TABLE OF CONTENTS

Atlas Expl.
Nibbing - Hess Area
1050 1-8
1970
T. J. Adamson

LIST OF APPENDICES

TELEPHONE 685-4331

ATLAS EXPLORATIONS LIMITED

330 MARINE BUILDING
355 BURRARD STREET
VANCOUVER 1, B.C.

REPORT ON GEOLOGY, PROSPECTING AND GEOCHEMISTRY HESS AREA OEX PROGRAM, 1970

INTRODUCTION

In the period June 21 to August 12, 1970, a geochemically oriented regional exploration program was carried out in the south half of N.T.S. Sheet 105-O (See key map). The work was done by a field crew of five men, under the supervision of the writer. Field operations were supported by a G3B-2 helicopter, on contract. The total budget for this program was approximately $60,000.00

LOCATION AND ACCESS

All work was done in N.T.S. areas 105-O-1 through 8. The base camp for the entire program was located at Jake Lake, approximately 5 miles NE of Niddery Lake, on map area 105-O-6. Initial mobilization of camp equipment and fuel was by truck from Ross River to Sheldon Lake, a distance of 68 miles NE of Ross River on the Canol Road, and then by float-equipped Beaver aircraft from Sheldon Lake to Jake Lake, a distance of 44 miles. Weekly supply flights were made from Ross River to Jake Lake, using a Beaver aircraft, a distance of 100 miles. The Canol Road cuts across the southeast border of the area that was investigated.

GEOLOGY

The entire area of investigation is underlain by a thick section of Devonian-Mississippian intercalated dark grey to black graphitic shale and cherts, black argillite, chert pebble conglomerate, and minor limestone and quartzite. Geological Survey of Canada reports have noted that continuous sections of dark shales and cherts as much as 10,000 ft. thick were noted in this unit, but that the units very extensive development suggests a much greater total thickness.

A number of Cretaceous plutons intrude the sediments in the project area. The composition of these plugs ranges from biotite quartz monzonite to granodiorite. The intrusives are generally medium grained, unaltered, and free of any sulphide mineralization except for some very minor disseminated pyrite at a few localities. The intrusives generally have a halo of highly pyritized hornfels in the surrounding argillaceous sediments.

The sediments in the project area are very difficult to map on a regional scale. Individual rock members are generally very thin and closely interbedded with other rock members. Typically, 2 or 3 individual rock types might be interbedded in any hundred feet of section. A relatively thick highly resistant member of chert pebble conglomerate is the only individual member that can be traced for any significant strike length.

Throughout the belt, the rocks are generally striking NNW and dipping steeply to the north or south. Because of the thickness and homogeneity (on a regional scale) of the unit, it would require a very detailed job of geologic mapping to determine the structural elements of the area.

GEOCHEMISTRY

Silt sampling was the primary geochemical tool used in this program. In the area investigated, the silt sample density approached 1 silt sample per square mile. Soil samples and rock samples, for geochemical testing, were taken primarily in the process of following up anomalous silt sample results.

Most samples were analyzed for copper, lead and zinc, and about one-half of the samples were analyzed for molybdenum. Copper, lead and zinc determinations were made by atomic absorption methods after digestion in hot aqua regia. Molybdenum content was determined colorimetrically by the thiocyanate-stannous chloride method using isopropyl ether for the extraction of the coloured Mo complex. Lower detection limit for all elements sought was 2 ppm.

Silt sample results from the regional sampling program were plotted on base maps having a scale of 1" to 1 mile. Histograms were plotted for all elements (See Fig. 1). From these plots the thresholds of anomalous value for all 4 elements tested were visually determined to be as follows:

		Threshold
Cu	:	155 ppm
Pb	:	40 ppm
Zn	:	1700 ppm
Mo	:	16 ppm

It can be seen from the above that we are dealing with a rock unit that has unusually high concentrations of the 4 elements tested.

The areas of all anomalous silt results were further investigated by one or a combination of the following techniques: more detailed silt sampling, soil sampling, rock goechem sampling, mapping and prospecting.

The silt sample anomalies, and the results of follow-up work on them are as follows (anomalous areas and their assigned numbers are plotted on the key map):

105-O-1

Area 27 - See Figs. 2, 3.
The regional silt sampling resulted in one marginally anomalous lead value in this area. The area, one of almost 100% outcrop, was prospected, but no significant sulfide mineralization could be found. The area is underlain by steeply dipping grey to black shales and cherts, very minor clean grey limestone, and very minor conglomerate.

