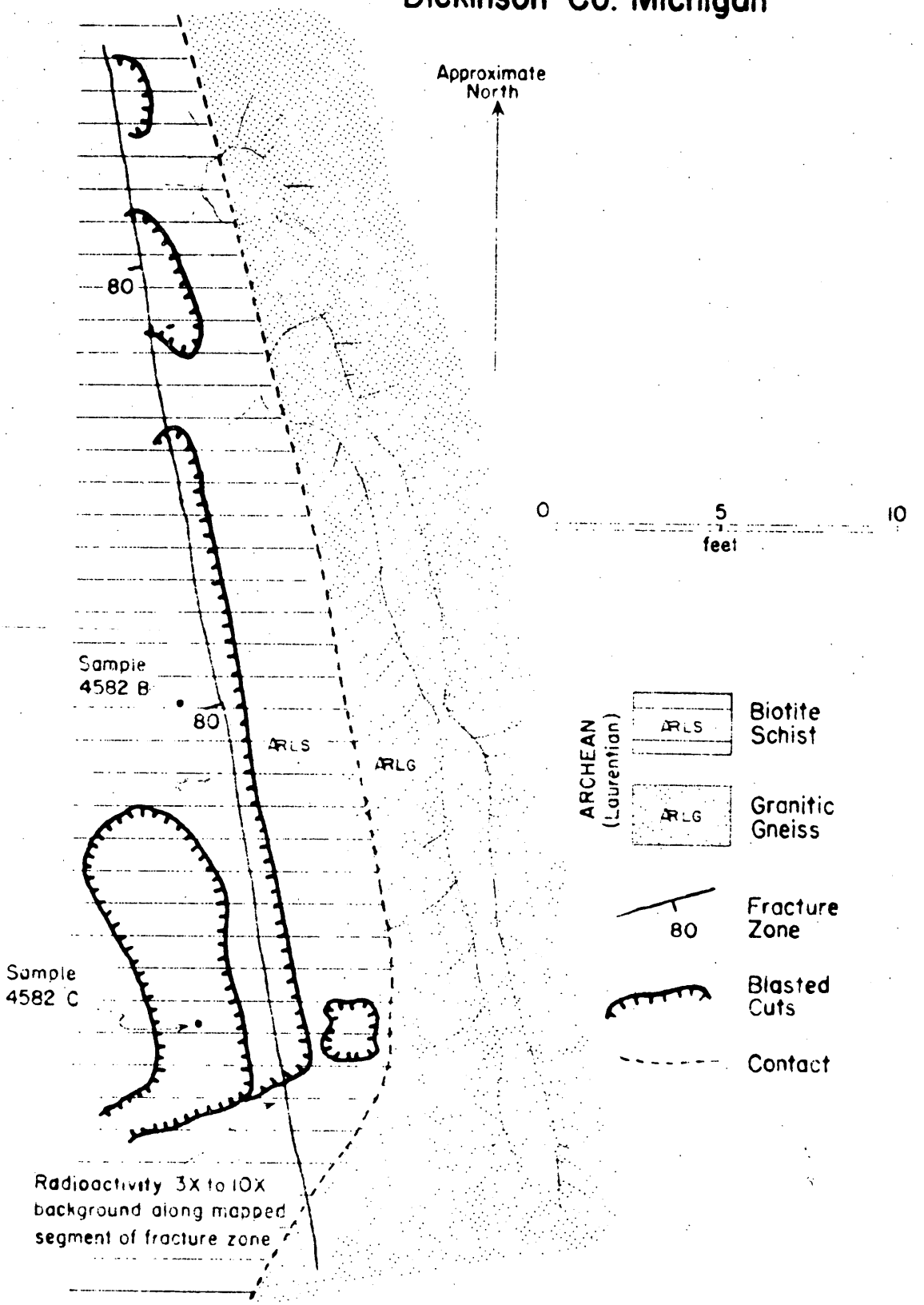
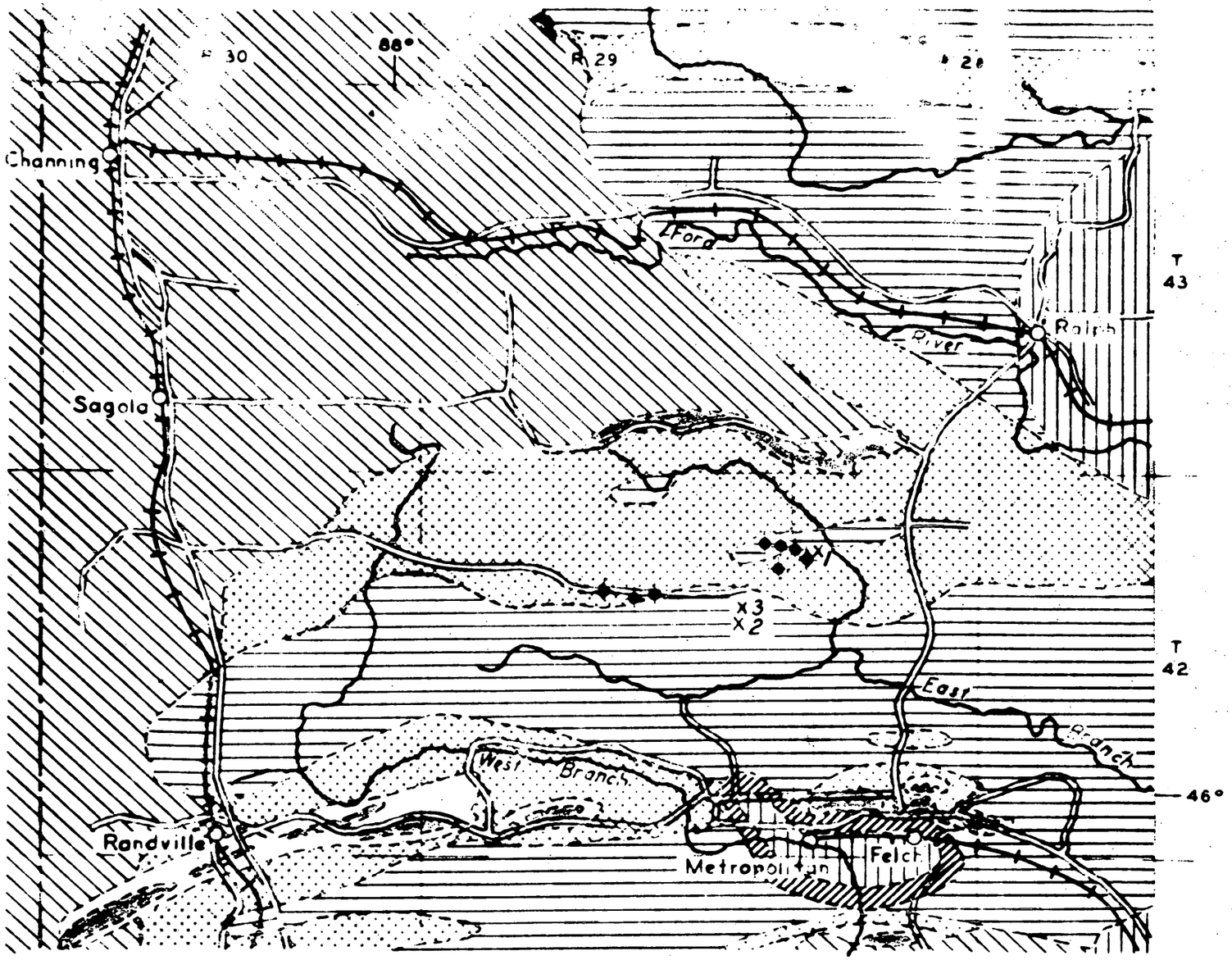
Fig. 2

LEITCH ISHAM CLAIM No. 2
Section 13, T.42.N., R.29.W.
Dickinson Co. Michigan



Sketch by
D. L. EVERHART

FIG. 1

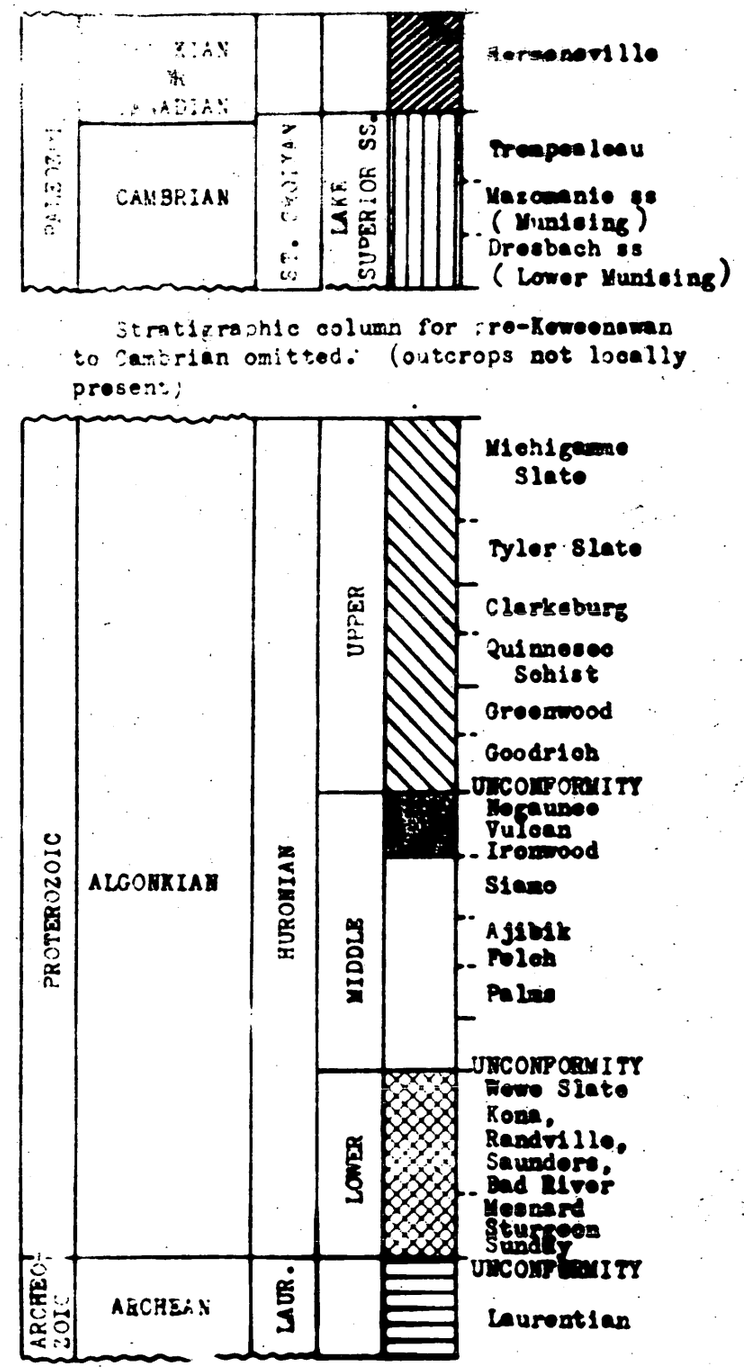


GEOLOGICAL MAP & REPORTED URANIUM OCCURRENCES
DICKINSON COUNTY, MICHIGAN

1 0 1 2 3 4 5 MILES

✦ ANOMALIES SHOWN ON U.S.G.S. "REDBALL" MAP

X_2 CLAIM LOCATION



Stratigraphic column for pre-Keweenawan to Cambrian omitted. (outcrops not locally present)

USAEC. DRM, RMO 934, JAN. 1951 AUG. 1952

Docket No. D.M.E.A.-2697 Uranium
Dickenson County Mich

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JAN 8 1953

Sect 1, MF103

(a) Glacial drift removed to bed rock and benches have been bulldozed as working ledges and to remove overburden to find width of chlorite schist formation. The three ben - ches were used to spot the compressor, drilling and blasting equipment, they also made it possible to use a 3/4 Ton Willys pick up to remove rock blasted out to further open the seam for inspection.
Accessibility to the lease haw been made possible by the bulldozing of a road from the end of the sixmile lake road, (see map attached) can drive directly to the Uranium occurance. We have possession of state leased land for the purpose of exploration and mining for Fissionable materials and Mr. Isham has supervised all the work done on this leasehold to date.

(b) There has been no commerical production of ores from this leasehold to date.

(c) Refer to the reports of Mr. Everhardt and Mr. H.V. Lee as attached imformation.

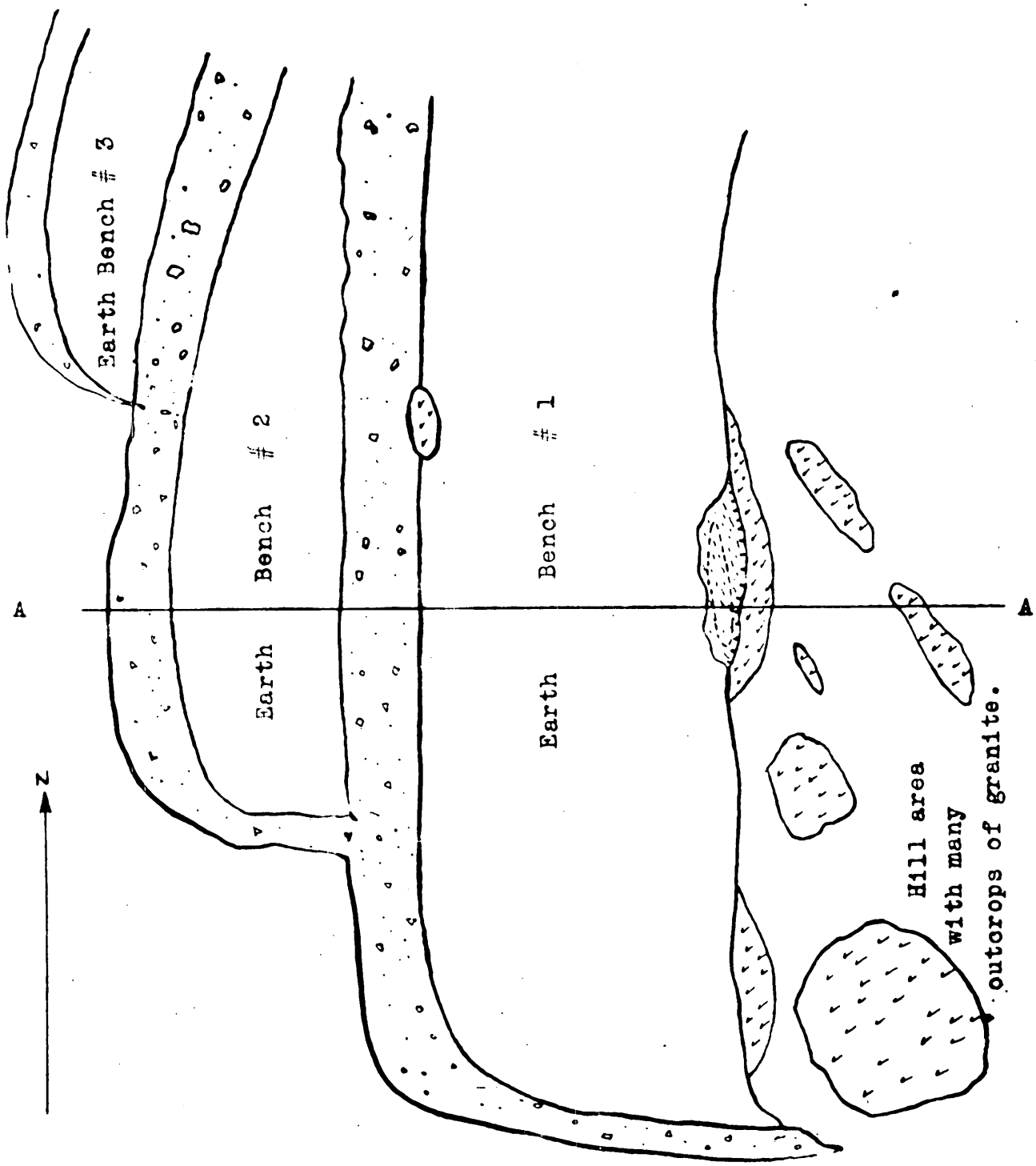
(d) Road into the project, rail shipping facilities only 12 miles at Segola, Michigan . Railroad and siding at this point and practically all supplies are available at Iron Mountain, 19 miles from project.

(e) Labor is available and no problem at present time. We have sufficient applications for all labor necessary. Materials, supplies and Equipment are near at hand. A stream of fresh water, open year around, is only about 400 feet from deposit. Power line is not available at present but in case of mining could be brought in, it is approximately 4 miles away at present.

Docket No. D.M.E.A. 2697 Uranium
Dickenson County, Michigan.

Sect M.F. 103

5-D Mr. Thad D.Isham will supervise the exploritory operations with the aid of a consultant enginer. The construction of Tool sheds and other buildingswill be done by Mr.Isham who has had fifteen year's experience at this type of work. As to his exploritory work,all work to date has been done by Mr,Isham. He has the knowledge of proper equipment to use for gravity exploritory operations, however any instructions or directions from the mining engineer and geologist,will be closely followed.



