprise and Gerome Claims; British Columbia Ministry of Energy, Mines and Petroleum Resources, Assessment Report No. 10708.
- _____ (1982): Report on Geology and Geochemistry of the Al Claims; British Columbia Ministry of Energy, Mines and Petroleum Resources, Assessment Report No. 10709.
- _____ (1983): Report on Geology, Geochemistry, Trenching and Diamond Drilling on the Al Property; British Columbia Ministry of Energy, Mines and Petroleum Resources, Assessment Report No. 11157.
- _____ (1984): Final Report on the Al Property; Private report for Kidd Creek Mines Ltd.
- Yoshida, H. and Kawasaki, K. (1973): Geophysical Report on IP and Ground Magnetic Surveys on the Met, San and Tan Groups for Sullivan and Rodgers; British Columbia Ministry of Energy, Mines and Petroleum Resources, Assessment Report No. 4680.

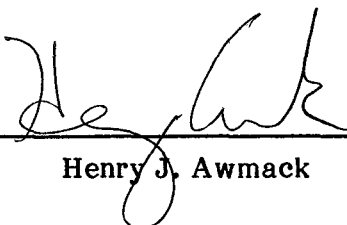
APPENDIX 6
CERTIFICATE

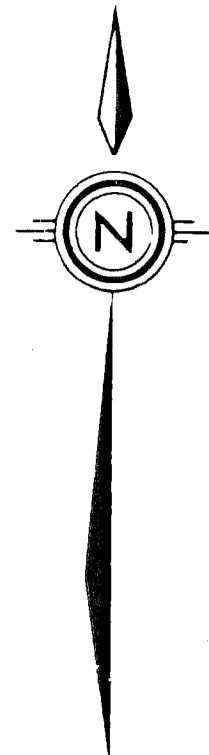
CERTIFICATE

I, HENRY J. AWMACK, residing at Suite 708, 1265 Burnaby Street, Vancouver, British Columbia, do hereby declare:

1. I graduated from the University of British Columbia with an Honours Bachelor of Applied Science degree in Geological Engineering in 1982;
2. I have practised my profession since graduation;
3. I am a member of the Canadian Institute of Mining and Metallurgy, and am a registered as an Engineer in Training with the Association of Professional Engineers of British Columbia;
4. I am the author of this report and I performed the work described herein.

DATED at Vancouver, British Columbia, the 29th day of January, 1987.


Henry J. Awmack



LEGEND

- C** Feldspar-biotite porphyry: Chloritic alteration - Pink feldspar phenocrysts in finegrained green to brownish green chloritic matrix. Magnetic Rare quartz or calcite veinlets. Buff to grey-weathering.
- K** Feldspar-biotite porphyry: Potassic alteration - Pink feldspar phenocrysts in pink Kspar-quartz matrix. Abundant quartz stringers and vuggy veinlets. 1% finegrained disseminated pyrite. Buff-weathering, limonitic.
- TT** Transitional: gradational between chloritic and potassic alteration, with features of both. Generally pink feldspar phenocrysts in Kspar-chlorite matrix, with rare chlorite stringers.

SYMBOLS

- Outcrop - observed
- Outcrop - inferred
- 86-183 □ Grab sample 86HA-183
- I Chip sample
- / Fracture orientation
- Bedding orientation
- (Au-ppb, Ag-ppm)

