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SEP

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. DMEA-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. Laurence
Executive Officer, DMEA
Field Team, Region V

See Mr. Laurence's memo Sept. 13, 1956.
Clearance memo _____

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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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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. 420 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 D Mutterdorf
Administrator, Defense Minerals
Exploration Administration

William G. Reynolds
William G. Reynolds

Indritz 4/4/56
Lawyer
Approved
Murphy
Ellis
Chambers
Selfridge

Confidential

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MAR 21 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)

It is agreed this JAN 26 1956 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 Hardin, 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."

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(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.*—

Butin
Singer
"Appd. Sol. Off.
Murphy
Ellis
Talbot
Selfridge

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 O Mitterdorf
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]

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EXPLORATION PROJECT CONTRACT
WILLIAM G. REYNOLDS
DOCKET NO. DMRA-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 N½ 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, 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, DMRA-3855, Reconnaissance Geologic Map of Kick's Dome Area ....," attached hereto and made a part hereof.

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

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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 "Nick'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 Hemp Lease - Nick'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 "Hemp 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.

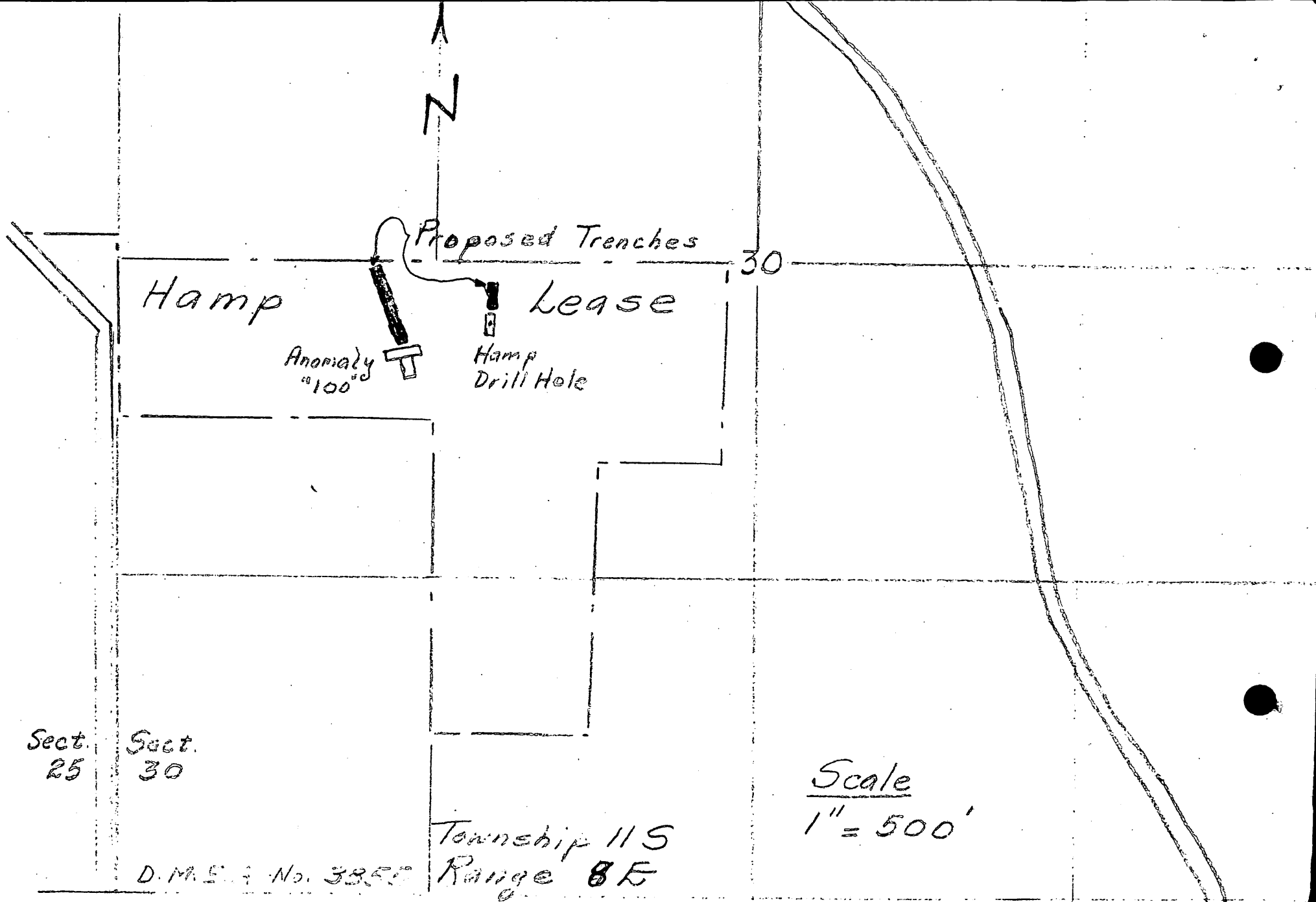

Figure 1. PLAN OF HAMP LEASE - HICK'S DOME
Hardin County, Illinois

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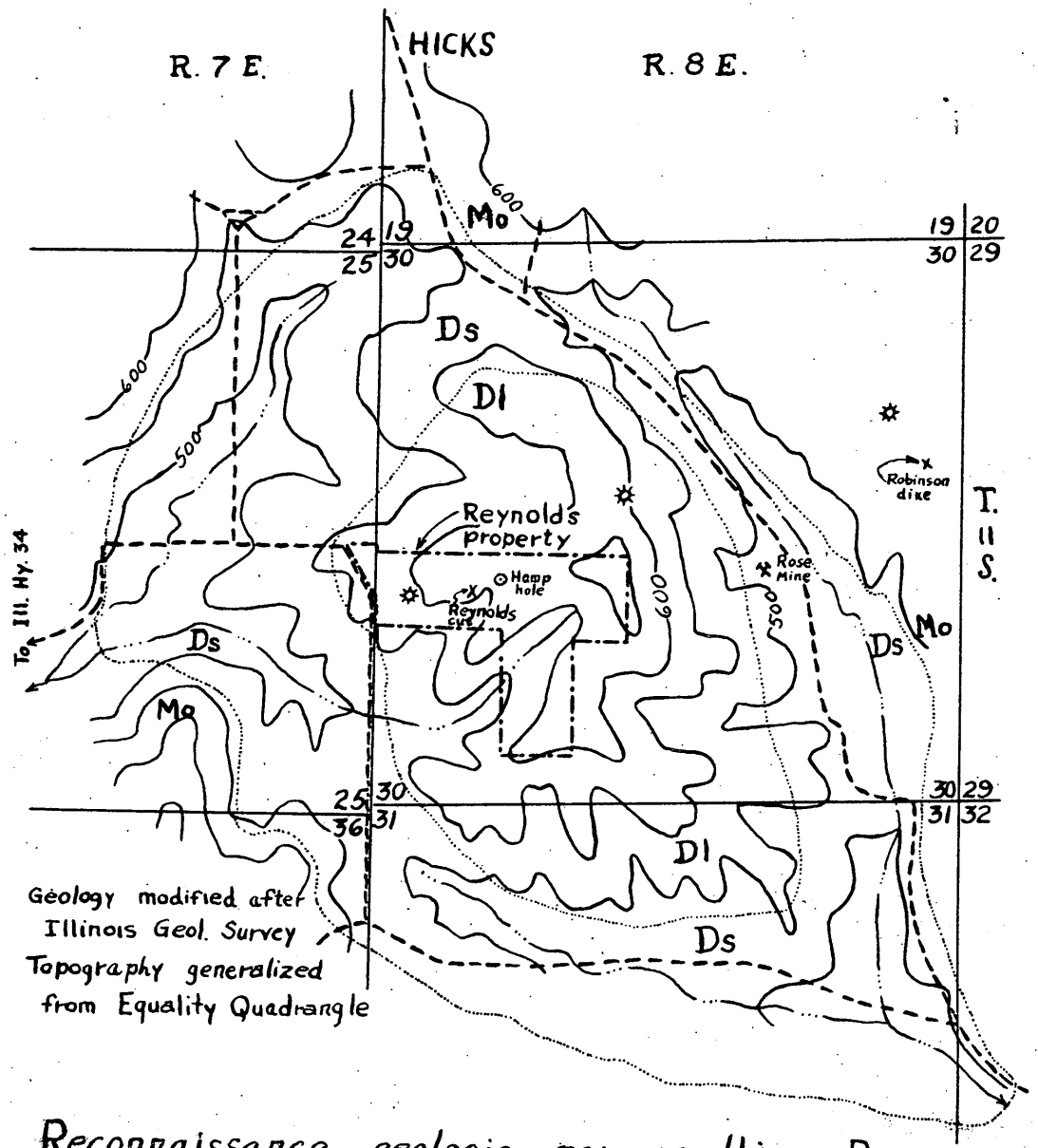
Figure 2
DMEA 3855



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.
10-16-55

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MF-201
Revised March 24, 1955

For Government's Use Only
EXPLORATION PROJECT CONTRACT
Operator W. G. Reynolds
Docket No. DMEA- 3655
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.

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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 Mar. 7, 1959.

Lucille B. Walston
NOTARY PUBLIC

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MAR 21 1955

"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.

dited

Certified

William G. Reynolds

ate Illinois

WORK ANALYSIS SHEET - DMEA PROJECT

Analysis as of 2/28/57
Incl. Voucher for July 1956

Commodity Thorium, Uranium, rare earths

☐ Actual Cost

☒ Agreed Unit Costs

Docket No. 3855

Idm-E No. 914

OPERATION	AUTHORIZED Units	AUTHORIZED Cost	COMPLETED Units	COMPLETED Cost	NET COST
Drifting & Crosscutting					
Raising					
Shafts					
Winzes					
Drilling (Specify) Core	405'	1620.00	405'	1620.00	1620.00
Surface Excavation (Trenching)		2340.00		2340.00	2340.00
Underground Excavation					
Roads and Trails					
Operating Equipment Purchased					
Surface Rehabilitation & Repairs					
Underground Rehabilitation					
New Building, Improvements, etc. Surveying & mapping		250.00		250.00	250.00
Other (Specify) Analyses		1410.00		455.00	455.00
Totals		$ 5620.00		$ 4665.00	$ 4665.00

Prepared by F. M. Murphy

71626

Project Summary Report

By: R. A. Murphy Date: February 28, 1957

1. Docket No. [illegible]-3655 (Thorium-uranium-rare earths)
   Contract No. [illegible]-1914

   Operator: William G. Reynolds
   Stonegate Road
   Anchorage, Kentucky

   Operator's Property Rights: Lease on 51.00 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 "Mick's Dome" 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 200 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 filed 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.

/s/ F. H. Murphy, Mining Engineer
Rare and Miscellaneous Metals Div.

FHMurphy/izm 2-28-57

cc to: Code 700
Mr. Johnson
~~Operating Committee~~
Admr.'s heading File
Mr. Murphy

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

illiam J. Chenault
Louise Ryan Chenault

1279 Cherokee Road
Louisville, Kentucky

Re: Contract No. [illegible] (Thorium, uranium, and rare earths)
Contract [illegible]
William D. Reynolds
Alice's Dome
Marion County, Illinois

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,

C. O. Mittendorf

Administrator

Enclosure

Fr:murphy/iam 2-26-57
cc to: Code 7[illegible]
Mr. Murphy
Admr.'s Reading File
Contract Adm. & Audit Division
Contract Reg. 5 (2)

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

MAR - 1 1957

Mr. William [illegible] Reynolds
[illegible] Road
Anchorage, Kentucky

Re: Contract No. [illegible] (Berlin, [illegible], [illegible] farm center)
[illegible]'s Cove
Hancock County, Illinois
Contract No. Idm-3914

Dear Mr. Reynolds:

Reference is made to your 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,

C. O. Mittendorf

Administrator

Murphy/lsc 2-27-57
cc to: William E. A. Lienault & Louise Lyon Lienault
Code 7[illegible]
Mr. [illegible]
Adm.'s Reading File
Contract [illegible] Audit Div.
[illegible] Ser. V (2)

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

Mr. Robert A. Laurence
Executive Officer
Field Team, Region V
Rm. 413, P. O. Building
Knoxville, Tennessee

MAR - 1 1957

Re: Docket No. [illegible]-3855 (thorium, uranium, and rare earths)
William G. Reynolds
Dick's Dome
Marion County, Illinois
Contract No. Idm-E914

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 owner 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

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

DEFENSE MINERALS EXPLORATION ADMINISTRATION
CONTRACT ADMINISTRATION AND AUDIT DIVISION

REPORT OF REVIEW

I have reviewed the Monthly Reports of:

William C. Reynolds
Stonegate Road
Anchorage, Kentucky

pertaining to Exploration Project Contract No. Idm-E914, DMEA No. 3855, including Amendment Nos. 1 and 2, for the months of April, 1956, to July, 1956, inclusive, covering a project for the exploration of thorium, uranium and rare earths on property, known as the Hamp Lease, Hicks Dome Area, located in Hardin County, Illinois.

My review included an examination of the Monthly Reports (Forms MF-104) and supporting documents attached thereto, comparison of the costs claimed with the contract and pertinent schedules, verification of work performed by reference to Field Team reports and correspondence; and a determination of the reasonableness and propriety of the costs.

This review was made in lieu of a final audit of the Operator's accounts and records for the following reason:

all of the costs incurred were under a contract provision for payment by the Government on the basis of fixed unit costs of work actually performed.

The review disclosed the following facts in regard to the amount paid or to be paid the contractor:

Total cost as billed by Contractor		$4,610.00
Exceptions:		
Prior to this review	$ -0-	
Herewith (underclaimed for rare earth determinations)	(55.00)	(55.00)
Total Accepted Cost		$4,665.00

The contract calls for a 75 percent participation of exploration expenses by the United States Government. Therefore, payment to the contractor by the Government in the amount of Three thousand four hundred ninety-eight and 75/100 Dollars

$3,498.75

is considered valid and proper, provided that the Regional Executive Officer, the Administrator, or other competent official has accepted or will accept the project as having otherwise met the terms of the contract.

E. D. Talbert, Auditor

February 25, 1957

Audit Report
of Review

February 20, 1957

3855
Idm-E914
Uranium
William G. Reynolds
Hicks Dome
Hardin County, Ill.
$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

2/11/57 2/18/57

[illegible]

[illegible]

[illegible]

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

EXTRA COPY
DMEA
RECEIVED 1957

DATE	INITIALS	CODE
2/25	Murph	700

February 21, 1957

Memorandum

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

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

Subject: Completion of DMEA-3855, Idm-E914(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/mm
Lynch
Files
Opr. Com.-2

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON, D.C.
ROOM POST OFFICE BLDG.
KNOXVILLE 2, TENN.
February 13, 1957

EXTRA COPY DMEA RECEIVED FEB 15 1957		
DATE	INITIALS	CODE
		130
2-19	C	220
2-19	Murphy	700

Memorandum

To: Operating Committee, DMEA - Washington

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

Subject: Final Report - Field Team- DMEA-3855, Idm-5914 (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, Acting
Executive Officer, DMEA
Fieldd Team, Region V

Helmuth Wedow, Jr.
Geologist, Geological Survey

VJL/xm

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

Final Field
Team Report

EXTRA 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

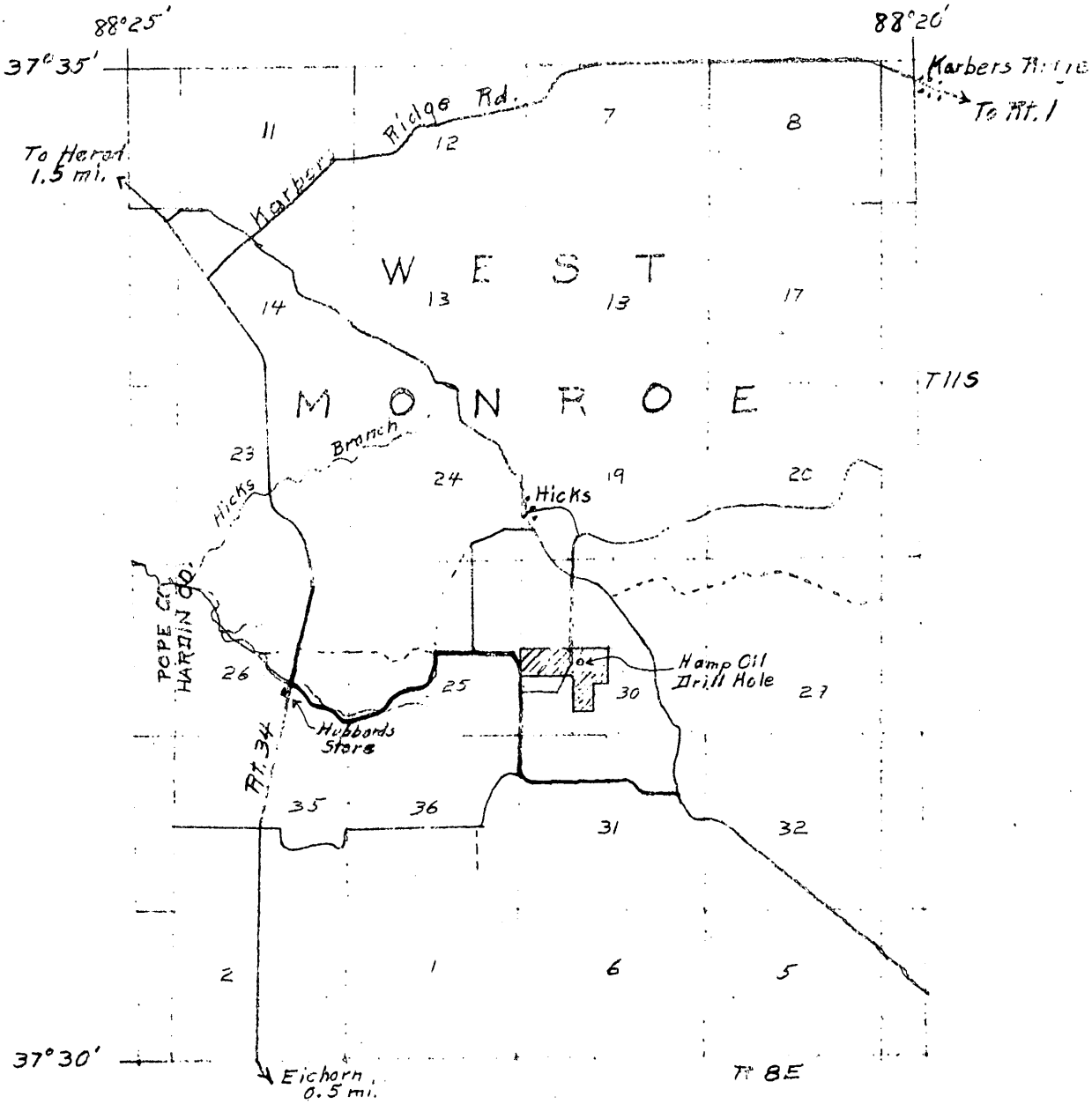
No equipment was purchased.

Robert D. Trace

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

H. L. Burmeister

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



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

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D.M.E.A.

DMEA #3855
Idm-E914

SUMMARY OF NICK'S DOME SAMPLE ANALYSES

Analyst	Sample No.	Thor.	U_3O_8	Cb	Ta	Rare Earths	Zirc.	Lith.
C. C. Parker	11-A	.18 x	.048 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	.078	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 Est.	.06					

FIG.-2 a

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D.M.E.A.