Glacial Surface Material

Pink to White granite

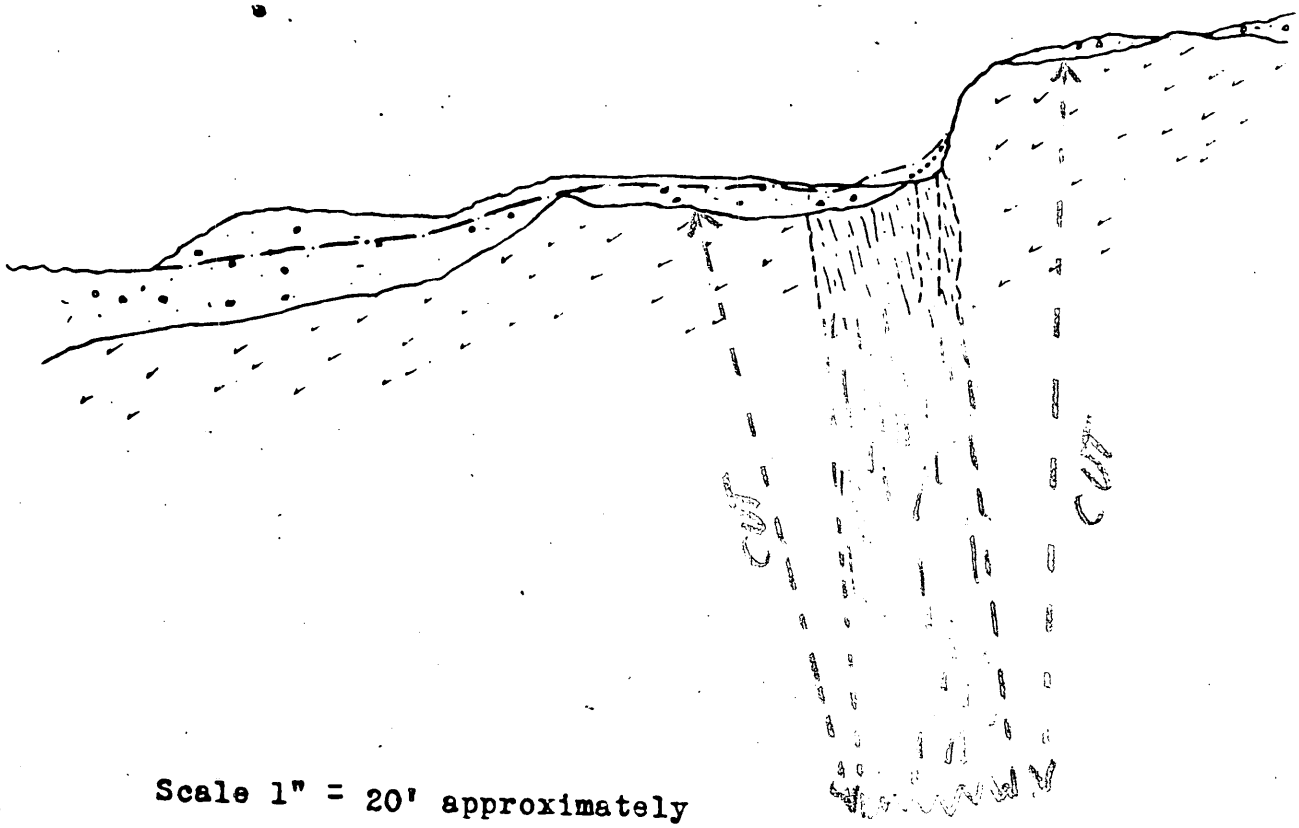
Biotite Schist

Radioactive zone

Scale 1" = 20' approximately

Figure 1. Plan view of prospect area.

Cross Section A-A (Looking North)



Scale 1" = 20' approximately

Glacial Surface Material

Pink to White granite

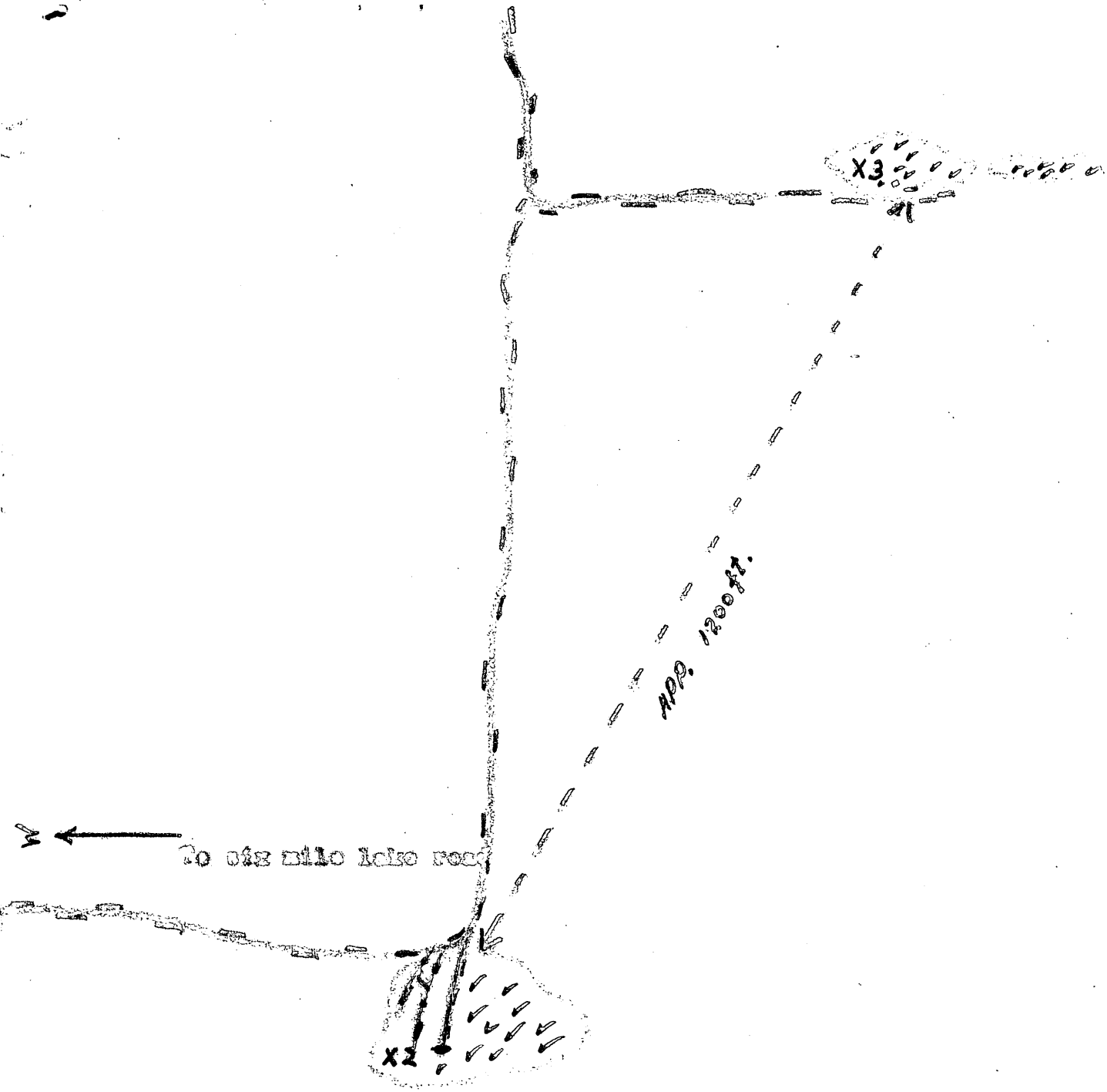
Biotite Schist

Radioactive zone

Former surface of ground

Former rock ledge surface

FUTURE EXPLORITORY WORK



Bulldozed road
Radioactive zone
Outcrops
X2 X3 As U.S.G.S. "Redhill" Map
Scale 1 inch - 100 ft. approximately
Section 13, T42N, R29W, Dickinson County, Mich.
Outcrops not to scale and are only for identification of road and radioactive zones.

ADDRESS REPLY TO:

RAW MATERIALS OPERATIONS
U. S. ATOMIC ENERGY COMMISSION
P. O. BOX 30, ANSONIA STATION
NEW YORK 23, NEW YORK

and refer to:
RMEM:MM:ps

UNITED STATES
ATOMIC ENERGY COMMISSION
RAW MATERIALS OPERATIONS
NEW YORK OFFICE

September 20, 1950

Mr. Ted D. Isham
Hardwood, Michigan

Dear Mr. Isham:

Please refer to our letter of August 15, 1950. We have now received the results of the chemical assays of the two samples which we described to you in that letter. They are as follows:

Sample Number 1361D, labeled by you number 14, which showed by radiometric tests 0.4% U_3O_8 equivalent showed by chemical assay 0.3% U_3O_8. 1.030

Sample Number 1361E, labeled by you number 15, showed by radiometric tests 0.1(7)% U_3O_8 equivalent and by chemical assay 0.16% U_3O_8.

Very truly yours,

Robert D. Nininger

Robert D. Nininger
Deputy Asst. Manager

Files February 12, 1951

Herbert V. Lee, Chief, General Exploration Branch, Raw Materials Operations

RECONNAISSANCE TRIP TO ISHAM-LEITCH CLAIMS, DICKINSON COUNTY, MICHIGAN

SYMBOL: RMEE:HVL:sgs

Summary

Radioactive occurrences have been reported throughout the Northern Peninsula of Michigan but, for the most part, it was found that the radioactivity was due to thorium. The first uranium occurrence reported was the Jones & Laughlin discovery in Baraga County, and the second was the Isham find in Dickinson County. On the Isham properties pitchblende occurs in narrow shear zones up to six inches in width and thirty feet in length. Within the shear zone the radioactive concentrations could be traced for a maximum distance of ten feet along the strike. One picked sample assayed 0.30% U_3O_8 but the average sample carried less than 0.10% U_3O_8. In the absence of drill hole or other underground information on the occurrences, it is impossible to properly evaluate them or to make an estimate of the reserves. Although there is little evidence to indicate the presence of commercial deposits of uranium, the area is new and little is known of its mineral resources.

General

The Northern Peninsula of Michigan has been the scene of a very active search for uranium during the past year but most of the radioactivity was found to be due to the presence of thorium and interest in uranium prospecting waned somewhat. Early in the fall of 1950, two samples were sent to our New York laboratory by Mr. T. D. Isham, Owosso, Michigan, from Dickinson County; pitchblende was tentatively identified in each sample In order that further information be obtained on the area prior to the closing in of the winter season, an immediate trip was arranged to the property. Mr. T. D. Isham co-owner of the claims, met the writer in Felch on November 11, 1950 and a short visit was made to the three uranium occurrences discovered by Mr. Isham.

The general geology of the area is shown on the Centennial Geological Map of the Northern Peninsula of Michigan, 1936, published by the State Geological Survey. According to reports, most of the land in the vicinity is state owned but the mineral rights are in the names of several land companies which formerly held the timber rights.

Prospect No. 1 is located four miles north and 1 mile west of Felch in the NW¼ of Section 7, T42N, R28W, Dickinson County. The infrequent outcrops in the area are predominantly of reddish brown gneissic granite and black mica schist cut by numerous, rather discontinuous east-west shear zones.

The radioactive zone from which the pitchblende had been reported was a minor, vertical shear zone striking east-west within which were a number of very thin hematite stringers up to ½ inch in width. There was no visible uranium mineralization but the strongest radioactivity was found in small, scattered areas in the hematite stringers. The entire zone as exposed was less than ten feet long, and efforts to trace the zone beyond the one exposure were of no avail as the shear zone died out several feet to the west and was obscured by overburden to the east.

Picked samples of the most highly radioactive zones in the hematite stringers gave the following assay results: 0.30% (Isham sample), 0.03 and 0.07% U_3O_8.

Prospects Nos. 2 & 3 are located approximately 1½ miles southwest of No. 1, in Section 13, T42N, R29W and are easily reached by means of an old logging road east of Sagola.

Prospect No. 2 is in a black mica schist at the south edge of an isolated knob of reddish brown coarse-grained gneissic granite. The highest radioactivity was found in scattered, small and irregular zones a few inches across within the schist, a few inches from the schist-granite contact. The contact zone, trending east-west was exposed for approximately ten feet and no extension of the radioactive zone could be found.

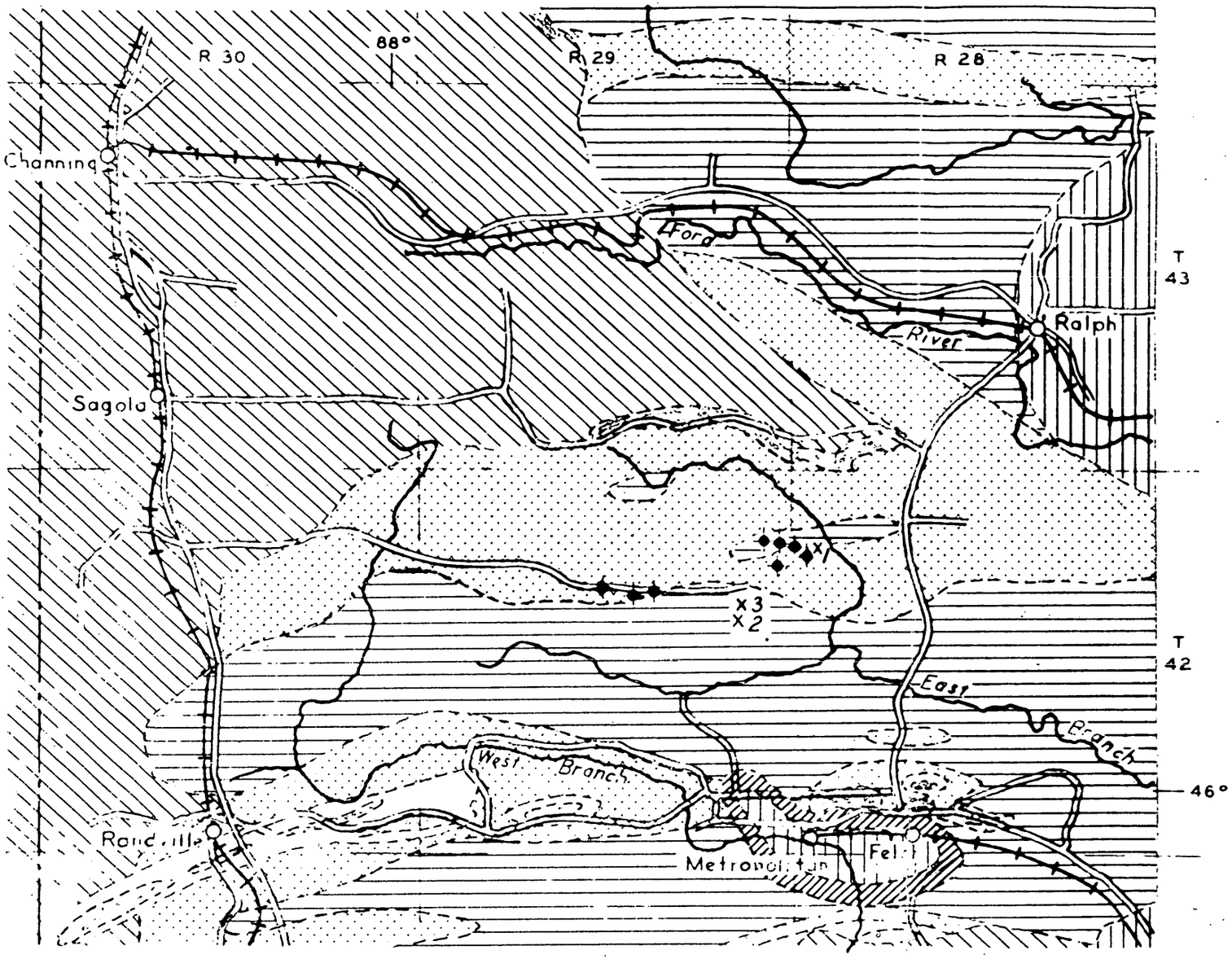
Picked samples of the radioactive zone contained only a few traces of a yellow secondary uranium mineral and assays for U_3O_8 ran from 0.02 - 0.10%. Pitchblende had been tentatively identified in one of the Isham samples from this outcrop. As in the case of Prospect No. 1, the occurrence at No. 2 is insufficiently exposed to permit an appraisal of its possibilities.

Prospect No. 3 is located about 1000 feet north of No. 2 point, in a small isolated knob of coarse-grained reddish brown gneissic granite. This occurrence is the most favorable appearing of the three and is also the most readily explored at depth. Radioactive mineralization was found in two sections of the outcrop, one along a ten foot vertical cliff face and the second twenty feet north in a six inch vertical shear zone cutting the granite. Along the cliff face are a number of scattered areas on which abnormally high readings were obtained with the counter but there was no visible uranium mineralization and no samples were taken.

The strongest radioactivity was found in a narrow shear zone where traces of a yellow radioactive mineral, probably gummite, occurs along the fracture surfaces. Although the shear zone could be traced for a distance of thirty feet, only the one ten foot zone gave above background readings on the counter. At the base of the cliff were many large boulders of black mica schist, suggesting the proximity to a granite-schist contact similar to the one at Prospect No. 2.

Picked samples along the shear zone ran from 0.01 - 0.16% U_3O_8. A tentative identification of pitchblende was made in one of the samples from this zone.

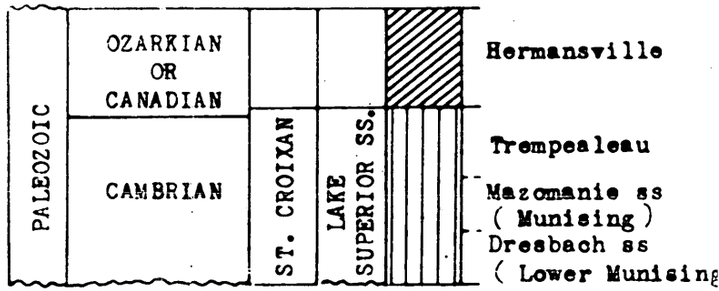
Enclosures:
1. Sample Descriptions
2. Map



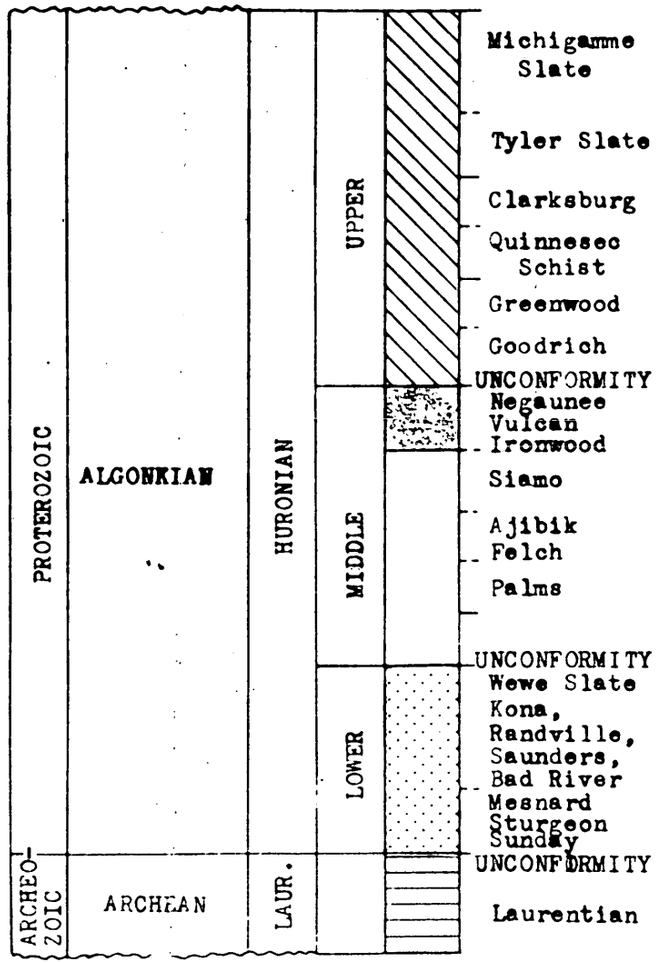
GEOLOGICAL MAP OF REPORTED URANIUM OCCURRENCES
DICKINSON COUNTY, MICHIGAN

1 0 1 2 3 4 5 MILES

✦ ANOMOLIES SHOWN ON U.S.G.S. "REDBALL" MAP



Stratigraphic column for pre-Keweenawan to Cambrian omitted. (outcrops not locally present)



JAN 19

RMO-914

RADIOACTIVE MINERAL DEPOSITS

Held By

J. E. LEITCH AND T. D. ISHAM

In

DICKINSON COUNTY, MICHIGAN

by

D. L. Everhart

United States Atomic Energy Commission
Division of Raw Materials
New York Operations Office

Issued: August, 1952

[redacted]

[redacted]

[redacted]

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James E. Leitch, Ossosso, Michigan	1

RADIOACTIVE MINERAL DEPOSITS HELD BY J. E. LEITCH AND T. D. ISHAM, DICKINSON COUNTY, MICHIGAN

by

Donald L. Everhart

ABSTRACT

Three claims containing mineralized zones with anomalous radioactivity are held by Messrs. James E. Leitch and Thad D. Isham, of Owosso, Michigan, in Dickinson County, Michigan. The first, leased from the Keweenaw Land Association of Boston, is in the NW¼ of Section 7, T.42N., R28W., about 5 miles northwest of the village of Felch. The other two are about 1½ miles southwest of the first, in Section 13, T.42N., R29W. and are leased from the State of Michigan.

