Report on

ECHO RIDGE MOLYBDENITE DEPOSITS

ECHO TOWNSHIP, DISTRICT OF KENORA

Presented by

Arthur C. Thompson.

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August 1st, 1953.

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ECHO RIDGE MOLYBDENITE DEPOSITS, ECHO TOWNSHIP, DISTRICT OF KENORA.

I. HISTORY. A Geological Report on Echo Township, based on a field survey in 1946, contains brief comment upon occurrences of Molybdenite observed in the vicinity of Lateral Lake.

About the time that the geological survey was in progress, two prospectors - one of whom was E. Lundmark of Wabogoon, Ontario - had uncovered Molybdenite in Echo Township. However, lacking experience with deposits of this kind and being deterred by their sponsors whose attention at the time was directed to gold, they abandoned claims which they had staked, and did no work beyond some initial slight stripping and the sampling of a 50 foot section across the mineralized contact zone (the result being inevitably below ore grade, since the detail structural pattern was then neither revealed nor taken in account).

Afterwards, Mr. G. L. Pidgeon of Wabigoon prospected in the same locality, and discovered evidence of more promising Molybdenite deposits along the extension of the original discovery zone. His work at the time, and until this year, consisted only in a limited amount of stripping and casual surface sampling of the showings. During the interval between 1946 and 1953, from time to time he held one or two claims covering the mineralized exposures.

In June of this year Mr. Pidgeon undertook to open up the showings on his original ground. To this end he completed a short access road, so to enable removal of overburden by bulldozer and blasting of a considerable area of rock for the purpose of determining ore structures and sub-surface ore indications.

A promising picture has emerged as a result of that recent work. Some very encouraging assays were obtained, and consistent patterns of mineralization revealed the possibility of a series of definite ore shoots.

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A promising picture has emerged as a result of that recent work. Some very encouraging assays were obtained, and consistent patterns of mineralization revealed the possibility of a series of definite ore shoots.

Mr. Pidgeon felt it desirable to obtain further ground about his showings, and has staked a total of eight claims. The discovery claims, together with the block of claims which have been staked adjoining, probably include the main portion of the important Molybdenite-bearing structures in this locality.

II. LOCATION and ACCESS. The claims are accessible by good sandy road (logging roads) extending some five or six miles off the highway which connects Sioux Lookout with the Trans-Canada Highway. The road distance is about twenty-eight miles in all from the Canadian National Railway and Sioux Lookout to northeast, and about the same distance from the Trans-Canada Highway and the Canadian Pacific Railway to southward. The property of the Newlund Mine is four miles distant to southeast, while the power line to Newlund crosses the area of the claims, within a half-mile of the original showings. Excellent ground, good water supply and varied timber resources are present in the immediate vicinity. In the event of any exploration and development program, the necessary facilities can be quickly and economically assembled.

III. ECHO RIDGE. The northwesterly portion of Echo Township is generally an area of slight relief and sparse outcrop, except for a moderately outstanding hill area which extends eastward from Lateral Lake. The relief here is up to a hundred feet or more, representing a dome of resistant meta-sediments which partially withstood glaciation that reduced the surrounding area of sedimentary rocks and exposed the Lateral Lake granite mass to westward. This semi-elliptical hill area appears to be the shallow roof overlying an extension of the granitic intrusive along its gently-plunging northeasterly axis. At the eroded western margin of this hilly roof occur the principal surface exposures of Molybdenite. For descriptive purposes the hill area and its geological environs is hereunder called Echo Ridge.

IV. EXTENT of DEPOSITS. The Echo Ridge Molybdenite deposits are exposed along the southeastward margins of a granitic mass (which has been

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IV. EXTENT of DEPOSITS. The Echo Ridge Molybdenite deposits are exposed along the southeastward margins of a granitic mass (which has been

classified as quartz monzonite), at the contact with meta-sediments of Pre-Algoman period.

Preliminary observations suggest that the Molybdenum-bearing mineralization may be localized for the most part within a hundred feet of the contact; however, there is insufficient exposure to fully establish this, and the productive zone may be wider in places. Ore mineralization appears along a strike length of a half-mile, or more, being apparent in some degree at any section of the exposed zone in the northeast-trending contact area. Also, Molybdenite mineralization of similar type (fissure filling and disseminations in a metamorphosed zone) appears a mile and a half to west and south of the main showings. All evidence to date goes to suggest a likely continuity of the mineralized area between the exposed portions of the south-side contact zone.

V. MODE of OCCURRENCE. Molybdenite is deposited in more or less continuous seams, as zones of dissemination, as fillings in tension fractures, and to a considerable extent in rich patches and pockets at the junction of fracture systems. It occurs generally in close relation to quartz veins and stockworks and quartz-pegmatite, but the deposition occurs mainly in fractured sills and dykes of pink felsite. The quartz veins proper are apt to contain only small amounts, whereas the marginal felsitic rock is usually strongly mineralized, especially where minor tension fractures occur tangent to the veins. Disseminated Molybdenite is practically always found wherever the rock adjacent to veins shows a pink tinge due to felspar enrichment.

VI. STRUCTURAL CONTROL of ORE DEPOSITION:

A. Regional Elements of Control. A conjunction of local and regional structural elements appears to have prepared the ground for ore deposition. In the Geological Report on Echo Township (1946), the authors note that "the Lateral Lake granitic stock" is intruded into an anticline imposed upon the northward flank of a major syncline, of which the axis lies some two or three

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miles southeast and parallel to this intrusive. Underlying the synclinal valley they have presumed a major fault, which is supposed to separate the area of Pre-Algoman sediments on the north from a belt of Keewatin volcanics to southward.

It may be noted that the property of Newlund Mines is situated about four miles distant to southeast, at the opposite side of that presumed fault. The same regional stresses which produced a favorable ore structure at the Newlund Mine must have exerted some influence in the vicinity of the Lateral granite. This is suggested strongly by a major assymetry of the vein systems that occur off the otherwise remarkably symmetrical dome of sediments exposed to east of the Lateral granite along Echo Ridge: whereas on the southward flank of that dome the veins dip approximately perpendicular to the underlying granite contact and to the bedding-schistosity, to northward the veins depart from this pattern, showing a continued appreciable northerly dip, tending to parallel both the presumed intrusive contact and the bedding-schistosity of overlying sediments. One may note also the abundant mineralization at the southward contact in contrast with the barren aspect of an exposed north-side contact of the Lateral granite.

It appears, therefore, that regional stress and movement as postulated in the aforementioned Report on Echo Township, may have acted upon the Echo Ridge structures so as to affect the localization of ore deposits.

B. Local Elements of Control. As mentioned before, the Lateral granite was intruded into an anticline developed in Pre-Algoman sediments. Those sediments show a high degree of alteration, being now identified as hornblende schist and paragneiss where they occur in the general vicinity of the intrusive. Bedding and schistosity (more or less coincident, it appears, at angles varying between 25 and 45 degrees) show a striking symmetry about the intrusive body. A profusion of quartz veins, evidently derived from underlying

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The strong vein systems, which occur abundantly at the granite contact and throughout the dome of meta-sediments, show a tendency to more intensive development about the southward and easterly flanks of the structure, where their prevailing aspect seems to be generally perpendicular to the bedding-schistosity. Other evidences indicate that ore concentrations might particularly be expected on the southeastward flanks of the northeast-trending axis of the structural dome.

A feature of possible economic significance is an apparent cross-fold or faulting which interrupts the symmetry of the southward flank of the structural dome in the vicinity of the ore exposures.

C. Ore Localization. At the Echo Ridge contact zone may be noted a transition from massy pink granite through a banded gneissic zone, which is probably bedded old sediments metamorphosed by the nearby granite mass and injected by narrow sills of felsite. The contact proper is mostly hidden under a narrow depression beyond which appear the less altered sediments, intruded by felsite lobes and stringers. Undigested remnants of sediments appear,

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occurring as bedded inclusions within the margins of the intrusive zone. Bedding and schistosity apparently coincide on a dip about 45 degrees to southeast at this section.

It is in the metamorphic zone that the ore deposits occur. Here the rock was hardened sufficiantly to sustain strong fracturing and so to develop vein systems. The veins seem apt to pinch where they enter tangent to the less altered and locally schistose sediments. Where the veins extend into the massy granite area they appear to be mostly barren and the wall rock evidently did not support mineralization. The productive section of the veins is where they cut at low angles through the metamorphosed relics of old sediments, the rock here being competent enough to sustain open fracture, yet sufficiently weak to yield slightly along planes parallel to old bedding and particularly along the intruding bands of felsite.

Deposition of Molybdenite occurs at the conjunction of the veins with the fractures which spread out along those old bedding planes. Rich concentrations are apt to occur at the intersection of vein fractures or of veins and strong slips within this zone of optimum deposition. The ideal structural condition seems to be where sustained large veins recur en echelon within a few feet of each other, striking at low angles (15 degrees or less) across the optimum zone, and the intervening rock is more or less continuously fractured. Such a condition is found along the Echo Ridge contact, raising the prospect of the occurrence of ore shoots of substantial tonnage and mineable grade. In one such instance, preliminary observations suggest a continuous body of ore having surface dimensions averaging fifteen feet by two hundred feet or more, of estimated apparent grade 0.75 per cent; such a body might be expected to contain many thousands of tons, which might be mined in a large-scale operation. Richer shoots of lesser dimensions typically occur in relation to close stockworks of veins.

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Some direct evidences of rock movement and slight faulting appear along the ore zone, by way of slickensides, slight displacement of gneissic bands, and in the development of close-spaced perpendicular fractures at the walls of some of the veins (a condition apt to produce a locus for unusually rich ore).

It would appear that regional stresses still were effective during the latter stage of cooling of the Lateral granite, when open fissures began to develop at the edges. The regional forces tended to augment the local effects, and fractures generated at the contact acted as a network of numerous small inter-connected faults, to accommodate such regional stresses as reached to the vicinity of the intrusive. Because of this sustained movement, a web of minute channelways developed and remained open at the margins of the veins at a stage later than their original emplacement and hardening. The high temperature-pressure mineralizers readily penetrated to the contact area along the open flank of the structural dome. Ore deposition may have occurred in consequence of sudden pressure drops across the margin between metamorphosed contact and weaker outlying sediments. Hence a relatively high degreen of concentration would have been possible along a narrow but otherwise extensive "blanket" zone at the contact.

D. Ore Structures and Vein Detail. Along the exposed portions of the Echo Ridge contact zone structural variations have been noted, resulting in what have been identified as three distinct types of ore structure; as follows:

1) Major veins, (quartz, minor pegmatite), of vertical aspect, occur aligned parallel to the contact. Particularly along the outer wall of such veins, fracture systems extending into a zone of felsite and pegmatite offshoots appear apt to make ore on widths varying between one and four feet, of a grade estimated (from surface appearances) at 1 to 3 per cent. Molybdenite. Such

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veins, in parallel and cross-linked formation, have been observed in widths up to sixteen feet and may extend for at least several hundred feet. Cross-linking structures, especially those which converge at the outer walls of the major veins, seem apt to produce rich local shoots. This type of ore structure is characteristic of the southwesterly portion of the Echo Ridge contact, representing the steeper flank of the structural dome;

(ii) Stockworks systems, comprised of felsite, quartz and quartz-pegmatite, cross-cut the metamorphosed contact at angles between 30 degrees and 45 degrees. Generally, the ore structure of this type consists of at least one large quartz vein which cuts the bedding at a steep angle, together with intersecting veins and stringers which are apt to lie parallel to the contact but may occur at any angle of dip. The edges of the glassy quartz may merge into a zone or patches of pegmatite consisting of coarse pink felspar and coarsely crystalline quartz. In turn the vein as a whole seems to have cut through a dyke of fractured felsite, which partly intrudes into the metamorphic wall rock and partly cuts across bedding.

The widest and most persistent Molybdenite occurrences appear to be in the felsite portion of the veins, but to a considerable extent also (and in strikingly rich pockets) in parts of the pegmatite, but usually very little within the quartz section of the veins.

Two or more of such complex ore-vein systems may converge or be interjoined by ore-bearing felsites, Quartz stringers or slip-seams heavily charged with Molybdenite (sometimes up to half an inch or wider of the massive ore).

This type of occurrence is a feature of the mid-portion of the exposed Echo Ridge contact, and appears to be closely associated with an irregularity along the flank of the structural dome, that may mark a cross-fold or faulting. It appears that the richest ore may be found in relation to stfuctures of this kind;

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(iii) Echelon vein systems occur, arrayed at a slight tangent to the contact (about 15 degrees). At the northeastward extension of the contact zone appears a strong structure of this type. Several large quartz veins in echelon? angle across the metamorphic zone through a distance of two hundred feet or more before resuming a parallel alignment with the contact. Localization of Molybdenite deposits is provided in tension fractures developed along felsitic bands in the area between the veins, which are from eight to twenty feet apart, and in pegmatite aggregates at the edges of the quartz. This type of structure occurring towards the ridge or axis of the structural dome, seems apt to provide the largest continuous bodies of ore, though probably of average lesser grade than in the case of type (ii).

DEPOSITION SEQUENCE IN VEINS. Examination of the composite ore-vein systems indicates that the sequence of development may have been as follows: Felsite bodies were developed first, as sills injected along bedding planes at the contact and as dykes that occupied fissures which broke across the contact zone. Subsequent movements and tension re-opened the dyke fissures, and fracturing spread into the felsite margins and into convergent felsite sills. Quartz-pegmatite and Molybdenite entered at this stage, the Molybdenite migrating largely into the fractured walls. Quartz-forming fluids continued to penetrate along the enlarging vein fissures, while sustained movements kept the wall fractures sufficiently open to receive further enrichment with Molybdenite. Some quartz may have come in later than the main mineralization stage.

