42D15NE0051 2.2844 WALSH

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DEAD HORSE CREEK PROJECT

GEOLOGICAL REPORT - WALSH TOWNSHIP

NTS 42/D/15

T. R. KEIL
NOVEMBER, 1978

GULF MINERALS CANADA LIMITED
TORONTO

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* IN POCKET

INTRODUCTION

Gulf Minerals Canada Limited holds 25 claims in Walsh Township near the north shore of Lake Superior, about 26 miles east of Schrieber. The claims were staked between August and November, 1977, by Gulf Minerals Canada Limited, in four groupings and are all contiguous.

The area was selected for evaluation after finding radioactivity associated with diatreme breccias. The diatremes had not been previously mapped and their alkaline nature suggested a possible economic uranium and/or thorium occurrence.

LOCATION AND ACCESS

The Dead Horse Creek Claims are located in the east central part of Walsh Township, formerly known as Township 80. Walsh Township is within the Thunder Bay Mining District and is situated about half way between the towns of Terrace Bay and Marathon, on the north shore of Lake Superior. The NTS map reference number is 42/D/15.

Access to the claims is easily accomplished by using the Dead Horse Creek logging road which runs north-south through the central part of the claims. The claims are located between mile 1.5 and mile 3, north of the Trans Canada Highway, number 17. Figure 1 shows the general location of the property.

