DMEA 3855

DOCKET INDEX

ACTION DOCUMENTS

1. APPLICATION — DATE RECEIVED 6-17-55

2. CONTRACT — DATE 1-26-56

3. TERMINATION AGREEMENT: — DATE

   a. Mutual (with/without repayment provision).
   b. Unilateral.
   c. Amendment with automatic termination clause and with/without repayment provision.

4. CERTIFICATION — DATE

5. AUDIT REPORT — DATE

6. AMENDMENTS - NUMBERS — DATE

   1 — 4-9-56
   2 — 9-6-56

Docket Copy

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EXPLORATION PROJECT CONTRACT

AMENDMENT No.2

DMEA-3855, Idm-E914, HICKS DOME PROJECT
(Thorium, Uranium, and Rare Earths)
Hardin County, Illinois

Contract Idm-E914, Docket No. DMFA-3855, between the United States of America, acting through the Department of the Interior, Defense Minerals Exploration Administration and William G. Reynolds, Anchorage, Kentucky, dated January 26, 1956, is hereby further amended as follows:

1. Article 3 is amended to provide that the Operator shall complete the work on or before October 1, 1956, instead of June 1, 1956 as originally provided in the contract.

July 6, 1956

This amendment shall not be construed to increase the estimated total cost of the project, the aggregate total amount which the Government may be obligated to pay, or the percentage of the cost which the Government may be obligated to pay, under the provisions of Article 5 of the contract.

THE UNITED STATES OF AMERICA

William G. Reynolds
William G. Reynolds, Operator

By Robert A. Lawrence
Executive Officer, DMEA
Field Team, Region V

RAL/mm

Docket Copy

EXPLORATION PROJECT CONTRACT
WILLIAM G. REYNOLDS
DOCKET NO. DMEA-3855

Amendment No. 1

WHEREAS, when the draft of Exploration Project Contract Idm-E914 (Docket No. DMEA-3855) was presented to the Operator for signature, it was found that it failed to reflect the understanding of the parties with respect to the costs allowed for analyses to determine the uranium, thorium, columbium, tantalum, and rare earths content of samples, and the necessity for trenching, if hard rock requiring shooting or blasting is encountered; and,

WHEREAS, the parties then agreed that the Contract would be signed with the understanding that an amendment would be promptly executed to correct the afore-mentioned matters with respect to which the draft of Contract failed to reflect the understanding of the parties.

NOW, THEREFORE, it is agreed this 9th day of April, 1956, between the United States of America, acting through the Department of the Interior, Defense Minerals Exploration Administration, hereinafter called the "Government," and William G. Reynolds, hereinafter called the "Operator," that Exploration Project Contract Idm-E914 (Docket No. DMEA-3855), dated January 26, 1956, is amended, as follows:

1. In Exhibit "A", Description of the Work, delete all of item 2 in Stage I, and replace it with the following provisions:

> "2. Not in excess of the following chemical determinations shall be made: 70 for thorium, 10 for uranium, and 3 for columbium-tantalum (combined); and not in excess of 30 spectrographic analyses for rare earths shall be made for these elements, or groups of elements, in samples procured under this Stage I of the Contract. Samples may be analyzed for any or all of the individual elements or groups of the elements mentioned above. However, at least one sample from each of the trenches excavated under Stage I shall be analyzed for all the individual elements and for the three rare-earth groups, namely, cerium, terbium, and ytterbium groups of the rare earths series of elements."

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MAY 2 - 1956

2. In Exhibit "A", Description of the Work, delete all of item 2 of Stage II and replace it with the following provision:

> "2. Not in excess of 405 feet of drilling shall be performed under this Stage II of the Contract and not in excess of 12 chemical determinations for thorium and 2 spectrographic analyses for rare earths shall be made for these elements, or groups of elements, in samples procured under this Stage II of the Contract."

3. In Exhibit "A", Fixed Unit Costs, delete item 2 under Stage I, which reads as follows:

> "2. 480 analyses @ $3.00/each element analyzed - $1,260.00"

renumber item 3 to become item 4, and insert the following provisions in lieu of item 2:

"2.	Chemical analyses:		
	(a) 70 determinations for thorium @ $10.00 each	$700.00	
	(b) 10 determinations for uranium @ $5.00 each	50.00	
	(c) 3 determinations for columbium-tantalum (combined) @ $20.00 each	60.00	
3.	Spectrographic analysis:		
	30 determinations for rare earths @ $15.00 each	450.00	$1,260.00."

4. In Exhibit "A", Fixed Unit Costs, delete item 2 under Stage II which reads as follows:

> "2. 50 analyses @ $3.00 each element analyzed $150.00"

and replace it with the following provisions:

"2.	(a) Chemical analyses:		
	12 determinations for thorium @ $10.00 each	$120.00	
	(b) Spectrographic analyses:		
	2 determinations for rare earths @ $15.00 each	30.00	$ 150.00"

5. The Operator shall have the option to discontinue the trench excavation provided for in item 1 under Stage I of Exhibit "A", if hard rock is encountered which, in the opinion of the Government, can not be bulldozed without shooting or blasting.

6. In Article 3 of the Contract, the time for commencing the work is extended from March 15, 1956, to May 1, 1956.

7. In Article 3 of the Contract, the word "uranium" is deleted and the words "thorium, uranium and rare earths" are substituted in lieu thereof.

This amendment shall not be construed to increase the estimated total cost of the project, or the aggregate total amount which the Government may be required to contribute.

THE UNITED STATES OF AMERICA

By C O Mittendorf
Administrator, Defense Minerals
Exploration Administration

William T Reynolds,
William G. Reynolds

Indirs 4/4/56
Lawyer
"Appd. Sol. Off."
Murphy
Chambers
Selfridge
Fitzmaurice

Docket Copy

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MAR 2 1 1956

MF-200A
(Revised June 1954)

Docket No. DMEA 3855
Thorium
Commodity Uranium
Rare Earths
Contract No. Idm-E 914

UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
EXPLORATION PROJECT CONTRACT[1]
(Short Form)

JAN 2 6 1956

It is agreed this ..... day of ....., 195...., between the United States of America, acting through the Department of the Interior, Defense Minerals Exploration Administration, hereinafter called the "Government," and [2] William G. Reynolds,

whose mailing address is Stonegate Road
Anchorage, Kentucky,

hereinafter called the "Operator," as follows:

ARTICLE 1. *This contract* is entered into under the authority of the Defense Production Act of 1950, as amended. It consists of this form (MF-200A), the attached Exhibit "A," Annex I, and maps Figure 1 and Figure 2

The Operator shall not transfer or assign this contract or any right thereunder without the written consent of the Government.

ARTICLE 2. *Operator's property rights.*—(a) The land which is the subject of this contract (hereinafter called "the land") is in the State of Illinois, County of Bartin, and is described in Annex I.[3]

(b) The Operator represents and undertakes that:

(1) The Operator is the [4] lessee-assignee of [5] the mineral rights in the land, in possession and entitled to possession for all of the purposes of this contract, under and by virtue of a [6] lease, [7] recorded in Book 5, page 219, official records of said County; and

(2) The Operator's right, title, or interest (whether as owner, lessee, or otherwise) is subject only to the following claims, liens, or encumbrances: 10 percent royalty held by William A. Chenault

(c) The Subordination Agreement of the holder of any claim, lien, or encumbrance listed above, and (if the Operator does not hold the legal title) the Consent to Lien of any holder of the legal title of the land (lessor, seller, optionor, etc.), are attached, as follows: (Consent to lien of lessor waived.) Subordination Agreement signed by William A. Chenault and his wife, Louise Ryan Chenault.

[1] If sufficient space is not provided in any blank, use an extra sheet of paper and refer to it in the blank.
[2] Insert name, and if an organization, its nature (corporation and place of incorporation, partnership with names of partners, etc.).
[3] State on a separate sheet marked "Annex I" the legal description or enough to identify the property, particularly excluding any areas from which the production is not to be subject to the Government's percentage royalty.
[4] Insert "owner," "lessee," "contract purchaser," "locator," etc.
[5] Insert "the entire interest," "the mineral rights," "an undivided one-third," etc.
[6] Insert "deed," "lease," "contract," "location notice," "patent," etc.
[7] If not recorded, so indicate by inserting "un."

(d) The Operator shall preserve and maintain his right, title, and interest in the land and his right to the possession thereof for the purposes of this contract, and shall devote the land and all existing improvements, facilities, buildings, installations, and appurtenances to the purposes of this contract. Until the lapse of the time within which the Government may make a certification of discovery or development without any such certification having been made, and after any such certification has been made, the Operator shall neither transfer, convey, nor surrender the land nor any right, title, or interest therein, nor permit nor suffer any claim, lien, or encumbrance thereon, without expressly referring to and providing in the instrument of conveyance, lien, or encumbrance for the preservation of the Government's right to a percentage royalty on production and lien for the payment thereof. If the Government makes no certification of discovery or development within the time limited in Article 7, it shall thereafter have no claim against the land or any production therefrom except for any production referred to in Article 7(b)(1).

ARTICLE 3. *The exploration project.*—The project is a search for indicated or undeveloped deposits of Uranium. The work to be performed is described in Exhibit "A." The Operator on or before MAR 15 1956 shall commence the work, and on or before June 1, 1956 (unless the Operator's obligation to complete the work is terminated—see Article 8) shall complete the work., except as otherwise provided in Exhibit "A" with respect to stages of work.

ARTICLE 4. *Performance of the work.*—(a) *Operator's responsibility.*—The work shall be performed with reasonable diligence, efficiently, expertly, in a workmanlike manner, in accordance with good mining standards and State regulations for health and safety and for liability insurance covering employment; and with suitable and adequate equipment, facilities, materials, supplies, and labor, to bring it to completion within the time fixed.

(b) *Government may inspect.*—The Operator shall consult with and inform the Government on all phases of the work as it progresses. The Government may enter at all reasonable times to inspect the work under the contract, and also after a certification of discovery or development to inspect production operations and underground workings. The operator shall provide the Government with all reasonable means of access for such inspections.

ARTICLE 5. *Contribution by the Government.*—A fixed cost for each unit of work to be performed (per foot of drifting, per foot of drilling, per hour of operations, etc.) is hereby agreed upon, and is set forth in Exhibit "A" in connection with the estimated total cost of the project in the sum of $5,620.00 The Government will contribute 75 percent of the fixed unit costs as work is performed, in a total sum not in excess of $4,215.00: *Provided,* That until the Operator has rendered to the Government his final report, and any final auditing required by the Government has been made, and a final settlement of the contract has been made, the Government may withhold from the last voucher or vouchers such sums as it sees fit not in excess of 10 percent of the estimated total cost of the work. The Government will make its contribution on the basis of the monthly vouchers referred to in Article 6(b), but all payments by the Government are provisional only, subject to audit, until the account between the Operator and the Government is finally audited and settled. To the extent that excesses over fixed unit costs or any excess over the estimated total cost may be necessary for the performance of the work, the Operator shall incur and pay such excesses for his own account without contribution by the Government. The Government may make payments directly to independent contractors and suppliers for the account of the Operator rather than to the Operator.

ARTICLE 6. *Reports, accounts, audits.*—(a) *Operator's records.*—The Operator shall keep suitable records and accounts of the units of work performed and of any production in which the Government may have an interest; and shall preserve those with respect to work performed for at least three years after final payment by the Government, and those with respect to production for at least three years after any obligation to pay royalties to the Government has terminated. The Government may inspect and audit said records and accounts at any time, either by itself or by a certified public accountant. The Comptroller General of the United States or his representative, until the expiration of said three-year periods, shall have access to and the right to examine any pertinent books, documents, papers, and records of the Operator. All of the Operator's vouchers and records and accounts relating thereto and the Government's payments thereof remain subject to adjustment until final audit by the Government.

(b) *Progress reports and vouchers.*—The Operator shall provide the Government with five copies of monthly progress reports in three sections as follows: (1) Operator's Monthly Report and Voucher showing a detailed statement of units of work performed during the reporting period; (2) Operator's Unit Cost and Progress Report showing the various types of work performed during the reporting period and the fixed unit costs incurred for each type of work; and (3) a Narrative Report of the work

performed during the reporting period including adequate engineering-geological maps or sketches, drill hole logs and locations, and assay reports on samples taken concurrently with advance in mineralized ground. (Forms for reporting under (1) and (2) above will be provided by the Government.)

(c) *Final report.*—Upon completion of the work or termination of the Government's obligation to contribute to costs, the Operator shall furnish the Government with five copies of a final report (in addition to the final progress report and voucher). This final report shall include a geological and engineering evaluation of the results of the work performed under the contract with an estimate of the ore reserves resulting from such work, complete assay data, adequate geological and engineering maps or sketches, and a summary of the work performed and the unit costs thereof.

(d) *Report of sales.*—The Operator shall provide the Government with suitable accounting and documentary evidence covering all production to which the Government's percentage royalty relates, such as copies of smelter or concentrator settlement sheets, and certified accounts of production and sale or other disposition of production.

(e) *Compliance with requirements.*—If in the opinion of the Government any of the Operator's reports, records, or accounts are insufficient or incomplete, or if the Operator fails to make them, the Government may procure the making or completion of such with suitable attachments as an expense of the work to which the Operator shall contribute. The Government may withhold approval and payment of any vouchers relating to insufficient or incomplete reports, records or accounts.

ARTICLE 7. *Repayment by Operator.*—(a) *Certification.*—If the Government considers that a discovery or development from which production may be made has resulted from the work, the Government, at any time not later than six months after a sufficient final report and final account (see Article 6) has been rendered, may so certify in writing to the Operator. Such certification shall describe broadly or indicate the nature of the discovery or development.

(b) *Royalty on production.*—The Operator, as principal if the Operator is the producer, or as surety if the Operator is not the producer, shall pay to the Government a royalty on all minerals mined or produced from the land, as follows: (1) regardless of any certification of discovery or development, from the date of the contract until the lapse of the time within which the Government may make such certification, or until the total net amount contributed by the Government without interest is fully repaid, whichever occurs first; or (2) if the Government makes a certification of discovery or development, within a period of ten years from the date of the contract, or until the total net amount contributed by the Government without interest is fully repaid, whichever occurs first.

(c) *Basis for computation.*—The Government's royalty shall be a percentage of the gross proceeds (including any bonuses, premiums, allowances, or other benefits) from the production sold, in the form sold (ore, concentrates, metal, or equivalent), at the point of delivery (the f. o. b. point); *except,* that charges of *the buyer* arising in the regular course of business, and shown as deductions on the buyer's settlement sheets, on account of the cost of treatment processes performed by *the buyer,* sampling and assaying to determine the value of the production sold, and freight paid by *the buyer* to a carrier (not the Operator), shall be allowed as deductions in arriving at the "gross proceeds" as that term is used herein. Any costs of treatment processes, sampling or assaying, or transportation, performed or paid by the Operator or by anyone other than the buyer, are not deductible in arriving at the "gross proceeds" as that term is here used. The term "treatment processes," as here used, means those processes (such as milling, concentrating, smelting, refining, or equivalent) applied to the crude ore or other production after it is extracted from the ground, to put it into a commercially marketable form; excluding fabricating or manufacturing.

(d) *Unsold production.*—If any production (ore, concentrates, metal, or equivalent), after the lapse of six months from the date the ore was extracted from the ground, remains neither sold nor used by the Operator in integrated manufacturing or fabricating operations (for instance, if it is stockpiled), the Government, at its option, as long as it so remains, may require the computation and payment of its royalty on the value of such production in the form (ore, concentrates, metal, or equivalent) it is in when the Government elects to require computation and payment. If any production is used by the Operator in integrated manufacturing or fabricating operations before the Government makes its election, the Government's royalty on such production shall be computed on the value thereof in the form in which and at the time when it is so used. "Value" as here used means what is or would be gross income from mining operations for percentage depletion purposes in Federal income tax determination, or the market value, whichever is greater.

(e) *Percentages of royalty.*—The percentages of the Government's royalty shall be as follows:

One and one-half (1½) percent of amounts ("gross proceeds" or "value") not in excess of eight dollars ($8.00) per ton of production in the form in which sold, held, or used, plus one-half (½) percent for each additional full fifty cents ($0.50) by which such amounts exceed eight dollars ($8.00) per ton, but not in excess of five (5) percent of such amounts.

(For instance: the royalty on an amount of five dollars ($5.00) per ton would be one and one-half (1½) percent; on an amount of ten dollars ($10.00) per ton, three and one-half (3½) percent.)

(f) *Time for computation and payment.*—The Government's royalty shall be computed and paid currently upon each lot sold, held, or used in integrated operations, as the case may be, as above provided in this article.

(g) *Lien for payment.*—To secure the payment of its percentage royalty, there is hereby granted to the Government a lien upon the land or the Operator's interest in the land and upon any production of minerals therefrom, until the royalty claim is extinguished by lapse of time or is fully paid.

(h) *Notice to purchasers.*—The Operator shall give notice of the Government's claim for royalty to any purchaser of the production, and shall authorize and direct such purchaser to pay the royalty directly to the Government and to furnish the Government with copies of the settlement sheets. If the records of any production and sales or other disposition of production, whether the production is by the Operator or by others, are not made available to the Government, the amount of the royalty may be estimated by the Administrator, Defense Minerals Exploration Administration, or his successor, and his estimate thereof shall be final and binding upon the Operator.

(i) *No obligation to produce.*—Nothing in this contract is to be construed as imposing any obligation on the Operator or the Operator's successor in interest to engage in any production operations.

(j) *Government not obligated to buy.*—Nothing in this contract shall be construed as imposing any obligation on the Government to purchase any minerals mined or produced from the land.

ARTICLE 8. *Termination of the Government's obligations.*—(a) If in the opinion of the Government operations at any time have failed to achieve anticipated results that indicate the probability of making a worthwhile discovery, and in the opinion of the Government further operations are not justified, the Government may give the Operator written notice thereof, and thereupon the Government shall be free of all obligation to pay on account of units of work not then performed, and the Operator shall be free of all further obligation to prosecute the work other than such as may be necessary and incidental to winding up, reporting, and accounting.

(b) If in the opinion of the Government the Operator is in any manner in default under the terms of the contract, the Government may give the Operator written notice of such default with a specification of reasonable time within which the default must be cured; and if the Operator fails to cure such default as required, thereupon the Government shall be relieved of all obligation to pay on account of units of work not performed when the notice was given, and the Operator shall be free of all obligation to prosecute the work other than such as may be necessary and incidental to winding up, reporting, and accounting. The remedy provided for the Government in this paragraph "(b)" is in addition to any other remedy provided in this contract, and in addition to any other remedy the law may provide for breach of contract.

(c) The giving of any notice by the Government under the provisions of this Article 8 shall not affect the Government's rights as provided for in the contract with respect to a percentage royalty, and such rights shall be fully preserved.

ARTICLE 9. *Notices to be given by the Government* may be delivered to the Operator, or may be sent by registered mail addressed to the Operator at his mailing address stated in this contract. If mailed, notices are deemed to have been delivered five days after the date of mailing.

ARTICLE 10. *Officials not to benefit.*—No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE 11. *Changes and added provisions.*—

Ruth
Dwyer
Appd. Sol. Off.
Murphy
Ellis
Talbert
Selfridge
H. Gleason

Executed in sextuplicate the day and year first above written.

WILLIAM G. REYNOLDS
(Operator)

By William G. Reynolds

THE UNITED STATES OF AMERICA

By O. Mitchell Dorf
Administrator, Defense Minerals
Exploration Administration

I, ..., certify that I am the ..... secretary of the corporation named as Operator herein; that ..... who signed this contract on behalf of the Operator, was then ..... of said corporation; that said contract was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

.....

[CORPORATE SEAL]

U. S. GOVERNMENT PRINTING OFFICE 16—70618-1

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MAR 2 1 1950

EXPLORATION PROJECT CONTRACT
WILLIAM G. REYNOLDS
DOCKET NO. DMEA-3855

ANNEX I

The land referred to in Article 2 of the contract consists of 51.80 acres, situated in sec. 30, T. 11 S., R. 8 E., Hardin County, Illinois, more fully described as follows:

> The N½ of the NW¼ of the SW¼ and a part of the E½ of the SW¼ described by metes as follows:
>
> Beginning at the NW corner of the said E½ of the SW¼, thence running south with the west line thereof to the center point of the west line of the SE¼ of the SW¼, being the NW corner of the Silas Stacey tract, thence east 40 rods, thence north to a point 30 rods north of the north line of the SE¼ of the SW¼, thence east 33 rods to the west line of the Fleas Rose tract, thence north to the north line of the said E½ of the SW¼, thence west to the place of beginning.

The approximate location of the above-described land is shown on the map entitled, "Figure 2, DMEA-3855, Reconnaissance Geologic Map of Hick's Dome Area ....," attached hereto and made a part hereof.

EXPLORATION PROJECT CONTRACT
WILLIAM G. REYNOLDS
DOCKET NO. DMRA-3855

RECEIVED
MAR 21 1956

Exhibit "A"

Description of the Work

The object of this project is to explore two high radioactivity anomaly areas which have been exposed in trenches near the apex of "Kick's Dome" on the subject property.

The work shall be performed in two stages. The Operator shall complete all the work under Stage I, and so much of the work under Stage II as is approved in advance in writing by the Government.

Stage I

1. Bulldoze two large trenches at the approximate locations shown on the attached map entitled, "Figure I. Plan of Kamp Lease - Kick's Dome, Hardin County, Illinois," as follows:

Starting from the 9-foot vein (indicated as "Anomaly 100" on map Figure I), one trench shall be bulldozed in a northwesterly direction for a distance of about 250 feet. The trench shall be approximately 48 feet wide at the top and taper to about 15 feet wide at the bottom. The bottom of the trench shall be approximately 30 feet below the crest of the cut. It is estimated that 8,900 cubic yards of material will be excavated to complete this trench.

The second trench shall begin at the edge of the hill just north of "Kamp Drill Hole," (See Figure I) and run in a northerly direction for a distance of approximately 80 feet. The other dimensions of this trench shall be approximately the same as the dimensions of the first trench described. It is estimated that 2,800 cubic yards of material will be excavated to complete this trench.

2. Not in excess of 420 analyses shall be made for the elements uranium, and/or thorium, columbium, tantalum, and rare earths.

3. Prepare a topographic map of the areas excavated including the surrounding areas.

Stage II

1. Core drill one or more holes, not less than AX core size, to explore favorable ground indicated by the work completed under Stage I.

2 Not in excess of 405 feet of drilling shall be done under this Stage II of the contract and not in excess of 50 analyses shall be made for the elements uranium and/or thorium columbium tantalum, and rare earths.

3. On the map prepared under Stage I show the drilling performed under Stage II

General Provisions

Mineralized portions of the core and all other samples, shall be split, one-half used for assay purposes, and the remainder stored by the Operator in suitable containers, properly identified, for Government use. Non-mineralized sections of the core shall be stored by the Operator for Government inspection and disposal.

The location of drill holes and trenches the extent and method of mapping and sampling, and the laboratory making the analyses, are all subject to Government approval.

Fixed Unit Costs

Stage I

1.	Excavation of 2 trenches 11,700 cubic yards @ $0.20/cu. yd	$2,340.00	
2.	420 Analyses @ $3.00/each element analyzed	1,260.00	
3.	Surveying and mapping the Stage I project area 1/	125.00	$3,725.00

Stage II

1.	Diamond core drilling 405 feet @ $4.00/ft	$1,620.00	
2.	50 Analyses @ $3.00/each element analyzed	150.00	
3.	Surveying and mapping the Stage II project area 1/	125.00	1,895.00
Total Agreed Unit Cost of the Project			$5,620.00
Government Participation @ 75%			$4,215.00

1/ The completed map constitutes the unit.

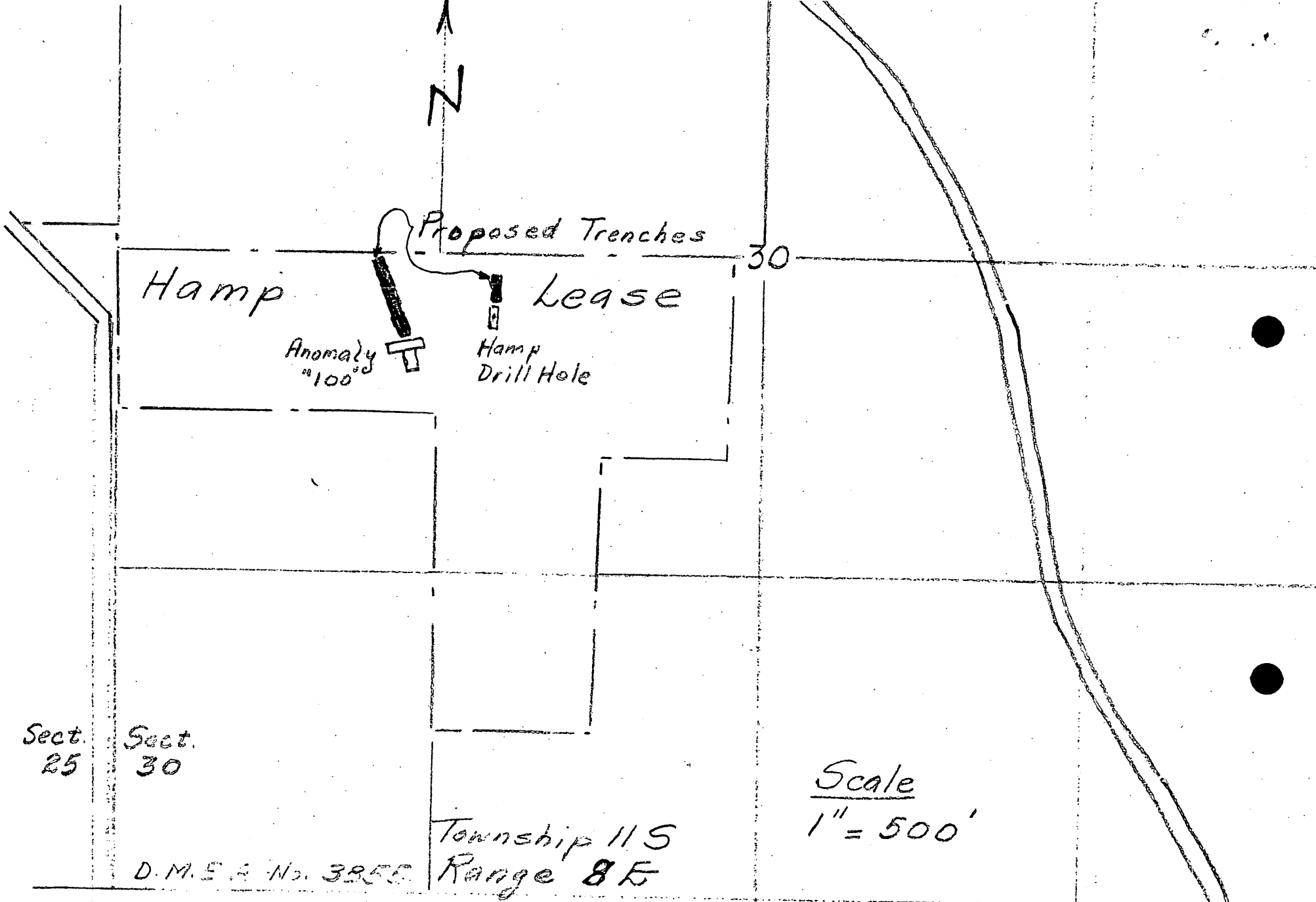
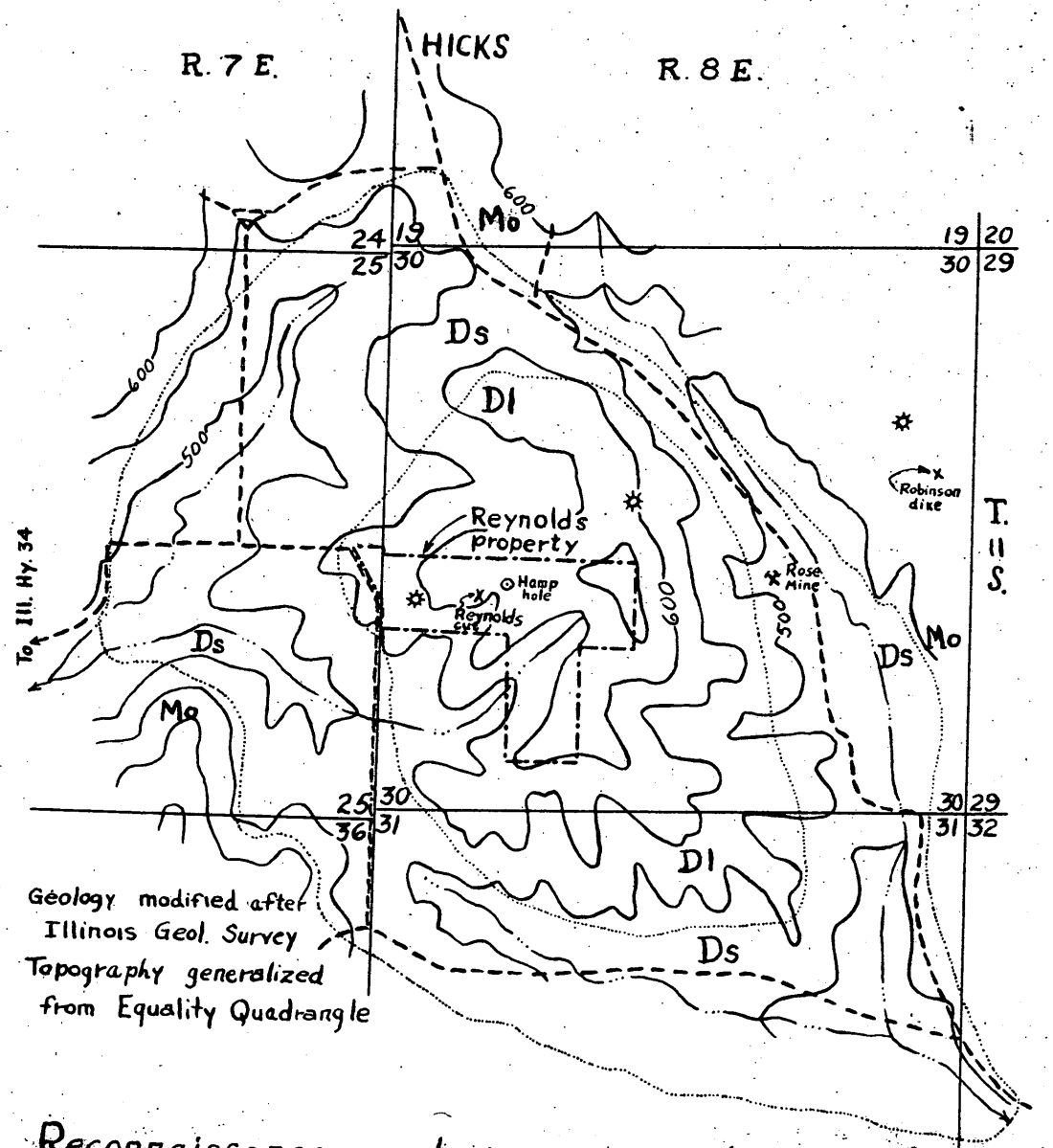


Figure 1. PLAN OF HAMP LEASE - HICK'S DOME
Hardin County, Illinois

Figure 2
DMEA 3855



Reconnaissance geologic map of Hicks Dome area
Hardin County, Illinois

EXPLANATION

Mo
Mississippian, Osage fm.

Ds
Devonian shale

Dl
Devonian limestone

Geologic contact (approximate)

Breccia

x
Pit or open cut

Fluorspar mine

Graded road

0 ¼ ½ 1 mile

Contour interval 50 feet
Datum is mean sea level

R.D.T.

MF-201
Revised March 24, 1955

RECEIVED
MAR 21 1956

For Government's Use Only
EXPLORATION PROJECT CONTRACT
Operator W. O. Reynolds
Docket No. DMEA- 3355
Contract No. Idm-E
Contract Date

SUBORDINATION AGREEMENT

To the United States of America:

Referring to that certain land in the County of Hardin, State of Illinois, described as follows:1/

See "ANNEX I" attached hereto.

which is the subject of a proposed exploration project contract, hereinafter called the "contract," with the United States of America, hereinafter called the "Government;" in consideration of the contract and as an inducement to the Government to enter into it, the undersigned hereby--

1. Subordinates whatever right, claim, lien or encumbrance the undersigned may have in or against the land to whatever interests, equities, and rights the Government may acquire under the contract (a) with respect to purchased property in or upon the land to the cost of which it has contributed, including the right to dismantle, sever, and remove it from the land; and (b) with respect to a percentage royalty on production from the land and a lien to secure the payment thereof; and

2. Undertakes and agrees (a) neither to commit any act nor assert any claim in conflict with the provisions of this Subordination Agreement; and (b) to give advance notice of this Subordination Agreement to any transferee of the right, claim, lien, or encumbrance hereby subordinated; and

3. Consents to all amendments and assignments of the contract without notice thereof, and agrees that this Subordination Agreement shall extend and apply thereto.

1/ Either (a) insert the legal description of the land, or (b) strike out the words "as follows" and insert "in a lease [or contract, deed, or other document] dated _____, and recorded in book _____ page _____ official records of said county." If (b) is used, the book and page of recordation cannot be dispensed with. If the space provided is insufficient, use an Annex, and refer to the Annex in the space.

(OVER)

RECEIVED
JAN 9 1956

Dated this 18th day of November, 1955.

William A. Chenault [Seal]

Louise Ryan Chenault [Seal]

_____ [Seal]

I, _____, certify that I am the _____ _____, (Secretary, etc.) of the corporation named herein; that _____ _____ who signed this agreement was then _____ (President or Vice-President, etc.) of said corporation; that said agreement was duly signed for and in behalf of said corporation by authority of its governing body, and was within the scope of its corporate powers.

_____

[Corporate Seal]

I- Lucille B. Walston a Notary Public, do certify that the foregoing instrument of writing from William A. Chenault and Louise Ryan Chenault, his wife, was this day produced to me in my county by the parties and acknowledged before me by the said William A. Chenault and Louise Ryan Chenault his wife, respectively, to be their act and deed for the uses and purposes therein set forth.

Given under my hand and seal of office this 18 day of November 1955.

My commission expires My Commission expires May 2, 1959

Lucille B. Walston
NOTARY PUBLIC

RECEIVED
MAR 2 1 1956

"ANNEX I"

The land referred to in this Subordination Agreement is in Section 30, Township 11 South, Range 7 East, Third principal meridian, Hardin County, Illinois, and described as follows:

The N½ of the NW¼ of the SW¼ and a part of the E½ of the SW¼ described by metes as follows: Beginning at the NW corner of the said E½ of the SW¼, thence running South with the West line thereof to the center point of the West line of the SE¼ of the SW¼, being the NW corner of the Silas Stacy tract, thence East 40 rods, thence North to a point 30 rods North of the North line of the SE¼ of the SW¼, thence East 33 rods to the West line of the Pleas Rose tract, thence, North to the N. line of the said E/2 SW¼, thence West to the place of beginning in Section 30.

DMEA Form 7
(12-56)

700

OFFICIAL FILE COPY

Date	Surname	Code
3-1	Murphy	700
3-1	Kubach	700
3-1	Chamlee	800
3/1	Selfridge	130
"	[illegible]	110
"	Rittenhouse	100
		220

MAR - 1 1957

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Rm. #13, P. O. Building
Knoxville, Tennessee

Re: Docket No. DMEA-3855 (Thorium, uranium, and rare earths)
Contract No. Idm-E911
William G. Reynolds
Hick's Dome
Hardin County, Illinois

Dear Mr. Laurence:

Enclosed for your files are two copies of a letter to the Operator closing the subject contract.

Since complete addresses for the owners of the property who signed the Subordination Agreement are not available in our docket, we are also enclosing a date-stamped original letter, with distribution copies, to William A. Chenault and Louise Ryan Chenault. You are requested to insert the correct address in the letter and all copies, forward the original to the owners, and return all copies, except those indicated for the Field Team, to this office for distribution.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee

Enclosures

APPROVED:

Frank D. Lamb
Member, Bureau of Mines

N. E. Nelson
Member, Geological Survey

FMMurphy/izm 2-28-57
cc to: Code 700
Mr. Murphy
Admr.'s Reading File
Operating Committee

8623

DMEA Form 7
(12-56)

700

OFFICIAL FILE COPY

Date	Surname	Code
2-29	Murphy	700
2-29	[illegible]	700
3-1	Chambers	800
3/1	Selledge	130
"	Johnson	110
"	Mittendorf	100
3-4	C	220
	Lamb	225
	Nelson	

MAR - 1 1957

Mr. William G. Reynolds
Stonegate Road
Anchorage, Kentucky

Re: Docket No. DMEA-3855 (Thorium, uranium, and rare earths)
Contract No. Idm-E914
Hick's Dome
Hardin County, Illinois

Dear Mr. Reynolds:

Reference is made to your completed exploration contract with the Government.

We sincerely regret that the work performed did not result in a certification of discovery or development under the provisions of the contract. In the absence of such certification, the Government retains no claim or lien against the property subject to the contract or any future production therefrom. We, therefore, are closing our books and records on this project. Your attention, however, is called to the provisions of the contract which require the operator to keep and preserve certain records for the period indicated.

Your interest in the DMEA exploration program and participation therein are fully appreciated.

Sincerely yours,

G. O. Mittendorf (for)

Administrator

FMMurphy/izm 2-28-57
cc to: William A. Chenault & Louise Ryan Chenault
Code 700
Mr. Murphy
Admr.'s Reading File
Contract Adm. & Audit Div.
DMEA FT Reg. V (2)

8623

DMEA Form 7
(12-56)

700

OFFICIAL FILE COPY

Date	Surname	Code
2-29	Murphy	700
2-29	Knoefler	700
3-1	Chenault	800
3/1	Selfridge	130
"	Johnson	110
"	Mittendorf	100
3/11		220
		225

MAR - 1 1957

William A. Chenault
Louise Ryan Chenault

1279 Cherokee Road
Louisville, Kentucky

Re: Docket No. DMEA-3855 (Thorium, uranium, and rare earths)
Contract No. Idm-E914
William G. Reynolds
Hick's Dome
Hardin County, Illinois

Nelson
Lamb

Dear Mr. and Mrs. Chenault:

Enclosed is a copy of a self-explanatory letter of today to the Operator under the above-cited contract.

This correspondence relates to the Subordination Agreement signed by you on November 18, 1955.

Sincerely yours,

G. O. Mittendorf (fw)

Administrator

Enclosure

FMMurphy/izm 2-28-57
cc to: Code 700
Mr. Murphy
Admr.'s Reading File
Contract Adm. & Audit Division
DMEA FT Reg. 5 (2)

Mailed in Fields.

8623

Docket Murphy 700 Kuodon

Project Summary Report

By: F. M. Murphy Date: February 28, 1957

1. Docket No. DMEA-3855 (Thorium-uranium-rare earths)
   Contract No. Idm-E914

   Operator: William G. Reynolds
   Stonegate Road
   Anchorage, Kentucky

   Operator's Property Rights: Lease on 51.80 acres, situated in sec. 30, T. 11 S., R. 8 E., Hardin County, Illinois

2. Contract dated: January 26, 1956

   Amendment No. 1 - April 9, 1956, provides a different method for payment of assaying.

   Amendment No. 2 - Extends the completion date from June 1, 1956 to October 1, 1956.

   Work Authorized, as amended:

Fixed Unit Costs

Stage I

Excavation of 2 trenches, 11,700 cu.yds. @ $0.20/cu.yd.	$2,340.00	
Surveying & mapping the project area	125.00	
Chemical analyses:		
70 determinations for thorium @ $10/each	700.00	
10 determinations for uranium @ $5/each	50.00	
3 determinations for columbium-tantalum @ $15/each	60.00	
Spectrographic analyses:		
30 determinations for rare earths @ $15/each	450.00	$3,725.00

Stage II

405 ft. core drilling @ $4/ft.	$1,620.00	
Surveying & mapping	125.00	
12 chemical analyses for thorium @ $10/sample	120.00	
2 spectrographic analyses for rare earths @ $15/sample	30.00	$1,895.00

Total Estimated Cost of Project $5,620.00

Government Participation @ 75% $4,215.00

Work Completed:

Bulldozing, 11,700 cu.yds. @ $0.20/cu.yd.	$2,340.00
Core drilling, 405 ft. @ $4/ft.	1,620.00
Surveying & mapping	250.00
41 chemical & spectrographic determinations	455.00

Total Actual Cost $4,665.00
Government Participation @ 75% $3,498.75

3. Final Reports:

Operator's: September 5, 1956 - accepted by DMEA

Audit Report of Review - dated February 25, 1957:

Total cost as billed by Operator	$4,610.00
Under claim for rare earth determinations	55.00
Total Accepted Cost	$4,665.00
Government Participation @ 75%	$3,498.75

Field Team Report received February 15, 1957: (excerpts)

The object of the project was to explore two radioactive areas on "Hick's Done" by means of 2 trenches and 2 diamond drill holes.

A wildcat oil drill hole previously drilled in the project area penetrated Devonian, Silurian, and Ordovician sediments from surface to 1605 feet; from 1605 feet to 2,944 the hole penetrated a breccia zone which contains fluorite, calcite, quartz, pyrite, sphalerite, galena, thorium, and rare earths.

Trench No. 1 exposed a vein at least 260 feet long and ½ to 2 feet wide, dipping at about 85° to the northeast. Samples taken indicate that the average content of the vein is about 0.4% thorium and about 2% combined rare earths.

Two diamond drill holes were put down to test the vertical extent of the vein exposed in trench 1. However, no core was obtained from the inferred vein intersection areas. It appears that the drill encountered either a cavity or unconsolidated sediments at the depths where the vein should have been cut.

Trench No. 2 failed to reveal a significant extent of radioactivity.

The Field Examiners note that although the project work strongly suggests that a vein containing thorium and rare earths is present, the vein consistently is not of minable width. In addition, nothing suggests that the vein will widen at depth.

The exploration work did not find an economic ore deposit, therefore, the field examiners and Field Team do not recommend a Certification of Discovery or Development.

Work under the contract started April 14 and was completed August 20, 1956. The work was completed in a satisfactory manner. The Operator's costs for trenching was actually about 32 cents per cubic yard or 12 cents more than allowed under the contract.

The field examiners H. L. Burmeister, USBM, and R. D. Trace, USGS, have done a creditable job on this project and their joint report of examination.

F. M. Murphy

F. M. Murphy, Mining Engineer
Rare and Miscellaneous Metals Div.

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
2/26	Talbert	800
2/27	C	220
		225

FEB 26 1957

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room 14, Post Office Building
Knoxville 2, Tennessee

Re: Docket No. DMEA-3855
William G. Reynolds
Hamp Lease, Hicks Dome Area
Hardin County, Illinois
Contract No. Idm-E914

Dear Mr. Laurence:

Enclosed are the original and two copies of a Report of Review in lieu of a final audit of the referenced project, prepared in accordance with your February 21, 1957, memorandum advice that such is now in order.

If you concur with the facts stated in this Report of Review, the original and one copy should be forwarded to the Certifying Officer and one copy should be retained in your files. If, for any reason, the report does not have your concurrence please return all copies to this Division with your comments.

Sincerely yours,

(Signed) J. L. Chambers

Jay L. Chambers, Chief
Contract Administration
and Audit Division

Enclosure

EDTalbert/wb
February 26, 1957

Copy to: Docket
Admr. Reading File
Helen Miller
Mr. Chambers

8623

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.
ROOM POST OFFICE BLDG.
KNOXVILLE 2, TENN.

February 21, 1957

EXTRA COPY DMEA RECEIVED FEB 25 1957		
DATE	INITIALS	CODE
2/25	C	220
		225

Memorandum

To: Jay L. Chambers, Chief, Contract Admin & Audit Div.

From: Executive Officer, DMEA - Region V - Knoxville, Tenn.

Subject: Completion of DMEA-3855, Idm-Z914(Thorium, etc.)
Wm. G. Reynolds, Anchorage, Ky.
Hicks Dome, Hardin County, Illinois

Work on this project has been completed, the Operator's final report received, and the final voucher approved. Work quantities are verified in the Field Team final report submitted from this office February 13, 1957.

The suggestion in an earlier memorandum that additional assays might be needed turned out to be erroneous. Therefore, a Report of Review on this contract is now in order.

Robert A. Laurence

RAL/xm
Lynch
Files
Opr. Com.-2

[illegible]

[illegible] February 20, 1957

DMEA Project No. 3855
DMEA Contract No. Idm-E914
Commodity Uranium
Name of applicant William G. Reynolds
Name of property Hicks Dome
Location of property Hardin County, Ill.
Estimated cost of project $4,610.00

Ernest William Ellis, DMEA Member
Uranium Commodity Committee
John E. Crawford, Bureau of Mines Member
Uranium Commodity Committee

Field Team's Final Report

[illegible] 2/11/57 [illegible] 2/18/57

[illegible] Yes [ ] No [ ]

[illegible] Yes [ ] No [ ]

[illegible] Yes [ ] No [ ]

[illegible] Yes [ ] No [ ]

[illegible]

[illegible]

[illegible]
a. Location [ ]
b. Commodity [ ]
c. Estimate of [illegible] [ ]
d. Costs [ ]
e. Proposed exploration method [ ]
f. Alternate exploration method [ ]
g. Costs [ ]
h. _____ [ ]

[illegible]
a. Obtain information from applicant [ ]
b. Refer to Field Team [ ]
c. Reject [ ]
d. Agree with Field Team [x]
e. Consult with Mr. _____ at _____ AEC office.
f. Discuss with Field Team [ ]
g. Request alternate plan [ ]
h. Request another consultation [ ]
i. Approval [ ]

[illegible]: (Use back of page if necessary)

OFFICIAL FILE COPY
DMEA
RECEIVED FEB 20 1957

DATE	INITIALS	CODE
2/21	C	220

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 4, POST OFFICE BLDG.
KNOXVILLE 2, TENNESSEE

WASHINGTON 25, D.C.

February 13, 1957

OFFICIAL FILE COPY
DMEA
RECEIVED FEB 15 1957

DATE	INITIALS	CODE
2-15	C	220
"		130
2-19	C	220
2/26	Murphy	700

Memorandum

To: Operating Committee, DMEA - Washington

From: DMEA Field Team, Region V - Knoxville, Tenn.

Subject: Final Report - Field Team- DMEA-3855, Idm-E914 (thorium, uranium, and rare earths) William G. Reynolds, Hicks Dome, Hardin County, Ill.

Enclosed are 4 copies of the Field Team final report on the subject contract.

The Field Team agrees with the recommendations and conclusions set forth in this report.

V. J. Lynch

V. J. Lynch, Acting
Executive Officer, DMEA
Field Team, Region V

Helmuth Wedow, Jr.

Helmuth Wedow, Jr.
Geologist, Geological Survey

Reviewed by
DMEA OPERATING COMMITTEE
2-18-57
(date)

ACTION ON INTERIM 3855
OR FINAL FIELD TR REPORT

Date 8-19

Referred to:

4 1. Mr. ~~[illegible]~~
~~2. Mr. Johnson~~
~~2. Mr. Chambers~~
~~1. Docket Control Mails and Files~~
~~5. Dir. of Insp. Matls Divisi~~
6. Docket Control Mails and Files

Note comments in report regarding:

1. Note error on Fig. 7, as marked in red pencil;
2. also corrected costs on
3. page 18 of report.

Talbert 8/25/59

4.

and take appropriate action.

- - - - - - - -

Action taken by Division:

Changes in costs noted
Murphy

Robert E. Adams

OFFICIAL FILE COPY
DMEA
RECEIVED FEB 15 1957

DATE	INITIALS	CODE
		130
		220

FINAL REPORT ON COMPLETED CONTRACT

by

H. L. Burmeister and Robert D. Trace[1]

DMEA Docket No. 3855 (Thorium, uranium and rare earths)
Contract No. Idm-E 914
Operator: William G. Reynolds, Stonegate Road, Anchorage, Kentucky
Property: Hicks Dome, Hardin County, Illinois

Summary

The purpose of this exploration was to investigate at moderate depth the economic potential of a vein-like occurrence containing thorium, rare earths and uranium minerals.

Exploration was conducted in section 30, T11S-R8E, Hardin County, Illinois on ground held by the operator under a lease of mineral rights (fig. 1). "Owner's Consent to Lien" was waived, but "Subordination Agreements" were executed.

Contract amendment No. 1 provided that the date of commencing work be extended from March 15 to May 1, 1956, and changed the number and allowable cost of chemical and spectrographic determinations. Amendment No. 2 extended the time for completion of the contract to October 1, 1956.

Work was divided into two stages. Stage I as accomplished consisted of bulldozing two main and two spur trenches for an aggregate length of 730 feet, in the course of which a total of 12,332 cu. yds. of material was removed, of which 652 cu. yds. was for the operator's account.

Reviewed by
DMEA OPERATING COMMITTEE
2-18-57
(date)

1/ H. L. Burmeister, Engineer, U. S. Bureau of Mines
Robert D. Trace, Geologist, U. S. Geological Survey

Results obtained in Stage I justified diamond core drilling two holes. Drilling totaled 406 feet, of which one foot was for the operator's account. A total of 41 chemical or spectrographic determinations was made (fig. 2a). Total cost of the project was $4,610.00.

In diamond drilling both holes a number of either actual cavities or clay-filled cavities were encountered. The engineer was present on two such occasions when the drill dropped suddenly. It is believed that open cavities were encountered because of immediate but temporary loss of drilling water, and the fact that no clay appeared in the returning water.

Conclusions and Recommendations

No further DMEA participation in the subject project is recommended. Although the past exploration strongly suggests that a vein of thorium and rare earths is present, the vein consistently is not of minable width. In addition, nothing suggests that the vein will widen in depth, as evidenced by the consistent width of about 1 foot along trench 1 and in D.D.H. 1. As the exploration did not get below the oxidized part of the vein and no definite results were obtained by mineralogical study, nothing can be predicted about the grade of the unoxidized vein.