ORE SIGNIFICANCE OF QUARTZ VEINS. In all the ore structures described, the quartz veins proper do not seem receptive to much significant ore deposition; although they are an invariable component in all the ore systems. For purposes of mining, the unproductive quartz portions might be left in place in the case of the major veins, or regarded as dilution in the stockworks occurrences, or barren quartz might be easily sorted and discarded from the distinctive milling

(iii) Echelon vein systems occur, arrayed at a slight tangent to the contact (about 15 degrees). At the northeastward extension of the contact zone appears a strong structure of this type. Several large quartz veins in series angle across the metamorphic zone through a distance of two hundred feet or more before resuming a parallel alignment with the contact. Localization of Molybdenite deposits is provided in tension fractures developed along felsitic bands in the area between the veins, which are from eight to twenty feet apart, and in pegmatite aggregates at the edges of the quartz. This type of structure, occurring towards the ridge or axis of the structural dome, seems apt to provide the largest continuous bodies of ore, though probably of average lesser grade than in the case of type (ii).

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VII. MINERALIZATION, ASSAYS and ESTIMATES. Although Molybdenite seems to be the important economic mineral present in the Echo Ridge deposits, a very interesting array of other minerals occur, to some extent more or less. Wall rock adjacent to veins is generally impregnated with a variety of amorphous pale sulphides not yet certainly identified. Cubic aggregates fo pyrites occur in a haphazard conjunction with the Molybdenite. Mica is more or less abundant, often intimately layered with Molybdenite: there appear to be more muscovite and an unidentified greenish-resinous mica, as well as a little biotite. Magnetite occurs as fine granules or in local masses, in which Molybdenite is apt to be finely intermingled. Antimony sulphides are present, sometimes in heavy aggregates along with Molybdenite; and there appears also what may be a cadmium sulphide. Tin is slightly present, probably as cassiterite, assaying at .02 to .03 per cent. Cuprite, chalcopyrite, bismuthinite, fluorspar, and possibly barite, have been tentatively identified in slight or scattered amount. Other substances visibly occur, of which the identity is still obscure. Some unknown fluorescent minerals are present, but possibly do not include scheelite.

Assay returns to date have been on grab samples taken from significant ore sections. The range has been from about 0.10 per cent to 6.12 per cent. Rich and striking specimens are commonplace. But typical specimens usually grade between 1.2 per cent and 2.6 per cent. Visual evidence suggests that overall mineable grades might be expected, varying from 0.5 per cent to 1.25 per cent, on bodies of width six to twenty-five feet and of length fifty to three hundred feet, at surface. (The higher grade figure refers generally to the bodies of lesser dimensions, and vice versa). It appears furthermore distinctly possible that progressive exploration might outline continuous lare-tonnage bodies of average low to moderate mineable grades.

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Consistent with this, it will be apparent that at any horizon along the contact a number of ore shoots may be exposed in varying phases between their upper and lower limits. Several such shoots appear tobe exposed along the Echo Ridge contact at some part of their middle section, whereas it appears also that other bodies there exposed may represent either the upward limits or the lower extremities of other shoots. Assuming this to be so, a tentative figure might be arrived at for determination of ore potential, by reconing the combined areas of exposed ore shoots in relation to the total exposed contact area, and referring this to the total potential ore horizon along strike and slope of the contact.

Various attempts to arrive at such an ore-potential index have yielded an average figure ranging from 0.25 to 1.0 ton per slope foot of the ore horizon for every strike foot along the contact. The figure is apt to be decidedly higher at certain sections. fot he exposed contact zone, and might exceed 1 ton per foot. The over-all minimum grade assumed is 0.65 per cent Molybdenite on averaged minimum widths of siz feet for surface lengths of fifty feet or better. A strike length of 2500 feet along the Echo Ridge contact may be reasonably assumed- the actual length should be more than this. On slope, interence from structural and mineralization evidence allows an assumption of 5000 feet or more.

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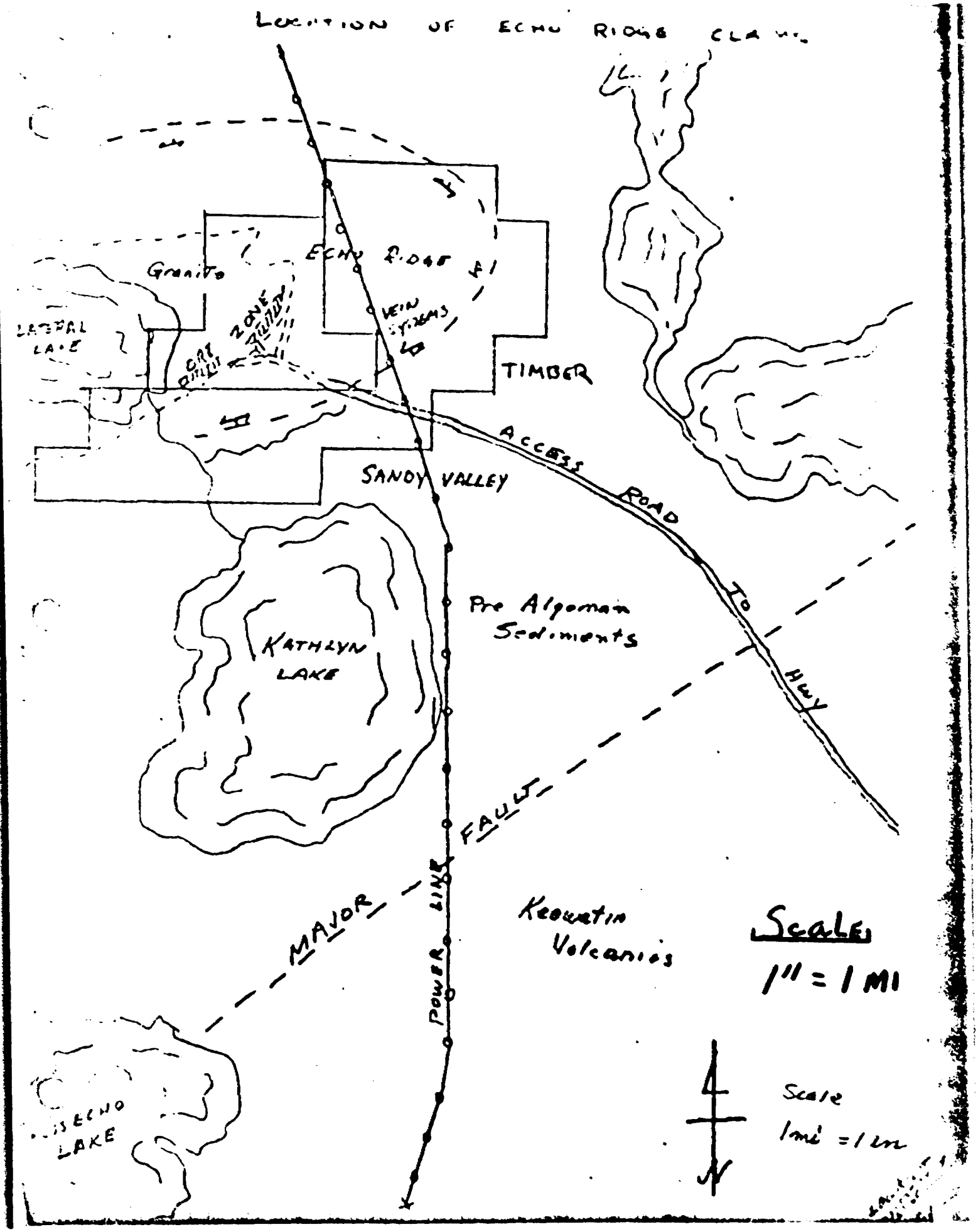
LOCATION OF ECHO RIDGE CLAIMS
Granite
ECHO RIDGE
VEIN SYSTEMS
LATERAL LAKE
ZONE
TIMBER
ACCESS ROAD
SANDY VALLEY
Pre Algoman Sediments
KATHLYN LAKE
To Hwy
FAULT
MAJOR
POWER LINE
Keewatin Volcanics
ECHO LAKE
SCALE
1" = 1 MI
Scale
1mi = 1 in
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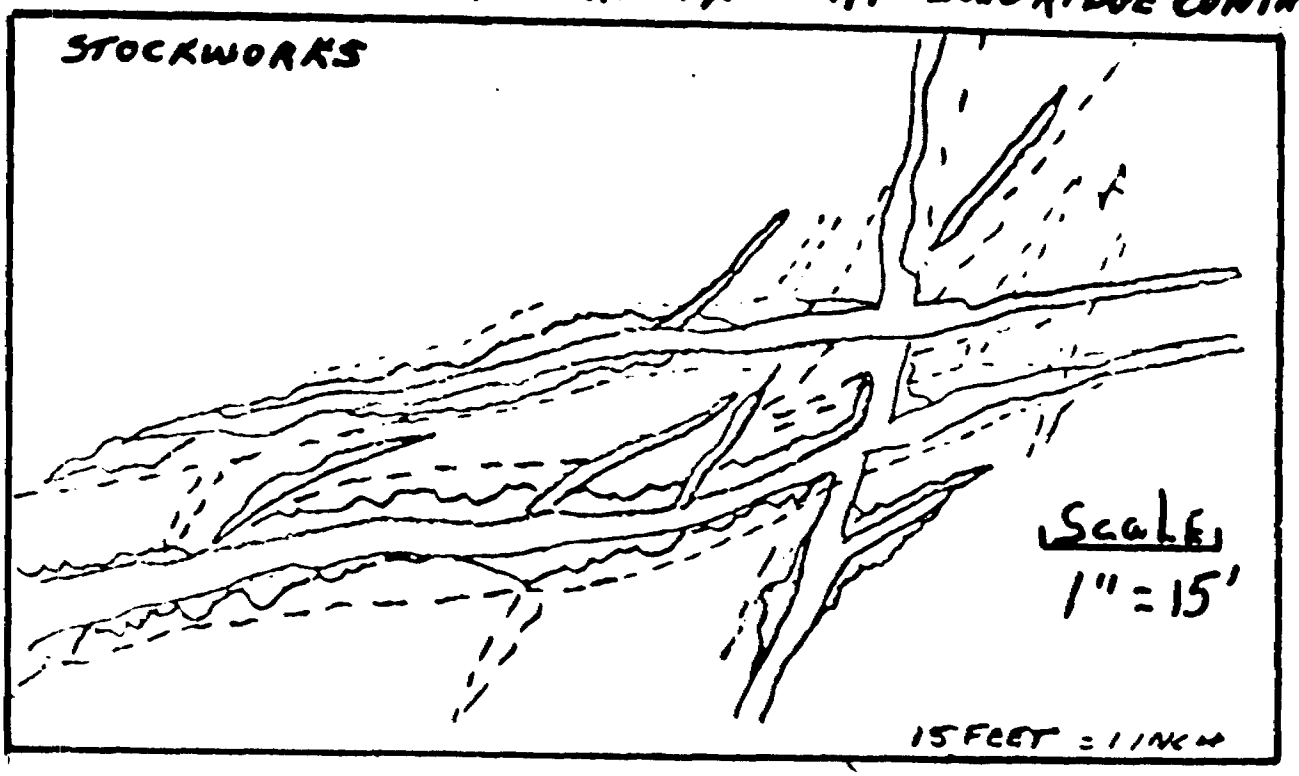
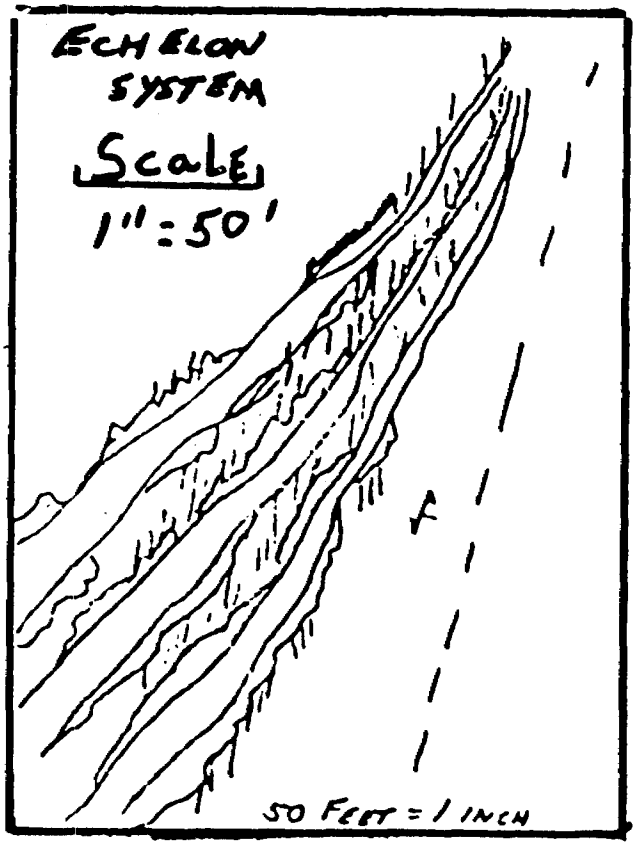
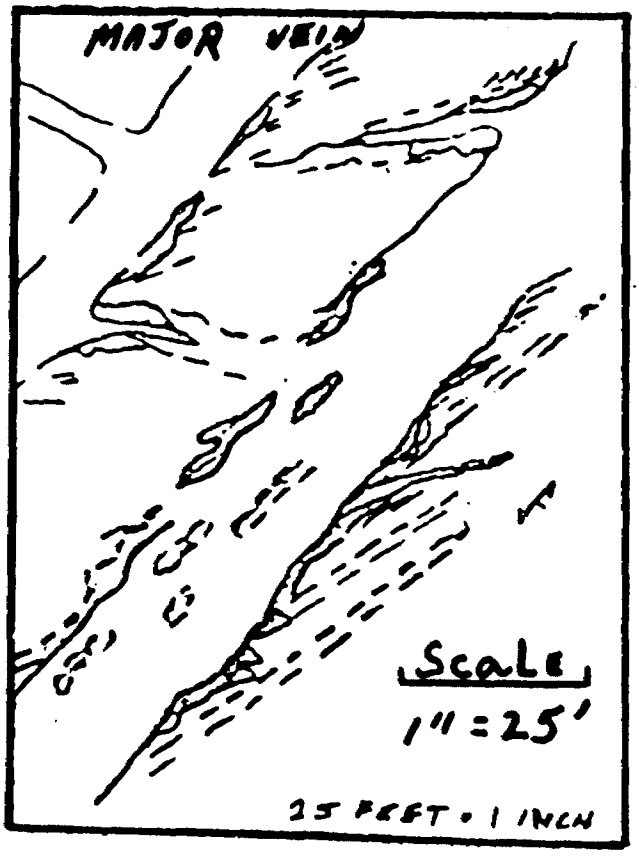
ORE STRUCTURE TYPES AT ECHO RIDGE CONTACT

