84-#658a-13353

REPORT ON THE

GEOLOGICAL, GEOPHYSICAL AND GEOCHEMICAL PROGRAMS CONDUCTED ON THE

PITA CLAIMS PROPERTY

VERNON MINING DIVISON

BRITISH COLUMBIA

N.T.S. 82L/2E

Longitude 118° 32' W. Latitude 50° 10' N.

Owner

MOHAWK OIL CO. LTD.

Author

M.W. Waldner

August 22, 1984

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INTRODUCTION

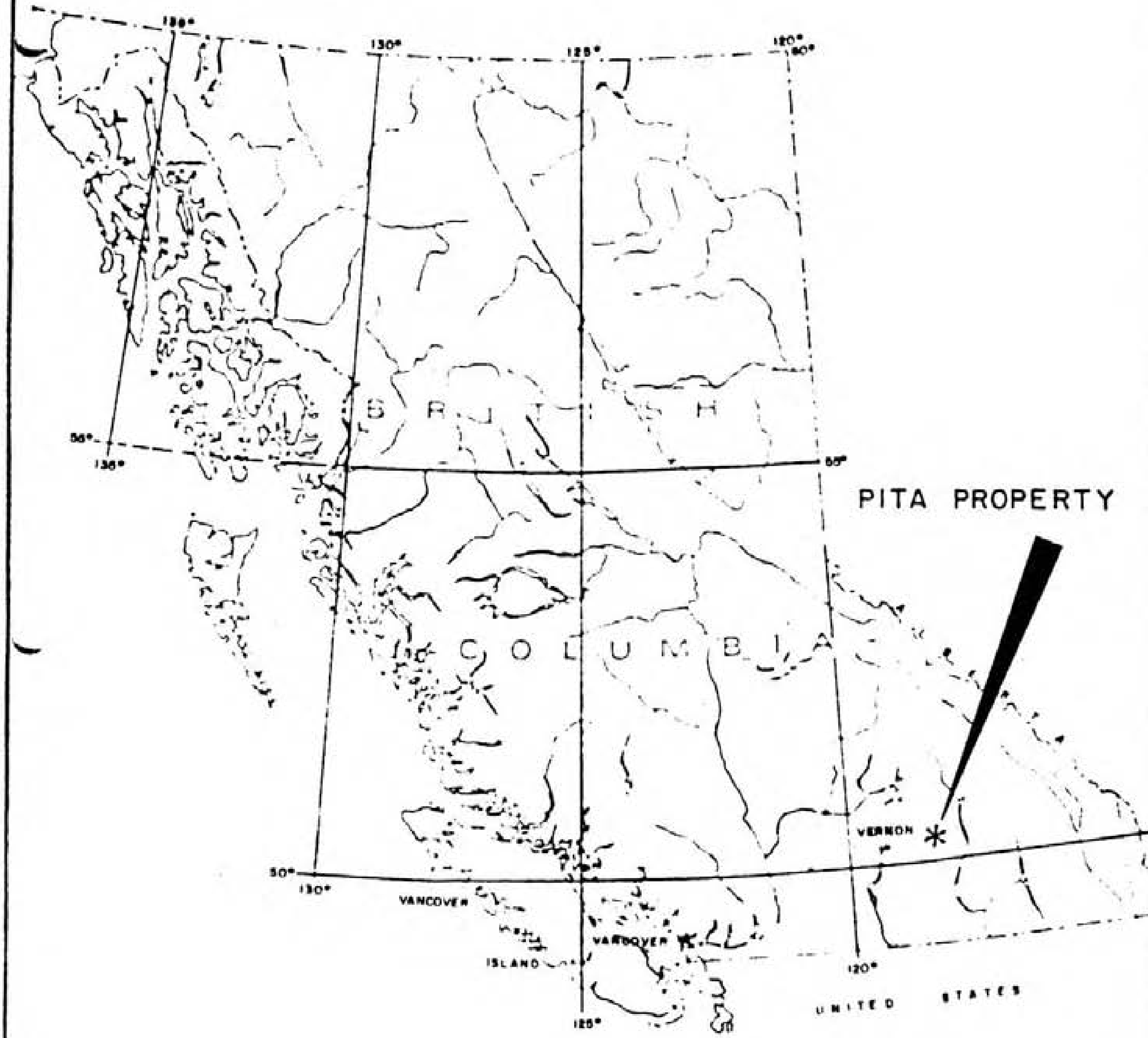
A program of follow-up geological mapping, prospecting, geochemical surveying and geophysics (Magnetics and VLF-EM) was conducted on the PITA claims between May 25, 1983 and September 1, 1983. The geophysical surveys assisted in identifying possible mineralized zones, contacts and rock types. The geology and geophysical responses also assisted in interpreting the geochemical soil and silt anomalies identified from previous surveys.

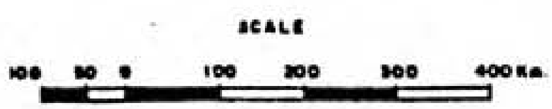
LOCATION AND ACCESS

The Pita Claim block is located in the Vernon Mining Division of British Columiba, N.T.S. map reference 82L/2E. The group of claims is centred at approximately 50° 10' N latitude and 118° 32' W longitude, in south eastern B.C.

The property is situated on the Monashee Mountains, about 50 km southeast of Vernon. The claims are drained by the Monashee Pass, Heckman and Inches Creeks.

Access to the property is via Highway 6 which traverses the northern and eastern portions of the claim group, 60 km. southeast of Vernon, B.C.Logging roads leading from the highway, afford good access to most of the property.





MOHAWK OIL CO. LTD.

PITA PROPERTY
MONASHEE CREEK AREA, B.C.

LOCATION MAP

DATE: AUGUST 1984 | FIGURE: 1

PHYSIOGRAPHY AND VEGETATION

On the PITA Claims the elevation ranges from 1150m to 1850m. The terrain is generally moderately sloping with steeper slopes in the Monashee and Heckman Creek Valleys.

Mature stands of fir, spruce, pine, cedar, poplar and birch occur in areas that have not as yet been logged. Approximately 20% of the property has been logged.