At the first claim, dark red metamorphosed Laurentian granite is intersected by a fracture zone that is mineralized with hematite coatings and which, by field instruments, exhibits anomalous radioactivity. Selected samples of the most radioactive material assay 0.06% U_3O_8 radiometrically and 0.014% U_3O_8 chemically indicating that most of the radioactivity is due to small concentrations of thorium.

Claim No. 2 is characterized by a fracture zone cutting massive black biotite schist, parallel to a contact with course-grained granitic gneiss of the Laurentian formation. Radioactivity ranging from 3 to 10 times background is registered for 30 feet along the fracture.

A few tons of rock have been blasted from a prominent outcrop along the zone, and samples of the most radioactive and freshly blasted rock adjacent to the fracture assay 0.02% U_3O_8 radiometrically and 0.000% U_3O_8 chemically.

Claim No. 3, lying about 1200 feet northeast of No. 2, is very similar geologically and picked samples of the most radioactive rock in a 30 foot mineralized fracture zone assay 0.02% U_3O_8 radiometrically and 0.002% U_3O_8 chemically.

The above grade figures and size of the known and indicated mineral concentrations strongly indicate that none of the three claims contain commercial quantities of uranium ore, near the surface. However the presence of uraninite, the primary oxide of uranium, in Claims No. 2 and 3 may justify at least a moderate exploration effort to test the uranium-bearing structure at depth in the hope of discovering higher-grade deposits.

INTRODUCTION

Radioactive samples from properties held by Mr. J. B. Leitch and T. D. Isham, of Owosso, Michigan, in Dickinson County, Michigan were submitted to the A.E.C. in 1950. An examination of the properties was made by H.V. Lee, then Chief of the General Exploration Branch of the A.E.C., on November 11, 1950 and described in a memorandum report dated February 12, 1951. Mr. L.P. Barrett, in charge of the Division of Raw Materials' exploration contract in Michigan, examined the properties in the summer of 1951 and submitted results of several sample assays on December 7, 1951. Finally, the writer re-examined the properties in the company of Mr. Isham on July 15, 1952 in order to observe the results of blasting on Claim No. 2, and to make a current appraisal of the potentiality of the properties as uranium ore producers.

CLAIM NO. 1

Claim No. 1, leased by Messrs. Leitch and Isham from the Keweenaw Land Association of Boston, Massachusetts, lies in the NW¼ of Section 7, T.42N., R23W., and is accessible by about 5 miles of graded road north and west of the village of Felch (see Fig. 1).

The claim is underlain by scattered outcrops of dark red gneissic Laurentian granite of Archean age. The granite is marked by its metamorphosed character, high content of jasper, and hematite staining. In one prominent outcrop a small group of parallel vertical fractures trending N.15-20E. are filled with coatings of specular hematite, and

along a ten-foot sector of this fracture zone, readings of several times background are recorded on field radiometric instruments. However, assays of carefully picked samples of the most radioactive material in the zone are as follows:

Laboratory No.	Collector (Year)	$\%U_3O_8$e (radiometric)	$\%U_3O_8$ (chemical)
1361-C	F. Pardee (1950)	-	0.031
1361-H	H.V. Lee (1950)	-	0.07
-	L.P. Barrett (1951)	0.013	0.001
-	L.P. Barrett (1951)	0.009	0.001
-	L.P. Barrett (1951)	0.065	0.024
4582-A	D.L. Everhart (1952)	0.06	0.014

No other anomalous radioactivity has been noted on the property.

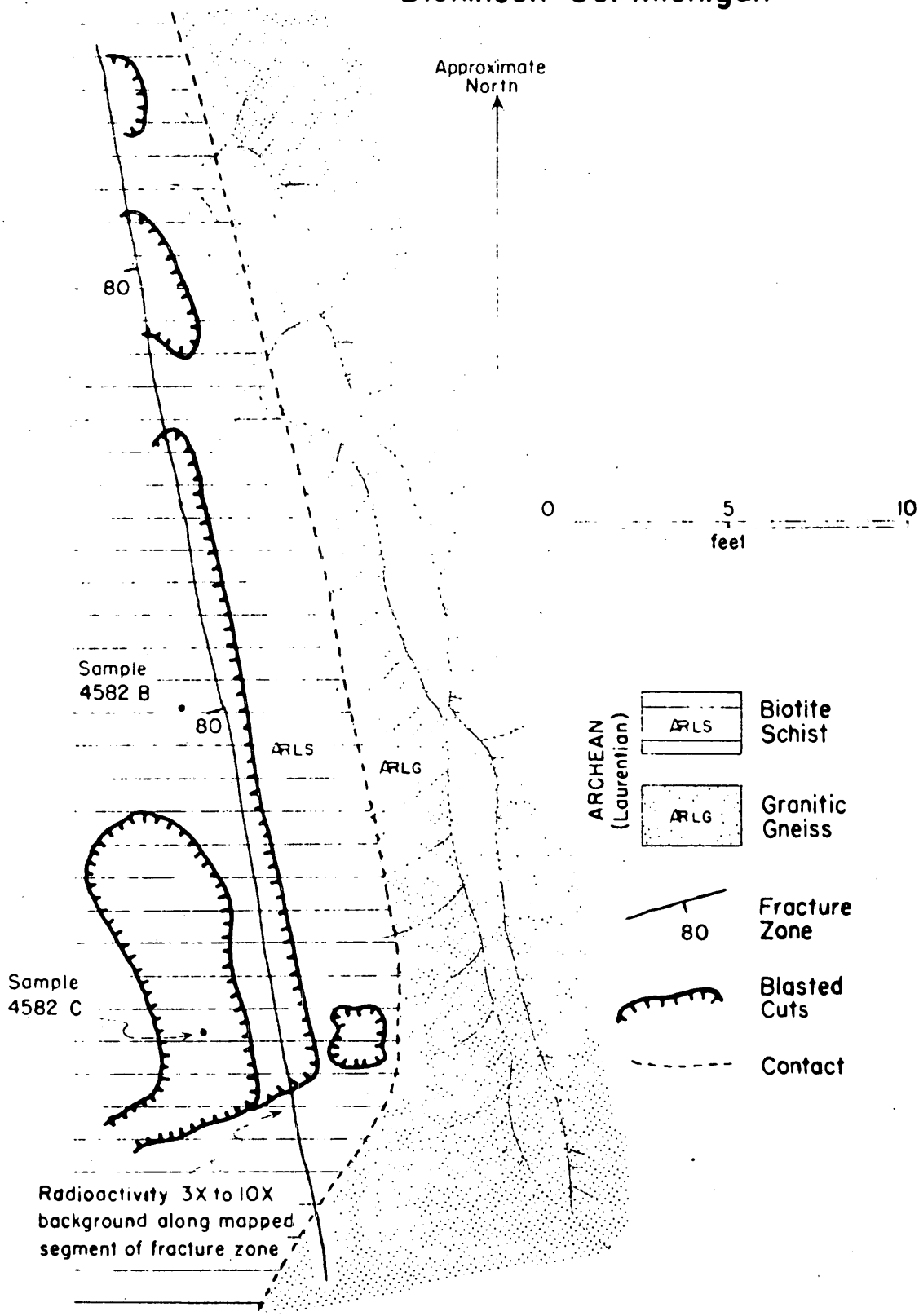
CLAIM NO. 2

Claim No. 2, which is leased from the State of Michigan, is in Section 13, T.42N., R29W., about 1½ miles southwest of Claim No. 1. An old logging road, running eastward from the Sagola-Randville highway, reaches a point within one mile of the deposit, but the eastern end of it is nonpassable during much of the year (see Fig. 1). Heavy equipment is towed to the property by means of a bulldozer capable of penetrating heavy brush and undergrowth.

The radioactivity noted on this claim lies along a prominent fracture that transects the west edge of a massive bedrock ledge (see Fig. 2).

Fig. 2

LEITCH ISHAM CLAIM No. 2
Section 13, T.42.N., R.29.W.
Dickinson Co. Michigan



Sketch by
D. L. EVERHART

The western part of the outcrop is underlain by massive black mica schist containing numerous small erratic quartz stringers and feldspar concentrations. The rest of the outcrop is underlain by coarse-grained granitic gneiss. Both rock types are members of the Laurentian formation of Archean age. The fracture cutting the schist trends N.10W. and dips 80°SW. and for about 30 feet along the fracture, several tons of schist have been blasted from the outcrop adjacent to the radioactive segment of the fracture zone. Except for this 30 foot zone, no other anomalous radioactivity has been noted on the property.

Assays of selected samples of the most radioactive rock found by various investigators on the prospect are tabulated below:

Sample No.	Collector (Year)	$\%U_3O_8$ (radiometric)	$\%U_3O_8$ (chemical)	Remarks
1361-I	H.V. Lee (1950)	-	0.03	
1361-J	H.V. Lee (1950)	0.02	-	
-	L.P. Barrett (1951)	0.01	0.003	
-	L.P. Barrett (1951)	0.029	0.002	
4582-B	D.L. Everhart (1952)	0.009	0.002	
4582-C	D.L. Everhart (1952)	0.02	0.008	Collected from freshly blasted rock in the most radioactive spot in the prospect.

CLAIM NO. 3

Claim No. 3, also leased from the State of Michigan, is in Section 13, T.42N., R29W., about 1200 feet N.35E. of No. 2. Here a prominent gneissic granite outcrop (of the Laurentian formation), some 30 feet in height is transected by a shear zone in which there are numerous quartz stringers. For a length of about 50 feet along the shear, which trends N.80W. and dips 75° SW., radioactivity of 4 to 5 times background is recorded on field radiometric instruments. Assays of picked samples of the most radioactive parts of the zone, as located by Lee and the writer, are as follows:

Sample No.	Collector (Year)	$\%U_3O_8$ (radiometric)	$\%U_3O_8$ (chemical)
1361-K	H.V. Lee (1950)	-	0.01
4582-D	D.L. Everhart (1952)	0.02	0.002

MINERALOGY

Carefully hand-picked concentrates of the radioactive mineral in specimens selected by the writer from Claim No. 2 were prepared by mineralogists in our New York laboratory. These were submitted to the U. S. Geological Survey for X-ray study and the radioactive mineral was determined to be uraninite. Identification of similar material, collected by others in 1950, has also indicated minute amounts of pitchblende, a variety of uraninite, in specimens said to be collected in both Claims No. 2 and 3.

CONCLUSION

From the limited exposures and relatively small amount of exploratory work on the properties, no realistic quantitative estimate of ore reserves can be made. However the small linear extent and narrow width of the exposed radioactive rock, together with the low chemical assays of the picked samples, indicates no workable uranium ore at the surface.

Blasting on the No. 2 claim has only been surficial, and since uraninite has been identified at the surface there is a possibility that better concentrations of primary uranium oxide might conceivably be encountered at depth along the controlling fractures. From experience with similar deposits near the east shore of Lake Superior, however, this possibility is not believed to be particularly strong.

URANIUM LEASE NO. 2

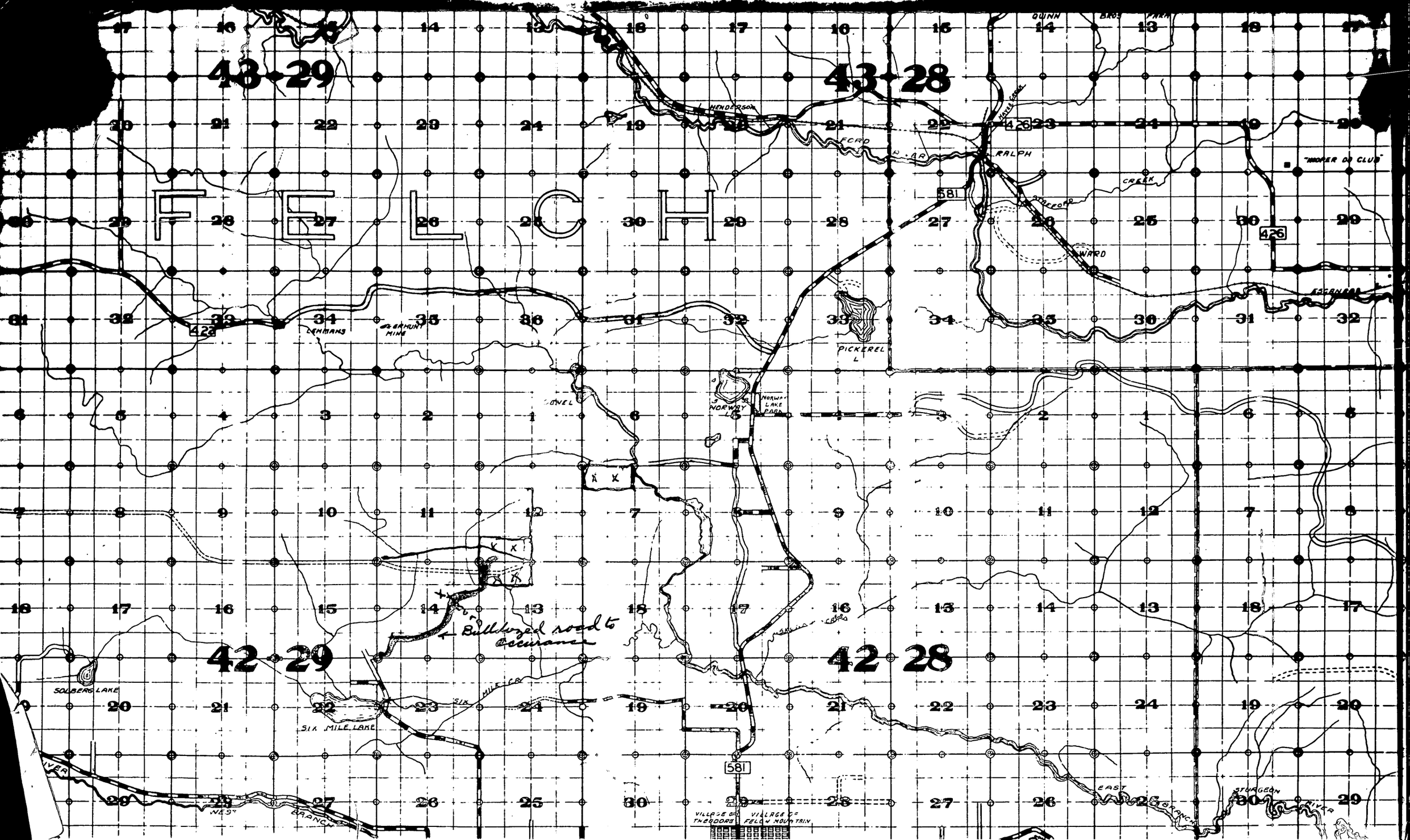
Schedule A - Fee Ownership

Thad D. Isham and James E. Leitch

Township forty-two North (T 42 N), Range twenty-nine West (R 29 W)

Section twelve (12): South half of Southwest quarter ($S\frac{1}{2}$ of $SW\frac{1}{4}$).

Section thirteen (13): North half of Northwest quarter ($N\frac{1}{2}$ of $NW\frac{1}{4}$).


43-29
43-28
42-29
42-28
FELCH
HENDERSON
FORD
RALPH
CREEK
"MOPER OD CLUB"
581
426
424
LEMMANS
GERMUNT MINE
PICKERELL L
NORWAY LAKE PARK
NORWAY L
Bulldozed road to accurance
SOLBERS LAKE
SIX MILE LAKE
SIX MILE CR
WEST BRANCH
EAST BRANCH
STURGEON RIVER
VILLAGE OF THEODORE
VILLAGE OF FELCH MOUNTAIN

STATE OF MICHIGAN

Exploration and Mining Lease for Ores
which Are Source Material for Fissionable Elements
and Associated Minerals and Metals

No. 2

THIS INDENTURE, Made this first day of August, 19 50, by and between THE DEPARTMENT OF CONSERVATION FOR THE STATE OF MICHIGAN, hereinafter called "Lessor", party of the first part, and THAD D. ISHAM AND JAMES E. LEITCH, Owosso, Michigan, hereinafter called "Lessee", party of the second part.

WITNESSETH, That, for and in consideration of One Dollar ($1.00) in hand paid, the receipt whereof is hereby confessed and acknowledged, and of the execution and delivery by the Lessee to the Lessor of a bond for the performance by the Lessee of its covenants and agreements contained in this lease, the receipt and sufficiency of both of which are hereby acknowledged, and in further consideration of the covenants, agreements and conditions hereinafter contained, to be observed, kept and performed by the Lessee, the Lessor, in accordance with the authority vested in it by The Public Acts of the State of Michigan, and due approval hereof by the State Administrative Board, has demised and leased, and by these presents does demise and lease for the purposes hereinafter set forth, to the said Lessee, its successors and assigns, each and all of the following tracts and parcels of land situated in the County of Dickinson, State of Michigan, and more particularly described as follows:

S½ of SW¼, Section 12, subject to a State Iron Ore Exploration and Mining Lease dated January 3, 1950 to the Hanna Coal and Ore Corporation for the SW¼ of SW¼, Section 12; and the N½ of NW¼, Section 13; Township 42 North, Range 29 West, containing 160.00 acres, but subject in each case to all legal rights of way, easements, licenses, and permits and, with respect to each of certain of said tracts or parcels, to the respective surface conveyances, leases, licenses, or easements as listed after such tract or parcel, but including each, all, and singular the rights, title, interest, and estate of the Lessor in and to each, all, and singular said tracts, parcels, and premises and including all rights under, by virtue of, or in connection with each and all such surface conveyances, leases, licenses, and easements; for and during the term of twenty-five years from and after the date hereof, or until, as to each such respective tract or parcel, this lease shall be earlier terminated in the manner hereinafter provided. Said premises are leased to the Lessee for the purpose of giving and granting to the Lessee, its successors, assigns and sublessees, the exclusive right and privilege of entering into and upon said leased premises and each and every part thereof so long as this lease shall remain in effect with respect thereto, and to explore for, mine, remove, and ship any ores which are source material for fissionable elements and such other minerals and metals directly associated with source material for fissionable elements as are found and contained in the same ores which are source material for fissionable elements, which it may desire, as are or may be found therein or thereon, together with the full right, privilege and authority of constructing, erecting, maintaining, and removing any and all such buildings, structures, machinery, excavations, openings, ditches, drains, water pipes, railroads, truck and wagon roads, tramways, and other improvements, property, and fixtures as may be reasonably necessary, convenient, or suitable for mining, removing, concentrating, and shipping any of such ores or materials or products thereof or for any activities incidental thereto or to any of the rights or privileges of the Lessee hereunder, including full right and authority to divert streams and to remove lateral and subjacent support, and to cave, subside, or destroy the surface or any part thereof, and to dump earth, rocks, waste and lean ores or materials on any part of such surface where it will not interfere with mining, and to commit waste to the extent necessary, usual, or customary in the carrying out of any and all of such purposes, rights, privileges or authorities. It is hereby understood and agreed that the Lessor retains all other rights and interests not inconsistent with the right herein granted, to the extent that the same may be exercised, used, or retained without in any way interfering with the full and free exercise by the Lessee of its rights and privileges hereunder.