Any further exploration would have to be deep drilling (at least 400-500 foot holes), in order to explore the unoxidized veins, or a shaft; neither is justified, in the light of our present knowledge.

The exploration project did not find an economic ore deposit and therefore no certification of discovery is recommended.

Work Provided for in Contract

Work under this contract was divided into two stages. Stage I provided for the removal of a maximum of 11,700 cu. yds. of material from two trenches by bulldozing methods. Stage II was dependent upon results obtained in Stage I and provided for diamond core drilling a maximum total of 405 feet in one or two holes. A total of 95 chemical and 32 spectrographic determinations was allowed for the entire contract. A topographic map was to be made of the exploration area and was provided for.

Description of Work Completed

Work under this contract started April 14 and was completed August 20, 1956. In Stage I there were completed two main trenches, No. 1 and No. 2, and two smaller spur trenches from No. 2 (figs. 3, 4, 5). Trenches No. 1 and No. 2 were made on the strike of two separate lines of mineralization and the spur excavations of trench No. 2 followed indicated branches of the main line of mineralization.

Trench No. 1 is 350 feet in length and averages 26 feet wide and 27 feet deep inside the approaches. Trench No. 2 is 230 feet in length and averages 29 feet wide and 21 feet deep between approaches. The spur trenches are of lesser dimensions, as is shown in fig. 3. The presence of chert along the course of mineralization made necessary the nearly constant use of scarifying teeth on the bulldozer blade. Partially because of increasing hardness of the ground, and partially because of contract yardage limitations, trenching was stopped after excavating the contract amount of 11,700 cu. yds. plus 652 cu. yds. for the operator's own account.

Radioactivity was measured with a Precision Model 111B Scintillator. In trench No. 1 between points 0+00' and 2+50' and from several feet below the surface to trench bottom, the one-foot width of greatest radioactivity averaged approximately 1 MR/hr, or 77 times the background of 0.013 MR/hr, and the 2-foot widths adjoining on each side averaged about 0.41 MR/hr, or 32 times background. On this basis, radioactivity for a total width of 5 feet and a length of 250 feet might measure an average of 0.53 MR/hr, or 40 times background.

Results obtained in Stage I were considered sufficiently encouraging to justify diamond drilling in Stage II (figs. 6, 7, 8).

Stage II provided a total of 405 feet of AX size diamond core drilling which could be done in either one or two holes. Although information which might be gained from deeper drilling was desirable, it was concluded that two more shallow holes would decrease the possibility of obtaining unrepresentative results which would almost certainly be obtained in one drill hole. The locations of holes No. 1 and No. 2 are shown on fig. 3. Hole No. 1 was drilled 211 feet on a bearing of S 62° W and at a -60° inclination. The hole penetrated to a point 10 feet beyond the vertical projection of mineralization in the bottom of the trench. Hole No. 2 was drilled 195 feet on a bearing of S 62° W and at a -50° inclination. The hole penetrated to a point about 25 feet beyond the vertical projection of mineralization in the trench bottom (fig. 9 a, b, c).

A number of open or possibly clay-filled cavities were encountered in each hole. No core was obtained in these sections. Efforts to obtain a drill

hole probe were unsuccessful in the time the drill could be held to keep the hole open for probing. If a probe had been used, it is highly probable that it could not have been recovered.

Geology

General Area

The Reynolds property is near the center of Hicks Dome, which is in the northern part of the Illinois-Kentucky fluorspar district. The name Hicks Dome refers to a small domal uplift in northwestern Hardin County, southern Illinois.

Rocks of the Illinois-Kentucky fluorspar district are mostly sedimentary and range in age from Devonian to Cretaceous. Some dikes, sills, and irregularly shaped bodies of mica-peridotite and breccias of sedimentary and both femic and mafic igneous materials are present. Structurally, the area is a low oval-shaped dome broken by a series of northeast-trending high-angle faults that displace the beds as much as 2,000 feet. The beds range in dip from essentially horizontal to about 15 degrees, except near faults where dips may be nearly vertical.

Hicks Dome, in the northern part of the fluorspar district, is a small structural uplift that is superimposed on the larger dome that comprises the entire fluorspar district. The central part of Hicks Dome is about a mile in diameter and is underlain by cherty limestone and siliceous shale of Devonian age (fig. 10); the shale is well exposed in several places, but only cherty overburden crops out in the part of the central area underlain by limestone.

Mississippian and Pennsylvanian limestone, sandstone, and shale dip as much as 15 degrees and crop out in a circular pattern around the Devonian rocks, except to the southeast of the Dome, where northeast-trending faults break the circular continuity (Ill. Geol. Survey Bull. 76).

Hicks Dome probably is the result of deep-seated igneous activity -- either an intrusive body that is more than 3,000 feet below the surface, or an incipient or uncompleted cryptovolcanic structure. Evidence for the igneous activity is the perioditite dikes and the igneous and sedimentary breccias (diatremes?) that are present in the vicinity of Hicks Dome (Ill. Geol. Survey R. I. 197).

Within the area underlain by Devonian limestone, fluorspar has been produced only from the Rose mine (fig. 10). This mine was operated more than 30 years ago and no reliable information is available regarding its occurrence.

Project Area

In order to make this final report as complete as possible, some of the data from an interim report by Dewey H. Amos, U.S.G.S., and from the examination report are summarized herein.

The project area is near the center of Hicks Dome and is underlain by cherty and dolomitic limestone of middle Devonian age. No exposures of limestone were found at the surface or in trenches 1 and 2, as the overburden near the center of the Dome is about 75 feet thick. Unweathered limestone, however, was cut in D.D.H. 1 and 2.

The formations beneath the near-surface limestone are described by Brown and others (Econ. Geol. v. 49, no. 8) from cuttings of the Hamp hole

(figs. 3 and 10). In summary this hole penetrated Devonian, Silurian, and Ordovician sediments from the surface to 1,605 feet; from 1,605 to 2,944 the hole penetrated a breccia zone which contained traces of fluorite, calcite, quartz, pyrite, sphalerite, galena, and thorium and several rare-earths (fig. 11).

Faults that trend northeast are common in the Mississippian and Pennsylvanian rocks surrounding the Dome, but because of the lack of bed-rock exposures in the center of the Dome, it is not known whether these faults extend through its center. Data from trenches 1 and 2 and D.D.H. 1 and 2 (fig. 3) show that faults are present within the center of the Dome, but the explored area is not sufficiently large to demonstrate that these faults continue to the edge of the Dome.

The initial exploration on the property (other than the Hamp hole) was a bulldozer cut on the side of a small hill; in the examination report, the radioactivity in this cut was called anomaly 100. This cut is now the extreme southeast end of trench 1 (fig. 3). Nearly vertical zones of varying radioactivity were exposed at anomaly 100 which from southwest to northeast are as follows: zone 1 - 3 feet wide, eU 0.019; zone 2 - 16 inches wide, eU 0.094; zone 3 - 4.5 feet wide, eU 0.030; zone 4 - 5 feet wide, barren; zone 5 - 16 inches wide, eU 0.042 (fig. 11, Reynolds 1-6).

The Hamp hole sump (fig. 3) also contains scattered 1- to 2-foot areas of radioactivity.

Trench 1 was started at anomaly 100 and was excavated northwestward, following the zone of high radioactivity. A vein-like body (hereafter called

a vein) consisting of yellow-brown clay-like and silty material is exposed that is at least 260 feet long and 1/2 to 2 feet wide (zone 2). The attitude of the vein is somewhat irregular but has an average strike over its exposed length of N 24° W and a dip of about 85° to the northeast. Average microroentgen counts on a scintillator (Model 111B) across the vein ranged from 800 to 1,200 per hour against a background count of 18 microroentgens. For 1 to 6 feet on each side of the vein the overburden from the country rock has a count of 400-800 microroentgens (zones 1 and 3).

At least four gravity-type faults with displacement of one-half to 2 feet intersect the vein (fig. 3). These faults strike about N 70° E and dip 75° to 85° southeast. The highest radioactivity readings are obtained at the intersection of these faults with the vein, although the faults are not radioactive away from the vein.

Assays of trench samples were made by C. O. Parker, Denver, with check samples by Lindsay Chemical Company and the U.S.G.S. (fig. 2 a and b). According to the Parker assays of the vein, the thorium ranges from 0.09 to 0.47 percent, averaging about 0.2, and the combined rare-earths ranges from 0.38 to 1.47 percent, averaging about 0.9. Check samples by Lindsay Chemical Company and the U.S.G.S., however, suggest that these figures should be doubled, and that the average content of the vein probably is about 0.4 percent thorium and about 2 percent combined rare-earths.

Although the country rock in trench 1 is weathered, i.e., the carbonate content has been removed, the original attitude of the limestone beds is suggested

by the attitude of the chert layers that remain. Their attitude varies greatly within short distances, but in general southeast of the intersection of D.D.H. 1 and the trench (fig. 3), the beds dip 5 to 10 degrees to the southeast, and northwest of this point, the beds dip 15 to 20 degrees to the northwest. Locally, the layers are completely folded.

Trench 2 failed to reveal a significant extent of radioactivity. A few localized spots of high radioactivity associated with yellow clay are present in the southern end of the cut. These spots have neither vertical nor lateral extent, nor indicate any systematic distribution or trend. No faults are present in this trench. Weathered country rock in the southern end of the trench is brecciated.

Two core drill holes (fig. 9 a, b, c) were put down to test the vertical extent of the vein exposed in trench 1. No core was recovered from these holes that contained the high radioactivity found at the surface, although breccia zones with slight radioactivity were found.

In D.D.H. 1, the zone of greatest brecciation is from 176.5 to 183 (probably corresponds to zone 3 at anomaly 100). The core consisted of angular fragments of limestone and chert with many veinlets and small cavity fillings of purple fluorite and white calcite. Radioactivity is as much as 0.009 eU. The interval of 183-184 (zone 2?) is reported by the driller as a cavity. The interval 184-193 (zone 1?) also is brecciated and contains calcite and fluorite, but in lesser quantities than zone 3. The cavity at 183-184 (zone 2?) is approximately the width of the highly radioactive vein in trench 1

and at anomaly 100, and is also in the same relative position within the entire radioactive zone.

D.D.H. 2 also cut breccia zones with fluorite and calcite and some radioactivity, but except for 0.6 foot no core was obtained from zones 1, 2, and 3. The vein probably is somewhere in the 139.6-161 interval which was reported as a cavity. This interpretation is based upon (1) the anticipated position of the radioactive zones from data in D.D.H. 1, and (2) the core from the interval 139.0-139.6 was highly brecciated, similar to the 176.5-183 (zone 3) interval in D.D.H. 1. The breccia zone in D.D.H. 2 was cut about 25 feet higher than in D.D.H. 1 and was therefore subject to more complete weathering; this could account for the lack of core or cavity.

In both D.D.H. 1 and 2, a narrow zone of radioactive breccia was cored that is 5 to 10 feet horizontally east of the zones 1, 2, and 3. This probably corresponds to zone 5 at anomaly 100.

The highest radioactivity in both holes is in zone 5 (D.D.H. 1 156.0-156.1, eU 0.013; D.D.H. 2 127.9-128, eU 0.018) that seemingly parallels the wider breccia zone.

The core drilling proves that the vein in the overburden has vertical continuity, as shown by the localization of breccia and radioactivity. The vein, however, was cut at too shallow a depth (i.e., about 125' below the trench). Although the wall rocks are unweathered at this depth, the highly radioactive vein probably has either been weathered completely and washed out by surface water, or was so soft that it could not be cored. This phenomenon is common; for example, fluorspar veins in the area are known to weather as deep as

300 feet and yet have solid rock walls. For an individual case, however, the depth of weathering is difficult to predict.

Mineralogy

The mineralogical work is described in three parts: (1) samples from the Hamp hole, (2) samples from the surface at anomaly 100, and (3) a sample from the drill core.

The pulps of the Hamp hole (drilled in 1952) were obtained from the U.S.G.S. laboratory in Denver. Assays for eU, U, and CaF_2 had been made by the U.S.G.S. and published by Brown in Economic Geology. Semiquantitative spectrographic analyses also had been made, although except for thorium they were not published by Brown (fig. 11, Hamp 1-8). At the writer's request, the Washington laboratory of the U.S.G.S. studied the minerals in these pulps, as they contain more thorium and probably rare-earths normally found in sediments. A study of the mineralogy might determine whether the thorium and rare-earths are in primary minerals like monazite or bastnaesite, or whether they are adsorbed on amorphous iron oxide or clay-like material that was carried into position by surface water, possibly from the formerly overlying Devonian shale.

The Hamp sample pulps had been ground to pass a 150-mesh screen and therefore the minus 100 plus 200-mesh fraction was small. According to Miss Regina L. Wack, mineralogist of the U.S.G.S.: "In the minus 100 plus 200-mesh fraction quartz, calcite, fluorite, pyrite and magnetite were identified. Biotite is present in samples (Hamp) 2 and 4 and barite in sample 4. No rare earth minerals could be identified."

The only previously unreported mineral is biotite. The Hamp hole probably penetrated a narrow dike of mica-peridotite, as they are known to occur less than a mile away.

A study was made of the mineralogy of the most radioactive sample at anomaly 100 (Reynolds 3, fig. 11), which contains about 2 percent combined thorium and rare-earths. Semiquantitative spectrographic and X-ray analyses were run on the heavy (in methelene iodide) fraction of the sample. The combined thorium and rare-earth content was raised from about 2 percent in the original sample to about 7 percent in the heavy fraction. By X-ray work, however, only goethite and hematite were definitely identified. Some X-ray lines are present that might indicate monazite, and the relative quantities of the various rare-earths (Ce, La, Nd, and Pr) shown in the spectrographic analysis of the heavies are suggestive of monazite also. No definite identification, however, could be made.

X-ray and spectrographic work was done on the most radioactive core sample, D.D.H. 2, 127.9-128.0, eU 0.018. This 0.1-foot zone is stained brown and is dominantly calcite with subordinate quantities of silica, iron oxide, and traces of barite, and an unknown mineral. Work is continuing on this sample, although the quantity of the sample is so small and the quantity of the unknown mineral in the sample also is so small that conclusive results may not be obtained.

The laboratory work on the above sample was as follows: The sample was crushed and screened into six size fractions by using 40-, 80-, 120-, 200-, and 300-mesh screens. The radioactivity of these fractions was measured by

a portable Geiger counter with attached scalar. The plus 200 fractions are about twice background, whereas the minus 200 plus 300 and minus 300 fractions are three to four times background.

A further separation of the two finer fractions was attempted by centrifuging in bromoform. In both samples, the small quantity of heavies obtained was insufficient for measurement of their radioactivity, so no comparison of relative radioactivity of the heavies and lights could be made. Both of the light fractions, however, were still radioactive. Therefore, both the light and heavy fractions were used for additional study.

The plus 200 fractions also were split by centrifuging in bromoform, but no results could be obtained from them. The quantity of heavies was extremely small -- a few grains. The light fractions were larger in quantity, but all the material was heavily coated, making microscope examination useless. In order to remove the coating, the material was boiled in concentrated HCl. The residue was entirely quartz grains and a small quantity of an amorphous brown clay-like material, probably iron oxide.

The minus 300 light fraction was examined by X-ray work; although the material was radioactive, only calcite was found. The radioactivity likely is in the amorphous clay-like coating, or possibly thorium may be substituting for calcium in the calcite lattice. (When this sample was digested in HCl, the clay-like material remaining was so small in quantity that its radioactivity could not be measured.)

The plus 300 minus 200 light fraction was also X-rayed, but only calcite and quartz were identified.

The plus 300 minus 200 heavy fraction was only a few grains and no results could be obtained.

The minus 300 heavy fraction was X-rayed. A small quantity of calcite and quartz was found, and also barite and an unknown mineral. As the X-ray card files at the writer's office in Beltsville are incomplete, this sample was sent to the U.S.G.S. Washington laboratory. They found the same X-ray pattern as the writer, but as yet, they cannot identify the unknown mineral.

The data now known suggest that at least most of the radioactivity in the drill core sample is in the brown iron oxide coating, although the unidentified mineral also may be radioactive.

Origin of Mineralization

Three possible origins for the weathered occurrence of the thorium and rare earths have been suggested: (1) a weathered vein deposit localized along breccia or fault zones and related to the deep-seated igneous or explosive activity, (2) fissure filling by surface waters that carried minerals downward from the stratigraphically higher Devonian shale, and (3) mica-peridotite dikes, which contain a small quantity of rare earths.

Although the weathered vein trends northwest, which is the common trend for dikes in the area, the following data suggest that the weathered vein is NOT a dike and that the weathered vein might have at best only a distant relationship with dikes in the area, that is, a common igneous origin.

(1) No mica has been found in the trench or core drill holes. In the known dikes, however, mica is extremely resistant to weathering and always can be found in the surficial material overlying the dikes.

(2) In comparing spectrographic analyses of two dike samples to similar analyses of the weathered vein (fig. 11), the known dikes contain considerable nickel and chrome, whereas the weathered vein contains only minute quantities.

(3) The dikes contain the rare-earth-bearing mineral perofskite, but no thorium is known to be present, as in the weathered vein.

(4) No mica-peridotite was found in the drill core, although possibly it could have been so completely weathered as not to core.

Possibly the weathered vein could be a fissure and breccia zone that has been filled with material by mineral-bearing water percolating downward from the Devonian shale. This shale is known to be slightly radioactive and probably overlaid the project area prior to doming.

The thorium (and associated rare earths) probably did not come from the Devonian shale, however, because: 1) According to Frondel (U.S.G.S. Prof. Paper 300, p. 575) "thorium, unlike uranium, is not a significant constituent of the carbonaceous marine black shale . . . ." 2) Thorium is relatively insoluble and probably would not migrate downward from theDevonian shale, and 3) Considerable pyrite is present in the Hamp samples, suggesting that little if any oxidation has taken place at the sampled depths and therefore it is unlikely that thorium-bearing surface water ever reached these depths.

The following factors suggest that the thorium and rare earth vein was formed by migration of mineral-bearing material upward along breccia and fault zones which resulted from deep-seated igneous or explosive activity.

Exploration in trench 1 showed that, as is common with veins, the highly radioactive zone is continuous and consistently mineralized horizontally for at least 260 feet, and D.D.H. 1 and 2 show that the radioactivity has vertical continuity of over 100 feet and is localized along breccia and fault zones.

Regarding continuity, the breccia zone in trench 1 may be the same general zone that was cut in the Hamp hole. This zone in trench 1 is about 200 feet southwest of and dips about 85° toward the Hamp hole.

The association of these radioactivity zones with a structural disturbance, Hicks Dome, suggests a common origin, whether the Dome be the result of an igneous intrusion at great depth or an incipient cryptovolcanic structure, as suggested by Brown.

The association of fluorite, which migrated upward along the breccia or fault zones, with the thorium and rare earths suggests a common origin. Although the fluorite and thorium and rare earths are both localized in the breccia, the evidence suggests that the thorium is not present as a substitution in the fluorite lattice; for example, X-ray work shows that no fluorite is in the most radioactive core sample.

Resources

A small quantity of low-grade material was found in a narrow vein. In order to complete the record, the following resource calculation is made for the narrow highly radioactive vein:

$$\frac{260 \text{ (length in feet)} \times 1 \text{ (width in feet)} \times 100 \text{ (depth in feet)}}{20 \text{ (cubic feet per ton)}}$$

= 1,300 short tons

0.4 percent thorium
2.0 percent combined rare earths
(Ce, La, Nd, Pr)

The resources are indicated for 50 feet below the trench bottom and inferred for an additional 50 feet. The lack of definite data in the drill holes precludes any further calculation.

Efficiency of Operations -- Competency of Operator

The bulldozing and diamond drilling operations were carried out in an efficient and satisfactory manner. The operator's representative has apparently had no experience in mining or in keeping related records, but on the whole, they are acceptable.

Expenditures

Bulldozing 11,700 cu. yds. at $0.20	$ 2,340.00	
Core drilling 405 ft. at 4.00	1,620.00	
Surveying and mapping	250.00	
41 chemical or spectrographic determinations	400.00	
Total actual cost	$ 4,610.00	

Total approved	$ 5,620.00	
Total cost of project	4,610.00	
Government's share of cost	3,457.50	
Government's share unexpended	757.50	

Value of production - None
Government royalty - None

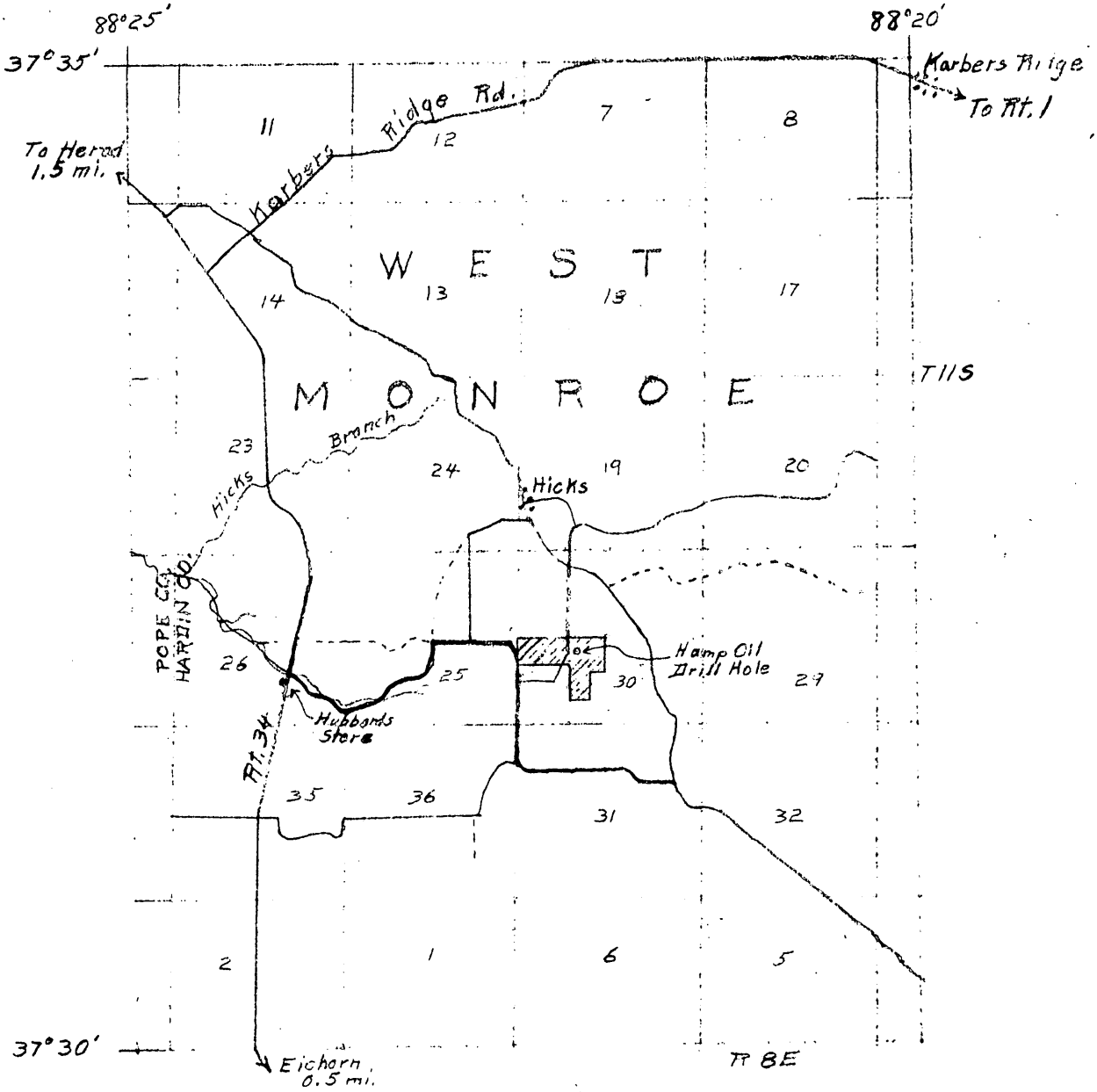
No equipment was purchased.

Robert D. Trace, Geologist
U. S. Geological Survey

H. L. Burmeister, Engineer
U. S. Bureau of Mines

Trench No. 1

Trench No. 2



HAMP LEASE

DMEA 3855, CONTRACT Idm-E 914
HAMP LEASE, HICKS DOME, HARDIN CO. ILL.
STATE of ILLINOIS — EQUALITY QUAD.

0 miles 1

FIG. 1

DMEA #3855
Idm-E914

SUMMARY OF HICK'S DOME SAMPLE ANALYSES

Analyst	Sample No.	Thor.	U_3O_8	Cb	Ta	Rare Earths	Zirc.	Lith.
C. O. Parker	11-A	.15 x	.043 x	Tr. x	Tr. x	.67 x	Tr. x	
"	11-B	.17 x	.02 x			.40 x		
"	12-A	.11 x						
"	12-B	Tr. x						
"	13-A	.19 x	.038 x			.84 x		
"	13-B	Tr. x	.096 x			Tr. x		
"	14-A	.14 x						
"	14-B	Tr. x						
"	15-A	.09 x				.38 x		
"	15-B	Tr. x				.15 x		
"	16-A	.21 x						
"	16-B	.12 x						
"	17-A	.47 x	.040 x			1.47 x		
"	17-B	.07 x				.32 x		
"	18-A	.17 x						
"	18-B	Tr. x						
"	19-G	.49 x	.084 x	Tr. x	Tr. x	1.65 x	Tr. x	Tr.
"	21-G	Tr. x				.12 x		
"	3-A	.13	.073	Tr.	Tr.	.58	Tr.	
Lindsay Chemical	1-A	.50				2.20		
"	19-G	1.0				3.0		
"	20-G	.60				3.1		
Vanadium Corp.	19-G	1.0 Det.	.06					

FIG. 2 a

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Figure 2b
DMEA 3855

SEMIQUANTITATIVE SPECTROGRAPHIC ANALYSIS

Report No.	For	Date
TWS-2925	R. D. Trace	November 7, 1956

Lot No.	Spec. Lab. No.	Plate No.	Refer.
1639	2395	III-2183	TWP-3171 TWC-5127

Notation: Figures are reported to the nearest number in the series 10, 3, 1, .3 etc., in percent. Eighty percent of the reported results may be expected to agree with the results of quantitative methods. Symbols used are:

- \- = not looked for
- 0 = looked for but not detected (see attached table of sensitivities)
- M = major constituent - greater than 10%
- < with number = below number shown; here standard sensitivities do not apply

Samples from Hicks Dome, Illinois

Field No.	15A	15B		15A	15B
Lab. No.	148359	148360		148359	148360
Si	M	M	La	.3	.1
Al	1.0	1.0	Li	0	0
Fe	M	10	Lu	.001	.001
Mg	.03	.1	Mo	.001	.001
Ca	.1	.1	Nb	0	0
Na	0	0	Nd	.3	.1
K	0	0	Ni	0	.001
Ti	.3	.3	Os	0	0
P	1.0	.3	Pb	.03	.03
Mn	.03	.03	Pd	0	0
Ag	0	0	Pr	.03	.01
As	0	0	Pt	0	0
Au	0	0	Rb	0	0
B	.003	.003	Re	0	0
Ba	.03	.01	Rh	0	0
Be	.001	.0003	Ru	0	0
Bi	0	0	Sb	0	0
Cd	0	0	Sc	.003	.003
Ce	1.0	.3	Sn	.001	.001
Co	.001	.001	Sr	.1	.03
Cr	.001	.001	Sm	.003	0
Cs	0	0	Ta	0	0
Cu	.003	.003	Tb	0	0
Dy	.03	.01	Te	0	0
Er	.03	.03	Th	.1	.03
Eu	.003	0	Tl	0	0
F	-	-	Tm	0	0
Ga	0	0	U	.1	0
Gd	.1	.03	V	.01	.003
Ge	0	0	W	0	0
Hf	0	0	Y	.1	.1
Hg	0	0	Yb	.003	.003
Ho	0	0	Zn	0	0
In	0	0	Zr	.01	.01
Ir	0	0			

By Spectrographic Methods for AEC (Washington)
Katherine V. Hazel
Project Leader: Claude L. Waring

Liaison Officer
Atomic Energy Commission Program
Geochemistry and Petrology Branch

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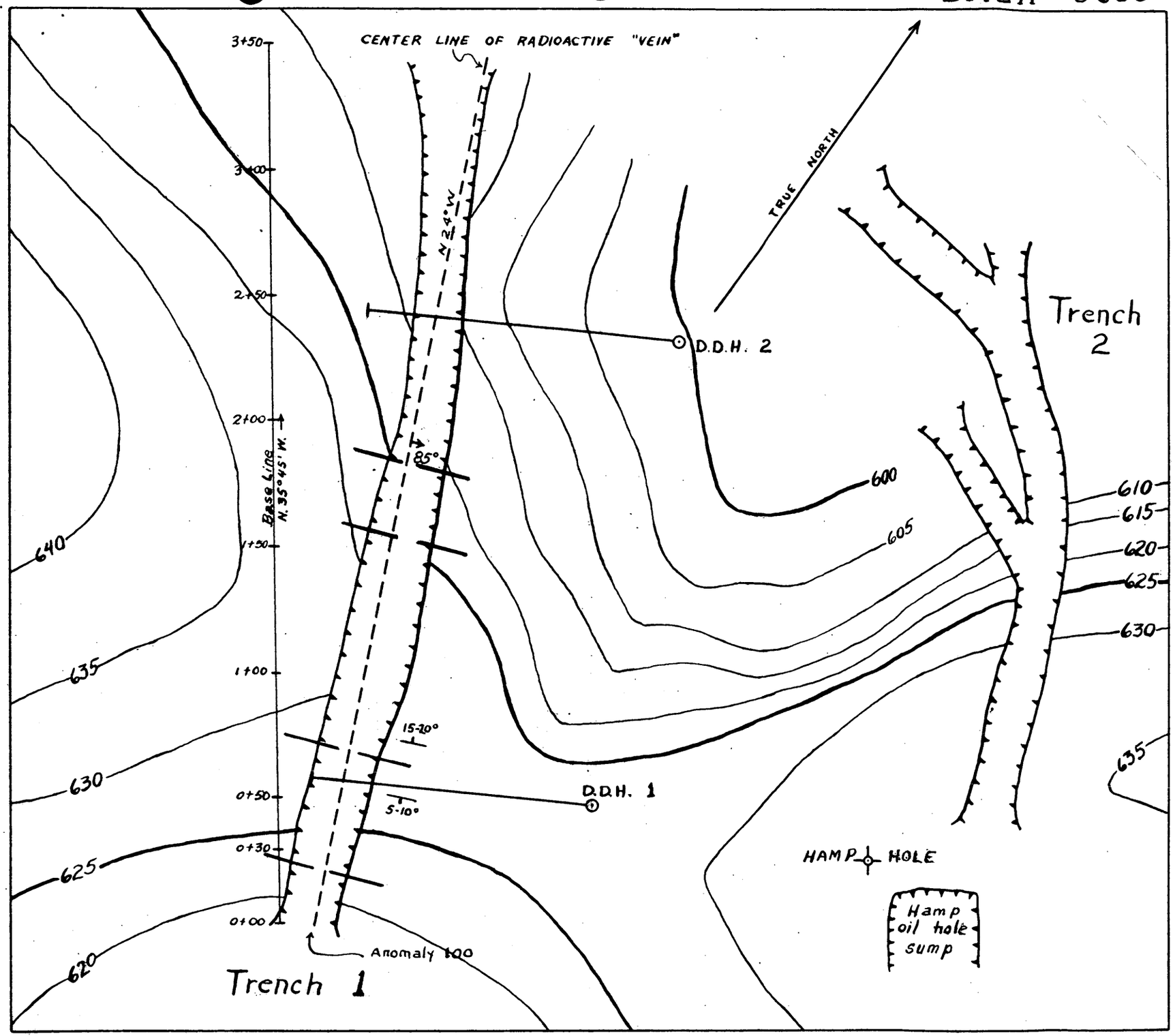

EXPLANATION

FAULT

15°

APPARENT STRIKE AND DIP OF BEDS

D.D.H.1

DIAMOND DRILL HOLE

TRENCH

BASE MAP MODIFIED AFTER MAP BY B. L. BAXTER

CONTOUR INTERVAL 5 FEET
DATUM IS APPROXIMATELY MEAN SEA LEVEL

0 25 50 100 FEET

SEPTEMBER 1956

(SEE FIGURE 8 FOR LOCATION OF TRENCH SAMPLES.)

Figure 3.--MAP OF PART OF REYNOLDS PROPERTY HICKS DOME, HARDIN COUNTY, ILLINOIS

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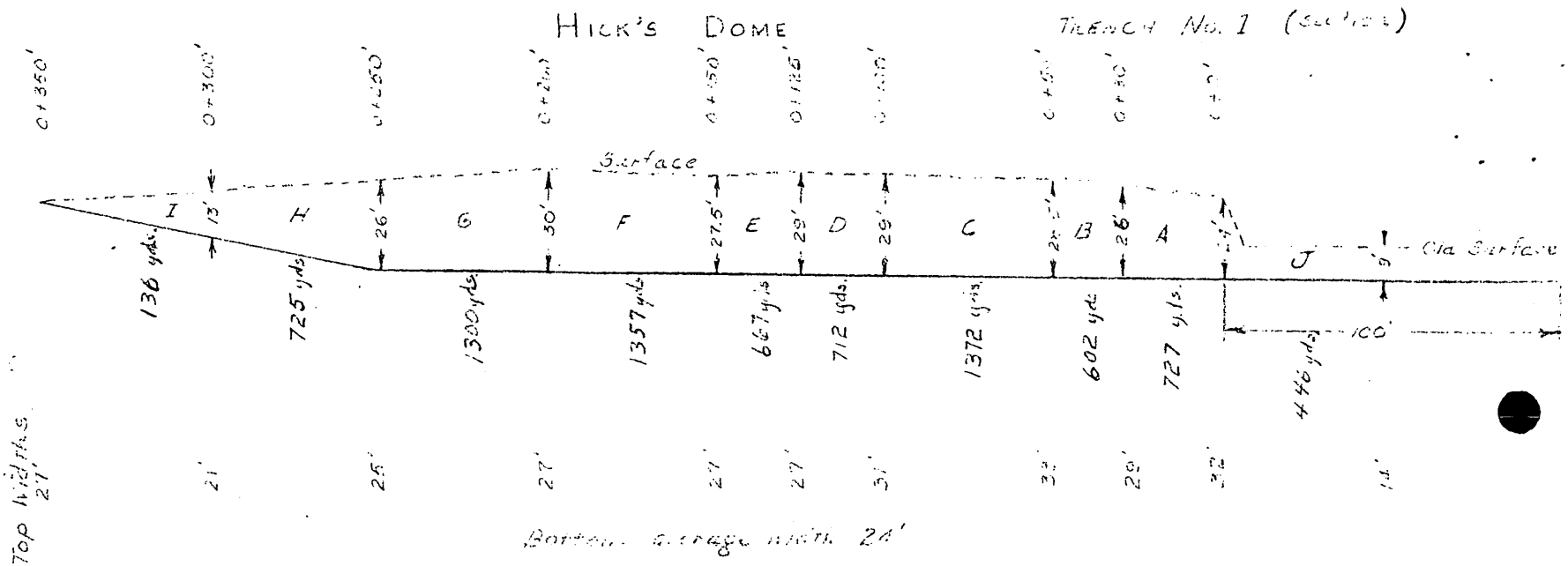


TOTAL CUBIC YARDAGE = 8044

HICK'S DOME

DMEA - 3855

TRENCH No. 1

MEASUREMENTS FOR CUBIC YARDS

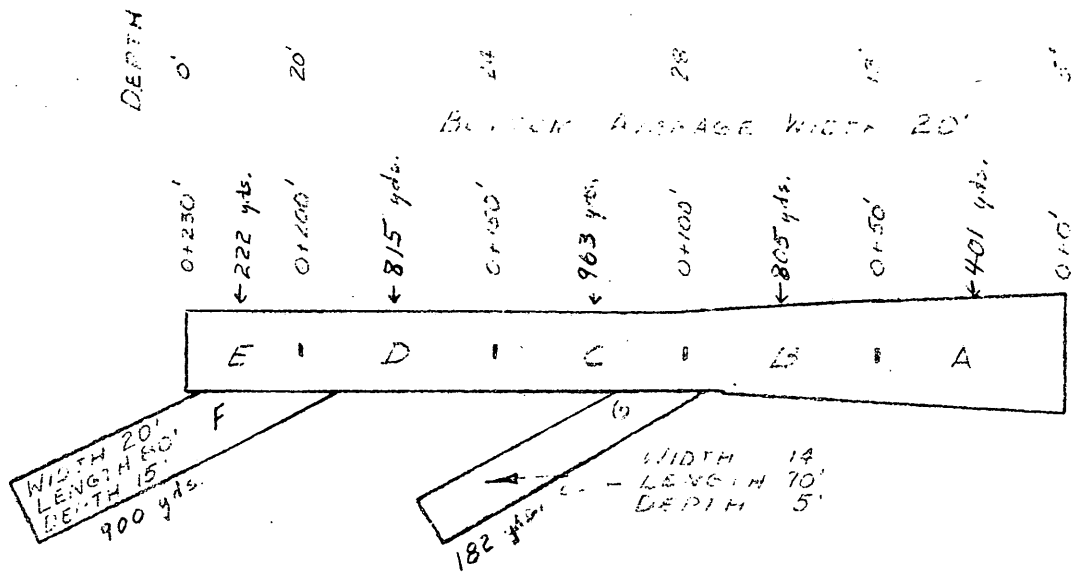
0 INCHES 1

0 FEET 50

7-1-55

FIG. 4

TRENCH No. 6 (Plan)



TOTAL CUBIC YARDAGE = 4280

INDIAN DOME
DAMEN - 3655
TRENCH No. 6
MEASUREMENTS FOR CUBIC YARDS

0 INCHES 1
0 FEET 50

FIG. 5

FEB 15 1991

Average of Determinations

Item	Number of Determinations	By	Trench No.	"A" or "B"	Chem. Thorium Percent	Chem. U_3O_8 Percent	Chem. Cb-Ta Percent	Spectrographic Rare earths Percent	Zr	Li
I	10	C. O. Parker	1	A	0.22					
II	8	C. O. Parker	1	A	0.15					
III	3	Lindsay Chemical	1	A	0.70					
IV	8	C. O. Parker	1	B	0.045					
V	6	C. O. Parker	1	A				0.93		
VI	4	C. O. Parker	1	B				0.22		
VII	3	C. O. Parker	1	A			Tr.		Tr.	Tr.
VIII	7	C. O. Parker	1	A&B		0.057				
IX	3	Lindsay Chemical	1	A				2.77		
X	1	C. O. Parker	2	A	Tr.	0.006		0.12		

Explanation: ← 2' → 1' ← 2' →
"A"
Composite "B"

Refer to Fig. and Table

II - Eliminates 2 high assays included in I, (17A cut sample and 19G grab sample).
III - Grab Samples 19G and 20G; also cut sample 1A.
V - Includes grab sample 19G.
IX - Includes grab samples 19G and 20G; also cut sample 1A.

~~Table~~ FIG-6

SUMMARY OF HICK'S DOME SAMPLE ANALYSIS

Analyst	Sample Number	Thor.	U_3O_8	Cb	Ta	Rare Earths	Zirc.	Lith.	DMEA Cost
C. O. Parker	11-A	.18 $10.	.048 $5.	Tr. $20.	Tr.	.67 $10.	Tr.		$45.00
"	11-B	.17 $10.	.02 $5.			.40 $10.			25.00
"	12-A	.11 $10.							10.00
"	12-B	Tr. $10.							10.00
"	13-A	.19 $10.	.038 $5.			.84 $10.			25.00
"	13-B	Tr. $10.	.096 $5.			Tr. $10.			25.00
"	14-A	.14 $10.							10.00
"	14-B	.09 $10.				.38 $10.			20.00
"	15-A	.09 $10.				.38 $10.			20.00
"	15-B	Tr. $10.				.15 $10.			20.00
"	16-A	.21 $10.							10.00
"	16-B	.12 $10.							10.00
"	17-A	.47 $10.	.040 $5.			1.47 $10.			25.00
"	17-B	.07 $10.				.32 $10.			20.00
"	18-A	.17 $10.							10.00
"	18-B	Tr. $10.							10.00
" Grab	19-G	.49 $10.	.084 $5.	Tr. $20.	Tr.	1.65 $10.	Tr.	Tr.	45.00
" Trench 2	21-G	Tr. $10.	.006 $5.			.12 $10.			25.00
"	3-A	.13 $10.	.078 $5.	Tr. $20.	Tr.	.58 $10.	Tr.		45.00
Lindsay Chemical	1-A	.50				2.20			
" Grab	19-G	1.0				3.0			
" Grab	20-G	.60				3.1			
Vanadium Corp.	19-G Grab	1.0 Est.	.06						

Total DMEA Sample Cost $400.00

Note: Zirconia & Lithium analyses cost to be borne by W. G. Reynolds

FIG-7

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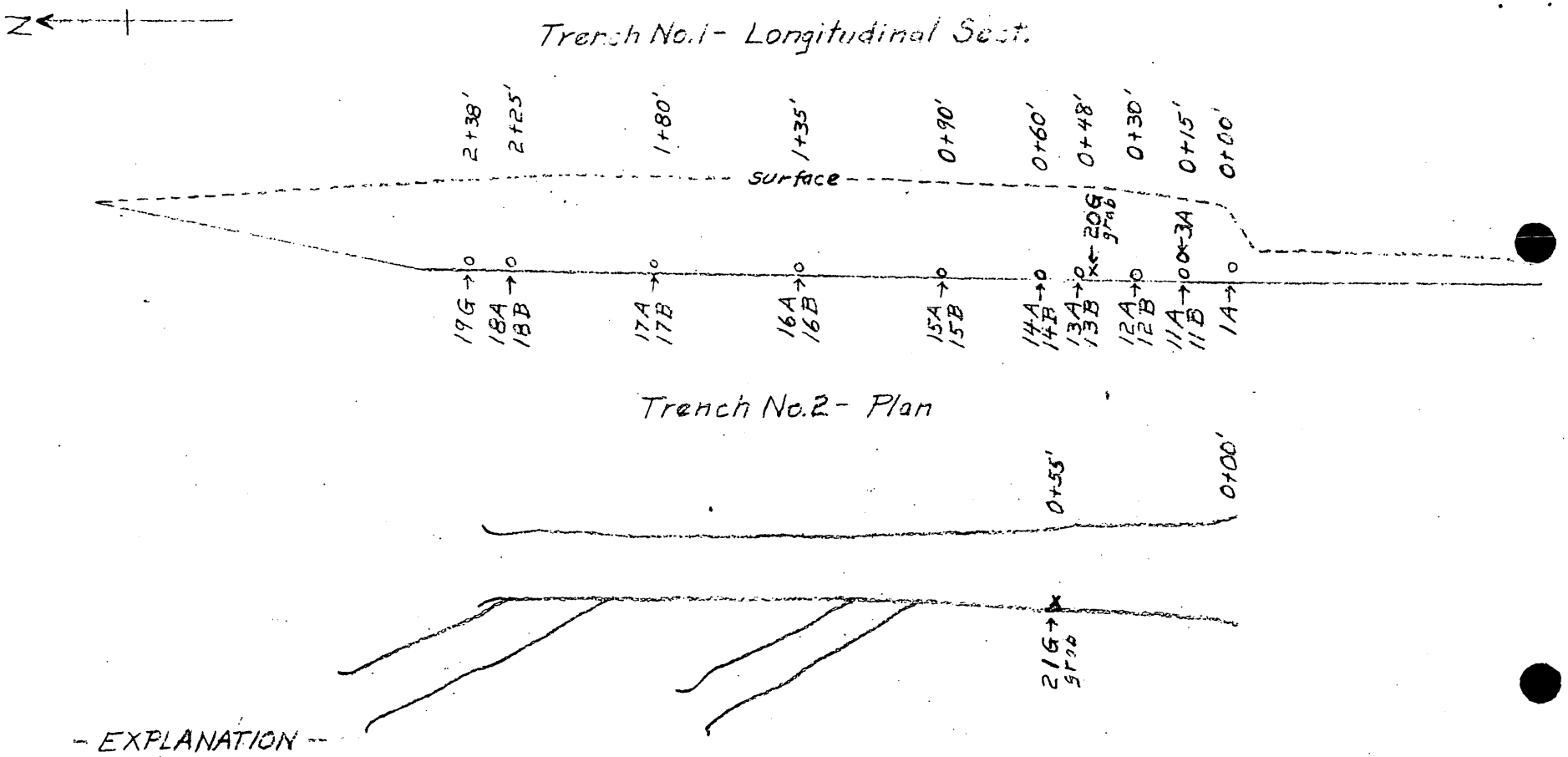
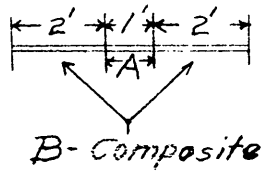
SAMPLE LOCATIONS



- EXPLANATION --

X - Grab Sample

o - Cut Sample in floor thus



Wm. G. REYNOLDS
DMEA 3855 - CONTRACT E 914
HICKS DOME - HARDIN CO. ILL.

0 inches 1
0 feet 50

FIG.-8

Figure 9a.—DESCRIPTION OF HICKS DOME D.D.H. 1 AND 2
(See also parts b and c.)

Both D.D.H. 1 and 2 cut dolomitic limestone of Devonian age which in places contains so many fine quartz grains that it is called chert, and several limestone-chert breccia zones which contain traces of purple fluorite and white calcite and, in places, are slightly radioactive.

No differentiation into lithologic units could be made in either hole; therefore, the following description applies to both holes. The specific location of breccia zones, cavities, radioactivity anomalies, and traces of fluorite is shown on parts b and c.

Country rock in D.D.H. 1 and 2: Limestone, medium to dark gray, fine grained, with abundant rhombohedrons of dolomite; and chert, light brown and fine grained. The chert contains from 80 to 90 percent of fine quartz grains and no more than 10 to 20 percent of interstitial carbonate. About 1/2 to 2/3 of the country rock is dolomitic limestone and the remaining 1/3 to 1/2 is chert.

The chert occurs in layers that range from less than an inch to over a foot thick. The boundaries between the chert and the limestone are sharp, but irregular and wavy rather than straight. The chert layers contain abundant irregular-shaped remnants of dolomitic limestone.

Breccia zones in D.D.H. 1 and 2: The breccia zones consist of limestone and chert that have been shattered into fragments as large as an inch in diameter, with interstitial fillings and veinlets of purple fluorite and white calcite. The radioactivity is associated with the breccia, either in narrow cavernous and leached zones that contain clay-sized brown material, or in narrow dark brown zones that appear to be partly altered.

Laboratory determination of the percent eU of several samples follows:

D.D.H. 1	142.4-142.8	0.002	D.D.H. 2	100.6-100.9	0.006
	156.0-156.1	.013		101.8-102.1	.007
	179.0-180.0	.009		122.9-123.1	.009
				127.9-128.0	.018
				139.0-139.4	.003

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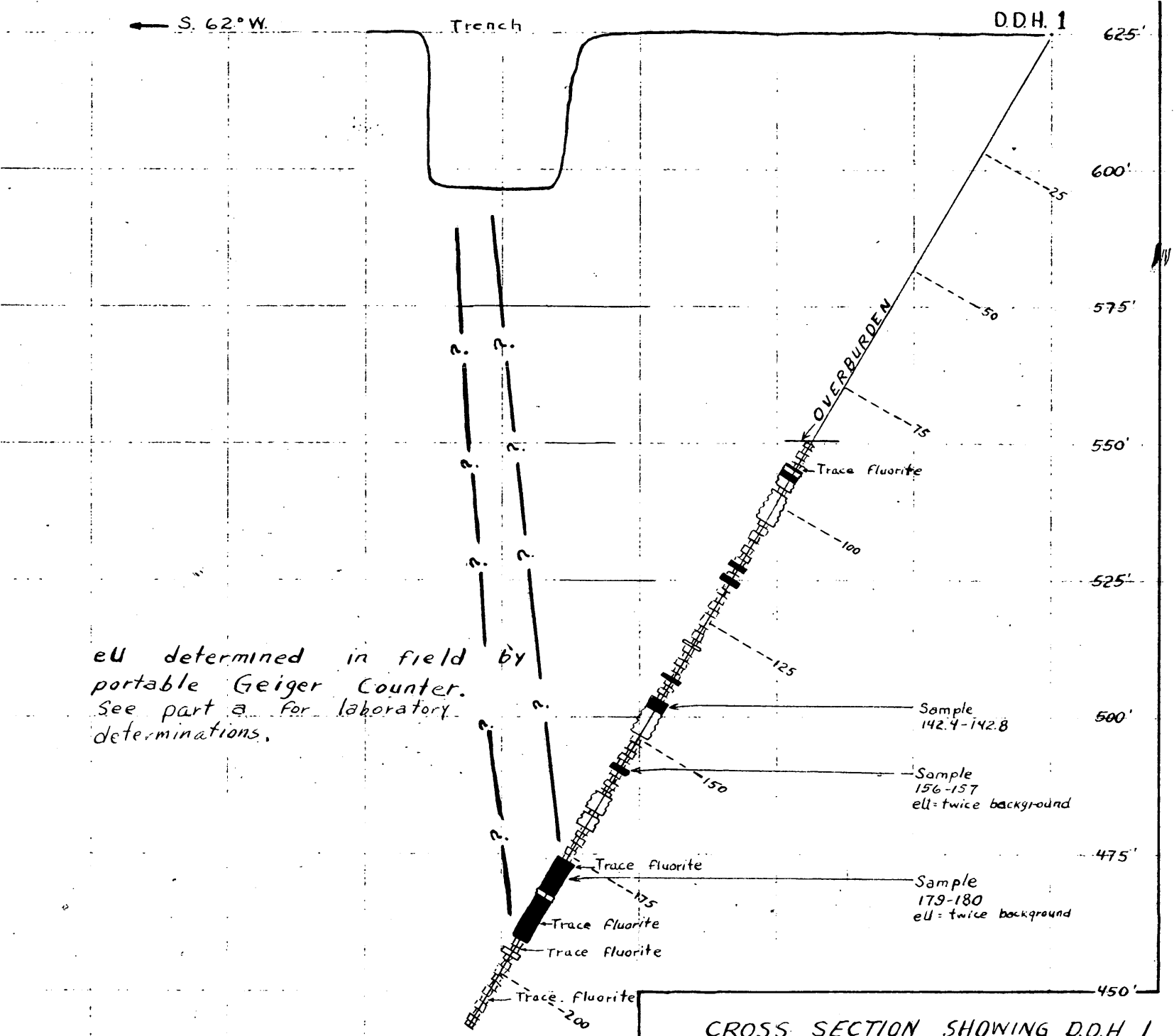
DMEA 3855

FIGURE-9b



eU determined in field by portable Geiger Counter. See part a for laboratory determinations.

