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REPORT ON THE GEOLOGICAL EVALUATION OF QUARTZ MINERAL PERMITS OF NORTH-EASTERN ALBERTA

(Permits 41, 42, 47, 48, 52)

Prepared For

VISION DEVELOPMENTS LTD.

September 10, 1968.

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TABLE OF CONTENTS

MAP AND FIGURE REFERENCES

Map Section

Reference Figures

GEOLOGICAL EVALUATION

OF QUARTZ MINERAL PERMITS OF N.E. ALBERTA

INTRODUCTION:

This report has been prepared at the request of J.W. Worobec of 517 Lancaster Building, Calgary 2, Alberta, for submittal to Vision Developments Ltd., The object of this study is to ascertain the economic potential of possible uranium deposits and other minerals within the acquired permits and claims from a survey of the published geological literature.

The present report presents the results of an investigation of publicly available information relating to the Company's permits, claims and interests and surrounding areas. The properties themselves were not examined in the field by the undersigned in conjunction with this report, but the occurrence of uranium deposits and other mineralization in the area has been confirmed through an investigation of the area by J.D. Godfrey of the Research Council of Alberta.

DESCRIPTION OF PROPERTIES:

Permit No. 41

Township 119, Range 3, W4M
Sec. 19, and 27 - 34 inclusive
(9 sections)

Township 119, Range 4, W4M
Secs. 25 and 36

Township 120, Range 3, W4M
Secs. 1, 2 and 3

Township 120, Range 4, W4M
Sec. 1

Total: 9,600 acres

Permit No. 42

Township 120, Range 3, W4M
Secs. 9-16, 21-28, and 31-33 inclusive

Township 120, Range 4, W4M
Secs. 12, 13, 23, 24, 25, 26, 35 and 36

Township 121, Range 3, W4M
West half of township (18 sections)

Township 121, Range 4, W4M
East one-third of township (12 sections)

Township 122, Range 3, W4M
Secs. 4 - 9 inclusive

Township 122, Range 4, W4M
Secs. 1, 2 and 12

Total: 39,680 acres.

Permit No. 47

Township 120, Range 4, W4M
Secs. 2-11, 14-22, and 27-34 inclusive

Township 120, Range 5, W4M
Secs. 10 - 25 inclusive

Total: 29,440 acres.

Permit No. 48

Township 123, Range 9, W4M
Secs. 1, 12, 13, 24, 25 and 36

Township 123, Range 8, W4M
Secs. 4, 5, 6, 7, 8, 9, 15, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30, 31, 32, 33, 34

Township 122, Range 8, W4M
Secs. 31 and 32

Township 122, Range 9, W4M
Sec. 36

Total: 19,840 acres.

Permit No. 52

Township 119, Range 1, W4M
Secs. 1, 2, 3, 10, 11, 12, 13,
14, 15, and 19 - 36 inclusive

Township 119, Range 2, W4M
Secs. 28 - 36 inclusive

Township 119, Range 3, W4M
Secs. 23, 24, 25, 26, 35 and 36

Township 120, Range 1, W4M
Secs. 1 - 9 inclusive

Township 120, Range 2, W4M
South half of township (18 sections)

Township 120, Range 3, W4M
Secs. 1 - 3 and 10 - 15 inclusive
(9 sections)

Total: 49,920 acres.

TOTAL OVERALL ACREAGE: 148,480 acres.

ACCESSIBILITY:

Direct access to this region is available to Fort Chipewyan by air from Edmonton or by an all-weather road starting at Peace Point. (Reference Map #1). However, travel within the area itself is difficult, and can only be economically accomplished by means of float-equipped, fixed wing aircraft or helicopter. Boat or canoe travel is slow and difficult, with numerous portages required.

The topography of the Precambrian Shield east of the Slave River is generally a gentle undulating surface of low rounded hills, however, locally deep valleys and fault scarps up to 200' high are encountered. The area is mainly Precambrian outcrop with numerous glacially-scoured lakes and small muskeg areas. Local relief up to

300' is probably maximum, with a general elevation increase from 700' on Lake Athabasca to 1370' in the northeast corner of the area.

The valleys are wooded with spruce, fir and poplar. Scrubby muskeg and open watery muskegs are generally confined to the lower areas.

GENERAL STATEMENT:

Metalliferous vein deposits are generally recognized to be genetically and spatially related to faulting. A large concentration of vein and related types of uranium deposits are known to occur along the north shore of Lake Athabasca in a belt exceeding 30 miles in width northward from Fort Chipewyan in Alberta and extending eastward through Beaverlodge, Saskatchewan to Black Lake for a length of approximately 200 miles.

This belt lies within Athabasca geologic province of the Canadian Shield, and for ease of reference this belt will be termed the Lake Athabasca metalogenic belt. Map #2 (Map 1045 - M1, Metalogenic Map, Uranium in Canada) indicates a favourable area extending northeasterly for an additional 500 miles to the west shore of Hudson's Bay.

In the Canadian Shield the uranium ores are classified into three general types: (1) conglomeratic, (2) vein and related types, and (3) the pegmatitic types. Almost all of the uranium deposits of the producing mines and known occurrences within the Lake Athabasca Belt consist of veins, lenses, stringers and disseminations, and fall within the classification of vein and related types. This type of deposit or occurrence as previously stated is often related to faulting. Therefore structural control can be used to delinate the most promising prospecting

areas as well as eliminating much of the unfavourable areas.

GENERAL GEOLOGY:

The rocks within the area under discussion are of Precambrian age. The geologic succession and distribution is poorly known, since most of the area has not been mapped. The strata have been intensely folded and faulted, generally along northerly or northeasterly trending axis.

The oldest exposed strata are sedimentary and volcanic rocks, exhibiting various degrees of metamorphism and are referred to as the Tazin Group. However, much of the terrain is composed of granites and related rocks, and of complexes made up of gneisses, migmatites and granitized rocks. The intense deformation resulted in brecciation fracturing and mylonitization of these rocks, which are prime areas to prospect for mineral occurrences, particularly those of the meta-sediments.

The principal structural elements of the Precambrian north of Lake Athabasca on the Alberta side consist of three major fault structures termed the Allan Fault, the Warren Fault and the Rutherford Fault, by J.D. Godfrey (Figure #2). Belts of folded and faulted rocks exist between the three named fault zones.

The aerial photographic analysis and surface examination by J.D. Godfrey of the Research Council of Alberta (Geological Division - Bulletin 1) was used as a guide to select the above permits in areas most favourably located structurally wherein mineralization related to faults and fault zones could occur (Map #3).

SPECIFIC PERMITS (Ref. Figure #2)

Permits Nos. 41, 42 and 47 straddle the southern portions

of the Allan Fault (Reference Map #3 and Figure #1). The Allan Fault is the major structural element in the western part of the Lake Athabasca Belt. This fault system, more than 100 miles in length with a northerly strike, is expressed as a shear zone varying from one to five miles in width, with a great number of minor faults and shears. North of Woodman Lake the Allan Fault consists of several parallel fault planes with intervening fault blocks. Belts of meta sediments within granites and granite gneiss provide the structurally weak zones. Southward, the Allan Fault meets the shore of Lake Athabasca at Fidler Point. The strong northeasterly faults northeast of Fort Chipewyan are believed to be a drag effect of the Allan Fault (Map #3).

At Fidler Point, approximately 10 miles south of Permit 39, a pitchblende strike has been recorded and a uraninite strike at Fort Chipewyan (Ref. Map #2). About 12 miles north of Permit 42, two radioactive areas and molybdenite occurrences associated with chalcopyrite were noted in the Botts Lake area (Ref. Research Council of Alberta Preliminary Report 65-6).

Along the Allan Fault, the occurrence of pitchblende and uraninite to the south and radioactive areas, molybdenite and chalcopyrite occurrences to the north, categorizes these permits as highly prospective areas in which uranium and other mineral deposits are likely to occur.

Permit No. 52, approximately 49,920 acres, is an irregular block about 12 miles in length and about 5 miles wide and lies adjacent to the east of Permits No. 41 and 42. The dominant structural pattern (Ref. Map #3) is a large number of minor faults, fractures and shears. Approximately 15 miles north of this permit, McIntyre-Porcupine have

apparently found an important discovery (Ref. Northern Miner, Figure #3). South of Colin Lake in the Belyea and Roderick Lake areas (about 3 miles north of Permit No. 52) about 40 radioactive occurrences are reported in Research Council of Alberta Preliminary Report 62-2 by John D. Godfrey and E.W. Peikert. It appears that on the basis of the structural aspect that Permit No. 52 will lie within a southern continuation of the Cherry Lake, Belyea Lake and Roderick Lake radioactive trend.

Permit No. 48, containing approximately 19,840 acres, is located at the southern extremity of the Warren Fault (Map #3). This fault zone consists of two distinct shear zones about 2 miles apart. The western shear terminates within the southern part of the permit. To the west, the third fault system, the Rutherford Fault, swings southwards and appears to intersect the Warren Fault within the permit area. Here the Precambrian rocks are highly altered and faulted, and therefore must be considered a highly prospective area for mineralization to occur.

COMMENT:

The holdings under consideration, as presented to me, are located in Townships 119, 120, 121, 122, 123 and Ranges 1, 2, 3, 4, 5, 8 and 9, West of the 4th Meridian, as shown on the accompanying Reference Map, Figure #2. The total acreage involved is 148,480 acres.

Although the information on these properties, as given to me by Mr. J.W. Worobec, has been accpted as correct, I have made no investigation of my own as to legal title to such properties or the amounts of interests held.

SUMMARY:

The acquired permits are in an area which forms the westerly margin of the Athabasca province of the Canadian Shield. Within this geologic province, a belt of meta-sedimentary, volcanic, granite and related rocks, about 200 miles long and at least 40 miles wide, extends from Black Lake, Saskatchewan, westwards to the Shield area of Alberta. Within this belt, numerous occurrences and concentrations of uranium deposits are known. The depositis found in this belt are mainly vein and related types that often are genetically and spatially related to fault and shear zones.

The Research Council of Alberta, under the direction of J.D. Godfrey, conducted a detailed study of surface geology over part of the Shield area in Alberta. The prime purpose of this work was to map the detail geology of this region. In many cases areas of anomalously high radioactivity were encountered and noted as well as other metalliferous occurrences. These occurrences, although secondary objectives, were very numerous and discussing them individually is beyond the scope of this report.