Figure 2b
DMEA 3855

SEMI-QUANTITATIVE 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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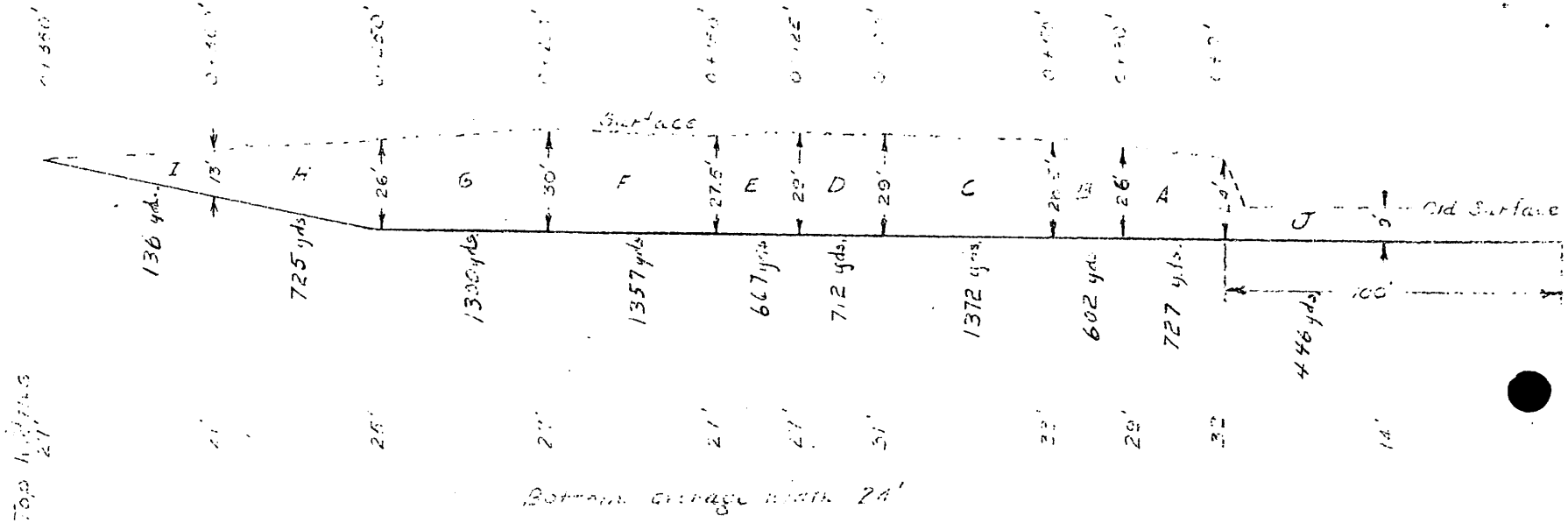
FEB 15 1951
D.M.E.A.

HICK'S DOME

TRENCH No. 1



TOTAL CUBIC YARDAGE = 8044

HICK'S DOME

DMEA - 3805

TRENCH NO. 1

MEASUREMENTS FOR CUBIC YARDS

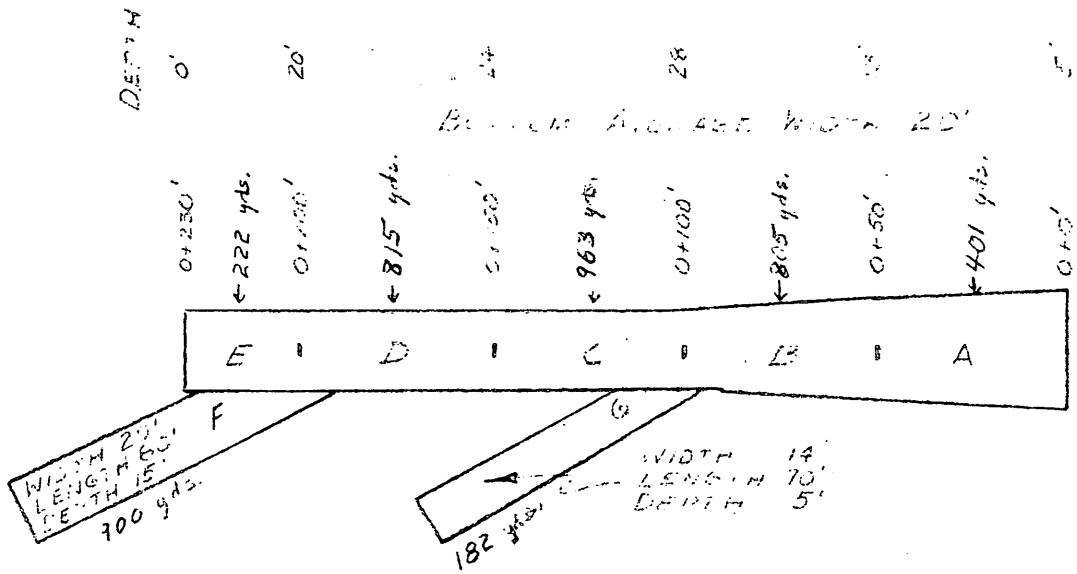
0 INCHES 1

0 FEET 50

7-1-55

FIG. 4

TRENCH NO. 2 (HIGH)



TOTAL CUBIC YARDAGE = 4255

HOOKS DAME

DAM - 3455

TRENCH NO. 2

WEIGHTED FOR [illegible] YARDS

0 INCHES 1

0 FEET 50

FIG. 5

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' → Refer to Fig. and Table

"A" Composite "B"

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

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SUMMARY OF HICK'S DOME SAMPLE ANALYSIS

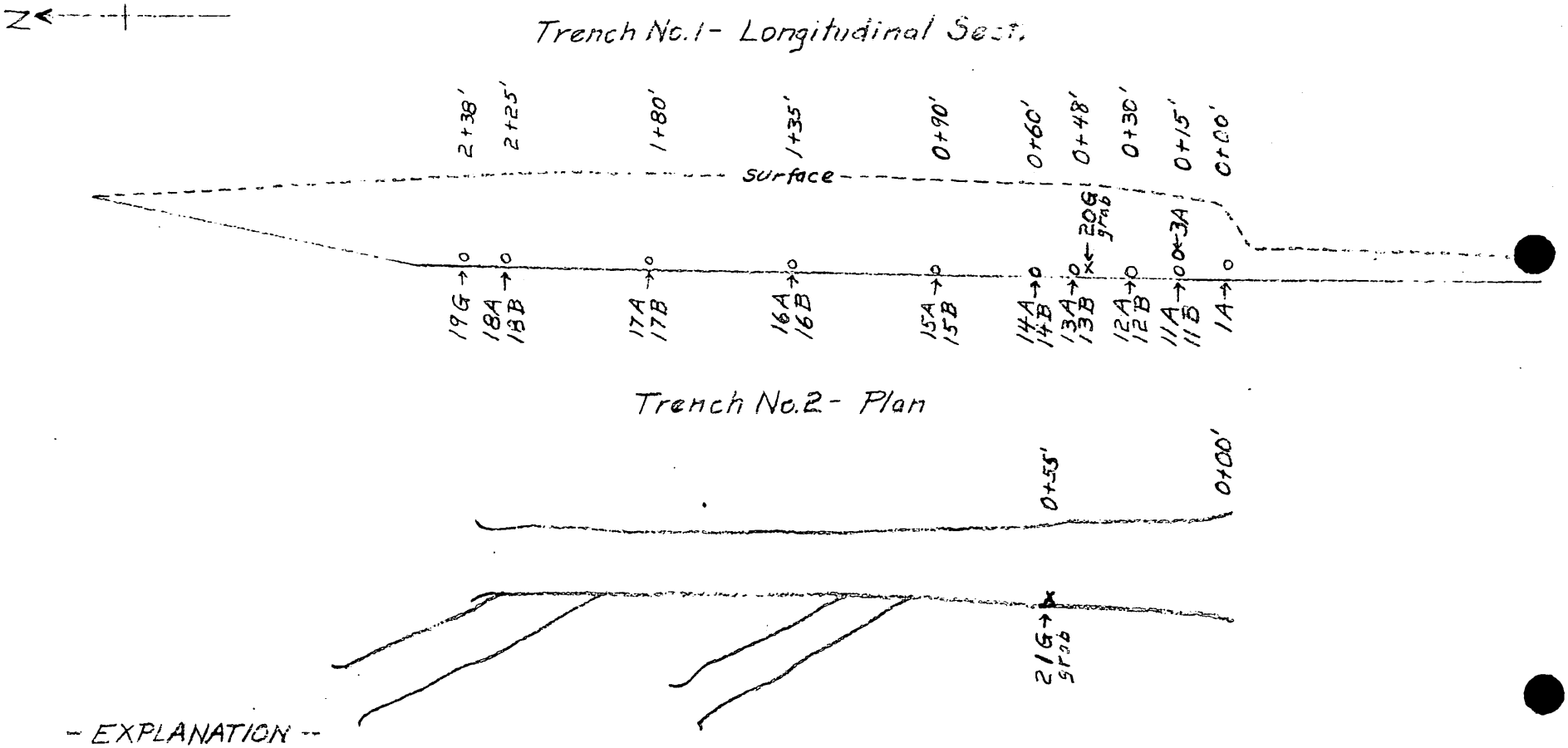
Analyst	Sample Number	Thor.	U_3O_8	Cb	Ta	Rare Earths	Zirc.	Lith.	DMEA Cost
C. O. Parker	11-A	.18 $10.	.048 $5.	Tr. $20.	Tr.	.67 $10.	Tr.		$45.00
"	11-B	.17 $10.	.02 $5.			.40 $10.			25.00
"	12-A	.11 $10.							10.00
"	12-B	Tr. $10.							10.00
"	13-A	.19 $10.	.038 $5.			.84 $10.			25.00
"	13-B	Tr. $10.	.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

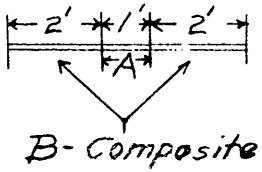
SAMPLE LOCATIONS



- 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

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D. MEA

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.

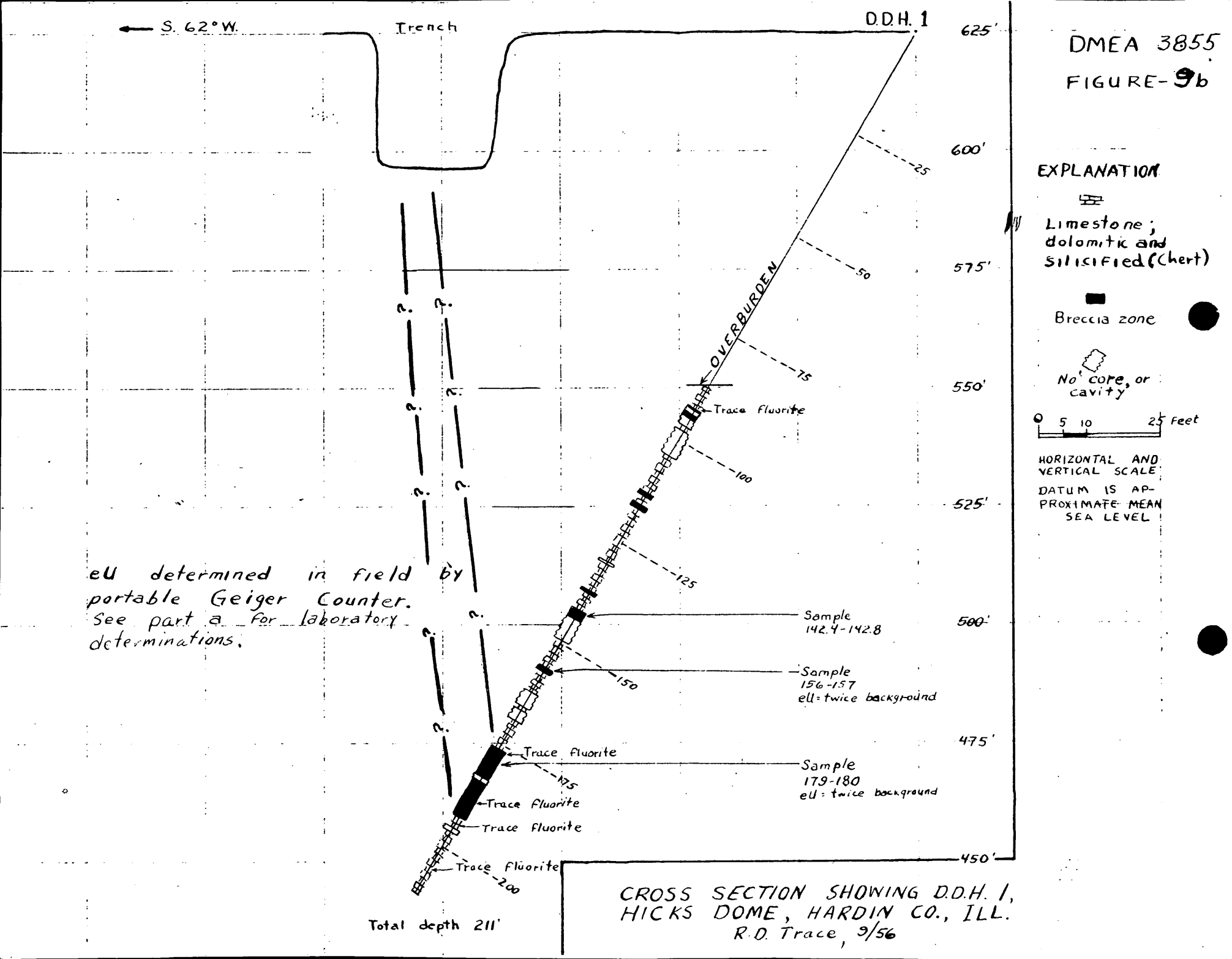
Breccia zones in D.D.H. 1 and 2: The breccia zones consist of limestone and chert that have been shattered into fragments as large as an inch in diameter, with interstitial fillings and veinlets of purple fluorite and white calcite. The radioactivity is associated with the breccia, either in narrow cavernous 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

DMEA 3855

FIGURE-9b

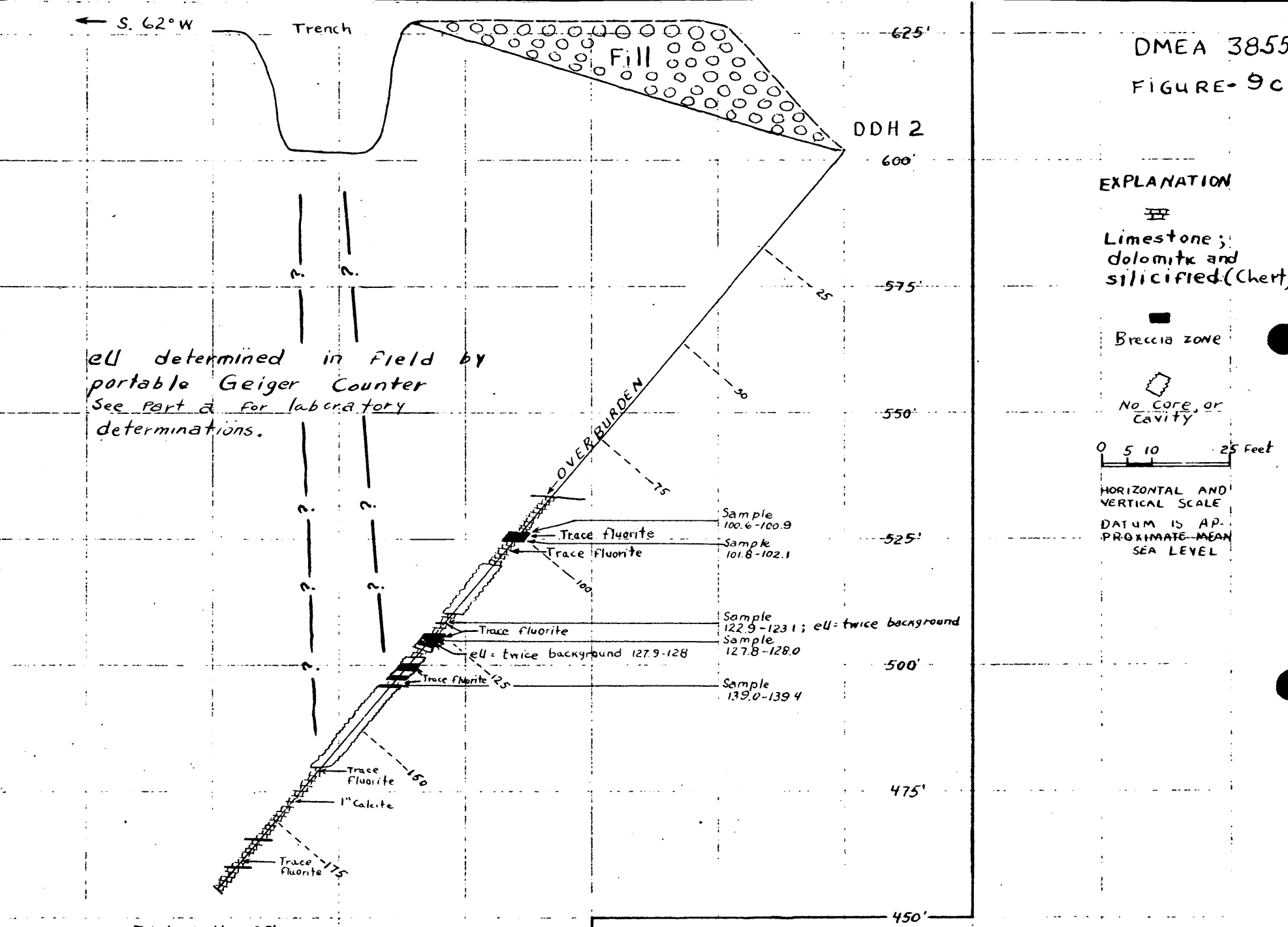


CROSS SECTION SHOWING D.D.H. 1, HICKS DOME, HARDIN CO., ILL.

