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BEAUCAGE MINES LIMITED

GEOLOGICAL REPORT

O.E.OWENS

DUPLICATE COPY POOR QUALITY ORIGINAL TO FOLLOW

> North Bay, Ontario August 10, 1956

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INTRODUCTION

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There are five islands in the Manitou group arranged in a ring about $1\frac{1}{2}$ miles in diameter. The total land area of these islands is 328.7 acres.

Uranium was discovered during the summer of 1952 on Newman Island. Subsequent examination of rock samples revealed that the redioactive mineral was a uranian-pyrochlore thus indicating presence of columbium.

Diamond drilling from the ice during the winter of 1953 indicated 4,037,685 tons of metamorphic alkaline rocks grading more than 0.5% $Cb_2 0_{sc}$ and 0.04% $U_3 0_{sc}$.

This was followed by a detailed geological and magnetometer investigation of the other islands, and the area as a whole. Small occurrences of columbium-uranium bearing rocks were uncovered on Big Manitou and Calder Islands.

Further diamond drilling on the main Newman Zone during that winter of 1955 increased the tonnage of ore to 5,431,000 tons at a grade of 0.53% $Cb_2 0_{5}$ and 0.039% $U_3 0_8$, established continuity to the zone, and indicated the presence of higher grade cores to

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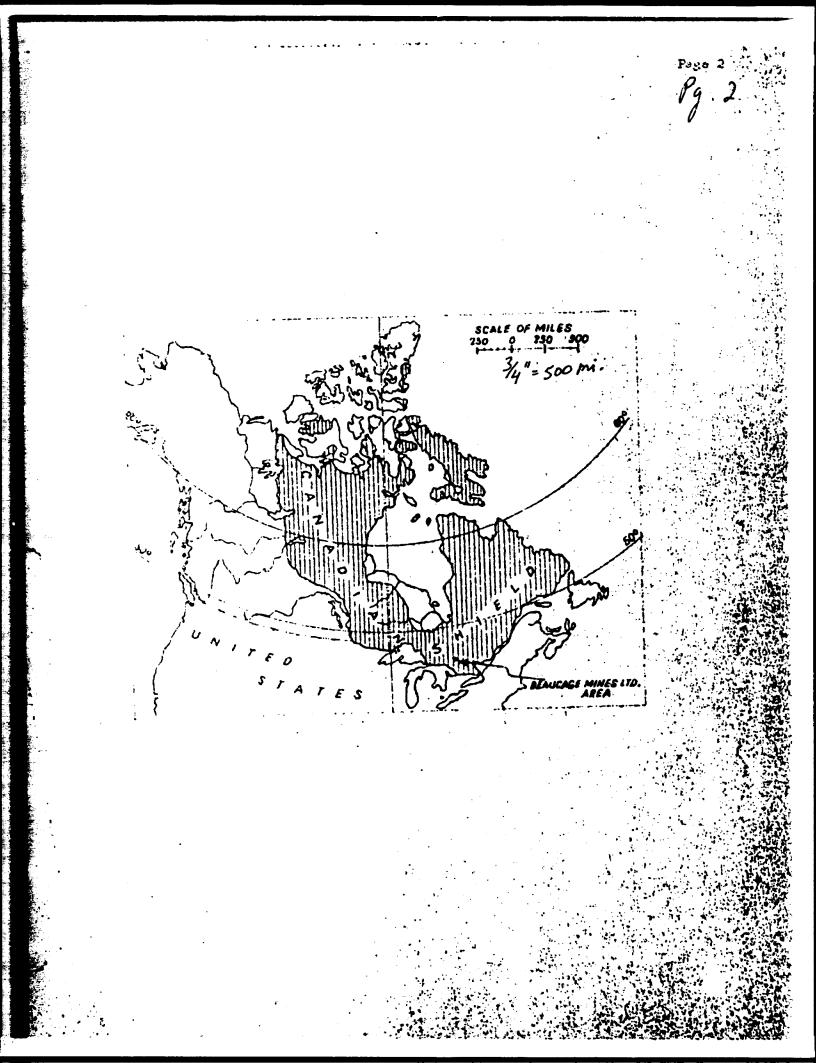
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Underground sampling, diamond drilling and a reevaluation of the surface drilling in the light of undergroung data indicates the presence of 3,384,740 tons of ore rock in the Newman Zone at a grade of 0.73% $Cb_2 0_3$ and 0.053% $U_3 0_3$.

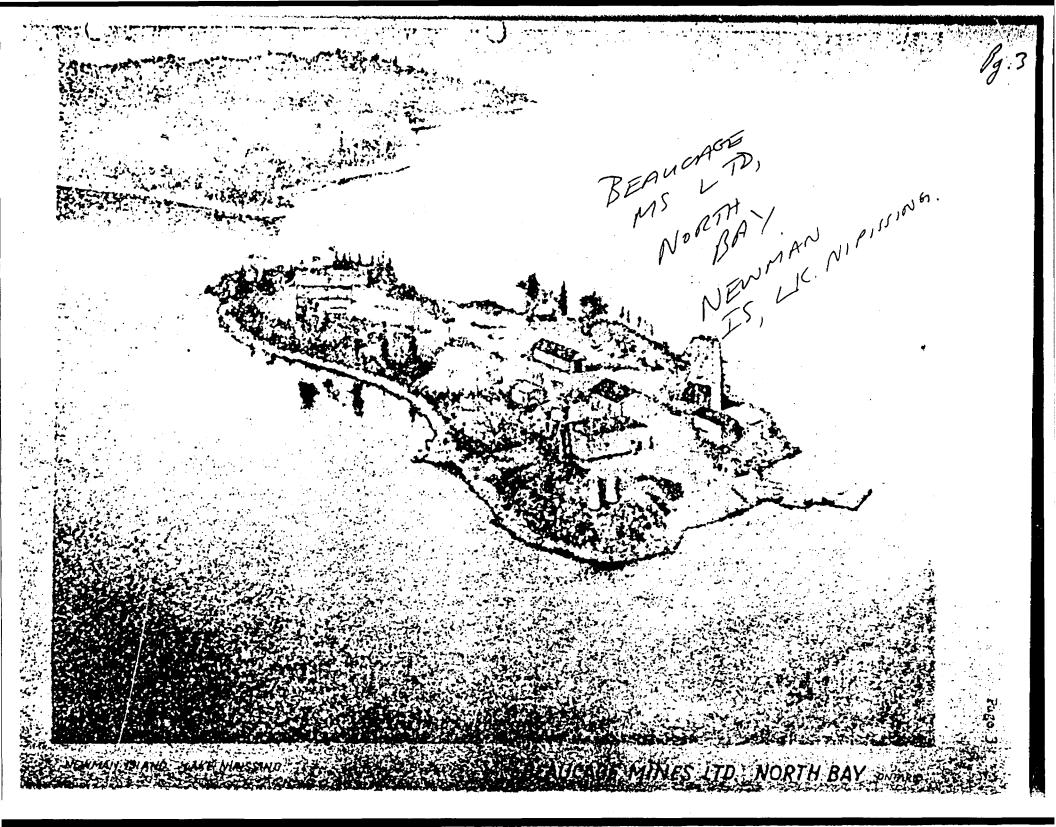
Property:

The property of Beaucage Mines Limited consists of 7923.72 acres held under License of Occupation No.12268, of which 328.62 acres comprise the Manitou Islands as follows:

Great Manitou Island	203.0 acres
Little Manitou Island	69.22 acres
Calder Island	26 acres
Rankin Island	22.75 acres
Newman Island	7.15 acres

Type of Work to Date:

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During the winter of 1953 7510 feet of diamond drilling was carried out from the ice in the area east of Newman Island, which is now referred to as the Newman Zone. During March of the same year a magnetometer survey was made of the Newman Zone. A substantial tonnage of rock of probable economic value was indicated and Battelle Memorial Institute of Columbus, Ohio and others were engaged to conduct metallurgical studies on the ore.

Diamond drilling was continued on Calder (6,010) and Big Manitou (9,697') islands during the spring and summer. At the same time geological and scintillation surveys were made of the islands, and an aeromagnetic survey was conducted of the Manitou Island area.

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Page 6

Construction of a 50 ton per day pilot plant commenced during June of 1955 on the mainland 10 miles west of the City of North Bay with the flotation section commencing operation in December and the chemical section in July 1956.

REGIONAL GEOLOGY

The rocks in the North Bay area are typical Grenville, quartz-feldspar paragneisses. Their altitude varies from place to place, but commonly they are folded into open folds with an irregular increase in metamorphic grade which results in areas of nearly massive granitic gneisses. This assemblage is intruded by dykes and larger intrusive bodies of basic composition. Some of these are slightly radioactive and contain traces of columbium.

The only geological mapping in the area is a reconnaissance map of the region south of Lake Nipissing which was done by J. Satterly of the Ontairo Department of Mines in 1943. This map shows numerous is lands of Grenville limestone within the guartz feldspar gneisses.

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The area is on strike of two topographic breaks, one along the Ottawa-Mattawa kiver valleys and the other along the C. N. R. mainline to Ottawa. There is not sufficient geological information on the subject to indicate whether these breaks are due to faulting, however this is a likely hypothesis.

Lake Nipissing is a large shallow lake lying at the headwaters of rivers flowing to Georgian Bay and the Ottawa River. The maximum depth of the lake is about 50 feet.

The Manitou Islands rise less than 100 feet above lake level.

GEOLOGY MANITOU ISLANDS

The rocks exposed underground and in diamond drill cores are mainly paragneisses, crystalline limeston, alkaline intrusives and metamorphoses equivalents. It is a complex assemblage typical of the Grenville province but with local peculiarities, notably concentrations of sodium, phosphorous, fluorine, uranium and columbium; as well as a regional brecciation of the rocks.

Resting unconformably upon these rocks are scattered patches of Palaeozoic conglomerate, limestone, anddolomite.

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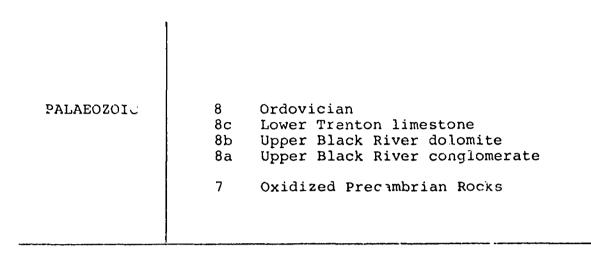
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TABLE I

TABLE OF FORMATIONS



UNCONFORMITY

	6	Ore
	5	Lamprophyre Dykes
	4	Diorite
	4b	Diabase
	3	Feldspar acmite gneiss
		Grey feldspar
	3b	•
		Red feldspar
		Pegmatite Fine grain acidic dyke
		Distinct gneissic landing
	501	Distinct gneissic landing
	2	Basic Silicate Rock (probably skarn)
	2a	Fine grain biotite predominant mineral
PRECAMBRIAN	2b	Acmite and calcite predominant minerals
	2c	
	2f	
	2g	Basic dykes
	_	
	1	Grenville type limestone
	<u>la</u>	
		Massive white carbonate
		White carbonate porphyroblasts acmite
	1	
	lc	Carbonate dykes

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MODEL TABLEI

TABLE OF FORMATIONS

PALAEOZOIC

PRECAMBRIAN

8 Ordovician
8 Lower Trenton limestone
8 Upper Black River dolomite
8 Upper Black River conglomerate
7 Oxidised Precambrian Rooks

UNCONFORMITY

Ore 6 Lamprophyre Dykes 5 Diorite 7 Diabase ---LD. Feldupar acmite gnaiss 3 Grey feldspar 34 Pink foldspar 36 3br Red feldspar 3b2 Pegnatite 3as Fine grain acidic dykes 3b1 Distinct gneissic landing Basic Silicate Rock (probably ekarn) Fine grain bictite predominant mineral Acmite and calcite predominant mineral 2 2a 2b Acmite and feldspar predominant minerals: 2c Acmite and spatite predominant minerals 2**f** Basic dykes 2g Orenville type limestons ٦.... Laminated grey limestone 12 1b1 Massive white corbonate 1b2 White carbonate porphyroblasts agaite Carbonat e dykes : lc Quarts feldopar gneiss 0

The Precambrian assemblage has been divided into seven main groups with subdivision as listed in Table 1. There is generally a gradation between the rock types.

Geological details and the results of a magnetometer survey suggest a circular structure to the rock units.

Granite Gneiss

The outermost unit in the rock series is a medium grained equigranular quartz feldspar gneiss. Gneissic banding is poorly developed largely because of its fine texture and subsequent alteration which includes streaks of migmatite and 1-3 mm. wide stringers of acmite*. This member is well exposed on the islands.

The rock is composed of 5-20% quartz, 60% pink feldspar (mainly potash type) and 30% ferromagnesian minerals (mainly acmite with lesser amounts of biotite and arfvedsonite**). The grain size of the rock is between 1 and 3 millimeters although in places there are segregations of corrser(?) grained material resembling migmatite structure.

The features of the gneiss which distinguish it from other rocks in the North Bay area are finer and more even grain size, a general brecciation of the rock, the presence of fine stringers of acmite intimately cutting the rock, and the low quartz content.

* Soda Pyroxene ** Soda Amphabole

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Grenville Limestone

The Grenville limestone is exposed on Calder Island and in the drill cores from Calder, Big Minitou and Newman Island. It may be subdivided on the basis of appearance and mineral composition into three types:

- 1 (a) "Laminated" Cargonate
- 1 (b) Carbonate, Porpyroblasts of Acmite or Biotite
- 1 (c) Carbonate veins

The "Laminated" Carbonate is a crystalline colcium carbonate with a variegated appearance due to irregular streaks, layers, beds or disseminated grains of biotite, acmite, apatite, magnetite and fledspar. The carbonate, which is almost entirely calcite, is medium grained and white to light grey in colour. In appearance the rock closely resumbles Grenville limestone in many parts of Ontairo and Quebec. The nearest reported occurrance of Grenville limestone is in Lount Township about 36 miles south of North Bay.

The Carbonate, Porpyoblasts of Acmite or Biotite is exposed on Calder and Big Manitou Islands were it occurs as 5 to 75 feet thisk bands separated by sheet like masses of syenite gneiss. It is composed of medium grained crystalline carbonate and 10-30% of porpyroblasts of acmite, biotite and magnetite. The porphyroblasts of acmite are commonly about $\frac{1}{2} - \frac{1}{2}$ inches in diameter and are partially repoaced by arfvedsonite and biotite. The calcite is white and medium to coarse grained. Apparently this rock is the recrystallized and altered equivalent of the Laminated Carbonate.