Area 28 - See 105-O-2

Area 29 - See Figs. 2, 3, 4
This area is on the border of map sheets 105-O-1 and 105-O-2 and was originally detected as a high anomalous copper value (330 ppm) in a silt sample. Soil sampling and more detailed silt sampling were subsequently done in this area. While soil sampling, a gossan was discovered. The gossan was also sampled. Geochemical results have indicated a zone of anomalous Cu and Pb values in soils roughly centred on the gossan area. The gossan was also anomalous in copper. No outcrop was found in the anomalous area. Rubble of chert and quartzite, containing disseminated pyrite and weathering rusty, was observed in several locations within the area of interest. More intensive prospecting and a soil sampling grid is recommended for this area.

Area 30 - See Fig. 2, 3
Area 30 is the small restricted drainage basin of a small north flowing creek that ran very marginally anomalous in lead. Bedrock is exposed throughout this basin. No significant sulfide mineralization could be found, and conglomerate and shale were the only rock type observed.

105-O-2

Area 28 - See Figs. 5, 6, 7

This ares extends on to N.T.S. Map sheet 105-O-3. Two silt samples having marginally anomalous copper values (180 ppm, 186 ppm) resulted from the regional survey. The area was carefully prospected with no encouraging results. A poorly exposed dioritic dyke (?) or small plug (?) in the area is adjacent to and has highly altered a conglomeritic member of angular shale, chert and grit fragments. The conglomerate has scattered vuggy calcite fracture fillings, and weathers quite rusty. A base of slope soil sample line below the above area resulted in no anomalous results. A gossan (transported limonite) about one mile south of the above area was sampled and gave no anomalous values.

105-O-3

Area 1 - See Fig. 8

A silt sample at the mounth of a SE flowing stream gave an anomalous result for copper (260 ppm). Another silt sample about one-half mile upstream gave only background values. The possible source area of the anomalous result is totally overburden covered. Two soil sample lines were run across this area. No anomalous results for any element were obtained. No gossons were observed in this area.

Area 2 - See Figs. 9, 10

Two very marginally anomalous zinc results, in silts (1770 ppm, 1740 ppm) were obtained from a small north-flowing creek. Outcrop is abundant. The drainage basin was carefully prospected. No mineralization of interest was observed. The creek cuts graphitic cherts, shales, chert pebble conglomerate, and minor limestone and quartzite. A 6" thick barite vein was found cutting the conglomerate.

Area 3 - See Figs. 9, 10

Anomalous copper-zinc results, in silts, were obtained along the entire length of the creek, extending right to the headwaters of two branches. The creek cuts a typical section of shales, cherts, and minor limestone. Outcrop is abundant. No significant sulfides could be found in place or as float. No gossans were observed in the area. The geochemical anomaly could not be explained.

Area 4 - See Figs. 9, 10, 11

Area 4 is a small basin directly south of, and over a ridge from, Area 3. The original two silt samples from the creek draining this basin were anomalous in lead (80 ppm, 85 ppm). Subsequent silt sampling determined that the source of the anomalous results was within a thick chert pebble conglomerate member. The conglomerate, in places, contains minor disseminated pyrite. Two thick (5-10 ft.) quartz eye felsite dykes, cutting the conglomerate, also contain minor pyrite. Transported limonite from a large gossan located downstream from most of the conglomerate was analyzed but gave only background values. Two soil sample lines were run over a portion of the basin that is overburden covered. Again, only background values resulted. Geochemical analyses were made of all types and variations of rocks encountered, but no enlightening results were obtained. Nothing was discovered that could explain the high lead geochemical results.

105-O-4

Area 5 - See Figs. 12, 13

A single silt sample from the mouth of a short creek draining a small high cirque, gave a very anomalous value in copper (820 ppm). However, the analytical results of subsequent more detailed silt sampling in the same drainage were not anomalous in any element.

Area 5 (Cont'd.)