Brief mention, however, is made of two important occurrences noted by the Research Council of Alberta (Preliminary Report #58-4).

(1) At an outcrop 200' by 75' southwest of Andrew Lake, three grab samples assayed as follows:

U_3O_8 %	MO %
1.03	0.69
3.93	1.03
3.29	1.40

(2) Spider Lake - A zone containing high radioactive bands with molybdenite was followed for over half a mile along the strike. Geiger

counter readings indicate that this radioactive zone extends for a distance of at least two miles.

The most recent discovery (Northern Miner, February 1st, 1968) in the area of the Permit blocks, was found by McIntyre-Porcupine Mines. Apparently five strikes were found, of which at least two reported grade ore running as high as 0.79% U_3O_8. Detailed exploratory work is currently being carried out.

On the basis of proven mineralization under similar geological conditions in Saskatchewan and other parts of the Shield, the numerous occurrences found in an otherwise unexplored area, it seems reasonable to state that the Alberta portion of the Lake Athabasca Metallogenic Belt is a highly promising area wherein economic deposits of uranium-bearing minerals can be found. Molybdenite-bearing deposits must be considered as an important secondary objective.

The permits are strategically located from the structural aspect as well as proximity to known occurrences, and therefore must be considered as highly prospective.

THE FOLLOWING EXPLORATORY PROGRAM IS RECOMMENDED:

(1) A two man surface party to conduct a ground scintillometer survey using the air photo analysis as a guide.

(2) If encouraging radioactive anomalies are discovered in Phase 1, conduct an airborne scintillometer survey using a 1/4 mile grid.

(3) Depending on the results of Phase 2, conduct detailed geological surface studies on anomalous areas, including surface trenching.

(4) If warranted, an initial diamond drilling should be undertaken to determine the vertical geometry of any apparent ore bodies.

BIBLIOGRAPHY

"Aerial Photographic Interpretation of Precambrian Structures North of Lake Athabasca", by J.D. Godfrey; Research Council of Alberta, Bulletin 1, 1958.

"Mineralization in the Andrew, Waugh and Johnson Lakes Area, Northeastern Alberta", by J.D. Godfrey; Research Council of Alberta, Preliminary Report 58-4. (1958).

"Geology of the Andrew Lake, North District", by John D. Godfrey; Research Council of Alberta, Preliminary Report 58-3. (1961).

"Geology of the St. Agnes Lake District, Alberta", by John D. Godfrey and E.W. Peikert; Research Council of Alberta, Preliminary Report 62-1. (1963).

"Geology of the Andrew Lake, South District, Alberta", by John D. Godfrey; Research Council of Alberta, Preliminary Report 61-2. (1963).

"Geology of the Colin Lake District, Alberta", by John D. Godfrey and E.W. Peikert; Research Council of Alberta, Preliminary Report 62-2. (1964).

"Geology of the Bayonet, Ashton, Potts and Charles Lakes District, Alberta", by John D. Godfrey; Research Council of Alberta, Preliminary Report 65-6. (1966).

CERTIFICATE

I, James Alfred Dockery, consulting engineer, of 4820 Eighth Avenue Southeast, Calgary, Alberta, do declare:

1. That I graduated as a Petroleum Engineer from the University of Alberta with the degree of Bachelor of Science, in the year 1951.

2. That I am a registered member of the Association of Professional Engineers for the Province of Alberta.

3. That I have no interest, direct or indirect, nor do I expect to receive any interest, direct or indirect, in the properties described in the attached report entitled, "Geological Evaluation of Quartz Mineral Permits of N.E. Alberta", dated September 10, 1968, nor have I any interest, present or expected, in the securities of the Company.

4. The above report is based on my geological and engineering knowledge of the areas described above, and upon a study of all the published data pertaining to the area.

J.A. Dockery, P. Eng.

4820 Eighth Avenue S.E.,
Calgary, Alberta.
September 10, 1968.

McIntyre To Test Uranium Property Of New Senator

McIntyre Porcupine Mines has completed plans for what will amount to a sizable exploration program this year on an extensive uranium acreage taken under a working option last year from New Senator-Rouyn Ltd. The property is an 80-sq. mile concession located in the northeastern part of Alberta and some 60 miles due west of the Beaverlodge uranium camp in Saskatchewan. Also holding a minority interest in the ground is **Astrabrun Mines.**

The program is to involve diamond drilling as well as other surface investigations, with a drill being moved to the property and slated to commence work on or about Feb. 20. This is to take advantage of winter conditions so that first drilling may be done from the ice on Cherry Lake.

The program during last year's field season consisted primarily of surface trenching and general prospecting, and this outlined five separate radioactive areas of sufficient importance to warrant further work, The Northern Miner understands. In each case, the showings are associated with fault zones.

Most interesting showing is regarded as the one at the north end of Cherry Lake. Here, ore grade uranium values have been obtained in two areas, while three others are regarded as potential targets for further exploration.

In one case, a radioactive zone related to a major north-south trending fault has been traced intermittently by scintillation counter and surface trenching for a length of about 2,500 ft. At the south end, near the shore of Cherry Lake, chip sampling of a rock trench across the zone has returned grade of 0.79% uranium oxide across 4.0 ft.

High scintillation counter readings have also been obtained in a swampy area about the middle of the known length. This is regarded as an interesting area and will be tested later by diamond drilling. Only low grade values were found in trenching towards the north end of the zone.

As mentioned, first drilling will be near the south end of this zone.

In addition to this winter program, which is expected to amount to at least 3,000 ft. of work, an extensive program has been lined up for this coming summer season. This latter will include further surface investigation of other known areas, as well as diamond drilling which already has been earmarked for some.

As indicated, the property is held under working option from New Senator which, in turn, obtained the ground from Astrabrun Mines. If carried to completion by McIntyre, a new company would be formed to operate the property in which McIntyre interest would amount to approximately 52%, with New Senator having a 39% stake. In addition, McIntyre has also agreed to furnish most of the senior financing which would be required should production be warranted.

CANADA

74 M | 1:250,000 | (Joins Fort Smith 75 D) | EDITION 3 (1967) | 74 M

(Joins Peace Point 84 P)

(Joins Tazin Lake 74 N)

(Joins Chipewyan 74 L)

FITZGERALD

ALBERTA

WEST OF FOURTH MERIDIAN - OUEST DU QUATRIÈME MÉRIDIEN

Scale 1:250,000 Échelle

Miles 5 0 5 10 15 20 Miles

Kilometres 5 0 5 10 15 20 25 30 Kilomètres

Transverse Mercator Projection
North American Datum 1927
Contour Interval 100 feet
Elevations in feet above Mean Sea Level
Magnetic declination 27° 34' East at centre of map 1963
Annual change (decreasing) 5.2'
Interim corrections 1967.

Projection Transverse de Mercator
Réseau géodésique nord-américain unifié (1927)
Équidistance des courbes: 100 pieds
Élévations en pieds au-dessus du niveau moyen de la mer
Déclinaison magnétique au centre de la feuille en 1963: 27°34' Est
Variation annuelle (décroissante) 5.2'
Corrections provisoires 1967.

Produced and printed by the SURVEYS AND MAPPING BRANCH, DEPARTMENT OF MINES AND TECHNICAL SURVEYS, 1963, from air photographs taken in 1955. Field surveys and culture check 1957.

Copies may be obtained from the Map Distribution Office, Department of Mines and Technical Surveys, Ottawa.

Établie et imprimée par la DIRECTION DES LEVÉS ET DE LA CARTOGRAPHIE, MINISTÈRE DES MINES ET DES RELEVÉS TECHNIQUES en 1963, d'après les photographies aériennes prises en 1955. Travaux exécutés sur le terrain et vérification des ouvrages en 1957.

Ces cartes sont en vente au Bureau de distribution des cartes, ministère des Mines et des Relevés techniques, Ottawa.

Road, loose or stabilized surface, all weather ... Route, gravier aggloméré, toute saison ... 2 lanes or more / 2 voies ou plus

Power transmission line ... Ligne de transport d'énergie

Road, all weather ... Chemin, toute saison

Wagon or winter road ... Chemin de terre ou d'hiver

Trail or portage ... Sentier ou portage

Town ... Ville

Village or settlement ... Village ou hameau

Post office ... Bureau de poste ... P

Building ... Bâtiment

Horizontal control point ... Point géodésique

Boundary monument ... Borne frontière

Spot elevation, in feet ... Repère de nivellement en pieds ... 2550

Rapids; falls ... Rapides; chutes

Marsh or swamp ... Marais ou marécage

Depression contours ... Courbes de cuvette

Surveyed line ... Ligne arpentée

PROVISIONAL MAP

Some names on this map are not yet official. Corrections or additions are invited by the Surveys and Mapping Branch.

CARTE PROVISOIRE

Certains noms inscrits sur cette carte ne sont pas encore officiels. La Direction des levés et de la cartographie saurait gré au public de lui signaler corrections et additions.

Map #1 19630014

GRID ZONE DESIGNATION 12V
100 000 M. SQUARE IDENTIFICATION: VB WB / VA WA, 660, 50

IGNORE the SMALLER figures of any grid number. these are for finding the full coordinates. Use ONLY the LARGER figures of the grid number. example 450000

TO GIVE A STANDARD REFERENCE ON THIS SHEET TO NEAREST 1000 METRES

SAMPLE POINT: CABIN

1. Read letters identifying 100,000 metre square in which the point lies.
2. Locate first VERTICAL grid line to LEFT of point and read LARGE figures labeling the line either in the top or bottom margin, or on the line itself.
   Estimate tenths from grid line to point.
3. Locate first HORIZONTAL grid line BELOW point and read LARGE figures labeling the line either in the left or right margin, or on the line itself.
   Estimate tenths from grid line to point.