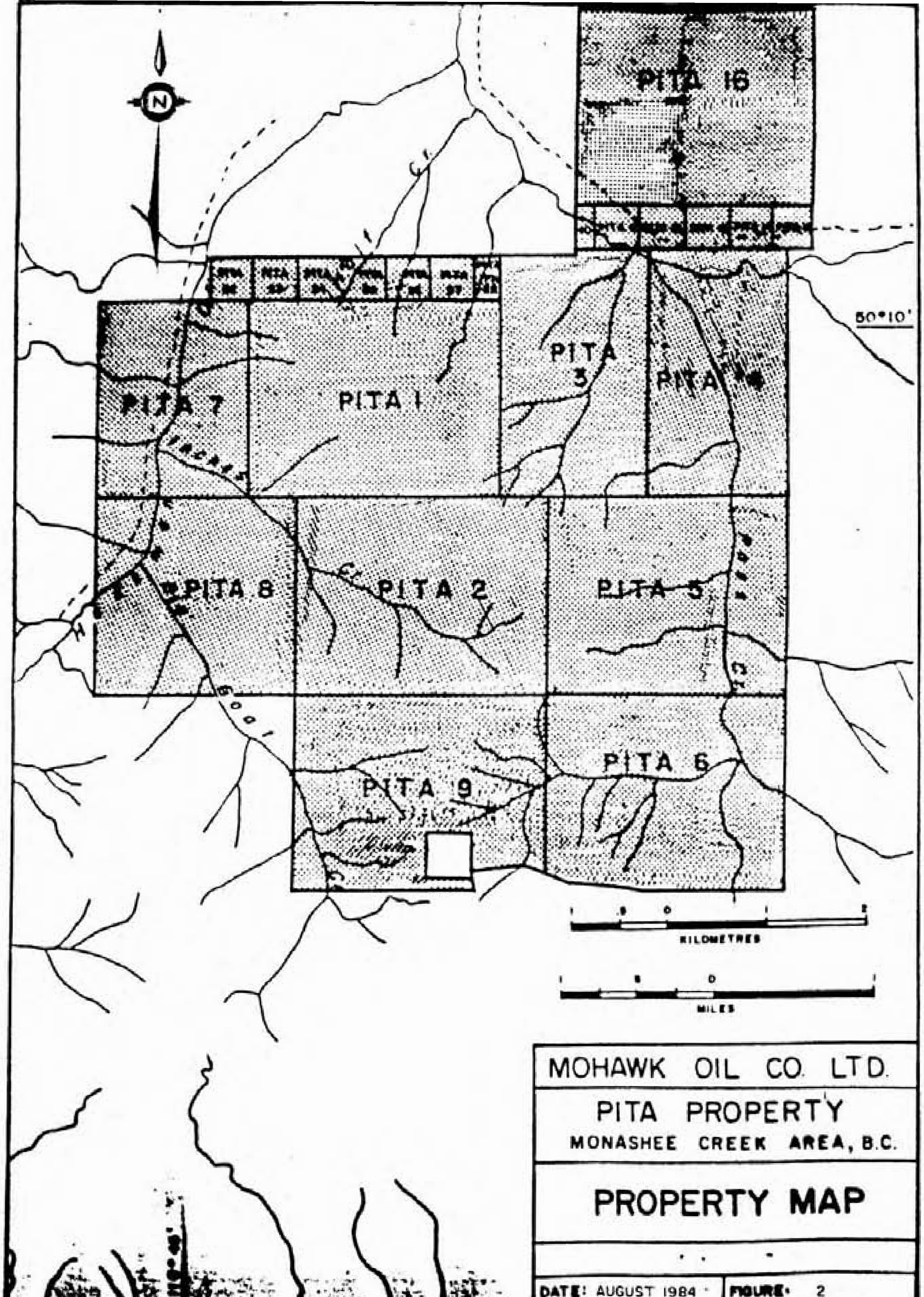
Rock outcrops are, in general confined to the steep creek valleys and road cuts. More than 80% of the property is overlain by varying thickness of overburden.

PROPERTY

The Pita Claim group is comprised of ten modified grid mineral claims, six two-post mineral claims and two fractional claims as listed below. The total property area is approximately 11,300 acres.

The claims are owned and were located by Mohawk Oil Co. Ltd.

Claim Name	Record Number	Record Date	Units	Mining Division
PITA 1	1032	03/06/81	20	Vernon
PITA 2	1033	03/06/81	20	Vernon
PITA 3	1034	03/06/81	15	Vernon
PITA 4	1035	03/06/81	15	Vernon
PITA 5	1036	03/06/81	20	Vernon
PITA 6	1037	03/06/81	20	Vernon
PITA 7	1038	03/06/81	12	Vernon
PITA 8	1039	03/06/81	16	Vernon
PITA 9	1123	09/12/81	20	Vernon
PITA 10	1205	03/18/82	1	Vernon
PITA 11	1206	03/18/82	1	Vernon
PITA 12	1207	03/18/82	1	Vernon
PITA 13	1208	03/18/82	1	Vernon
PITA 14	1209	03/18/82	1	Vernon
PITA 15	1210	03/18/82	1	Vernon
PITA 16	1518	06/09/83	20	Vernon
PITA 20 Fraction	1221	03/18/82	1	Vernon
PITA 21 Fraction	1519	06/09/83	1	Vernon


PITA 16
PITA 1
PITA 3
PITA 7
PITA 8
PITA 2
PITA 5
PITA 6
PITA 9
50°10'
KILOMETRES
MILES
MOHAWK OIL CO. LTD.
PITA PROPERTY
MONASHEE CREEK AREA, B.C.
PROPERTY MAP
DATE: AUGUST 1984
FIGURE: 2

SUMMARY

The 1983 exploration program on the PITA Claims was primarily designed to explore the precious metals potential on the property. A program of geophysics (VLF-EM, Mag.), geological mapping, prospecting and trenching succeeded in outlining three distinct areas which could host gold, silver and base metals mineralization. The program also detailed areas of gold soil anomalies and succeeded in discovery of several in-site rock exposures hosting anomalous gold and base metals valves. Although the exploration effort was designed primarily for gold and silver exploration the base metals (copper, lead, zinc), potential on the property is excellent. In addition to three areas containing anomalous gold in soil, two areas of large lead-zinc-silver and copper anomalies in soils are identified.

A staged program of geological, geophysical and geochemical exploration followed by trenching and diamond drilling if justifiable is recommended to explore the base and precious metals potential on the property.

WHERE IS THE REST OF THIS PAGE????

PROPERTY GEOLOGY

The property exhibits three distintive geological assemblages. The Cache Creek Group rocks in the southern sector of the propert are primarily basalts and limestones and minor argillites overlain by Olivine basalt, which is probably Tertiary, Kamloops Group. The central zone is characterized by a diorite intrusive identified by Jones (1959) as part of the Cretaceous Nelson Batholith. The northern part of the property is underlain by an assemblage of tuffs, andesites, argillaceous sediments and minor exposures of limestone. Mapping and sampling in the extreme northern sector has been limited to date. The property geology is illustrated in detail on Drawing Nos. 1, 11, 20 and 29.