Cu	Pb	Zn (ppm)
32	2	400
88	14	88
100	14	488
88	12	244

The area is above timberline and bedrock is well exposed. Most of the drainage basin is underlain by chert-pebble conglomerate, except for a band of black argillite, containing minor fine grained pyrite lenses, at the extreme head of the valley. A small barite nodule with heavy monzonite stain was found as float in the creek. Geochemical analyses were made of all rock types observed:

	Cu	Pb	Zn (ppm)
-Black argillite, minor fine grained pyrite lenses	60	18	220
-Barite nodule	2	6	8
-Fine grained rusty conglomerate	32	10	60
-Medium grained rusty conglomerate	36	6	28
-Coarse grained clean conglomerate	34	10	8
-Rusty course grained conglomerate with very minor disseminated pyrite	28	6	22
-Highly sheared, rusty, crumbly chert-shale conglomerate (float)	14	6	4

Areas 6 and 7 - See Figs. 12, 13

Marginally anomalous copper and copper-zinc silt results were obtained from both Areas 6 and 7. Both areas have abundant outcrop and were carefully prospected. Only unmineralized cherts, shales and conglomerate were observed. One shale member in Area 7 contains minor small barite nodules. Neither the shale nor the nodules are geochemically anomalous.

Area 8 - See Figs. 12, 13

One marginally anomalous copper result from a silt sample was found at Area 8. This anomaly was not directly followed up. The surrounding ridges were mapped. Nothing of economic interest was observed in the area.

Areas 9 and 10 - See Figs. 12, 13, 14

The original silt sampling detected two sample sites anomalous in copper (380 ppm, 170 ppm). These locations were on two branches of the same larger stream. Further silt sampling gave a number of additional anomalous copper and zinc results. The source of the anomalous values seemed to be along a linear feature visible on air photographs but not readily apparent on the ground. Outcrop in this area is restricted in many places to creek cuts. The area is underlain by black shale with thin interbeds of black chert. The shale is cut by a number of thin felsite dykes. A narrow (6"-12") quartz-pyrite-pyrrhotite-realgar vein was found cutting the shales and cherts, in the creek valley corresponding to the above mentioned lineament. A gossan was also found along the lineament, although it contained no anomalous geochemical values. Four silt sample lines were run across the lineament. Three marginally anomalous lead values were obtained in the vicinity of the gossan and the quartz vein. All other results were at background levels.

105-O-5

Area 11 - See Figs. 15, 16, 17

Three anomalous lead results (41, 44, 47 ppm) were obtained in the lower reaches of a north-flowing creek. There is no outcrop in this area. Mapping of surrounding ridge suggest the area of interest is underlain by grey shale and quartzite. Two soil sample lines were run across strike, and parallel to the creek. No anomalous results were obtained. No mineralized float was found in the creek bed.

Area 12 - See Figs. 15, 16

This area has a number of high zinc values and one high lead value in silts. The area was carefully prospected. A small quartz monzonite plug, and a number of granitic dykes intrude the graphitic black shales found in this area. The shales in the vicinity of the intrusives are strongly pyritized. A number of rusty seepages and gossans are found in the creek downslope from the pyrite-rich shales. No mineralization of any economic interest was found in the area.

Area 14 - See Figs. 15, 16, 18

Two marginally anomalous copper results (156, 183 ppm) were detected along the mid-section of the creek in this area. Overburden cover is extensive but the area is probably underlain by shale and chert. Two soil sample lines were run across strike adjacent to the anomalous silt results. None of the soil results were anomalous. No mineralized float could be found in the creek bed.

105-O-6

Area 15 - See Figs. 19, 20

Area 15 has a number of scattered anomalous copper, lead and zinc results in silts. The creeks drain an area of heavily pyritized hornfels surrounding a large quartz monzonite intrusion. The area was prospected but no interesting mineralization was discovered, either in place or as float.

Area 16 - See Figs. 19, 20

This area contains scattered marginally anomalous copper and lead values in silts. Careful mapping and prospecting was done. The area is underlain by closely interbedded, steeply dipping shales, chert, quartzite and minor limestone. No significant sulfide mineralization, rusty seepages or gossans were found.

105-O-7

Area 18 - See Figs. 21, 22

Area 18 is a single marginally anomalous zinc value (1800 ppm) in silt near the headwater of a small creek. Prospecting and mapping was carried out. The area is underlain by black shales, brown shales, and conglomerate. No sulfide mineralization was found.

Areas 19 and 20 - See Figs. 21, 22

The marginally anomalous copper and zinc reulsts in these areas were followed up by careful prospecting and mapping. Outcrop is abundant. No sulfide, or indication of sulfide mineralization (gossan, rust staining, etc.) could be found.