R.D. Trace, 9/56

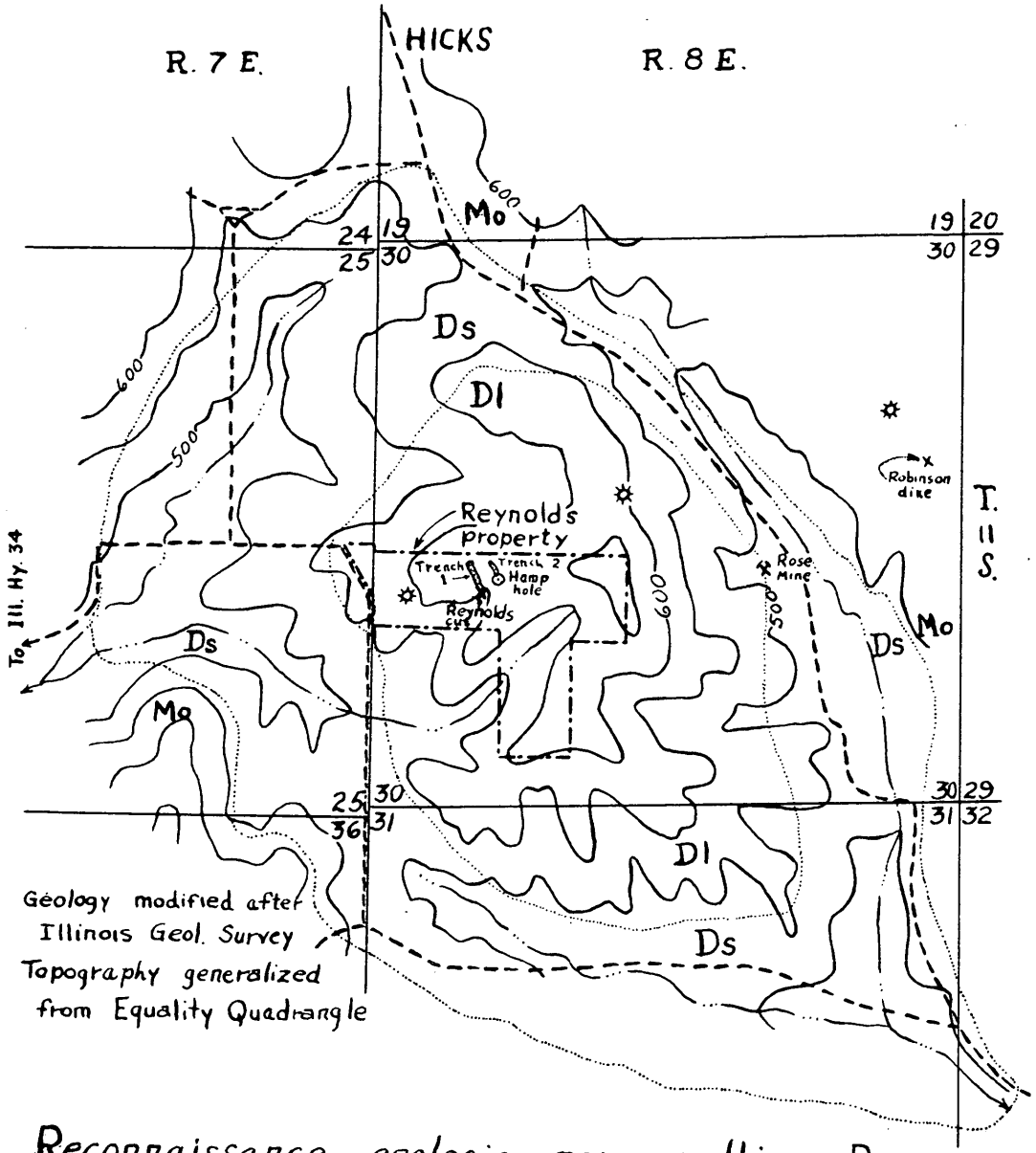
DMEA 3855

FIGURE-9c



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

Figure 10
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

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

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

Trench No. 2

Photograph by
U. S. Dept. of the Interior
Bureau of Mines
Minerals Technology Division
College Park, Maryland

Neg. No. H-1399-CP

Date _____

If this picture is used for publication, please credit the Bureau of Mines.

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FEB 15 1950
D.M.E.A.

Trench No. 1

9/20/56 gl

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 1 SHIPPING 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,
Executive Officer, DMEA
Region V

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

9/19/56 gla

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D.C.
ROOM 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/xm
cc:
Opr. Com.-2
Lynch -Trace

Operator's final report

RECEIVED
SEP 10 1956

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. ... ey
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 UMEA 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

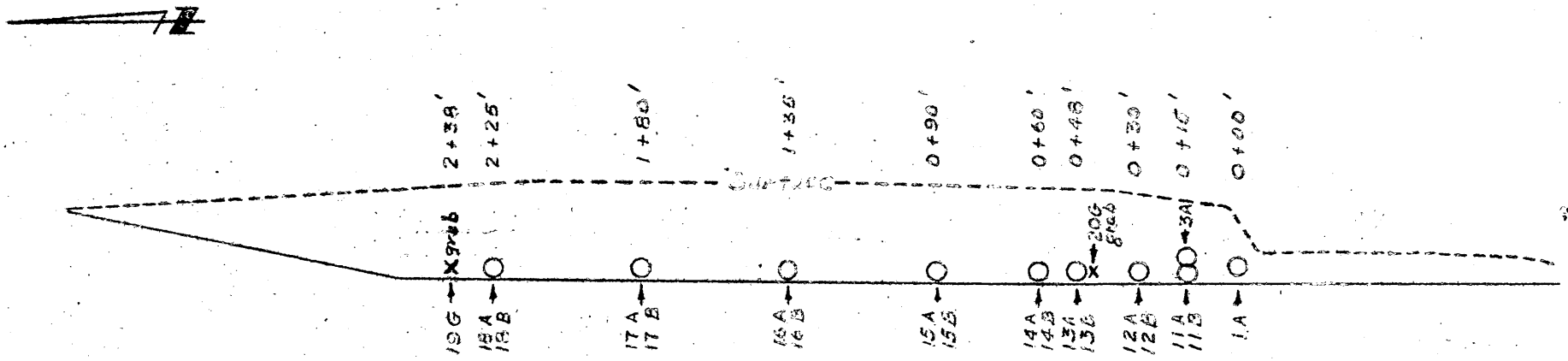
Attachment

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

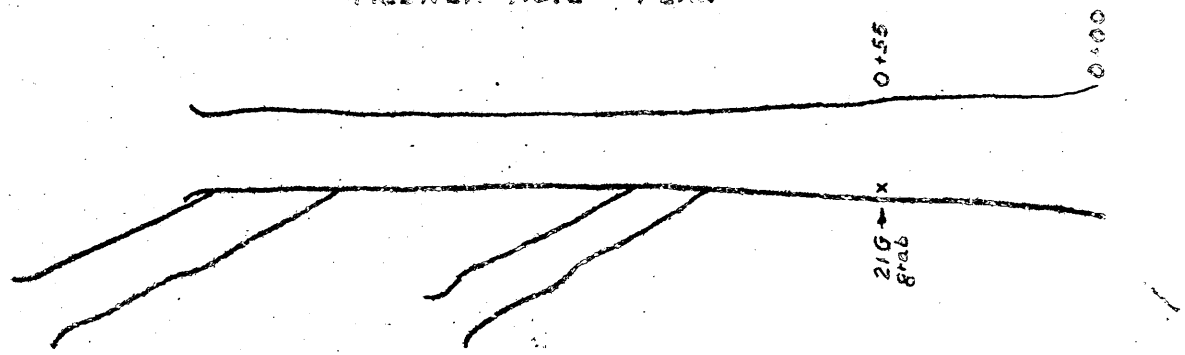
BLB/t

SAMPLE LOCATIONS

TRENCH NO. 1 LONGITUDINAL SECT.



TRENCH NO. 2 PLAN

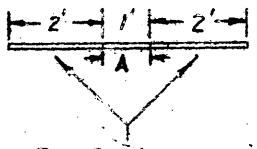


EXPLANATION

X Grab Sample

O Cut Sample in floor

thus



B - COMPOSITE

WM. G. REYNOLDS

DMEA 3855 - CONTRACT E 914

HICKS DOME - HARDIN CO. ILL.

0 inches 1

0 feet 50

R.L.B.

RECEIVED
SEP 1 0 1956

RECEIVED
SEP 1 0 1956

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

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U. S. Geological Survey
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B. L. Baxter

Bruce L. Baxter

Attachment

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

BLB/t

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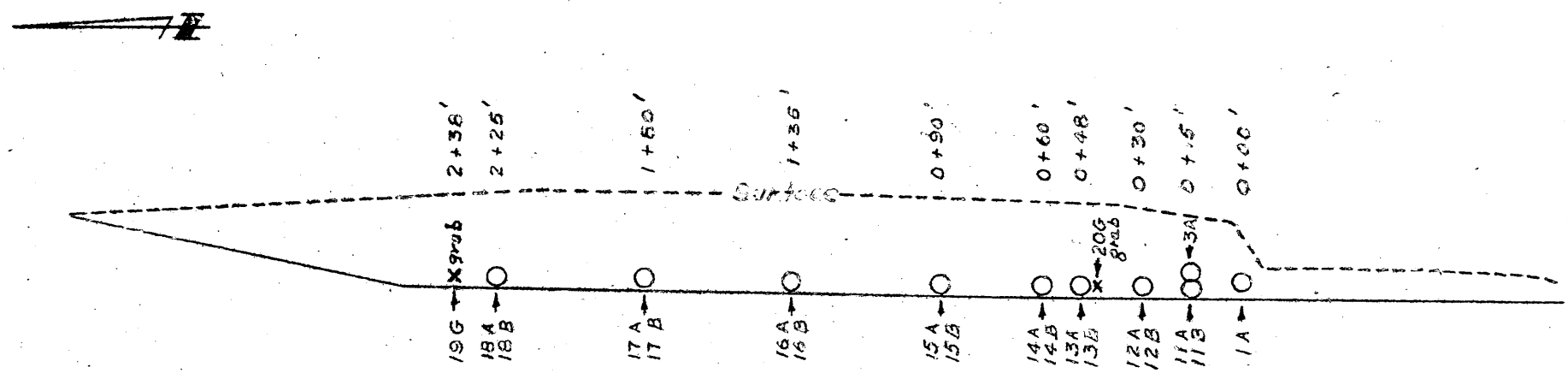

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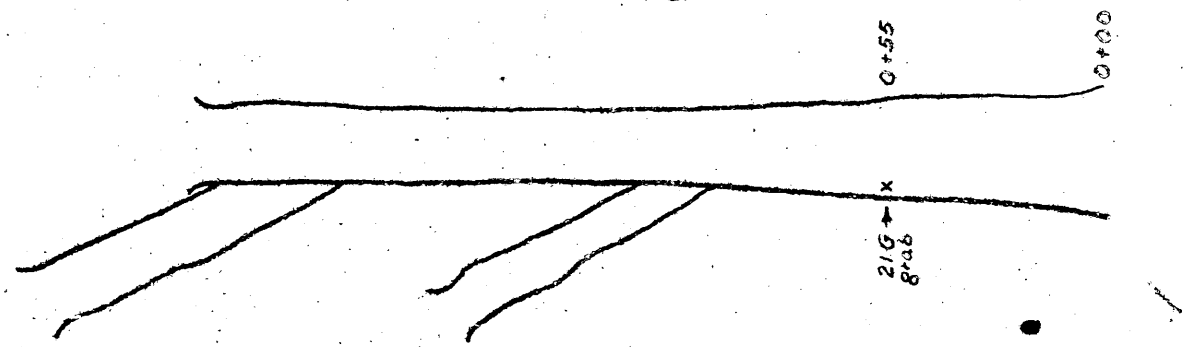
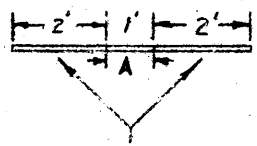


EXPLANATION

X Grab Sample

O Cut Sample in Floor

thus



B - COMPOSITE

WM. G. REYNOLDS

DMEA 3855 - CONTRACT E 914

HICKS DOME - HARDIN CO. ILL.

0 inches 1

0 feet 50

RECEIVED
SEP 19 1966

RECEIVED
SEP 19 1956

DOCKET DMEA #3855 - Idm-E914 - Hick's Dome

STATUS REPORT

W. G. Reynolds

August 20, 1956

August 20, 1956

U. S. Department of Interior
Bureau of Mines
College Park, Maryland

RECEIVED
SEP 19 1956

Attention: Mr. H. L. Burmeister

Subject: Status Report - Docket DMEA #3855
Contract Idm-E914
W. G. Reynolds
Hick's Dome
Hardin County, Illinois

Gentlemen:

Attached is Status Report to date, regarding subject DMEA Project. Attached you will find the following:

1) Operator's Monthly Report and Voucher.

2) Operator's Unit Cost and Progress Report.

3) Final invoices - O. B. Wardlaw and Sons , covering all bulldozing work.

4) Measurement for cubic yards of earth bulldozed in Trench #1 and Trench #2 with recapitulation showing number of yards yet to be reported.

5) Final invoice from Joy Manufacturing Company covering core drilling. The invoice covers 406 feet, but we are requesting 405 feet in the Operator's Monthly Report and Voucher, which is the amount approved by the contract. The other one foot will be paid personally by Mr. W. G. Reynolds.

6) Sketches showing core drilling details for drill hole number one and drill hole number two. Please note that hole #1 extended a distance of 16 feet beyond the vertical and hole #2 extended 50 feet beyond the vertical. We are, therefore, satisfied that both holes were drilled a sufficient linear distance to intersect any potential extension of the radioactive vein.

7) Summary of Hick's Dome sample analyses.

Each Parker invoice has been individually checked and the amount to be borne under the DMEA Contract is listed in the right-hand column. Mr. W. G. Reynolds will bear the cost for Zirconia and Lithium analyses.

8) C. O. Parker invoices.

These have been checked out and are in accordance with the contract. Please note that although the contract calls for spectrographic analysis for rare earths at $15.00 each, C. O. Parker only charged us $10.00 each for these rare earth analyses. We are, therefore, submitting the rare earth cost at this $10.00 amount.

9) Topographic map of the area excavated and core drilled, showing location of bulldozing, location of radioactive vein in main cut and location of the two drill holes in the main cut and also contours of the area explored.

With respect to the evaluation of the cores from the two drill holes, the writer met with Mr. R. D. Trace on July 22nd at Hick's Dome and thoroughly reviewed all cores from both core holes. Mr. Trace and the writer concurred that exceptionally good core recovery was obtained in view of the cherty formation. Up to 95% core recovery was obtained. These cores were thoroughly checked by the writer with a Precision Scintillator, Model 111B. Certain cores showed a radioactivity of 30 microroentgens per hour which compared to a background of 13 microroentgens per hour, i.e., about 2.5 times background. This amount of radioactivity above background was insufficient, in the writer's opinion, to warrant the cost of having C. O. Parker run any analyses. However, it was felt worthwhile, as suggested by Mr. Trace, that an analysis be made in a Government Laboratory of certain cores in an effort to identify the minerals in their unaltered form causing the radioactivity. This might perhaps be a clue as to the source of radioactivity and perhaps indicate whether the source was of hydrothermal or sedimentary origin. This work could, of course, only be performed in a properly equipped laboratory and by personnel experienced in such work. The results of such a mineralogical study when completed could serve as a basis for possible future exploratory work in this area. If the results indicated a sedimentary source of radioactivity from the Chattanooga shale above, then no further exploration could be justified, in the writer's opinion. On the other hand, if the unaltered cores indicated a possible hydrothermal mechanism, then perhaps further exploration by core drilling or shafting through the present radioactive vein might be justified.

EVALUATION OF POTENTIAL MARKET FOR HICK'S DOME ORES

Ore concentrates containing 6% Thorium oxide are now being purchased by Lindsay Chemical Company. According to Mr. C. O. Parker in Denver, who has analyzed thousands of ore samples from the Colorado plateau, the Thorium content of our Hick's Dome ore is far above the average of the Colorado plateau ores. This is borne out by Mallinckrodt Chemical Works, who indicated to the writer that the Idaho ores near Cascade, Idaho in the Paddy flat area averaged from .002% to .005% Thorium oxide, which were economically feasible until Lindsay began importing monazite ores from South Africa. The statement was made by the Mallinckrodt representative that the Idaho Thorium ores would have to be over .08% to be equal to the South African monazite on the assumption, of course, that the ores were amenable to commercial concentrating processes.

As shown on the Summary of Hick's Dome sample analyses, we obtained Thorium samples ranging from .18% up to 1.0%, which is several times higher than the .08% mentioned above as being the requirement for being equal to imported ores. Furthermore, the 1.0% sample was taken from the center of the 5 foot wide zone, which gave an average reading of 100 times background across the entire 5 foot width.

Our indications from several sources are that there is every likelihood that there will be an increasing demand for Thorium, particularly for industrial power reactors.

Also, we were told by the representative of Mallinckrodt that our 3.0% rare earth analysis was considered high. As high as 10% rare earth oxide is obtained in Nevada, but is a tough ore to separate. If the rare earth is a monazite type ore, it is much more easily separated. Also compared to Idaho sources, we were told that our 3.0% rare earth analysis was considered very good.

As you know, we have sent samples of our ore to Vitro Uranium, Salt Lake City for evaluation as to amenability. As of this writing, we have as yet received no reply.

It is felt that if a Thorium ore body in the Hick's Dome area of sufficient size and magnitude can be determined, then a ready market can be quickly developed. This ore body may very well be located at depths below that reached by the two core holes. Also during the core drilling operations, certain voids or mushy zones, as much as 11 feet, were encountered, in which it was impossible to obtain a core sample. These zones could very well have been an extension of the radioactive vein located on the surface in the main cut.

It is, therefore suggested that any further exploratory work be held in abeyance until after the mineralogical evaluation of the unaltered samples is completed.

Yours very truly,

B. L. Baxter

B. L. Baxter

Attachments

BLB/t

Form MF-104 (Rev.)
(April 1952)

Budget Bureau No. 42-R1036.5

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

PAID ON VOUCHER & SCHEDULE OF PAYMENTS K-

OPERATOR'S MONTHLY REPORT AND VOUCHER

Month of July, 1956 Docket No. DMEA 3855 RECEIVED Contract No. Idm-E914
Operator's Name William G. Reynolds Minerals
Address Stonegate Road, Anchorage, Kentucky SEP 19 1956
Contract Amount, $ 5,620.00 Government Participation: 75 % Amount, $

ITEMS OF COSTS	FOR OPERATOR'S USE: Monthly Total	Totals Previously Reported	Totals To Date	FOR GOVERNMENT USE ONLY: Approved Monthly Total	Approved Totals Previously Reported	Approved Totals To Date
(1) Independent Short Form Contracts:						
Drilling						
Bulldozing 7,070 x $ .20	$1414.00	$926.00	$2,340.00			
Crosscutting						
Drifting						
(2) Labor and Supervision:						
Labor						
Supervision						
Technical Service Surveying Mapping	$ 125.00	$125.00	$ 250.00			
(3) Operating Mat'ls. and Supplies:						
Timber						
Explosives						
Pipe						
Track						
(4) Operating Equipment:						
Rental						
Purchase						
Depreciation						
(5) Initial Rehabilitation and Repairs						
(6) New Bldgs., Improvements, etc.						
(7) Miscellaneous:						
Repairs to Equipment						
Sampling and Analysis	$ 400.00	-0-	$ 400.00			
Payroll Taxes						
Liability Insurance						
Core Drilling (405 ft. @ $4.00/ft	$1620.00	-0-	$1,620.00			
(8) Contingencies (specify):						
TOTALS	$3559.00	$1051.00	$4,610.00	3,559.00	1,051.00	4,610.00

I certify that the above bill is correct and just and that payment therefor has not been received.

Date ..... *Payee W. G. Reynolds

Per ..... Title .....

*When a voucher is signed or receipted in the name of a company or corporation, the name of the person writing the company or corporate name, as well as the capacity in which he signs, must appear. For example: "John Doe Company, per John Smith, Secretary," or "Treasurer," as the case may be.

→ NOTE.—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.

(Instructions on reverse)

889.75

Pursuant to authority vested in me, I certify that this account is correct and proper for payment in the amount of:

$2,669.25

Signature Helen R. Mulin
(Authorized Certifying Officer)

Date SEP 14 1956 Vou. No. 39
(See other side)

(For Government use only)

CERTIFICATION BY GOVERNMENT REPRESENTATIVE:

I certify that to the best of my knowledge and belief the contractor submitting this voucher is operating a Defense Minerals Exploration Administration project under Contract No. E-419 in accordance with the terms of the contract.