While the Lessor represents that it (and the State of Michigan for which it is acting in accordance with due authority) is the owner of the leased premises as hereinbefore set forth, it does not warrant its title thereto and it is therefore specifically understood and agreed that the Lessee shall not, either by accepting and executing this lease or otherwise, be estopped or otherwise prevented from questioning or contesting the Lessor's title to any part or parts of the leased premises, but the Lessee shall be entirely free at any time, or from time to time, in case it shall appear that the Lessor's title as hereinbefore set forth to any part or parts of the leased premises shall be in any way defective, to contest, or to participate in any suit, action, or proceeding for the contesting of the Lessor's title; and that while the Lessor does not agree to refund otherwise to the Lessee any amounts paid hereunder under mistake as to the Lessor's title, Lessor does agree that the Lessee shall have full credit for any amounts so paid to the Lessor as royalty or minimum royalty on account of any ore or tract not belonging to Lessor with the right to use and apply the same in payment or satisfaction of obligations of the Lessee to pay royalty on ore shipped from, or minimum with respect to any part or parts of the leased premises as to which the Lessor has good title.

Definition of Source Material for Fissionable Elements

As used in this lease, the term "source material" shall mean any ore which contains uranium or any other material determined by the United States Atomic Energy Commission to be peculiarly essential to the production of fissionable materials in such concentration as the Atomic Energy Commission may by regulation determine from time to time.

Royalty

That the Lessee shall on or before the 20th day of January, April, July, and October of each and every year, so long as this indenture continues in force, pay a royalty to the Lessor at the rate of ten per cent (10%) of the gross value as shipped for all ores mined from the leased premises and shipped without treatment by the Lessee, as hereinafter provided, during the three months preceding the first day of the month in which the payments are to be made as aforesaid.

That the Lessee shall on or before the 20th day of January, April, July, and October of each and every year, so long as this indenture continues in force, pay a royalty to the Lessor at the rate of ten per cent (10%) of the gross value as shipped, less milling or refining costs, or both, for all concentrates, minerals and metals taken from ores mined and treated on the leased premises and shipped by the Lessee, as hereinafter provided, during the three months preceding the first day of the month in which the payments are to be made as aforesaid.

The value of the uranium or other fissionable elements contained in such ores, concentrates, minerals and metals shall be based on the existing published price, or the price supported by the United States Atomic Energy Commission, or the actual sale price, whichever is the greatest. The value of all materials other than uranium or other fissionable elements contained in the ores shall be based on the average price during the royalty period in which the shipments occur, as published in the Engineering and Mining Journal, or a similar reliable publication, or the actual sale price, whichever is the greater. Provided, however, that the full value of the ores shall be determined by the combined values of the uranium and other fissionable elements and of such other minerals or metals which may be contained in the same ores. All fees and expenses in connection with the evaluation of the mined ores, and the concentrates, minerals and metals taken from the mined ores shall be borne by the Lessee.

Reports on Weights, Analysis and Costs

The Lessee shall submit sworn statements at the end of each royalty period hereinbefore mentioned, showing the certified weights, analysis and values of any and all ores, concentrates, minerals and metals shipped during the preceding royalty period. The Lessee shall also submit sworn statements at the end of each royalty period hereinbefore mentioned, showing actual costs of milling and refining ores mined from the leased premises and so milled and refined to produce concentrates, minerals and metals shipped during the royalty period for which royalty payments are being made.

The method of determining the analysis and grades of ores mined, and of concentrates, minerals and metals taken from ores mined from the leased premises and shipped shall be by agreement between the Lessor and Lessee and shall be in accordance with established and customary practice.

Exploration Period

The period of this lease from the date hereof to and including July 31, 19 53, shall be known as the exploration period, and it is understood and agreed by the Lessee that it will expend the sum of Sixteen Hundred and no/100- - - - -Dollars ($----1,600.00--) prior to August 1, 19 51, and a similar amount for each year of the exploratory period after August 1 19 51, for exploration on the leased premises by drilling, test pitting, trenching, shaft sinking or by such geological methods of exploration as may be approved in writing by the Lessor or for experimental or developmental work on the beneficiation, concentration, or treatment of source material for fissionable elements which may be found in such area. It is understood that the obligation to spend Sixteen Hundred and no/100------Dollars ($---1,600.00----) in any year following the first year shall be satisfied to the extent of the expenditures in prior years shall exceed the total of stated amounts to be spent in such years.

On or before November 1, 19 51, Lessee shall submit a report to Lessor covering the exploration work carried on during the period from the date of this lease to August 1, 1951. Similar annual reports shall be submitted for subsequent years of the exploration period. These reports shall describe the type and extent of exploratory work carried on on the leased premises, and shall contain an expenditure report for the exploratory work conducted by the Lessee during the required period. Lessee also shall submit drill records, file maps and sections describing in detail the results which have been obtained in exploration work on the leased premises.

Rental

For the rental during the exploration period of this lease, the Lessee shall pay annually to the Lessor a sum equivalent to ten cents (10¢) per acre of land held subject to this lease on the date such rental payment shall be due. Such payment shall be due annually in advance and shall operate to reimburse the Lessor for a similar amount paid in the form of a specific tax each year on state-owned lands.

Minimum Royalty

For the year commencing August 1, 19 53, and for each year thereafter during which this lease shall continue in effect, and regardless of whether Lessee shall conduct any mining or other operations on the premises, the Lessee shall pay to the Lessor an annual minimum royalty or rent for the premises hereby leased and the rights and privileges hereby granted, at the rate of Twenty-five Dollars ($25.00) per acre for acreage subject to this lease at the beginning of the year for which payment is made; provided, however, if a commercially minable body of ore has been discovered before the expiration of the exploratory period of this lease on any description of land subject to this lease, the Lessee shall, commencing with the payment of minimum royalty or rent for the year next ensuing after the discovery of such commercially minable body of ore, pay to the Lessor as minimum royalty or rent for such individual description of land the sum of Twenty-five Dollars ($25.00) per acre annually so long as it remains unsurrendered and subject to this lease. Such minimum royalty for any year to the extent not satisfied by royalty on ore shipped from any part or parts of the leased premises during the corresponding year, shall be paid on or before August 20, 1954, for the lease year directly preceding. ~~the month in which the payment is made.~~ If in any such year the Lessee shall ship ore from the leased premises, it shall be required to pay minimum royalty for such year only if and to the extent that royalties accruing on the ore shipped shall be less than the minimum royalty for such year. The Lessee shall have credit for any amount or amounts paid to the Lessor as for minimum royalty, and any and all such credits may be used and applied by the Lessee, so far as the same will go and be required to satisfy any amounts coming due under this lease to the Lessor for royalty in any subsequent year or years in excess of the current minimum royalty for the year of application.

Operations

All mines on said premises shall be opened, used and worked in such manner only as is usual and customary in skillful and proper mining operations of similar character when conducted by the proprietors or other prudent operators, and so as not to do, cause or permit any unnecessary and unusual permanent injury to the same or any improper interference or hindrance in the subsequent operation of said mine or mines; provided that, subject to the above requirements the Lessee may from time to time use and employ such methods of mining as to the whole or any part of the ore upon said property, or under any portion thereof, as it may desire or find most profitable and economical, or may, when it deems it necessary or desirable, discontinue operations entirely so long as it shall well and truly meet its obligations hereunder to pay taxes and minimum royalty, if any; and provided further that nothing contained in this lease shall require the Lessee to develop a separate shaft or shafts on the leased premises or any part thereof, or prevent said Lessee from developing mine or operations on the leased premises or any part thereof solely through or in connection with its operations on or in any adjoining or nearby property or properties as to it may seem most desirable, taking into account its developments and operations on any or all adjoining or nearby properties, or require the Lessee to mine, preserve or protect in its mining operations any ore which, under good mining practice, cannot be mined and shipped at a profit to the Lessee at the time encountered.

Taxes

The Lessee does hereby covenant, promise and agree that it will pay as and when the same shall become due and payable and save and indemnify the Lessor from and against all lawful public taxes and assessments, if any, whatsoever, whether general, specific or otherwise, which are legally assessed and levied upon or against the leased premises, or any part thereof, or on any ores or other product thereof, or any property or improvements that may be placed or made thereon by, or under, the Lessee, or any business or occupation that may be pursued or carried on by or under the Lessee upon the leased premises during the times this lease shall remain in effect with respect thereto, but Lessee shall not be liable for the payment of any taxes accruing by reason of the payment to or receipt by the Lessor of royalties or any other amounts herein provided to be paid by the Lessee, whether such taxes be designated as income taxes, royalty taxes, or otherwise. And it is agreed by the parties that upon the termination of this lease for any cause or with respect to any of said premises at a time other than at the end of any year, the Lessee shall be liable for the payment of only such proportion of any such taxes for such year on or with respect to the premises being surrendered, as the part of such year elapsed prior to the effective date of the termination shall bear to the entire year. Provided, however, that the Lessee shall always have the right to contest in the courts or otherwise, the validity of any taxes or assessments hereby required to be paid by it, in case the same shall be deemed unlawful, unjust, unequal or excessive, or to take such other steps or proceedings as may be necessary to secure a cancellation, reduction, readjustment or equalization thereof, before the Lessee shall be required to pay and discharge the same, or any part thereof; but, provided further, that the Lessee shall not permit or suffer the demised premises, or any part thereof, or any ore mined thereon, or any improvements or personal property thereon, to be sold at any time for such taxes or assessments.

Waste

The Lessee further agrees that it will not permit or suffer to be made any waste of the leased premises (except such waste as may be necessarily or customarily incidental to the conduct of the mining operations herein contemplated or the full and proper exercise of any of the rights and privileges hereby granted): that at the end of said term, or the termination of this lease or demise, in whole or in part, whether by forfeiture, expiration of time, surrender by the Lessee or otherwise, it will peaceably surrender the leased premises or the governmental descriptions affected thereby, as the case may be, to the Lessor with all caves and openings properly fenced, filled or protected as may be required by any laws or proper regulations of any duly constituted governmental authority then in effect and with all stopes, shafts and underground openings that may be made by the Lessee thereon, in good order and condition, ordinary wear and tear in use and deterioration from and damage by the elements excepted.

Removal

It is mutually agreed that the Lessee shall have ninety (90) days after any such termination or surrender in which to remove all engines, tools, machinery, railway tracks, shaft houses, buildings, dwellings, and structures and all other property of every nature and description erected, placed or situated upon the premises as to which this lease is being terminated or surrendered, except any and all

supports placed in any shafts, drifts, or openings thereon or any timber or frame work necessary to the use and maintenance of shafts or approaches to mines or tramways within mines, none of which shall be removed or destroyed by the Lessee; provided, always, however, that none of said property may be removed by the Lessee unless all payments of taxes, if any, (except taxes not then due and payable, which must and will be paid within thirty (30) days after they become due and payable), royalties then due and other dues shall have been made and all other covenants, agreements and conditions hereof obligatory upon the Lessee shall have been properly and faithfully observed and performed. Upon the failure of the Lessee to remove any such permitted property within said period of ninety (90) days, the same shall belong to and become the absolute property of the Lessor.

Inspection by Lessor

It is mutually agreed that said Lessor, its agents and servants, may at all reasonable times, subject to any security rules and regulations imposed by the United States Atomic Energy Commission, enter upon the demised premises, or any part thereof, peaceable, and view the same, and take all reasonable means to ascertain the condition thereof, and the kind, qualities and quantities of ore therein or removed therefrom, not thereby unreasonably or unnecessarily hindering or interrupting the proper business or operations of the Lessee; provided, however, that said Lessor agrees to save the Lessee harmless from all claims for damages arising out of any death or personal injuries sustained by any such agents or servants of the Lessor while in or upon said premises as herein permitted, unless the death or injury arises as the result of negligence of the Lessee.

Default

It is mutually agreed that if the royalty hereby reserved, or the minimum royalty or rent herein agreed to be paid by the Lessee, or any part of either thereof, be and remain unpaid after the days and times above specified, or if the Lessee shall fail to keep any of the other conditions herein expressed to be kept, performed or observed by the Lessee, and if any or either such failure shall continue for sixty (60) days after written notice from the Lessor specifying any such default, neglect or failure, such notice to be given in the manner hereinafter provided, then and from thence forward it shall be lawful for the Lessor, with or without any process of law or judgment, to enter upon and take possession of the demised land or any part thereof, in the name of the whole, and the said land together with all ores, machinery, fixtures, improvements and personal property thereon to possess and hold, and to exclude forcibly if necessary and without being guilty of any trespass or other wrongful act, the Lessee and any and all persons claiming under it, and at the election of the Lessor to declare this lease terminated and the rights of the Lessee hereunder forfeited; and any such re-entry on the part of the Lessor shall be without prejudice to any other remedy or proceedings which the Lessor might have in law, equity or otherwise by reason of any breach of any covenants, promise or agreement of the Lessee herein contained, or for the recovery of possession of said premises, and provided that if the Lessee shall deny the failure alleged by the Lessor and shall demand arbitration thereof in the manner hereinafter provided, the period required for the hearing and determination of such matter by the arbitrators shall not be deemed a part of said sixty (60) days hereinbefore referred to, and if the contention of the Lessor be sustained by the arbritrators, the Lessee shall have sixty (60) days after the filing of the decision by the arbitrators in which to correct the failure complained of.

Termination of Lease or Surrender of Rights by Lessee

It is hereby further covenanted, agreed and understood by and between the said parties hereto, that the Lessee may:

(a) At any time terminate the foregoing lease and demise; and/or

(b) At any time and from time to time separately surrender the rights, privileges and easements hereinabove granted, leased and demised to it, and terminate its obligations hereunder, insofar as the same pertains to any one or more designated governmental descriptions which are part of the leased premises:

by giving the Lessor, or those having its estate in the premises, written notice of its intention so to do at least sixty (60) days before such termination or surrender, as the case may be, such notice to be given in the manner herein provided; and in each such case this lease shall terminate, or the rights and obligations of the

Lessee with respect to the designated governmental descriptions surrendered shall terminate as the case may be, sixty (60) days after the giving of such notice, provided that all of the covenants, agreements and conditions hereof obligatory upon the Lessee, including payment of all minimum royalty, royalties and other sums that may have accrued and become payable hereunder (but not including taxes, if any, or other amounts not then due and payable, which must and will be paid within thirty (30) days after they become due and payable), shall have been properly kept and performed by the Lessee; and the Lessee must and will upon any such termination or surrender, as the case may be, and upon the request therefor by the Lessor, forthwith execute and record in any public office where this instrument may have been filed and recorded, a formal release and discharge, evidencing such termination or surrender, as the case may be.

Lessor's Lien

That the Lessor shall at all times have, possess, and hold a lien upon all ores mined but not shipped from the leased premises, and upon all machinery, personal property and improvements placed upon said premises by the Lessee, as security for any unpaid balance of money due hereunder, and as security for the performance by the Lessee of each and all of the covenants and conditions hereof obligatory upon the Lessee, which lien may be enforced against any such property in like manner as liens conferred by chattel mortgages, or by any other lien security, are or may be entitled to be enforced under the laws of Michigan. Nothing herein contained, however, is intended or shall be construed to prevent the sale and removal of said ore or concentrated products in the usual course of business, nor to prevent the removal of tools, machinery, equipment or any other property at any time when said Lessee shall not be in default; and the above referred to lien shall not, in case of sales of ore or concentrated products to third parties, be deemed to follow the same as against such third parties.

Arbitration

In case any disagreement or controversy shall arise between the parties hereto relative to the observance or fulfillment or construction of the terms and obligations hereof, then such controversy or disagreement shall be determined by arbitration. Either party may within a reasonable time after such disagreement arises demand arbitration thereof and the party making such demand shall in writing specify the matter to be submitted to arbitration and at the same time choose and nominate some disinterested competent person to act as an arbitrator; thereupon within ten (10) days after receipt of such written notice the other party to this lease shall in writing choose and nominate a disinterested and competent arbitrator and the two arbitrators so chosen shall promptly select a third arbitrator, giving written notice to both parties of the choice so made and fixing a place and time for meeting not later than thirty (30) days thereafter, at which both parties may appear and be heard touching such controversy. The decision of said arbitrators shall be made in writing within thirty (30) days after the completion of hearings thereon, and when signed by a majority of them shall be final and conclusive upon both parties, and the award so made shall be forthwith complied with. In case the notified party shall neglect or refuse to choose and nominate an arbitrator within the time herein specified, or in case the two chosen by either method herein provided shall fail to agree upon a third arbitrator, then such arbitrator shall in each case, upon application of either party, be named by the person (or any one of the persons) who may then be holding the office of judge of the United States District Court in and for the district in which the mine is located, or the person holding an office which corresponds to such office as now extant if it shall then have been abolished. The expenses of any such arbitration, including reasonable compensation for the arbitrators, shall be paid by the party against which the award shall be made or as otherwise directed by the arbitrators.

Addresses

For the purposes hereof, the address of the Lessor shall be Department of Conservation, State Office Building, Lansing, Michigan, or such other place as it may have last designated in writing to the Lessee, and the address of the Lessee shall be Owosso, Michigan, or such other place as it shall have last designated in writing to the Lessor.

Routine or regular periodical reports, statements and payments hereunder may be sent by regular mail so addressed; and, if so addressed and mailed in due season, then if any of the same shall not be received when due, the addressee will notify the addressor of such failure of receipt and give the addressor a reasonable

time to follow up and secure the delivery of the statement, report or payment, or a duplicate thereof, before claiming any default on account of such failure of delivery. But as to any formal notices of surrender, cancellation, default or termination, the same shall be delivered to the party notified either personally or by registered mail to be effective hereunder.

