



REPORT ON
GEOLOGICAL MAPPING
AND SOIL TESTING SURVEY
JUNE 18 TO AUGUST 30, 1982

TURK 97-156 CLAIMS
BRINCO EXPLORAM PROJECT
DAWSON MINING DISTRICT, Y.T.
CLAIM SHEET 116 C/7

LATITUDE 64 29'N

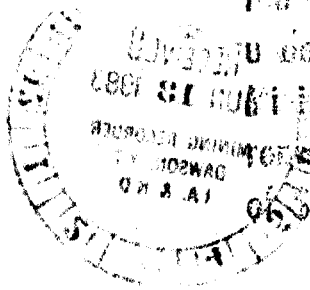
LONGITUDE 140 45'W

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Geological Services for Commissioner
of Yukon Territory.

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INTRODUCTION

The Turk 97-156 claims were staked for Brinco Exploram Project (Brinco Mining Ltd. and Exploram Minerals Ltd.) during June, July and August 1982. They cover several poorly exposed serpentinite bodies which are situated north of the Clinton airstrip, about 5 km northwest of the Clinton Mine.

The ultramafites are marked by loose, serpentinite talus but are surrounded by thick, clay-rich alluvium except along the banks of Easter Creek. An intense aeromagnetic anomaly is shown on government maps and extends across the north end of the Clinton airstrip for at least 2 km to the west where two drill holes by Asbestos Corporation Ltd. in 1963 located the Foxy ultramafite beneath a thin capping of argillite. In spite of the close proximity of the Clinton Mine, the asbestos potential of this area has never been thoroughly explored although some trenching was done at the north end of the airstrip about 1967, and a ground magnetic survey was performed over the Turk ultramafite about 1970. The majority of the ultramafites are less exposed than either of these areas and have no history of physical work.

The BEP program consisted mainly of grid soil sampling, linecutting and geological mapping, although some trenching was done late in 1982. Work was conducted from the Clinton Creek townsite and daily transportation to the property was by Ford 4x4 pickup.

The Archer, Cathro crew in 1982 consisted of party chief J. S. Murray, geologist C. Main and linecutter/samplers S. Beckmann, T. Carlson and J. Duke. Overall supervision was provided by R.J. Cathro.

PROPERTY, LOCATION AND ACCESS

This property is situated on the north side of Clinton Creek approximately 5 km north of the Clinton minesite, at 64 29°N and 140 45°W. It consists of 156 contiguous mineral claims that were recorded in the name of Archer, Cathro & Associates (1981) Limited in the Dawson Mining District as follows:

<u>Claim Name</u>	<u>No. of Claims</u>	<u>Record Numbers</u>	<u>Expiry Date</u>
Turk 1-16	28	YA64503-18	24 Feb 86
17-64	48	YA64451-98	24 Feb 86
65-96	32	YA64531-62	24 Feb 86
97-124	28	YA65014-41	17 Jun 83
125-132	8	YA65078-85	8 Jul 83
133-140	8	YA65169-76	24 Aug 83
141-148	8	YA65161-68	24 Aug 83
149-156	8	YA65086-93	20 Jul 83
	156		
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The 1982 program was conducted from the Clinton Creek townsite, which is located about 100 km northwest of Dawson City by road. Access to the claims was by the Clinton Mine access road which leads to the Clinton airstrip located near the center of the claims. A Ford 4x4 pickup was used for daily crew transportation and a Kamatsu bulldozer, contracted from L. Beck of Clinton Creek, was used for a brief trenching program from July 31 to August 2, 1982.

HISTORY AND PREVIOUS WORK

General

The presence of asbestos in the Clinton Creek area had been known since before 1887, when the rumours were reported by the G.S.C.; however, the first asbestos property recorded was located on the west bank of the Yukon River, about 3 km south of Fortymile. This showing was staked initially in 1895, restaked as the Aurora claims in 1912 and subsequently restaked as the Verlene claims in 1928. The 1912 claim application stated that this was an asbestos occurrence. Chrysotile fibre up to 5 mm long occurs at this locality. It is associated with fibrous tremolite in two small, highly sheared, ultramafite bodies, one of which is capped by Tertiary columnar basalt. Much of the chrysotile is slip fibre and total fibre content is less than 1%. The showing has no current economic potential.

Clinton Mine

Exploration and development of the Clinton Mine was conducted independently of other exploration in the Clinton Creek basin and began with the optioning of the Caley and Clinton asbestos discoveries by Conwest. The discovery outcrops on Snowshoe Hill were first staked in April, 1957 by prospectors G. Walters and A. Anderson, who were grubstaked by Fred Caley, a Dawson merchant. Caley had optioned claims covering the Caley asbestos deposit on Cassiar Creek to Conwest the previous year and was successful in stimulating interest in asbestos exploration among residents of the Dawson area.

Caley's Clinton Creek claims were optioned by Conwest soon after they were recorded and were transferred to an affiliate, Cassiar Asbestos Corp. Ltd., late in 1957 following prospecting

and hand trenching. Cassiar explored with trenching, diamond drilling and two adits (250 m) in the main (west) zone on Porcupine Creek and a 365 m adit on a smaller zone 300 m to the east on Snowshoe Hill in 1957-58. Initial tunnelling however, failed to locate the main orebody on Porcupine Hill and it was not until a fluxgate magnetometer survey was performed in 1961, that the major portion of the Porcupine ultramafite was outlined.