Signature W. L. Summeister Title Mining Engr. Date 8/28/56

APPROVAL BY DMEA EXECUTIVE OFFICER OR ALTERNATE:

Signature Robert A. Sermonne Title EXECUTIVE OFFICER DMEA REGION V Date SEP 10 1956

MONTHLY REPORT OF OPERATOR

The Operator (Contractor) of an exploration project is required to make a monthly report to the Government through the Regional Executive Officer. This report consists of three parts as follows:

(a) *Form MF-104—Operator's Monthly Report and Voucher.*—This form details expenditures and constitutes a voucher for reimbursing the Operator for the Government's share of costs;

(b) *Form MF-104A—Operator's Unit Cost and Progress Report.*—This is a statistical report of expenditures which shows costs for the various types of operation; and

(c) *Narrative.*—A concise narrative description of progress made, results accomplished, and any unusual difficulties encountered must be furnished as an attachment to this Report and Voucher. Wherever possible, the narrative is to be illustrated with maps or sketches showing formations penetrated and location and assays of samples taken as well as advances in workings. In the case of diamond drilling or churn drilling, the location and inclination of holes is to be shown on a map; logs and assays also are to be submitted.

The Monthly Report of Operator should be prepared in an original and four copies all of which must be sent to the Executive Officer of the Region not later than the 15th of the month following.

Preparation of Form MF-104—Operator's Monthly Report and Voucher.—All the applicable spaces in Form MF-104 should be filled in by the Operator, and the Operator or his agent should sign the certification in the lower left corner of the form.

The items of costs are arranged in the order they appear in Article 6 (a) of Form MF-200 (Revised February 1952), however, this form is readily adaptable for use in reporting activities under other contract forms.

Under Item (1) delete words "Short Form" if the contract is a sub-contract under Form MF-200; and delete word "Independent" if the contract reported is on Form MF-200 (A). Also, report work paid for on a unit basis under contract Form MF-200 as though it were performed under an independent contract.

Under Item (2) include labor, supervision and technical services incurred for the exploratory operations. Do not include labor, supervision and technical services used for work performed under items (5) and (6).

Under Item (3) include the costs of material and supplies used in the project other than that used under items (5) and (6).

Under Item (4) appear the three types of operating equipment expenditures, that is, rental, purchase and depreciation. The expenditures made for renting equipment belonging to a third party will be reported under "Rental". The amount paid or duly obligated for payment for the purchase of equipment will be reported under "Purchase". The amount of expenditures due the Operator to reimburse him for depreciation of equipment owned will be reported under "Depreciation".

Item (5) comprises costs of labor, supervision, technical services, materials, etc., which are used in the initial rehabilitation and repair of existing buildings, installations, fixtures, and equipment. These costs, therefore, should not be reported under items (2) and (3).

Item (6) includes the labor, supervision, technical services, materials, etc., used in the installation or construction of new buildings, fixed improvements, etc., necessary for the project. These costs, therefore, should not be reported under items (2) and (3).

Item (7) covers miscellaneous types of expenditure such as payroll taxes, liability insurance, workmen's compensation insurance, repairs to equipment and sampling and analysis. Only that part of payroll taxes, liability insurance and workmen's compensation which are paid by the operator should be reported under item (7). The share paid by the employee as a payroll deduction is to be included under item (2) as labor costs.

Item (8) includes any unforeseen costs not included in the other seven categories.

The original of Form MF-104 when submitted for reimbursable expenses incurred under contract Form MF-200 must be supported by original documentation or by certified copies of purchase orders, payrolls or transcripts of payrolls, unless such documentation has been waived by the Regional Executive Officer. This certification may be stated thus, "Certified True Copy (or Transcript)", followed by appropriate signature. If the Executive Officer of the Region determines that a contract under Form MF-200 should have an "on-site" audit, that is, a Government auditor should make an audit of the Operator's books and records of account, the Operator need not support his monthly voucher with original or certified documents except in cases of equipment purchases whose individual costs exceed $50.00. In these cases the original or a certified copy of the purchase order or invoice should be attached to the Monthly Voucher. N. B.—Only the *original* of Form MF-104 is required to be documented. The four copies of Form MF-104 are not to be thus supported.

Form MF-104 submitted for reimbursement under fixed price contracts on Form MF-200 (A), however, are not required to be supported by documentation of any kind. The Operator will submit his claim under item (1) of Form MF-104 by deleting as stated above the word "Independent" and by showing the number of feet or other units immediately after the appropriate descriptive word, such as, drilling, bulldozing, crosscutting, drifting, etc., and giving the "Monthly Total" amount due. "Totals Previously Reported", and "Totals to Date" columns should also be filled in.

Form MF-104A
(April 1952)

Budget Bureau No. 42-R1151.1
Approval expires 6-30-53.

UNITED STATES
DEPARTMENT OF THE INTERIOR

DEFENSE MINERALS EXPLORATION ADMINISTRATION

RECEIVED
SEP 19 1956

OPERATOR'S UNIT COST AND PROGRESS REPORT

Month of July 1956 Docket No. DMEA 3855 Contract No. Idm-3914
Operator's Name William G. Reynolds Minerals
Address Stonegate Road, Anchorage, Kentucky

OPERATION	UNIT	COSTS THIS MONTH	UNITS THIS MONTH	COSTS TO DATE	UNITS TO DATE	UNIT COSTS TO DATE	AUTHORIZED BY CONTRACT Units	AUTHORIZED BY CONTRACT Unit Costs
Sample Analysis								
Drifting								
Thorium	1	$ 190.00	19	$ 190.00	19	$10.00	70	$10.00
Crosscutting								
Uranium	1	40.00	8	40.00	8	5.00	10	5.00
Raising								
Cb-Ta	1	60.00	3	60.00	3	20.00	3	20.00
Shafts								
Rare Earths	1	110.00	11	110.00	11	10.00	30	10.00
Winzes								
	1 ft.	$ 1620.00	405	$1620.00	405	$ 4.00	405	$ 4.00
Drilling: Core								
Churn								
Auger								
Stripping								
Trenching Bulldozing	1 cu. yd	$ 1414.00	7,070	$2340.00	11,700	$ .20	11,700	$ .20
Test Pits								
Roads and Trails								
Surveying & Mapping	1 map	125.00		250.00				
TOTAL DISTRIBUTED COSTS		$3,559.00		$4,610.00				TOTAL COSTS AUTHORIZED BY CONTRACT
Operating Equipment Purchased								
Initial Rehabilitation and Repairs								
New Buildings, Improvements, etc.								
TOTAL COSTS								

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this report is correct and complete to the best of their knowledge and belief.

Date _____ Operator W. G. Reynolds

Per _____ Title _____

REMARKS:

NOTE.—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.

(Instructions on reverse)

(For Government use only)

R. A. Burmeister

INSTRUCTIONS

Preparation of Form MF–104A—Operator's Unit Cost and Progress Report.—Applicable places on Form 104A should be filled in by the Operator. The purpose of this form is twofold as follows: (1) to furnish the supervising engineers and other administrators with statistical information necessary to better determine the progress of the project; and (2) to furnish more permanent information on mining costs for future use. The more important phases of operation on which permanent information is desired have been outlined in the form. There are blank lines, however, for those unusual phases which may need to be reported for a particular project. It will be necessary for the Operator to distribute his costs among the applicable phases reported with the exception of three items the costs of which are not to be distributed by the Operator. These three items are: "Operating Equipment Purchased", "Initial Rehabilitation and Repairs", and "New Buildings, Improvements, etc." The reason for not distributing these items on a monthly basis is doubtless clear to the Operator, since such distribution might well overstate the cost for any one month or period short of the entire contract period.

Form MF–104A has been designed to tie in with Form MF–104 for both monthly and cumulative costs. The "Total Costs" on Form MF–104A for each month should equal the monthly "Total Costs" as reported on Form MF–104. This is also true of the "Total Costs To Date".

In preparing Form MF–104A, it will be necessary frequently to distribute certain costs over a number of items. For instance, supervisory and engineering costs may have to be distributed over several phases, such as, drifting, crosscutting, raising, etc., provided that these items were reported active for the month. Such distributions should be made on the basis of time spent on the various phases, on man days of labor charged to such phases, or on some other equitable basis. "Operating Equipment", "Initial Rehabilitation and Repairs", and "New Buildings Improvements, etc.", will be distributed to the several phases of the project by the Washington Office of DMEA at the close of the project if determined necessary. The last two columns headed "Authorized by Contract" will be filled in by the Operator if such information is found in the contract. This information is usually a part of Exhibit "A" of the contract. A space for remarks has been provided for the use of the Operator to call attention to any unusual circumstances causing excessive or disproportionate unit costs.

GPO 83-38475

RECEIVED
SEP 10 1956

O. B. WARDLAW AND SONS

Core Drilling Contractors
Box 410
Marion, Kentucky

May 25, 1956

Mr. W. G. Reynolds
2000 S. Ninth Street
Louisville, Kentucky

Dear Mr. Reynolds:

Due to a very hard cherty formation we were compelled to buy and use a ripper on the dozer. It required ripping every inch of the way after the first five feet. Total hours were 262½. We charge $12.50 per hour so you can see we lost money doing the job at 20¢ per cu. yd.

I thank you very much for the contract. If we can be of any assistance to you in the future don't hesitate to call on us.

Yours very truly,

O. B. WARDLAW AND SONS

By /s/ O. B. Wardlaw

C
O
P
Y

O. B. WARDLAW & SONS
CORE DRILLING CONTRACTORS
Box 410
MARION, KENTUCKY

May 23, 1956

TO

Mr. W. G. Reynolds
200 S. Ninth Street
Louisville, Kentucky

Attn; Mr. B. L. BAXTER

TERMS: NET

INVOICE NO. 175
CUSTOMER'S NO.
AUTHORIZATION
REQUISITION NO.
CONTRACT

For Dozer Work

Main Cut	8,900 cu. yd.			
Hampwell Cut	2,800 cu. yd.			
Total	11,700 cu yd.	at	20¢ cu. yd.	$ 2,340.00

Government Docket
DMEA 3855

PDGE-56

Engineer B.L. Baxter

Approval

REYNOLDS METALS CO.
PARTS DIVISION
GENERAL ENGINEERING

File No. Hicks Dome DMEA 3855

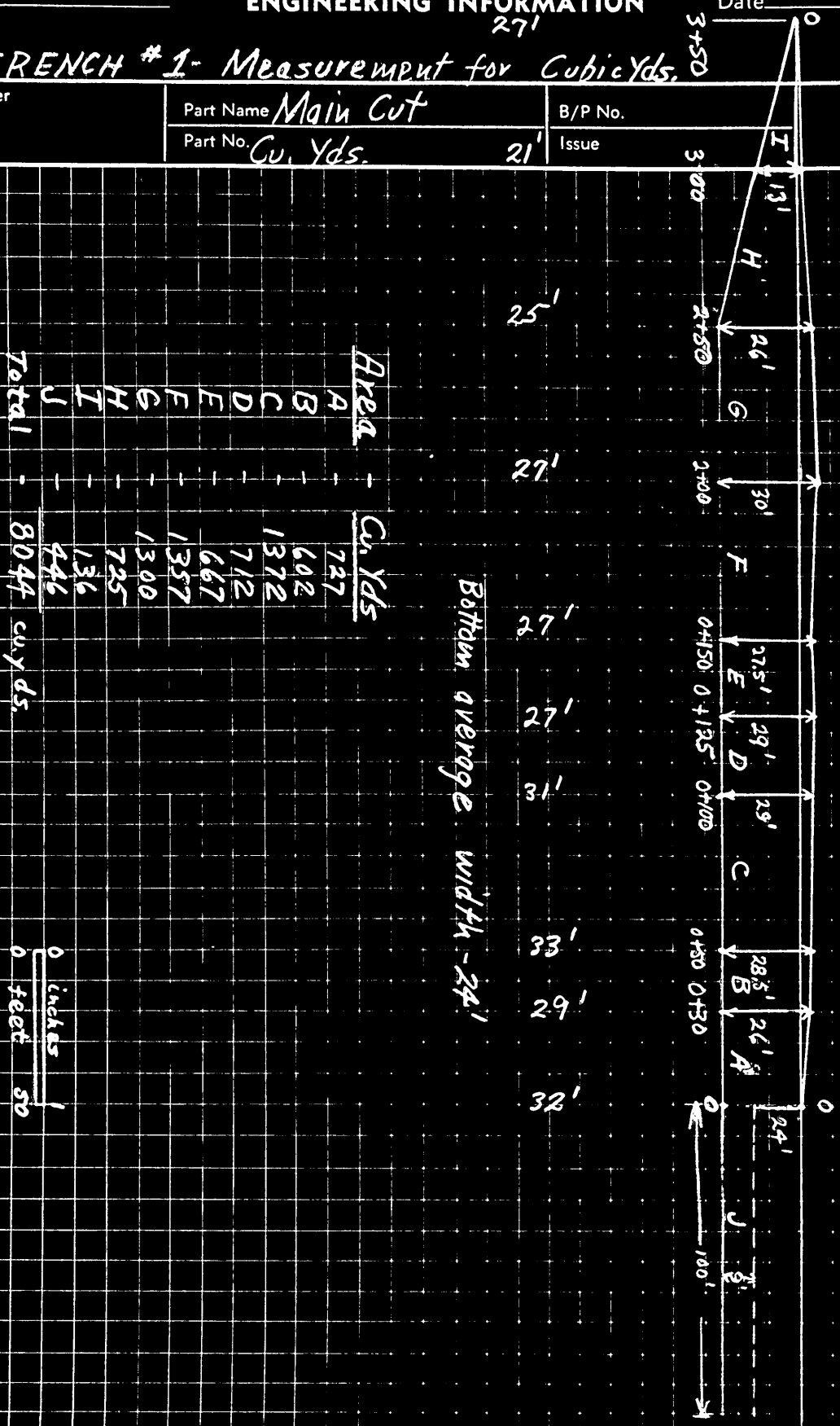
Page 16 of Sheet

Date 7/1/56

ENGINEERING INFORMATION

TRENCH #1 - Measurement for Cubic Yds.

Customer	Part Name Main Cut	B/P No.	Unit	Total
	Part No. Cu. Yds.	Issue		



Use to show all engineering sketches, calculations and information other than where standard forms are provided.

RECEIVED
SEP 10 1956

PDGE-56

Engineer B. L. Baxter

Approval

REYNOLDS METALS CO.
PARTS DIVISION
GENERAL ENGINEERING

ENGINEERING INFORMATION

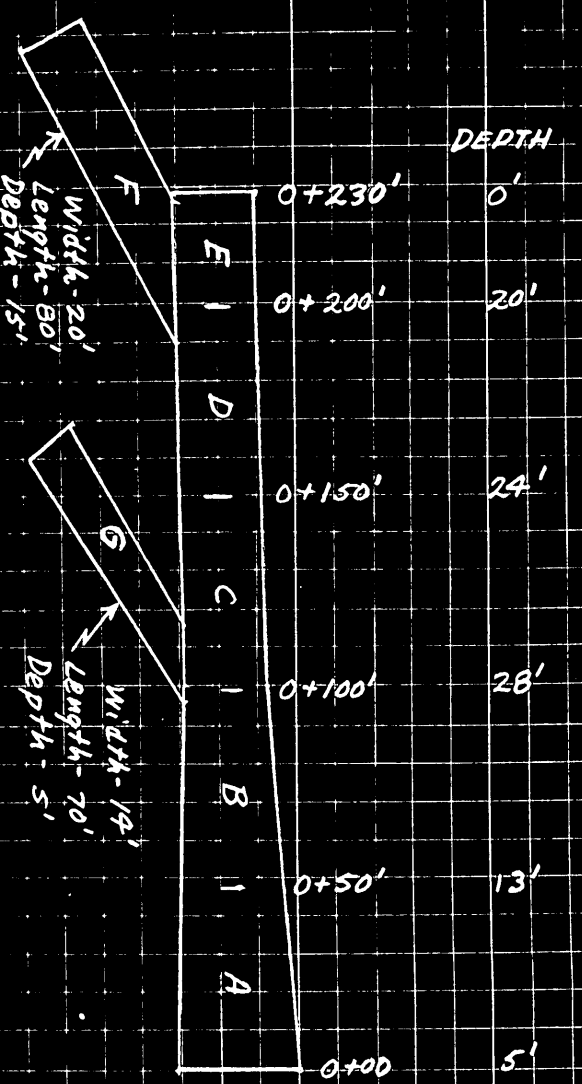
File No. Hick's Dome DMEA 3855

Page 17 of Sheet

Date 7/1/56

TRENCH #2- Measurement for Cubic Yds.

Customer	Part Name Hamp Well Cut	B/P No.	Unit	Total
	Part No. Cu. Yds.	Issue		



Area - Cu. Yds

A - 401
B - 845
C - 963
D - 815
E - 222
F - 900
G - 182

Total - 4,288 cu. yds.

0 inches 1
0 feet 50

Recapitulation: Trench No. 1 - 8044 cu. yds
Trench No. 2 - 4288 "
Total Yards Bulldozed - 12,332 "
Allowed in Contract - 11,700 "
Overage (for operator's acct) - 632 cu. yds
Allowed in Contract - 11,700
Vouchered in April Report - 4,630
Yet to be reported - 7,070 cu. yds.

Use to show all engineering sketches, calculations and information other than where standard forms are provided.

JOY MANUFACTURING COMPANY

HENRY W. OLIVER BUILDING

PITTSBURGH 22, PENNSYLVANIA

CUSTOMER'S ORDER NO.	DATE	REQ. NO.	OUR ORDER NO.	DATE	AT REC. POINT	B.O. NO.
CONTRACT	CODE			DATE	AT SHIP POINT	

SOLD TO: W. G. Reynolds
2000 S. 9th St.
Louisville, Ky.

~~TERMS NET 30 DAYS~~
NO CASH DISCOUNT

PLEASE REMIT TO
PITTSBURGH, PA.

INVOICE NO. 98640

INVOICE DATE 7-25-56

DATE SHIPPED

SHIPPED VIA

SHIPPED TO: Hicks Dome, Ill.

P. O. ADDRESS

MARKS

REQUESTED ROUTING

SHIPPED FROM

ORIGINAL QUANTITY ORDERED	UNIT	PART NUMBER	DESCRIPTION	CODE	UNIT PRICE	QUANTITY BACK ORDERED	QUANTITY SHIPPED	AMOUNT
			To 406.' Core Drilling at Hicks Dome, Illinois for period ending July 25th as per agreement.					
			Prospect # / From / To		Total Feet		Unit Cost	Total Cost
			1 — 0. — 211.		211.			
			2 — 0. — 195.		195.			
					406.		$4.00	$1,624.00
			WORK COMPLETED					

F. O. B. SHIPPING POINT UNLESS OTHERWISE SPECIFIED

NO RETURNS ALLOWED UNLESS AUTHORIZED BY THIS OFFICE

FORM P133A 50M-1-56

GOODS COVERED BY THIS INVOICE WERE PRODUCED IN COMPLIANCE WITH THE REQUIREMENTS OF THE FAIR LABOR STANDARDS ACT OF 1938, AS AMENDED, INCLUDING SECTION 12(A).

PDGE-56

Engineer B.L. Baxter

Approval

REYNOLDS METALS CO.
PARTS DIVISION
GENERAL ENGINEERING

File No.