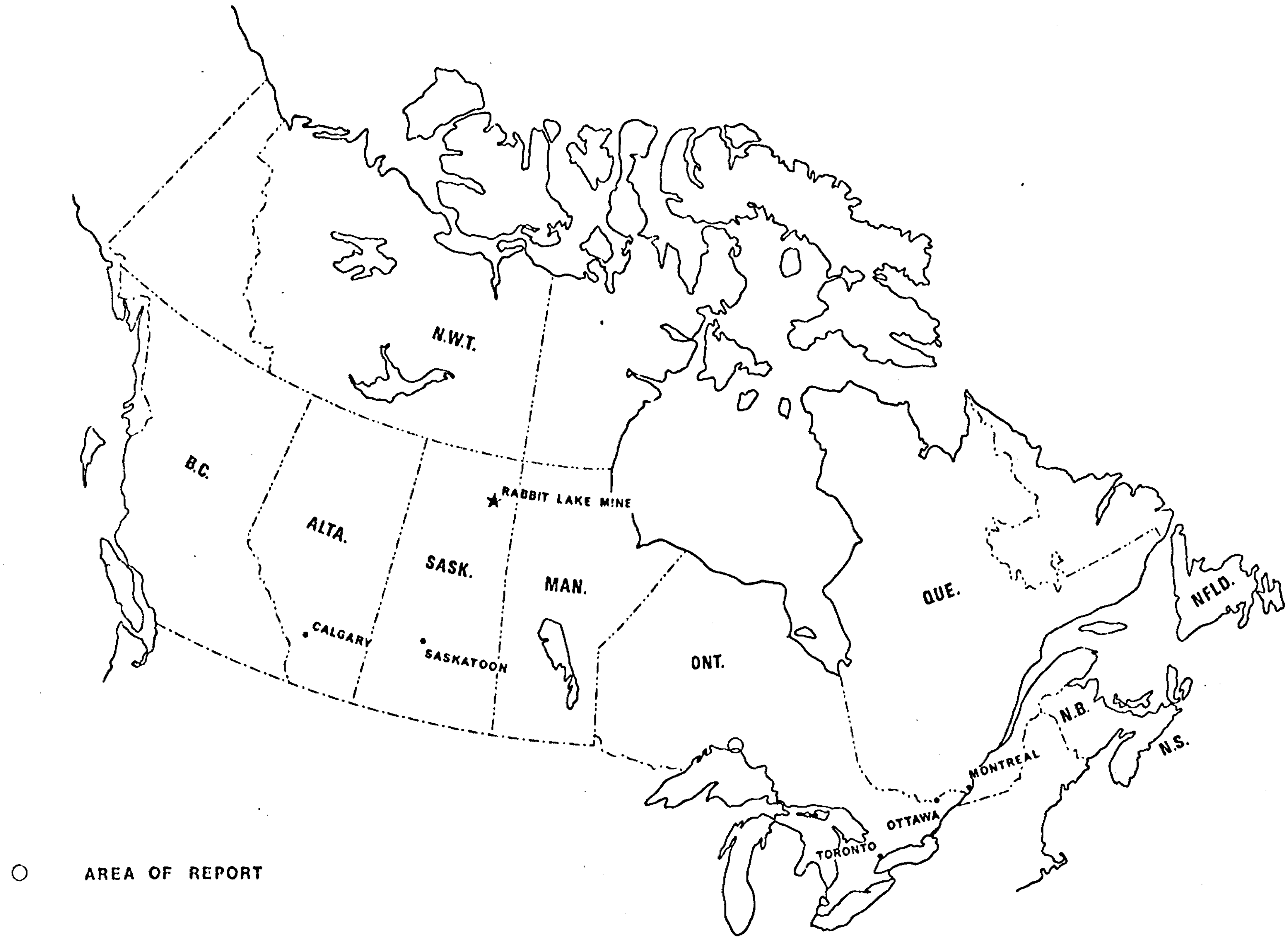

N.W.T.
B.C.
ALTA.
SASK.
MAN.
ONT.
QUE.
NFLD.
N.B.
N.S.
RABBIT LAKE MINE
CALGARY
SASKATOON
MONTREAL
OTTAWA
TORONTO
○ AREA OF REPORT

FIGURE 1

PREVIOUS WORK

Although some or all of the area encompassed by the Dead Horse Creek claims was previously staked at various times, no assessment work has been filed with the government.

Detailed geological mapping in Walsh Township was first done by J. Walker and Associates in 1953, 1954 (Walker, 1967). Mapping on a scale of one inch to half a mile, no reference was made of a diatreme breccia within the claim area.

In recent years, with the opening of the Dead Horse Creek bush road, further examination of this area disclosed the presence of the diatreme. A brief report on this structure was first made by Mitchell and Platt (1977).

In 1978, R. Sage (1978) completed the first detailed mapping of the diatreme and the immediate adjacent area.

THE EXPLORATION PROGRAM

After the initial discovery of radioactivity, the area of interest was staked on behalf of Gulf Minerals Canada Limited, in 1977. Preliminary work consisted of prospecting and blasting pits in areas indicating anomalous radioactivity.

The writer visited the claims for a week in June of this year to familiarize himself with the local geology prior to planning a geological mapping program. During this time, several meetings were held with R. Sage, Ontario MNR-OGS geologist, who was mapping in the area at that time.

In late July, detailed geological mapping commenced on the Dead Horse Creek Claims. Between August 4 and 18, the Dead Horse Creek grid comprising 21.6 line miles was cut.

TABLE I

CLAIMS GEOLOGICALLY MAPPED

TB 464129

TB 464130

TB 464131

TB 464132

TB 464133

TB 464134

TB 464135

TB 464136

TB 464137

TB 464138

TB 464609

TB 464610

TB 464611

TB 464612

TB 464613

TB 466576

TB 466577

TB 466578

TB 466579

TB 466580

TB 466581

TB 466582

TB 466583

TB 466584

TB 466585

The mapping was primarily done by the writer, assisted by a graduate geologist. A high school graduate was available to help either of the geologists (as needed). The bulk of the geological mapping was completed by September 3, 1978. The writer spent nine days in the area, at the end of September and early in October, doing additional correlation field work. During the intervening periods since September, most of the writer's time has been occupied with assembling the geological map and preparing the accompanying report.

On November 1, 1978, a small program of diamond drilling was begun on the Dead Horse Creek Claims.

TOPOGRAPHY AND VEGETATION

The terrain within the Dead Horse Creek Claims is quite rugged. Elevation differences of up to 300 feet exist between Dead Horse Creek and the surrounding hills. Because of the relief along the creek and many prominent structural lineaments, such as faults and joints, much of the outcrop occurs as cliffs and sinuous ridges. In many areas outcrop exposure is in excess of 50 percent, though in others it is quite poor. In some of the higher flatlands east and west of Dead Horse Creek swamps and thick glacial overburden give less than 5 percent outcrop exposure.