The property remained idle until 1963 when about 45 surface diamond drill holes and 29 underground holes tested the magnetic anomaly and led to the discovery of the orebody. A feasibility study was completed about 1965 and mining commenced in April, 1967. The mine recovered more than 15.5 million tonnes of ore grading about 5.9% fibre from the Porcupine and Snowshoe open pits which produced more than 910 thousand tonnes of asbestos by mine closure on August 19, 1978.

Turk Claims

Outside the mine property, some of the most aggressive early grass-roots exploration was conducted by a joint venture between Yukon Consolidated Gold Corp. Ltd. (Y.C.G.C.) and Consolidated Zinc Corporation Ltd., which carried out an aeromagnetic survey of the Clinton Creek valley in early 1957 and staked many magnetic anomalies and exposed ultramafites near the Clinton Mine. By 1964, the joint venture, in conjunction with Asbestos Corporation, had performed grid magnetometer surveys and mapping on several ultramafites, including some of those now covered by the Turk claims, and performed diamond drilling on the Foxy target, located about 1 km east of the Clinton airstrip.

Drilling on the Foxy claims consisted of two holes, each about 125 m deep and roughly centering on an aeromagnetic target. Serpentinite was intersected in both holes beneath about 15 m and 60 m of graphitic argillite, respectively. No ultramafites are known to outcrop in this area and further drilling was not performed because of low fibre contents in the cores recovered.

Later exploration near the Turk claims included an aeromagnetic survey and follow-up ground magnetic surveys in 1966 and 1967 by Sphere Development Corp. Ltd. and bulldozer trenching on an ultramafite located at the north end of the Clinton airstrip by Voels International Development Ltd. in 1967. A magnetometer survey of these ultramafites was also performed by Cassiar Asbestos Corporation Ltd. about 1970 although no physical work was performed. Results of this survey are shown on Figure 1, in pocket.

GEOMORPHOLOGY

The Turk claims are situated within the unglaciated portion of the Yukon Plateau which is marked by poor bedrock exposures. Regional uplift in the late Tertiary, together with disrupted drainage patterns to the east caused by glacial advance in the Pleistocene from the Ogilvie Mountains, has resulted in substantial rejuvenation and some disruption of the drainage system. Major tributaries, such as Clinton Creek, are incised into steep, V-shaped valleys with low gradients and steep headwalls.

The Turk claims cover all three elements of terrain in

this district - plateau, incised valleys, and alluvial terraces. Gravels resembling the Klondike White Channel Gravel are present at about 700 m elevation on the Clinton Mine lease and are present on the Turk claims near the Clinton airstrip at similar elevations. Clay is common in overburden below the 700 m elevation and may be alluvial in origin. Vegetation consists of thick black spruce, alder, aspen and poplar. Permafrost occurs on some moss-covered, north-facing slopes.

Locating and mapping ultramafites on the property has been difficult even though some targets like the Turk ultramafite are marked by a conspicuous lack of vegetation. At least five areas on the claims up to 100 m across are covered only by grass and a few stunted trees because plants do not grow well in ultramafite soils. Before BEP, all of the ultramafites in the Clinton Creek basin, except the Foxy, were initially mapped according to the size of the vegetation anomalies covering them. However, so much of the area is covered by fertile, clay-rich alluvium that using vegetation patterns as a mapping tool has been found unreliable.

Outcrops are rare and most ultramafite exposures consist of some highly weathered serpentinite fragments scattered across vegetation anomalies; sometimes with a few boulders showing through the soil cover. The best exposures are some widely spaced outcrops measuring only a few meters across at the Turk ultramafite and a few small outcrops along Easter Creek, particularly where some old trenches have removed the overburden.

REGIONAL GEOLOGY

The Clinton Creek camp is situated within the Yukon Plateau and is sharply bounded to the northeast by the late Cretaceous Tintina Fault. The district has a complex geological history resulting from tectonic activity that has thoroughly deformed and intermixed several major rock assemblages. Ages are difficult to estimate since the fossil record has mainly been obliterated by deformation and regional metamorphism and contacts are obscured by overburden cover.

Rocks in this region have been subdivided by government geologists into three major packages: Nasina Suite (OSD); Anvil Allochthon (CPv); and, Klondike Schist (LPK). In the continental collision model proposed by Tempelman-Kluit (1979), the Nasina Suite represents the North American plate margin material. The Anvil Allochthon and Klondike Schist represent seafloor material and continental "Stikinia" plate rocks obducted onto the North American plate during a collision in Jurassic(?) time. The thrust faulting associated with the collision resulted in complex interfingering of the three units, destruction of sedimentary features and development of new cataclastic textures.

Anvil Allochthon

The allochthonous overthrust block consists of an ophiolite suite composed of alpine-type ultramafite, gabbro, basalt, chert and limestone. In the Clinton Creek camp, these rock types are usually present as their metamorphosed equivalents: serpentinite with associated hornblende diorite,

amphibolite, and chlorite schist. The ophiolite assemblage has become highly dismembered by thrusting and most serpentinite bodies are enveloped in graphitic schists of the Nasina Suite.

The ultramafites (CPub) are typically fairly small bodies composed of massive, dark green, fine to medium grained magnetic serpentinite derived from both peridotite and dunite. Most of them are highly sheared, reflecting a stressful emplacement, and are enclosed in metamorphosed host rocks. No relationship has been established yet to link the metamorphic grade of surrounding rocks to fibre development within serpentinite. However, it seems probable that strong shearing in the wall rocks is important in creating islands of unshaped serpentinite within which tensional fracturing and fibre veins can develop.

