MINING AND GEOLOGICAL REPORT

ON

THE 1987 NORTEK EXPLORATION

PROGRAM

By
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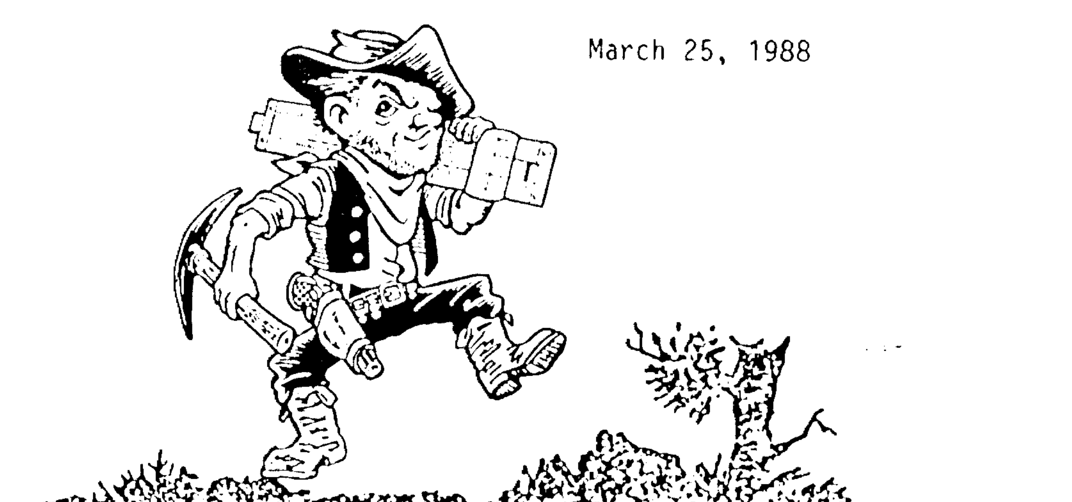
March 25, 1988



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<u>CERTIFICATE</u>

I, Gordon B. French, of R.R.# 1, Highway 112, Tarzwell, Ontario, POK 1V0, do hereby certify that:

1. I am a registered fellow in good standing of the Geological Association of Canada and a registered U.S.Professional Geologist, #2414, of the American Institute of Professional Geologists; a member of the Canadian Institute of Mining and Metallurgy; a member of the American Institute of Mining Engineers; a member of the Rocky Mountain Association of Geologists; and a past director of the Colorado Mining Association.

2. I am a graduate of Missouri School of Mines (B. Sc., 1954)(M. Sc., 1956).

3. I have been practicing my profession, as a geologist and mining engineer, for thirty-two years and have worked in the field of mineral exploration for over twenty years.

4. I do not have nor have I ever had any interest, direct or indirect or contingent, in the shares of Nortek Minerals Ltd., Shenandoah Resources Ltd., or Miller-Independence Mining Ltd., or any other property within a radius of 10 Kilometers of the Miller-Independence properties.

5. I have conducted a completely independent analysis of all data available for this property.

6. I have spent over four and one-half years supervising the exploration on these properties with the majority of the time spent on site.

DATED at Tarzwell, Ontario this 30th day of March, A.D., 1988.

Gordon B. French

Gordon B. French, M.Sc.,F.G.A.C.,P.Geol.

0.0 ABSTRACT

The attached Report has been prepared to provide details of the Phase I Joint Venture(Nortek Minerals Ltd./Shenandoah/Miller-Independence) Field Exploration Program. This work was completed during the 1987 exploration season, commencing in September of 1987 and being completed by March 1988. The project was composed of the following specific tasks:

TASKS

A. DRILL 36 CORE HOLES WHICH WOULD BETTER DELINEATE THE PREVIOUSLY DEFINED ORE BODY LIMITS. TOTAL FOOTAGE DRILLED WAS 7,294 LINEAR FEET.

B. IDENTIFY ROCK TYPES AND MINERALIZED SEQUENCES AND CONDUCT DETAILED PETROGRAPHIC EXAMINATIONS OF THIN SECTIONS AND POLISHED SECTIONS TO IDENTIFY MINERAL SUITES, GRAIN SIZES AND THE ASSOCIATED HOST ROCK PETROGENESIS.

C. OBTAIN BY DRILLING AND BLASTING A FRESH REPRESENTATIVE BULK SAMPLE OVER 600 KG IN WEIGHT AND CONDUCT DETAILED PROCESSING TESTS, WHICH WOULD IDENTIFY PROCESS FLOW SHEET DESIGN FACTORS AND CONFIRM THE ABILITY TO ECONOMICALLY RECOVER THE DISSEMINATED FINE GRAIN GOLD MINERALIZATION.

D. ESTABLISH A 1:2000 METRIC BASE MAP AND OUTLINE THE PRINCIPLE PROPERTY BOUNDARIES WITH PERMANENTLY ESTABLISHED SURVEYED CUT LINES.

E. SURVEY IN ALL DRILL HOLES; LOCATE AND MAP MAJOR GEOLOGICAL FEATURES; TO FURTHER ESTABLISH THE LACK OF COMPLEXITY OF THE ORE MINERALIZATION ZONE AND TO BETTER DEFINE ITS' OVERALL CONTINUITY WITH DETAILED CROSS SECTIONS.

F. COMPLETE THE REQUIRED ASSESSMENT WORK ON THE McELROY AND BOSTON HOLDINGS AND FURTHER DELINEATE THE GEOLOGICAL CONTROL FEATURES, AS WELL AS POTENTIAL MINERALIZED ZONES LOCATED ON THESE PROPERTIES.

G. CONDUCT REGIONAL AND LOCAL GEOLOGICAL FIELD OBSERVATIONS AND RELATE THESE FINDINGS TO DEVELOPMENT OF A ROLE MODEL TO DEFINE LOCAL GOLD MINERALIZATION.

The final report presented hereafter takes into consideration the results from this program, as well as results from previous exploration programs when deemed reliable.

The main results might be summarized as follows:

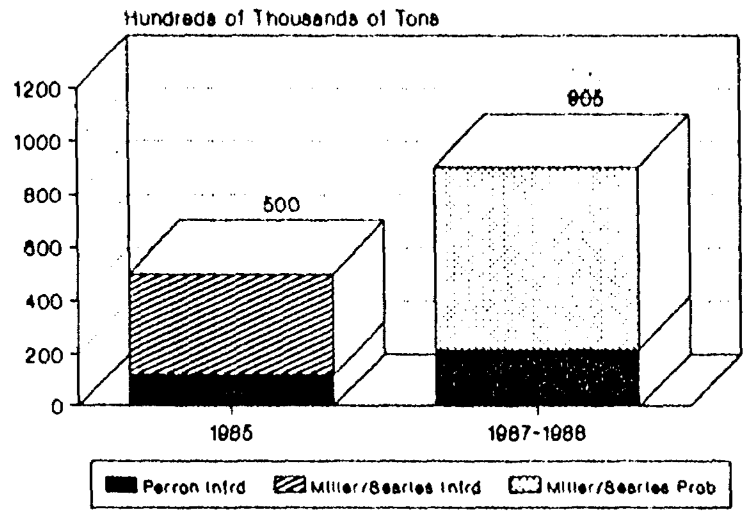
0.1 CHANGE OF RESERVE CATEGORY:

From: Inferred

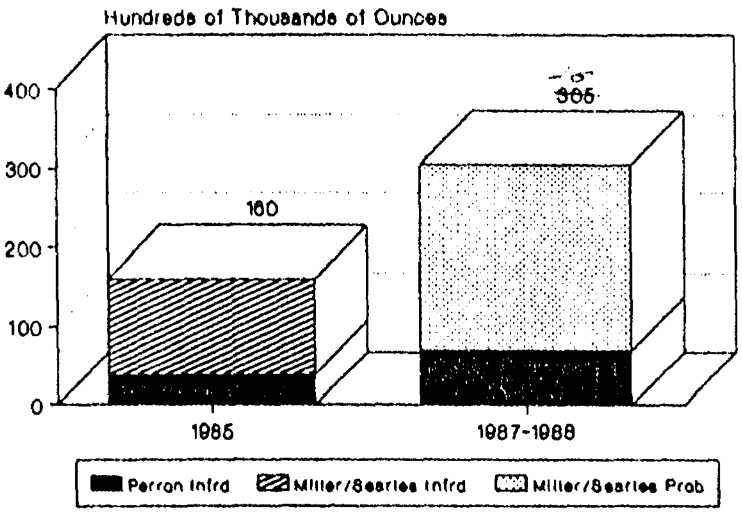
TO: Probable

Graphic Summary of the Results of the 1987-1988 Exploration Program

Tonnage Increase



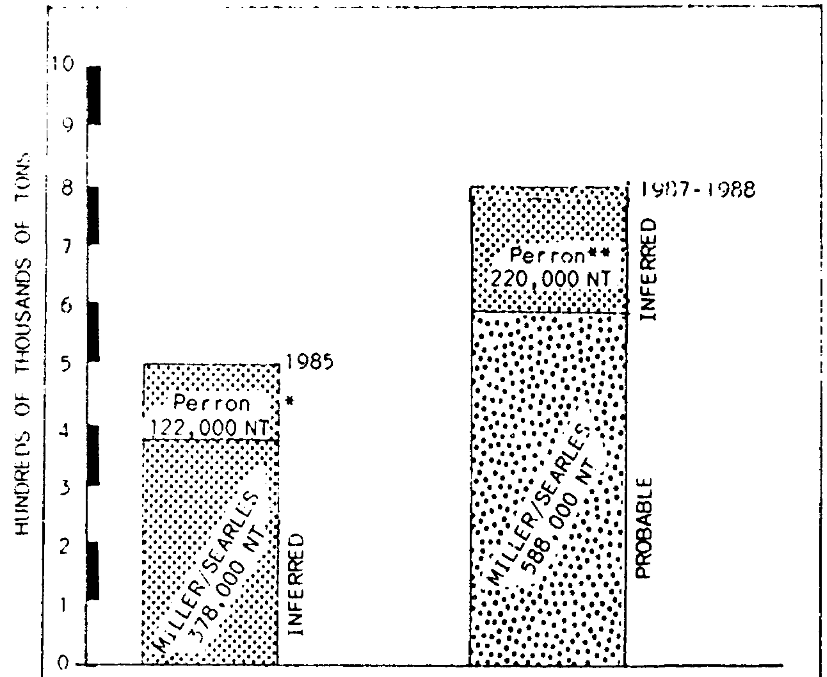
Gold Reserves Increase



Original Estimate Included Perron Property, then under lease
Perron not included in Joint Venture Partners at this time

GRAPHIC SUMMARY OF THE

RESULTS OF THE 1987-1988 EXPLORATION PROGRAM



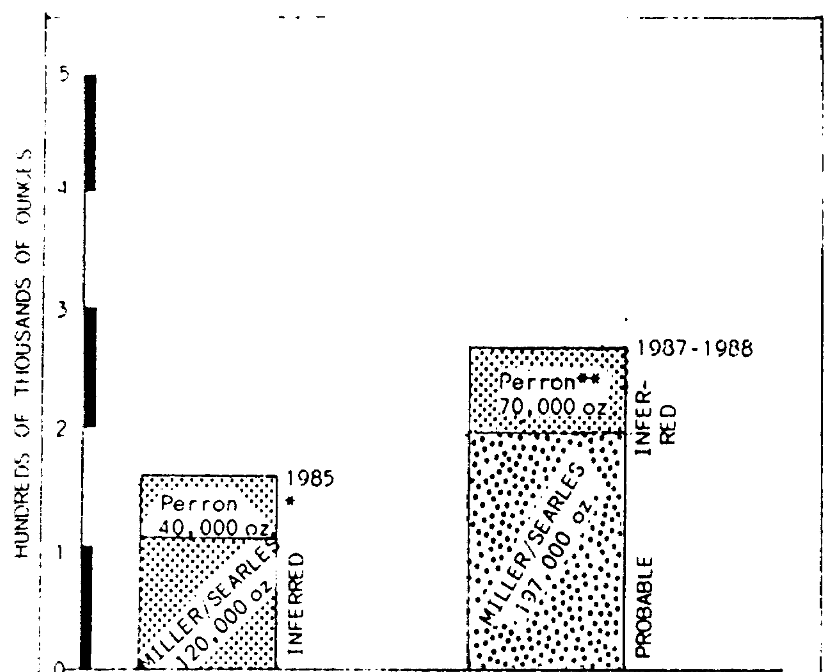
TONNAGE INCREASE

JOINT VENTURE RESERVES

(NORTEK SHENANDOAH/MILLER)

* Original Estimate Included Perron Property, Then Under Lease.

**Perron Not Included In Joint Venture Partners At This Time.



GOLD RESERVES INCREASE

JOINT VENTURE GOLD RESERVES

0.2 INCREASE IN MINEABLE TONNAGE:

From:	Miller/Searles	378,000 NT	
	Perron	122,000 NT	
	Total	500,000 NT	
TO:			
	Miller/Searles	588,000 NT	(+ 55.6%)
	Perron (*)	220,000 NT	(+ 80.3%)
	Total	808,000 NT	(+ 62.0%)

(*) Results of Perrons' latest field program.

0.3 INCREASE IN GOLD RESERVES

From:	Miller/Searles	120,000 oz.	
	Perron	40,000 oz.	
	Total	160,000 oz.	
TO:			
	Miller/Searles	197,000 oz.	(+ 64.2%)
	Perron (*)	70,000 oz.	(+ 75.0%)
	Total	267,000 oz.	(+ 66.8%)

0.4 INCREASE IN GOLD GRADE

From: 0.32 oz/NT

TO: 0.335 oz/NT (+ 1.1%)

0.5 PROCESSING TESTS

Processing tests on the 600 kg bulk sample show that adequate flow sheet selection would lead to potentially economic gold recoveries in excess of 97%.

0.6 FUTURE COURSE OF ACTION

A PHASE 2 Field Program has been prepared. It is estimated at $860,000 and would provide the following principle results:

A. Add additional reserves in the Vein # 1 system

B. Define probable reserves of the D-Vein and Miller North

C. Conduct a limited contract mine ramp development to provide representative bulk samples for detailed processing tests and establish engineering parameters to be used to complete a high degree of reliability feasibility study. These would include but not be limited to: ore grade and mineability factors; production mining design factors and equipment limitations; rock mechanics parameters; and general ground control and hydrology.

0.7 ASSESSMENT WORK

This study contains also a proposal for required assessment work to keep the claims located in Boston and McElroy Townships in good standing, as well as an alternate exploration program, which might be conducted outside the framework of the current Joint Venture, if financing possibilities arose.

1.0 REGIONAL GEOLOGY OF THE AREA DOMINATED BY THE ROUND LAKE BATHOLITH

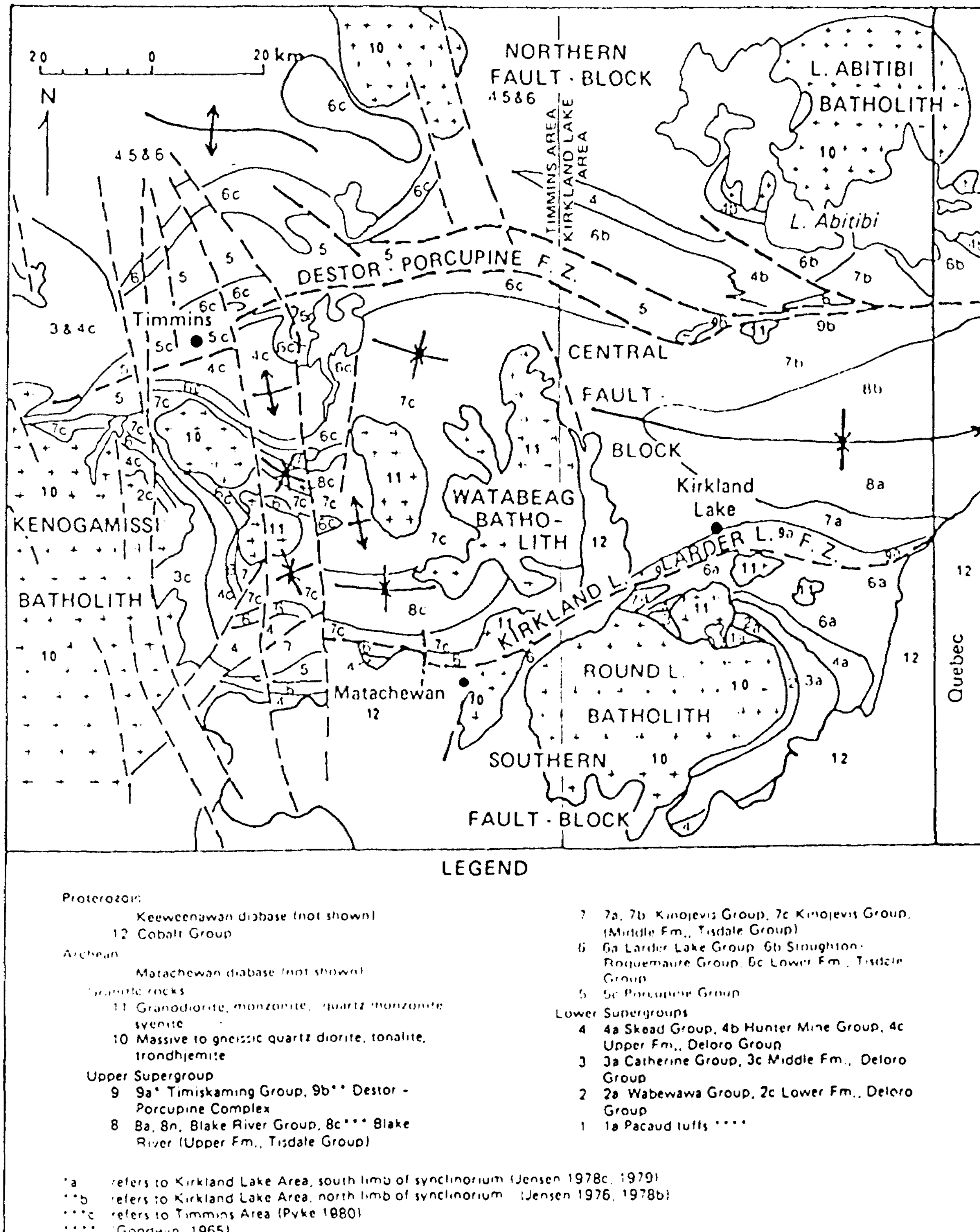


Figure 1-1. Geological map of the Timmins - Kirkland Lake area.

The preceding Geological Map(Figure 1-1) provides a regional generalized overview of the dominant geological features. Our principle area of interest lies in the Southern Fault Block, adjacent to the north east flank of the Round Lake Batholith (defined as Archean 10 tonalite and trondhjemite). As with all areas that have a significant geological interest, with time the original geological nomenclature is revised. A correlation chart listing the formations original naming system through today is included as Figure 1-2.

Specific area Geological Maps No.-1950-3, 'Township of McElroy' and Map No. 1957-4, 'Boston Township and Part of Pacaud Township' provide more details of the specific area of evaluation. See correlation chart for name changes.

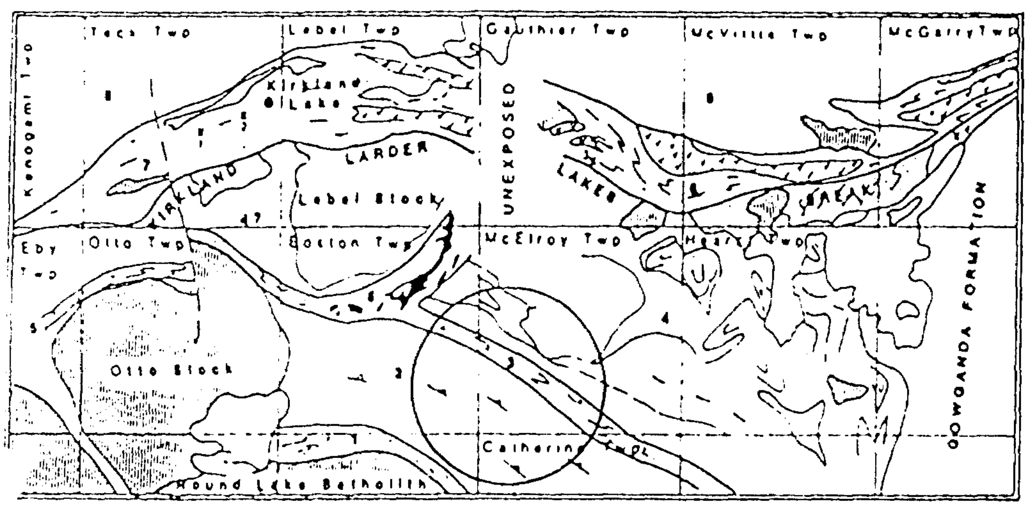


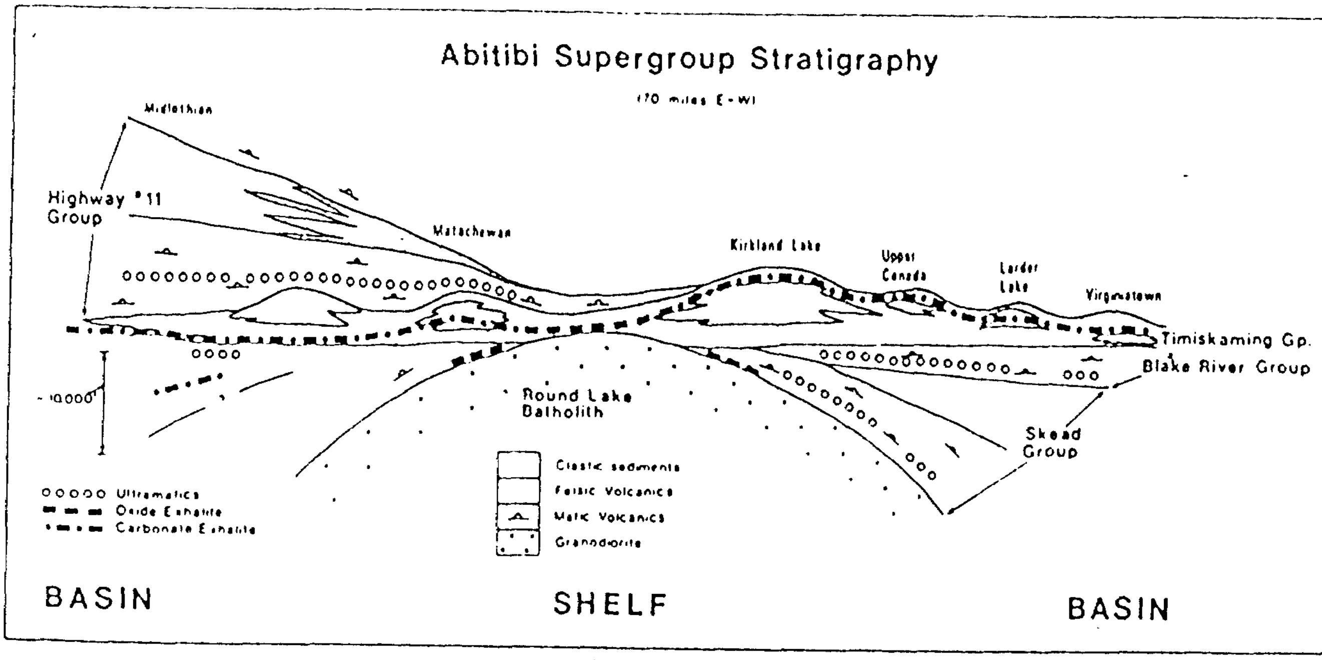
Figure 1-3. Sketch map of the litho-structural subdivisions in the SW Abitibi belt. Ornamentation: stippled - Pre-Timiskaming sedimentary rocks; hatchured - intrusions; "V" pattern - trachytes; solid - Boston Iron Formation. Operation x mines: 1 - Macassa; 2 - Lakeshore; 3 - McBean; 4 - Kerr Addison. Township boundaries are 10 km apart. (Toogood, 1986).

Figure 1-3. Area within circle defines the limits of property ownership.

As shown in the above Figure 1-3 - the area of interest is located in the Boston, McElroy, Pacaud, Catharine Townships concentrically disposed away from the Round Lake Batholith. For reference, the operating mines of the Kirkland area are also shown. Our interest will be confined within domains 1, 2, 3 & 4, as shown on the above Figure 1-3.

The area of interest is dominated by ultramafic and felsic lavas with significant zones of tholeiitic and calc-alkalic mafic volcanic rocks. Intercalated with the volcanic rocks(specifically in McElroy Twp.) are subordinate sedimentary units. All of these assemblages have been invaded by a multitude of andesite and syenite stocks, sills and dikes.

Very low grade regional metamorphism is ubiquitous. Deformation is widespread and is most commonly evidenced by moderate to steep dipping beds. Isoclinal folding and penetrative planar and linear fabrics are well developed. The granitoid and felsic stocks and dikes all appear to have been injected parallel to tension and on shear resulting from the compressional stage of the Round Lake Batholith.



(After R.H.Ridler GSC 1976)

Figure 1-4.

1.1 TECTONIC FRAMEWORK

The Timmins-Kirkland Area may be subdivided into eight domains which have definitive lithological associations and structural imprints. Some of these domains are narrow panels representing high strain or deformation zones(domains 1, 3, 5 and 7) which separate larger and less strongly deformed crustal blocks. See Figure 1-3.

Lower Supergroups (Keewatin)

Domain 1: A narrow zone, a few hundred metres wide, of intensely foliated and altered rocks surrounds the Round Lake Batholith and the steeply dipping transposition foliation is co-planar with the gneissic banding along the contact of the intrusion. This deformation zone corresponds to the Pacaud Tuffs.

Domain 2: North and east of domain 1 is a succession of mafic lavas with komatiitic and tholeiitic affinities which mostly face and dip uniformly outwards from the batholith. No major folds or pervasive foliations are visible in this domain. The volcanic rocks belong to the Wabewawa and Catherine Groups. The area is strongly faulted by both shear and tension folds; owing to the scale of Figure 1-3, the numerous granitoid bodies injected parallel to the fold system can not be shown. See detailed Site Geological Maps attached in the sections containing the property descriptions.

Domain 3: Between domains 2 and 4 is a narrow, northwest-trending deformation zone containing a sub-vertical transposition foliation together with extensive carbonate alteration products. Domain 3 merges with domain 5 near the Adams Iron Ore Mine. For the most part this domain falls within units mapped as part of the Skead Group Volcanics. It is thought to be the surface expression of a rapidly filling basin. See Figure 1-4

Domain 4: Lithologically distinct from the monotonous sequence of mafic lavas in domain 2 is a heterogeneous assemblage of ultramafic to felsic volcanic rocks together with their plutonic equivalents and considerable intercalated clastic sediments all belonging to the Larder Lake and Skead Groups which constitute domain 4. In contrast to domain 2 these units exhibit large scale fold·interference patterns resulting from the overprinting of a north-northwest-trending isoclinal fold set by northeasterly trending tight-to-isoclinal folds. In both cases the folding is associated with steeply dipping foliations and steeply plunging lineations. This domain is the last of the specific groups within the area of interest. The remaining domains are included for completeness of definition only. As you can see from the correlation chart, the area of interest does not contain extensive exposures beyond Keewatin-Early Pre-Cambrian, except for the numerous granitoid intrusions.

Domain 5: This deformation zone attains a maximum width of 1.5 km east of the Lebel Stock. Westwards from here it becomes narrower, merges with domain 3 and curves north of the Otto Stock. The domain contains a subvertical transposition foliation, mylonites, talc chlorite schsists and an isoclinally folded banded iron formation(Boston Iron Formation). Assemblages in this domain have been placed in the Larder Lake and Skead Groups.

Timiskaming Group

Timiskaming sedimentary rocks generally strike east, have steep dips and face south. Marked facies changes and variations in deformation patterns between the

Timiskaming in Teck and Kenogami Townships in the west and Gauthier, McVittie and McGarry Townships in the east allow the subdivision of the belt into two domains.

Domain 6: The southern contact of this deformation zone with domain 4 occurs at the Kirkland-Larder Lake Break while the northern contact with domain 8 is faulted. Between two and three foliations are strongly developed in this domain and are related to right-lateral, strike slip movement in a shear zone associated with the formation of the Break. These foliations include classic shear-related S-C fabrics present in discrete linear zones, the most prominent of which coincides with the Break itself and a more commonly encountered northeasterly trending younger overprint. Carbonatization and silicification are locally intense. The relationship between high strain domains 5 and 6 is obscured by glaciofluvial deposits.

The Timiskaming lithologies are characterized by graded-bedded greywackes, minor conglomerate horizons and laterally extensive trachyte flows.

Domain 7: The domain limits are the same as those for domain 6 except that the northern faulted contact gives way to an unconformity at three localities. Deformation throughout the domain is weak and only the younger northeast trending foliation is penetratively developed. A panel within the Timiskaming, bounded by the Kirkland Lake Main Break and the Murdock Creek Fault Zone, is non-foliated. The dominant facies are conglomerates, current bedded sandstones and subordinate pyroclastic units.

Domain 8: The Timiskaming in both domains 6 and 7 is bounded to the north by mafic volcanic assemblages and minor felsic volcanic rocks of the Kinojevis and Blake River Groups that extend northwards into the central Abitibi. Deformation in this extensive domain is weak and there appear to be no penetratively developed foliations.

1.2 REGIONAL STRATIGRAPHIC FEATURES

A consistent shelf to basin tectonic pattern is symmetrically disposed about the presumed Round Lake Batholith basement diapir(Ridler, 1976). Consider:

a) The enormous increase in stratigraphic thickness and complexity on either side of the "divide."

b) Distal oxide exhalite on the basement uplift; carbonate and sulphide in the basin, in part proximal.

c) Distal volcanics on the shelf; large volcanoes in the basins.

d) No known or apparent basement massifs in the basins.

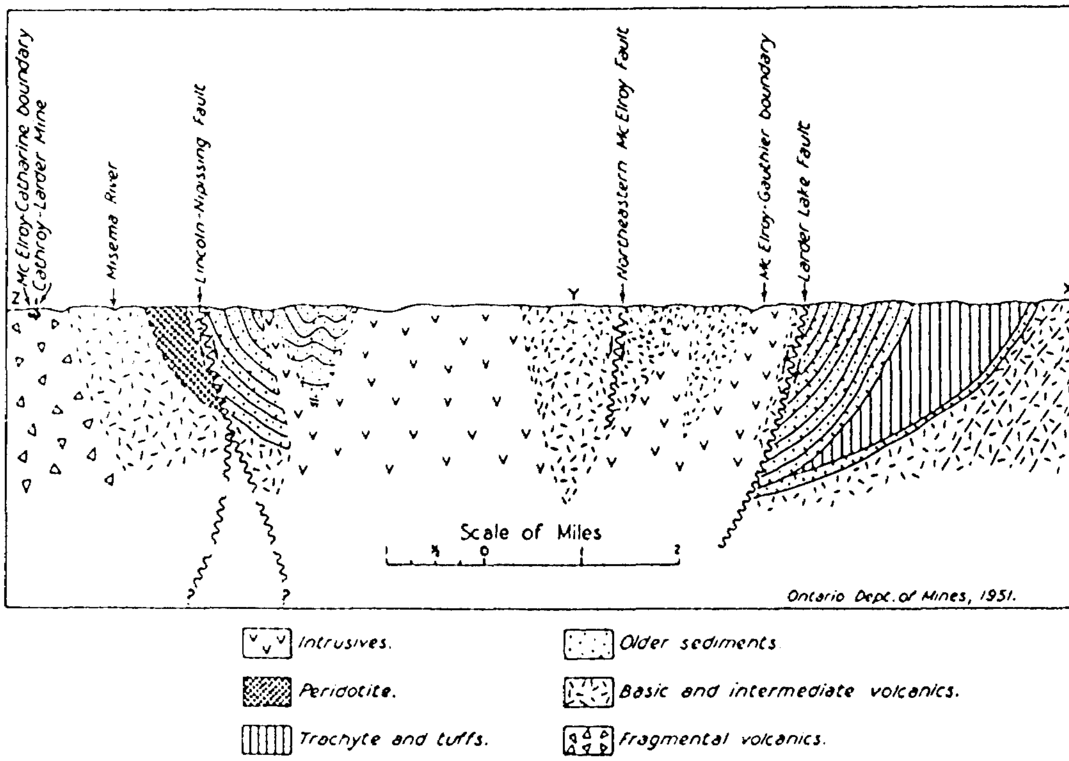
e) Alkaline volcanism(Kirkland Lake, Matachewan) on the shelf, calc-alkaline in the basins and,

f) A paleocurrent sense flowing eastward away from the "divide" in the Timiskaming clastic sediments of the Kirkland Lake area.

1.2.1 Site Specific Stratigraphic Features.

Specifically, stratigraphic analysis of the area controlled by Nortek / Shenandoah/Miller suggests that a symmetrical shelf to the basin facies is transitional about the basement high centered on the Round Lake Batholith(see Figure 1-4).

The tectonically controlled distribution of felsic eruptive centers with associated differential subsidence leading to basin development is well shown in an analysis of a section from the Round Lake Batholith northeast toward the Misema River and the syenite stocks(11) centered in this basin. This is viewed as the prime cause of the sequential arrangement of mafic to felsic volcanic sequences and associated clastic metasediments and iron formations. The main periods of basin subsidence were broadly synchronous with the felsic eruptions. The development of steep transport gradients promoted clastic sedimentation. The felsic pyroclastic piles provided local detrital sources(see photos page). The banded iron formations to the northwest in the basin is attributed to volcanic exhalative origin and is transitional from volcanic to clastic sedimentary associations, thereby demonstrating the essential contemporaneity of volcanism and sedimentation. Overall, the presence and source of this volcano-tectonic basin, between the Round Lake Batholith and the Kirkland-Larder Lake Break to the north, is only hinted at by earlier geological papers.



—Diagrammatic structure section across McElroy township and part of Gauthier, Larder Lake area.

Figure 1-5.

The 59th Annual Report, Vol. LIX, Part VI, 1950 by Abraham, has the preceding (Figure 1-5) cross-section taken east of the major subsiding area centered on the felsic eruptive centers. The northwest trending mafic volcanic band(sometimes referred to as a lapolith) roughly parallels the resulting large depressions produced by regional crustal subsidence and by collapse brought about by eruption of large quantities of magma associated with felsic eruptions(Adams iron ore deposits centered in these depressions during periods of quiet volcanic activity).

1.3 SITE SPECIFIC GEOLOGY

Domain 2 contains all of the joint ventures(Nortek, Shenandoah, Miller) drilled ore bodies.

1.3.1 Greenstones

The original stratigraphic sections were a world of undifferentiated understatement. These sections mapped, usually green in color, constituted a "huge" segment of the Keewatin, as basic and intermediate volcanic rocks. If this were all that was needed to classify igneous rocks, we might only have three or four rock types. As it was, this group included all the rocks from andesite to basalt or diabase in their composition, including and undifferentiating their metamorphic equivalents and flow breccias. The features, they had in common, were mostly dark-green commonly referred to as "greenstones". They included a group of mostly massive from fine to coarse-grained rocks. The finer grained varieties might contain vesicles, amygdules, variolites and pillows. The coarse grained might include diorites, diabase and gabbroic lavas. A notably poor mapping job included Catharine Township using this nomenclature system. Unfortunately, all of Searles and the Kennedy properties are in Catharine Township. Mapping improved, ever so slightly, and the Townships of McElroy, Pacaud and Boston were geologically mapped. All of the areas covered by Shenandoah/Miller-Independence claims are now mapped as Keewatin, Basic or Intermediate Volcanics, largely undifferentiated. Only the intrusive granitoids were separated and over 50% of their occurrences were not mapped, including their structural implications. Next, a broad area geological map called all of these metavolcanics, which was understood to include both intermediate and mafic metavolcanics.

1.3.2 Basalts

For the most part, the Miller-Independence ore body is contained within basalts (probably tholeiitic basalts). For our purposes, this is: "poor in or lacking olivine and containing minor quartz with a diabase being a coarse-grained equivalent." Major minerals are calcic plagioclase and augite. The term "tholeiite" was first used in 1840 by Steininger for naming basaltic rocks near Tholey, Saarland, Germany (American Geological Institute Glossary 1970). However, the term "tholeiite" did not receive prominence until Kennedy(1933) and Tilley(1950) applied the term to a magma type. Reviews of this historical development concerning the use of "tholeiite" to refer to a saturated to oversaturated magma series showing an iron enrichment trend, have been given by Turner and Verhoogen(1960), Barth

(1962), Wilkinson (1967), and Irvine and Baragar(1971).

Since 1970, many major element classifications of volcanic rocks have been proposed to distinguish the tholeiitic rocks from the alkaline volcanic and calc-alkalic volcanic rocks, and also to distinguish tholeiitic rocks from different tectonic environments(Irvine and Baragar 1971; Middlemost 1972, 1974, 1975; Pearce 1974; Miyashiro 1974, 1975; Jolly 1975; Church 1975; Le Maitra 1976, Jensen 1976a; Delong and Hoffman 1975; Johnson 1979). Examinations of all these classifications are beyond this scope.

1.3.2.1 Field and Petrographic Characteristics Of The Exposed Mafic Domain 2 Rocks.

Detailed descriptions of the tholeiitic volcanic rock types in parts of the Kirkland Lake area have been made by Jensen(1978a, 1978b) and Jackson (1980). Much of the description of tholeiitic lavas will be done in terms of the mineral morphologies within them in order to interpret their cooling histories and modes of extrusion.

Magnesium-rich tholeiitic basalts are dark green to grey, or light green to grey, on weathered and fresh surfaces. These rocks occur as tabular flows, pillowed lavas, and pillow-breccias. The tabular flows are 1 to 100 m thick. The thicker flows can be traced along strike for several kilometeres in areas where bedrock is well exposed. In places, the tabular flows can grade into pillowed lavas either along strike, or vertically.

The pillows are 30 to 150 cm in diameter and have dark green, deeply weathered selvages 1 to 3 cm thick. Pillowed flows form mappable units 10 to 600 m thick, which can be traced up to several kilometres where well exposed. The pillows may be closely packed, or they may be separated from one another by thick zones of hyaloclastite. In places, the pillows may be extensively fractured so that they can be described as pillow breccias. The fragments of pillows occurred in a hyaloclastic matrix composed of fine-grained chloritized glass globules and shards.

Magnesium-rich tholeiitic basalt consists of 30 to 40% augite and 50 to 60% plagioclase(An_{55} to An_{70}). Magnetite, ilmenite, and sulphide grains form the remaining 1 to 3% of the rock. Some thick flows contain sparse enstatite phenocrysts, 0.5 to 1 cm in size altered to bastite, antigorite, and talc and, in other flows light, yellowish green to white phenocrysts of plagioclase, 0.5 to 3 cm across are present(Pearce and Birkett 1974; Jensen 1978a). The feldspar phenocrysts can form 0.5 to 15% of the rock, and are seen in the coarser grained sections throughout the flow, including the fine-grained top and selvage; this suggests that the phenocrysts were formed at depth and then transported to surface. Flows with feldspar phenocrysts similar to those above have been described in other greenstone terrains by Green(1975), and in ocean-floor basalts with similar chemical compositions by Langmuir et al.(1977) and Rhodes et al.(1979).

Grains of plagioclase, clinopyroxene, and magnetite in the flow-tops and near the margins of pillows are small, and have spherulitic or dendritic habits. Without detailed chemical analysis differentiating the tholeiitic basalts from calc-alkaline or komatiitic is impossible. The family cation diagram involving percentages of Al_2O_3, $FeO + Fe_2O_3 + TiO_2$ and MgO is as follows:

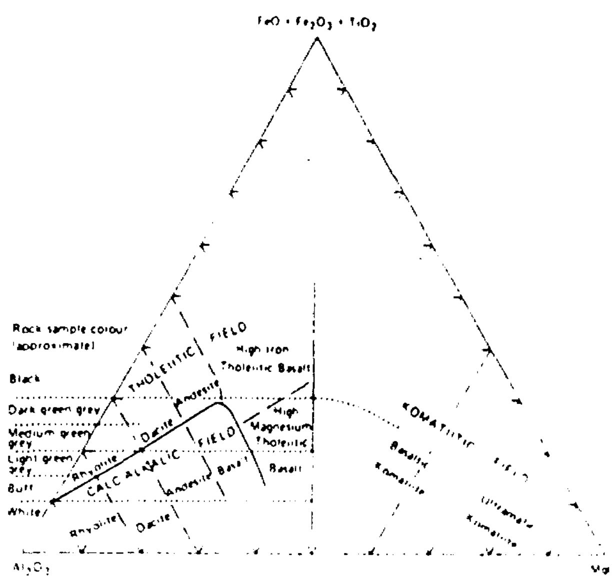


Figure 1-6

The basalts exposed, adjacent to the mineralized zone outcrop and the cabin, exhibit a pillow flow character. This stratigraphic zone dips under to the north and the further north one traverses, the rock changes from a pillow flow to a fine-grained basalt to a diabasic textured basalt(about N-87-6) to a gabbroic textured basalt(near the Pacaud Township line). See the following diagram.