Glacial straie indicate Pleistocene glacial ice movement was from north to south.

Forest cover is extensive, grass fields common on some slopes. Tall birch is abundant on most of the property, as is spruce. Alders are common along creeks and streams.

REGIONAL GEOLOGY

The rocks in Walsh Township and surrounding area are all Precambrian in age. Generally east-west trending metavolcanics and metasediments are the oldest rocks and were formed during the Archean. The former includes pillow lavas porphyritic lavas, pyroclastic rocks, and volcanic breccias. The latter comprises predominantly pelitic rocks, greywackes, and slates. Pretectonic basic and some associated felsic intrusives are commonly associated with the volcanic rocks. During the late Archean Kenoran Orogeny granitic rocks ranging in composition from granite to quartz diorite to syenite intruded the volcanics and sediments. These intrusives resulted in isoclinal folding of the older rocks. Regional metamorphism of variable intensity accompanied the intrusives.

During the Neohelikian, a large alkaline intrusive event known at the Coldwell complex was intruded east of Walsh Township. The rocks associated with this intrusive are predominantly syenite.

Following the emplacement of the Coldwell rocks and perhaps associated with them as a late stage event is the Dead Horse Creek diatreme. Within the region are other diatreme breccias, including the Neys, McKeller Creek, Slate Islands and probably others, yet undiscovered. The detailed structure and relationships among these breccias is still to be solved, although Sage (1978) considers the Neys diatreme distinct from the others. The matrix of these breccia structures are commonly carbonate rich. The McKeller Creek diatreme was first mapped by Walker (1967), and was considered by him to be an outlier of late Precambrian Animikie (?) conglomerate.

Late Proterozoic intrusive dikes were the last major geologic event in this area. These dikes are of various compositions, and the more common ones comprise diabase, trachyte, granite-syenite, carbonate and non-carbonate lamprophyre dikes.

TABLE II

TABLE OF FORMATIONS

MIDDLE TO LATE PRECAMBRIAN - PROTEROZOIC

Post-Diatreme Dikes

Carbonate-lamprophyre, mafic lamprophyre, syenite, Granite, Pegmatite, Hornblende-Biotite Syenite (gneiss), Diabase, Trachyte.

INTRUSIVE CONTACT

Diatreme Breccia

INTRUSIVE CONTACT

Syenite, Monzonite, Granite

INTRUSIVE CONTACT

Pre-Diatreme Dikes
Syenite, Granite, Hornblende-Biotite Syenite (gneiss), Quartz-Diorite, Diabase

INTRUSIVE CONTACT

EARLY PRECAMBRIAN - ARCHEAN

Metasediments

Metavolcanics

banded, massive, pillowed, tuff

GEOLOGY OF THE DEAD HORSE CREEK CLAIMS

METAVOLCANICS

These mafic rocks occur in the northwest, central and southeastern claims. In the field they are characterized by dark green to black colour on fresh surfaces, with medium to dark green weathered surfaces. Composition is predominantly plagioclase feldspar and amphiboles. Minor quartz and traces of pyrite occur locally. Small calcite veinlets are common

Texturally these rocks are quite variable, and together with colour, provided the primary criterion used in classification. The best evidence of their origin is seen in the pillow lavas. These structures vary from moderately to strongly deformed, preventing any definite top determinations. The best examples of pillow lavas occur in the metavolcanic rocks between lines 8N and 12S. East of the Dead Horse Creek road and south of line 0, weathering has noticably eroded the material between the pillow surfaces. Micro-garnets show good relief in many of these spaces.

Also occurring in the central area of the metavolcanic sequence are units of massive basic lavas. This rock, whose overall appearance is similar to nearby diabase dikes, can be distinguished by their slight to moderate foliation.

Another distinctive unit within the volcanics is a well-banded rock, comprising layers of differential colours, commonly less than an inch in thickness. This rock, on and between lines 20S and 24S, east of baseline 0, suggests a tuffaceous texture and is identified as such.

Most of the remaining volcanic rocks are finely foliated, with no further distinction made. It is probable that sections of this rock are sedimentary in occurrence, though having a primary volcanic origin. Rocks of a tuffaceous nature would also be included.