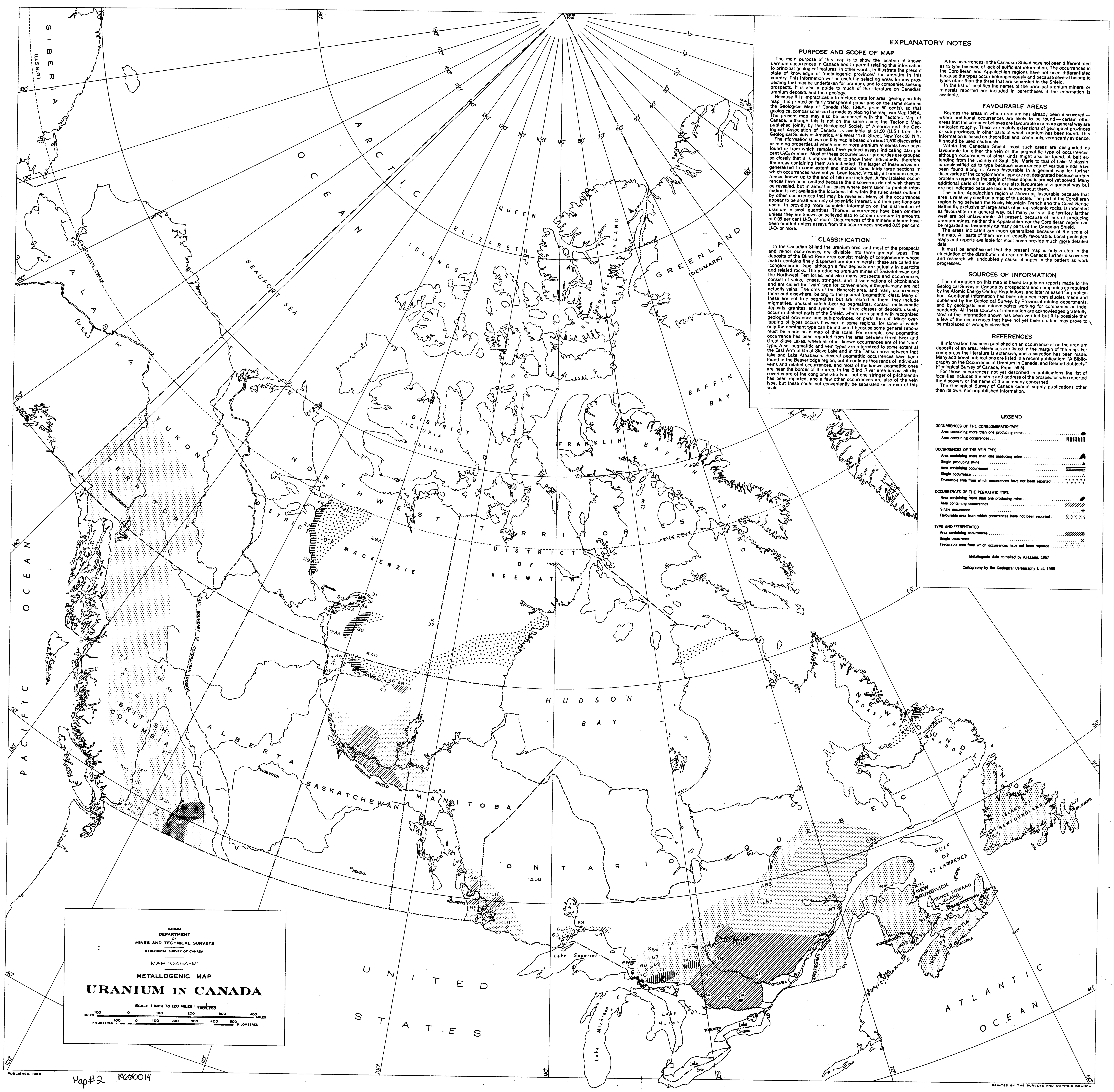
VA 7 6 5 4

SAMPLE REFERENCE: VA7654

If reporting beyond 18° in any direction, prefix Grid Zone Designation as: 12VVA7654

TEN THOUSAND METRE
UNIVERSAL TRANSVERSE MERCATOR GRID
ZONE 12

FITZGERALD
74 M
EDITION 3 (1967)



CANADA
DEPARTMENT
OF
MINES AND TECHNICAL SURVEYS

GEOLOGICAL SURVEY OF CANADA

MAP 1045A-M1

METALLOGENIC MAP

URANIUM IN CANADA

SCALE: 1 INCH TO 120 MILES = $\frac{1}{7,603,200}$

MILES 100 0 100 200 300 400 MILES
KILOMETRES 100 0 100 200 300 400 500 KILOMETRES

EXPLANATORY NOTES

PURPOSE AND SCOPE OF MAP

The main purpose of this map is to show the location of known uarnium occurrences in Canada and to permit relating this information to principal geological features; in other words, to illustrate the present state of knowledge of 'metallogenic provinces' for uranium in this country. This information will be useful in selecting areas for any prospecting that may be undertaken for uranium, and to companies seeking prospects. It is also a guide to much of the literature on Canadian uranium deposits and their geology.

Because it is impracticable to include data for areal geology on this map, it is printed on fairly transparent paper and on the same scale as the Geological Map of Canada (No. 1045A, price 50 cents), so that geological comparisons can be made by placing the map over Map 1045A. The present map may also be compared with the Tectonic Map of Canada, although this is not on the same scale; the Tectonic Map, published jointly by the Geological Society of America and the Geological Association of Canada is available at $1.50 (U.S.) from the Geological Society of America, 419 West 117th Street, New York 20, N.Y.

The information shown on this map is based on about 1,500 discoveries or mining properties at which one or more uranium minerals have been found or from which samples have yielded assays indicating 0.05 per cent U_3O_8 or more. Most of these occurrences or properties are grouped so closely that it is impracticable to show them individually, therefore the areas containing them are indicated. The larger of these areas are generalized to some extent and include some fairly large sections in which occurrences have not yet been found. Virtually all uranium occurrences known up to the end of 1957 are included. A few isolated occurrences have been omitted because the discoverers do not wish them to be revealed, but in almost all cases where permission to publish information is not available the locations fall within the ruled areas outlined by other occurrences that may be revealed. Many of the occurrences appear to be small and only of scientific interest, but their positions are useful in providing more complete information on the distribution of uranium in small quantities. Thorium occurrences have been omitted unless they are known or believed also to contain uranium in amounts of 0.05 per cent U_3O_8 or more. Occurrences of the mineral allanite have been omitted unless assays from the occurrences showed 0.05 per cent U_3O_8 or more.

CLASSIFICATION

In the Canadian Shield the uranium ores, and most of the prospects and minor occurrences, are divisible into three general types. The deposits of the Blind River area consist mainly of conglomerate whose matrix contains finely dispersed uranium minerals; these are called the 'conglomeratic' type, although a few deposits are actually in quartzite and related rocks. The producing uranium mines of Saskatchewan and the Northwest Territories, and also many prospects and occurrences, consist of veins, lenses, stringers, and disseminations of pitchblende and are called the 'vein' type for convenience, although many are not actually veins. The ores of the Bancroft area, and many occurrences there and elsewhere, belong to the general 'pegmatitic' class. Many of these are not true pegmatites but are related to them; they include migmatites, unusual calcite-bearing pegmatites, contact metasomatic deposits, granites, and syenites. The three classes of deposits usually occur in distinct parts of the Shield, which correspond with recognized geological provinces and sub-provinces, or parts thereof. Minor overlapping of types occurs however in some regions, for some of which only the dominant type can be indicated because some generalizations must be made on a map of this scale. For example, one pegmatitic occurrence has been reported from the area between Great Bear and Great Slave Lakes, where all other known occurrences are of the 'vein' type. Also, pegmatitic and vein types are intermixed to some extent at the East Arm of Great Slave Lake and in the Taltson area between that lake and Lake Athabasca. Several pegmatitic occurrences have been found in the Beaverlodge region, but it contains thousands of individual veins and related occurrences, and most of the known pegmatitic ones are near the border of the area. In the Blind River area almost all discoveries are of the conglomeratic type, but one stringer of pitchblende has been reported, and a few other occurrences are also of the vein type, but these could not conveniently be separated on a map of this scale.

A few occurrences in the Canadian Shield have not been differentiated as to type because of lack of sufficient information. The occurrences in the Cordilleran and Appalachian regions have not been differentiated because the types occur heterogeneously and because several belong to types other than the three that are separated in the Shield.

In the list of localities the names of the principal uranium mineral or minerals reported are included in parentheses if the information is available.

FAVOURABLE AREAS

Besides the areas in which uranium has already been discovered — where additional occurrences are likely to be found — certain other areas that the compiler believes are favourable in a more general way are indicated roughly. These are mainly extensions of geological provinces or sub-provinces, in other parts of which uranium has been found. This information is based on theoretical and, commonly, very scanty evidence; it should be used cautiously.

Within the Canadian Shield, most such areas are designated as favourable for either the vein or the pegmatitic type of occurrences, although occurrences of other kinds might also be found. A belt extending from the vicinity of Sault Ste. Marie to that of Lake Mistassini is unclassified as to type because occurrences of various kinds have been found along it. Areas favourable in a general way for further discoveries of the conglomeratic type are not designated because certain problems regarding the origin of these deposits are not yet solved. Many additional parts of the Shield are also favourable in a general way but are not indicated because less is known about them.

The entire Appalachian region is shown as favourable because that area is relatively small on a map of this scale. The part of the Cordilleran region lying between the Rocky Mountain Trench and the Coast Range Batholith, exclusive of large areas of young volcanic rocks, is indicated as favourable in a general way, but many parts of the territory farther west are not unfavourable. At present, because of lack of producing uranium mines, neither the Appalachian nor the Cordilleran region can be regarded as favourably as many parts of the Canadian Shield.

The areas indicated are much generalized because of the scale of the map. All parts of them are not equally favourable. Local geological maps and reports available for most areas provide much more detailed data.

It must be emphasized that the present map is only a step in the elucidation of the distribution of uranium in Canada; further discoveries and research will undoubtedly cause changes in the pattern as work progresses.

SOURCES OF INFORMATION

The information on this map is based largely on reports made to the Geological Survey of Canada by prospectors and companies as required by the Atomic Energy Control Regulations, and later released for publication. Additional information has been obtained from studies made and published by the Geological Survey, by Provincial mining departments, and by geologists and mineralogists working for companies or independently. All these sources of information are acknowledged gratefully. Most of the information shown has been verified but it is possible that a few of the occurrences that have not yet been studied may prove to be misplaced or wrongly classified.