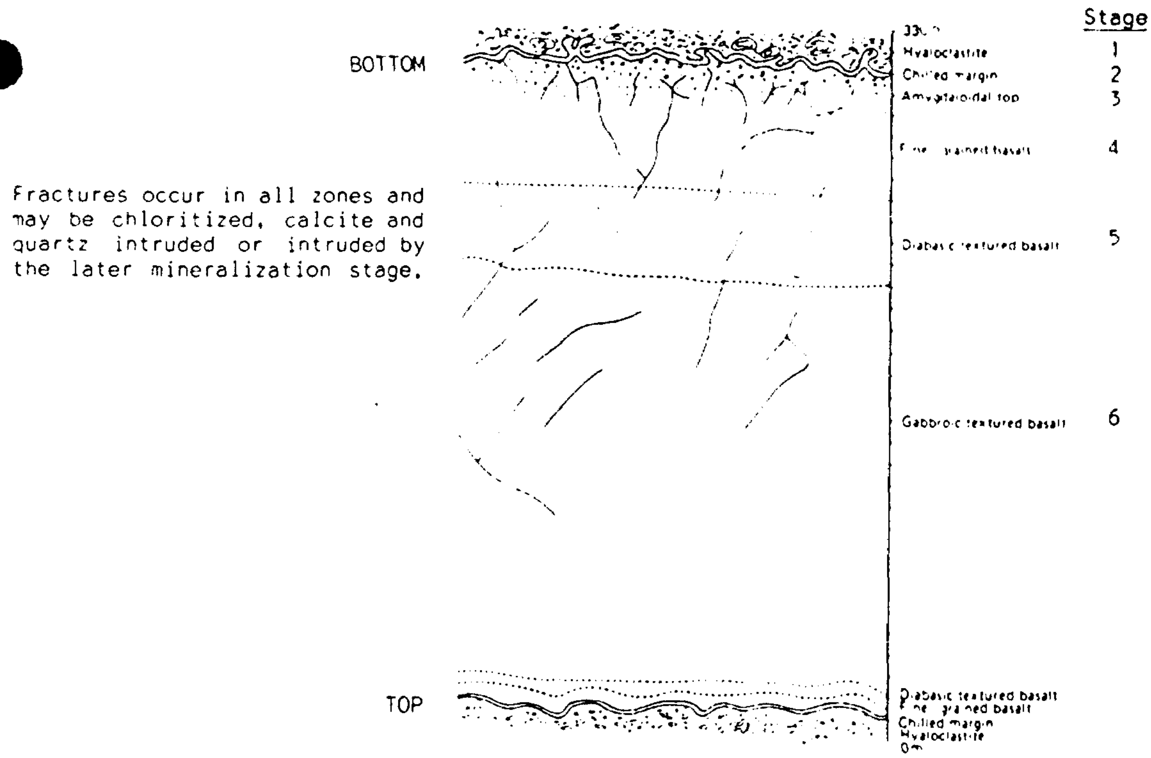


Figure 1-7

Since the mineralized zone on exposure is confined to the pillow basalts, we will look further into their character.

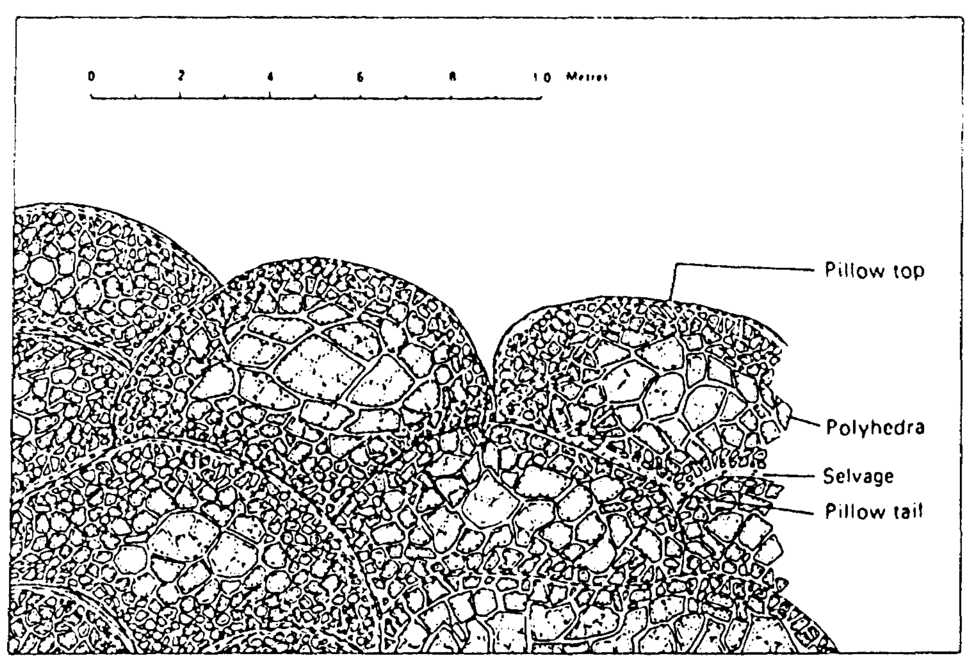


Figure 1-8

1.3.2.2 Pillows And Lava Toes (Map and Log Defined as Stage 1).

Controversy, over the definition and manner of formation of pillows, has existed in geological literature for a considerable time. In 1938 Stark reported the occurrence of ellipsoidal structures within subaerial lavas of Borabora, Society Islands and he used the term "pillow" to describe these structures. Immediately, he was criticized by McKinstry(1939), who pointed out that the structures were in fact pahoehoe lava toes, and suggested that a clear distinction be made between such structures that form by a bulbous-budding mechanism, and what he called "ordinary or typical pillows". He described as typical pillows examples from the Porcupine District, Ontario, and emphasized their discrete, ball-like form. A short time earlier Stearnes(1937) had defined pillows as "...spheroidal and ellipsoidal ball-like masses of lava, coated with glass and generally detached from one another". More recently Snyder and Fraser(1963) in a review of recent literature on pillow lavas concluded that a distinction between pillows and pahoehoe structures should be made.

These ideas were critized by Jones(1968), who suggested that the majority of ellipsoidal structures in submarine lavas have the morphology of lava toes and are formed by a budding mechanism; and in the next five years several more papers have appeared in which the terms "pillow" or "elongate pillow" are applied to toe-like structures within submarine lavas(Moore 1970; Moore et al 1973a; Arculus 1973).

The term pillow is now used to describe two distinctly different types of structure: "true" or "discrete" pillows, which are ellipsoidal sacs of lava, completely separated from one another; and lava toes. This situation is well illustrated in Catharine & Pacaud Townships where both types of structure have been mapped.

1.3.2.3 Pillows In Tholeiitic Basalts.

Although, it is not possible to determine the overall morphology of these structures, in many cases a three dimensional exposure is present and in such cases the discrete, ball-like form of the tholeiitic pillows is apparent. These structures range in diameter from 10 cm to more than 2 metres. Their upper surfaces are convex and their lower surfaces are moulded so as to conform to the shape of underlying pillows. Fine-grained hyaloclastite or clastic sedimentary material may be present in interstices between pillows. Glassy rims or selvages ranging in thickness from 2 to 6 cm completely enclose each pillow; no budding or branching, or connections between pillows have been observed.

Photo-1

Typical Pillow Lava Exposure.

The interstices between the pillows are filled with chert, quartz, carbonate or sulphides locally, but more commonly they are devitrified. In the thicker flows, the pillows grade downward (or upward) into coarser grained lava, which for the most part has a diabasic texture, although invariably completely altered. This grades rapidly into dense fine-grained material at the base of the flow. Amygdules may occur in this fine-grained phase. The tops of many flows are composed of thin breccias, consisting of fine-grained, devitrified lava fragments imbedded in a matrix of the same type. The flow-top breccias may be used to determine the tops of flows, although it is not always easy to establish whether the breccia belongs to the flow on the one or the other side. In some flows, the surface of the flow is made up of pillows, on others, the flow-top breccia forms the surface, and pillows, if they occur, lie below it.

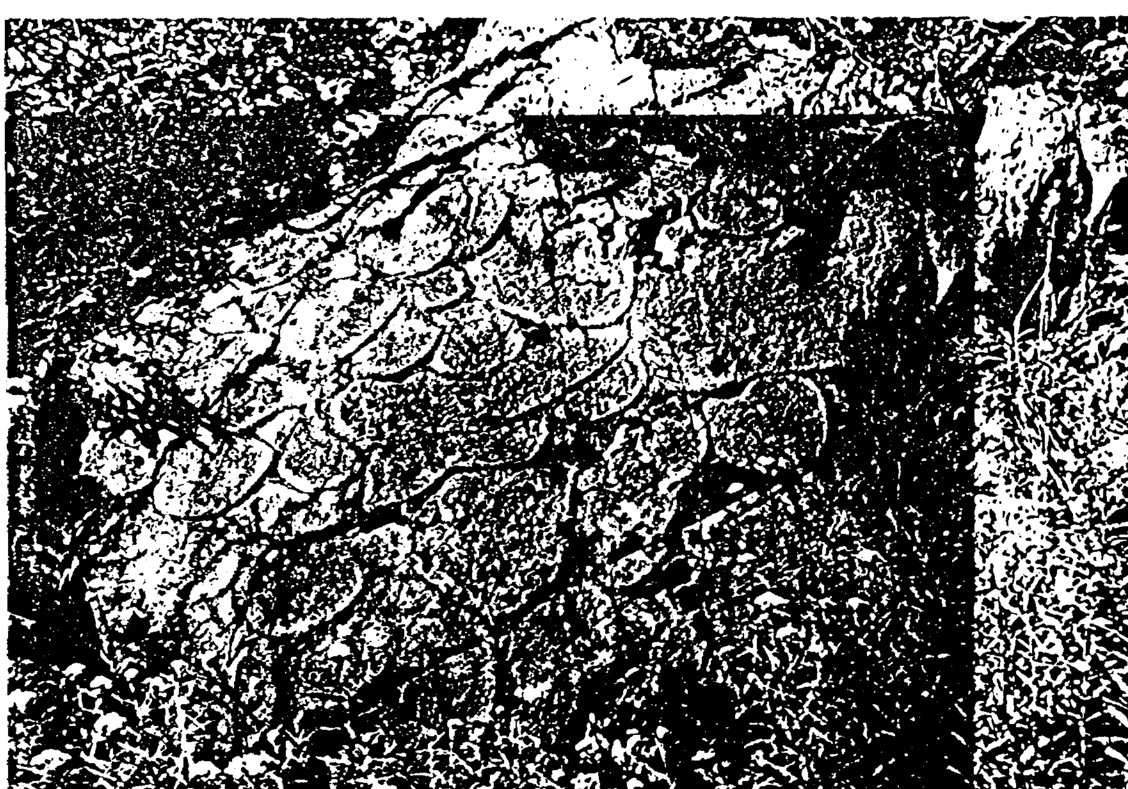
Fine-grained dacite cutting thru the earlier formed basalt pillow lava. Actual dacite width, about 12 inches.

Photo-2

Elongated pillows with flow direction roughly parallel to injected dike. (Stage 1).

Both sea water and burial metamporphism creates chlorite altered zones on the pillows.

Photo-3



Extensive pillows showing later developed joint patterns, secondary selvages growing inward. Note pillow sac-like form, as well as obvious direction of flow shown by elongation.

The process envisioned for the development of pillows involves extrusion of a massive, mobile lava flow. During flowage, or following the cessation of movement, selvages grow downwards from the top of the flow and divide the massive lava into a large number of ellipsoidal cells. In some cases selvage formation is arrested before completion and only the upper part of the flow becomes pillowed. In other cases the process goes to completion and the entire flow becomes pillowed. Pillows, once they form by this process, may become separated from the flow. Sediment may be incorporated between the pillows at this stage, or the pillows may break up and a pillow breccia or hyaloclastite may form.

The mechanism of selvage growth is not understood. Certainly the process is triggered and motivated by the chilling effect of seawater, but the actual mechanism involved is a matter for speculation.

Osborn(1949) compared pillows in lavas with cells formed within synthetic glasses. These cells develop when a large volume of molten glass is poured into a metal trough. Their formation apparently is triggered by the chilling effect of the cool metal. Osborn explained the formation of the cells in the synthetic glasses, and pillows in lavas by the action of short-lived convection cells which operate during the cooling of molten material. Selvages or cell margins form at the margins of the convection cells as a result of chilling of the cooler downgoing material.

The formation of pillows may alternatively be analagous to the development of droplets of one liquid in emulsion within another. Under some conditions emulsions form spontaneously between two immiscible liquids: The process involved may be similar in some respects to that which leads to the formation of pillows.

It is quite apparent that these explanations are highly speculative. The process of selvage growth within massive lava to produce pillows is strongly supported by field evidence, but more work and imaginative thought is required before the mechanisms involved will be understood.

1.3.3 Clastic Flows

Higher in the geological section, but still within the undifferentiated Basic and Intermediate Volcanic Rocks is a mappable NW trending Fragmental Meta-Clastic Flow, as shown on the following photo.

Photo-4

Clastic Intermediate Volcanic Flow.
Note: Glacial stria - actual direction of ice is S 10° E.

Photo-5

Additional photo of Intermediate Volcanic Clastic Flow showing large size of included fragments and effect of glacial scour, as well as the fresh character of the nearly unweathered surface. Note: Secondary jointing developed on or after cooling.

2.0 GOLD MINERALIZATION GENERALIZATIONS

1. Vertically all the gold mineralization is hosted by tholeiitic and komatitic basalt flow units.

2. Whether the wallrocks are mafic or ultramafic, they have been effected by carbonate alteration.

3. Quartz feldspar porphyry or porphyritic andesite(same material) intrusions are present to bound all mineralized zones.

4. The auriferous alteration quartz veins cut the porphyry intrusive bodies.

5. Porosity of the original basalts, such as hiatus formed re-worked (now loss circulation) zones, define the mineralized zones and may have provided the original plumbing.

2.1 ROCK ALTERATION GENERALIZATIONS

2.1.1. Burial Metamorphism

The earliest hydrothermal event to have effected the basaltic rocks resulted from lower temperature(less than 300°C) sea water/rock interaction. Some evidence besides the pillow edge chloritization is the presence of calcite and quartz, which fills primary porosity(vesicles) in the basalt flows. The absence of zeolites or clay can be attributed to greenschist regional metamorphic overprint.

2.1.2. Contact Metamorphism

The greenschist metamorphic assemblages formed during the intrusion of the Kenoran aged granitoid bodies(north of holes N-87-5 and N-87-4). This greenschist facies consists of chlorite, epidote, albite, quartz and minimal calcite. These were probably superimposed upon pre-existing seawater alteration assemblages.

2.1.3. Intense Carbonatization

This type of alteration is characterized by the development of hydrous alteration i.e., hydration of basaltic rock, marked by the formation of chlorite in veinlets and nearby replacement of rock matrix. Not present in the Boston Creek Area, but regionally common, is the intense carbonatization to produce sericite and fuchsite. These micas formed simultaneously with ferroan dolomite. Overall the carbonatization resulted from reaction with CO_2 bearing hydrothermal fluids, which gained access along regional extensive deformation zones and dispersed through the less extensive subsidiary planar zones, such as shear zones and flow contacts and pillow surfaces where a brief hiatus occurred, along quartz veins, dike contacts d unconformities, in general. Only one, of the felsic dikes drilled, showed any envelope-type alteration. Most evident is the carbonatization, which is sub-parallel to the flow tops or contacts and includes flow top breccia areas.

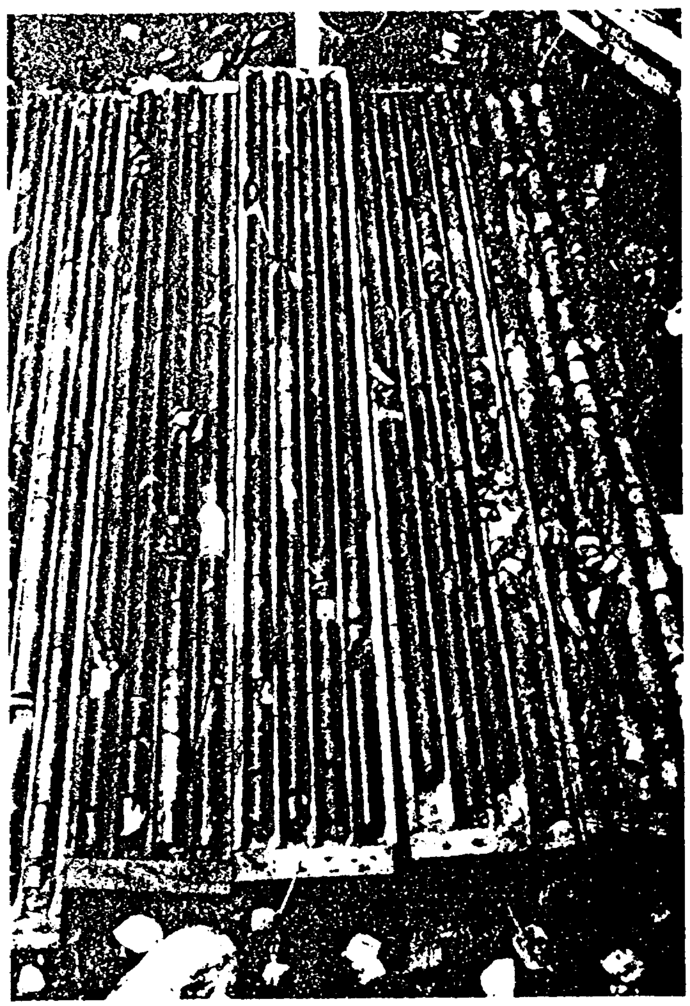
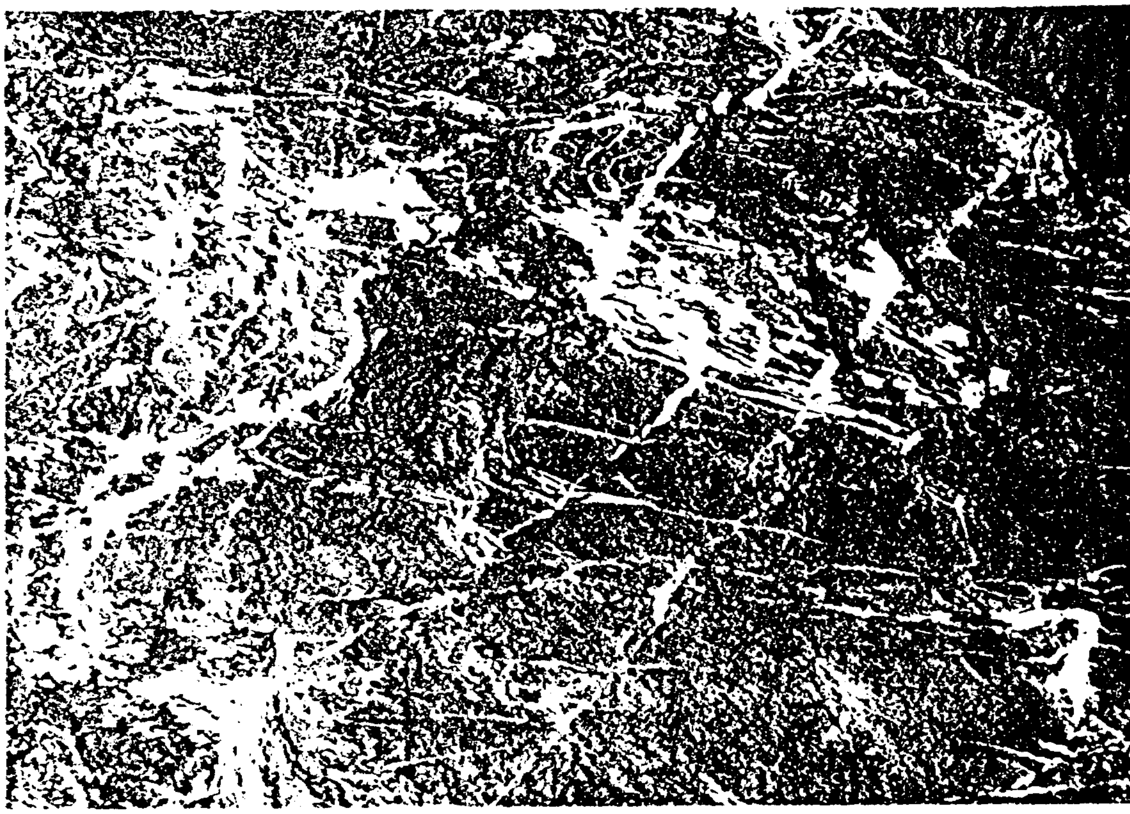


Photo-6

Drill core of Basalts, showing the numerous zones of chlorite and other greenschist metamorphic assemblages.

Note: Jasper: high angle ½" wide fracture filling; Quartz zones: 2" to 4" long and the overall extensive alteration of the original Basalt.

Photo-7



An example of intense carbonatization, green color due to Fuchsite, most white(milky) areas Quartz, all hosted by a Ferro-dolomite. This is an example of the grade of metamorphism common on the Break East of Kirkland Lake.

2.2 GOLD MINERALIZATION TIMING

The following Sequence of Geological Development provides a time frame for the gold mineralization event on the Nortek Properties. Section 1.0 should be consulted for stratigraphic sequence.

GEOLOGICAL DEVELOPMENT OF THE KIRKLAND & LARDER LAKES

OLDER

TISDALE VOLCANISM

OLDER SEDIMENTATION

ROTATION OF STRATA INTO SUBVERTICAL ATTITUDES ON LISTRIC NORMAL FAULTS

YOUNGER SEDIMENTATION

LARGE FOLDS WITH NW AXIAL STRUCTURES

MAIN FAULTS AND SYNCLINE/ANTICLINAL STRUCTURES

PORPHYRY INTRUSIONS

GOLD-QUARTZ VEINS & CU-AU STOCKWORKS

"S" AND "Z" FOLDS ON NW AND SE LINEATIONS AXIAL SURFACES IN AREAS OF SIMILARLY ORIENTED FAULTS AND DEVELOPMENT OF PENETRATIVE FOLIATION, E-PLUNGING LINEATION

UNCONFORMITY

YOUNGER

CARBONATIZATION (spanning: Rotation of strata into subvertical attitudes through "S" and "Z" folds)

GOLD (spanning: Porphyry intrusions through axial surfaces in areas of similarly oriented faults)

2.3 GENERAL GEOLOGY IMPORTANT TO MINERALIZATION

The Geological Sequence defined in Section 1.0 can be summarized for the Nortek area as follows:

GENERAL GEOLOGY

1. THE SEQUENCE OF LITHOLOGIC UNITS IS CONCENTRICALLY DISPOSED AROUND THE NE SIDE OF THE ROUND LAKE BATHOLITH AND DIP AND FACE MOSTLY OUTWARDS FROM THE BATHOLITH CONTACT.

2. THE AREA REPRESENTED IS A BROAD GEO-SYNCLINAL STRUCTURE WITH THE SOUTH LIMB IN McELROY AND BOSTON TOWNSHIP AND THE HINGE IN HEARST TOWNSHIP IN THE LARDER LAKE SYNCLINE.

3. THE HINGE AREA OF THE STRUCTURE IS IN McELROY TOWNSHIP. THE FELSIC CORE OF ANTICLINE IS THE SKEAD PYROCLASTICS.

4. THE HOMOCLINAL SEQUENCE (LARDER LAKE GROUP) LOWEST MEMBER IS THE PACAUD GROUP BORDERING THE ROUND LAKE BATHOLITH.

5. THE CENTER SANK AS IT WAS FILLED RESULTING IN THE ROCKS BECOMING ROTATED TO SUBVERTICAL ATTITUDE AS THE VOLCANIC PILE GREW.

6. THE KIRKLAND-LARDER LAKE BREAK IS LOCATED ON A STRATIGRAPHIC ZONE FORMED BY VOLCANIC PROCESS IN/OR JUST BELOW THE SEA FLOOR WITH A CLOSE SPATIAL RELATIONSHIP BETWEEN CARBONATE-RICH ROCKS AND THE THIN CONTINUOUS HORIZON OF VOLCANIC ROCKS.

7. THE NEARBY ADAMS OPEN PIT IRON ORE MINE IS THE RESULT OF IRON FORMATIONS DEPOSITED AS A SHALLOW WATER FACIES OF STRATIFORM CARBONATE RICH HORIZONS.

8. OVER THE ENTIRE SEQUENCE IS AN ALKALI VOLCANIC-SEDIMENTARY CAP LOCALIZED IN THE LARGE SCALE TENSIONAL STRUCTURES.

2.3.1 Further Summary of Geological Features

It is necessary to understand the area Overall Geological Features, in order to relate to the specific mineralization exhibited in the Miller Area. These are summarized in the following two charts: 1. Overall Geological Features; and 2. The Deformation History.

OVERALL GEOLOGICAL FEATURES

1. The great thickness of volcanic section - Lack of dissemination of Au mineralization.
2. The generally low grade metamorphic features except close to the Batholith.
3. The limited depth extension of the greenstone belt.
4. Stratigraphic contacts exhibit a steep dip; Contacts parallel greenstone belts; Granitoids intrude the greenstones.
5. Over broad areas the stratigraphic topo face uniformly in one direction with short amplitude isoclinal folds. Major structures are greatly higher magnetic anomalies.
6. Folds can be traced around the hinge but facings change abruptly and units do not match on opposite sides of the axial trace.
7. There was an extremely high geothermal gradient in Archean times. The gold deposits are:
    A. Zones of intense carbonatization adjacent to porphyry intrusive bodies.
    B. Two porphyries commonly found are Quartz-Feldspar sub-alkaline and Feldspar alkalic.
    C. Gold is invariably associated with Quartz veins and Sulphide mineralization.

DEFORMATION HISTORY

1. Intrusion of the porphyries, gold mineralization and the penetrative deformation is tied to crustal melting and rise of granitoid diapirs on boundaries of greenstone belts.
2. The deposition of volcanic-sedimentary rocks was on a sialic crust in areas of high extrusional strain; Typically with normal faulting and development of folds associated with the largest faults and related to oblique slip.
3. There is progressive rotation of the strata in hanging wall blocks i.e., normal faults with curved, concave upward fault planes; The steep dip is due to rotation on faults.
4. "The Kirkland-Larder Lake Break is caused by movement on faults" with left-lateral strike slip movement.
5. The porphyry bodies are emplaced along fault zones. These fault zones and surrounding rocks are intensely hydrothermally altered and locally mineralized with gold and a penetrative foliation and lineation is developed. The batholiths represent a compressional phase.

2.4 SEQUENCE OF DEVELOPMENT OF THE 4 TOWNSHIP AREA

The following is a Petrogenesis of the development of the four township area and thus, serves to define the major events leading up to and including mineralization and beyond.

PETROGENESIS OF THE COMMON CORNER AREA OF
BOSTON, PACAUD, CATHARINE AND McELROY TOWNSHIPS

OLDEST

1) KOMATIITIC and THOLEIITIC LAVAS

thickening and subsiding by subduction and faulting central axis NW-SE in McElroy and Boston twps. above mile post II hinge NW trend on east edge of O'Donald Lake. Metamorphism of buried lavas differentials formed rising to surface.

1a) ACCUMULATION OF ADDITIONAL KOMATIITIC and THOLEIITIC ROCKS
new megacauldron marginally subsiding forming thick outward facing homoclinal successors i.e.: Round Lake Batholith. Remains of margin Pacaud Tuffs in Boston Twp. near Batholith attests to volcanic phase.

1b) SUCCEEDING MEGACAULDRONS
developed east of Round Lake Batholith and the formation of the east facing homoclinal sequence of Wabewawa-Catharine-Skead Supergroup dated 2710±2 Ma over 16 Km thickness overlaying 80% of subject area.

2) CALC-ALKALIC MAGMAS

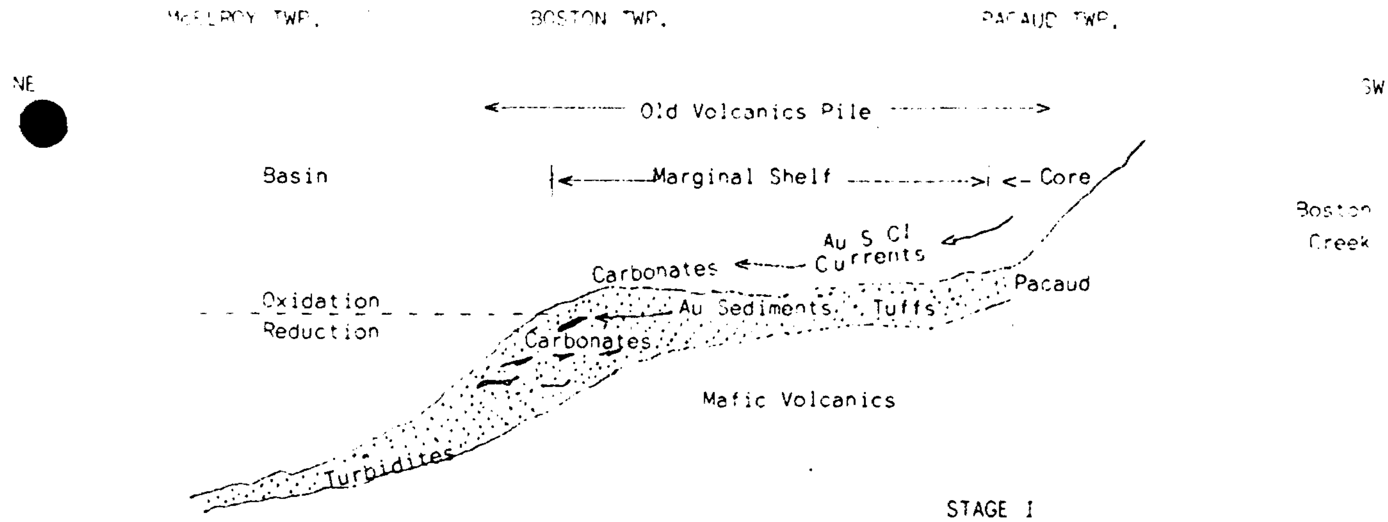
thick accumulation in center of megacauldron with continued subsidence partial melting of subducted basal calc-alkalic forming trondhjemitic magmas including cores of calc-alkalic piles. Distal calc-alkalic tuffs and sedimentary rocks deposited on margins of piles. Now the growth of core trondhjemitic rocks formed composite batholiths of low specific gravity and the central area of McElroy stopped subsiding. Instead, the denser marginal volcanics were drawn downward and inward under the batholith and margins tilted to face away from the batholith.

2a) YOUNGEST MEGACAULDRON
pyroclastic and sedimentary rocks of the Larder Lake Group formed mostly from sources to NE outside area of interest dated 2703±2 Ma say 5 Km thickness.

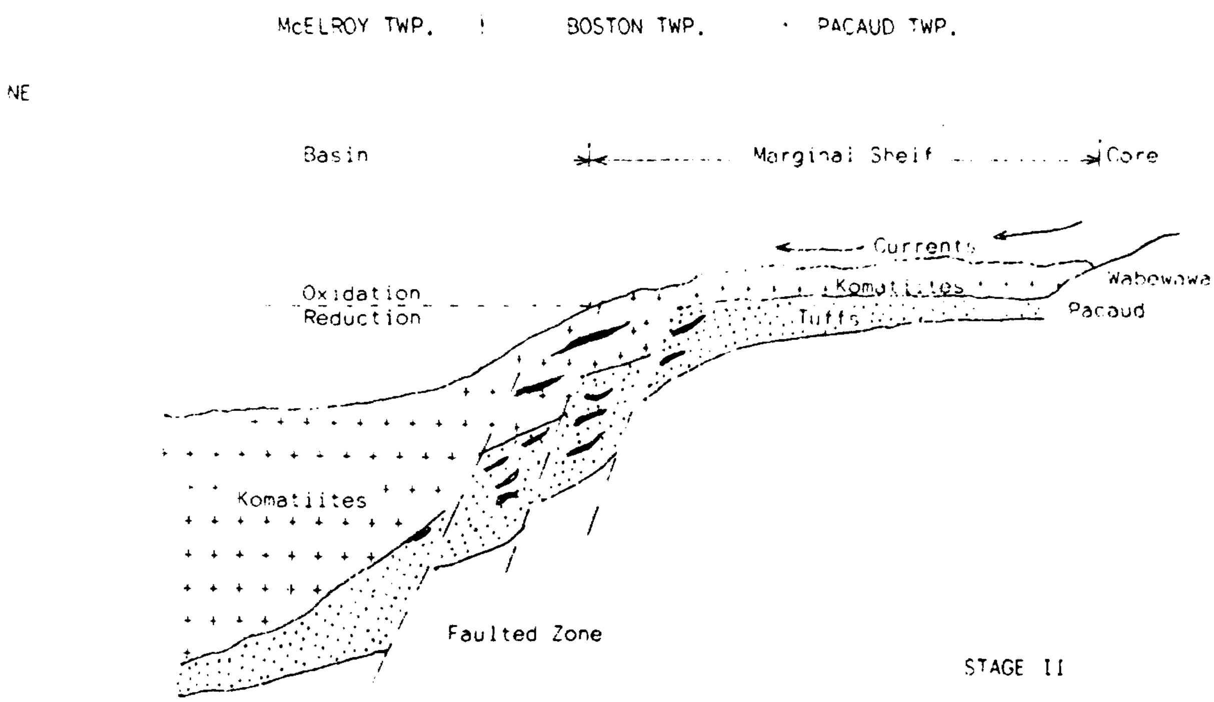
YOUNGEST

2b) FINAL MULTIPLE GRANITOID INTRUSIONS TYPICAL EXAMPLES
McElroy Batholith, Planet, Tagliamonti, Miller Independence, and other tension/shear related intrusives. Last period of high geothermal gradient downfolding and faulting injection on dilatant fracture zones.

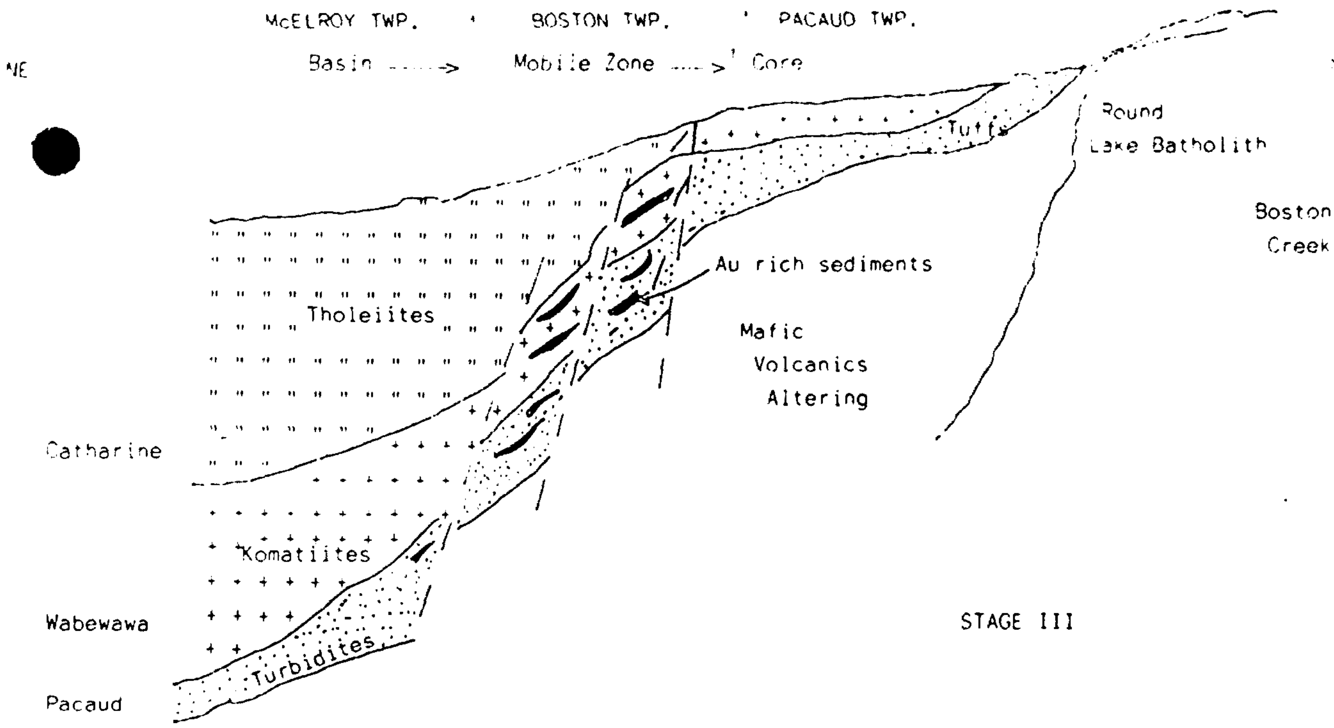
Late intrusive dikes, etc.
Lamprophyres and diabase dikes last igneous activity.



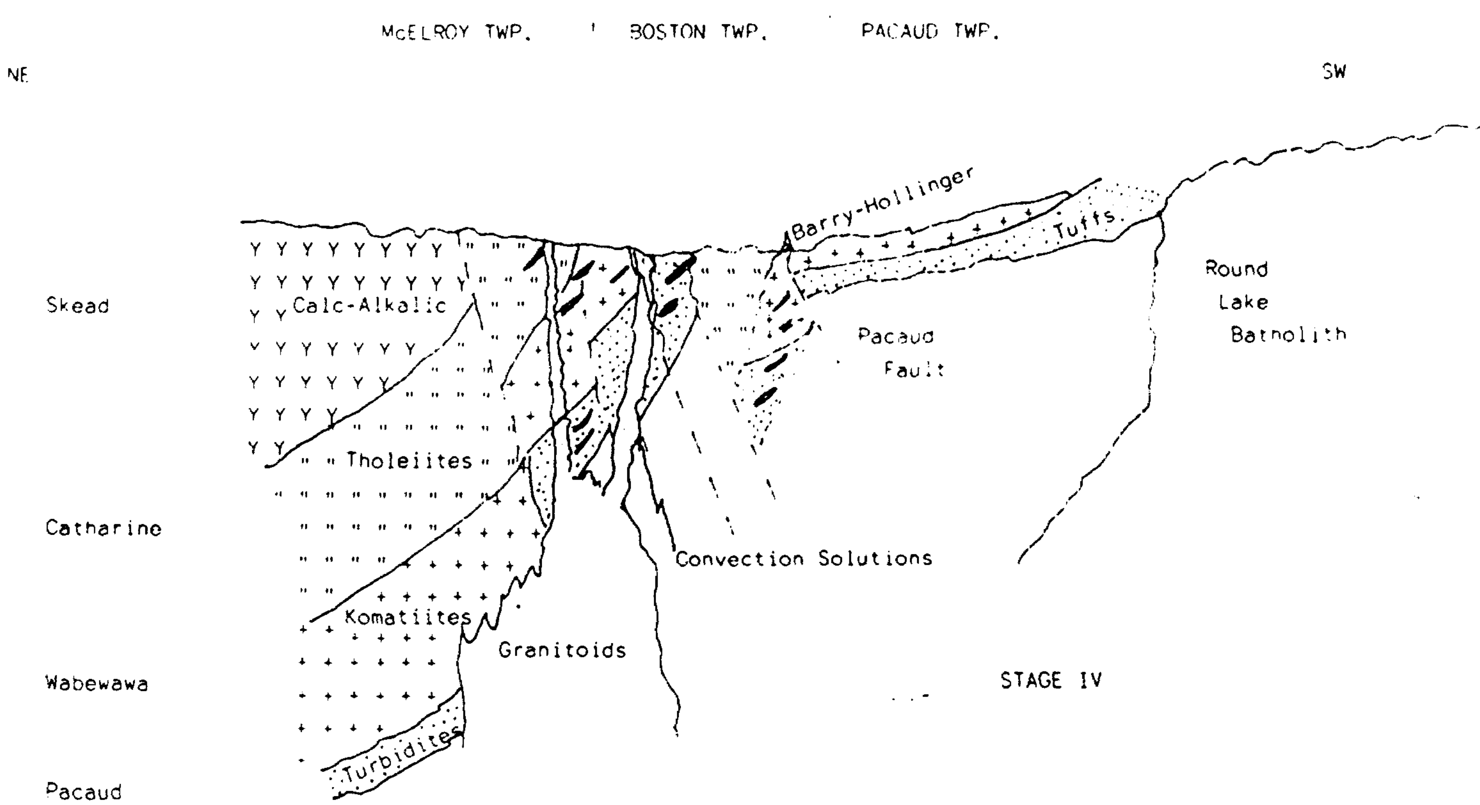
Gold originally deposited in sedimentary acid reducing environment.



Basin floor subsides as fractures form at edge of the shelf. Ultramafic and mafic flows make up komatiites. Fault zone generates peridotic magma(modified from L. S. Jensen 1980).



Filling the basin in McElroy and Boston Townships with Tholeiitic flows depresses the basin further. Movement in faults both shear and tension at edge of basin within fault movement zone east of O'Donald Lake, the ultramafic rocks are altered to serpentinite.