EXPLANATION

Limestone; dolomitic and silicified (chert)

Breccia zone

No core, or cavity

0 5 10 25 Feet

HORIZONTAL AND VERTICAL SCALE

DATUM IS APPROXIMATE MEAN SEA LEVEL

CROSS SECTION SHOWING D.D.H. 1, HICKS DOME, HARDIN CO., ILL.

R.D. Trace, 9/56

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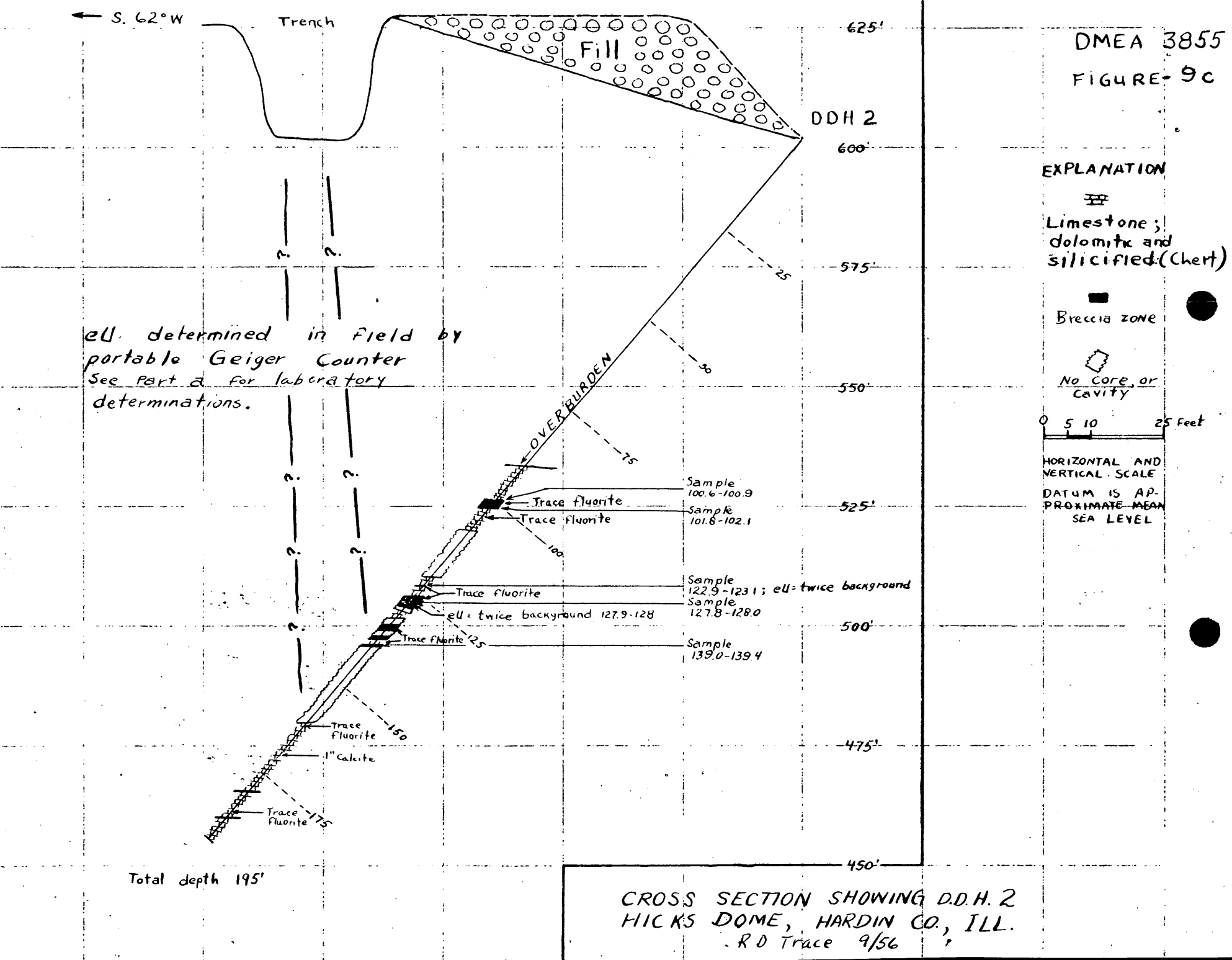
DMEA 3855

FIGURE-9c



CROSS SECTION SHOWING D.D.H. 2
HICKS DOME, HARDIN CO., ILL.
R D Trace 9/56

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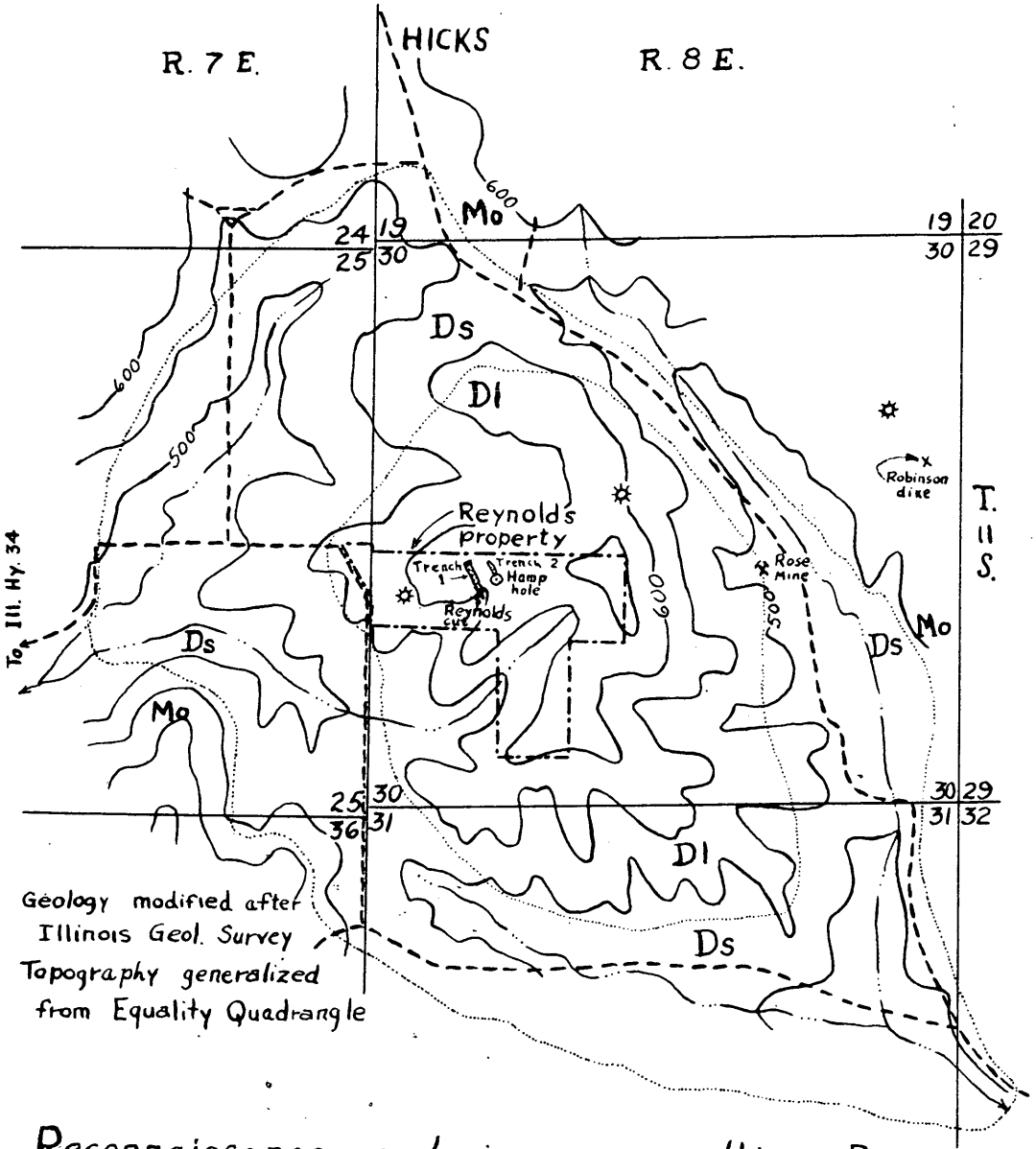
Figure 10
DMEA 3855



Geology modified after Illinois Geol. Survey
Topography generalized from Equality Quadrangle

EXPLANATION

Mo
Mississippian, Osage fm.

Ds
Devonian shale

Dl
Devonian limestone

Geologic contact (approximate)

Breccia

x
Pit or open cut

Fluorspar mine

Graded road

0 ¼ ½ 1 mile

Contour interval 50 feet
Datum is mean sea level

(See Figure 3 for detailed map of project area.)

Reconnaissance geologic map of Hicks Dome area
Hardin County, Illinois

R.D.T.
1-1-57 10-16-55

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D.M.E.A.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.
ROOM POST OFFICE BLDG.
KNOXVILLE 2, TENN.

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SEP 17 1956

September 13, 1956

Memorandum

To: Operating Committee, DMEA - Washington

From: Executive Officer, DMEA - Region V - Knoxville, Tenn

Subject: Amendment No.2, Idm-E914, DMEA-3855, William G. Reynolds
Hicks Dome Project, Hardin County, Illinois

Transmitted are three signed copies of the subject amendment extending the completion date until Oct. 1, 1956.

The usual distribution of the other copies has been made.

Robert A. Laurence

Robert A. Laurence

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 45 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
SEP 19 1956

September 17, 1956

Memorandum

To: Operating Committee, DMEA - Washington

From: DMEA Field Team, Region V - Knoxville, Tenn.

Subject: DMEA-3855, Idm-E914 (thorium-) W. G. Reynolds, Anchorage, Ky. Hicks Dome Project, Hardin County, Illinois

Enclosed are four copies of a letter from the Operator, to be added to his last narrative report, as a supplement. That narrative was bound with the final voucher and documentation and was forwarded through the Finance Office on September 10.

We believe that the last narrative with this supplement fulfill the requirements of the Operator's final engineering and geologic report. However, if the results of the Geological Survey's mineralogic studies indicate that it is justified, we might then want to ask the Operator to have assays made on some of the drill cores, which would necessitate another voucher and a supplemental final report.

The Field Team final report cannot be prepared until results of the drill-core studies are available. However, the period during which certification may be made does not expire until March 7, 1957, and we will have it in before that time.

Robert A. Laurence

Robert A. Laurence,
Executive Officer, DMEA
Region V

Wm. A. Beck

Wm. A. Beck, for V. J. Lynch
Member, Bureau of Mines

REYNOLDS METALS COMPANY
REYNOLDS METALS BUILDING
RICHMOND 19, VIRGINIA

RECEIVED
SEP 10 1956

REPLY TO
PARTS DIVISION
2000 SOUTH NINTH STREET
LOUISVILLE 1, KENTUCKY

September 5, 1956

Mr. Robert A. Laurence
Executive Officer, DMEA
U. S. Department of the Interior
Post Office Building
Knoxville 2, Tennessee

Re: DMEA #3855, Idm-E914
Hick's Dome Project
Hardin County, Illinois

Dear Mr. Laurence:

Attached are five executed copies of Amendment No. 2 regarding the completion of work on or before October 1, 1956. We have retained the Operator's Copy.

We do not plan to have any chemical assays made on the drill cores, since after a thorough examination of drill cores by the writer, the amount of radioactivity was so small (2.5 times background), that we could not justify the expense of running chemical analyses.

In talking with Mr. Bob Trace, he indicated that the Government Laboratories might run a thorough mineralogical study of the cores in an effort to ascertain the source of the radioactivity present. This, of course, could only be done in a Government Laboratory since very few private laboratories are equipped to run such a complete study. Such a study is not included in the scope of the present contract.

We were, of course, disappointed that the two drill holes did not produce samples of higher radioactivity. This radioactive vein may have been passed through at a lower depth in one of the open cavities. Several of these open cavities were encountered on both drill holes, ranging from 2 ft. to 12 ft. in length in which it was impossible to recover a core. Also, the source of radioactivity may be at depths much lower than the depths reached by the two drill holes. As a matter of fact it is our belief that if the veins are of hydrothermal origin, then there is every indication that deposits of commercial value, if present, would be reached at much lower depths, rather than at the relatively shallow depths of the two drill holes. This thinking is borne out by the exceptionally high grade ore encountered at depths in four

RECEIVED
SEP 7 - 1956
U. S. ... ...vey
Geologic Division
Knoxville, Tenn.

of the worlds largest Uranium mines, whereas it had previously been thought that there was commercial ore only relatively near the surface. These mines are: Shinkolobwe, Belgian Congo, Joachimsthal, Czechosolovakia, Eldorado Mine, Great Bear Lake in Canada, and the Urgeirica Mine in Portugal. The Urgeirica Mine initially produced secondary uranium minerals that were not recognized as of primary origin until substantial pitchblende was recently discovered in the deeper mine workings at Urgeirica. Also the surface description of the Urgeirica Mine in Portugal appears to be similar to the kaolinized veinlets of Hick's Dome and the dark red Jasper is similar to the dark reddish brown radioactive rock of Hick's Dome. Thus if the Hick's Dome structure is of Precambrian origin, there may be a possibility of a commercial mother lode at depths. If the mineralization emanated from the Chattanooga Shale from above and is consequently sedimentary in origin, then it is our opinion that the minerals produced from such sedimentary mineralization would be of insufficient quality to be of commercial significance, and in such a case no further exploration work could be justified. Therefore, the mineralogical study would be very worthwhile if a clue could be obtained as to whether the origin of the radioactivity was hydrothermal or sedimentary.

The results of two core holes of shallow depths are, of course, insufficient to draw any conclusions. At least fifty or more core holes to depths ranging from 200 ft. to 1000 ft. in vertical depth would be necessary, in our opinion, before any definite conclusions could be drawn. In Canada it is not uncommon to mine radioactive ores to depths of 2000 to 3000 ft. As an alternative to core drilling, shafting might yield conclusive results if two or more incline shafts were sunk starting from points along the radioactive vein in the main trench and the direction of the shaft changed to conform to the direction of the radioactive vein. Such a program of core drilling and shafting would, in all probability, yield conclusive information as to the existence of a commercial ore body at Hick's Dome. Such a program if taken in stages might be justified. We should like to have an expression from DMEA as to whether or not they would entertain granting further exploratory aid in view of the findings to date, if not, we would probably close out the project.

As to our estimate of the reserves indicated by the present contract work, we can not estimate this since we feel that the two core holes, which were drilled under the present contract, furnished inconclusive evidence as to the extent in depth of the radioactive vein which extended the full 300 ft. length of the main trench. The width of this vein was approximately 5 ft., but only the center portion of one foot width contained radioactive materials, which might be considered approaching commercial grade. Therefore, since the depth to which these radioactive materials extended is unknown, there is no way of estimating the extent of any commercial reserves. Therefore, we can only conclude that within the scope of this contract no significant commercial deposits were found.

As a supplement to our July Report, we are attaching a longitudinal sketch showing locations of all samples taken in both trenches.

Summarizing, we request that you accept the contents of this letter, along with our July Report, as a Final Report.

Cordially,

B. L. Baxter

Bruce L. Baxter

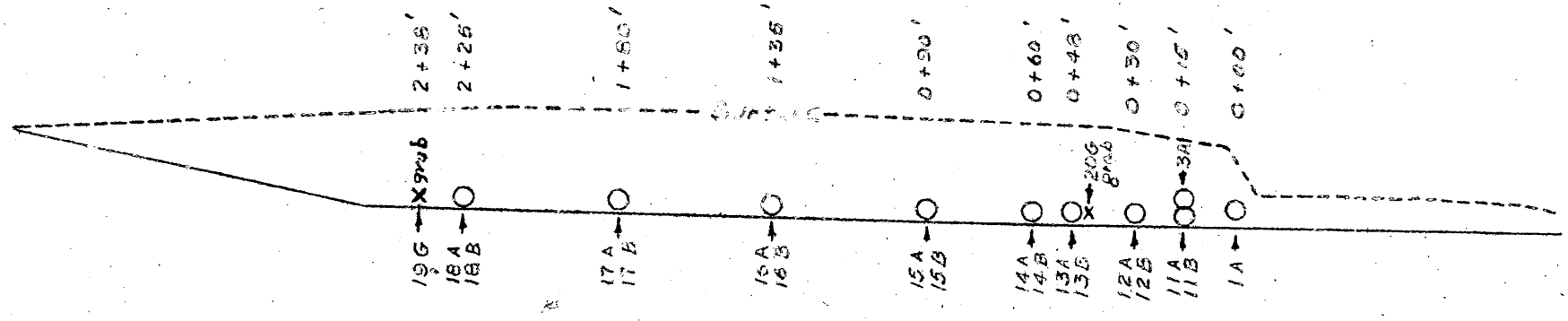
Attachment

c/c Messrs: H. L. Burmeister
W. G. Reynolds

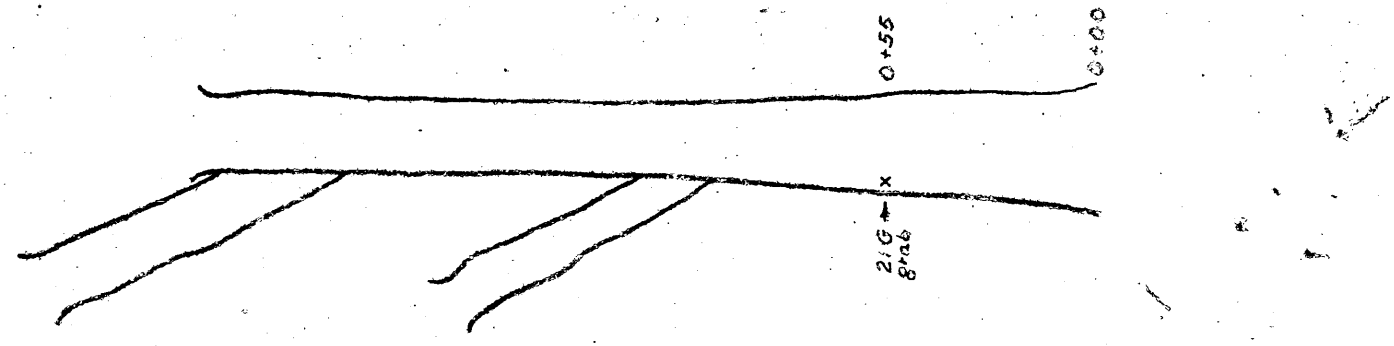
BLB/t

SAMPLE LOCATIONS

TRENCH NO. 1 LONGITUDINAL SECT.



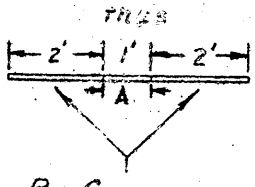
TRENCH NO. 2 PLAN



EXPLANATION

X Grab Sample

O Cut Sample in floor



B - COMPOSITE

WM. G. REYNOLDS

DMEA 3855 - CONTRACT E 914

HICKS DOME - HARDIN CO. ILL.

0 inches 1

0 feet 50

H.D.B.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 405 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
SEP 19 1956

September 17, 1956

Mr. B. L. Baxter
Reynolds Metals Company
2000 South 9th Street
Louisville 1, Kentucky

Re: DMEA-3855, Idm-E914
(Thorium, rare earths)
W. G. Reynolds
Hicks Dome, Illinois

Dear Mr. Baxter:

Your letter of September 5, considered as a supplement to your final voucher and narrative, appears to meet the requirements of a final engineering and geologic report.

It appears that assays of the drill cores would not be justified unless need for them is indicated by results of the mineralogic studies. Also, any decision as to the adviseability of additional work will have to await these results.

I, too, am disappointed that the drill cores did not produce samples with higher radioactivity.

With best regards, I am

Sincerely,

Robert A. Laurence
Executive Officer, DMEA
Field Team, Region V

RAL/zm
cc:
Opr. Com.-Z
Lynch -Trace
Miller Files

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
SEP - 4 1956

August 31, 1956

Mr. B. L. Baxter
Reynolds Metals Company
2000 South Ninth Street
Louisville, Kentucky

Re: DMEA-3855, Idm-E915 (thorium, etc.)
W. G. Reynolds
Hicks Dome, Hardin Co., Ill.

Dear Mr. Baxter:

On July 6 I sent you six copies of Amendment No. 2, extending the time for completion of the Hicks Dome contract to October 1, 1956, to be signed by Mr. Reynolds and returned to me. I have not received them. If you still have them, please return them to me. If they have been sent, they must have been lost in the mail; in that case I will prepare and send you another set for signature.

I have received, from Mr. Burmeister, your interim report and voucher, but I cannot forward the voucher for payment until the executed amendment has been returned. As soon as I receive it, we will process the voucher and forward it to the Finance Office.

Mr. Burmeister suggested that you may have intended this interim report to serve also as a final report. The interim report is an excellent account of progress to date, but it lacks certain essential data for a final report. The final report should include results of assays on the drill cores, your estimate of the reserves (tonnage and grade) indicated by the contract work, your interpretation of the geology of the deposit and your evaluation of the results of the project.

Also, I assume that there will be another voucher, as this one does not contain any invoices for analyses of Stage II samples.

The results to date, as summarized in the interim report are interesting, and I will be very much interested in the results of examination and analyses of the drill core samples.

Sincerely yours,

Robert A. Laurence
Executive Officer
DMEA Field Team, Region V

RAL/mg
cc
Oper. Comm. (2)
Millar
Trace
Lynch

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D.C.
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

July 5, 1956

Mr. William G. Reynolds

Anchorage, Kentucky

Re: DMEA-3855, Idm-E914
(Thorium, uranium and rare earths)
Hicks Dome, Hardin County, Ill.

Dear Mr. Reynolds:

This will confirm the verbal approval given by Mr. Burmeister and Mr. Trace to Mr. B. L. Baxter, to begin Stage II of the exploration project at Hicks Dome.

Please have the drill core boxed and preserved, so that it may be examined by our field representatives before sampling.

Very truly yours,

Robert A. Laurence
Executive Officer
DMEA Field Team, Region V

RAL/mg
cc
Governemtn Copy of Contract
Docket " " "
Division " "
Finance Office " "
Field Team " "
Millar
Lynch
Files

RECEIVED
JUL 6 - 1956

Interim Report

by

H. L. Burmeister

RECEIVED
JUL 11 1956

Docket No. DMEA 3855 (Rare Earths and Uranium)
Contract: Idm-E914
Operator: Wm.G.Reynolds
Location: Hicks Dome, Hardin County, Illinois

This property was visited on July 1, 1956 by H. L. Burmeister, Bureau of Mines, and Robert Trace, Geological Survey, in company with B.L. Baxter, the Operator's representative. The purpose of the visit was to determine whether the diamond drilling under Stage II should be done, and also to measure the cubic yardage excavated in bulldozer trenches No. 1 and No. 2.

It was agreed that the results obtained in trenching justified diamond drilling in Stage II. Verbal permission to drill was given Mr. Baxter to proceed with diamond drilling. The drill holes were laid out and spotted in accordance with the attached sections. A memorandum to Mr. V.J.Lynch with attached tracing of the drill hole layout has just been mailed, informing him of our action. Written permission to enter Stage II will probably be given Mr. Baxter. Drilling will start by the end of this week.

Attached are the calculations of cubic yardage bulldozed in trenches No. 1 and No. 2, and the sketches pertinent to these calculations. It is noted that not more than 7,070 cubic yards may be reported in the Operator's next report. These calculations show that the Operator has bulldozed 652 cu.yds. in excess of the allowed maximum. Mr. Baxter has been informed of the yardage measured so that his next report may be in order.

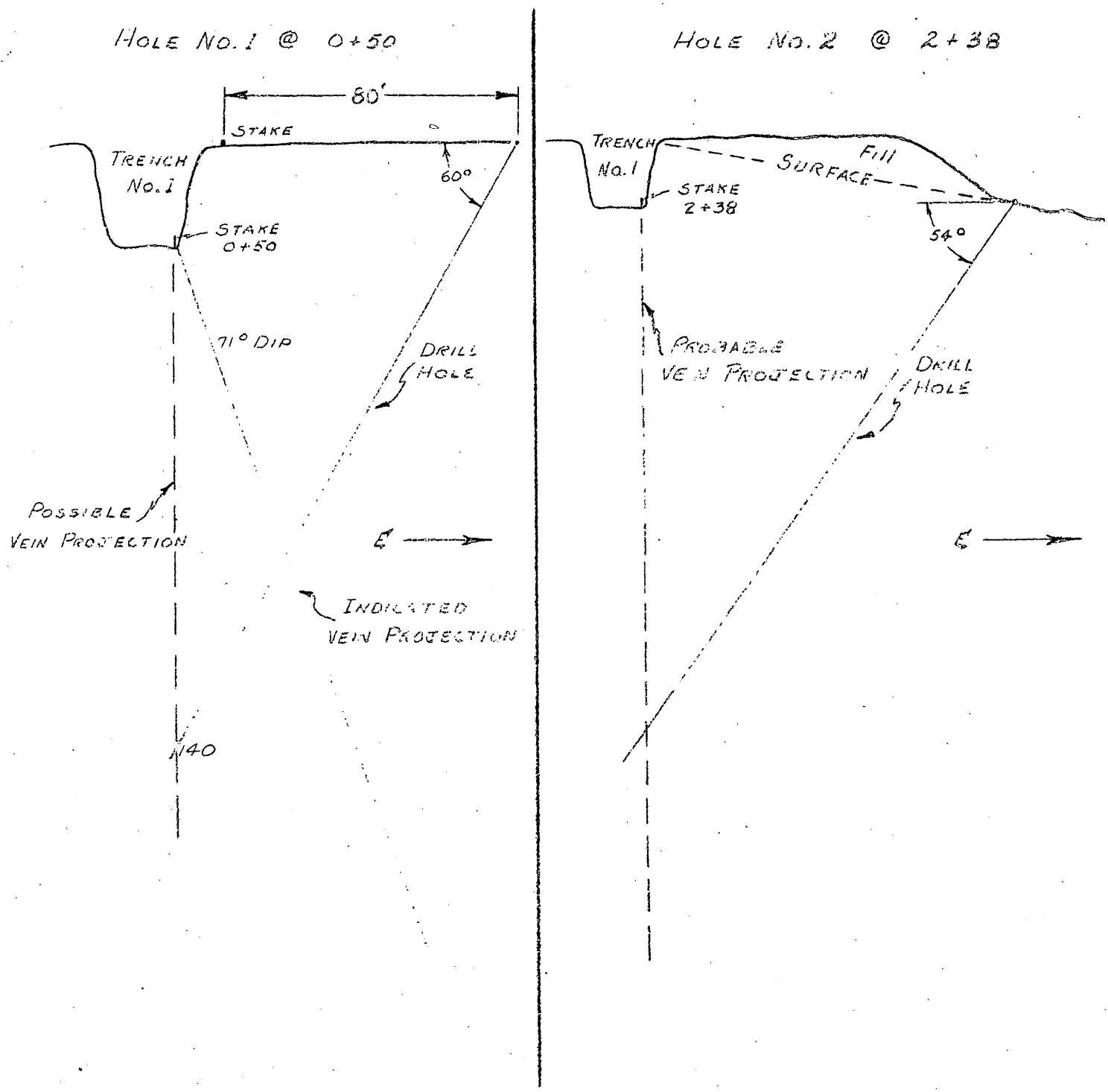
The results of one assay for uranium and its accompanying invoice are being awaited. As soon as these are received by the Operator a monthly report will be made on Stage I work not as yet reported.

Arrangements have been made with Mr. Baxter to furnish a resumé of correspondence and telephone conversations he has had with rare earth processors regarding prices, concentration and extraction of rare earths. This will be reported when received.

H. L. Burmeister

July 5, 1956

HICK'S DOME

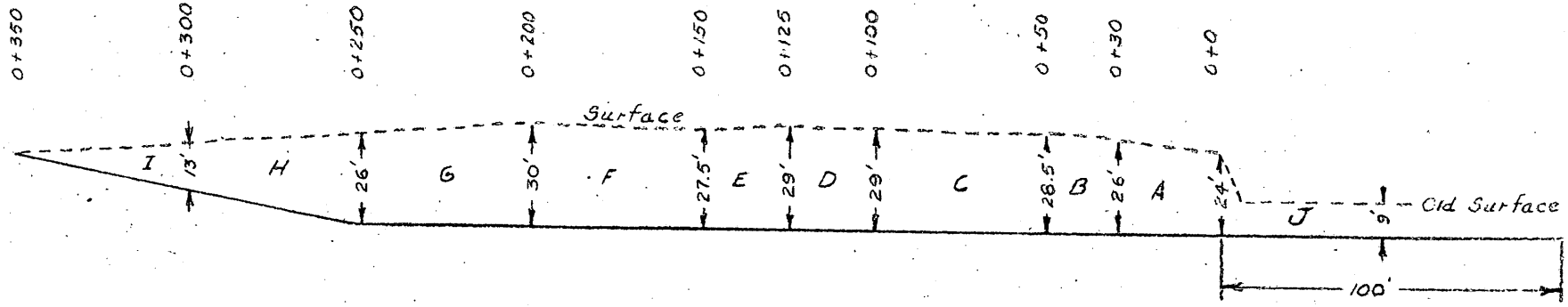


WM. G. KEYNOLDS
HICK'S DOME PROPERTY
HARDIN CO., ILL.
DMEA - 3855

0 INCHES 1
0 FEET 50

7-1-56

HICK'S DOME — TRENCH No. 1 (section)



Top Widths 27' 21' 25' 27' 27' 27' 31' 33' 29' 32' 14'

Bottom average width 24'

TOTAL CUBIC YARDAGE = 8064

HICK'S DOME

DMEA - 3855

TRENCH No. 1

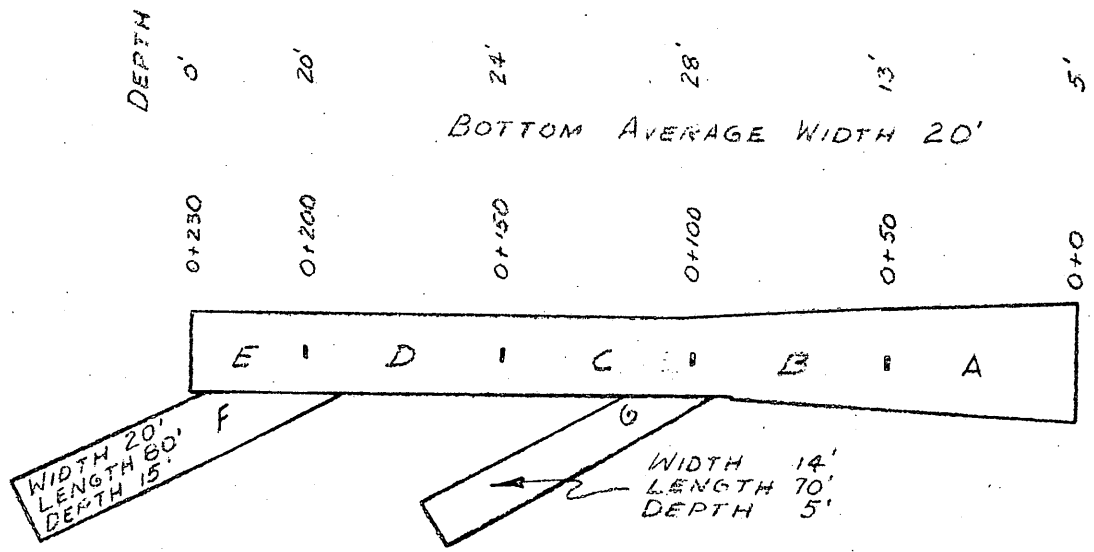
MEASUREMENTS FOR CUBIC YARDS

0 INCHES 1

0 FEET 50

7-1-56

TRENCH No. 2 (Plan)



TOTAL CUBIC YARDAGE = 4288

HICK'S DOME

DMEA - 3855

TRENCH No. 2

MEASUREMENTS FOR CUBIC YARDS

0 INCHES 1

0 FEET 50

7-1-56

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
JUN 14 1956

CW

June 12, 1956

Mr. E. L. Baxter
Reynolds Metals Company
2000 South Ninth Street
Louisville 1, Kentucky

Re: DMEA-3855, Idm-E914
Hicks Dome, Hardin County, Ill.

Dear Mr. Baxter:

On further consideration of the question of analyzing the sample from Trench no. 2, it has been agreed that it is advisable to have a complete analysis made of at least one sample from Trench no. 2. Therefore, I would suggest that you make a composite of all the grab samples from Trench no. 2 and have them sent for a complete analysis as provided in Item 1 of Amendment No. 1.

Sincerely yours,

Robert A. Laurence
Executive Officer
DMEA Field Team, Region V

RAL/mg
cc
Amos
Burmeister
Operating Committee (3)
Lynch
files

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.
ROOM 13 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
JUN 14 1956

June 12, 1956

Mr. E. L. Baxter
Reynolds Metals Company
2000 South Ninth Street
Louisville 1, Kentucky

Re: DMEA-3855, Ida-8914
Hicks Dome, Hardin County, Ill.

Dear Mr. Baxter:

On further consideration of the question of analyzing the sample from Trench no. 2, it has been agreed that it is advisable to have a complete analysis made of at least one sample from Trench no. 2. Therefore, I would suggest that you make a composite of all the grab samples from Trench no. 2 and have them sent for a complete analysis as provided in Item 1 of Amendment No. 1.

Sincerely yours,

Robert A. Lawrence
Executive Officer
DMEA Field Team, Region V

RAL/mg
cc
Amos
Burmeister
Operating Committee (3)
Lynch
files

Surname copy

700

Murphy
Ellis
Martin
Talbot
Byrnes
Dwyer
Mitchell

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

JUN - 8 1956

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room #13, P. O. Building
Knoxville 2, Tennessee

Re: Docket No. DMEA-3855 (Thorium, Uranium, and Rare Earths)
Contract No. Ida-E914
William G. Reynolds
Hicks Dome
Hardin County, Illinois

Dear Mr. Laurence:

This is in response to your memorandum, dated May 25, 1956, and the Interim Report of the examination made May 12 by Dewey H. Amos, USGS, relating to the subject project.

In writing Amendment No. 1, it was our thought that, because the work was located in a new area, at least one composite sample should be analyzed for all the elements mentioned so that we would have a record in our files to prove the absence or presence of such mineralization.

We note that the Field Team agrees with Mr. Amos that in the case of Trench No. 2 such a complete analysis of a sample does not appear to be justified. However, if such an analysis is not made, then an amendment to Amendment No. 1 will be required to eliminate this provision for one complete analysis of material from Trench No. 2. If such an amendment is executed by the Field Team, it should be fully justified.

Sincerely yours,

W. S. Martin
ACTING Chairman, Operating Committee (s/s)

FMMurphy/gla
5-31-56

APPROVED:

/s/ Robert W. Geeham (s/s)
Member, Bureau of Mines

Thor H. Kiilsgaard (s/s)
Member, Geological Survey

cc to: Admr.'s Reading File
Operating Committee
Docket
Messrs. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JOHosted, Rm. 3210, GSA
Code 700
Mr. Murphy

RAL

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.
ROOM 1 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
JUN - 4 1956

June 1, 1956

Memorandum

To: Operating Committee, DMEA - Washington

From: DMEA Field Team, Region V - Knoxville, Tennessee

Subject: DMEA-3855, Idm-E914 (thorium, uranium, rare earths) Wm G. Reynolds, Anchorage, Ky. Hicks Dome, Hardin County, Illinois.

According to the contract, the time for completion of this project is June 1, 1956. Work under Stage I has been completed, and it is probable that Stage II will be approved; however, no decision can be made until results of the analyses are available. Therefore, we will defer preparation of a time extension amendment until such time as approval for Stage II is given. If Stage II is not approved, no amendment will be needed.

Robert A. Laurence

Robert A. Laurence
Executive Officer, DMEA
Region V

A. L. Peyton, for V. J. Lynch
Member, Bureau of Mines

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D.C.
ROOM POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
MAY 28 1956

May 25, 1956

Memorandum

To: Operating Committee, DMEA - Washington

From: DMEA Field Team, Region V - Knoxville, Tenn.

Subject: DMEA-3855, Idm-E914 (thorium, uranium, rare earths) William G. Reynolds, Anchorage, Ky. Hicks Dome, Hardin County, Illinois

Enclosed are 4 copies of Mr. Amos' interim report, covering the trenching done under Stage I of the subject contract.

Your attention is directed to the final paragraph. We agree with Mr. Amos, that complete analysis of samples from Trench 2 is not warranted. We interpret the wording of the amended contract to permit, rather than require, the complete analysis referred to, and therefore do not consider an amendment necessary. If this is incorrect, please authorize preparation of an amendment to correct this situation.

The results at Trench 1 are definitely encouraging, but a decision as to whether or not Stage II is to be authorized must await results of the analyses.

Robert A. Laurence
Robert A. Laurence, Executive Officer
DMEA Field Team, Region V

V J Lynch
V J. Lynch, Member
Bureau of Mines

ACTION ON INTERIM 3855
OR FINAL FIELD TEAM REPORT

Date 5-28

Referred to:

1. Mr. Mittendorf
2. Mr. Johnson
3. Mr. Chambers
4. Docket Control Mails and Files
5. ~~Rare & Misc. Metals Division~~
6. Docket Control Mails and Files

Note comments in report regarding:

1.

2.

3.

4.

and take appropriate action.

- - - - - - - -

Action taken by Division:

See letter to Executive Officer, prepared 5/31/56 re Amendment No. 1

Robert E. Adams

RECEIVED
MAY 28 1956

INTERIM REPORT

DMEA-3855, Idm-E 914 (thorium, uranium, rare earths)

Operator: William C. Reynolds, Anchorage, Kentucky.

Location: In Sec. 30, T.11S., R. 8E, on the crest of Hicks Dome, northern Hardin County, Illinois.

The two bulldozer trenches provided for in Stage I of the contract have been completed. They consist of two cuts as follows:

No. 1. A trench 290 feet long in a N.24°W. direction along the vein from Anomaly 100 as indicated on Figure 1 attached to the contract. It averages 21 feet in width at the bottom and is 18-26 feet deep. Addition depth could not be obtained with a bulldozer because of chert layers in the semi-weathered bedrock.

No. 2. A trench 110 feet long in a N.15°E. direction beginning at a point about 50 feet N.52°E. of the Hamp well. This cut averages about 20 feet in width at the bottom of the cut and is 16-23 feet deep. Chert nodules and layers restricted additional deepening with a bulldozer.

The country rock exposed in both trenches is cherty limestone of Devonian age. Its attitude varies much in short distances. Dips vary from 12°S. to 13°N. Locally, the rock is brecciated and in places is highly contorted and folded.

A vein-like body at least 260 feet long was exposed by Trench No. 1. The body is 1/2-2 feet in width and contains a distinctive yellow brown clay-like "filling" with irregular concentrations of black material, probably manganese oxides and hydroxides. Its attitude is somewhat irregular but has an average strike over the exposed length of N.24°W. and a dip of about 80° to the northeast. Average microroentgen counts on a scintillator (Model 111B) across the vein varied from 800 to 1200 against a background count of 18 microroentgens. On each side of the vein the country rock has a count of 400-800 for a distance of 1 to 6 feet. This body probably represents a fault filling, although the semi-weathered nature of the country rock prevented positive confirmation. Highest readings are obtained where faults of small displacement (1/2-2 feet) intersect the vein. They strike N.65-75°E and dip 75-85° to the southeast. All are gravity-type

faults and contain residual red clay from weathering of limestone. They are not radioactive away from the vein. High counts also occur in the vein where the adjacent country rock is breeciated or crumpled.

The highest count along the vein was obtained about 50 feet north of Anomaly 100 as shown on Figure 1 attached to the contract. A small cross-fault intersects the vein at this point and the adjacent country rock is complexly folded. Northeastward from this point the count decreases slowly and irregularly and the vein thins. The vein could not be uncovered south of Anomaly 100 because of alluvium and a small swamp. A few small branches extend at acute angles from the vein but all terminate in a strike distance of 4 or 5 feet.

Trench No. 2 failed to reveal a significant extent of radioactivity or yellow "clay". A few localized spots of high radioactivity associated with yellow "clay" are present in the southern end of the cut. They have neither vertical or lateral extent nor indicate any systematic distribution or trend. No faults are present in this trench. Country rock in the southern end of the cut is brecciated.

Channel samples were taken by the examiner assisted by the Operator's representative at regular intervals along the vein in Trench No. 1 of both the vein and the adjacent country rock. Grab samples were taken in Trench No. 2.

The amended contract requires that "at least one sample from each of the trenches excavated under Stage I shall be analyzed for all the individual elements and for the three rare-earth groups, namely, cerium, terbium, and ytterbium groups of the rare earths series of elements." This extensive analysis is not justified for samples taken from Trench No. 2.

Date of Exam:
May 12, 1956

Dewey H. Amos
Geologist-U.S.G.S.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 1087 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
MAY 28 1956

May 25, 1956

Mr. B. L. Baxter
Reynolds Metals Company
2000 South Ninth St.
Louisville 1, Ky.

Re: DMEA-3855, Idm-E914
Hicks Dome, Hardin County, Ill.

Dear Mr. Baxter:

Mr. Lynch and I are in agreement with Mr. Amos that the extensive analyses described in item 1 of Amendment No. 1, are not justified for material from Trench No. 2. We would prefer to see the money spent on two or more samples from Trench No. 1.

However, may I suggest that any samples taken from Trench No. 2, be retained, until we get a definite decision from our Washington staff.

The results at Trench No.1 are encouraging, but of course a decision on Stage II will have to await the analyses.

Mr. Amos will not be in Illinois after June 5, but Mr. Trace, who participated in the original examination, is expected to be in the fluorspar district after about June 10, and will visit the project some time shortly after that.

With best regards, I am

Sincerely yours,

Robert A. Laurence
Executive Officer, DMEA
Field Team, Region V

RAL/mm
cc:
Miller
Amos
Trace
Lynch
Files
Cpr. Gen-2

Interim Report

by

H. L. Burmeister

RECEIVED
MAY 9 - 1956

Docket No. DMEA-3855 (rare earths, uranium)
Contract: Idm-E914
Location: Hicks Dome, Hardin County, Illinois
Operator: Wm. G. Reynolds, Anchorage, Kentucky

This property was visited April 18 to 21, 1956. Those present at the time of visit were Robert A. Laurence, Exec. Officer, Region V, Dewey Amos, U.S.G.S., B. L. Baxter, the Operator's representative, and W. A. Chenault who prospected the area and interested the operator.

Equipment used consists ofoone Caterpillar D-7 tractor with a 12-foot straight bulldozing blade. A single quickly removable scarifying tooth is occasionally used in local areas containing chert.

Exploration started at 10 a.m. April 14 on the southern portion of the Reynolds or main trench. After 44 hours of work there had been removed from this trench approximately 1300 cu.yds. of material, or 29.5 cu. yds. per hour (Fig.1). At the termination of this visit the deepest portion of this trench was 20 feet below the surface. Probably drainage cannot be maintained at a greater depth. In addition to the above described work, approximately 500 cu. yds. had been excavated in the northern portion of the Reynolds trench and in locating the strike trend of mineralization in the Hamp trench. Considering the nature of the material and the distance to dump, it is believed that satisfactory advancement was being made in the work.

? Approx. 30' required for effective work

Below the top 3 feet the material bulldozed has been quite uniform and consists of red and yellow clay with a comparatively small amount of chert. The chert is largely confined to two belts, each about 18 inches wide, paralleling and about 3 feet removed from each side of

3855

ACTION ON INTERIM
OR FINAL FIELD TEAM REPORT

Date 5-9

Referred to:

1. ~~Mr. Mrvosh~~
2. ~~Mr. Johnson~~
3. ~~Mr. Chambers~~
4. ~~Docket Control Mails and Files~~
5. ~~Rate & Tariff Section Division~~
6. Docket Control Mails and Files

Note comments in report regarding:

1. Interesting report

2.

3.

4.

and take appropriate action.

- - - - - - - -

Action taken by Division:

Robert E. Adams

the mineralized zone. The most radioactive zone in the Reynolds trench is approximately one foot wide and returns an average scintilometer reading of 1100 microroentgens/HR or 1.1 MR/HR with a background of 13 microroentgens. Adjacent to and on each side of this 1-foot width there is a 2-foot width of clay which is from 1/3 to 1/2 as radioactive as the 1-foot central portion. All radioactive material consists of a slightly gritty lighter colored yellow clay.

A total of 5 samples were channeled in 3 locations indicated as 1, 2 and 3 in Fig. 1. These include 3 of the central 1-foot wide central portion and 2 composites of the two-foot wide lower activity bands. The samples contain a minimum of 5 pounds per foot of width channeled and were taken to be used in comparison to mineralization which may be encountered at a greater depth. Location of the central portion of the "vein" was staked and is shown in Fig. 1. The lateral location of the "vein" was accurately referenced to stakes in the trench walls to assist in determining the dip for diamond drilling purposes.

The area of mineralization in the Reynolds or main trench (Fig.1) has a quite definite strike of N.16°W. Sufficient excavation had not been made at the Hamp trench location to definitely establish the strike of mineralization but it appears to be about N.10°E. The occurrence of chert bands in the Reynolds trench is also found in the Hamp trench.

The northern boundary of the Operator's lease is approximately 300 feet north of the northern end of the Reynolds trench. This may be sufficient to provide space for dumping but if it is not the dump may be extended a short distance north of the line onto property which is also controlled by the Operator.

The N-S location of the Hamp trench as given in the contract, Exhibit "A", Stage I, paragraph 3 of Article 1, is not consistent with the topography nor with the sketch contained in the contract. The trench is being excavated in accordance with the sketch which observation indicates is correct.

Radioactivity was measured with both the engineer's scintilometer, Model 111, and the Operator's Model 111-B, which has nearly double the sensitivity of Model 111. It is found that the Field Team's examination report records results obtained with the operator's scintilometer. In the interest of continuity, Mr. Baxter was advised to keep all records of radioactivity on the same basis.

The contract does not provide for core boxes or for the use of casing in this clay material. A satisfactory arrangement has been made whereby the Joy Manufacturing Co. will furnish core boxes and supply casing where necessary at the contract unit cost of $4.00 per foot.

Mr. Baxter was supplied with sufficient report forms for the project and the details of reports were reviewed. Due to the rapidity of progress Mr. Baxter was advised to submit his first monthly report as of April 30 although work was not started until April 14. Photostats of plans of the Reynolds trench will be supplied with radiation intensities at trench depths of 8', 11½', and 19½'. Mr. Baxter was further advised to submit (invoices for all analyses) and true, certified copies of all results of analyses. Reports will also contain plan and sections necessary for computing yardage removed from trenches. Location and length of all samples will be indicated on sketches or maps. The operator is to notify laboratories to return rejects from all samples for possible later use.

Not required for unit cost basis.

H. L. Burmeister

April 30, 1956

H. L. Burmeister

FIG. 1

Looking N. from S. end of Reynolds trench

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 25, POST OFFICE BLDG.
WASHINGTON
KNOXVILLE 2, TENN.

April 30, 1956

Memorandum

To: Operating Committee, DMEA - Washington

From: Acting Executive Officer, DMEA - Region V

Subject: Amendment No. 1, on DMEA-3855, Idm-E914, William G. Reynolds, Hicks Dome Project (rare earths) Illinois

Transmitted are three copies of the subject contract.

The usual distribution of the other copies has been made by this office.

V. J. Lynch

V. J. Lynch

RECEIVED
MAY 2 - 1956

700

FILE COPY
Surname:
FMMurphy
Crawford
Selfridge

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Rm. 13, P. O. Building
Knoxville 2, Tennessee

APR 10 1956

Re: Docket No. DMEA-3855 (Thorium, Uranium, and Rare Earths)
Contract No. Idm-E914
William G. Reynolds
Nick's Dome
Hardin County, Illinois

Dear Mr. Laurence:

Enclosed are the original and five copies of a proposed Amendment No. 1 to the subject contract, signed by the Administrator.

The Amendment, consisting of 3 pages, has been prepared in accordance with your memorandum of March 19, 1956, and subsequent telephone conversations with Mr. Ellis and Mr. Murphy of the Rare and Miscellaneous Metals Division.

In regard to the element Yttrium, mentioned in the Operator's letter of March 15, this element is considered by chemists as being one of the rare earths series. Therefore, this element may be included in the spectrographic analyses provided for in Amendment No. 1.

P. S. At the request of Mr. H. Burmiester, College Park Station, Region V, a copy of Amendment No. 1 has been forwarded to him.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee

Enclosure

APPROVED:

J. W. Pennington
Member, Bureau of Mines

N. E. Nelson
Member, Geological Survey

FMMurphy/izm 4-5-56
cc to: Docket
Code 700
Mr. Murphy
Admr.'s Reading File
Operating Committee
Messrs. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JOHosted, Rm. 3210, GSA

R.C.G.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 1 SHIP POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
APR 6 - 1956

April 4, 1956

Memorandum

To: W. T. Millar, College Park, Maryland

From: V. J. Lynch - DMEA - Knoxville

Subject: Contract, Idm-E914, DMEA-3855, Hicks Dome, Hardin County, Ill.