METASEDIMENTS

The other major Archean rocks are metasediments, generally pelitic in nature. These rocks, commonly finely foliated, range from blue-grey to green-black on a fresh surface. Brown to blue-black are the colours of the weathered surface.

Originally volcanic in origin these rocks are reworked sediments. The composition reflects the origin, though unlike some of the finely foliated metavolcanics biotite is more prominent than amphibole and results in a more schistose texture. Sections of metasediments are sufficiently quartz rich that they approach impure sandstone (quartzite) in composition. Small quartz and carbonate stringers and veinlets are common throughout the metasediments as are trace amounts of sulphides. Pyrite is most common, and minor marcasite, and chalcopyrite is also present.

Original textures have been largely obliterated by regional metamorphism and isoclinal folding. Occurring frequently in the metasediments, are contorted grey-white quartz stringers within a moderate to strongly contorted host rock. The metasediments nort of the metavolcanics show this most frequently and this is a reflection of the proximity of the granitic intrusions found in the northern part of Walsh Township.

The location of a definite boundary between the metavolcanics and the metasediments is uncertain at best. Interbedded relationships exist. The boundaries shown on the accompanying map should be interpreted to reflect a subtle change and not necessarily a sharp and clearly defined contact.

SYENITE INTRUSIVES

These rocks occurring almost exclusively east of baseline 0 are complex, showing both variable texture and variable composition. The felsic rocks intrude metavolcanics and metasediments and contain xenoliths of both. These intrusives are undersaturated with respect to SiO_2, and for the most part can be referred to as a syenite. In the northern claims, north of line 28N, quartz is more common and some of these rocks approach a granite in composition. The margins of the intrusion are slightly to moderately contaminated with mafic minerals absorbed by partial melting of the country rocks. In these areas the rocks show a general diorite composition.

Textures are mainly equigranular, though some porphyritic textures are present locally. Syenite gneiss, pegmatite, aplite and hybrid rock types occur within the intrusive..

The colour of the intrusives vary from white to red. Overall the rocks show only slight alteration.

Walker (1967) shows, these intrusives as the western-most edge of the Port Coldwell complex.

DIATREME BRECCIA

Five distinct and probably separate diatreme breccia stocks have been identified on the Dead Horse Creek claims. The largest diatreme measures approximately 2,400 feet in diameter, and the smallest is 200 feet long and 100 feet wide. The following features were observed to be common to all the breccia stocks. Clasts are abundant throughout the diatreme, and are mainly subangular to angular. The nature of the clast is determined by the rock type being intruded, i.e. no deep seated exotic clasts have been recognized.

e matrix consists of fine grained amphibole (altered) and carbonate. With the exception of a few small areas the matrix shows higher radioactivity than the country rocks. Small disseminated pyrite grains are common. Alteration rims are visible on many of the clasts. Clasts tend to increase in size toward the margin of the diatreme.

The following are general observations made by the writer concerning the diatreme. Some of the clasts closer to the margins of the diatreme show pronounced hematization. In these areas the matrix commonly shows more radioactivity. Most of the hematized clasts do not show any preferential weathering whereas many of the non-hematized clasts show more resistant rims. Some margins of the diatreme are sharp, whereas others are subtle. In the latter case it is difficult to tell whether the clasts are becoming larger, or whether penetrating diatreme dikes are becoming smaller. In some of the areas where the diatreme contacts are subtle, a pronounced and definite clast lineation pattern is observed. This is best seen at the diatreme edges north and south of line 0, west of baseline 0, and also at the hematized breccia cliffs between lines 24S and 28S, west of Dead Horse Creek.

Some quartz (quartzite) clasts have been observed in the diatreme and although their origin is uncertain at the present time, they may be remnants of contorted quartz present in the metasediments and metavolcanics. In several places diatreme breccia dikes occur some distance from the main diatreme body. One of these areas is between line 20N and 28N west of baselin 0, with breccia dikes trending north-south. Another area is adjacent to line 28S west of baseline 0, with the dikes trending east-west. The diatreme dikes are believed to form in areas of structural breaks that predate the diatreme intrusions.