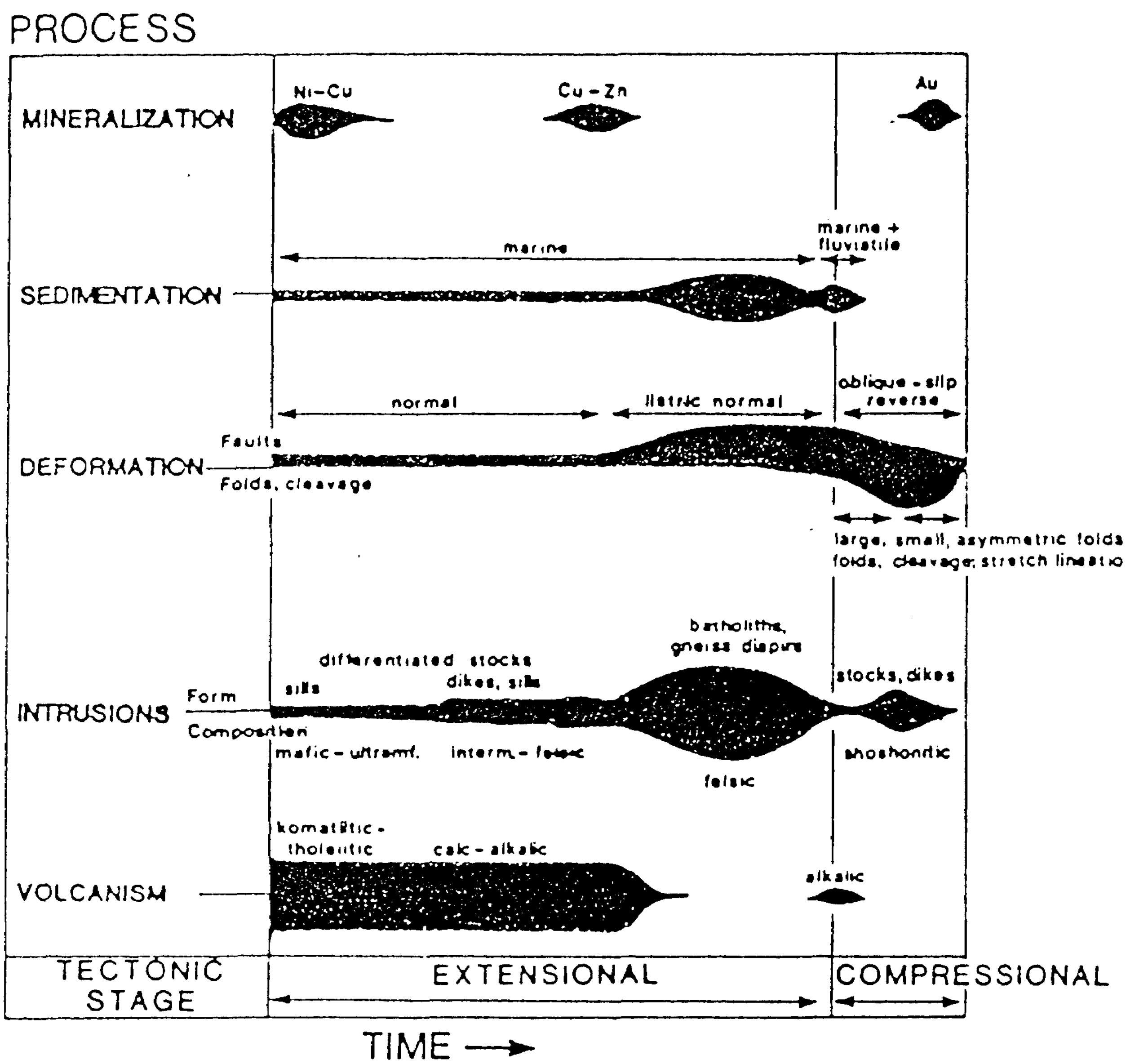


Inward collapse of volcanics toward center of basin with dilation of fault zone(tension faults not shown preceding view). Pressure at depth causes melting of felsic magma which intrudes upper rocks and re-distributes Au, SiO_2, CO_2 and H_2O thus producing Au in and near granite intrusions. Heat from granitic magma(geothermal gradient) drives Si-CO_2-S-Au rich solutions upward into tholeiite flows to form quartz carbonate veins in fractures or silicified and carbonatized zones. Gold which was in sedimentary re-work sequences now found near hydrothermally altered zones and granitoids. Overall control based on tension and shear zones formed due to basin subsidence and compression release from Round Lake Batholith intrusive.

STAGE V

The compression of the fracture zone of STAGE IV by the intrusion of granitic batholiths on the other side of the fault zone, like the McElroy Batholith located at the end of the cross section depicted. This causes tight folding and additional fracturing along the fault zones. Migration of gold into the hinge zones of folds and other dilation zones probably occurred at this stage.

In graphic form, this same Petrogenesis can be shown on the following figure:



Diagrammatic representation of the proposed sequence of geological processes which resulted in the present geology of the Timmins-Kirkland Lake area.

2.5 MODEL FOR GOLD MINERALIZATION

The following model covers all modes thought possible for gold mineralization within the four township area under Nortek control. The model thought applicable to the Miller Ore Body Area is both stratiform No. 3, as well as lode No. 1 for the northwestern area.

MODEL FOR GOLD MINERALIZATION

STRATIFORM

1. Gold is deposited with clastic and or chemical sedimentary rocks.

2. Gold is precipitated at and near surface by hydrothermal solutions by penetrating fracture induced permeability along major fault zones during the accumulation of volcanic and sedimentary rocks.

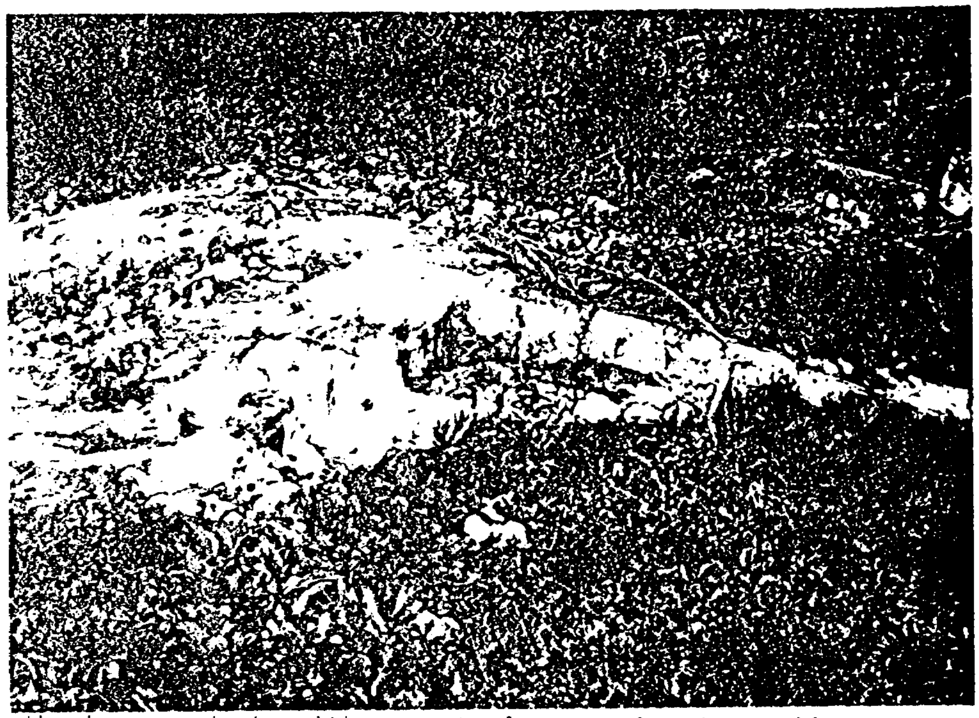
3. Gold is concentrated epigenetically in the rocks along fault zones during late tectonic and felsic igneous activity.

LODE

1. Epigenetically associated with the late alkalic porphyritic to granitic textured intrusions; gold in veins, fractures, alteration zones and metamorphic aureoles around these intrusions. Preferentially intruded along fault systems.

The mineralized basalts of the flat lying(11°-14°) Miller ore body are shown on the following photos:

Photo-8



Shallow dipping ore body with a central core of white bull quartz intruding on the old erosion surface within the basalt flows. Adjacent to this core, both the footwall and hanging wall have been carbonatized, altered, silicified and mineralized by this ore phase invasion.

Photo-9

The brecciated and nearly flat nature of the mineralization is well shown in this area.

Photo-[illegible]

The surface outcrop of the ore zone including both mineralized edges is an average of 6 feet in thickness. The contact zones weather light to dark brown as shown on this photo due to conversion of included pyrite to limonite.

Photo-11

chalco zone

In addition to the drill proven, flat lying ore body mineralization, there is an, as yet undefined, mineralized zone within the granitoid intrusions. The above photo shows a typical quartz intrusion zone within the granitoids. These zones and the control mechanisms are difficult to quantify and very difficult to accurately estimate tonnage potentials due to their possible discontinuous nature.

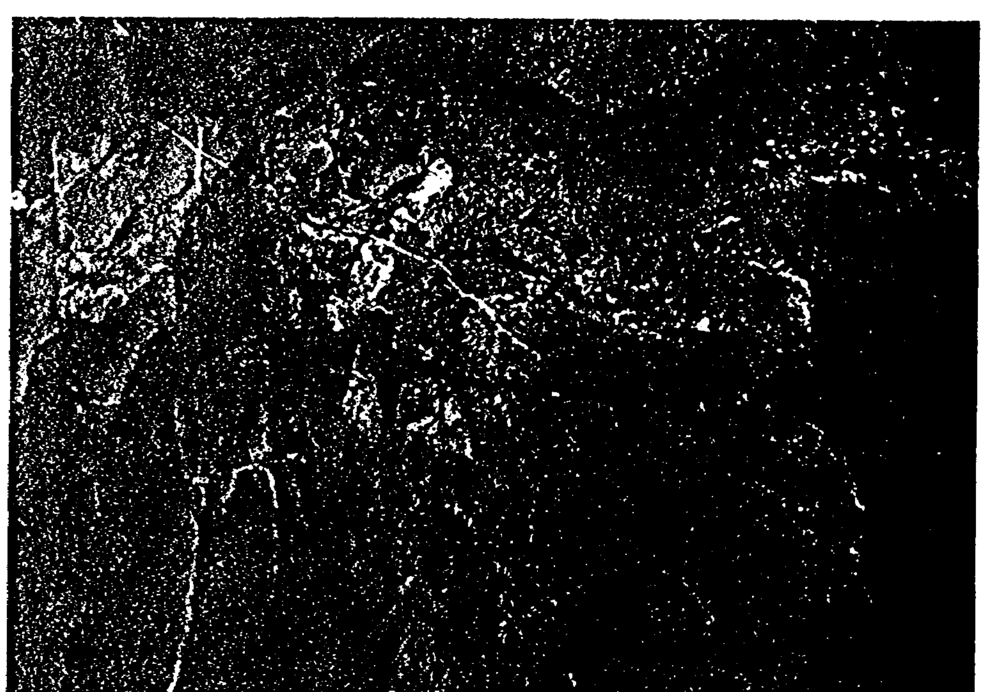
Typical core taken adjacent to one of these granitoid stocks N-87-14 shows the green basalts, original to the area, injected by fingers of mineralized granitoids.

Photo-12

Upper zone core is a mineralized granitoid injecting into the basalts(green broken core, front of photo).

Late stage lamprophyre dikes occur in the area but do not appear to effect the mineralization.

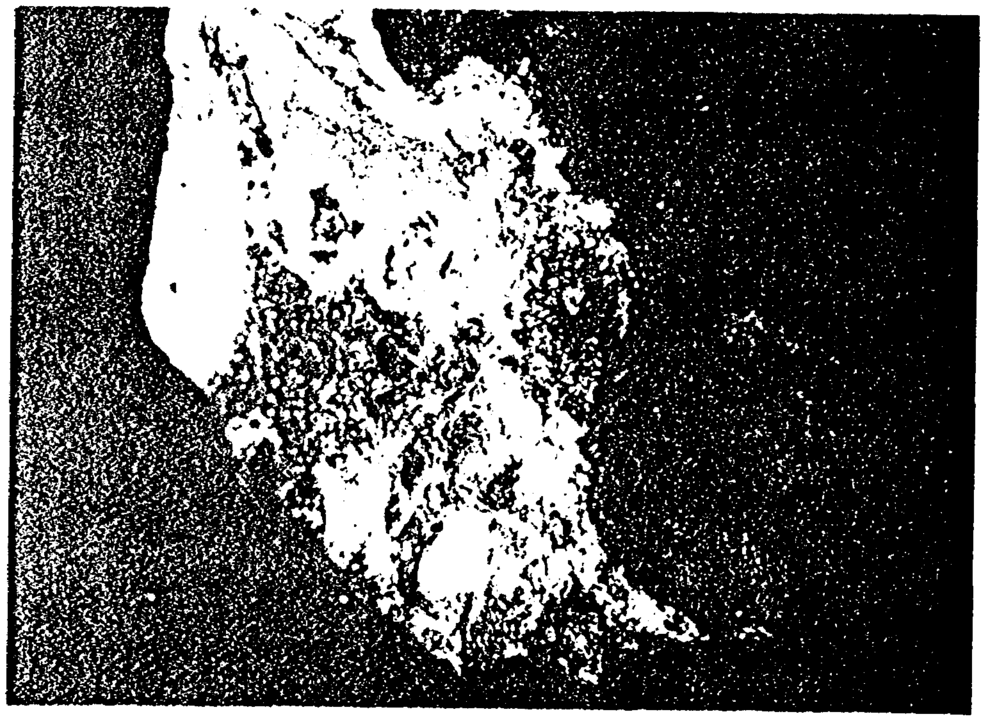
Photo-13



Altered basalt Contact zone Lamprophyre dike

Very high grade gold mineralization associated with the quartz veining is shown in the following photo:

Photo-14



A sample of quartz showing
very high grade gold mineralization.

2.6 SITE SPECIFIC MINERALIZATION FEATURES

In calculating reserves, the mineralized zone has only been considered where the thickness was six feet or better. The central quartz segement is from 1 to 4 feet thick and may be continuous or brecciated, or in more than one layer. Both the hanging wall and the foot wall are altered and pyritized and mineralized for at least two feet on each side of the central quartz zone. Overall, the mineralized zone is a low angle, 10° to 15°, tabular body of remarkable continuity over the area used to calculate tonnage and reserves. Generally speaking, the best grades are in the foot wall segment, but this is not true in all cases. The quartz central zone, if it is brecciated and contained numerous fragments of included altered carbonatized/silicified/pyritized basalt, can be high grade. In the highest assay grade area, i.e. parallel with the 10,000N line, the total mineralized zone is over 10 feet thick. The intercept of the central quartz zone can be predicted prior to drilling the hole to ± 2 feet over the entire area, wherein the tonnage was calculated to exist.

A total of 38 local (Kirkland Lake) similar, but higher dip ore bodies were evaluated from literature MNR data search. In all instances, the grade varied to the same extent shown by these core holes. To be economically successful, the key ingredient was total thickness of the mineralized zone. If a thickness of six feet or more existed, all mines evaluated proved to be economical to mine. As the thickness improved, the grade recovered also improved. Mines which had less than four feet of mineralized zone were generally not economical or produced only small tonnages. A successful mine was associated with: A. quartz mineralization; B. altered carbonatized pyritized ore zone; C. had an altered mineralized thickness of six feet or better.

3.0 NORTEK/SHENANDOAH/MILLER-INDEPENDENCE PROPERTIES

3.1 LOCATION AND ACCESS

The Miller-Independence properties consists of approximately 480 acres of patented fee simple land located about 26 kilometres southeast of Kirkland Lake, Ontario, within the Boston-Skead gold area. The property is located adjacent to a good gravel road extension of Highway 564, about 8.5 km east of the village of Boston Creek in Pacaud and Catharine Townships as shown on the following map.

Good access to the property is provided in non-snow months, but the highway is unmaintained from Boston Creek to the site during the winter. Local Department of Transportation personnel indicated that maintenance would be resumed year around if a mine were developed on the site. A 150 KVA Hydro line runs parallel with the properties about 3.2 km west, and Boston Creek is on the main line of the Canadian National Railroad with sidings for loading or unloading.

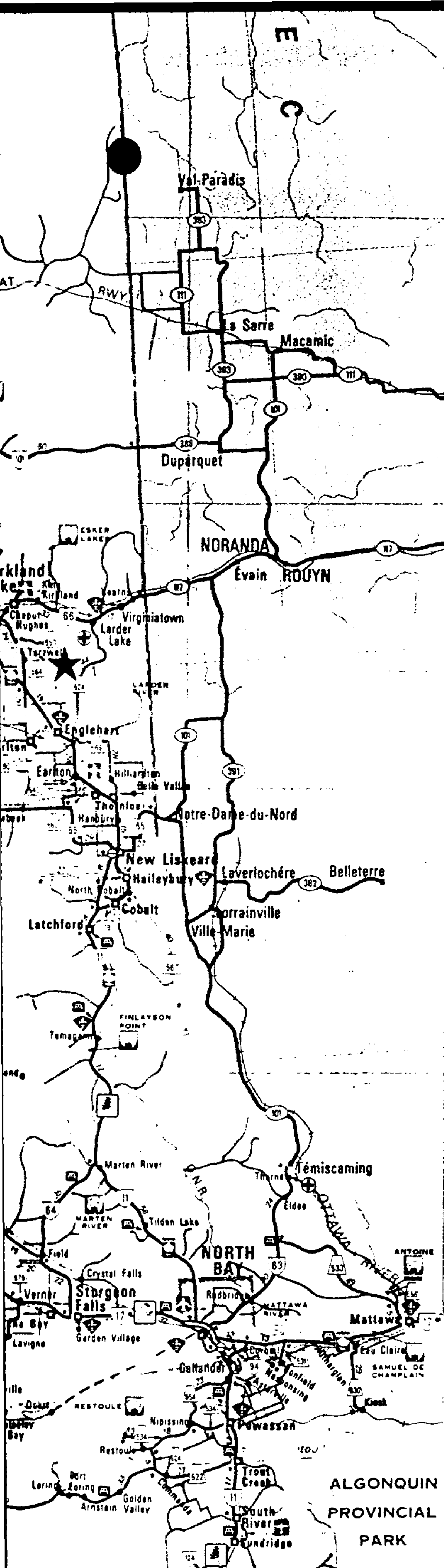
The Miller-Independence properties are made up of two main groups: Group 1 consists of approximately 320 acres of patented claims which include all of Lot 1, Concession VI, Pacaud township; Group 2 is a 160 acre patented claim comprising the South half of Lot 12, Concession VI, Catharine Township, Patent number 2352. See attached total property map, Figure 0-0, for claim locations.

3.2 ORIGINAL MILLER-INDEPENDENCE

3.2.1 Miller-Independence History

The original Miller-Independence Mine is located in Lot 1, Concession VI, Pacaud Township and includes Patents 17936, 17937, 17938, 17939 and 3529. The property was purchased from Ozora Marie McCarthy, the daughter of George Miller. The previous owners in order were: Lord Joice(land grant); purchase in 1915 by Joseph McDonough of Haileybury, Ontario and Fred M. Connell of Toronto; purchase by George J. Miller of Toledo, Ohio in 1916 and at the same time acquiring the name Miller Independence Mines Ltd.

The main ore body is a flat lying(No. 1 vein) quartz vein system with free gold and tellurides. The vein material is milky white quartz, in which are associated tellurides and pyrites and some galena. The chief telluride is a slightly Au-depleted calaverite. The country rock is primarily greenstones (basalts) with north-south trending, shear related porphyritic intrusions.



Val-Paradis
La Sarre
Macamic
Duparquet
NORANDA
Evain
ROUYN
Virginiatown
Larder Lake
Englehart
Earlton
Notre-Dame-du-Nord
New Liskeard
Haileybury
Laverlochère
Belleterre
Cobalt
Latchford
Lorrainville
Ville-Marie
Témiscaming
Marten River
Tilden Lake
NORTH BAY
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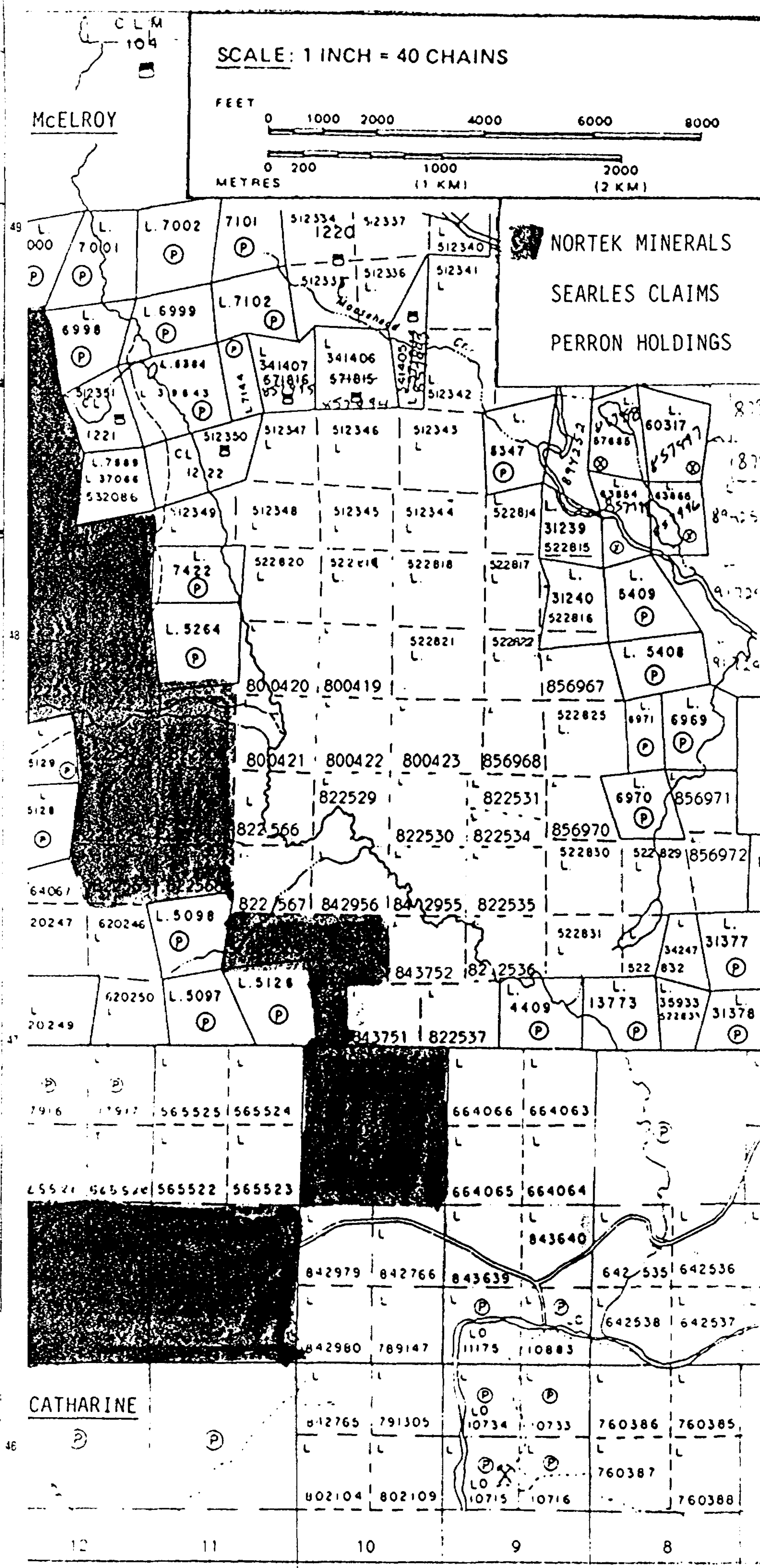
Mattawa
Callander
Powassan
Trout Creek
South River
Sundridge
ALGONQUIN
PROVINCIAL
PARK
80°
79°



SCALE: 1 INCH = 40 CHAINS
FEET
0 1000 2000 4000 6000 8000
0 200 1000 2000
METRES (1 KM) (2 KM)
McELROY
NORTEK MINERALS
SEARLES CLAIMS
PERRON HOLDINGS
CATHARINE
12
11
10
9
8

The Northern Miner provides some additional insight into the operations: he following excerpts are provided to show the early activity levels:

December 18, 1915
Page 6

STAMPS FOR BOSTON CREEK

The Nissen stamp that was taken out of the Dome mill has been sold to the Miller Independence Mining company at Boston Creek. The Miller Independence company own the controlling interest in the McDonough property in Pacaud township. Camps are being built a winter road has been cut and a small plant will be installed very shortly.

It is the desire of the company to make production from the rich vein on the McDonough property as quickly as possible.

December 18, 1915
Page 6

MILLER INDEPENDENCE MINES

The syndicate of capitalists taking over the McDonough claims in Pacaud township has been incorporated as the Miller Independence Mines, with its main business office at Dayton, Ohio.

The preparing for opening up the veteran claims acquired by the Miller interests at Boston Creek are being advanced rapidly.

December 4, 1915
Page 3

STARTING WORK ON McDONOUGH CLAIMS

From Boston Creek a road has already been cut half way to the McDonough property, which Mr. Geo. Miller and his associates have taken up in Pacaud Township. Over this road as soon as it is completed will be taken a small boiler and a hoist and compressor and a mill of ten stamps for testing purposes. Mr. Frank Horne of the Dome staff has been placed in charge. Camps are being built and preparations made to start operations on a considerable scale.

January 22, 1916
Page 2

NEW VEIN AT MILLER INDEPENDENCE

Plant at Old McDonough Claim

A new vein has been found on the property of the Miller Independence Mine at Boston Creek. It strikes directly across the first discovery made. At one point where it has been uncovered there is a width of several feet of quartz, and in this quartz there is a good deal of free gold and sulphides. It is, moreover, not as flat an ore body as the first discovery.

A shaft is being sunk on the original discovery. Owing to the character of the ore body there has been some difficulty in following it. It has been in and out of the shaft once or twice already in the short distance to which the shaft has been sunk now.

A boiler has recently been taken in over the trail from Boston Creek, and as a compressor and other equipment, including a small Nissen stamp mill purchased from the Dome, proceeded it, the Miller Independence should soon be working under steam. The thick crust which formed on the snow last week made the breaking of roads quite difficult for some time, but the passage of the boiler over the trail from Boston Creek should make it quite good for the rest of the the winter.

Some ore has already been bagged from the original discovery and taken to an ore house which has been erected.

February 19, 1916
Page 5

BOSTON CREEK PROSPECTS

A Promising Camp

There are two prospects being worked at Boston Creek, one within three quarters of a mile of the track, at Boston Creek, a station just established 51 miles south in Pacaud Township.

February 19, 1916(cont'd)

The first and more important of these two prospects is the property of the R.A.P. Mining Prospecting and Developing Company. The R. in the syndicate stands for Mr. E.M.Richardson, the A. for Mr. W.B.Albright, both of New York and the P. for Mr. J.A.Papassimakes, who is also manager of the company affairs at Boston Creek. There are two claims upon which work bas been done by the R.A.P. Syndicate at Boston Creek. One of these is the Kenzie, in which Messrs. A.M.Scott, J.P.Bickell and others bought an interest. It is sunk upon one end of the long vein uncovered for some hundreds of feet. The shaft was put down 28 feet upon a remarkable showing last summer and so remains today. The other claims the R.A.P. Syndicate are now conducting work upon with a small steam plant. The vein has been followed to the 100-foot level, where the station is now being cut, before sinking another hundred feet and also drifting on the vein. The vein is from four to five hundred feet wide at the 100-foot level. At 75 feet in the shaft there was five or six inches of remarkable high grade ore, and it now appears to be coming in to the working at the 100-foot level. The vein on the surface shows three short but phenomenally rich ore bodies. Across six and a half feet of one of these short ore bodies the ore gave an average of $91, the high grade six to eight inches wide running $400 to $500 to the ton and the wall rock about $8.

The ore is remarkable for the quantity of free gold it carries and also the fineness of the sulphides.

The Miller Independence

The other working property is the Miller Independence, a Dayton company. This company purchased the McDonough veteran claim from Mr. Fred Connell and his partner McDonough, and they have already completed all payments. The vein upon which the spectacular exposure of free gold ore was discovered last fall is strong and has been traced for upwards of 33 chains on the Miller Independence and the veteran claim to the east. Several tons of quartz very rich in free gold have been sacked ready for crushing with the Nissen stamp that has been taken into the property but not erected. The vein is almost flat and it's estimated by the company that 1800 tons of ore can be taken out of this rich pocket almost at the surface and with very little trouble. The wall rock on either side of the vein also carries values. The vein faulted, but has just been picked up again, showing that it had been thrown about four feet. Work had not much more than commenced this week on the faulted extension of the vein but it showed that there is a good body of quartz though there is but little free gold showing in the ore and the values are very much lower. The gold is closely associated with galena and a copper telluride. Careful sampling shows that the gold is not confined to the quartz. Sulphides are not as plentiful in the vein as at the R.A.P. mine.

The company has been handicapped in their construction by the severe weather, the depth of snow and in the fall the difficulty of getting material over a bad road. Under the circumstances they have made excellent headway. The compressor should be running in three weeks time in the power house, good camps have been built and ground is now being broken for the erection of the Nissen stamp. There are about twenty men working under the direction of Mr. Adams, previously at the Dome staff.

Other Prospects

To the east the veteran claim upon which the extension of the vein has been traced has been optioned by Mr. Weldy Young, with whom are associated Messrs. A.M.Scott, Bickell and others. Mr. Papassimakes also has a property adjoining with a vein carrying free gold.

There are more prospectors in the bush in Pacaud and Catharine townships than in any other part of the Northern Ontario field. There is such a depth of snow that little work is being attempted but the whole section will be very lively when warmer weather comes. Options are very much in demand.

Boston Creek Settlement

The centre of all this activity is at Boston Creek. On the R.A.P.Syndicate property the company has erected a most comfortable semi-public hotel and a boarding and sleeping camp all in the same building. Apart from that there are not more than two or three buildings, two of which are small stores erected on the other side of the rock cut near the iron bridge over Boston Creek.

March 11, 1916
Page 1

MILLER INDEPENDENCE

Plant Is Now Running

The plant at the Miller Independence Mine at Boston Creek is now running and much speedier progress will now be made with sinking the shaft on the main vein. The installation of the Nissen stamp, with which it is intended to treat the gold ore which can be mined from the lode on or near the surface, is proceeding rapidly.

May 6, 1916
Page 1

FIRST BRICK FROM BOSTON

The gold brick which will shortly be shipped from the Miller Independence at Boston Creek will not be the first from that district. Mr. J.C.O'Donald shipped a small brick to the Canadian Mint some years ago, and one of the original owners of the McCrea claims has just melted down a good-sized button from gold leaf in the ore taken from their claims.

While there is no ore actually blocked out at any prospect at Boston Creek there are so many veins of excellent promise that it will be remarkable if it does not make a camp.

May 13, 1916
Page 1

WONDERFUL ORE ON MILLER

Shot Out Of Surface Vein

Some remarkable ore has been shot out of the vein on the Miller Independence for treatment in their Nissen stamp mill. Some specimens are as rich as the high grade from the Croesus mine and there are several hundred pounds that will run very high indeed in the yellow metal.

July 1, 1916
Page 8

FIRST GOLD FROM BOSTON CREEK

Small Shipment Made

Mr. George Miller, from the Miller Independence, has shipped about a couple of tons of high grade ore taken from the surface of his vein on the Miller Independence to Campbell & Devell's for sampling purposes. He has also taken out some small bars of gold as a result of preliminary runs with the small Nissen mill, which has now been shut down on account of shortage of power.

Cartwrights In Boston Creek

Mr. Morgan Cartwright has bought the six Beatty and Duggan claims in Boston Creek.

January 27, 1917
Page 1

FLOTATION AT BOSTON CREEK

Machine Installed But Waiting For Ball Mill

The Groche flotation machine has been installed at the Miller Independence plant at Boston Creek. It will be used after the slimes have passed over the amalgamating plates and its purpose will be to concentrate the tellurides. As the Hardinge ball mill, of about forty tons a day capacity, has not yet arrived, it will be some time before the first flotation plant on gold ores in Northern Ontario will be tried out.

At present only a small gang is working on the Miller Independence. Surface work is being done, but it is proposed to sink a shaft on the second vein. Diamond drilling will also be done.

May 26, 1917
Page 8

MILL SOON READY

Miller Independence Developments

It is expected that the ball mill being installed in the Miller Independence mill at Boston Creek will be ready for operations inside a month. It is expected to start with a daily capacity of about thirty tons, though the mill is capable of treating twice that.

Development of No. 2 vein through B shaft is in full swing. It is now thought that No. 1 vein is connected in some way with No. 2 vein and owing to the large difference in size work will be concentrated on the latter. A feldspar porphyry dyke cut through the shaft and on slashing into it free gold and tellurides made their appearance. This dyke is being drifted on and is showing a width of from nine to fifteen feet.

The milling process will be amalgamation and concentration by flotation.

Five or six directors of the company will be visiting the property next week.

June 9, 1917
Page 6

ANOTHER VEIN ON MILLER

Discovery In Centre Of Boston Creek

Another vein has been found on the Miller Independence in Boston Creek. It was six inches wide on surface, but widened to ten inches wide with the first few rounds and gives indications of still further width. The new discovery was made alongside a third porphyry dyke discovered about four hundred feet west of where work was previously carried on. The vein is alongside the porphyry dyke and both carry visible gold and tellurides.

Following discoveries in a geological way that tend to clear up some features that have given the management some worry, it has been decided to continue the first shaft to a depth of about 150 feet and crosscut both ways to the porphyry dykes alongside which the veins are thought to be at depth.

It is proposed to have the mill working in two weeks. It is estimated that there is available about three month's ore.

June 30, 1917
Page 7

BOSTON CREEK'S FIRST PRODUCER

Miller Independence Mill Running

The Miller Independence mill was started last week for a series of test runs. Some changes are being made in the method of hoisting rock to the mill and when these changes are made operations will be carried on regularly. By the middle of the coming week it is expected that all necessary changes will have been made and Boston Creek's first producer will be regularly turning out bullion.

The process used is to amalgamate, after which the pulp is subject to oil flotation by which it is expected to concentrate the tellurides. This is the first flotation plant installed to treat gold ore in Northern Ontario and the results of its operation will be watched with considerable interest.

The flotation machine was installed by the Growards Company.

The ore for the mill is being broken on surface, though some ore from development work will also be available. Operations are being carried on almost across the company's holdings of about a half mile in width.

November 10, 1917
Page 1

THE MILLER INDEPENDENCE PROPERTY

Report On Boston Creek Property

The Miller Independence property is a veteran claim of 160 acres located in south half, Lot 1, Concession 6, Pacaud Township, known as the Crawford Vet., owned by Lord Joice, North Humberland Castle, England. Gold was found on it in August, 1915, by Joseph McConnagh, of Haileybury, Ont., who together with Fred M. Connell of Toronto, purchased same from Lord Joice. Joseph McDonnagh sold same to Geo. J. Miller, Secy. and Mrg. of the Miracle Mines Ltd., at South Porcupine who organized the Miller Independence Mines Ltd., with a capitalization of $500,000, at Dayton Ohio. The company is a closed syndicate and the stock is held by strong Dayton-Germantown and Toledo Ohio interests.

Geo. J. Miller, Toledo, President and Manager.

N. W. Kirkpatrick, Vice President, Dayton, Ohio, Capitalist.

J. C. Schaeffer, Secretary, Germantown, Ohio, President and Secretary of Germantown Lumber Co.

Secretary Building and Loan Co., Germantown.

President Germantown Telephone Co. Dr. Edd Rittuick, Treasurer, Germantown, Ohio.

Vice President Germantown Natl. Bank, who are also directors together with Judge O. B. Brown, Atty, and capitalist John A. Read, retired merchant. Adam Begard, Tobacco Merchant, Adam Bergard, Tobacco Jatiust.

The mine is located 2 3/4 miles from B.C. and is reached by company road. The management has cut three roads to date to property.

Number Of Veins

A number of veins have been located at surface but all work has been done on the Number 1, which was the original find on the property. This vein cuts across the property in a north westerly and southeasterly direction for at least ¼ mile and gold and tellurides occur all along for the entire length showing an enrichment over the entire ore body. Three main porphyry belts cross the property in an north westerly and southeasterly direction carrying fair gold values and showing free gold in places.

First Work

The first work was started on the property in December, 1915, and development work has continued down to the present time. Suitable camps were built at once and a small test mill consisting of a 60 h.p. boiler, 3 drill Rand Compressor, 40 h.p. engine for mill, a 1400 lb. Nissen Stamp and amalgamating plates were installed as a test plant. This first plant was operated for a short itme but owing to the heavy gold tellurides in the ore same was shut down until a method of treatment could be found for same. The first ore was hand picked and the free gold and tellurides was bagged for future treatment. After hand picking the quartz was found to contain a fair amount of gold which was collected on the plates. A small amount of high grade was run and a good extraction was obtained on the plates but the tellurides were carried in the tailing floating out on the water. All the gold taken out in this preliminary test is in Germantown, Ohio.

Present Plant and Buildings

Camps to accomodate 40 men.

Staff quarters and office.

Competent assay and testing laboratory.

Blacksmith shop, complete.

Power plant--two 60 h.p. boilers, 3 drill Rand compressor, direct connected lighting outfit.

Mill equipment--one 40 h.p. steam engine. One 4x5 Standard Ball Mill, just installed. Two 12x5 amalgamating plates. One oil flotation machine, 60 tons. Crushers and etc., for 50 ton mill.

All camps, mill and mine lighted with electric lights.

Milling operation will start in course next few days. Delayed by delivery of parts for same.

Shafts

Two vertical shafts and two incline.

A shaft down 76 feet and drift run 120 feet to south but No. 1 vein not cut owing to faulting.

C shaft down 40 feet and cut No. 1 vein at that level. Three feet ore showing gold and tellurides. Drifting just started on three sides of shaft.

November 10, 1917(cont'd. page 2)

B incline shaft down 165 feet on the No. 1 vein, gold and tellurides showing entire length of same.

D incline down 140 feet on No. 1 vein showing gold and tellurides for entire length of shaft.

Test Pits

A number of test pits were put down on No. 1 vein at surface from 6 to 10 feet deep and in every place opened up the vein has started to widen out and heavy gold and tellurides can be seen in place in bottom. These test pits were sunk at different places on No. 1 vein at intervals for about 1000 feet on No. 1 vein.

At the present three eight hour shifts are employed. An ore bin has been built at surface. The main tramway is being connected up with the ore bin.

Staff

Mr. W. W. Hotskins, consulting engineer.

Mr. Peter Sampson, mine captain.

Mr. Wm. R. Adams, mill supt.

Formation

Basalt with porphyry intrusion.

August 10, 1918
Page 8

WORK AT MILLER INDEPENDENCE

Several Shafts Sunk On The Property

The spectacular ore in "D" shaft at the Miller Independence at Boston Creek continues. The gold is free and in tellurides. Several pits and shafts have been sunk, described as follows:

"A" shaft - This shaft was put down 76 feet. No vein was cut and a crosscut was driven from that depth, 120 feet south with no results. This work was done previous to 1917. It is intended that this shaft be used as a permanent one for what is known as "D" vein.

"B" shaft - This pit was down 21 feet vertically when a vein, its objective was cut. A drift was run 174 feet south on the vein, good values being met with.

INCLINE shaft - A vein averaging about two feet on surface was followed by this incline shaft 141 feet. Drifts east and west were started and values were met. This work was done in 1916 & 1917.

"C" shaft - This shaft was sunk 110 feet. The vein was cut at 44 feet, at 62 feet a mud seam 30 inches wide was cut. A crosscut was driven south 112 feet and north 60. This work was done in 1917 and 1918.

JUMBO shaft - This pit was put down 14 feet. A vein, average about 30 inches was followed. The vein carried good values.

"D" shaft - About the middle of May, this year, a vein, called "D" was discovered on surface and work on it was commenced at once. The shaft is down 120 feet. A level was established at 100 feet and drifting east and west is under way. The drifts are now about twenty five feet. The vein has widened considerable from surface, and the drift do not show either wall. Values have also improved. The spectacular section is up to four feet in width and runs very high.

To the immediate north of this vein are four parallel fractures carrying values. The Jumbo also parallels and is 400 feet south. These veins dip south and strike about 30 degrees north of east.

Future underground work as now planned includes continuing "D" shaft to a depth of 200 feet and drifting on the vein at that depth. This will allow steady work on four faces.

On surface the work being done includes a new two story dining room with bedrooms above, a new house for the assistant manager. The mill is to be enlarged. Another boiler, 80 horse power, is to

August 10, 1918(cont'd)

be installed and set up with a 10 drill compressor. A dam is being made 120 feet long and between two bluffs about 100 feet northeast of the power house. This is expected to give a more or less permanent resevoir of water and should more than meet requirements. The management state that electric power has been arranged for and is to be ready for when the present wood supply is exhausted. The line will probably be begun this winter or early next spring.

Some of the Miller Independence directors were at the property this week.

January 25, 1919
Page 3

MILLER INDEPENDENCE ANNUAL

On about the 5th of February, the annual meeting of the Miller Independence Mines Limited will be held at Dayton, Ohio.

July 24, 1920
Page 1

MILLER INDEPENDENCE
THAT CROSSCUT VERY CLOSE TO
VEIN SHOWN BY INDICATIONS
IN THREE HUNDRED

The Miller Independence, Boston Creek, expected to cut "D" vein from 300 to 350 feet out from the shaft. The crosscut is now 300 feet long and the first indications that the expectations were correct are beginning to appear. The vein should be struck any day now. All the signs that surrounded the vein near surface are exhibiting themselves.

The other work on the property including southwesterly drifting operations and crosscutting north through fractured ground to the boundary, is being continued.

September 4, 1920
Page 1

FINDS ON MILLER-INDEPENDENCE
SEVERAL PROMISING LOOKING STRINGERS CUT ON
FIVE HUNDRED - D SHAFT DEWATERED

While crosscutting at the 500 foot level, several highly mineralized and promising looking stringers were cut on The Miller Independence, Boston. The stringers are narrow and many are very rich in iron and copper sulphides. They run in an east and west direction toward what is known on the property as the Jumbo porphyry.

This porphyry showed some gold on surface and the "Jumbo Vein" runs into it. To hit the Jumbo vein and porphyry 160 feet more drifting along the stringers will have to be done.