Bruce L. Baxter of Reynolds Metal Company has advised us that work on Stage I of the subject contract will be started April 14. I assume that Burmeister will look after this project in place of Gus Neumann. Bob Laurence is planning on having Dewey Amos look after the Surveys end of the work. Dewey was formerly a geologist on DMEA work with headquarters in Knoxville. He is now teaching at Southern Illinois University.

Bob Laurence plans to be at Hicks Dome on the morning of April 18 for a few hours, while enroute to Frederick, Missouri. If Burmeister is there at that time, Bob will be glad to go over the project with him.

V. J. Lynch

VJL/ms

cc:

Opr. Com.-2

Amos

Burmeister
Lynch
Files

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 1 WASHINGTON POST OFFICE BLDG.
KNOXVILLE 2, TENN.

March 27, 1956

Mr. B. L. Baxter
Reynolds Metals Company
Parts Division
2000 South Ninth St.
Louisville, Kentucky

Re: DMEA-3855, Idm-E91h, -Uranium
Thorium and Rare Earths
Hicks Dome, Hardin County, Ill

Dear Mr. Baxter:

I have been advised by our Washington office that the error in the item for analyses in the exploration project contract may be corrected by amending the contract to provide for:

Stage I.

70 - Thorium analyses	@ $10.00	$700.00
10 - Uranium "	@ 5.00	50.00
3 - Cb - Ta "	@ 20.00	60.00
30 - Spectrographic analyses for rare earths	@ 15.00	450.00
		$1,260.00

Stage II

12 - Thorium analyses	@ $10.00	120.00
2 - Spectrographic analysis	@ 15.00	30.00
		$150.00

Because this is a unit-cost contract, it is not feasible to get a single price based on an average of the various costs of analyses.

Please let me know at your earliest convenience if this is agreeable to you so that we can proceed with drafting of the amendment.

It has also been suggested that you might inquire of the Lindsay Chemical Company, West Chicago, Illinois, whether they could handle the analyses. As you probably know, they are one of the largest purchasers of ores of thorium and rare earths.

Sincerely yours,

Robert A. Laurence, Executive Officer
DMEA Field Team, Region V

RAL/am
cc:
Opr. Com.-3
Millar
Lynch
Files

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 1 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
MAR 29 1956

March 27, 1956

Mr. B. L. Baxter
Reynolds Metals Company
Parts Division
2000 South Ninth St.
Louisville, Kentucky

Re: DMEA-3855, Idm-E914, -Uranium
Thorium and Rare Earths
Hicks Dome, Hardin County, Ill

Dear Mr. Baxter:

I have been advised by our Washington office that the error in the item for analyses in the exploration project contract may be corrected by amending the contract to provide for:

Stage I.

70 - Thorium analyses	@ $10.00	$700.00
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		$150.00

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Please let me know at your earliest convenience if this is agreeable to you so that we can proceed with drafting of the amendment.

It has also been suggested that you might inquire of the Lindsay Chemical Company, West Chicago, Illinois, whether they could handle the analyses. As you probably know, they are one of the largest purchasers of ores of thorium and rare earths.

Sincerely yours,

Robert A. Laurence, Executive Officer
DMEA Field Team, Region V

RAL/sm
cc:
Opr. Com.-3
Millar
Lynch
Files

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

DOCKET COPY

March 27, 1956

Memorandum

To: The Administrator

From: Ernest Wm. Ellis, Chief
Rare and Miscellaneous Metals Division

Subject: Docket No. DMEA-3855 (Thorium, uranium, rare earths)
Contract No. Idm-E914
William G. Reynolds
Hick's Dome
Hardin County, Illinois

JUSTIFICATION FOR AMENDMENT NO. 1

The Field Team report accepted the Applicant's request for 200 analyses at a price of $7.00 each. This figure appeared high, as this office estimated that a spectrographic analysis at a cost of $15.00 each would be sufficient to determine the approximate percentages of the elements of thorium, columbium, tantalum, and rare earths; moreover, in large lots, chemical analyses for uranium have been placed at $3.50 in previous contracts.

In drafting the contract, it was assumed that for a small exploration project an "Agreed Unit Cost" contract would be cheaper to administer than an actual cost contract. Therefore, the $15.00 cost for a spectrographic analysis was broken down, assuming that the report of analyses would cover 4 or 5 elements @ $3.00 per element, and in a number of cases the sample would be chemically analyzed for uranium alone at a cost of $3.00. There were so many variables as to number of samples, elements to be tested for, etc., that it was decided an agreed unit cost of $3.00/element would be an equitable figure and the contract was drafted in accordance with this figure.

However, according to quotations, in the docket, recently received from nationally-known laboratories, the cost of analyses for the elements mentioned in the contract ~~is~~ are much higher than the agreed unit cost under the contract. Therefore, in fairness to the Operator, this amendment, providing payment for analyses on the basis of prices quoted by Charles O. Parker Company of Denver, Colorado, is recommended for your approval.

Ernest Wm. Ellis

Ernest Wm. Ellis

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

March 21, 1956

Memorandum

To: The File

Through Robert E. Adams, Chief
Operations Control & Statistics Division

From: F. M. Murphy, Mining Engineer
Rare and Miscellaneous Metals Division

Subject: Docket No. DMEA-3855 (Thorium, uranium, and rare earths)
Contract No. Idm-E914
William G. Reynolds
Hick's Dome
Hardin County, Illinois

Referring to the contract Form MF-200A of the subject contract, it is noted that on page 1 the commodities are listed as "Thorium, uranium, rare earths." However, under Article 3 only "Uranium" is listed as the commodity to be explored for.

Mr. Rubin of the DMEA Legal Division was consulted in regard to this omission. I was informed that because all the commodities were eligible for Government participation of 75 percent of exploration costs, and the fact that under the contract the Government would receive royalties on all mineral or metal production, this omission has no importance. Therefore, an amendment to the subject contract to rectify the error is not considered necessary.

The docket file containing the "extra" copy of the contract is returned herewith.

F. M. Murphy

F M Murphy

Attachments

Same copy

700

Murphy

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

March 21, 1956

Memorandum

To: The File

Through Robert E. Adams, Chief
Operations Control & Statistics Division

From: F. M. Murphy, Mining Engineer
Rare and Miscellaneous Metals Division

Subject: Docket No. DMEA-3855 (Thorium, uranium, and rare earths)
Contract No. Idm-8914
William G. Reynolds
Mick's Dome
Hardin County, Illinois

Referring to the contract Form MF-200A of the subject contract, it is noted that on page 1 the commodities are listed as "Thorium, uranium, rare earths." However, under Article 3 only "Uranium" is listed as the commodity to be explored for.

Mr. Rubin of the DMEA Legal Division was consulted in regard to this omission. I was informed that because all the commodities were eligible for Government participation of 75 percent of exploration costs, and the fact that under the contract the Government would receive royalties on all mineral or metal production, this omission has no importance. Therefore, an amendment to the subject contract to rectify the error is not considered necessary.

The docket file containing the "extra" copy of the contract is returned herewith.

/s/ F. M. Murphy

Attachments

F. M. Murphy

FMMurphy/gla

cc to: Code 700
Mr. Murphy
Docket

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 1015 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
MAR 21 1956

March 19, 1956

Memorandum

To: Operating Committee, DMEA - Washington

From: DMEA Field Team, Region V - Knoxville, Tennessee

Subject: Signed Contract - DMEA-3855, Idm-E914- Thorium, uranium, rare earths. Wm. G. Reynolds, Anchorage, Kentucky. Hicks Dome, Hardin County, Illinois

Enclosed are the executed Government, Division and Docket copies of the subject contract. The usual distribution has been made of the other copies. Also enclosed are 2 copies of the Operator's letter.

We recommend preparation of an amendment authorizing a change in the unit amounts for assays, in accordance with the enclosed prices quoted by two commercial laboratories, with the total amount to remain the same. We have advised the Operator not to send any samples for assay until the amendment has been executed. We suggest that this be incorporated in an amendment extending the starting time to May 1, 1956. The delay in starting is due to heavy floods along the lower Ohio River.

Orig + 2 copies
Contract Office

Robert A. Laurence
R. A. Laurence, Executive Officer
DMEA Field Team, Region V

W. A. Beck
Wm. A. Beck, for V. J. Lynch, Member
Bureau of Mines

REYNOLDS METALS COMPANY
REYNOLDS METALS BUILDING
RICHMOND 19, VIRGINIA

RECEIVED
MAR 21 1956

REPLY TO
PARTS DIVISION
2000 SOUTH NINTH STREET
LOUISVILLE 1, KENTUCKY

March 15, 1956

RECEIVED
MAR 19 1956
U.
Knoxville, Tenn.

Mr. Robert A. Laurence, Executive Officer, DMEA
U. S. Department of the Interior
Room - Post Office Building
Knoxville 2, Tennessee

Re: DMEA - Docket No. 3855
Contract No. Idm-E914
Hardin County, Illinois
(Thorium, Uranium, Rare Earths)

Dear Mr. Laurence:

We are attaching five executed copies of subject contract, retaining the Operator's copy.

Confirming our telephone conversation, we are forwarding these copies with the understanding that an addendum will be made changing the unit cost of the analyses under Stage I, item 2, from $3.00 for each element analyzed to the market price for the respective elements involved.

I have obtained mineral assay prices from two recognized assayers. These are Charles O. Parker and Company, Denver, Colorado and Mineral Assay Laboratory, Grand Junction, Colorado. Their respective price lists are attached.

Please note that Mineral Assay Laboratory charges $3.50 for an Uranium assay compared to $5.00 for an Uranium assay by Charles O. Parker. However, Parker only charges $10.00 for Thorium, whereas Mineral Assay Laboratory charges $15.00. Parker charges $10.00 for rare earths and $20.00 for Columbium - Tantalum, whereas Mineral Assay does not quote a price on these elements, stating that the price depends on the separations or interference they find after the analysis has started.

The writer has discovered that there is a current market for Yttrium of as much as $5.00 per pound. We, therefore, would like to include this element at Parker's quoted price of $15.00 for the spectrographic analysis.

Since Parker's price list is complete for all the elements involved, it is suggested that the addendum to the contract, covering unit costs, be based on

Parker's list, since it would be simpler and more economical to send the samples to one laboratory than to split the samples between two laboratories.

Also, as we discussed, contracts are being released with the proviso that trench excavation under Stage I, item 1, will be stopped if hard rock is encountered which can not be bulldozed without shooting or blasting, and in such an event, there will be no obligation to trench. Our experience, however, in this area leads us to believe that shooting or blasting will not be required. We tentatively plan to begin operations under this contract on April 14th, weather permitting. Heavy rains have continued to drench the area, so no time has been lost. I shall contact your office later confirming the above date.

Also, we wish to express our appreciation for the fine cooperation which we have received from your office.

Yours very truly,

B. L. Baxter

B. L. Baxter

RECEIVED
MAR 19 1956
U. S. Geological Survey
Geologic Division
Knoxville, Tenn.

Attachments

c/c Mr. W. G. Reynolds

BLB/t

MINERALS ASSAY LAB.
54 ROAND AVE. PH. 1441
GRAND JUNCTION, COLO.

Mar. 10, 1956

RECEIVED
MAR 21 1956

Reynolds Metal Co.
Parts Division
2000 So. Ninth St.
Louisville 1, Kentucky

Attn. Mr. B.L. Baxter

Dear sir;

In reply to your letter received 3/9/56, we are able to take care of the analysis you have listed.

As to Uranium it will take about 48 hours, after we receive the samples, Price $3.50 per Sample .

Thorium 5 days Price $15.00 Per Sample.

Columbium, Tantalum & Rare Earths from two to three weeks. The price on these depends on the seperations or interferences we run into.

I hope we can serve you and will give your samples prompt attention as we receive them.

We thank you for your inquiry.

There is no sampling charge except on very large samples.

Hoping to hear from you.

Yours Truly

Minerals Assay Lab

R.E. Morris

R.E. Morris Chief Chemist;

REM/br

TELEPHONE MAIN 3-1852
2114 CURTIS STREET
DENVER 5, COLORADO

March 7, 1956

RECEIVED
MAR 21 1956

Parts Division
2000 South Ninth St.
Louisville 1, Kentucky

Attn. B.L. Baxter

Dear Mr. Baxter,

Enclosed please find a price list as requested in your letter of March 5. Normally it takes 4 days from the time we get the sample until you get a reply of the results.

The chemical analysis for Yttrium is run with rare earths and is reported as total rare earths only. Chemical separation of Yttrium for analysis is virtually impossible, however, the most accurate approximation known is by Spectrographic analysis. The price for a Spectrographic analysis is $15.00.

We hope this information is sufficient. If you have further questions we will be glad to supply any information we can.

Sincerely,

Charles O. Parker II

Charles O. Parker II

RECEIVED
MAR 21 1956

TELEPHONE MAIN 3-1852
2114 CURTIS STREET
DENVER 5, COLORADO

March 7, 1956

Parts Division
2000 South Ninth St.
Louisville 1, Kentucky

Attn. B.L. Baxter

Dear Mr. Baxter,

Enclosed please find a price list as requested in your letter of March 5. Normally it takes 4 days from the time we get the sample until you get a reply of the results.

The chemical analysis for Yttrium is run with rare earths and is reported as total rare earths only. Chemical separation of Yttrium for analysis is virtually impossible, however, the most accurate approximation known is by Spectrographic analysis. The price for a Spectrographic analysis is $15.00.

We hope this information is sufficient. If you have further questions we will be glad to supply any information we can.

Sincerely,

Charles O. Parker

Charles O. Parker II

CHARLES O. PARKER & COMPANY
2114 CURTIS ST. MA 3-1852
DENVER, COLORADO

GOLD	$1.00
SILVER	1.00
GOLD & SILVER (SAME SAMPLE)	1.50
COPPER, LEAD, ZINC, EACH	1.00
ALUMINUM	3.00
ANTIMONY	5.00
ARSENIC	5.00
BARIUM	3.00
BERYLLIUM	5.00
BISMUTH	5.00
CHROMIUM	5.00
COBALT	5.00
COLUMBIUM - TANTALUM (COMBINED)	20.00
FLUORSPAR	3.00
IRON	1.00
INSOLUBLE	1.00
LIME	1.00
MAGNESIUM	2.50
MANGANESE	2.50
MERCURY	5.00
MOLYBDENUM	5.00
NICKEL	5.00
PHOSPHORUS	3.00
PLATINUM	5.00
SILICA	3.00
SULPHUR	2.50
THORIUM	10.00
TIN	5.00
TITANIUM	5.00
TUNGSTEN	5.00
URANIUM	5.00
VANADIUM	2.00
RARE EARTHS	10.00
FUSION, SILICA, LIME IRON, EACH	3.00
COMPLETE QUALITATIVE ANALYSIS	15.00

ONE POUND MAKES A GOOD SAMPLE

MAR 13 1965
CATALOGS

Thorium ---------- $15.00
Copper ---------- $2.00

ASSAY PRICES

Radiometric Assay ------ $2.50

Uranium	3.50
Vanadium	1.50
Lime	2.00
Tungsten	4.00
Molybdenum	2.50
Arsenic	3.50
Iron	5.00
Insoluable	5.00
Magnesium	3.50
Manganese	4.00
Mercury	4.00
Phosphorus	3.50
Sulphur	3.50
Lead	2.50
Gold & Silver	2.50
Zinc	2:50
Spectographic Analysis	15.00
Preparation of Samples	1.00 up

Other prices quoted on request.

Test Work prices also quoted.

Minerals Assay Laboratory
549 Noland Avenue
Grand Junction, Colorado

700
FILE COPY
Surname:
Murphy
Ellis
Talbot
Selfridge
Johnson

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

Mr. Robert A. Lawrence
Executive Officer
DMEA Field Team, Region V
Rm. 13, P. O. Building
Knoxville 2, Tennessee

Re: Docket No. DMEA-3855
William G. Reynolds
Hisk's Dome
Martin County, Illinois
(Thorium, uranium, and rare earths)

Dear Mr. Lawrence:

Enclosed are the original and five copies of a short-form contract between the Government and William G. Reynolds. Also enclosed are two extra copies of Exhibit "A".

If you and the Applicant find the proposed contract in order, please insert in Article 3 of the Contract form the date work shall commence; then have the Applicant sign the original and all copies. Thereafter, kindly distribute the copies in the usual manner.

If any part of the Contract does not meet with your or the Applicant's approval, then the original and all copies, including the extra copies of Exhibit "A" are to be returned to this Office with the proposed changes for consideration.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (GCS)

Enclosures

APPROVED:

/s/ Robert W. Geehan (GCS)
Member, Bureau of Mines

Thor H. Kiilsgaard (GCS)
Member, Geological Survey

FMMurphy/izm 1-23-56
cc to: Docket
Code 700
Mr. Murphy
Admr.'s Reading File
Operating Committee
Messrs. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JOHosted, Rm. 3210, GSA

P. S. In Annex I attached to the Subordination Agreement, please note the land description states "Range 7 East" instead of "Range 8 East. This discrepancy should be corrected.

RCH

Surname copy

700

Murphy
Ellis

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

January 10, 1956

Memorandum

To: Associate Solicitor, Division of Mineral Resources

From: F. M. Murphy, Mining Engineer
Rare and Miscellaneous Metals Division

Subject: Docket No. DMEA-3855 (Uranium)
William G. Reynolds
Hick's Dome
Hardin County, Illinois

Will you kindly prepare a short-form contract with William G. Reynolds in accordance with the attached draft.

You will note from his letter, dated January 5, 1956, in the docket file, that he has been unable to obtain Mr. Hamp's signature on the Consent to Lien forms. You will also note Mr. Mittendorf's letter, dated December 23, 1955, regarding the waiver of these documents.

/s/ F. M. Murphy

F. M. Murphy

FMMurphy/gla
cc to: Admr.'s Reading File
Code 700
Mr. Murphy
Docket

DRAFT
1/10/56
FTMurphy/gla

MF-200A
(Revised June 1954)

Docket No. DMEA 3855

Commodity Uranium

Contract No. Idm-E

UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
EXPLORATION PROJECT CONTRACT[1]
(Short Form)

It is agreed this ..... day of ....., 195...., between the United States of America, acting through the Department of the Interior, Defense Minerals Exploration Administration, hereinafter called the "Government," and [2] William C. Reynolds, whose mailing address is Stonegate Road, Anchorage, Kentucky, hereinafter called the "Operator," as follows:

ARTICLE 1. *This contract* is entered into under the authority of the Defense Production Act of 1950, as amended. It consists of this form (MF-200A), the attached Exhibit "A," Annex I, and maps Figure I and Figure 2

The Operator shall not transfer or assign this contract or any right thereunder without the written consent of the Government.

ARTICLE 2. *Operator's property rights.*—(a) The land which is the subject of this contract (hereinafter called "the land") is in the State of Illinois, County of Hardin, and is described in Annex I.[3]

(b) The Operator represents and undertakes that:

(1) The Operator is the [4] lessee of [5] oil, gas, and mineral rights in the land, in possession and entitled to possession for all of the purposes of this contract, under and by virtue of a [6] lease, [7] recorded in Book 5, page 219, official records of said County; and

(2) The Operator's right, title, or interest (whether as owner, lessee, or otherwise) is subject only to the following claims, liens, or encumbrances: .....

(c) The Subordination Agreement of the holder of any claim, lien, or encumbrance listed above, and (if the Operator does not hold the legal title) the Consent to Lien of any holder of the legal title of the land (lessor, seller, optionor, etc.), are attached, as follows: Owner's Consent to Lien waived. Subordination Agreement signed by William A. Chenault and his wife, Louise Ryan Chenault

[1] If sufficient space is not provided in any blank, use an extra sheet of paper and refer to it in the blank.
[2] Insert name, and if an organization, its nature (corporation and place of incorporation, partnership with names of partners, etc.).
[3] State on a separate sheet marked "Annex I" the legal description or enough to identify the property, particularly excluding any areas from which the production is not to be subject to the Government's percentage royalty.
[4] Insert "owner," "lessee," "contract purchaser," "locator," etc.
[5] Insert "the entire interest," "the mineral rights," "an undivided one-third," etc.
[6] Insert "deed," "lease," "contract," "location notice," "patent," etc.
[7] If not recorded, so indicate by inserting "un."

(d) The Operator shall preserve and maintain his right, title, and interest in the land and his right to the possession thereof for the purposes of this contract, and shall devote the land and all existing improvements, facilities, buildings, installations, and appurtenances to the purposes of this contract. Until the lapse of the time within which the Government may make a certification of discovery or development without any such certification having been made, and after any such certification has been made, the Operator shall neither transfer, convey, nor surrender the land nor any right, title, or interest therein, nor permit nor suffer any claim, lien, or encumbrance thereon, without expressly referring to and providing in the instrument of conveyance, lien, or encumbrance for the preservation of the Government's right to a percentage royalty on production and lien for the payment thereof. If the Government makes no certification of discovery or development within the time limited in Article 7, it shall thereafter have no claim against the land or any production therefrom except for any production referred to in Article 7(b)(1).

ARTICLE 3. *The exploration project.*—The project is a search for indicated or undeveloped deposits of ..... The work to be performed is described in Exhibit "A." The Operator on or before ..... shall commence the work, and on or before ..... (unless the Operator's obligation to complete the work is terminated—see Article 8) shall complete the work.

ARTICLE 4. *Performance of the work.*—(a) *Operator's responsibility.*—The work shall be performed with reasonable diligence, efficiently, expertly, in a workmanlike manner, in accordance with good mining standards and State regulations for health and safety and for liability insurance covering employment; and with suitable and adequate equipment, facilities, materials, supplies, and labor, to bring it to completion within the time fixed.

(b) *Government may inspect.*—The Operator shall consult with and inform the Government on all phases of the work as it progresses. The Government may enter at all reasonable times to inspect the work under the contract, and also after a certification of discovery or development to inspect production operations and underground workings. The operator shall provide the Government with all reasonable means of access for such inspections.

ARTICLE 5. *Contribution by the Government.*—A fixed cost for each unit of work to be performed (per foot of drifting, per foot of drilling, per hour of operations, etc.) is hereby agreed upon, and is set forth in Exhibit "A" in connection with the estimated total cost of the project in the sum of $ 5,600.00 ..... The Government will contribute 75 percent of the fixed unit costs as work is performed, in a total sum not in excess of $ 4,200.00 .....: *Provided,* That until the Operator has rendered to the Government his final report, and any final auditing required by the Government has been made, and a final settlement of the contract has been made, the Government may withhold from the last voucher or vouchers such sums as it sees fit not in excess of 10 percent of the estimated total cost of the work. The Government will make its contribution on the basis of the monthly vouchers referred to in Article 6(b), but all payments by the Government are provisional only, subject to audit, until the account between the Operator and the Government is finally audited and settled. To the extent that excesses over fixed unit costs or any excess over the estimated total cost may be necessary for the performance of the work, the Operator shall incur and pay such excesses for his own account without contribution by the Government. The Government may make payments directly to independent contractors and suppliers for the account of the Operator rather than to the Operator.

ARTICLE 6. *Reports, accounts, audits.*—(a) *Operator's records.*—The Operator shall keep suitable records and accounts of the units of work performed and of any production in which the Government may have an interest; and shall preserve those with respect to work performed for at least three years after final payment by the Government, and those with respect to production for at least three years after any obligation to pay royalties to the Government has terminated. The Government may inspect and audit said records and accounts at any time, either by itself or by a certified public accountant. The Comptroller General of the United States or his representative, until the expiration of said three-year periods, shall have access to and the right to examine any pertinent books, documents, papers, and records of the Operator. All of the Operator's vouchers and records and accounts relating thereto and the Government's payments thereof remain subject to adjustment until final audit by the Government.

(b) *Progress reports and vouchers.*—The Operator shall provide the Government with five copies of monthly progress reports in three sections as follows: (1) Operator's Monthly Report and Voucher showing a detailed statement of units of work performed during the reporting period; (2) Operator's Unit Cost and Progress Report showing the various types of work performed during the reporting period and the fixed unit costs incurred for each type of work; and (3) a Narrative Report of the work

performed during the reporting period including adequate engineering-geological maps or sketches, drill hole logs and locations, and assay reports on samples taken concurrently with advance in mineralized ground. (Forms for reporting under (1) and (2) above will be provided by the Government.)

(c) *Final report.*—Upon completion of the work or termination of the Government's obligation to contribute to costs, the Operator shall furnish the Government with five copies of a final report (in addition to the final progress report and voucher). This final report shall include a geological and engineering evaluation of the results of the work performed under the contract with an estimate of the ore reserves resulting from such work, complete assay data, adequate geological and engineering maps or sketches, and a summary of the work performed and the unit costs thereof.

(d) *Report of sales.*—The Operator shall provide the Government with suitable accounting and documentary evidence covering all production to which the Government's percentage royalty relates, such as copies of smelter or concentrator settlement sheets, and certified accounts of production and sale or other disposition of production.

(e) *Compliance with requirements.*—If in the opinion of the Government any of the Operator's reports, records, or accounts are insufficient or incomplete, or if the Operator fails to make them, the Government may procure the making or completion of such with suitable attachments as an expense of the work to which the Operator shall contribute. The Government may withhold approval and payment of any vouchers relating to insufficient or incomplete reports, records or accounts.

ARTICLE 7. *Repayment by Operator.*—(a) *Certification.*—If the Government considers that a discovery or development from which production may be made has resulted from the work, the Government, at any time not later than six months after a sufficient final report and final account (see Article 6) has been rendered, may so certify in writing to the Operator. Such certification shall describe broadly or indicate the nature of the discovery or development.

(b) *Royalty on production.*—The Operator, as principal if the Operator is the producer, or as surety if the Operator is not the producer, shall pay to the Government a royalty on all minerals mined or produced from the land, as follows: (1) regardless of any certification of discovery or development, from the date of the contract until the lapse of the time within which the Government may make such certification, or until the total net amount contributed by the Government without interest is fully repaid, whichever occurs first; or (2) if the Government makes a certification of discovery or development, within a period of ten years from the date of the contract, or until the total net amount contributed by the Government without interest is fully repaid, whichever occurs first.

(c) *Basis for computation.*—The Government's royalty shall be a percentage of the gross proceeds (including any bonuses, premiums, allowances, or other benefits) from the production sold, in the form sold (ore, concentrates, metal, or equivalent), at the point of delivery (the f. o. b. point); *except,* that charges of *the buyer* arising in the regular course of business, and shown as deductions on the buyer's settlement sheets, on account of the cost of treatment processes performed by *the buyer,* sampling and assaying to determine the value of the production sold, and freight paid by *the buyer* to a carrier (not the Operator), shall be allowed as deductions in arriving at the "gross proceeds" as that term is used herein. Any costs of treatment processes, sampling or assaying, or transportation, performed or paid by the Operator or by anyone other than the buyer, are not deductible in arriving at the "gross proceeds" as that term is here used. The term "treatment processes," as here used, means those processes (such as milling, concentrating, smelting, refining, or equivalent) applied to the crude ore or other production after it is extracted from the ground, to put it into a commercially marketable form; excluding fabricating or manufacturing.

(d) *Unsold production.*—If any production (ore, concentrates, metal, or equivalent), after the lapse of six months from the date the ore was extracted from the ground, remains neither sold nor used by the Operator in integrated manufacturing or fabricating operations (for instance, if it is stockpiled), the Government, at its option, as long as it so remains, may require the computation and payment of its royalty on the value of such production in the form (ore, concentrates, metal, or equivalent) it is in when the Government elects to require computation and payment. If any production is used by the Operator in integrated manufacturing or fabricating operations before the Government makes its election, the Government's royalty on such production shall be computed on the value thereof in the form in which and at the time when it is so used. "Value" as here used means what is or would be gross income from mining operations for percentage depletion purposes in Federal income tax determination, or the market value, whichever is greater.

(e) *Percentages of royalty.*—The percentages of the Government's royalty shall be as follows:

One and one-half (1½) percent of amounts ("gross proceeds" or "value") not in excess of eight dollars ($8.00) per ton of production in the form in which sold, held, or used, plus one-half (½) percent for each additional full fifty cents ($0.50) by which such amounts exceed eight dollars ($8.00) per ton, but not in excess of five (5) percent of such amounts.

(For instance: the royalty on an amount of five dollars ($5.00) per ton would be one and one-half (1½) percent; on an amount of ten dollars ($10.00) per ton, three and one-half (3½) percent.)

(f) *Time for computation and payment.*—The Government's royalty shall be computed and paid currently upon each lot sold, held, or used in integrated operations, as the case may be, as above provided in this article.

(g) *Lien for payment.*—To secure the payment of its percentage royalty, there is hereby granted to the Government a lien upon the land or the Operator's interest in the land and upon any production of minerals therefrom, until the royalty claim is extinguished by lapse of time or is fully paid.

(h) *Notice to purchasers.*—The Operator shall give notice of the Government's claim for royalty to any purchaser of the production, and shall authorize and direct such purchaser to pay the royalty directly to the Government and to furnish the Government with copies of the settlement sheets. If the records of any production and sales or other disposition of production, whether the production is by the Operator or by others, are not made available to the Government, the amount of the royalty may be estimated by the Administrator, Defense Minerals Exploration Administration, or his successor, and his estimate thereof shall be final and binding upon the Operator.

(i) *No obligation to produce.*—Nothing in this contract is to be construed as imposing any obligation on the Operator or the Operator's successor in interest to engage in any production operations.

(j) *Government not obligated to buy.*—Nothing in this contract shall be construed as imposing any obligation on the Government to purchase any minerals mined or produced from the land.

ARTICLE 8. *Termination of the Government's obligations.*—(a) If in the opinion of the Government operations at any time have failed to achieve anticipated results that indicate the probability of making a worthwhile discovery, and in the opinion of the Government further operations are not justified, the Government may give the Operator written notice thereof, and thereupon the Government shall be free of all obligation to pay on account of units of work not then performed, and the Operator shall be free of all further obligation to prosecute the work other than such as may be necessary and incidental to winding up, reporting, and accounting.

(b) If in the opinion of the Government the Operator is in any manner in default under the terms of the contract, the Government may give the Operator written notice of such default with a specification of reasonable time within which the default must be cured; and if the Operator fails to cure such default as required, thereupon the Government shall be relieved of all obligation to pay on account of units of work not performed when the notice was given, and the Operator shall be free of all obligation to prosecute the work other than such as may be necessary and incidental to winding up, reporting, and accounting. The remedy provided for the Government in this paragraph "(b)" is in addition to any other remedy provided in this contract, and in addition to any other remedy the law may provide for breach of contract.

(c) The giving of any notice by the Government under the provisions of this Article 8 shall not affect the Government's rights as provided for in the contract with respect to a percentage royalty, and such rights shall be fully preserved.

ARTICLE 9. *Notices to be given by the Government* may be delivered to the Operator, or may be sent by registered mail addressed to the Operator at his mailing address stated in this contract. If mailed, notices are deemed to have been delivered five days after the date of mailing.

ARTICLE 10. *Officials not to benefit.*—No member of or delegate to Congress or resident commissioner shall be admitted to any share or part of this contract or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

ARTICLE 11. *Changes and added provisions.*—

Executed in sextuplicate the day and year first above written.

THE UNITED STATES OF AMERICA

.....
(Operator)

By .....

By .....

.....

I, ..., certify that I am the ..... secretary of the corporation named as Operator herein; that ..... who signed this contract on behalf of the Operator, was then ..... of said corporation; that said contract was duly signed for and in behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

.....

[CORPORATE SEAL]

U. S. GOVERNMENT PRINTING OFFICE 16—70618-1

DRAFT
1/10/56
FMMurphy/gla

EXPLORATION PROJECT CONTRACT
William O. Reynolds
Docket No. DMEA-3855

ANNEX I

The land referred to in Article 2 of the contract consists of 51.80 acres, situated in Sec. 30, T. 11 S., R. 8 E., Hardin County, Illinois, and is described as follows:

The N½ of the NW¼ of the SW¼ and a part of the E½ of the SW¼ described by metes as follows: Beginning at the NW corner of the said E½ of the SW¼, thence running south with the west line thereof to the center point of the west line of the SE¼ of the SW¼, being the NW corner of the Silas Stacey tract, thence east 40 rods, thence north to a point 30 rods north of the north line of the SE¼ of the SW¼, thence east 33 rods to the west line of the Pleas Rose tract, then north to the north line of the said E½ of the SW¼, thence west to the place of beginning.

The approximate location of the above-described land is shown on the map entitled, "Figure 2, DMEA-3855, Reconnaissance Geologic Map of Hicks Dome Area . . . ," attached hereto and made a part hereof.

EXPLORATION PROJECT CONTRACT
William G. Reynolds
Docket No. DMEA-3855

EXHIBIT "A"

Description of the Work

The object of this project is to further explore two high radioactivity anomaly areas which have been exposed in trenches near the apex of "Hicks Dome" on the subject property.

The work shall be performed in two stages. The Operator shall complete all the work under Stage I and so much of Stage II as is approved of in advance in writing by the Government.

STAGE I

The work under Stage I shall consist of two large bulldozed trenches at the locations approximately shown on the attached map entitled, "Figure I. Plan of Hamp Lease - Hicks Dome, Hardin County, Illinois." Also, a topographic map of the excavated areas and adjacent portions of the lease shall be made.

Starting from the 9-foot vein (indicated as "Anomaly 100" on map Figure I) one trench shall be bulldozed in a northwesterly direction for a distance of about 250 feet. The trench will be approximately 48 feet wide at the top and taper to about 15 feet wide at the bottom. The bottom of the trench shall be approximately 30 feet below the crest of the cut. It is estimated that 8900 cubic yards of material will be excavated to complete this trench.

The other trench shall begin at the edge of the hill just north of "Hamp Drill Hole," (See Figure I) and run in a northerly

direction for a distance of approximately 80 feet. The other dimensions of this trench shall be approximately the same as the one previously described. It is estimated that 2800 cubic yards of material will be excavated to complete this trench.

Not in excess of 180 samples shall be analyzed for their uranium,and/or thorium, columbium, tantalum, rare earths content under this StageI of the contract.

STAGE II

Stage II shall consist of core drilling one or more holes, not less than AX core size, to explore favorable ground indicated by the work completed under Stage I. Not in excess of 402 feet of drilling shall be done under this Stage II of the contract and not in excess of 20 samples shall be analyzed for their uranium, and/or thorium, columbium, tantalum, rare earths content.

General Provisions

Mineralized portions of the core, and all other samples, shall be split, the Operator using one-half for assay purposes and storing the remainder in suitable containers, properly identified, for Government use. Non-mineralized sections of the core shall be stored by the Operator for Government inspection and disposal.

The supervision, the location of drill holes and trenches, the extent and method of mapping and sampling, and the laboratory making the analyses, are all subject to Government approval.

AGREED UNIT COSTS

STAGE I

1. Excavation of 2 trenches 11,700 cubic yards @ $0.20/cu.yd.	$2,340.00	
2. Analyses for uranium, and/or thorium, columbium, tantalum, rare earths, 180 samples, average $7.00 1/ each	1,260.00	
3. Surveying and mapping the Stage I project area 2/	125.00	
		$3,725.00

STAGE II

1. Diamond core drilling 405 feet @ $4.00/ft.	1,620.00	
2. Analyses for uranium and/or thorium, columbium, tantalum, rare earths, 20 samples, average $7.00 1/ each	140.00	
3. Surveying and mapping the Stage II project area 2/	125.00	
		1,885.00

Total Agreed Unit Cost of the Project	$5,610.00
Government participation @ 75% (rounded)	$4,210.00

1/ The cost of analyzing each sample shall be participated in by the Government on the basis of $3.00 per individual analysis for each of the following elements: uranium, thorium, columbium, tantalum, rare earths.

2/ The completed map shall constitute the unit.

1-10-56 dgm

REYNOLDS METALS COMPANY
REYNOLDS METALS BUILDING
RICHMOND 19, VIRGINIA

REPLY TO
PARTS DIVISION
2000 SOUTH NINTH STREET
LOUISVILLE 1, KENTUCKY

January 5, 1956

Mr. C. O. Mittendorf, Administrator
United States Department of the Interior
Defense Mineral Exploration Administration
Washington 25, D. C.

Re: Docket No. DMEA-3855 (Uranium)
Hick's Dome
Hardin County, Illinois

Dear Mr. Mittendorf:

We wish to adknowledge your December 23, 1955 letter, regarding subject application.

Mr. Hamp has finally officially advised us through his lawyer that he definitely will not sign the Consent to Lien forms.

We appreciate your acceptance of our own financial responsibility in lieu of these forms and we are attaching executed copies of the Subordination Agreement.

Yours very truly,

W G Reynolds.
W. G. Reynolds

Attachment
WGR/bt

RECEIVED
JAN 9 1956

Surname copy

Murphy 700
H Johnson

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

Mr. William G. Reynolds
Stonegate Road
Anchorage, Kentucky

DEC 23 1955

Re: Docket No. DMEA-3855 (Uranium)
Nick's Dome
Hardin County, Illinois

Dear Mr. Reynolds:

This is to acknowledge your letter of December 20, 1955, in which you state that you have made many unsuccessful attempts to obtain Mr. Hamp's signature on the requested Consent to Lien forms.

We prefer having the Owner's Consent to Lien; however, if this cannot be obtained, we will accept your signature on the proposed contract as sufficient guaranty for its performance. Your letter is accepted as proof of your financial responsibility. ?

As soon as we receive the executed copies of the Subordination Agreement, mentioned in your letter, we shall promptly continue to process the subject proposed contract.

Sincerely yours,

C. O. Mittendorf

Administrator

FMMurphy/gla
12-23-55
cc to: Admr.'s Reading File
Docket
Messrs. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JOHosted, Rm. 3210, GSA
Code 700
Mr. Murphy
DMEA Field Team, Region V (2)

R.G.S.

12/23/55 gla

REYNOLDS METALS COMPANY
REYNOLDS METALS BUILDING
RICHMOND 19, VIRGINIA

RECEIVED
DEC 23 1955

REPLY TO
PARTS DIVISION
2000 SOUTH NINTH STREET
LOUISVILLE 1, KENTUCKY

December 20, 1955

Mr. Ernest Wm. Ellis, Chief
Rare and Miscellaneous Metals Division
U. S. Department of Interior
Defense Minerals Exploration Administration
Washington 25, D. C.

Re: Docket No. DMEA 3855 (Uranion)
Hick's Dome
Hardin County, Illinois

Dear Mr. Ellis:

With reference to your recent letter, regarding subject application, we wish to advise that we are definitely interested in processing this application. We are experiencing difficulty in obtaining the signature of the landowner, Mr. Henry Hamp, Jr., on the "Consent to Lien" forms that you forwarded us. This has caused the present delay.

We have made repeated attempts to obtain Mr. Hamp's signature on these Consent to Lien and are continuing our attempts. However, he has been very obstinate, so far, in refusing to sign. We desire to proceed with this preliminary exploration work just as soon as possible.

In the event that Mr. Hamp finally refuses to sign these liens, we should like to be advised if the Government will waive these liens on the strength of the writer's own financial recognizance. The writer is Vice President and owns a most substantial interest in the Reynolds Metals Company, Richmond Virginia, the second largest producer of aluminum in this country. Further information as to substantial financial worth can be supplied.

The other set of papers which you forwarded, namely the Subordinate Agreement forms have been signed by William A. Chenault and Louise Ryan Chenault, and acceptance by the Governmentof the writer's own financial recognizance in lieu of the landowner's Consent to Lien would enable us to proceed immediately. Please advise if this is acceptable.

Yours very truly,

W G Reynolds

W. G. Reynolds

WGR/t

Surname copy

700

Murphy
Ellis
Mathews

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

DEC 13 1955

Mr. William G. Reynolds
Stonegate Road
Anchorage, Kentucky

Re: Docket No. DMEA-3855 (Uranium)
Hick's Dome
Hardin County, Illinois

Dear Mr. Reynolds:

Reference is made to our letter of November 7, 1955, relating to the captioned application.

Action on your application is pending receipt of the documents requested. If you are no longer interested in the processing of this application, please advise us.

Sincerely yours,

Ernest Wm. Ellis, Chief
Rare and Miscellaneous
Metals Division

FMMurphy/gla
12-13-55
cc to: Admr.'s Reading File
Docket
Messrs. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JOHosted, Rm. 3210, GSA
Code 700
Mr. Murphy
DMEA Field Team, Region V (2)

11-25-55

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

RECEIVED
NOV 25 1955

November 23, 1955

Memorandum

To: E. W. Ellis, Chief, Division of Rare and Misc. Metals, DMEA

From: Assistant Chief, Branch of Rare and Precious Metals

Subject: Review of Field Team Examination Report, DMEA Docket 3855 (Uranium, thorium and rare-earth minerals), W. G. Reynolds, Hamp lease, Hick's Dome Prop., Hardin County, Illinois.

A review of the subject report shows that 5 samples taken by the field examiners across a vein approximately 9 feet thick and 1 sample about 4 feet east of the vein on the applicant's property contained only minor quantities of uranium. However, the presence of 2 to 2.5 percent combined rare earths and thorium was considered by the examiners to justify recommendation of an exploration project consisting of 2 bulldozer trenches and 400 feet of core drilling.

It should be pointed out that 2 or 3 percent of rare earths in a lode deposit does not necessarily indicate commercial rare-earth ore. Bastnaesite deposits in California and New Mexico containing about 10 percent of rare-earth oxides are not able to compete with foreign monazite which is chiefly valuable for thorium. Only 1 of the 6 samples taken by the examiners assayed as high as 0.45 percent thorium. The other 5 samples assayed less than 0.20 percent thorium and would not be considered minable grade material under present conditions.

On the basis of the examiners report I do not agree with the Field Team's recommendation that the application be approved. However, the area under consideration is a new occurrence for rare-earth and thorium minerals and the limited project proposed may well be justified on the basis of increasing geologic knowledge of the area. The proposal seems to be one for prospecting rather than exploration.

Frank D Lamb

Frank D. Lamb

RECEIVED
NOV 25 1955

November 23, 1955

Memorandum

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From: Assistant Chief, Branch of Rare and Precious Metals

Subject: Review of Field Team Examination Report, DMEA Docket 3855 (Uranium, thorium and rare-earth minerals), W. G. Reynolds, Hemp lease, Hick's Dome Prop., Hardin County, Illinois.

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Frank D. Lamb

RECEIVED
NOV 25 1955

November 23, 1955

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From: Assistant Chief, Branch of Rare and Precious Metals

Subject: Review of Field Team Examination Report, DMEA Docket 3855 (Uranium, thorium and rare-earth minerals), W. G. Reynolds, Hemp lease, Hick's Dome Prop., Hardin County, Illinois.

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Frank D. Lamb

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

RECEIVED
NOV 16 1955

November 15, 1955

Re: DMEA 3855
William G. Reynolds
Hamp lease, Hick's Dome
Hardin County, Illinois
$6,150 - Uranium

Memorandum

To: E. W. Ellis, Defense Minerals Exploration Administration

From: W. P. Williams, U. S. Geological Survey

Subject: Review of Field Team Report, DMEA 3855, William G. Reynolds, Hamp lease, Hick's Dome, Hardin County, Illinois.

The examining team recommends approval of an exploration project consisting of two bulldozer trenches, 400 feet of core drilling, and the necessary sampling, assaying and mapping.

According to some theories Hick's Dome was formed by igneous upheaval, as evidenced by peridotite dikes and other intrusives in the vicinity. The rare earth minerals that are present on the dome may then be related genetically to igneous activity.

Spectrographic analyses and assays show that while uranium mineralization on the dome is weak, rare earth minerals and thorium are present in appreciable amounts.

In an interim request the applicant has submitted a revised program of test pitting, core drilling and sampling at a total estimated cost of $6,150.

Because past sampling has shown rare earths to be present on the property and because of the peculiar geologic characteristics of the property I believe the applicants modest request should be approved.

Detailed cost figures for the proposed work are not present in the field examination report. Perhaps the examining engineer is in complete agreement with the applicant's "Interim Request" figures. If so, such is not definitely stated in the report.

The applicant does not seem to have obtained the owner's consent to lien nor has he offered a suitable substitute.

D. H. Kilsgaard
for: W. P. Williams

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

RECEIVED
NOV 16 1955

November 15, 1955

Re: DMEA 3855
William G. Reynolds
Kemp lease, Kick's Dome
Hardin County, Illinois
$6,150 - Uranium

Memorandum

To: E. W. Ellis, Defense Minerals Exploration Administration

From: W. P. Williams, U. S. Geological Survey

Subject: Review of Field Team Report, DMEA 3855, William G. Reynolds, Kemp lease, Kick's Dome, Hardin County, Illinois.

The examining team recommends approval of an exploration project consisting of two bulldozer trenches, 400 feet of core drilling, and the necessary sampling, assaying and mapping.

According to some theories Kick's Dome was formed by igneous upheaval, as evidenced by peridotite dikes and other intrusives in the vicinity. The rare earth minerals that are present on the dome may then be related genetically to igneous activity.

Spectrographic analyses and assays show that while uranium mineralization on the dome is weak, rare earth minerals and thorium are present in appreciable amounts.

In an interim request the applicant has submitted a revised program of test pitting, core drilling and sampling at a total estimated cost of $6,150.

Because past sampling has shown rare earths to be present on the property and because of the peculiar geologic characteristics of the property I believe the applicant's modest request should be approved.

Detailed cost figures for the proposed work are not present in the field examination report. Perhaps the examining engineer is in complete agreement with the applicant's "Interim Request" figures. If so, such is not definitely stated in the report.

The applicant does not seem to have obtained the owner's consent to lien nor has he offered a suitable substitute.

WPWilliams:jeh
11/15/55
cc: Director's reading, 4212
Branch reading 4212
DMEA (3) ✓

W. P. Williams
Docket file
J. E. Crawford, 3641 Int.
J. O. Hosted, 3210 Int.

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

RECEIVED
NOV 16 1955

November 15, 1955

Re: DMEA 3855
William G. Reynolds
Kemp lease, Nick's Dome
Hardin County, Illinois
$6,150 - Uranium

Memorandum

To: R. W. Ellis, Defense Minerals Exploration Administration

From: W. P. Williams, U. S. Geological Survey

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cc: Director's reading, 4212
Branch reading 4212
DMEA (3) ✓

Docket-File
J. E. Crawford, 3641 Int.
J. O. Nested, 3210 Int.

11-8-55 rzm

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 25, POST OFFICE BLDG.
KNOXVILLE 2, TENN.

WASHINGTON, D. C.

RECEIVED
NOV - 2 1955

October 31, 1955

Memorandum

To: Operating Committee, DMEA - Washington

From: DMEA Field Team, Region V - Knoxville

Subject: Field Team Examination Report, DMEA-3855, Wm. G. Reynolds, applicant. Hicks Dome Pros. Hardin County, Illinois (uranium)

Enclosed are the original and 3 copies of the subject examination report, and three copies of an interim request by Applicant.

We agree with the conclusions and recommendations made by the field examiners.

Robert A. Laurence
Robert A. Laurence
EXECUTIVE OFFICER
DMEA REGION V

V. J. Lynch
V. J. Lynch, Members
Bureau of Mines

11-7-55

Field Team Report on Examination of Property

by

G. L. Neumann and Robert D. Trace 1/

DMEA Docket No. 3855 - (Uranium, niobium and rare earth minerals)

Applicant: William G. Reynolds
Stonegate Road, Anchorage, Kentucky

Property: Hamp Lease - Hicks Dome
Hardin County, Illinois

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Summary:

The objective of this application is to enhance the Nation's reserves in these various critical and strategic materials. For the past four months considerable activity and excitement has been rampant in this territory, brought about by the many high readings on Geiger counters and scintillators, many at 200 - 400 times the background and from a good sized area surrounding that geologic nonconformity, known as Hicks Dome. The Illinois Geological Survey had six men working this area for a period of six weeks and analyzed some 176 samples. Numerous geologists and engineers, representing many of the large mining companies, now all deeply interested in uranium and other radioactive materials, came here for examinations. Only a few of the many samples taken from this area by the Illinois Geological Survey and numerous prospectors have indicated commercial grade uranium to be present.

The application was referred to the Field Team for an on-site examination. All factual data were collected from the Illinois Geological Survey, the applicant and other parties interested in the territory. The Hamp lease comprises the crest area of Hicks Dome. The area was traversed with a Geiger counter and a scintillator; the best anomaly appeared to be a N.20°-30°W.trending vein (anomaly "100"), approximately 9 feet thick, exposed in a vertical wall at the north end of a bulldozer trench. Five

1/ G. L. Neumann, engineer, Bureau of Mines and
Robert D. Trace, geologist, Geological Survey.

channel samples were cut across this vein from west to east, breaks being made on slight apparent lithological differences. Another sample was taken about four feet east of this vein.

These six samples were split four ways and analyzed by four different laboratories: (1) Bureau of Mines, College Park, Md., (2) Bureau of Mines, Tuscaloosa, Ala., (3) U.S.G.S. Naval Gun Factory, Washington, D. C. (4) Vanadium Corporation of America, Durango, Colo. The results follow:

Sample No.	Sample Length in.	Micro-roentgen Reading*	College Park eU	College Park Th	Tuscaloosa eU	Gun Factory eU	Gun Factory U	Vanadium Corporation U_3O_8
1	19	450	0.032	0.15	0.036	0.035	0.004	0.05
2	17	600	< 0.005	<0.02	0.004	0.003	0.001	0.03
3	16	900	0.091	0.45	0.11	0.094	0.008	0.13
4	19	600	0.020	0.10	0.025	0.022	0.003	0.06
5	37	500	0.033	0.15	0.039	0.036	0.004	0.02
6	16	600	0.044	0.20	0.050	0.042	0.004	0.07

* background count 13 microroentgens

The Bureau of Mines at College Park and the Geological Survey report as much as 2-2.5% combined rare earths and thorium is present. (see table 1 - appendix)

The average microroentgen count on a scintillator (model 111B) across the vein was approximately 700 against a background count of 13 microroentgens. The work program for the exploration, as amended by the applicant's representative, Mr. Bruce Baxter, and agreed to as the most operable procedure by the Field Team representatives, is to test this structure by removing the overburden to the northwest to determine the extent of this vein and then to trench along the apparent trend down to a depth of 30 feet.