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The carbonate veins are 1 to 6 inch wide dyke-like masses of carbonate which cut all other rocks in the area. They are composed especially of crbonate and fluorite, with small amounts of feldspar, pyrite and hematite. The carbonate varies in composition; much of it is calcite, but dolomite, siderite and very rarely rhodochrosite are present. The fluorite fraction which varies between 10 and 40% of the whole, is a deep purple variety and although it is commonly fine grained, locally it occurs as well developed grain up to 3/8" diameter.

Basic Silicate rock

The Basic silicate group of rock types contains most of the ore developed to date. It is medium grained and consists essentially of acmite and biotite with lesser amounts of calcite, apatite or feldspar. The rock may be subdivided into three types on the basis of the percentage of calcite, apatite or feldspar.

This rock type is restircted to the ore zone on Newman and Big Manitou Islands and will be described in the Economic Geology section.

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Syenite Gneiss

The syenite gneiss is fine to medium grained and equigranular. It usually consists of 70% potash feldspar and 30% acmite with small amounts of carbonate, apatite, pyrite, magnetite, arfvedsonite, and uranium pyrochlore.

The acmite occurs as dark gneissic bands, irregular blobs and fine stringers. Phto #2 show the gradual change from fine gneissic banding to a massive syenite. The photographs are taken of core picked in sequence across the zone from south (right) to north (left). The alteration is more intense on the north side of the Newman Zone. Generally speaking, most of the syenite gneiss from the ore zone is only faintly gneissic and shows nearly a massive texture similar to the centre pieces of core in the photograph. Apparently the various types of gneiss represent the gradual development of metasomatic alteration with the source to the north of the Newman Zone. The syenite gneiss, throughout the one zone, is shattered and cut by fine acmite stringers.

DIORITE

Diamond drill holes from Big Manitou, Little Manitou and Newman Islands have intersected a medium grained rock consisting of about 55% pearl grey potash feldspar, 40% acmite or its altered aquivalent, and magnetite, Diorite is the field term for this rock since the more correct name, syenite, might be confused with the syenite gneiss.

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The Diorite apparently has the form of a ring dyke on the inner side of the islands. The grain size, and relative proportions of feldspar and dark minerals vary along and across the strike. It is common on Big Manitou Island to find phases with grain size in excess of $\frac{1}{2}$ ". These dykes may be a gradation of the more common medium to ccarse grain diorite, or parallel pegmatitic structures intruding the Syenite Gneiss and Basic Silicate Rock group.

Apparently water-rich solution shave been important in the process of emplacement of the diorite. It is believed that the diorite is an offshoot of a deeper more significant intrusive.

PALAEOZOIC ROCKS

There is a total of about 6 acres of Palaeozoic limestone at or near the surface on Newman, Rankin, Calder, Big Manitou and Little Manitou Islands. The greatest measureable thickness is 25'. These are buff weathering grey limestones and dolomites of Ordovician age. The uppermost unit is Lower Trenton limestone which is separated from the Black River dolomite by a thin shale stratigraphic horizon. These rocks are nearly flat lying, resting unconformably on the underlying Pre-cambrian rock.

The lower most unit of the Palaeozoic series is a conglomerate with fragments of syenite gneiss altered in a manner similar to that of the ore zone; also the gneiss fragments are slightly radioactive. The limestone is not cut by any other rock type.

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It is thus most likely that the Beaucage ore is pre-Black River in age.

STRUCTURE

The rocks in the vicinity of the Manitou Islands are crystalline limestone, steeply dipping gneisses and various intrusives. Diamond drill intersections and surface mapping indicate that these rocks strike parallell to the circumference of the islands. The similarity of the rocks on each island and the constant sequence on each, suggests a circular structure to the bedrock pattern. Also the contours of the airborne magnetometer survey form a circular pattern about the islands with local variations following deviations in bedrock structure. The circular magnetic highs may be due to topographic features, but this does not seem likely.

Superimposed on this circular bedrock structure is a regional brecciation or shattering of the gneisses, with an intimate network of secondary acmite stringers.

In certain localities such as the area east of Newman Island this shattering is intense and apparently has produced a porous zone favourable for the deposition of columbium and uranium.

Within the Newman Zone the areas containing the highest columbium and uranium content are those with the highest

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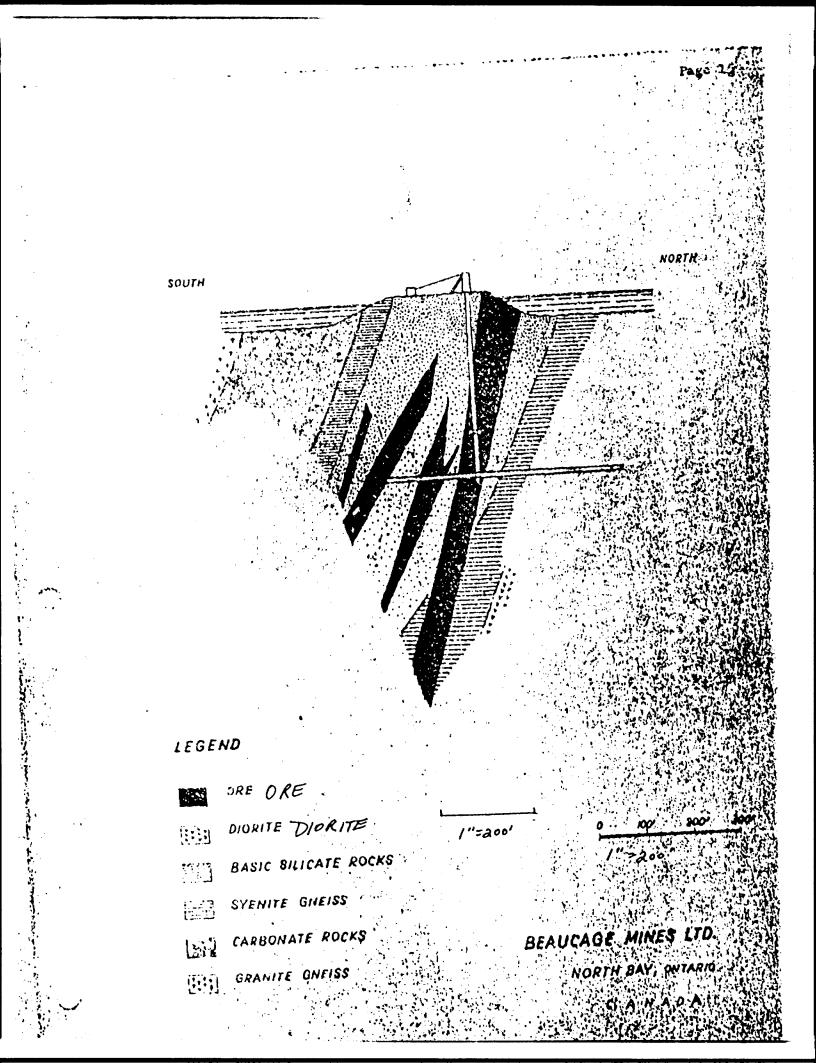
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degree of brecciation, and the most intense secondary alteration.

The limestone member of the series has evidently yielded plastically to the forces which caused brecciation of the gneiss, as evidenced by the swirls and irregular flowage banding of the carbonate rocks.

ECONOMIC GEOLOGY

The Beaucage columbium-uranium deposit contains an unusually high percentage of sodium, phosphorus, and iron and is closely associated with masses of carbonate rocks.

The carbonate rocks resemble Grenville limestone, such as that outcropping to the south of Lake Nipissing. It seems logical to classify the carbonate rocks as recrystallized Grenville limestones, which may perhaps in many instances, have been mobilized and squeezed into new locations.

A characteristic feature of the rocks in the vicinity of the Manitou Island is a regional brecciation. This brecciation is most intense in the vicinity of the Newman deposit, and is the dominent structural feature of the ore zone.

The main tonnage of rock, outlined to date, containing more than 0.5% Cb₂0₅, occurs in a brecciated series of Acidic Silicate Rocks along the contact with Grenville Limestone.

All the uranium and columbius in the rock is contained in the mineral, uranian-pyrochlore. This mineral is associated with concentrations of acmite, apatite, red feldspar, biotite, magnetite, and pyrite.

degree of brecciation, and the most intense secondary alteration.

The limestone member of the series has evidently yielded plustically to the forces which caused brecciation of the gnoiss, as evidenced by the swirls and irregular flowage banding of the combonate recks.

ECONDITIC GROUNDY

The Beaucage columbium-uranium deposit contains an unusually high percentage of sodium, phosphorus, and iron, and is closely associated with masses of carbonate rocks,

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Page 17

Newman ore zone

A group of rocks terms Basic Silicate Rocks constitute the major part of the Newman Ore zone. They are acmite-biotitearfvedsonite-rich rocks which appear to have formed as a result of metasomatic alteration of pre-existing limestone and acidic gneisses. They may convening to sub-divided into two types :

Ferromagnesian - Calcite rock

Ferromagnesian - Feldspar rock

The ferromagnesian-calcite rock which consitutes about 60% of the total ore, is composed of about 50% ferromagnesian minerals, and 30% calcite and apatite, with lesser amounts of feldspar pyrrhotite, pyrite, magnetite, fluorite, and uranianpyrochlore. The rock consists of 2-8 mm. diameter porphyroblasts of acmite and biotite in a medium grained groundmass of white calcite and pale green apatite. The acmite is a dark dull green in hand specimen and a medium green in thin section. The grains may be clear or altered to a felty mass of biotite, arfvedonite, and chlorite.

The ferromagnesian Calcite type of rock occurs as a matrix in, and as a replacement of, a brecciated area of symite gneiss, and also as a replacement in the limestone stratigraphic horizon. The more intense the brecciation and replacement the higher the percentage of iron silicates in the rock. They appear to have formed as a result of metasomatic alteration of limestone material which has been squeezed

Heronou Gre Zone

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Forromagnesian - Calcite Rock

Ferromagnosian - Feldspar Hock

The Ferromagnesian - Calcite Rock which constitutes about (22 of the total ore, is composed of about 50% ferromagnesian missials, and 30% calcite and apatite, with lessor amounts of foldener purchaulte, pyrite, magnetite, fluorite, and uranianples chlose. The rock consists of 2-8 mm. diameter porphyroblasts of nonline and bictite in a medium grained groundmass of white maintee and bictite in a medium grained groundmass of white maintee and pale graen spatite. The somite is a dark dull green is hand spacement and a medium green in this section. The grains , he shear or altered to a felty mass of biotite, arfvedsonite, and objective.

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Page 1

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Pyrochlore			
Calcite	10		50%
Acmite	25	-	50%
Biotite	5		30%
Arfredsonite			
Feldspar	5	-	60%
Apatite	0	-	308 -
Zincon			
Hematite			
Magnetite			

MINERAL COMPOSITION

CHEMICAL ANALYSIS

Cb² C5

ErO ²	.033%
TiO'	.2 - 28
Na²O	.5 - 5%
K² O	1 - 5%

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Ta ² 05	Nil
U ³ O8	.034
P² 05	3.1
ScO2	26.7
CaO	19.2
Fe	12.2
CO ²	11.4
Al ² O ³	4.6
MgO	5.3

COMPOSITION BEAUCAGE ORE

.59

COMPOSITION BLAUCAGE ONE

CHERICAL ANALYSIS	
Cb205	• 59
Ta 205	NIL
11 O 3 8	.034
P205	۲.۲
5002	26.7
CaO	19.2
7 •	12.2
co2	11.4
A1_0 2 3	4.6
Mg O	5.3
SPHICHANTITATING	SPECTROGRAPHIC ANALYS

SENICUANTITATIVE SPECTROCHAPHIC ANALYSIS

Er02	.0335
71.02	.2 - 25
# a ₂ 0	•55 %
K20	1 - 5\$

MINERAL CONFUSITION

Pyrocklore

.....

caloite	10 - 50%
Aomite	25 - 50%
Biotite	5 - 30%

Arfre daonite

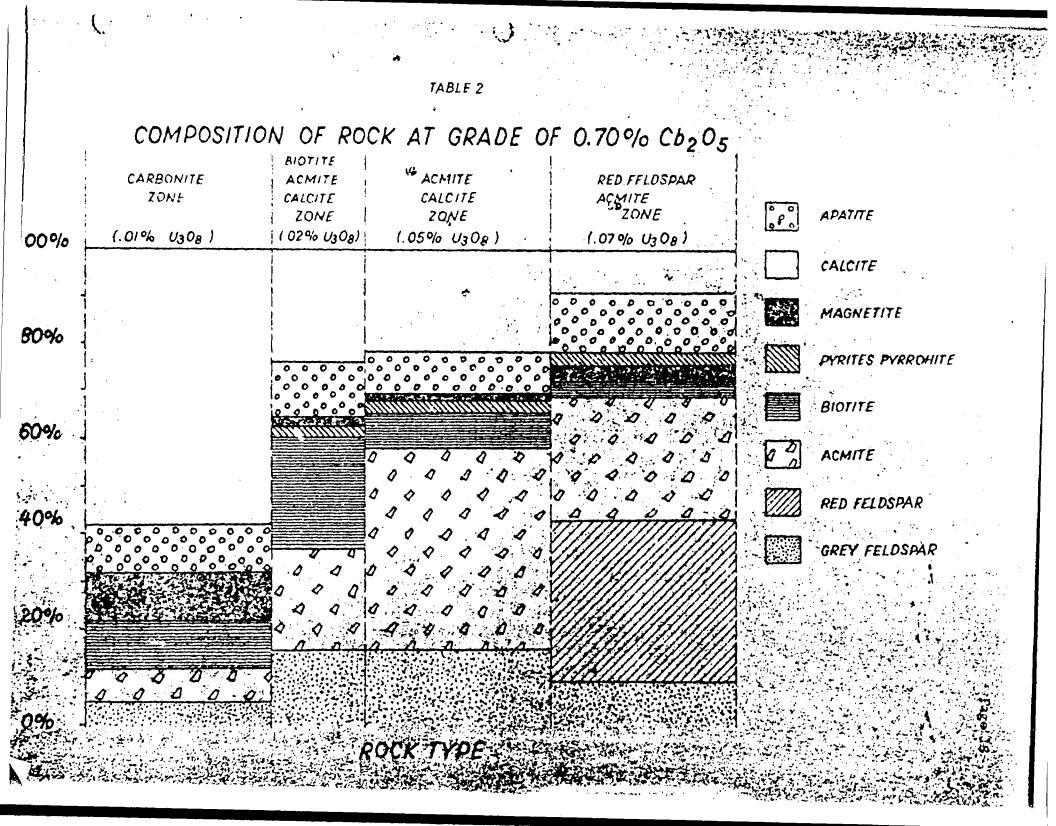
Peldspur 5.-60%

*patite 0 - 30%

Ziroon

Hemetite

Nametite



into the adjacent brecciated ryenite. Apparently this zone is one of recurrent brecciation which provided a porous structure, in a chemically favourable zone, for replacement by solutions rich in iron, sodium, phosphorus, fluorine, columbium and uranium.