REFERENCES

If information has been published on an occurrence or on the uranium deposits of an area, references are listed in the margin of the map. For some areas the literature is extensive, and a selection has been made. Many additional publications are listed in a recent publication: "A Bibliography on the Occurrence of Uranium in Canada, and Related Subjects" (Geological Survey of Canada, Paper 56-5).

For those occurrences not yet described in publications the list of localities includes the name and address of the prospector who reported the discovery or the name of the company concerned.

The Geological Survey of Canada cannot supply publications other than its own, nor unpublished information.

LEGEND

OCCURRENCES OF THE CONGLOMERATIC TYPE

- Area containing more than one producing mine
- Area containing occurrences

OCCURRENCES OF THE VEIN TYPE

- Area containing more than one producing mine
- Single producing mine
- Area containing occurrences
- Single occurrence
- Favourable area from which occurrences have not been reported

OCCURRENCES OF THE PEGMATITIC TYPE

- Area containing more than one producing mine
- Area containing occurrences
- Single occurrence
- Favourable area from which occurrences have not been reported

TYPE UNDIFFERENTIATED

- Area containing occurrences
- Single occurrence
- Favourable area from which occurrences have not been reported

Metallogenic data compiled by A.H.Lang, 1957

Cartography by the Geological Cartography Unit, 1958

LOCALITIES

(With key to selected references where available. Otherwise names of companies or individuals concerned are included)

1. Atlin area. Ref. 2, 1953, p. 79; 2, 1955, p. 7 (uraninite)
2. Lincoln Creek, Y.T. (B. A. Sage, 10824A-82 Ave., Edmonton, Alta.)
3. Hazelton area. Ref. 1, p. 40; 2, 1948 p. 80; 2, 1949 p. 82 (uraninite)
4. Granite Creek. Ref. 2, 1955 p. 29 (pyrochlore)
5. Grandview Claim, near Houston. (C. S. Powney, Fort St. James, B.C.)
6. Nation River. Ref. 3 (uraninite)
7. Fraser Lake (south of). Ref. 2, 1955 p. 28; 2, 1956 p. 28 (autunite, etc.)
8. Tudyah Lake. (N. Micholls, 4444 S.E. Marine Drive, S. Burnaby, B.C.)
9. Zeballos area. (S. N. Rey, 4717 Pender St., Vancouver, B.C.)
10. Bridge River area. Ref. 1, p. 43; 2, 1948 p. 112
11. Clinton area. Ref. 1, p. 44
12. Horsefly River. (R. B. Earle, 2254 Bowker Ave., Victoria, B.C.)
13. Birch Island area (including Rexspar deposit). Ref. 2, 1953 p. 101; 2, 1954 p. 108; 2, 1955 p. 38; 2, 1956 p. 70; 4 (uraninite, uranothorite)
14. Lempriere area. Ref. 2, 1952 p. 115; 2, 1954 p. 111 (pyrochlore)
15. Texas Creek. Ref. 1, p. 45 (uraninite)
16. Lytton area. Ref. 1, p. 45; 2, 1955 p. 33, 34 (metazeunerite)
17. Harrison Lake (south of). (L. G. Woodman, 1671 Harrow St., Vancouver, B.C.)
18. Hope area. Ref. 1, p. 45
19. A.M. claims. Ref. 2, 1954 p. 152 (uraninite)
20. Hedley Lake (north of). (G. Ramsay, Keremeos, B.C.)
21. Armstrong area. Ref. 1, p. 44 (uraninite)
22. Kelowna area. Ref. 1, p. 45 (fergusonite)
23. Part of Kootenay region. Ref. 1, p. 44, 45; 2, 1954 p. 142, 150; 2, 1955 p. 86; 2, 1956 p. 142 (uraninite, pyrochlore)
24. Great Bear Lake area (Eldorado mine). Ref. 1, p. 46-57 (pitchblende)
25. Belleau Lake. Ref. 1, p. 56
26. Hepburn Lake. (A. M. Berry, 14 Mercantile Bldg., Edmonton, Alta.)
27. Hottah Lake area. Ref. 1, p. 57-60 (pitchblende)
28. Contwoyto Lake (approx.) Ref. 5 (pitchblende)
29. Marian River area (Rayrock mine). Ref. 1, p. 61; 6; 7 (pitchblende)
30. De Staffany property. Ref. 1, p. 64
31. Barnston River area. Ref. 1, p. 63, 64 (uraninite)
32. Copmor property. Ref. 1, p. 64
33. Stark Lake and Murky Channel areas (Rag property, etc.). Ref. 1, p. 64, 65 (pitchblende)
34. Rex property. Ref. 1, p. 65 (uraninite)
35. Tee Lake. Ref. 1, p. 66
36. Nonacho (Taltson) area. Ref. 1, p. 66 (pitchblende)
37. Nicholson Lake. Ref. 1, p. 67
38. Leggo Lake area (pegmatitic). Dog River Mining Co. Ltd.
39. Leggo Lake. Dog River Mining Co. Ltd. (pitchblende)
40. Abitau River. New Santiago Mines Ltd.
41. Fort Chipewyan. New Delhi Mines Ltd., etc. (uraninite)
42. Fidler Point. Goldfields Uranium Mines Ltd. (pitchblende)
43. Beaverlodge or Goldfields area. Ref. 1, p. 68-106; 8, 9, 10, 11 (pitchblende)
44. Sucker Bay and Grease River. Ref. 1, p. 107, also Fond-du-Lac Exploration Co. Ltd. (pitchblende)
45. Black Lake area (pegmatitic). Ref. 1, p. 108-109; 13
46. Black Lake area. Ref. 1, p. 108-112; 13 (pitchblende)
47. Middle Lake occurrence. Ref. 12 (autunite)
48. Charlebois Lake area. Ref. 1, p. 108-114; 13, 14 (uraninite)
49. Foster Lakes. Ref. 15; 16 (uraninite)
50. Cup Lake area. Ref. 15 (uraninite)
51. Lac la Ronge area. Ref. 1, pp. 114-116; 15; 17; 18; 19 (uraninite)
52. Bleasdel Lake area. Ref. 20 (uraninite)
53. Herb Lake area. Ref. 21 (uraninite)
54. Manigotagan River - Bird River area. Ref. 1, pp. 116-117; 21 (uraninite)
55. Whiteshell area. Ref. 1, pp. 116-117 (uraninite, uranothorite)
56. Kenora area. Ref. 1, pp. 117-121; 22; 23; 24 (uraninite)
57. Wolf Island, Lake of the Woods. Ref. 1, p. 120; 22
58. Bamaji Lake. Ref. 24
59. Fort Frances area. Pioneer Consultants Ltd.
60. Port Arthur. Ref. 1, p. 120 (uraninite)
61. Port Arthur. Ref. 1, p. 120
62. Greenwich Lake. Ref. 1, p. 118 (pitchblende)
63. Mountain Bay. Ref. 1, p. 118
64. Marathon area. Ref. 1, pp. 118-121
65. Montreal River area (Sault Ste. Marie Region). Ref. 1, pp. 121-136; 25 (pitchblende)
66. Nemegos area. Ref. 1, p. 131 (pyrochlore)
67. Township 10D. Ref. 1, p. 128 (assay in this reference should read 0.081, not 0.81)
68. Aubakagama Lake. Ref. 1, p. 123 (uraninite)
69. Aubrey Falls. Ref. 1, p. 132; 26
70. Tarbutt Township. Tarbutt Mines Ltd.
71. Blind River area. Ref. 1, p. 122, 124; 27; 28; 29; 30 (brannerite, uraninite)
72. Carter Township. Ref. 1, p. 150 (euxenite)
73. Elk Lake - New Liskeard area. Ref. 1, p. 150
74. Vermilion River - Timagami Lake area. Aubay Uranium Mines Ltd., D'Eldona Gold Mines Ltd., Harrison Minerals Ltd., etc.
75. Lake Nipissing area. Ref. 34 (pyrochlore)
76. Parry Sound area. Ref. 1, pp. 136-149 (uraninite, etc.)
77. Haliburton area. Ref. 1; 31, pp. 146-149 (uraninite, etc.)
78. Bancroft area. Ref. 1, pp. 136-150; 31; 32; 33 (uraninite, uranothorite, etc.)
79. Kipawa area. (Dr. J. T. MacLean, 202 Medical Arts Bldg., Ottawa, Ont.; Mr. Gerald Jones, Kipawa, Que.) (fergusonite, etc.)
80. Abitibi area. Ref. 1, p. 155; 35; 36 (betafite)
81. Pontiac-Gatineau area. Ref. 1, pp. 151-154, 37; 38; 39 (uraninite, etc.)
82. Oka area. Ref. 40 (pyrochlore)
83. Laviolette-Portneuf area. Ref. 1, p. 152-153 (uranothorite, etc.)
84. Bresanni Township. Barnat Mines Ltd. (uraninite)
85. Levy Township. Opemiska Copper Mines Ltd.
86. Harvey Township. (J. R. Dallaire, 466 rue de Sales, Chicoutimi, Que.)
87. Charlevoix area. Ref. 1, p. 151 (uraninite, fergusonite)
88. Letellier Township. Ref. 41 (uraninite)
89. Cross Point. Ref. 1, p. 154; 42 (pitchblende)
90. Coxs Brook. Ref. 42 (pitchblende?)
91. Shippigan Island. Ref. 42 (pitchblende?)
92. Harvey area. Ref. 42 (uranospinite)
93. Hampton. Ref. 42 (uranium-bearing hydrocarbon)
94. Shediac River. Maritime Exploration Co. Ltd.
95. Black Brook. Ref. 42
96. Georgeville. Ref. 42 (cyrtolite, uranothorite)
97. New Ross. Ref. 42 (torbernite)
98. Barnes Ice Sheet, Baffin Island (radioactive columbite-tantalite)
99. Ryan Bay
100. Ten Mile Lake. Frobisher Ltd. (pyrochlore)
101. Seal Lake area. British Newfoundland Exploration Ltd. (pitchblende)
102. Makkovik area. British Newfoundland Exploration Ltd. (uraninite)
103. Makkovik area. British Newfoundland Exploration Ltd. (pitchblende)
104. Indian Head area. Ref. 43 (uraninite)
105. Flat Bay area (J. J. Dodd, Flat Bay River, Newfoundland)
106. Searston area (J. J. Dodd, Flat Bay River, Newfoundland)
107. Torbay area. (J. J. Dodd, Flat Bay River, Newfoundland)

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Alberta Government

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This page was inserted by the Coal and Minerals Development Branch, to provide a reference that the map 3 of Research Council of Alberta Geological Division was not truncated by the scanning process. The full extent of the map is represented by the scan.