It appears that the anomaly might get stronger with greater depth. Another good anomaly was found at the site of the sludge pond from the Hamp oil hole. No samples were taken here on account of the bulldozer cut here being full of water. The amended work program would also include a north-south 80 foot long bulldozer trench to a depth of about 30 feet on this anomaly. Test diamond core drilling to a maximum of 400 feet has also been proposed.

Conclusions:

Most of the factual data collected appear to indicate that this deposit is not too encouraging from a viewpoint of uranium, but the occurrence of thorium, associated with numerous rare earth minerals, would be worthy of exploration.

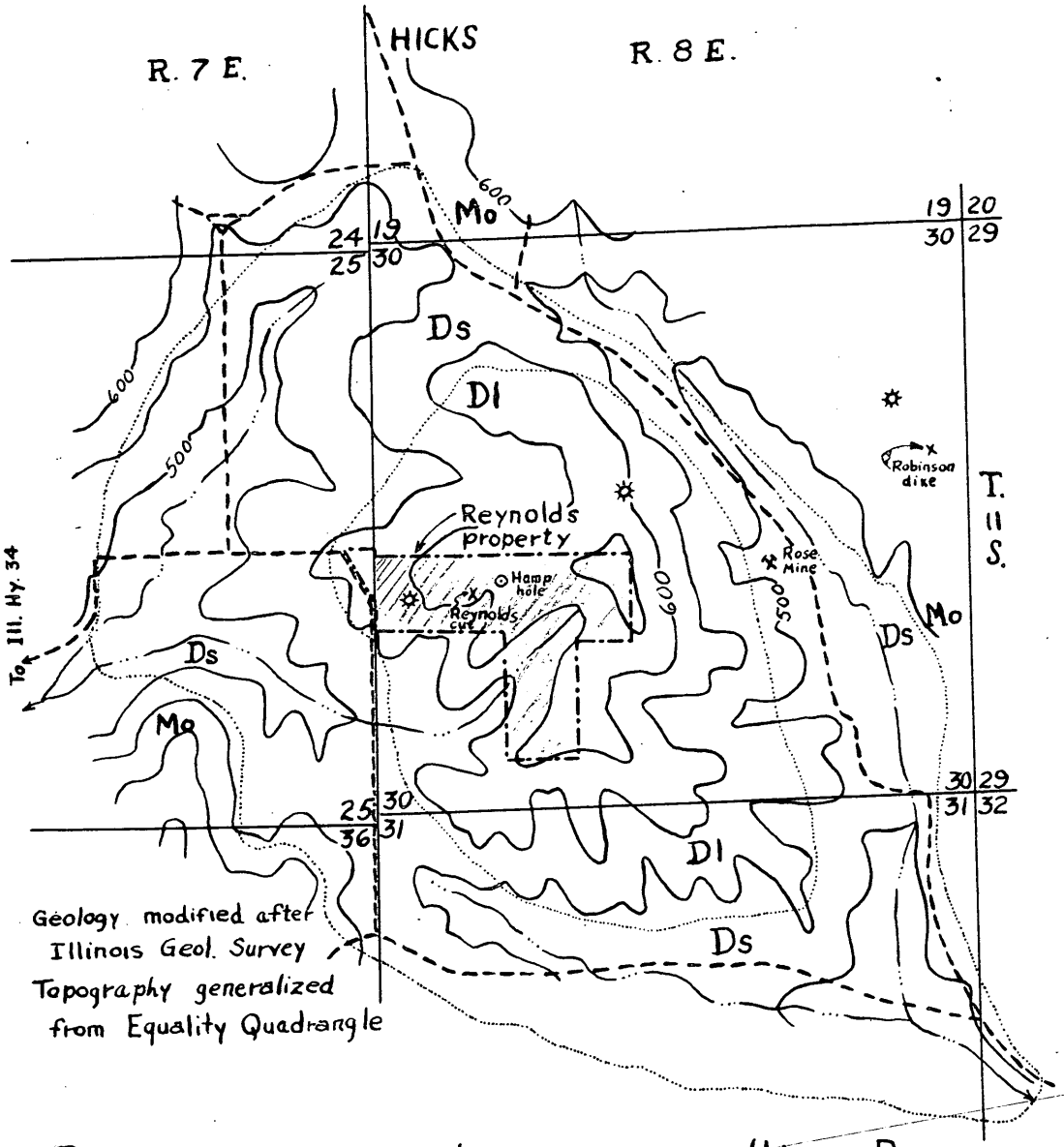
Recommendations:

The Field Team representatives recommend that the amended work program consisting of two bulldozer trenches: (1) on anomaly "100" and (2) on the Hamp sludge pond anomaly, be approved, (3) test diamond core drilling, and (4) necessary sampling, analyses, and mapping.

Time Spent on the Property:

The on-site examination took place on Saturday, July 30, 1955. Conferences were held on Friday, July 29 and Saturday, July 30. The Field Team representatives, Robert D. Trace, U.S.Geological Survey and G. L. Neumann, Bureau of Mines, were accompanied on the examination by Mr. Bruce Baxter, applicant's representative, Mr. M. E.Ostrom, Illinois Geological Survey, and Mr. V. J. Lynch, Bureau of Mines Member of DMEA Field Team. Mr. Ostrom did not participate in the conferences.

Figure 2
DMEA 3855



Geology modified after Illinois Geol. Survey
Topography generalized from Equality Quadrangle

EXPLANATION

Mo
Mississippian, Osage fm.

Ds
Devonian shale

Dl
Devonian limestone

Geologic contact (approximate)

Breccia

Pit or open cut

Fluorspar mine

Graded road

0 ¼ ½ 1 mile

Contour interval 50 feet
Datum is mean sea level

Reconnaissance geologic map of Hicks Dome area
Hardin County, Illinois

R.D.T.
10-16-55

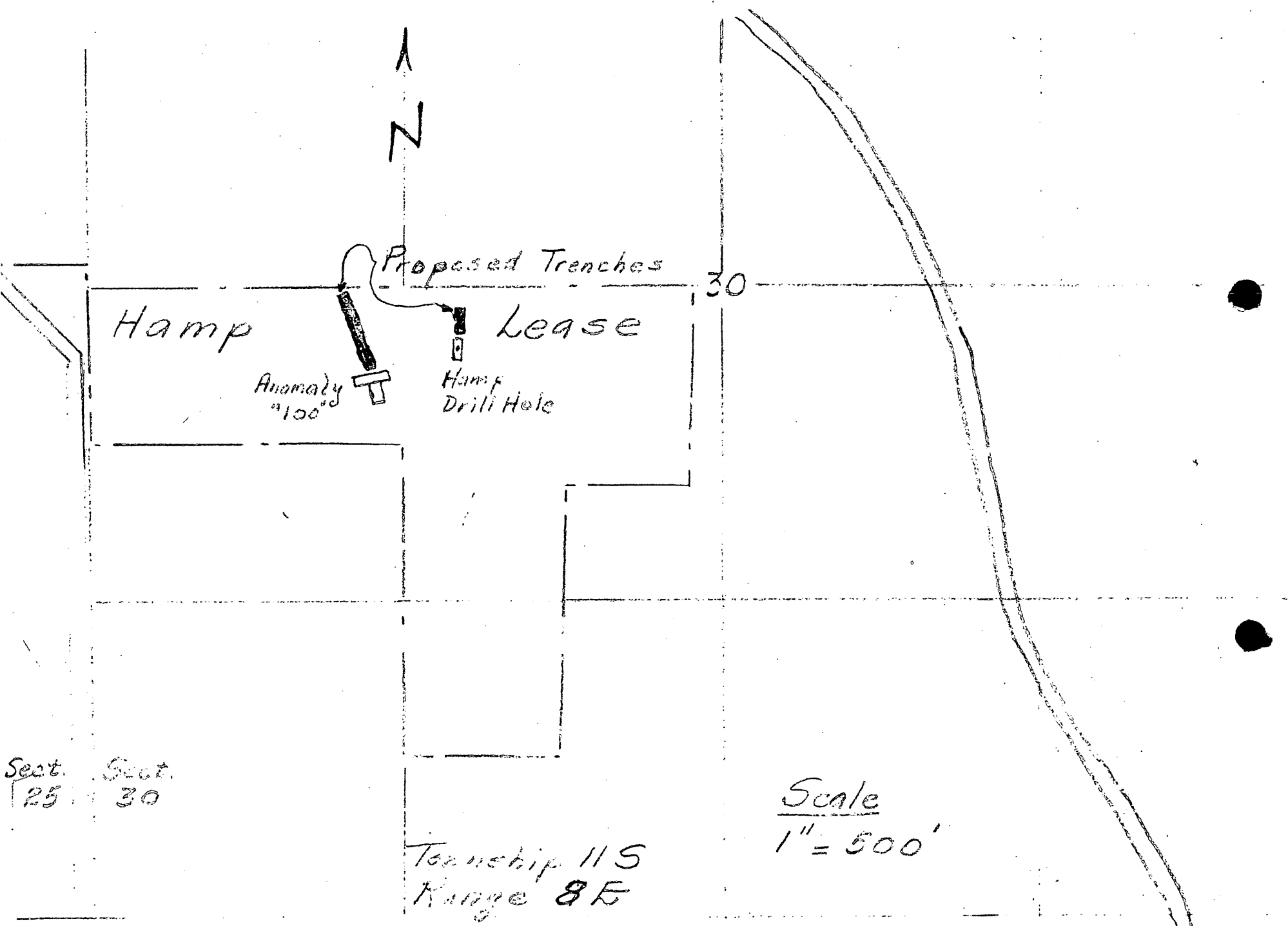


Figure 1. PLAN OF HAMP LEASE - HICKS DOME
Hardin County, Illinois

Name and Location of Property:

The Hamp lease, comprising 51.8 acres, is located (see Figs.1 and 2) on the crest of Hicks Dome in Hardin County, Illinois. It is approximately 10 miles from the towns of Rosiclare or Elizabethtown via Illinois highways 34 and 146, a county road to and around Hicks Dome and a bulldozer trail to the lease. This lease consists of the N½ of the NW¼ of the SW¼, (20 ac); the W½ of the NE¼ of the SW¼, (20 ac); the NW¼ of the SE¼ of the SW¼, (10 ac); the western 3/4 of the NE¼ of the NE¼ of the SW¼ (8 ac); a small fraction of the NW side of the SE¼ of the NE¼ of the SE¼ of the SW¼ (2 ac); all of Section 30, Township 11 S, Range 7 E 8 of the 3rd principal meridian.

Also a triangular plot in the NE Cor. of the NE¼ of the SE¼ (1½ acres) of Section 25, Township 11 S, Range 7 E of the 3rd principal meridian.

Condition and seasonal accessibility of road to property:

Illinois highways 34 and 146 are good all-weather roads. The county road to Hicks Dome is a good gravel all-weather road, the road to the crest of the Dome is clay and is not usable in wet weather.

Competency of Applicant:

The applicant is a highly successful operator in the mineral industry and employs men of high caliber for all operations. He is quite capable to furnish his share of the explorational costs.

Property Rights:

A copy of the lease and assignment of the lease to the applicant is included in the application and appears to be in good form. If the Owner's Consent to Lien cannot be obtained the applicant is prepared to procure waiver to this document by a guarantee satisfactory to the Government for the repayment of any funds provided by the Government in this explorational program, providing that such explorational program is certified as a discovery or development and production is realized within the allotted time period.

Description of Property:

The area covered by the Hamp lease is primarily the crest of Hicks Dome (fig.3). Part of it is in cultivation. It is fairly flat and only sparsely timbered. The main exploration (see maps included with application) that has been performed to date, amounts to: (1) the Hamp oil well 2944 feet); (2) two bulldozer cuts, Hamp sludge pond (50 x 20 x 10') and anomaly "100", a T-shaped cut (50 x 20 x 20') and (50 x 20 x 20') (fig.4); (3) one vertical diamond core hole (70 feet): (4) several hand-dug pits. There are no mine workings.

Geology:

General - The applicant's property is near the center of Hicks Dome, which is in the northern part of the Illinois-Kentucky fluorspar district. The name Hicks Dome refers to a small domal uplift in northwestern Hardin County, southern Illinois. The geology of the area is described in the following:

1. Weller, J. Marvin, et al., 1952, Geology of the fluorspar deposits of Illinois, Ill. Geol. Survey Bull.76.
2. Brown, J.S. et al., 1954, Explosion well on Hicks Dome, Hardin County, Illinois, Econ.Geol. Vol. 49, No. 8.
3. Bradbury, J.C., Ostrom, M.E., and McVicker, L.D., 1955, Preliminary report on uranium in Hardin County, Illinois, Ill. State Geol. Survey Circular 200 (preprint).

Item 1 describes the geology of the Illinois part of the fluorspar district, but does not mention any radioactivity.

Item 2 describes the results of the 2,944-foot Hamp oil test hole in the center of the Dome and on the Reynolds property (fig.2). In summary, the hole penetrated Devonian, Silurian, and Ordovician sediments from the surface to 1,605 feet; from 1,605 to 2,944 the hole penetrated a breccia zone which contained traces of fluorite, calcite, quartz, pyrite, sphalerite, galena, and thorium and several rare-earth elements. Equivalent uranium,

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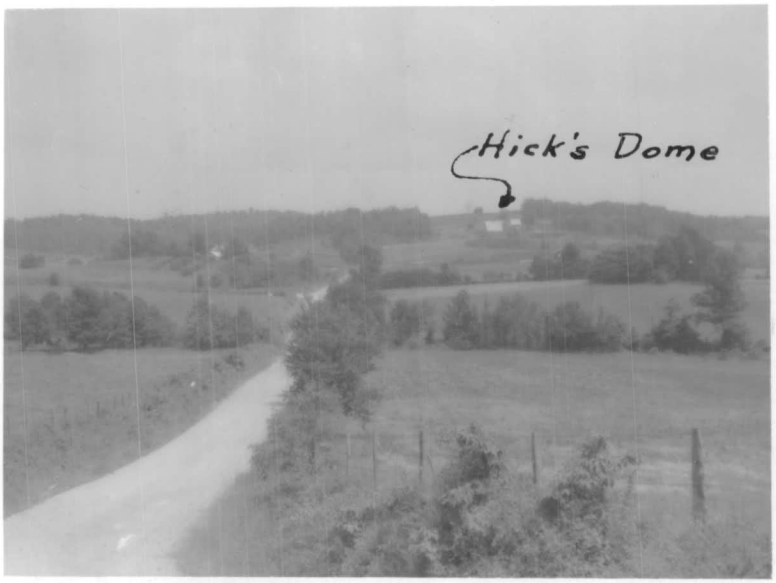

Figure 3 - Hicks Dome looking east.

chemical uranium, and calcium fluoride, and spectrographic analyses of eight samples taken by Brown from the hole are given in table 1 of this DMEA field examination report.

Item 3 summarizes the results of a study of the uranium possibilities of the Dome area by the Illinois Geological Survey during early 1955. Much of the data given in this DMEA field examination report is taken from the Illinois Survey's work. Item 3 is an excellent summary of the area and its uranium possibilities. The abstract of item 3 follows:

> Hick Dome in Hardin County, Ill., is an eroded structural dome whose specific mode of formation is not clear. Associated with it are explosion breccias and peridotite dikes. The central part of the dome is an area of about 1½ square miles underlain by rocks of Devonian-New Albany age, principally limestone and chert bordered by black shale. The bedrock in the central areas of the dome, as well as in other adjacent areas, is covered by red and yellow clays believed to be a residuum resulting from the leaching of cherty Devonian limestone. Chert breccias, cemented by secondary silica, also are present.
>
> Tests of about 200 samples taken from the dome and throughout the county suggest that the residual clays and breccias within the Devonian-New Albany area of the dome are generally more radioactive than samples elsewhere, though there are some exceptions. Samples of fluorspar, zinc, and lead ores, and concentrates from these ores have little or no radioactivity as measured by a laboratory Geiger counter. U_3O_8 determinations made by chemical procedure on 25 samples having some of the higher uranium equivalent values were all lower than the uranium equivalent values. All the samples analyzed for U_3O_8 contained less of this compound than the minimum of 0.1 percent for which prices are quoted by the Atomic Energy Commission.

Mr. L. P. Barrett of the Atomic Energy Commission visited the area in March 1955 (before the localized high radioactivity occurrence, anomaly "100", had been uncovered in the Reynolds cut), and wrote an administrative report on the area. A copy of this report was obtained through Mr. J. O. Hosted of the Commission. Mr. Barrett's conclusion follows:

The radioactivity in the Devonian chert and red clay on the apex of Hicks Dome is rather uniform and moderate averaging .09 mr/hr. It seems to be the result of mass effect of the red clay. No areas of high count were noted and the samples, when separated from the mass background, gave only slight counts on the scintillometer.

However, very little of the surface area of the Devonian sediments in Section 25, 30 or 31 is exposed for sampling or radioactive tests with the scintillometer. Therefore, the limited exposures sampled may not be a reliable index of the radioactivity of the Devonian rocks as a whole.

The center of Hicks Dome is underlain by cherty limestone and shale of Devonian age, dipping from 100 to 1,000 feet per mile (fig.2). The shale is well exposed in several places, but only clay and chert are exposed in the area underlain by limestone. Mississippian and Pennsylvanian limestone, sandstone, and shale crop out in a circular pattern around the Devonian rocks, except to the southeast of the Dome where northeast-trending faults break the circular continuity. (See Ill. Geol. Survey Bull. 76) Lamprophyre or peridotite dikes occur throughout the Illinois-Kentucky fluorspar district; one of these, the Robinson dike, is exposed in a trench about half a mile northeast of the Reynolds property (fig.2). Chert breccias that have been ascribed to explosive igneous activity are present in the area. Spectrographic analyses were made of both the Robinson dike and a chert breccia (fig.2) from the Reynolds property (table 1, Reynolds 8,10).

Faults that trend northeast are common in the Mississippian and Pennsylvanian rocks surrounding the Dome, but because of the lack of bedrock exposures in the center of the Dome, it is not known whether the faults extend through the Devonian rocks. Slickensides have been reported by the Illinois Geological Survey, but according to that Survey "it is believed that such faults as may be present are small and of limited extent."

The forces that produced Hicks Dome and also the faulting in the fluorspar district are incompletely known. The forces that produced the Dome may be related to the forces that produced the numerous faults in the fluorspar district. Perhaps the Dome reflects a deep igneous intrusion, possibly accompanied by buried explosive activity. The origin of the Dome is more than an academic question, as the general localization of potential ore minerals might be predicted if the origin of the Dome were known.

The potential ore found in the center of the Dome is thorium and rare earths. According to USGS analyses the uranium found so far is extremely low in grade. Radioactivity analyses are as high as 0.11 percent eU but the highest government chemical analysis for uranium is 0.008 percent U (table 1, Reynolds 3). The radioactivity in the samples taken by the government representatives, and the samples from the Hamp hole, is caused by thorium. The writer cannot explain the discrepancies in the chemical uranium values of the samples designated Reynolds 1-6, as analyzed by the Vanadium Corporation of America and the USGS (table 1).

According to spectrographic analyses, from about 0.1 to 1.0 percent each of thorium, cerium, lanthanum, yttrium, and neodymium are present. Lesser quantities of other rare earths and niobium also are present. The writer has been unable to isolate or identify the rare earth and thorium-bearing mineral(s) in either the surface samples taken or in the eight samples from the Hamp oil test hole. The thorium and rare earths were concentrated, however, by using methylene iodide (specific gravity 3.3). The combined rare earth and thorium content of sample Reynolds 3 (table 1) was raised from 2-2.5 to about 7 percent.

The origin of the potential ore minerals is unknown. Two possibilities have been suggested: (1) The mineralization is related to the igneous activity that produced the lamprophyre dikes, the chert (explosion ?) breccias, and possibly the fluorspar deposits; or (2) the minerals may have been leached from Devonian shale and deposited in fissures or sink holes in the underlying Devonian limestone. The Devonian shale is slightly radioactive and probably overlaid the entire area prior to the doming. In Tennessee, Devonian shale is radioactive; also about 12 to 20 miles north of the Dome, thin beds of black shale that overlie Pennsylvanian coal beds, contain radioactivity as high as 0.018 percent eU. (See Patterson, E. C., 1955, Radioactivity of some coals and shales in southern Illinois, U.S. Geol. Survey TEI-466, unpublished report.)

At present, more of the known facts suggest that the mineralization is associated with the igneous activity. Fluorite, and thorium, and rare-earth elements are present in the breccia found in the Hamp oil test hole (table 1). Spectrographic analysis of the Robinson dike also showed several rare earths. These rare earths may be in the mineral perovskite (a calcium titanite which may contain small quantities of rare earths), which is known to occur in many of the dikes of the area. Significant perhaps is the fact that the rare-earth content of the Robinson dike near the Dome is considerably higher than the rare-earth content of a lamprophyre dike near Marion, Kentucky (table 1, Reynolds 7), some 20 miles southeast of the Dome.

The association of rare earths and fluorite, as noted in the Hamp oil test hole, is not uncommon. According to Allen (Allen, Robert D., 1952, Variations in chemical and physical properties of fluorite, the American Min., vol. 37, p. 910-930) minor quantities of yttrium, lanthanum, europium, and ytterbium are known to be present in the fluorite lattice. The six

samples Allen took from the Illinois-Kentucky district contained little if any of the rare earths. None of these six samples, however, were taken from near the Dome.

Reynolds property - The highest radioactivity occurrence in the Dome area is in the Reynolds cut at anomally "100" (figs.1 and 2, table 1 - Reynolds 1-6). The sludge pond pit at the site of the Hamp oil test hole also contains scattered 1- to 2-foot areas of high radioactivity along its edges, but the pit was filled with water and no samples were taken. The proposed work is to sample and explore the surface continuity and depths of the radioactivity occurrences in these open cuts.

The Reynolds cut is on the side of a small hill, about 200 feet west-southwest of the site of the sludge pond pit and Hamp oil test hole, The cut is about 20 feet deep where samples Reynolds 1-6 were taken on the vertical face of the uphill side (figs. 4 and 5). Except the chert, all of the material exposed in the cut is highly weathered. A highly radioactive "vein" of alternating yellow clay zones and yellow clay and chert beds or fragments is present in the uphill face of the cut. The "vein" is about 14 feet wide, trends from N.20-30°W., and dips 80-85° northeast. A "horse" of essentially barren material 4 feet wide occurs within the "vein" near the northeast wall (fig.4). Both the southwest and northeast wall of the "vein" is primarily red clay and chert, is only slightly radioactive, and contains significantly lesser quantities of rare earths than the "vein". (In table 1, compare Reynolds 9 with Reynolds 1-6.)

Within the highly radioactive yellow clay "vein", some of the chert occurs in nearly vertical beds as much as a foot wide. In the red clay "wall" zones, no vertical beds of chert were noted; some of the chert appears to occur in horizontal beds, although mostly it occurs as pebbles and boulders in random fashion.

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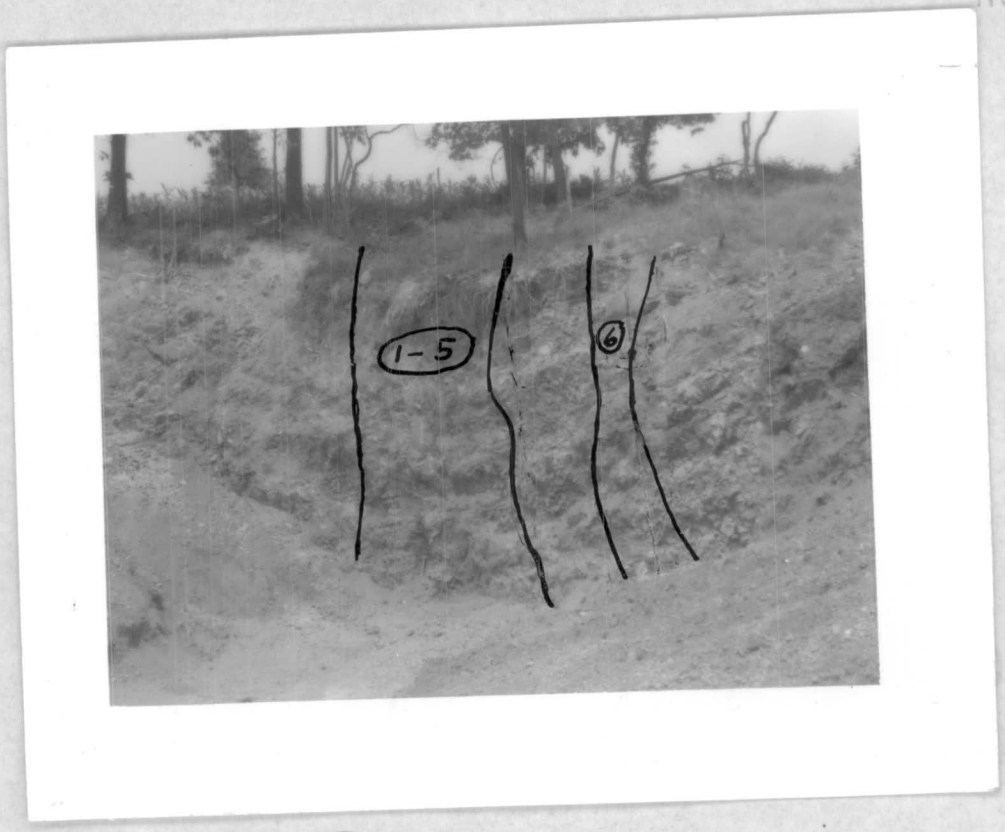

Figure 4 - Reynold's Cut, "Anomaly 100". Looking northwest and showing sample locations

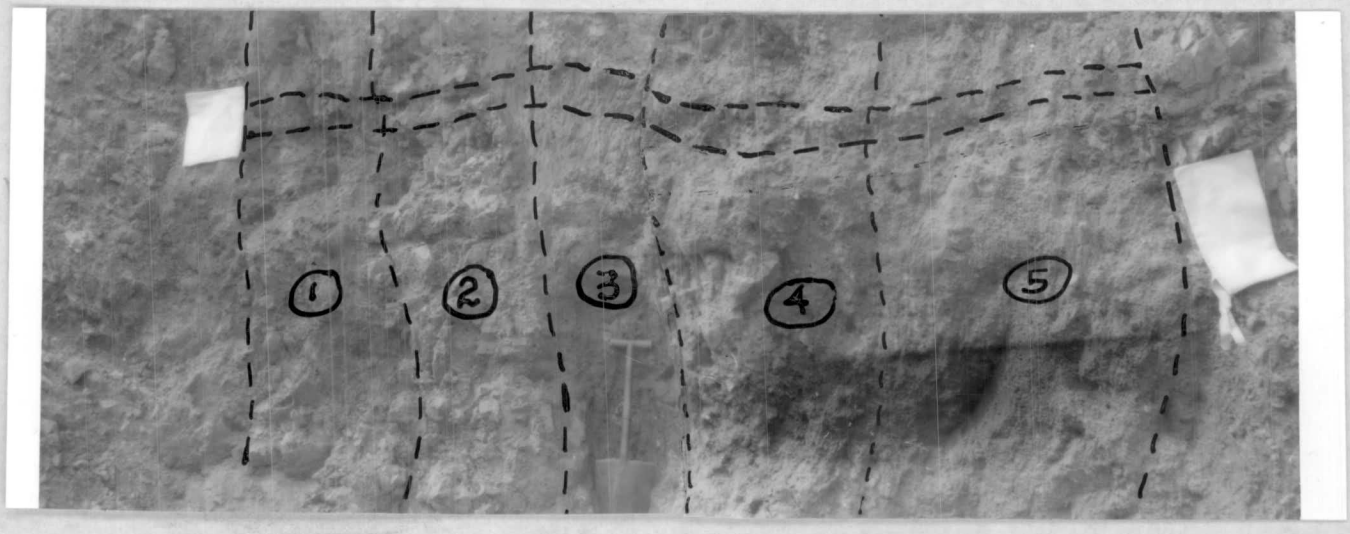

Figure 5 - Closeup of west section of "vein".

According to the Illinois Geological Survey: "The yellow clay is different in appearance and physical properties from the red clay. It dries to a rather powdery mass which feels silty; the red clay typically dries to a hard substance resembling brick. Size analyses of the red and yellow clays show that . . . the yellow clay carries twice as much silt as the . . . red clays."

Two possible origins of the radioactive "vein" have been suggested: (1) According to the Illinois Survey: "The yellow clay occurring in 'veins' probably came from an overlying layer of yellow residual clay which has been completely eroded. As cracks opened in the underlying red clay, possibly from slumping into sink holes in the limestone, the yellow clay was washed into the fissures. As these fissures were also watercourses, radioactive substances in the groundwater may have become concentrated in the yellow clay 'veins' by absorption on the clay minerals." (2) The other, and to the writer the more likely possibility is that the structure is the highly weathered remnant of a vein, or possibly a pipe. The doming of formations that has taken place, the mineralized breccia found in the Hamp oil test hole, the concentration of thorium and rare earths in the veinlike structure, and the presence of rare earths in the Robinson dike, suggest that the mineralization may be more than a groundwater concentration of radioactivity in clay-filled sink holes or fissures.

The object of the proposed work is to uncover and sample the horizontal extension of the "vein" and, if warranted, to obtain by core drilling a sample of the bedrock and "vein" below the weathered zone.

The proposed work is not geologically justified on the basis of exploration for uranium, although the possibility of the presence of uranium cannot be dismissed until more data are obtained.

The combined thorium and rare earth content of the "vein", however, is as much as 2-2.5 percent in the Reynolds cut. The known data support the theory that a mineralized "vein" occurs in the Reynolds cut and, considering the geologic disturbances that have affected the area, it is a reasonable geologic inference that the mineralized material may continue and perhaps increase in grade below the weathered zone.

Past Production:

There has never been any mining operation on the dome outside of a few hand-dug pits for fluorspar.

Availability of Manpower, etc.:

Manpower is readily available for any type of mining operation in this district. Materials, supplies, and machinery are available at Rosiclare and Elizabethtown, Illinois, about 10 miles distant; Marion, Kentucky, 30 miles distant; Harrisburg, Illinois, 20 miles distant; Paducah, Kentucky, 50 miles distant. Power is available from Rural Electrification Administration lines close at hand. Water is not readily available.

Applicant's Proposed Program:

The amended program is for two bulldozer trenches, 400 feet of core drilling, and necessary sampling, analyses and mapping. The first trench will be at "anomaly 100" at Reynolds cut and will be 250' x 30' x 30'. The second trench will be an extension and deepening of the trench at the Hamp oil hole sludge pond and will be 80' x 30' x 30'. The cost of this work is 20¢/cu.yd. which appears reasonable and adequate to do a workmanlike job.

The 400 feet of core drilling would be approved by the Field Team only if a fairly continuous and mineralized "vein" is exposed in the trenching. A small amount of drill footage is proposed at this time in order to test the feasibility of a larger scale core drilling program and also to test the "vein" in one or possibly two places beneath the weathered zone. For example, if the results of trenching appear encouraging, it would be difficult to decide whether the next exploration stage should be shafting or drilling. The ground is believed to be broken and the depth of weathering is unknown. One or possibly two drill holes would allow the operator and Field Team to intelligently plan, if warranted, further exploration. The exact location of the hole(s) would be determined after the trenching is completed.

Two hundred analyses have been requested at a price of $7.00 each. This appears more than adequate. A topographic map of the work area is worth while. The funds requested seem adequate. The target appears sufficient to justify this work.

G. L. Neumann, Mine
Exam.& Expl. Engineer

R. D. Trace

R. D. Trace,
Geologist

October 24, 1955

Surname Copy
700

Murphy
Ellis
JEJohnson

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

NOV - 7 1955

Mr. William C. Reynolds
Stonegate Road
Anchorage, Kentucky

Re: Docket No. DMEA-3855 (Uranium)
Nicky's Dome
Hardin County, Illinois

Dear Mr. Reynolds:

In order to further process your above-docketed application, we will require six copies of a "Consent To Lien" signed by Henry Hamp, Jr., and his wife Goldie Bee Hamp, also six copies of a "Subordination Agreement" signed by William A. Chenault and his wife, Louise Ryan Chenault.

Enclosed are six copies of each of the documents required. When executed, will you kindly forward them to this office.

Sincerely yours,

Ernest Wm. Ellis, Chief
Rare and Miscellaneous
Metals Division

Enclosures

FMMurphy/izm
11/4/55
cc to: Admr. Reading File
Docket
Code 700
Mr. Murphy
DMEA Field Team, Region V (2)
Messrs. JECrawford, Rm. 3641
THKiilsgaard, Rm. 5224
JOHosted, Rm. 3210, GSA

R.C.B.

APPLICATION FOR AID IN MINERAL EXPLORATION
PURSUANT TO DMEA ORDER #1
FOR
HICK'S DOME, HARDIN COUNTY, ILLINOIS

RECEIVED
NOV - 2 1955

Interim Report

W G Reynolds

APPLICANT: W. G. Reynolds
Anchorage, Kentucky

DATE: September 27, 1955

INTERIM REQUEST FOR MINERAL EXPLORATION PROJECT

HICK'S DOME DOCKET DMEA # 3855

RECEIVED
NOV - 2 1955

Introduction:

The above docketed application for Federal Aid in an exploration project was submitted, June 14, 1955, for exploration assistance under the Defense Production Act of 1950.

A field survey team met with the writer on July 30th at Hick's Dome. These men were Messrs. R. D. Trace, U. S. Geological Survey, G. L. Neumann, Bureau of Mines and V. J. Lynch, Bureau of Mines.

As a result of this field survey and subsequent conferences, we are submitting an Interim Proposal, covering an initial exploration phase, as detailed below.

Depending upon the results obtained from this interim exploration work, we will then submit a revised proposed exploration project, which will encompass the same scope of exploration, as outlined in the originally submitted proposal.

Description of work in Interim Request

It is proposed that two large bulldozed cuts be made across the heart of Hick's Dome. One cut will consist of a trench 250 feet long, starting from the 9 foot wide radioactive rein on the side of the hill from which samples were taken and proceeding in a north westerly direction across the top of the Dome for a distance of 250 feet. This cut will be 30 feet in depth. The width on the top of the cut will be 48 feet tapered to a width of 15 feet at the bottom of the cut. This will require an estimated movement of 8900 cubic yards of earth.

The second cut will consist of the same type of cut as the first, except that it will be 80 feet in length. The depth will also be 30 feet with a 48 foot width at the top tapered to a 15 foot width at the bottom of the cut. The second cut will require removal of approximately 2800 cubic yards of earth and will be made directly across the abandoned Hamp oil well mud pit, which runs north - south. The cut will begin at the edge of the hill and run in a north westerly direction for a distance of 80 feet.

It is felt that these two cuts will expose the heart of the Dome to determine the direction and depth of the radioactive veins that are already present at these two locations.

The first cut described above will particularly determine the extent and direction of the 9 foot wide radioactive vein so that the most promising points for subsequent core drills can be ascertained.

These two cuts when completed will be radiometrically surveyed and samples taken for wet chemical assays for Uranium, Columbium and rare earths.

It is also proposed that one test core hole to a depth of 400 feet be drilled, in order to ascertain the type of sub-surface structure and degree of core recovery for use in subsequent core drilling.

It is further proposed that a topographic map of excavated areas and other portions of the lease be made.

Firm proposals have been received for the bulldozing work and core drilling. The bulldozing pronosals are contingent upon no blasting being required and based on previous experience in bulldozing in this particular location, no rock blasting requirement is anticipated by those submitting the bulldozing proposals.

COST SUMMARY

Removal of approximately 11,700 cubic yards at $0.20/cu.yd.	$ 2,340.00
Diamond core drilling one test hole, approximately 400 feet Maximum at $4.00/ft.	1,600.00
Chemical analyses of samples for Uranium, Columbium, etc. (Prices range from $5.00 for U_3O_8 to $18.00 for Columbium and Tantalum)	
200 samples at an average cost of $7.00/sample	1,400.00
Cost of topographic map of excavated areas and other portions of lease	250.00
	$ 5,590.00
10% Contingencies	560.00
TOTAL	$ 6,150.00

SUMMARY

No costs have been included in this interim request for funds to cover overhead, management services or geologists. This interim work will be directed by the writer, who will be on hand to direct the bulldozing, in order to properly follow the 9 foot radioactive vein direction-wise by means of close scintillator check as the work progresses. It is desired to ascertain if this 9 foot vein continues to widen out with depth and further ascertain if it becomes more radioactive with depth. It is also desired to ascertain the approximate length of this particularly radioactive vein. The same applies to the radioactive vein in the mud sump pit covered by the second proposed cut.

The test drill hole is desired to ascertain the feasibility of core recovery at various depths for subsequent diamond core drilling, provided the bulldozed cuts turn up promising results.

It is felt that the highly radioactive veins discovered practically on the surface justify this interim work, prior to proceeding with major exploration work.

B. L. Baxter

B. L. Baxter

September 27, 1955

Surname 700
Murphy
Chung
Geehan
Kilgard
Selfridge
Hyman

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

JUL 14 1955

Mr. William C. Reynolds
Stonegate Road
Anchorage, Kentucky

Re: Docket No. DMEA-3855 (Uranium)
Nick's Home
Hardin County, Illinois

Dear Mr. Reynolds:

The application for assistance in exploring your property in Hardin County, Illinois, under the captioned docket number, has been reviewed by the Rare and Miscellaneous Metals Division of the Defense Minerals Exploration Administration. It has been referred to the Executive Officer of Region V at the following address:

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room #13, P. O. Building
Knoxville 2, Tennessee

The Regional Office will contact you in regard to your project if additional information is required.

Sincerely yours,

C. G. Mittendorf (Leo)

Administrator

FMurphy:am
7-12-55
cc to: Admr. Reading File
Docket
Code 700
DMEA Field Team, Region V(2)

cc

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

Surname copy

Murphy
Ching
Selfridge
Hyman
Mittendorf

JUL 12 1955

Mr. Robert A. Laurence
Executive Officer
DMEA Field Team, Region V
Room #13, P. O. Building
Knoxville 2, Tennessee

Re: Docket No. DMEA-3855 (Uranium)
William G. Reynolds
Hick's Dome
Hardin County, Illinois

Dear Mr. Laurence:

The captioned application is referred to Region V Field Team for investigation, a field examination if deemed advisable, and recommendation. A copy of the application was retained by your office.

Enclosed are copies of memoranda, dated June 23, from J. E. Crawford and N. E. Nelson, members of the Uranium Commodity Committee. Also enclosed are two copies of a letter, dated July 5, and one copy of a map submitted by the Applicant in response to Mr. Ellis' letter of June 22, 1955, requesting additional information. The Applicant submitted only two copies of the map; therefore, we are retaining one copy for our files. Our copy will be available to the field examiners if you so desire.

You will note Mr. Crawford mentions that Mr. R. D. Trace recently made an examination of the Hick's Dome area. This examination was made to study fluorspar deposits; however, the occurrence of uranium in the area was noted incidental to the main purpose of the investigation.

With reference to the above-mentioned examination, Mr. Trace does not believe that the data with regard to the occurrences of uranium which were accumulated are sufficient to base a decision on the merits of the proposed application. Therefore, unless you have other data, it would appear that a field examination of the subject property should be scheduled.

We note that the Owner's Consent to Lien on the subject property may not be obtainable. In the event the Field Team recommends a project on this property, the Applicant should be

advised we will require a written statement from the owner that an Owner's Consent to Lien on the subject property will not be executed.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (GCS)

Enclosures

APPROVED:

/s/ Robert W. Geehan (GCS)
Member, Bureau of Mines

Thor H. Kiilsgaard (GCS)
Member, Geological Survey

FMMurphy/gla
7-13-55
cc to: Admr.'s Reading File
Operating Committee
Docket
Messrs. J. E. Crawford, Rm. 3641
T. H. Kiilsgaard, Rm. 5224
J. O. Hosted, Rm. 3210, GSA
Code 700
Mr. Murphy

Cal

7/8/55 gla

REYNOLDS METALS COMPANY
REYNOLDS METALS BUILDING
RICHMOND 19, VIRGINIA

RECEIVED
JUL 8 1955

REPLY TO
PARTS DIVISION
2000 SOUTH NINTH STREET
LOUISVILLE 1, KENTUCKY

July 5, 1955

Mr. Ernest Wm. Ellis, Chief
Rare and Miscellaneous Metals Division
United States Department of Interior
Defense Minerals Exploration Administration
Washington 25, D. C.

Re: Docket No. DMEA-3855 (Uranium)
Hick's Dome, Hardin County, Illinois

Dear Mr. Ellis:

We have your June 22nd letter, regarding the above DMEA Application. The land described in the third paragraph of your letter we believe is a misinterpretation on your part of the deed description, which can easily be clarified.

The major portion of the Henry Hamp lease lies in the Southwest Quarter of Section 30 and not in the Southwest Quarter of Section 25. The only portion in Section 25 is the 1-1/2 acres lying Northeast of the public road. The wording of the remainder of the lease which begins "and also the North half of the Northwest Quarter, etc." applies to Section 30 (not to Section 25). This is evident since the last portion of the deed description reads "thence West to the Place of beginning in Section 30". This latter reference applies to all of the land described above this sentence with the exception of the 1-1/2 acres lying in Section 25 Northeast of the public road.

The wording at first does appear to be a little bit confusing, unless the entire description is read as a whole.

The land described in the Henry Hamp lease is as shown on the attached drawing. Incidentally, the Henry Hamp lease comprises a total of 60.3 acres, plus the 1-1/2 acres, making an actual total of 61.8 acres approximately, although the nominal amount shown in the lease is 51.8 acres, plus the 1-1/2 acres. Also shown on this drawing are the proposed adits, as well as the chemical analyses for U_3O_8.

Please ignore the additional land (other than the Henry Hamp Lease) as described in the Chenault "Agreement of Assignment", dated March 24, 1955, inasmuch as we

are not proposing at this time to include these additional lands in the proposed DMEA application. Our thinking is that the Henry Hamp lease, being the key lease, and apparently the most promising lease, should be explored first before any consideration is given to the exploration of additional properties.

We trust that the above information will answer the questions raised in your subject letter, however, please advise if any additional information is required.

Very truly yours,

B. L. Baxter

B. L. Baxter

Attachments

BLB/t

6/24/55 gla

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
WASHINGTON 25, D. C.

June 23, 1955

Memorandum

To: Ernest William Ellis, DMEA Member
Uranium Commodity Committee, Room 4445

From: John E. Crawford, Bureau of Mines Member
Uranium Commodity Committee

Subject: Application for assistance, DMEA Docket 3855, William G. Reynolds, Hick's Dome, Hardin County, Illinois

I have reviewed the attached application for assistance, Mr. William G. Reynolds, DMEA Docket 3855; and I have discussed it with Joseph O. Hosted, Washington representative of the Atomic Energy Commission.

We suggest that the application be referred to the Field Team for examination and report, and the Field Team be requested to consult with Mr. L. P. Barrett, Atomic Energy Commission, Room 2, Post Office Bldg., Ishpeming, Michigan. I should like to point out that Mr. Robert D. Trace, a Uranium Commodity Committee member for the U. S. Geological Survey, recently made an examination of uranium occurrences in the Hick's Dome area of Hardin County, Illinois. Mr. Trace may have information which would assist the Field Team in reaching a conclusion regarding the application of Mr. Reynolds.

John E. Crawford

John E. Crawford

Attachment

RECEIVED
JUN 24 1955

6/27/55-gla

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

RECEIVED
JUN 27 1955

June 23, 1955

Re: DMEA-3855
William G. Reynolds
Hamp lease, Hick's Dome
Hardin Co., Illinois
$39,800 - Uranium

Memorandum

To: E. W. Ellis, Defense Minerals Exploration Administration

From: N. E. Nelson, U. S. Geological Survey

Subject: Review of application

This application pertains to an unusual condition in an unexpected locality.

The supporting data, and the responsibility of the applicant and his consultants, warrant a field examination, and such is recommended.

N. E. Nelson

N. E. Nelson

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WASHINGTON 25, D. C.

RECEIVED
JUN 27 1955

June 23, 1955

Re: DMEA-3855
William G. Reynolds
Hemp lease, Nick's Dome
Martin Co., Illinois
$39,600 - Uranium

Memorandum

To: E. W. Ellis, Defense Minerals Exploration Administration

From: N. E. Nelson, U. S. Geological Survey

Subject: Review of application

This application pertains to an unusual condition in an unexpected locality.

The supporting data, and the responsibility of the applicant and his consultants, warrant a field examination, and such is recommended.

N. E. Nelson

N. E. Nelson

NENelson:hlm
G-6/23/55

Copy to: Director's reading, 4212
Branch reading, 4212
DMEA (3)
Docket file
J. E. Crawford, 3641 Interior
J. O. Hosted, 3210 GSA

Surname 700

Murphy
Ellis
Mathews

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

JUN 22 1955

Mr. William G. Reynolds
Stonegate Road
Anchorage, Kentucky

Re: Docket No. DMEA-3855 (Uranium)
Rick's Dome
Hardin County, Illinois

Dear Mr. Reynolds:

The above-docketed application for Federal aid in an exploration project has been reviewed by this Division.

In the application under the narrative item, "Methods and Cost of Proposed Exploration," page 11, starting with line 9, the location of the proposed exploration is given in relation to the "Hamp" and "Fricker" oil wells. According to map Fig. 1, both these wells are in the south half of sec. 30, T.11 S., R.8 E.

The greater part of the land described in the "Henry Hamp Lease" (51.80 acres), according to our interpretation, lies in the S.W.¼ of sec. 25, T.11 S., R.7 E. Also, the additional land described in the Chenault "Agreement of Assignment," dated March 24, 1955, lies in sec. 24, T.11 S., R.7 E.; and in the W½ of the S.W.¼ of sec. 19, the W½ of the N.W.¼ of sec. 30, and the E½ of S.W.¼ of sec. 29, all in T.11 S., R.8 E.

If our interpretation is correct, the area which you propose to explore will not fall within the limits of the land described in either of the above leases.

We suggest that you submit four (4) copies of a map or sketch, showing the approximate location of the proposed trenches and adits, also indicating the boundaries of the land which would be subject to the proposed exploration contract. If available, the location where samples were taken and the results (chemical analyses for U_3O_8 and/or radiometric values) should also be noted on the map or sketch.

Upon receipt of this information we will promptly continue to process your application.

Sincerely yours,

$39,800

FMurphy:am
6-22-55
cc tp: Admr. Reading File
Docket
Code 700
Mr. Murphy

Ernest Wm. Ellis, Chief
Rare and Miscellaneous
Metals Division

DMEA Field Team, Reg. V(2)

R.C.B.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

June 17, 1955
Subject: DMEA-3855
Re: Exploration Assistance
Hick's Dome

William G. Reynolds
Stonegate Road
Anchorage, Kentucky

Dear Mr. Reynolds:

The receipt of your application dated June 14, 1955 for exploration assistance under the Defense Production Act of 1950, as amended, is hereby acknowledged.

Your application has been assigned Docket Number DMEA-3855 and referred to the Rare and Miscellaneous Metals Division .

Kindly identify all future correspondence relating to your application by this docket number.

Sincerely yours,

Robert E. Adams, Chief
Operations Control and
Statistics Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D. C.

June 17, 1955

Memorandum

To: Executive Officer, DMEA Field Team, Region V

From: Chief, Operation's Control and Statistics Division

Subject: Assignment of Docket Number

There is listed below the assigned docket number to an application recently received from Region V.

DMEA-3855 Hick's Dome
William G. Reynolds

Robert E. Adams
Chief, Operation's Control
and Statistics Division

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 25 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

RECEIVED
JUN 17 1955

June 15, 1955

Memorandum

To: Operating Committee, DMEA - Washington

From: DMEA Field Team, Region V, Knoxville, Tennessee

Subject: Application received from William G. Reynolds, Louisville, Ky. Hamp lease, Hicks Dome, Hardin County, Ill. (uranium)

Enclosed are three copies of the subject application, received in this office today, accompanied by three copies of the lease, three copies of the Assignment of the lease to the applicants, and three copies of the applicant's transmittal letter. The fourth copies are being held here for our use.

Telephone conversation with Mr. Wilson Wyatt, attorney, indicate that the Applicant is willing and able to sign a quaranty in the event they do not obtain the Consent to Lien.

Robert A. Laurence
Robert A. Laurence
EXECUTIVE OFFICER
DMEA REGION V

V. J. Lynch
V. J. Lynch, Member
U. S. Bureau of Mines

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Form Approved.
Budget Bureau No. 42-R1035.2.

RECEIVED
JUN 17 1955

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

To be filled in by applicant

Docket No. 3855
Metal or Mineral Uranium
Date Received 6/17/55
Estimated Cost $39,800
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: William G. Reynolds
Stonegate Road
Anchorage, Kentucky

(*b*) If other than an individual, add to your name above whether a corporation, partnership, etc., and the name of the State in which incorporated or otherwise organized.

(*c*) If a corporation, add to above statement, titles, names and addresses of officers.

(*d*) If a partnership, add to the above statement the names and addresses of all partners.

2. *General.*—Read DMEA Order 1, "Government Aid in Defense Exploration Projects," before completing this application. Submit this application and all accompanying papers in quadruplicate (four copies), with your name and address on each sheet of the application and on all accompanying papers. Where sufficient space is not provided on the form for all required information, state it on an accompanying paper, with a reference in each case to the instruction to which it refers by number. Comply with all applicable instructions; or, if not applicable, so state. File the application with Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest field executive officer thereof.