Cross fibre veins in commercial-grade mineralization seldom show straining or strong disruption except within localized shear zones, indicating they formed at a late stage in the emplacement and alteration of the ultramafite. In the Clinton Creek and Caley orebodies, blocky fracturing with commercial fibre lengths and quantities constitute less than 10 per cent of the serpentinite. These zones are surrounded by sheared varieties of serpentinite such as fish-scale that are typical of other bodies in the camp.

Some serpentinite bodies contain augen-like bodies of relic, massive serpentinite or lens-shaped bodies of diorite. A few of the massive lenses, such as those at the Tjop property, contain cross fibre veins that may have formed during or shortly after emplacement. Some of the fibre veins near the edges of these bodies are highly deformed and drawn out.

Similarly, fibre veins that formed in the blackwall alteration zones surrounding diorite lenses (black pods), such as those at the Toc property, often exhibit curved veins and chrysotile fibres that are bent in the direction of movement. Both types of bodies are usually too widely dispersed through a sheared serpentinite to have economic importance.

The margins of many serpentinite bodies are altered to soapstone; for example at the Tjop and Tiza properties. This suggests that temperatures exceeded 400 deg C for a short period after emplacement, probably during regional metamorphism. Quartz-carbonate alteration, which consists of magnesite, talc and opaline silicates, is common and is probably also a post-mineralization event since the alteration is sometimes pseudomorphic after chrysotile fibre. Transformations from serpentinite to quartz-carbonate are displayed best in the Clinton Creek Mine, where long fibre veins can occasionally be traced from serpentinite into highly altered rock. This is a gradual change from silky chrysotile to harsh opal along the veins and is not accompanied by physical disruption.

Fine to medium grained, light grey to dark green, biotite or hornblende-rich diorites occur along with the ultramafites at several locations and are usually considered to be part of the Anvil Allochthonous suite. The diorites occur as small lens-shaped bodies or "dykes" that are enclosed by serpentinite and often are associated with black-pod mineralization, as at the Toc property. Alternatively, diorite forms large, stock-like bodies up to several metres across adjacent to the ultramafites, as at the Tjop property. Contacts between the larger bodies of diorite and serpentinite are usually altered

to quartz-carbonate, whereas the smaller dykes usually exhibit "blackwall" alteration. This suggest that the diorites are slightly younger than the ultramafites. The smallest dykes are usually enveloped by highly sheared serpentinite and appear to have been squeezed and dismembered into their present lensy form by strong tectonic forces.

Nasina Suite

The Nasina suite has been defined by Tempelman-Kluit (1976) as a distal sequence of carbonaceous and quartz-rich sedimentary rocks. They have been mostly metamorphosed to greenschist facies and now consist of palegreen quartz-mica-chlorite schist, grey to silvery colored quartz-muscovite schist, graphitic schist, chloritic quartzite and minor quartz-biotite gneiss. Although the sequence is not well understood and correlations are difficult to establish, a tentative age of Ordovician to Devonian has been assigned to the Nasina. Rubidium/strontium and potassium/argon age determinations by Htoon (1979) near the Clinton Mine suggest a Permian age, although one sample of biotite schist returned a rubidium/strontium age of 470 ma, which is Ordovician. The younger dates may reflect the date of latest metamorphism or of regressive (biotite to chlorite zone) metamorphism, while the Ordovician date may reflect the age of deposition or of earlier metamorphism.

Preliminary mapping by J.G. Abbott of DIAND in the vicinity of Clinton Mine during 1981 revealed the presence of slightly metamorphosed carbonaceous mudstone, limy sandstone and tuffaceous phyllite that he tentatively assigned to the Nasina suite. These rocks probably represent the unmeta-

morphosed equivalents of the common Nasina suite rocks. They resemble rocks mapped elsewhere in Yukon that are Triassic in age and fossil conodonts tentatively identified from Clinton Mine rocks in 1982 support this assumption. Abbott demonstrated fairly conclusively that the Nasina suite underlies the allochthonous assemblage and concluded that the graphite schist adjoining the orebody was derived from Nasina rocks.

Klondike Schist

The Klondike schist is a cataclastic rock that is thought to be derived from felsic intrusive rocks. In the Clinton Creek camp, quartz-rich cataclastics, gneisses and quartz-muscovite cataclastic schist are common. Age relationships are difficult to determine as the Klondike schists cannot be related to other rock units. Radiometric ages of 138 and 145 ma were obtained from samples of cataclastic material by Tempelman-Kluit (1976). These dates are late Jurassic and probably reflect the time of cataclasis.

Igneous Rocks

Igneous rocks in the belt consist of lower Cretaceous biotite granodiorite and quartz monzonite and Tertiary feldspar porphyries. These have been combined for simplicity on Figure 3 as unit Tqfp but are differentiated on GSC Map 1284a. One of the largest quartz monzonite stocks in the district is located about 2 km west of the Tjop claims. It consists of plagioclase, biotite and altered grains of hornblende with minor amounts of potash feldspar, quartz and magnetite. Granitic gneiss and amphibolite have developed along contact zones. The eastern

contact of this body was explored for tungsten mineralization by Noranda during 1981.

Small bodies of feldspar porphyry occur throughout the region. These rocks are characterized by phenocrysts of feldspar and quartz up to several mm in length in a light grey to grey-green, fine grained groundmass. One of the largest of these porphyry bodies, on Cassiar Dome, was staked by Cominco for molybdenum-tungsten potential as the Pluto claims and was drilled in 1981. A porphyry dyke at the southeast corner of the Tjop claims was staked in 1927 for sulphide mineralization as the Roal occurrence. Also, basalt associated with a small porphyry dyke on the Thane grid area was found to contain traces of uranium mineralization. The porphyry bodies are probably more numerous than was previously known and some may host important base metal mineralization.