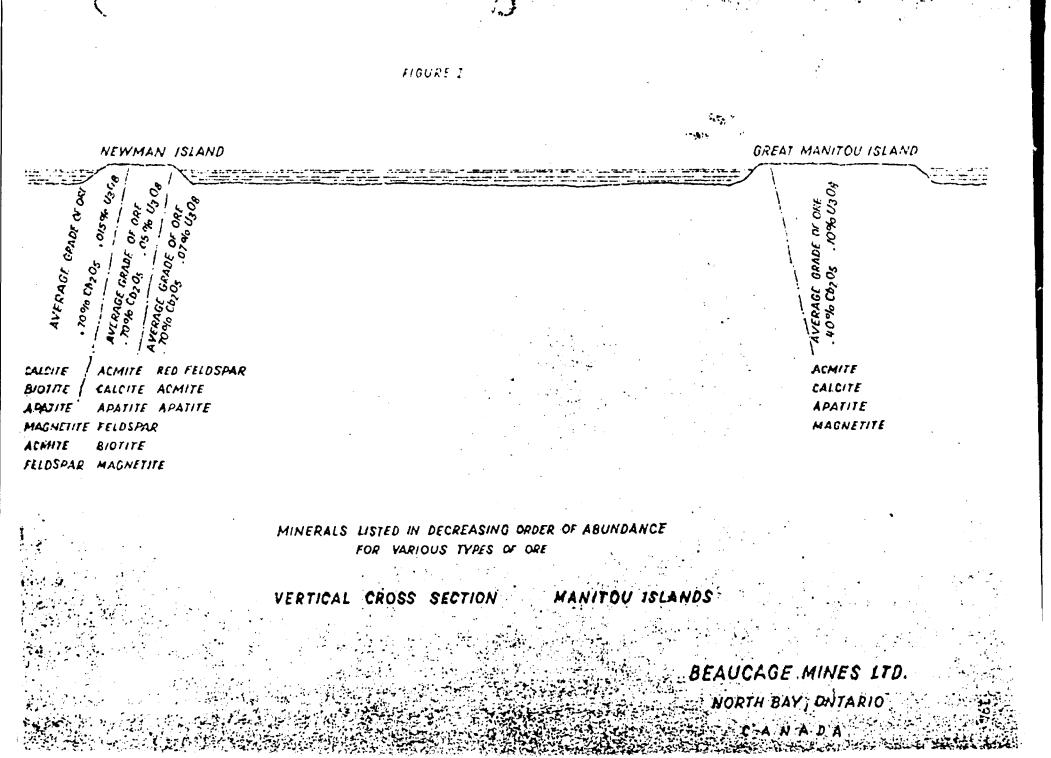
The composition of this type of ore is not constant, but varies with the degree of alteration. Table II shows the range in average composition but in practive there is a considerably greater variation than this. The acmite content varies between 20 and 60%; the calcite between 10 and 40%; the apatite between 2 and 30%; the biotite between 10 and 30%; and the magnetite, pyrite and pyrrhotite content generally increases in with grade to a combined maximum of about 20%. The fledspar content of the ore diminishes as the percentage of columbium increases. The most intensely brecciated, and most completely altered sections contain the highest persentage of columbium and the lowest amount of feldspar.

The colour and appearance of the uranian-pyrochlore varies as the columbium-uranium ratio. The high uranian-pyrochlore is dark steel grey to brown in colour with a vitrous to metallic luster and is partially opaque in thin section; while the low uranian-pyrochlore is honey yellow in cloour and clear in thin section. The grains vary in size between 0.01 and 0.5 mm. Detailed thin section study, with the aid of short exposure autoradiographs, indicates that the radioactivity is restricted to the dark chocloate brown to black part of the pyrochlore grain which commonly occurs as a border to, or along cracks in, the clear pyrochlore core. Photo #12 shows two

into the adjacent brecciated symple. Apparently this zone is one of recurrent brecciation which provided a porous structure, in a chemically favourable zone, for replacement by colutions rich in iron, sodium, phosphorus, fluorine, columbium and uranium.

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pyrochlore grains with a slightly offset autoradiograph. Note how the pattern of the alpha tracks corresponds to the outline of the dark material in the pyrochlore grain. These plates were exposed for 48 hours. It seems likely that this dark material is a replacement phenomena, and is close to Ellsworthite or Betafite in composition. The higher the percentage of uranium in the rock the greater the percentage of dark grains of pyrochlore or the amount of dark material constituting the pyrochlore grains.

The composition of the pyrochlore has been determined by calculating the weight of pyrochlore in the rock with the aid of two thin sections, cut at right angles, and by assaying the enclosing rock fragments for uranium and columbium. This method indicates that the pyrochlore contains between 0.6 and 11% U, 0_{eff} and between 20 and 50% Cb₂ 0_{eff} .

Pyrochlore with a low uranium content is clear and commonly occurs in the southern part of the ore zone, in the high calcite and the high biotite type of rocks, while the darker variety occurs in the northern part of the ore zone in those rocks containing a high percentage of acmite and red feldspar (see figureI).

The average composition of the feldspar acmite type of Basic Silicate Rock is 45% potash fledspar, 25% acmite, 10% calcite, 13% apatite, 3% pyrite and pyrrhotite, 3% magnetite, and 3% biotite. The rock is commonly equigranular, medium grained with veinlets of acmite and fledspar. The majority of the feldspar contains fine disseminated red-coloured dust-like material believed to be hematite,

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Page 20

which gives a red colour to the mineral and the rock. The acmite occurs either as short prismatic grains disseminated through the rock, in aggregates of crystals, or in veinlets. In places the acmite is a clear green mineral, in others it is cloudy or is partly replaced by arfvedsonite and biotite. The calcite fraction of the rock occurs either as 1"-6" wide veins, or very small clots. The apatite occurs as disseminated grains and fine clusters. The pyrochlore is always dark in colour with a sub-metallic lustre and has a uranium to columbium ratio of 1 to 10. These grains are between 0.025 and 0.5 mm. in diameter and occur disseminated through the rock, and commonly associated with the acmite.

Newman Ore Reserves

The Newman zone of columbium-bearing rock strikes eastwest and dips steeply south. It is about 500 feet wide, and so far has been traced for a length of 1,000 feet, and to a depth of 1100 feet. Within this zone are definable lenses or lensitic pipes of ore at higher grades. To date 2,536,000 tons at a grade of 0.053% $U_3 O_2$ and .77% $Cb_2 O_5$ have been indicated by surface and underground diamond drilling. This is largely contained in lensitic pipes between 20-150 feet in width, 300 feet in length and extending to a depth of at east 1100 feet.

All the ore intersections uncovered to date are associated with higher than normal amounts of magnetite, and magnetometer anomalies have been the most favouravle zones for investigation.

The underground work has shown that the ore is a clearly recognizable rock; however because it occurs as a matrix in a breccia zone, it has assay walls (allrock fragments of Syenite Gneiss are waste).

*(Providing ore outlines 25' on either side of ore areas on section)?

Pago 21

which gives a red colour to the mineral and the rock. The admits becomes either as short prismatic grains disceminated through the book, in aggregates of crystals, or in veinlets. In places the admite is a clear green mineral, in others it is cloudy or is partly beladed by arfvedsonite and biotite. The calcite fraction of the cook occurs either as $1^{n}-6^{n}$ wide veins, or very small clots. The apatite occurs as disseminated grains and fine clusters. The pyrochlore is always dark in colour with a sub-metallic lustre and has a granium be columbium ratio of 1 to 10. These grains are between 0.025 and 0.5 mm, in diameter and occur disseminated through the rock, and downedly associated with the admite.

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+ (PROVIDING OFE OUTLI

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All the ore intersections uncovered to date are associated with higher than normal amounts of magnetite, and magnetometer anomalies have been the most favourable zones for investigation.

The underground work has shown that the ore is a clearly recognizable rock; however because it occurs as a matrix in a breccis zone, it has assay walls (wallrock fragments of Symite Gneiss are waite), The ore zone has been nearly completely drilled to a depth of 700'. There is an indicated tonnage of 1,821,290 tons at a grade of .056% $U_3 0_3$ and .81% $Cb_2 0_5$ between the 300' level and an average depth of 700'. i.e. 4,560 tons per vertical foot below the 300 foot level.

Of the total tonnage developed to date 903,170 tons consists of the Basic Silicate, Ferromagnesian Feldspar type of ore. The grade of this material is .062% $U_3 O_8$ and 0.78% $Cb_2 O_5$.

A considerable part of the wider sections of ore is above mine grade, and it is possible that substantial units of ore might be outlined at grades up to 1% Cb, 0_5 . In the figures included in the appendix, 617,650 tons averages .077(?) U, 0_8 and .92% Cb, 0_5 .

One of the major considerations in arriving at an estimate of the columbium content of the Beaucage ore has been assaying. In the early stages of the operation, duplicate analysis sent to different assay laboratories and duplicates sent to the same laboratory, did not check. To improve this situation and reduce the cost of analysis the Geology Department of McGill University developed an X-Ray Fluorescent method of columbium analysis. Repeated checks by rerunning splits of original samples produced consistant results and the McGill results were chosen as a standard. Subsequent checks with later methods developed by the United States Geological Survey and the Canadian Geological Survey indicated that the McGill results were lower by 15-24%. With the

Page 22

The one zone has been nearly completel drilled to a double of 700¹. There is an indicated tonnage of 1,821,290 tons at a grade of .0565 U30g and .815 Cb₂05 between the 300¹ level and an average depth of 700¹, i. e. 4,560 tons per vertical foot below the 300 foot level.

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Up until March 9, 1956 X-Ray Assay Laboratories results were reduced by 15% to equate them with checks at McGill.

Thus the results listed on all development plans, sections, and reports to date including those listed in this report are probably low by 15%*. A list of check analysis is included in the appendix.

All Beaucage analysis are presently conducted in our own labs, by a colorimetric method; the results are standardized on McGill plus 15%.

Uranium check analysis suggest that the Beaucage uranium assaying may be gigh by 5%.

The average grade of the ore exposed in the underground development completed to date, as indicated by muck samples is .04% $U_3 0_x$ 0.51% $Cb_2 0_y$, as indicated by face samples is .04% $U_3 0_y$.63% $Cb_2 0_y$ (15% above standard of foregoing figures). The calculated grade of this material on diamond drill sections is .05% $U_3 0_g$ and 175% $Cb_2 0_y$. It appears that the grade of the

*Exception 1955 Beaucage Mines Limited Annual Report Radiometric Method.

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* Exception 1955 Beaucage Mines Limited Annual Report

RADIOMETRIC METHOD.

ore removed to date is about 28% lower than calculated grade (though only 13% lower in absolute $Cb_2 O_5$ content). This is not due to wall rock dilution, but apparently is a result of geometric difficulties in relating diamond drill hole results, in a brecciated rock, to actual grade of rock in place; especially in narrow sections of ore which have been developed to date.

Big Manitou Island Ore Zone

During the summer season of 1953, some 40 diamond drill holes were drilled along a broad zone of radioactivity on the south west arm of Big Manitou Island. Most of the holes intersected at least 5 feet of material grading more than .10% U, 0, or .40% $Cb_2 0_r$; however these intersections were scattered and are not part of a continuous mass of ore. An exception to this was found at the south end of the zone where some 20 short vertical holes, at 50' centres, indicated 27,000 tons of ore grading .104% U, 0, .38% $Cb_2 0_r$, and 10% $P_2 0_r$. This ore is at the surface and could be easily removed. It is interesting to note the high uranium ratio on this island.

Rankin Ore Zone

Three diamond drill holes, at 200' intervals have been drilled in the area just north of Rankin Island. These holes were 437',495 and 679' in length and averaged .01% $U_3 0_8$ and .33% $Cb_2 0_5$ for their combined total lengths. As these holes were drilled at-55°, and the ore on the Beaucage property is believed to dip steeply, they indicate a major tonnage of low grade material. These holes also have correlateable intersections of rock grading .01% $U_3 0_8$ and .60 - 1.00% $Cb_2 0_5$. This is the high carbonate type of ore shown in table 2, p.18. The pyrochlore is associated with concentrations of apatite.

24

the reserved to date is about 285 lower than calculated grade (though only 135 lower in absolute Cb₂O₅ content). This is not use to wall rock dilution, but apparently is a result of geometric colficelties in relating diamond drill hole results, in a preciated rock, to actual grade of rock in place; especially in marrow sections of one which have been developed to date.

Pig Mauiton Island Ore Sone

During the summer season of 1953, some 40 diamond drill below were drilled along a broad zone of radioactivity on the south work arm of Sig Hamitou Island. Most of the holes intersected at 1 and 5 feet of material grading more than .10% U₃O₈ or .40% Cb₂O₅; be ever these intersections were scattered and are not part of a continuous most of one. An exception do this was found at the south cost of two wore above some 20 short vertical holes, at 50° centres, the elected 27,000 tons of one grading .104% U₃O₈, .38% Cb₂O₅, and 10% $\frac{10}{2}$. This are is at the surface and could be easily removed. It is intersecting to note the high uranium ratio on this island.

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North-east of this ore, and 1500' due east of the Newman ore bodies is another important magnetic anomaly, as yet not drilled, which probably contains important columbium reserves.

Calder Island

Nineteen diamond drill holes were drilled on Calder Island in the spring of 1953. Carbonate, and Syenite Gneiss rocks were intersected, but with only widely scattered, low values, in columbium and uranium.

ORIGIN

The Beaucage columbium-uranium deposits re believed to be hydrothermal deposits connected with contact metasomatism of soda-iron rich intrusives. The matamorphic grade of the Syenite Gneiss suggests that the locus of the most intense alteration is in the vicinity of the centre of the Manitou Islands.

The "Diorite" and pegmatites are believed to be offshoots of a major basic intrusive which is not exposed underground or on surface.