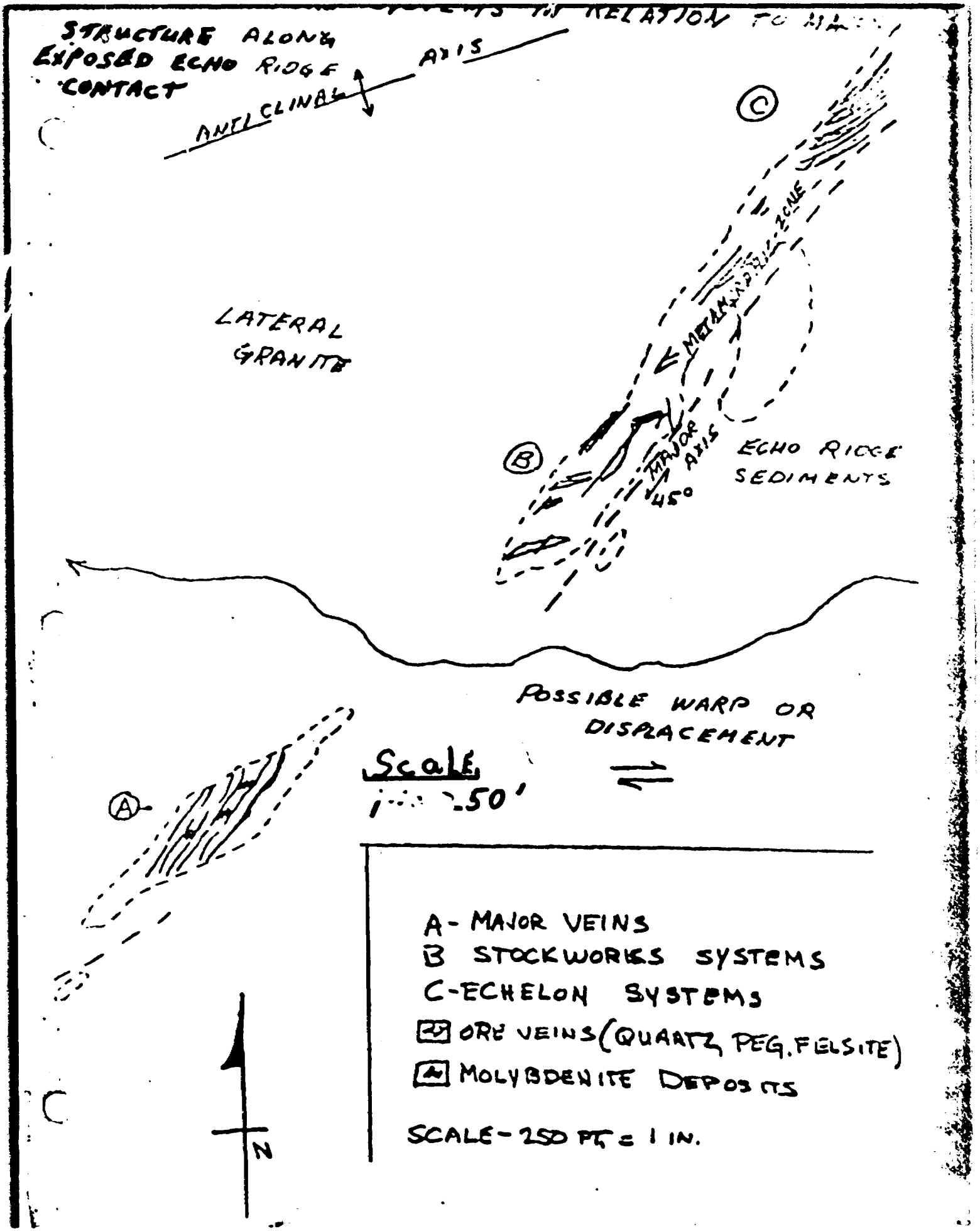






KEY

- FELSITE
- QUARTZ
- PEGMATITE
- MOLYBENITE


STRUCTURE ALONG EXPOSED ECHO RIDGE CONTACT
ANTICLINAL AXIS
LATERAL GRANITE
METAMORPHIC ZONE
MAJOR AXIS
45°
ECHO RIDGE SEDIMENTS
POSSIBLE WARP OR DISPLACEMENT
Scale
1" = 250'
A- MAJOR VEINS
B STOCKWORKS SYSTEMS
C-ECHELON SYSTEMS
ORE VEINS (QUARTZ, PEG. FELSITE)
MOLYBDENITE DEPOSITS
SCALE - 250 FT = 1 IN.
N

Fractured Zones and Mineralization at Southward Flank of Lateral Lake Anticline.

1. Strong vein systems(slight molybdenite, and associated rusty schists) cutting the symmetrical dome of old sediments, presist for a mile and more eastward from the exposed contact of the intrusive quartz monzonite on the G. L. Pidgeon claims.

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3. Average plunge of the anticline is inferred as about 20 degrees north of east, hence the sediments may constitute a relatively shallow roof over the intrusive monzonite.

4. The quartz-vein systems cutting sediments seem to recur in more or less parallel zones of fracture.

5. Such vein systems might be regarded as the surface expression of fracture systems that have produced deposition of molybdenite at a favorable lower horizon (at the transitional contact zone, where metamorphosed sediments are intruded by felsite bodies).

6. The molybdenite seems to be mainly deposited in the competent felsite-whether dykes or sills - whenever later fracturing has admitted pegmatite and quartz.

Summary: The mineralized stockworks system exposed on the G.E Pidgeon claims may constitute only part of a more extensive series of fractured zones localizing molybdenite deposition along the low-plunging "felsitized" horizon of the contact between intrusive quartz monzonite and the overlying shallow roof of altered sediments.

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52F16NW8219 52F16NW0064 ECHO

PIDGEON MOLYBDENITE PROPERTY
ECHO TOWNSHIP,
DISTRICT OF KENORA.

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3. Diamond Drill Logs and Assays.
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REPORT ON

PIDGEON MOLYBDENITE PROPERTY

ECHO TOWNSHIP
SIOUX LOOKOUT AREA

September 22nd, 1954

G. L. HOLBROOKE

SUMMARY

Important molybdenite mineralization occurs associated with quartz-aplite-pegmatite stockworks in the eastward pointing, mile wide, tongue or projection from a large granite intrusive to the west. The tongue is intrusive into folded Temiskaming sediments and the nose plunges eastward at 40° with the folding.

Where visible, the mineralization is along and near the southeastern contact of the granite tongue as it approaches the nose area. The mineralized area is exposed on one outcrop across a width of from 70 to 110 feet and for a length of 2,200 feet. It is apparently associated with the stockworks which cover widths from 12 to 30 feet and are from 500 to 700 feet long, arranged "en echelon" along the length of the outcrop. The material between the stockwork lenses is but sparsely mineralized and is comparable in width to the lenses themselves.

A considerable amount of blasting has been done irregularly along the outcrop but no attempt has been made to open it up systematically for sampling.

It is impossible to accurately estimate the grade of the mineralization except by bulk sampling. Visual inspection suggests something better than 1% MoS_2 for the stockworks lenses and 0.10 to 0.20% MoS_2 for the intervening rock. Tin values are present to the extent of 0.02 to 0.03% in the samples assayed for this element. The only approach to bulk sampling is from a large number of chips taken from a freshly blasted trench across one of the stockworks. The work was done by Ventures and returned 0.93% MoS_2 with all massive streaks of molybdenite discarded.

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LOCATION

The property consists of fifteen unpatented claims in Echo Township. Twelve of the claims - Nos. PA. 14051, 14071, 14081; 14192, 3, 4, 5, 14223 plus four others are owned by G. L. Pidgeon of Wabigoon, and the remaining three claims by A. Lanz, also of Wabigoon.

The claims are about midway between Dinorwic and Sioux Lookout and are twenty miles by road from either place. Dinorwic is on the C. P. R. and Sioux Lookout on the C. N. R.

Access to the property is by five mile gravel all-weather road from the Sioux Lookout Highway.

The Ontario Hydro-Electric Power Commission power line to the Newlund Mine crosses the property about 2,000 feet east of the main showing.

An ample water supply is found in Lateral Lake, 3,000 feet west of the main showing.

An 18 x 20 foot new log camp is on the property.

GEOLOGY - GENERAL

The geology of the immediate area consists of Temiskaming age sediments intruded to the west by a large granite batholith. A mile-wide tongue of this granite extends eastward from the main mass and the eastern end of the tongue lies about the centre of the property.

The sediments around the granite nose are folded into a broad anticline whose axial place strikes N80°E with a very steep north dip. The dips along the limbs of the fold are from 35° to 45° and the plunge is 30° to 40° to the east. The granite tongue has apparently been intruded along the axial plane of the fold and the eastern nose presumably plunges eastward under

the sediments in conformity with the folding.

The granite tongue is not well exposed being largely swamp covered, but a few outcrops are to be seen along the north and south edges of the tongue. Apparently there has been a great deal of assimilation of the sediments by the intrusive as the edges of the granite show considerable ghost bedding conforming in attitude with the invaded rocks.

GEOLOGY - ECONOMIC

The principal showings on the property are found on two outcrops lying along the southeast edge of the granite tongue approaching the east pointing nose. The eastern outcrop is almost on the contact, and is from 80 to 110 feet wide and some 2,200 feet long. The western outcrop is from 50 to 70 feet wide and 700 feet long. It lies 800 feet west of the east outcrop and its outer edge is about 400 feet within the granite tongue. Aside from these two outcrops, the granite tongue is entirely swamp covered on the property.

The main showing on the property occurs across the east outcrop. Here the granitized sediments have been invaded by a pattern of quartz veins and stringers with the principal members trending northeast along the outcrop with steep rolling dips. In addition, numerous dyke-like intrusions of aplitic material and irregular pegmatite dykes and masses cut the granitic rocks but are themselves cut by the quartz.

The above complicated stockwork of veins and dykes covers the entire width of the outcrop but appears to be concentrated in three 12 to 30 foot wide zones trending northeast along the outcrop and separated by like widths of granite and granitized sediments.

A considerable amount of molybdenite is to be seen along the length and across the width of the entire outcrop. A large amount of blasting has been

done but in an irregular manner and exposes considerable fresh rock along the outcrop. The molybdenite occurs as flaky disseminations up to 1/4 inch in diameter and in massive streaks and patches up to 4 inches thick and from 1 to 20 feet long.

The mineralization is more apparent in, and near, the quartz-aplite-pegmatite stockworks. Here it occurs in four ways: -

(1) As massive streaks along the contacts of the quartz veins and as streaks in tension fractures in the wall rocks of the veins;

(2) As strong disseminations in the aplitic or felsitic material with occasional massive streaks;

(3) As disseminations and irregular bunches or lenses in the pegmatitic material, and

(4) As disseminations in the invaded granitized sediments and granites.

The granitized sediments between the stockworks carry a little disseminated material but are very much lower in molybdenite content than the stockworks.

There is a great deal of molybdenite exposed by the irregular blasting but it is impossible to determine the grade without expensive bulk sampling. From visual inspection the stockworks appear to carry something better than 1% MoS_2 across widths from 12 to 30 feet. The intervening weekly mineralized material is very low grade, probably from 0.10 to 0.20% MoS_2. The only attempt at bulk sampling was made by Ventures who blasted a trench across the most southeasterly stockworks on the east outcrop. This was sampled by taking a large number of chips and small pieces from both walls and the bottom of the trench. The assay of this material was 0.93% MoS_2. In spite of the fact that all massive molybdenite encountered was discarded in the sampling. It should also be noted that whenever tested samples have returned

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SUMMARY

In summary, the Pidgeon property shows very interesting possibilities. Molybdenite occurs concentrated in stockwork zones from 12 to 30 feet wide and from 300 to 500 feet long, arranged "on echelon" along the southern contact of an intrusive granite mass. The mineralization is observed for a length of some 3,500 feet and appears to be in the neighbourhood of 1% MoS_2 in grade.Only bulk sampling will determine the exact grade and will be an expensive process. Estimated costs for two miles? through the mineralized section is $15,000, including freight and mill bands? at Ottawa.