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract

See copy of lease enclosed herewith

(*b*) State any mine name by which the property is known Hick's Dome, Hardin County, Illinois

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise Lessee

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property.

(*e*) If you own the land, describe any liens or encumbrances on it

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice.

4. *Physical description.*—(*a*) Describe in detail any mining or exploration operations which have been or now are being conducted upon the land, including existing mine workings and production facilities. State your interest, if any, in such operations. Also describe accessibility of mine workings for examination purposes.

(*b*) State past and current production, and ore reserves, if any, giving quantities and grades.

(*c*) Describe the geologic features of the property, including mineralization, type of deposit (vein, bedded, etc.), and your reasons for wishing to explore. Illustrate with maps or sketches. Send with your application (but not necessarily as a part of it) any geologic or engineering report, assay maps, or other technologic information you may have, indicating on each whether you require its return to you.

(*d*) State the facts with respect to the accessibility of the project: Access roads, distances to shipping, supply and residence points.

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power.

See enclosed brochure

RECEIVED
JUN 15 1955
U. S. Geological Survey
Geologic Division
Knoxville, Tenn.

16—66551-1

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore ..... see enclosed brochure

(*b*) Describe fully the proposed work, including a map or sketch of the property showing a plan (and cross sections if needed) of any present mine workings, and the location of the proposed exploration work as related to such features as contacts, veins, ore-bearing beds, etc.

(*c*) The work will start within ....14.... days and be completed within ....10.... months from the date of an exploration project contract.

(*d*) State the operating experience and background of the applicant with relation to the ability to carry out such exploration project, and also that of the person or persons who will supervise the operations.

6. *Estimate of costs.*—Furnish a detailed estimate of the costs of the proposed work (you will have to use a separate sheet), under the following headings. Add the totals under all headings to give the estimated total cost of the project:

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.).

(*b*) *Labor, supervision, consultants.*—Include an itemized schedule of numbers, classes and rates of wages, salaries or fees for necessary labor, supervision and engineering and geological consultants.

(*c*) *Operating materials and supplies.*—Furnish an itemized list, including items of equipment costing less than $50 each, and power, water and fuel.

(*d*) *Operating equipment.*—Furnish an itemized list of any operating equipment to be rented, purchased, or which is owned and will be furnished by the Operator, with the estimated rental, purchase price, or suggested use-allowance based on present value, as the case may be.

(*e*) *Rehabilitation and repairs.*—Furnish a detailed list showing the cost of any necessary initial rehabilitation or repairs of existing buildings, installations, fixtures, and movable operating equipment, now owned by the Operator and which will be devoted to the exploration project.

(*f*) *New buildings, improvements, installations.*—Furnish a detailed list showing the cost of any necessary buildings, fixed improvements, or installations to be purchased, installed or constructed for the benefit of the exploration project.

(*g*) *Miscellaneous.*—Furnish a detailed list showing the cost of repairs to and maintenance of operating equipment (not including initial rehabilitation or repairs of the Operator's equipment), analytical work, accounting, workmen's compensation and employers' liability insurance, and payroll taxes.

(*h*) *Contingencies.*—Give an estimate of any necessary allowances for contingencies not included in the costs stated above.

NOTE.—No items of general overhead, corporate management, interest, taxes (other than payroll and sales taxes), or any other indirect costs, or work performed or costs incurred before the date of the contract, should be included in the estimate of costs. see enclosed brochure

7. (*a*) Are you prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation (Sec. 7, DMEA No. 1)? Yes

(*b*) How do you propose to furnish your share of the costs?

[X] Money [ ] Use of equipment owned by you [ ] Other

Explain in detail on acompanying paper. see enclosed brochure

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief.

Dated ....June 14...., 1955

W T Reynolds
(Applicant)

By .....

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—66551-1

C O P Y

RECEIVED
JUN 17 1955

WYATT, GRAFTON & SLAYDEN
Law Offices

Marion E. Taylor Bldg.
Louisville 2, Kentucky

Mr. Robert A. Lawrence
Executive Officer
Defense Minerals Exploration Administration
Knoxville 2, Tennessee

Dear Mr. Lawrence:

We herewith submit on behalf of our client, Mr. William G. Reynolds, an application for aid in a minerals exploration project to be undertaken at Hick's Dome, Hardin County, Illinois. In this connection we enclose four copies of each of the following:

1. Executed form ME-103, Application for Aid in an Exploration Project, Pursuant to DMEA Order 1, under the Defense Production Act of 1950, as amended.

2. A brochure containing all the information required by the Defense Minerals Exploration Administration as set forth in application form ME-103.

3. A photostatic copy of an oil, gas and mineral lease between the lessors, Henry Harp, Jr. and Goldie Dee Harp, his wife, and W. G. Reynolds and William A. Chenault, lessees.

4. A photostatic copy of an Agreement of Assignment showing the assignment of William A. Chenault's interest in the above lease to W. G. Reynolds.

To date we have been unable to obtain the Owners Consent to Lien and it is willikely that we will be able to obtain it in the very near future. Since our client is most anxious to proceed with the exploration project, we request that the Government waive the filing of the consent agreement as permitted by pertinent DMEA regulations. In this regard we wish to point out the financial responsibility of the applicant, Mr. William G. Reynolds, and his past experience in mineral exploration which is covered in the enclosed brochure.

We would appreciate your prompt review of the enclosed application. In your review of the enclosed material if you desire any additional information, you may write Mr. Bruce Baxter, Browns Lane, Louisville, Kentucky, or call him at CA 6521.

Very truly yours,

s/s James T. Carey

COPIED: DMEA Office Knoxville- (zm)
2-copies to Cpr. Gen. Mr. Miller & Files

Section 25 and 30 Township 11S Range 7E and 8E containing 51.80 acres, more or less, and being the same land conveyed to lessor, together with all land or interests owned by Lessor adjoining or contiguous to the land above described, whether in the same or different surveys. For determining the amount of any money payment hereunder the leases premises shall be treated as comprising 51.80 acres, whether there be more or less. The word "mineral" as used in this lease includes oil, gas, distillate, sulphur and any other minerals whether similar or dissimilar, unless the context clearly requires a different meaning.

OIL, GAS AND MINERAL LEASE

THIS AGREEMENT, made this 14th day of FEBRUARY, 1955 between Lessors

HENRY HAMP, JR., and GOLDIE DEE HAMP, his wife

whose address is 3728 Marconi Avenue, Sacramento, Calif

and Wm. A. Chenault and W. G. Reynolds LESSEE whose address is Louisville, Kentucky.

WITNESSETH:

1. LESSOR in consideration of ONE DOLLAR ($1.00) in hand paid, and of the agreements of Lessee herein contained, hereby grants, leases and lets exclusively unto Lessee, for the purpose of testing by any method for formations or structures and prospecting and drilling for, mining, and producing oil, gas distillate, sulphur and other minerals, injecting salt water, other fluids, and gas, into subsurface strata, storing minerals and fluids, laying pipe lines, dredging canals, building roads, bridges, docks, tanks, powers, stations, telephone and electric transmission lines, and other structures and facilities including houses for employees, necessary for producing, saving, caring for, treating, processing, and transporting minerals and conducting said operations, the following described land - situated in the County of Hardin, State of Illinois to wit:

All that part of the Northeast (NE) Quarter of the Southeast (SE) Quarter of Section Twenty-five (25) Township 11 South of Range 7E, lying Northeast of public road containing 1½ acres more or less and also the North half of the Northwest Quarter of the Southwest Quarter and a part of the East half of the Southwest quarter described by metes as follows: Beginning at the Northwest corner of the said E/2 SW., thence running South with the West Line thereof to the center point of the West line of the SE 1/4 of the SW 1/4, being the NW corner of the Silas Stacey tract, thence East 40 rods, thence North to a point 30 rods North of the North line of the SE 1/4 of the SW 1/4, thence East 33 rods to the west line of the Pleas Rose tract, thence, North to the N. line of the said E/2 SW., thence West to the Place of beginning in Sec. 30 T. 11 S, R 8E. containing 51.80 acres.

2. Subject to the other provisions herein contained, this lease shall remain in force for a term of 60 days from this date, (hereinafter called "primaryterm") and as long thereafter as oil, gas distillate sulphur or other mineral is produced hereunder, or any operation is conducted, any payment is made, or any condition exists, which as hereinafter provided continues this lease in force.

3. The royalties reserved by Lessor, and which shall be paid by Lessee are (a) on oil (including but notlimited to distillate and condensate) one-eighth (1/8th) of that produced and saved from the leased premises, the same to be delivered at the wells or to the credit of Lessor in the pipe line to which the wells may be connected; provided, however, Lessee may from time to time purchase

(b) on gas (including casinghead gas and other vapors) produced from said land and sold or used off the leased premises or in the manufacture of gasoline or other product, the current market price at the wells of one-eighth (1/8th) of the gas so sold or used; (c) on sulphur mined and marketed, One Dollar ($1.00) per long ton (2240 lbs); (d) on all other minerals mined and marketed, one-tenth (1/10th) of the current market price at the wells or mine. During any period (whether before or after expiration of the primary term hereof) when gas is not being so sold or used due to lack of market and the well or wells are shut in and there is no current production of oil or operations on said leased premises sufficient to keep this lease in force. Lessee may pay or tender as royalty an amount (which shall be the same regardless of the number of the shut in wells) per half year, equal to one-half the annual rental hereafter provided, and it will be considered that gas is being produced, for all purposes of this lease during any period for which such payment is made; such amount for the first half year to e payable within ninety (90) days following shutting in of the first well and for subsequent periods semi-annually in advance thereafter. The amount of each royalty payment or tender may be made by check or draft of Lessee in the same manner as provided for "rental" payments under Paragraph Four (4) hereof. Lessee shall have free use of oil, distillate, condensate, gas and water from the leased premises, except water from Lessor's wells and tanks, for all operations hereunder. Lessor shallhave the privilege at his risk and expense of using gas from any well, producing gas only, on the leased premises for stoves and inside lights in the principal dwelling thereon out of any surplus gas not needed for operations hereunder.

4. If drilling operations or mining operations are not commenced on the leased premises on or before 60 days from this date, this lease shall then terminate as to both parties.

5. If during the primary term and before there has been a discovery of any mineral on the leased premises Lessee should drill a dry hole or fail in an exploratory attempt to establish production hereunder, this lease shall not be terminated thereby if Lessee commences further drilling operations, or mining operations, or commences or resumes the payment or tender of rentals on or before the rental paying date, if any, next ensuing after thirty days following completion of the dry hole or failure of such exploratory attempt, or, if there be no such rental paying date, commences such further operations before the expiration of the primary term. If after the discovery of any mineral the production thereof and also of the other discovered mineral of minerals. If any, should cease from any cause this lease shall not be terminated thereby if within sixty days thereafter production of any mineral or minerals is restored or Lessee commences drilling operations, reworking operations, or mining operations, or if it be within the primary term. Lessee commences or resumes the payment or tender of rentals on or before the rental paying date, if any, next ensuing after thirty days following such cessation of production. If at the expiration of the primary term no mineral is being produced on the leased premises but Lessee is then engaged in drilling operations, reworking operations, or mining operations thereon, this lease shall remain in force so long as such operation (whether on the same well or mine or on different wells or mines successively) are continuously prosecuted and, if they result in the production of a mineral so long thereafter as any mineral is produced hereunder from the leased premises. Such operations, after the expiration of the primary term, shall be deemed to be continuously prosecuted if not more than sixty days shall elapse between the

completion of drilling operations, reworking operations, or mining operations, on one well or mine and the commencement of such operations on another well or mine.

6. Lessee shall have the right at any time until one year after the expiration of this lease to remove all fistures and other property placed by Lessee on the leased premises, including the right to draw and remove all casing. When required by Lessor, Lessee will bury all pipe lines below ordinary plow depth in cultivated land. Lessee shall pay Lessor for damages to Lessor's growing crops caused by Leesee's operations. Any structures and facilities placed on the leased premises by Lessee for operations thereon and any well or wells on the leased premises drilled or used for the injection of sale water, other fluids, or gas may also be used for Lessee's operations on other lands in the field.

7. Lessee is hereby granted the right at any time and from time to time to unitize the leased premises or any portion or portions thereof, as to all strata or any stratum or strata, with any other lands as to all strata or any stratum or strata, for the production primarily of oil or primarily of gas with or without distillate. However, no unit for the production primarily of oil shall embrace more than 40 acres, or for the production primarily of gas with or without distillate more than 640 acres; provided that if any governmental regulation shall prescribe a spacing pattern for the development of the field or allocate a producing allowa le based on acreage per well, then any such unit may embrace as much additional acreage as may be so prescribed or as may be used in such allocation of allowable. Lessee shall file written unit designation in the county in which the leased premises are located. Operations upon and production from the unit shall be treated as if such operations were upon or such production were from the leased premises whether or not the well or wells are located thereon. The entire acreage within a unit shall be treated for all purposes as if it were covered by and included in this lease except that the royalty on production from the unit shall be as below provided, and except that in calculating the amount of any rentals or shut in gas royalties, only that part of the acreage originally leased and then actually embraced by this lease shall be counted. In respect to production from the unit. Lessee shall pay Lessor, in lieu of other royalties thereon, only such proportion of the royalties stipulated in paragraph 3 as the amount of his acreage placed in the unit, or his royalty interest therein on an acreage basis, bears to the total acreage in the unit.

8. The rights of either party hereunder may be assigned or subleased in whole or in part and the provisions hereof whall extend to their heirs, successors, sublessees, and assigns. However, no change or division in ownership of the lands, rentals, or royalties, shall enlarge the obligations or siminish the rights of Lessee. No change or division in such ownership shall be binding on Lessee until thirty days after the Lessee shall have been furnished by registered mail at its above stated address with the original or a certified copy of the recorded instrument or instruments evidencing same. In the event of assignment or sublease hereof in whole or in part liability for breach of any obligation hereunder shall rest exclusively upon the owner of this lease or of a portion thereof or of an interest therein who commits such breach. In the event of the death of any person entitled to rentals hereunder

Lessee may pay or tender such rentals to the authorized depository bank to the credit of the estate of the deceased until such time as Lessee is furnished proper evidence of the appointment and qualifications of an executor or administrator of the estate or, if there be none, then until Lessee is furnished evidence satisfactory to it as to the heirs or devisees of the deceased. In the event of assignment or sublease of this lease as to a segregated protion of said land, the rentals payable hereunder shall be apportionable among the several leasehold owners (including subleasees) ratably according to the surface area of each, and default in rental payment by one shall not affect the rights of other leasehold owners (including su lessees).

9. Lessee may at any time, and from time to time, execute and deliver to Lessor or place of record a release covering all or any portion of the leased premises, and thereupon shall be relieved of all obligations as to the acreage surrendered. After a release of this lease as to only part of the acreage the rentals payable hereunder shall be reduced in the proportion that the acreage covered hereby is reduced by each such release.

10. In the event Lessor considers that Lessee has failed to comply with any obligation hereunder, express or implied. Lessor shall notify Lessee in writing specifying in what respects Lessor claims Lessee has breached this lease. The service of such notice and the lapse of sixty days without Lessee's meeting or commencing to meet the alleged breaches shall be a condition precedent to any action by Lessor for any cause. If within sixty days after receipt of such notice Lessee shall meet or commence to meet the breaches alleged by Lessor, Lessee shall be deemed in default hereunder. The breach by Lessee of any obligation hereunder shall not work a forfeiture or termination in whole or in part, of this lease.

11. When drilling, production, or other operations are delayed or interrupted by lack of water, labor or material, or by fire, storm, flood, war, rebellion, insurrection, riot, strike, differences, with workmen, or failure of carriers to transport or furnish facilities for transportation or lack of market for the minerals produced, or as a result of some order, requisition or necessity of the government, or as the result of any cause whatsoever beyond the control of Lessee, the time of such delay or interruption shall not be counted against Lessee and this lease shall remain in force during such delay or interruption and ninety days thereafter, anything in this lease to the contrary notwithstanding.

12. Lessor hereby warrants and agrees to defend the title to said land. If Lessor owns less interest than the entire fee or mineral estate (even though this lease purports to cover only such lesser interest) the rentals and royalties to be paid Lessor shall be reduced proportionately. Lesee at its option may discharge any tax, mortgage, or other lien upon said land either in whole or in part, and thereby be subrogated to such lien with the right to enforce same ane apply rentals and royalties toward satisfying same.

13. Should any one or more of the parties above named as Lessor fail to execute this lease, it shall nevertheless be binding upon all such parties who do execute it as Lessor. The word "Lessor" as used in this lease means the party or parties who execute this lease as Lessor, although not named above The Lessor hereby wai es and releases all right of dover and homestead in the premises herein described.

14. It is understood and agreed by the Lessor and Lessee, that after a period of 30 days from date of this Agreement, if no royalty payment from any oil, gas or other mineral whatsoever has been paid to Lessor, then and in that event, the Lessee agrees to pay the Lessor, in lieu of such royalty payment the sum of ~~Seventy Five~~ TEN DOLLARS ($~~75.00~~10.00) per month until such Royalty payment from oil, gas or other minerals is paid to the Lessor. The payment in lieu of a Royalty payment will continue for the term of this Agreement.

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RMS
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IN WITNESS WHEREOF, this instrument is executed on the date first above written.

WITNESSES;

Henry Hamp
Goldie Dee Hamp

LESSOR

STATE OF CALIFORNIA }
COUNTY OF SACRAMENTO } SS

On this 14th day of February in the year one thousand nine hundred and fifty-five before me RUTH M. SUTTON, a NOTARY PUBLIC in and for the County of Sacramento, personally appeared

HENRY HAMP and GOLDIE DEE HAMP, his wife

known to me to be the persons whose names are subscribed to the within instrument, and they duely acknowledged to me that they executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my OFFICIAL SEAL the day and year in this certificate first above written.

Ruth M Sutton
NOTARY PUBLIC IN AND FOR THE COUNTY OF SACRAMENTO, STATE OF CALIFORNIA

MY COMMISSION EXPIRES
AUGUST 20th, 1955

[illegible] GAS AND MINERAL LEASE

[illegible]

WM. [illegible] CHEMAULT

[illegible]

[illegible] PLANTER

[illegible]

[illegible]

STATE OF ILLINOIS, }ss. No. 4922
Hardin County

This instrument was filed for record in Recorder's Office of Hardin County aforesaid, on 19th day of February A. D. 1955 at 11:30 o'clock A.M., recorded in Book 5 of Misc. on page 219

F. H. Henry Recorder

Recording Fee

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AGREEMENT OF ASSIGNMENT

This agreement of assignment made this 24th day of March, 1955, by and between William A. Chenault and Louise Ryan Chenault, his wife, hereinafter referred to as the Assignors; and William G. Reynolds, hereinafter referred to as the Assignee

W I T N E S S E T H:

For and in consideration of $1.00 in hand paid and the undertaking of Assignee to pay to William A. Chenault 10% of the net proceeds to Assignee (or to the partnership consisting of W. G., R. S., and Louise Parham Reynolds) from operation or sale of the leases hereinafter mentioned (Net proceeds as used herein shall mean the gross income from either sale or operation of the leases less any costs properly attributable to the procurement, exploration, operation or sale of the said leases, including without limitation the expenditures made to reimburse William A. Chenault for expenses, the rental, sales commissions, if any, operation and exploration costs, accounting costs, geological and other technical costs, and all other proper costs. Payments shall be made to William A. Chenault monthly as soon after the end of each month as the amount of net proceeds for the foregoing month can be accurately computed) Assignors hereby assign all their right, title, and interest in and to the below mentioned leases unto the Assignee, his heirs, and assigns. In consideration of such assignment, the Assignee hereby assumes and agrees to make all the payments and perform all the covenants and conditions of the below mentioned leases. The leases which are assigned herein are as follows:

1. That certain lease dated February 18, 1955 by and between Hal Stacey and Anna Stacey, his wife, lessors, and William A. Chenault and William G. Reynolds, lessees, granting certain mineral rights on twenty-five acres of land situated in Hardin County, Illinois and described as follows:

Section 25, Township 11, Range 7. N.5/8

N.E.1/4 S.E.1/4.

2. That certain lease dated March 18, 1955 by and between E. F. Wall, Jr., a widower, lessor and William A. Chenault and William G. Reynolds, lessees granting certain mineral rights on the hereinafter described real estate situated in the County of Hardin, State of Illinois, to wit:

The East Half of the Southwest Quarter of Section 29, Township 11 South, Range 8 East of the Third Principal Meridian, and also the Northeast Quarter of the Southwest Quarter of Section 26, Township 11 South, Range 7East of the Third Principal Meridian.

3. That certain lease agreement dated the 18th day of March, 1955 between the First State Bank of Elizabethtown, a corporation, lessor, and William A. Chenault and William G. Reynolds, lessees granting certain mineral rights on the hereinafter described real estate, situated in the County of Hardin and State of Illinois, to wit:

The Southwest Quarter of the Southwest Quarter of Section 19, the South 17 1/2 acres of the Northwest Quarter of the Southwest Quarter of Section 19, the West half of the Northwest Quarter of Section 30, all in Township 11 South, Range 8 East of the Third Principal Meridian; also the Southeast Quarter of the Southeast Quarter of Section 24. Also the East half of the Northeast Quarter; the Southwest Quarter of the Northeast Quarter; and a parcel of land lying in the North part of the Northeast Quarter of the Southeast Quarter described by metes and bounds as follows:

Beginning at the Southeast corner of the Southeast Quarter of the Northeast Quarter, thence running West 50 rods, thence South 2 1/2 rods, thence East 50 rods to the township line, thence North 2 1/2 rods to the place of beginning, containing 3/4 of an acre, all lying and being in Section 25, Township 11 South, Range 7 East of the Third Principal Meridian.

4. That certain agreement dated March 7, 1955 between Carrie Schutt, a widow; Robert Deneen Schutt and Corena Schutt, his wife, and Ruth Schutt, a single woman, lessors and William A. Chenault and William G. Reynolds, lessees granting certain mineral rights on the following described land situated in the County of Hardin, State of Illinois, to wit:

Southeast Quarter of the Southwest Quarter of Section 24, Township 11 South, Range 7 East of the Third Principal Meridian, containing 40 acres more or less.

5. That certain lease agreement dated February 18, 1955 between Wiley Robinson and Voley Robinson, his wife, lessors to William A. Chenault and William G. Reynolds, lessees granting certain mineral rights in the following described land in Hardin County, Illinois, and bounded as follows, to wit:

Section 25, Township 11, Range 7. N.5/8 N.E.1/4 S.E.1/4, containing 25 acres.

6. That certain lease agreement dated February 14, 1955 between Henry Hamp, Jr. and Goldie Dee Hamp, his wife, lessors and William A. Chenault and William G. Reynolds, lessees, granting certain mineral rights on the following described land situated in the County of Hardin, State of Illinois, to wit:

All that part of the Northeast Quarter of the Southeast Quarter of Section 25, Township 11 South of Range 7E, lying Northeast of public road containing 1 1/2 acres more or less and also the North half of the Northwest Quarter of the Southwest Quarter and a part of the East half of the Southwest Quarter described by metes as follows: Beginning at the Northwest corner of the said E/2 SW., thence running South with the West Line thereof to the center point of the West line of the SE 1/4 of the SW 1/4, being the NW corner of the Silas Stacey tract, thence East 40 rods, thence North to a point 30 rods North of the North line of the SE 1/4 of the SW 1/4, thence East 33 rods to the west line of the Pleas Rose tract, thence, North to the N. line of the said E/2 SW., thence West to the Place of beginning in Section 30, Township 11 S, Range 8E, containing 51.80 acres.

In witness whereof, the parties have hereunto set their hands and seals on the date first above written.

W G Reynolds

Louise Ryan Chenault

STATE OF ~~Jefferson~~ Kentucky)
COUNTY OF Jefferson) ss.

I, Lucille Walston, a Notary Public, do certify that the foregoing instrument of writing from William A. Chenault and Louise Ryan Chenault, his wife, was this day produced to me in my

county by the parties and acknowledged before me by the said William A. C. Hessault and Louise Ryan C. Hessault, his wife, respectively, to be their act and deed for the uses and purposes therein set forth.

GIVEN under my hand and seal of office this 24th day of March, 1955

My commission expires _____. Lucille Walston
Notary Public

STATE OF Kentucky)
) ss.
COUNTY OF Jefferson)

I, Lucille Walston, a Notary Public, do certify that the foregoing instrument of writing from W. G. Reynolds ~~and~~ _____, ~~his wife,~~ was this day produced to me in my county by the parties and acknowledged before me by the said W. G. Reynolds ~~and~~ _____, ~~his wife, respectively~~, to be ~~their~~ the act and deed for the uses and purposes therein set forth.

GIVEN under my hand and seal of office this 24th day of March, 1955

My commission expires _____. Lucille Walston.
Notary Public

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APPLICATION FOR AID IN MINERAL EXPLORATION
PURSUANT TO DMEA ORDER #1
FOR
HICK'S DOME, HARDIN COUNTY, ILLINOIS

APPLICANT: W. G. Reynolds
Anchorage, Kentucky

DATE: April 27, 1955

TABLE OF CONTENTS

		Page
I.	General Introduction	1
II.	Regional Geology	2
III.	The Uranium Mineralization of Hick's Dome	3,4,5
IV.	Genesis of the Mineral	6,7,8
V.	Qualifications of Personnel	9,10
VI.	Methods and Cost of Proposed Exploration	11,12,13
VII.	Summary	14

PROPOSED MINERAL EXPLORATION PROJECT FOR HICK'S DOME

General Introduction

Subject applicant, Mr. W. G. Reynolds, Anchorage, Kentucky, desires to make application for aid in mineral exploration of certain acreage which he holds as lessee on Hick's Dome, Hardin County, Illinois.

The acreage upon which exploration is desired covers 51.8 acres, known as the Henry Hamp Lease, Section 25 and 30, Township 11S, Range 7E and 8E, as shown in Figures 2 and 3, and as described in recorded Lease No. 9422, filed for record in the Recorder's Office of Hardin County, February 19, 1955. This property is approximately 8 miles north of Elizabethtown, Illinois. The applicant owns several additional leases in this area, other than the one mentioned above, total in excess of 500 acres, but desires to explore the Hamp Lease only at this time. The Henry Hamp Lease is in the center of Hick's Dome and it is felt that this is the key lease for this area. Anomalous radioactivity is widespread on the ground surface at and near the apex of this dome, which is on this lease.

Hick's Dome is also located in the heart of the flourspar mineral area of south eastern Illinois. Lead and zinc mines are also numerous in this area. Unusually high radioactive scintillometer readings and other indications of mineralization, as subsequently described in detail, are the basis for this project application.

Regional Geology

As shown in Figure 3, Hick's Dome is regarded as a crypto-volcanic structure, known as a quaquaversal dip. A broken system of ring faults surrounds the Dome and intrusive dikes dot the area, as shown in Figure 1. A layer of New Albany shale, generally considered as a potential source of Uranium, surrounds the area, as shown in the Block Diagram of Figure 3. It has been postulated that the doming is of explsoive volcanic origin, the result of sudden liberation of pent-up volcanic gases that had accumulated relatively near the surface.

The Hick's Dome faulting is mostly of two sets, one striking about N 20° W and the other about N 65° E. Some of the dikes are of a very deep-seated origin, generally confined to the northwest striking faults. The flourspar mineralization, which is abundant in this region, largely is emplaced in the northeast striking set of faults. In addition to these faults, there are a few curved ones around the flanks of the Dome that appear to be concentric with it. These ring-like faults are probably related in origin to the doming process.

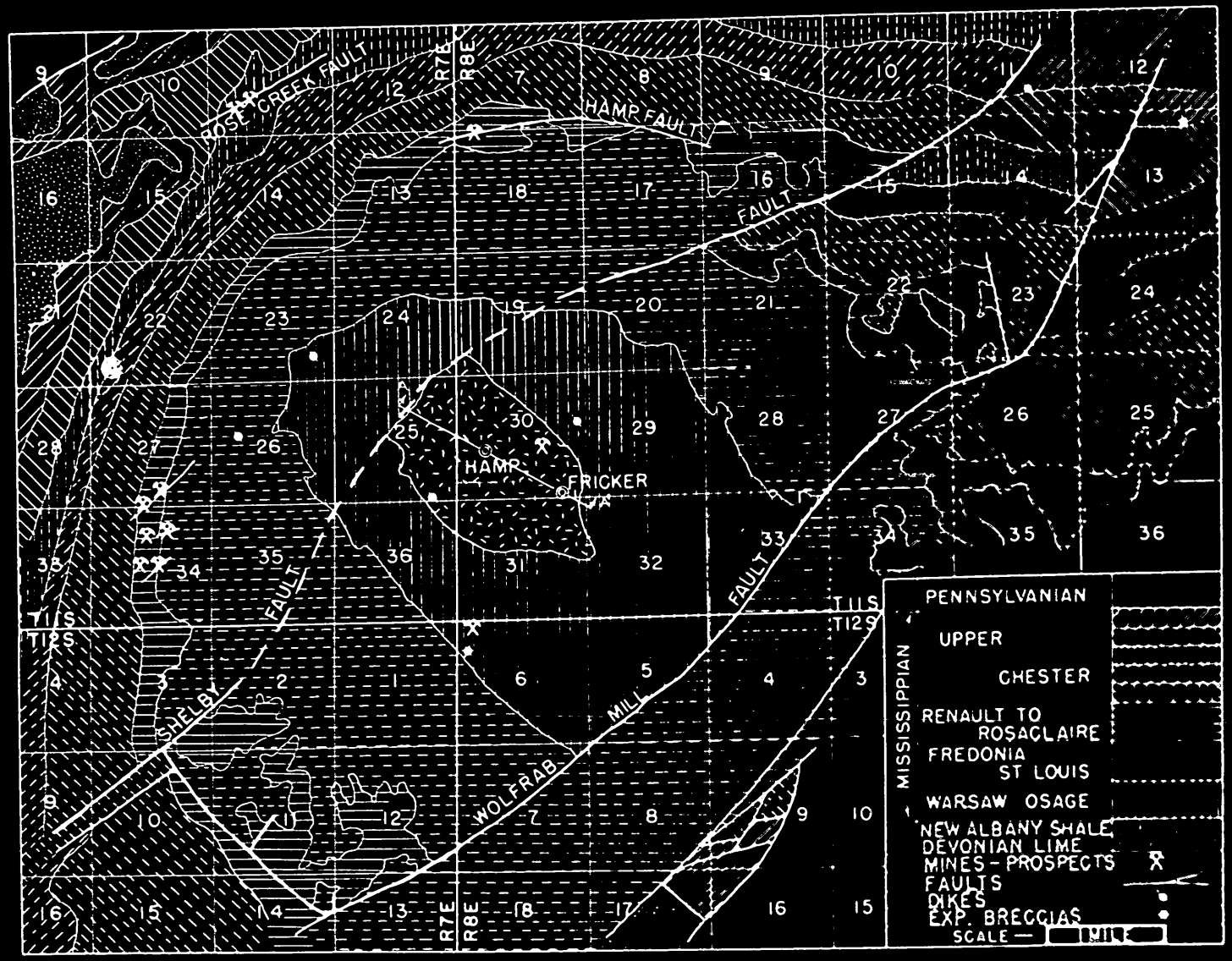
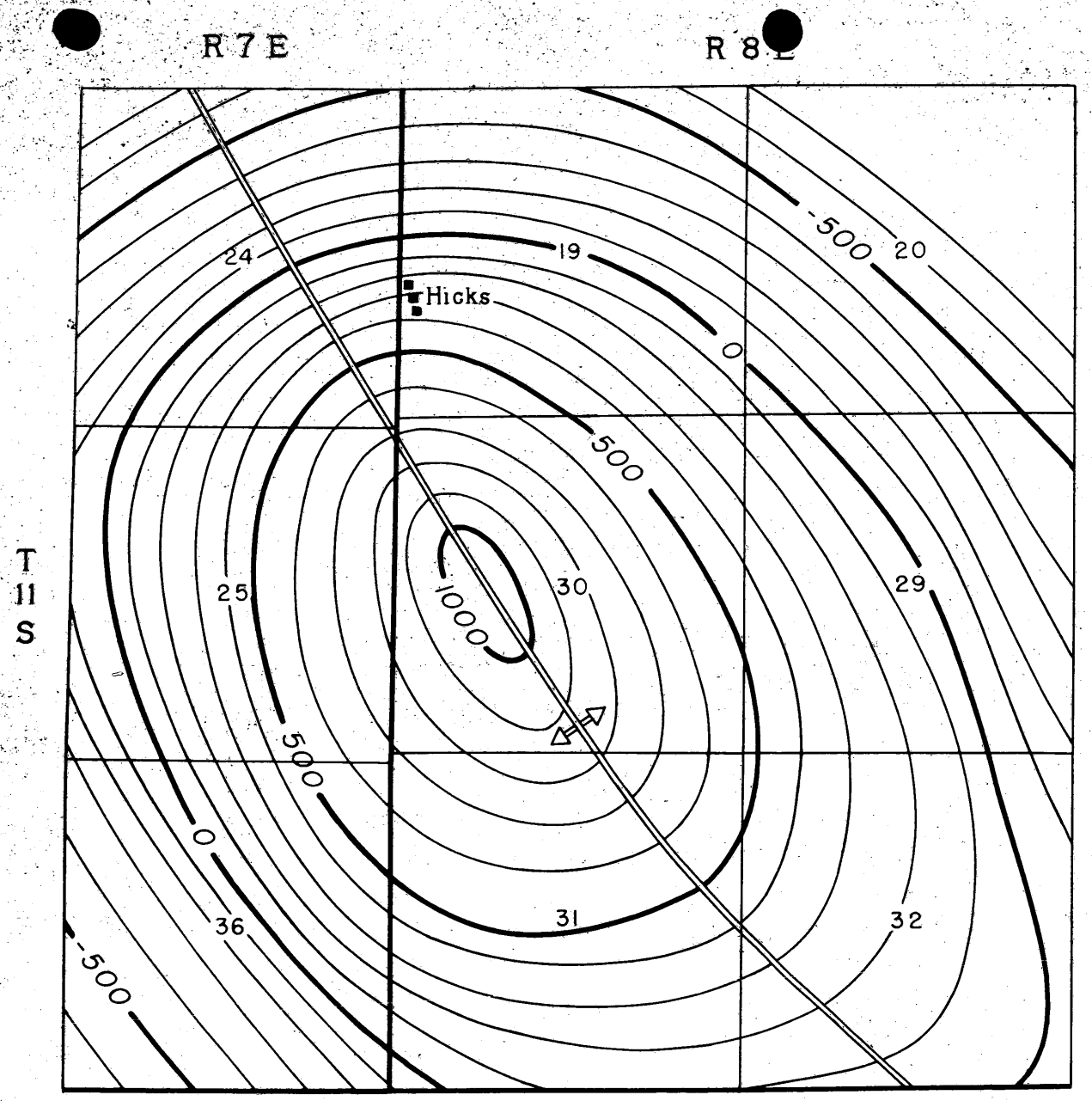


FIG. 1. Geologic map of Hicks Dome area (after Illinois Geological Survey).



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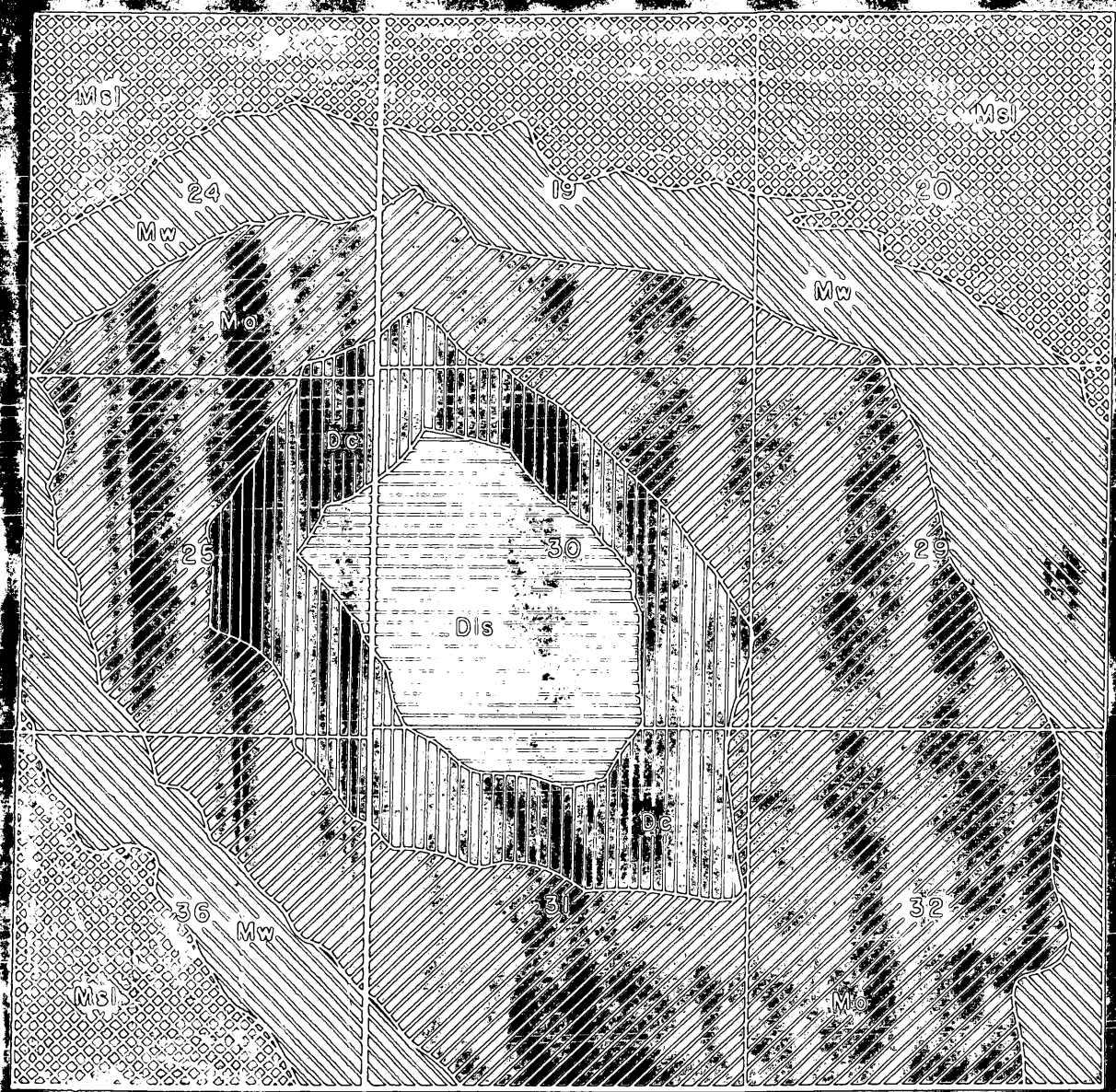
STRUCTURAL CONTOURS ON THE TOP
OF THE CHATTANOOGA SHALE
-HICKS DOME-
HARDIN COUNTY, ILLINOIS

Contour Interval: 100'

Scale: 2" = 1 Mi.



MISSISSIPPIAN
MERAMEC
OSAGE
DEVONIAN

Msl 350' St. Louis limestone

Mw 250' Warsaw limestone

Mo 550' Osage formation

Dc 400' Chattanooga shale

Dis 200' Devonian limestone

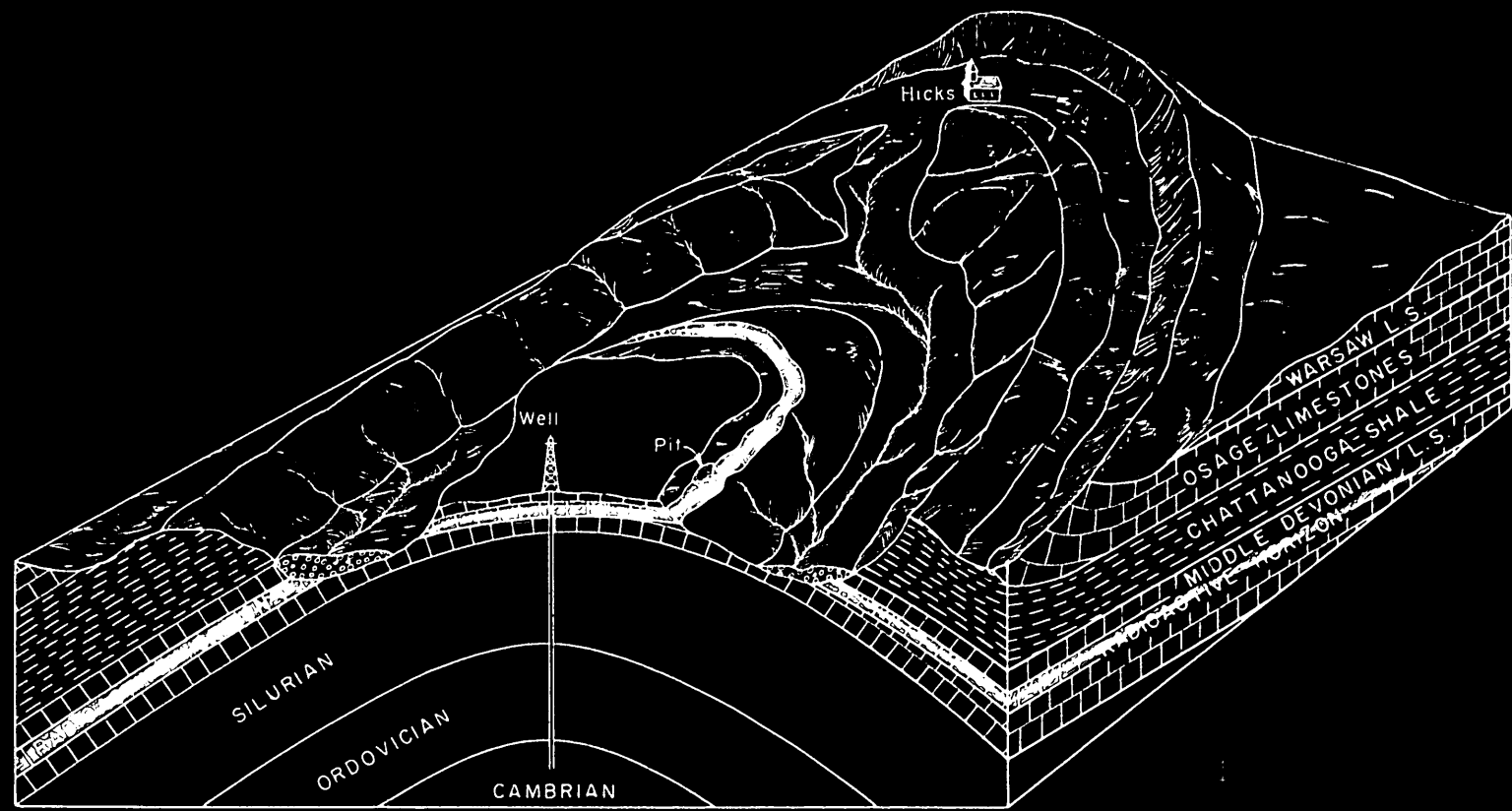
LEGEND

GEOLOGIC MAP OF HICKS DOME

HARDIN COUNTY, ILLINOIS

Scale: 2" = 1 Mi.

Figure 2



BLOCK DIAGRAM OF THE
NORTHERN END OF HICKS DOME
HARDIN COUNTY, ILLINOIS

SHOWING THE RELATION OF THE
RADIOACTIVE ZONE TO THE TOPOGRAPHY,
STRUCTURE, AND STRATIGRAPHY

Not to Scale

Figure 3

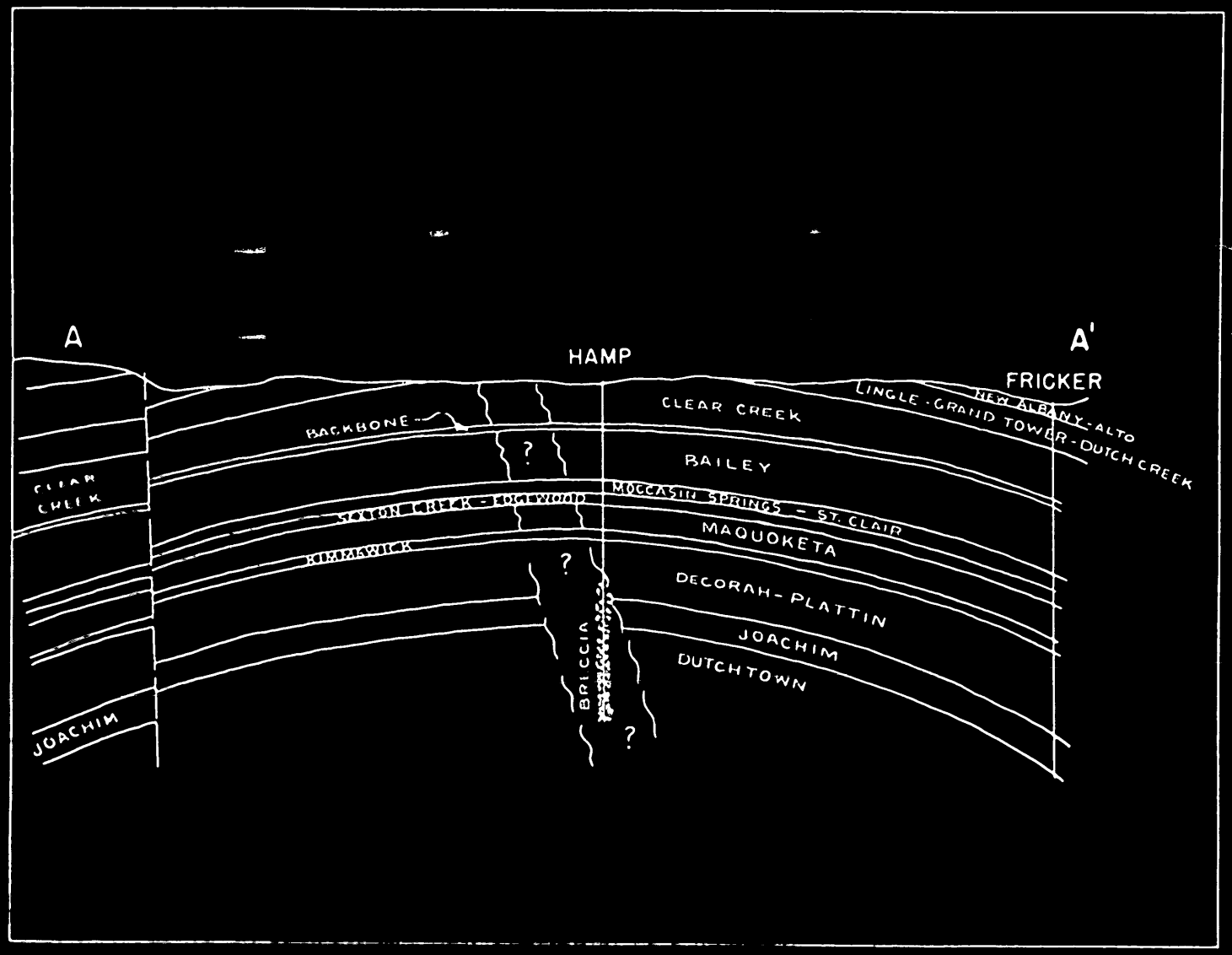


Fig. 4. Cross section showing correlation of Hamp and Fricker wells.

The Uranium Mineralization of Hick's Dome

The lease is underlain by light gray chert with lesser amounts of light gray limestone. The overburden averages about ten feet thick, and apparently is thicker on the lower parts of the slopes of the gently rounded hills, than pn and near their crests. A dark red residual clay has formed just beneath the grass roots, grading into a yellowish sandy clay zone that extends into the weathered bed rock. It is known that sporadic anomalous radioactivity has been found in these clays, particulary the yellow one, throughout much of Hick's Dome. Two such zones are known on the Reynolds' lease, and undoubtedly many more exist, but have escaped detection as they are masked by the upper part of the red clay and a foot or so of soil. These two zones are exposed by bull dozer cuts. These excavations are on and near the crest of a hill, and some bed rock is exposed in them.

While most of the clay exposed in the lower portions of the cuts contains anomalous radioactivity, restricted zones of the material are many times more radioactive. In the cut on top of the hill, the highly radioactive material is within relict small shear zones in the residual clay. The other cut near the crest of the hill reveals two parallel zones of high radioactivity striking north 15° west. One is a highly kaolinized breccia zone about two feet wide. The breccia appears of explosive origin, and probably was formed by the doming processes. A foot or more of sedimentary chert separates the breccia from a parallel shear or fault zone. This fault zone, about a foot wide, consists of high radioactive yellow clayey and sandy material. The chert or highly siliceous limestone enclosing the breccia and fault zone is not appreciably radioactive. The cut exposes these two structures for a vertical distance of over ten feet and a horizontal distance of about fifteen feet. They appear fairly consistent in width and intensity of radiation throughout their exposed entent.

The Uranium Mineralization of Hick's Dome (Continued)

The two areas of anomalous radioactivity exposed by the excavations initially were found by activation of scintillometer instruments carried over the ground surface. The overburden is usually thin in those areas, and detection was facilitated in one instance by shallow dozing done in preparation of a drilling site for oil exploration.

Using a Precision Radiation Model 111B Scintillator, readings as high as 3000 microroentgens per hour were obtained in the bull dozed cuts. There are six scales on this Scintillator instrument graded from most sensitive to least sensitive. This reading of 3000 MRH represented a reading on the sixth, or least sensitive scale of the Scintillator. If higher readings had been obtained, such readings would have been beyond the scope of the Scintillator. Undoubtedly, many similar zones of radioactive clays exist on the lease and would be revealed by surface excavations.