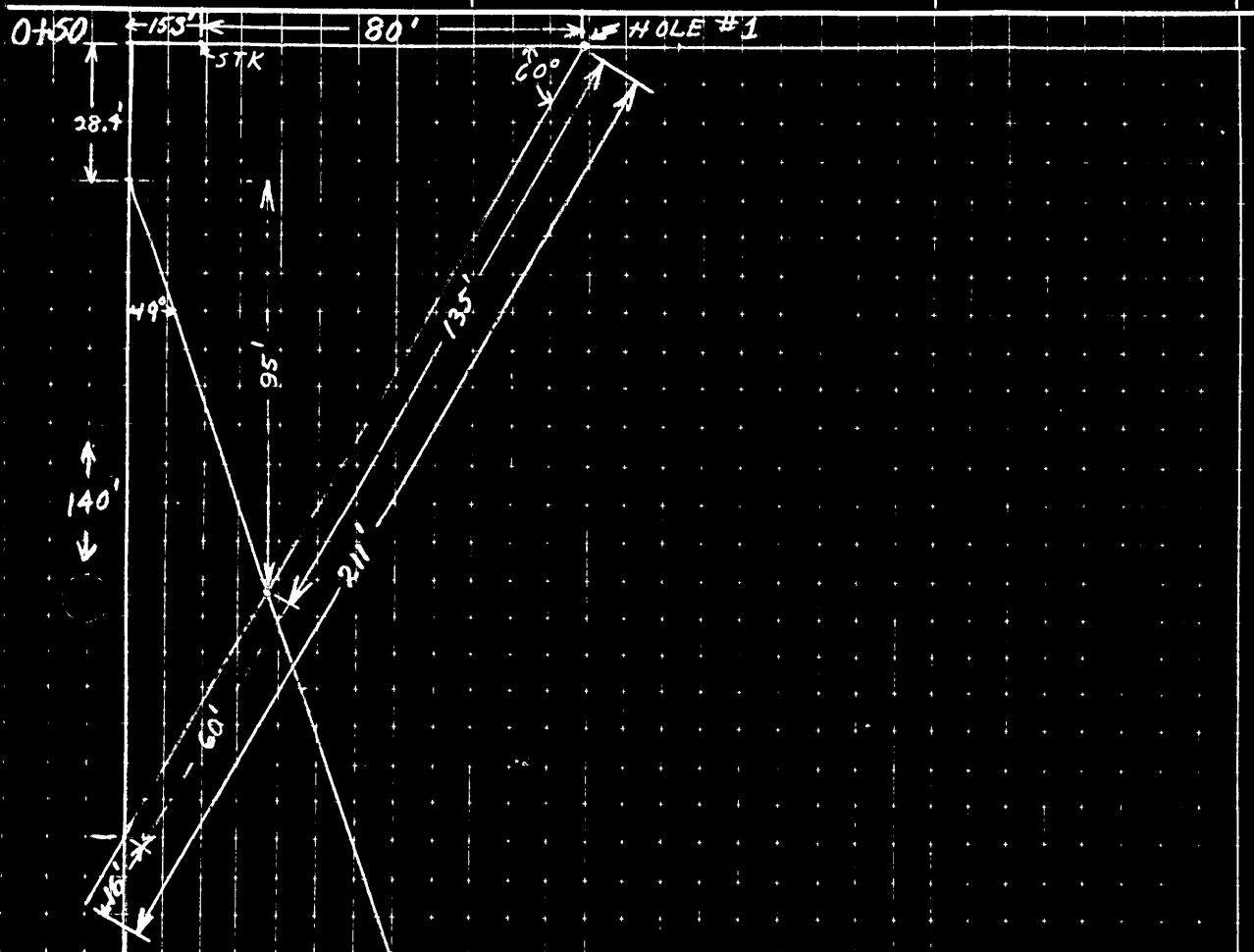
Page 14 of Sheet

Date 7/1/56

ENGINEERING INFORMATION

Drill Hole #1 (Total Depth - 211 FT - Angle 60°)

Customer	Part Name 0+50 Sta.	B/P No.	90' = 1" Unit	Total
	Part No.	Issue		



Use to show all engineering sketches, calculations and information other than where standard forms are provided.

PDGE-56

Engineer B. L. Baxter

Approval

REYNOLDS METALS CO.
PARTS DIVISION
GENERAL ENGINEERING

ENGINEERING INFORMATION

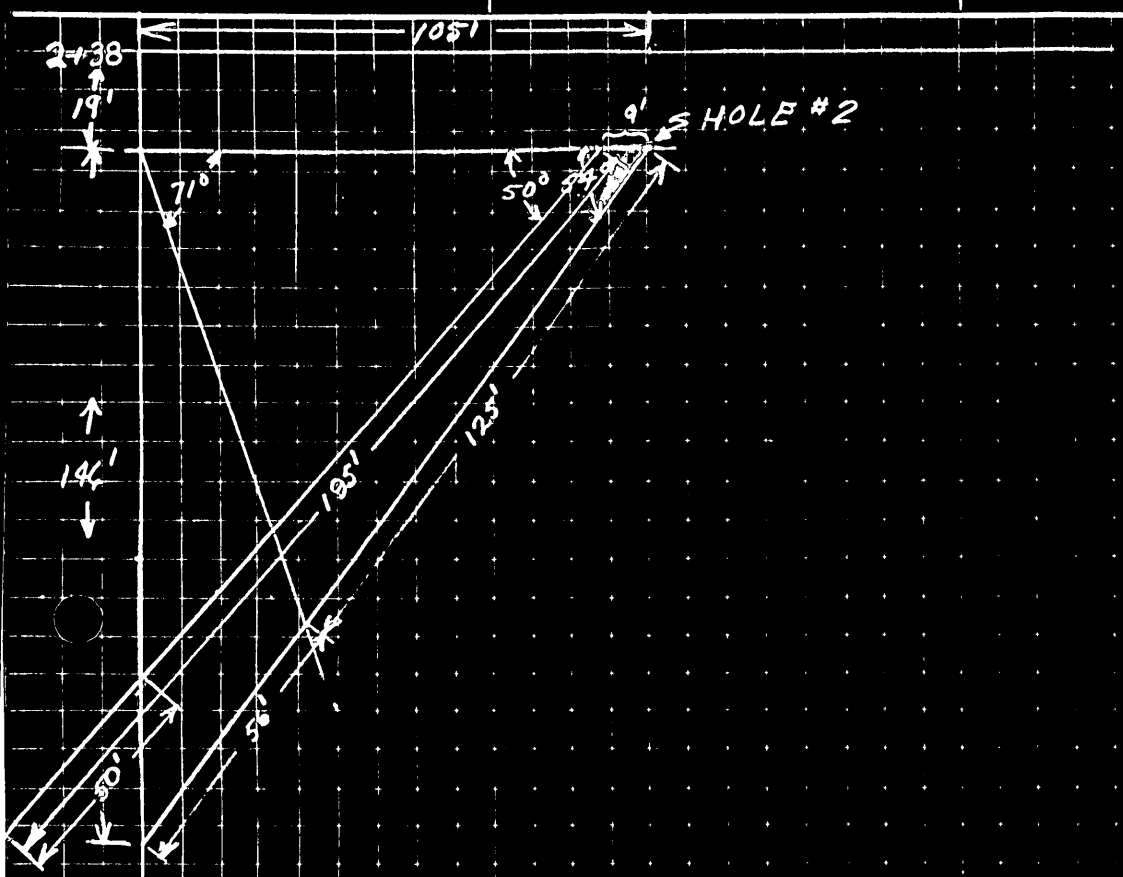
File No.

Page 15 of Sheet

Date 7/1/56

Drill Hole #2 (Total Depth - 195 FT; Angle - 50°)

Customer	Part Name 2+38 Sta.	B/P No.	40' = 1" Unit	Total
	Part No.	Issue		



Use to show all engineering sketches, calculations and information other than where standard forms are provided.

RMA #3255
Idm-E914

RECEIVED
SEP 19 1956

SUMMARY OF HICKOR BOMB SAMPLE ANALYSIS

Analyst	Sample Number	Thor.	U3O8	Cb	Ta	Rare Earths	Zirc.	Lith.	RMA Cost
C.O. Parker	11-A	.13 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.			.34 10.			25.00
"	13-B	Tr. 10.	.096 5.			Tr. 10.			25.00
"	14-A	.14 10.							10.00
"	14-B	Tr. 10.							10.00
"	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.	.030 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
"	19-A	.49 10.	.004 5.	Tr. 20.	Tr.	1.65 10.	Tr.	Tr.	45.00
"	21-A	Tr. 10.	.006 5.			.12 10.			25.00
"	3-A	.13 10.	.07 5.	Tr. 20.	Tr.	.58 10.	Tr.		45.00
Lindsay Chemical	1-A	.50				2.20			
"	19-A	1.0				3.0			
"	20-A	.60				3.1			
Vanadium Corp.	19-A	1.0 Est.	.06						

Total RMA Sample Cost $400.00

Note: Zirconia & Lithium analyses' cost to be borne by R. C. Reynolds

Approved: B. L. Baxter
B. L. Baxter

August 13, 1956

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5 COLORADO

"URANIUM CENTER"

Folio 6793

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

RECEIVED
SEP 10 1956

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS oxides	COMBINED COLUMBIUM TANTALUM OXIDES
#11-4 Main Cut Hicks Dome IME 3855 a	0.048%				0.18%	0.67%	TRACE

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ ~~45.00~~

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5 COLORADO

"URANIUM CENTER"

Folio 6793

Date May 18, 1956.

RECEIVED

SEP 19 1956

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

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DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS	COMBINED COLUMBIUM TANTALUM OXIDES
#11-B Main Cut Hicks Dome DMA 3855	0.02%				0.17%	0.40%	

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 25.00

CHARLES O. PARKER & CO.

CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5 COLORADO

"URANIUM CENTER"

Folio 6793

Date May 18, 1956.

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Attention: Mr. B. L. Baxter,
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#12-A Main Cut Hicks Dome DMEA 3855					0.11%		

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 10.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5 COLORADO

"URANIUM CENTER"

Folio 6793

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

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DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS	COMBINED COLUMBIUM TANTALUM OXIDES
#12-B Main Cut Hicks Dome DMEA 3855					trace		

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 10.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5 COLORADO

"URANIUM CENTER"

Folio 6793

Date May 18, 1956.

RECEIVED
SEP 10 1956

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS oxides	COMBINED COLUMBIUM TANTALUM OXIDES
#13-A Main Cut Hicks Dome DAMA 3855	0.038%				0.19%	0.84%	

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 25.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5 COLORADO

"URANIUM CENTER"

Folio 6793

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS oxides	COMBINED COLUMBIUM TANTALUM OXIDES
#13-R Main Cut Hicks Dome DMRA 3855	0.096%				trace	trace	

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 25.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 6793

Date May 18, 1956.

RECEIVED
SEP 10 1956

W. G. Reynolds,
Attention: Mr. P. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT •U	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS	COMBINED COLUMBIUM TANTALUM OXIDES
#14-A Main Cut Hicks Dome DMEA 3855					0.14%		

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 10.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 6794

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS	COMBINED COLUMBIUM TANTALUM OXIDES
#14-B Hicks Dome Main Cut IMBA 3855					trace		

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 10.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 6794

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS oxides	COMBINED COLUMBIUM TANTALUM OXIDES
#15-A Hicks Dome Main Cut DMCA 3855					0.09%	0.38%	

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ ~~20.00~~ 20.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 6794

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS oxides	COMBINED COLUMBIUM TANTALUM OXIDES
#15-B Hicks Dome Main Cut BMA 3855					trace	0.15%	

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 20.00

CHARLES O. PARKER & CO.

CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 6794

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS	COMBINED COLUMBIUM TANTALUM OXIDES
#16-A Hicks Dome Main Cut DMFA 3855					0.21%		

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 10.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 6794

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS	COMBINED COLUMBIUM TANTALUM OXIDES
#16-B Hicks Dome Main Cut DMEA 3855					0.12%		

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 10.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 6794

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

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DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS oxides	COMBINED COLUMBIUM TANTALUM OXIDES
#17-A Hicks Dome Main Cut IMEA 3855	0.040%				[redacted] 0.47%	1.47%	

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 25.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 6794

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

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DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS oxides	COMBINED COLUMBIUM TANTALUM OXIDES
17-B Main Cut Hicks Dome DMEA 3855					0.07%	0.32%	

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 20.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 6794

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS	COMBINED COLUMBIUM TANTALUM OXIDES
#18-A Hicks Dome Main Cut DMEA 3855					0.17%		

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 10.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 3794

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS	COMBINED COLUMBIUM TANTALUM OXIDES
#18-B Hicks Dome Main Cut DMEA 3855					trace		

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 10.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5 COLORADO

"URANIUM CENTER"

Folio 6794

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS oxides	COMBINED COLUMBIUM TANTALUM OXIDES
#19-G Main Cut Hicks Dome DMEA 3855	0.084%				0.49%	1.65%	TRACE

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 45.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5 COLORADO

"URANIUM CENTER"

Folio 6794

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

RECEIVED
SEP 19 1956

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS	COMBINED COLUMBIUM TANTALUM OXIDES
#21-G Well Cut Kicks Down DMEA 3855					trace	0.12%	

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 20.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 6834

Date July 7, 1956.

Reynolds Metals Company,
2000 South Ninth Street,
Louisville 1, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS	COMBINED COLUMBIUM TANTALUM OXIDES
#21-G	0.006%						

Second set of certificates. Original mailed July 11th, 6 P.M. AIRMAIL, as shown above on address. COP

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 5.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

2114 CURTIS STREET

TELEPHONE MAin 3-1852

[redacted]

CHEMISTS • ASSAYERS • ENGINEERS

DENVER 5, COLORADO

Folio 6802

Date May 18, 1956.

W. G. Reynolds,
Attention: Mr. B. L. Baxter,
Stonegate Road,
Anchorage, Kentucky.

We hereby Certify, that the samples assayed for you gave the following results:

DESCRIPTION	URANIUM OXIDE U_3O_8	VANADIUM PENTOXIDE V_2O_5	LIME $CaCO_3$	RADIOMETRIC EQUIVALENT eU	THORIUM OXIDE ThO_2	TOTAL RARE EARTHS Ce_2O_3	COMBINED COLUMBIUM TANTALUM OXIDES
#3-A Hicks Dome IMEA 3855	0.078%				0.13%	0.58%	TRACE

PLEASE PAY FROM THIS INVOICE AS NO OTHER STATEMENT WILL BE MAILED. THANK YOU.

Charge $ 45.00

CHARLES O. PARKER & CO.
CHEMISTS, ASSAYERS and ENGINEERS

September 17, 1956

Memorandum

To: Hamal Barry, Operating Committee

From: Grace L. Ault, Rare and Miscellaneous Metals Division

Subject: Amendment to contract

Mr. Murphy has reviewed and approved Amendment No. 2 to Contract Ion-E914, Docket DMEA-3055, William G. Reynolds, and has indicated that the amendment requires no further review.

/s/ Grace L. Ault

Grace L. Ault

Date 9-17-56

Commodity Thorium, Uranium, and rare earths

To: Mr. Murphy

Docket No. DMEA- William G. Reynolds

Contract No. Idm-E 914

Attached is Amendment No. 2, dated July 6, 1956 ??

TO BE REVIEWED.

Approved F M Murphy

Other action None

Please return this slip to me for my records.

Grace Ault

RECEIVED
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

ZM

cc:
Finance Office
Lynch
Shirley
Files

9-4-56

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

7/9/56 gla

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

Amsterage, Kentucky

Re: DMEA-3855, Idm-E911
(Therium, 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. H. L. Baxter, to begin Stage II of the exploration project at Hicks Dome.

Please have the drill core bound 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
Governmentn Copy of Contract
Docket " "
Division " "
Finance Office " "
Field Team " "
Millar
Lynch
Files

RECEIVED
JUL 9 - 1956

7-11-56

Interim Report

by

H. L. Burmeister

Docket No. DMLA 3555 (Rare Earths and Uranium)
Contract: Ltm-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.

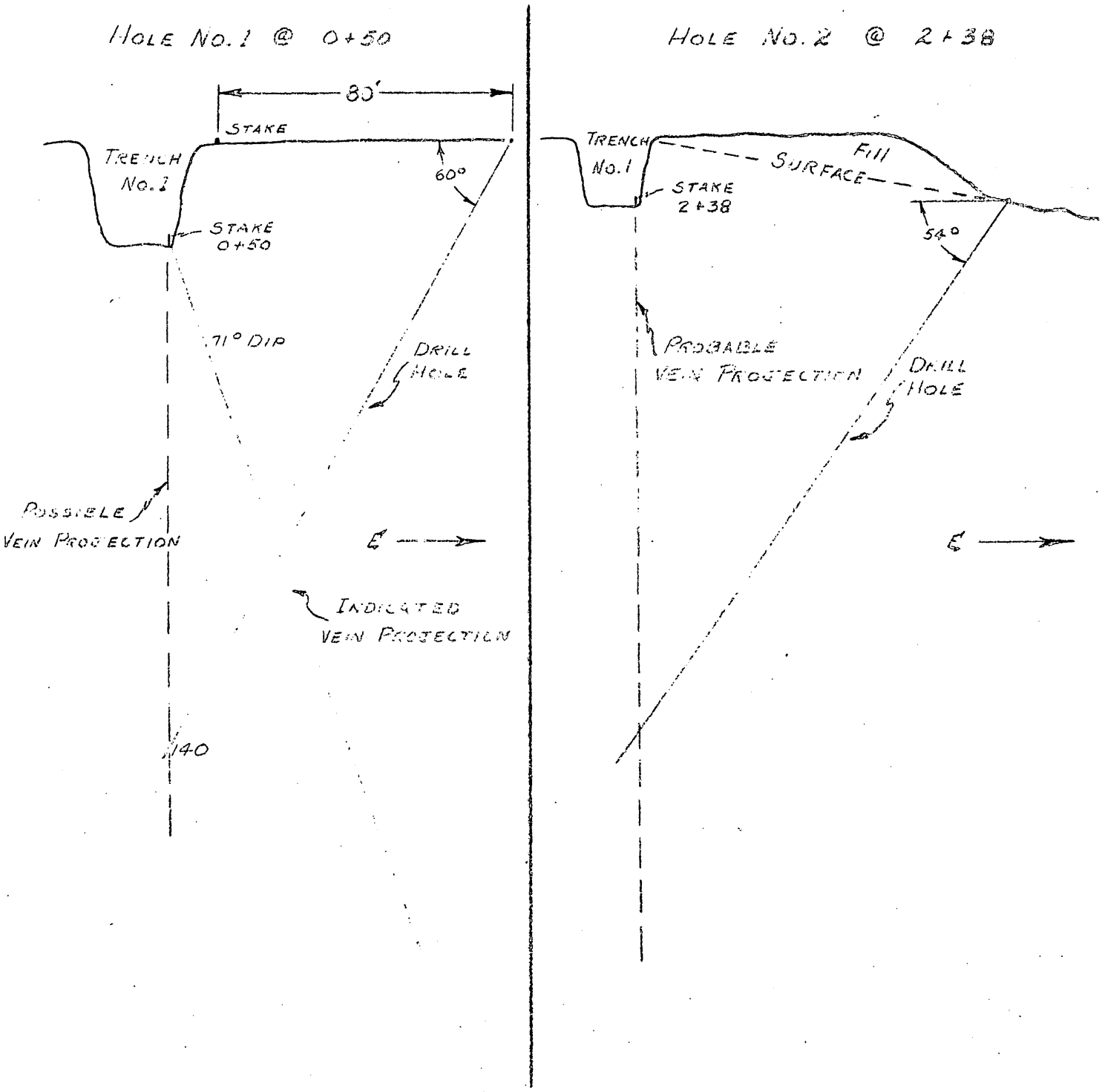
The results of one assay for uranium and its accompanying invoice are being awaited. As soon as these are received by the Operator a monthly report will be made on Stage I work not as yet reported.