MAP #3.
1968 0014

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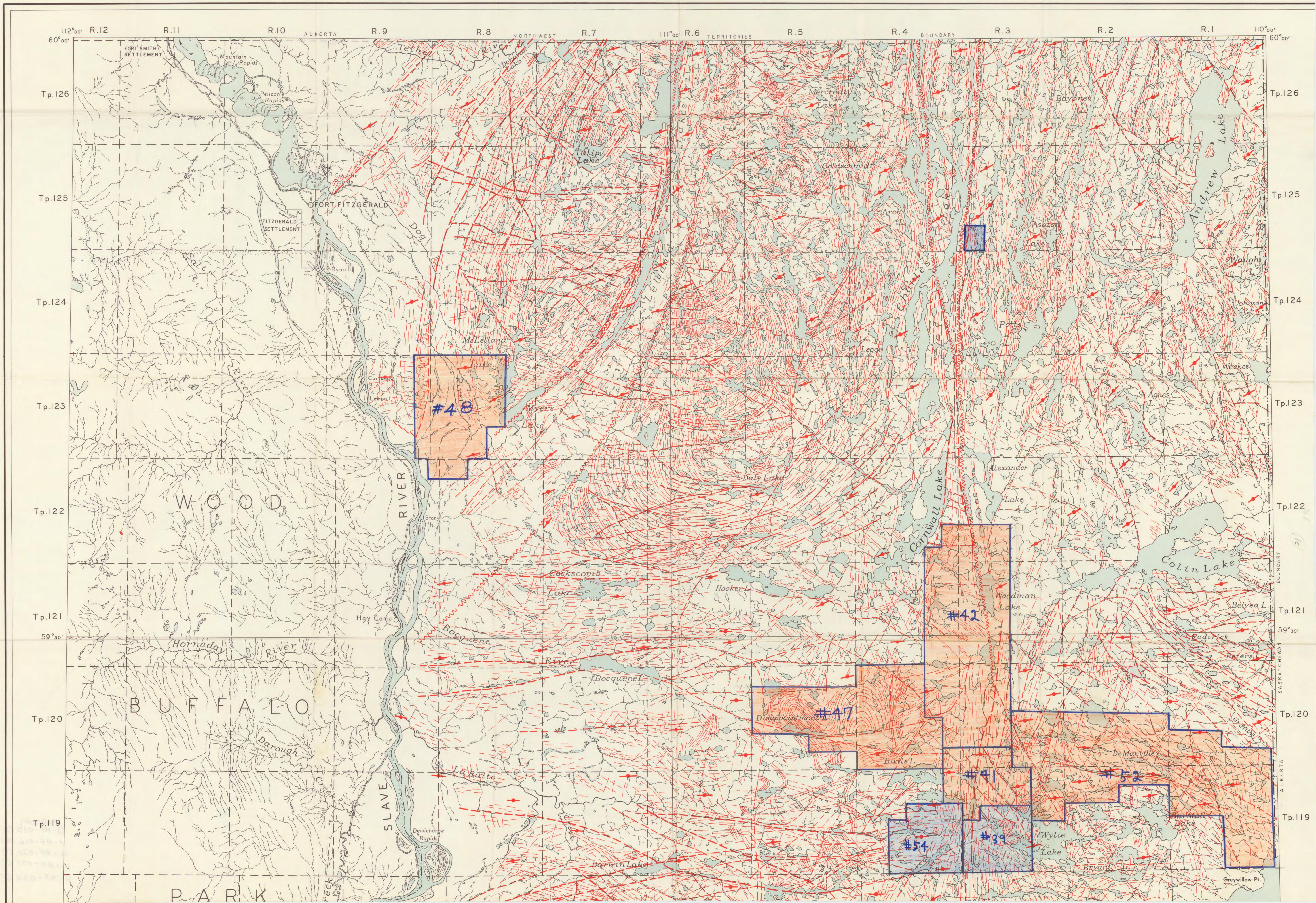

FIRST EDITION

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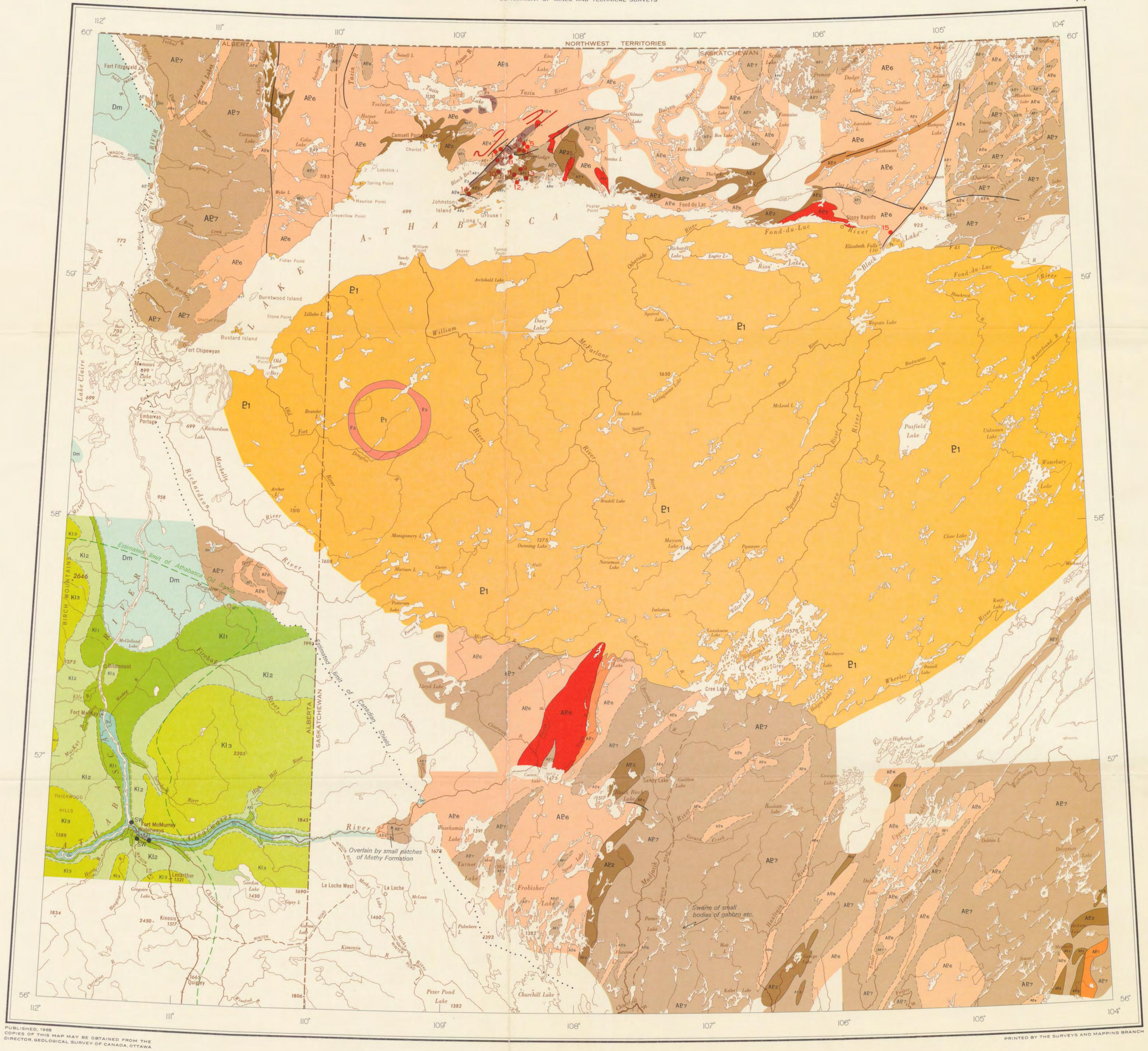
DEPARTMENT OF MINES AND TECHNICAL SURVEYS



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85 SLAVE RIVER	75 LOCKHART RIVER	65 DUBAWNT RIVER
84 1161A HAY RIVER	74 1162A CLEARWATER RIVER	64 COCHRANE RIVER
83 ATHABASCA RIVER	73 1163A NORTH SASKATCHEWAN RIVER	63 1164A CARROT RIVER

INDEX TO ADJACENT SHEETS

MAP 1162A

GEOLOGY

CLEARWATER RIVER

SASKATCHEWAN-ALBERTA

Scale 1:1,000,000
1 inch to 15.78 miles

Miles 20 0 20 40 60 Miles
Kilometres 25 0 25 50 75 100 Kilometres

LEGEND

MESOZOIC

CRETACEOUS
LOWER CRETACEOUS

- Kl3 — *GRAND RAPIDS FORMATION: white and yellow sand and sandstone*
- Kl2 — *CLEARWATER FORMATION: grey and black shale; grey and green sandstone*
- Kl1 — *McMURRAY FORMATION: sandstone, shale, conglomerate. Parts impregnated with oil*

PALAEOZOIC

DEVONIAN
UPPER AND/OR MIDDLE DEVONIAN

- Du — *BEAVERHILL LAKE (Waterways) FORMATION: limestone, argillaceous limestone, shale*

MIDDLE DEVONIAN AND (?) OLDER

- Dm — *METHY FORMATION: dolomite, calcareous dolomite*
  LA BUTTE FORMATION: limestone
  McLEAN RIVER FORMATION: shale, sandy and silty shale, dolomite, sandy and calcareous dolomite
  FITZGERALD FORMATION: dolomite, dolomitic limestone, calcareous shale
  LA LOCHE FORMATION: arkosic sandstone

PROTEROZOIC

- P3 — *MARTIN LAKE FORMATION: arkose, sandstone, feldspathic siltstone, conglomerate, basalt*
- P2 — *CARSWELL FORMATION: dolomite*
- P1 — *ATHABASCA FORMATION: sandstone, grit, conglomerate, siltstone, shale*