Uraniferous Chalcedonic Silica

Another type of uraniferous material consists of chalcedonic silica or quartz very similar in composition and appearance to the sedimentary chert, although usually darker in color. This material has been found in a vein about two feet wide and as small veinlets in brecciated chert boulders in the bottom and sides of a gully east of the oil well drilling site. Some of the tiny veinlets in the boulders are highly radioactive, and very select portions might assay as high as one per cent uranium oxide. The two foot wide vein of this material is exposed in an old flourspar exploration pit a hundred yards or so southeast of the oil test hole. The vein is only weakly radioactive, but is much more than the surrounding clays. It trends north 65° east, and may be filling one of the regional faults of the northeast striking set.

The Uranium Mineralization of Mick's Dome (Continued)

Inspection of the geologic report of the oil test hole in the Hamp lease indicates a breccia zone was entered at about a thousand feet, as shown in Figure 4, and the hole did not emerge from it although it was drilled nearly two thousand additional feet. The breccia zone was reported to be radioactive, and to contain small amounts of sulfides as well. The reported uranium content of several samples indicate sub-commercial mineralization, but the thoroughness of the investigation for radioactive material and the freedom of reporting allowed by St. Joseph Lead, who drilled the well, is not known.

The Area Southwest of the Lease

The fault a mile or more southwest of the lease was visited in company with the lessees of ground in that area. It is a highly silicified fault zone of the northeast striking set, and is readily traceable along the hill. It disappears beneath the alluvium in the low areas, but its projection would pass through or just north of the Reynolds' lease. Its outcrop is said to be weakly radioactive, but this was not readily apparent due to the high background caused by the fallout from atomic bomb tests. Boulders of brecciated sedimentary chert said to be weakly radioactive were sporadically distributed in the area. Even though well down on the flank of the dome, an explosive breccia zone may have reached the present surface in this locality.

Genesis of the Mineralization

The Chattanooga Shale of Tennessee and Kentucky is known to contain very unusual amounts of uranium. Its equivalent (New Albany shale) crops out as a ring around the flanks of Hick's Dome and once was present about five hundred feet above the present ground surface at the apex of the dome. It would have contained enough uranium to account for the radioactivity found in the clays of the present surface.

Due to indications of igneous intrusions and other volcanic materials, it has also been postulated the uranium mineralization is of hydrothermal origin. Should that be the case, there would be a possibility of mineable concentrations of uranium mineralization in the area in the opinion of one recognized expert uranium geogolist, Kirby C. Coryell, Grand Junction, Colorado. Furthermore, the ore bearing rocks of three of the richest pitchblende producing mines in the world are a very old Precambrian series. These mines are Shinkolobwe, Belgian Congo; Joachimsthal, Czechosolovakia; and Eldorado Mine, Great Bear Lake in Canada. The good evidence of igneous action in the form of several basic dikes in the Hick's Dome area and the existence of breccia containing granitic fragments are easily ascribable to the sources in the Precambrian basement.

The Urgeirica Mine in Portugal ranked after Joachimsthal during the early period of uranium production. This Portuguese mine initially produced secondary uranium minerals that were not recognized as of primary origin until substantial pitchblende was recently discovered in the deeper mine workings at Urgeirica. These uranium deposits are found in veins, some of which have been traced for several thousand feet in the white coarse-grained granite of medium age surrounded by folded Precambrian schists. On the surface the veins are marked by zones of kaolin and limonite and the vein material itself usually

Genesis of the Mineralization (Continued)

has the distinctive dark red Jasper, common to most primary uranium deposits, crisscrossed with white quartz veinlets. This surface dsecription of the Urgeirica Mine in Portugal appears to be similar to the kaolinized veinlets of Hick's Dome and the dark red Jasper is similar to the dark reddish brown radioactive rock of Hick's Dome. It is felt that due to the Precambrian origin of some of the Hick's Dome minerals that there may be a possibility of a pitchblende lode at depths under the crest of the Dome on the Hamp lease. This is one of the main purposes for requesting this exploration project to determine if there are indications of a pitchblende deposit or indications of a uranium deposit of any type in commercial quantities.

The Portuguese deposits described above are the first of four groups of such deposits (Portugal; Marysvale, Utah; Central France; and Boulder area, Montana), all originally believed to be of secondary uranium minerals because of complete oxidation of the primary minerals to considerable depth, thus preventing the early detection of these primary deposits.

The vein of chalcedonic silica exposed in the old pit, and the same material in veinlets in the brecciated chert boulders, suggest the possibility that such a vein, or a zone of numerous, closely spaced small veinlets, may in some places constitute mineralization of commercial grade and volume. The uranium in this material probably is very close to being in equilibrium with its disintegration products, so such a deposit would not necessarily be found at depth only, but may be close to the surface. The possibility that such ore bodies exist, or that they would repay the exploration expense is unpredictable at this stage. It is felt that possible ore bodies within the large zones of explosive breccia would constitute local filling of interstices of the breccia by the uraniferous chalcedonic silica. Their shape and attitude probably would be considerably more irregular than the other possible types

Genesis of the Mineralization (Continued)

of ore bodies.

Samples taken at random from the surface cores indicate the presence of uranium in less than commercial quantities range chemically from as high as .074% with radiometric equivalent U_3O_8 as high as 0.91%. Indications are that the uranium is out of equilibrium, since the radiometric analysis does not agree with the chemical analysis. It is felt that this may be due to leaching out of the uranium or its daughter elements. However, it is further felt that if a primary host rock can be found, or if a primary pitchblende lode source can be located, then the uranium could reasonably be expected to be in equilibrium and with chemical assays substantially above the minimum acceptable of 0.1%. Samples assayed for columbium and rare earths by the Dow Chemical Company, Midland, Michigan show a content of .43% Columbium (metal oxide content); .82% rare earths. The United States Government has a program to purchase columbium and it is desired that this exploration project encompass the search for columbium to ascertain its availability in commercial quantities. Flourspar mineralization was evidenced in virtually every sample core in the Henry Hamp oil hole, either as breccia filling, vein incipient, veinlets or replacement. Some zones indicate flourspar continuing for 150 feet, one assay yielding 12.8% calcium flouride. It is conceivable, according to Illinois geoligists, that any zone within this structure could contain mineable deposits of flourspar or active sphalerite or galena.

Qualifications of Personnel

Subject applicant, Mr. W. G. Reynolds, is Vice President of Reynolds Metals Company. He is active in a number of private business ventures, including oil exploration. He owns major interests in several oil leases in the State of Kentucky. He is also engaged in exploring for uranium and other minerals. This proposed exploration is a personal business enterprise of Mr. Reynolds and has no connection with the Reynolds Metals Company. Mr. Reynolds owns the controlling leases in the Hick's Dome area. He is in a position to furnish his share of the cost of the proposed project in accordance with the regulations on Government participation. His share of the cost can be furnished either in the form of cash or payment of his proportion of actual operating costs as they accrue. He is thoroughly qualified and capable to manage and supervise a group of associates consisting of competent expert technical personnel to handle this project. This personnel consists of geogolists, mining engineers and other technical consultants now working on a consulting basis for Mr. Reynolds in connection with his various oil and mineral enterprises. Some of the personnel operate on a full time basis, being paid directly by Mr. Reynolds and others operating on a part time consulting basis. Other personnel associated with Mr. Reynolds are as follows:

Kirby C. Coryell, Consulting Geogolist and Mining Engineer, Grand Junction, Colorado. Mr. Coryell has made a preliminary survey of Mr. Reynolds' Hick's Dome lease and some of his observations are included in the foregoing description of the geogolical structures. Mr. Coryell is recognized on the Colorado plateau as a top expert on uranium exploration, having served with the Atomic Energy Commission for two years in field exploration work. He was Chief Geogolist for Mr. Vernon Pick during the time of Mr. Pick' major uranium

Qualifications of Personnel (Continued)

discoveries. He is now a Consulting Geogolist and Mining Engineer, residing in Grand Junction, Colorado, and would be available to set up and supervise this exploration project.

C. C. O'Boyle, Consulting Geogolist, Denver, Colorado. Mr. O'Boyle is a qualified consulting geogolist, who is also an employee of Mr. W. G. Reynolds in a consulting capacity for evaluating the Hick's Dome area. He would also be available, if required.

Methods and Cost of Proposed Exploration

Drilling normally would be the initial stage of exploration, preceeded by limited stripping by bull dozer to define the faults and zones to be drilled. The cost of diamond drilling in this area of blocky chert is approximately $10.00 a foot or more, extremely high and core recovery is poor. The less usual procedure of initial exploration by driving tunnels or drifts into the hill sides would cost $30.00 per foot, but would be many times more informative than drilling. Should exploration be undertaken, it is suggested that strips along the crests of the hills be removed to bed rock by a bull dozer. This essential crest stripping would be started at a point about 400 feet directly northeast of the Henry Hamp oil well drilled on the Henry Hamp lease, as shown in Figure 1. Some of the rock on part of this crest has already been dynamited to study the inside of the radioactive rock formations.

Should numerous zones of promise be disclosed by this method they should be explored by drifts and crosscuts. The drifts would consist of two horizontal tunnels, each 4 feet wide x 5 feet high x 400 feet in length. One drift would start at the bottom of the crest of the hill at the location mentioned above and run in a southeasterly direction toward the Fricker well. The second drift would start 20 feet from the above drift on the opposite side of the same ravine and run 400 feet in a southwesterly direction toward the Hamp well. There are a large number of qualified unemployed miners in this area due to the shutdown of the flourspar mines. It is proposed that three miners be employed, under the supervision of Mr. Coryell and a sub-contract entered into with these miners for a flat rate per foot of drift on the basis of the miners furnishing their own explosives, digging tools and other small equipment for removal of rock and debris. It is estimated that such a contract can be made for $30.00 per foot of drift. 800 feet of drift would, therefore, cost $24,000.00.

Methods and Cost of Proposed Exploration (Continued)

Bull dozing operations can be performed on a rental basis in this area for $13.00 per hour. It is estimated that 200 hours of bull dozing would be required, or a total cost of $2600.00. Fuel, operators time, equipment, haulage to and from site and all other costs are included in this $13.00 per hour rate. In connection with the drift mining and bull dozer operations, it is estimated that at least 3 core holes should be diamond drilled to depths of 80 feet at $10.00 per foot, or $800.00 per hole. Thus, a total cost of $2400.00 would cover the diamond drilling operations.

Services of Mr. Coryell at the rate of $100.00 per day, plus travel cost and services of Mr. O'Boyle at the same rate, are estimated to amount to a total of $7200.00. This would cover a period of 50 total working days at $100.00, plus $2200.00 travelling and miscellaneous allowable costs. These 50 days will not necessarily be consecutive days, but will be intermittent as required.

Contingencies, in the amount of 10%, are included to cover miscellaneous items of cost, not mentioned above, but excluding general overhead management, interest, taxes, or any other unrecorded costs or work performed, or cost incurred before the date of the contract.

Cost Summary

1)	Drift Mining - 800 lineal ft. @ $30.00 per ft. (labor and material)	$24,000.
2)	Bull dozing - 200 hrs. @ $13.00 per hr.	2,600.
3)	Diamond drilling - 3 holes of 80 ft. each @ $10.00 per ft.	2,400.
4)	Supervision, Consultants - 50 days at $100.00 per day	5,000.
	Travel and other allowable expenses	2,200.
		$36,200.
5)	Contingencies - 10%	3,600.
	TOTAL	$39,800.

Methods and Cost of Proposed Exploration (Continued)

It is estimated that the work will start within two weeks and be completed within ten months from the date of the exploration contract. If at the end of this exploration contract, commercial minerals in mineable quantities are found, then the applicant may apply for additional funds to cover exploration of applicant's other leases in the Hick's Dome area.

Access roads are readily accesible and are in good condition right up to the crest of the Dome where the exploration operations will take place. Hick's Dome is located approximately 8 road miles from Elizabethtown, Illinois, most of which is over Illinois State Highway #34, which is in excellent condition. Elizabethtown is located directly on the Ohio River, approximately 50 miles north of Paducah. Ore and/or ore concentrates could be readily transported by truck from the site to be loaded on Ohio River barges for shipment to any designated shipping point for further processing.

Local water sources for drilling operations are available from small ponds near the crest of the Dome.

Electricity, if required, can be provided by rental of small portable generator equipment, the cost of which is provided under contingencies. However, it is anticipated that small mining tools will be penumatic operated from rented air compressors, the cost of which can be covered under contingencies.

Summary

In conclusion, it is strongly felt that the efforts to be expended under this proposed exploration contract have every possibility of uncovering uranium, columbium, flourspar, rare earths and other valuable minerals in commercial quantities.

Chemical assays on a few random samples taken to date have not been up to the necessary minimum of 0.1%. However, some chemical assays have come close to this minimum percentage and radiometric assays have substantially exceeded this percentage for equivalent U_3O_8. If uranium bearing ore can be found in equilibrium in a host rock (rather than in the clay), it is felt that such ore has every possibility of chemical assaying in commercial percentages.

The geological structural mechanics of the Hick's Dome area, whether of hydrothermal origin or sedimentary origin, or both, are favorable for the formation of uranium bearing strata.

Columbium has been found in sufficient quantities in a few samples checked to warrant further exploration.

The entire area is already a known flourspar producing area and flourspar has been found on the crest of Hick's Dome in sufficient percentages to indicate the justification for further exploration.

By the expenditure of the above proposed funds, covering a thoroughly established plan for exploration under the guidance of well qualified and experienced personnel, it is felt that if minerals do exist in Hick's Dome in commercial quantities, they will be uncovered and their scope determined by this proposed work.

B. L. Baxter

B. L. Baxter
R.R.-6, Box 574
Louisville, Kentucky

April 27, 1955

C O P Y

WYATT, GRAFTON & GRAFTON
Law Offices

Mari
Lo

Mr. Robert A. Laurence
Executive Officer
Defense Minerals Exploration Administra
Knoxville 2, Tennessee

Dear Mr. Laurence:

We herewith submit on behalf of our client, Mr. William G. Reynolds, an application for aid in a minerals exploration project to be undertaken at Hick's Dome, Hardin County, Illinois. In this connection we enclose four copies of each of the following:

1. Executed form MF-103, Application for Aid in an Exploration Project, Pursuant to DMEA Order 1, under the Defense Production Act of 1950, as amended.

2. A brochure containing all the information required by the Defense Minerals Exploration Administration as set forth in application form MF-103.

3. A photostatic copy of an oil, gas and mineral lease between the lessors, Henry Hamp, Jr. and Goldie Dee Hamp, his wife, and W. G. Reynolds and William A. Chenault, lessees.

4. A photostatic copy of an Agreement of Assignment showing the assignment of William A. Chenault's interest in the above lease to W. G. Reynolds.

To date we have been unable to obtain the Owners Consent to Lien and it is unlikely that we will be able to obtain it in the very near future. Since our client is most anxious to proceed with the exploration project, we request that the Government waive the filing of the consent agreement as permitted by pertinent DMEA regulations. In this regard we wish to point out the financial responsibility of the applicant, Mr. William G. Reynolds, and his past experience in mineral exploration which is covered in the enclosed brochure.

We would appreciate your prompt review of the enclosed application. In your review of the enclosed material if you desire any additional information, you may write Mr. Bruce Baxter, Browns Lane, Louisville, Kentucky, or call him at CA 6521.

Very truly yours,

s/s James T. Carey

COPIED: DMEA Office Knoxville- (zm)
3-copies to Opr. Com. Mr. Millar & Files

RECEIVED
JUN 17 1955

APPLICATION FOR AID IN MINERAL EXPLORATION
PURSUANT TO DMEA ORDER #1
FOR
HICK'S DOME, HARDIN COUNTY, ILLINOIS

APPLICANT: W. G. Reynolds
Anchorage, Kentucky

DATE: April 27, 1955

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Form Approved.
Budget Bureau No. 42-R1035.2.

RECEIVED
JUN 17 1955

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

Not to be filled in by applicant

Docket No. 3855
Metal or Mineral Uranium
Date Received 6/17/55
Estimated Cost $39,800
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address: William G. Reynolds
Stonegate Road
Anchorage, Kentucky

(*b*) If other than an individual, add to your name above whether a corporation, partnership, etc., and the name of the State in which incorporated or otherwise organized.

(*c*) If a corporation, add to above statement, titles, names and addresses of officers.

(*d*) If a partnership, add to the above statement the names and addresses of all partners.

2. *General.*—Read DMEA Order 1, "Government Aid in Defense Exploration Projects," before completing this application. Submit this application and all accompanying papers in quadruplicate (four copies), with your name and address on each sheet of the application and on all accompanying papers. Where sufficient space is not provided on the form for all required information, state it on an accompanying paper, with a reference in each case to the instruction to which it refers by number. Comply with all applicable instructions; or, if not applicable, so state. File the application with Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest field executive officer thereof.

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract

See copy of lease enclosed herewith

(*b*) State any mine name by which the property is known. Hick's Dome, Hardin County, Illinois

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise
Lessee

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property.

(*e*) If you own the land, describe any liens or encumbrances on it

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice.

4. *Physical description.*—(*a*) Describe in detail any mining or exploration operations which have been or now are being conducted upon the land, including existing mine workings and production facilities. State your interest, if any, in such operations. Also describe accessibility of mine workings for examination purposes.

(*b*) State past and current production, and ore reserves, if any, giving quantities and grades.

(*c*) Describe the geologic features of the property, including mineralization, type of deposit (vein, bedded, etc.), and your reasons for wishing to explore. Illustrate with maps or sketches. Send with your application (but not necessarily as a part of it) any geologic or engineering report, assay maps, or other technologic information you may have, indicating on each whether you require its return to you.

(*d*) State the facts with respect to the accessibility of the project: Access roads, distances to shipping, supply and residence points.

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power.

See enclosed brochure

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16—66551-1
U. S. Geological Survey
Geologic Division
Knoxville, Tenn.

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore see enclosed brochure

(*b*) Describe fully the proposed work, including a map or sketch of the property showing a plan (and cross sections if needed) of any present mine workings, and the location of the proposed exploration work as related to such features as contacts, veins, ore-bearing beds, etc.

(*c*) The work will start within 14 days and be completed within 10 months from the date of an exploration project contract.

(*d*) State the operating experience and background of the applicant with relation to the ability to carry out such exploration project, and also that of the person or persons who will supervise the operations.

6. *Estimate of costs.*—Furnish a detailed estimate of the costs of the proposed work (you will have to use a separate sheet), under the following headings. Add the totals under all headings to give the estimated total cost of the project:

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.).

(*b*) *Labor, supervision, consultants.*—Include an itemized schedule of numbers, classes and rates of wages, salaries or fees for necessary labor, supervision and engineering and geological consultants.

(*c*) *Operating materials and supplies.*—Furnish an itemized list, including items of equipment costing less than $50 each, and power, water and fuel.

(*d*) *Operating equipment.*—Furnish an itemized list of any operating equipment to be rented, purchased, or which is owned and will be furnished by the Operator, with the estimated rental, purchase price, or suggested use-allowance based on present value, as the case may be.

(*e*) *Rehabilitation and repairs.*—Furnish a detailed list showing the cost of any necessary initial rehabilitation or repairs of existing buildings, installations, fixtures, and movable operating equipment, now owned by the Operator and which will be devoted to the exploration project.

(*f*) *New buildings, improvements, installations.*—Furnish a detailed list showing the cost of any necessary buildings, fixed improvements, or installations to be purchased, installed or constructed for the benefit of the exploration project.

(*g*) *Miscellaneous.*—Furnish a detailed list showing the cost of repairs to and maintenance of operating equipment (not including initial rehabilitation or repairs of the Operator's equipment), analytical work, accounting, workmen's compensation and employers' liability insurance, and payroll taxes.

(*h*) *Contingencies.*—Give an estimate of any necessary allowances for contingencies not included in the costs stated above.

NOTE.—No items of general overhead, corporate management, interest, taxes (other than payroll and sales taxes), or any other indirect costs, or work performed or costs incurred before the date of the contract, should be included in the estimate of costs. see enclosed brochure

7. (*a*) Are you prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation (Sec. 7, DMEA No. 1)? Yes

(*b*) How do you propose to furnish your share of the costs?

[X] Money [ ] Use of equipment owned by you [ ] Other

Explain in detail on acompanying paper. see enclosed brochure

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief.

Dated June 14, 1955

W. G. Reynolds
(Applicant)

By

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—66551-1

TABLE OF CONTENTS

		Page
I.	General Introduction	1
II.	Regional Geology	2
III.	The Uranium Mineralization of Hick's Dome	3,4,5
IV.	Genesis of the Mineral	6,7,8
V.	Qualifications of Personnel	9,10
VI.	Methods and Cost of Proposed Exploration	11,12,13
VII.	Summary	14

PROPOSED MINERAL EXPLORATION PROJECT FOR HICK'S DOME

RECEIVED
JUN 17 1955

General Introduction

Subject applicant, Mr. W. G. Reynolds, Anchorage, Kentucky, desires to make application for aid in mineral exploration of certain acreage which he holds as lessee on Hick's Dome, Hardin County, Illinois.

The acreage upon which exploration is desired covers 51.8 acres, known as the Henry Hamp Lease, Section 25 and 30; Township 11S, Range 7E and 8E, as shown in Figures 2 and 3, and as described in recorded Lease No. 9422, filed for record in the Recorder's Office of Hardin County, February 19, 1955. This property is approximately 8 miles north of Elizabethtown, Illinois. The applicant owns several additional leases in this area, other than the one mentioned above, total in excess of 500 acres, but desires to explore the Hamp Lease only at this time. The Henry Hamp Lease is in the center of Hick's Dome and it is felt that this is the key lease for this area. Anomalous radioactivity is widespread on the ground surface at and near the apex of this dome, which is on this lease.

Hick's Dome is also located in the heart of the flourspar mineral area of south eastern Illinois. Lead and zinc mines are also numerous in this area. Unusually high radioactive scintillometer readings and other indications of mineralization, as subsequently described in detail, are the basis for this project application.

Regional Geology

As shown in Figure 3, Hick's Dome is regarded as a crypto-volcanic structure, known as a quaquaversal dip. A broken system of ring faults surrounds the Dome and intrusive dikes dot the area, as shown in Figure 1. A layer of New Albany shale, generally considered as a potential source of Uranium, surrounds the area, as shown in the Block Diagram of Figure 3. It has been postulated that the doming is of explsoive volcanic origin, the result of sudden liberation of pent-up volcanic gases that had accumulated relatively near the surface.

The Hick's Dome faulting is mostly of two sets, one striking about N 20° W and the other about N 65° E. Some of the dikes are of a very deep-seated origin, generally confined to the northwest striking faults. The flourspar mineralization, which is abundant in this region, largely is emplaced in the northeast striking set of faults. In addition to these faults, there are a few curved ones around the flanks of the Dome that appear to be concentric with it. These ring-like faults are probably related in origin to the doming process.

The Uranium Mineralization of Hick's Dome

The lease is underlain by light gray chert with lesser amounts of light gray limestone. The overburden averages about ten feet thick, and apparently is thicker on the lower parts of the slopes of the gently rounded hills, than pn and near their crests. A dark red residual clay has formed just beneath the grass roots, grading into a yellowish sandy clay zone that extends into the weathered bed rock. It is known that sporadic anomalous radioactivity has been found in these clays, particulary the yellow one, throughout much of Hick's Dome. Two such zones are known on the Reynolds' lease, and undoubtedly many more exist, but have escaped detection as they are masked by the upper part of the red clay and a foot or so of soil. These two zones are exposed by bull dozer cuts. These excavations are on and near the crest of a hill, and some bed rock is exposed in them.

While most of the clay exposed in the lower portions of the cuts contains anomalous radioactivity, restricted zones of the material are many times more radioactive. In the cut on top of the hill, the highly radioactive material is within relict small shear zones in the residual clay. The other cut near the crest of the hill reveals two parallel zones of high radioactivity striking north 15° west. One is a highly kaolinized breccia zone about two feet wide. The breccia appears of explosive origin, and probably was formed by the doming processes. A foot or more of sedimentary chert separates the breccia from a parallel shear or fault zone. This fault zone, about a foot wide, consists of high radioactive yellow clayey and sandy material. The chert or highly siliceous limestone enclosing the breccia and fault zone is not appreciably radioactive. The cut exposes these two structures for a vertical distance of over ten feet and a horizontal distance of about fifteen feet. They appear fairly consistent in width and intensity of radiation throughout their exposed entent.

The Uranium Mineralization of Hick's Dome (Continued)

The two areas of anomalous radioactivity exposed by the excavations initially were found by activation of scintillometer instruments carried over the ground surface. The overburden is usually thin in those areas, and detection was facilitated in one instance by shallow dozing done in preparation of a drilling site for oil exploration.

Using a Precision Radiation Model 111B Scintillator, readings as high as 3000 microroentgens per hour were obtained in the bull dozed cuts. There are six scales on this Scintillator instrument graded from most sensitive to least sensitive. This reading of 3000 MRH represented a reading on the sixth, or least sensitive scale of the Scintillator. If higher readings had been obtained, such readings would have been beyond the scope of the Scintillator. Undoubtedly, many similar zones of radioactive clays exist on the lease and would be revealed by surface excavations.

Uraniferous Chalcedonic Silica

Another type of uraniferous material consists of chalcedonic silica or quartz very similar in composition and appearance to the sedimentary chert, although usually darker in color. This material has been found in a vein about two feet wide and as small veinlets in brecciated chert boulders in the bottom and sides of a gully east of the oil well drilling site. Some of the tiny veinlets in the boulders are highly radioactive, and very select portions might assay as high as one per cent uranium oxide. The two foot wide vein of this material is exposed in an old flourspar exploration pit a hundred yards or so southeast of the oil test hole. The vein is only weakly radioactive, but is much more than the surrounding clays. It trends north 65° east, and may be filling one of the regional faults of the northeast striking set.

The Uranium Mineralization of Hick's Dome (Continued)

Inspection of the geologic report of the oil test hole in the Hamp lease indicates a breccia zone was entered at about a thousand feet, as shown in Figure 4, and the hole did not emerge from it although it was drilled nearly two thousand additional feet. The breccia zone was reported to be radioactive, and to contain small amounts of sulfides as well. The reported uranium content of several samples indicate sub-commercial mineralization, but the thoroughness of the investigation for radioactive material and the freedom of reporting allowed by St. Joseph Lead, who drilled the well, is not known.

The Area Southwest of the Lease

The fault a mile or more southwest of the lease was visited in company with the lessees of ground in that area. It is a highly silicified fault zone of the northeast striking set, and is readily traceable along the hill. It disappears beneath the alluvium in the low areas, but its projection would pass through or just north of the Reynolds' lease. Its outcrop is said to be weakly radioactive, but this was not readily apparent due to the high background caused by the fallout from atomic bomb tests. Boulders of brecciated sedimentary chert said to be weakly radioactive were sporadically distributed in the area. Even though well down on the flank of the dome, an explosive breccia zone may have reached the present surface in this locality.

Genesis of the Mineralization

The Chattanooga Shale of Tennessee and Kentucky is known to contain very unusual amounts of uranium. Its equivalent (New Albany shale) crops out as a ring around the flanks of Hick's Dome and once was present about five hundred feet above the present ground surface at the apex of the dome. It would have contained enough uranium to account for the radioactivity found in the clays of the present surface.

Due to indications of igneous intrusions and other volcanic materials, it has also been postulated the uranium mineralization is of hydrothermal origin. Should that be the case, there would be a possibility of mineable concentrations of uranium mineralization in the area in the opinion of one recognized expert uranium geogolist, Kirby C. Coryell, Grand Junction, Colorado. Furthermore, the ore bearing rocks of three of the richest pitchblende producing mines in the world are a very old Precambrian series. These mines are Shinkolobwe, Belgian Congo; Joachimsthal, Czechosolovakia; and Eldorado Mine, Great Bear Lake in Canada. The good evidence of igneous action in the form of several basic dikes in the Hick's Dome area and the existence of breccia containing granitic fragments are easily ascribable to the sources in the Precambrian basement.

The Urgeirica Mine in Portugal ranked after Joachimsthal during the early period of uranium production. This Portuguese mine initially produced secondary uranium minerals that were not recognized as of primary origin until substantial pitchblende was recently discovered in the deeper mine workings at Urgeirica. These uranium deposits are found in veins, some of which have been traced for several thousand feet in the white coarse-grained granite of medium age surrounded by folded Precambrian schists. On the surface the veins are marked by zones of kaolin and limonite and the vein material itself usually

Genesis of the Mineralization (Continued)

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The Portuguese deposits described above are the first of four groups of such deposits (Portugal; Marysvale, Utah; Central France; and Boulder area, Montana), all originally believed to be of secondary uranium minerals because of complete oxidation of the primary minerals to considerable depth, thus preventing the early detection of these primary deposits. not in 58.8 acre lease

The vein of chalcedonic silica exposed in the old pit, and the same material in veinlets in the brecciated chert boulders, suggest the possibility that such a vein, or a zone of numerous, closely spaced small veinlets, may in some places constitute mineralization of commercial grade and volume. The uranium in this material probably is very close to being in equilibrium with its disintegration products, so such a deposit would not necessarily be found at depth only, but may be close to the surface. The possibility that such ore bodies exist, or that they would repay the exploration expense is unpredictable at this stage. It is felt that possible ore bodies within the large zones of explosive breccia would constitute local filling of interstices of the breccia by the uraniferous chalcedonic silica. Their shape and attitude probably would be considerably more irregular than the other possible types

Genesis of the Mineralization (Continued)

of ore bodies.

Samples taken at random from the surface cores indicate the presence of uranium in less than commercial quantities range chemically from as high as .074% with radiometric equivalent U_3O_8 as high as 0.91%. Indications are that the uranium is out of equilibrium, since the radiometric analysis does not agree with the chemical analysis. It is felt that this may be due to leaching out of the uranium or its daughter elements. However, it is further felt that if a primary host rock can be found, or if a primary pitchblende lode source can be located, then the uranium could reasonably be expected to be in equilibrium and with chemical assays substantially above the minimum acceptable of 0.1%. Samples assayed for columbium and rare earths by the Dow Chemical Company, Midland, Michigan show a content of .43% Columbium (metal oxide content); .82% rare earths. The United States Government has a program to purchase columbium and it is desired that this exploration project encompass the search for columbium to ascertain its availability in commercial quantities. Flourspar mineralization was evidenced in virtually every sample core in the Henry Hamp oil hole, either as breccia filling, vein incipient, veinlets or replacement. Some zones indicate flourspar continuing for 150 feet, one assay yielding 12.8% calcium flouride. It is conceivable, according to Illinois geoligists, that any zone within this structure could contain mineable deposits of flourspar or active sphalerite or galena.

Qualifications of Personnel

Subject applicant, Mr. W. G. Reynolds, is Vice President of Reynolds Metals Company. He is active in a number of private business ventures, including oil exploration. He owns major interests in several oil leases in the State of Kentucky. He is also engaged in exploring for uranium and other minerals. This proposed exploration is a personal business enterprise of Mr. Reynolds and has no connection with the Reynolds Metals Company. Mr. Reynolds owns the controlling leases in the Hick's Dome area. He is in a position to furnish his share of the cost of the proposed project in accordance with the regulations on Government participation. His share of the cost can be furnished either in the form of cash or payment of his proportion of actual operating costs as they accrue. He is thoroughly qualified and capable to manage and supervise a group of associates consisting of competent expert technical personnel to handle this project. This personnel consists of geogolists, mining engineers and other technical consultants now working on a consulting basis for Mr. Reynolds in connection with his various oil and mineral enterprises. Some of the personnel operate on a full time basis, being paid directly by Mr. Reynolds and others operating on a part time consulting basis. Other personnel associated with Mr. Reynolds are as follows:

Kirby C. Coryell, Consulting Geogolist and Mining Engineer, Grand Junction, Colorado. Mr. Coryell has made a preliminary survey of Mr. Reynolds' Hick's Dome lease and some of his observations are included in the foregoing description of the geogolical structures. Mr. Coryell is recognized on the Colorado plateau as a top expert on uranium exploration, having served with the Atomic Energy Commission for two years in field exploration work. He was Chief Geogolist for Mr. Vernon Pick during the time of Mr. Pick' major uranium

Qualifications of Personnel (Continued)

discoveries. He is now a Consulting Geogolist and Mining Engineer, residing in Grand Junction, Colorado, and would be available to set up and supervise this exploration project.

C. C. O'Boyle, Consulting Geogolist, Denver, Colorado. Mr. O'Boyle is a qualified consulting geogolist, who is also an employee of Mr. W. G. Reynolds in a consulting capacity for evaluating the Mick's Dome area. He would also be available, if required.

Methods and Cost of Proposed Exploration

Drilling normally would be the initial stage of exploration, preceeded by limited stripping by bull dozer to define the faults and zones to be drilled. The cost of diamond drilling in this area of blocky chert is approximately $10.00 a foot or more, extremely high and core recovery is poor. The less usual procedure of initial exploration by driving tunnels or drifts into the hill sides would cost $30.00 per foot, but would be many times more informative than drilling. Should exploration be undertaken, it is suggested that strips along the crests of the hills be removed to bed rock by a bull dozer. This essential crest stripping would be started at a point about 400 feet directly northeast of the Henry Hamp oil well drilled on the Henry Hamp lease, as shown in Figure 1. Some of the rock on part of this crest has already been dynamited to study the inside of the radioactive rock formations.

Should numerous zones of promise be disclosed by this method they should be explored by drifts and crosscuts. The drifts would consist of two horizontal tunnels, each 4 feet wide x 5 feet high x 400 feet in length. One drift would start at the bottom of the crest of the hill at the location mentioned above and run in a southeasterly direction toward the Fricker well. The second drift would start 20 feet from the above drift on the opposite side of the same ravine and run 400 feet in a southwesterly direction toward the Hamp well. There are a large number of qualified unemployed miners in this area due to the shutdown of the flourspar mines. It is proposed that three miners be employed, under the supervision of Mr. Coryell and a sub-contract entered into with these miners for a flat rate per foot of drift on the basis of the miners furnishing their own explosives, digging tools and other small equipment for removal of rock and debris. It is estimated that such a contract can be made for $30.00 per foot of drift. 800 feet of drift would, therefore, cost $24,000.00.

Methods and Cost of Proposed Exploration (Continued)

Bull dozing operations can be performed on a rental basis in this area for $13.00 per hour. It is estimated that 200 hours of bull dozing would be required, or a total cost of $2600.00. Fuel, operators time, equipment, haulage to and from site and all other costs are included in this $13.00 per hour rate. In connection with the drift mining and bull dozer operations, it is estimated that at least 3 core holes should be diamond drilled to depths of 80 feet at $10.00 per foot, or $800.00 per hole. Thus, a total cost of $2400.00 would cover the diamond drilling operations.

Services of Mr. Coryell at the rate of $100.00 per day, plus travel cost and services of Mr. O'Boyle at the same rate, are estimated to amount to a total of $7200.00. This would cover a period of 50 total working days at $100.00, plus $2200.00 travelling and miscellaneous allowable costs. These 50 days will not necessarily be consecutive days, but will be intermittent as required.

Contingencies, in the amount of 10%, are included to cover miscellaneous items of cost, not mentioned above, but excluding general overhead management, interest, taxes, or any other unrecorded costs or work performed, or cost incurred before the date of the contract.

Cost Summary

1)	Drift Mining - 800 lineal ft. @ $30.00 per ft. (labor and material)	$24,000.
2)	Bull dozing - 200 hrs. @ $13.00 per hr.	2,600.
3)	Diamond drilling - 3 holes of 80 ft. each @ $10.00 per ft.	2,400.
4)	Supervision, Consultants - 50 days at $100.00 per day	5,000.
	Travel and other allowable expenses	2,200.
		$36,200.
5)	Contingencies - 10%	3,600.
	TOTAL	$39,800.

Methods and Cost of Proposed Exploration (Continued)

It is estimated that the work will start within two weeks and be completed within ten months from the date of the exploration contract. If at the end of this exploration contract, commercial minerals in mineable quantities are found, then the applicant may apply for additional funds to cover exploration of applicant's other leases in the Hick's Dome area.

Access roads are readily accesible and are in good condition right up to the crest of the Dome where the exploration operations will take place. Hick's Dome is located approximately 8 road miles from Elizabethtown, Illinois, most of which is over Illinois State Highway #34, which is in excellent condition. Elizabethtown is located directly on the Ohio River, approximately 50 miles north of Paducah. Ore and/or ore concentrates could be readily transported by truck from the site to be loaded on Ohio River barges for shipment to any designated shipping point for further processing.

Local water sources for drilling operations are available from small ponds near the crest of the Dome.

Electricity, if required, can be provided by rental of small portable generator equipment, the cost of which is provided under contingencies. However, it is anticipated that small mining tools will be penumatic operated from rented air compressors, the cost of which can be covered under contingencies.

Summary

In conclusion, it is strongly felt that the efforts to be expended under this proposed exploration contract have every possibility of uncovering uranium, columbium, flourspar, rare earths and other valuable minerals in commercial quantities.

Chemical assays on a few random samples taken to date have not been up to the necessary minimum of 0.1%. However, some chemical assays have come close to this minimum percentage and radiometric assays have substantially exceeded this percentage for equivalent U_3O_8. If uranium bearing ore can be found in equilibrium in a host rock (rather than in the clay), it is felt that such ore has every possibility of chemical assaying in commercial percentages.

The geological structural mechanics of the Hick's Dome area, whether of hydrothermal origin or sedimentary origin, or both, are favorable for the formation of uranium bearing strata.

Columbium has been found in sufficient quantities in a few samples checked to warrant further exploration.

The entire area is already a known flourspar producing area and flourspar has been found on the crest of Hick's Dome in sufficient percentages to indicate the justification for further exploration.

By the expenditure of the above proposed funds, covering a thoroughly established plan for exploration under the guidance of well qualified and experienced personnel, it is felt that if minerals do exist in Hick's Dome in commercial quantities, they will be uncovered and their scope determined by this proposed work.

B. L. Baxter

B. L. Baxter
R.R.-6, Box 574
Louisville, Kentucky

April 27, 1955

Section 25 and 30 Township 11S Range 7E and 8E containing 51.80 acres, more or less, and being the same land conveyed to lessor, together with all land or interests owned by Lessor adjoining or contiguous to the land above described, whether in the same or different surveys. For determining the amount of any money payment hereunder the leases premises shall be treated as comprising 51.80 acres, whether there be more or less. The word "mineral" as used in this lease includes oil, gas, distillate, sulphur and any other minerals whether similar or dissimilar, unless the context clearly requires a different meaning.

OIL, GAS AND MINERAL LEASE

THIS AGREEMENT, made this 14th day of FEBRUARY, 1955 between Lessors

HENRY HAMP, JR., and GOLDIE DEE HAMP, his wife

whose address is 3728 Marconi Avenue, Sacramento, Calif

and Wm. A. Chenault and W. G. Reynolds LESSEE whose address is Louisville, Kentucky.

WITNESSETH:

1. LESSOR in consideration of ONE DOLLAR ($1.00) in hand paid, and of the agreements of Lessee herein contained, hereby grants, leases and lets exclusively unto Lessee, for the purpose of testing by any method for formations or structures and prospecting and drilling for, mining, and producing oil, gas distillate, sulphur and other minerals, injecting salt water, other fluids, and gas, into subsurface strata, storing minerals and fluids, laying pipe lines, dredging canals, building roads, bridges, docks, tanks, powers, stations, telephone and electric transmission lines, and other structures and facilities including houses for employees, necessary for producing, saving, caring for, treating, processing, and transporting minerals and conducting said operations, the following described land - situated in the County of Marion, State of Illinois to wit:

All that part of the Northeast (NE) Quarter of the Southeast (SE) Quarter of Section Twenty-five (25) Township 11 South of Range 7E, lying Northeast of public road containing 1½ acres more or less and also the North half of the Northwest Quarter of the Southwest Quarter and a part of the East half of the Southwest quarter described by metes as follows: Beginning at the Northwest corner of the said E/2 SW., thence running South with the West Line thereof to the center point of the West line of the SE 1/4 of the SW 1/4, being the NW corner of the Silas Stacey tract, thence East 40 rods, thence North to a point 30 rods North of the North line of the SE 1/4 of the SW 1/4, thence East 33 rods to the west line of the Pleas Rose tract, thence, North to the N. line of the said E/2 SW., thence West to the Place of beginning in Sec. 30 T. 11 S, R 8E. containing 51.80 acres.

2. Subject to the other provisions herein contained, this lease shall remain in force for a term of 60 days from this date, (hereinafter called "primaryterm") and as long thereafter as oil, gas distillate sulphur or other mineral is produced hereunder, or any operation is conducted, any payment is made, or any condition exists, which as hereinafter provided continues this lease in force.

3. The royalties reserved by Lessor, and which shall be paid by Lessee are (a) on oil (including but notlimited to distillate and condensate) one-eighth (1/8th) of that produced and saved from the leased premises, the same to be delivered at the wells or to the credit of Lessor in the pipe line to which the wells may be connected; provided, however, Lessee may from time to time purchase

(b) on gas (including casinghead gas and other vapors) produced from said land and sold or used off the leased premises or in the manufacture of gasoline or other product, the current market price at the wells of one-eighth (1/8th) of the gas so sold or used; (c) on sulphur mined and marketed, One Dollar ($1.00) per long ton (2240 lbs); (d) on all other minerals mined and marketed, one-tenth (1/10th) of the current market price at the wells or mine. During any period (whether before or after expiration of the primary term hereof) when gas is not being so sold or used due to lack of market and the well or wells are shut in and there is no current production of oil or operations on said leased premises sufficient to keep this lease in force. Lessee may pay or tender as royalty an amount (which shall be the same regardless of the number of the shut in wells) per half year, equal to one-half the annual rental hereafter provided, and it will be considered that gas is being produced, for all purposes of this lease during any period for which such payment is made; such amount for the first half year to e payable within ninety (90) days following shutting in of the first well and for subsequent periods semi-annually in advance thereafter. The amount of each royalty payment or tender may be made by check or draft of Lessee in the same manner as provided for "rental" payments under Paragraph Four (4) hereof. Lessee shall have free use of oil, distillate, condensate, gas and water from the leased premises, except water from Lessor's wells and tanks, for all operations hereunder. Lessor shallhave the privilege at his risk and expense of using gas from any well, producing gas only, on the leased premises for stoves and inside lights in the principal dwelling thereon out of any surplus gas not needed for operations hereunder.

4. If drilling operations or mining operations are not commenced on the leased premises on or before 60 days from this date, this lease shall then terminate as to both parties.

5. If during the primary term and before there has been a discovery of any mineral on the leased premises Lessee should drill a dry hole or fail in an exploratory attempt to establish production hereunder, this lease shall not be terminated thereby if Lessee commences further drilling operations, or mining operations, or commences or resumes the payment or tender of rentals on or before the rental paying date, if any, next ensuing after thirty days following completion of the dry hole or failure of such exploratory attempt, or, if there be no such rental paying date, commences such further operations before the expiration of the primary term. If after the discovery of any mineral the production thereof and also of the other discovered mineral of minerals. If any, should cease from any cause this lease shall not be terminated thereby if within sixty days thereafter production of any mineral or minerals is restored or Lessee commences drilling operations, reworking operations, or mining operations, or if it be within the primary term. Lessee commences or resumes the payment or tender of rentals on or before the rental paying date, if any, next ensuing after thirty days following such cessation of production. If at the expiration of the primary term no mineral is being produced on the leased premises but Lessee is then engaged in drilling operations, reworking operations, or mining operations thereon, this lease shall remain in force so long as such operation (whether on the same well or mine or on different wells or mines successively) are continuously prosecuted and, if they result in the production of a mineral so long thereafter as any mineral is produced hereunder from the leased premises. Such operations, after the expiration of the primary term, shall be deemed to be continuously prosecuted if not more than sixty days shall elapse between the

completion of drilling operations, reworking operations, or mining operations, on one well or mine and the commencement of such operations on another well or mine.

6. Lessee shall have the right at any time until one year after the expiration of this lease to remove all fistures and other property placed by Lessee on the leased premises, including the right to draw and remove all casing. When required by Lessor, Lessee will bury all pipe lines below ordinary plow depth in cultivated land. Lessee shall pay Lessor for damages to Lessor's growing crops caused by Leesee's operations. Any structures and facilities placed on the leased premises by Lessee for operations thereon and any well or wells on the leased premises drilled or used for the injection of sale water, other fluids, or gas may also be used for Lessee's operations on other lands in the field.

7. Lessee is hereby granted the right at any time and from time to time to unitize the leased premises or any portion or portions thereof, as to all strata or any stratum or strata, with any other lands as to all strata or any stratum or strata, for the production primarily of oil or primarily of gas with or without distillate. However, no unit for the production primarily of oil shall embrace more than 40 acres, or for the production primarily of gas with or without distillate more than 640 acres; provided that if any governmental regulation shall prescribe a spacing pattern for the development of the field or allocate a producing allowa le based on acreage per well, then any such unit may embrace as much additional acreage as may be so prescribed or as may be used in such allocation of allowable. Lessee shall file written unit designation in the county in which the leased premises are located. Operations upon and production from the unit shall be treated as if such operations were upon or such production were from the leased premises whether or not the well or wells are located thereon. The entire acreage within a unit shall be treated for all purposes as if it were covered by and included in this lease except that the royalty on production from the unit shall be as below provided, and except that in calculating the amount of any rentals or shut in gas royalties, only that part of the acreage originally leased and then actually embraced by this lease shall be counted. In respect to production from the unit. Lessee shall pay Lessor, in lieu of other royalties thereon, only such proportion of the royalties stipulated in paragraph 3 as the amount of his acreage placed in the unit, or his royalty interest therein on an acreage basis, bears to the total acreage in the unit.

8. The rights of either party hereunder may be assigned or subleased in whole or in part and the provisions hereof whall extend to their heirs, successors, sublessees, and assigns. However, no change or division in ownership of the lands, rentals, or royalties, shall enlarge the obligations or siminish the rights of Lessee. No change or division in such ownership shall be binding on Lessee until thirty days after the Lessee shall have been furnished by registered mail at its above stated address with the original or a certified copy of the recorded instrument or instruments evidencing same. In the event of assignment or sublease hereof in whole or in part liability for breach of any obligation hereunder shall rest exclusively upon the owner of this lease or of a portion thereof or of an interest therein who commits such breach. In the event of the death of any person entitled to rentals hereunder

Lessee may pay or tender such rentals to the authorized depository bank to the credit of the estate of the deceased until such time as Lessee is furnished proper evidence of the appointment and qualifications of an executor or administrator of the estate or, if there be none, then until Lessee is furnished evidence satisfactory to it as to the heirs or devisees of the deceased. In the event of assignment or sublease of this lease as to a segregated protion of said land, the rentals payable hereunder shall be apportionable among the several leasehold owners (including subleasees) ratably according to the surface area of each, and default in rental payment by one shall not affect the rights of other leasehold owners (including su lessees).

9. Lessee may at any time, and from time to time, execute and deliver to Lessor or place of record a release covering all or any portion of the leased premises, and thereupon shall be relieved of all obligations as to the acreage surrendered. After a release of this lease as to only part of the acreage the rentals payable hereunder shall be reduced in the proportion that the acreage covered hereby is reduced by each such release.

10. In the event Lessor considers that Lessee has failed to comply with any obligation hereunder, express or implied. Lessor shall notify Lessee in writing specifying in what respects Lessor claims Lessee has breached this lease. The service of such notice and the lapse of sixty days without Lessee's meeting or commencing to meet the alleged breaches shall be a condition precedent to any action by Lessor for any cause. If within sixty days after receipt of such notice Lessee shall meet or commence to meet the breaches alleged by Lessor, Lessee shall be deemed in default hereunder. The breach by Lessee of any obligation hereunder shall not work a forfeiture or termination in whole or in part, of this lease.

11. When drilling, production, or other operations are delayed or interrupted by lack of water, labor or material, or by fire, storm, flood, war, rebellion, insurrection, riot, strike, differences, with workmen, or failure of carriers to transport or furnish facilities for transportation or lack of market for the minerals produced, or as a result of some order, requisition or necessity of the government, or as the result of any cause whatsoever beyond the control of Lessee, the time of such delay or interruption shall not be counted against Lessee and this lease shall remain in force during such delay or interruption and ninety days thereafter, anything in this lease to the contrary notwithstanding.

12. Lessor hereby warrants and agrees to defend the title to said land. If Lessor owns less interest than the entire fee or mineral estate (even though this lease purports to cover only such lesser interest) the rentals and royalties to be paid Lessor shall be reduced proportionately. Lesee at its option may discharge any tax, mortgage, or other lien upon said land either in whole or in part, and thereby be subrogated to such lien with the right to enforce same ane apply rentals and royalties toward satisfying same.

13. Should any one or more of the parties above named as Lessor fail to execute this lease, it shall nevertheless be binding upon all such parties who do execute it as Lessor. The word "Lessor" as used in this lease means the party or parties who execute this lease as Lessor, although not named above The Lessor hereby wai es and releases all right of dover and homestead in the premises herein described.

14. It is understood and agreed by the Lessor and Lessee, that after a period of 30 days from date of this Agreement, if no royalty payment from any oil, gas or other mineral whatsoever has been paid to Lessor, then and in that event, the Lessee agrees to pay the Lessor, in lieu of such royalty payment the sum of ~~Seventy-five~~ Ten Dollars ($~~75.00~~ 10.00) per month until such Royalty payment from oil, gas or other minerals is paid to the Lessor. The payment in lieu of a Royalty payment will continue for the term of this Agreement.

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IN WITNESS WHEREOF, this instrument is executed on the date first above written.

WITNESSES;

Henry Hamp Jr
Goldie Dee Hamp

LESSOR

STATE OF CALIFORNIA }
COUNTY OF SACRAMENTO } SS

On this 14th day of February in the year one thousand nine hundred and fifty-five before me RUTH M. SUTTON, a NOTARY PUBLIC in and for the County of Sacramento, personally appeared

HENRY HAMP and GOLDIE DEE HAMP, his wife

known to me to be the persons whose names are subscribed to the within instrument, and they duly acknowledged to me that they executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my OFFICIAL SEAL the day and year in this certificate first above written.