A prominent area of scapolite replacement occurs locally in the northeast quadrant in the southernmost diatreme. On the weathered surface it shows as white prismatic crystals.

INTRUSIVE DIKE ROCKS

These rocks, because of the complexity of their age relationships and varied compositions are described under a single heading. Diabase of at least two ages occurs. On the map they are shown based solely on field evidence. The largest dikes occur in the southern claims and trend predominantly northwest-southeast. In the north, diabase cuts the granitic intrusives and is also believed to cut the diatreme.

Porphyritic texture is occasionally visible as one small mafic veinlets. The latter may be so abundant that they form a spiderweb-like texture. Occasionally the diatreme shows a moderate to strong magnetic attraction.

Syenite-granite-quartz diorite and hornblende-biotite gneiss (foliated syenite) were intruded in conjunction with the main syenitic emplacement. Some dikes of this type are believed to post-date the main syenite intrusion.

Some minor, late stage, pegmatite is observed,

Dark, commonly carbonate rich, fine grained lamprophyre rocks are observed to cut most other rocks in the area, including the diatremes. Amphiboles are the dominent mafic mineral. Spects of pyrite are commonly present, and in one area the lamprophyre is cut by fine hematite veinlets. The rocks are massive, though some exhibit a pseudo-foliation.. Some shearing accompanies the emplacement. The interesting feature of the carbonate lamprophyres is the radioactivity associated with them. With the exception of the radioactive shear at 28+50W, L12S, the carbonate lamprophyres exhibit the greatest and most consistent radioactivity found on the property to date. Any buried radioactive spot has invariably turned out to be carbonate-lamprophyre. The largest and best observed lamprophyre dike occurs just east of baseline 0 between 11N and 16N. Numerous other carbonate lamprophyre dikes occur in the area, all trending in a general north-south direction.

The writer believes the carbonate-lamprophyre share , a genetic affinity with the carbonate rich matrix of the diatreme. The carbonate lamprophyre represents late stage remenant volatiles remaining after the main diatreme intrusion which were intruded into previously formed structural breaks and other zones of weakness.

The last major dike rock that is commonly seen in the claim is a trachyte. This distinctive dark green-black, fine grained rock contains numerous tabular, coarse grained, lineated, subhedral to euhedral plagioclase. Small dikes of this rock are observed trending in a general east-west direction, and are believed to be among the last intrusives in the area.

STRUCTURAL GEOLOGY

The structure of the area is very complex. Structural trends are predominantly northeast-southwest and northwest-southeast. A north-south trend is also present but is not always as well developed as the others. Faulting is concurrant with many of the structural lineaments although the amount of movement and its direction is difficult to assess.

A metamorphic imposed foliation parallels the bedding in most areas. The metasediments and metavolcanics are isoclinally folded. In the northern claims strikes are generally north-south, dips are steep, though no definite pattern is observed. The rocks in the north show more contortions and drag folding than is seen elsewhere and this is a result of nearby granitic intrusions. In the middle and southern claims the metasediments strike northwest-southeast. Dips are dominantly steeply south.

The detailed structure of the diatremes is still sketchy. It is unknown what level of the intrusion is represented by the exposure, or to what depth they extend. It appears that the diatremes are generally oval and subangular in form. Some of the larger stocks may be connected by a series of anastamosing breccia dikes and veinlets.

Dead Horse Creek is believed to occupy a major fault that extends much further north. Evidence exists to suggest that the fault extends south of Lake Superior into Michigan.

METAMORPHISM

Both the metasediments and metavolcanics have been metamorphosed. Greenschist facies metamorphism is common west of Dead Horse Creek. Amphibolite facies metamorphiam is best developed adjacent to the syenite intrusive.

Where they are unaltered, the diatreme clasts show metamorphic grade similar to country rock, from which they were derived. The diatreme matrix indicates the presence of volatile components during the gaseous emplacement. The determination of any metamorphism in the diatreme is a problem for further study.

RADIOACTIVITY

Radioactivity occurs in several areas. It is most widespread within the diatreme matrix. It occurs in all the diatreme stocks, although it is not equally distributed in each. It varies between two and six times, non-igneous, background radiation. Strongly hematized areas in the diatreme show greater radioactivity.