Doming and shattering of the rocks in the regio:. accompanied the main intrusion. The granitic gneisses were recrystallized and shattered. The free silica was converted to sodairon silicates by silica-deficient solutions. The Grenville Lime-

> POOR QUALITY ORIGINAL TO FOLLOW

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In regions of intense repeated brecciation of the Syenite Gneiss, Basic Silicate Rock was formed by squeezing in of adjacent LImestone, and alteration of the breccia zone by solution rich in soda, iron, phosphorus, columbium, uranium, titanium, zinconium, and fluorine.

The inferred paragenisis of the ore is shown in figure II. Acmite, calcite and feldspar are the earliest minerals in the ore. The acmite has been subsequently partially altered to arfvedsonite and biotite. Biotite also replaced feldspar. Next in the sequence is apatite and honey yellow columbium pyrochlore. Apparently the first stage of pyrochlore is uranium free. This followed, perhaps in part simultaneously, by dark uranian-pyrochlore(notedark borders and dark stringers in pyrochlore in uranium-bearing rock). This phase is closely followed by deposition of iron oxides and iron sulphides. The last stage is late calcite as blob-like replacements and narrow dykes or veins.

Recommendations

The Beaucage columbium-uranium deposit is one of numerous reported deposits containing exceptional quantitites of columbium. Some of these are located at Oka, Province of Quebec; Nemagos, Province of Ontario; Mountain Pass, California; Magnet Cove, Arkansas; Manono, Belgium Congo; Panda Hill, Tanganyika;

> DUPLICATE COPY POOR QUALITY ORIGINAL TO FOLLOW

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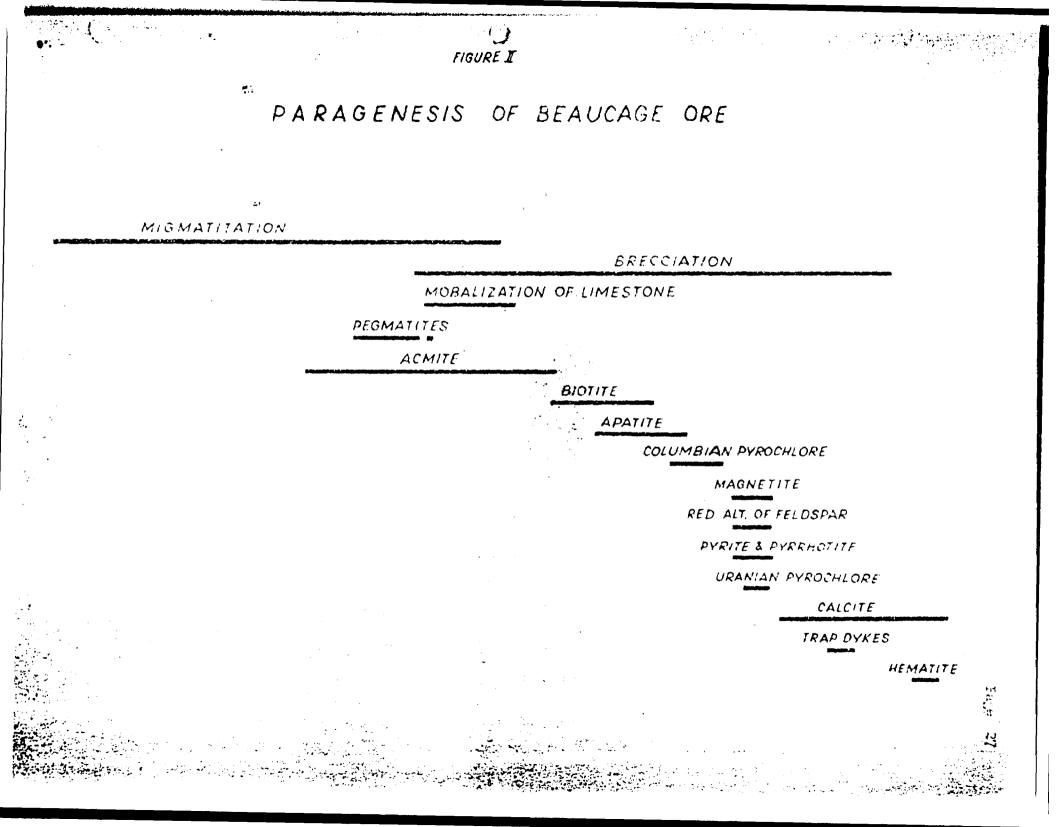
about the recrystallised, mobalized, and purtially replaced by acaile, liotite, spatite, and regnetite.

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LOW AROPHATIONS

The Beaucage columbium-uranium deposit is one of the second reported deposits containing exceptional quantities of columbian. Come of these are located at Oka, Province of Quebec; Network, Reviewe of Oktario; Mountain Pass, California; Magnet () a , Achemona; Manono, Belgium Congo; Panda Hill, Tanganyika;



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Mrima~Hill, Kenya; Sukulu, Uganada; Chilwa Island, Southern Nyasaland; Tundulu, Nyasaland, Tororo Uganda; Kola Peninsula Russia, and some granites of Nigeria.

From the limited information avaialbel to date it appears that the Beaucage, Newman Island deposit is higher in grade than the fore mentioned deposits, and is the only one with any significant amount of underground development. Also indications in the Rankin island area suggest that Beaucage has a major tonnage of low grade material.

Themineralogy of the Beaucage deposit may turn out to be its most significant feature. The only ore material found in the extensive studies to date is pyrochlore. The pyrochlore is tantalum free. It contains upto 10% uranium, but no thorium, nor are any rare earths present in the deposit. Information released by other columbium properties suggests that Beaucage may be unique in having such simple mineralogy. This mono mineralistic ore, without other rare earths simplifies the metallurgical picture (relative to other potential producers), and may enable production, of a relatively pure columbium metal, to be undertaken at a considerably lower cost than other properties.

With this view in mind it is important to examine the metallurgical details of the different types of ores and studies should not be conducted only on one type of ore from one locality in the ore zone.

Prima Mill, Konge, Sukulu, Uganda; Oldlana Iolani. Seatherry Metaland; Toudulu, Nyasaland, Teroro Ugande; Kola Peningula det du; and some granite: of Nigeria.

From the limited information available to date H cancers that the Beaucage, Neuman Island deposit is higher in state that the forementioned deposite, and is the only one which any edgetficial amount of underground development. Also information the Eankin Island area suggest that Beaucage has m are been so flow grade material.

The sineralogy of the Beaucage deposit may turn out a balts most significant feature. The only are mineral found to the extensive studies to date is pyrochlore. The pyrochlore is function from 10 contains up to 10% uranium, but as therizan, but sets any rare carties present in the deposit. Information reto and by their columbium properties suggests that Beaucage may be unique in hering such simple mineralogy. This mono mineralic are, with out other none earths simplifies the motallurgical picture (nob-time to other potential producers), and may enable production, of a relativity pare columbium motal, to be underies of a considerably lower cost than other properties.

With this view in mind it is important to examine the out-clurgical details of the different types of one and tables should not be conducted only on one type of one from the leadily in the one zone. The discrépancy between calculated grade and grade mined, in the narrow sections of the ore mined on the 400 feet level, points out the need for further underground development, at deeper levels, in the wider sections of ore, to ascertain more closely actual grade of rock which may be obtained. It seems likely thta the wider sections of ore will average closer to calculated grade.

Date: 29

The discomponer between calculated grade and pade about in the number sections of the minution the 400 feet level, which one the most for further underground development, at deeper levels, in the older sections of one, to accord in some closely control grade of mock which may be obtained. The serve likely that the wide, contions of one will average closer to calculated grade.

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APPENDIX



AFIENDIX

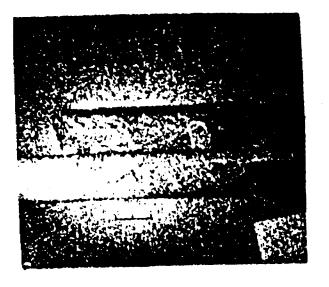




Photo #1 - Diamond Drill cores of Granite Gneiss. Note acmite stringer in large section of core, and brecolated nature of scaller core. Photo #2 - Diamond drill core of a Syenite Gneiss series across the ore zone from south (right) to north (left).



Photo #3 - Undapeciman Laminated Cartonate



Photo #4 - Diamond Drill cores of White Carbonate (right) Laminated Carbonate (centre) Carbonate Porphyroblasts Acmite & Biotite (left)

r 乎 3°

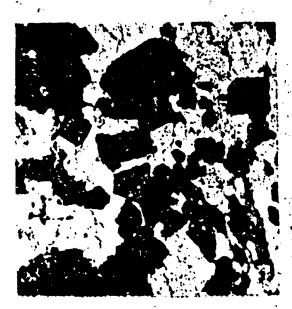




Photo #5 Handspeciman B asic Silicate Bock Ferromagnesian Calcite type.



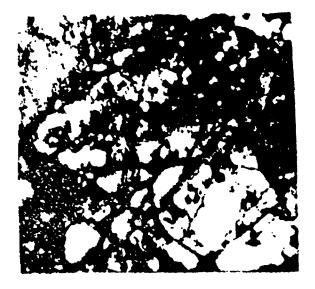
Photo #7 Dismond Drill core. Easic Silicate Rock. Ferromagnesian Calcite type with preccia fragments of pink Synite Gneiss. Photo #6 - Diamond Drill cores Basic Silicate Rock Ferromagnesiam Calcite type (top) Ferromagnesian Feldspar type (bottom)



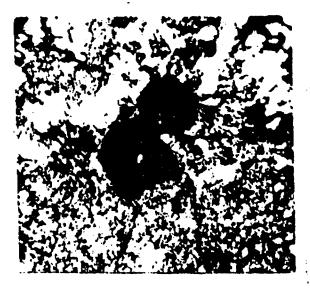
Photomicrograph #8 Basic Silicate Rock Ferromagnesian Calcite Type, x 65, ordinary light Acmite (a) Apatite (ap) Calcite (c) Pyrochlore (p)

1:

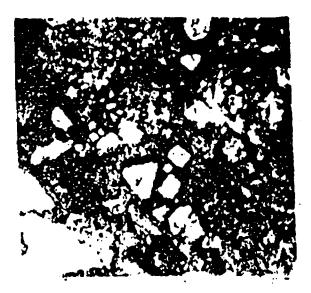
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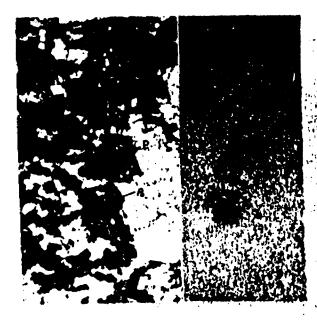
Flutonicrograph #9 Pyrochlere grain, x 65 Ordinary light. Note dark stringerscutting clear pyrochlore.



Photomicrograph #10 Two dark pyrochloro grains in Basic Silicate matrix. x 65, ordinary light.



Photomicrograph \$11 Clear graphing grains (p) in Photo Silicate matrix x = 50, ordinary light



Photomicrograph #12 Pyrochlore grains with offset nuclear track plate showing alpha track pattern corresponding to dark section of pyrochlore grains

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TOTAL TONNAGE NEWMAN ZONE								
SECTION	AREA	TONS	<u>&U,0</u>	8Cb20	TONS x &U,0	TONS x %Cb,0		
5190E	A	17,770	.014	.66	248.78	11,728.20		
	B	22,220	.014	.85	311.09	17.887.00		
5240E	A D F G H	8,300 6,250 48,800 3,680 12,000 28,500	.011 .013 .025 .023 .062 .03	.81 .56 .87 .68 .76 .58	91.30 81.25 1,220.00 84.64 744.00 855.00	6,723.00 3,500.00 42,456.00 2,502.40 9,120.00 16,530.00		
5290E	A	14,000	.038	.99	532.00	13,860.00		
	B	33,800	.077	.94	2,602.60	31,772.00		
	C	22,500	.057	.60	1,282.50	13,500.00		
	D	15,750	.074	.75	1,165.40	11,812.50		
	F	70,800	.06	.70	4,248.00	49,560.00		
5240E	A B C D E F G H I J K L	25,200 20,000 102,000 22,020 10,800 16,600 32,600 8,000 8,000 36,000 222,000 30,600	.06 .07 .041 .046 .05 .035 .055 .038 .035 .035 .075 .063 .066	.61 .66 .69 .64 .69 .82 .58 .55 .81 .81 .64	1,512.00 1,400.00 4,182.00 1,012.92 540.00 581.00 1,793.00 304.00 280.00 2,700.00 13,986.00 2,019.60	15,372.00 13,200.00 70,380.00 14,533.20 6,912.00 11,454.00 26,732.00 4,640.00 4,400.00 29,160.00 179.820.00 19,584.00		
5390E	A	23,400	.073	.68	1,708.20	15,912.00		
	B	14,000	.057	.80	798.00	11,200.00		
	C	137,500	.097	15	13,337.50	158,125.00		
5440E	A B D F I	50,400 10,000 42,700 33,200 53,300 39,100	.075 .056 .08 .055 .086 .066	.64 .69 .72 .56 1.04 .92	3,780.00 560.00 3,416.00 1,826.00 4,583.80 2,580.60	34,776.00 6,900.0C 30,744.00 18,592.00 55,432.00 35,972.00		
5490E	A	14,000	.01	.63	140.00	8,820.00		
	B	19,000	.012	.82	228.00	15,580.00		
	C	44,000	.034	.73	1,496.00	32,120.00		
	D	31,000	.11	1.07	3,410.00	33,170.00		
	E	9,000	.071	.77	639.00	6,930.00		
5540E	A	24,300	.061	.76	1,482.30	20,403.00		
	B	13,850	.14	1.21	1,939.00	16,758.50		
	C	14,400	.107	1.11	1,540.80	15,984.00		