ARCHAEAN AND/OR LOWER PROTEROZOIC

- AP7 — *Granite, granodiorite, and related rocks, and gneissic equivalents. Includes unseparated bodies of units AP1, AP2, and AP4*
- AP6 — *Gneisses, schists, migmatites, granitized rocks, and unseparated bodies of units AP1, AP2, AP4, and AP7*
- AP4,5 / AP4 — AP4. *Amphibolite and other metamorphosed mafic and ultramafic rocks of sedimentary, volcanic, and igneous origins. Includes unseparated bodies of AP5*
  AP5. *Gabbro, norite, and other mafic or ultramafic intrusions*
- AP2 — *Quartzite, ferruginous quartzite, dolomite, dolomitic quartzite, conglomerate, limestone, argillite and gneissic and schistose equivalents. Includes part of TAZIN GROUP*
- AP3 — *Unseparated sedimentary, volcanic, and metamorphic rocks equivalent to units AP1 and AP2*
- AP1 — *Andesite, basalt, rhyolite, tuff, and metamorphic equivalents. Includes part of TAZIN GROUP*

Geological boundary (defined or approximate)
Geological boundary (inferred or gradational)
Principal fault
Estimated limit of Athabasca Oil Sands
Mine (gold, uranium) . . . Au, U
Salt well . . . SW

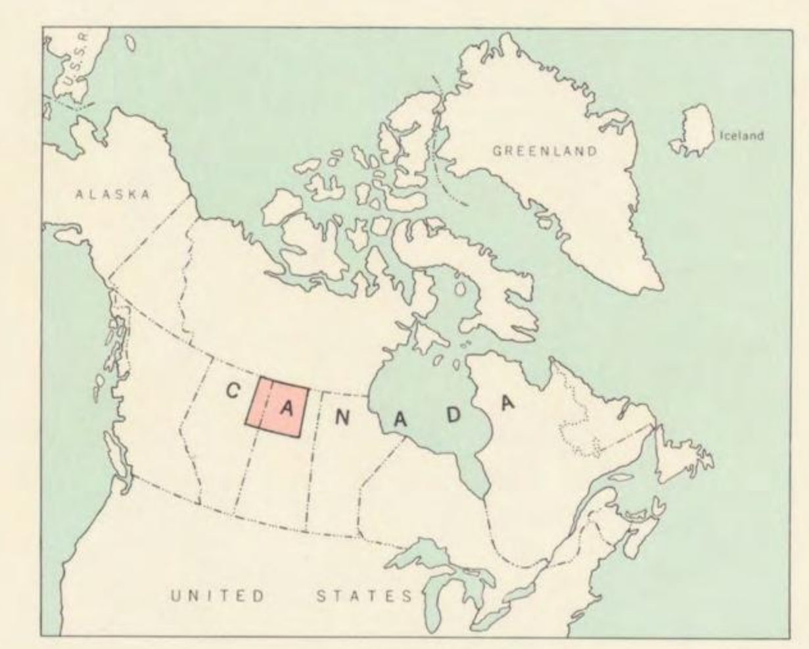
Geology compiled by A. H. Lang, 1962, from maps and reports published by the Geological Survey of Canada, the Saskatchewan Department of Mineral Resources, and the Research Council of Alberta

Base-map from Map 2141, "Clearwater River" by the Surveys and Mapping Branch, 1949, with minor revisions, 1964

INDEX TO MINES

*Former producer

1. *Rix (Rix-Athabaska Uranium Mines Ltd.) U
2. *Cayzor (Cayzor Athabaska Mines Ltd.) U
3. *Jam-Maj (Nesbitt—La Bine Uranium Mines Ltd.) U
4. *National Explorations (National Exploration Ltd.) U
5. Verna (Eldorado Mining and Refining Ltd.) U
6. Ace-Fay (Eldorado Mining and Refining Ltd.) U
7. *Lake Cinch (Lake Cinch Mines Ltd.) U
8. *Martin Lake (Eldorado Mining and Refining Ltd.) U
9. *Gretta (Black Bay Uranium Ltd.) U
10. *Lorado (Lorado Uranium Mines Ltd.) U
11. *Box (The Consolidated Mining and Smelting Co. of Canada Ltd.) Au
12. *Athona (Athona Mines Ltd.) Au
13. *Nicholson (Consolidated Nicholson Mines Ltd.) U
14. Gunnar (Gunnar Mines Ltd.) U
15. *Nisto (Haymac Mines Ltd.) U



INDEX MAP

NOTES

GENERAL

Most of the map-area is in the Churchill 'province' of the Canadian Shield, but the eastern part is in the Interior Plains and Lowlands. Physiographically, the part in the Shield is divisible into two main areas. One is a flat area extending eastward from the mouth of Athabasca River to Wollaston Lake, and northward from Cree Lake to Lake Athabasca. It slopes gently northward from an elevation of about 1,600 feet along its southern limit to about 700 feet, the level of Lake Athabasca. It is underlain mainly by the Athabasca Formation, which is poorly exposed and covered mainly by sand and other glacial deposits. This area is flanked to the north and south by hilly areas containing elevations up to about 1,400 feet above sea-level, and underlain by older Precambrian rocks, which are fairly well exposed. The surface of the area within the Interior Plains and Lowlands varies from flat to hilly, with elevations up to about 2,800 feet above sea-level. It is underlain by flat-lying Palaeozoic and Mesozoic strata, exposures of which are virtually restricted to the banks of the larger streams.

Almost all the 'Precambrian' part of the map-area has been mapped geologically on the scale of 1 inch to 4 miles, much of it has also been mapped at 1 inch to 1 mile, and a large area extending from the vicinity of Johnston Island to a line about 5 miles north of Beaverlodge Lake has been mapped at 1 inch to 400 feet. As much of the detail cannot be shown at the scale of this map, it has been possible to illustrate only the larger geological features and a few smaller ones that illustrate structures or other phenomena particularly well.

PRECAMBRIAN

The older strata exposed are sedimentary and volcanic rocks exhibiting various degrees of metamorphism. It is not clear whether volcanic or sedimentary strata are the oldest, and it is possible that rocks of several ages are represented. North of Lake Athabasca these strata have been named the Tazin Group, to which at least some of the analogous strata in other parts of the area are probably related. The strata are intensely folded, generally along northeasterly trending axes. Evidence available at present from age determinations on samples from the Churchill province indicates that the orogenies within it took place in Proterozoic rather than Archaean times, but this does not preclude the possibility that some of the rocks involved may be Archaean. Much of the Precambrian terrane is composed of granites and related rocks, and of complexes made up of gneisses, migmatites, grantizied rocks, and small bodies of granite and other rocks. In areas that have been mapped at 1 inch to 1 mile or in greater detail the various components of the complexes have been separated and in some areas several varieties of gneisses have been mapped separately. It proved impossible to indicate these details on the present map, not only because of limitations of scale, but also because various workers used different classifications.

Also present are numerous bands of amphibolite of different sizes. Some of the narrower ones have been indicated symbolically because they illustrate the folding; many others had to be omitted.

In the large flat area south of Lake Athabasca the older rocks are overlain by the gently tilted Athabasca Formation, which was originally thought to be of Cambrian age but is now generally regarded as Proterozoic. At and near Carswell Lake several outcrops of dolomite in a circular pattern have been grouped as the Carswell Formation. The contact between these beds and the Athabasca Formation has not been found exposed, but nearby dips suggest that the Carswell overlies the the Athabasca and has been infolded in a domal structure. In the vicinity of Beaverlodge Lake beds of arkose and other sedimentary rocks interbedded with flows of basalt, which were formerly considered part of the Athabasca 'series' have recently been redefined as the Martin Lake Formation.

The older Precambrian rocks are traversed by numerous faults, many of which strike northeasterly. Only a few of the more prominent ones could be shown on this map. North of Lake Athabasca two main periods of faulting have been recognized. The older followed the granitization of rocks of the Taxin Group, and the younger took place after the deposition of the Martin Lake Formation. Wide zones of fracturing, brecciation, and mylonitization are believed to have resulted from still earlier deformation or faulting, rather than from faults that can now be mapped.

PALAEOZOIC AND MESOZOIC

The Palaeozoic strata exposed in the area mainly contain fossils indicative of Middle and Upper Devonian ages. The Fitzgerald Formation found along Slave River was formerly considered to be Upper Silurian, and because the evidence available at present is uncertain its age is now stated as "Upper Silurian and/or Middle Devonian". In the southwestern part of the map-area Lower Cretaceous strata rest on an erosion surface in the Devonian beds. The distribution of the Palaeozoic and Mesozoic formations is reasonably well known from exposures along streams and from drilling records, but the precise locations of the boundaries between them is in most places indefinite because of the extensive overburden of glacial and post-glacial deposits. Some additional formations have been recognized in drill sections but are not mappable from surface information.

ECONOMIC FEATURES

The map-area contains occurrences of a large variety of metals, discoveries to date being almost entirely confined to the earlier Precambrian rocks. The region first attracted prospectors in and following 1910 when interest was mainly in copper-nickel occurrences associated with norite, and in iron-bearing sedimentary rocks, neither of which were developed successfully. Gold discoveries in 1934 caused establishment of the town of Goldfields, near which two mines produced for a few years. An occurrence of pitchblende found at the Nicholson copper prospect near Goldfields in 1935 was not then of particular interest, but in and following 1942 it caused much prospecting for uranium in the area. This resulted in discovery of more than 3,000 occurrences of pitchblende in the general vicinity of Beaverlodge Lake, and establishment of 12 producing mines, the town of Uranium City, and several roads and airstrips. The larger pitchblende deposits consist of stringer-systems and disseminations in a variety of earlier Precambrian rocks and in the Martin Lake Formation; most are associated with prominent faults. Many additional uranium occurrences were found between Slave River and Beaverlodge area, and between that area and Porcupine River; some are of the pitchblende type described above, and most others contain crystalline uraninite in pegmatites, migmatites, and related rocks. Many occurrences of the latter type were also found in the general vicinity of Foster Lakes.