Ruth M Sutton
NOTARY PUBLIC IN AND FOR THE COUNTY OF SACRAMENTO, STATE OF CALIFORNIA

MY COMMISSION EXPIRES
AUGUST 20th, 1955

OIL, GAS AND MINERAL LEASE

FROM

WM. A. CHEMAULT

TO

W. C. REYNOLDS

[illegible]

STATE OF ILLINOIS, } ss. No. 4922
Hardin County

This instrument was filed for record in Recorder's Office of Hardin County aforesaid, on 19th day of February A. D. 1955 at 11:30 o'clock A.M., recorded in Book 5 of Misc. on page 219

R. H. Henry Recorder

Recording Fee

RECEIVED
JUN 17 1955

RECEIVED
JUN 17 1955

AGREEMENT OF ASSIGNMENT

This agreement of assignment made this 24th day of March, 1955, by and between William A. Chenault and Louise Ryan Chenault, his wife, hereinafter referred to as the Assignors; and William G. Reynolds, hereinafter referred to as the Assignee

W I T N E S S E T H:

For and in consideration of $1.00 in hand paid and the undertaking of Assignee to pay to William A. Chenault 10% of the net proceeds to Assignee (or to the partnership consisting of W. G., R. S., and Louise Parham Reynolds) from operation or sale of the leases hereinafter mentioned (Net proceeds as used herein shall mean the gross income from either sale or operation of the leases less any costs properly attributable to the procurement, exploration, operation or sale of the said leases, including without limitation the expenditures made to reimburse William A. Chenault for expenses, the rental, sales commissions, if any, operation and exploration costs, accounting costs, geological and other technical costs, and all other proper costs. Payments shall be made to William A. Chenault monthly as soon after the end of each month as the amount of net proceeds for the foregoing month can be accurately computed) Assignors hereby assign all their right, title, and interest in and to the below mentioned leases unto the Assignee, his heirs, and assigns. In consideration of such assignment, the Assignee hereby assumes and agrees to make all the payments and perform all the covenants and conditions of the below mentioned leases. The leases which are assigned herein are as follows:

1. That certain lease dated February 18, 1955 by and between Hal Stacey and Anna Stacey, his wife, lessors, and William A. Chenault and William G. Reynolds, lessees, granting certain mineral rights on twenty-five acres of land situated in Hardin County, Illinois and described as follows:

Section 25, Township 11, Range 7. N.5/8

N.E.1/4 S.E.1/4.

2. That certain lease dated March 18, 1955 by and between E. F. Wall, Jr., a widower, lessor and William A. Chenault and William G. Reynolds, lessees granting certain mineral rights on the hereinafter described real estate situated in the County of Hardin, State of Illinois, to wit:

The East Half of the Southwest Quarter of Section 29, Township 11 South, Range 8 East of the Third Principal Meridian, and also the Northeast Quarter of the Southwest Quarter of Section 26, Township 11 South, Range 7East of the Third Principal Meridian.

3. That certain lease agreement dated the 18th day of March, 1955 between the First State Bank of Elizabethtown, a corporation, lessor, and William A. Chenault and William G. Reynolds, lessees granting certain mineral rights on the hereinafter described real estate, situated in the County of Hardin and State of Illinois, to wit:

The Southwest Quarter of the Southwest Quarter of Section 19, the South 17 1/2 acres of the Northwest Quarter of the Southwest Quarter of Section 19, the West half of the Northwest Quarter of Section 30, all in Township 11 South, Range 8 East of the Third Principal Meridian; also the Southeast Quarter of the Southeast Quarter of Section 24. Also the East half of the Northeast Quarter; the Southwest Quarter of the Northeast Quarter; and a parcel of land lying in the North part of the Northeast Quarter of the Southeast Quarter described by metes and bounds as follows:

Beginning at the Southeast corner of the Southeast Quarter of the Northeast Quarter, thence running West 50 rods, thence South 2 1/2 rods, thence East 50 rods to the township line, thence North 2 1/2 rods to the place of beginning, containing 3/4 of an acre, all lying and being in Section 25, Township 11 South, Range 7 East of the Third Principal Meridian.

4. That certain agreement dated March 7, 1955 between Carrie Schutt, a widow; Robert Deneen Schutt and Corena Schutt, his wife, and Ruth Schutt, a single woman, lessors and William A. Chenault and William G. Reynolds, lessees granting certain mineral rights on the following described land situated in the County of Hardin, State of Illinois, to wit:

Southeast Quarter of the Southwest Quarter of Section 24, Township 11 South, Range 7 East of the Third Principal Meridian, containing 40 acres more or less.

5. That certain lease agreement dated February 18, 1955 between Wiley Robinson and Voley Robinson, his wife, lessors to William A. Chenault and William G. Reynolds, lessees granting certain mineral rights in the following described land in Hardin County, Illinois, and bounded as follows, to wit:

Section 25, Township 11, Range 7. N.5/8

N.E.1/4 S.E.1/4, containing 25 acres.

6. That certain lease agreement dated February 14, 1955 between Henry Hamp, Jr. and Goldie Dee Hamp, his wife, lessors and William A. Chenault and William G. Reynolds, lessees, granting certain mineral rights on the following described land situated in the County of Hardin, State of Illinois, to wit:

All that part of the Northeast Quarter of the Southeast Quarter of Section 25, Township 11 South of Range 7E, lying Northeast of public road containing 1 1/2 acres more or less and also the North half of the Northwest Quarter of the Southwest Quarter and a part of the East half of the Southwest Quarter described by metes as follows: Beginning at the Northwest corner of the said E/2 SW., thence running South with the West Line thereof to the center point of the West line of the SE 1/4 of the SW 1/4, being the NW corner of the Silas Stacey tract, thence East 40 rods, thence North to a point 30 rods North of the North line of the SE 1/4 of the SW 1/4, thence East 33 rods to the west line of the Pleas Rose tract, thence, North to the N. line of the said E/2 SW., thence West to the Place of beginning in Section 30, Township 11 S, Range 8E, containing 51.80 acres.

In witness whereof, the parties have hereunto set their hands and seals on the date first above written.

W G Reynolds

Louise Ryan Chenault

STATE OF ~~Jefferson~~ Kentucky)
COUNTY OF Jefferson) ss.

I, Lucille Walston, a Notary Public, do certify that the foregoing instrument of writing from William A. Chenault and Louise Ryan Chenault, his wife, was this day produced to me in my

county by the parties and acknowledged before me by the said William A. C. Chenault and Louise Ryan C. Chenault, his wife, respectively, to be their act and deed for the uses and purposes therein set forth.

GIVEN under my hand and seal of office this 24th day of March, 1955

My commission expires _____. Lucille Walston
Notary Public

STATE OF Kentucky)
) ss.
COUNTY OF Jefferson)

I, Lucille Walston, a Notary Public, do certify that the foregoing instrument of writing from W. G. Reynolds ~~and~~ _____, ~~his wife,~~ was this day produced to me in my county by the parties and acknowledged before me by the said W. G. Reynolds ~~and~~ _____, ~~his wife, respectively~~, to be ~~their~~ his act and deed for the uses and purposes therein set forth.

GIVEN under my hand and seal of office this 24th day of March, 1955

My commission expires _____. Lucille Walston.
Notary Public

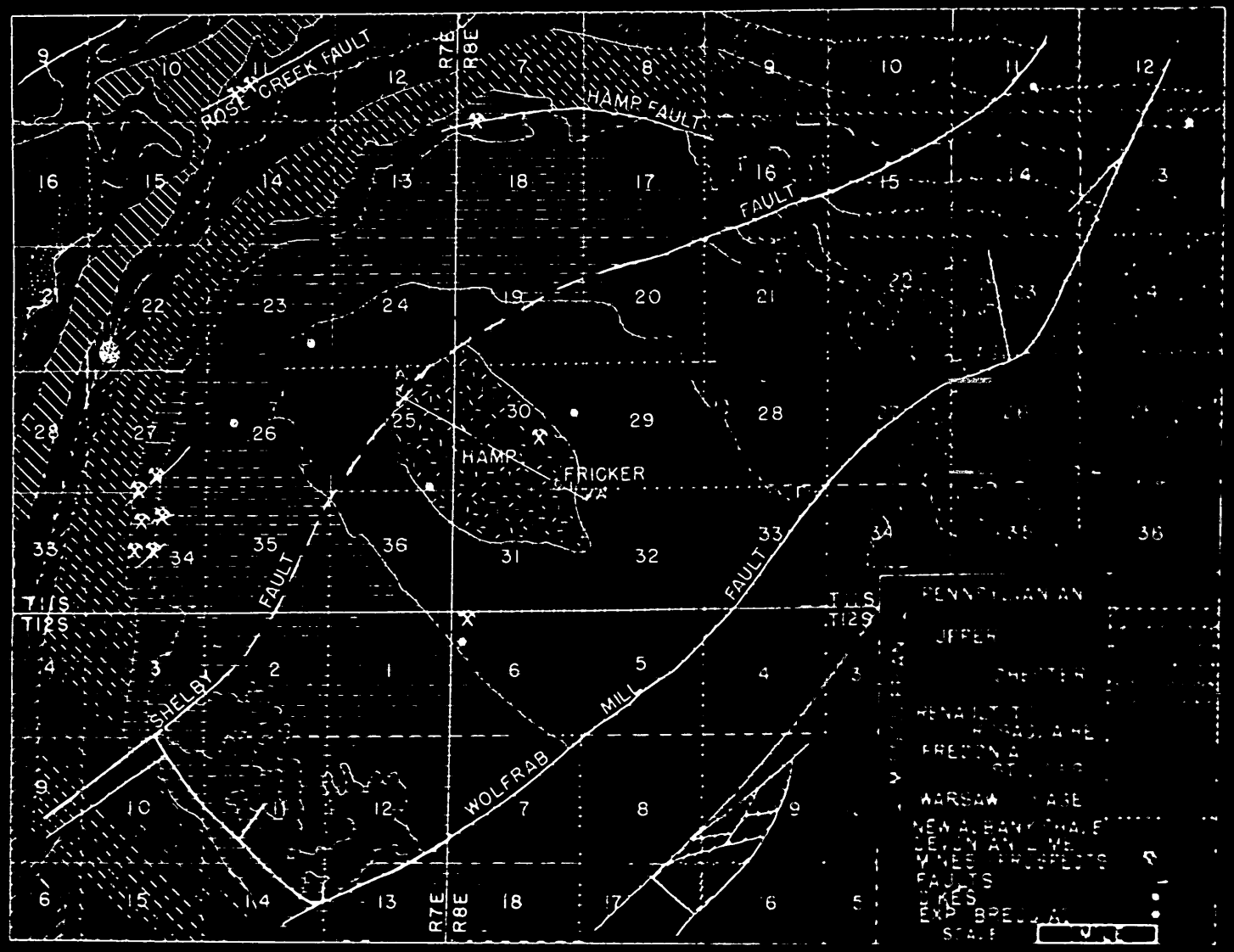
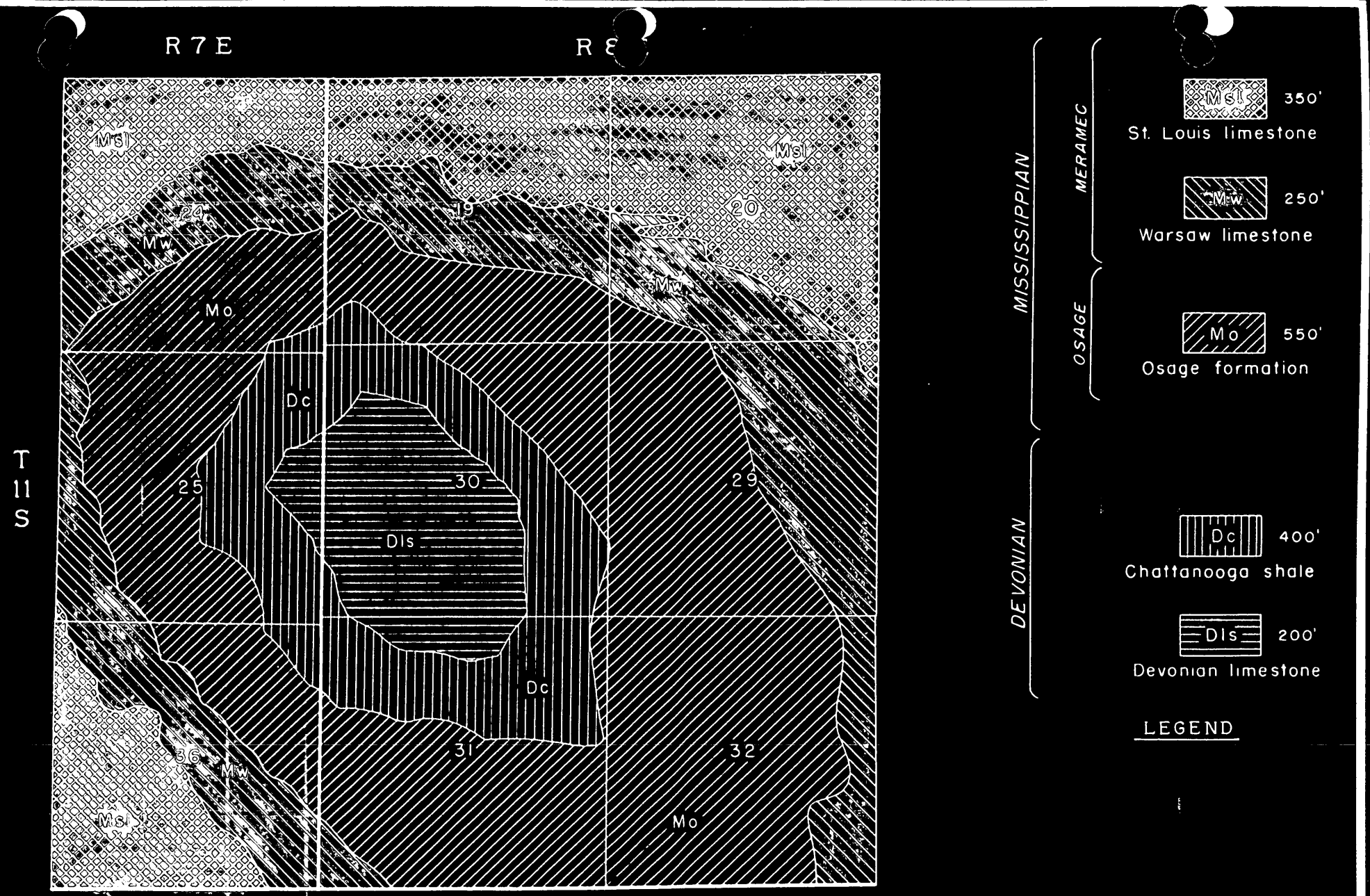


FIG. 1. Geologic map of Hicks Dome area (after Illinois Geological Survey).



GEOLOGIC MAP OF HICKS DOME
HARDIN COUNTY, ILLINOIS
Scale: 2" = 1 Mi.

Figure 2

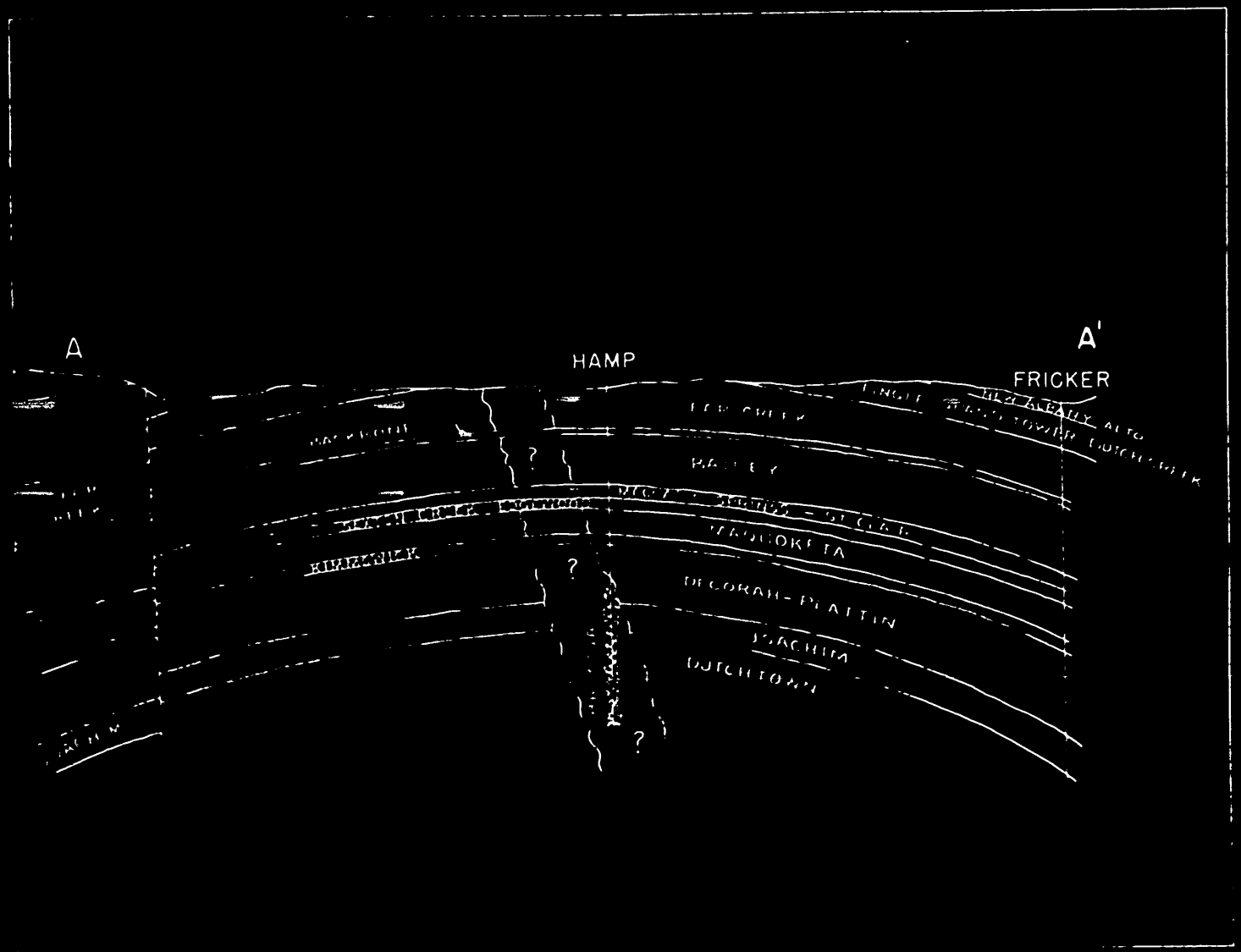
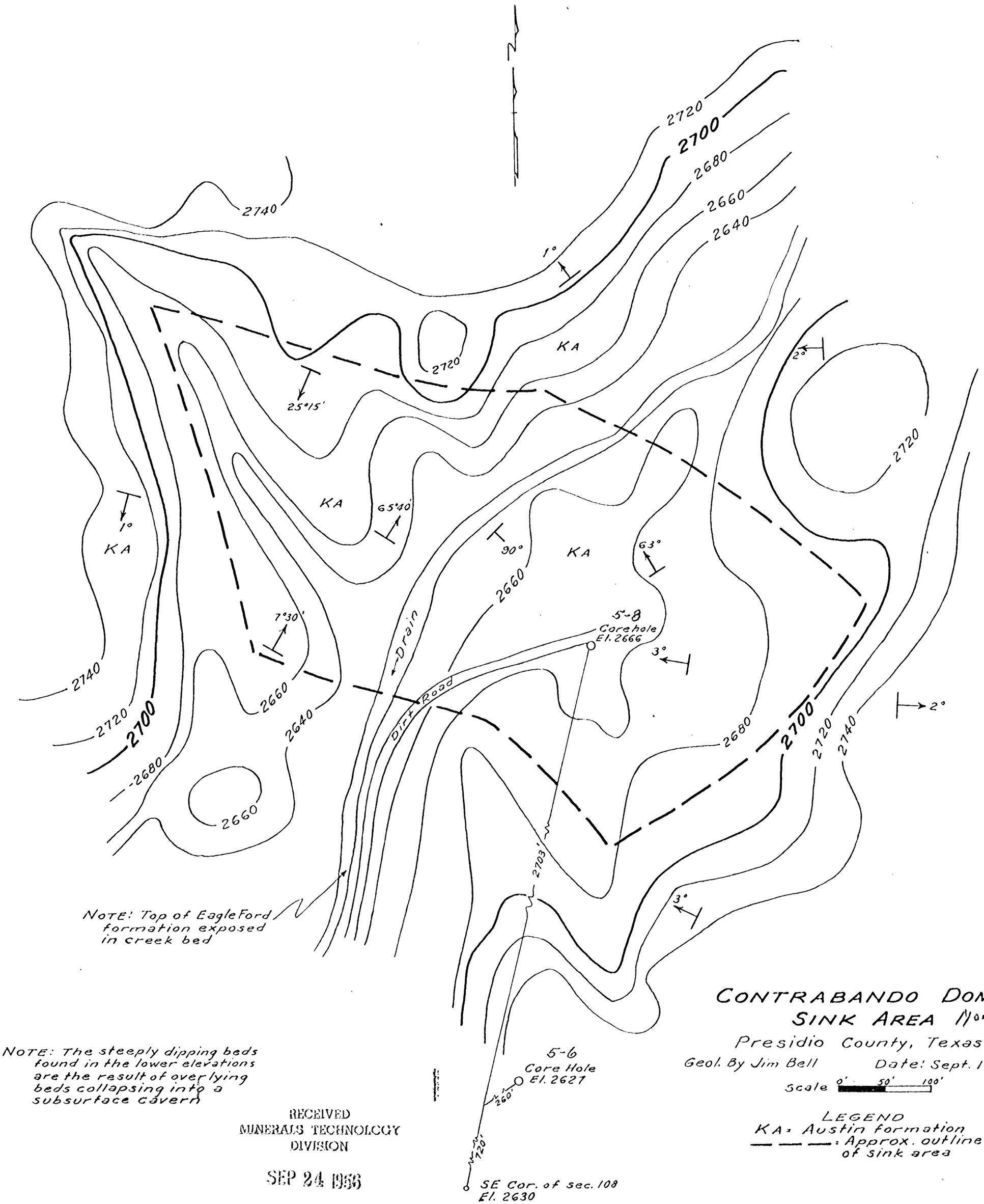


Fig. 4. Cross section showing correlation of Hamp and Fricker wells.

D. M. E. A. Operating Committee
Dept. of the Interior
Washington 25, D.C.



NOTE: The steeply dipping beds found in the lower elevations are the result of overlying beds collapsing into a subsurface cavern

CONTRABANDO DOME
SINK AREA No. 7

Presidio County, Texas

Geol. By Jim Bell Date: Sept. 19, 1956

Scale 0' 50' 100'

LEGEND
KA = Austin formation
— — — = Approx. outline of sink area

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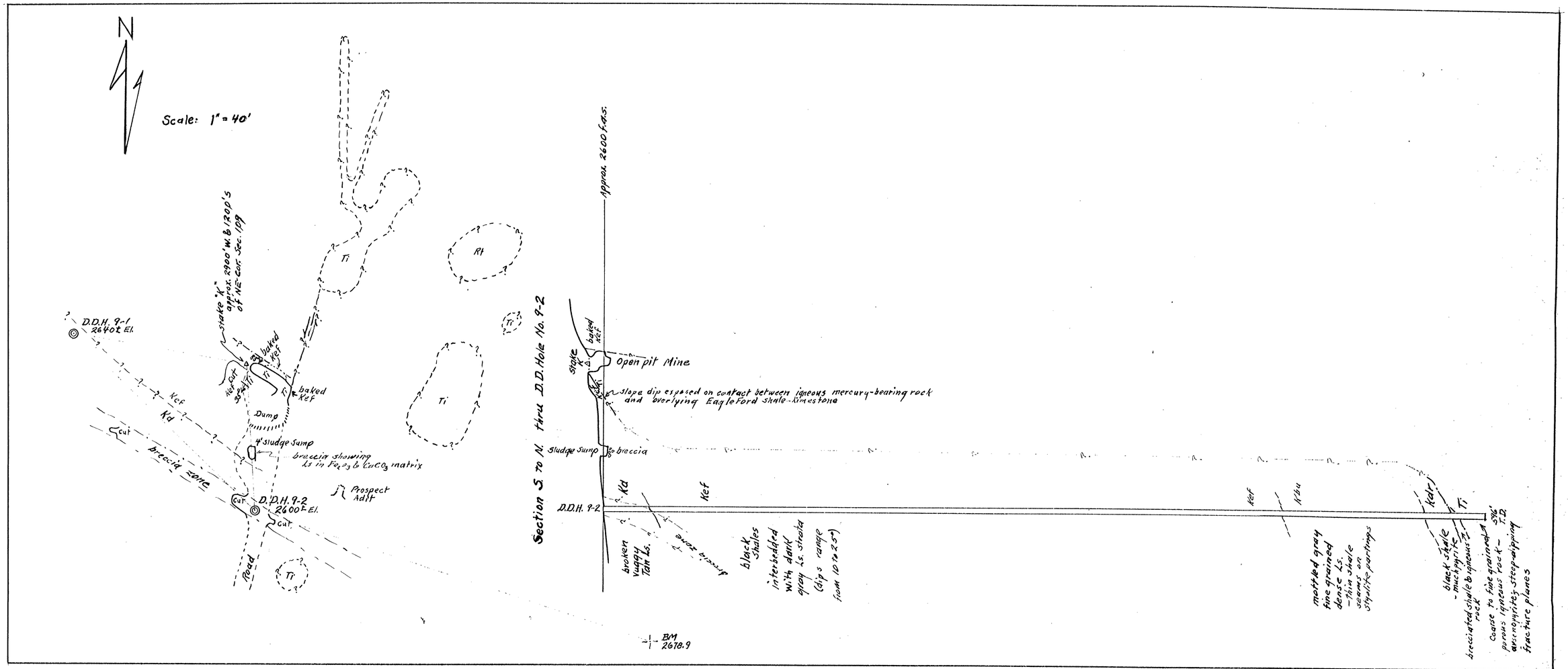
SEP 24 1956

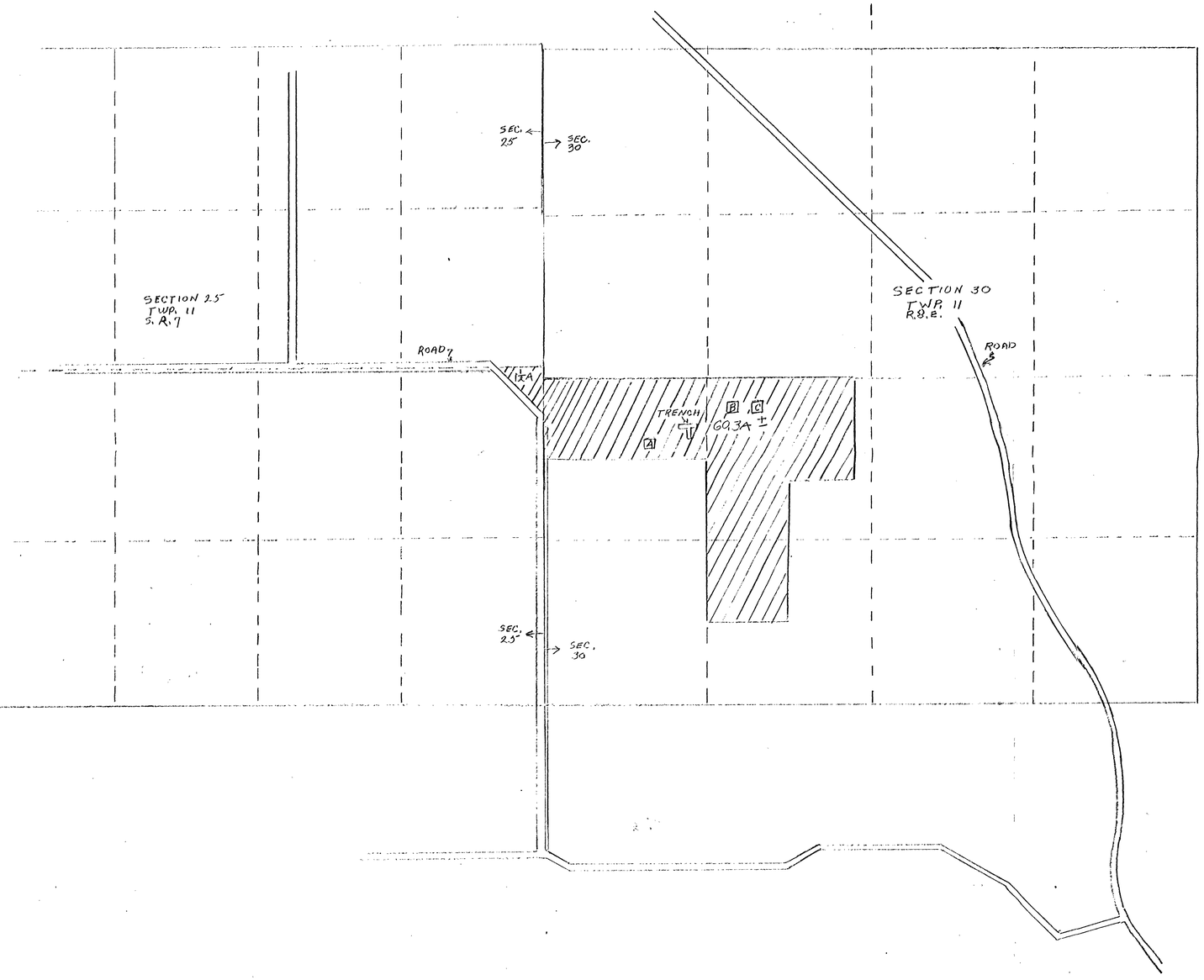
BUREAU OF MINES
JOPLIN, MO.



Sketch Map of Area 1, Contrabando Dome, NE/4 Sec. 109, Blk. 341, T.C. Ry. Co. Sur., Lajitas, Presidio County, Texas

Knox 4-14-56

Docket DMEA-3776 (mercury), Big Bend Mining, Inc., Project Contract Idm-E893



1: SHADED AREA - H. HAMP LEASE (61.8 acres).
2: PROPOSED LOCATION OF ADITS AT A, B, + C.
3: TRENCHES - AS SHOWN
4: WET CHEMICAL U_3O_8 ANALYSIS - .05%, .11% TAKEN AT A, .05% TAKEN AT B + C AND IN TRENCHES.

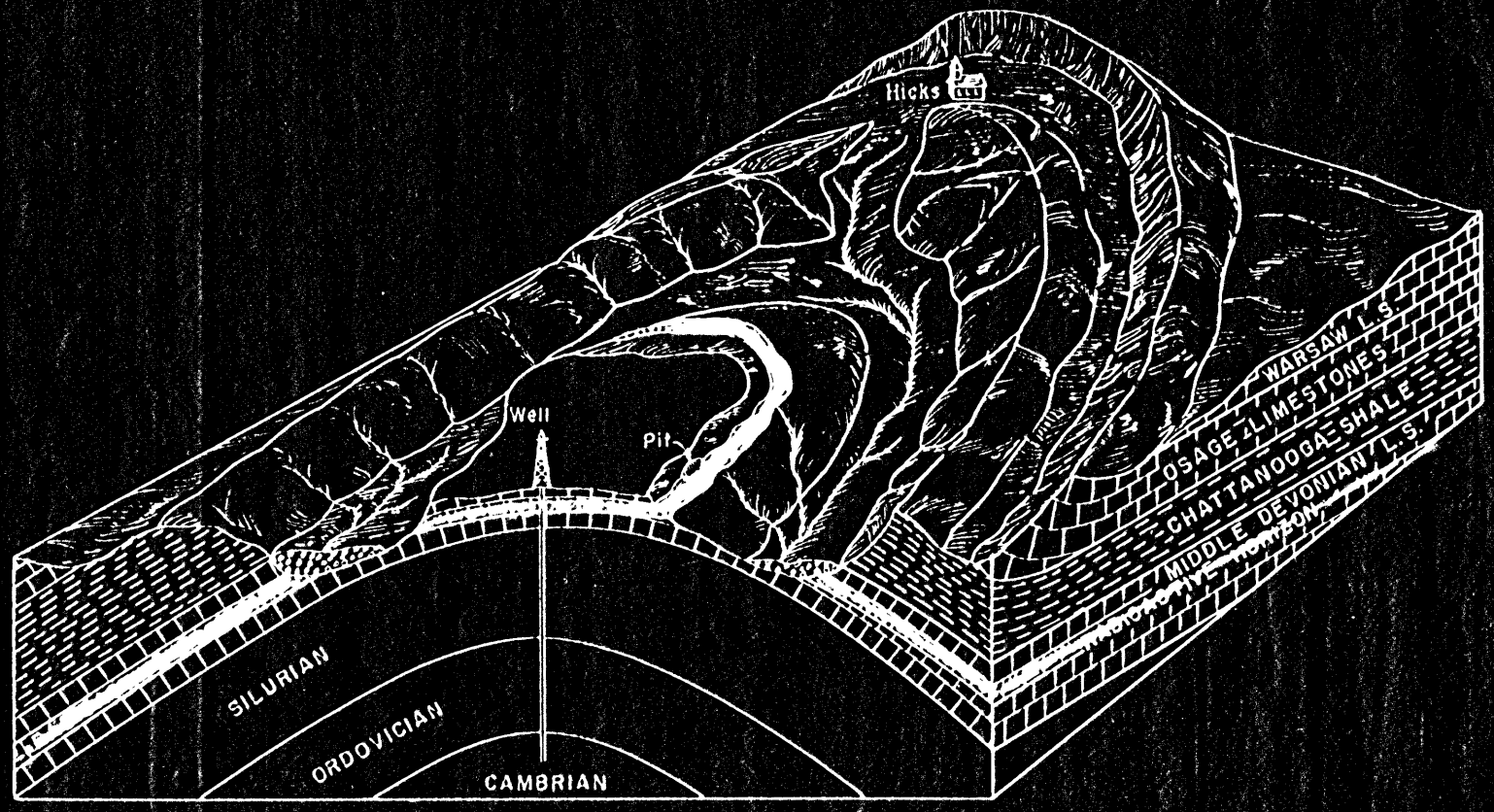
DMEA-3855

PLAT OF LANDS
FOR
WILLIAM G REYNOLDS
IN TOWNSHIP #11 IN HARDIN CO. ILL.
LEGAL DESCRIPTON FROM
ABSTRACT

L. W. O'DONNELL & ASSOC. ENGINEERS
2005 FRANKFORT AVE. LOUISVILLE, KY.

SCALE 1" = 500' 7/27/55

Dwg No. -101



BLOCK DIAGRAM OF THE NORTHERN END OF HICKS DOME
HARDIN COUNTY, ILLINOIS

SHOWING THE RELATION OF THE RADIOACTIVE ZONE TO THE TOPOGRAPHY, STRUCTURE AND STRATIGRAPHY

Not to Scale

Figure 3

Sample Designation 1/	Type of material	eU USBM Coll. Pk.	eU USBM Tusca-loosa	eU USGS Wash. Denver	U_3O_8 Van Corp. of Amer.	U USGS Wash.	CaF_2 USGS Denver	Calculated thorium 2/ USBM Coll. Pk.	—	—
Reynolds 1	Yellow clay, some chert	.032	.036	.035	.05	.004	—	.15	—	—
" 2	Mostly chert, some yell. clay	<.005	.004	.003	.03	.001	—	<.02	—	—
" 3	Yellow clay	.091	.11	.094	.13	.008	—	.45	—	—
" 4	Mostly chert, some yell. clay	.020	.025	.022	.06	.003	—	.10	—	—
" 5	Mostly yellow clay, some chert	.033	.039	.036	.02	.004	—	.15	—	—
" 6	Yellow clay, some red clay	.044	.050	.042	.07	.004	—	.20	—	—
" 7	Lamprophyre, Marion, Ky.	—	—	.002	—	—	—	—	—	—
" 8	Lamprophyre near Hicks Dome	—	—	.003	—	—	—	—	—	—
" 9	Red clay	—	—	.006	—	.004	—	—	—	—
" 10	Intrusive (?) breccia	—	—	.006	—	.003	—	—	—	—
Hamp 1	Explosion breccia	—	—	.029	—	.001	6.4	—	—	—
" 2	do.	—	—	.024	—	.001	9.6	—	—	—
" 3	do.	—	—	.001	—	—	1.3	—	—	—
" 4	do.	—	—	.016	—	.001	7.9	—	—	—
" 5	do.	—	—	.011	—	.001	10.8	—	—	—
" 6	do.	—	—	.008	—	.001	6.6	—	—	—
" 7	do.	—	—	.004	—	—	4.6	—	—	—
" 8	do.	—	—	.001	—	—	2.8	—	—	—

SPECTROGRAPHIC ANALYSES

USGS; Reynolds samples-Washington, Hamp samples-Denver

Sample Designation	>10	5-10	1-5	.5-1	.1-.5	.05-.1	.01-.05	.005-.01	.001-.005	.0005-.001	.0001-.0005
Reynolds 1	Si	—	Al, Fe	K	Ti, Mg, Y, Th, P, Ba, La, Ca, Ce	Nd, Pb, Mn, Sr	Zr, Zn, Na, Be, Nb, Pr, Tb	Cu, Dy, Yb, V, Er, Ni, Gd	Cr, Ga, Lu, Sc	Be, Mo	Ag
" 2	Si	—	Fe	Al	Mg, Ti, K, P	Y, Mg, Ba, Ce, Cu, La	Nd, Pb, Sr, Na, B, Pr, Nb, Sn	Cu, Zr, Co, V, Ni	Yr, Cr, Sc, Lu	Mo	Ag, Be
" 3	Si	Fe	Al	Ca, K, P, La	Y, Ba, Ti, Nd, Th, Mg, Ca	Sr, Pb, Pr, Mn	B, V, Er, Nb, Tb, Na, Zn	Cu, Gd, Yb, Sm, Dy, Ni	Eu, Sn, Ga, Co, Lu, Cr, Sc	Be, Mo	Ag
" 4	Si	—	Al, Fe	P	Ba, Ca, Ti, Y, Ce, Mg, K, Th	La, Mn, Pb, Nd.	Sr, B, Er, Nb, Na, Pr	Gd, Yb, Dy, Cu, V, Ni	Zr, Ga, Co, Eu, Sc, Cr, Lu	Be, Mo	Ag
" 5	Si	Al	Fe	—	Y, P, Ti, Mg, K, Th, Ba, Ce, Cu, La	Nd, Pb, Sr	Nb, Er, Pr, B, Mn, Na, V	Cu, Dy, Yb, Tb, Gd, Zr	Ni, Sc, Cr, Eu, Co, Lu	Be, Mo	Ag
" 6	Si	Al	Fe	Ti	Y, Ba, Cu, P, K, Mg, Th	Pb, Ce, La	Nd, Na, Yb, Cr, B, Er, V, Pr, Sr, Mn	Cu, Dy, Yb, Gd, Ni, Zn	Sc, Cr, Eu, Ga, Lu	Be, Mo, Ag	—
" 7	Si	Fe, Al	Mg, Ca	Ti, K	Ni, Cr	—	Mn, Ba, Na, Sr, V, Cu	Co, Ga	La, Yb, Y, Pb, Nd, Zr, Mo, Sc	—	Yb, Ag, Be
" 8	Si	Fe, Al	Ti, Mg	Cu, K, Na	Ni, Y, Ba, Ce	Mn, Nd	La, Sr, Y, Co, Cr, Zr, Cu	Nb, Zn, Ga	Yb, Pb, Mo, Sc, Be	—	Ag
" 9	Si	Al	Fe	—	Ca, K, Mg, Ti	Ba	Y, Pb, Ni, Sr, V, B, Na	Zn, Dy, La	Cu, Cr, Yb, Ga, Sc, Sn, Co, Mo, Mn	—	Be
" 10	Si	Fe	Al	—	K, Ba, Mg, Ti, Cu	Sr, Pb, Mn	Y, V, B, Cu, Na	Zr, Ni, Dy	Cr, La, Ga, Mo, Sc, Yb, Sn	—	Be, Ag
	x.x.	x.+	x.	x.−	.x+	.x	.x−	.ox+	.ox	.ox−	.oox+
Hamp 1	Ca	Si	Mg	Al, Fe	K, Ba	Ti	Na, Th, Y	Mn, Be, Sr	Pb, Zn	Dy, La, Nb, Sc, V, Zr	Yb
" 2	Ca	Si	Mg	Al, Fe	K	Ti	Na, Th, Y	Mn, Be, Sr	Ba, Pb, Zn	Dy, La, Nb, Sc, V, Zr	Yb
" 3	Ca	Mg	Si	—	Al, Fe, Ba	K	Na	Mn	Ti, Be	Sr	Be, Pb, V, Y
" 4	Ca	Si, Mg	—	—	Al, Fe	Ti	Ba, Y	Mn, Na, Th	Be, Sr	Dy, Nb, V, Zr	Yb
" 5	Ca	Si	Fe, Mg	Al, K	—	Ti	Mn, Na	Ba, Co, Sr, Th, Y	La	Dy, Nd, V	Be, Nb, Sc, Zr
" 6	Ca	Si, Mg	Al, Fe, K	—	Ti	Mn, P, Na	—	Ba, Ce, Sr	La	Nd, Sc, V, Y	Be, Cr, Nb, Zr
" 7	Ca	Si, Mg	—	Fe	Al, K	Ti	Na, Ba	—	Sr	La, Pb	V, Y
" 8	Ca, Si	Mg	—	—	Fe, K	Al, Ba	—	Mn, Na	Ti	Pb, Sr	Be, Y

USBM; College Park, Md.

Sample Designation	>10	>5	1-10	.5-5	.1-1	.08-.8	.05-.5	.03-.3	.02-.2	.01-.1	.008-.08	.005-.05	.003-.03	<.01	<.005	Type of sample
Reynolds 1	Si	Al	Fe	—	—	—	Ti, Mg, Ce	La	Pb, Y	Nd, Sm	V, Zn, Mn, Pr, Yb	Nb, Sc	—	Zr, Cu	Mo	"Vein" 19" wide
" 2	Si	—	—	Al, Fe	—	—	—	Ce	—	Ti, La, Sm	Mg, Na, Nd, Pr	Y, Sc, Yb	—	V, Nb, Zr, Cu	Mo	"Vein" 17" wide
" 3	Si	Al, Fe	—	—	Ce	Ti, Mg, Nd, La	P, Th, Pr, Y	—	—	V, Sm	Nb, Zn, Pb, Mn, Sc, Yb	—	—	Zr, Cu, Mo	—	"Vein" 16" wide
" 4	Si	Al	Fe	—	—	—	Ti, Mg, Ce	La	Y	Nd, Sm	Mn, Pr, Yb	V, Sc	Nb, Zn	Zr, Cu, Pb	Mo	"Vein" 19" wide
" 5	Si	Al	Fe	—	—	—	Ti, Mg, Ce	La	—	Nd, Y, Sm	V, Pr, Yb	Nb, Sc	Zn, Mn	Zr, Cu, Pb	Mo	"Vein" 37" wide
" 6	Si	Al	Fe	—	—	—	Ti, Mg	Ce, Y	—	La, Sm	V, Pb, Nd, Pr, Yb	Nb, Sc	Zn, Mn	Zr, Cu	Mo	"Vein" 16" wide
" 7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Grab
" 8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Grab
" 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Grab
" 10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Grab
	.oox	.oox−	.oox+	Trace	Type of sample											
Hamp 1	Cr, Cu	Bi, Ni	—	Ga	Hamp hole 1725'-1750'											
" 2	Cr, Cu	Bi, Ni	—	Ga	Hamp hole 1785'-1815'											
" 3	—	Nb, Sc, Zr	Cr, Cu, Ni, Yb	—	Hamp hole 1975'-2000'											
" 4	Pb, Sc	Cr, Cu	Ni	Bi, La	Hamp hole 2150'-2175'											
" 5	Cr, Cu, Yb	Co, Ni	—	Pb	Hamp hole 2370'-2400'											
" 6	Ni, Pb, Yb	Co, Cu	—	Dy, Ga, Th	Hamp hole 2425'-2450'											
" 7	Be, Cr, Cu, Nb, Sc, Zr	Ni, Yb	Co	Ce, Dy, Ga, Th	Hamp hole 2450'-2475'											
" 8	Cu, V, Zr	Cr, Nb, Ni, Sc	Yb	—	Hamp hole 2900'-2925'											

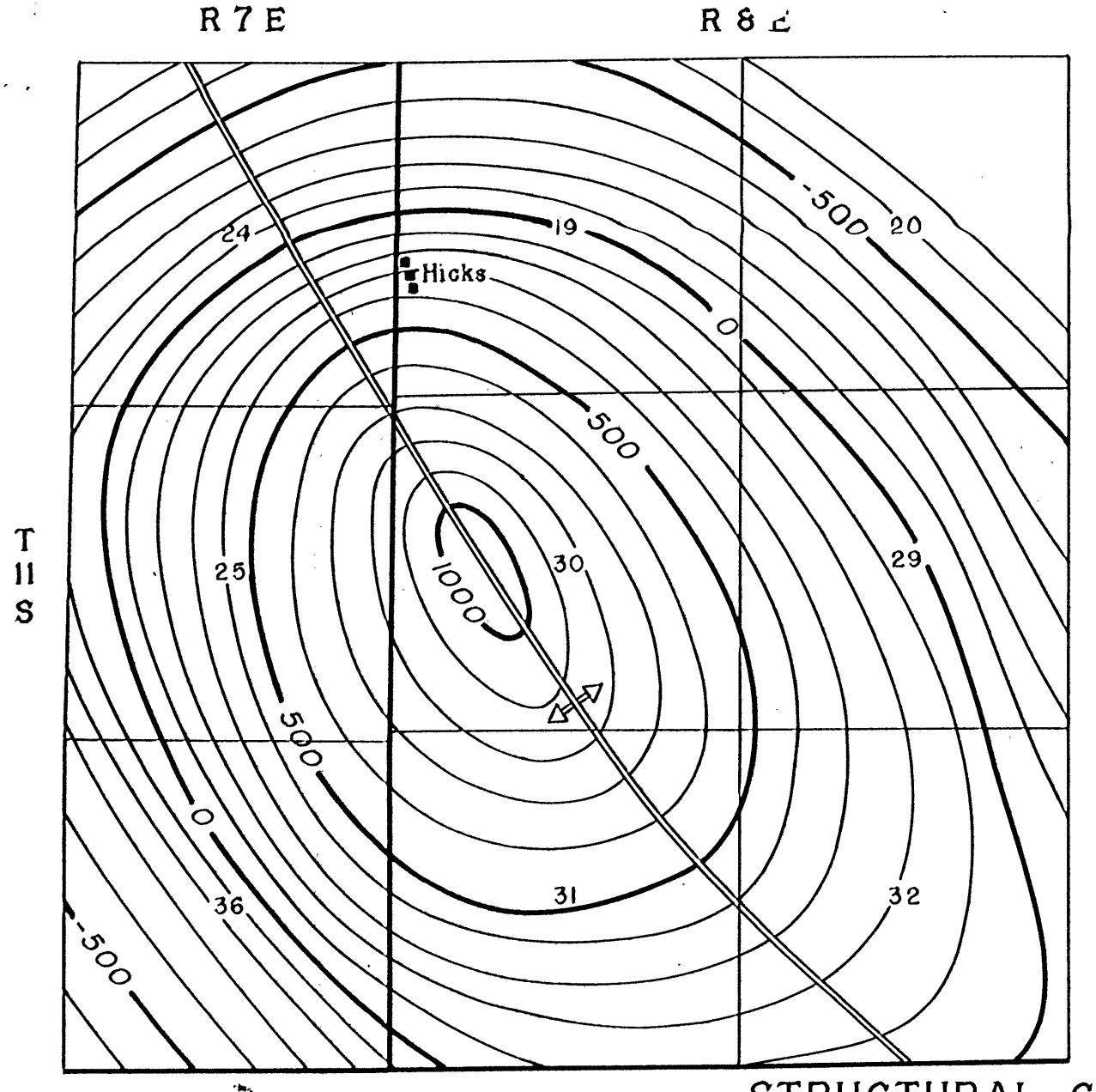
Note: All analysis figures are percent.
< less than
> greater than

1/ Samples designated Reynolds 1-6 were collected jointly by representatives of the applicant, the Bureau of Mines, and the Geological Survey. The samples were prepared and divided into four splits by the Bureau of Mines, College Park, Md. The applicant's split was analyzed by the Vanadium Corporation of America, Durango, Colorado.
Samples designated Reynolds 7-10, collected by R. D. Trace, and Hamp 1-8, collected by Brown et al., were analyzed by the USGS only. Hamp samples analyzed in 1953, Reynolds samples in 1955.
The location of the samples are as follows:
Reynolds 1-6 and 9 are from the Reynolds cut (Fig. 2).
Reynolds 7 is from a lamprophyre dike about 2 miles southwest of Marion, Ky.
Reynolds 8 is from the Robinson lamprophyre dike (Fig. 2).
Reynolds 10 is from a large boulder of intrusive(?) breccia on the Reynolds property (fig. 2).
Hamp 1-8 are the same samples described by Brown et al. in Econ. Geol. They are cuttings from the Hamp oil test hole. The depths of the samples are given in the right hand column of the above table.

2/ Calculated thorium is based on radiometric and X-ray spectrographic analysis, and is ±10 percent.

TABLE 1.--ANALYSES OF SAMPLES FROM HICKS DOME, HARDIN COUNTY, ILLINOIS -- DMEA 3855

R.D.T. 10-16-55



STRUCTURAL CONTOURS ON THE TOP OF THE CHATTANOOGA SHALE
-HICKS DOME-
HARDIN COUNTY, ILLINOIS

Contour Interval: 100'

Scale: 2" = 1 Mi.