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TOTAL TOINAGE NEUMAN ZONE

SECTION	AREA	TONS	\$U308	\$Cb205	Tons x 10308	Tons x %Cb2O5
		 19 990	.014	•66	248.78	11,728,20
5190E	A B	17,770 22,220	.014	.85	311.09	18,887.00
5240E	A	8,300	.011	.81	91.30	6,723.00
72400	D	6,250	.013	,56	81.25	3,500.00
	Ē	48,800	.025	. 87	1,220.00	42,456.00
	F	3,680	.023	•68	84.64	2,502.40
	G	12,000	.062	.76	744.00	9,120.00
	Н	28,500	.03	•58	855.00	16,530.00
5290E	A	14,000	.038	•99	532.00	13,860.00
J~/JL	В	33,800	.077	•94	2,602.60	31,772.00
	č	22,500	.057	•60	1,282.50	13,500.00
	ΰ	15,750	.074	•75	1,165.50	11,812.50
	F	70,800	.06	.70	4,248.00	49,560.00
5340E	A	25,200	.06	.61	1,512.00	15,372.00
تلان بهار ز	В	20,000	.07	•66	1,400.00	13,200.00
	č	102,000	.041	.69	4,182.00	70,380.00
	מ	22,020	.046	.66	1,012.92	14,533.20
		10,800	.05	.64	540.00	6,912.00
	E		.035	.69	581.00	11,454.00
	F	16,600	.055	.82	1,793.00	26,732.00
	G	32,600	.038	•58	304.00	4,640.00
	H	8,000		•55	280.00	4,400.00
	Ĩ	8,000	.035 .075	.81	2,700.00	29,160.00
	J	36,000	- / -	.81	13,986.00	179,820.00
	K L	222,000 30,600	• • 063 • 066	•64	2,019.60	19,584.00
			073	.68	1,708.20	15,912.00
5390E	Ä	23,400	•073	.80	798.00	11,200.00
	B C	1/4,000 137,500	.057 .097	1.15	13,337.50	158,125.00
		50,100	.075	•64	3,780.00	34,776.00
5440E	A	50,400		.69	560.00	6,900.00
	В	10,000	.056	.72	3,416.00	30,744.00
	D	42,700	.08	.56	1,826.00	18,592.00
	E	33,200	•055 086	1.04	4,583.80	55,432.00
	F	53,300 39,100	.086 .066	.92	2,580.60	35,972.00
	-	-	0)	.63	140.00	8,820.00
5490E	A	14,000	.01	.82	228,00	15,580.00
	B	19,000	.012	.73	1,496.00	32,120.00
	C	44,000	.034		3,410,00	
	D	31,000	.11	1.07	639.00	
	E	9,000	.071	•77	· · ·	
5540S	A	24,300	.061	.76	1,482.30	20,403.00
	В	13,850	.14	1.21	1,939.00	
	C	14,400	.107	1,11	1,540.80	15,984.00

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SECTION	AREA	TONS	ξU, 0g	8Cb, 05	TONS x &U,0 y	TONS x &Cb ₂ 05
5590E	A	23,000	.054	.52	1,242.00	11,960.00
5640E	A	10,200	.085	.41	867.00	4,182.00
	В	7,150	.058	1.29	414.70	9,223.50
	С	15,600	.045	1.22	702.00	19,032.00
5690E	А	17,000	.045	.60	765.00	10,200.00
	В	9,500	.05	.51	475.00	4,845.00
5740E	A	36,000	.01	1.31	360.00	47,160.00
	В	90,000	.01	.54	900.00	48,600.00
	С	58,800	.037	.91	2,175.60	53,508.00
	D	68,000	.05	.71	3,400.00	48,280.00
	Е	142,000	.066	.62	9,372.00	88,040.00
	F	120,200	.063	.78	7,572.60	93,756.00
	G	144,000	.055	.71	7,920.00	102,240.00
	Н	35,070	.04	.60	1,402.80	21,042.00
5790E	A	12,500	.054	.80	675.00	10,000.00
5840E	А	16,500	.031	.89	511.50	14,685.00
	В	19,600	.077	1.16	1,509.20	22,736.00
5890E	A	35,000	.052	1.00	1,820.00	35,000.00
5940E	Α	52,000	.015	.75	780.00	39,000.00
	В	79,600	.044	.61	3,502.40	48,556.00
	С	17,250	.04	.70	690.00	12,075.00
	D	22,800	.007	.56	159.60	12,768.00
6140E	А	57,000	.01	.93	570.00	53,010.00
	В	36,000	.02	.86	720.00	30,960.00
TOTAL		2,536,110	.053	.77	135,748.78	1,986,415.30

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SECTION	AREA	TOIS	\$U308	%Cb205	Tons x \$U308	Tons x \$Cb205
5590E	A	23,000	.054	.52	1,242.00	11,960.00
64102	A	10,200	.085	.41	867.00	4,182.00
5640E	B	7,150	.058	1.29	414.70	9,223.50
	C C	15,600	.045	1.22	702.00	19,032.00
5690E	A	17,000	.045	.60	765.00	10,200.00
10705	B	9,500	.05	.51	475.00	4,845.00
571.00	A	36,000	.01	1.31	360.00	47,160.00
5740E	B	90,000	.01	•54	900,00	48,600.00
	C	58,800	.037	.91	2,175.60	53,508.00
	D	68,000	.05	.71	3,400.00	48,280.00
	E	142,000	.066	.62	9,372.00	88,040.00
	F	120,200	.063	.78	7,572.60	93,756.00
	Ĝ	144,000	.055	.71	7,920.00	102,240.00
	Н	35,070	.04	.60	1,402.80	21,042.00
5790E	A	12,500	•054	.80	675.00	10,000.00
5840E	A	16,500	.031	.89	511.50	14,685.00
)040H	В	19,600	.077	1.16	1,509.20	22,736.00
5890E	A	35,000	.052	1.00	1,820.00	35,000.00
5940E	A	52,000	.015	.75	780.00	39,000.00
J7406	В	79,600	.044	.61	3,502.40	48,556.00
	U U	17,250	•04	.70	690.00	12,075.00
	D	22,800	.007	.56	159.60	12,768.00
6140E	Ä	57,000	.01	.93	570.00	53,010.00
014015	B	36,000	.02	.86	720.00	30,960.00
TUTAL		2,536,110	.053	•77	135,748.78	1,986,415.30

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		TONN				
SECTION	AREA	TONS	€U, 0,4	8Cb205	Tons x &U, 0	Tons x %Cb ₂ 05
5190E	А	17,770	.014	.66	248.78	11,728.20
	В	22,220	.014	.85	311.09	18,887.00
5240E	А	8,300	.011	.81	91.30	6,723.00
	D	6,250	.013	.56	81.25	3,500.00
	E F	48,800	.025	.87	1,220.00	42,456.00
	F	3,680	.023	.68	84.64	2,502.40
	G	12,000	.062	.76	744.00	9,120.00
	Н	28,500	.03	.58	855.00	16,530.00
5290E	А	14,000	.038	.99	532.00	13,860.00
	В	33,800	.077	.94	2,602.60	31,772.00
	С	22,500	.057	.60	1,282.50	13,500.00
	D	15,750	.074	.75	1,165.50	11,812.50
	F	70,800	.06	.70	4,248.00	49,560.00
5340E	А	25,200	.06	.61	1,512.00	15,372.00
	Е	10,800	.05	.64	540.00	6,912.00
	F	16,600	.035	.69	581.00	11,454.00
	G	32,600	.055	.82	1,793.00	26,732.00
	Ĥ	8,000	.038	.58	304.00	4,640.00
	I	8,000	.035	.55	280.00	4,400.00
	Ĵ	36,000	.075	.81	2,700.00	29,160.00
	ĸ	222,000	.063	.81	13,986.00	179,820.00
	L	30,600	.066	.64	2,019.60	19,584.00
5390E	A	23,400	.073	.68	1,708.20	15,912.00
	В	14,000	.057	.80	798.00	11,200.00
	c	137,500	.097	1.15	13,337.50	158,125.00
5440E	F	53,300	.086	1.04	4,583.80	55,432.00
	I	39,100	.066	.92	2,580.60	35,972.00
5490E	A	14,000	.01	.63	140.00	8,820.00
	В	19,000	.012	.82	228.00	15,580.00
	Ċ	44,000	.034	.73	1,496.00	32,120.00
	D	31,000	.11	1.07	3,410.00	33,170.00
	Ē	9,000	.07	.77	639.00	6,930.00
5540E	с	14,400	.107	1.11	1,540.30	15,984.00
5390E	А	23,000	.054	.52	1,242.00	11,960.00
5640E	с	15,600	.045	1.22	702.00	19,032.00

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		TONNAGE 1	· :				
SECTION	AREA	TUNS	\$1308	%Cb 205	TONS x \$1308	TUNS x \$Cb205	
5190E	X	17,770	.014	.66	248.78	11,728.20	
	Б	22,220	.014	.85	311.09	18,887.00	
521,0E	A	8,300	.011	.81	91.30	6,723.00	
	D	6,250	.013	.56	81.25	3,500.00	
	E	48,800	.025	.87	1,220.00	42,456.00	
	F	3,680	.023	.63	84.64	2,502.40	
	G	12,000	.062	.76	744.00	9,120.00	
	Н	28,500	.03	-58	855.00	16,530.00	
5290E	A	14,000	.038	•99	532.00	13,860.00	
	В	33,800	.077	•94	2,602.60	31,772.00	
	C	22,500	•057	.60	1,282.50	13,500.00	
	D	15,750	.074	•?"	1,165.50	11,812.50	
	F	70,800	•06	•75	4,248.00	49,560.00	
5340E	A	25,200	.06	.61	1,512.00	15,372.00	
	E	10,800	.05	.64	540.00	6,912.00	
	F	16,600	.035	.69	581.00	11,454.00	
	G	32,600	.055	.82	1,793.00	26,732.00	
	li	8,000	•038	.58	304.00	4,640.00	
	I	8,000	.035	•55	280.00	4,400.00	(e
	J	36,000	.075	.31	2,700.00	29,160.00	
	K	222,000	.063	.81	13,986.00	179,820,00	
	L	30,600	•066	.64	2,019.00	19,584.00	
5390E	A	23,400	.073	. 68	1,708.20	15,912.00	
	Н	14,000	.057	.80	798.00	11,200.00	
	C	137,500	•097	1.15	13,337.50	158,125.00	
5440e	F	53,300	.086	1.04	4,583.00	55,432.00	
	I	39,100	.066	.92	2,580.60	35,972,00	
5490E	A	14,000	.01	.63	140.00	8,820.00	
	В	19,000	.012	.82	228,00	15,580,00	
	C	44,000	.034	.73	1,496.00	32,120,00	
	D	31,000	.11	1.07	3,410.00	33,170.00	
	E	9,000	.07	•77	539.00	6,930.00	
5540E	С	14,400	.107	1.11	1,540.30	15,984.00	
5590E	A	23,000	•054	•52	1,242.00	11,960.00	
5640е	С	15,600	•045	1.22	702,00	19,032.00	

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			-2-			
SECTION	AREA	TONS	ξU, 0 3	8Cb, 0,	Tons x &U,03	Tons x %Cb,05
5690E	A B	17,000 9,500	.045	.60 .51	765.00 475.00	10,200.00 4,845.00
5740E	A B D F G H	36,000 90,000 68,000 120,200 144,000 35,070	.01 .01 .05 .063 .055 .04	1.31 .54 .71 .78 .71 .60	360.00 900.00 3,400.00 7,572.60 7,920.00 1,402.80	47,160.00 48,600.00 48,280.00 93,756.00 102,240.00 21,042.00
5790E	A	12,500	.054	.80	675.00	10,000.00
5840E	A B	16,500 19,600	.031 .077	.89 1.16	511.50 1,509.20	14,685.00 22,736.00
5890E	A	35,000	.052	1.00	1,820.00	35,000.00
5940E	С	17,250	.04	.70	690.00	12,075.00
6140E	В	36,000	.02	.86	720.00	30,960.00
TOTAL	:	1,821,290	.055	.81	100,026.06	1,470,432.10



SECTION	AREA	TONS	\$1308	%Cb205	Tons x \$0308	Tons x %Cb205
5690E	A	17,000	.045	.60	765.00	10,200.00
	В	9,500	.05	.51	475.00	4,845.00
5740E	Å	36,000	.01	1.31	360.00	47,160.00
21000	В	90,000	.01	•54	900.00	48,600.00
	ม	68,000	.05	.71	3,400.00	48,280.00
	Ĩ	120,200	.063	.78	7,572.60	93,756.00
	Ġ	144,000	.055	.71	7,920,00	102,240.00
	н	35,070	.04	.60	1,402.80	21,042.00
5790E	A	12,500	.054	.80	675.00	10,000.00
5840E	A	16,500	.031	.89	511.50	14,685.00
, .	В	19,600	.077	1.16	1,509.20	22,736.00
5890E	A	35,000	.052	1.00	1,820.00	35,000.00
5940E	С	17,250	.04	.70	690.00	12,075.00
6140E	В	36,000	.02	•86	720.00	30,960.00
TOTAL		1,821,290	. 055	.81	10 0,026. 06	1,4 70,432.1 0

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Page 3	8
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TONS BASIC SILICATE ROCK FERROMAGNESIAN FELDSPAR TYPE

SECTION	AREA	TONS	<u> ३८, 0ह</u>	8Cb₂05	Tons x &U ₃ 08	Tons x %Cb ₂ 0
5240E	G	12,000	.062	.76	744.00	9,120.00
	H	28,500	.03	.58	855.00	16,530.00
5290E	В	33,800	.077	.94	2,602.60	31,772.00
	С	22,500	.057	.60	1,282.50	13,500.00
	D	15 , 750	.074	.75	1,165.50	11,812.50
	F	70,800	.06	.70	4,248.00	49,560.00
5340E	G	32,600	.055	.82	1,793.00	26,732.00
	Н	8,000	.038	.58	304.00	4,640.00
	I	8,000	.035	.55	280.00	4,400.00
	J	36,000	.075	.81	2,700.00'	29,160.00
	К	222,000	.063	.81	13,986.00	179,820.00
	\mathbf{r}	30,600	.066	.64	2,019.60	19,584.00
5390E	С	68,700	.097	1.15	6,664.20	79,062.00
5440E	I	39,100	.066	.92	2,580.60	35,972.00
5490E	E	9,000	.071	.77	639.00	6,930.00
5690E	В	9,500	.05	.51	475.00	4,845.00
5740E	G	144,000	.055	.71	7,920.00	102,240.00
	F	60,000	.063	.78	3,780.00	46,800.00
	Н	35,070	.04	.60	1,402.80	21,042.00
5940E	G	17,250	.04	.70	690.00	12,075.00
TOTAL		903,170	.062	.78	55,131.80	705,596.50