Olivine basalt (Tv) occurs locally in the region and is probably the youngest rock type as it overlies all other units.

References

- Htoon, M.
1979: Geology of the Clinton Creek asbestos deposit, Yukon Territory; unpublished M.Sc. Thesis, University of British Columbia.
- Tempelman-Kluit, D.J.
1976: The Yukon crystalline terrane: Enigma in the Canadian Cordillera; Geological Society of America Bulletin, v. 87, pp. 1343-1357.
1979: Transported cataclasite, ophiolite and granodiorite in Yukon: Evidence of arc-continent collision; G.S.C. Paper 79-14.

GEOLOGY AND MINERALIZATION

The Turk claims are mainly underlain by low grade metamorphic rocks and cataclastic rocks of the Nasina Suite and Anvil Allochthon, respectively. The ultramafites consist of partially to highly sheared serpentinite bodies with abundant fish scale surrounding competent portions. Quartz carbonate alteration of the serpentinites is common throughout the area. Many of the serpentinites are light green, contain abundant bastites and generally resemble the ultramafites that make up the footwall of the Porcupine orebody at the Clinton Mine. Some boulders on the Turk ultramafite however, exhibit large, glassy pyroxene crystals indicating that not all ultramafites on the property are completely serpentinitized.

Rocks that surround the ultramafites mainly consist of graphitic schist, quartz-muscovite schist and chlorite schist. Small outcrops of schist occur along Easter Creek and fragments of schist have been seen paving shallow creek channels and in soil pits throughout the area. Like the ultramafites, these rocks weather recessively and are generally covered by alluvium throughout most of the region.

The Turk claims were staked to cover the vegetation anomalies as well as several large areas that contain high concentrations of asbestos fibres in the soil. Soil studies have shown that fibres up to 5 mm long are dispersed in soils throughout the area although very few fibre veins have been seen while prospecting because of the highly weathered nature of the ultramafite scree. Fibre veins tend to break up readily when exposed to the harsh climate of the Yukon and only the

enclosing serpentinites persist on the surface of the ground for many seasons. This phenomenon is best seen at the Clinton Mine where a thick fibre mat has developed on the pit floor and specimens of ore with intact fibre veins are difficult to find only four years after mine closure.

On the Turk 97-156 claims, at least two ultramafites occur which are called the Mary and Foxy ultramafites and are respectively situated about 1 km north and 1.5 km east of the Clinton airstrip. The surface exposure of the Mary target is less than 50 m across and consists of fragments of serpentinite similar to those seen along Easter Creek. The serpentinites from the Foxy target were only viewed in diamond drill cores made by Asbestos Corporation Ltd. in 1963, and consisted of massive to highly sheared serpentinites with minor fibre veins up to 6 mm wide.

Near the center of the claim group and just beyond the Turk 97-156 claims boundary, are two old asbestos showings that were exposed in bulldozer trenches made by Voeles International Development Ltd. about 1967. Both showings are in an ultramafite body that is at least 100 m thick and dips about 30 degrees to the east beneath graphitic schists. Road access to these showings was reopened by BEP during 1982.

The uppermost showing is called the Airport showing and is located about 300 m from the north end of the Clinton airstrip by road. At the Airport showing the mineralization consists of a few fibre veins up to 10 mm wide next to a 1 m wide blackwall alteration envelope that surrounds a diorite body about 5 m long and 2 m wide. This zone grades about 1% along strike and has no economic potential.

The second showing occurs close to the valley floor about 100 m west and 50 m lower in elevation than the first. The fibre occurs in a light green, moderately sheared serpentinite and no diorites were seen at this location. Compound fibre veins up to 10 mm wide containing fibres up to 6 mm long occur in a few widely spaced gash veins up to 30 mm long. The fibre content of the rock is about 1% where exposed and the quality of the fibre present is good. There is some potential for better mineralization at depth.

SAMPLING AND TRENCHING

Soil sampling grids were established in 1982 across the Turk 97-156 claims area on a continuing program of fibre dispersion surveys begun in 1981 on the Turk 1-96 claims. During this phase of the program, about 1415 soil and silt samples were collected at 50 m spacing on compass lines 200 m apart and about ten km of baselines were cut for survey control. In addition, bulldozer trenches were made at three locations as shown on Figure 3, in Pocket C.

SAMPLING AND TRENCHING RESULTS

Anomaly_L

This very large cluster of samples encompasses at least four poorly defined ultramafites that are marked by vegetation anomalies. The ultramafites consist mainly of partly to highly sheared serpentinite. The anomaly is situated on the southwest side of Easter Creek and follows the south bank of a western tributary for nearly 1 km. Roughly crescent-shaped, it measures

about 1500 m long by 250 m wide. Point values range up to 50a and 132b and fibre quantities are generally higher where the soils are thinnest over the ultramafites. Much lower point scores and fibre quantities in soils surrounding the anomaly are probably caused by airborne contamination from the Clinton mill, located only 2 km to the southeast. No trenching has been performed on any of these ultramafites although a ground magnetometer survey was performed by Cassiar Asbestos Corporation Ltd. about 1970 which shows intense magnetic highs surrounding the anomalous soil zone.