The submarine assemblage of rocks in the southern sector are dominated by andesites, which may conformably overlay a sequence of westerly trending black argillites and limestone, probably of Permian age. This package is unconformably overlain by a olivine plateau basalt of probable miocene age (Kamloops Volcanics).

The dominant features in the central portion of the property are a diorite intrusion of probable Cretaceous age and a granite to granodiorite intrusion flanking the north central sector which is also of probable Cretaceous age.

The northern assemblage of tuffs, andesite, argillaceous sediments and minor limestone trend in a north westerly direction. Rocks in this package have reports assays of over 1 oz/ton gold in the vicinity of Monashee Creek near the north western property boundary. Unmapped sectors in the north are thought to be primarily volcanics.

ECONOMIC GEOLOGY

Several distinctive targets are recognized on the property. The northern sector of the property has the potential for hosting a large tonnage, low grade disseminated or fracture filling gold-silver deposit hosted in the volcanic rocks or argillaceous sediments . A target area exists in the vicinity of minor gold anomalies and anomalous silver, lead, zinc and copper along the northeastern flank of the hills immediately west of Highway 6.

The central sector may host narrow, high grade epithermal type gold-silver vein mineralization. Gossan exposures and hydrothermal alternations in conjunction with gold and silver geochemical anomalies (gold 100-380 ppb) and a large lead-zinc anomalies exist in this area. (See geology and geochemical maps.) Disseminated pyrite with traces of chalcopyrite, galena and pyrrhotite were exposed in backhoe trenches. Rock samples from these trenches returned geochemically significant values 0.195 g./tonnes gold and 3.4 g/tonne silver).

The southern sector of the property is considered to potentially host a base and precious metal massive sulphide deposit within the volcanics or a skarn-type deposit associated with the limestones. The geochemical soil surveys over the southern sector of Pita 5 Claim and the northern part of Pita 6 Claim proved a large copper anomaly, and weakly anomalous values of zinc.

The work program conducted during 1983 was primarily designed to explore the precious metals potential of the property. To this end gold soil geochmical anomalies were detailed and trenched. It was observed that the gold anomalies were generally confined to the Cache Creek Group rocks but do seem to occur on the western, northern and east flanks of the central diorite intrusive (see Drawings Nos. 2, 12, 21 and 30). Although the base metals potential was not actively explored there is also an apparent concentric development of lead, zinc and copper soil anomalies around the diorite (lead and zinc in the west, copper in the south).

GEOCHEMISTRY

Follow-up geochemical soil surveys included detailed sampling concentrated on Pita 1, 2, 7 and 8 an the most significant gold anomalies identified during 1981 and 1982. The results of the 1983 program were generally lower than previous surveys. A total of 144 soil and silt samples were collected in the follow-up program and analyzed for lead, zinc, gold, silver, copper, antimony and arsenic. Rock samples were also collected from trenches in the vicinities of many of the gold and silver anomalies and geochemically analyzed for the same seven elements as the soil samples. The results of these geochemical samples assisted in the overall interpretatio of the possible ore deposits which may occur on the property. These interpretatons are discussed in the geology section.

The soil samples were taken in the "B" horizon whenever possible. This horizon was generally reddish-brown in colour and occurred at a depth of 10 to 50 cm and was abour 20 cm thick. A small mattock was used to dig the hole. Coarse rock debris and organic matter was discarded. Soil samples were not collected in swampy areas, in areas of tabes or rock outcrop. If the "B" horizon was not developed a "C" soil horizon was sampled and noted. The grid location, soil type and depth, visual soil descriptin and exposure were noted at each soil sample site.

The soil and silt samples were air died and boxed for shipment to Kamloops Research and Assay Laboratories Ltd. for analyses. The lab. preparation included drying and pulverizing of the minus 10 mesh fraction. A measured amount of the pulverized (minus 80 mesh) fraction was digested in hot aqua regia. Atomic absorption was used to determine parts per million for antimony, silver, zinc, copper, molybdenum, lead, and arsenic. Gold determinations reported in parts per billion were done using a combination of atomic absorption and fire assaying.

The rock samples were treated in a similar fashion to the soil samples except the complete rock samples required crushing and pulverizing to minus 80 mesh prior to the hot aqua regia digestion. The rock sample numbers are plotted on the Geology Map (Drawing Nos. 1, 11, 20 and 29).

The soil and silt sample data were plotted on single element maps at a scale of 1:5000 combining the 1981, 1982 and 1983 data. The years the lines were sampled are marked onthe geochemical maps. The plotted data was contoured and statistical analyses performed for the different elements. Depending upon the rock type underlying the sample sites, subanomalous, anomalous and second order anomalous values for each of the elements are identified on the geochemical maps (Drawing Nos. 2 to 8, 12 to 18, 21 to 27, 30 to 36). These values are identified on the single element geochemical maps. Generally, subanomalous values for each element are the mean plus one standard deviation, anomalous values are the mean plus two standard deviations and second order anomalous values are the mean plus three standard deviations.

Exploration activity was concentrated in the areas identified as having significant gold bearing potential, primarily on Pita 1, 2, 7 and 8 Claims. Generally the gold soil geochemical anomalies occur peripheral to a diorite intrusion within volcanics on the eastern half of Pita 7 Claim and the northwestern part of Pita 1 Claim. These values range to a high of 340ppb gold located inthe southwest corner of Pita 1. Generally silver anomalies up to 2.8ppm (north central Pita 1 Claim) occur in the vicinity of the gold anomalies. However, the silver is not as wide spread as the gold anomalies.

Lead and zinc soil anomalies are generally coincident occurring on the Pita 1 - Pita 7 Claim boundary and the northern sector of Pita 1 (coincident with a silver anomaly with values to 2.8 ppm). The lead value range to a high of 145ppm and the zinc to 515ppm.

Copper soil geochemical values to 220ppm occur in the southeastern corner of Pita 7 and southeastern corner of Pita 1. The copper anomaly generally do not correlate with other elemental anomalies.

GEOPHYSICS

Between June 7 and July 15, 1983, a magnetometer and E/M (VLF) investigation of parts of the PITA property was carried out. Approximately 24km of mag. and about 8km of E.M. was done. The sampling interval for the magnetics was usually 12.5 metres with a line spacing of 50 metres providing a moderately detailed coverage. Sampling intervals for the E.M. were 12.5m; 25m intervals were run over some of the magnetometer grids. The magnetic and VLF-EM surveys were conducted in specific areas of suspected gold mineralization based upon geology and geochemistry.

The survey were done considering an "epithermal model" and "porphyrite model" for gold deposition. It was hoped that the magnetics would map geology and assist in interpreting locations of possible "porphyrite flows", and possible gold bearing epithermal structures could be identified using the VLF-EM results.