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. I. Burmeister

July 5, 1956

HICK'S DOME



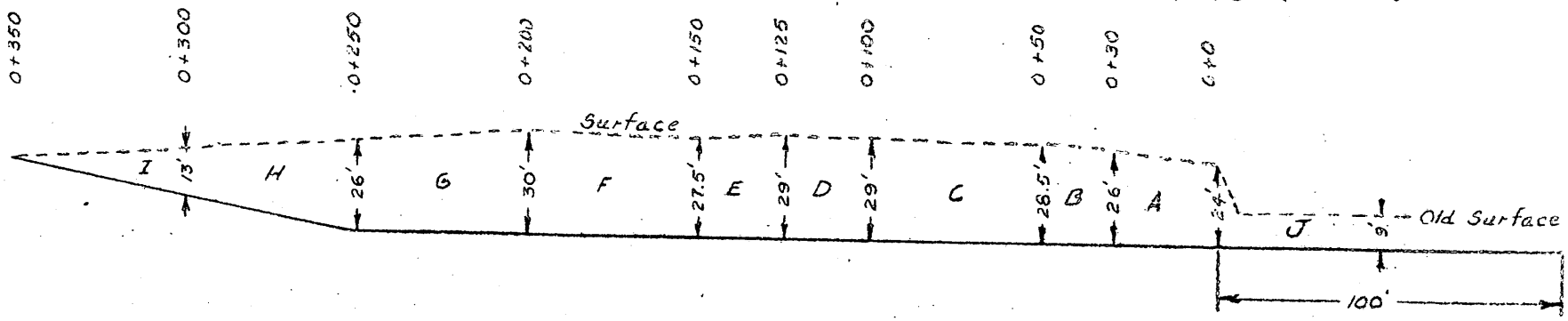
WM. G. REYNOLDS
HICK'S DOME PROPERTY
HARDIN CO., ILL.
DMEA - 3855

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

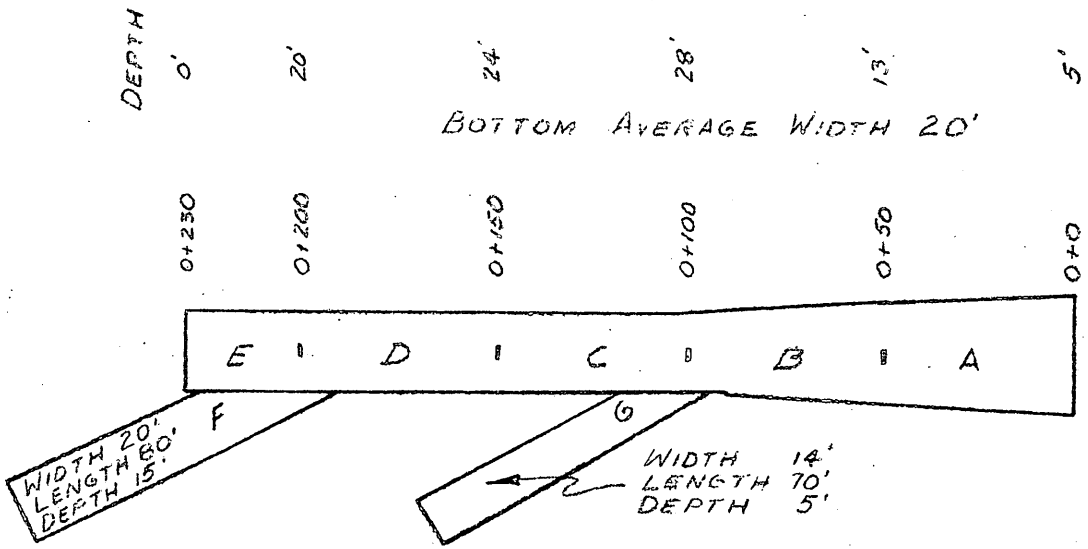
MEASUREMENTS FOR CUBIC YARDS

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

June 12, 1956

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

Re: DMEA-3855, Idm-7911
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

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-891h (thorium, uranium, rare earths) Wm J. 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. Lawrence
Executive Officer, DMEA
Region V

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

RAL/mm
ec:
Opr. Com.

Miller
Amos

Lynch
Files

5/28/56 gla

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM POST OFFICE BLDG.
WASHINGTON 25, D.C.
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-K91h
Hicks Dome, Hardin County, Ill.

Dear Mr. Baxter:

Mr. Lynch and I are in agreement with Mr. Ames 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. Ames 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/sm
cc:
Millar
Ames
Trace
Lynch
Files
Opr. Com-2

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, Executive Officer
DMEA Field Team, Region V

W J. Lynch, Member
Bureau of Mines

RAL/sm
cc:
Millar
Amos
Trace
Lynch
Files
Opr. Com.

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 brecciated 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.

5-17-56

Form MF-204 (Rev.)
(April 1952)

Budget Bureau No. 42-R1036.5

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

PAID ON VOUCHER & SCHEDULE OF PAYMENTS

OPERATOR'S MONTHLY REPORT AND VOUCHER

RECEIVED MAY 16 1956

Month of April, 1956 Docket No. DMEA 3855 Contract No. Idm-3914
Operator's Name William G. Reynolds
Address Stonegate Road, Anchorage, Kentucky
Contract Amount, $ 5,620.00 Government Participation: 75% Amount, $ 1,051.00

ITEMS OF COSTS	FOR OPERATOR'S USE: Monthly Total	Totals Previously Reported	Totals To Date	FOR GOVERNMENT USE ONLY: Approved Monthly Total	Approved Totals Previously Reported	Approved Totals To Date
(1) Independent Short Form Contracts:						
Drilling						
Bulldozing 4630 x .20	$ 926.00	-0-	$ 926.00			
Crosscutting						
Drifting						
(2) Labor and Supervision:						
Labor						
Supervision						
Technical Services Surveying & Staking	125.00	-0-	125.00			
(3) Operating Mat'ls. and Supplies:						
Timber						
Explosives						
Pipe						
Track						
(4) Operating Equipment:						
Rental						
Purchase						
Depreciation						
(5) Initial Rehabilitation and Repairs						
(6) New Bldgs., Improvements, etc.						
(7) Miscellaneous:						
Repairs to Equipment						
Sampling and Analysis						
Payroll Taxes						
Liability Insurance						
(8) Contingencies (specify):						
TOTALS	$ 1051.00	-0-	$ 1051.00	1051.00	—	1051.00

I certify that the above bill is correct and just and that payment therefor has not been received.

Date May 9, 1956 *Payee William G. Reynolds

Per _____ Title _____

*When a voucher is signed or receipted in the name of a company or corporation, the name of the person writing the company or corporate name, as well as the capacity in which he signs, must appear. For example: "John Doe Company, per John Smith, Secretary," or "Treasurer," as the case may be.

NOTE.—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.

(Instructions on reverse)

Pursuant to authority vested in me, I certify that this account is correct and proper for payment in the amount of:

$ 788.25

Signature Helen R. Muller (Authorized Certifying Officer)

MAY 15 1956

Date _____ Vou. No. _____

(See other side)

262.75

(For Government use only)

CERTIFICATION BY GOVERNMENT REPRESENTATIVE:

I certify that to the best of my knowledge and belief the contractor submitting this voucher is operating a Defense Minerals Exploration Administration project under Contract No. IdmE 914 in accordance with the terms of the contract.

Signature H. L. Burmeister Title Mining Engr. Date 5/10/56

APPROVAL BY DMEA EXECUTIVE OFFICER OR ALTERNATE:

Signature V. J. Lynch Title ACTING EXECUTIVE OFFICER DMEA REGION V Date MAY 14 1956

MONTHLY REPORT OF OPERATOR

The Operator (Contractor) of an exploration project is required to make a monthly report to the Government through the Regional Executive Officer. This report consists of three parts as follows:

(a) *Form MF-104—Operator's Monthly Report and Voucher.*—This form details expenditures and constitutes a voucher for reimbursing the Operator for the Government's share of costs;

(b) *Form MF-104A—Operator's Unit Cost and Progress Report.*—This is a statistical report of expenditures which shows costs for the various types of operation; and

(c) *Narrative.*—A concise narrative description of progress made, results accomplished, and any unusual difficulties encountered must be furnished as an attachment to this Report and Voucher. Wherever possible, the narrative is to be illustrated with maps or sketches showing formations penetrated and location and assays of samples taken as well as advances in workings. In the case of diamond drilling or churn drilling, the location and inclination of holes is to be shown on a map; logs and assays also are to be submitted.

The Monthly Report of Operator should be prepared in an original and four copies all of which must be sent to the Executive Officer of the Region not later than the 15th of the month following.

Preparation of Form MF-104—Operator's Monthly Report and Voucher.—All the applicable spaces in Form MF-104 should be filled in by the Operator, and the Operator or his agent should sign the certification in the lower left corner of the form.

The items of costs are arranged in the order they appear in Article 6 (a) of Form MF-200 (Revised February 1952), however, this form is readily adaptable for use in reporting activities under other contract forms.

Under Item (1) delete words "Short Form" if the contract is a sub-contract under Form MF-200; and delete word "Independent" if the contract reported is on Form MF-200 (A). Also, report work paid for on a unit basis under contract Form MF-200 as though it were performed under an independent contract.

Under Item (2) include labor, supervision and technical services incurred for the exploratory operations. Do not include labor, supervision and technical services used for work performed under items (5) and (6).

Under Item (3) include the costs of material and supplies used in the project other than that used under items (5) and (6).

Under Item (4) appear the three types of operating equipment expenditures, that is, rental, purchase and depreciation. The expenditures made for renting equipment belonging to a third party will be reported under "Rental". The amount paid or duly obligated for payment for the purchase of equipment will be reported under "Purchase". The amount of expenditures due the Operator to reimburse him for depreciation of equipment owned will be reported under "Depreciation".

Item (5) comprises costs of labor, supervision, technical services, materials, etc., which are used in the initial rehabilitation and repair of existing buildings, installations, fixtures, and equipment. These costs, therefore, should not be reported under items (2) and (3).

Item (6) includes the labor, supervision, technical services, materials, etc., used in the installation or construction of new buildings, fixed improvements, etc., necessary for the project. These costs, therefore, should not be reported under items (2) and (3).

Item (7) covers miscellaneous types of expenditure such as payroll taxes, liability insurance, workmen's compensation insurance, repairs to equipment and sampling and analysis. Only that part of payroll taxes, liability insurance and workmen's compensation which are paid by the operator should be reported under item (7). The share paid by the employee as a payroll deduction is to be included under item (2) as labor costs.

Item (8) includes any unforeseen costs not included in the other seven categories.

The original of Form MF-104 when submitted for reimbursable expenses incurred under contract Form MF-200 must be supported by original documentation or by certified copies of purchase orders, payrolls or transcripts of payrolls, unless such documentation has been waived by the Regional Executive Officer. This certification may be stated thus, "Certified True Copy (or Transcript)", followed by appropriate signature. If the Executive Officer of the Region determines that a contract under Form MF-200 should have an "on-site" audit, that is, a Government auditor should make an audit of the Operator's books and records of account, the Operator need not support his monthly voucher with original or certified documents except in cases of equipment purchases whose individual costs exceed $50.00. In these cases the original or a certified copy of the purchase order or invoice should be attached to the Monthly Voucher. N. B.—Only the *original* of Form MF-104 is required to be documented. The four copies of Form MF-104 are not to be thus supported.

Form MF-104 submitted for reimbursement under fixed price contracts on Form MF-200 (A), however, are not required to be supported by documentation of any kind. The Operator will submit his claim under item (1) of Form MF-104 by deleting as stated above the word "Independent" and by showing the number of feet or other units immediately after the appropriate descriptive word, such as, drilling, bulldozing, crosscutting, drifting, etc., and giving the "Monthly Total" amount due. "Totals Previously Reported", and "Totals to Date" columns should also be filled in.

Form MF-104A
(April 1952)

Budget Bureau No. 42-R1151.2

UNITED STATES
DEPARTMENT OF THE INTERIOR

DEFENSE MINERALS EXPLORATION ADMINISTRATION

RECEIVED
MAY 16 1956

OPERATOR'S UNIT COST AND PROGRESS REPORT

Month of April 1956 Docket No. DMEA 3855 Contract No. 14-5914
Operator's Name William G. Reynolds Minerals
Address Stonegate Road, Anchorage, Kentucky

OPERATION	UNIT	COSTS THIS MONTH	UNITS THIS MONTH	COSTS TO DATE	UNITS TO DATE	UNIT COSTS TO DATE	AUTHORIZED BY CONTRACT	
							Units	Unit Costs
Drifting								
Crosscutting								
Raising								
Shafts								
Winzes								
Drilling: Core								
Churn								
Auger								
Stripping								
Trenching Bulldozing	1 cu. yd.	$926.	? 4360	-0-	-0-	4360	11,700	$0.20
Test Pits								
Roads and Trails								
Surveying & Mapping	1 mo.	125.						
TOTAL DISTRIBUTED COSTS		$1051.	4360	$1051.00				TOTAL COSTS AUTHORIZED BY CONTRACT
Operating Equipment Purchased								
Initial Rehabilitation and Repairs								
New Buildings, Improvements, etc.								
TOTAL COSTS								

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this report is correct and complete to the best of their knowledge and belief.

Date May 9, 1956 Operator William G. Reynolds

Per Title

NOTE.—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.

(Instructions on reverse)

REMARKS:

(For Government use only)

4630 cu. yds. on MF-104 is probably correct as it checks the calculations on photostat of excavation section. — Cubic yardage of 4360 on MF-104A is obviously a transposition.

W. Burmeister

W.B.

INSTRUCTIONS

Preparation of Form MF–104A—Operator's Unit Cost and Progress Report.—Applicable places on Form 104A should be filled in by the Operator. The purpose of this form is twofold as follows: (1) to furnish the supervising engineers and other administrators with statistical information necessary to better determine the progress of the project; and (2) to furnish more permanent information on mining costs for future use. The more important phases of operation on which permanent information is desired have been outlined in the form. There are blank lines, however, for those unusual phases which may need to be reported for a particular project. It will be necessary for the Operator to distribute his costs among the applicable phases reported with the exception of three items the costs of which are not to be distributed by the Operator. These three items are: "Operating Equipment Purchased", "Initial Rehabilitation and Repairs", and "New Buildings, Improvements, etc." The reason for not distributing these items on a monthly basis is doubtless clear to the Operator, since such distribution might well overstate the cost for any one month or period short of the entire contract period.

Form MF–104A has been designed to tie in with Form MF–104 for both monthly and cumulative costs. The "Total Costs" on Form MF–104A for each month should equal the monthly "Total Costs" as reported on Form MF–104. This is also true of the "Total Costs To Date".

In preparing Form MF–104A, it will be necessary frequently to distribute certain costs over a number of items. For instance, supervisory and engineering costs may have to be distributed over several phases, such as, drifting, crosscutting, raising, etc., provided that these items were reported active for the month. Such distributions should be made on the basis of time spent on the various phases, on man days of labor charged to such phases, or on some other equitable basis. "Operating Equipment", "Initial Rehabilitation and Repairs", and "New Buildings Improvements, etc.", will be distributed to the several phases of the project by the Washington Office of DMEA at the close of the project if determined necessary. The last two columns headed "Authorized by Contract" will be filled in by the Operator if such information is found in the contract. This information is usually a part of Exhibit "A" of the contract. A space for remarks has been provided for the use of the Operator to call attention to any unusual circumstances causing excessive or disproportionate unit costs.

GPO 872894

RECEIVED
MAY 16 1956

~~Route #6~~
Box 574
Louisville, Kentucky

May 9, 1956

Mr. H. L. Burmeister
U. S. Department of the Interior
Defense Minerals Exploration Administration
College Park, Maryland

Re: DMEA Docket No. 3855
Contract Idm-E914
Hick's Dome, Hardin County, Illinois
Uranium, Thorium and Rare Earths

Dear Mr. Burmeister:

We are attaching six copies of Operator's Unit Cost and Progress Report, Form MF-104A, and Operator's Monthly Report and Voucher, Form MF-104 (Rev.), for the month of April, 1956, covering initial exploratory work under subject docket.

We are attaching photostats of Pages 1 through 6, showing Scintillator readings at various depths in the main cut.

The radioactive vein has been pin pointed at the 19½ ft. depth in the south end of the main cut and the 7½ ft. depth in the north end of the main cut. Exact measurements were taken from fixed stakes, located at both sides of the trench to a point over the highest reading in the trench, using the string measurement method which you suggested. These measurements are shown on Pages #4 and #5 of the photostatic copies. We will take similar measurements at full depth which should then determine the dip of the radioactive vein.

Also attached are photographs, Figures 101 through 108, taken April 28, 1956, which are self-explanatory.

In general, the vein continues in a north 21° west direction throughout the entire length of the main cut. The entire length and breadth of the trench continues to be highly radioactive. The center of the trench continues around 1000 microroentgens per hour with a background of 14 microroentgens per hour, or 70 times background.

The east and west walls of the trench gave readings of about 350 microroentgens per hour taken at a depth of 4 ft. throughout the entire length of the trench (25 times background). One pronounced vertical highly radioactive vein was noticed on the west wall about the center of the trench. This vein was fairly narrow (about 1 ft.). Readings as high as 1500 microroentgens were noticed at this point at a depth elevation of approximately 22 ft. from the top. A stake was driven in at this point.

A second highly radioactive vertical vein was noticed in the east wall at the north end of the main cut at a depth of 7½ ft. from the top. Readings of about 1500 microroentgens per hour were observed. This vertical vein appeared to be about 3 ft. in width at this elevation.

Plans were made with the bulldozing contractor, O. B. Wardlaw & Sons, to proceed with the Hamp well cut after completion of the main cut. This cut appeared to be very rocky, which indicated that bulldozing work would be fairly difficult. Bulldozing work at the north end of the main cut proceeded slowly because of very rocky soil, requiring almost constant use of the ripper tool on the blade of the bulldozer.

As agreed upon, Sample #3-A was taken from the main cut, consisting of 6½ lbs. and forwarded to C. O. Parker, Denver, Colorado, April 23, 1956, for chemical analyses for Thorium, rare earths, Uranium and Columbium-Tantalum under the contract.

Sample #1-A from the main cut was sent the same day to Lindsay Chemical Company, Chicago, Illinois for analyses for Thorium and rare earths at no charge.

All bulldozing is expected to be completed by this week, at which time we should be ready to make a decision regarding location of the diamond core drilling under Stage II of the contract.

It is felt that the amount of bulldozing done through April (4630 cubic yards) represents a very conservative estimate of the amount of earth moved.

Also included in this report is a topographical map, which we have prepared, showing elevations in the vicinity of the main cut and Hamp well cut.

If there are any questions or corrections to be made regarding Operator's Progress Report and Voucher, please advise.

Again we wish to express our sincere thanks to you for the excellent assistance and advice, which has been most helpful to us.

Yours very truly,

B. L. Baxter

Attachments

PDGE.20

Engineer B. L. Baxter

REYNOLDS METALS CO.
PARTS DIVISION
GENERAL ENGINEERING

File No. Hicks Dome, Ill.