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TONS PASIC SILICATE ROCK FERROLAGHESIAN FELDSPAR TYPE

SECTION	AREA	TUNS	*0308	%CL205	Tons x %U308	Tons x ZCb:05
		12,000	.062	.76	744.00	9,120.00
5240E	ら H	28,500	.03	.58	855.00	16,530.00
	• •	22 0(1)	.077	.94	2,602.60	31,772.00
52WE	В	33,800	.057	.60	1,282.50	13,500.00
	C	22,500		.75	1,165.50	11,812.50
	D F	15,750 70,800	.074 .06	.70	4,248.00	49,560.00
			0.F.F	00	1,793.00	26,732.00
5340X	G	32,600	.055	.82	304.00	4,640.00
	Н	8,000	.038	•58	280.00	4,400.00
	I	8,000	.035	•55		29,160.00
	ູ	36,000	.075	.81	2,700.00	179,820.00
	К	222,000	.063	.81	13,986.00	19,584.00
	L	30,600	•066	.64	2,019.60	17,04,00
5390E	С	68,700	.097	1.15	6,664.20	79,062.00
544.0Z	I	39,100	.066	.92	2,580.60	35,972.00
54,90E	Е	9,000	.071	.77	639.00	6,930.00
5690E	ь	9,500	.05	.51	475.00	4,845.00
PE01 (11)	C	144,000	.055	.71	7,920,00	102,240.00
5740E	G	ώ0,000	.063	.78	3,780.00	46,800.00
	F h	35,070	.04	.60	1,402.80	21,042.00
5940E	c	17,250	.04	.70	690.00	12,075.00
TOTAL		903,170	.062	.78	56,131.80	705,596.50

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		TONNAGE	"HIGH GRADE"	SECTION N	NEWMAN ZONE	
SECTION	AREA	TONS	8U, 07	8Cb205	Tons x &U,03	Tons x &Cb, 05
5290E	B D F	33,800 15,750 70,800	.077 .074 .06	.94 .75 .70	2,602.60 1,165.50 4,248.00	31,772.00 11,812.00 49,560.00
5340E	к	222,000	.063	.81	13,986.00	179,820.00
5390E	с	137.500	.097	1.15	13,337.50	158,125.00
5440E	F I	53,300 39,100	.086 .066	1.04 .92	4,583.80 2,580.60	55,432.00 35,972.00
5490E	D	31,000	.11	1.07	3,410.00	33,170.00
5540E	С	14,400	.107	1.11	1,540.80	15,984.00
5640E	с	15,600	.045	1.22	702.00	19,032.00
5840E	A B	16,500 19,600	.031 .077	.89 1.16	511.50 1,509.20	14,685.00 22,736.00
5890E	А	35,000	.052	1.00	1,820.00	35,000.00
6140E	В	36,000	.0	.86	720.00	30,960.00
TOTAL		740,350	.071	.94	52,717.50	694,060.00

TOINIAGE "HIGH GRADE" SECTION NEWMAN ZONE

SECTION	AREA	TONS	×U308	\$Cb205	TUNS x \$U308 _N	10NS x \$Cb205
5290E	B D F	33,800 15,750 70,800	.077 .074 .06	•94 •75 •70	2,602.60 1,165.50 4,248.00	31,772.00 11,812.00 49,560.00
5340E	ĸ	222,000	.063	.81	13,986.00	179,820.00
5390E	С	137,500	.097	1.15	13,337.50	158,125.00
54 4. 0E	F I	53,300 39,100	.086 .066	1.04	4,583.80 2,580.60	55,432.00 35,972.00
54905	D	31,000	.11	1.07	3,410.00	33,179.00
5540E	C	14,400	.107	1,11	1,540.80	15,984.00
5640e	c	15,600	.045	1,22	702.00	19,032.00
5840E	A B	16,500 19,600	.031 .077	.89 1,16	511.50 1,509.20	14,685.00 22,736.00
5890E	٨	35,000	.052	1.00	1,820.00	35,000.00
6140E	В	36,000	.0	.86	720.00	30,960.00
TOTAL		740,350	.071	•94	52,717.50	694,060.00

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Section 5190E

D.D.Hs. U16, U20

Area A	average grade true width assumed depth assumed length	.014% U ³ 08 and Cb ² 05 27' 131' 50'
	Tons 17,770 @	.014% U ³ 08 and .66% Cb ² 05
Area B	average grade true width assumed depth assumed length	.014% U ³ O8 and .85% Cb ² O5 34' 131' 50'
	Tons 22,200 @	.014% and .85%

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	<u>51.795</u>	D. D. H. 18 UI 6, U20			
Aron a	average grade true width Soured depth Soured length	.014,5 U308 & .66% Cb205 271 1311 501			
	Tons 17,770 3	.014,2 U308 & .66% CU205			
Anea - ¹⁵	average grade traa width Assamed dopth ausumed longth	.0145 U308 & .85% 06205 341 1311 501			
	Tens 22,200 0	.014 & .85			

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SECTION 5	240E	D.D.H's U2,	<u>U3,</u>	, U8,	<u>U12, U14, U23</u>
Area A	average grade true width assumed depth assumed length	.011% U ₃ 0 ₃ 20' 83' 50'	&	.81%	Cb, 0, -
	Tons 8,300 @	.011	&	.81	
Area D	average grade true width assumed depth assumed length	.013% U,0 ₃ 25' 50' 50'	&	.56%	Cb, 05
	Tons 6,250 @	.013	&	.56	
Area E	average grade	$\frac{.012 + .038}{2}$	= .	.025%	$U_3 0_3 .56 + 1.18 = .8$ 2 %Cb ₂ 0
	true width	$\frac{58+65}{2}=63$	1'		
	assumed depth assumed length	160' 50'			
	Tons 48,800 @	.025	&	.87	
Area F	average grade true width assumed depth assumed length	.023% U,0 ₃ 21' 35' 50'	å	.68%	Cb ₂ 0 ₅
	Tons 3,680 @	.023	Ł	.68	
Area H	average grade true width assumed depth assumed length	.03% U,0 ₈ 38' 150' 50'	£	.58%	Cb ₂ 0 ₅
	Tons 28,500 @	.03	ê	.58	
Area G	average grade true width assumed depth assumed length	.062% U,0 ₈ 24' 100' 50'	&	.76%	Cb, 05
	Tons 12,000 @	.062	&	.76	

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SECTION 5	<u>21,0E</u>	D.D.H.'s U2	<u>. U</u> 3,	U8, U12, U14, U23
Ares A	average grade true width assumed depth assumed length	.011% ک ₃ 08 20۱ 83۱ 501	&	.81% Cb205
	Tons 8,300 u	.011	&	.81
krea D	average grade true width assumed depen assumed length	•013% U ₃ 08 251 501 501	&	.56% Cb205
	Tons 6,250 @	.013	8	•56
Area E	average grade			.025% 1308 .56 + 1.18 .8 2 %Cb2
	true width	$\frac{58+65}{2}$ =	61 '	
	assumed depth	160'		
	assumed length	501		
	Tons 48,800 6	.025	\$.87
Area F	average grade true width assumed depth assumed length	.023% 0308 211 351 501	ł	.68% Cb205
	Tons 3,680 @	.023	8	.68
Area H	average grade true width assumed depth assumed length	.03% U3 ⁰ 8 33' 150' 50'	Ŀ	.58% CЪ205
	Tons 28,500 @	.03	\$.58
Area C	average grade true width assumed depth assumed length	.062% U308 241 1001 501	ę,	.76% Cb205
	Tons 12,000 a	.062	Ł	•76

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SECTION 52	290E			D.D.H.'s U15	<u>, U17,</u>	<u>U19, U46</u>
Area A	average true wic assumed assumed	lth depth		.038% U,0 ₃ 14' 200' 50'	£	.99% Cb₂0 ₅
		Tons 14,000	6	.038	&	.99
Area B	average true wid assumed assumed	lth depth		.077% U,0 ₅ 54' 125' 50'	&	.94% Cb₂0 ₅
		Tons 33,800	6	.077	&	.94
Area C	average true wig assumed assumed	lth depth		.057% U,Q ₃ 45' 100' 50'	&	60% Cb,0 ₅
		Tons 22,500	e	.057	&	.60
Area D	average true wi assumed assumed	dth depth		.074% U₃0 ₅ 45' 70' 50'	ê	.75% Cb₂0 ₅
		Tons 15,750	6	.074	&	.75
Area F	average true wi assumed assumed	dth		.06% U,05 86' 16:' 50'	å	.70% Cb₂Q ₅ -
		Tons 70,800	0	.06	&	.70

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SECTION 5	290E	D.D.H. 13 U15,	<u>U17</u>	<u> </u>
Area h	average grade true width assumed depth assumed length	.038% ^U 3 ⁰ 8 141 2001 501	ę	.99% Cb205
	Tons 14,000 @	.038	Å	.99
Area B	average grade true width assumed depth assumed length	.077% U3 ⁰ 8 54' 125' 50'	çr	.94% Cb205
	Tons 33,800 🛢	.077	Ł	•94
Area Ü	average grade true width assumed depth assumed length	.057≸ U ₃ 08 45' 100' 50'	&	.60% Cb205
	Tons 22,500	.057	&	.60
Area D	average grade true width assumed depth assumed length	.074% U ₃ 08 451 701 501	۶.	.75% Cb205
	Tons 15,750 @	.074	&	•75
Area F	average grade true width assumed depth assumed length	.06% U ₃ 08 86' 165' 50'	۴	.70\$ ^{Cb} 2 ⁰ 5
	Tons 70,800 @	.06	8	.70

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SECTION	5 <u>342E</u>	D.D.H.'s 9,3	0,34	<u>,05,07,013,018,034,NX3</u> .
Area A	average grade true width assumed depth assumed length	.06% U,0% 28' 180' 50'	£	.61% Cb,0 <u>.</u>
	Tons 25,200 @	.06	&	.61
Area B	average grade true width assumed depth assumed length	.07% U,0 ₃ 20' 200' 50'	ર્ક્ષ	.66% Cb₂05
	Tons 20,000 @	.07	&	.66
Area C	average grade true width assumed depth assumed length	.041% U,0 ₈ 102' 200' 50'	&	.69% Cb₂Q5
	Tons 102,000 @	.041	å	.69
Area D	average grade true width assumed depth assumed length	.046% U ₃ 0 ₈ 42' 105' 50'	&	.66% Cb ₂ 05
	Tons 22,020 @	.046	&	.66
Area E	average grade true width assumed depth assumed length	.05% U ₃ 0 ₃ 54' 40' 50'	å	.64% CL,0 ₅
	Tons 10,800 @	.05	å	.64
Area F	average grade true width assumed depth assumed length	1035% U,0 ₈ 19' 175' 50'	å	.69% Cb ₂ 05
	Tons 16,600 @	.035	&	.69
Area G	average grade true width assumed depth assumed length	.055% U,0 _ð 31' 210' 50'	£	.82% Cb₂05
	Tons 32,600 @	.055	ર્ક્ષ	.82
Area H	average grade true width assumed depth assumed length	.038% U,0 ₈ 8' 200' 50'	Ł	.58% Cb205
	Tons 8,000 @	.038	&	.58

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SECTION 5342E

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D.D.H. 19 9,30,34,05,07,013,018,034, MX3.

Area A	average grade true width assumed depth assumed length	06% U308 281 1801 501	æ	.61% Cb205
	Tons 25,200 U	.06	8	.61
Area B	average grado truo width assumed depth assumed length	•07≈ U ₃ 08 201 2001 501	ŝ,	.66% Cu2O5
	Tons 20,000 @	.07	&	•66
Area C	average grade true width assumed depth assumed length	.041% U308 1021 2001 501	Ŀ	.69≴ Cb205
	Tons 102,000 🗘	.041	Ł	•69
Area D	average grade true width assumed depth assumed length	.046% U ₃ 08 421 1051 501	£	.66% Cb ₂ 05
	Tons 22,020 ü	•046	ŝ.	.66
Area E	average grade true width assumed depth assumed length	.05% U308 541 401 501	¢	.64% Cb205
	Tons 10,800 @	•05	ራ	•64
Ares F	average grade true width assumed depth assumed length	.035 % U308 19' 175' 50'	k	.69% Cd ₂ 05
	Tons 16,600 🔮	.035	&	.69
Area G	average grade true width assumed depth assumed length	.055% U ₃ 08 31' 210' 50'	દ	.82% Cb205
	Tons 32,600 🛛	•055	å	.82
Area H	average grade true width assumed depth assumed length	,038 U ₃ 0 ₈ 81 2001 501	£	.58% Cb205
	Tons 8,000 .	•038	6	•58

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SECTION 5	340E Cont'd	D.D.H.'s 9,30,	34,U	5, U7,U13,U18,U34,NX3 .
Area I	average grade true width assumed depth assumed length	.035% U,0 8' 200' 50'	&	.55% Cb,05
	Tons 8,000 @	.035	8	.55
Area J	average grade true width assumed depth assumed length	.075% U₃0☆ 24' 300' 50'	Ł	.81% Cb ₂ 0 ₅
	Tons 36,000 @	.075	å	.81
Area K	average grade true width assumed depth assumed length			053/3 = .063% U,03 5/3 = .81% Cb205
	Tons 222,000 @	.063	å	.81
Area L	average grade true width assumed depth assumed length	.066% U,0 18' 340' 50'	&	.64% Cb ₂ 0 ₅
	Tons 30,600 @	.066	8	.64

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SECTION	534)E Contid	D.D.H. 's 9,30,34,05,07,013,018,034,023.
Area I	nverage grade true width assumed depth assumed length	•035% U ₃ 08 & •55% Cb ₂ O ₅ 81 2001 501
	Tons 8,000 @	.035 & .55
Area J	average grade true width assumed depth assumed length	•075% U308 & •81% Cb205 241 3001 501
A	Tons 36,000 0	.075 & .81
Area K	average grade true width assumed depth assumed length	$.08/3 + .056/3 + .053/3 = .063\% U_30_8$ $.91/3 + .85/3 + .65/3 = .81\% Cb_205$ 120' 370' 50'
Area L	Tons 222,000 B	.063 & .81
	average grads true width assumed depth assumed length	•066% U308 & •64% Cb205 18' 340' 50'
	Tons 30,600 é	•066 & •6 4

SECTION 5	390E	D.D.H.'s U10), Ul	1, U51
Area A	average grade true width assumed depth assumed length	.073% U ₃ 0 ₈ 39' 120' 50'	£	.68% Cb₂05
	Tons 23,400 0	.073	æ	.68
Area B	average grade true width assumed depth assumed length	.057% U,0 ₈ 14' 200' 50'	Ş.	.80% Cb₂05
	Tons 14,000 @	.057	&	.80
Area C	average grade true width assumed depth assumed length	.097% U,0 ₈ 157' 175' 50'	Ł	1.15% Cb ₂ 0 ₅ -
	Tons 137,500 @	.097	6	1.15