Another radioactive area found occurs in a shear zone adjacent to the western most and smallest diatreme. Mostly covered by deep overburden, pits have exposed a well defined shear zone, striking northwest and dipping steeply southwest. Apatite is prominent within the shear. The shear zone is post diatreme in age, some of the diatreme having been re-brecciated and cemented with quartz. For most of its length the shear zone is concurrant with a hematized diatreme dike. The maximum length of the shear zone is less than 300 feet.

Radioactivity in most of the pits is very high, up to 100 times, non-igneous, background radiation - (+5000 cps, BG-1SL scintillometer). Analysis indicate thorium is greater than uranium. At the time of writing, one diamond drill hole has investigated this feature, though no significant radioactivity has been found.

Another source of radioactivity are the late stage carbonate lamprophyre dikes. These rocks have been previously described in detail and show the most consistant radioactivity found on the property. Examples in the field give 25 to 50 times background radiation.

SUMMARY AND CONCLUSIONS

During the late Precambrian, several slightly radioactive diatreme breccias were emplaced in an area having numerous structural breaks, just west of the Port Coldwell alkaline complex. The diatremes intruded older metasediments and metavolcanics that had previously been intruded by syenite. During the emplacement, gas charged carbonate rich volatiles, fragmented the country rocks and incorporated them within the diatreme. Diatreme dikes extending from the main stocks into the country rocks were an integral part of the emplacement process.

Dike rocks of various ages occur throughout the property. Carbonate-lamprophyre dikes appear to be the most economically significant rocks, and require further investigation.

REFERENCES

Mitchell, R. H., and Platt, R. G., "Field Guide to Aspects of the Geology of the Coldwell Alkaline Complex". Institute on Lake Superior Geology, 1977.

Sage, R., "Summary of Field Work 1978". Ontario Ministry of Natural Resources - Geological Branch. Toronto, (1978).

Walker, J. R. W., "Geology of the Jackfish - Middleton Area" Geological Report 50. Ontario Department of Mines. Toronto, (1967).

File

Ministry of Natura'

Ontario

GEOPHYSICAL – GEOLOGIC/
TECHNICAL DATA

42D15NE0051 2.2844 WALSH

900

TO BE ATTACHED AS AN APPENDIX TO TECHNICAL REPORT
FACTS SHOWN HERE NEED NOT BE REPEATED IN REPORT
TECHNICAL REPORT MUST CONTAIN INTERPRETATION, CONCLUSIONS ETC.

Type of Survey(s) Geological Survey

Township or Area Walsh Township

Claim Holder(s) Gulf Minerals Canada Limited

Suite 1400, 110 Yonge, Toronto, Ont.
M5C 1T4

Survey Company

Author of Report Tom R. Keil

Address of Author 1400-110 Yonge St., Toronto, Ont.

Covering Dates of Survey July 26 - September 3, 1978
(linecutting to office)

Total Miles of Line Cut 21.6

SPECIAL PROVISIONS CREDITS REQUESTED

ENTER 40 days (includes line cutting) for first survey.

ENTER 20 days for each additional survey using same grid.

	DAYS per claim
Geophysical	
–Electromagnetic	
–Magnetometer	
–Radiometric	
–Other	
Geological	40, 30, 20
Geochemical	

AIRBORNE CREDITS (Special provision credits do not apply to airborne surveys)

Magnetometer ______ Electromagnetic ______ Radiometric ______
(enter days per claim)