Successors and Assigns

It is further covenanted, agreed and understood between the parties hereto, that this lease and the covenants, agreements and conditions herein contained shall run with the land, and shall inure to the benefit of and be binding upon the successors and assigns of the parties hereto, respectively as if mentioned throughout by words of appropriate designation.

Bond

The Lessee has delivered to the Lessor a bond, with surety satisfactory to the Lessor, in the amount of One Thousand Dollars ($1,000.00) for the performance by the Lessee of the covenants and agreements of the Lessee contained in this lease, for the duration of the exploratory period of this lease. The Lessee further agrees that at such time as mining operations are commenced under the terms and conditions of this lease, the Lessee shall deliver to the Lessor a bond, with surety satisfactory to the Lessor, in the amount of Ten Thousand Dollars ($10,000.00) for the performance by the Lessee of the covenants and agreements of the Lessee contained in this lease pertaining to mining operations. The Lessee, its successors and assigns, will, at all times while this lease continues in effect, maintain such or a similar bond with reasonable surety to the Lessor in full force and effect; and, in case of any assignment of this lease by the Lessee, the same shall not be or become effective to release the assignor from liabilities thereafter accruing hereunder unless and until the assignee shall similarly furnish and confirm to the Lessor such or a similar bond for the performance of the Lessee's covenants and agreements hereunder by such assignee.

Federal Requirements

This lease shall be subject to all requirements that the government of the United States may impose for the purpose of maintaining national security, including loyalty investigations and including compliance with the provisions of Public Law 585 of the 79th Congress of the United States, commonly known as the Atomic Energy Act of 1946, and all amendments thereto, and of all subsequent Act or Acts which may be enacted for the purpose of maintaining national security; and where there is any inconsistency or conflict between the provisions and requirements of this lease and the federal requirements, the federal requirements shall govern. Failure of the Lessee to comply with the aforesaid requirements and laws of the United States for the handling of source materials, shall constitute grounds for the cancellation of this lease.

IN WITNESS WHEREOF, the said Lessor, by its Director, has hereunto affixed its name and the seal of the said department, by virtue of a resolution passed by the Department of Conservation on June 9, 19 50, and with due approval of the State Administrative Board duly given on July 5, 19 50, and the said Lessee has affixed its name and seal as of the day and year first above written.

Witnesses to the signatures of Director and Secretary:

Levis U. Sibley

J. D. Stephansky

DEPARTMENT OF CONSERVATION FOR THE STATE OF MICHIGAN

P. S. Hoffmaster, Director

Wayland Osgood, Secretary

Witnesses to the signature of Lessee:

Alice Lecureux

Thad D. Isham

James E. Leitch

STATE OF MICHIGAN)
) ss.
County of Ingham)

On this 27th day of July, 19 50, personally appeared before me, a Notary Public in and for the County of Ingham, P. J. Hoffmaster, Director, and Wayland Osgood, Secretary, of the Department of Conservation, personally known to me to be the same persons who executed the foregoing instrument, and who acknowledged the same to be their free act and deed and the free act and deed of the Department of Conservation, in whose behalf they act, and for the purpose in said instrument set forth.

Joseph D. Stephansky
Joseph D. Stephansky
Notary Public, Ingham County,
Michigan

My Commission Expires: Jan.12,1954

STATE OF Michigan
) ss.
County of Shiawassee

Before me, the undersigned, a Notary Public in and for said county and state on this 27 day of July, 1950, personally appeared Thad D. Solam and James E. Leitch, to me personally known, who being duly sworn, did say that _____ ~~and~~ _____ ~~of the corporation named in the foregoing instrument and acknowledges to me that~~ they executed the same as their free and voluntary act and deed and as the free and voluntary act and deed of such corporation, for the purposes therein mentioned and set forth, and that the seal affixed to said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors.

Alice Hosking
Notary Public, Shiawassee

My Commission Expires: 10/24/52

I HEREBY CERTIFY, That the within lease, insofar as it pertains to lands held in fee simple by the State and listed in Schedule A attached, was approved at a meeting of the State Administrative Board held on July 5, 1950.

August 2, 19 50.

Robert F. Steadman
Secretary, State Administrative Board
Robert F. Steadman

Docket No. D.M.E.A.-2697 URANIUM
Dickenson County, Mich

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JAN 8 1953

Sect 4, MF 103

(a) Glacial drift removed to bed rock and benches have been bulldozed as working ledges and to remove overburden to find width of chlorite schist formation. The three ben - ches were used to spot the compressor, drilling and blasting equipment, they also made it possible to use a 3/4 Ton Willys pick up to remove rock blasted out to further open the seam for inspection.
Accessibility to the lease haw been made possible by the bulldozing of a road from the end of the sixmile lake road, (see map attached) can drive directly to the Uranium occurance. We have possession of state leased land for the purpose of exploration and mining for Fissionable materials and Mr. Isham has supervised all the work done on this leasehold to date.

(b) There has been no commerical production of ores from this leasehold to date.

(c) Refer to the reports of Mr. Everhardt and Mr. H.V. Lee as attached imformation.

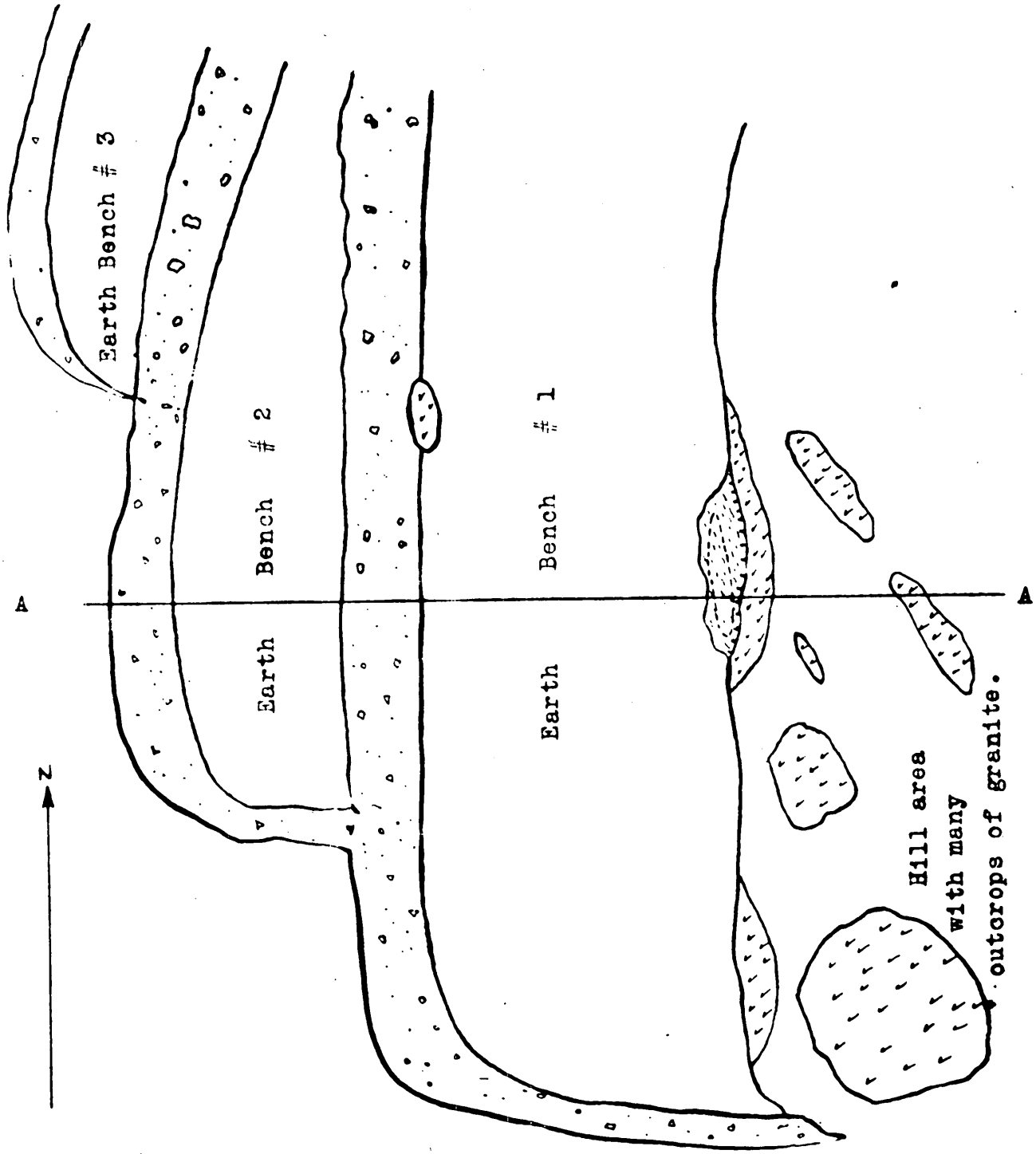
(d) Road into the project, rail shipping facilities only 12 miles at Segola, Michigan . Railroad and siding at this point and practically all supplies are available at Iron Mountain, 19 miles from project.

(e) Labor is available and no problem at present time. We have sufficient applications for all labor necessary. Materials, supplies and Equipment are near at hand. A stream of fresh water, open year around, is only about 400 feet from deposit. Power line is not available at present but in case of mining could be brought in, it is approximately 4 miles away at present.

Docket No. D.M.E.A. 2697 Uranium
Dickenson County, Michigan

Sect M.F.103

5-D Mr. Thad D.Isham will supervise the exploritory operations with the aid of a consultant enginer. The construction of Tool sheds and other buildingswill be done by Mr.Isham who has had fifteen year's experience at this type of work. As to his exploritory work,all work to date has been done by Mr,Isham. He has the knowledge of proper equipment to use for gravity explorritory operations, however any instructions or directions from the mining engineer and geologist,will be closely followed.



Glacial Surface Material

Pink to White granite

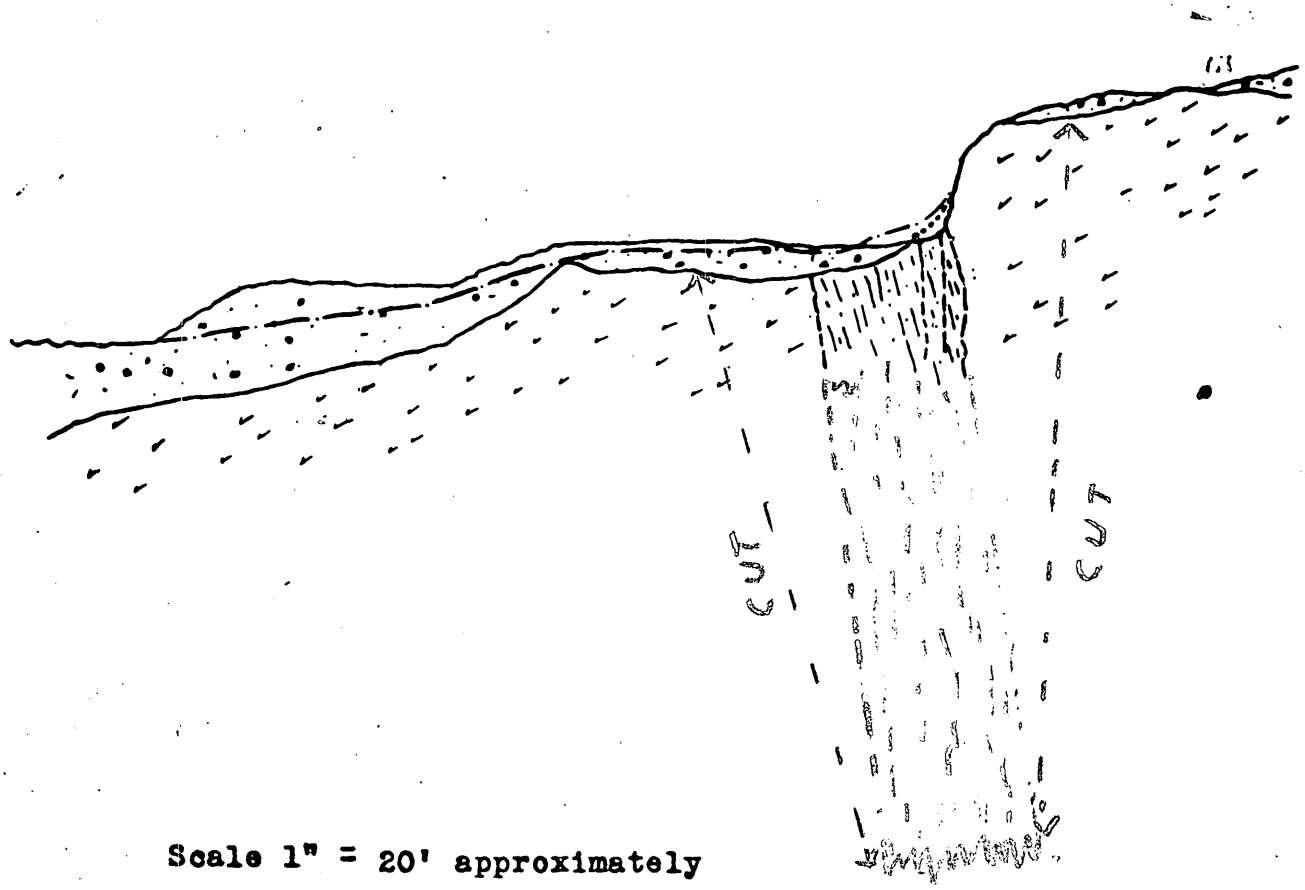
Biotite Schist

Radioactive zone

Scale 1" = 20' approximately

Figure 1. Plan view of prospect area.

Cross Section A-A (Looking North)



Scale 1" = 20' approximately

Glacial Surface Material

Pink to White granite

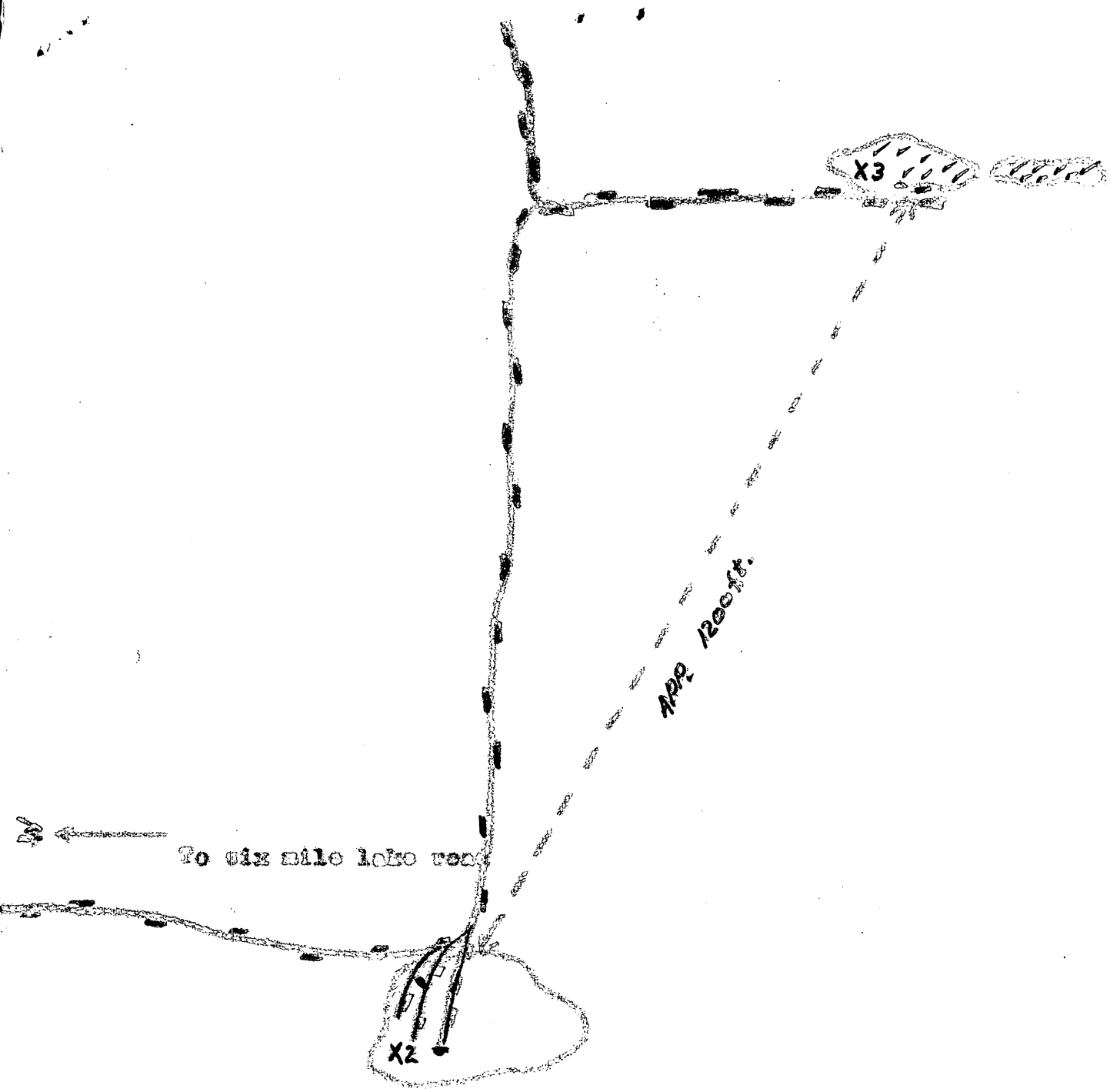
Biotite Schist

Radioactive zone

Former surface of ground

Former rock ledge surface

– FUTURE EXPLORITORY WORK



Bulldozed road
Radioactive zone
Outcrops
X2 X3 As U.S.G.S. "Redbell" Map
Scale ½ inch - 100 ft. approximately
Section 13, T42N, R29W, Dickinson County, Mich.
Outcrops not to scale and are only for identification of road and radioactive zones.

ADDRESS REPLY TO:

RAW MATERIALS OPERATIONS
U. S. ATOMIC ENERGY COMMISSION
P. O. BOX 30, ANSONIA STATION
NEW YORK 23, NEW YORK

and refer to:
RMEM:MM:ps

UNITED STATES
ATOMIC ENERGY COMMISSION
RAW MATERIALS OPERATIONS
NEW YORK OFFICE

September 20, 1950

Mr. Ted D. Isham
Hardwood, Michigan

Dear Mr. Isham:

Please refer to our letter of August 15, 1950. We have now received the results of the chemical assays of the two samples which we described to you in that letter. They are as follows:

Sample Number 1361D, labeled by you number 14, which showed by radiometric tests 0.4% U_3O_8 equivalent showed by chemical assay 0.3% U_3O_8. .030

Sample Number 1361E, labeled by you number 15, showed by radiometric tests 0.1(7)% U_3O_8 equivalent and by chemical assay 0.16% U_3O_8.