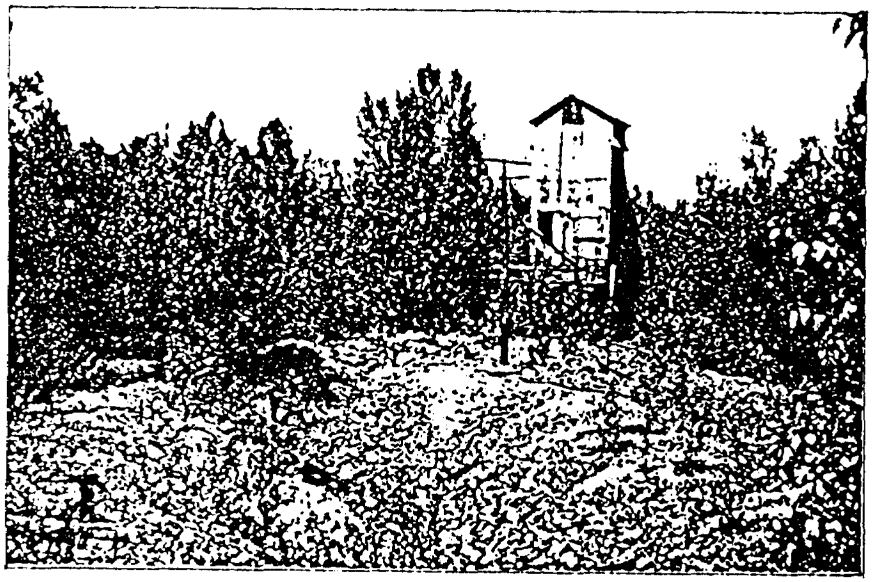
The Miller Independence drove 343 feet at the 500 foot level from the shaft. From this point a crosscut runs north west and one cuts off north east.

"D" vein is probably still a hundred feet distant in the crosscut that heads for it. On "D" vein an incline shaft had been sunk 200 feet. It has been dewatered and it is the intention to continue exploration from it very shortly.

It is very possible that the company will scrape together from the plant that was burned, sufficient machinery to equip a small mill for the purpose of running through ore from the No. 1 Vein.

NOTE: Page numbers below dates given indicate page of Northern Miner issue.

The following was taken from the 1957 Annual Report of the Ontario Department of Mines, Volume LXVI, Part 5.



C shaft, Miller Independence property, Pacaud township.

Miller Independence Mines, Limited

The Miller Independence property occupies the south half of lot 1, concession VI, Pacaud township. It is a gold prospect in the Boston Creek area that has been idle for many years. A motor road extending eastward from the village of Boston Creek provides easy access to the property.

The property is underlain largely by Keewatin basic lavas. They are developed here as a fairly uniform succession of flows, which strike northwesterly and face northeast. The tops of the flows are finer-grained and are marked by the development of pillowed structure. The interiors of the flows are massive, medium to coarse-grained phases of dioritic or gabbroic composition in which pillowed structure is lacking. Small outcroppings of Haileyburian (?) hornblendite and serpentinite occur in the western part of the property, and a few dikes of Algoman feldspar porphyry are intruded into the Keewatin.

The property has been described by Burrows and Hopkins[1] as follows:

Gold was first discovered on the lot in No. 1 vein by Joseph McDonough in July, 1915. Three years later W. Adams, then mine captain, discovered the "Independence Vein," which contains a small shoot of ore carrying a precious telluride, calaverite.

. . . .

The original No. 1 vein has been traced on the property for about 600 feet in an east and west direction and for several hundred feet easterly into Catharine township. It is narrow, averaging about a foot in width, and has a low dip to the north, usually about 20° or less, at one place being almost horizontal. The vein material is milky white quartz, and the mineralization is more or less concentrated toward the footwall side of the vein. Tellurides, copper pyrites, pyrite, specular iron ore, and galena are observed in the quartz. Native gold occurs frequently with the telluride in a net-like arrangement in the quartz along the footwall. A bismuth telluride, brilliant grey in colour, and containing some selenium, occurs abundantly with the gold. A darker-coloured telluride (petzite?) is also present in smaller amounts. The vein has been prospected by means of a number of trenches, pits and shafts, from which some high-grade ore was bagged, and a small production recorded. Along parts of both walls of the vein there is a narrow dike of grey feldspar-porphyry. The porphyry contains much calcite and other carbonates, as well as disseminated iron pyrites and is cut by veinlets of quartz.

The Independence vein, containing the small shoot of exceptionally high-grade ore, strikes N. 20° E., and dips 55° southeasterly. The rich ore was found between the depths 30 feet and 160 feet in the inclined shaft, but could not be traced for any great distance on the 100-foot level. The hanging wall of the shaft is a strong fault plane. Below this is a second fault plane nearly parallel to the upper one, the planes varying from a foot to three feet apart. Below the lower fault plane is a series of irregular quartz veinlets, from a fraction of an inch to one inch in width and roughly parallel to the fault plane. A few veins are terminated sharply at the fault plane, indicating that some of the faulting is later than the mineralization. About ten feet above the 100-foot level the veinlets occur over a width of four feet. These veinlets can be followed down to 160 feet in the shaft below which the rock is less altered. Where the veinlets occur, the dark basalt has been altered for a few inches to a light grey rock carrying abundant iron pyrites. The quartz carries in places iron pyrites and copper pyrites together with a gold telluride, calaverite. The telluride occurs chiefly in minute veinlets and small masses in and with the copper pyrites and is sometimes accompanied by native gold. Faulted sections of flat-lying quartz veins were observed between the main fault planes about fifty feet below the 100-foot level.

Shaft No. A has been sunk vertically to a depth of 500 feet and extensive exploration carried on at this level. The strong faults on which the inclined shaft "D" was sunk to the 200-foot level were encountered in the cross-cut on the 500-foot level, 190 feet north of "A" shaft; drifting along these faults did not reveal any ore of similar character to the rich telluride ore which was found in "D" shaft. Seven diamond-drill holes were made from the 500-foot level.

In all, six shafts were sunk on the property. These shafts were named "A" through "D". The "A" shaft was 515 feet deep and the "D" shaft was 500 feet deep. The mine operated sporadically from 1916 through 1934. Official 1918 production was 58 ounces of gold and 70 ounces of silver. Little data survives today. In 1930, the Allied Gold Mines property(N½, Lot 1) was merged with the Miller Independence to form the 320 acre block as it is today. Only the "C" shaft intersected the No. 1 vein at about the 44 foot depth.

For a brief period in 1934, the Miller Independence re-opened, with the "C" shaft development of 185 feet of cross cuts and 1,049 feet of drifting, as well as 1,000 feet of diamond drill holes completed. All apparently without success, for it closed soon after.

A portion of this drill data has survived: Diamond drill hole No. 1 is a vertical hole intersecting the No. 1 vein at 150 foot depth. Data on this drilling was obtained from the local Kirkland Lake office of the Ontario Ministry of Mines and later confirmed by private letters obtained from the former owner. It was collared in what was logged as grey porphyry; encountered 23.5 feet of fine grained basalt above 153 feet; and found the vein from 153.3 feet to 160 foot depth, apparently dipping 10°. The vein averaged 0.57 oz/ton of gold across 3.4 foot of width. This hole provides a down dip positive extension of the outcropping vein by more than 750 feet in length.

Diamond drill hole No. 3 is also vertical for 267 feet. Near the surface, it encountered the altered hydrothermal vein system, logging it as altered porphyry 18.2 feet to 19.5 foot depth with a ¼ inch quartz veinlet. This zone assayed 2.09 oz/ton.

The "C" shaft was sunk to about 150 feet, through the currently delineated ore zone at 44 feet and only in the 1930's was development, on this ore body, started. The poor mill recovery of the ore and the stabilized, low gold price were largely responsible for the mine's closure. This shallow, dipping ore body was a problem to mine in 1930. It was developed by limited drifting on strike with a winze sunk to follow the 11° to 12° dip with levels cut on strike, so that track haulage could be utilized. The mined ore was then transferred to the shaft by rail and hoisted up the winze by air operated tuggers. Modern trackless loadhaul dumps could now be used to mine the ore body and its' tabular nature and minimal faulting would allow room and pillar techniques to further reduce mining costs. The possible less mineralized zones could be plotted ahead and pillars turned for maximum recovery of the highest grade zones.

3.2.2 Recent Shenandoah Exploration 1983-1986

In 1983, Shenandoah Resources Ltd. had optioned the Searles, approximately 160 acre, claim in the S½ of Lot 12, Concession VI, Catharine Township and dozed nearly 400 linear feet of surface outcrop of the No. 1 vein. Samples, which have been composited, were cut from this vein, an average 6 foot vertical height and from 6 inches to 8 inches of width, at the locations shown on the following assay map. This sampling proved conclusively that the vein system was thick enough to economically mine and that the grade was, as is normal to local gold deposits, variable over very short distances. The large bulk of the samples taken and the overall average grade in excess of 0.35 oz/ton indicating a mineable resource.

The following winter, the adjacent Miller, 320 acre property, was purchased outright. This allowed the dozed outline of the ore body outcrop to be continued to the west in the early spring. In addition, a series of shallow holes, numbered 101 through 108, were drilled. In all, the ore body surface exposure was extended for 1100 feet on strike. Samples were cut wherever the vein outcropped and an old adit on strike was pumped sufficiently to allow for sampling of the ribs. All of this sampling indicated a highly variable grade, typical gold ore mineralization, with statistically an ore grade probable in excess of 0.32 oz/ton.

The following fall, a total of four core holes 201 to 204 were drilled in line on strike, down dip of the ore body outcrop which confirmed the extension of the mineralized zone for over 700 linear feet. Again, the grade was highly variable, but very encouraging.

Now the area was forced to sit while financing was arranged.

3.3 NORTEK 1987 EXPLORATION PROGRAM

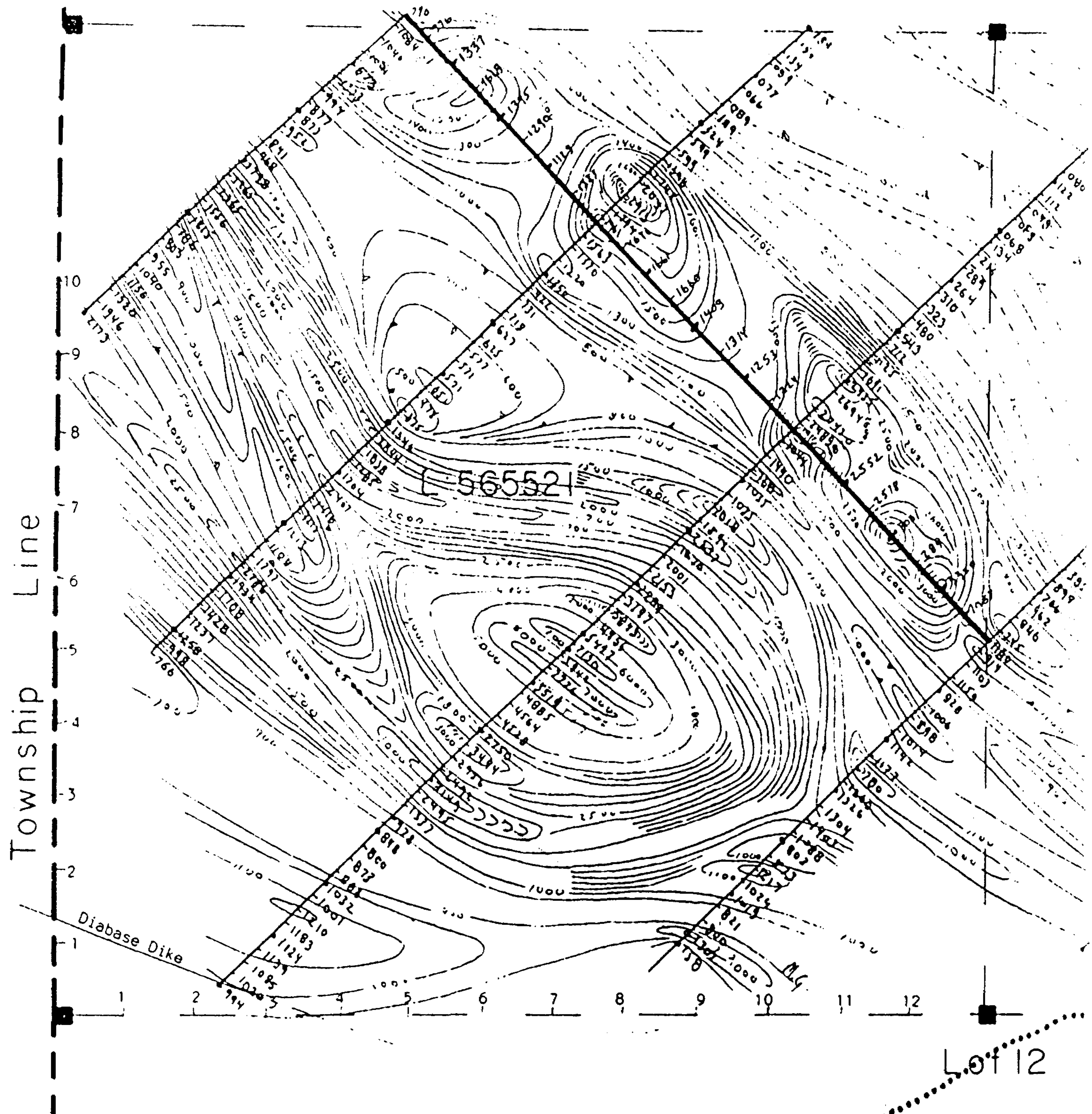
During the 1987 Exploration Season, Nortek Minerals Ltd. completed the following three main projects as defined in their Program Plan:

COMPLETED 1987 EXPLORATION PROGRAM PLAN

ACTION ITEM	OBJECT	GOAL
1. Drill 24 holes 7000± feet of core on Miller-Independence properties. Log and assay. Prepare ore cross sections and estimates.	Define ore body. Establish need for adjacent leases. Establish possible mining techniques.	Obtain in excess of 500,000 NT of relatively high grade reserves with ground added if necessary to control ore body.
2. Complete assessment work on lease ground. Obtain existing MNR aerial photos. Topo map properties.	Doze sulfide zone access. Evaluate new and existing exposed ground by geological mapping and field sampling. Prepare composite maps to guide future work.	Develop role model for mineralization to validate next years activities and reduce holdings of specifically higher cost leases, with possible farm outs.
3. Obtain representative samples for petrographic, polished ore and metallurgical testing.	Define sequence of deposition and control mechanisms.	Understanding of mineralogy and pre-milling technology potentials.

In all 36 core holes were drilled with locations as defined in the following Plan Map(see pocket attached) of the Miller mineralized area. In drilling these holes, locations were adjusted as information was available from each hole drilled. A total of 7,294 linear feet of "BQ" drill hole was drilled to provide a probable ore body containing in excess of 588,000 NT with a grade thought to be slightly better than one-third ounce per ton. The southern and southeastern portions of the ore body are well defined. The north and western limits will require additional infill drilling, as well as outside limit definition. The western edge appears to coincide with a granitoid dike system, but mineralization is irregular and not specifically limited by this dike. The northern ore body extreme appears to grade into an area of the same dike system which is bulbous in appearance. At least six holes will be required to better define this zone. The north central portion of the ore body extends to the adjacent Perron Claim L-565521. Perron has drilled a total of six holes within this area(shown on the attached Plan Map as G-series) with the result of defining an additional

250 foot zone north of the property line. See attached cross sections (H-H'). It is probable that as much as one-third of the total ore body will underlie the Perron property. Magnetometer Surveys conducted during the 1984 period, while Shenandoah held the lease on this adjacent property, clearly define the limits of the ore body; when coupled with the completed Nortek drilling program. See the following segment of this magnetometer mapping:



MAGNETOMETER SURVEY OF PERRON PROPERTY

4.0 RESERVE CALCULATIONS

4.1 VEIN # 1

4.1.0 Methodology

4.1.1 Limits Of Ore Body

The ore body as defined by this calculation(see attached map) was delineated by:

a. Visible and assayed outcrops, essentially at the southern limits.
b. Property lines as is the case for most of the northern and western limits.

c. An assumed line linking estimated limits of mineralized areas together. As a rule the zone of influence of one borehole was considered to reach always the halfway point between two holes. This method was mainly used at the eastern limit of the deposit where limits of old underground workings were also taken into consideration.

4.1.2 Thickness Of Ore Body

The thickness of the mineralized zone has been taken from core logs and the measured width of outcrops.

4.1.3 Specific Gravity

Five(5) selected samples were forwarded to Swastika Laboratories for specific gravity determination. The results were as follows:

Sample Description	Specific Gravity
D-Vein, heavily mineralized	2.91
Mineralized core(about 30% quartz) from Vein # 1	2.90
Outcrop rock of # 1 Vein (about 91% quartz)	2.71
Mineralized core(quartz/country rock brecciated) from Vein # 1	2.81
Core(100% quartz) from Vein # 1	2.67

The average density was established by calculating the arithmetic average of all Vein # 1 samples. This value used for reserve calculations has been calculated at: 2.77.

4.1.4 Gold Grade

4.1.4.1 Boreholes

Borehole #	Mineralized Width In Feet	Assays in Oz/NT	Remarks
N-87-1	2.00	0.045	
	2.00	.nil	
	2.00	0.015	
	1.00	0.088	
	7.00	0.029	say 0.03
N-87-2	1.00	0.26	
	1.00	0.0005	
	2.00	0.015	
	2.00	0.1075	
	6.00	0.085	say 0.09
N-87-3	1.60	0.0675	
	1.00	0.045	
	1.40	0.020	
	1.00	0.3675	
	1.00	0.03	
	6.00	0.096	say 0.10
N-87-4	ore zone not reached		
N-87-5	ore zone not reached, drilling problems		
N-87-5a	2.00	0.025	
	2.00	0.61	
	4.00	0.3175	say 0.32
	1.00	0.325	} forty feet below not considered in reserve calculations.
	1.00	0.13	
	2.00	0.2275	say 0.23
N-87-6	2.50	1.765	say 1.77
N-87-7	Barren, out of deposit		
N-87-8	0.82	0.05	
	1.50	nil	
	1.58	0.01	
	1.91	0.002	
	1.50	0.01	
	1.41	20.325 (average of four assays)	
	1.58	0.14	
	10.30	2.81	say 2.81

Borehole #	Mineralized Width in Feet	Assays in Oz/NT	Remarks
N-87-9	1.17	0.55	
	1.66	0.03	
	1.33	0.075	
	2.25	0.035	
	1.34	1.625	
	7.75	0.392	say 0.39
N-87-10	1.92	0.12	
	2.08	0.065	
	2.92	0.02	
	0.58	0.3275	
	7.50	0.082	say 0.08
N-87-11	In diabase dike, considered for reserve calculation average between values of holes #10 or #12 i.e.		
	6.46	0.08	
N-87-12	1.08	0.05	
	1.83	0.1325	
	1.00	0.035	
	1.50	0.025	
	5.41	0.0682	say 0.07
N-87-13	2.25	0.03295	
	2.17	0.13425	
	4.42	0.0827	say 0.08
N-87-14	1.00	0.0325	say 0.03
N-87-15	1.00	0.005	
	1.00	3.845	
	1.00	0.002	
	3.00	nil	
	1.17	0.16	
	1.67	0.005	
	1.08	0.005	
	1.08	0.002	
	1.17	0.26	
	11.17	0.3903	say 0.39
N-87-16	1.00	0.0225	say 0.02
N-87-17	0.92	0.035	
	1.25	0.1475	
	1.17	0.0475	
	3.34	0.081	say 0.08
N-87-18	1.00	0.002	
	1.25	0.075	
	2.00	0.04	
	1.67	0.04	
	1.08	0.1225	
	7.00	0.05355	say 0.05

Borehole #	Mineralized Width In Feet	Assays in Oz/NT	Remarks
N-87-19	1.00	0.002	
	1.00	0.015	
	1.00	0.010	
	1.50	nil	
	1.00	nil	
	5.50	0.0049	say 0.01
N-87-20	1.56	0.015	
	1.50	0.002	
	0.67	nil	
	1.58	0.0175	
	5.31	0.0102	say 0.01
N-87-21	Stopped at 11 feet - drilling problems		
N-87-21a	1.41	0.0375	say 0.04
N-87-22	1.00	0.355	
	2.00	0.590	
	2.00	nil	
	2.00	0.2025	
	7.00	0.277	say 0.28
N-87-23	2.00	0.115	
	2.00	0.61	
	2.00	0.20	
	2.00	0.3625	
	8.00	0.321875	say 0.32
N-87-24	Barren		
N-87-25	1.00	0.5325	say 0.53
N-87-26	2.00	0.0475	say 0.05
N-87-27	Barren		
N-87-28	Barren		
N-87-29	Barren		
N-87-30	6.00	0.045	say 0.05
N-87-31	4.00	0.002	
N-87-32	Barren		
201*	2.00	0.24	
202*	2.00	0.06	
203*	4.00	0.02	
204*	4.00	1.32	

(* Shenandoah holes)

4.1.4.2 Outcrops

Outcrops were sampled by Shenandoah/Miller-Independence prior to the 1987/1988 Nortek Exploration works. For our calculations, two sections were considered:

1. The eastern section located mainly on the former Searles property.
2. The western section located on the Miller-Independence property.

4.1.4.2.1 Eastern Section

26 channel samples over an average width of 6 feet each can be listed as follows:

# of order from East to West	Assay result in OZ/NT	Extended outcrop length 12 feet
1	0.08	20
2	0.12	40
3	0.02	25
4	0.05	20
5	0.02	18
6	0.02	12
7	0.32	12
8	0.05	35
9	1.71	33
10	0.73	12
11	0.71	12
12	0.14	10
13	1.27	14
14	0.12	15
15	0.08	13
16	0.05	11
17	4.24	10
18	0.83	10
19	0.14	15
29	0.07	18
21	0.11	20
22	0.05	22
23	0.08	20
24	0.005	15
25	0.25	20
26	0.02	10
TOTAL		462
Arithmetical Average	0.434	17.8 feet
Weighted Average used in calculations	0.372(1)	

(1) Note: The average gold grade of the 600 kg bulk sample forwarded to "Lakefield Research Laboratories" for processing tests, taken randomly in the same area, was assayed at 0.391 oz/nt.

RECAPITULATION OF VOLUMES TONS AND GRADES

OF THE VEIN # 1 DEPOSIT

BLOCK #	BOREHOLE #	SURFACE IN FEET²	THICKNESS IN FEET	VOLUME IN YARD³	NET TONS	GRADE OZ/NT	TOTAL OZ.	ASSAY RESULTS FT²/ASSAY	# OF ASSAYS
1	N-87-5a	37,500	4.00	5,556	12,945	0.32	4,142	37,500	1
2	N-87-15	28,500	11.17	11,791	27,473	0.39	10,714	28,500	1
3	N-87-3	28,500	6.00	6,333	14,756	0.10	1,476	28,500	1
4	N-87-14	30,000	1.00	1,111	2,589	0.03	78	30,000	1
5	N-87-2	30,000	6.00	6,667	15,534	0.09	1,398	30,000	1
6	N-87-6	30,000	2.50	2,778	6,473	1.77	11,457	30,000	1
7	N-87-1	30,000	7.00	7,778	18,123	0.03	544	30,000	1
8	201, 202 203, 204 DH 1	64,500	3.00	7,167	16,699	0.50	8,350	12,900	5
9	N-87-17	70,500	3.34	8,721	20,320	0.08	1,626	70,500	1
10	Outcrops	280,600	6.00	62,356	145,289	0.37	53,757	10,792	26
11	Outcrops & Incline	85,075	6.00	18,906	44,051	0.31	13,656	21,269	4
12	N-87-20 N-87-21A	43,275	3.36	5,385	12,547	0.02	251	21,638	2
13	N-87-25	31,050	1.00	1,150	2,679	0.53	1,420	31,050	1
14	N-87-22	22,400	7.00	5,807	13,530	0.28	3,788	22,400	1
15	N-87-30	37,975	6.00	8,439	19,663	0.05	983	37,975	1
16	N-87-19	26,250	5.50	5,347	12,458	0.01	125	26,250	1
17	N-87-18	25,500	7.00	6,611	15,404	0.05	770	25,500	1
18	N-87-8	26,250	10.30	10,014	23,333	2.81	65,566	26,250	1
19	N-87-9	22,500	7.75	6,458	15,047	0.39	5,868	22,500	1
20	N-87-10	22,500	7.50	6,250	14,563	0.08	1,165	22,500	1
21	N-87-11	25,500	6.46	6,101	14,215	0.08	1,137	25,500	1
22	N-87-12	22,500	5.41	4,508	10,504	0.07	735	22,500	1
23	N-87-13	23,250	4.42	3,806	8,868	0.08	709	23,250	1
24	N-87-23	35,700	8.00	10,578	24,647	0.32	7,887	35,700	1
TOTALS		1,079,825		219,618	511,710		196,716		57
AVERAGE			5.47			0.384		18,944	

4.1.4.2.2 Western Section

Four samples were considered of which one came from inside an old incline.

# of Order From East to West	Assay Results in oz/NT	Extended Outcrop Length in Ft.
1	0.06	12.5
2	0.32	50.0
3	0.17	25.0
4 (1)	0.76	12.5
		100.0
Arithmetical Average	0.33	25.0
Weighted Average (2)	0.31	N.A.

(1) Assay from incline

(2) Considered in reserve calculations

4.1.5 Average Gold Grade Of The Mineralized Zone

The deposit was subdivided into 24 different reserve blocks of variable grade and thickness. Volumes, tonnages, grades and results per block and the total deposit are listed in the following table.

The following is the result of this compiliation:

Total Volume	219,618 yd^3
Total mineralized tonnage	511,710 NT
Average grade(weighted average)	0.384 oz/NT
Total ounces	196,716 oz

The preceding compiliation did not take into consideration the dilution to be added to determine mineable tonnage and mineable grades.

The following are the criteria used to establish the dilution:

- Considered minimum mining height 4 feet
- Overbreak dilution from both foot and hanging wall ½ foot

The non-mineralized mineable tonnages to be added were calculated as follows:

Reserve Block #	Surface in Ft^2	Thickness To Be Mined in Ft	NT Dilution Material
1	37,500	0.5	1,924
2	28,500	0.5	1,462
3	28,500	0.5	1,462
4	30,000	3.0	9,233
5	30,000	0.5	1,539
6	30,000	1.5	4,617
7	30,000	0.5	1,539
8	64,500	0.5	3,309
9	70,500	0.66	4,774
10	280,600	0.5	14,394
11	85,075	0.5	4,364
12	43,275	0.64	2,841
13	31,050	3.00	9,557
14	22,400	0.50	1,149
15	37,975	0.50	1,948
16	26,250	0.50	1,347
17	25,500	0.50	1,308
18	26,250	0.50	1,347
19	22,500	0.50	1,154
20	22,500	0.50	1,154
21	25,500	0.50	1,154
22	22,500	0.50	1,154
23	23,250	0.50	1,193
24	37,700	0.50	1,934
	1,079,825	N.A.	75,857 NT

The total mineable reserves has been calculated as follows:

	NET TONS	GRADE OZ/NT	OUNCES GOLD
Mineralized tonnage	511,710	0.384	196,716
Dilution tonnage	75,857	---	196,716
Total mineable tonnage	587,567	0.335	197,716

For all practical purposes the following reserve figures can be assumed:

Mineable Tonnage	588,000 NT
Ounces of Gold Weighted	197,000 OZ
Average Gold Grade	0.335 OZ/NT
Dilution Factor	12.5%

4.1.6 Nugget Effect

Some reserve calculations are made by systematically reducing all gold assays over 1 oz/NT to 1 oz/NT to correct for the so called nugget effect.

We believe that this method might be justified when dealing with placer deposits or an ore deposit showing coarse grained gold only, but it is in no way statistically justified as long as correction factors are only used for the high values without correcting the low assays. However, to further eliminate this effect, all high value assays were obtained from four different pulps.

We have not applied this method for the following reasons:

1. Up to four assays per high grade sample have shown ± variation in the 10 or 15% range from the mean value which we have used for our reserve calculations.
2. Microscopic studies of the polished ore sections have demonstrated the fact that the gold ore mineralization is actually linked to significant sulphide/telluride mineralization where gold inclusion averaged 10 to 20 microns with occasional values up to 50 microns. A grain size certainly not to be considered as coarse.

4.1.7 Discussion Of Results

The reserve figures obtained might be classified as probable reserves. The assay density is: "The number of square feet by assayed vein intercept." According to Ontario Stock Exchange Commission rules this figure should be in the 10,000 ft^2/intercept range to be considered as a drill proven reserve.

The average figure for the Vein # 1 deposit amounts to 18,944 ft^2/intercept with a maximum of 70,500 ft^2/intercept and a minimum of 10,792 ft^2/intercept. It must be noted in this context that the maximum figure covers a low grade ore zone whereas our higher grade ore zone assay densities are much closer to the average figure.

It is for this reason that ore reserves have been defined between the probable and drill proven reserve categories.

As far as the average grade is concerned, we consider the value obtained through the 600 kg bulk sample which assayed at 0.391 oz/NT as representative for this deposit. The calculated value of 0.343 oz/NT is therefore certainly realistic.

Whatever method one might apply to obtain a representative gold grade. The old saying that the grade is only known once the deposit is mined out is particularly true for gold deposits.

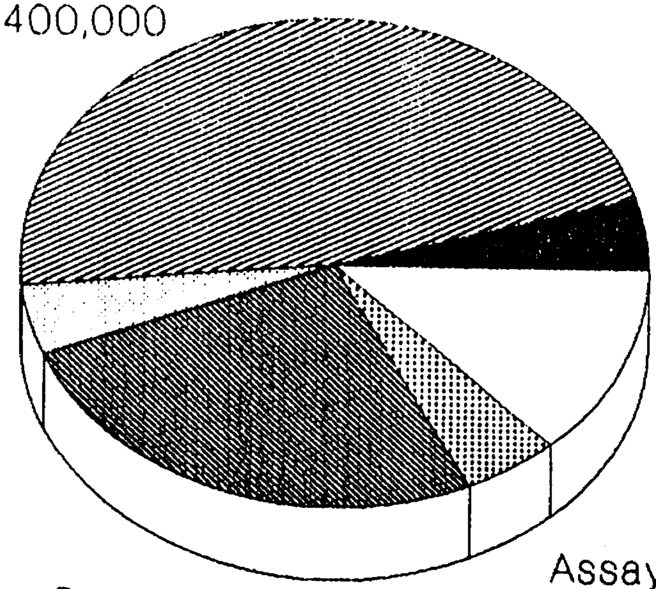
The Vein # 1 deposit is no exception to this rule. As noticed through outcrop sampling and also by analyzing old underground sample maps, grades ocillate within feet up to 80 fold.

We do not think that increasing the number of drill holes within the already delineated deposit will increase the confidence level.

The drilling of say 50 drill holes(about 15,000 ft. of core drilling) costing about $375,000 will certainly allow to consider this probable reserves as drill proven resources, but would we really gain more knowledge as far as grade, mining behavior, roof stability, etc. of the deposit is concerned? We doubt it !

The only realistic way to improve the confidence level as far as reserves, grades, mining engineering parameters is concerned is to obtain a reasonable bulk sample through underground sampling of representative parts of the deposit. This method, combined with some core drilling at the limits of the deposit should be applied in Phase 2 of this exploration program to obtain at the end of this phase all data required to make a mine development decision.

Joint Venture 1988
Exploration Program



Total Expenditure $860,000
Less Overhead, Home Office
and Contingencies

4.2 SUGGESTED 1988 NORTEK EXPLORATION PROGRAM

The suggested Nortek/Shenandoah/Miller-Independence Properties Exploration will consist of eight main phases. They are:

1. The continued core drilling of the Miller properties associated ore bodies. Proposed core hole locations are shown on the following Plan Map as red circles. In all about 10,500 linear feet of "BQ" core will be drilled, geologically logged and mineralized zones assayed. Approximately 25 holes will be required. Total core drilling costs are estimated at about $220,000

2. Assessment drilling and sampling. Proposed core drilling to complete currently required assessment drilling is estimated at about 2,000 linear feet. One month of field mapping and surface sampling will also be required prior to drilling to delineate additional potential targets beyond those known to exist from last years dozing assessment work. Two tables are attached which show the claims affected and the type and magnitude of work required. Total costs to maintain all claims in good standing is estimated at about . . $40,000

3. 700 linear feet of underground 6 x 6 ramp and a mining milling cost feasibility study done in-house. It is proposed to construct a declining ramp approximately 700 feet long and an on strike lateral development within budget limitations. From this mining, a 50 NT bulk sample, representative of the ore body, will be obtained and delivered to Lakefield Laboratories for detailed testing. An in-house mining, milling feasibility study will be produced based on mining data derived and milling data obtained from testing. Total cost of contract mine development is estimated at about $400,000

4. Bulk sample laboratory testing. A 50 NT bulk sample will be obtained from the mined ore from the ramp and cross cuts. This will be metallurgically tested by Lakefield Research Laboratories to determine milling procedures, equipment requirements and reagent usage.

Processing tests. The quartering rejects, about 50 NT, which represents, in our opinion, a representative bulk sample will be forwarded to Lakefield Research Laboratories for bench testing to optimize the flow-sheet and processing equipment selection. Processing tests to be performed will be as outlined in the Lakefield Research proposal, but exclude all roasting related tests since it seems to be impossible to obtain roasting related emission permits. This program is estimated to cost about $40,000

5. Site Supervision and Engineering. On site supervision, miscellaneous, is estimated to cost about $110,000

6. Field obtained contract help. Local contract help will be required part time during May and June for field sampling and geological mapping. Additional help will be required to assist in grade surveys, sample selection, channel sample cutting, etc. during ramp development. Total costs for this help are estimated at about $10,000

7. Assays, sample preparation, etc. Swastika Laboratories assay work will be required throughout the program. There are other costs associated with field sampling and surveying, etc. The total costs are estimated at . . $9,000

8. Miscellaneous contracts. In order to clear sites, develop ore storage pads, provide access roads, etc., contract equipment will be required. It is estimated that the total cost for dozing, etc. will be about . . .$24,000

The grand total for this proposed program exclusive of Nortek Minerals' overheads, etc. is estimated at $860,000

See timing summary chart which follows:

SUGGESTED 1988 EXPLORATION PROGRAM

NORTEK/SHENANDOAH/MILLER-INDEPENDENCE PROPERTIES

TASK	TIME FRAME BY MONTHS									ESTIMATED TOTAL COST
	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	
1. Miller Ore Body 10,500 feet core drilling		○	Yost	10,500 Contract	feet Drilling	▲ Report ●					$220,000
2. Assessment Drilling		Sample Iron Formation Delineation	& Map ○	KOSY	2,000ft.	▲ File ★	N½ Lot 10 8 hole, 2,000 ft.	added ore reserve option			$ 40,000
3. Ramp Construction & Feasibility Study					○ Install of	700 linear 6' x 6'	feet ramp	▲ Feasibility Cost be	Study included low	● DECISION TO OPEN Financing Arrangements Started	$400,000
4. Bulk Sample Metallurgical Testing											$ 40,000
5. Supervision, Etc.	———	———	———	———	———	———	———	———	———	———	$110,000
6. Field Contract Help -Locally		$5,	000			$5,	000				$ 10,000
7. Assays, etc.											$ 9,000
8. Miscellaneous Contracts Equipment rental, dozers, etc.											$ 30,000
										TOTAL	$860,000

NOTE: 1) Does not include possible contract with Searles for NE sulfides area work.

2) Nortek home office costs not included, Ontario Site help only.

○ Start
▲ Complete
● Report and Decision
★ Action Required

fAI

4.2.1 Complete Miller Ore Body Drilling

The northwestern and western extremes of the Miller ore body will be delineated by additional drill holes, and the 200 foot spaced pattern will be turned into a 5 spot, 150 foot spaced pattern. The granitoid(dike bulge) area will be drilled by at least six more 500 foot holes(this area currently thought to be a potential for open pitting). The northern, adjacent to the granitoid dike, mineralized zones as defined by surface sampling will also be drilled. The "D" vein drilling will be completed and potential reserves in this system identified. In all, over 10,000 linear feet of drilling is thought to be required. Results should increase in place reserves, as well as improve the category of resource. See attached core hole pattern in the Map Pocket.

TABLE OF DRILL HOLE DATA

PROPOSED DRILL HOLE #	PROPOSED DEPTH	LOCATION
1	80'	see map location
2	100'	see map location
3 & 3a	200' & 400'	"D" vein exploration
4 & 4a	200' & 400'	Each hole number only at 50° and
5 & 5a	300' & 500'	a series holes are nearly verti-
6 & 6a	300' & 500'	cal, say 80° to 90°.
7	350'	see map location
8	400'	see map location
9	400'	see map location
10	500'	see map location
11	550'	see map location
12	500'	see map location
13	500'	see map location
14	500'	see map location
15	500'	see map location
16	400'	see map location
17	400'	see map location
18	400'	see map location
19	400'	see map location
20	300'	see map location
21	500'	see map location
SUBTOTAL	9,600 feet	
22-26		Reserved for expansion as data is developed

Total drilling 10,500 linear feet.

BOSTON TOWNSHIP CLAIMS HELD 50% SHENANDOAH RESOURCES LTD./50% MILLER-INDEPENDENCE MINING LTD.
February 20, 1988

Claim No. L-	Current Assessment Work Credit					Totals	Staked	Recorded	Assessment Man Days Needed 1987	1988	1989	1990
822554	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/19/84	1/15/85			59	
822555	96.42PS	2.85ML	1.10AS	40.66DD		141.03	12/19/84	1/15/85			59	
822556	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/19/84	1/15/85			59	
822575	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/17/84	1/15/85			59	
822576	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/17/84	1/15/85			59	
822577	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/17/84	1/15/85			59	
822578	96.42PS	2.85ML	1.07AS	40.66DD		141.	12/18/84	1/15/85			50	
822579	96.42PS	2.85ML	1.07AS	40.66DD		141.	12/18/84	1/15/85			59	
822580	96.42PS	2.85ML	1.07AS	40.66DD		141.	12/19/84	1/15/85			59	
822581	96.42PS	2.85ML	1.07AS	40.66DD		141.	12/18/84	1/15/85			59	
822582	96.42PS	2.85ML	1.07AS	40.66DD		141.	12/18/84	1/15/85			59	
822583	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/19/84	1/15/85			59	
842959	100.PS	2.85ML	.15AS			103.	5/26/85	6/05/85		37	60	
842960	100.PS					100.	5/21/85	6/05/85		40	60	
842961	100.PS					100.	5/21/85	6/05/85		40	60	
842962	100.PS	2.85ML	.15AS			103.	5/26/85	6/05/85		37	60	
842963	100.PS	2.85ML	.15AS			103.	5/26/85	6/05/85		37	60	
842964	100.PS	2.85ML	.15AS			103.	5/26/85	6/05/85		37	60	
843632	100.PS	2.85ML	.15AS			103.	5/26/85	6/05/85		37	60	
843633	100.PS	2.85ML	.15AS			103.	5/27/85	6/05/85		37	60	
843634	100.PS	2.85ML	.15AS			103.	5/27/85	6/05/85		37	60	
843635	100.PS	2.85ML	.15AS			103.	5/29/85	6/05/85		37	60	
843636	100.PS	2.85ML	.15AS			103.	5/29/85	6/05/85		37	60	
843637	100.PS	2.85ML	.15AS			103.	5/29/85	6/05/85		37	60	
843638	100.PS	2.85ML	.15AS			103.	5/29/85	6/05/85		37	60	

AS = Assay credit
CL = Core library donation of core
DD = Diamond Drilling credits
ML = Manual labor credits
PS = Power stripping by dozer credits

4-15

Chart 1
4.2.2

McELROY TOWNSHIP CLAIMS HELD 50% SHENANDOAH RESOURCES LTD./50% MILLER-INDEPENDENCE MINING LTD.
February 20, 1988

Claim No. L-	Current Assessment Work Credit					Totals	Staked	Recorded	Assessment Man Days Needed 1987	1988	1989	1990
822532	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/11/84	1/04/85			59	
822533	96.42PS	2.85ML	1.90AS	40.22DD	18.45CL	159.84	12/11/84	1/04/85			41	
822547	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/13/84	1/04/85			59	
822548	96.42PS	2.85ML	1.59AS	40.22DD	19.92CL	161.	12/13/84	1/04/85			39	
822549	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/14/84	1/04/85			59	
822550	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/15/84	1/04/85			59	
822551	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/15/84	1/04/85			59	
822552	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/18/84	1/04/85			59	
822553	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/18/84	1/04/85			59	
822562	96.42PS	2.85ML	1.51AS	40.22DD		141.	12/13/84	1/04/85			59	
822563	100.PS	2.85ML	.15AS			103.	12/13/84	1/04/85		37	60	
822564	96.42PS	2.85ML	.51AS	40.22DD		140.	12/13/84	1/04/85			60	
822565	96.42PS	2.85ML	.51AS	40.22DD		140.	12/14/84	1/04/85			60	
822568	100.PS	2.85ML	.15AS			103.	12/15/84	1/04/85		37	60	
822569	100.PS	2.85ML	2.35AS			105.2	12/15/84	1/04/85		35	60	
822570	100.PS	2.85ML	2.35AS			105.2	12/15/84	1/04/85		35	60	
822571	100.PS	2.85ML	2.35AS			105.2	12/15/84	1/04/85		35	60	

AS = Assay credits
CL = Core library donation of core
DD = Diamond Drilling credits
ML = Manual labor credits
PS = Power stripping by dozer credits

Chart 2 4.2.2

4.2.3 Details Of Ramp Development

4.2.3.1 Underground Bulk Sampling Program Work Description

In order to obtain a representative bulk sample for ore processing tests and to ascertain with more accuracy:

a. Average grade of the # 1 Vein deposit

b. Hanging wall behavior

c. Rock stability in general

d. Blasting parameters

e. Grade variations in strike and dip direction

The following underground exploration should be carried out:

1. Driving of 700 feet of an inclined ramp, directed approximately in south/north direction starting at 9,120 north/10,070 east. The section of this ramp will be a normal 6 x 6 foot; will cover about 700 feet of the central part of the deposit; yielding about 2,600 NT of ore; ore zones may dictate an increased mining height.