There were several areas in which high magnetic relief was encountered. In most of the places the high relief was associated with the presence of diorite. In areas of generally low magnetic relief, andesite and limestones were found. In the following pages an analysis of the individual areas is made (see Drawing Nos. 9, 19, 19, 28).

"13F"

In this area some very high magnetic relief (as much as 4500 grammas) was found to be coincident with diorite, and the caustive source of the magnetism has been shown to be magnetite and possible pyrrhotite. The magnetite concentration often become segregated within the intrusive rocks, thus explaining the large variation in magnetism over the diorite here and also in other areas. In the southern portion of the grid there appears to be a clear difference between areas of higher magnetic relief and lower relief. the boundary between the two types of relief trends northwest and is likely to be the diorite contact. In the north, this contact trends northeast. There has been geological evidence of diorite accuring in areas of higher magnetic relief. The gold could possibly occur in the andesite (porphyrite flow) but perhaps specially and generally related to the diorite body. (segregation with magnetite qtz. veins, ect.)

PITA 1/4E

The PITA 1/4E line area exhibits moderately high magnetic relief (1500 gammas), again coincident with diorite. The contact between the high magnetic relief and low magnetic relief runs north-northwest. This is believed to be the contact between diorite and andesite. The entire diorite body can be observed on the aeromagnetic map of the region. The body strikes northwesterly just as was outlined by the ground survey and the strike length may be as much as 1.5 kilometers. Trenching was done on parts of the diorite especially in areas of high magnetism. The cause of the magnetism was found to be magnetite often with pyrite in association. A major VLF-EM structure running north-south 150 metres west of Pita 1/4E has a maximum dip angle relief of 24° and probably depicts a fault. This fault warrants further investigation because some high magnetism is coincident with the E/M structure. The gold anomalies found in this area are primarily over andesite close to, or over the diorite, therefore it is impossible to tell at present what kind of feature is controlling the distribution of the gold.

PITA 1/5E

In the vicinity of line PITA 1/5E the magnetism is not as strong as in the previously mentioned areas but the relief is as much as 800 gammas. West of the baseline (Pita 1/5E) there apears to be a horseshoe-shaped pattern of higher magnetism. This pattern is not typical of that produced by a central body and more likely depicts a contact between a small intrusive and country racks, the higher magnetism depicting possible mineralized zones. The magnetic pattern may also depict a horseshoe shaped mafic body such as diorite. Very little outcrop has been mapped in this area except for two outcrops of andesite. The almost continous line of gold anomalies found along Pita 1/5E cannot be explained in terms of structure so far. There is no evidence that the gold values are higher in value near the magnetic anomalies. This may be a zone of low grade, disseminated gold mineralization Gossan Area.

The gossan area near coordinate 388,000E and 557,000N exhibits very little magnetic relief. A pattern of weak dipol features (amplitude 50 - 100 gammas) trends northeast - southeast and is probably related to the fault exposed at the gossan. The pattern correlates with VLF data run on the same gird, which outlines a probable the clay zone. A regional trend in the vicinity of PITA 1/1E probably associated with the magnetic low south of the diorite high, is the only feature that can readily be detected. Some volcanic andesite has been exposed at the south end of the grid by trenching.

DISCUSSION

The results based on 36 selected samples representing diorite or andesite indicate that the gold may be hosted in either rock type. In the region around Pita 1/4E, the geophysical grid covers mostly diorite. Samples taken from the diorite have anomalous gold content and in one anomalous gold rock sample there is high magnetite. Unfortunately no correlation between gold content and magnetite content can be made due to insufficient data. There is some support that epithermal high gold occurrences may be related to the more altered diorite. Since most of the diorite samples were taken from the Pita 1/4E rigon, there may be some association with whatever is causing the VLF-EM structure (epithermal alteration) which does not run far away from the high gold samples taken in the trench C-7 (632 and 633). If alteration is causing higher gold values and the VLF-EM structure then the source of the gold may possibly be at depth. There has been evidence (rock sample 633) that the gold may have been concentrated: (1) - By magmatic segregation (associated with magnetite) hosted in intrusive; (2) - Disseminated in the andesite flows, and (3) - In a hydrothermal system. Because there are different possibilities the geophysical methods are more useful as a tool for mapping geology than direct prospecting. The magnetics may be useful for finding the concentrations of magnetite but may not find the hydrothermal alteration zones. The VLF should pick up clay zones associated with shearing and hydrothermal activity. The magnetic characteristics or the andesite flows appear to vary slightly over different parts of the flows (i.e. the sides, the tip; where they contact other rocks).

TABLE I

TABLE I

ANALYSIS AND CORRELATION OF GEOPHYSICS

RELATED TO GEOCHEMISTRY

Sample	Au ppb	Cu	Pb	Zn	Sulph	Alt'n	Au ppb	Cu	Pb	Zn	Sulph	Alt'n
601	35	47	67	110	1%	6es						
603	45	40	115	182								
604	10	43	14	161	1%							
606	16	41	25	156	1%							
607	30	45	43	96	1%	yes++						
608	5	31	17	89		yes++						
611	30	105	930	208	1%							
614	10	15	14	45	1%							
619							10	93	12	22	yes	?
620							30	135	12	22	1%	no
621		Gabbro in contact with And.					15	204	14	35	4%	yes
628		**Quartz vein ** in Di					70	37	17	80	tr .	-
631							70	59	12	59	1%	no
632							165	28	11	33		yes
							190	49	14	77	Lin. none	yes
634	35	13	12	42	none	?		Docite?		siliceous And?		
637	30	38	12	45	3%	"		Si	And			
638	1	40	12	61	5%	?		Si	And			
639		*Quartz vein **					130	20	11	26	none	-
640	30	30	21	68	1%	?						
640	80	71	17	180	1%							
643		"Quartz vein""					195	78	19	259	FeO	chl. +Clay
645							120	119	15	82	none	?
651	125	67	16	46	1%	Lin V. oxid		**near limestone contact				
652	1	6	42	8	1%	calc						
653	1	22	42	7	none							
657	220	05	16	37	1%			Hlb. And.				
658	5	136	18	31	trace							
660	100	183	23	74								
	5	102	18	45	?							
663	210	179	21	47	none	gossany						

No Sample	Au ppb	Cu	Pb	Zn	Sulph	Alt'n	Au ppb	Cu	Pb	Zn	Sulph	Alt'n
665		**Quartz vein*						20	4	17	5	
669	30	36	15	370	3%	calc.						
670		Quartz Diorite? sl. magnetic					25	85	16	57	5%	
672	30	74	17	65	?							
674	60	24	26	25	1%	calc.						