NOTE:
 Coordinates are approximate
GEOLOGICAL BRANCH
ASSESSMENT REPORT

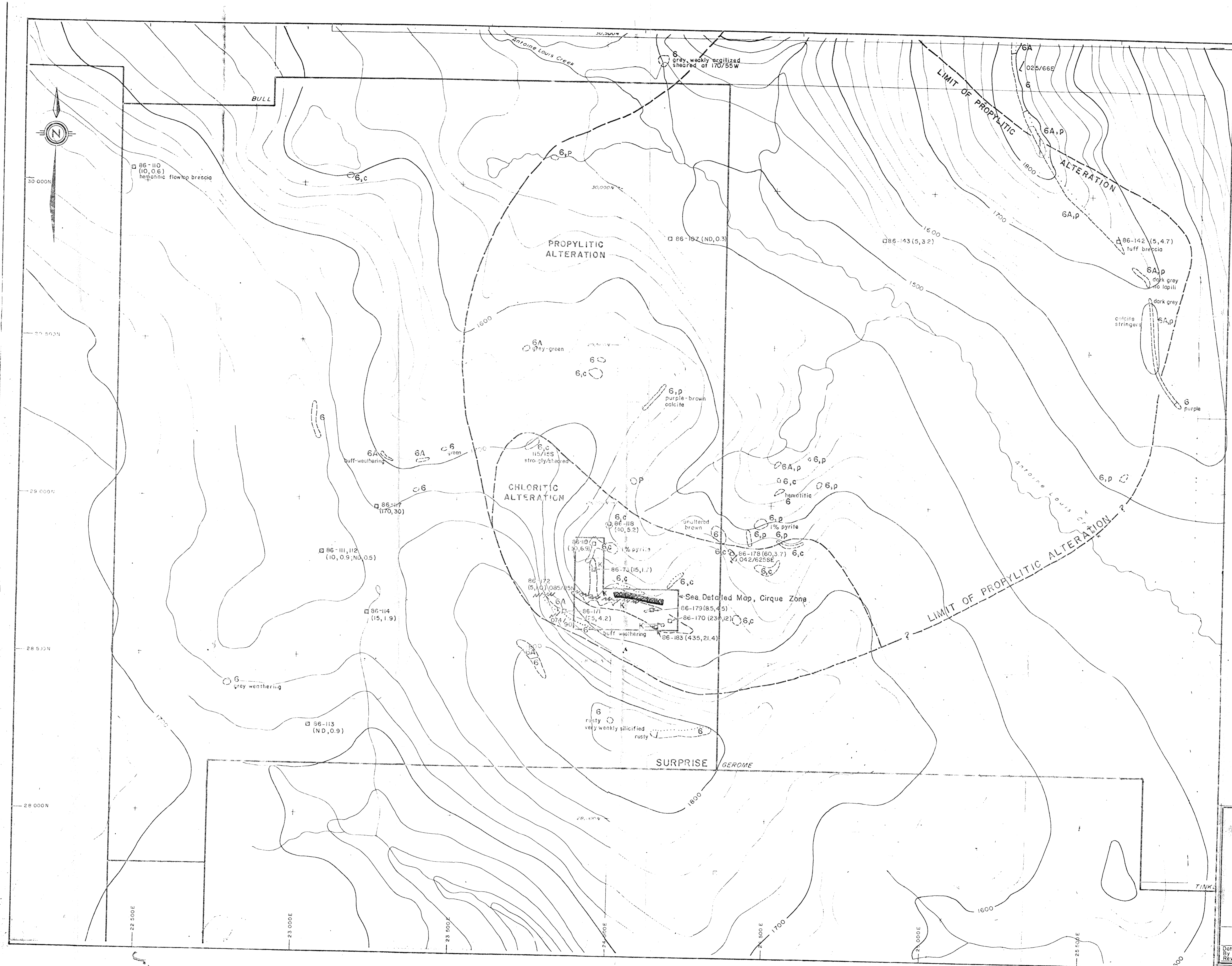
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SCALE 1:500

Date Dec. 86
 By H.J.A.
 Revisited

N.T.S. 94E6W Figure 6



LEGEND

LITHOLOGY (See BCMER Preliminary Map 61):

- 6** Tuff Peak Formation: Feldspar-biotite-hornblende porphyry flows.
- 6A** Tuff Peak Formation: Tuff, tuff breccia, crystal tuffs.
- I** Adogotcho Creek Formation: Lapilli tuffs and ashflows.

ALTERATION

- H** Hematite-alunite: soft, locally brecciated.
- P** Propylitic: Matrix contains up to 10% epidote with rare specularite and minor chlorite.
- C** Chloritic: Pink feldspar phenocrysts in a fine-grained green to brown chloritic matrix with minor magnetite.
- K** Potassic alteration: Pink feldspar phenocrysts in pink Kspar-quartz matrix. Abundant quartz stringers and vuggy veinlets. 1% finely-grained disseminated pyrite. Buff-weathering.