RECOMMENDATIONS

It is recommended that two cross-cut tunels be driven across the main east outcrop as near the swamp level as is feasible. It will require some 250 feet of underground work to do this at an estimated cost of $7,500.00 The muck from this work should be split and a 40 ton (carload) representative sample should be shipped to Ottawa for a mill test and grade determination. The cost of this is estimated at $5,000.00. Supervision should run $2,500.00.

Before the tunnels are driven, two flat diamond drill holes should be driven into the hill at each tunnel site, and carefully sampled and assayed. The purpose of this drilling is to provide a basis for a rough calibration of future possible drilling of the entire mineralized zone.

September 22, 1954.

G. L. Holbrooke

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September 22, 1954 — G. L. Holbrooke

Report on Echo Molybdenite Property

Echo Township, Kenora District, Ontario.

Introduction

The Echo Molybdenite prospect is situated in Echo Township, concession V, district of Kenora, Ontario. It consists of eight claims, staked by G. L. Pidgeon of Wabogoon, Ontario, and covers the contact between granodiorite of possible Algoman age and pre-Algoman sediments. It lies about 3 miles west of No. 72 highway which connects with Sioux Lookout to the North by about 25 miles.

General Geology.

A lenticular mass of granodiorite lies to the west of the property and the east end or nose of the intrusive lies within the claim group. The structure of the enclosing sediments suggests that the nose plunges to the east.

Along the south-east contact a zone of felsite and partly replaced sediments has been developed. The felsite has been subjected to stress and the introduced quartz veins and pegmatite stringers form a stockwork in the fracture pattern developed.

The zone outcrops abruptly from the muskeg in two locations. The indicated length of the zone is 2100 feet and the width at least 80 feet. Its relationship with the granodiorite is not exposed. The sedimentary contact is gradational and it dips about 30 degrees to the south-east.

The mineralization consists of molybdenite and minor amounts of pyrite. The molybdenite occurs as small grains or crystals along the margins of the pegmatites, in minute shear planes in the felsite and in the altered sediments. Some occurs along or within quartz stringers and in fine fractures at

Report on Echo Molybdenite Property

Echo Township, Kenora District, Ontario.

Introduction

The Echo Molybdenite prospect is situated in Echo Township, concession V, district of Kenora, Ontario. It consists of eight claims, staked by G. L. Pidgeon of Wabogoon, Ontario, and covers the contact between granodiorite of possible Algoman age and pre-Algoman sediments. It lies about 3 miles west of No. 72 highway which connects with Sioux Lookout to the North by about 25 miles.

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the end of the stringers. Some molbdenite was observed occurring with the? altered sediments in a disseminated form.

A grab sample taken from the blasted area gave a value of 0.34% No.

Recommendations

The zone of molybdenite is well worth sampling on a bulk sample and it is suggested that a series of sections, 100 feet apart be marked out along the zone. That each section be sampled by drilling a series of regularly spaces short drill holes parallel to each other and all the core of a section be included in one sample.

This method would give a representative sample, and eliminate the human element of error when blasting a bulk sample.

The samples should be assayed by treating it with modern flotation methods for molybdenite.

E. A. Hart.

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Preliminary Report on the
G. L. Pidgeon Claims
Echo Township, Kenora District, Ont.

Forword.

On September 11, Mr. E. L. Evans requested a preliminary examination and appraisal of the G. L. Pidgeon claims located east of Lateral Lake. Echo Township, Kenora District, Ontario. The claims, eight in number, were reported to contain appreciable amounts of molybdenite.

Mr. Evans' request also included an investigation of the adjoining territory to determine if there was still desirable ground open for staking.

The examination was undertaken on September 15, in the company of Mr. Pidgeon.

Conclusions and Recommendations.

The property appears to be worthy of further examination and study. It is ideally located with respect to highway transportation and hydro power.

I recommend that the exploration be carried out as follows:

1. A bulk sample of the exposed material be obtained and subjected to mill test.
2. The property should be mapped to determine the extent of the mineralization.
3. Some diamond drilling should be undertaken to determine vertical extent and the persistence of molybdenite at depth.

Location and Access.

The property, consisting of eight mining claims, is situated in Echo Township, District of Kenora, and immediately east of Lateral Lake. The property is approximately four miles northwest of the Newlund Mine. Easiest access is by road either from Dinorwic on the mainline of the Canadian Pacific Railway or from Sioux Lookout on the mainline of the Canadian National Railway.

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At a distance of twenty-five miles along Highway No. 72, north from Dinorwin?, a gravel bush road trends northwestward to the claims and presently terminates less than one mile from the principal showings. The Hydro Electric Power Commission transmission line to Newlund Mine crosses the bush road and the easterly claims.

Geology and Mineralogy

According to Ontario Department of Mines Map No. 1950-1, published in Volume 59, Part 5, 1950, the claims are underlain by paraschists and paragneisses subsequently intruded by granite, aplite and granite pegmatites. Some of the granite is gneissic in character and the whole is cut by a network of quartz veins of varying width. All phrases of the granite and some of the quartz veins are mineralized with pyrite and molybdenite. Both minerals are present as fine disseminations and quite coarse blobs. Certain of the fractures and slip planes are entirely filled with molybdenite with or without pyrite. The deposit can be classified as a stockwork and does not appear to be amenable to channel or ship sampling. The best method of appraising the percentage of molybdenite in the deposit would be by bulk sampling in some way.

Tonnage and Tenor.

No attempt was made to estimate tonnage or grade of the deposit. Mr. Pidgeon had sent a number of samples for analysis and the returns varied all the way from .05% to 6.50% MoS. A large sample collected by Art Thompson, and said to represent some thirty feet of width, is reported by Pidgeon to have assayed.95%MOS_2. Since all the rock visible, with the exception of the paragneisses and parachists, contains more or less molybdenite, I would estimate that there is a strong possibility that the entire zone might average. 75% MOS_2 This is naturally a very crude guess and should not be considered in any way authentic.

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General Remarks.

The property is one of the better molybdenite showings which I have examined. This opinion is based on the persistent presence of the mineral throughout all the granite rock with concentrations at various localities. The ore material should be free-milling and should not present too great a problem for recovery. There may be some difficulties encountered in mining, due to the presence of swampy ground close to the outcrops, but a more detailed examination would confirm this point.

Respectfully submitted,

M. W. Bartley, P. Eng.
Consulting Geologist.

Port Arthur, Ontario,
September 23, 1953.

DETTA MINERALS LTD.

Report on Sampling

PIDGEON MOLYBDENITE PROPERTY

ECHO TOWNSHIP - ONTARIO

February 25, 1953

Keith J. Benner

DELTA MINERALS LTD.

Report on Sampling
PIDGEON MOLYBDENITE PROPERTY

ECHO TOWNSHIP - ONTARIO

February 28, 1955

Keith J. Bonner

CONCLUSION

Two sections of possible ore-grade were intersected by drill Hole No. 1 and later checked by adit work. The sections were separated by 18.8 feet of very low grade material. The following table gives widths and comparative values in percent MoS_2 :

ASSAYS

Section	Width	Core	Muck	Channel	Average
1	23.4'	0.72	0.24	0.37	0.44
2	25.8'	0.92	0.57	0.58	0.69

It can be seen that mucks and channels agree reasonably well, however, both are considerably lower than drill core assays.

In view of the amount and extent of the molybdenite mineralization seen on surface it is felt that the grade shown in muck and channel sampling appears too low and is not necessarily what could be expected from further, more comprehensive work.

Separated by 19.0 of APPROX. 0.04% MATERIAL

PROPERTY

The group consists of twelve unpatented claims numbers 14051, 14071, 14081, 14192 to 14196; 15232, 15233, and 15242 to 15244, all located in the north central part of Echo Township, Patricia Mining Division, Ontario. The property is about five miles westerly from mileage 22-1/2 (dating from Sioux Lookout) on the Sioux Lookout-Dinorwic Highway. From the highway to the property the road is not surfaced but due to the nature of the country traversed, it is fair in all weather.

The easterly part of the property is fairly high, morrain-covered ground with comparatively few outcrops reported. This area is densely wooded with jackpine, birch and poplar. Undergrowth is only moderate. To the west of the main showing, the terrain is largely swampy with spruce, of mine timber size, as the main growth.

The Hydro-Power line to Newlund Mines crosses the north-east corner of the property.

The few small creeks on the property cannot be relied on to supply water even for a small camp. In the event of extensive operations Lateral Lake, on the west boundary, would be the only reasonable source.

GEOLOGY

The property has not yet been mapped in detail but the geology in the immediate area of the showings is known to consist of Temiskaming sediments intruded by granite of Algoma age. In the contact area the granite has been injected by felsite and pegmatite in the form of irregular dykes. Veins of white, glassy quartz cut the felsite and pegmatite. The extent of the individual dykes and veins could not be traced on surface due to snow coverage.

The molybdenite occurs in all of the igneous rocks but is more prevalent in the later dykes and veins. In the felsite it is associated with varying amounts of pyrite in finely disseminated form, as large, platey crystals and as massive blobs. In the pegmatite and quartz the molybdenite occurs as platey crystals or as multiple crystals.

The showing consists of three outcrops, all with considerable molybdenite in evidence, covering a total length of about 2,000 feet and a width of 80 to 110 feet; and open at extremities. The two northerly outcrops are adjacent to the contact and follow a strike of 830°W. The third and southerly outcrop is about 600 feet west of projected strike indicating either a bend in the contact or, if the contact remains relatively straight, a possible mineralized zone at least 600 feet wide.

EXPLORATION

As a preliminary step two diamond drill holes were drilled horizontally and across strike some 600 feet apart, from the edge of the outcrop to cut the granite-sediment contact.

Hole No. 1, under the centre outcrop, was drilled to a depth of 125 feet and cut the contact at 110 feet. No. 2 hole, under the north outcrop, cut the contact at 213 feet and was stopped at a depth of 225 feet. In diamond drilling the rock was found to be exceptionally hard. Core recovery was excellent and at no place was there any indication of loss of mineralized core due to grinding. In sampling, the core was split with one-half shipped for assay and the remaining part stored on the property for future reference.

Following the drilling an adit was driven along hole No. 1 to beyond the granite-sediment contact. The purpose of this was to provide bulk and channel samples from which to calibrate the drill assay results and thus evaluate future drilling.

The work was carried out during the period October 10th, 1954 to February 8th, 1955, and was somewhat hampered by snow conditions and server temperatures.

BULK SAMPLING

Rounds of about six feet each were pulled as frequently as conditions permitted but no set schedule was maintained. In sampling, each round was treated as a unit. A minimum amount of water was used during drilling and mucking, eliminating to some extent gravity concentration of fines. each round was mucked out the bottom was blown clean and all fines recovered. The average round gave about 25 tons of muck.

Prior to sampling the rock was crushed to minur 5/8" in a jaw crusher screen rolls circuit and passed over a Snyder?? sampler. The sampler was desinged to cut out five percent of the total bulk, or about one ton per round. This initial cut was the basis for all further samples, the reject was used as road surfracing.

The 2000 pound sample was put over the Snydar sampler two times to obtain a semi-fined sample weighing approximately 200 pounds. Rejects from this operation were bagged, tagged and recorded. The 200 pound sample was again split, mechanically on a 40-60 basis. The smaller sample was shipped to the Bell-White Laboratories in Haileybury for further crushing, splitting and molybdenite determination. At the Bell-White Laboratories the sample was crushed to minus 1/8 inches and cut to five pounds. The five pound sample was then pulverized and three samples cut out, using a flat Denver riffle. One pulp was assayed by Bell-White Laboratories. Swasktika Laboratories assayed one and one third was run at the E????? Assay Office. For analysis

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Bell-White Laboratories used the colorometric method; Swastika Loboratories used precipitation with alpha-bonzoinoxime; the method used by the Bourlamaque Assay Office is not known. A table showing a comparison of assay results will be found on page 5.

The larger portion of the final sample was stored until the job was completed. At that time a weighted sample, representing the possible ore width was assembled and shipped to the Mineral Dressing and Process Metallurgy Dept. in Ottawa for metallurgical tests. In addition, a sample of high grade material was shipped to Ottawa for mineralogical examination.

The crushing plant used for the preparation of the bulk sample was a type known as a Cedar Rapids gravel crushing unit, Although the plant was much too elaborate for the job, it was the only crusher unit available in the area.

At the discharge end of the crusher a sampling floor was erected and equipped with a 24" Snyder type sample. As mentioned previously the sampler was constructed to cut a sample of approximately 5% of the total bulk.

On completion of adit 1 both walls were channel sampled. These samples were assayed by Bell-White Laboratories only.

The accompanying sketch shows results obtained from the three types of sampling - diamond drill core, bulk muck and channels.