CONCLUSIONS

1. Follow-up soil sampling surveys failed to expand areas of previously delineated gold soil geochemical anomalies. However, there was excellent correlation between previous silver, copper, zinc and lead anomalies established and the 1983 surveys. The may be in part due to differences in sample preparation. The 1983 samples were screened and the minus 10 mesh fraction pulverized to minus 80 mesh whereas previous samples were screened to minus 80 mesh and this fraction was then analyzed and the plus 80 mesh fraction discarded.

2. Rock samples collected from trenches established in the vicinity of several of the gold anomalies did return anomalously high values in gold and other metals. Most notably trenches L-1, C-2 and C-15.

3. The north and central sectors of the property appear to be most conducive to hosting gold and silver mineralization primarily within the volcanic rocks, but perhaps spacially or genetically related to the diorite intrusion. One possible exception is the area in the vicinity of trench C-7 approximately 150 metres west of line PITA 1/4E where altered diorite was exposed and possible disseminated mineralization or an epithermal gold bearing system uncovered.

   Generally the northern sector is considered an area of possible skarn mineralization or disseminated or stockworks type low grade large tonnage gold-silver mineralization (e.g. the large gold anomaly on line 1/5E PITA). However, high grade gold over narrow widths are reported from a property adjacent to the northern sector.

   The central sector could host epithermal gold-silver mineralization and/or mesothermal base metal mineralization hosted in the andesite or granitic rocks.

4. The southern sector of the property generally did not return anomalous soil geochemistry values in gold. However, the geological environment and copper, lead, zinc and silver soil anaomalies in this sector indicate that massive sulphide or skarn type mineralization is a possiblity.

5. The geophysics (VLF-EM and magnetics) were valuable in establishing rock contacts and possible fault or clay alteration zones, but less useful for establishing drill hole or trenching targets.

RECOMMENDATIONS

A staged program of geophysics, geological mapping, additional trenching and geochemistry is recommended in an effort to establish drill hole targets.

Specifically it is recommended that:

1. An induced polarization survey be conducted over the entire property and detailed I.P. conducted in anomalous resistivity and chargeability areas coincident with geochemical anomalies and favourable geology.

2. Detailed soil geochemistry be conducted in the areas of copper, lead, zinc and silver soil anaomalies, geophysical anomalies and favourable geology for base metals deposits.

3. Trenching in the target areas identified by exploration proposed in 1 and 2 above.

4. Drilling favourable trenched areas or areas of deep overburden identified as targets in steps 1 and 2 above.

CERTIFICATE OF QUALIFICATIONS

I, Matthew W. Waldner do certify that:

I graduated from the University of British Columbia in 1969 with a Bachelor of Science degree in Geology. Since graduating, I have continually practiced my profession in various levels of responsibility in industry.

The following is a synopsis of employment experience:

1969	Seven months Junior Geologist and Party Chief in Southern B.C. and Yukon Territory - Atlas Explorations Ltd. (N.P.L.)
1970 - 1973	Three and one-half years as Open Pit Geologist at Endako Mines Ltd. -Placer Development Ltd.
1973 - 1979	Six and one-third years as Pit Geologist, Mine Geologist and Chief Mine Geologist at Lornex in the Highland Valley of B.C. - Lornex Mining Corporation Ltd.
1979	Four months as Projects and Reclamation Engineer - Lornex Mining Corporation Ltd.
1979 - 1981	Thirteen months as Chief Mine Engineer, in charge of the Mine Engineer Department - Lornex Mining Corporation Ltd.
1981 (Jan.) - present	Chief Geologist - resposible for mining exploration in Canada and U.S.A. - Mohawk Oil Co. Ltd., Mining Division.

M.W. Waldner

M.W. Waldner
August 22, 1984

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APPENDIX I

ITEMIZED COST STATEMENT

APPENDIX I

PITA CLAIMS

Itemized Cost Statement

Personnel Equipment		Rate ($)		Time Worked		Total ($)
B. Callaghan Project Geologist		110	day	32	days	$ 3,520.00
A. Gamp Geophysist		95	day	39	days	3,705.00
D. Newton Geologist Assistant		84.50	day	34	days	2,873.00
C. Nagati Geologist		95	day	32	days	3,040.00
B. Maltby Geologist Assistant		84.50	day	35.5	days	2,999.75
M. Waldner Chief Geologist		250	day	7	days	1,750.00
						17,887.75
4 x 4 Pick-up	Crew Trans	46	day	45	days	2,070.00
Radio Communication		15	day	165	days	2,475.00
VLF-EM	EM Survey	15/	day	6.5	days	97.50
Magnetometer	Mag. Survey	15/	day	21.5	days	322.50
FL-9 Backhoe	Trenching	55/	hr.	116.5	hrs	6,407.50
D6-C Dozer	Trenching	69/	hr.	130	hrs	8,970.00
Room & Board		55/man/day		207	day	11,385.00
Geochem. samples		144 soil and silt samples 124 rock samples				4,811.91
Freight	sample freight					100.00
Draughting	Map prep.	12/	hr	16	hrs	192.00
Typing and copying						450.00
R. Burton Geol. Consultant						585.72
Miscellaneous		Equipment and supplies				1,101.75
Equipment Mobilization and Demobilization						380.25
						$ 39,349.13
				GRAND TOTAL		$ 57,236.88

* NOTE: Field work done between June 7, 1983 and July 22, 1983

APPENDIX II

VERY LOW FREQUENCY ELECTROMAGNETIC SURVEY - INSTRUMENTATION AND THEORY

APPENDIX II

Very Low Frequency Electromagnetic Survey - Instrumentation and Theory

A VLF-EM receiver, Model 27, manufactured by Sabre Electronics was used for the VLF-EM surveys. A transmitter located in Hawaii, U.S.A. and Annapolis, U.S.A. was used. The instrument measures the magnetic component of a very low frequency (VLF) electromagnetic (EM) field. The dip angles were measured on grid lines with the instrument oriented towards Hawaii and Annapolis. The VLF radio transmission from Hawaii and Annapolis produce an alternating magnetic field (primary). If a conductive mass such as a sulphide body or clay filled fault zone is within the magnetic field, a secondary alternating current is induced within it which in turn induces a secondary magnetic field that distorts the primary magnetic field. It is this distortion that the EM receiver measures. The VLF-EM uses a frequency range from 16 - 24 KHz. whereas most EM instruments use frequencies ranging from a few hundred to a few thousand KHz. Because of its relatively high frequency, the VLF-EM can pick up bodies of a much lower conductivity and therefore is more susceptible to clay beds, electrolyte-filling fault or shear zones and porous horizons, graphite, carbonaceous sediments, lithological contacts as well as sulphide bodies of too low a conductivity for other EM methods to pick up.