Areas 21 and 22 - See Figs. 21, 23

The anomalous lead and zinc results in silts, of these areas, occur in an area of abundant outcrop exposure and were followed up by careful prospecting. Closely interbedded, steeply dipping chert, argillite, limestone and shale are the predominant rock types. Minor barite is associated with some of the limestone members. A number of base of slope groundwater seepages in this general area are depositing travertine. Geochemical analyses of the travertine resulted in only background values. No mineralization of any economic interest was located in this area.

Area 23 - See Figs. 21, 22, 23

Attention was first drawn to Area 23 by a number of very high zinc values from silt samples taken during the regional sampling. Subsequently, more detailed silt sampling, soil sampling, rock sampling for geochemical analyses, and prospecting were carried out in the area.

Chert pebble conglomerate forms the ridge at the head (south end) of the valley. The rocks to the north of the

Area 23 (Cont'd.)

conglomerate are interbedded brown shale, black shale, black argillite, black and grey chert, baritic limestone and barite. The most anomalous silt and soil sample responses seem to be associated with the barite members. Assays of baritic gossan material, found downslope from the largest zone of barite, ran about 1.2% Zn. Float of calcite-barite-sphalerite vein material (apparent thickness of vein 2") found in a limey barite talus slide contained 12.9% Zn. No other zinc mineralization was found in the area. No mineralized float was found in any of the creek beds. Analyses were made of a number of representative barite samples. All these samples gave only background values for copper, lead and zinc. It is thought that the high zinc geochemical values are probably caused by a number of small veins containing sphalerite. The high concentration of zinc in the gossan is probably the result of a "zinc scavenging" process in the surface environment.

Due to snow cover, a number of very high zinc values in silts, taken during the follow up work, from tributary creeks on the western side of the basin, were not adequately investigated. In this area, only the ridges were mapped in any detail. The lack of any economically interesting mineralization in the eastern side of the basin, that also have correspondingly high zinc geochemical results, would tend to downgrade the significance of the western area. However, to conclusively evaluate the area, a closer examination is recommended.

105-O-8

Area 25 - See Figs. 24, 25, 26

Three anomalous zinc values (1800 ppm, 2400 ppm, 5000 ppm) were obtained from initial silt sampling. More detailed silt sampling confirmed the original results and delineated a sharp up-stream cut-off of anomalous values. Outcrop in the valley is limited to the creek banks. The rock types encountered were a variety of shales, chert, argillite and minor limestone. A thin limestone member (6 ft.), its position coinciding quite closely with the upstream limit of anomalous values, contained abundant disseminated pyrite. A geochemical analysis of this material gave only background values for copper, lead and zinc. Two soil sample lines were run across strike, at the base of slope, in the area of interest. No anomalous values were detected. A member of closely interbedded barite limestone and limey shale was observed on ridges, to both sides of the anomalous creek, striking towards the point in the creek where anomalous silt values began. Geochemical analyses of samples of this barite member, however, were not anomalous in zinc. More prospecting and more soil sampling are recommended for this area. A number of contour soil sample lines, along the eastern side of the valley, would ascertain if the high zinc values were directly associated with the barite rock member.

Area 26 - See Fig. 2

A silt sample from the mouth of the creek draining the small cirque in this area was anomalous in copper (175 ppm) and lead (85 ppm). The area is one of almost 100% bedrock exposure. Careful prospecting was carried out. No sulfides, other than very minor pyrite in a chert pebble conglomerate member, were found. Other rock types encountered in the basin were black and green shale, black argillite and grey quartzite, all relatively steeply dipping.

Area 31 - See Fig. 27

This area is on the northeast corner of Map Area 105-O-8, and extends slightly onto 105-O-9, somewhat to the northeast of the main belt on which work was done. This was an area of three reported gossan occurrences to the northeast of the Keele Peak pluton. The area was prospected, and samples of silts, soils, and gossans were collected for geochemical analyses. No sulfide mineralization, other than pyrite in hornfels, could be found. The results of all geochemical analyses were at background levels.

CONCLUSIONS AND RECOMMENDATIONS

Approximately thirty areas of anomalous silt sample values were investigated. In most cases, nothing was found that could explain the geochemical anomalies. In no case was any sulfide mineralization of any economic interest discovered. In three areas (Areas 23, 25 and 29), before a conclusive evaluation can be made, further prospecting and geochemical sampling are required. This work could best be carried out by a geologist and two geochemical samplers, fly-camping at each area for 3 or 4 days. The total cost of this further work would probably be about $3,500.00.

Respectfully submitted,

T. J. Adamson,
Geologist

November, 1970