February 23, 1955. Keith J. Benner

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February 23, 1953

Keith J. Benner

PIDGEON MOLYBDENITE

COMPARISON OF ASSAY RESULTS

(Footages date from collar of D.D.H. No.1)

Round	Footage	Assayed by: Bell-White Laboratories	Assayed by: Swastika Laboratories	Assayed by: Bourlamaque Assay Office	Average
1	0.0'-42'	0.25	0.22	0.19	0.22
2	4.2'-11.2'	0.23	0.20	0.16	0.20
3	11.2'-17.2'	0.20	0.10	0.16	0.18
4	17.2'-23.0'	0.38	0.34	0.33	0.35
5	23.0'-29.0'	0.07	0.08	0.06	0.07
6	29.0'-34.5'	0.03	0.01	0.01	0.02
7	34.5'-42.0'	0.03	0.01	0.01	0.02
8	42.0'-49.4'	0.43	0.29	0.28	0.33
9	49.4'-56.0'	1.12	0.96	0.92	1.00
10	56.0'-62.3'	0.71	0.54	0.54	0.60
11	62.3'-67.3'	0.44	0.31	0.30	0.33
12	67.3'-74.0'	0.03	0.08	0.07	0.07
13	74.0'-79.0'	0.03	0.03	0.03	0.03
14	79.0'-84.8'	0.03	0.05	0.02	0.03
15	84.8'-90.4'	Trace	0.03	0.01	0.01
16	90.4'-96.4'	0.03	0.06	0.04	0.04
17	96.4'-102.0'	0.08	0.08	0.07	0.08
18	102.0'-106.5'	0.03	0.06	0.02	0.04
19	106.5'-113.7'	0.04	0.06	0.04	0.06
20	S	0.93			
21	"	0.33			
22	"	0.46			
23	Sketch	0.32			

average 25% discrepancy BW + Bour. BW 25% + on Bour.

CANADA

DEPARTMENT

OF

MINES AND TECHNICAL SURVEYS

O T T A W A

July 8, 1955.

R E P O R T

of the

MINERAL DRESSING AND PROCESS METALLURGY DIVISION

Investigation No. MD3093.

Sink-Float and Flotation Tests on a Molybdenite Ore from Echo Twonship, near Sioux Lookout, Ontario, Submitted by Mid-North Engineering Services Limited, Toronto, Ontario

Shipment:

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The purpose of the investigation was to determine the grade of molybdenite concentrate that could be made, and the percentage of molybdenite that could be recovered from the ore.

Location of the Property:

The property is located in Echo township, near Sioux Lookout, in northwestern Ontario.

Sampling and Analysis:

The ore was sampled by coning and quartering out a 100 lb. sample. This sample was crushed to minus 14 mesh and a head sample was riffled out. The analysis of the head sample was as follows:-

MoS_2	-	0.38 per cent
Fe	-	1.20 " "
S	-	0.56 " "
Cu	-	0.05 " "
Insoluble	-	94.80 " "

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Characteristics of the Ore:

Some selected specimens of the ore were examined in the mineragraphic laboratory with the aid of a binocular microscope and suitable chemical and physical tests.

The rock in general consists of fine grained pink feldspar and quartz; scattered at random through the fine groundmass are a few small lenses of coarse bluish-white quartz. Hence, the composition of this rock probably corresponds to a granite.

Abundant molybdenite occurs as coarse to fine hexagonal plates, in narrow seams along fractures or other planes of weakness throughout the rock. The individual flakes range up to about one half inch in size and, even where massive and earthy looking, this mineral is seen to be finely crystalline under the microscope.

Greenish white scales of mica (muscovite) are locally abundant and have similar modes of occurrence to molybdenite, with which mineral they are sometimes associated.

Pyrite and chalcopyrite are also visible in the specimens, as occasional to rare coarse grains and small granular masses disseminated sporadically through the rock-forming minerals. As represented in the specimens examined, the total amount of chalcopyrite is very small.

Yellow oxidation products of molybdenum and reddish brown stains of limonite are also visible in a few places on the samples.

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Summary of Test Work, an Conclusions:

Laboratory flotation tests indicated that 90 to 94 per cent of the molybdenite in the ore could be recovered by flotation, with the flotation tailing averaging about 0.025 per cent MoS_2. Reagents used were sodium cyanide, kerosene, and pine oil. As only small amounts of concentrates were obtained from laboratory tests, 800 lb. of ore was floated in a mill test, and, after cleaning and recleaning, a concentrate containing 82 per cent MoS_2 was obtained. The low recovery of 69.5 per cent of the molybdenite in the recleaner concentrate from the mill flotation test, does not properly reflect the amenability of the ore to flotation, since the large scale circuit was operated for only a short time, and principally to obtain a sample of concentrate for recleaning tests.

The final concentrate contained 0.30 per cent copper and 3.11 per cent bismuth. The copper content is acceptable but the bismuth content is well above the maximum limit of about 0.2 per cent. The bismuth content could possibly be reduced by leaching, or by flotation following a low temperature roast, but an investigation into the removal of bismuth would require a much larger amount of concentrate than was obtained from this test.

In addition to bismuth and copper, the final concentrate contained 2.03 per cent iron, 2.88 per cent insoluble,

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In addition to bismuth and copper, the final concentrate contained 2.03 per cent iron, 2.88 per cent insoluble,

and 1.4 per cent lead. The iron content is mainly represented by pyrite and no doubt repeated cleaning of the concentrate would result in the rejection of most of the pyrite and of the insoluble gangue. This, along with the removal of bismuth, would be necessary to make a concentrate that would meet the required specifications, which call for 90 per cent MoS_2 and less than 0.5 per cent of bismuth and copper.

Sink-float and jig tests were not successful in making a good recovery of molybdenite from the ore.

DETAILS OF TEST WORK:

Test No. 1 - Sink-Float.

A sink-float test was made on minus one inch ore to determine if the ore could be upgraded by the rejection of coarse, low grade gangue. About 25 lb. of ore was screened on 6 mesh and the minus one inch, plus 6 mesh portion was treated in the laboratory sink-float machine. The specific gravity of the medium was first set at 2.65 but no sink was obtained at this gravity. The specific gravity of the medium was then decreased to 2.625 and a small amount of sink was recovered. The float from this operation was treated in a medium of a specific gravity of 2.60 and the float at 2.60 was again treated at 2.57. The float product at a specific gravity of 2.57 was screened into three sizes, viz: minus 1 in., plus 1/2 in.; minus 1/2 in., plus 1/4 in.; and minus 1/4 in., plus 6 mesh.

and 1.4 per cent lead. The iron content is mainly represented by pyrite and no doubt repeated cleaning of the concentrate would result in the rejection of most of the pyrite and of the insoluble gangue. This, along with the removal of bismuth, would be necessary to make a concentrate that would meet the required specifications, which call for 90 per cent MoS_2 and less than 0.5 per cent of bismuth and copper.

Sink-float and jig tests were not successful in making a good recovery of molybdenite from the ore.

DETAILS OF TEST WORK:

Test No. 1 - Sink-Float.

A sink-float test was made on minus one inch ore to determine if the ore could be upgraded by the rejection of coarse, low grade gangue. About 25 lb. of ore was screened on 6 mesh and the minus one inch, plus 6 mesh portion was treated in the laboratory sink-float machine. The specific gravity of the medium was first set at 2.65 but no sink was obtained at this gravity. The specific gravity of the medium was then decreased to 2.625 and a small amount of sink was recovered. The float from this operation was treated in a medium of a specific gravity of 2.60 and the float at 2.60 was again treated at 2.57. The float product at a specific gravity of 2.57 was screened into three sizes, viz: minus 1 in., plus 1/2 in.; minus 1/2 in., plus 1/4 in.; and minus 1/4 in., plus 6 mesh.

Results of Sink-float Test No. 1

Product	Weight per cent	Analysis, MoS_2, per cent	Distribution of MoS_2, per cent
Float at 2.57 -1 in. + 1/2 in.	17.3	0.12	4.5
-1/2" + 1/4 "	27.3	0.14	8.3
-1/4" + 6 mesh	11.2	0.13	3.1
Sink at 2.57	2.6	0.18	1.0
" " 2.60	2.9	0.33	2.1
" " 2.625	0.8	3.81	6.8
-6 mesh	37.9	0.91	74.4
Feed	100.0	0.46♦	100.0

♦ Calculated.

74.4 per cent of the molybdenite in the head reported in the minus 6 mesh portion of the sample, and in fact, a much better concentration was made by crushing and screening than was made in the subsequent sink-float test on the coarse, plus 6 mesh, portion of the sample. Because of this concentration of molybdenite values in the minus 6 mesh fraction, the material treated by sink-float was of very low grade, and only a small proportion of the molybdenite in the head was recovered in the sink product.

As tailings containing 0.02 and 0.03 per cent molybdenite were obtained from flotation tests, it would seem that neither the minus 1 in. plus 6 mesh fraction, nor the float product obtained from the treatment of this fraction by sink-float, would be sufficiently low in molybdenite to be discarded as a tailing.

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Test No. 2 - Jigging of Minus 6 Mesh Fraction.

An examination of the minus 6 mesh material showed that a large proportion of the molybdenite in this product was free from gangue. A jig test was made to try to recover this free molybdenite in a jig hutch product, but due to its flaky nature and inherent hydrophobic characteristics, most of the mineral reported in the jig tailing which analyzed 0.50 per cent MoS_2. The jig concentrate contained only 3.65 per cent MoS_2.

Tests Nos. 3 to 10. - Flotation.

2,000 grams of ore was used for each of the laboratory flotation tests. The ore was ground to the fineness indicated, and reagents were added as shown in the following table:

Test No. 2 - Jigging of Minus 6 Mesh Fraction.

An examination of the minus 6 mesh material showed that a large proportion of the molybdenite in this product was free from gangue. A jig test was made to try to recover this free molybdenite in a jig hutch product, but due to its flaky nature and inherent hydrophobic characteristics, most of the mineral reported in the jig tailing which analysed 0.50 per cent MoS_2. The jig concentrate contained only 3.65 per cent MoS_2.

Tests Nos. 3 to 10. - Flotation.

2,000 grams of ore was used for each of the laboratory flotation tests. The ore was ground to the fineness indicated, and reagents were added as shown in the following table:

Results of Flotation Tests Nos. 3 to 10.

Test No.	Grind, per cent minus 200 mesh	Flotation time, minutes	Reagents Added				Test Results			
			To Grind	Lb./ ton	To Flotation	Lb./ton	Product	Weight, per cent	Analysis, MoS_2, per cent	Distribution, of MoS_2, per cent
3	82.7	7	Sodium cyanide	0.2	Kerosene Pine oil	1.0 0.075	Concentrate Tailing	0.5 99.5	57.14 0.09	90.8 9.4
4	90.9	7	" "	0.2	Kerosene Pine oil Barrett No. 4	0.5 0.03 0.05	Concentrate Tailing	0.8 99.2	38.29 0.025	92.5 7.5
5	78.0	10	" "	0.2	Kerosene Pine oil	1.25 0.10	Concentrate Tailing	1.4 98.6	22.61 0.02	94.3 5.7
6	82.4	10	" "	0.2	Kerosene Pine oil	1.50 0.075	Concentrate Tailing	1.1 98.9	27.42 0.02	94.0 6.0
7	85.4	11	" "	0.5	Kerosene Pine oil	1.00 0.075	Concentrate Tailing	1.3 98.7	23.30 0.02	94.1 5.9
8	51.8	12	" "	0.5	Kerosene Pine oil	1.00 0.075	Concentrate Tailing	1.7 98.3	18.60 0.02	94.5 5.5
9	72.0	12	" "	0.5	Kerosene Pine oil	Nil 0.075	Concentrate Tailing	1.9 98.1	14.62 0.025	92.3 7.7
10	78.3	8	" "	0.5	Nujol Pine oil	0.5 0.075	Concentrate Tailing	1.1 98.9	28.00 0.03	91.0 9.0

Nos. 3 to 10.

Reagents Added				Test Results				
To Grind	Lb./ton	To Flotation	Lb./ton	Product	Weight, per cent	Analysis, MoS_2, per cent	Distribution, of MoS_2, per cent	Calculated Head, per cent MoS_2
Sodium cyanide	0.2	Kerosene Pine oil	1.0 0.075	Concentrate Tailing	0.5 99.5	57.14 0.03	90.8 9.4	0.318
" "	0.2	Kerosene Pine oil Burrell No. 4	0.5 0.03 0.05	Concentrate Tailing	0.8 99.2	38.29 0.025	92.5 7.5	0.333
" "	0.2	Kerosene Pine oil	1.25 0.10	Concentrate Tailing	1.4 98.6	22.81 0.02	94.3 5.7	0.334
" "	0.2	Kerosene Pine oil	1.50 0.075	Concentrate Tailing	1.1 98.9	27.42 0.02	94.0 6.0	0.332
" "	0.5	Kerosene Pine oil	1.00 0.075	Concentrate Tailing	1.3 98.7	23.39 0.02	94.1 5.9	0.322
" "	0.5	Kerosene Pine oil	1.00 0.075	Concentrate Tailing	1.7 98.3	18.69 0.02	94.5 5.5	0.337
" "	0.5	Kerosene Pine oil	Nil 0.075	Concentrate Tailing	1.9 98.1	14.62 0.025	92.3 7.7	0.307
" "	0.5	Nujol Pine oil	0.5 0.075	Concentrate Tailing	1.1 98.9	28.00 0.03	91.0 9.0	0.332

Test No.11 - Mill Flotation Test.

The weight of concentrate obtained from each of the laboratory tests ranged from 10 to 40 grams and was not enough to treat by cleaner flotation to make an acceptable grade of molybdenite concentrate. In order to make a sufficient amount of concentrate for cleaning to determine the best grade of molybdenite that could be obtained from the ore, a mill flotation test was made on approximately 800 lb. of ore.