The map-area contains the northeastern part of the Athabasca Oil Sands, which in their entirety are considered to be the world's largest reserve of petroleum. They are mainly in the McMurray Formation, which is impregnated with viscous petroleum, and are regarded as an oil reservoir that was exposed sufficiently by erosion to permit escape of the more volatile constituents. Whether the oil originated in these beds, in the underlying Devonian strata, or in overlying Cretaceous formations has not yet been proved. Many investigations have been undertaken regarding the extent of the sands, and methods of exploiting them, but to date commerical production has not been achieved.

Devonian strata contain thick beds of salt, anhydrite, and gypsum. Salt was produced for several years from wells drilled near McMurray.

REFERENCES

The maps and reports used in this compilation are too numerous to be listed here. Most will be found in the Index to Publications of the Geological Survey of Canada (1845-1958) and its supplements, and in the lists of the Research Council of Alberta and the Saskatchewan Department of Mineral Resources.

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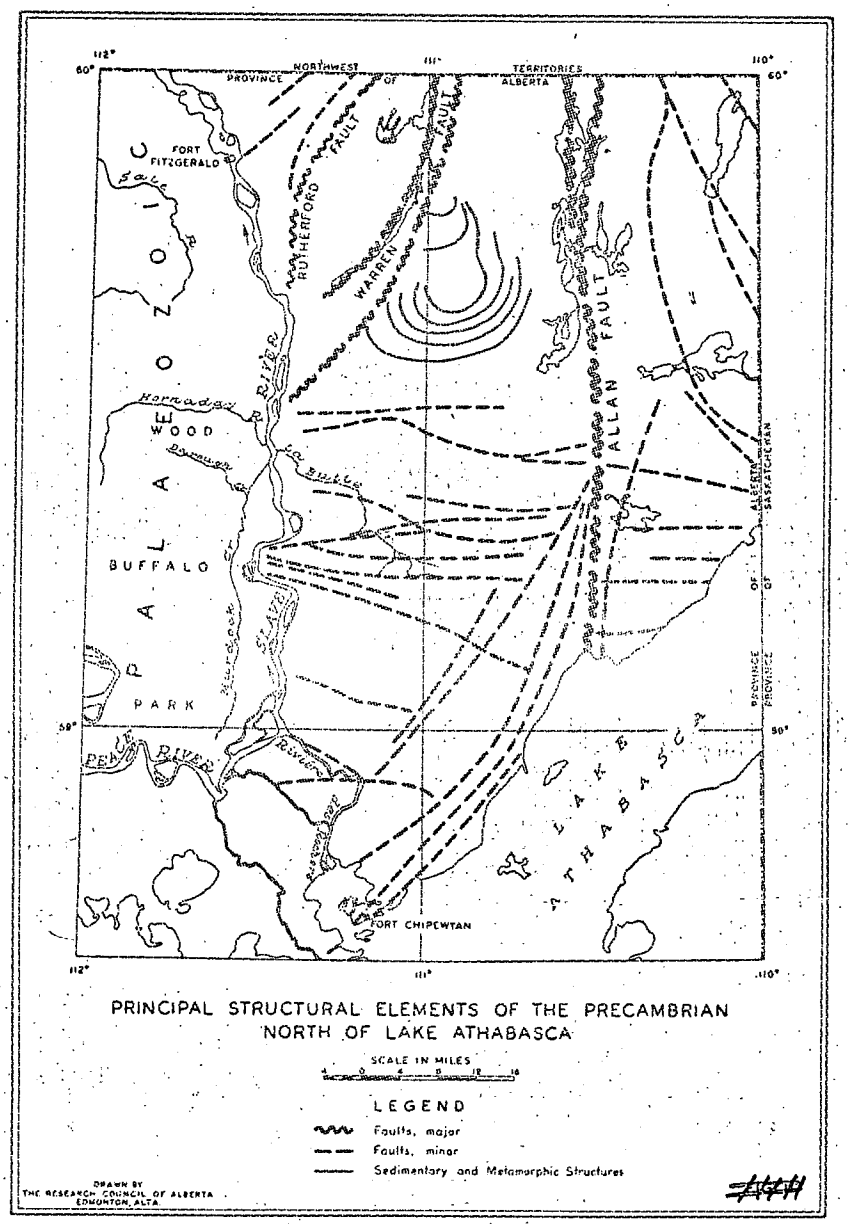
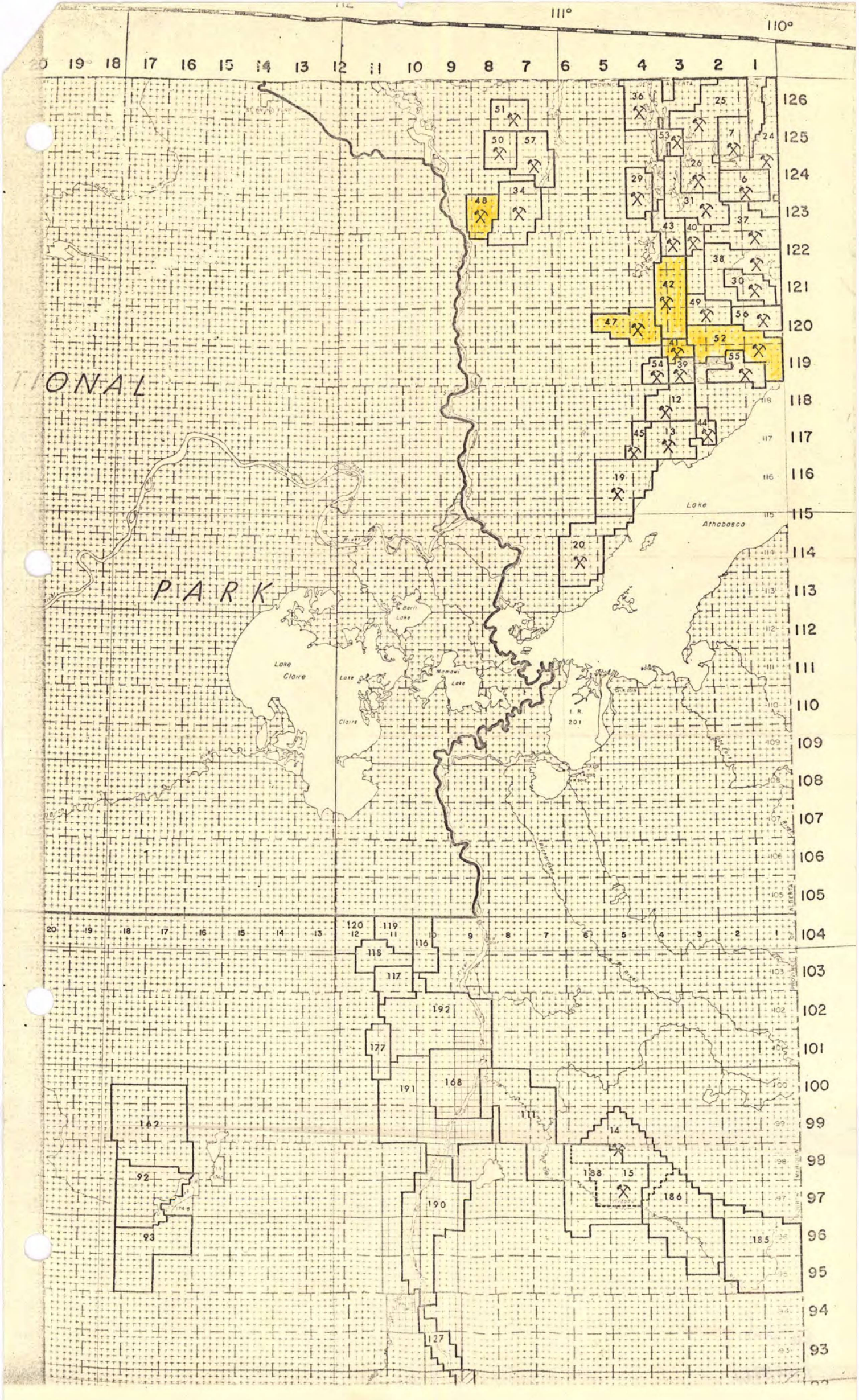
17	23 - 10 - 67	5	2	5	5,120	" " " "	F
18	23 - 10 - 67	5	4	5	17,367	KENNCO EXPL. (CANADA) LIMITED	F
19	23 - 10 - 67	116	5	4	46,720	ARTHUR DENNIS DAVIS	F
20	23 - 10 - 67	114	6	4	48,000	" " "	F
21	27 - 10 - 67	22	9	5	48,413	IMPERIAL OIL LIMITED	F
22	27 - 10 - 67	20	8	5	46,080	" " "	F
23	27 - 10 - 67	24	10	5	8,594	" " "	F
24	27 - 10 - 67	124	1	4	37,600	ROBERT BRYANT SCHICK	F
25	27 - 10 - 67	126	2	4	47,680	" " "	F
26	27 - 10 - 67	124	3	4	29,120	" " "	F
27	27 - 10 - 67	6	2	4	49,120	SCOTEIRE EXPLORATION LTD.	F
28	27 - 10 - 67	7	2	4	48,800	" " "	F
29	1 - 11 - 67	123	4	4	19,200	SAMUEL HUNTER TRAINER	F
30	1 - 11 - 67	121	1	4	19,200	AJAX MINERALS LIMITED	F
31	1 - 11 - 67	123	3	4	36,480	LEDO MINES. LTD.	F
32	1 - 11 - 67	8	4	4	19,350	DOME PETROLEUM LIMITED	F
33	1 - 11 - 67	9	2	4	19,882	" " "	F
34	1 - 11 - 67	123	7	4	38,400	CHIEFTAIN DEVELOPMENT CO. LTD.	F
35	1 - 11 - 67	87	13	6	19,200	Mc GREGOR TELEPHONE & POWER	F
36	28 - 11 - 67	126	4	4	49,440	DYNALTA OIL & GAS CO. LTD.	F
37	11 - 12 - 67	122	2	4	39,040	AJAX MINERALS LIMITED	F
38	11 - 12 - 67	121	2	4	49,920	" " "	F
39	19 1 68	119	3	4	9,600	MISSION HOLDINGS LTD	F
40	1 2 68	122	3	4	9,600	ALEXANDRA PETROLEUMS LTD.	F
41	1 2 68	119	3	4	9,600	VISION DEVELOPMENT LTD	F
42	1 2 68	120	3	4	39,680	" " "	F
43	1 2 68	122	3	4	19,200	Mc MAHON OILS LIMITED	F
44	1 2 68	117	2	4	9,600	Mac NAIR LAND SERVICES LTD.	F
45	1 2 68	117	4	4	9,600	Mc MAHON OILS LIMITED	F
46	1 2 68	7	5	5	14,577	MERIDIAN PETROLEUMS LTD	F
47	19 2 68	120	4	4	29,440	VISION DEVELOPMENT LTD.	F
48	19 2 68	123	8	4	19,840	" " "	F
49	23 2 68	120	2	4	19,840	EDWIN RALPH GAYFER	F
50	23 2 68	125	8	4	19,200	" " "	F
51	23 2 68	126	7	4	19,200	" " "	F
52	28 2 68	119	1	4	49,920	VISION DEVELOPMENT LTD	F
53	3 4 68	125	3	4	9,920	WILLIAM WALTER KIZAN	F
54	6 6 68	119	4	4	9,600	MADISON OILS LIMITED	F
55	11 6 68	119	2	4	19,840	JOSEPH WILLIAM WOROBEC	F
56	11 6 68	120	1	4	19,200	" " "	F
57	11 6 68	124	7	4	29,440	" " "	F

19680014

Figure 2



Considering these major fault and fold features together, it seems possible that the faults are shears which have replaced the limbs of the folds under excessive shearing stress. Relative movement has brought south the two folds mentioned, whilst the intervening complementary fold has been moved north and out of the map area.