Page 1 of Sheet

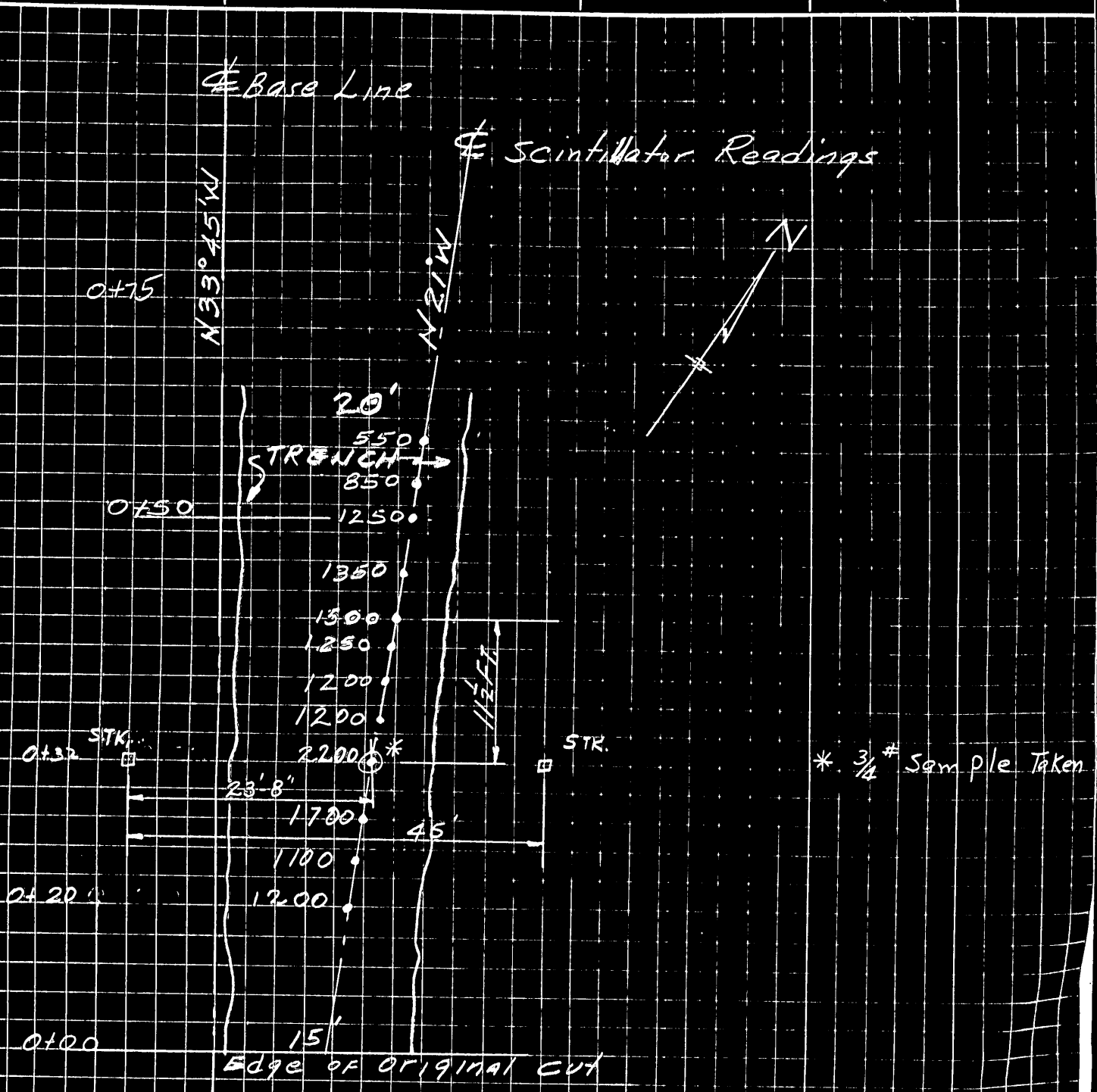
Approval

ENGINEERING INFORMATION

Date 4-14-56

Reading Taken in Trench - 8 FT. CUT AT Station 0+32

Customer	Part Name / Part No.	B/P No. / Issue	Unit	Total



Background - 13 Micro-R/HR

Use to show all engineering sketches, calculations and information other than where standard forms are provided.

PDGE-56

Engineer [illegible]

Approval

REYNOLDS METALS CO.
PARTS DIVISION
GENERAL ENGINEERING

File No. Hicks Dome

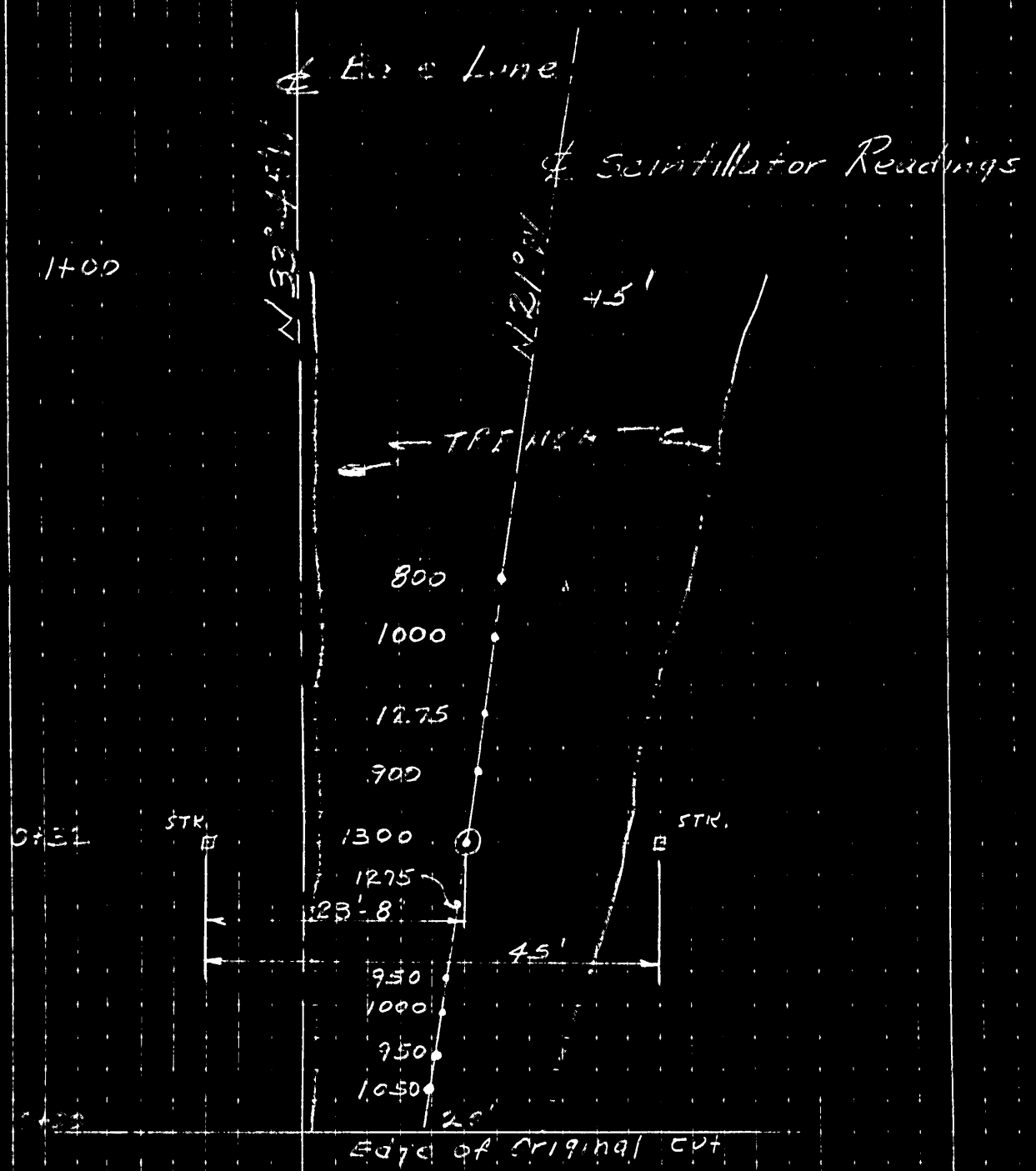
Page 2 of Sheet

Date 4-15-56

ENGINEERING INFORMATION

[illegible] Tiron [illegible] Trench - 1½ Ft. Cut at Tiron 2+32

Customer	Part Name / Part No.	B/P No. / Issue	Unit	Total



Background 13 Micro-R/HR

Use to show all engineering sketches, calculations and information other than where standard forms are provided.

PDGE-36

Engineer
B. L. Baxter

REYNOLDS METALS CO.
PARTS DIVISION
GENERAL ENGINEERING

File No. Hicks Dome

Page 3 of Sheet

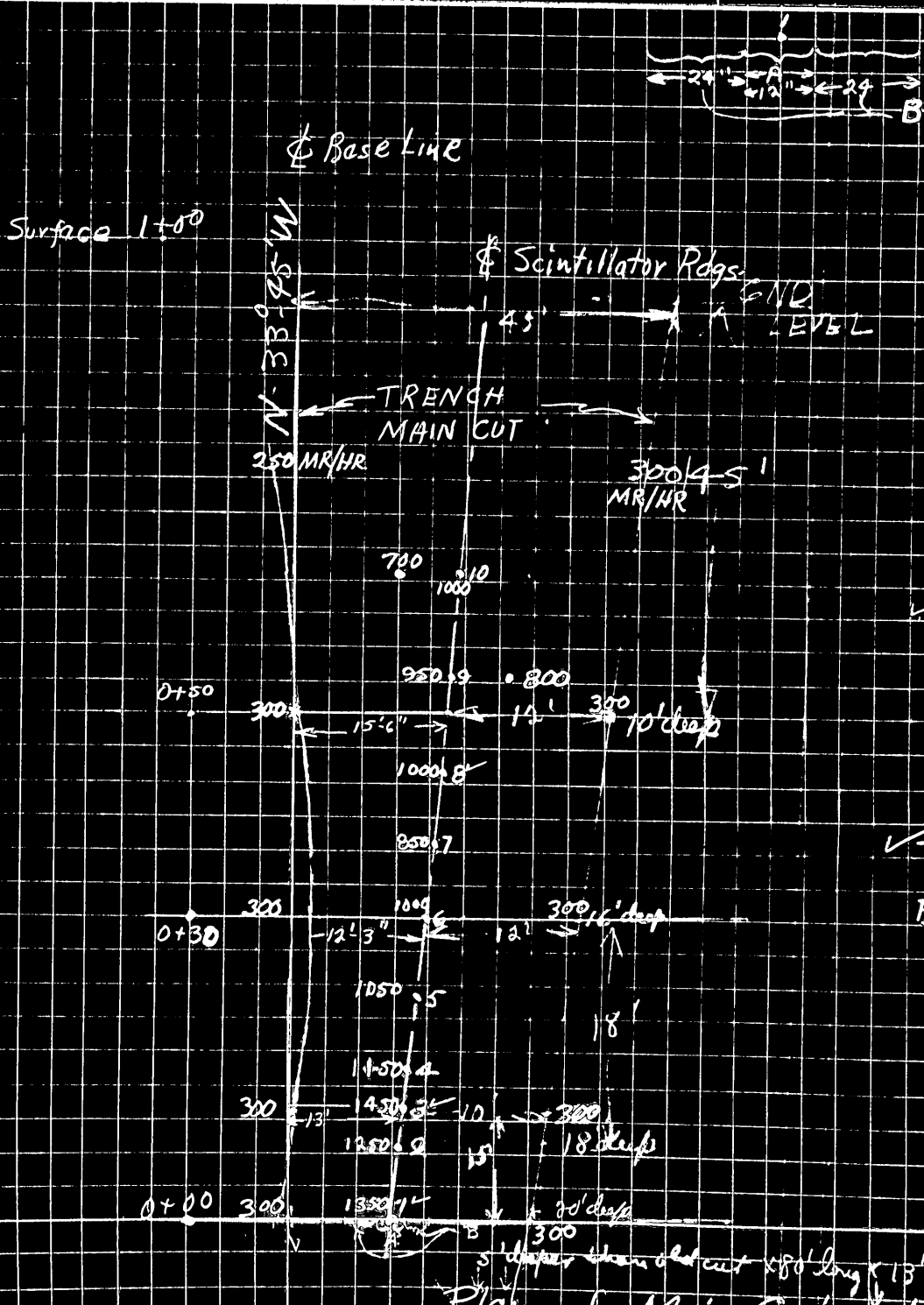
Approval

ENGINEERING INFORMATION

Date 4/18/56

Readings Taken in Trench - 19½ Ft Cut at Station 0+32

Customer	Part Name / Part No.	B/P No. / Issue	Unit	Total



A - 12" -
B - 2" on each side of A

✓1A - 1350 - 8" Lindsay Cl
✓1B - 675 4" B3
2A - 1250
2B 650
✓3A - 1450 - 6½" C.O. Parker
✓3B - 900 4" B3
4A - 1150
4B - 750
5A - 1050
5B - 900
6A - 1000
6B - 750
7A - 850
7C - 550
✓8A - 1000
8B - 600
9A - 950
9B - 575
10A 1000
10B 700

✓-Samples Taken

Background = 13 Micro-Roentgens/HR

Plan of Main Cut at 19½' Deep @ 0+32

Use to show all engineering sketches, calculations and information other than where standard forms are provided.

PDGE-56

Engineer B.L. Baxter

Approval

REYNOLDS METALS CO.
PARTS DIVISION
GENERAL ENGINEERING

File No. Lick's Dome

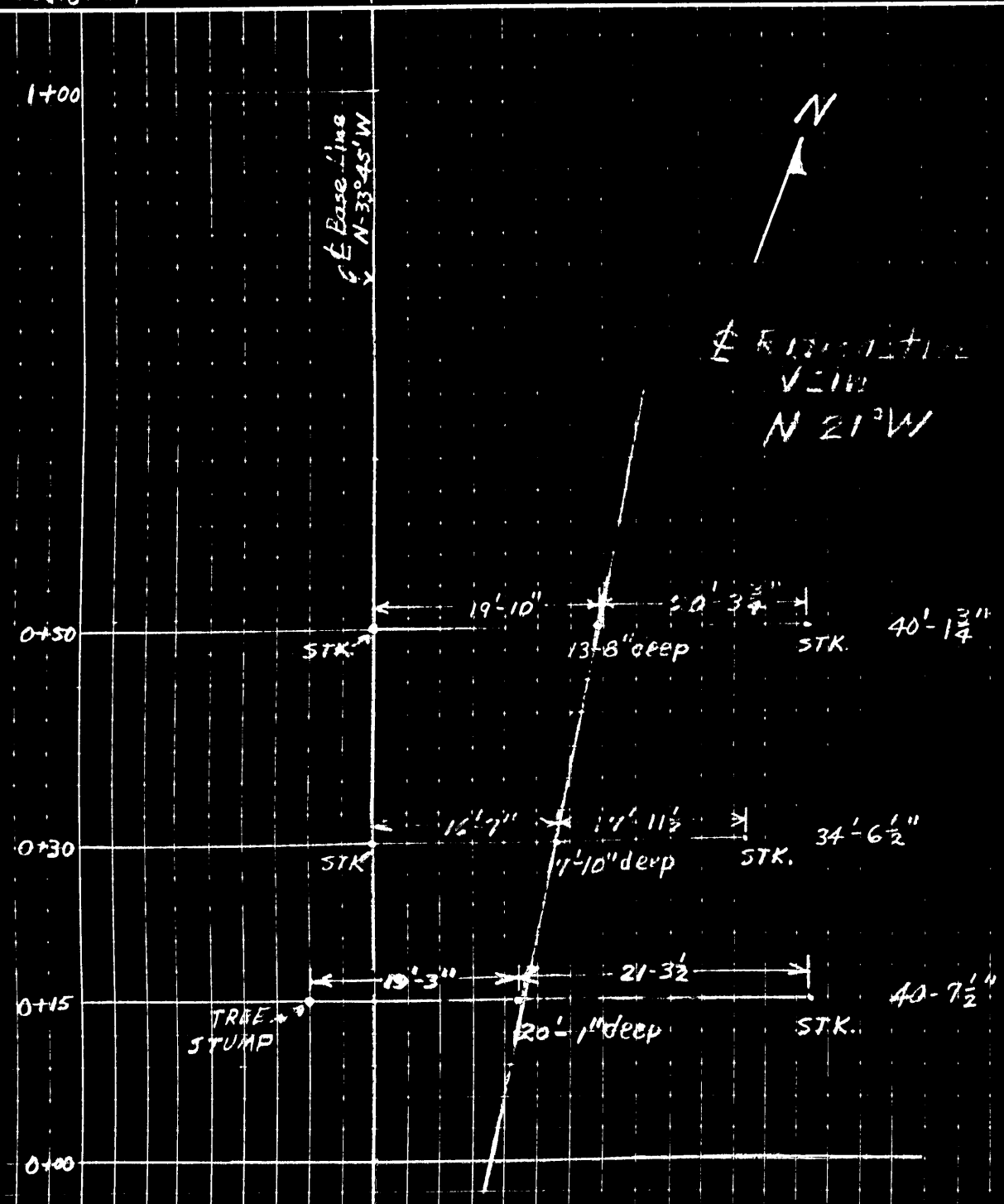
Page 4 of Sheet

Date 4/20/56

ENGINEERING INFORMATION

Location of ℄ Hot Zone in Main Cut at 19½' Depth at Sta. 0+30

Customer	Part Name South End	B/P No.	Unit	Total
Scale: 1 square = 3 ft.	Part No.	Issue		



650 - Sta 8.6 MR/HR.

Backgr. = 14 MR/HR

900 Sta. 5.9

975 Sta. 3.8

Use to show all engineering sketches, calculations and information other than where standard forms are provided.

PDGE-56

Engineer B.I. Baxter

REYNOLDS METALS CO.
PARTS DIVISION
GENERAL ENGINEERING

File No. Hick's Dome

Page 5 of Sheet

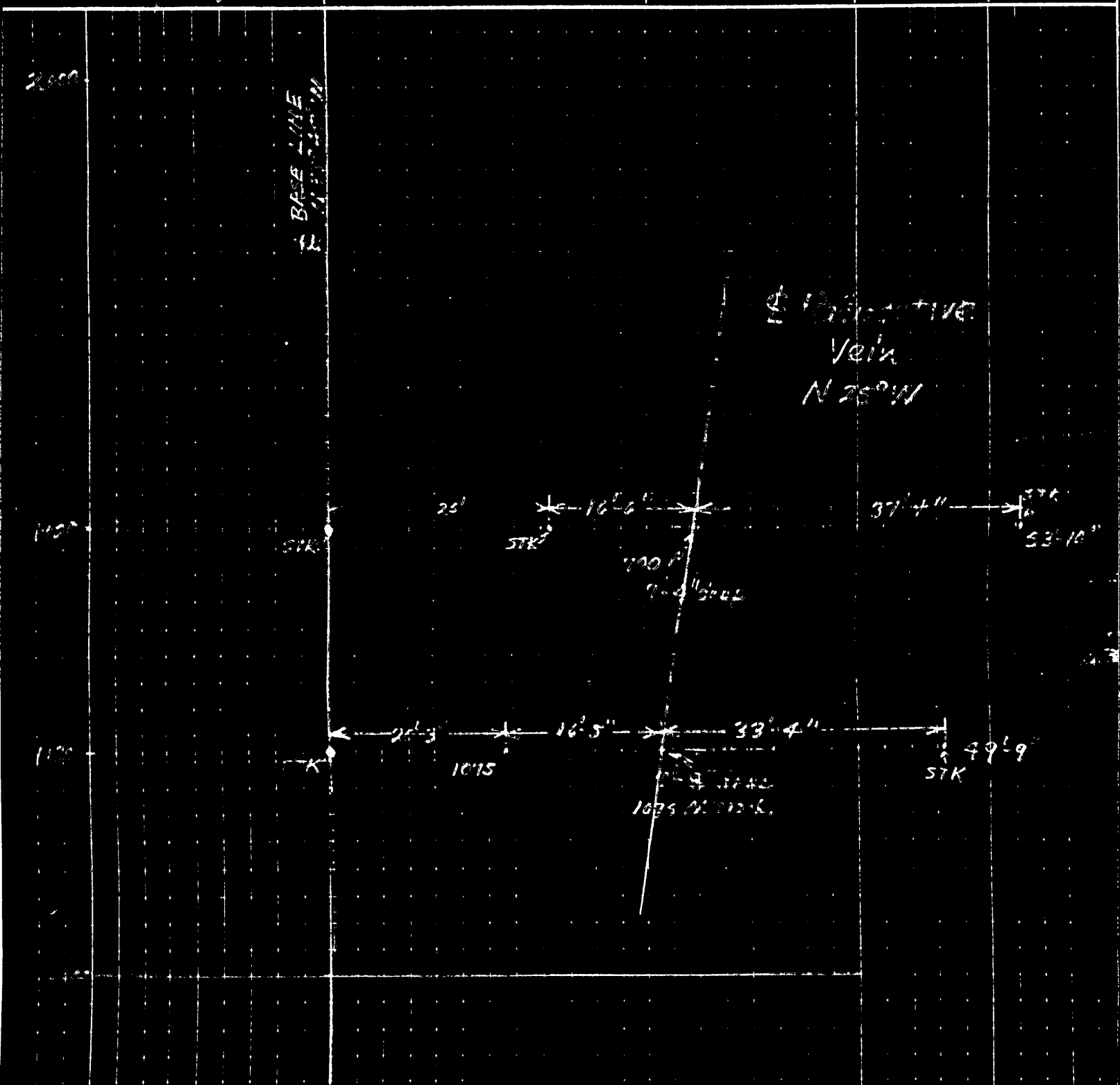
Approval

ENGINEERING INFORMATION

Date 4/21/56

[illegible] of ℄ Hot Zone in Main Cut at 7½' Depth at [illegible] 1+50

Customer	Part Name	B/P No.	Unit	Total
15 : 3 ft.	Part No.	Issue		



Use to show all engineering sketches, calculations and information other than where standard forms are provided.