Very truly yours,

Robert D. Nininger

Robert D. Nininger
Deputy Asst. Manager

Files February 12, 1951

Herbert V. Lee, Chief, General Exploration Branch, Raw Materials Operations

RECONNAISSANCE TRIP TO ISHAM-LEITCH CLAIMS, DICKINSON COUNTY, MICHIGAN

SYMBOL: RMEE:HVL:sgs

Summary

Radioactive occurrences have been reported throughout the Northern Peninsula of Michigan but, for the most part, it was found that the radioactivity was due to thorium. The first uranium occurrence reported was the Jones & Laughlin discovery in Baraga County, and the second was the Isham find in Dickinson County. On the Isham properties pitchblende occurs in narrow shear zones up to six inches in width and thirty feet in length. Within the shear zone the radioactive concentrations could be traced for a maximum distance of ten feet along the strike. One picked sample assayed 0.30% U_3O_8 but the average sample carried less than 0.10% U_3O_8. In the absence of drill hole or other underground information on the occurrences, it is impossible to properly evaluate them or to make an estimate of the reserves. Although there is little evidence to indicate the presence of commercial deposits of uranium, the area is new and little is known of its mineral resources.

General

The Northern Peninsula of Michigan has been the scene of a very active search for uranium during the past year but most of the radioactivity was found to be due to the presence of thorium and interest in uranium prospecting waned somewhat. Early in the fall of 1950, two samples were sent to our New York laboratory by Mr. T. D. Isham, Owosso, Michigan, from Dickinson County; pitchblende was tentatively identified in each sample In order that further information be obtained on the area prior to the closing in of the winter season, an immediate trip was arranged to the property. Mr. T. D. Isham co-owner of the claims, met the writer in Felch on November 11, 1950 and a short visit was made to the three uranium occurrences discovered by Mr. Isham.

The general geology of the area is shown on the Centennial Geological Map of the Northern Peninsula of Michigan, 1936, published by the State Geological Survey. According to reports, most of the land in the vicinity is state owned but the mineral rights are in the names of several land companies which formerly held the timber rights.

Prospect No. 1 is located four miles north and 1 mile west of Felch in the NW¼ of Section 7, T42N, R28W, Dickinson County. The infrequent outcrops in the area are predominantly of reddish brown gneissic granite and black mica schist cut by numerous, rather discontinuous east-west shear zones.

The radioactive zone from which the pitchblende had been reported was a minor, vertical shear zone striking east-west within which were a number of very thin hematite stringers up to ½ inch in width. There was no visible uranium mineralization but the strongest radioactivity was found in small, scattered areas in the hematite stringers. The entire zone as exposed was less than ten feet long, and efforts to trace the zone beyond the one exposure were of no avail as the shear zone died out several feet to the west and was obscured by overburden to the east.

Picked samples of the most highly radioactive zones in the hematite stringers gave the following assay results: 0.30% (Isham sample), 0.03 and 0.07% U_3O_8.

Prospects Nos. 2 & 3 are located approximately 1½ miles southwest of No. 1, in Section 13, T42N, R29W and are easily reached by means of an old logging road east of Sagola.

Prospect No. 2 is in a black mica schist at the south edge of an isolated knob of reddish brown coarse-grained gneissic granite. The highest radioactivity was found in scattered, small and irregular zones a few inches across within the schist, a few inches from the schist-granite contact. The contact zone, trending east-west was exposed for approximately ten feet and no extension of the radioactive zone could be found.

Picked samples of the radioactive zone contained only a few traces of a yellow secondary uranium mineral and assays for U_3O_8 ran from 0.02 - 0.10%. Pitchblende had been tentatively identified in one of the Isham samples from this outcrop. As in the case of Prospect No. 1, the occurrence at No. 2 is insufficiently exposed to permit an appraisal of its possibilities.

Prospect No. 3 is located about 1000 feet north of No. 2 point, in a small isolated knob of coarse-grained reddish brown gneissic granite. This occurrence is the most favorable appearing of the three and is also the most readily explored at depth. Radioactive mineralization was found in two sections of the outcrop, one along a ten foot vertical cliff face and the second twenty feet north in a six inch vertical shear zone cutting the granite. Along the cliff face are a number of scattered areas on which abnormally high readings were obtained with the counter but there was no visible uranium mineralization and no samples were taken.

The strongest radioactivity was found in a narrow shear zone where traces of a yellow radioactive mineral, probably gummite, occurs along the fracture surfaces. Although the shear zone could be traced for a distance of thirty feet, only the one ten foot zone gave above background readings on the counter. At the base of the cliff were many large boulders of black mica schist, suggesting the proximity to a granite-schist contact similar to the one at Prospect No. 2.

Picked samples along the shear zone ran from 0.01 - 0.16% U_3O_8. A tentative identification of pitchblende was made in one of the samples from this zone.

Enclosures:
1. Sample Descriptions
2. Map

SAMPLE DESCRIPTION
DICKINSON COUNTY, MICHIGAN

Laboratory Number	Location	Prospect Number	% U_3O_8	Pitchblende Indicated	Rock Description
1361-D	Sec. 7 T42 R28W	1 (Isham Sample 14)	0.30	-	Reddish-brown granite.
1361-C	NW¼ NE½ Sec. 7 T42 R28	1 (Pardee)	.031	-	Area contains small diorite dikes-N80W. Sample from joints in granite.
1361-H	Sec. 7 T42 R28	1 (Lee)	0.07	-	Red brown granite hematite streaks.
1361-F	NW¼ Sec. 13 T42 R29	2 (Lewis, B.M.Mpls.)	0.03 e	-	100 gram split. Chlorite schist.
1361-G	Sec. 13 T42 R29W	2	0.019 e	X	100 gram split of sample furnished by Lewis, Bureau of Mines, Minneapolis.
1361-I	Sec. 13 T42 R29	2 (Lee)	0.03	-	Black mica schist at contact with granite.
1361-J	Sec. 7 T42 R28	2 (Lee)	0.02 e	-	Mica schist.
1361-L	Sec. 7 T42 R28	2 (Lee, Isham Sample)	0.10 e	-	Mica schist.
1361-K	1,000 ft. north of 1361-I	3 (Lee)	0.01	-	Reddish-brown granite. Fracture planes slightly coated with yellow mineral - gummite (?).
1361-E	NW¼ Sec. 13 T42 R29-?	3 ? (Isham Sample 15)	0.16	X	Schistose chlorite rock (mica schist). Pitchblende in very small amount.
1361-B	NW¼ Sec. 13 T42 R29-?	3 ? (Isham Sample 10)	.06	X	Pitchblende in granite. Indication of pitchblende reported by Professor Kerr.

NOTE: All picked samples

[redacted]

RADIOACTIVE MINERAL DEPOSITS

Held By

J. E. LEITCH AND T. D. ISHAM

In

DICKINSON COUNTY, MICHIGAN

by

D. L. Everhart

United States Atomic Energy Commission
Division of Raw Materials
New York Operations Office

Issued: August, 1952

[redacted]

[redacted]

RADIOACTIVE MINERAL DEPOSIT
DICKINSON COUNTY, MICHIGAN

Distribution	No. of Copies
Division of Raw Materials, Washington (J. C. Johnson)	3
Division of Raw Materials, New York (P. L. Merritt)	3
James E. Leitch, Ossoso, Michigan	1

RADIOACTIVE MINERAL DEPOSITS HELD BY J. E. LEITCH AND T. D. ISHAM, DICKINSON COUNTY, MICHIGAN

by

Donald L. Everhart

ABSTRACT

Three claims containing mineralized zones with anomalous radioactivity are held by Messrs. James E. Leitch and Thad D. Isham, of Owosso, Michigan, in Dickinson County, Michigan. The first, leased from the Keweenaw Land Association of Boston, is in the NW¼ of Section 7, T.42N., R29W., about 5 miles northwest of the village of Felch. The other two are about 1½ miles southwest of the first, in Section 13, T.42N., R29W. and are leased from the State of Michigan.

At the first claim, dark red metamorphosed Laurentian granite is intersected by a fracture zone that is mineralized with hematite coatings and which, by field instruments, exhibits anomalous radioactivity. Selected samples of the most radioactive material assay 0.06% U_3O_8 radiometrically and 0.014% U_3O_8 chemically indicating that most of the radioactivity is due to small concentrations of thorium.

Claim No. 2 is characterized by a fracture zone cutting massive black biotite schist, parallel to a contact with coarse-grained granitic gneiss of the Laurentian formation. Radioactivity ranging from 3 to 10 times background is registered for 30 feet along the fracture.

A few tons of rock have been blasted from a prominent outcrop along the zone, and samples of the most radioactive and freshly blasted rock adjacent to the fracture assay 0.02% U_3O_8 radiometrically and 0.000% U_3O_8 chemically.

Claim No. 3, lying about 1200 feet northeast of No. 2, is very similar geologically and picked samples of the most radioactive rock in a 50 foot mineralized fracture zone assay 0.02% U_3O_8 radiometrically and 0.002% U_3O_8 chemically.

The above grade figures and size of the known and indicated mineral concentrations strongly indicate that none of the three claims contain commercial quantities of uranium ore, near the surface. However the presence of uraninite, the primary oxide of uranium, in Claims No. 2 and 3 may justify at least a moderate exploration effort to test the uranium-bearing structure at depth in the hope of discovering higher-grade deposits.

INTRODUCTION

Radioactive samples from properties held by Mr. J. E. Leitch and T. D. Isham, of Owosso, Michigan, in Dickinson County, Michigan were submitted to the A.E.C. in 1950. An examination of the properties was made by H.V. Lee, then Chief of the General Exploration Branch of the A.E.C., on November 11, 1950 and described in a memorandum report dated February 12, 1951. Mr. L.P. Barrett, in charge of the Division of Raw Materials' exploration contract in Michigan, examined the properties in the summer of 1951 and submitted results of several sample assays on December 7, 1951. Finally, the writer re-examined the properties in the company of Mr. Isham on July 15, 1952 in order to observe the results of blasting on Claim No. 2, and to make a current appraisal of the potentiality of the properties as uranium ore producers.

CLAIM NO. 1

Claim No. 1, leased by Messrs. Leitch and Isham from the Keweenaw Land Association of Boston, Massachusetts, lies in the NW¼ of Section 7, T.42N., R28W., and is accessible by about 5 miles of graded road north and west of the village of Felch (see Fig. 1).

The claim is underlain by scattered outcrops of dark red gneissic Laurentian granite of Archean age. The granite is marked by its metamorphosed character, high content of jasper, and hematite staining. In one prominent outcrop a small group of parallel vertical fractures trending N.15-20E. are filled with coatings of specular hematite, and

along a ten-foot sector of this fracture zone, readings of several times background are recorded on field radiometric instruments. However, assays of carefully picked samples of the most radioactive material in the zone are as follows:

Laboratory No.	Collector (Year)	$\%U_3O_8e$ (radiometric)	$\%U_3O_8$ (chemical)
1361-C	F. Pardee (1950)	-	0.031
1361-H	H.V. Lee (1950)	-	0.07
-	L.P. Barrett (1951)	0.013	0.001
-	L.P. Barrett (1951)	0.009	0.001
-	L.P. Barrett (1951)	0.065	0.024
4582-A	D.L. Everhart (1952)	0.06	0.014

No other anomalous radioactivity has been noted on the property.

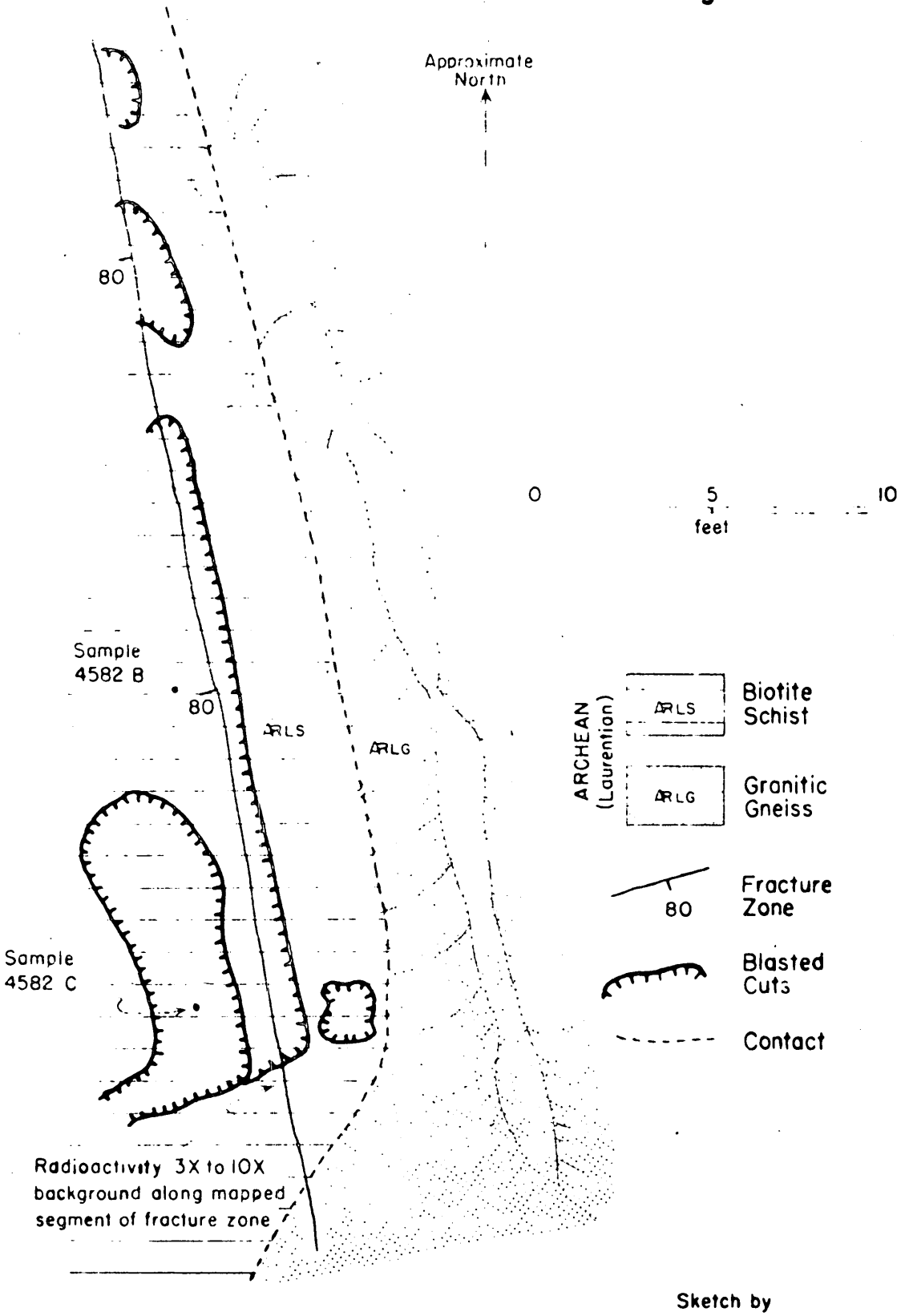
CLAIM NO. 2

Claim No. 2, which is leased from the State of Michigan, is in Section 13, T.42N., R29W., about 1½ miles southwest of Claim No. 1. An old logging road, running eastward from the Sagola-Randville highway, reaches a point within one mile of the deposit, but the eastern end of it is nonpassable during much of the year (see Fig. 1). Heavy equipment is towed to the property by means of a bulldozer capable of penetrating heavy brush and undergrowth.

The radioactivity noted on this claim lies along a prominent fracture that transects the west edge of a massive bedrock ledge (see Fig. 2).

Fig. 2

LEITCH ISHAM CLAIM No. 2
Section 13, T.42.N., R.29.W.
Dickinson Co. Michigan



Sketch by
D. L. EVERHART

The western part of the outcrop is underlain by massive black mica schist containing numerous small erratic quartz stringers and feldspar concentrations. The rest of the outcrop is underlain by coarse-grained granitic gneiss. Both rock types are members of the Laurentian formation of Archean age. The fracture cutting the schist trends N.10W. and dips 80°SW. and for about 30 feet along the fracture, several tons of schist have been blasted from the outcrop adjacent to the radioactive segment of the fracture zone. Except for this 30 foot zone, no other anomalous radioactivity has been noted on the property.

Assays of selected samples of the most radioactive rock found by various investigators on the prospect are tabulated below:

Sample No.	Collector (Year)	$\%U_3O_8$ (radiometric)	$\%U_3O_8$ (chemical)	Remarks
1361-I	H.V. Lee (1950)	-	0.03	
1361-J	H.V. Lee (1950)	0.02	-	
-	L.P. Barrett (1951)	0.01	0.003	
-	L.P. Barrett (1951)	0.029	0.002	
4582-B	D.L. Everhart (1952)	0.009	0.002	
4582-C	D.L. Everhart (1952)	0.02	0.008	Collected from freshly blasted rock in the most radioactive spot in the prospect.

CLAIM NO. 3

Claim No. 3, also leased from the State of Michigan, is in Section 13, T.42N., R29W., about 1200 feet N.35E. of No. 2. Here a prominent gneissic granite outcrop (of the Laurentian formation), some 30 feet in height is transected by a shear zone in which there are numerous quartz stringers. For a length of about 50 feet along the shear, which trends N.80W. and dips 75° SW., radioactivity of 4 to 5 times background is recorded on field radiometric instruments. Assays of picked samples of the most radioactive parts of the zone, as located by Lee and the writer, are as follows:

Sample No.	Collector (Year)	$\%U_3O_8$ (radiometric)	$\%U_3O_8$ (chemical)
1361-K	H.V. Lee (1950)	-	0.01
4582-D	D.L. Everhart (1952)	0.02	0.002

MINERALOGY

Carefully hand-picked concentrates of the radioactive mineral in specimens selected by the writer from Claim No. 2 were prepared by mineralogists in our New York laboratory. These were submitted to the U. S. Geological Survey for X-ray study and the radioactive mineral was determined to be uraninite. Identification of similar material, collected by others in 1950, has also indicated minute amounts of pitchblende, a variety of uraninite, in specimens said to be collected in both Claims No. 2 and 3.

CONCLUSIONS

From the limited exposures and relatively small amount of exploratory work on the properties, no realistic quantitative estimate of ore reserves can be made. However the small linear extent and narrow width of the exposed radioactive rock, together with the low chemical assays of the picked samples, indicates no workable uranium ore at the surface.

Blasting on the No. 2 claim has only been surficial, and since uraninite has been identified at the surface there is a possibility that better concentrations of primary uranium oxide might conceivably be encountered at depth along the controlling fractures. From experience with similar deposits near the east shore of Lake Superior, however, this possibility is not believed to be particularly strong.