111°
110°
ONAL
PARK
Lake
Athabasca
Lake
Claire
Lake
Claire
Lake
Mamawi
Lake
I. R.
201
ALBERTA
SASKATCHEWAN

QUARTZ MINERAL EXPLORATION PERMIT No. 47

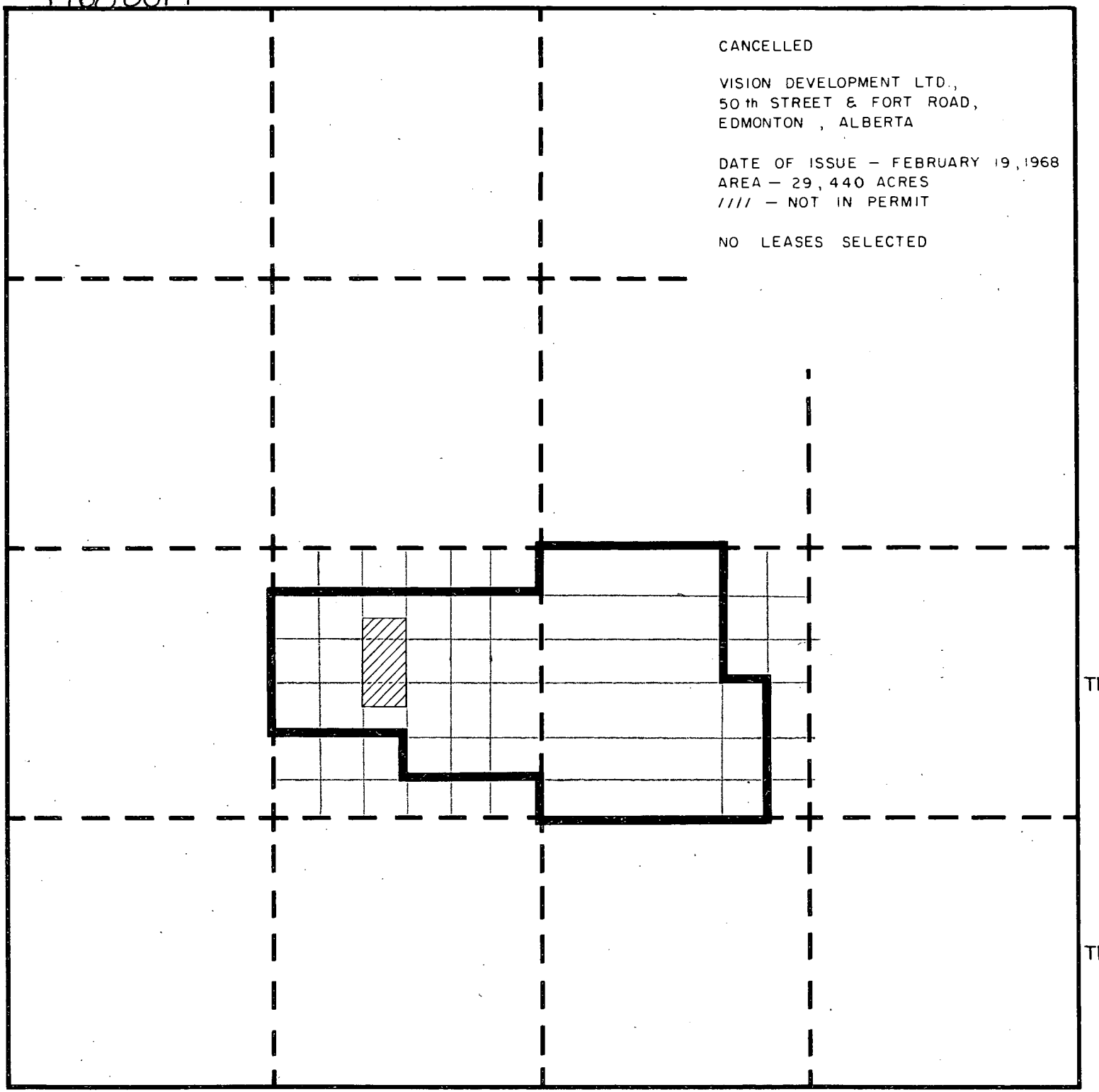
19680014

CANCELLED

VISION DEVELOPMENT LTD.,
50th STREET & FORT ROAD,
EDMONTON , ALBERTA

DATE OF ISSUE – FEBRUARY 19, 1968
AREA – 29,440 ACRES
//// – NOT IN PERMIT

NO LEASES SELECTED



QUARTZ MINERAL EXPLORATION PERMIT No. 48

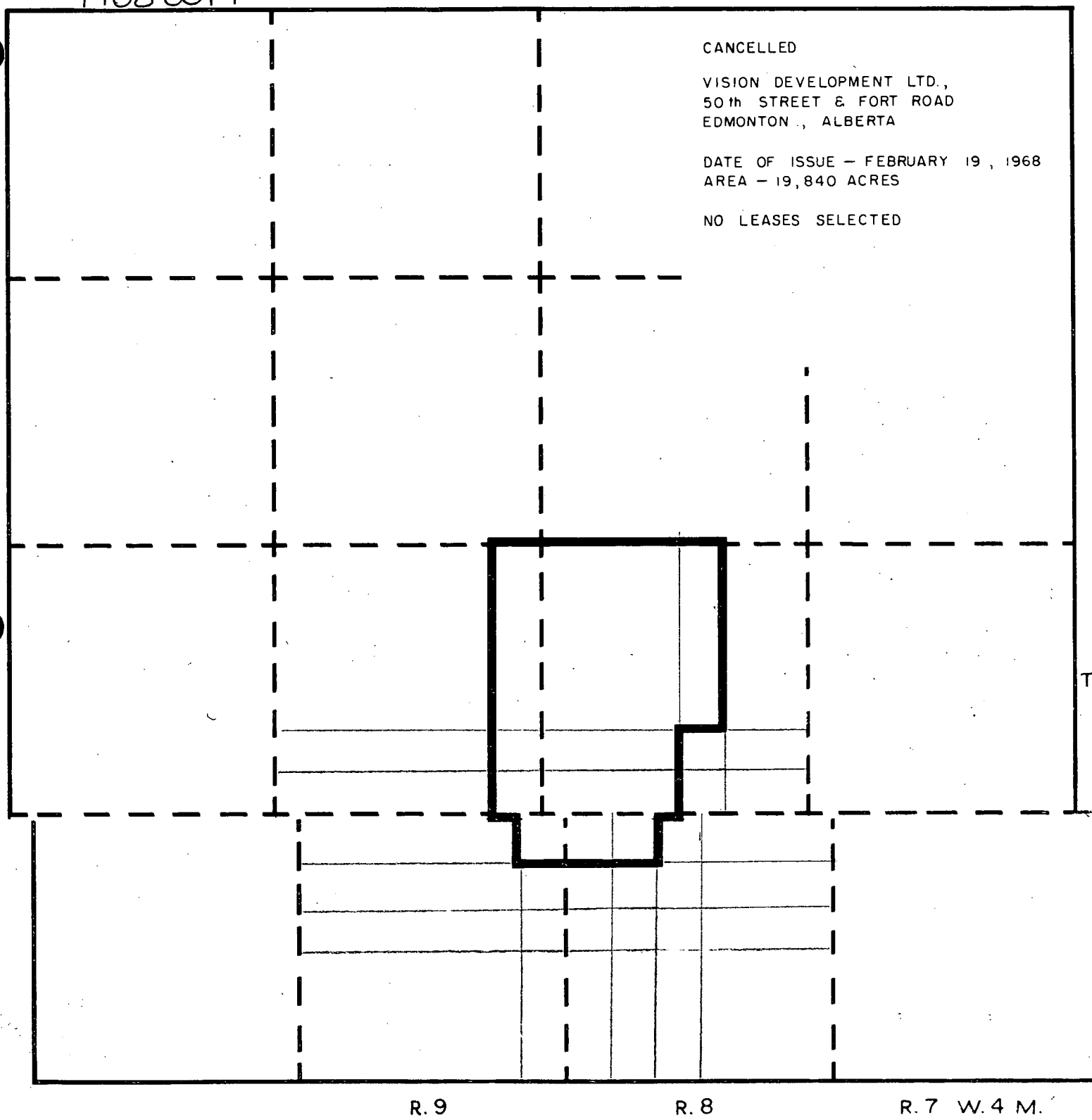
19680014

CANCELLED

VISION DEVELOPMENT LTD.,
50th STREET & FORT ROAD
EDMONTON, ALBERTA

DATE OF ISSUE – FEBRUARY 19, 1968
AREA – 19,840 ACRES

NO LEASES SELECTED



QUARTZ MINERAL EXPLORATION PERMIT No. 52

19680014