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SECTION	SECTION 53901: D.D.H.'S UIO, U11, U51		
Area A	average grade true width Ersumed depth assumed length	.073% U ₃ 0 ₈ 39' 120: 50'	\$,68% Cb205
	Tons 23,400 @	.073	& .68
Area B	average grade true width assumed depth assumed length	.057≴ U ₃ 08 141 2001 501	& .80% Cd ₂ 05
	Tons 14,000 @	.057	& .8 0
Àrea C	average grade true width assumed depth assumed length	097% 0 ₃ 0 ₈ 1571 1751 501	4 1.15≸ Cb ₂ 05
	Tons 137,500 t	.097	4 1.15

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SECTION 5440E		D.D.H.'s 37,	U21,	, U22, U31, U40
Area A average o true wid assumed o assumed o	th depth	.075% U ₃ 0 _% 56' 180' 50'	å	.64% Cb ₂ 0 ₅ -
,	Tons 50,400 @	.075	&	.64
Area B average true wid assumed assumed	th depth	.056% U ₃ 0 ₅ lc' 200' 50'	£	.69% Cb ₂ 0 ₅
	Tons 10,000 @	.056	&	.69
Area D average true wid assumed assumed	th width	.08% U,0 ₃ 45' 190' 50'	å	.72% Cb₂0 ₅
	Tons 42,700 @	.08	Ł	.72
Area E average true wid assumed assumed	th depth	.055% U,0 ₃ 51' 130' 50'	&	.56% Cb₂0 ₅
	Tons 33,200 @	.055	å	.56
Area F zverage true wid assumed assumed	th depth	.086% U,Q, 82' 130' 50'	å	1.04 Cb ₂ 05
	Tons 53,300 @	.086	&	1.04
Arer H average true wid assumed assumed	lth depth	.066% U,Q ₃ 46' 170' 50'	&	.92% Cb:05
	Tons 39,100 @	.066	&	.92

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				•				Page	
	SECTI	ON 54	40E			D.D.H.'s 37,	<u>021</u>	<u>, U22, U31, U40</u>	•
-	Area	A	average true wid ussumed assumed	th depth		.075% U,0 ₃ 56' 180' 50'	ê	.64% Cb ₂ 05	
				Tons 50,400	ଡ	.075	å	.64	
	Area	В	average true wid assumed assumed	th depth		.056% U ₃ 0 ₃ 10' 200' 50'	&	.69% Cb,05	
				Tons 10,000	6	.056	à	.69	
	Area	D	average true wid assumed assumed	th width		.08% U,0 ₃ 45' 190' 50'	æ	.72% Cb,05	
				Tons 42,700	e	.08	å	.72	
	Area	E	average true wid assumed assumed	th depth		.055% U,0% 51' 130' 50'	દ	.56% Cb,05	
				Tons 33,200	6	.055	£	.56	
	Area	F	average true wid assumed assumed	lth depth		.086% U,O, 82' 130' 50'	á	1.04 Cb;05	
				Tons 53,300	<u>e</u>	.086	8	1.04	
	Area	Н	average true wid assumed assumed	lth depth		.066% U30x 46' 170' 50'	ર્ક	.92% Cb ₂ 0 ₅	
				Tons 39,100	6	.066	8	.92	

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SECTION 5	<u>440E</u>	D.D.H. * 37,	U21	, 1122, 1131, 1140.
Area A	average grade true width assumed depth assumed length	.075% U308 561 1801 501	<u>k</u>	.64% CD205
	Tons 50,400 🕯	.075	Ł	.64
Area B	average grade true width assumed depth assumed length	•056≴ U ₃ 0 ₈ 101 2001 501	&	.69% Съ ₂ 05
	Tons 10,000 @	.056	Ł	.69
Area D	average grade true width assumed depth assumed length	•08% U ₃ 08 451 1901 501	Ł	.72% Cb205
	Tons 42,700 9	.08	& .	.72
Area E	average grade true width assumed depth assumed length	● .055% U308 -511 1301 501	Ł	.56% Cb205
	Tons 33,200 0	•055	\$	•56
Area P	average grade true width assumed depth assumed length	.086% U ₃ 08 821 1301 501	ŝ,	1.04% Cb ₂ 05
	Tona 53,300 🌢	•086	\$	1.04
Area H	average grade true width assumed depth assumed length	•066% U ₃ 0 ₈ 46' 170' 50'	ŝ.	.92≴ Cb205
	Tons 39,100 @	.066	Ŀ	.92

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SECTION 5490E D.D.H.'s U24, U25, U47 .10% U,0g Area A average grade å .63% Cb205 true width 14' 200' assumed depth assumed length 50' Tons 14,000 @ .01 .63 S. Area B .012% U₃0₅ & .82% Cb₂0₅ average grade 19' true width assumed depth 200' assumed length 50' Tons 19,000 @ .012 .82 å Area C average grade .034% U, 02 & .73% Cb, 05 44' true width assumed depth 200' assumed length 50' Tons 44,000 @ .034 6 .73 Area D .11% U₃O₂ & 1.07% Cb₂O₅ average grade 31' true width 200' assumed depth 50' assumed length Tons 31,000 @ .11 1.07 ۶. .0718 U, 0 & .778 Cb, 05 Area E average grade 91 true width 200' assumed depth

assumed length

Tons 9,000 @

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SECTION	<u>5490E</u>	D.D.H. 18 U24, U25, U47.
Area A	averefie Brage	.01% U308 & .63% C5205
	true wiath	14'
	assumed depth	2001
	assumed length	50'
	Tons 14,000 @	.01 & .63
Area B	average grade	.01.2% U308 & .82% Cb205
	trug width	191
	assumed depth	2001
	assumed length	501
	Tons 19,000 @	.012 & .82
Area C	average grade	.034% U308 & .73% Cb205
	true width	441
	assumed depth	2001
	assumed length	501
	Tons 44,000 @	.034 & .73
Area D	average grade	.11% U308 & 1.07% Cb205
	true width	31'
	assumed depth	2001
	assumed length	501
	Tons 31,000 U	.11 & 1.07
Area E	average grade	.071% U308 & .77% Cb205
	true width	91 91 29
	assumed depth	2001
	assumed length	501
	Tons 9,000 @	.071 & .77

SECTION 5540	E	D.D.H.'s 13,	16,	U29, U30, U42.
as	crage grade ue width sumed depth sumed length	.061% U,0 ₀ 32' 152' 50'	£	.70% Cb,05
	Tons 24,300 @	.061	â	.70
tr as	verage grade rue width sumed depth ssumed length	.14% U,O ₃ 21' 132' 50'	ર્ક	1.21% Cb,05
	Tons 13,850 @	.14	ĥ	1.21
tr as	verage grade rue width ssumed depth ssumed length	.107% U,0 ₈ 32' 90' 50'	&	1.11% Cb₂05
	Tons 14,400 @	.107	8	1.11

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Page



SECTION	551.DE	D.D.H.'s 13,	16,	U29, U30, U42.
Area A	average grade true width assumed depth assumed length	.061% U ₃ 08 321 1521 501	î.	.70% Cb ₂ 05
	Tons 24,300 3	.061	š	.70
Area B	average grade true width acsumed depth assumed length	.14% U3 ⁰ 8 211 1321 501	&	1.21% Cb205
	Tons 13,850	.14	6	1.21
Àrea C	average grade true width assumed depth assumed length	.107≴ U ₃ 08 321 901 501	ŕ	1.11% Cb205
	Tons 14,400	.107	&	1.11

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SE	СТ	IC	DN -	-55	9 (JE
_	-	-		_	-	-

Area	Α	•	a١
			tı
			as

average grade true width assumed depth assumed length

Tons 23,000 0

D.D.H.'s U33.

.054% 23' 200' 50'	U,0 ₈	ર્ક	.52%	Cb ₂ 05
.054		હ	.52	

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P.30 49

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SE	SCTION	5590E	D.D.H's 033	•	
 A1	rea A	average grade true width assumed depth assumed length	054% U308 231 2001 501	ĸ	.52% Cb2O5
		Tons 23,000 🔌	.054	Ł	.52

SECTION	<u>5640e</u>	D.D.H.'s 33	<u>, U32</u>	2, U35, U41.
Area A	average grade true width assumed depth assumed length	.085% U,0 ₈ 17' 120' 50'	£	.41% Cb,05
	Tons 10,200 @	.085	&	.41
Area B	average grade true width assumed depth assumed length	.058% U,0 ₅ 13' 110' 50'	å	1.29% Cb₂05
	Tons 7,150 @	.058	å	1.29
Area C	average grade true width assumed depth assumed length	.045% U,0 _% 24' 130' 50'	Ċ	1.22% Cb,0 ₅
	Tons 15,600 @	.045	&	1.22

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SECTION	<u>56408</u>	D.D.H.'s 33,	032	<u>, 135, 141</u> .
Area A	average grade true width assumed depth assumed length	.085% U308 17' 120' 50'	ę	.41% Cb205
	Tens 10,200 @	.085	&	.41
Area B	average grade true width assumed depth assumed length	.058£ U ₃ 0 ₈ 13' 110' 50'	ŝ,	1.2% Cb ₂ 05
	Tons 7,150 0	.058	k	1.29
Area C	average grade true width assumed depth assumed length	.045% U ₃ 0 ₈ 241 1301 501	ŝe.	1.22\$ Cb205
	Tone 15,600 @	.045	P.,	1.22

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SECTION 5690E

D.D.H.'s U37, U38.

Due to lack of drilling on this section ore intersection used to substantiate masses outlined on Section 5740E. Ore calculated on Section 5740E projected to Section 5690E.

Area A	average grade true width assumed depth assumed length	.045% U ₃ 0 _% 34' 200' 25'	£	.60% Cb,05
	Tons 17,000 @	.045	8	.60
Area B	average grade true width assumed depth assumed length	.05% U,0 ₃ 19' 200' 25'	6	.51% Cb205
	Tons 9,500 @	.05	5	.51

D.D.H. 18 U37, U38.

P. 20 51

SECTION 5690E

Due to lack of drilling on this section ore intersection used to substantiate incesses outlined on Section 5740E. Ore calculated on Section 5740E projected to Section 5690E.

Area A	avorage grade true width assumed depth assumed length	.045% U308 341 2001 251	Ł	.60% Cd205
	Tons 17,000 @	.045	Ł	.60
Агон В	average grade true width assumed depth assumed length	.05% U308 191 2001 251	\$.51\$ 0b205
	Tons 9,500 📾	.05	ķ	.51

SECTION 5740E

D.D.H.'s 15, 18, 20. U43, U44.

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Due to lack of drill holes on adjacent sections, ore masses on this section are projected 50' E & to' W.

Area A	average grade true width assumed depth assumed length	.01% U,0 _g 18' 200' 100'	£	1.31% Cb, Q
	Tons 36,000 @	.01	å	1.31
Area B	average grade true width assumed depth assumed length	.01% U,0 ₃ 40' 225' 100'	å	.54% Cb ₂ 0 ₅
	Tons 90,000 @	.01	&	.54
Area C	average grade true width assumed depth assumed length	.037% U,0 ₃ 42' 140' 100'	8	.91 % Cb,05
	Tons 58,800 @	.037	8	.91
Area D	average grade true width assumed depth assumed length	.05% U,0 _% 40' 170' 100'	&	.71% Cb,0 ₅
	Tons 68,000 @	.05	8	.71
Area E	average grade true width assumed depth assumed length	.066% U,0 ₈ 64' 222' 100'	ર્ક	.62% Cb ₂ 0 ₅
	Tons 142,000 @	.066	å	.62
Area F	average grade true width assumed depth assumed length	.063% U ₃ 0 ₂ 46' 262' 100'	ę	.78% Cb ₂ 0 ₅
	Tons 120,200 @	.063	ά	.78
Area G	average grade true width assumed depth assumed length	.055% U,0 ₃ 54' 268' 100'	ઠ	.71% Cb,0 ₅
	Tons 144,000 @	.055	&	.71

SECTION 5740E

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D.D.H. 1s 15, 18, 20, U43, U44.

Due to lack of drill holes on adjacent sections, ore masses on this section are projected 50^{1} E & 50^{1} W.

Area A	average grade truo width assumed depth assumed length	.01% U308 & 18' 200' 100'	1.31% Cb205
	Tons 36,000 @	.01 &	1.31
Area B	average grade true width assumed depth assumed length	.01% U308 & 40' 225' 100'	.54% Cb205
	Tons 90,000	.01 &	•54
Агеа С	average grade true width assumed depth assumed length	.037% U ₃ 08 & 421 1401 1001	.91% Cb ₂ 05
	Ions 58,800 🛍	.037	.91
Arəa D	average grade true width assumed depth assumed longth	.05% U308 8 401 1701 1001	• .71% Cb ₂ 05
	Tons 63,000 6	.05 8	.71
Area E	average grade true width assumed depth assumed length	.066% U ₃ 08 8 641 2221 1001	4 .625 Cb205
	Tons 142,000 @	.066	k .62
Area F	average grade true width assumed depth assumed length	.063% U ₃ 08 461 2621 1.001	•
	Tons 120,200 🗉	-	£ .78
Area G	nverage grade true width assumed depth assumed length	•055≸ U ₃ 08 54! 268! 100!	4 .71% Cb ₂ 05
	Tons 144,000 @	•055	& . 71

SECTION 5740E Cont'd

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Area H	average grade true width	.04% U,0 ₈ 21'	8	.60% Cb205
•	assumed depth assumed length	167' 100'		
	Tons 35,070	.04	&	.60

Page 5

D.D.H.'s15, 18, 20, U43, U44.



SUCTION	5740E cont d		D.D.H. 13 1	5, 18	3, 20, 043, 044.
kroa H	averaje grade true width assumed depth assumed length	:	.04% U308 211 1671 1001	ł.	.60% Cb205
	Tons 35,070	ů	.04	š	.60

SECTION 5790E

Due to lack of drilling on this section ore outlined on section 5740E projected to this section.

Area A	average grade true width assumed depth assumed length	.054% U,0 ₈ 25' 200' 25'	Ś.	.80% Cb20 <u>5</u>	
	Tons 12,500 @	.054	ê	.80	

SECTION 5790E

Due to lack of drilling on this section ore outlined on section 5740E projected to this section.