DATE: November 10/78 SIGNATURE: Tom Keil
Author of Report or Agent

Res. Geol. L.D. Qualifications ref in the qualification book

Previous Surveys

File No.	Type	Date	Claim Holder

MINING CLAIMS TRAVERSED
List numerically

(prefix)	(number)
See attached Schedule	

If space insufficient, attach list

TOTAL CLAIMS

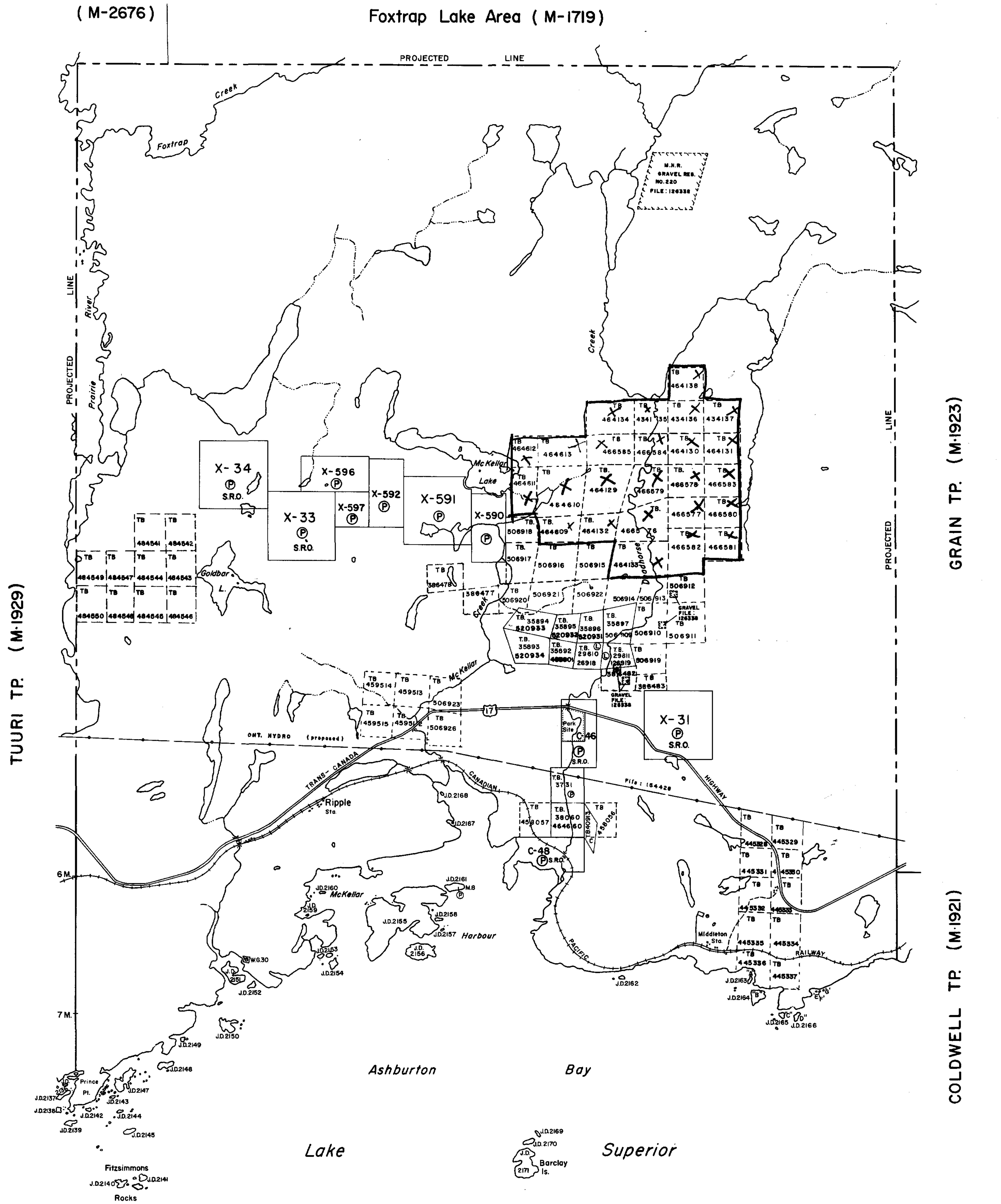
SCHEDULE OF CLAIMS

Claim Nos.	Days
464129	40
464130	40
464131 ½	20
464132 ½ not covered	40
464133	40
464134	40
464135	40
464136	40
464137 ½	20
464138 ½	40
464609 ½	20
464610	20
464611	20
464612 ½	20
464613 ½	20
466576	40
466577	40
466578	40
466579	40
466580 ½	20
466581 ½	20
466582	40
466583 ½	30
466584 ½	40
466585 ½	20

Area of claims not covered = 6

25 x 40 = 1000 ÷ (25+6) = 32 days per claim

25 claims



THE TOWNSHIP OF 2.2844

WALSH

(TP. 80)