2. Driving of cross-cuts, as the budget allows, in the strike direction of the deposit to better define mineralization pattern in east-west direction. The 6 x 6 foot cross-cuts will produce about 1,300 NT of ore.

4.2.3.2 Sampling

To obtain a representative sampling of the deposit two sampling methods will be used:

a. Channel sampling at regular intervals of say 5 feet on the east and west or north and south walls of the incline and cross cuts i.e., practically one channel sample for each 2.5 feet.

b. A sampler will recover randomly 3 shovels by mine car(about 12 kg/NT) and stockpile this material in one heap. For each drift increment of 5 feet, about 220 kg of randomly selected sample material per 18.5 NT or 1.3% will be available for testing purposes. Sample material will be quartered down until the quantities required for assaying are obtained.

c. Assay results from channel and shovel samples will be correlated.

d. The quartering rejects, about 50 NT will be stockpiled for processing tests.

4.2.3.3 UNDERGROUND BULK SAMPLING COSTS

700 feet of ramp driving	$227,600
Available for cross cuts	106,500
Sampler costs	10,000
Bulk Sample Preparation:	
Loading, transportation	15,000
Mobilization/demobilization, etc.	41,000
Total	$400,000

5.0 OTHER NORTEK OR JOINT VENTURE RESOURCE POTENTIALS

5.1 ALTERNATE EXPLORATION AREA

The 1988 Nortek Minerals exploration program is proposed to consist of four iterative principal phases, each defined to add substantially to reserves to increase the existing 685,000 probable reserves on the Miller property, and thus justify construction of an on site milling facility. The total expenditure for exploration during 1988 could be as high as $860,000(not including lease payments). See suggested exploration program Sec. 4.2). If additional resources are deemed desirable and cash flow allows an alternate 8 hole drill pattern on the N½ of Lot 10 is suggested.

5.1.1 Preliminary 8 Hole Pattern N½, Lot 10; October-November

This preliminary 8 hole pattern is designed to core drill the surface sampled and geologically mapped, dozer exposed mineralized fault zone in the southwest corner of the North ½ of Lot 10, Concession VI, Catharine Township* and the extension of this possible ore body into adjacent Perron claim L-565523 (see hole locations map, Figure 5-1). This area has been dozed, mapped and is accessible for early exploration with the completion of some road work which includes installing three 10" culverts; about 5 days of dozing; and the haulage of 50 to 70 yards of gravel. Drill water impoundments have been constructed and are available for use as the weather permits. Assay results and the strong width and length of the exposed silicified faulted mineralized zone make this a prime alternate target for core drilling. If a sufficient number of core holes intersect mineable ore, it is possible to greatly increase the reserves with drilling this area only. In all, a total of about 8 holes will be required as a minimum, with contemplated average depths of 200 feet. After analysis of core results, it may be necessary to drill additional deeper holes to further define the ore body. Initial drilling and evaluation is expected to cost about $20,000 with potential costs for deeper, more extensive drilling adding an additional $40,000 at a later stage.

5.1.2 Magnetic Anomaly Drilling

With the completion of drill site installation in the areas shown on attached Figure 5-2(principal axis of dozing areas), a series of five core drill holes(minimum) could be drilled, at a later time, to an average depth

*Assumes readers have read Shenandoah & Miller-Independence Geological Report.

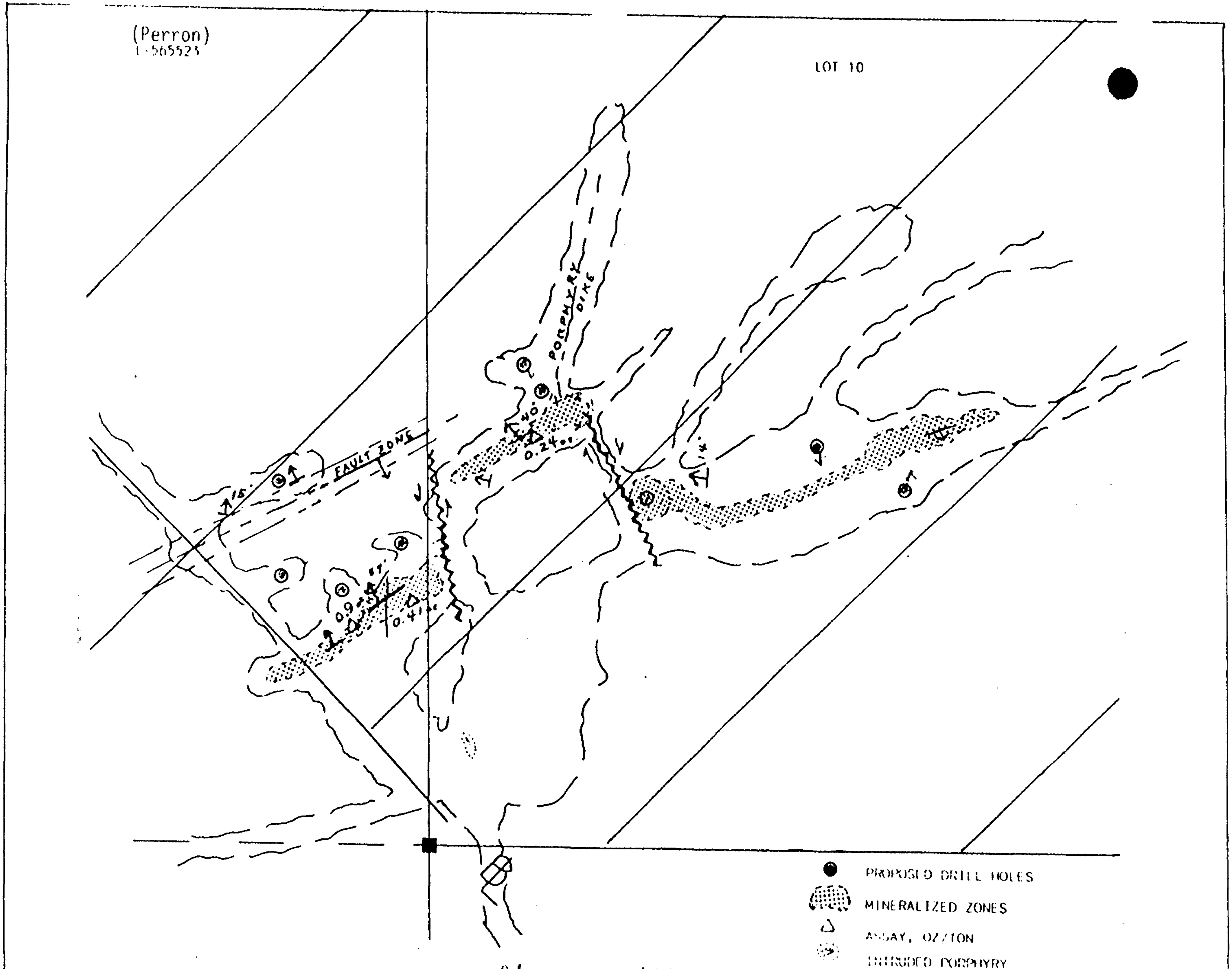
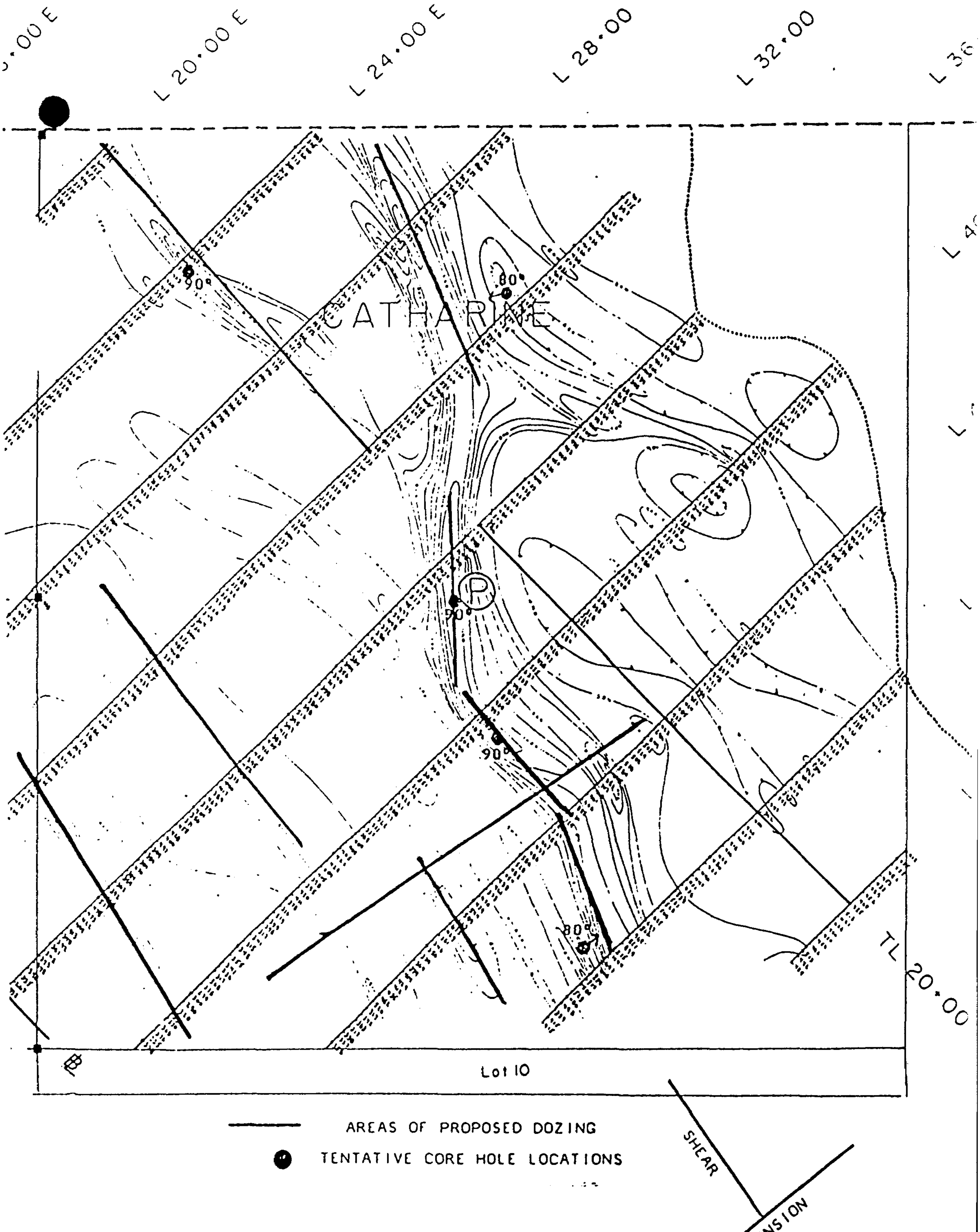

(Perron)
I-565523
LOT 10
PORPHYRY DIKE
FAULT ZONE
PROPOSED DRILL HOLES
MINERALIZED ZONES
ASSAY, OZ/TON
INTRUDED PORPHYRY
0
200
1" = 200'

FIGURE 5-1



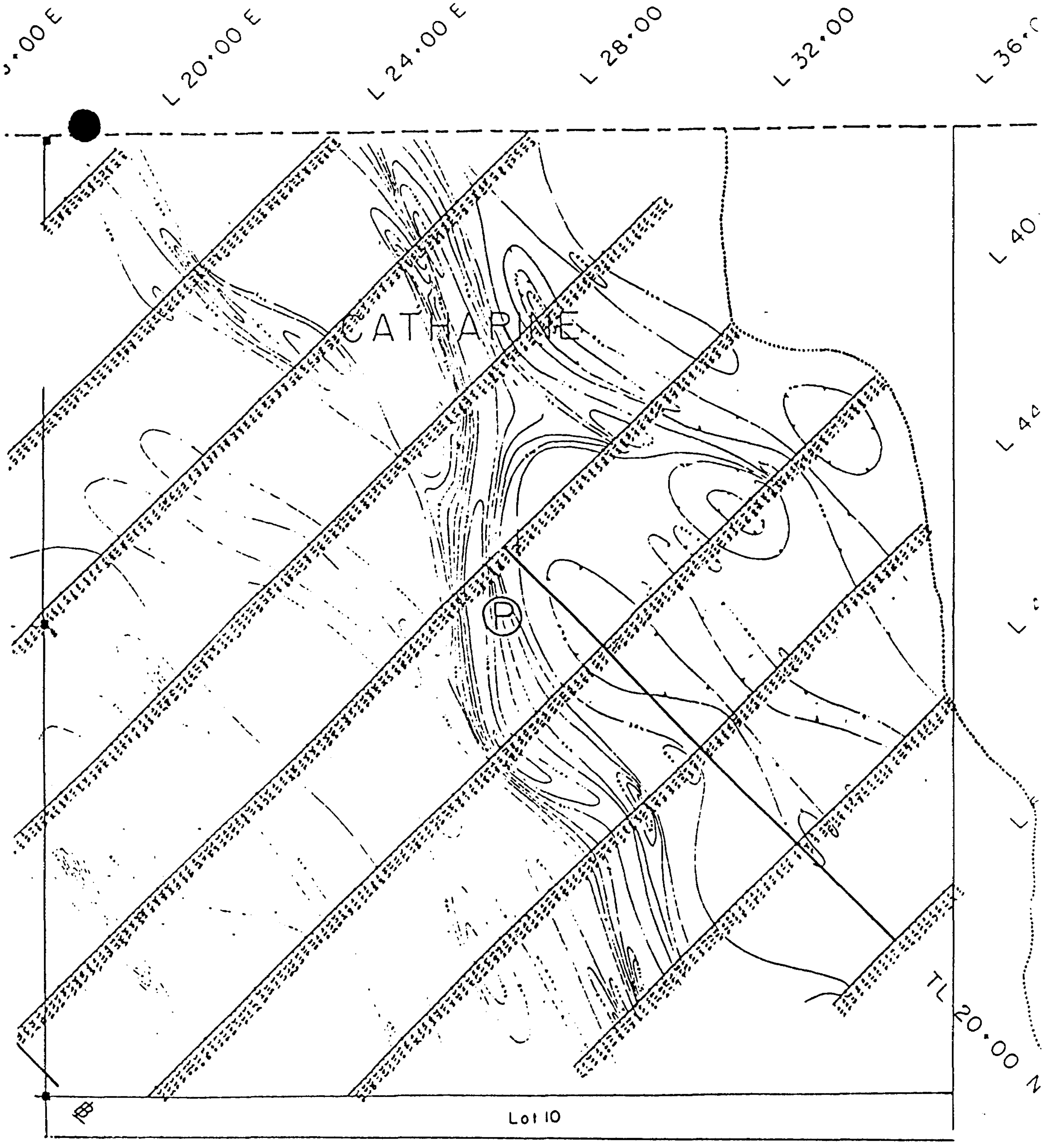
L 20·00 E
L 24·00 E
L 28·00
L 32·00
CATHARINE
90°
80°
90°
90°
80°
TL 20·00
Lot 10
AREAS OF PROPOSED DOZING
TENTATIVE CORE HOLE LOCATIONS
SHEAR
TENSION

FIGURE 5-2

of 400 feet each, on the dozed and geologically mapped conductors as defined by the March 1984 Geological Survey(see Geophysical maps attached as Figures 5-3 and 5-4). The indicated strong North/South trending conductor is thought to be a source of additional potential reserves. After conpletion of prescribed dozing, the final location of core holes will be selected. However, tentative locations, based on geophysical data only, are shown on the attached figures. Costs for this phase are expected to be about $55,000. Total results at this point may be sufficient so that limited additional core drilling will be required to define neeeded reserves. Since this is an alternate site for drilling, no costs have been included in this year's program. If however, reserves are limited or funds become available, this site is recommended.

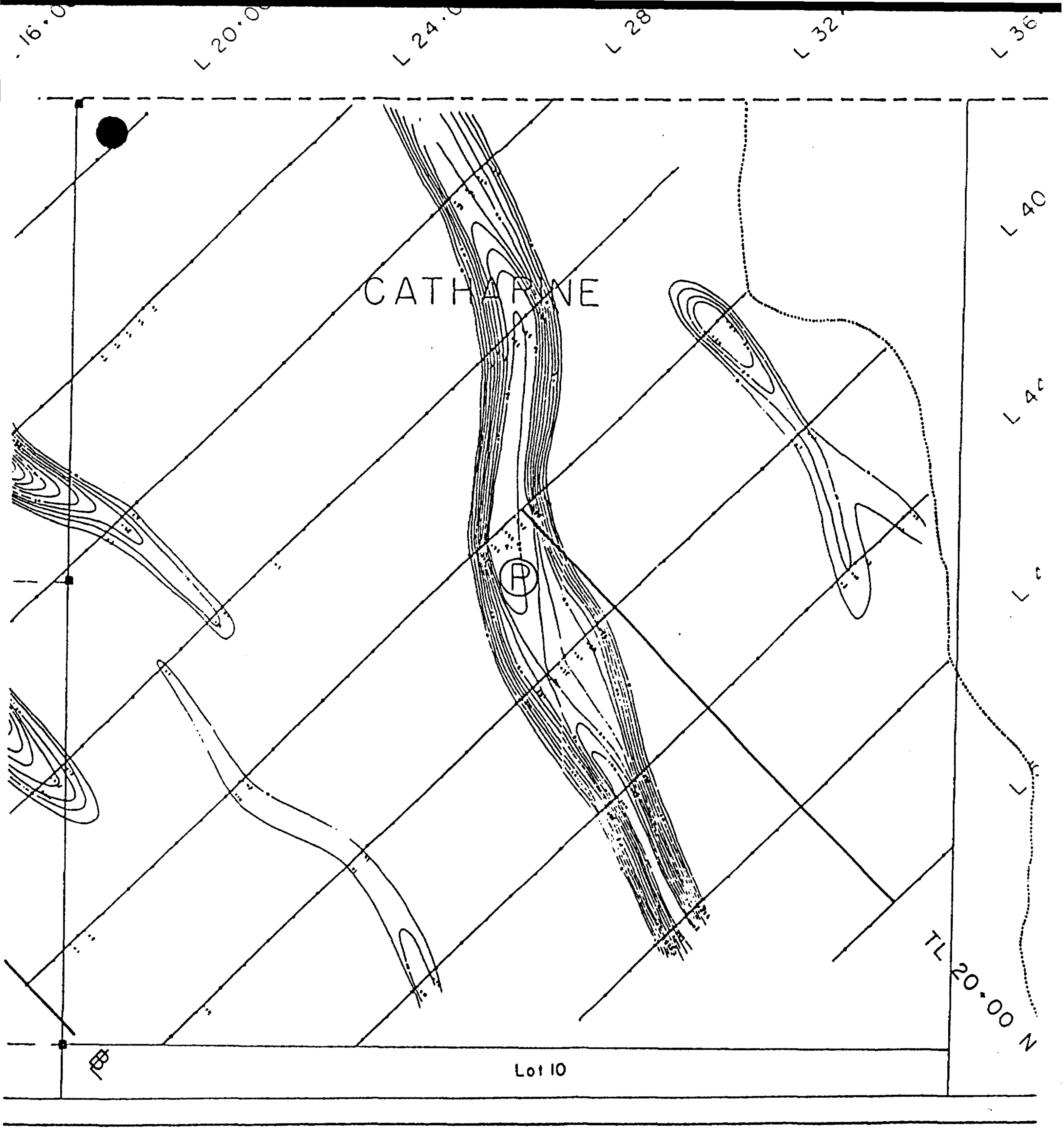
5.1.3 Farm Out Possibilities

The N½ of Lot 10, Concession VI, property potential represents a totally separate area on patented land, which could be farmed out - joint ventured or used as a separate exploration venture. It is included so that preliminary information is available for possible dissemination to interested parties.



SHENANDOAH RESOURCES LTD. N 1/2, LOT 10, CATHARINE TOWNSHIP
GROUND MAGNETOMETER SURVEY
ISOMAGNETIC CONTOURS AT 100 GAMMA'S INTERVAL
PROTRON MAGNETOMETER - GEOMETRICS G-856

FIGURE 5-3



SHENANDOAH RESOURCES LTD.
N1/2, LOT 10, CONCESSION VI, CATHARINE TOWNSHIP
GROUND VLF - EM SURVEY
CONTOUR INTERVAL 10 UNITS, FREQUENCY 24.0 KH_2
GEONICS VLF - EM16 on NAA CUTLER, MAINE
Topographic relief not in excess of 50' over area of survey

FIGURE 5-4

DRILL HOLE LOGS AND ASSAY DATA

FOR

PERIOD FROM NOVEMBER 1987 THRU FEBRUARY 1988

LOCATION: 9,845N, 10,100E, + 29 feet above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-8 | Vertical Scale: 1" = 6' | Total Depth: 199 feet

DEPTH		CORE LOG	DESCRIPTION	Joints "DIP"	Number of ASSAY	SAMPLE thickness
0–5	CASING 5'					
5	Basalt, dk. green-grey			10,45		
6	Hard, numerous siliceous bands associated pyrite + minor calcite on fracture surfaces	Py / Py	6-7 Vertical ½" pyrite zone	15,60		
7				90,40		
8		Py / Py	8-9 Pyrite blebs to 1/8"	30,75		
9				15		
10		Py	10.5 ½" zone w/pyrite blebs @ 75°	20,20		
11		Q	11 ½" Quartz	40		
12		Q	12 3 thin quartz bands @ 75°	25		
13		Py Q	13 ½" pyrite + quartz zone @ 20°	25,20		
14		Q Py	14.5 ½" quartz + minor pyrite @ 5°	40		
15				70,20		
16			16-25 Competant core	25		
18				20		
20				30,25		
22				30		
23				50,50		
24		Q Py	24 ½" quartz + minor pyrite @ 60°	20,25		
25				10,15		
27				35		
28		Calcite	28 1" calcite vug filling			
29				80		
30				30		
32.5	Altered Basalt, med. green siliceous		32.5-38 Altered zone, numerous quartz fracture fillings			
33		"M-1"		35,20		
34		Qtz	34 0.3" quartz @ 40°	65		
35				30		
37				60		
38	Basalt dark green-grey	Qtz	38 ½" quartz 38-50 competant core	60		
39		Qtz	39-40 Quartz filling zone to ½"			
40				60		
41				60		
42			42-43 Slightly altered			
44	Basalt very dark green to black Hard. pyrite blebs	"M-2"		55		
45				55		
46				45		
47.5			47.5-49.5 Moderately altered zone with quartz + calcite to ½", minor pyrite associated w/quartz	50		
48		Q Py Ca		50		
50				90		

LOCATION: 9,845N, 10,100E, + 29 feet above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-8 | Vertical Scale: 1" = 6' | Total Depth: 199 feet

DEPTH	CORE LOG	DESCRIPTION		ASSAY	SAMPLE
50					
52			80		
	"Q-1" Equivalent	53-54 Shearing w/weathered pyrite on surfaces	80		
54			75		
			30		
56			45,25		
			15,20		
58			75		
	Calcite	59 Calcite filled bleb, 1"	5		
60			10,20		
62					
			5,5		
64			20		
66					
			75,15		
68			80,10		
	Py Q	69 2" quartz + pyrite zone @± 20°			
70	Py Q	70 ½" pyrite + quartz @ 20°	20,40		
	Py	70-72 Numerous thin pyrite stringers @ 20°	10		
72		72.5-74 Moderate alteration	15,55		
74					
			20		
76					
			10,15		
78					
			20		
80		80-84 Quartz + calcite filled tension fracture zone, 2x6" broken zones @ 80°	10		
			10,80		
82	Q Cal				
			80		
84					
			20		
86					
		87-89 Slightly altered			
88			55,55		
			15		
90			20		
92		92.5-94 Moderate alteration			
			15,70		
94			15		
		94.5-96 Slightly brecciated			
96					
			20		
98	Py Q	98 3/4" pyrite quartz @ 30°	45,25		
	Q	99 ¼" quartz @ 50°	10 20		
100					

LOCATION: 9,845N, 10,100E, + 29 feet above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-8 | Vertical Scale: 1" = 6' | Total Depth: 199 feet

DEPTH	(Lithology)	CORE LOG	DESCRIPTION	Joints "DIP"	Number of ASSAY	SAMPLE thickness
100						
				10,15		
102						
		Q, Py	103-104 Highly altered, light green brown, w/quartz + minor pyrite			
104				10		
				15		
106				15		
				0,5		
108				10		
			109-113 Fractured	80		
110						
				80		
112	112 Basalt, deep green, minor altered sections			80,20		
				35,20		
114				15,40,20		
				10,30		
116				25,15		
				30,80		
118	118 Basalt, moderate alteration. Siliceous, minor pyrite blebs med. green			10		
		Q	119.5 ½" Dirty quartz	40,20		
120						
122		Qtz	122 1" = ½" Dirty quartz	25		
		Qtz	123.5 3" Dirty quartz			
124						
				45		
126				45		
		Q-2 Py Py	127 3" quartz + pyrite @ 15°	15		
128						
	129 Basalt, deep green, minor alteration sections			5,45		
130				10		
				0		
132				10		
				35,15		
134				40		
				25		
136						
	137 Basalt, medium to lite green, Moderate altered, dark quartz		137-142 Some minor associated Ca	85,10		
138				15		
				35,35		
140				10		
				55		
142	142 Basalt deep green calcareous blebs			90		
				80,70		
144						
				30,80		
146				50,70		
				70,60		
			147.5-155 Minor alteration			
148						
			149.5 4" moderate alteration, medium grain	20,20		
150				70,75		

LOCATION: 9,845N, 10,100E, + 29 feet above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-8 | Vertical Scale: 1" = 6' | Total Depth: 199 feet

DEPTH		CORE LOG	DESCRIPTION	Joints "DIP"	Number of ASSAY	SAMPLE thickness
150						
				5		
152				10,70,80		
		"Q-3"		75,80		
154		Py Py	154 2" quartz + pyrite @ 15°	35,35,30		
			155-156 Broken	70		
156			156 Lost circulation (lost ½)	35		
			156.5-158.5 Slightly altered	30		
158				5,15		
				15, 5,40		
160				20		
	"VEIN"	Py Q	161-162 Very fine disseminated Py	30,25	5655 .05	161/1"-161/11"
			161.5 2" Quartz stringers			
162	Siliceous	Py	162-163.4 Minor disseminated pyrite		5656 .01	161/11"=163/5"
	quartz and		163.5-165 Very fine disseminated Py	15		
164	pyrite zones	Py		25,90	5657 .01	163/5"-165/2"
			165-167 White quartz, barren, pyrite fract.	90,10		
166		Py Q Q	166 Lost circulation(lost other ½)	35	5658 .002	165/2"-167/1"
			167-170 Very fine disseminated Py			
168		Py Q	168 2"(two) quartz stringers to ½"	50	5659 .01	167/1"-168/7"
			169-170 Quartz stringers to 5" w/Py		5660 22.24/22.48	168/7"-170/0"
170		Q Py	170-171 Brecciated quartz w/pyrite	30,40	5661 .14	170/0"-171/7"
		Q Py Q Py	171-172 Quartz stringers to 3"			
172	Basalt			5,60		
	deep green			5		
174	minor calc. blebs		175-182 Slight alteration	55		
176	176.5					
	Basalt mot-					
178	tled medium green, slight-		174-180 Slightly broken	40,45,40		
	ly altered					
180	minor quartz			20,20,15		
	stringers			20		
182	occasional			15		
	clovite w/					
184	Py stringers					
				20,20		
186						
				15,45		
188				25		
190			190 2" broken	70,60		
				30		
192				60		
				45,40,45		
194				15,30,35		
				45,45,10		
196			196-197 Broken	15,20,50		
				65,60,15		
198				60,15		
	199		198.5-199 Broken	20,50		
200	TOTAL DEPTH		Stopped due to caving in vein			

This core logged by Peter J. Proudlock

87-10-30

Peter J. Proudlock

SWASTIKA LABORATORIES LIMITED

P.O. BOX 10, SWASTIKA, ONTARIO P0K 1T0
TELEPHONE: (705) 642-3244 FAX: (705) 642-3300
ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 68783 Date: Nov. 11, 1987

Received Oct. 30, 1987 15 Samples of Split Core & Broken Rock

Submitted by Nortek Minerals Ltd., c/o G. B. French, Tarzwell, Ontario.

N-87-8

SAMPLE NO.	GOLD Oz/ton
5655	0.050
5656	Nil
5657	0.010
5658	0.002
5659	0.010
5660	22.24/22.48
Second Pulp	18.42/18.16
5661	0.140
5801	22.34/22.24
5802	2.92
5803	1.18
5804	0.080
5805	0.040
5806	0.035
5807	0.250
5808	38.18/38.72
Second Pulp	46.18/45.46

Per G. Lebel

G. Lebel - Manager /ns

LOCATION: 9,845N, 10,250E, elevation + 29 feet above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-9 | Vertical Scale: 1" = 6' | Total Depth: 189 feet

DEPTH	CORE LOG	DESCRIPTION	Joints "DIP"	Thickness ASSAY	SAMPLE Number & oz
0-5 CASING 5					
GREENSTONE medium to dark green Hard. Slightly altered sections with mottled appearance. Fairly competant. (Monotonous)		6-7 Broken	65, 70, 25,90, 30,25, 30,0, 60,65, 5, 30, 55, 20, 70, 20,5, 10, 25, 10, 60, 15, 20,25, 55,30, 20, 20,20, 45, 25, 70, 10, 15, 5,5, 30, 85, 35,70, 50, 50,90, 45, 20, 20,15,50, 70		

TYPICAL FLOW BASALT WITH ALTERATION (CHLORITIZED) ZONES ON THE PILLOWS/gbf

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50

LOCATION: 9,845N, 10,250E, elevation + 29 feet above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-9 | Vertical Scale: 1" = 6' | Total Depth: 189 feet

DEPTH	CORE LOG	DESCRIPTION	Joints "DIP"	Thickness of ASSAY	Number & oz/ton SAMPLE
50					
			20		
52					
			10		
54			20		
			25,30		
56			20,40		
			45,20		
58					
		59-60 Minor jasper fractures			
60			60		
			55		
62			65		
			80,70		
64	Ca J	64-65 Breccia zone. Calcite 2 jasper healed			
66					
		Tenaceous core			
68					
69 As above, but increasing alteration					
70	"M-1" ? equivalent		80		
72					
74					
			70		
76					
	Q Q	77 3 ¼" quartz bands @ 20°			
78			60		
			10		
80			90		
			85,20		
82			25,40		
			65		
84			60		
			65,90		
86					
			25,80		
88		88 Calcareous alteration	90		
			90		
90					
		91-93 Broken	25,30,60		
92			75		
			65		
94		94-95 Broken	75		
95 Basalt, dark green to black. Hard Pyrite blebs Minor calcite fracture filling			90,70		
96	"M-2" Q,Py	96 ¼" quartz and pyrite @ 20°	50,80		
	Q,Py	97 ¼" quartz and pyrite @ 20°	10		
98			40,60,70		
100			10,75,60		

LOCATION: 9,845N, 10,250E, elevation + 29 feet above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-9 | Vertical Scale: 1" = 6' | Total Depth: 189 feet

DEPTH	CORE LOG	DESCRIPTION	Joints "DIP"	Thickness of ASSAY	Number & oz/ton SAMPLE
100					
			80,10,15		
102			80		
	Jasper - Pyrite	103 1" Pyrite bleb, jasper	70		
104	Jasper	104 Minor jasper fracture	60		
			20,20		
106			40,90		
	Jasper	107 Minor Jasper	40,50,90		
108			70		
	Jasper	109 Minor jasper	70,70,70		
110		109-111 Broken	90		
			70,70		
112			5,80,60		
			15		
114			75,90		
		115-116.5 Moderate alteration	75		
116					
			70,15,75		
118			10		
			25		
120			75,70,20		
		120-121 Broken	80,15		
122			20		
			45		
124	Jasper	124 Minor Jasper	80,80		
		124-128 Moderately broken	85,10		
126			90		
			85		
128			90,30		
			10		
130			85,20		
132					
			65		
134			85		
			90,10		
136			85		
138			60,10,80		
140			45,50,75		
			40,40		
142			5,40		
144			90,10,50		
	"Q-3" Py	145 1" Pyrite and quartz	15,30,85		
146			5,15		
			90		
148			90		
149	Pyrite	149 Minor pyrite	15		
150 Description see next page.			15		

LOCATION: 9,845N, 10,250E, elevation + 29 feet above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-9 | Vertical Scale: 1" = 6' | Total Depth: 189 feet

DEPTH		CORE LOG	DESCRIPTION	Joints "DIP"	Thickness of ASSAY	Number & oz/ton SAMPLE
150	BASALT, Medium to dark			15		
152	green. Slightly mottled	Quartz	151.5 ½" Quartz @ 40°	20		
	appearance.	Quartz	152.5 ½" Quartz @ 50°	10,5		
154	Hard, siliceous. Minor	Quartz	153.5 ½" Quartz @ 40° (#1 + #3 parallel, #2 is perpendicular)	5		
156	calcareous fractures.			10		
				20		
158			158 4" very broken	15,90,85		
				85		
160				90		
				10		
162				20		
				50		
164				80,60,70		
				5,10		
166				10,85,25		
	167.5		167.5-168.5 Banded dark quartz, pyrite	25,40,15	5662 0.56/0.54	167'4"-168'6"
168	VEIN	Quartz, Pyrite	168.5-170 White & dark quartz; mottled	20,10	5663 0.030	168'6"-170'2"
	Quartz and	Quartz		0,20		
170	Pyrite		170-175 Dark quartz with fine disseminated pyrite; grey	25,60	5664 0.075	170'2"-171'6"
				40,30	5665 0.035	171'6"-173'9"
172		Q, Py	171.5 3" broken	20,55		
			75% LOSS CIRCULATION ZONE	20,25	"less mineralized"	
174		Q, Py		0	5666 1.62/1.63	173'9"-175'1"
	175		175-189 Core breaks easily other than fracture surfaces.			
176	BASALT, dark grey			15,20		
	to dark		Numerous calcite fracture	20		
178	green		fillings at ± 60°	50,70		
				75,75		
180				20		
				85		
182						
184				65		
		Quartz	185 ½" quartz @ 60°	45		
186		Q, Py	186 1" quartz + Py @ 10°	5		
			186-189 Broken	90,90		
188				90,30		
	189					
190	TOTAL DEPTH		This core logged by Peter J. Proudlock 1987-11-5.			
192						
194						
196						
198						
200						

Peter J. Proudlock

SWASTIKA LABORATORIES LIMITED
P.O. BOX 10, SWASTIKA, ONTARIO P0K 1T0
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ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 68840 Date: November 12, 1987

Received November 6, 1987 5 Samples of Split Core

Submitted by Nortek Minerals Limited, c/o G. B. French, Larzwell, Ontario

A-87-9

SAMPLE NO.	GOLD OZ/TON
5662	0.56/0.54
5663	0.030
5664	0.075
5665	0.035
5666	1.62/1.63

Per G. Lebel

G. Lebel-Manager/rl

LOCATION: 9,850N, 10,400E, elevation + 22' above lake level
INCLINATION: Vertical hole
CORE SIZE: BQ core SEARLES LEASE

Hole: N-87-10 | Vertical Scale: 1" = 6' | Total Depth: 200 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0	FLOW BASALT (0–50)	Dark black-green, fractured aphanitic basalt fractures mostly 60° ± typical spacing 2" to 4" minor calcite healed fractures from horizontal to 20° little chlorite alteration until 20 foot depth		
26		Irregular thin chlorite alteration zones with minor calcite 10% or less of core. Mostly fine, black, with 2% to 4% FeS_2		
40		*"Alteration (chlorite zones) are interpretated as hydrolysis and carbonatization of ferromagnesian minerals and oxides. The chlorite alterations are apparently regional in linear deformation zones"*		
50				

LOCATION: 9,850N, 10,400E, elevation + 22' above lake level
INCLINATION: Vertical hole
CORE SIZE: BQ core

SEARLES LEASE

Hole: N-87-10	Vertical Scale: 1" = 6'		Total Depth: 200 feet	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
50				
52 FLOW BASALT	"Q-1"	1½" altered pyrite with ½ quartz Aphanitic black		
54		2% to 4% FeS_2 alteration		
56		5% chlorite, irregular, re-healed and fractured again		
58				
60				
62				
64				
66				
68		Minimal fracture Massive, bedded		
70				
72 "M-2" ZONE	2" mineralized			
74				
76				
78				
80				
82				
84		Dark, aphanitic basalt with 10% chlorite alteration		
86		Thin zones		
87	6" qtz. breccia	Quartz and chlorite breccia for 6" Flow top breccia		
88				
90				
92				
94				
96		Becoming more fractured, 2"-4" spacing from nearly horizontal to 60°		
98	4" 30% FeS_2	Pyrite stringers and veinlets		
100				

LOCATION: 9,850N, 10,400E, elevation + 22' above lake level
INCLINATION: Vertical hole
CORE SIZE: BQ core

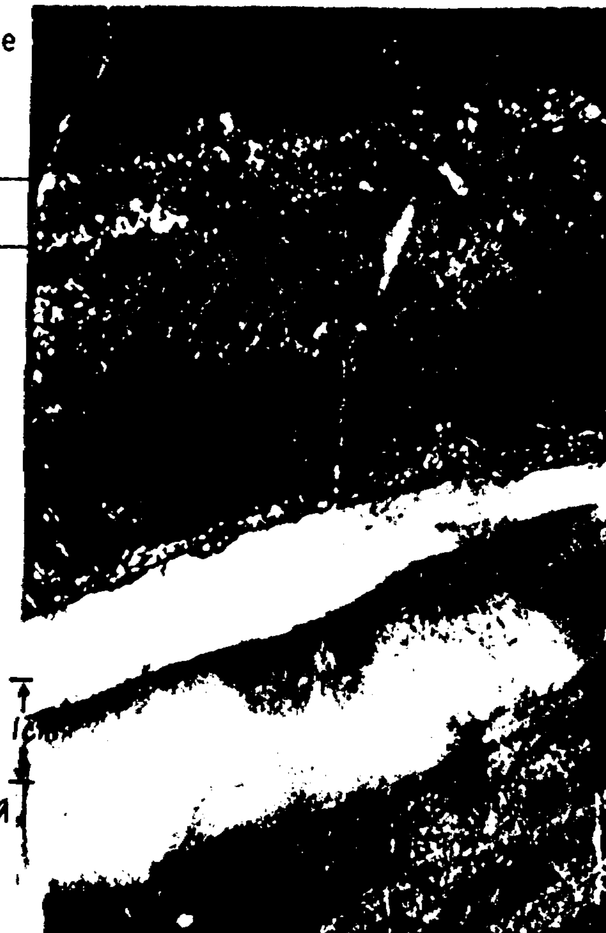
SEARLES LEASE

Hole: N-87-10 | Vertical Scale: 1" = 6' | Total Depth: 200 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
100				
102		Broken, fractured core 1" to 2" partings.		
104		Falls in hole, three directional fracture, vertical, 60° and about 20°		
106		↓	CEMENT AND DRILL OUT	RE-CEMENT
108				
110				
112				
114				
116		117.5'		
118		Dense, black, aphanitic not too hard basalt Occasional darker splotch		
120				
122				
124				
126				
128	40° altered			
130				
132		Less than 5% alteration		
134		More competant		
136				
138		*"The alteration assemblages reflect increasing thermal gradients toward porphyry contacts"*		
140				
142				
144	14 2" mineralized			
146		Lighter grey-black		
148				
150		2% FeS_2		

Depth column, 100–150: BASALT (ULTRAMAFIC KOMATITIC FLOWS) ↓

LOCATION: 9,850N, 10,400E, elevation + 22' above
INCLINATION: Vertical hole
CORE SIZE: BQ core SEARLES LEASE



Hole: N-87-10 | Vertical Scale: 1" = 6'

DEPTH		CORE LOG	DESCRIPTION			
150	BASALT		Dense aphanitic Grey black Less than 5% alteration Massive bedded			
158–160		Altered	Pyrite sub-veinlets Joints from 80° to 30° One set prominent			
166		1' altered	Chloritized 1'			
169.5	Brittle deformation / Minor displacement	"ORE ZONE"	Altered, pyritized, quartz 15% 1' bull quartz	LOST 80% CIRCULATION	5667 NIL	169'7"-171'7"
172			Altered fractured 1' 18" bull quartz, breccia zone		5668 0.185/0.135	171'7"-173'6"
174			Wall rock immediately adjacent to veins is characterized by minerals that also occur in the veins i.e: carbonates, quartz and pyrite.		5669 0.065	173'6"-175'7"
176					5670 0.020	175'7"-178'6"
178			75% quartz in altered matrix		5671 0.395/0.385 0.255/0.275	178'6"-179'1"
179.6			Slightly altered and pyritized			
184–188			Dark basalt with massive calcite and chlorite.			
190–196			Alteration 10% from vertical to nearly horizontal			
192		1" mineralized				
197		2" quartz				
200 feet		TOTAL DEPTH	This core logged by Gordon B. French			

Depth scale: 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200

11-12-87 Gordon B. French (signature)
Gordon B. French

SWASTIKA LABORATORIES LIMITED

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ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 68969 Date: Nov. 23, 1987

Received Nov. 12, 1987 11 Samples of Bulk & Split Core

Submitted by Nortek Minerals Ltd., c/o G. B. French, Tarzwell, Ontario.