The ore was first crushed to 14 mesh and them fed to a 20 in. diam. ball mill at the rate of 260 lb. per hour. The ball mill discharge at approximately 50 per cent minus 200 mesh was ied(?) to a bank of four No. 7 Denver flotation cells. The first cell was used as a conditioner and a rougher concentrate was removed from the other three cells. Sodium cyanide (0.25 lb per ton) and kerosene (0.5 lb per ton) were added to the ball mill feed; pine oil (0.10 lb. per ton) was added to the ball mill discharge.

The rougher concentrate was cleaned in batches, using a 2000 gram laboratory flotation cell. The cleaner concentrate was recleaned three times and the tailings from each recleaning were combined as a recleaner tailing.

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The ore was first crushed to 14 mesh and then fed to a 20 in. diam. ball mill at the rate of 260 lb. per hour. The ball mill discharge at approximately 50 per cent minus 200 mesh was fed to a bank of four No. 7 Denver flotation cells. The first cell was used as a conditioner and a rougher concentrate was removed from the other three cells. Sodium cyanide (0.25 lb. per ton) and kerosene (0.5 lb. per ton) were added to the ball mill feed; pine oil (0.10 lb. per ton) was added to the ball mill discharge.

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Results of Flotation Test No.11

Product	Weight, lb.	Weight per cent	Analysis, MoS_2 per cent	Distribution of MoS_2 per cent
Head	788.2	100.0	0.35*	100.0
Recleaner Concent.	2.2	0.3	81.9	69.5
Recleaner tailing	2.0	0.2	2.35	1.9
Cleaner tailing	34.0	4.3	0.60	7.0
Rougher tailing	750.0	95.2	0.08	21.8

* Calculated.

The tailing from the mill flotation test at 0.08 MoS_2 is much higher than the tailings obtained from the laboratory tests. It is felt, however, that the three hour test did not give sufficient time to stabilized the grinding and flotation circuits, and in practice it should be possible to make an 0.02 per cent MoS_2 tailing.

A preliminary analysis of the concentrate showed it to contain 1.5 per cent copper (a more detailed analysis later set the actual copper content at 0.42 per cent), and a further test was run on the concentrate in which an attempt was made to float chalcopyrite by depressing molybdenite with caustic starch. The analysis of this final concentrate was as follows:

MoS_2	-	84.32	per cent
Cu	-	0.30	" "
Fe	-	2.03	" "
Insol.	-	2.88	" "
Pb	-	1.40	" "
Bi	-	3.11	" "

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Cu	-	0.30 " "
Fe	-	2.03 " "
Insol.	-	2.88 " "
Pb		1.40 " "
Zi	-	3.11 " "

The Acceptable bismuth content of a molybdenite concentrate is in the order of 0.20 per cent. By leaching or by flotation after a low temperature roast, the bismuth could possibly be decreased to an acceptable figure. To carry out any test work to investigate a procedure to reject the bismuth would require a much larger amount of concentrate than was recovered in this test.

RAE:(PES)AL.

R.A.Elliott.

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R. A. Elliott.

PIDGEON MOLYBDENUM MINES LIMITED

REPORT ON

ECHO TOWNSHIP PROPERTY

January 26th, 1960

HARPER and HOLBROOKE

CONCLUSION

The Pidgeon Molybdenum property is exceptionally well located geologically and with respect to all important facilities.

Approximately $70,000 has been spent on the property in surface trenching, limited bulk sampling and rather widely spaced diamond drilling.

The results to date have outlined two areas of strong molybdenite mineralization but have not accurately determined size, grade or vertical continuity. The present indications point to a potential of about 4,000 tons per vertical foot of material grading in the order of 0.60% MoS_2 or possibly a little higher. These are good possibilities of other similar areas in unexplored sections of the property.

The mineralization occurs associated with clusters or groups of aplite-pegmatite-quartz stockworks which are found in the 50 to 200 foot wide, heavily granitized, contact area between a series of folded sediments and a granite tongue which intrudes the sediments along the axial plane of a major anticline. The stockworks form from 35% to 50% of the area covered by the cluster. Two such areas are known, about 500 feet apart, and are 100 feet wide by 500 and 600 feet long respectively in horizontal dimension.

The diamond drill results are disappointing except immediately under the outcrop areas of the stockwork clusters. However, the hole spacing is from 200 to 500 feet which provides only a very coarse grid. The attitude of the clusters in vertical dimension is not known but they probably conform to the 20° to 30° northeast plunge of the folding and, is so, would easily pass through the coarse mesh of the drill pattern and probably continue downward indefinitely.

narrow stockwork bands but on the whole is not comparable to the two outcrop areas. The eastern outcrop is also apparently in an area outside of a cluster.

The conclusion is therefore that the molybdenite mineralization occurs associated with the stockworks which are themselves concentrated in lenticular areas along the altered contact zone having widths of about 100feet and lengths of from 500 to 800 feet in the horizontal dimension. Two such lenticular areas are known and there may be others in unexplored sections of the contact zone on the property. The attitude of the lenses is unknown but, as noted above, is probably controlled by the folding and should thus conform to the contact area and plunge northeastward with the folding at from 20 degrees to 30 degrees. They should continue downward indefinitely as long as the structural conditions remain constant.

In view of the above relationships and the wide spacing of the diamond drill holes it is probable that most of the holes have missed the main clusters, either above or below, and that the majority of the intersections represent either fringe areas or sections of the contact zone between clusters.

Although the data are insufficient for any accurate determination of tonnage or grade they do give some indication of the potential. Thus the stockwork zones of the central outcrop comprise about 50% of the lense or cluster and the grade is indicated as about 0.60% MoS2. For the western outcrop cluster the percentage is about 35 with a similar or slightly higher grade. From the dimensions of the clusters there are incicated some 2,000 tons per vertical foot of 0.60% material in the former and about the same in the latter for a total of 4,000 tons per vertical foot. There are good possibilities of additional clusters being found in unexplored sections of the contact zone.

The problem of the vertical continuity of the cluster lenses is unsolved. If, as seems likely, the lenses plunge with the plunge of the folding they should continue downward indefinitely with an easterly plunge of 20 degrees to 30 degrees. They would thus easily pass through the rather coarse mesh of the present diamond drill grid and only close detailed, pattern drilling will determine the continuity.

HARPER and HOLBROOKE

January 26th, 1960

G. L. HOLBROOKE

Mill tests indicate a 90% to 95% recovery of MoS_2 by simple flotation in an 82% concentrate with tailings running about 0.025% MoS_2.

The quantity of molybdenite in the stockwork areas is impressive and the further, detailed investigation of the property is amply warranted.

RECOMMENDATIONS

It is recommended that the two known areas of strong mineralization be investigated by detailed diamond drilling to provide AXT core. The holes should dip at 45° and should bear northwest parallel to the old drilling direction. The holes should be spaced 25 feet apart and should fill-in between the old holes. The first bank of holes should be located to cut the centre line of each mineralized area at a depth of 75 feet and once the plunge of the areas has been estabilshed the areas should be followed down plunge by a second bank of holes 100 feet deeper.

For each tier a total 50 holes will be required to cover both areas and these holes will be 175 feet long for the first tier and 325 feet for the second tier. The total footage for the first tier will thus be 8,750 feet and for the second tier 16,250 feet. The overall cost on a 25,000 foot contract is estimated at $4.00 per foot so that the total cost of this drilling will be $100,000. At first glance this may seem a high figure but the results will establish the grade, size and continuity of the mineralized areas and will, from present indications, outline approximately 1,000,000 tons of ore to the 200 foot level. The drilling thus would reduce to 10¢ per ton which is not exhorbitant.

The information so gained will also allow the further depth continuation to be adequately explored with much more widely spaced drilling.

I would also recommend that, if the above drilling is successful, the large quartz-breocia zone in the extreme southeastern corner of the property be investigated by 5,000 feet of diamond drilling. This zone lies in the sediments, about 2,500 feet southeast of the granite contact and could easily represent the "up-plunge" expression of a large and rich ore-bearing stockwork system overlying a cupola, or projection, of the main granite tongue at depth. If so the body would probably also plunge in conformity with the folding and I would suggest that holes be drilled to intersect the centre of the breocia zone down its plunge at progressively deeper horizons until a granite contact area is reached. The first hole should be 500 feet feet down, the second 1,000 feet, the third 1,500 feet, etc. Once the contact area is reached two or three additional holes will evaluate any important mineralization if based on the experience of the earlier detailed drilling. It should be pointed out that additional claims to the east will have to be acquired before this investigation can be undertaken.

* * * * *

LOCATION - ACCESS - FACILITIES

The property consist of a group of 12 unpatented mining claims in northwestern Echo Township of the Patricia Mining Division of Ontario. It covers approximately 480 acres and is composed of the following claims:

P.A.-14051, 14071, 14061
P.A.-14192 to 14195 inclusive
P.A.-15232 to 15233 inclusive
P.A.-15242 to 15244 inclusive

The claims are about midway between Dinorwic on the Canadian Pacific Railway and Sioux Lookout on the Canadian National Railway and are about 25 miles from either place. Access to the property is by a five-mile long all-weather, gravel road which branches westward from highway No. 72 to Sioux Lookout.

The Ontario Hydro-Electric Power Commission transmission line to the Newlund Mine crosses the property about 2,000 feet east of the main showing and would provide power for any mining operation.

An ample water supply for all purposes is to be found in Lateral Lake, 3,000 feet west of the main showing and partly on the property.

An 18 x 20 foot log camp in good condition is on the property near the main workings.

DEVELOPMENT and HISTORY

The property was discovered and staked by Mr. G. L. Pidgeon of Wabigoon in the 1930's. Subsequently a number of irregularly distributed pits and small trenches were blasted into the two main showings on claims 14051 and 14194 and these showed a suprising amount of molybdenite scattered through the rocks. The showings were examined by a number of mining companies to the end of 1950 but because of the lack of interest in the mineral no serious work was undertaken.

Eventually in 1954 the claims were acquired by Detta Minerals Limited, now Candors Explorations Limited. This company drilled 340 feet in two flat diamond drill holes, as pilot-holes for two proposed adits, and followed these with one crosscutting adit 232 feet long under the main showing. Both walls of the cross-cut were carefully channel sampled and the muck from each round was crushed to 5/8 inch size and sampled by a Snyder sampler. The samples were assayed by three different assay laboratories and the rejects from all of the sampling were combined to form a bulk sample which was sent to the Mineral Dressing and Process Metallurgy Department of the Bureau of Mines in Ottawa for testing. No further work was done by this company.

Finally, in 1957, Pidgeon Molybdenite Mines Limited was formed and a deal was made with Rio Canadian Explorations Limited whereby that company would explore the molybdenite possiblities of the property. The first phase of this work was the completion of 7,750 feet of diamond drilling in 21 holes. These holes were drilled on sections from 200 to 500 feet apart and cover the important granite contact area to depths of from 150 to 550 feet and for a total length of 2,800 feet. The work was stopped in 1958 when Rio became deeply involved in the Blind River area and the property has been idle since.

GEOLOGY - GENERAL

The geology of the immediate area consists of Temiskaming age sediments intruded to the west by a large granite bathelith. A mile-wide tongue of this granite extends eastward for 4 miles from the main mass and the eastern end of the tongue lies about the centre of the property.

The sediments around the granite tongue are folded into a broad anticline whose axial plane strikes N80°E with a very steep north dip. The dips along the limbs of the fold are from 35°to 45°and the plunge is 30° to 20° to the east. The granite tongue has apparently been intruded along the axial plane of the fold and the nose presumably plunges eastward under the sediments in conformity with the folding. For several miles to the northeast of the granite nose the plunge of the folding gradually flattens, as shown by the bedding, and eventually reverses to about 20° southwest. There are no further exposures of granite in this direction but the sediments show strong alteration and it is probable that the granite tongue continues northeastward under a relatively shallow cover of sediments.

The granite tongue is not well exposed being largely swamp covered, but a few outcrops are to be seen along the north and south edges of the tongue. Apparently there has been a great deal of assimilation of the sediments by the intrusive as the edges of the granite show considerable ghost bedding conforming in attitude with the invaded rocks. This contact zone of alteration and assimilation varies in width from 50 to 200 feet or more and, by virtue of its relative competency, forms the host rock of the mineralization and dyke injection as described below.

The anticlinal fold invaded by the granite tongue is itself imposed along the northwestern limb of a major syncline whose axis lies about 2½ miles to the southeast and is roughly parallel. Farther to the southeast, within the synclinal valley, there are numerous indications of a major, northeast trending fault of large displacement which forms the boundary between the Temiskaming sediments to the north and a wide belt of older Keewatin volcanics to the south.

GEOLOGY - ECONOMIC

The molybdonite showings on the property are found on a series of outcrops lying along the southeastern edge of the granite tongue near the nose area. They occur across claim 14051 and parts of adjacent claims 14194 and 14081 for a length of 2,500 feet. The principal outcrop is almost on the contact in the northeastern part of claim 14051 and is about 100 feet wide by 500 feet long. A second outcrop is found some 700 feet to the southwest about 75 feet north of the contact. It is about 50 feet wide and 500 feet long. A third outcrop, 50 feet wide by 150 feet long lies 550 feet to the northeast of the principal one about 30 feet north of the contact. All of these outcrops are composed of heavily granitized sediments, intruded by pegmatite and aplite dykes, but by quartz veins and stringers and strongly mineralized by molybdenite with some pyrite and a little chalcopyrite. Aside from these outcrops the granite tongue is entirely swamp covered on the property.