SYMBOLS

- Outcrop - observed
- Outcrop - inferred
- - - Fault
- Rock Geochemical Sample: (Au (ppb), Ag (ppm))
- Jointing
- ▭ Bedding
- ▽ Trench

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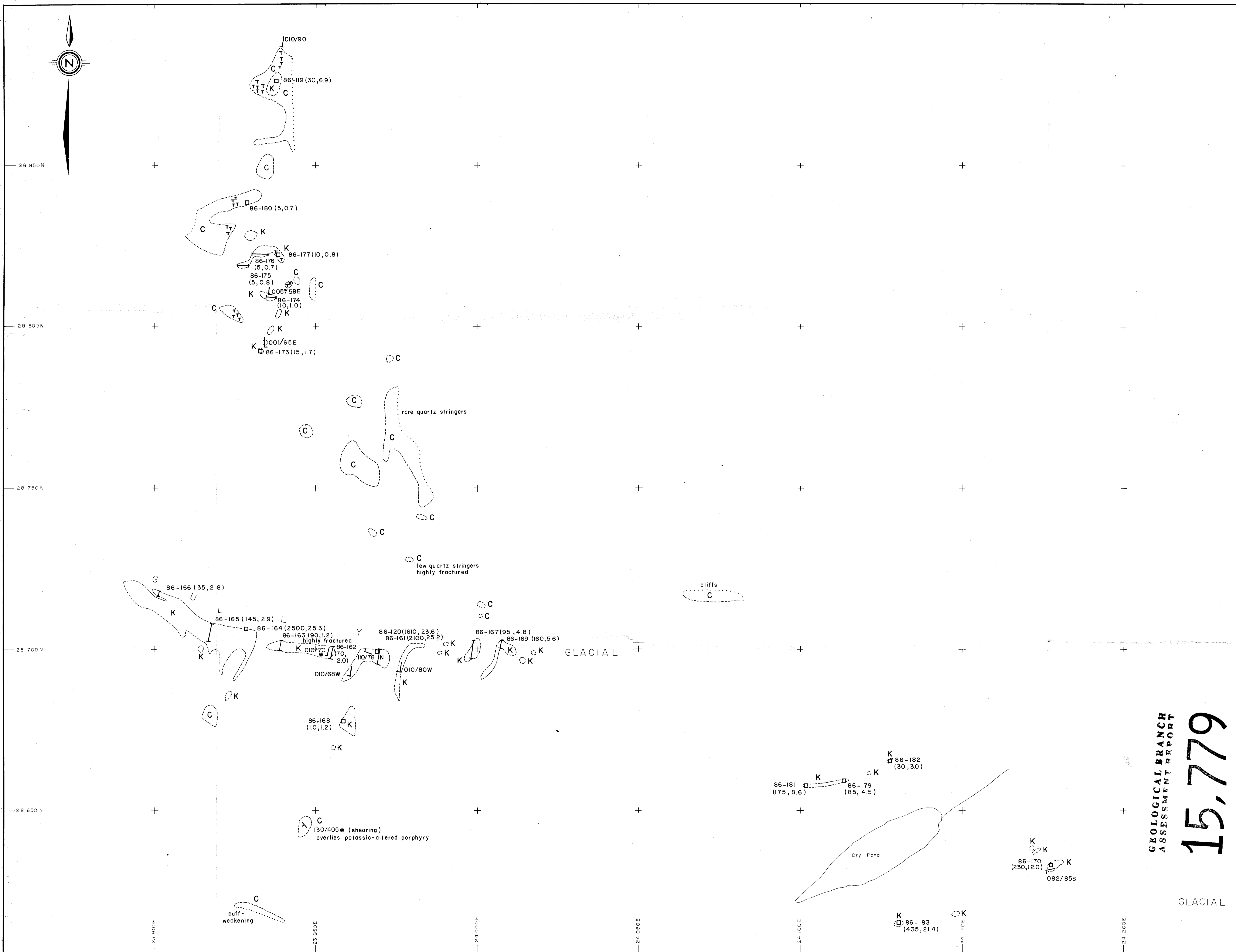
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Date DEC 86
By H.V.A.
Revisions

N.T.S. 94EGW Figure 5



LEGEND

- C** Feldspar-biotite porphyry: Chloritic alteration- Pink feldspar phenocrysts in finegrained green to brownish green chloritic matrix. Magnetic. Rare quartz or calcite veinlets. Buff to grey-weathering.
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NOTE:
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