SAMPLE NO.	GOLD Oz/ton
5812	Nil
5813	Nil
5814	Nil
5815	0.002
5816	Nil
5817	Nil
5667	Nil
5668	0.105/0.135
5669	0.065
5670	0.020
5671	0.395/0.385
Second Pulp	0.255/0.275

N-87-10

Per G. Lebel

G. Lebel - Manager /ns

Member Canadian Testing Association

ESTABLISHED 1928

LOCATION: 9,850N, 10,575E, + 30 feet above lake level elevation
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-11		Vertical Scale: 1" = 6'	Total Depth:	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0	CASING			
5		Slightly altered 5% to 8% FeS_2 in veinlets and discreet non-euhedral 5mm to 8mm fragments		
6–12 FLOW BASALT				
14	2" mineralized	15% of core altered in typically flow pillow patterns S faced thickness of pillows 6" to 2'		
21	6" quartz			
23	Breccia	Some zones dense aphanitic dark black basalt		
25	1' altered			
30		Minor quartz veinlets, discontinuous, shot thru less than 2% of total		
35	2" quartz			
39		Splotchy pyrite 5% to 10% some massive 2" pyrite irregular zones		
46	6" altered			
50				

Sample 87-11 25'

ALTERED, EPIDOTE-RICH ROCK

Estimated mode

Epidote	62
Quartz	10
Carbonate	7
Amphibole	19
Chlorite	trace
Sphene	1
Fe-Ti oxides	1
Pyrite	trace
Chalcopyrite	trace

This is a rock of similar mineralogy to the previous sample. Macroscopically (see stained cut-off block) it appears more homogenous, but in thin section it is found to show patchy (crudely-banded?) textural variations.

Overall it is an intimate, often very fine-grained intergrowth of the four main constituents,in various proportions,in which primary textures are destroyed or, in part, pseudomorphed.

Epidote is the dominant constituent and often shows a very fine-grained, almost felted, aggregate form.

One half of the slide is composed largely of epidote with intimately intergrown amphibole- which is notably different from the pale, actinolitic form of the previous slide and is a strongly pleochroic, blue-green to pale green variety of more hornblendic aspect. This locally forms networks outlining blocky to rounded masses of minutely fine-grained epidote which may be pseudomorphing original plagioclase crystals. Elsewhere the epidote and hornblende are intimately and randomly intergrown, and have diffuse patches of interstitial carbonate. Indications of a relict meshwork texture are sometimes seen, suggesting an igneous parentage.

The other half of the slide has notably more fine-grained quartz and carbonate intergrown with the epidote/amphibole. Quartz sometimes forms a matrix to clumps of fibrous hornblende-epidote or appears to pseudomorph a sub-oriented, microlitic fabric. Late quartz is seen cutting and replacing epdiote via thread-like veinlets.

Fine-grained sphene occurs as rims to disseminated granules of Fe-Ti oxides. Rare specks of pyrite and chalcopyrite are also seen.

This rock appears to be a strongly altered rock of mafic-intermediate igneous origin - possibly a diabase or andesitic volcanic.

Sample 87-11 30' GREENSTONE

Estimated mode

Hornblende	50
Chlorite	23
Epidote	12
Plagioclase	5
Sericite	3
Quartz	2
Sphene	trace
Ilmenite	3
Pyrite	2
Chalcopyrite	trace

This is another intensely altered rock of greenstone mineralogy. It is probably of similar general character to the previous two samples, but differs in that amphibole is the dominant constituent and chlorite is a prominent accessory. It also lacks carbonate and contains a little recognizable plagioclase.

It shows compositional variations which appear to reflect a folded banding and/or coarse fragmental structure.

In the core of the folded structure or coarse fragment at one end of the slide, the rock consists of abundant, random, small, fibrous or sheaf-like hornblende clusters with interstitial, minutely fine-grained, fresh plagioclase of recrystallized aspect; a few pockets of granular quartz are present. This assemblage grades outwards to a similar fabric in which compact chlorite takes the place of the plagioclase. This, in turn, grades to an intimate intergrowth of compact epidote and chlorite without hornblende. Randomly oriented, lathlike grains of ilmenite occur throughout these assemblages.

The rest of the slide consists of dispersed, partially assimilated patches of these various assemblages, plus some wisps of strongly sericitized plagioclase, all cemented or permeated by irregular pockets and veinlike masses of felted chlorite (which shows an intense purple-blue anomalous birefringence).

The chlorite segregations are the preferential host to disseminated sulfides. These consist of clumps of pyrite cubes, 0.1 - 0.5mm in size, complexly embayed by (intergrown with) granular epidote and quartz. Traces of chalcopyrite occur, independent of the pyrite. The sulfides would appear mainly to be contemporaneous with the chlorite stage of alteration.

LOCATION: 9,850N, 10,575E, + 30 feet above lake level elevation
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-11		Vertical Scale: 1" = 6'	Total Depth:	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
50				
52 — FLOW BASALT →				
54	2" mineralized			
56	altered 12°	1' altered with 1" quartz veinlet horizontal in center		
58				
60	1½" quartz 30°			
62				
64	"M-1"	Altered zone *"Only high temperature altered zones defined as mineralized are thought to contain 'any' relationship to gold mineralization. Pyrite blebs, stringers, disseminated euhedral crystals, etc. are a different generation not associated with the mineralization period."*		
66	2" quartz 45°			
68				
70				
72				
74				
76				
78				
80	2" quartz 60°	Mostly massive aphanitic, dark black basalt, less than 10% chloritized and then only on selvages.		
82				
84		veinlet		
86	1" 70°			
88				
90	6" altered			
92	6" breccia	Chlorite altered breccia		
94				
96		Minor pyrite, irregular blebs- 2%-5% throughout		
98				
100				

LOCATION: 9,850N, 10,575E, + 30 feet above lake level elevation
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-11 | Vertical Scale: 1" = 6' | Total Depth:

DEPTH		CORE LOG	DESCRIPTION	ASSAY	SAMPLE
100	FLOW BASALT (100'–145')				
102					
104		"M-2"	"M-2" Zone		
106		18"mineralized	Mostly massive basalt		
108					
110			5mm to 10mm amygdules filled with chlorite 110' to 120'		
112					
114			2% to 5% FeS_2		
116					
118		½"mineralized			
120					
122			Fractures or joints mostly high angle spaced over 3' apart		
124					
126		1' altered			
128			Massive dense flow		
130		1' altered			
132					
134			Some chloritization on common 60° angle - thought tube pillow sides		
136					
138		1"mineralized 15°			
140					
142					
144			Logged to 145' only by G. B. French		
146					
148					
150					

Gordon B. French
Gordon B. French

LOCATION: 9,850N, 10,575E, + 30 feet above lake level elevation
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-11		Vertical Scale: 1" = 6'	Total Depth: 190 feet	
DEPTH	**CORE LOG**	**DESCRIPTION**	**ASSAY**	**SAMPLE**
0–5 CASING				
5 BASALT deep green to black. Numerous small altered sections. Some minor pyrite on fractures	Ca, Q	7.5 ½" Ca + Qtz. vein @ 50°		
		15 1" Qtz.+ Py vein @ 15°		
	Q	21 4" zone with brecciated Qtz. to 1"		
	Q, J	22 1½ Qtz. vein @ 20°, some minor jasper		
		25-27 Mod.altered.[Alteration zones are light green]		
	Q	25.5 ½" Qtz.fract.filling @ 45°		
27 BASALT as above but with altered "augins" or spots and "vermiculations" to ± ½" across				
	Q	35 3/4" Qtz @ 60°		
		48 4" moderately altered		

Depth scale (feet): 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50

LOCATION: 9,850N, 10,575E, + 30 feet above lake level elevation
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-11 | Vertical Scale: 1" = 6' | Total Depth: 190 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
53	Q	53 ½" Qtz + Py @ 15°		
54–55.5		54-55.5 Moderately altered		
54.5	Q	54.5 ½" Qtz. @ 35° Minor pyrite		
62–65.5	"M-1"	62-65.5 Moderately altered. Bottom 1' slightly altered. Bottom contact sharp @ 15°		
65	Q	65 ½" Qtz. @20°, minor pyrite		
67.5	Q	67.5 1½" Qtz @ 50°		
80.5	Q,Py	80.5 ½" Qtz. + Py @ 20°		
81	Q	81 1" Qtz. @ 50°		
89.5	Q	89.5 ½" Qtz @ 80°		
91	Q	91 ½" Qtz. @ 40°		

LOCATION: 9,850N, 10,575E, + 30 feet above lake level elevation
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-11 | Vertical Scale: 1" = 6' | Total Depth: 190 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
105 BASALT as above, but with increasing small alteration zones; to about 20%		105.5-107 Slightly altered		
		108 - 108.5 Slightly altered		
		115.5 - 116 Moderately altered		
		119 - 119.5 Moderately altered		
	Py, Q	120 ½" Qtz stringers with pyrite @ 35°		
	Q	125 4" slightly altered with 1/8" + 1/10" quartz fracture filling.		
	Q, Py	131-132 Moderately altered, minor Qtz + pyrite		
		133-134 Moderately altered		
		136-136.5 Slightly altered		
	Q, Py	138 ½" Quartz + pyrite		
		146.5-148 Slight alteration		
		149 CONTACT -sharp. Driller notes "sand" coming from this.		
DIABASE(?) 15° Dike(?)		149-150 CONTACT ZONE. Very fine grained on top coarsening down. Medium grey		

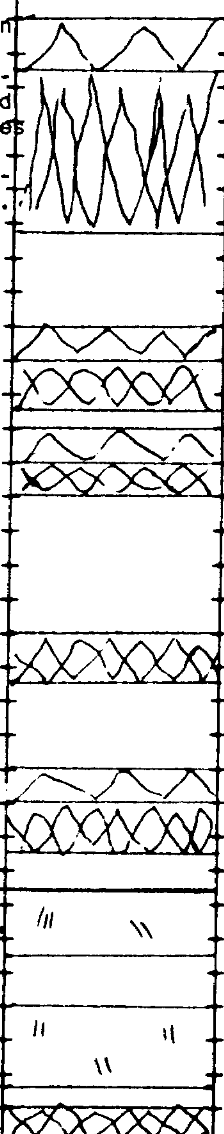
Depth scale: 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150

LOCATION: 9,850N, 10,575E, + 30 feet above lake level elevation

INCLINATION: Vertical hole

CORE SIZE: BQ Core

Hole: N-87-11	Vertical Scale: 1" = 6'	Total Depth: 190 feet



DEPTH	DESCRIPTION	ASSAY	SAMPLE
150 DIABASE(?) DIKE(?) Deep grey. Meduim grained. Slightly "granitic" appearance. Only moderately hard (softer than the basalt) Black chlorite(?) noted on fractures Numerous highly fractured zones. Few competant areas.			
	157-158.5 Broken core		
	158.5-163.5 Highly broken and rubbled.		
	166-167 Broken		
	167-168.5 Highly broken and rubbled.		
	169-170 Broken		
	170-171 Highly broken and rubbled.		
	175-176.5 Highly broken and rubbled		
177 DIABASE(?) DIKE(?) Dark grey fine grained.	177-182.5 CONTACT ZONE fining down		
	179-180 Broken		
	180-181.5 Highly broken and rubbled.		
182.5 BASALT Same as 105 to 149'	182.5-184.5 Slight to moderate alteration. Some black chlorite(?) fracture filling.		
	186-188.5 Slightly altered.		
190	189-190 Highly broken and rubbled.		
190' TOTAL DEPTH	Hole stopped due to sticking(at about 167' level).		

This core logged by Peter J. Proudlock

1987-11-17

Peter J. Proudlock

LOCATION: 9,850N, 10,575E, + 30 feet above lake level elevation
INCLINATION: Vertical hole
CORE SIZE: BQ Core

[illegible]e: N-87-11		Vertical Scale: 1" = 6'	Total Depth: 235 feet	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
190		22" of diabase, minor phenocrysts grey black		
192	altered 1"	6" altered chloritized		
		1" mineralized 15% FeS_2		
194		7' of basalt with 10-20mm flow amygdules		
196	amygdules			
198				
200				
	2' dense	2' dense aphanitic basalt 5% FeS_2		
202	6" altered	6" altered		
204				
	1' altered			
206		2' dense aphanitic black basalt 5% pyrite veinlets		
208	13" 30% FeS_2	13" of 30% pyrite veinlets in dark aphanitic basalt, probably primary		
210				
212				
214	altered 18"			
216	altered	*"Chlorite-carbonate alteration zones must involve the emplacement of very large amounts of water and carbon dioxide in a great volume of mafic rock. Widespread and intense meta-somatism is a feature common to many gold areas."*		
218				
220				
222				
224	altered			
226				
228	½" quartz			
230	altered			
232				
234	3" quartz	Minor quartz fracturing ¼" rehealed.		
235				
TOTAL	DEPTH 235'	This core logged by Gordon B. French		

DEC. 12, 1987 ______________________
Gordon B. French

LOCATION: 9,825N, 10,725E, Elevation + 28' above lake level

INCLINATION: Vertical Hole

CORE SIZE: BQ Core

Hole: N-87-12 | Vertical Scale: 1" = 6' | Total Depth: 207 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0–5 CASING				
BASALT (?) Dark grey to charcoal. Minor calcite fracture filling. Some calcareous blebs.				
11–12	Ca Py	11-12 Minor pyrite with calcite.		
11.5	Ca	11.5 ½" calcite fracture filling.		
21–23		21-23 Moderately altered, whitish-green.		
21.5	Q Py	21.5 1" quartz + pyrite @ 15°		
30.5	Q Ca Py	30.5 ½" quartz, with minor pyrite + calcite envelope		
45–60		45-60 Colour of basalt slight dark green hue with grey. Slight increase in calcite fracture filling. Some minor healed shears.		

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50

LOCATION: 9,825N, 10,725E, Elevation + 28' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-12 | Vertical Scale: 1" = 6' | Total Depth: 207 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
50				
52				
54				
56				
58				
60	— — —			
62				
63	Q, Py	63 1" Quartz and pyrite @ 15°		
64				
66				
68				
70				
72				
74				
76				
78				
80				
80.5	Q	80.5 ½" quartz @ 35°		
81	Q	81 ½" quartz @ 45°		
82				
84				
86				
88				
90				
92				
93	Q Py	93 2" zone of thin quartz + pyrite veinlets @ 10°		
94	Ca	94 3/4" calcite @ 80°		
96				
98				
100				

LOCATION: 9,825N, 10,725E, Elevation + 28' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-12 | Vertical Scale: 1" = 6' | Total Depth: 207 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
	Ca	103.5 1/4" calcite @ 15°		
	Ca	107.5 1" calcite @ 75°		
122 DIABASE 123.5		122-123.5 Diabase, dark grey, medium grained.		
BASALT Dark greenish grey. Minor calcareous blebs. Minor healed shears.				
135		134-135 Highly altered with calcite	134'11" to 136'1"	5672 Nil
VEIN White and grey quartz + pyrite + minor calcite.	Q Q	135-136 Quartz, white, barren, broken		
	Q Py Ca	136-139 Light grey quartz w/pyrite + minor calcite. Some zones of white quartz to 1/4". Healed shearing or bedding @ 35°. Top 1" broken	136'1" to 137'2"	5673 0.050
	Q Py Ca		137'2" to 139'	5674 0.125/0.140
	Q Py Ca	139-139.5 As above, but dark grey.	139'0" to 140'	5675 0.035
141.5	Q Py Ca	139.5-141.5 Same as 136' to 139'	140' to 141'6"	5676 0.025
BASALT Dark greenish grey. Minor calcite fracture filling.		142-147 Slightly altered		
		149-158 Slightly altered.		

LOCATION: 9,825N, 10,725E, Elevation + 28' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-12 | Vertical Scale: 1" = 6' | Total Depth: 207 feet

DEPTH	CORE LOG	DESCRIPTION		ASSAY	SAMPLE
150					
BASALT As above except increase in calcite fracture filling and more greenish.	Q	151 1/8" quartz vein @ 55°			
160		161-161.5 Moderately to highly altered			
	Q	165.5 ½" quartz vein @ 70°			
170		172-173 Broken			
	Q	177 6" highly altered with quartz stringers.			
180		182-190.5 Slightly to moderately altered.			
190.5 DIABASE Medium grained. Charcoal grey.	CONTACT ZONE	190.5-192 CONTACT ZONE - fine grained on top grading down to medium grained.			
200					

LOCATION: 9,825N, 10,725E, Elevation + 28' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-12		Vertical Scale: 1" = 6'	Total Depth: 207 feet	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
200		ACID TEST - 85°		
202				
204				
206				
207				
207' Total Depth		This core logged by Peter J. Proudlock 1987-11-21		

Peter J. Proudlock

Sample 87-12 205'   DIABASE

Estimated mode

Plagioclase	50
Augite	38
Altered mafic	10
Magnetite	2
Pyrite	trace
Chalcopyrite	trace

This is a fresh diabase, of grain size 0.2 - 1.5mm, showing perfectly preserved primary textures. It consists of a random meshwork of fresh, well-twinned plagioclase prisms intergrown with pale brown clinopyroxene, probably augite. The plagioclase is of labradorite composition, is totally fresh and exhibits classic ophitic relations with the coarser augite. A proportion of augite also occurs as anhedral grains interstitial to the plagioclase laths.

The augite also appears totally fresh. However, an altered form of mafic, consisting of olive brown and green felted material, occurs scattered throughout. This mostly forms discrete, equant to irregular grains exhibiting a cellular texture, and may represent a form of serpentine, possibly after accessory olivine. More diffuse development of this brownish alteration occurs in acicular form in a few microcrystalline pockets probably representing original glassy segregations.

Opaques are dominantly magnetite, as evenly disseminated, partially skeletal grains and clumps. Rare traces of pyrite and chalcopyrite occur as minute specks.

This rock differs from the other diabasic sample (87-5A 305') in being strikingly fresh, in containing probable accessory olivine and in lacking accessory quartz. It shows no apparent metamorphic effects.

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ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 69052 Date: Nov. 30, 1987

Received Nov. 23, 1987 5 Samples of Split Core

Submitted by Nortek Minerals Ltd., c/o G. B. French, Tarzwell, Ontario.

SAMPLE NO.	GOLD Oz/ton
N-87-12	
5672	Nil
5673	0.050
5674	0.125/0.140
5675	0.035
5676	0.025

Per [signature]

G. Lebel - Manager /ns

ESTABLISHED 1928

LOCATION: ~~9,936.55N~~ 9,836.55N, 10,888.52E, + 12' above lake level elevation
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-13 | Vertical Scale: 1" = 6' | Total Depth: 137 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0–5 CASING				
5 BASALT Dark green Minor calcite, fracture filling Very minor pyrite on fracture surfaces.				
	Q Py	15.5 ½" Quartz and pyrite vein @ 15°		
		20.5 - 24 Moderately altered to light medium grey; calcareous		
	Q Py	29.5 1" Quartz and pyrite vein @ 30°		
	Q Ca	29.5-30.5 Quartz and calcite healed shear.		
32 BASALT As above but with zones containing calcareous blebs.				
	Q	41 ¼" Quartz vein @ 20°		
		45-48 Slightly altered, greyish green.		

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50

LOCATION: 9,936.55N, 10,888.52E, + 12' above lake level elevation
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-13 | Vertical Scale: 1" = 6' | Total Depth: 137 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
	Py Q	56.5 1½" Disseminated pyrite with thin quartz vein		
	Chlorite	56.5-57.5 Chloritized zone		
69.5		69.5-70 CONTACT, alteration		
DIABASE				
72		71.5-72 CONTACT, alteration		
BASALT as above	Ep, Py	73 2 x 1/8" epidote and pyrite veinlets @ 20°		
		77-79 Slightly altered, greyish green		
79 BASALT as above except dark to charcoal greyish green "M - 2" ?				
	Q	87.5 2" Quartz @ 20°		

LOCATION: 9,936.55N, 10,888.52E, + 12' above lake level elevation
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-13 | Vertical Scale: 1" = 6' | Total Depth: 137 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
100				
102				
104	Q Py	103.5 1" Quartz and Pyrite vein @ 15°		
	Q Py	104.5 ½" Quartz and Pyrite vein @ 15°		
106		105-110 Core very competent		
108	Q Py	108 ½" Quartz and Pyrite vein @ 20°		
110	Q Py	110 ½" Quartz and Pyrite vein @ 20°		
	Q Py	111 ½" Quartz and Pyrite vein @ 15°		
112				
114				
116				
118	Q Py	118 ½" Quartz and Pyrite vein @ 15°		
120 — 120.5	MISSING	120.5 to		
122 — 121		121 6" Ground cove		
124				
126				
127.5		127.5-128.5 Silicified, moderately altered	5677	127'6"-128'6" 12" 0.0005
128 VEIN Quartz and silicified		128.5-132 Highly altered, silicified, grey	5678	128'6"-130'0" 18" Ni'l
130		130, 132.5 Fracture zones, LOST CIRCULATION Sand inflow	5679	130'0"-132'1" 25" Ni'l
132	Py Quartz	132-134.5 White Quartz, upper contact, brecciated, streaks of dark grey quartz; some pyrite	5680	132'1"-134'4" 27" 0.03295
134	Py Q Py	134.5-136.5 Altered, silicified, convoluted bedding entrained pyrite	5681	134'4"-136'6" 26" 0.10/0.119 0.179/0.139
136 — 136.5	Q Py	135.75 2" White and pink quartz healed breccia		
BASALT	Q	136.5-EOH Basalt, green with Quartz stringers		
138 EOH 137.5	TOTAL DEPTH	NB Could not drill further due to severe sand inflow. Destroyed 2 bits and 1 core barrel. Up to 30' of sand in hole.		
140				
142				
144				
146				
148				
150				

This core logged by Peter J. Proudlock

1987-12-8

Peter J. Proudlock

SWASTIKA LABORATORIES LIMITED
P.O. BOX 10, SWASTIKA, ONTARIO P0K 1T0
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ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 69251 Date: Dec. 17, 1987

Received Dec. 8, 1987 5 Samples of Split Core

Submitted by Nortek Minerals Ltd., c/o G. B. French, Tarzwell, Ontario.

SAMPLE NO.	GOLD PPB
5677	20
5678	Nil
5679	Nil
5680	1130
5681	3430/4110
Second Pulp	6170/4800

Per G. Lebel
G. Lebel Manager /ns

Member Canadian Testing Association

ESTABLISHED 1928

LOCATION: 10,278N, 9,762W, + 30' elevation above lake level
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-14 | Vertical Scale: 1" = 6' | Total Depth: 454 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0–5 CASING				
6–50 FLOW BASALT				
6–10		Broken, fractured basalt, 3" to 5" pieces, typical dark black/green with less than 10% alteration to chlorite mostly in streaks		
15	Siderite 15%			
16–19		1" mineralized horizontal fracture quartz center 15-20% pyrite sides chlorite alteration, on angles up to 70°, about 2% FeS_2 fine		
24	1' altered			
32		1" mineralized		
33		1" mineralized		
36–38		Calcite filling fractures 45° - 70° 1/16" to 1/2" thick, broken, re-healed		
40		1" mineralized		
42		UP TO 30% OF TOTAL CHLORITIZED		
46		1/2" mineralized		
48		High angle chlorite alteration.		

LOCATION: 10,278N, 9,762W, + 30' elevation above lake level
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-14		Vertical Scale: 1" = 6'	Total Depth: 454 feet	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
50 – 88 FLOW BASALT		Flow basalt, dark black/green with 15% chlorite in high angle thin alteration zones.		
54–55		1/2" mineralized		
56		1" mineralized		
60		Typical core size only 2" to 3" from 60' to 65', otherwise mostly 10" to 12" fragments (jointing controlled)		
70–71	mineralized		70'-71'	5683 C.C1C/C.C1C
72		Both calcite and siderite fracture cementing. Most fractures less than 1/4" wide, widely spaced jointing less pronounced, up to 2 foot cores		
88–90	FAULT	Fault breccia in 1/4" to 1" angular fragments re-cemented carbonate and hematite		
90 – 100				
99		Less than 10% alteration of dark green basalt flow		

Depth scale: 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100

LOCATION: 10,278N, 9,762W, + 30' elevation above lake level
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-14 | Vertical Scale: 1" = 6' | Total Depth: 454 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
100		Aphanitic dark green basalt flow		
106	mineralized	Fragmental quartz and pyrite	105'-107'	5682
108		1/4" mineralized, horizontal		
110		Mostly dense jointed aphanitic basalt with occasional, nearly vertical, fractures filled with calcite or chlorite		
122		3/8" mineralized horizontally bedded 3' core badly fractured, 2" pieces jointed		
128		Calcite/siderite fractures 1'		
137	quartz	Quartz veinlets 1/2" wide, vertical for 1'		
142	1" mineralized			
144		Dense grey dark green aphanitic basalt jointing 9" to 3" apart, mostly 60° angle.		
150				

Depth column (100–150): FLOW BASALT

LOCATION: 10,278N, 9,762W, + 30' elevation above lake level
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-14 | Vertical Scale: 1" = 6' | Total Depth: 454 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
150		Flow basalt at 151' fractures(jointing) became more vertical by 155', ending at 162' depth - - near base 1' of siderite and carbonate fracture filling.		
152				
154				
156				
158				
160				
162		Bedding(jointing) returns to about 60°		
164				
166 FLOW BASALT				
168		Alteration minimal, less than 5% of core. Jointing spaced nearly horizontal at 3" to 14" intervals, occasional ¼" veinlet of quartz or thinner irregular siderite, dark grey/green aphanitic basalt.		
170				
172				
174				
176				
178				
180				
182				
184				
186	Reworked	14" re-worked carbonate and siderite minor breccia. 10% alteration of basalt overall.		
188				
190		2" mineralized		
192				
194		3" mineralized		
196				
198		Higher angle flow. Jointing fractures horizontal.		
200				

LOCATION: 10,278N, 9,762W, + 30' elevation above lake level
INCLINATION: Vertical hole

CORE SIZE: BQ Core

Hole: N-87-14 | Vertical Scale: 1" = 6' | Total Depth: 454 feet

DEPTH		CORE LOG	DESCRIPTION	ASSAY	SAMPLE
200			Grey/black aphanitic basalt 10% thin alteration veinlets highangle flow, pillow edges.		
202					
204			1" mineralized		
206					
208					
210					
212			2' of thin veinlets about 30° to core quartz mostly under 1/8" thick		
214	BASALT				
216					
218	FLOW		Dense aphanitic basalt, jointed low angle less than 30° 8" to 15" spacing grey/green		
220					
222					
224			3/8" mineralized, low angle		
226					
228					
230					
232					
234					
236					
238			Meta volcanic sediment "*Hiatus of flow conditions with fine volcanic ash deposited in reducing conditions dark black, fine grained with dis-seminated original pyrite*". Total length these zones 3'-5' badly broken On coring, wedge in barrel. 10-15% scattered pyrite, somewhat aligned with bedding at angles greater than 45°. Distinct irregular masses penta contemporaneous with deposition of altered ash.		
240	"M-1"				
242					
244					
246					
248					
250					

LOCATION: 10,278N, 9,762W, + 30' elevation above lake level
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-14 | Vertical Scale: 1" = 6' | Total Depth: 454 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
250		Basalt altered with silicified zones		
255	2"			
256	4"			
258	1' syenite porphyry	Coarse syenite porphyry fingers Broken core(shattered) Minor carbonate/siderite veinlets		
266		Core badly fractured two directional Piece size typically angular ½" x 1½" Jams core barrel.		
270–276	FLOW BASALT			
280	½ to 1" red siliceous veinlet	Vertical ½" to 1" wide silicified brick red, fine grained veinlet. Minor pyrite and chalcopyrite adjacent, less than 10% Basalt altered to chlorite	283'-286'	5685-Nil
291		Continued brick red silicious veinlets with pyritic contacts.	291'-292.5'	5686-Nil
299	4"	mineralized	299'-301'	5684-0.002/0.002
300				

LOCATION: 10,278N, 9,762W, + 30' elevation above lake level
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-14 | Vertical Scale: 1" = 6' | Total Depth: 454 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
300				
301	Q	4" bull quartz		
302–304		Iron/SiO_2 veinlets with pyrite similar to N-87-5		
306		3" mineralized	306–307.5'	5687 - 0.002
307	mcm/pyr	18"		
308–312		Edge of BOSS (syenite) 40% chlorite altered Basalt with every 5" to 6" a thin streak of hematite/siderite or silicified minor disseminated pyrite		
314				
316	2" mineralized			
318	2" mineralized			
300–350	FLOW BASALT			
326		30% alteration of basalts to chlorite mostly low angle		
328	3" mineralized			
334		20" siliceous, brick red porphyry edge fragment	333.5' to 335.5'	5688 -Nil
340		4" porphyry LOST 80% OF CIRCULATION		
346–348	Breccia	Basalt/syenite porphyry Breccia zone syenite fragments from 2" to 1' and altered basalt		
350				

LOCATION: 10,278N, 9,762W, + 30' elevation above lake level
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-14 | Vertical Scale: 1" = 6' | Total Depth: 454 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
350–360 (SYENITE PORPHYRY)		Changing to syenite porphyry, upper 3' veined with SiO_2 and brick red SiO_2 vein minor mineralized streaks at 351'5", 353', 354'7" and 359'.All less than 1/2" thick		
360–362	18"basalt	Mineralized basalt	360'-362'	5689 -Nil
362–372	FRACTURED/HEALED SYENITE/SILICIFIED	Porphyry mineralized at 362'4", 363'4", 369'9". Less than ½" thick- brick red siliceous stringers throughtout core		
366–372		Mineralized at 367', 367'8", 370'3", 372', 378', 382'3", 384'9", 385'6" All thin syenite, generally more competant. Still cut with high angle brick red silicified zones, but less frequent darker syenite.		
386–392		Mineralized at 386', 386'5", 387'6", 388'5", 389'3", 391'6", 392'8", 395'3", 397'8", 398'7". All less than ½" thick. Generally quartz, thin, horizontal fracture filling, mineralized, both sides.		

Depth scale: 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400

LOCATION: 10,278N, 9,762W, + 30' elevation above lake level
INCLINATION: Vertical hole
CORE SIZE: BQ Core

Hole: N-87-14 | Vertical Scale: 1" = 6' | Total Depth: 454 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
400	SYENITE PORPHYRY			
402				
404	BRECCIA	Basalt with angular fragments of syenite porphyry, generally 2" to 3" in size		
406				
408	BASALT	Vertically fractured basalt with wavey alteration		
410	1'	407'5" to 407'9" thin tuff 409'8" to 410'6" silicified brick red with 8% to 10% FeS_2		
412		Veinlets at 414' 3/8" brick red SiO_2		
414				
416				
418				
420	SILICIFIED - GRADING TO FINE GRAINED HORNBLENDE/GRANITE — Silicified brick red 2-5% FeS_2	Silicified 2% to 5% pyrite, brick red iron staining judged at 95% SiO_2		
422			422'-424'	5690 - N.I
424			TYPICAL OF SECTION	
426		Fragments of basalt at 428' and 435'	425'-426'5"	5694 - 0.002
428	Silicified	Aplite		
430				
432				
434		Fine grained aplitic granite excess of quartz, 1% to 2% sulfides		
436			436'-437'	5691-0.030/0.035
438		Minor mica and hornblende, less than 2mm sized	438'-439'	5692 - 0.005
440				
442				
444				
446				
448			448'-449'	5693- 0.002
450		Fine grained granite		
454				

TOTAL DEPTH 454 feet This core logged by Gordon B. French. 12/24/87 completed.

SWASTIKA LABORATORIES LIMITED
P.O. BOX 10, SWASTIKA, ONTARIO P0K 1T0
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ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 69350 Date: Dec. 23, 1987

Received Dec. 18, 1987 2 Samples of Split Core

Submitted by Nortek Minerals Ltd., c/o G. B. French, Tarzwell, Ontario.

SAMPLE NO.	GOLD Oz/ton
5682	Nil
5683	0.010/0.010

Per G. Lebel

G. Lebel - Manager /ns

Member Canadian Testing Association

ESTABLISHED 1928

SWASTIKA LABORATORIES LIMITED

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ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 69414 Date: Jan. 5, 1988

Received Dec. 29, 1987 11 Samples of Split Core

Submitted by Nortek Minerals Ltd., Tarzwell, Ontario.

c/o G. B. French

SAMPLE NO.	GOLD Oz/ton
NT-87-14	
5684	0.002/0.002
5685	Nil
5686	Nil
5687	0.002
5688	Nil
5689	Nil
5690	Nil
5691	0.030/0.035
5692	0.005
5693	0.002
5694	0.002

Per G. Lebel

G. Lebel - Manager /ns

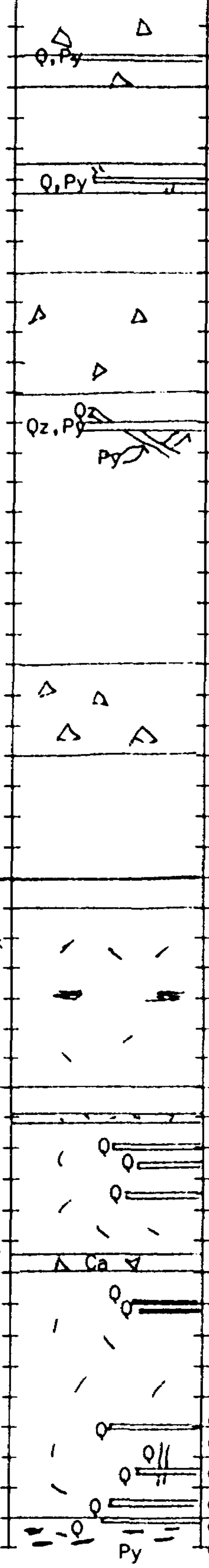
LOCATION: 10,531.5N, 9,760.6W, +20' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-15 | Vertical Scale: 1" = 6' | Total Depth: 430 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0–5 CASING				
5		5'-17' Broken Core		
BASALT Dark green to grey. Amygdaloidal zones. Some calcite alteration. Minor quartz and calcite fracture filling. Minor associated pyrite				
11.5–14		11.5'-14' Amygdaloidal		
Some chlorite.		19.5'-21' Medium grey, calcite and quartz alteration.		
21	Q Py	21' ¼" Quartz and pyrite at 10°		
35.5	Q, Py	35.5' ¼" calcite and pyrite at 10° + 1" green quartz at 50°		
38.5	Q, Py	38.5' 1¼" quartz and pyrite zone at 10°		
40–41.5		40'-41.5' amygdaloidal		
44–52		44'-52' Healed, brecciated		
47.5–48		47.5'-48' Amygdaloidal		
48	Q, Ca, Clh	48' ¼" quartz, calcite + chlorite vein at 25°		

LOCATION: 10,531.5N, 9,760.6W, +20' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-15		Vertical Scale: 1" = 6'	Total Depth: 430 feet	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
50				
		51' 1" quartz & pyrite vein at 20°		
52				
54				
		55' 10" alteration zone with 1" white quartz at 30°, + ¼" (x2) associated pyrite		
56				
58		58'-62' Healed brecciated zone		
60				
62				
		63' ¼" undulating altered "veinlet" with associated pyrite; cut by ¼" rose quartz-granite veinlet @ 75°; cut by ¼" white quartz, with minor chlorite & pyrite with slickensides @ 10°		
64				
66		66' to 73' Broken core		
68				
70				
		71'-74' Healed brecciated zone		
72				
74				
76				
78				
78' GRANITIC High in mafics, pink minor disseminated pyrite		78'-79' Contact zone-fine grained, pink, no mafics		
80				
82		82' 4" high mafics and pyrite zone		
84				
85' GRANITIC As above, but with numerous veins at 5° to 30° Bright pink				
86		86' 6" coarse grained higher mafics		
		87' ¼" white quartz @ 5°		
		87.5' ¼" white quartz @ 10°		
88		88.5' ¼" white quartz @ 10°		
90		90.5'-91' Brecciated with calcite healing		
92		92' 2x¼" white quartz veins @ 30°, terminated by 2 conjugate fractures @ 60°		
94				
96		96' 1" white quartz @ 20°		
		96'-99' ¼" ± pink quartz @ 90°		
		97.5' 1" white quartz @20° cutting vertical pink quartz.		
98		98.5' 1" white quartz @25°.		
		99'-101' fine grained higher mafics & pyrite.		
100		99' 1" white quartz @20°.		



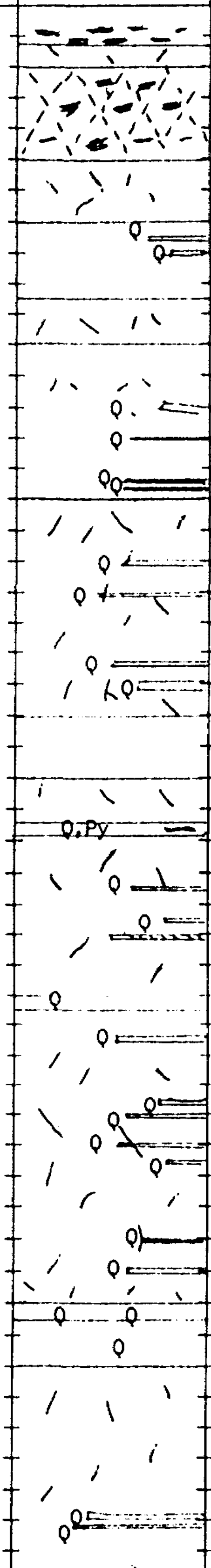
LOCATION: 10,531.5N, 9,760.6W, +20' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-15 | Vertical Scale: 1" = 6' | Total Depth: 430 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
100	Py, Q	100.5' ½" white quartz @ 15°		
	Q	101' 1" white quartz @ 20°		
102	Q	102' ½" white quartz @ 20°		
	Q	102.5' 1½" white quartz @ 20°		
104				
106 (granite)	Q	106' ½" white quartz @ 20°		
	Q	107.5' ½" white quartz @ 15°		
108				
110				
112				
	Q Q	113.5' 2x½" white quartz @ 5°		
114				
116		116'-118' coarser & darker zone, higher mafics		
		117' ½" white quartz @ 10°		
		1" white quartz @ 20°		
118				
120				
122	Q Q	122.5' 2x½" white quartz @ 15°		
		123.5'-125.5' Very fine grained, low mafics zone; pink-high quartz, some white qtz.		
124	Q			
126		126' ½" white quartz @ 5°		
128		128' ½" white quartz @ 20°		
130				
	Q Q	131'-132' Very fine grained, low mafics, pink high quartz, some white quartz.		
132		131.5' 1½" white quartz @ 20°		
	Q	133' 1" white quartz @ 50°		
134				
	Q	135' ½" white quartz @ 10°		
	Q	136' 3/4" white qtz. @ 10° with 1" offset @ 80°		
136	Q	136.5' 1" quartz and mafics @ 20°		
138		138' 2" quartz and mafics @ 20°		
140'				
140 GRANITIC as above, but darker pink to reddish.		141' ½" white quartz @ 70°		
142		142'-143' Healed brecciated zones. Jasper streaks.		
	Q, J			
144 Softer, faster drilling.				
146		146' ½" white quartz @ 10°		
148		148.5'-149.5' Lower mafics, brighter red		
		149.5'-150.5' Very high mafics, almost black		
150				

LOCATION: 10,531.5N, 9,760.6W, +20' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-15 | Vertical Scale: 1" = 6' | Total Depth: 430 feet



DEPTH	DESCRIPTION	ASSAY	SAMPLE
151	151'-154' Higher mafics, healed shear zone, core moderately broken		
156	156'-158.5' Very fine grained, almost no mafics,pink		
156.5	156.5' ½" white quartz @ 20°		
157	157' ¼" white quartz @ 15°		
159	159' 3/4" white quartz @ 10°		
160	160'-165' Alternating ±6" normal & very fine grained zones.		
162	162' ¼" white quartz & mafics @ 60°		
163	163' ¼" white quartz @ 5°		
164.5	164.5' 2x1" white quartz @ 10°		
167	167' ½" white quartz @ 15°		
168	168' 1" white quartz @ 5°		
170.5	170.5' 1" white quartz @ 25°		
171	171' 3/4" white quartz @ 20°		
172	172'-174' Medium grained, low mafics zone.		
175.5	175.5' 4" white quartz with some mafics and pyrite.		
177.5	177.5' ½" white quartz @ 40°		
178.5	178.5' ½" white quartz @ 25°		
179	179' 2" high mafics shear zone		
181.5	181.5' 3" white quartz @ 5° 1" vertical offset		
182.5	182.5' 1" white quartz @ 25°		
184.5	184.5' ½" white quartz @ 15°		
185	185' 3/4" white quartz @ 10°		
186	186' 3/4" white quartz @ 10°		
186.5	186.5' ½" white quartz @ 15°		
189	189' ½" white quartz @ 5°		
190	190' 3/4" white quartz @ 5°		
191	191' 8" white quartz at 10°		
191.5	191.5'-193' Very fine grained, pink,some qtz.		
198	198' 1" and 1½" white quartz @ 10°		
199	199'-200 Driller reports lost water		LOST WATER

LOCATION: 10,531.5N, 9,760.6W, +20' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-15 | Vertical Scale: 1" = 6' | Total Depth: 430 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
200		200.5' 1" white quartz @ 10°		
		201'-203' lighter pink zone.		
		207.5' 1½" high mafic zone @ 60°		
		208' 1" white quartz @ 15°		
		212' ½" white quartz @ 20°		
		212'-230' Vertical fractures with mafics, core moderately to highly broken.		
		214' 3½" white quartz and mafics @ 15°		
215' GRANITIC AS ABOVE, but medium pink. More dissem- inated pyrite.				
		228.5' 4" white quartz @ 5°		
		230'-230.5' 6" white quartz @ 5°		
		231.5' ½" + 1" white quartz @ 10°		
		232.5' ½" white quartz @ 30°		
		233.5' ½" white quartz @ 5°		
		234.5' ½" white quartz @ 5°		
		238.5' ½" white quartz @ 15°		
		243' ½" white quartz @ 10°		
		247.5' 1" white quartz @ 15°		
250'				

LOCATION: 10,531.5N, 9,760.6W, +20' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-15 | Vertical Scale: 1" = 6' | Total Depth: 430 feet

DEPTH

250'

GRANITIC AS ABOVE, except lighter pink. Higher quartz harder, slower drilling.