URANIUM LEASE NO. 2

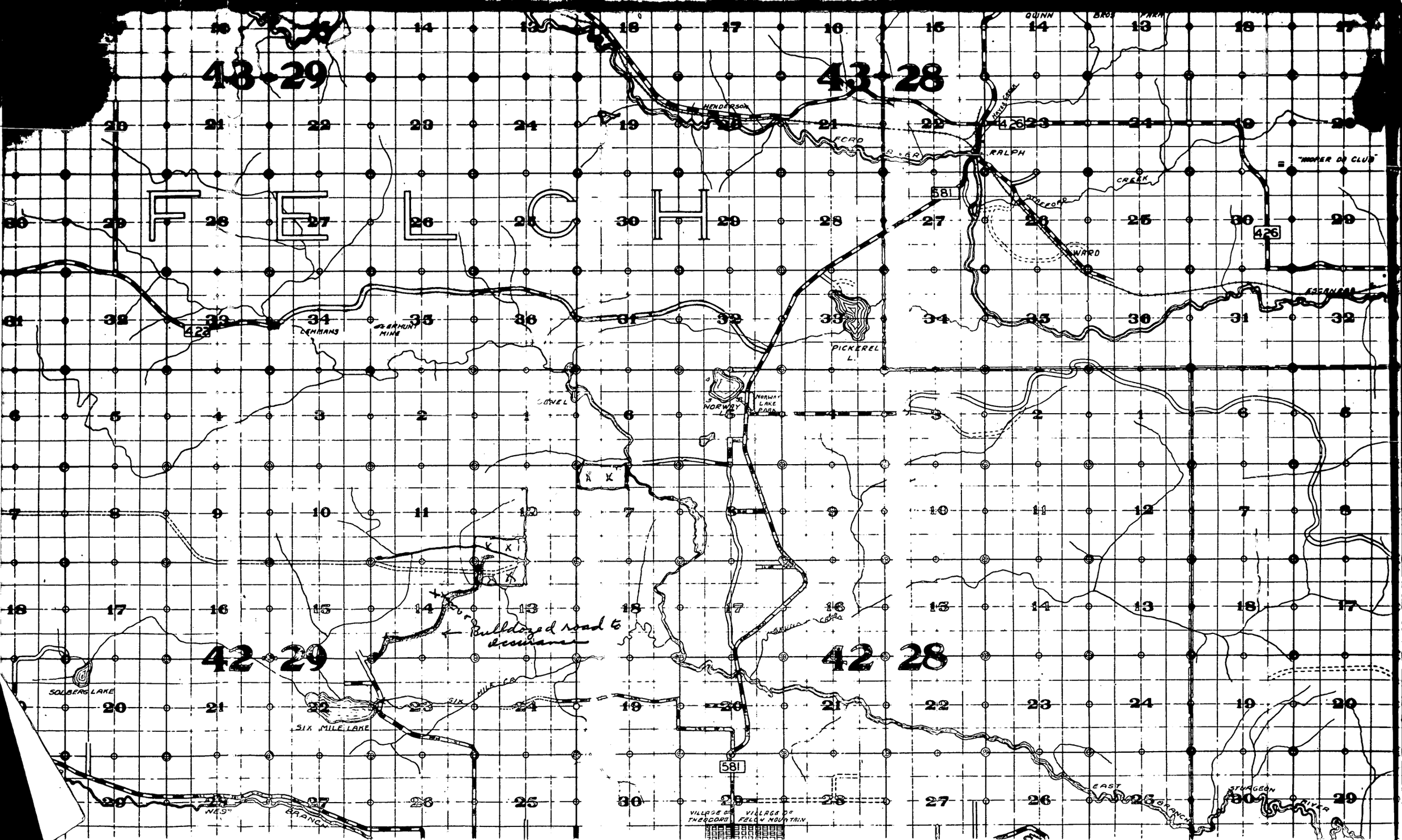
Schedule A - Fee Ownership

Thad D. Isham and James E. Leitch

Township forty-two North (T 42 N), Range twenty-nine West (R 29 W)

Section twelve (12): South half of Southwest quarter ($S\frac{1}{2}$ of $SW\frac{1}{4}$).

Section thirteen (13): North half of Northwest quarter ($N\frac{1}{2}$ of $NW\frac{1}{4}$).


43-29
43-28
42-29
42-28
FELCH
HENDERSON
FORD
RALPH
QUINN BROS. FARM
"HOOPER DE CLUB"
CREEK
STREFOR
WARD
STURGEON
RIVER
581
426
422
LEMMANS
MINE
PICKEREL L.
GRAVEL
NORWAY L.
NORWAY LAKE PARK
Bulldozed road to excavation
SOLBERS LAKE
SIX MILE LAKE
SIX MILE CR.
WEST BRANCH
EAST BRANCH
VILLAGE OF THEODORE
VILLAGE OF FELCH MOUNTAIN

STATE OF MICHIGAN

Exploration and Mining Lease for Ores
which Are Source Material for Fissionable Elements
and Associated Minerals and Metals

No. 2

THIS INDENTURE, Made this first day of August, 1950, by and between THE DEPARTMENT OF CONSERVATION FOR THE STATE OF MICHIGAN, hereinafter called "Lessor", party of the first part, and THAD D. ISHAM AND JAMES E. LEITCH, Owosso, Michigan, hereinafter called "Lessee", party of the second part.

WITNESSETH, That, for and in consideration of One Dollar ($1.00) in hand paid, the receipt whereof is hereby confessed and acknowledged, and of the execution and delivery by the Lessee to the Lessor of a bond for the performance by the Lessee of its covenants and agreements contained in this lease, the receipt and sufficiency of both of which are hereby acknowledged, and in further consideration of the covenants, agreements and conditions hereinafter contained, to be observed, kept and performed by the Lessee, the Lessor, in accordance with the authority vested in it by The Public Acts of the State of Michigan, and due approval hereof by the State Administrative Board, has demised and leased, and by these presents does demise and lease for the purposes hereinafter set forth, to the said Lessee, its successors and assigns, each and all of the following tracts and parcels of land situated in the County of Dickinson, State of Michigan, and more particularly described as follows:

S½ of SW¼, Section 12, subject to a State Iron Ore Exploration and Mining Lease dated January 3, 1950 to the Hanna Coal and Ore Corporation for the SW¼ of SW¼, Section 12; and the N½ of NW¼, Section 13; Township 42 North, Range 29 West, containing 160.00 acres, but subject in each case to all legal rights of way, easements, licenses, and permits and, with respect to each of certain of said tracts or parcels, to the respective surface conveyances, leases, licenses, or easements as listed after such tract or parcel, but including each, all, and singular the rights, title, interest, and estate of the Lessor in and to each, all, and singular said tracts, parcels, and premises and including all rights under, by virtue of, or in connection with each and all such surface conveyances, leases, licenses, and easements; for and during the term of twenty-five years from and after the date hereof, or until, as to each such respective tract or parcel, this lease shall be earlier terminated in the manner hereinafter provided. Said premises are leased to the Lessee for the purpose of giving and granting to the Lessee, its successors, assigns and sublessees, the exclusive right and privilege of entering into and upon said leased premises and each and every part thereof so long as this lease shall remain in effect with respect thereto, and to explore for, mine, remove, and ship any ores which are source material for fissionable elements and such other minerals and metals directly associated with source material for fissionable elements as are found and contained in the same ores which are source material for fissionable elements, which it may desire, as are or may be found therein or thereon, together with the full right, privilege and authority of constructing, erecting, maintaining, and removing any and all such buildings, structures, machinery, excavations, openings, ditches, drains, water pipes, railroads, truck and wagon roads, tramways, and other improvements, property, and fixtures as may be reasonably necessary, convenient, or suitable for mining, removing, concentrating, and shipping any of such ores or materials or products thereof or for any activities incidental thereto or to any of the rights or privileges of the Lessee hereunder, including full right and authority to divert streams and to remove lateral and subjacent support, and to cave, subside, or destroy the surface or any part thereof, and to dump earth, rocks, waste and lean ores or materials on any part of such surface where it will not interfere with mining, and to commit waste to the extent necessary, usual, or customary in the carrying out of any and all of such purposes, rights, privileges or authorities. It is hereby understood and agreed that the Lessor retains all other rights and interests not inconsistent with the right herein granted, to the extent that the same may be exercised, used, or retained without in any way interfering with the full and free exercise by the Lessee of its rights and privileges hereunder.

While the Lessor represents that it (and the State of Michigan for which it is acting in accordance with due authority) is the owner of the leased premises as hereinbefore set forth, it does not warrant its title thereto and it is therefore specifically understood and agreed that the Lessee shall not, either by accepting and executing this lease or otherwise, be estopped or otherwise prevented from questioning or contesting the Lessor's title to any part or parts of the leased premises, but the Lessee shall be entirely free at any time, or from time to time, in case it shall appear that the Lessor's title as hereinbefore set forth to any part or parts of the leased premises shall be in any way defective, to contest, or to participate in any suit, action, or proceeding for the contesting of the Lessor's title; and that while the Lessor does not agree to refund otherwise to the Lessee any amounts paid hereunder under mistake as to the Lessor's title, Lessor does agree that the Lessee shall have full credit for any amounts so paid to the Lessor as royalty or minimum royalty on account of any ore or tract not belonging to Lessor with the right to use and apply the same in payment or satisfaction of obligations of the Lessee to pay royalty on ore shipped from, or minimum with respect to any part or parts of the leased premises as to which the Lessor has good title.

Definition of Source Material for Fissionable Elements

As used in this lease, the term "source material" shall mean any ore which contains uranium or any other material determined by the United States Atomic Energy Commission to be peculiarly essential to the production of fissionable materials in such concentration as the Atomic Energy Commission may by regulation determine from time to time.

Royalty

That the Lessee shall on or before the 20th day of January, April, July, and October of each and every year, so long as this indenture continues in force, pay a royalty to the Lessor at the rate of ten per cent (10%) of the gross value as shipped for all ores mined from the leased premises and shipped without treatment by the Lessee, as hereinafter provided, during the three months preceding the first day of the month in which the payments are to be made as aforesaid.

That the Lessee shall on or before the 20th day of January, April, July, and October of each and every year, so long as this indenture continues in force, pay a royalty to the Lessor at the rate of ten per cent (10%) of the gross value as shipped, less milling or refining costs, or both, for all concentrates, minerals and metals taken from ores mined and treated on the leased premises and shipped by the Lessee, as hereinafter provided, during the three months preceding the first day of the month in which the payments are to be made as aforesaid.

The value of the uranium or other fissionable elements contained in such ores, concentrates, minerals and metals shall be based on the existing published price, or the price supported by the United States Atomic Energy Commission, or the actual sale price, whichever is the greatest. The value of all materials other than uranium or other fissionable elements contained in the ores shall be based on the average price during the royalty period in which the shipments occur, as published in the Engineering and Mining Journal, or a similar reliable publication, or the actual sale price, whichever is the greater. Provided, however, that the full value of the ores shall be determined by the combined values of the uranium and other fissionable elements and of such other minerals or metals which may be contained in the same ores. All fees and expenses in connection with the evaluation of the mined ores, and the concentrates, minerals and metals taken from the mined ores shall be borne by the Lessee.

Reports on Weights, Analysis and Costs

The Lessee shall submit sworn statements at the end of each royalty period hereinbefore mentioned, showing the certified weights, analysis and values of any and all ores, concentrates, minerals and metals shipped during the preceding royalty period. The Lessee shall also submit sworn statements at the end of each royalty period hereinbefore mentioned, showing actual costs of milling and refining ores mined from the leased premises and so milled and refined to produce concentrates, minerals and metals shipped during the royalty period for which royalty payments are being made.

The method of determining the analysis and grades of ores mined, and of concentrates, minerals and metals taken from ores mined from the leased premises and shipped shall be by agreement between the Lessor and Lessee and shall be in accordance with established and customary practice.

Exploration Period

The period of this lease from the date hereof to and including July 31, 19 53, shall be known as the exploration period, and it is understood and agreed by the Lessee that it will expend the sum of Sixteen Hundred and no/100- - - - -Dollars ($----1,600.00--) prior to August 1, 19 51, and a similar amount for each year of the exploratory period after August 1 19 51, for exploration on the leased premises by drilling, test pitting, trenching, shaft sinking or by such geological methods of exploration as may be approved in writing by the Lessor or for experimental or developmental work on the beneficiation, concentration, or treatment of source material for fissionable elements which may be found in such area. It is understood that the obligation to spend Sixteen Hundred and no/100------Dollars ($---1,600.00----) in any year following the first year shall be satisfied to the extent of the expenditures in prior years shall exceed the total of stated amounts to be spent in such years.

On or before November 1, 19 51, Lessee shall submit a report to Lessor covering the exploration work carried on during the period from the date of this lease to August 1, 1951. Similar annual reports shall be submitted for subsequent years of the exploration period. These reports shall describe the type and extent of exploratory work carried on on the leased premises, and shall contain an expenditure report for the exploratory work conducted by the Lessee during the required period. Lessee also shall submit drill records, file maps and sections describing in detail the results which have been obtained in exploration work on the leased premises.

Rental

For the rental during the exploration period of this lease, the Lessee shall pay annually to the Lessor a sum equivalent to ten cents (10¢) per acre of land held subject to this lease on the date such rental payment shall be due. Such payment shall be due annually in advance and shall operate to reimburse the Lessor for a similar amount paid in the form of a specific tax each year on state-owned lands.

Minimum Royalty

For the year commencing August 1, 19 53, and for each year thereafter during which this lease shall continue in effect, and regardless of whether Lessee shall conduct any mining or other operations on the premises, the Lessee shall pay to the Lessor an annual minimum royalty or rent for the premises hereby leased and the rights and privileges hereby granted, at the rate of Twenty-five Dollars ($25.00) per acre for acreage subject to this lease at the beginning of the year for which payment is made; provided, however, if a commercially minable body of ore has been discovered before the expiration of the exploratory period of this lease on any description of land subject to this lease, the Lessee shall, commencing with the payment of minimum royalty or rent for the year next ensuing after the discovery of such commercially minable body of ore, pay to the Lessor as minimum royalty or rent for such individual description of land the sum of Twenty-five Dollars ($25.00) per acre annually so long as it remains unsurrendered and subject to this lease. Such minimum royalty for any year to the extent not satisfied by royalty on ore shipped from any part or parts of the leased premises during the corresponding year, shall be paid on or before August 20, 1954, for the lease year directly preceding. ~~the month in which the payment is made.~~ If in any such year the Lessee shall ship ore from the leased premises, it shall be required to pay minimum royalty for such year only if and to the extent that royalties accruing on the ore shipped shall be less than the minimum royalty for such year. The Lessee shall have credit for any amount or amounts paid to the Lessor as for minimum royalty, and any and all such credits may be used and applied by the Lessee, so far as the same will go and be required to satisfy any amounts coming due under this lease to the Lessor for royalty in any subsequent year or years in excess of the current minimum royalty for the year of application.

Operations

All mines on said premises shall be opened, used and worked in such manner only as is usual and customary in skillful and proper mining operations of similar character when conducted by the proprietors or other prudent operators, and so as not to do, cause or permit any unnecessary and unusual permanent injury to the same or any improper interference or hindrance in the subsequent operation of said mine or mines; provided that, subject to the above requirements the Lessee may from time to time use and employ such methods of mining as to the whole or any part of the ore upon said property, or under any portion thereof, as it may desire or find most profitable and economical, or may, when it deems it necessary or desirable, discontinue operations entirely so long as it shall well and truly meet its obligations hereunder to pay taxes and minimum royalty, if any; and provided further that nothing contained in this lease shall require the Lessee to develop a separate shaft or shafts on the leased premises or any part thereof, or prevent said Lessee from developing mine or operations on the leased premises or any part thereof solely through or in connection with its operations on or in any adjoining or nearby property or properties as to it may seem most desirable, taking into account its developments and operations on any or all adjoining or nearby properties, or require the Lessee to mine, preserve or protect in its mining operations any ore which, under good mining practice, cannot be mined and shipped at a profit to the Lessee at the time encountered.

Taxes

The Lessee does hereby covenant, promise and agree that it will pay as and when the same shall become due and payable and save and indemnify the Lessor from and against all lawful public taxes and assessments, if any, whatsoever, whether general, specific or otherwise, which are legally assessed and levied upon or against the leased premises, or any part thereof, or on any ores or other product thereof, or any property or improvements that may be placed or made thereon by, or under, the Lessee, or any business or occupation that may be pursued or carried on by or under the Lessee upon the leased premises during the times this lease shall remain in effect with respect thereto, but Lessee shall not be liable for the payment of any taxes accruing by reason of the payment to or receipt by the Lessor of royalties or any other amounts herein provided to be paid by the Lessee, whether such taxes be designated as income taxes, royalty taxes, or otherwise. And it is agreed by the parties that upon the termination of this lease for any cause or with respect to any of said premises at a time other than at the end of any year, the Lessee shall be liable for the payment of only such proportion of any such taxes for such year on or with respect to the premises being surrendered, as the part of such year elapsed prior to the effective date of the termination shall bear to the entire year. Provided, however, that the Lessee shall always have the right to contest in the courts or otherwise, the validity of any taxes or assessments hereby required to be paid by it, in case the same shall be deemed unlawful, unjust, unequal or excessive, or to take such other steps or proceedings as may be necessary to secure a cancellation, reduction, readjustment or equalization thereof, before the Lessee shall be required to pay and discharge the same, or any part thereof; but, provided further, that the Lessee shall not permit or suffer the demised premises, or any part thereof, or any ore mined thereon, or any improvements or personal property thereon, to be sold at any time for such taxes or assessments.

Waste

The Lessee further agrees that it will not permit or suffer to be made any waste of the leased premises (except such waste as may be necessarily or customarily incidental to the conduct of the mining operations herein contemplated or the full and proper exercise of any of the rights and privileges hereby granted): that at the end of said term, or the termination of this lease or demise, in whole or in part, whether by forfeiture, expiration of time, surrender by the Lessee or otherwise, it will peaceably surrender the leased premises or the governmental descriptions affected thereby, as the case may be, to the Lessor with all caves and openings properly fenced, filled or protected as may be required by any laws or proper regulations of any duly constituted governmental authority then in effect and with all stopes, shafts and underground openings that may be made by the Lessee thereon, in good order and condition, ordinary wear and tear in use and deterioration from and damage by the elements excepted.

Removal

It is mutually agreed that the Lessee shall have ninety (90) days after any such termination or surrender in which to remove all engines, tools, machinery, railway tracks, shaft houses, buildings, dwellings, and structures and all other property of every nature and description erected, placed or situated upon the premises as to which this lease is being terminated or surrendered, except any and all

supports placed in any shafts, drifts, or openings thereon or any timber or frame work necessary to the use and maintenance of shafts or approaches to mines or tramways within mines, none of which shall be removed or destroyed by the Lessee; provided, always, however, that none of said property may be removed by the Lessee unless all payments of taxes, if any, (except taxes not then due and payable, which must and will be paid within thirty (30) days after they become due and payable), royalties then due and other dues shall have been made and all other covenants, agreements and conditions hereof obligatory upon the Lessee shall have been properly and faithfully observed and performed. Upon the failure of the Lessee to remove any such permitted property within said period of ninety (90) days, the same shall belong to and become the absolute property of the Lessor.