Anomaly D

This anomaly consists of a cluster of seven samples which straddle a vegetation anomaly on the east bank of Easter Creek about 500 m north of Anomaly L. Point scores up to 169a indicate that fibres over 11.5 mm long occur loose in the soils at this location. The vegetation anomaly measures about 100 m by 50 m across.

Two trenches made by BEP during 1982 did not uncover any significant asbestos mineralization in this area. A blackwall alteration zone less than 1 m wide surrounding a 2 m long diorite body contained a few asbestos veins and weathered out fibres up to 10 mm long had formed a mat about 3 cm thick covering the zone. The serpentinites in the trenches are mainly sheared and fish scaled with a thick envelope of reddish-brown quartz carbonate along the south margin. This rock contacts graphitic schists on the south side where trenched.

Anomaly_P

This cluster of ten samples is centered over the Airport ultramafite. Point scores up to 45a reflect the poor quality mineralization present in some old trenches made by Voeles International Development Ltd. in 1967, as described earlier. A ground magnetometer survey made by Cassiar Asbestos Corporation Ltd. in 1970 indicates that this ultramafite may extend beneath the airstrip 300 m to the east and north for at least 500 m. Thick soils and gravel deposits on the terrace in these areas severely hampered sampling and the poor results probably do not reflect the underlying geology. Deeper sampling methods are needed to test this area more thoroughly.

Anomaly_Q

This U-shaped anomaly occurs on a moderately steep hillside on the midwest side of the airstrip. Point scores reach 78c and all of the 12 samples included have only medium to low fibre quantities. No ultramafites are known to exist at this location. It is possible that the anomaly is due to airborne contamination from the Clinton mill as samples collected closer to the millsite further south have increasing quantities of fibre. No physical work has been done to test bedrock at this location.

SUMMARY AND RECOMMENDATIONS


The Turk claims were staked to cover several poorly exposed ultramafite bodies as well as some broad overburden covered areas that contain anomalous concentrations of asbestos fibres in the soil. The claims are mainly situated on the west side of Easter Creek, about 5 km northwest of the Clinton Mine.

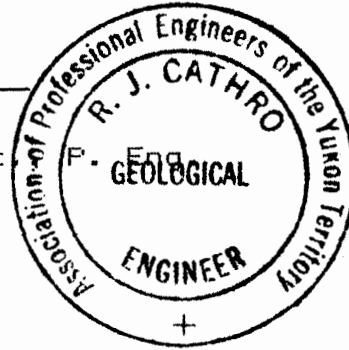
Soil studies were performed during 1981 and 1982 using a sampling technique pioneered by TJV. Although the area is located close to the Clinton mine and has been staked several times since 1957, very little physical work has been done to evaluate the asbestos potential of this area; mainly because the ultramafites are poorly exposed and rock fragments on the surface of the ground contain no fibre. Soils tested by TJV and BEP however, contain fibres up to 11.5 mm long and the best fibre anomalies occur within four areas that are covered by overburden and were difficult to prospect earlier.

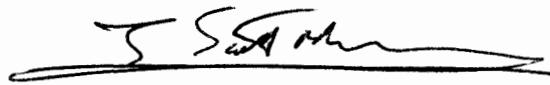
During 1982, two bulldozer trenches were made at Anomaly O which uncovered a weakly mineralized zone within sheared serpentinites. Previous trenching performed at Anomaly F by others, exposed two fibre showings with fibre lengths of up to 10 mm long but in subcommercial concentrations. Only small portions of these anomalies have been exposed however, and Anomalies L and Q have never been trenched at all.

A two week program of detailed ground magnetometer surveys to better outline the ultramafite bodies plus follow-up rotary drilling to test the bedrock beneath the best fibre dispersion survey anomalies is recommended.

Respectfully submitted,
ARCHER, CATHRO & ASSOCIATES LIMITED


R.J. Cathro, B.A.Sc.




J. Scott Murray

APPENDIX 1

FIBRE DISPERSION SURVEYS

THEORY

Fibre dispersion surveys take advantage of the fact that chrysotile is chemically resistant to weathering and maintains its fibrous integrity during weathering and erosion. Thus, fibre can be detected in soils whether it is being dispersed by normal residual erosion in unglaciated areas, such as the Clinton Creek camp, or by glacial scouring. Experience has shown that chrysotile fibre is so much more resistant to weathering than its host serpentinite that it can be found in soil in areas that are devoid of obvious serpentinite outcrops or talus.

In theory, the amount of fibre in the soil should be directly proportional to the amount of underlying mineralization, since the bulk of the fibre occurs in simple veins that break apart readily when subjected to weathering. Like conventional geochemical surveys, however, simple dispersion patterns and strongly anomalous contrasts only occur around buried fibre occurrences that are covered by simple soil profiles. TJV sampling has shown that all serpentinite bodies contain fibre and that even those that are apparently unmineralized have a low background level that is detectable in soil.

Fibre veins pinch and swell, and are usually divided along their length by a central parting. Weathering of chrysotile mineralization frees fibre veins from the walls and breaks their partings, causing the veins to disintegrate into rod-shaped fragments called fibre bundles (or spicks). Further weathering will cause these bundles to split lengthwise into thinner strands called fibrils. Experience has shown that individual fibrils are unusually strong and that they will seldom break transversely, although they

can split longitudinally into thinner fibrils. In soils, the longest fibrils reflect the maximum width of veins between partings but seldom the distance between the vein walls.