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·· Area A	average grade true width assumed depth assumed length	054≴ 0508 251 2001 251	Æ	.8C% Cb205	
	Tons 12,500 0	.054	Ł	.80	

SECTION	5840E	D.D.H.'s U49, U52, U54.			
Area A	average grade true width assumed depth assumed length	.013% U,0 ₅ 30' 110' 50'	Ł	.89% Cb₂≎5	
	Tons 16,500 @	.031	\$.89	
Area B	average grade true width assumed depth assumed length	.077% U30, 28' 140' 50'	&	1.16% Cb ₂ 0	
	Tons _9,600 @	.077	5	1.16	

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SECTION 9	5340E	D.D.H. 18 149, U52, U54.
krea A	average grade true width assumed depth assumed length	.013# U308 & .89% Ct-205 30' 110' 50'
	Tons 16,500 @	.031 & . 8 9
Area B	average grade true width assumed depth assumed length	.077% U308 & 1.16% Cb205 281 1401 501
	Tons 19,600 @	.077 & 1.16

SECTION 5890E

· · ·				1 A A		
Area A	average grade	.052% U,0, 35'	8	1.00% Cb. 05		
	true width	321		7		
	assumed depth	200 '				
	assumed length	50'				
	Tons 35 000 0	052	L.	1 00		

D.D.H.'s U56, U57.

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SECTION	<u>5890E</u>	D.D.H.'s U56, U57.				
Area A	average grade true width assumed depth assumed length	.052% U ₃ 08 351 2001 501	Ł	1.00% Cb205		
	Tona 35.000 @	.052	Ł	1.00		

<u>D.D.H.'s 17, 31.</u> .015% U,0g & .75% Cb,0√

Area A	average grade true width assumed depth assumed length	.015% U,0g 26' 200' 100'	£	.75% Cb ₂ 0 ₅
	Tons 52,000 @	.015	å	.75
Area B	average grade true width assumed depth assumed length	.044% U,O ₃ 26' 245' 125'	é	.61% Cb,05
	Tons 79,600 0	.044	હ્ય	.61
Area C	average grade true width assumed depth assumed length	.04% U,0; 5' 230' 125'	હ	.70% Cb₂05
	Tons 17,250 @	.04	å	.70
Area D	average grade true width assumed depth assumed length	.007% U,0 ₃ 11' 180' 125'	ર્સ	.56% Cb₂0∻
	Tons 22,800 @	.007	હ	,56

SECTION 5940E

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SECTION 5	91,0E	D.D.H.'s 17, 31.			
Area A	average grade true width assumed depth assumed length	.015% U308 261 2001 1001	& .75% Cb205		
	Tons 52,000 @	.015	& . 75		
Area B	average grade true width assumed depth assumed length	.044% U308 261 2451 1251	& .61% Cb205		
	Tons 79,600 @	.044	å .61		
Area C	averaje grade true width assumed depth assumed length	.04% U308 6' 230' 125'	& .70% Cb205		
	Tons 17,250 @	.04	& .70		
Arca D	average grade true width assumed depth assumed length	.007% U308 11' 180' 125'	& .56% Cb205		
	Tons 22,800 🛍	•007	& . 56		

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SECTION 6	140E			D.D.	H.'s 19,	38.		
Area A	true wid assumed	lth depth		.01% 19' 200' 150'	U, 0 _K	õ:	.93%	Cb,05
		Tons 57,000	6	.01		ઠ	.93	
Area B	true wie assumed	depth		.02% 12' 200' 150'	υ, 0 ₅	۶.	.86%	Cb, 05 [.]
		Tons 36,000	6	.02		å	.86	
	Area A	true wid assumed assumed Area B average true wid assumed	Area A average grade true width assumed depth assumed length Tons 57,000 Area B average grade true width assumed depth assumed length	Area A average grade true width assumed depth assumed length Tons 57,000 @ Area B average grade true width assumed depth	Area Aaverage grade true width assumed depth assumed length.01% 19' 200' assumed lengthArea Baverage grade true width assumed depth 12' assumed depth 200'.01	Area Aaverage grade true width assumed depth assumed length.01% U, 0, y; 19' 200' 150'Tons 57,000 @.01Area Baverage grade true width assumed depth true width assumed length.02% U, 0, y; 12'	Area Aaverage grade true width assumed depth assumed length.01% U, 0r; isàTons 57,000 @.01&Area Baverage grade true width assumed length.02% U, 0r; is&Area Baverage grade true width assumed length.02% U, 0r; is&Area Baverage grade true width assumed length.02% U, 0r; is&	Area Aaverage grade true width assumed depth assumed length.01% U, 0 _{F5} is.93% .93%Tons 57,000 @.01& .93Area Baverage grade true width assumed depth true width assumed length.02% U, 0 ₅ 200'& .86%Area Baverage grade true width assumed length.02% U, 0 ₅ 12'& .86%

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A COMPANY

SECTION		D.D.H. 18 19,38.		
Area A	average grade true width assumed depth assumed length	.01% U308 19' 200' 150'	•93% Cb ₂ 05	
	Tons 57,000 2	.01	હેર	•93
Area B	average grade true width assumed depth assumed length	.02% U308 121 2001 1501	ţ	.86% CD2O5
	Tons 36,000 @	.02	k	.86

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APPENDIX I

2

STAL STATIST

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	Columb:	ium Oxi	de 8	Analys	is Chec	ks	
i	Samp!e	No.	McGill	X-Ray	USGS	Battelle	TS.L Mines Branch Col. X-Ray Fl.
	78		20		47		
		Tma	.38		.47		
	561	Ins.	.15		.16		
	710	11	.96 .23		1.15		
	3017 3024	**	.23		.27		
	3024		.39		.50 .51		
	3043		.80		.96	.76	
	3005	67	.60		.89	. /0	
	3024	19	.39		.73	.53	
	3196	17	.48		.74	.63	
	5313	10	1.60		1.80	.05	
	3533	м	1.56		1.40		
	3704	19	.52		.66		
	4293		2.20		2.20		
	3792	11	.48		.54	.52	
	3814	19	.50		.76	.49	
	3814		.78		1.00	.86	
	3767	11	.62		1.00	.79	
	3921	11	1.03		1.30	.93	
	3969	18	.24		.36		
	3984	11	.81		.83		
	4017	- 9 0	.68		.63		
	4097	11	.51		.70		
	4109	н	5.21		5.00		
	500	16	.64	.72			
	659		.36	.43			
	660		.29	.52			
	661		.48	.52			
	693		1.00	1.14			
	695		.90	1.09			
	696		.65	.74			
	697		.82	.95			
	698		.50	.62			
	699		.14	.14		DII	
	70'		.40	.48		UU.	PLICATE COPY
	691		.44	.48		POO	POLIALITYODICUL
	692		.95	1.08		100	R QUALITY ORIGINAL
	693		1.00	1.11			TO FOLLOW
	694		1.08	1.35			
	1374	_	2.01	2.20			
	3911	Ins.	1.24	1.57			
	2645	11 11	.63	.85			
	734		.84	.86			
	1385	14	.76	.92			
	3812	**	.25 .50	.30			
	3813			.60			
	3816		.26	.34			

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APPENDI	X	I

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Columbian Gride X		Analysis Checks				
Sample No.	NcG111	Х-Кыу	USCS	Battelle	TS.L.	Mines Branch Col. X-Ray Fl.
78 561. $Ins.$ 710 " 3017 " 3024 " 3038 " 3043 " 3055 " 3024 " 3055 " 3024 " 3055 " 3024 " 3196 " 5313 " 3533 " 3704 " 4293 " 3704 " 4293 " 3704 " 4293 " 3704 " 3814 " 3969 " 3964 " 4017 " 4094 " 4017 " 4018 " 4017 " 4018 " 4018"	$\begin{array}{c} .38\\ .15\\ .96\\ .23\\ .39\\ .39\\ .80\\ .60\\ .39\\ .46\\ 1.56\\ .52\\ 2.20\\ .48\\ .50\\ .78\\ .62\\ 1.03\\ .24\\ .81\\ .68\\ .51\\ .64\\ .36\\ .29\\ .48\\ 1.00\\ .90\\ .55\\ .82\\ .50\\ .14\\ .40\\ .44\\ .95\\ 1.00\\ 1.08\\ 2.01\\ 1.24\\ .63\\ .26\\ .26\\ .26\\ .26\\ \end{array}$.72 .43 .52 .52 1.14 1.09 .74 .95 .62 .14 .48 1.08 1.11 1.35 2.20 1.57 .85 .86 .92 .30 .60 .34	.47 .16 1.15 .27 .50 .51 .96 .89 .73 .74 1.80 1.40 .66 2.20 .54 .76 1.00 1.30 .36 .83 .70 5.00	.76 .53 .63 .52 .49 .86 .79 .93		

Page

Sample No.	McGill	X-Ray	USGS	Battelle	T.S.L.		s Branch X-Ray Fl.
16M	.60	.83			.62	.72	.75
2331	.72	.94			.85	.74	.80
77M	.72	.93			.88		
2344	1.43	1.86			1.60		
915		.58			.66	.62	.63
928		1.18			1.35	1.42	1.32
984		1.17			1.20	1.29	1.32
1392		2.25			2.30	2.35	2.55
1.458		.67			.72	.78	.81
2567		.80			.75	.73	.73
2687		.74			.65	.70	.78
96M		.62			.55	.53	.52



APPENDIX I

Page 2

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Dample No.	McGill	X-Réy	USGS	Battelle	T.S.L.		Nes Branch X-Ray Pl.
3 GM	.60	.83	ŗ		.62	.72	.75
2331	.72	•94			.85	•74	.8 0
77M	.72	•93			. 83		
2344	1.43	1.86			1.60		
915		.58			.66	.62	.63
923		1.18			1.35	1.42	1.32
984		1.17			1.20	1.29	1.32
1392		2.25			2,30	2.35	2.55
1458		.67			.72	.78	.81
2567		.80			.75	•73	.73
2587		.74			.65	.70	.78
96M		.62			•55	•53	.52

McGIII = McGIII University X-ray Laboratory. X-May = X-Ray Laboratories, Ltd., Toronto. USGS = United States Geological Survey. Eattelle = Battelle Memorial Institute, Columbus, Ohio. T. S. L. = Technical Service Laboratories, Toronto. Col. = Colorimetric method. X-Ray Fl. = X-Ray Fluorescence. Pager 60

URANIUM ANALYSIS CHECKS

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Uranium Oxide %

Sample No.	Insp	M Chem.	ines Br <u>Calc.</u>	anch, Jtta Eq gamma	wa Eg beta	T.S.L.	Prob. Th0 ₂
2969 3742 3766 3815 3909 4072 4163	.081 .028 .069 .136 .186 .10 .033	.077 .023 .059 .12 .18 .094 .029	.074 .028 .064 .12 .17 .10 .034	.076 .030 .067 .141 .164 .094 .029	.075 .029 .066 .135 .168 .097 .031	.051 Tr .031	
3151 3194 3533 3610 3737 781 782	.102 .08 .01 .005 .015	.044 .026				.098 .072 nil nil Tr	
783 784 Bulk Sample 53	.10	.062 .029 .15	.15	.26	.06		
53 62 996 1106 1751 1921 926 2873 2874 2888	.10 .10 .05 nil .042 .046 .062 .138 .049 .08		.06 .086 .060 .032 .037 .050 .070 .11 .047 .072	.090 .063 .034 .044 .042 .075 .124 .045 .081	.088 .062 .033 .041 .046 .072 .117 .046 .077		
2889 1967 2230	.136 .08 .16		.11 .077	.129	.121	.19	
815 865 882 889 915 928	.015 .083 .046 .065 .072 .07	.012 .083 .041 .058 .072 .070	.016 .083 .045 .059 .068 .073	.016 .074 .045 .073 .079 .073	.016 .078 .045 .067 .074 .073	.019 .082 .043 .059 .061 .064	.036 .02
9884 1392 1458 2567 2587	.111 .106 .059 .041 .068	.12 .11 .054 .035 .063	.12 .10 .054 .037 .065	.12 .108 .063 .039 .067	.12 .105 .059 .038 .066	.12 .080 .042 .043 .066	
96M 3163 3164 3165 3166	.062 .075 .08 .043 .047	.055 .070 .037	.059 .069 .043	.061 .074 .045	.060 .072 .044	.065 .074 .085 .037 .052	

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UTANTUM ANALYSIS CHECKS

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Uraniwa Oxide Z

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Sample No.	Insp	M Chem.		anch, Ottu Eq gamma		T. S. L.	Prob. ThO ₂
2969 3742 3766 3815 3909 4072	.081 .028 .069 .136 .186 .10	.077 .023 .059 .12 .18 .094	.074 .028 .064 .12 .17 .10	.076 .030 .067 .141 .164 .094	.075 .027 .066 .135 .168 .097 .031	.051 Tr .031	
4163 3257 3194 3533 3610 3737	.033 .102 .08 .01 .005 .015	.029 .044	.034	.029	160°	.098 .072 nil nil Tr	
781 782 783 784		.026 .062 .029					
Bull Sample 53 (2	.10 .10 .05	.15	.15 .06 .086 .0(0	.06 .090 .063	.06 .028 .062		
996 1106 1751 1921	ni] .042 .046		.032 .037 .050	.034 .044 .042	.033 .041 .046		
926 2873 2874 2888	.062 .138 .049 .08		.070 .11 .047 .072	.075 .124 .04,5 .081	.072 .117 .046 .077		
2889 1987 2230	.136 .08 .16		.1] .077	.129 .086	.121 .082	.19 .019	
815 865 882 889	.015 .083 .046 .065	.012 .083 .041 .058	.016 .083 .045 .059	.016 .074 .045 .073	.045 .067	.082 .04,3 .059	.036
915 929 9834 1392	.072 .07 .111 .106	.072 .070 .12 .11	.068 .073 .12 .10	.079 .073 .12 .108	.073 .12	.061 .064 .12 .080	.03
1452 2567 25 87	.059 .041 .068	.054 .035 .063	.054 .037 .065	.063 .039 .067	.059 .038 .066	.042 .043 .066	
96M 3163 3164 3165	.062 .075 .08 .043	.055 .070 .037	.059 .069 .043	•074	.072	.074 .085 .037	
3166	.047					.052	

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Composition Pyrochlore

Information basel on send-quantitative spectrographic analyses and calculations by E.H. Nickel, Department of Mines and Technical Surveys, Mines Branch, Ottawa, Ontario.

Na ₂ 0	5%
CaÖ	13
FeO	5
M _X O	7
La,0,	0.3
U30x	7
Th0 ₂	0.8
TiO ₂	4
Nb, 05	56

The specific gravity is reported by S. Kaiman as being 5.2.

Composition Fyrochlore

Information based on send-quantitative spectrographic analyses and calculations by E. H. Nickel, Department of Mines and Technical Surveys, Mines Branch, Ottawa, Ontario.

Nazo	576
CeÒ	13
FoO	5
M80	7
12203	0.3
⁶ 308	7
ThO	9.0
TIO2	4
Nb205	56

The specific gravity is reported by S. Kaiman as

leing 5.2.

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