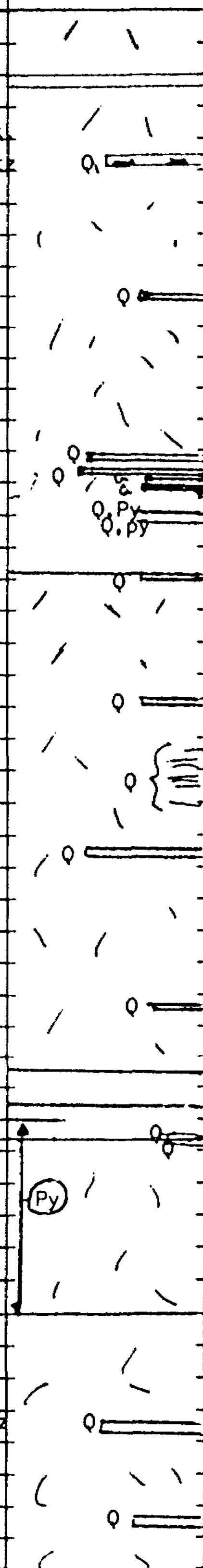
286.5'

GRANITIC AS ABOVE, except medium pink, softer, faster drilling. Numerous white quartz blebs, as well as veins.

299.5'

GRANITIC

CORE LOG



DESCRIPTION	ASSAY	SAMPLE
252' 5" very fine grained, pink, no mafics		
255' 1½" white quartz and mafics vein @ 15°		
259' ½" white quartz @ 45°		
264.5' 1½" + 1" white quartz @ 15°		
265' 3/4" + ½" white quartz @ 15°		
265.5'-268' Very fine grained, pink, no mafics		
266' 2x½" white quartz & pyrite @ 10°		
268' 1" white quartz @ 15°		
272' ½" white quartz at 45°		
273.5'-275' Numerous white quartz veins, ½" to 1" wide @ -20° to +20°		
276.5' 1½" white quartz @ 10°		
281.5' ½" white quartz at 25°		
282' ½" white quartz @ 50°		
283.5'-284.5' Very fine grained, pink, no mafics		
284.5'-285.5' Medium grained, pink, very low mafics		
285.5' 2x½" white quartz @ 10°	285'-286'6"	5695 0.002
285'-291' Slightly higher pyrite content.	286'6'-288'	5696 nil
	288'-289'6"	5697 nil
	289'6"-291'	5698 0.002
294.5' 3" white quartz @ 10°		
297.5' ½" white quartz @ 10°		
298' ½" white quartz @ 10°		

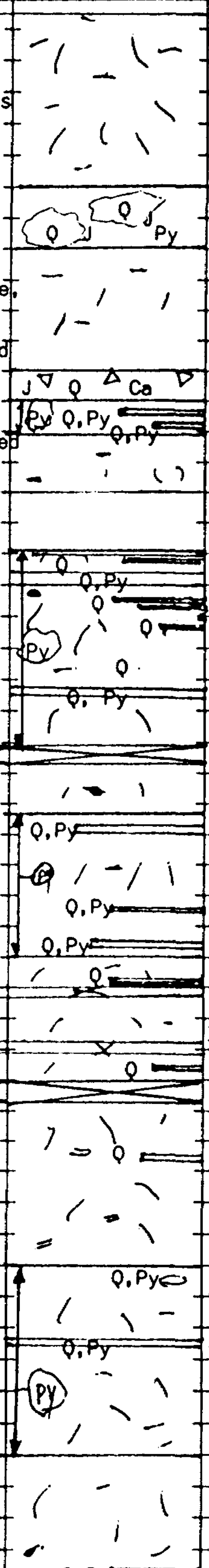
Depth scale: 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300

LOCATION: 10,531.5N, 9,760.6W, +20' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-15	Vertical Scale: 1" = 6'	Total Depth: 430 feet

DEPTH (300–350): GRANITIC Moderately high mafics Medium grained salt and pepper appearance; pink, white, and black. Fairly hard Minor and moderate disseminated pyrite.

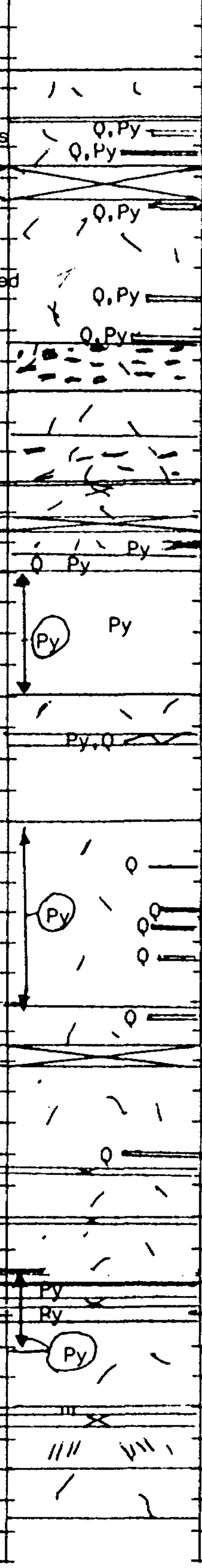
CORE LOG



DESCRIPTION	ASSAY	SAMPLE
305'-307' "Splotches" of white quartz to 1", with bright red(Jasper?) haloes, minor pyrite.	305'-307'	5699 0.002
	80%	LOST CIRCULATION
311'-311.5' 6" healed breccia, calcite, jasper and dark grey quartz.	311'-312'	5701 0.005
312'-313' Zone of higher pyrite and free gold	312'-313'	5700 3.41/4.28
312.5' 3/4"wh.qtz.@10°minor pyrite. (1/32"x1")	313'-314'	5702 0.002
313' ½" white quartz @ 10° minor pyrite.		
315'-317' Soft, pink granitic zone.		
317'-323.2' Higher disseminated pyrite	317'-318'2"	5703 0.160
317.3' 1" white quartz @ 20°		
317.5'-318' 6" white quartz zone(80%)some pyr.	318'2"-319'10"	5704 0.005
318.5' 2x½",½" white pyrite @10°-20°		
319.5 ½" white pyrite @ 20°	319'10"-320'11"	5705 0.005
320.7 ½" white pyrite @ 15°		
321.4' 3" grey quartz @ 20°, minor pyrite	320.11"-322'	5706 0.002
	322'-323'2"	5707 0.250/0.270
323.5' 5"± core loss NB: Between 323' & 430' incremental losses not definite, but total is = to 71"		
325.3"-329.7' Higher disseminated pyrite	325'3"-326'7"	5708 0.050
326 3" white quartz and minor grey quartz + minor pyrite @ 25°		
328.5' 1½" white quartz and minor pyrite @ 20°	327'11"-329'7"	5709 0.015
329.5" 2" white quartz and minor pyrite @ 20°		
331' 1" white quartz @ 10°		
331.5' ±3" core loss		
333' ±3" core loss		
333.5' ½" white quartz @ 20°		
334.5' ±9" core loss		
336.5' ½" white quartz and minor pyrite @ 15°		
340'-346' Higher disseminated pyrite	339'11"-341'11"	5710 0.002
340' 1" bleb of white quartz, minor pyrite		
342.5' 3½" white and grey quartz, + pyrite @ 20°	341'11"-343'	5711 0.005
	343'-344'3"	5712 0.002
	344'3"-346'2"	5713 0.002
350' 1" + ½" white quartz @ 5°, pyrite	349'6"-350'6"	5714 0.020

LOCATION: 10,531.5N, 9,760.6W, +20' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-15 | Vertical Scale: 1" = 6' | Total Depth: 430 feet



DEPTH	DESCRIPTION	ASSAY	SAMPLE
351.5' GRANITIC AS ABOVE, except less white	353'-357.5' Higher disseminated pyrite.		
	353.5' ½" white quartz @ 5° minor pyrite	353'-359'7"	5715 0.005
	354.3' 3/4" white quartz @ 5° + dissem.pyrite		
	354.8'-355.6' ±10" core loss		
	355.7' 3x½" white quartz @ 5°& 10° minor pyr.	355'5"-357'5"	5716 0.002
More reddish. Less disseminated pyrite.	357' ½" white quartz @ 45°		
	359' ½" white quartz @ 15°, minor pyrite	358'10"-360'6"	5717 0.025/0.030
	360.5' 1" white quartz @10°,disseminated py.	360'6"-362'	5718 0.010
	360.5'-362' High mafic zone, pyrite, charcoal grey.		
	363.5'-365.1' Slightly higher mafics zone,pyr.	363'3"-364'6"	5719 0.020
	365.3' ±3" core loss	364'6"-367'2"	5720 0.010
	366'-366.5' ±5" core loss		
	367' 4x½" white quartz, minor pyrite @ 5°-15°	367'2"-368'2"	5721 0.005
	367.5'-368' 6½" zone white quartz,minor grey quartz, minor pyrite	368'2"-370'	5722 0.002
	368'-372' High quartz,light colored,hard,lower mafics, disseminated pyrite.	370'-372'	5723 0.002
	373.5' 6" zone,low mafics, white quartz stringers, some pyrite		
	376'-382' Higher disseminated pyrite	376'-378'	5624 0.002
	377.5' ½" white quartz @ 10°		
	379' ½" white quartz @ 20°	378'-380	5725 0.020
	379.5' ½" white quartz @ 10°	380'-382'	5625 0.005
	380.5' ½" white quartz @ 15°		
	382.5' ½" white quartz @ 10°		
	383.8'-384.3' ±6" core loss		
	387' ½" white quartz @ 10°		
	387.5' ±3"core loss		
	389 ±3" core loss		
391' BASALTIC ? 392.3	391'-392.3' Sill 1" contacts very pyritic top contact @ 25°, bottom @ 15°	390'8"-393'	5727 0.055/0.050
GRANITIC AS ABOVE	392'-393' Pyrite		
	395'-397' Kaolinite alteration zone		
	395.5' ±2" core loss		
	398.5'-402.5' Slightly higher quartz content slightly harder, slightly less mafics 5° from vertical		

LOCATION: 10,531.5N, 9,760.6W, +20' above lake level
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-15		Vertical Scale: 1" = 6'	Total Depth: 430 feet	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
400		400' ACID TEST 85°		
	Py		400'-402'	5728 0.005
402				
404				
406				
408	Q	408.3' ½" white quartz @ 10°		
410	Q	410.4' ½" white quartz @ 5°		
412	Py Q Q Q	412.5' ½"+2x3/8" white quartz @ 5°-10° minor pyrite.	411'9"-412'3"	5729 0.030
414	Q	414' 1" white quartz @ 10°		
416	Q	416.5' ½" white quartz @ 5°		
418	Q	419' ½" white quartz at 5°		
420	Q	421' ½" white quartz @ 10°		
422	Q	422.3' ½" white quartz @ 10° terminated by fracture		
424	Q	423.3' 3/4 white quartz @ 10°		
426		427' 3/4" white quartz @ 10°		
428		427.6-427.9' ±4" core loss		
		429'-430' 12" core loss (430 reported EOH)		
430				
430' E.O.H.		Logged 1988-01-15		

Peter J. Proudlock

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ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 69512 Date: Jan. 21, 1988

Received Jan. 18, 1988 35 Samples of Split Core

Submitted by Nortek Minerals Ltd.,c/o G. B. French, Tarzwell, Ontario.

SAMPLE NO.	GOLD Oz/ton	SAMPLE NO.	GOLD Oz/ton
N-87-15		N-87-15	
5695	0.002	5713	0.002
5696	Nil	5714	0.020
5697	Nil	5715	0.005
5698	0.002	5716	0.002
5699	0.002	5717	0.025/0.030
5700	3.41/4.28	5718	0.010
5701	0.005	5719	0.020
5702	0.002	5720	0.010
5703	0.160	5721	0.005
5704	0.005	5722	0.002
5705	0.005	5723	0.002
5706	0.002	5724	0.002
5707	0.250/0.270	5725	0.020
5708	0.050	5726	0.005
5709	0.015	5727	0.055/0.050
5710	0.002	5728	0.005
5711	0.005	5729	0.030
5712	0.002		

Per G. Lebel
G. Lebel - Manager /ns

ESTABLISHED 1928

LOCATION: 10,836.4N, 9,904.88W
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-16 | Vertical Scale: 1" = 6' | Total Depth: 308 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0–5	CASING	ALTERED BROKEN BASALT		
5		BASALT: Flow; dark green		
8.5		8.5-9' 6" ± ground core - surface fractures		
10		10-10.9' 11" ± ground core		
12		BASALT: Pillows, medium green		
16.6	Q,Py	16.6' ½" quartz vein @ 5°, minor pyrite		
20.2		20.2-21.1' ±11" fractured ground core		
27.2	Q,Py	27.2' 1½" quartz + pyrite vein @ 20°		
30.9	Ca,Q,Py	30.9' ½" quartz + pyrite vein @ 15°, with calcite		
32.2		32.2-33.3' Minor alteration		
39.7	Ca,Q,Py	39.7' ½" quartz + pyrite vein @ 15° with calcite		
45.5		45.5-56.3' ground core 13" fractured/altered		
47.7		47.7-48 broken core		

Depth scale: 0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50

LOCATION: 10,836.4N, 9,904.88W
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-16 | Vertical Scale: 1" = 6' | Total Depth: 308 feet

DEPTH	DESCRIPTION	ASSAY	SAMPLE
	50.2-50.8 6" Calcite		
	52-52.3 ±3" broken core		
	54-56 Chlorite alteration, healed breccia		
	56-56.3 ±4" broken core	56'4"-57'6"	5730 0.002 gold trace silver
	56.3-57 Amygdaloidal pyrite		
	57-57.5 Fine disseminated pyrite		
	75-75.5 ±6" broken core		
	76.5 1" white quartz + 1" pyrite halos = 3" vein at 5°		
	78.6-79 6" broken core		
	80.7 1" quartz and pyrite vein at 20°		
83.2	83.2 CONTACT at ±43.2 ANDESITE DIKE: porphyritic, pinkish-green with some disseminated pyrite.	83'-85'	5731 Nil
	84 4"minor quartz and pyrite zone		
		85'-85'	5731 Nil
	89.5 ½" quartz and pyrite at 10°	89'3"-90'4"	5733 0.010
	90 1" quartz and pyrite at 5°		
	90-90.8 broken core		
	92.3-95.3 BASALT INCLUSION: upper half pyritic	92'5"-94'	5734 0.010
	92.5 2" quartz and pyrite vein at 20°		
99.8	99.8 Contact, bifricated @ 30°, pyritic	99'-100'	5735 0.025/0.020

LOCATION: 10,836.4N, 9,904.88W
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-16 | Vertical Scale: 1" = 6' | Total Depth: 308 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
97.8		BASALT PILLOWS, medium green		
108		108 Sharp contact at 5° ANDESITE DIKE as before		
111		111 bifricated contact BASALT, pillows, medium green		
		113.4-114 ±7" broken core		
116	Py	116-117 ALBITITE VEIN: top contact at 50° with ½" pyrite in the basalt. Bottom contact at 40° with 2" pyrite	115'6"- 116'6"	5736 0.005
117	Py	BASALT PILLOWS, medium green		
		122 4" Andesite, greyish green } Brecciated contacts		
		122.7 1" andesite, greyish green } Brecciated contacts		
		124.7-125 ±3" broken core		
		129.7-130 ±3" broken core		
	Py	135.5-140 BRECCIATED ZONE at 90° appearance of a vertical vein about 1"-2" thick, healed with silica + ?chlorite. Very minor andesite and chalcopyrite(?). Some quartz. Top 18" pyritic.	135'6"-137'	5737 0.002
		144.5 3/4" quartz and pyrite vein at 30°		
	Py, Q	149.7 1" white quartz at 5°, minor pyrite halo.		

LOCATION: 10,836.4N, 9,904.88W
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-16 | Vertical Scale: 1" = 6' | Total Depth: 308 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
150				
152				
154				
156				
158				
160				
162				
164				
		165.3-165.6 3" broken core		
166	Q,Py	165.7 1" quartz and pyrite at 5°		
168				
		169' BASALT, dark green, more numerous quartz veins. Minor pyrite.		
170				
172				
	Q,Py	173 1½" quartz and pyrite at 5°		
174				
176	Py,Cpy	176-177.5 Minor alteration, minor pyrite and chalcopyrite.		
178				
180				
182				
184	Q, Py			
	Q,Py	185 2" + 1" quartz and pyrite veins at 15°		
186				
	Q,Py	187.5 1" pyrite and quartz at 10°		
188				
	Q,Py	189 4" alteration, 3" quartz + pyrite @ 15°		
190	Q, Ca	190-191 Minor alteration with quartz + Calcite		
192				
194				
196				
	Q, Py	197.2 2" quartz and pyrite at 20°		
198				
200				

LOCATION: 10,836.4N, 9,904.88W
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-16 | Vertical Scale: 1" = 6' | Total Depth: 308 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
200				
202		201.3-201.8 ±6" broken core		
204				
206	Q Ca	206-207 ¼"-½" quartz and minor calcite fracture filling at 70° - 90°		
208				
210		210.8-211.4 ±7" broken core		
212				
214	Q	214-216 ½" quartz fracture filling at ±80°-90°		
216				
218				
220				
222				
224	Q.Py	224.3 4" quartz alteration, plus quartz and minor pyrite		
226				
228				
230				
232				
234				
236	Q	235-236 Minor quartz and jasper(?) fracture filling.		
		236.5-237 ±7" broken core		
238				
240				
242				
244				
246				
248		247-247.5 ±6" broken core		
250				

LOCATION: 10,836.4N, 9,904.88W
INCLINATION: Vertical Hole
CORE SIZE: BQ Core

Hole: N-87-16 | Vertical Scale: 1" = 6' | Total Depth: 308 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
250				
252				
254		254.5-254.8 ±4" broken core		
256				
258		257-258 ±12" broken core		
260				
262				
264				
266				
268				
270				
272				
274				
276				
278				
280				
282		283-308 CORE EXTREMELY BROKEN: Sheared in places. Some calcite fracture filling. Some minor alteration in zones to 1 or 2 feet.		
284		"Ground severely fractured - hole located less than 10 feet from surface expression of fault zone."		
386				
288	Q	289 Minor quartz fracture filling.		
290	Py	291 ½" pyrite		
292				
294				
296				
298	Q	297.5 ½" quartz vein		
300		308' Cemented--but could not drill further.		

308 E.O.H. 308 TOTAL DEPTH This hole logged by Peter J. Proudlock. 1988-01-24

Peter J. Proudlock

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ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 69618 Date: Feb. 1, 1988

Received Jan. 26, 1988 8 Samples of Split Core

Submitted by Nortek Minerals Ltd., c/o G.F. French, Tarzwell, Ontario.

SAMPLE NO.	GOLD Oz/ton	SILVER Oz/ton
5730	0.002	Trace
5731	Nil	---
5732	Nil	---
5733	0.010	---
5734	0.010	---
5735	0.025/0.020	---
5736	0.005	---
5737	0.002	---

Per [signature]
G. Lebel - Manager /ns

ESTABLISHED 1928

LOCATION: 9,913m N, 9,984.5m E,
INCLINATION: Vertical Hole
CORE SIZE: Wire Line

Hole: N-87-17 | Vertical Scale: 1" = 6' | Total Depth: 157 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0–12	CASING			
12		ANDESITE PORPHYRITIC DIKE: altered and weathered,. Numerous vuggy fractures and quartz zones. Core incompetant. Hematite ? staining abundant.		
		12'-18' Altered; siliceous(?), finer grained		
	Q	17'3" ½" white quartz vein @ 15°, not vuggy.		
		18'-19' Broken core		
		21'5"-23'5" broken core		
		26'-29' broken core		
		30'-30'5" broken core		
		32'5"-34' very broken core		
	Q	35'5" 3" white quartz at 45°, not vuggy		
		37'-38' broken core		
		43'-46' broken core		
	Q	44' ½" quartz at 15°, very vuggy(free quartz crystals)		
48'		ANDESITE DIKE: as above except less weathered. Core more competant.		

LOCATION: 9,913m N, 9,984.5m E,
INCLINATION: Vertical Hole
CORE SIZE: Wire Line

Hole: N-87-17 | Vertical Scale: 1" = 6' | Total Depth: 157 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
WEATHERED PORPHYRITIC ANDESITE (50–96'5")	Q	51'7" ½" quartz at 40°, vuggy, crystalline		
	Q	52'5" 1" quartz at 40°, vuggy, crystalline		
	Q	53' ½" quartz at 20°, vuggy, crystalline		
	Q	54'6" 2" white quartz at 15°, not vuggy		
	Q	64'3" 1' white quartz at 30°, not vuggy		
	Q	65'7" 3/4" white quartz at 15°, not vuggy		
	Q	68'2" ½" quartz, reddish, at 25°, not vuggy		
	Q	68'5" ½" white quartz at 30°		
	Q	69'2" 3/4" white quartz at 30°, extremely vuggy		
	Q	71'7" ½" white quartz at 40°		
	Q	74' ½" quartz at 30°, vuggy		
		77' 2" broken core, ½" quartz at 20°, extremely vuggy		
		78'-79' <u>LOST CIRCULATION ZONE</u> very broken core		
		79'3" ½" white quartz at 40°, not vuggy		
	BASALT	81'7" 3" BASALT INCLUSION		
		83'4" ½" extremely vuggy fracture at 20°		
	BASALT ?	87'-88'7" Extremely altered. BASALT <u>OR</u> SEDIMENTS. Pyritic. Sand appearance. Westhered. Inclusion?	87'-88'9"	5738 Nil
		92'-96'5" Altered, bottom 1' sheared.		
96'5"		96'5" CONTACT - ½" white quartz at 35°	96'6"-97'8"	5739 0.005
VEIN	(Py)	96'5"-97'8" highly altered basalt(?) slight pyrite, sheared, chloritic	97'8"-98'7"	5740 0.035
altered basalt ? <u>and</u> quartz	(Py)	97'8"-98'5" highly altered basalt(?) with quartz stringers, some pyrite 97'9" ½" white quartz	98'7"-99'9"	5741 0.150/0.145
		98'5"-98'7" 2" white quartz		
		98'7"-99'2" convoluted qtz. pyrite & minor altered basalt(?) High pyrite content.		
		99'2"-99'7" As above, except thin laminated.		

LOCATION: 9,913m N, 9,984.5m E,
INCLINATION: Vertical Hole
CORE SIZE: Wire Line

Hole: N-87-17		Vertical Scale: 1" = 6'	Total Depth: 157 feet	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
100	Q Py	99'7"-100'3" Grey quartz and some pyrite	99'9"-100'11"	5742 0.045/0.050
101'	Py Py	100'3"-100'5" Altered basalt(?) with much fine disseminated pyrite. Vertical, slicken-sided fracture. Movement at 15° indicated.		
102		101' BASALT, DARK GREEN, CALCAREOUS, PILLOWED		
104				
106				
108				
110				
112				
114				
116				
118				
120				
122				
124				
126	Q,Py	125' ½" quartz and pyrite haloes = 2" vein at 10°		
128				
130				
132				
134				
136				
138	Py, Q	137'5" ½" quartz and pyrite haloes = 1" vein at 15°		
139'		BASALT, DARK GREEN, NON-CALCAREOUS WITH SOME MINOR ALTERATION ZONES.		
140				
142		141'-141'5" Moderately altered, medium green.		
144		144'-144'5" Moderately altered, medium green.		
146				
148				
150				

This core logged by Peter J. Proudlock.
1988-02-02

157 TOTAL DEPTH

Peter J. Proudlock

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ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 69704 Date: February 5, 1988

Received February 3, 1988 5 Samples of Split Core

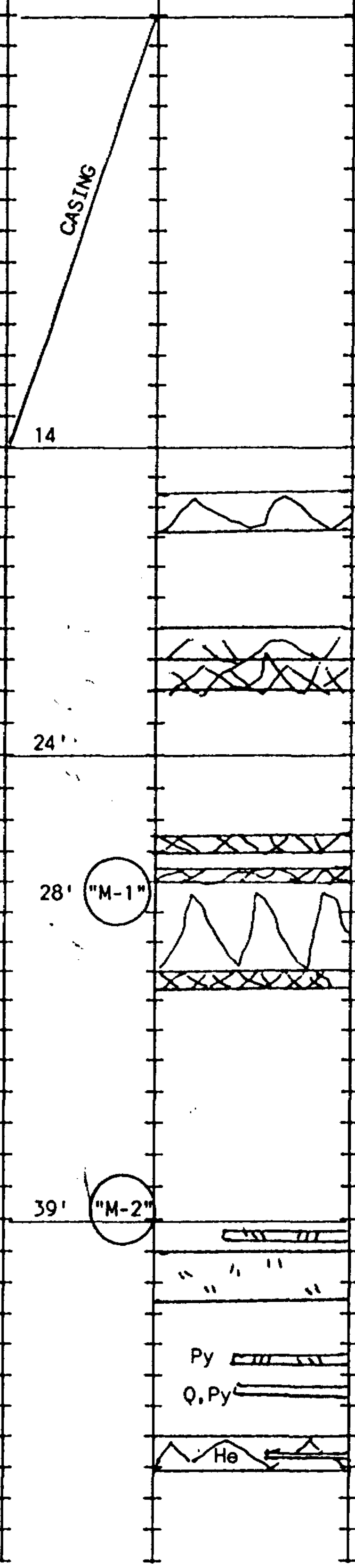
Submitted by Nortek Minerals Ltd., c/o G. B. French, Tarzwell, Ontario

SAMPLE NO.	GOLD OZ/TON
5738	Nil
5739	0.005
5740	0.035
5741	0.150/0.145
5742	0.045/0.050

Per [signature]
G. Lebel-Manager/rl

LOCATION: 9,894m N, 10,050m E,
INCLINATION: Vertical Hole
CORE SIZE: Wire line

Hole: N-87-18 | Vertical Scale: 1" = 6' | Total Depth: 108 feet

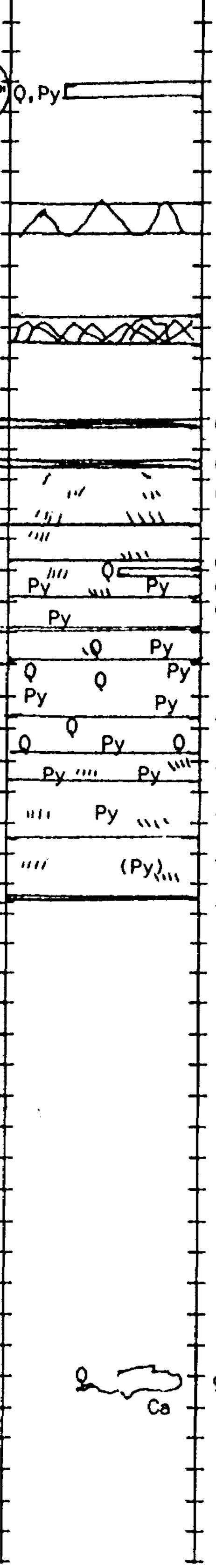


DEPTH	DESCRIPTION	ASSAY	SAMPLE
14	BASALT FLOW(?), CALCAREOUS FRACTURE FILLING + SPOTS, DARK GREEN. Core incompetant to 63', mostly broken to very broken.		
	15'5"-16'5" Broken core		
	20'-21' Broken core		
	21'-22' Very broken core		
24'	BASALT FLOW, DARK GREEN, PYRITE ON FRACTURE SURFACES.		
	26'5"-27' Very broken core		
	27'5"-28' Very broken core		
28' "M-1"	28'-31' Broken core		
	31'-31'5" Very broken core		
39' "M-2"	BASALT PILLOWS, DARK GREEN, MINOR ALTERATION ZONES AND SOME QUARTZ AND PYRITE.		
	39'4" 3" medium alteration		
	40'-41'5" Minor alteration		
	43'5" 3" Highly altered, with pyrite		
	44'7" 1" Quartz + ½" pyrite haloes = 2" vein at 10°		
	46'-47' Broken core		
	46'8" ± ½" Hematite vein at 20°, soft gouge		

Depth scale: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50

LOCATION: 9,394m N, 10,050m E,
INCLINATION: Vertical Hole
CORE SIZE: Wire line

Hole: N-87-18 | Vertical Scale: 1" = 6' | Total Depth: 108 feet



DEPTH	DESCRIPTION	ASSAY	SAMPLE	
52	52' 1" quartz + 1" pyrite haloes = 3" vein at 15°			
56	56'-57' Broken core			
60	59'7"-60'6" Very broken core			
63	63' Very broken			
64	64'5" Very broken			
66'7"	64'7"-66'7" Altered: top slight;bottom highly			
	VEIN, HIGHLY ALTERED BASALT, VERY SILICEOUS, QUARTZ, PYRITE	66'8" to 67'8"	5743	0.002
	67'7"-68'9" Highly alt.,1-8mm euhedral pyrite 67'8" 2' white quartz at 20°	67'8" to 68'11"	5744	0.070/0.080
	68'9"-70'9" Highly alt.,siliceous,minor qtz. veining, fine disseminated pyrite.	68'11" to 70'11"	5745	0.040
	70'9"-72'6" Highly alt.,considerable fine to med.disseminated Py.,some euhedral Py.to 3mm Qtz.veining and fracture filling	70'11" to 72'7"	5746	0.040
	72'6"-73'7" White qtz.,some highly alt.,Pyritic portions.	72'7" to 73'8"	5747	0.115/0.130
	73'7"-74'6" Hi.alt.considerable fine dissem. Py.some qtz.fracture filling	73'8" to 74'11"	5748	0.020
	74'6"-76'5" Hi.alt.,some dissem.Py.,minor qtz. fracture filling	74'7" to 76'6"	5749	0.015
78'6"	76'5"-78'5" Hi.alt.,minor dis.Py Sharp basal contact @ 15° with quartz surface	76'6" to 78'6"	5750	Nil
	78'6" BASALT, PILLOWED, MEDIUM GREEN, MOTTLED APPEARANCE, CALCAREOUS FRACTURE FILLING, VERY MINOR DISSEMINATED PYRITE			
94	94' 3" zone quartz and calcite(not a vein)			

Depth scale: 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100

108' 108' EOH TOTAL DEPTH Logged by Peter J. Proudlock 1988-02-04

Peter J. Proudlock

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Certificate of Analysis

Certificate No. 69766 Date: Feb. 11, 1988

Received Feb. 5, 1988 8 Samples of Split Core

Submitted by Nortek Minerals Ltd., c/o G. B. French, Tarzwell, Ontario.

SAMPLE NO.	GOLD Oz/ton
M-5743	0.002
5744	0.070/0.080
5745	0.040
5746	0.040
5747	0.115/0.130
5748	0.020
5749	0.015
5750	Nil

Per G. Lebel

G. Lebel - Manager /ns

ESTABLISHED 1928

LOCATION: 9,902m N, 10,089.5m E, elevation + 2 feet above lake level
INCLINATION: Vertical Hole

CORE SIZE: Wire line

Hole: N-87-19	Vertical Scale: 1" = 6'	Total Depth: 107 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0–17' OVER-BURDEN CASING OR GROUND				
17'		BASALT, DARK GREEN, MINOR CALCAREOUS FRACTURES AND AUGENS		
		18' Casing shoe		
	Ca (Py) Ca Ca (Py) Ca	21'-27'5" Highly altered with calcite, minor pyrite.		
			23'-24'6"	5751
	Ca (Ca)	26' 2"-4" calcite filled vug	26'8" to 27'8"	5752
	Q Py	27'5" 2" quartz and pyrite haloes at 25°		
		32' <u>LOST 80% OF CIRCULATION</u>		
38'		38' BASALT, DARK GREEN, MINOR PYRITE ON FRACTURE SURFACES, SOME MOTTLED ZONES, SOME EUHEDRAL PYRITE, HARD, DENSE		
"M-2"				
	Q	46' 3/4" whtie quartz at 45°		

LOCATION: 9,902m N, 10,089.5m E, elevation + 2 feet above lake level
INCLINATION: Vertical Hole

CORE SIZE: Wire line

Hole: N-87-19		Vertical Scale: 1" = 6'	Total Depth: 107 feet	
DEPTH	**CORE LOG**	**DESCRIPTION**	**ASSAY**	**SAMPLE**
50	BASALT PILLOW LAVA (↑)	Mottled sugary alteration. Salt and pepper colored.		
56		Lighter grey/green basalt. Less than 10% alteration.		
62	Py; "Q-4"	62'6" 1" pyrite zone at 30°		
		1½" quartz, mineralized.		
64	ALTERED META-SEDIMENT	64'-65' moderate alteration, medium light green		
66		Probable meta-sediment or tuff, originally with ± 2% fine pyrite, much altered later consolidation effects.		
70		Dense aphanitic basalt 2% to 5% pyrite in 1mm to 5mm range, isolated blebs dark altered china ring.		
73'		BASALT, AS ABOVE EXCEPT MEDIUM GREEN		
78'5"	CONTACT 45°	75'8" VEIN, HIGHLY ALTERED BASALT, HI SILICA, to 50% reworked MINOR PYRITE.		
76	MINERALIZED	75'8"-77' High disseminated pyrite, some qtz.	75'9" to 76'9"	5753 .002
	Ca limonite	77"-77"6" Highly weathered, calcitic, limonitic.		
78		77'6"-79'1" many hairline fractures, all quartz filled, hi.dissem.Py, medium grained	76'9" to 77'9"	5754 .015/.010
		79'1"-80'2" very fine grained, some pyrite	77'9" to 78'9"	5755 .010
80		80'2"-80'5" qtz.filled breccia, v.fine gr.matrik		
		80'5"-81'1" basalt, altered, lower portion qtz. and Ca filled shear fractures closely spaced	78'9" to 80'3"	5756 Nil
81'1"	WAVEY, BANDED 30°	81'1" BASALT, MEDIUM DARK GREEN, MINOR PYRITE SOME EUHEDRAL PYRITE	80'3" to 81'3"	5757 Nil
84		Dark green/black aphanitic, less than 2% fine pyrite overall.		
87		87' 2" sheared zone		
88		Less than 10% alteration throughout.		
90		Massive bedded with minimal fracture, typical spacing of fractures 3' to 4'.		
95'		95' BASALT, AS ABOVE EXCEPT WITH CALCITE FRACTURE FILLING.		
100		103'-107' Slightly altered		
107 / 107' EOH	TOTAL	DEPTH Logged by P.J.PROUDLOCK 1988-02-07 with comments by GBF.		

Glev 2 ft   wire line

Vertical Hole

Hole: N87-19 | Vertical Scale: 1" = 6' | Total Depth: 107

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
50		Mottled suggary alteration salt & pepper colored		
52–66 Basalt pillow lava				
56		Lighter grey/green Basalt < 10% alteration		
62	Py	62.6 1" py zone @ 30 mineralized		
64	9-4 [illegible]	64-65 mod. altered med-light green		
66	altered	probable meta sediment or tuff originally with ± 2% fine pyrite much altered later consolidation effects		
68	Meta-sediment			
70		Dense aphanitic basalt 2-5% pyrite in 1-5 mm range isolated blebs dark altered chaid [illegible]		
73 BASALT, as above except med. green				
74	contact 45-50%	reworked		
75.8		75.8-77 high disseminated py, some qtz.		
76 VEIN. Highly alt. Basalt. High silica, much pyrite	mineralized		75'9"-76'9" 12"	(1) M5753
77	ca limonite	77.0-77.6 Highly weathered, Calcitic, limonitic. core very broken + ground ±1" missing	76'9"-77'9" 12"	(1) M5754
78		77.6-79.1 Much hairline fractures all qtz filled high disseminated py med. grained	77'9"-78'9" 12"	(3) M5755
79		79.1-80 V. fine grained some py	78'9"-80'3" 18"	(6) M5756
80		80.2-80.5 qtz filled breccia. V. fine grained matrix		
81.1		80.5-81.1 Basalt, altered, [illegible] qtz + ca filled shear fractures closely spaced.	80'3"-81'3" 12"	(7) M5757
82 BASALT Med-dark green minor py, some as euhedral py	wavy banded 30 degrees			
84		dark green/BLK aphanitic < 2% fine pyrite mineral		
86		87. 2" sheared zone		
88		< 10% alteration throughout		
90		massive Bedded with minimal fracture typical spacing of fractures 3-4'		
95 BASALT as above except with calcite fracture filling [illegible]				
100				
	" "	103-107 - slightly altered		
107 T.D.	" "			

Logged by P.J. Drouowck 1988-02-07 With comments by GBF

SWASTIKA LABORATORIES LIMITED
P.O. BOX 10, SWASTIKA, ONTARIO P0K 1T0
TELEPHONE: (705) 642-3244 FAX: (705) 642-3300
ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 69776 Date: Feb. 12, 1988

Received Feb. 8, 1988 7 Samples of Split Core

Submitted by Nortek Minerals Ltd., c/o G. B. French, Tarzwell, Ontario.

SAMPLE NO.	GOLD Oz/ton
M-5751	Nil
5752	Nil
5753	0.002
5754	0.015/0.010
5755	0.010
5756	Nil
5757	Nil

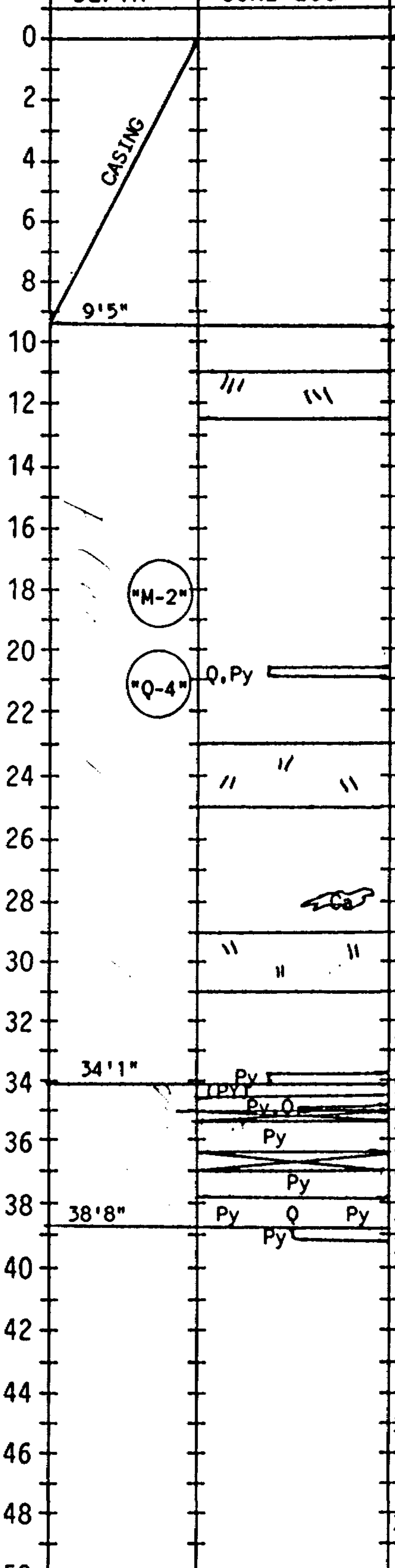
Per [signature]
G. Lebel - Manager /ns

ESTABLISHED 1928

LOCATION: 9,869.5m N, 10,135.5m E,
INCLINATION: Vertical Hole
CORE SIZE: Wire line

Hole: N-87-20 | Vertical Scale: 1" = 6' | Total Depth: 78 feet

DEPTH / CORE LOG	DESCRIPTION	ASSAY	SAMPLE



9'5" BASALT, MEDIUM GREEN, SLIGHTLY ALTERED, SLIGHTLY MOTTLED, MINOR CALCITE AND QUARTZ FRACTURE FILLING

11'-12'5" Moderately altered.

MINOR DISSEMINATED PYRITE

SOME EUHEDRAL PYRITE ,AND FRACTURE FILLING

21' 2" quartz and pyrite haloes at 5°

23'-25' Minor alteration

CORE FAIRLY DENSE, PILLOW FLOW(?)

27' 2" Calcite

28'2" Calcite filled vug.

29'-31' Minor alteration

34'1" VEIN: HIGHLY ALTERED BASALT, QUARTZ, HIGH PYRITE CONTENT

33'8"-34'1" Higher pyrite content.

34'1"-34'5" Altered basalt, some pyrite

34'5"-35' Highly altered basalt with pyrite

35' 1" white quartz at 10°

35'5"-36'5" Highly alt.basalt,v.fine dissem.Py, Minor quartz fracture filling

37'3"-37'9"Hi alt.basalt,v.fine dissem.pyrite

38'8" BASALT, MEDIUM DARK GREEN, SLIGHTLY MOTTLED, MORE CALCITE FRACTURE FILLING. PYRITE ON FRACTURE SURFACES. SOME EUHEDRAL PYRITE. CORE FAIRLY DENSE. PILLOW FLOW(?)