Much of what is known about the relationship between length and quantity in a fibre deposit has come from milling practise. TJV has assumed that the weathering of fibre is analagous to the milling of fibre to produce a commercial blend of lengths. Milling experience has shown that fibre lengths in a deposit are inversely proportional to the quantity of short fibres, and that the total quantity of fibre in the rock is roughly proportional to fibre length. This suggests that, under most conditions, the number of fibre veins that develop in a block of serpentinite is fairly constant and the main variable is fibre length (vein thickness). Thus, if conditions are favourable, longer fibres will form in many of the fractures, thereby increasing both the average length (and value) as well as the proportion of the rock that is fibre (ore). When conditions are unfavourable, only short fibre will form and the total fibre content of the rock will remain low. The validity of this concept is confirmed by the fact that long fibres are seldom found in lower grade ores.

The laboratory technique and interpretation methods used by TJV have been designed to identify samples that contain longer fibres and, by definition, have a better probability of having been derived from commercial mineralization. Most commercial deposits contain abundant 6.5 mm fibre. For example, Group 5 specifications stipulate that about 20% must exceed that length. Since 6.5 mm fibres are rare in TJV samples and have only been found in samples collected near important occurrences, that length has been chosen as an important threshold in fibre dispersion surveys.

POINT VALUES

In the TJV sampling, it has been found that most samples contain less than 100 fibres and that quantities exceeding 10,000 fibres are only obtained when sampling has encountered a fibre mat. A fibre mat is fairly uncommon in TJV sampling, either because the sample cannot be collected deep enough or because there is insufficient fibre in bedrock. Alternatively, some soils are too mixed by solifluction to permit the development of a mature profile. As a result, most samples do not contain enough fibres to be sure that the longest fibre present in the bedrock source are represented.

For example, the probability of collecting a fibre 6.5 mm long in soil over asbestos veins containing some fibres 6.5 mm long is high if the sample contains over 10,000 fibres (a fibre mat) but is poor if the sample contains only 10 fibres.

To overcome this difficulty, a "point" value is calculated by the laboratory which utilizes standard relationships between fibre lengths and quantities and greatly simplified the interpretation of soil results. By permitting the comparison of samples containing different quantities of fibre, the point help to overcome the field difficulty of collecting samples of uniform quality.

Using the example quoted above, the sample containing 10 fibres and a longest fibre of 3.2 mm would have the same point score (50 points) as the fibre mat sample with 10,000 fibres and a maximum length of 6.5 mm. A point score of 50 seems to be a good threshold value since nearly all soils tested from commercial-grade asbestos showings have scores of 50 or more.

Field testing of this method in 1981 showed that it loses its statistical validity once the number of fibres in the soil falls to a low level. For example, a soil sample containing only three fibres will give a point score of 34 if the longest fibre is 2 mm long, but a much higher score of 75 if the longest fibre measures 3 mm. To overcome this weakness, it was necessary to rate samples according to the number of fibres present by adding a suffix to the point number. Points with an "a" suffix have the highest reliability and those marked "e" the lowest, as shown below:

<u>Suffix</u>	<u>Fibre quantity/sample</u>
a	more than 250 fibres
b	100 to 249 fibres
c	20 to 99 fibres
d	6 to 19 fibres
e	1 to 5 fibres

Samples with quantity "a" are usually collected where soils are thinnest over ultramafites. Soils with "e" ratings generally fringe ultramafite bodies, contain spurious fibre because of contamination, or reflect deeper and more complex overburden profiles. For a given ultramafite, scores derived from "a" soils and from "e" soils will be roughly similar but the "e" scores will be more erratic. Statistics show that over 90% of all "e" scores were less than 50 points and fibres 3 mm or more in length seldom occur in "e" soils.

APPENDIX 2

TURK_TRENCH # _A_

Date: Aug. 23, 1982

Location: 100+00 N, 136+00 E

Volume: 90 cu.m Size: 1.0 m deep, 30.0 m long, 3.0 m wide

Rock Types: a) Soil fragments: White Channel gravels

b) Bedrock: Did not reach

Profile: 0.0 - 0.1 m ...Organic

0.1 - 1.0 m ...Fine sand with patchy zones of red-stained, pebbly, quartz-rich gravel; probably White Channel gravel

TURK_TRENCH # _B_

Date: Aug. 23, 1982

Location: 105+50 N, 130+00 E

Volume: 225 cu.m Size: 1.5 m deep, 50.0 m long, 3.0 m wide

Rock Types: a) Soil fragments: Serpentinite and graphitic schist

b) Bedrock: Serpentinite and graphitic schist

Profile: 0.0 - 0.1 m ...Organic

0.1 - 1.5 m ...Highly sheared serpentinite, abundant fish scale; a diorite body about 1 m wide crosses the trench about 20 m from the east end and fibre up to 10mm occurs in a few gash veins about 20 cm long next to the diorite; the eastern 10 m of the trench was made in highly weathered graphitic schist

TURK_TRENCH # _C_

Date: Aug. 23, 1982

Location: 106+00 N, 128+50 E

Volume: 550 cu.m Size: 1.5 m deep, 125 m long, 3.0 m wide

Rock Types: a) Soil fragments: Serpentinite, quartz-carbonate
b) Bedrock: Serpentinite, quartz-carbonate

Profile: 0.0 - 0.1 m ...Organic

0.1 - 1.5 m ...Southern 60 m of trench:red-stained
highly weathered quartz-carbonate
Northern 65 m of trench:highly sheared
serpentinite with abundant fish scale;
narrow diorite bodies (less than 2 m
wide) were exposed at 3 locations;

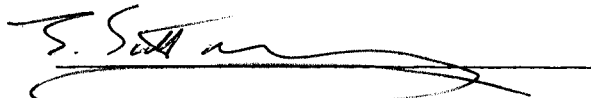
Comments: No fibre was seen

42

STATEMENT OF QUALIFICATIONS

J. Scott Murray

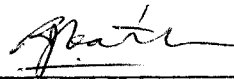
Scott Murray was raised at Abbotsford, B.C. and attended U.B.C., B.C.I.T. and Selkirk College. He was employed by Cassiar Asbestos Corp. from 1973 to 1978 as a geological technician at both the Cassiar and Clinton Mines. During this period he was engaged in all phases of mapping, surveying, grade control and exploration for asbestos fibre. From 1979 to present Mr. Murray has supervised asbestos exploration for Archer, Cathro & Associates (1981) Limited.