Consequently, the VLF-EM has additional uses in mapping structure and in detecting sulphide bodies of too low a conductivity for conventional EM methods and too small for induced polarization (in places it can be used instead of IP). However, its susceptibility to lower conductive bodies results in a number of anomalies, many of them difficult to explain and, thus, VLF-EM preferably should not be interpreted without a good geological knowledge of the property and/or other geophysical and geochemical surveys.

Subsequent to the collection of dip angle measurements at each station on the grid lines the data is "Fraser Filtered". The dip angle measurements for Hawaii and Annapolis are treated separately. North to Northeast striking structures should respond better to the Hawaiian signal and West or Northwest striking structures should respond best to the Annapolis signal.

The Fraser Filter is essentially a 4-point difference operator which transforms zero crossings into peaks, and a low pass smoothing operator which reduces the inherent high frequency noise in the data. Therefore, the noisy non-contourable data are transformed into contourable data. Another advantage of this filter is that a conductor that does not show up as a cross-over on the unfiltered data quite often will show up on the filtered data.

Profiles of the filter data were prepared for Hawaii and Annapolis separately. These plots were then analyzed and structures interpreted and possible zones of sulphide mineralization or clay alteration identified.

APPENDIX III

MAGNETIC SURVEYS - INSTRUMENTATION AND THEORY

APPENDIX III

Magnetic Surveys - Instrumentation and Theory

The instrument used to perform the magnetic surveys was a proton precession magnetometer, model MP-2 manufactured by Scintrex. This instrument measures the magnitude of the total magnetic field at any given point on the surface. The total field is the sum of the external field and the internal field within and surrounding the material being measured. The magnetometer sensor consists of a chamber filled with a proton rich fluid enclosed within two wire wound coils. When a current passes through these coils for a short period of time a magnetic field is set up which aligns the spinning protons. When this polarizing current is abruptly switched off, the protons begin to precess around the earth's magnetic field and eventually re-align with it. This precession induces a small, exponentially decaying, AC signal in the sensor coils whose frequency is proportional to the flux of the ambient magnetic field. This frequency is measured, converted to gammas and presented on the digital display of the instrument.

The surveys consist of measuring accurately the resultant magnetic field of the earth's magnetism acting on rock formations having different magnetic properties and configurations. The resultant field is the vector sum of induced and remanent magnetism.

Thus there are three factors, excluding geometrical factors, which determine the magnetic field at any particular locality. These are the strength of the earth's magnetic field, the magnetic susceptibility of the rocks present and their remanent magnetism.

Magnetic surveys are useful in conjunction with geological mapping and for exploration for magnetically susceptible minerals. Interpretation of magnetic profiles and maps can assist in interpretation of rock type distribution and the locations of structural features. Often magnetic minerals such as magnetite, pyrrhotite or ilmenite are associated with the mineral deposits which are sought or there may be a depletion of such minerals. Either case can assist in mineral exploration.

APPENDIX VI

UNFILTERED VLF-EM DATA

Wednesday June 29 VLF E/M near Jasson + continuation into mag. grid done June 7-14

Line 0+50N				Line 0+75N			
Stn	Dip	FF	F.S.	Stn	Dip°	FF	FS
0+00E	+15		14	0+00E	+10		14
	+16	+2	13		+12	+3	14
	+16	+3	15		+12	+5	14
	+17	+2	14		+13	+6	16
0+50E	+18	-0	14		+16	+2	14
	+17	+1	16		+15	+1	14
	+18	-2	15		+16	-0	17
	+18	+1	18		+16	-2	17
1+00E	+19	-7	18	1+00E	+15	-1	21
	+18	-18	19		+15	-1	19
	+17	-17	20		+15	-5	18
	+7	-4	17		+14	-9	17
1+50E	+6	+5	17		+11	-11	19
	+9	+1	17		+9	-13	18
	+9	-8	16		+5	-11	19
	+7	-14	18		+2	-6	18
2+00E	+3	-16	19	2+00E	+1	-3	17
	-1	-14	18		0	-[illegible]	17
	-5	-12	17		+1	-5	17
	-7	-7	17		-1	-8	17
2+50E	-11	+4	17		-3	-6	17
	-8	+9	15		-5	-1	18
	-6	+9	16		-5	+3	15
	-4		14		-4		16
3+00E	-1		15	3+00E	-3		15

June 29 E/M (VLF) over mag. grid done June 7-14

Line 14+00S (off 13F)

Sta	Dip°	FF	FS
14+00W	0		20
	+3	3	16
	+1	11	17
	-1	11	16
13+50W	-6	1	16
	-5	-5	17
	-3	-1	17
	-3	2	24
13+00W	-4	1	23
	-4	0	16
	-4	-3	23
	-4	-8	22
12+50W	-1	-7	23
	+1	-6	23
	+3	-1	24
	+3		25
12+00W	+2		24

Data E/M Survey (Zosson) June 24, 27 -1B

Stn	Line 0+25 N: Dip°	F.F	F.S	Stn	Line 0+00 N: Dip°	F.F.	F.S
0+00E	+18		-	1+00W	+7		20
	+22	-6	-		+6	+3	23
	+17	-6	18		+7	+6	18
	+17	0	18		+7	+7	17
0+50E	+16	+4	17	0+50W	+10	+11	17
	+18	+5	19		+13	+11	18
	+17	+4	17		+17	+5	19
	+20	-3	20		+17	+2	21
1+00E	+21	-15	27	0+00	+18	+4	23
	+15	-13	39		+18	+5	24
	+11	-10	37		+21	+1	22
	+9	-5	27		+20	-1	25
1+50E	+7	-2	27	0+50E	+20	-0	25
	+8	-7	29		+20	-6	30
	+6	-13	33		+20	-18	34
	+2		30		+14	-22	37
2+00E	-1		26	1+00E	+8	-18	37
					+4	-15	40
					0	-12	37
					-3	-9	27
				1+50E	-5	-7	24
					-7	-4	24
					-8	-2	25
					-8		24
				2+00E	-9		22