Please note footages on the following;

37'9"-38'8" Highly altered basalt; sheared and healed; very thin banded with quartz fracture filling. High very finely disseminated pyrite content.

38'8"-39' Higher pyrite content.

ASSAY	SAMPLE	
33'10" to 35'	5758	0.015
35'3" to 36'9"	5759	0.002
37'5" to 39'	5760	0.020/0.015

LOCATION: 9,869.5m N, 10,135.5m E,
INCLINATION: Vertical Hole
CORE SIZE: Wire line

Hole: N-87-20 | Vertical Scale: 1" = 6' | Total Depth: 78 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
52	Q	52'5" ½" quartz at 10°		
54'		53'-54' Moderately altered		
54		BASALT, AS ABOVE EXCEPT NOT MOTTLED AND WITH CALCITE AUGENS. PILLOW FLOW(?)		
57	Ca	57' 2" calcite at 20°		
66	Ca	66'5" 3" calcite filled vug.		
76	Q,Py	76' 1" quartz and pyrite vein at 15°		
78' EOH	TOTAL DEPTH	LOGGED BY PETER J. PROUDLOCK 1988-02-09		

Depth scale: 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100

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Certificate of Analysis

Certificate No. 69834 Date: Feb. 15, 1988

Received Feb. 11, 1988 8 Samples of Split Core

Submitted by Nortek Minerals Ltd.,c/o G. B. French, Tarzwell, Ontario.

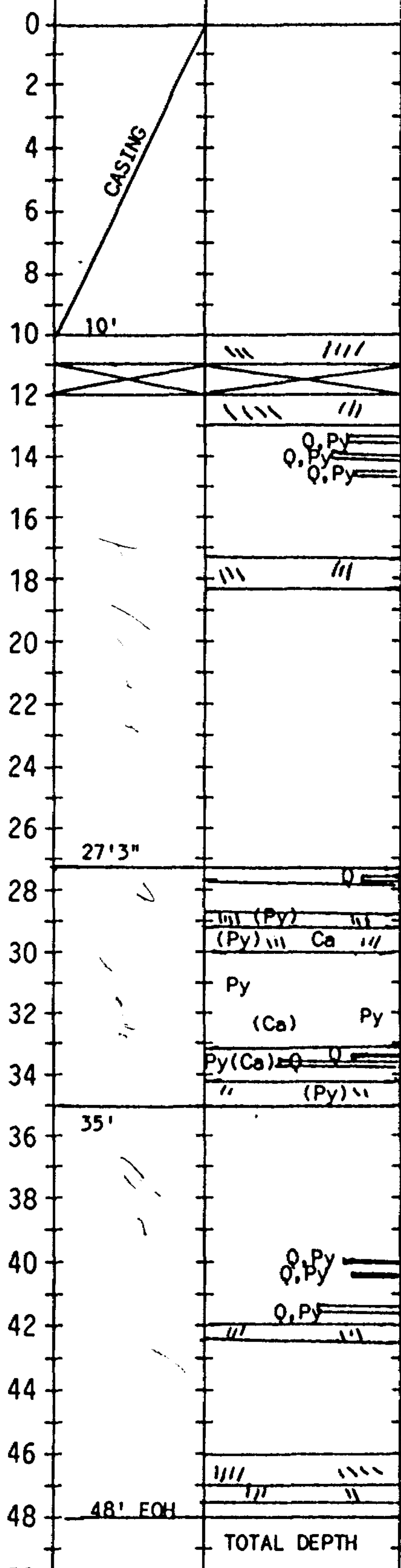
SAMPLE NO.	GOLD Oz/ton
M-5758	0.015
5759	0.002
5760	0.020/0.015
5761	Nil
5762	Nil
5763	Nil
5764	Nil
5765	0.035/0.040

Per G. Lebel
G. Lebel - Manager /ns

LOCATION: 9,857m N, 10,181.5m E,
INCLINATION: Vertical Hole
CORE SIZE: Wire line

Hole: N-87-21A | Vertical Scale: 1" = 6' | Total Depth: 48 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE



BASALT, MEDIUM GREEN, SLIGHTLY CARBONATIZED, ALTERATION ZONES, PILLOWS(?)
10'-13' Moderately to highly altered, light green, siliceous.
13'5"-15' Numerous low to med.angle fractures, calcite filled.
13'5" ¼" quartz and pyrite at 20°
14' ¼" quartz and pyrite at 20°
14'5" ¼" quartz and pyrite at 30°

17'5"-18'5" Moderately altered.

VEIN: SL.TO HI.ALTERED BASALT; MID.SEC.GRAINY APPEARANCE, SILICEOUS & CARBONATIZED, ABUNDANT PYRITE, 27'3"-27'8" sl.alt.basalt, some Py, dark grey. 27'5" ¼" quartz at 15°
27'8"-29'3" mod.alt.basalt or sediments, dark grey, minor disseminated pyrite
29'3"-30'1" as above except numerous Ca filled tension fractures
30'1"-32'3" Mod.alt.sediments or basalt, medium grey, grainy appearance, fine gr. disseminated pyrite, slightly carbonaceous.
32'3"34'4" as above exc. finer, more dense, & higher Py content, more siliceous.

ASSAY	SAMPLE	
27'3"-29'2"	5761	N.1
29'2"-30'1"	5762	N.1
30'1"-32'1"	5763	N.1
32'1"-33'7"	5764	N.1
33'7"-35'	5765	0.035/0.040

BASALT, MEDIUM GREEN, SLIGHTLY CARBONATIZED ALTERATION ZONES, MINOR PYRITE, PILLOW(?)
34'4"-35' Slightly altered basalt or sediments dark grey, minor pyrite.

40' ¼" quartz and pyrite at 15°
40'5" ¼" quartz and pyrite at 15°
41'5" ¼" white quartz with euhedral Py at 45°
42'-42'5" Mod.alt., siliceous, light green
NOTE DEPTHS ON THE FOLLOWING (too crowded above)
33'6" ¼" white quartz at 20°
33'7" 1¼" white quartz at 20°
35'5" ¼" quartz at 30°
46'-47' Highly altered, siliceous, light green
47'-47'5" Slightly altered, mottled

This core logged by Peter J. Proudlock.
1988-02-11

Peter J. Proudlock

SWASTIKA LABORATORIES LIMITED
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ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 69834 Date: Feb. 15, 1988

Received Feb. 11, 1988 8 Samples of Split Core

Submitted by Nortek Minerals Ltd.,c/o G. B. French, Tarzwell, Ontario.

SAMPLE NO.	GOLD Oz/ton
M-5758	0.015
5759	0.002
5760	0.020/0.015
5761	Nil
5762	Nil
5763	Nil
5764	Nil
5765	0.035/0.040

Per G. Lebel

G. Lebel - Manager /ns

LOCATION: 9,898m N, 10,219.5m E,
INCLINATION: Vertical Hole
CORE SIZE: Wire line

Hole: N-87-22 | Vertical Scale: 1" = 6' | Total Depth: 67 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0–12 OVERBURDEN	CASING	Located north side of road in physically low area. Swampy zone drainage collection from nearby higher ground.		
12 BASALT PILLOW LAVA		Dark green/black, aphanitic, altered flow basalt, 10% to 12% alteration to chlorite.		
18	"M-1"	18" altered zone		
21		Dark grey/green aphanitic basalt flow minor fine pyrite, less than 2%, fractured and re-healed.		
27	Calcite	1mm 30°-40° calcite filled fractures		
30	1"mineralized zone			
32	30° quartz	½" thick, mineralized both sides		
38	altered	intensely altered zone Mottled, greater than 20% altered.	38'-39'	5773 N:1
44	½"mineralized			
47	½"mineralized	Hematite and limonite in minor loss zone.		
50				

LOCATION: 9,898m N, 10,219.5m E,
INCLINATION: Vertical Hole
CORE SIZE: Wire line

Hole: N-87-22 | Vertical Scale: 1" = 6' | Total Depth: 67 feet

	DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
50	↑				
52			Start of alteration associated with mineralization		
54		Hematite dark grey		53'-55'	5766 *0.002*
56		↓		55'-56'	5767 *0.360/0.350*
58				56'-58'	5768 *0.58/0.60*
60	BASALT PILLOW LAVA	Lighter grey	Later stage cold water perhaps fracture induced near pond altered.	58'-60'	5769 *Nil*
62		More Quartz		60'-62'	5770 *0.185/0.220*
64			Broken quartz zone and limonite	62'-64'	5771 *Nil*
66		1' Quartz	6" core loss, washed out red limonite	64'-66'	5772 *0.010*
		Lighter grey	soft, altered, banded quartz, incomplete breccia, not as much pyrite, gradation from grey altered basalt to basalt at 66'5"		
68	TOTAL DEPTH				
70					
72			*"Tholeiitic flood basalt results from composite accumulations of subhorizontal flows which erupted in rapid succession over a vast area. These are products of fissure eruptions welling up in a continuous flood along tension fractures. If these flows encounter existing water barriers, they cool rapidly and form pillows on or near the fluid edge. The flows are not always continuous and can be interrupted with airborn ash of similar chemical composition. When this consolidates in the same near water barrier and with reducing conditions, considerable primary pyrite can form. Give all of this interbedded flows and sediments millions of years and multi re-heatings and you have an altered meta-basalt"*		
74					
76					
78					
80					
82					
84					
86					
88					
90					
92					
94					
96					
98			This core logged by Gordon B. French 1988 FEB 13.		
100					

Gordon B. French

SWASTIKA LABORATORIES LIMITED

P.O. BOX 10, SWASTIKA, ONTARIO P0K 1T0
TELEPHONE: (705) 642-3244 FAX: (705) 642-3300
ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 69906 Date: February 19, 1988

Received February 15,1988 8 Samples of Split Core

Submitted by Nortek Minerals Ltd., c/o G. B. French, Tarzwell, Ontario

SAMPLE NO. N-87-22	GOLD OZ/TON
5766	0.002
5767	0.360/0.350
5768	0.58/0.60
5769	Nil
5770	0.185/0.220
5771	Nil
5772	0.010
5773	Nil

Per G. Lebel
G. Lebel-Manager/rl

ESTABLISHED 1928

LOCATION: 9,825N, 10,038E, + 11' above lake level.
INCLINATION: Vertical Hole
Core Size: Wireline

Hole: N-87-23 | Vertical Scale: 1" = 6' | Total Depth: 148 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0–4	CASING / CASING	Sand, Silt, Boulders, Overburden		
4 (FLOOD BASALT)		Grey/green, very fine grained, flood basalt 30° to 60° fractures, spaced 6" to 2" apart		
12	1½" quartz,	mineralized		
16		Minimal alteration, less than 5% More crystalline, dense rock		
20 ("Q-3")	3" quartz,	mineralized		
22		Hard flood basalt, grey/green, fine grained.		
28	thin shear zone	"Overall drilling rate 50% slower due to hard nature of rock-essentially unaltered"		
36 (META VOLCANIC SEDIMENT ASH)		Red fracture(hematite) very thin, less than 1mm filling in grey/brown metavolcanic sediment(ash) basalt → diabase.		
40		Fine grained non-uniform mineral composition.		
48		More typical grey/green basalt, fine grained bordering on aphanitic.		

9,774 11,024
LOCATION: 9,825N, 10,038E, + 11' above lake level.
INCLINATION: Vertical Hole

Core Size: Wireline

Hole: N-87-23		Vertical Scale: 1" = 6'	Total Depth: 148 feet	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
50–92 FLOOD BASALT		Grey/green dark flood basalt, occasional fracture with quartz and hematite or jasper filling. Mostly under 2mm and low angle.		
62	1" quartz,	mineralized		
64	1" quartz,	mineralized		
68–70	Meta volcanic sediment	Fine grained grey/green, similar to 40 ft. depth zone		
77	silicified	2% pyrite		
78	1" mineralized	dark green/black, aphanitic quartz fracture filled 2-5mm high angle, spaced 1' to 2' apart		
85 "Q-4"	4" quartz,	mineralized		
88	2" quartz,	mineralized		
92–100 MINERALIZED		Quartz & fragments of basalt (breccia) 6" fragments to less than ½" angular extensive quartz from translucent to milky white with fragments of basalt and chlorite.	92'-94'	5774 0.115
			94'-96'	5775 0.62/0.60
			96'-98'	5776 0.200
99	18" basalt fragment		98'-100'	5777 0.370/0.355

9,774 11,024
LOCATION: 9,825N, 10,038E, + 11' above lake level.
INCLINATION: Vertical Hole
Core Size: Wireline

Hole: N-87-23 | Vertical Scale: 1" = 6' | Total Depth: 148 feet

DEPTH		CORE LOG	DESCRIPTION	ASSAY	SAMPLE
100	FLOOD BASALT		Basalt fragment		
		mineralized	Bull quartz and basalt fragments.	100'-102'	5778 0.005
102					
104			Grey/green, massive, bedded, less than 2% alteration		
106					
108			Fine grained		
110		1" quartz,	mineralized		
112					
114					
116					
118		Quartz, irre	gular		
120					
122					
		Meta sediment	1' fine grained ash(?)		
124			wavey bedded altered		
		Quartz 15%		124'-126'	5779 0.275
126					
128					
130		Metasediment	clayey ash		
132			Massive, bedded, grey/green, basalt fine grained		
134					
136					
138					
140			Less than 1% pyrite, very fine.		
142					
144					
146					
148			Total depth		
150		TOTAL DEPTH	This core logged by Gordon B. French 2-19-88		

Gordon B. French
Gordon B. French

SWASTIKA LABORATORIES LIMITED
P.O. BOX 10, SWASTIKA, ONTARIO P0K 1T0
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ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 69953 Date: Feb. 24, 198

Received Feb. 19, 1988 6 Samples of Split Core

Submitted by Nortek Minerals Ltd., c/o G. B. French, Tarzwell, Ontario.

SAMPLE NO.	GOLD Oz/ton
N-87-23	
5774	0.115
5775	0.62/0.60
5776	0.200
5777	0.370/0.355
5778	0.005
5779	0.275

Per G. Lebel
G. Lebel - Manager /ns

Member Canadian Testing Association

ESTABLISHED 1928

LOCATION: 9,825N, 11,188E, Elevation + 20' above lake level.
INCLINATION: Vertical Hole

CORE SIZE: Wireline = BQ

Hole: N-87-24 | Vertical Scale: 1" = 6' | Total Depth: 138 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0–5	CASING			
5 (FLOOD BASALTS, 5–50)	Mineralized	Mineralized original unaltered sulfides.		
7.5		1' lost core: mostly altered limonite		
8.5		Dark green fine-grained basalt, minimal alteration		
14		Banded by quartz 2" top and medium fine		
15	Altered		BURIAL METAMORPHISM (15–26)	
16		Coarser grained grey bottom		
18	2% to 5%	disseminated pyrite		
20.5	1" calcite			
21.5	low angle	less than 1mm		
23	2" calcite	grey/green basalt alteration. Vesicles and fractures occasionally filled with up to 2" wide calcite. Single 1mm 40° hematite filled fracture.		
27		Mostly massive flood basalt altered only by carbonatization of more porous zones.		
38		Mostly fresh basalt, green to black, dark somewhat salt and peppered grain sized, say 1-2mm irregular laths of labradorite, mostly massive bedded. No alteration products visible on surface. A coarse grained phase of the nearby finer grained basalts.		
50				

9808 11,222
LOCATION: 9,825N, 11,188E, Elevation + 20' above lake level.
INCLINATION: Vertical Hole

CORE SIZE: Wireline = BQ

Hole: N-87-24		Vertical Scale: 1" = 6'	Total Depth: 138 feet	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
50–52		Contoured fine grained diabase or basalt.		
54–55 FLOOD BASALT	1"quartz 30° 2"quartz 30°	not mineralized, chlorite boundaries.		
60	1¼"quartz 22°	mineralized pyritic boundaries.		
64–66		The fine grained dark green basalt now contains 2-5% irregular fine pyrite disseminated throughout.	MINIMAL ALTERATION - FRESH -	
68–69	1" quartz less than 10°	Still no weathering or carbonatization products.		
71–72 "Q"	3" quartz less than 15°	Occasional low angle, thin ¼" band of irregular pyrite, not crystalline 20-25° bedding, massive fresh basalt fine grained.		
78–79	1" quartz flat	Mineralized edges		
81–84		Dark grey/green, massive, fine grained basalt with varying amounts of original deposition fine grained, pyrite, mostly less than 1mm.		
86–87	½" quartz less than 10°	Not crystalline		
90–92		Occasional 4-6" darker zones attributed to presence of fine pyritic material, perhaps more mafic.		
99	3"mineralized	altered quartz and dolomite.		
100				

9,808 11,222
LOCATION: 9,825N, 11,188E, Elevation + 20' above lake level.
INCLINATION: Vertical Hole
CORE SIZE: Wireline = BQ

Hole: N-87-24		Vertical Scale: 1" = 6'	Total Depth: 138 feet	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
100		2-5% fine FeS_2 in dark grey/green fine grained - less than 1mm grain size basalt.		
102 FLOOD BASALTS				
104		Grey/green fine grained.		
106				
108	1½" quartz			
110	less than 10°	Mineralized		
		Virtually no alteration. Fresh, fine grained basalt.		
112				
114	½"mineralized			
116		2-5% pyrite.		
118				
120				
122				
124		High angle fractured, 2-5% FeS_2 Dense, fine grained.		
126				
128	1"mineralized	More grey/green.		
130				
132				
134				
136		Broken(fractured) basalt, fine grained.		
138	2"mineralized			
	TOTAL DEPTH	This core logged by G. B. French. 27 FEB. 1988.		
140				
142				
144				
146				
148				
150				

"Flood Basalt

In order to define the rationale for the use of this term, the following is offered: There appears to be a clear gradation of the coarser grained basalt(ie:fine grained diabase) into the pillowed basalts. The coarse phase is nearer the base of a given flow & the vesicular lava near the top of the body. Further, it appears that in the tops are tuffaceous pyritic sediments which continue into the cracks in the pillows. Thus, the flow or flood characteristic rather than defining the coarser phase as a sill."

LOCATION: 9,660S, 10,900E, elevation + 2' above lake level.
INCLINATION: Vertical Hole
CORE SIZE: Wireline = BQ

Hole: N-87-25 | Vertical Scale: 1" = 6' | Total Depth: 107 feet

DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
0	OVERBURDEN (0–20)	Lake pre-fill area, swampy, low, drainage area covered with tags.		
18–20		Last two feet boulders.		
20–50: ALTERED BASALT				BURIAL METAMORPHISM
22	1" altered	Dark green, aphanitic basalt, 20-30% altered, mostly in bands where old fractures were present.		
24	6"quartz,wavy			
26	1" qtz/chlorite			
30	8"chlorite	Altered vesicular chlorite/quartz and fractures filled with calcite/quartz, mostly low angle.		
35	2"mineralized			
37	1' chlorite			
39		*"Stage 2"*		
41	1' chlorite	Fractures mostly high angle +60° some hematite surface filling, overall greater than 2% FeS_2		
47	2' altered	chloritic		
48–50	TOP MINERALIZATION	grey/pyrite/quartz alteration	49'-50'6"	5780

9,623N 10,879

LOCATION: 9,660S, 10,900E, elevation + 2' above lake level

INCLINATION: Vertical Hole

CORE SIZE: Wireline = BQ

Hole: N-87-25		Vertical Scale: 1" = 6'	Total Depth: 107 feet	
DEPTH	CORE LOG	DESCRIPTION	ASSAY	SAMPLE
50	Mineralized	Low angle mineralized altered light grey, pyritic	50'6" to 52'3"	5781
52				
54	mineralized	6" pyritic/quartz	54'5"-55'	5782
56				
58	18"altered	altered chloritic		
60				
62		Massive dark green/black basalt, aphanitic		
64			64'- 66'	5783
66			66'- 68'	5784
68	///	Near vertical fractures hematite soft filled, no movement.	68'- 69'	5785
70	Mineralized	Mineralized quartz bull and fragmental(breccia). Basalt altered with pyrite etc.		
72				
74		Low angle ± 1mm quartz/calcite fracture filling 2' then 1' then 2' All under 30°		
76				
78				
80		Mostly massive aphanitic basalt No vesicules *"Stage 3"* dark green/black.		
82				
84				
86				
88		Becoming salt and pepper altered near vertical fractures.		
90				
92	Salt & Pepper	altered		
94				
96		Becoming fine grained with visible *"Stage 4"* phenocrysts. Top part more fractured, 60-70° bedding 6" to 2' Fractures more regular Fresh unaltered except minerals i.e. plagioclase.		
98				
100				
107				

Depth column labels (50–70 ft): ALTERED BASALT; Burial Metamorphism with Later Stage Mineralization

Depth column label (94–100 ft): FLOOD BASALT

107' TOTAL DEPTH This core logged by G.B.French

[signature]

SWASTIKA LABORATORIES LIMITED
P.O. BOX 10, SWASTIKA, ONTARIO P0K 1T0
TELEPHONE: (705) 642-3244 FAX: (705) 642-3300
ANAYLTICAL CHEMISTS • ASSAYERS • CONSULTANTS

Certificate of Analysis

Certificate No. 70155 Date: March 8, 1988

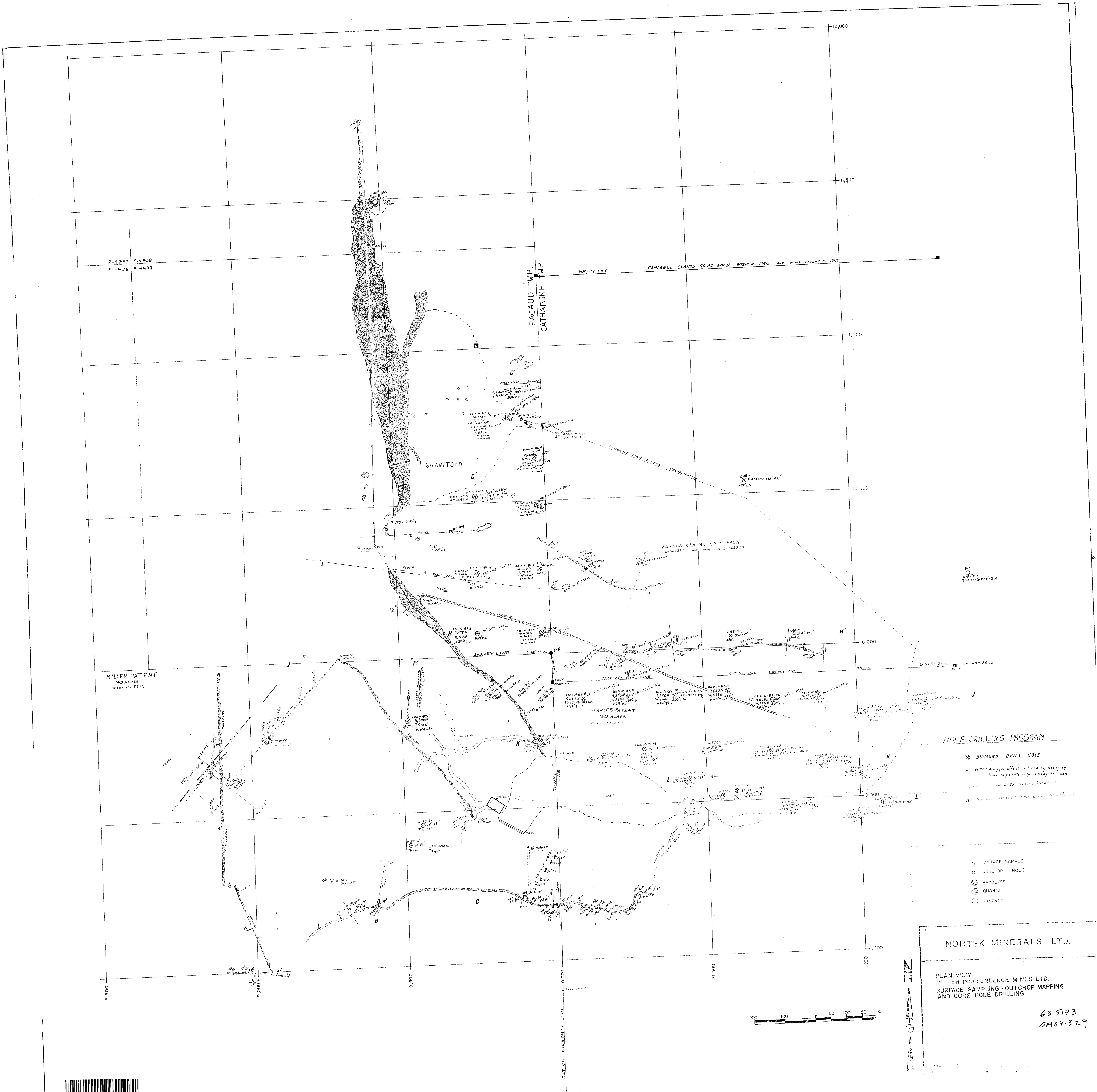
Received March 2, 1988 6 Samples of Split Core

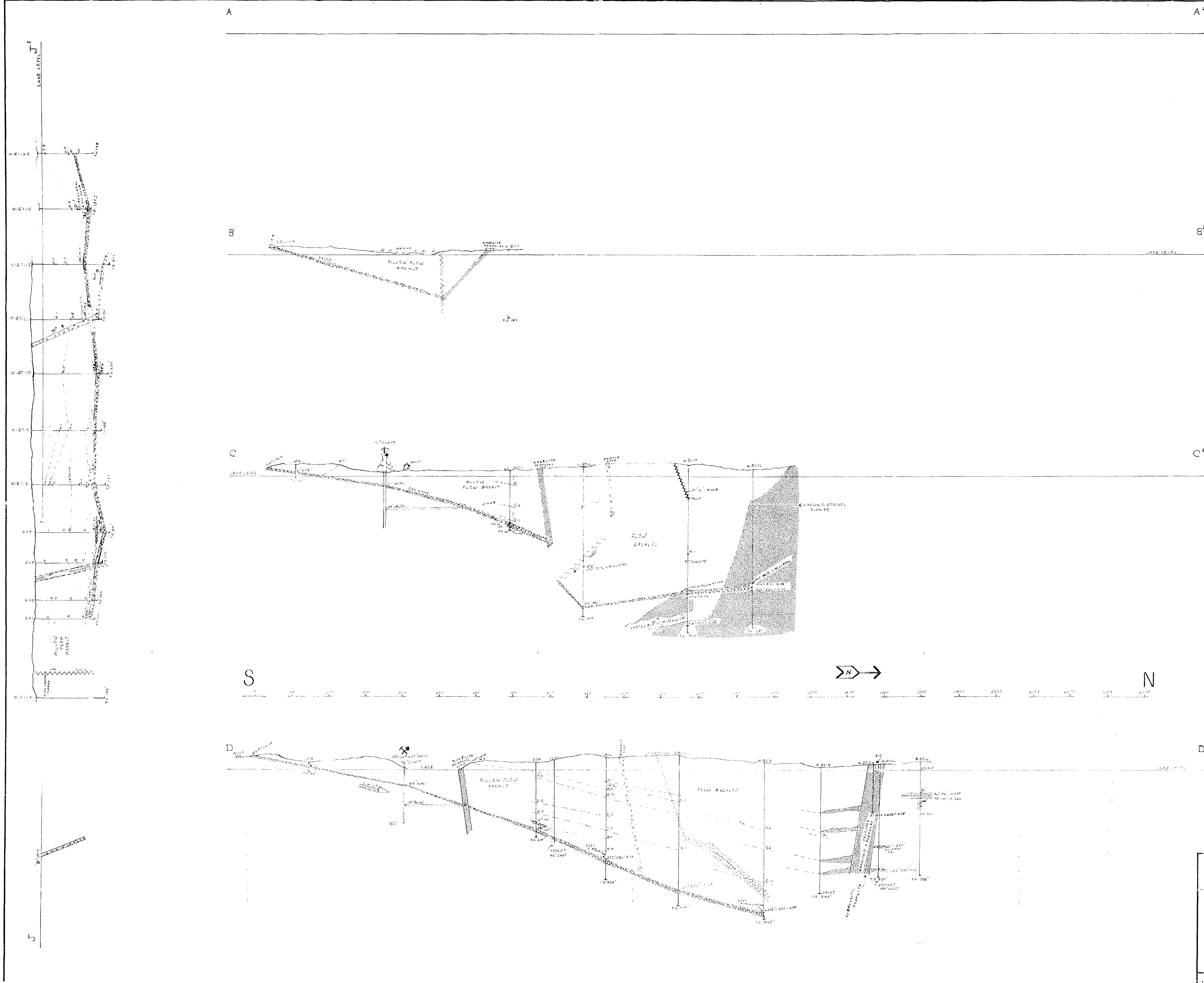
Submitted by Nortek Minerals Ltd., c/o G.B. French, Tarzwell, Ontario.

SAMPLE NO.	GOLD Oz/ton
M-5780	0.035
5781	0.005
5782	0.495/0.57
5783	0.010
5784	0.090
5785	0.002

Per G. Lebel
G. Lebel - Manager /ns

Member Canadian Testing Association

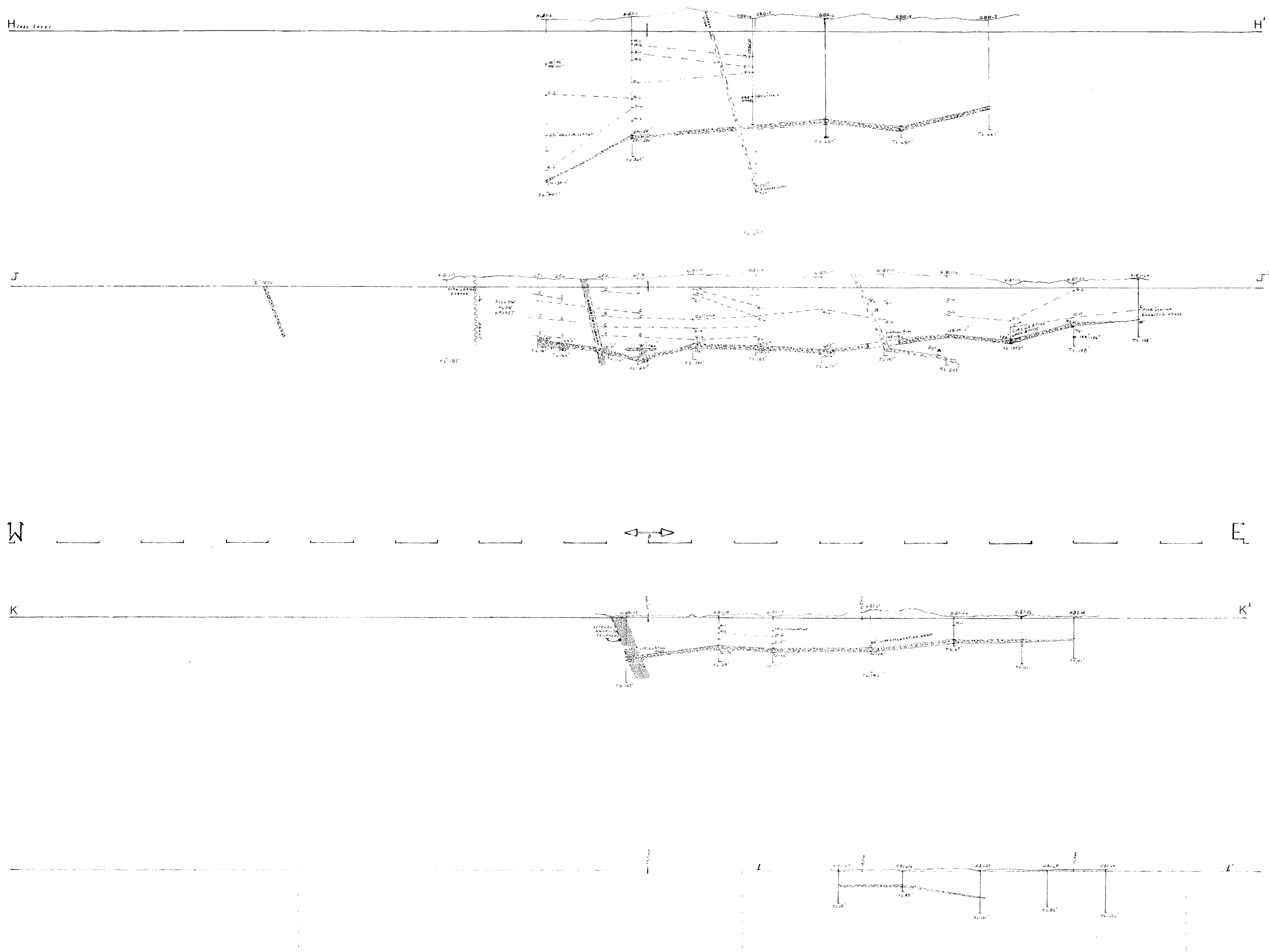

NORTEK MINERALS LTD.
PLAN VIEW
MILLER INDEPENDENCE MINES LTD.
SURFACE SAMPLING - OUTCROP MAPPING
AND CORE HOLE DRILLING
63.5173
OM87-329
HOLE DRILLING PROGRAM
DIAMOND DRILL HOLE
NOTE: Nugget effect reduced by assaying four separate pulps. Assay is mean.
SURFACE SAMPLE
CORE DRILL HOLE
RHYOLITE
QUARTZ
DIABASE
PACAUD TWP.
CATHARINE TWP.
CAMPBELL CLAIMS 40 AC. EACH
PROPERTY LINE
GRANITOID
SURVEY LINE
SEARLE'S PATENT
160 ACRES
MILLER PATENT
160 ACRES
PATENT No. 3529
CUT OUT TOWNSHIP LINE
TOWNSHIP LINE
TRENCH
SHAFT
DAM
P-4437
P-4438
P-4436
P-4439
12,000
11,500
11,000
10,000
9,500
8,500
9,000
10,500
11,000
200
100
0
50
100
150
200



NORTEK MINERALS LTD.

Preliminary Cross-sections

63.5173
OM87-329



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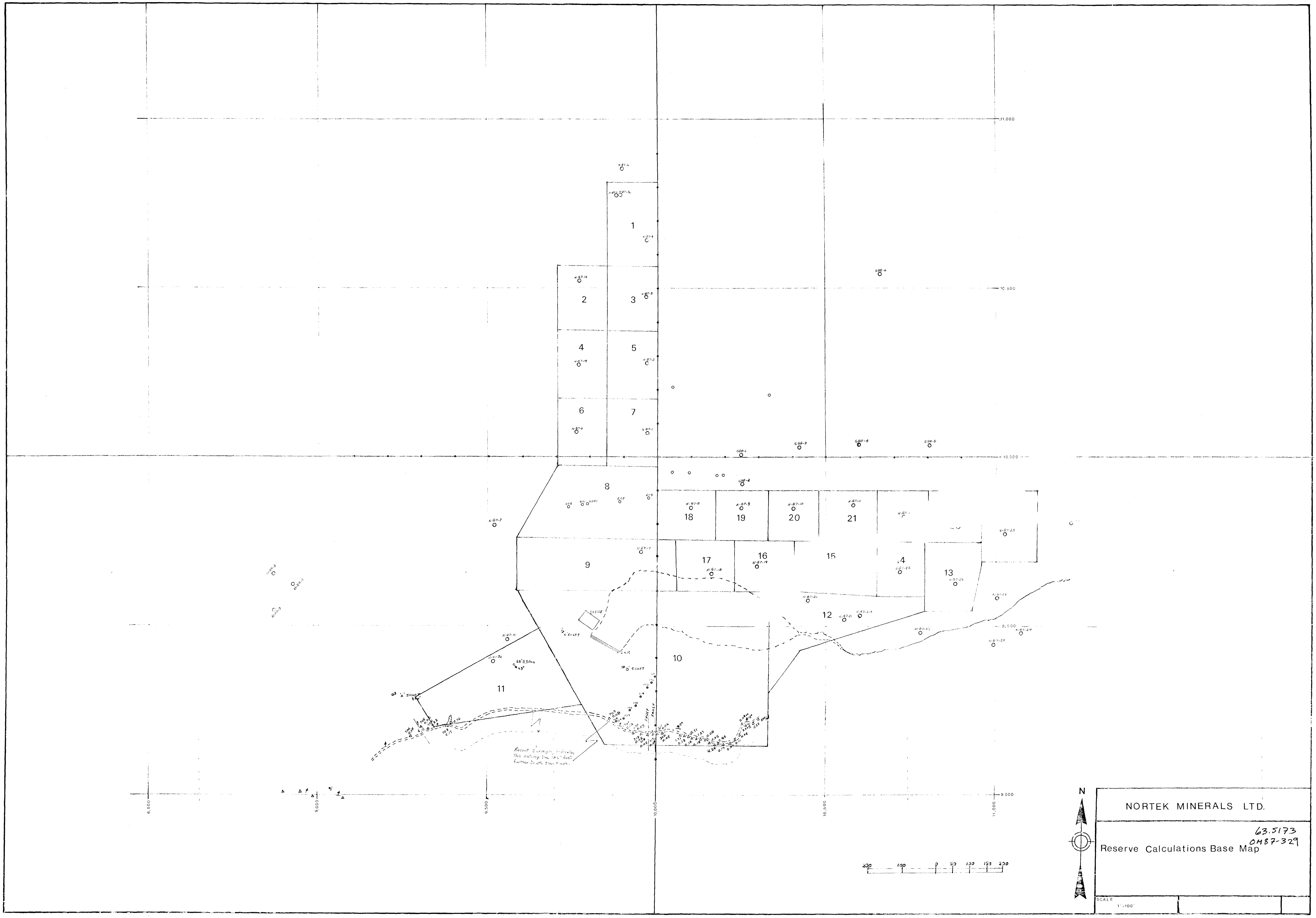
Preliminary Cross-sections E-W

63.5173
OM87-329

1" = 100' vert. & horiz.

220



NORTEK MINERALS LTD.
63.5173
OM87-329
Reserve Calculations Base Map
SCALE
1"=100'
N
11,000
10,500
10,000
9,500
9,000
8,500
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21


TAILS
POND
822584
822582
822581
822577
822576
822575
843638
822579
822578
822580
822583
SHEARED GABBRO
ADAM'S MINE
TAILINGS POND
SLIMES
822553
843637
843636
843635
822555
822556
MILLER BASE LINE
843634
843633
822552
MANDOUX SHAFT
SHALLOW GRANITOID
822554
QUARTZITE
842964
842963
822551
FRAGMENTAL CHERT
GABBRO
843632
842962
822550
822549
FALCONBRIDGE BASE
842959
POPLAR
PINE
Lianne Lake
822533
822548
DDH 86-1
DDH 86-2
799695
800420
80041
822532
BEAVER POND
842961
822547
822564
800 421
80042
842960
INTERMEDIATE PYROCLASTICS
ALTERED BASALT
L-873377
L-873376
HORNBLENDE GRANITE
822562
822565
822566
822529
BOSTON
McELROY
822563
822568
822567
664067
842956
QUARTZ STRINGERS
ANDESITE (MINERALIZED)
620247
620246
822569
822570
620248
ZONE OF STRONG DEFORMATION
SERPENTINITE ZONE
822571
620249
620250
12" to 14" QUARTZ VEIN WITH ALTERED FOOT & HANGING WALL 6" to 8" PYRITIZED WITH SURFACE ALTERATION TO GEOTHITE STRIKE N 30° E DIPPING 70°
BOSTON
PACAUD
DIABASE
COARSE DIABASE
MINOR QUARTZ BLEBS
RHYOLITE
McELROY
CATHARINE

Date of Photography 1986
Control taken from N.T.S. 32D/4
Compiled by: THE ORTHOSHOP

LEGEND

CONTOURS; INDEX		BUILDING	
INTERMEDIATE		RIVER	
DEPRESSION		STREAM	
SPOT HEIGHT	+ 282.87	LAKE, SWAMP	
IMPROVED ROAD		TREELINE	
TRAIL, CUTLINE		TOWNSHIP LINE	

NORTEK MINERALS LTD.
SHENANDOAH - MILLER CLAIMS
SCALE 1:2000
5 Metre Formlines

63.5173
OM87-329

N
Dec. 10° W.
SLIMES
PUMP HOUSE
THE BIG BEND
Lake
Lake
Misema R.
SHALLOW GRANITOID
FALCONBRIDGE BASELINE
800420
800419
522821
522822
856967
856968
822564
800 421
800422
800423
822531
856970
856971
W.R.97
822566
822530
822565
822529
822534
822568
822567
842956
842955
822535
522830
522 829
856972
822569
822570
843752
822536
522831
522832
34247
31377
31257
822571
843751
822537
13773
522833
3137 8
31749
McELROY
CATHARINE
Long L.
LEGEND
POWER DOZING
RIVERS
STREAMS
ROADS
TRAIL
FAULT
ANALYSIS △8032 0.002 oz. per ton
BOG
OLD CABINS
INTERMITTENT DRAINAGE
CORE HOLE
ASSAYS
NOTE: For the purpose of illustration ROADS are not necessarily drawn to scale
MILLER-INDEPENDENCE MINING LTD.
McELROY AND BOSTON TOWNSHIP LEASE HOLDINGS
63.5173
OM87-329
DATE: NOV. 1985
REVISED: JAN. 1987
DRAWN BY: S. FRENCH
APPROVED BY:
SCALE 1": 500'

NORTEK MINERALS LTD.
SHENANDOAH - MILLER CLAIMS
SCALE 1:2000
5 Metre Formlines

63.5173
OM87-329