J. Scott Murray

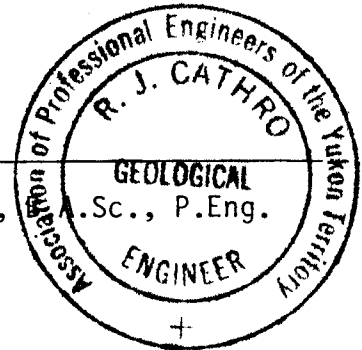
STATEMENT OF QUALIFICATIONS

I, Robert J. Cathro, with business addresses in Whitehorse, Yukon Territory and Vancouver, British Columbia, and residential address in West Vancouver, British Columbia, do hereby declare:

1. I am a 1959 graduate of the University of British Columbia in geological engineering.
2. I have been engaged in geological engineering for over twenty years, the past seventeen of which have been as a consultant.
3. I am a registered professional engineer in British Columbia and in Yukon Territory.
4. I have supervised the work described in this report.



Robert J. Cathro,

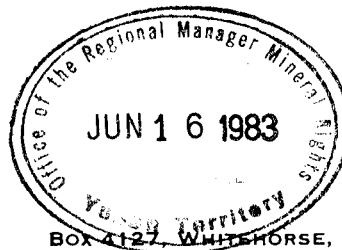


ARCHER, CATHRO

& ASSOCIATES LIMITED

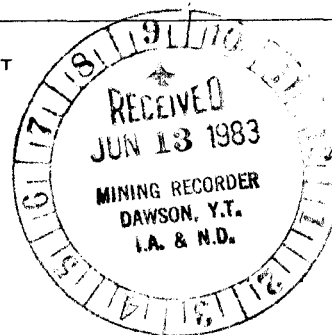
CONSULTING GEOLOGICAL ENGINEERS

VANCOUVER, B.C. (604) 688-2568



BOX 4127, WHITEHORSE, Y.T. Y1A 3S9 (403) 667-4415


1016 - 510 WEST HASTINGS STREET
VANCOUVER, B.C. V6B 1L8



AFFIDAVIT

I, Joan Mariacher, of Whitehorse, Yukon make oath and say:

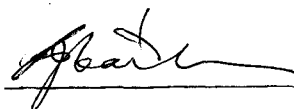
That to the best of my knowledge the attached Statement of Expenditures for exploration work on the Turk 97-150 mineral claims on Claim Sheet 116C/7 is accurate.


Joan Mariacher

Sworn before me at Whitehorse, Y.T.

this 10th day of

June, 1983



Notary, Yukon Territory

091454

Statement of Expenditures
Turk 97-150 Claims
June 10, 1983

Bulldozer contractor - Lindsay Beck - 12.5 hours at 70.00	\$ 875.00
Assays - Geotor Labs - 1415 samples at \$8	<u>11,320.00</u>
	<u>\$12,195.00</u>

LYNDIAY BEECH
 Box 387
 Dawson City
 Yukon Y0B1G0
 AUG 2, 1982

ARCHER, CATHERINE ASSOC. LTD.
 Box 4127
 Whitehorse
 Yukon Y1A 3S7

RE: CATERPILLAR DO DIGGER RENTALS
 CLINTON CREEK PROJECT

JULY 28, 1982	9
JULY 29, 1982	9
JULY 30, 1982	10
JULY 31, 1982	4
AUGUST 1, 1982	1
AUGUST 2, 1982	8 1/2
TOTAL TIME	
	41 1/2 Hours

41 1/2 Hours @ \$70.00 / Hour	\$2905.00
2 Hours Working Digger @ \$75.00 / Hour	\$150.00
TRANSPORT DIGGER BETWEEN CLINTON - BAYVIEW	\$-750.00
TOTAL COSTS	
	\$3755.00

CONTRACTOR: J. Beck.
 FOR ARCHER, CATHERINE: Skip Baker

GEOTECH SERVICES
485 12th. AVE
KAMLOOIS BC

ORDER NUMBER	066784
DATE	9/9/82
BUYER'S OFFICE	
SALESMAN	
TERMS	
F.O.B.	

SOLD TO ARCHER CATHRO & ASS.

Box 4127 WHITEHORSE YT

SHIPPED TO _____

ADDRESS _____ VIA _____

INVOICE

	P.E. PROJECT				
	CERTIFICATES 940-942				
	150 SAMPLES @ 8.00			1200.00	

REDIFORM - 7M31

Total 760⁰⁰
less 500.00

260.

CREDIT SERVICES
485 12th AVE
RAMBOUR

OUR NUMBER	066782
DATE	9/9/82
TERMS	
F.O.B.	