Data E/M Survey (Gossan) June 24, 27

Line 0+25S				Line 0+50S			
Stn	Dip	FF	F.S	Stn	Dip	FF	FS
1+00W	+9		17	1+25W	+7		16
	+10	+6	17		+7	-4	16
	+12	+5	16	1+00W	+6	+5	17
	+13	+4	16		+7	+14	17
0+50W	+14	+4	17		+11	-14	18
	+15	+9	17		+16	+5	18
	+16	+13	20	0+50W	+16	+4	17
	+22	+4	20		+16	-11	20
0+00W/E	+22	-2	23		+20	+13	22
	+20	-3	25		+23	-7	28
	+22	-12	25	0+00W/E	+26	-18	26
	+17	-20	27		+17	-26	32
0+50E	+13	-23	28		+12	-21	30
	+6	-21	30		+7	-18	31
	+1	-15	27	0+50E	+3	-16	28
	-3	-9	24		-2	-12	25
1+00E	-5	-7	24		-4	-9	25
	-6	-8	22		-7	-5	23
	-9	-5	22	1+00E	-8	-2	23
	-10	-2	22		-8	-1	22
1+50E	-10	-0	25		-9	+3	22
	-11	+2	17		-8		20
	-9	+1	18	1+50E	-6		17
	-10		16				
2+00E	-11		16				

Data E/M Survey (Gosdon) June 24, 27

Line 0+75S

Stn	Dip°	FF	F.S.
1+25W	+8		16
	+9	+4	16
1+00W	+9	+7	17
	+12	+11	17
	+15	+10	18
	+17	+9	18
0+50W	+20	+7	19
	+21	+6	20
	+23	-4	22
	+24	-22	28
0+00W	+16	-27	32
	+9	-22	27
	+4	-12	27
	-1	-9	28
0+50E	-2	-6	30
	-4	-4	28
	-5	-1	22
	-5	0	22
1+00E	-5	+1	19
	-5	+2	18
1+25E	-4	+3	18
	-4		17
1+50E	-2		16

Line 1+00S

Stn	Dip	FF	F.S.
1+50W	+7		15
	+8	+5	15
	+9	+8	15
	+11	+12	17
1+00W	+14	+16	16
	+18	+15	17
	+23	+5	18
	+24	-1	20
0+50W	+22	0	22
	+24	-9	26
	? (+22)	-27	?
	+15	-32	32
0+00W	+4	-20	26
	+1	-15	23
	-2	-12	22
	-6	-9	21
0+50E	-8	-3	34
	-7	+2	22
	-8	+3	20
	-6	-2	20
1+00E	-7	-1	20
	-7		23
1+25E	-7		22

Data E/M Survey (Gossan) June 24, 27 -48-

Sta	Dip	YY	Y.S.
1+50W	+10		1?
	+13	+13	15
	+18	+9	16
	+12	+7	16
1+00W	+22	-1	1?
	+21	-5	20
	+18	-8	24
	+20	-20	22
0+50W	+11	-23	31
	+7	-17	3?
	+1	-11	33
	0	-7	29
0+00	-3	-8	2?
	-5	-5	34
	-6	-3	30
	-7	-2	33
0+50E	-7	-3	26
	-8	-4	26
	-9	-2	25
	-10		[illegible]
1+00E	-9		[illegible]

Tues July 5 1983 VLF near Pit 1/4E

Stn	Line 4+00S Dip°	FF	F.S	Line 4+50S Dip°	FF	F.S.
2+00W	-10		37	-6		
	-8	+7	32	-5	+3	
1+50W	-6	+9	30	-4	+4	
	-5	+14	32	-4	+10	
1+00W	0	+13	33	-1	+13	
	+3	+7	30	+3	+9	
0+50W	+5	+5	31	+5	+4	
	+7	0	30	+6	-1	
0+00	+6	-3	32	+6	-5	
	+6	-5	42	+4	-6	
0+50E	+4	-6	43	+3	-6	
	+3	-6	44	+1	-4	
1+00E	+1	-5	46	0	-3	
	0	-4	48	0	-6	
1+50E	-1	-5	50	-2	-5	
	-2		48	-4		
2+00E	-4		46	-3		

July 5 1983 EM.

Stn	Line S100S Dip°	FF	FS	Line [illegible] Dip°	FF	FS
2+00W	-4		46	-3		31
	-4	-1	49	-1	2	32
1+50W	-4	1	46	-1	-4	28
	-5	11	50	-1	-2	30
1+00W	-2	16	44	-5	12	30
	+4	7	30	+1	14	30
0+50W	+5	1	35	+5	5	30
	+6	-3	35	N/A	1	
0+00	+4	-3	37	+6	-3	30
	+4	-5	39	+5	-7	40
0+50E	+3	-7	42	+3	-7	38
	0	-4	40	+1	-5	38
1+00E	0	-3	42	0	-2	39
	-1	-4	37	-1	0	40
1+50E	-2	-3	44	0	1	39
	-3		38	-1		40
2+00E	-3		42	-1		40

↑ [illegible]

July 5 1782 EM

-3C-

Stn	Line 6+00 Dip°	FF	FS	Line 6+50 Dip°	FF	FS
2+00W	+3		38	+3		41
	0	-4	40	+2	-2	41
1+50W	-2	8	40	0	8	40
	+1	13	39	+3	9	39
1+00W	+5	2	42	+7	0	44
	+7	6	44	+5	-3	45
0+50W	+7	-3	48	+5	-4	44
	+5	-2	46	+4	-5	45
0+00	+6	-6	48	+2	-3	46
	+4	-8	39	+2	0	46
0+50E	+1	-2	41	+1	2	43
	+1	1	42	+3	-3	43
1+00E	+2	-1	42	+2	-8	42
	+1	-2	42	-1	-6	44
1+50E	+1	-2	43	-2	-1	47
	0		47	-3		43
2+00E	0		45	-1		45

July 6
VLF on Pito 1/4E

Stn	Line 7+00S Dip°	FF	FS	Line 7+50S Dip°	FF	FS.
2+00W	+4	- -	22	-2		21
	+1	-4	24	0	3	20
1+50W	-3	10	21	0	1	20
	+4	6	21	+1	0	22
1+00W	+4	-2	22	0	2	22
	+3	-1	23	+1	3	21
0+50W	+3	0	24	+2	0	23
	+3	-2	26	+2	-2	21
0+00	+3	-4	32.	+1	-2	22
	+1	-3	34	+1	-3	22
0+50E	+1	-5	34	0	-5	22
	0	-7	37	-1	-6	22
1+00E	-3	-1	36	-3	-2	22
	-3	5	22	-4	2	30
1+50E	-1	4	22	-2	2	28
	0		21	-3		26
2+00E	0		24	-1		27

July 6 (VLF)

Stn	Line 8+00S Dip°	FF	FS	Line 3+50S Dip°	FF	FS
2+00W	+2		21	-7		20
	+1	0	24	-8	-4	22
1+50W	+1	0	25	-12	13	19
	+2	-4	24	-7	24	19
1+00W	0	0	24	0	18	19
	-1	6	22	+5	7	20
0+50W	+3	2	24	+6	2	21
	+2	-3	24	+6	2	23
0+00	+2	-4	27	+7	1	22
	0	-3	26	+7	-2	24
0+50E	0	-1	27	+7	-6	26
	-1	0	25	+5		24
1+00E	0	-1	25	+3		25
	-1	0	26			
1+50E	-1	3	25			
	0		25			
2+00E	+1		28			