1) Structure

The main showing occurs across the central outcrop. Here stockworks of aplite and pegmatite dykes, from 2 to 15 feet wide, are accompanied by a slightly later injection of quartz in veins and stringers from a fraction of an inch to several feet wide. These intrusives form an indefinite pattern with the principal and strongest members striking N70 degrees to 80 degrees east or about 30 degrees to the strike of the contact and dipping from 40 degrees south to 40 degrees to 60° north. A third direction is noticeable and is occupied by a few weak, irregular quartz gash-veins. These are nearly vertical in dip and strike northwest at right angles to the contact. The other two outcrops show similar but less intense stockworks of quartz veining and dykes.

The above complicated stokkworks of veins and dykes cover the entire width of the outcrops but appear to be concentrated in 20 to 30 foot wide zones trending N70° to 80°E parallel to the major direction of fracturing and separated by like widths of granite and granitized sediments.

ii) Mineralization

A considerable amount of molybdenite is to be seen along the length and across the width of the outcrops. A large amount of blasting has been done, but in an irregular manner, and exposes considerable fresh rock along the outcrop. The molybdenite occurs as flaky dissaminations up to ¼ inch in diameter and in massive streaks and patches up to 4 inches thick and from

1 to 20 feet long.

The mineralization is more apparent in, and near, the quartz-aplite-pegmatite stockworks. Here it occurs infour ways:

(1) As massive streaks along the contacts of the quartz veins and as streaks in tension fractures in the wall rocks of the veins;

(2) As strong disseminations in the aplitic or felsitic material with occasional massive streaks;

(3) As disseminations and irregular bunches or lenses in the pegmatitic material, and

(4) As disseminations in the invaded granitized sediments and the granites. The granitized sediments between the stockworks carry a little disseminated material but are very much lower in molybdenite content than the stockworks.

iii) Grade on Surface

There is a great deal of molybdenite exposed by the irregular blasting but it is impossible to determine grade without extensive bulk sampling or closely spaced, pattern diamond drilling. From visual inspection the stockworks appear to carry something in the order of 1% MoS_2 across widths of from 12 to 30 feet while the intervening weakly mineralized material is very low grade, probably under 0.10% MoS_2. Some confirmation to this is provided by Venturex who blasted a 30 foot long trench across a stockwork of the central outcrop and sampled it by taking a large number of chips and small pieces from both walls and the bottom of the trench. The assay of this sample was 0.93% MoS_2 in spite of the fact that all massive molybdenite encountered in the sampling was discarded.

iv) Bulk Sampling

The only attempt at bulk sampling is to be found in the single adit driven southeasterly under the central outcrop from the swamp edge to the sediment contact. The results of this test are below the visual estimates and it is probable that a considerable amount of fine molybdenite from the more massive streaks was lost in the blasting, crushing and bagging operations. The log of the adit from the portal at 0.0 feet to the contact at 114.0 feet is as follows. The corresponding results from the pilot drill hole, old No. 1, are also included.

			Grade - $\%MoS_2$		
Footage	Material	Width	Av. Channels	Mucks	Drill Core
23.4	Aplite & Quartz	23.4	0.773	0.240	0.720
42.2	Gran. Sediments	18.8	0.110	0.040	0.046
68.0	Quartz & Aplite	25.8	0.584	0.570	0.925
114.0	Gran. Sediments	46.0	0.062	0.045	0.034

It is apparent from these results that the adit transected two zones of stockworks which can also be seen in the outcrop, 12 to 15 feet above the adit. The visual examination of the outcrop gives the impression of a considerably better grade than that shown in the log although being a platey mineral molybdenite is difficult to estimate. The variance between the different types of samples is more than was expected and it appears to the writer that the average channel results are the most reliable with the mucks being too low because of lost fines.

v) Diamond Drilling Results

As noted above the diamond drilling completed by Rio Canadian is located along a series of cross-section planes spaced from 200 to 500 feet apart. In most instances the holes are bearing northeast with 45° dips across the contact and the sedimentary bedding but five of them bear southeast at dips of 45° nearly parallel to the contact.

The best results were obtained from the section crossing the central outcrop near the adit. This section is composed of holes 1, 2 and 3 and shows averages comparable to these in the adit with the following sections of special interest and several narrower 8 feet sections running from 0.32 to 0.58% MoS_2 at depths down to 180 feet.

Width in Feet	$\%MoS_2$	Depth in Feet
38.0	0.60	60
26.5	0.90	65
25.3	0.78	100

The next section, 200 feet to the northeast, is composed of holes 16 and 18 and shows much more narrow intersections in the contact zone as follows:

Width in Feet	$\%MoS_2$	Depth in Feet
10.1	0.38	190
6.5	0.35	205
9.3	0.41	315
1.0	1.50	340
1.0	0.51	355

The next section, 200 feet farther to the northeast, is composed of holes 13 and 19 whose intersections are also in the contact zone and are better than those of the previous section. They are as follows:

Width in Feet	$\%MoS_2$	Depth in Feet
5.0	0.27	210
5.0	0.30	235
2.0	1.99	260
8.0	0.79	315
4.0	1.02	375

The next section lies 250 feet farther to the north and a little east just off the southern end of the eastern outcrop described above. It is composed of holes 9 and 10 which gave the following rather indifferent results in the contact zone.

Width in Feet	$\%MoS_2$	Depth in Feet
8.0	0.55	35
22.0	0.39	100

The most northeasterly section lies 500 feet farther in that direction and is composed of holes 11 and 14. This shows only one intersection of 1.03% MoS_2 across 5.0 feet at a depth of 95 feet.

Progressing southwesterly the first section beyond the "adit" section is composed of hole 15 and lies 200 feet in that direction. It is just off the western end of the central outcrop and returned only one intersection of 0.40% MoS_2 across 6.0 feet at a depth of 141 feet.

The next section 300 feet farther southwest is composed of holes 7, 8 and 12. It returned the following intersections, all in the contact zone.

Width in Feet	%MoS_2	Depth in Feet
22.0	0.26	65
2.0	1.32	128
2.0	2.58	150
5.0	0.39	220

Hole no. 17 comprises the next section, 250 feet farther southwest. It shows the following two intersections on either edge of a 55 foot intersection of quartz and dyke material.

Width in Feet	%MoS_2	Depth in Feet
8.5	0.58	135
3.5	0.75	170

The next section is under the northeastern end of the western outcrop 300 feet farther southwest. It is composed of holes 4,5 and 6 and returned the following intersections, both in the contact zone.

Width in Feet	%MoS_2	Depth in Feet
42.0	0.45	80
5.0	1.84	200

The next section is composed of hole 20 and is 250 feet farther to the southwest under the centre of the outcrop. It returned the following intersections.

Width in Feet	%MoS_2	Depth in Feet
23.0	1.25	30
2.0	2.14	45
14.5	0.57	90

The last section is composed of hole 21, 250 feet farther southwest just off the end of the outcrop. It returned the following intersections in the contact zone.

Width in Feet	%MoS_2	Depth in Feet
7.0	0.45	65
13.0	0.43	100
9.5	0.35	180

vi) Mill Tests

As noted under development weighted samples from each adit round were combined to form an aggregate sample for testing. This included both the lower and higher grade sections of the adit and was shipped to the Department of Mines and Technical Surveys in Ottawa where it was investigated under No. M.D.-3093. The sample had a weight of 1,020 pounds and contained 0.38% MoS_2 along with 1.20% Fe, 0.56% S, 0.05% Cu, and 94.80% insoluble.

The laboratory floatation tests indicate that 90% to 94% of the molybdenite can be recovered by flotation in an 82% concentrate with tailings averaging 0.025% MoS_2. In addition to the molybdenite the final concentrate carried 0.30% copper and 3.11% binmuth along with 2.03% iron, and 1.4% lead. The quantity of concentrate was too small for tests to remover these impurities but the report states that no difficulty is to be expected.

Sink-float and jig tests were not successful in making a reasonable recovery of molybdenite.

ANALYSIS

Several pertinent relationships are apparent from a study of the results obtained to date. From the outcrop data it is obvious that the important molybdenite mineralization is intimately associated with the aplite-pegmatite-quartz stockworks which, in turn are apparently confined to the 50 to 200 foot wide zone of heavily granitized sediments along the southeastern contact of the granite tongue.

Within the contact zone the stockworks occur across widths of from 10 to 30 feet and appear to have a trend of N70" to 80° E with average dips near the vertical but varying as much as 40° in either direction. The deviation between the trend of the stockworks and the trend of the contact zone is thus about 30° in strike and 50°in dip.

The attitude of the stockworks themselves, as well as the attitudes of the component members, is thus compatible with the secondary shearing and tension stresses which would be set up by the movement of the sedimentary beds over each other due to the anticlinal folding described above. BUT IN THE OPPOSITE DIRECTION. The most reasonable explanation of this relationship is that the sedimentary beds were stressed during the folding and the intrusion of the granite tongue and that, near the end of the intrusive period, there was a relaxation which allowed the shattering of the competent altered zone along previously stressed directions and the emplacement of the end-produce dykes, veins and mineralization in these zones of weakeness. The purpose of this conclusion is to establish the very probable control of the stockworks distribution by the elemnass of the folding.

The stockworks are not evenly distributed throughout the contact zone but tend to occur in groups or clusters separated by stretches containing only a few narrow dykes or veins. The central outcrop is one such cluster which apparently has a width of 100 feet and a length of about 500 feet. The western outcrop apparently represents part of a second cluster which is also about 100 feet wide and extneds from hole 21 to hole 17, a length of 800 feet. The 500 feet between these two clusters shows occasional

DIAMOND DRILL RECORD

PROPERTY PIGEON MOLLY, Eako Twp HOLE NO. 1

SHEET NUMBER 2 SECTION FROM ____ TO ____ STARTED ____

LATITUDE ____ DATUM ____ COMPLETED Nov 5 1954

DEPARTURE ____ BEARING S 60° E ULTIMATE DEPTH 125.0'

ELEVATION ____ DIP Flat PROPOSED DEPTH ____

DEPTH FEET	FORMATION	SAMPLE NO	WIDTH OF SAMPLE	% Mo S2	BLUE OR GOLD			
0-5.0	Pink Granite weak Molly	20201	5.0	0.40				
7.7	" " " " weak py	2	2.7	0.35				
12.2	" " " "	3	4.5	0.32				
15.7	Grey Granite " "	4	3.5	0.10				
20.0	Felsite medium Molly	5	4.3	0.38				
22.0	" " "	6	2.0	5.25				
25.0	Grey Granite very weak Molly, pyr	7	3.0	0.21				
30.0	" " " " " "	8	5.0	0.03				
35.0	" " " " " "	9	5.0	0.04				
40.0	" " " " " "	20210	5.0	0.03				
45.0	" " " " " "	1	5.0	0.02				
46.8	" " " " " "	2	1.8	0.03				
50.0	Felsite strong Molly	3	3.2	5.26				
53.5	" medium to strong Molly	4	3.5	0.75				
54.0	Grey Granite very weak Molly	5	5.5	6.06				
64.0	White Quartz, occasional blobs of Molly	6	5.0	0.50				
68.9	" " " " " "	20218	4.9	0.37				
73.7	Grey Granite felsite stringers weak pyr	9	4.8	0.04				
76.7	Grey Granite weak pyr	26221	3.0	0.05				
80.0	Felsite weak Molly, pyr	2	3.3	0.03				
82.6	" " " "	3	2.6	0.03				

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DIAMOND DRILL RECORD

PROPERTY PIGEON MOLLY, Echo Twp. HOLE NO. 1

SHEET NUMBER 2 SECTION FROM ____ TO ____ STARTED ____

LATITUDE ____ DATUM ____ COMPLETED ____

DEPARTURE ____ BEARING ____ ULTIMATE DEPTH ____

ELEVATION ____ DIP ____ PROPOSED DEPTH ____

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	GOLD	SLUDGE / GOLD $
82.6-87.6	Grey Granite - very weak mineralization	203.34	5.0	0.03	
78.6	" " " " "	5	3.0	0.03	
83.8	" " " " "	207.51	32	0.03	
87.8	Pegmatite, qtz stringers, weak Molly?	2	70	0.03	
102.0	Gry Granite - very weak mineralization	3	72	0.03	
106.0	" " felsic stringers,very weak min.	4	40	0.03	
110.2	" " " " " " "	5	42	0.05	
125	Greenstone - not sampled				
	END				
	Assays by; Bell White Laboratories Maileybury(?) Ontario				

DIAMOND DRILL RECORD

PROPERTY PIGEON MOLLY, Echo Twp. HOLE NO. 1

SHEET NUMBER 2 SECTION: FROM ____ TO ____ STARTED ____

LATITUDE ____ DATUM ____ COMPLETED ____

DEPARTURE ____ BEARING ____ ULTIMATE DEPTH ____

ELEVATION ____ DIP ____ PROPOSED DEPTH ____

DEPTH FEET	FORMATION	SAMPLE NO.	FEET	% Cu CLASS	ASSAY			
82.6-87.6	Grey Granite - weak mineralization	20334	5.0	0.03				
78.6	" " " "	5	3.0	0.03				
93.8	" " " "	20757	3.2	0.03				
87.8	Pegmatite dyke - weak Molly	2	7.0	0.03				
132.0	Grey Granite - weak mineralization	3	7.2	0.03				
106.0	" " - strong or very weak min.	4	4.0	0.03				
110.2	" " " " " "	5	4.2	0.05				
125	Greenstone - NOT SAMPLED							
	Assays by Lab Laboratories Ltd. Timmins, Ontario							