SOLD TO ARCHER, CATRO 's ASS (1981) LTD
Box 4177 Whitehorse YT

SHIPPED TO _____
ADDRESS _____ VIA _____

INVOICE

	B.E. PROJECT				
	CERTIFICATES 928-936				
	450 @ \$8.00			3600.00	

ORDER NUMBER	066787
DATE	0-1-83
CUSTOMER'S ORDER	
SALESMAN	
TERMS	
F. O. B.	

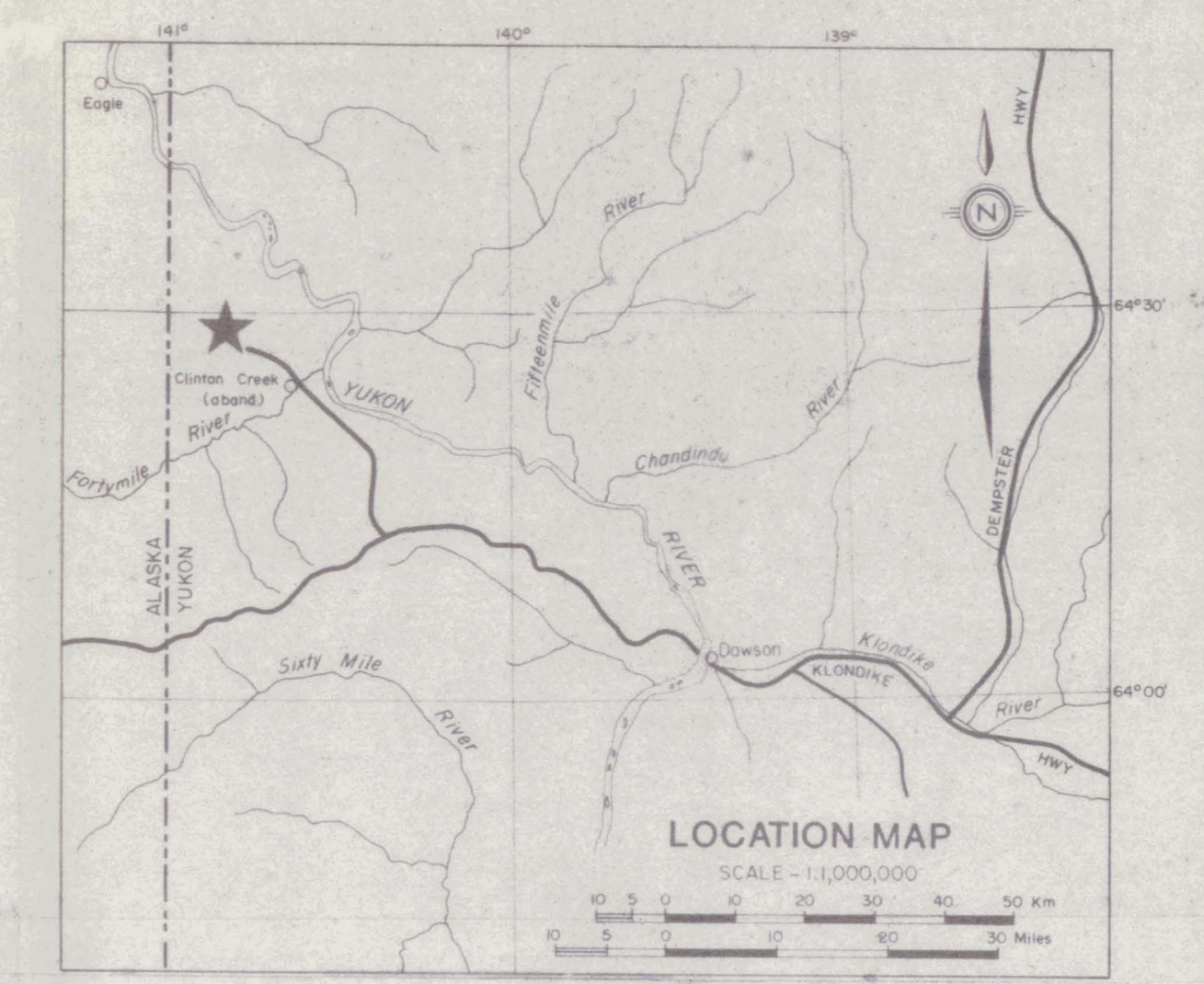
SOLD TO ARCHER CATHERO + ASS.

SHIPPED TO

ADDRESS VIA

INVOICE

D. E. PROJECT			
716	3 samples @	800	5728 ⁰⁰
NOTE: These samples conclude B.E.P. for a total of 2716 samples			
5000 Jan 5 1983 #511			



LEGEND

CARBONIFEROUS TO PERMIAN

- Dark green serpentinite and quartz-carbonate rocks, contacts assumed
- Fibre Dispersion Survey anomaly outlines
- Mine waste dump
- Mill tailings
- Mine site open cut
- Claims boundary
- Mine lease boundary
- Magnetometer survey area boundary
- 2,000 Ground magnetic contour, in gammas
- Picket-line
- All weather road
- Dirt road
- Cat-trail
- Bulldozer trench
- Diamond drill hole
- Excavator pit
- Asbestos showing
- Soil sample location and point value

NOTE: Chrysoile content of samples measured by Geotek Services Incorporated, Kamloops B.C.

091454



Fig. 1
 ARCHER, CATRO & ASSOCIATES (1981) LTD.
CLAIMS, ULTRAMAFITES, MAGNETIC & FIBRE DISPERSION SURVEYS
 TURK CLAIMS
 TESLIN JOINT VENTURE