Stn	Line 3+00S		
2+00W	-5		21
	-7	-6	21
1+50W	-8	3	21
	-10	18	24
1+00W	-2	19	26
	+2	12	21
0+50W	+5	7	20
	+7	3	22
0+00	+7	-1	22
	+8	-5	22
0+50E	+5	-5	26
	+5		23
1+00E	+3		23

APPENDIX V

ROCK SAMPLES LOCATIONS AND DESCRIPTIONS

APPENDIX V

ROCK SAMPLES LOCATIONS AND DESCRIPTIONS

NO. SAMPLE		LOCATION	DESCRIPTION
0601	60.96cm	Trench 1	gossan - Highly ox, alt. and
0602	15.24cm	Trench 1	gossan - Shear, ox. filt. gouge
0603	56cm	Trench 1	gossan - Light grn. siliciful And.
0604	150cm	Trench 1	gossan - andesite
0605	280cm	Trench 1	gossan - fault gouge
0606	3m	Trench 1	gossan - porphyritic And.
0607	2m	Trench 1	altered And.
0608	2m	Trench 1	highly alt. And.
0609	Garb	Trench L1-A	Silicious L/S
0610	24cm	Trench L2	faut gouge
0611	34cm	Trench L2	Andesite
0612	32cm	Trench L2	Andersite
0613	Grab	Trench L2	Andersite
0614	Grab	50m below station (SV 25) Eli 1365 - Andersite	
0615	Grab	75m above station (SV 25) Eli. 1385	
0616		Trench L3	contact between L/S & Volos
0617		Trench L3	contact between L/S & Volco L/S
0618		Trench L4	Alt volc.
0619		Trench C12	Diorite with ??? vein qutz.
0620		Trench C12	Diorite Trech.
0621		Trench C12	Alt. gabbro.
0622		Trench C12	clay - lim - seam between gabbro brecicum
0623		Trench C12	Highly alt. andersite
0624		Trench C12	Andersite
0625		Trench C11	Alt. andersite clays
0626		Trench C7	Fine grained And.
0627		Trench C7	
0628		Trench C7	2 - 7cm qtz. vein
0629		Trench C7	Fr. grn. and.
0630		Trench C7	Hb. lamp.
0631		Trench C7	Dc 50-50 moffcs

NO. SAMPLE	LOCATION		DESCRIPTION
0632	Trench	C7	Di
0633	Trench	C7	Di
0634	Trench	C3	Vol. Docite
0635	Trench	C14	Fault Gouge
0636	Trench	C14	Fault Gouge
0637	Trench	C14	Silified And.
0638	Trench	C14	Silicified And.
0639	Trench	L1	Qtz. vein
0640	Trench	L1	And. high weathered
0641	Trench	L1	Fr. grained And.
0642	Trench	L1	green And.
0643	Trench	L1	Minor quartz in small shear.
0644	Trench	C12	
0645	Trench	C12	Fr. gar. diorite.
0646	Trench	C12	Sili minor shear
0647	Trench	C8	Limestone
0648	Trench	C8	Skarn assemblage
0649	Trench	C8	Fine grn. And.
0650	Trench	C8	Fresh L/S
0651	Trench	C8	oxidized Andersite
0652	Trench	C8	Massive fine, grn. and.
0653	Trench	C8	And. highly alt.
0654	Trench	C2	Shear
0655	Trench	C2	Shear
0656	Trench	C2	flow brxx
0657	Trench	C2	Hb and fresh
0658	Trench	C2	for. grn. and.
0659	Trench	C2	shear
0660	Trench	C2	alt. and.
0661	Trench	C2	Highly alt. and.
0662	Trench	C2	L/S andesite cont.
0663	Trench	C2	Alt. and.
0664	Pita	16	Gossanous calraceous clay.
0665	Pita	16	quartz vein
0666	Pita	12, 1C	125E, 20N Pita 12 argillite
0667	Pita	1C	82-169 - float from overburden

NO. SAMPLE	LOCATION	DESCRIPTION
0668	Pita 12	0+00E, 0+50N quartz
0669	Big goat #1	
0670	Big Goat #2	Intrusive quartz Di?
0671	Big Goat #3	Porphyrite plug
0672	Big goat #3	Massive grey and.
0673	Trench L5	Quartz
0674	Trench L1	Gossan slight pophecite fine grained and.
0701	Trench C9	and. dose to L/S cont.
0702	Trench C9	L/S
0703	Trench C9	L/S
0704	Trench C9	And. Brxx
0705	Trench C9	L/S on F/W of Brxx cont.
0706	Trench C9	And.
0707	Trench C9	Diorite
0708	Trench C1	And.
0709	Trench C1	Argilluious 2/S
0710	Trench C1	Fr. gm. and.
0711	Trench C1	Argilluious L/S
0712	Trench C1	Argilluious L/S
0713	Trench C1	L/S
0714	Trench C1	And. flow Brxx
0715	Trench C3	Porphyritic and.
0716	Trench C3	Contact zone.
0717	Trench C3	L/S
0718	Trench C4	And.
0719	Trench ??	2/S
0720	Trench ??	And. fine grain
0721	Trench C5	And. fine grain
0722	Trench C5	L/S
0723	Trench C5	And. Brxx
0724	Road cut to lower trench between shear C15	
0725	Road cut to lower trench And.	
0726	Road cut to lower trench And. dyke.	
0727	Road cut to lower trench shear	
0728	Road cut to lower trench And.	

NO. SAMPLE	LOCATION		DESCRIPTION
0729	Road cut to lower trench And.		
0730	Trench L1-A		And.
0731	Trench L1-A		Silicified L/S
0732	Pita	1F	sample site 16-82-169 quartz float
0734	????		
0735	????		
0736	?????		
0737	1345m on first ck to heckman Whitsh volc. - and.?		
0738	1310m el 75m from Ck #1 wht. vlc. and?		
0739	1C-18-27 1155m - silicous And.		
0740	1C-81-28 el 1140m And.		
0741	L/S contact on Auy An #4		
0742	1347m Au, An #4 - And./L/S		
0743	1490m Au, An #4 near L/S/And. cont.		
0744	Below main gossan, green and.		
0745	Pita	16D	and. massive
0746	Pita	16B	Travertine
0747	Pita	16C	quartz vein
0748	Pita	16A	quartz vein
0749	Pita	16E	Calcarious Arg.
0750	Pita	16F	Argillite