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DRILLED BY ____ SIGNED ____

DIAMOND DRILL RECORD

PROPERTY PIGEON MOLLY, Echo Twp HOLE NO. 2

SHEET NUMBER 1 SECTION FROM ____ TO ____ STARTED ____

LATITUDE ____ DATUM ____ COMPLETED Nov 20. 1954

DEPARTURE ____ BEARING S 60°E ULTIMATE DEPTH 225.0'

ELEVATION ____ DIP Flat PROPOSED DEPTH ____

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	GOLD $	SILVER $/TON
0-15	Casing				
20.0	Pink Granite - weak to fair Molly	20756	5.0	0.03	
25.0	" " " " " "	7	5.0	0.02	
30.0	" " " " " "	8	5.0	0.05	
35.0	" " " " " "	9	5.0	0.03	
40.0	" " " " " "	20760	5.0	0.07	
42.7	" " " " " "	1	2.7	0.06	
45.9	White Quartz	2	3.2	0.03	
50.0	Pink Granite: Qtz stringers, medium Molly	3	4.1	0.20	
52.6	" " " " " "	4	2.6	0.08	
58.5	Quartz white glassy occasional bleb of Molly				
62.2	Pink Granite + 0.5' Qtz + 0.6' pegmatite, Weak Molly, medium mag + pyr.	20765	4.3	0.10	
67.4	Pink to Grey Granite - no visible Molly	6	4.6	0.02	
72.4	Pink Granite - weak to medium Molly	7	5.0	0.21	
77.0	Pink Granite - no visible Molly	8	4.6	0.07	
80.0	Pink Granite, weak pyr, ½" stringer Molly	9	3.0	0.39	
83.1	Pegmatite, streaks of Molly, weak pyr	20770	3.1	1.38	
87.2	Pink Granite & Pegmatite - Occasional flecks Molly	1	4.1	0.24	
92.2	Pink Granite, weak pyr - no visible Molly	2	5.0	0.10	
104.0	Granite - weak Molly, pyr.				

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DIAMOND DRILL RECORD

PROPERTY PIGEON MOLLY, Echo Twp. HOLE NO. 2

SHEET NUMBER 2 SECTION FROM ____ TO ____ STARTED ____

LATITUDE ____ DATUM ____ COMPLETED ____

DEPARTURE ____ BEARING ____ ULTIMATE DEPTH ____

ELEVATION ____ DIP ____ PROPOSED DEPTH ____

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	GOLD	SLUDGE GOLD $
104.0-107.1	Granite material - very weak molly	207.73	3.1	0.02	
108.2	Pagnatite - stringer molly & py	4	1.1	2.20	
112.0	Pegmatite - very weak molly	5	3.8	0.10	
122.7	Pegmatite - very low molly				
123.8	Pink Granite - weak to medium molly	6	1.1	0.47	
126.5	Qtz & magnetite - weak to medium molly	7	2.7	0.16	
133.6	granite grey, felsite bands - weak py				
135.0	Pegmatite - weak molly - py				
145.0	Gry granite felsite bands				
145.5	Pegmatite - medium molly				
147.8	Qtz white, barren				
150.8	Felsite weak py				
164.8	Gry granite - weak py				
166.8	Felsite				
168.5	Gry granite - weak py				
173.0	Felsite - very weak py				
174.0	Gry granite - weak to med py				
187.0	Felsite				
189.1	Pegmatite - qtz stringers - med to weak molly				
190.4	Gry granite - weak molly, py				
194.0	Qtz. white, barren				

DIAMOND DRILL RECORD

PROPERTY PIGEON MOLLY, Echo Twp. HOLE NO. 2

SHEET NUMBER _____ SECTION FROM _____ TO _____ STARTED _____

LATITUDE _____ DATUM _____ COMPLETED _____

DEPARTURE _____ BEARING _____ ULTIMATE DEPTH _____

ELEVATION _____ DIP _____ PROPOSED DEPTH _____

DEPTH FEET	FORMATION	SAMPLE NO.	WIDTH OF SAMPLE	% MOLY			
104.0 - 107.1	material - very weak [illegible]	20273	3.1	0.02			
10[illegible]2	- stringer Molly $[illegible]	4	1.1	0.20			
112.0	- very weak Molly	5	3.8	0.10			
122.7	- very low Molly						
123.8	[illegible]ite - weak to medium [illegible]	6	1.1	0.47			
126.5	[illegible]ite - weak to medi[illegible]	7	2.7	0.16			
123.6	[illegible] Folsite bands - [illegible]						
135.0	[illegible] - weak Molly - [illegible]						
146.0	Guy Granite, Folsite bands						
146.6	[illegible] - medium Molly						
147.8	[illegible] white, barren						
150.8	[illegible] weak pyr.						
164.8	Guy Granite - weak pyr.						
166.8	Folsite						
168.5	Guy Granite - weak pyr.						
173.0	Folsite - very weak pyr.						
174.0	Guy Granite - weak to medium pyr						
187.0	Folsite						
189.1	Pegmatite - qtz stringers - med. to weak Molly						
190.4	Guy Granite - weak Molly, pyr						
194.0	Qtz - white, barren						

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DIAMOND DRILL RECORD

PROPERTY PIGEON MOLLY, Echo TWP HOLE NO. 2

SHEET NUMBER 3 SECTION FROM ____ TO ____ STARTED ____

LATITUDE ____ DATUM ____ COMPLETED ____

DEPARTURE ____ BEARING ____ ULTIMATE DEPTH ____

ELEVATION ____ DIP ____ PROPOSED DEPTH ____

DEPTH FEET	FORMATION	SAMPLE No	WIDTH OF SAMPLE	% Mo	FLUOR GOLD			
194.0 - 194.7	Gay Granite - 1/8" stringer Molly	20778	0.7	0.33				
195.2	Qtz. White barren							
197.0	Gry Granite · felsite stringers. weak pyr.							
197.6	Pegmatite - medium Molly							
201.0	Grey Granite - felsite stringers							
203.6	Pegmatite, Gry Granite, Qtz no visible Molly	20779	2.6	0.06				
205.7	Pegmatite, medium Molly, weak pyr	80	2.1	0.1%				
207.0	Grey Granite, felsite stringers							
207.5	" " " " med Molly							
216.3	" " " "							
217.7	Greenstone, qtz stringers weak pyr							
217.9	Qtz vuggy							
223.3	Greenstone, weak pyr							
223.8	Lost Core							
225.0	Greenstone, weak pyr.							
	END							
	Assays by Bell White laboratories							
	Haileybury, Ontario							

N.M.P. TORONTO—STOCK FORM NO 901 REV 12/81

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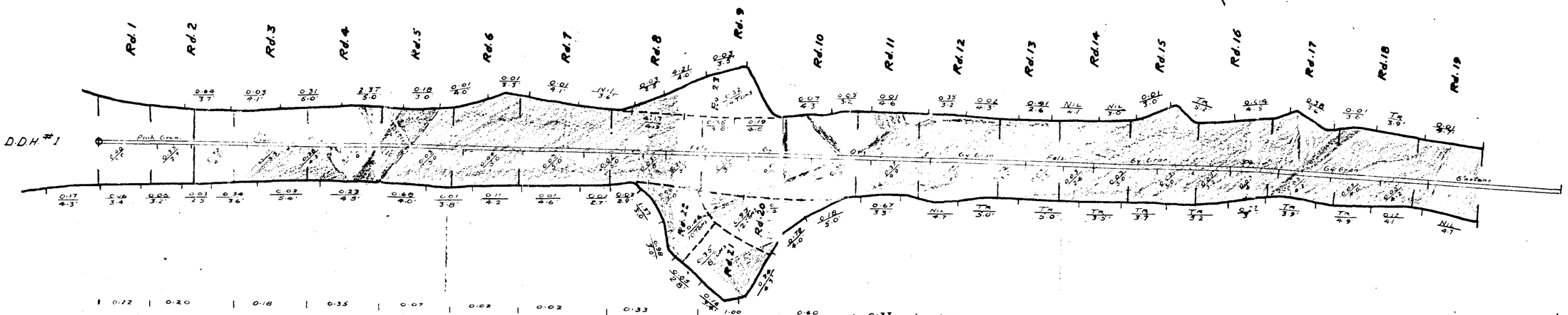
FOR ADDITIONAL

INFORMATION

SEE MAPS:

52F/16 NW-0064 # (1-3)

PLAN
No. 1 ADIT



Values in % MoS_2

DETTA MINERALS LTD.

PIDGEON MOLYBDENITE PROPERTY

ECHO TOWNSHIP — ONTARIO

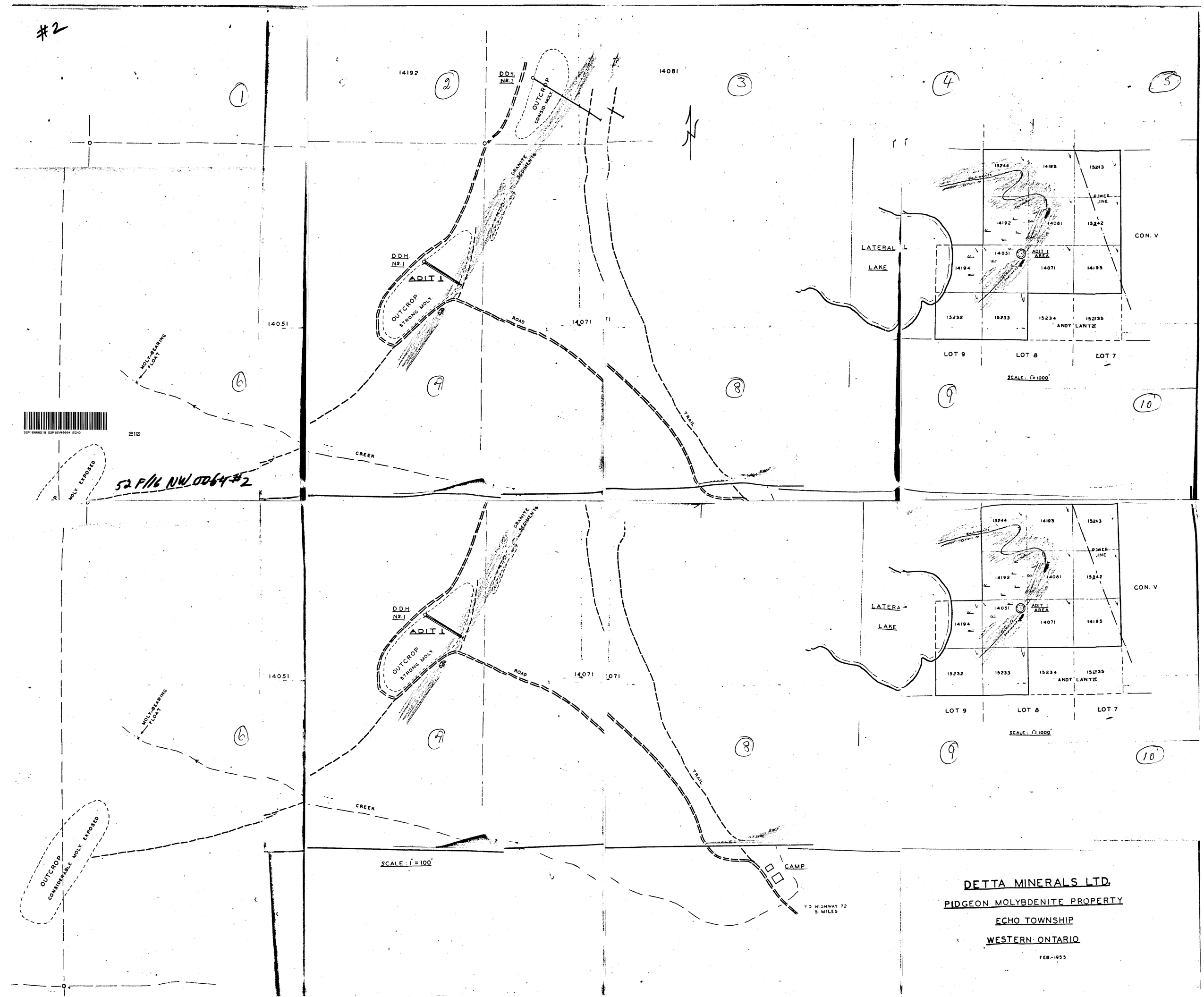
1" = 5' FEB.-'55

Scale, 1" = 5'

Legend
- Chromite 922
- Fluorite 927
- Pyrophyllite 925
- Quartz 916
- Sediments 911

#1

#2



210

52 F/16 NW/0064 #2

DETTA MINERALS LTD.

PIDGEON MOLYBDENITE PROPERTY

ECHO TOWNSHIP

WESTERN ONTARIO

FEB.-1955

#3

PIDGEON MOLYBDENUM MINES LTD.

ECHO TWP.

SCALE 1"=200'

PREPARED FOR HARPER & HOLBROOKE

DWN. BY W. YAWNEY

DATE Dec. 1963. SIGNED

52F16NW0064 #3

5244 14193 3 15243 14192 1408 14081 15242 14194 14051 14071 14195 15236 LANTZ 15233 234 ANTZ 15235 LANTZ 15234 LANTZ 15254 LANTZ