DISTRICT OF THUNDER BAY

THUNDER BAY MINING DIVISION

SCALE: 1-INCH = 40 CHAINS

LEGEND

PATENTED LAND	Ⓟ
CROWN LAND SALE	C.S.
LEASES	Ⓛ
LOCATED LAND	Loc.
LICENSE OF OCCUPATION	L.O.
MINING RIGHTS ONLY	M.R.O.
SURFACE RIGHTS ONLY	S.R.O.
ROADS	
IMPROVED ROADS	
KING'S HIGHWAYS	
RAILWAYS	
POWER LINES	
MARSH OR MUSKEG	
MINES	
CANCELLED	C.
PATENTED S.R.O.	

NOTES

400' Surface Rights Reservation along the shores of all lakes and rivers.

Land under Lake Superior withdrawn from staking by Order-in-Council dated April 30, 1912.

DATE OF ISSUE
NOV 2 1978
SURVEYS AND MAPPING BRANCH

PLAN NO.- M.1928

ONTARIO
MINISTRY OF NATURAL RESOURCES
SURVEYS AND MAPPING BRANCH

42D15NE0051 2.2844 WALSH

200

Bob K.

NOTE: For legend see south sheet (Plate II)

FEET
400 0 400
100 0 100
METRES

Gulf Minerals Canada Limited

DEAD HORSE CREEK PROJECT

GEOLOGICAL COMPILATION
(NORTH SHEET)

WALSH TOWNSHIP
ONTARIO

DATE:	SCALE:	DRAWN BY:	PLATE: I
NOVEMBER, 1978	1 INCH : 200 FEET	T. KEIL - D.A.G.	N.T.S. 42D/15

To accompany "Geological Report" dated Nov. 1978


N
L-0+00
L-4+00 S
L-8+00 S
L-12+00 S
L-16+00 S
L-20+00 S
L-24+00 S
L-28+00 S
L-32+00 S
L-36+00 S
L-40+00 S
BL-0+00
BL-32+00 W
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464610
464129
464609
464132
466579
466576
464133
466578
466583
466577
466580
466582
466581
Numerous Outcrop 1a, 6c
Thick Forest Cover
Open Forest
Grassland
Log Bridge
Numerous Dikes of 5
LEGEND
MIDDLE TO LATE PRECAMBRIAN – PROTEROZOIC
6 Post Diatreme Dikes
(a) carbonate lampophyre
(b) mafic lampophyre
(c) syenite to granite
(d) hornblende, biotite gneiss (foliated syenite)
(e) pegmatite
(f) diabase
(g) trachyte
INTRUSIVE CONTACT
5 Diatreme Breccia
(a) moderate to strong brecciation
(b) poor to moderate brecciation
(h) - hematized
INTRUSIVE CONTACT
4 Syenite, Monzonite, Granite
INTRUSIVE CONTACT
3 Pre Diatreme Dikes
(a) diabase
(b) syenite to granite
(c) hornblende, biotite gneiss, (foliated syenite), (quartz), diorite
EARLY PRECAMBRIAN – ARCHEAN
INTRUSIVE CONTACT
2 Meta-Sediments
1 Meta-Volcanics
(a) banded
(b) massive amphibolite
(c) pillowed
(d) tuff
SYMBOLS
Outcrop, area of outcrop (with contact)
Small outcrop, boulders in place
Talus
Foliation (vertical, inclined, dip unknown)
Pillowed foliation with dip
Shearing, faulting with dip
Glacial straie
Fault with direction of movement
Pit
Drag folding with dip
Swamp
Stream or creek (intermittent)
Claim post
Cleared ground adjacent to road
FEET
400 0 400
100 0 100
METRES
Gulf Minerals Canada Limited
DEAD HORSE CREEK PROJECT
GEOLOGICAL COMPILATION
(SOUTH SHEET)
WALSH TOWNSHIP
ONTARIO
DATE: NOVEMBER, 1978
SCALE: 1 INCH = 200 FEET
DRAWN BY: T. KEIL – D.A.G
PLATE: II
N.T.S. 42D/15
To accompany 'Geological Report' dated Nov., 1978
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