Inspection by Lessor

It is mutually agreed that said Lessor, its agents and servants, may at all reasonable times, subject to any security rules and regulations imposed by the United States Atomic Energy Commission, enter upon the demised premises, or any part thereof, peaceable, and view the same, and take all reasonable means to ascertain the condition thereof, and the kind, qualities and quantities of ore therein or removed therefrom, not thereby unreasonably or unnecessarily hindering or interrupting the proper business or operations of the Lessee; provided, however, that said Lessor agrees to save the Lessee harmless from all claims for damages arising out of any death or personal injuries sustained by any such agents or servants of the Lessor while in or upon said premises as herein permitted, unless the death or injury arises as the result of negligence of the Lessee.

Default

It is mutually agreed that if the royalty hereby reserved, or the minimum royalty or rent herein agreed to be paid by the Lessee, or any part of either thereof, be and remain unpaid after the days and times above specified, or if the Lessee shall fail to keep any of the other conditions herein expressed to be kept, performed or observed by the Lessee, and if any or either such failure shall continue for sixty (60) days after written notice from the Lessor specifying any such default, neglect or failure, such notice to be given in the manner hereinafter provided, then and from thence forward it shall be lawful for the Lessor, with or without any process of law or judgment, to enter upon and take possession of the demised land or any part thereof, in the name of the whole, and the said land together with all ores, machinery, fixtures, improvements and personal property thereon to possess and hold, and to exclude forcibly if necessary and without being guilty of any trespass or other wrongful act, the Lessee and any and all persons claiming under it, and at the election of the Lessor to declare this lease terminated and the rights of the Lessee hereunder forfeited; and any such re-entry on the part of the Lessor shall be without prejudice to any other remedy or proceedings which the Lessor might have in law, equity or otherwise by reason of any breach of any covenants, promise or agreement of the Lessee herein contained, or for the recovery of possession of said premises, and provided that if the Lessee shall deny the failure alleged by the Lessor and shall demand arbitration thereof in the manner hereinafter provided, the period required for the hearing and determination of such matter by the arbitrators shall not be deemed a part of said sixty (60) days hereinbefore referred to, and if the contention of the Lessor be sustained by the arbritrators, the Lessee shall have sixty (60) days after the filing of the decision by the arbitrators in which to correct the failure complained of.

Termination of Lease or Surrender of Rights by Lessee

It is hereby further covenanted, agreed and understood by and between the said parties hereto, that the Lessee may:

(a) At any time terminate the foregoing lease and demise; and/or

(b) At any time and from time to time separately surrender the rights, privileges and easements hereinabove granted, leased and demised to it, and terminate its obligations hereunder, insofar as the same pertains to any one or more designated governmental descriptions which are part of the leased premises:

by giving the Lessor, or those having its estate in the premises, written notice of its intention so to do at least sixty (60) days before such termination or surrender, as the case may be, such notice to be given in the manner herein provided; and in each such case this lease shall terminate, or the rights and obligations of the

Lessee with respect to the designated governmental descriptions surrendered shall terminate as the case may be, sixty (60) days after the giving of such notice, provided that all of the covenants, agreements and conditions hereof obligatory upon the Lessee, including payment of all minimum royalty, royalties and other sums that may have accrued and become payable hereunder (but not including taxes, if any, or other amounts not then due and payable, which must and will be paid within thirty (30) days after they become due and payable), shall have been properly kept and performed by the Lessee; and the Lessee must and will upon any such termination or surrender, as the case may be, and upon the request therefor by the Lessor, forthwith execute and record in any public office where this instrument may have been filed and recorded, a formal release and discharge, evidencing such termination or surrender, as the case may be.

Lessor's Lien

That the Lessor shall at all times have, possess, and hold a lien upon all ores mined but not shipped from the leased premises, and upon all machinery, personal property and improvements placed upon said premises by the Lessee, as security for any unpaid balance of money due hereunder, and as security for the performance by the Lessee of each and all of the covenants and conditions hereof obligatory upon the Lessee, which lien may be enforced against any such property in like manner as liens conferred by chattel mortgages, or by any other lien security, are or may be entitled to be enforced under the laws of Michigan. Nothing herein contained, however, is intended or shall be construed to prevent the sale and removal of said ore or concentrated products in the usual course of business, nor to prevent the removal of tools, machinery, equipment or any other property at any time when said Lessee shall not be in default; and the above referred to lien shall not, in case of sales of ore or concentrated products to third parties, be deemed to follow the same as against such third parties.

Arbitration

In case any disagreement or controversy shall arise between the parties hereto relative to the observance or fulfillment or construction of the terms and obligations hereof, then such controversy or disagreement shall be determined by arbitration. Either party may within a reasonable time after such disagreement arises demand arbitration thereof and the party making such demand shall in writing specify the matter to be submitted to arbitration and at the same time choose and nominate some disinterested competent person to act as an arbitrator; thereupon within ten (10) days after receipt of such written notice the other party to this lease shall in writing choose and nominate a disinterested and competent arbitrator and the two arbitrators so chosen shall promptly select a third arbitrator, giving written notice to both parties of the choice so made and fixing a place and time for meeting not later than thirty (30) days thereafter, at which both parties may appear and be heard touching such controversy. The decision of said arbitrators shall be made in writing within thirty (30) days after the completion of hearings thereon, and when signed by a majority of them shall be final and conclusive upon both parties, and the award so made shall be forthwith complied with. In case the notified party shall neglect or refuse to choose and nominate an arbitrator within the time herein specified, or in case the two chosen by either method herein provided shall fail to agree upon a third arbitrator, then such arbitrator shall in each case, upon application of either party, be named by the person (or any one of the persons) who may then be holding the office of judge of the United States District Court in and for the district in which the mine is located, or the person holding an office which corresponds to such office as now extant if it shall then have been abolished. The expenses of any such arbitration, including reasonable compensation for the arbitrators, shall be paid by the party against which the award shall be made or as otherwise directed by the arbitrators.

Addresses

For the purposes hereof, the address of the Lessor shall be Department of Conservation, State Office Building, Lansing, Michigan, or such other place as it may have last designated in writing to the Lessee, and the address of the Lessee shall be Owosso, Michigan, or such other place as it shall have last designated in writing to the Lessor.

Routine or regular periodical reports, statements and payments hereunder may be sent by regular mail so addressed; and, if so addressed and mailed in due season, then if any of the same shall not be received when due, the addressee will notify the addressor of such failure of receipt and give the addressor a reasonable

time to follow up and secure the delivery of the statement, report or payment, or a duplicate thereof, before claiming any default on account of such failure of delivery. But as to any formal notices of surrender, cancellation, default or termination, the same shall be delivered to the party notified either personally or by registered mail to be effective hereunder.

Successors and Assigns

It is further covenanted, agreed and understood between the parties hereto, that this lease and the covenants, agreements and conditions herein contained shall run with the land, and shall inure to the benefit of and be binding upon the successors and assigns of the parties hereto, respectively as if mentioned throughout by words of appropriate designation.

Bond

The Lessee has delivered to the Lessor a bond, with surety satisfactory to the Lessor, in the amount of One Thousand Dollars ($1,000.00) for the performance by the Lessee of the covenants and agreements of the Lessee contained in this lease, for the duration of the exploratory period of this lease. The Lessee further agrees that at such time as mining operations are commenced under the terms and conditions of this lease, the Lessee shall deliver to the Lessor a bond, with surety satisfactory to the Lessor, in the amount of Ten Thousand Dollars ($10,000.00) for the performance by the Lessee of the covenants and agreements of the Lessee contained in this lease pertaining to mining operations. The Lessee, its successors and assigns, will, at all times while this lease continues in effect, maintain such or a similar bond with reasonable surety to the Lessor in full force and effect; and, in case of any assignment of this lease by the Lessee, the same shall not be or become effective to release the assignor from liabilities thereafter accruing hereunder unless and until the assignee shall similarly furnish and confirm to the Lessor such or a similar bond for the performance of the Lessee's covenants and agreements hereunder by such assignee.

Federal Requirements

This lease shall be subject to all requirements that the government of the United States may impose for the purpose of maintaining national security, including loyalty investigations and including compliance with the provisions of Public Law 585 of the 79th Congress of the United States, commonly known as the Atomic Energy Act of 1946, and all amendments thereto, and of all subsequent Act or Acts which may be enacted for the purpose of maintaining national security; and where there is any inconsistency or conflict between the provisions and requirements of this lease and the federal requirements, the federal requirements shall govern. Failure of the Lessee to comply with the aforesaid requirements and laws of the United States for the handling of source materials, shall constitute grounds for the cancellation of this lease.

IN WITNESS WHEREOF, the said Lessor, by its Director, has hereunto affixed its name and the seal of the said department, by virtue of a resolution passed by the Department of Conservation on June 9, 19 50, and with due approval of the State Administrative Board duly given on July 5, 19 50, and the said Lessee has affixed its name and seal as of the day and year first above written.

Witnesses to the signatures of Director and Secretary:

Levis U. Sibley

J. D. Stephansky

DEPARTMENT OF CONSERVATION FOR THE STATE OF MICHIGAN

P. J. Hoffmaster, Director

Wayland Osgood, Secretary

Witnesses to the signature of Lessee:

G. M. Kenny

Alice Lecureux

Thad D. Isham

James E. Leitch

STATE OF MICHIGAN)
) ss.
County of Ingham)

On this 27th day of July, 19 50, personally appeared before me, a Notary Public in and for the County of Ingham, P. J. Hoffmaster, Director, and Wayland Osgood, Secretary, of the Department of Conservation, personally known to me to be the same persons who executed the foregoing instrument, and who acknowledged the same to be their free act and deed and the free act and deed of the Department of Conservation, in whose behalf they act, and for the purpose in said instrument set forth.

Joseph D. Stephansky
Joseph D. Stephansky
Notary Public, Ingham County,
Michigan

My Commission Expires: Jan.12,1954

STATE OF Michigan)
) ss.
County of Shiawassee)

Before me, the undersigned, a Notary Public in and for said county and state on this 21 day of July, 1950, personally appeared Thad D. Solan and James E. Leitch, to me personally known, who being duly sworn, did say that _____ ~~and _____ of the corporation named in the foregoing instrument and acknowledges to me that~~ they executed the same as their free and voluntary act and deed and as the free and voluntary act and deed of such corporation, for the purposes therein mentioned and set forth, and that the seal affixed to said instrument was signed and sealed in behalf of said corporation by authority of its Board of Directors.

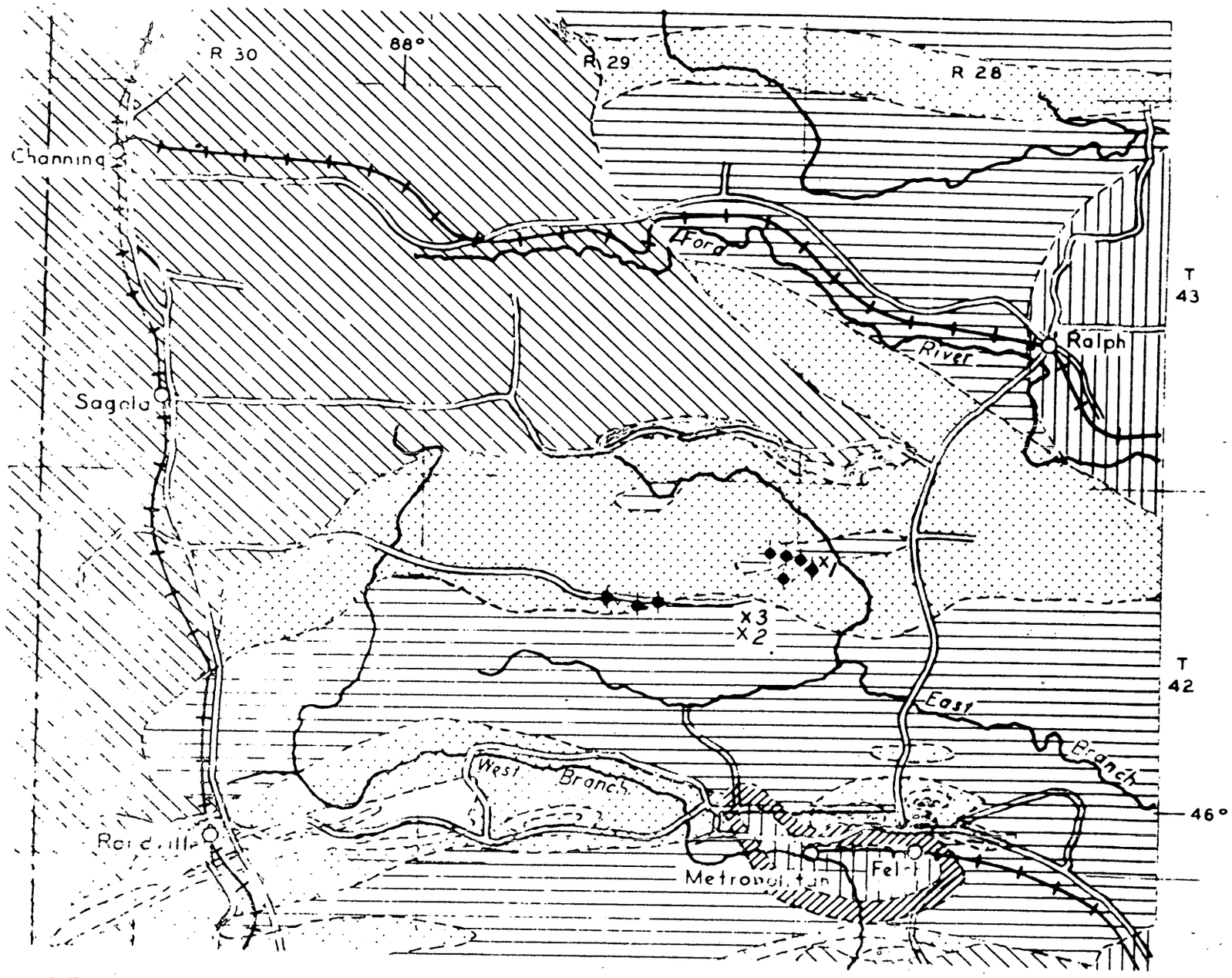
Alice Hosking
Notary Public, Shiawassee

My Commission Expires: 10/24/52

I HEREBY CERTIFY, That the within lease, insofar as it pertains to lands held in fee simple by the State and listed in Schedule A attached, was approved at a meeting of the State Administrative Board held on July 5, 1950.

August 2, 19 50.

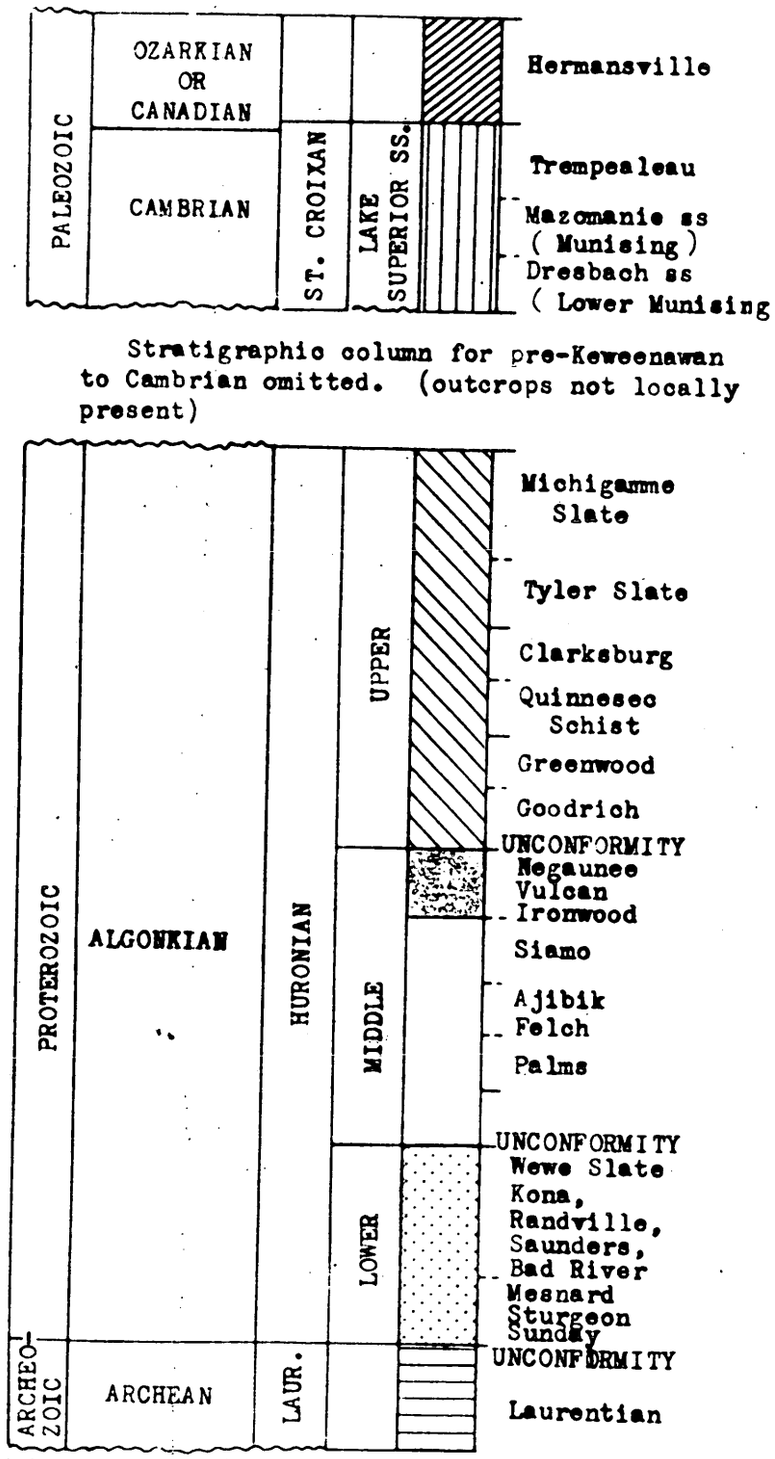
Robert F. Steadman
Secretary, State Administrative Board
Robert F. Steadman



GEOLOGICAL MAP OF REPORTED URANIUM OCCURRENCES
DICKINSON COUNTY, MICHIGAN

1 0 1 2 3 4 5 MILES

ANOMOLIES SHOWN ON U.S.G.S. "REDBALL" MAP



Stratigraphic column for pre-Keweenawan to Cambrian omitted. (outcrops not locally present)

JAN. 951