PDGE-56

Engineer B.L. Baxter

Approval

REYNOLDS METALS CO.
PARTS DIVISION
GENERAL ENGINEERING

File No. Hick's Dome

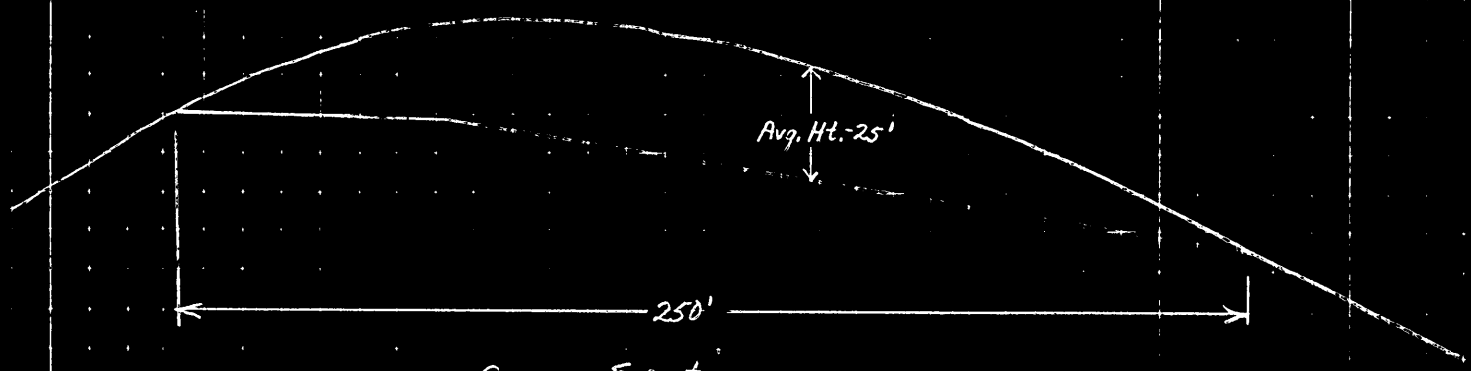
Page 6 of Sheet

Date 4/28/56

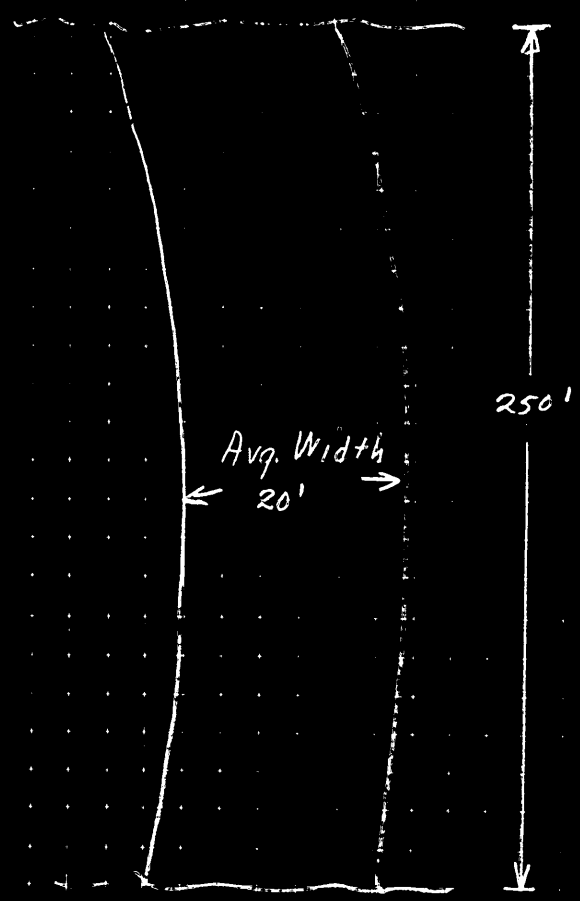
ENGINEERING INFORMATION

Longitudinal Cross-Section + Plan of Main Cut

Customer	Part Name / Part No.	B/P No. / Issue	Unit	Total



Cross-Section



Plan

Amt of Earth Bulldozed thru 4/28/56 =

$$\frac{25' \times 250' \times 20'}{27} = 4630 \text{ cu yds}$$

Use to show all engineering sketches, calculations and information other than where standard forms are provided.

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MAY 1 6 1956

5-9-56

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 of one 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.

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

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.15°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.

H. L. Burmeister

April 30, 1956

H. L. Burmeister

Fig. 1

Looking N. from S. end of Reynolds trench

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MAY 9 - 1956

Photograph by
U. S. Dept. of the Interior
Bureau of Mines
Minerals Technology Division
College Park, Maryland
Neg. No. H-1353
Date

If this picture is used for publication, please credit the Bureau of Mines.

5-2-56

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 25 POST OFFICE BLDG.
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-8914, 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

ZM.
cc:
Lynch
Finance
Dewey Ames
Files
Opr. Com.-2

700

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

APR 1 0 1956

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

Re: Docket No. DMEA-3855 (Thorium, Uranium, and Rare Earths)
Contract No. Idm-8914
William O. Reynolds
Kirk's Dam
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. Allis 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

MF-500

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

REFERENCE SLIP

DATE 4-6

REFERRED TO:

1. 700
2. ~~[illegible]~~
3. [illegible]
4.

FOR:

..... Action	..... Recommendation
..... Approval	..... Record of .....
..... Comment	..... Referring to .....
..... Conference	..... Reply for signature of .....
..... Consideration	..... Rewriting
..... Filing	..... Signature
..... Instructions	..... Suggestions
..... Investigation	..... Your information
..... Initials	
..... Mailing	
..... Previous correspondence	

REMARKS: Harry Burmeister wants copy of amendment No. 1. Monday or Tuesday

~~Check (X) before the items needing attention.~~

Initials of sender.

GPO 16—63815-1

4-6-56

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 1000 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 Bermeister 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/mm

cc:

Opr. Com.-2

Amos

Burmeister
Lynch
Files

DRAFT
3/28/56
FMurphy/gla

Division copy of draft

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

Amendment No. 1

It is agreed this _____ day of _____, 1956, between the United States of America, acting through the Department of the Interior, Defense Minerals Exploration Administration, hereinafter called the "Government" and William O. Reynolds, hereinafter called the "Operator," that:

Whereas, the "Agreed Unit Cost" for analyses to determine the uranium, thorium, columbium, tantalum, and rare earths content of samples procured under the contract has been found to be too low in relation to the actual cost of such analyses as quoted by commercial laboratories; therefore, to correct this mutual error, Exploration Project Contract Ida-2911 (Docket No. DMEA-3855), dated January 26, 1956, is amended, effective as of March 1, 1956, as follows:

Under "Exhibit 'A,' Description of the Work, Stage I," in item 2, delete the complete text and replace it with the following:

"Not in excess of 70 chemical determinations shall be made for thorium, 10 for uranium, and 1 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 uncovered 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.

Under Stage IX, item 2, in line 2, after the words "not in excess," delete the rest of the sentence, and replace it with the following: "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 IX of the contract."

Under "Exhibit 'A,' Fixed Unit Costs, Stage I," in item 2, delete the text "120 analyses @ $3.00/each element analyzed," and replace it with the following:

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

Under Stage IX, in item 2, delete the text "50 analyses @ $3.00/each element analyzed" and replace it with the following:

"Chemical Analyses:

"12 determinations for thorium

@ $10.00 each $ 120.00

"Spectrographic Analyses:

"2 determinations for rare earths

@ $15.00 each 30.00 $ 150.00"

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

UNITED STATES OF AMERICA

By _____
Administrator, Defense Minerals Exploration Administration

WILLIAM O. REYNOLDS

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

March 27, 1956

Memorandum

To: The Administrator

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

Subject: Docket No. DMEA-3655 (Thorium, uranium, rare earths)
Contract No. Ida-K914
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 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

FMMurphy/gla
cc to: Admr.'s Reading File
Operating Committee

Docket
Code 700
Mr. Murphy

RARE EARTHS:

	Atomic Number	Atomic Weight	Valenge
1. Cerium Group:			
Lanthanium	57	138.9	3
Cerium	58	140.25	3-4
Praseodymium	59	140.92	3
Neodymium	60	144.27	3
Illinium	61	144.00	3
Samarium	62	150.43	3
2. Terbium Group			
Europium	63	152.0	3
Yttrium *	39	88.90	3
Gadolinium	64	157.26	3
Terbium	65	159.2	3
3. Ytterbium Group			
Dysprosium	66	162.52	3
Holmium	67	163.40	3
Erbium	68	167.70	3
Thulium	69	169.40	3
Ytterbium	70	173.60	3
Lutecium	71	175.00	3

* found (combined) in gadolinite and other rare minerals (not on DMEA list)

However, chemists consider scandium (At. No. 21) and Yttrium (At. No. 39) as Rare Earths.

Fay

3/29/56 gla

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
ROOM 1009 POST OFFICE BLDG.
KNOXVILLE 2, TENN.

March 27, 1956

RECEIVED
MAR 30 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
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. Lawrence, 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.

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
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.

/s/ F. M. Murphy

Attachments

F. M. Murphy

F.M.Murphy/gla

cc to: Code 700
Mr. Murphy
Docket

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

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.

RAL/sm
cc:
Anon
Miller
Lynch
Files

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

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

REYNOLDS METALS COMPANY
REYNOLDS METALS BUILDING
RICHMOND 19, VIRGINIA

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

RECEIVED
MAR 21 1956

March 15, 1956

RECEIVED
MAR 19 1956

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 [illegible]ral assay prices from two recognized assayers. These are Charles O. P[illegible]r 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

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

Chapman
Wood

12.50

7.00

1.00

R. E. MORRIS
Chief Chemist & Assayer

MINERALS ASSAY LABORATORY
48 Hour Service on Uranium and Vanadium Assays

Assay prices on reverse side.
(Over)

549 Noland Avenue
Grand Junction, Colorado
Phone 1441

ASSAY PRICES

Radiometric Assay	$2.50
Uranium	3.50
Vanadium	1.50
Lime	2.00
[illegible]	[illegible]
[illegible]	
Arsenic	[illegible]
Iron	3.00
[illegible]	[illegible]
Magnesium	
Manganese	[illegible]
Mercury	4.00
Phosphorus	3.50
Sulphur	3.50
Lead	2.50
Gold & Silver	2.50
Zinc	2.50
Spectrographic Analysis	15.00
Preparation of Samples	1.00 up
Other prices [illegible]	
Ten Work [illegible]	

ASSAY PRICE LIST

RECEIVED

MAR 21 1956

March 2[illegible], 1956

RECEIVED

MAR 19 1956

U.

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

Attachments

c/c Mr. W. G. Reynolds

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

BLB/t

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

Mar. 10, 1956

RECEIVED
MAR 1 1 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 operations 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. Thomas

MINERALS ASSAY LAB.
549 NOLAND AVE. PH. 1441
GRAND JUNCTION, COLO.

Mar. 10, 1956

RECEIVED
MAR 3 1 1956

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

Attn. Mr. B.L. Baxter

Dear sir;

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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;

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

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

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

Charles O. Parker II

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

JAN 26 1956

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

Re: Docket No. DMEA-3055 (Thorium, uranium, and rare earths)
William G. Reynolds
Hick's Dome
Hardin County, Illinois

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

Enclosures

FMMurphy/ism 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

APPROVED:

/s/ Robert W. Geehan
Member, Bureau of Mines

Thor H. Kiilsgaard
Member, Geological Survey

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.

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
FMMurphy/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 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 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 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, 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 Stage I 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 102 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

Excavation of 2 trenches, 11,700 cubic yards @ $0.20/cu. yd.	$2,340.00	
Diamond core drilling, 402 feet @ $4.00/ft.	1,608.00	
Analyses for uranium, thorium, niobium, tantalum, and rare earths, 200 samples, average @ $7.00 1/ each	1,400.00	
Surveying and mapping the project area 2/	250.00	
Total Agreed Unit Costs (rounded)		$5,600.00
Government Participation @ 75%		$4,200.00

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.

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.

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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, Hemp lease, Nick'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 B. Lamb

11-16-55 [illegible]

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: 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, Nick'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 Nick'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.

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.

700

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

NOV - 7 1955

Mr. William G. Reynolds
Stonegate Road
Anchorage, Kentucky

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

Dear Mr. Reynolds:

In order to further process your above-designated application, we will require six copies of a "Consent To Lease" signed by Henry Hamp, Jr., and his wife Goldie Sue 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,

SIGNED

Ernest Wm. Ellis, Chief
Rare and Miscellaneous
Metals Division

Enclosures

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

11/3/55 gla

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

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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 Prog. 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. Lawrence
EXECUTIVE OFFICER
DMEA REGION V

V. J. Lynch, Western
Bureau of Mines

VJL/sm
cc: Lynch
Miller
Files

11-7-55

Field Team Report on examination of Property

by

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

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DMEA Docket No. 3655 - (Uranium, molybdenum and rare earth minerals)

Applicant: William C. Reynolds
Triangle Road, Anchorage, Kentucky

Property: Hump Lease - Hicks Dome
Hardin County, Illinois

11-7-55

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 170 samples. Numerous geologists and engineers, representing many of the large mining companies, are also 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 Hump 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 2 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 taken across this vein from [illegible] shaft, breaks being [illegible] on slight [illegible] mineralogical differences. A [illegible] 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, Muscaloosa, Ala., (3) [illegible] Naval Gun Factory, Washington, D. C. (4) Vanadium Corporation of America, Orange, Colo. The results follow:

Sample No.	Sample Length in.	Micro roentgen Reading*	College Park eU	College Park Th	Muscaloosa eU	Muscaloosa eU	Gun Factory U	Vanadium Corporation U_3O_8
1	19	400	[illegible].32	[illegible].15	0.036	[illegible].035	[illegible].004	0.05
2	17	600	[illegible].002	[illegible].02	0.004	0.003	0.001	[illegible].03
3	16	900	[illegible].91	0.25	0.11	[illegible]	[illegible].006	[illegible].15
4	19	600	[illegible].020	[illegible].10	[illegible].025	[illegible].042	0.003	[illegible].00
5	37	[illegible]	[illegible].033	0.15	[illegible].39	[illegible].036	0.004	[illegible].02
6	16	600	[illegible].004	[illegible].20	[illegible]	[illegible].004	0.004	[illegible].07

* background count 13 microroentgens

The Bureau of Mines at College Park and the Geological Survey report as much as 2-7.[illegible] combined rare earths and thorium is present. (see table 1 - appendix)

The average microroentgen count on a scintillator (model [illegible]3) across the vein was approximately 700 against a background count of 13 microroentgens. The work program for the exploration, as outlined by the applicant's representative, Mr. Bruce Baxter, and agreed to as the most operable procedure by the field [illegible] representatives, is to test this structure by removing the overburden to the northeast 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 ? cool anomaly was found on the site of the sludge and [illegible] oil [illegible]. No samples were [illegible] on account of the bulldozer cut were being full of water. The extended work program would also include a north-south 50 to 1 long bulldozer trench to a depth of about 30 feet on this anomaly. Four diamond core drill holes to a maximum of 400 feet have been proposed.

Conclusions:

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

Recommendations:

The field [illegible] representatives recommend that the extended work program consisting of the bulldozer trenches (1) on anomaly "[illegible]" and (2) on the hay sludge (and anomaly, be approved, (3) [illegible] core drilling, and (4) necessary sampling, analyses, and mapping.

Time spent on the property:

The on-site reconnaissance took place on Thursday, July 21, 1955. Conferences were held on Friday, July 29 and Saturday, July 30. The field team representatives, Robert E. Grace, U.S. Geological Survey, and G. L. Neuman, Bureau of Mines, were accompanied on the examination by Mr. Bruce Baxter, applicant's representative, Mr. A. Cestron, Illinois Geological Survey, and Mr. V. J. Lynch, Bureau of Mines member of DMA field team. Mr. Cestron did not participate in the conferences.

Name and location of property:

The [illegible], comprising 51.3 acres, [illegible] and [illegible] and [illegible] on the crest of Hicks Dome in Hardin County, Illinois, [illegible] approximately [illegible] miles from the town of [illegible] Elizabethtown via Illinois Highways [illegible] and 146, a county road to and around Hicks Dome and a bulldozer trail to the lease. This lease consists of the [illegible] of the [illegible] ac); the [illegible] of the [illegible] ac); the [illegible] of the [illegible] (40 ac); the northern 3/4 of the [illegible] of the [illegible] of the [illegible] ac); a small fraction in the NW side of the [illegible] of the [illegible] of the [illegible] ac); all of section 30, Township [illegible], Range 7 [illegible] of the 3rd Principal Meridian.

Also a triangular lot in the [illegible] corner of the [illegible] of section [illegible], Township [illegible], Range 7 [illegible] of the 3rd Principal Meridian.

Condition and general 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, but road to the crest of the dome is clay and is not passable 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 the funds of the explorational costs.

Property Rights:

A copy of the lease and assignment of the leases to the applicant is included in the application and appears to be in good form. If the owner's consent to lease 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.

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Description of Report:

The area covered by the map lies [illegible] the crest of Hicks Dome (fig. [illegible]), [illegible] in cultivation, [illegible] and only sparsely timbered. The main exploration (see map [illegible]) with specifications that has been performed to date, amounts to: (1) [illegible] well 2,[illegible] feet; (2) two bulldozer cuts, [illegible] anomaly "[illegible]", [illegible]; (3) one vertical diamond core [illegible]; (4) several [illegible]. 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 local uplift in northwestern Hardin County, southern Illinois. The geology of the area is described in the following:

1. Weller, J. M., et al., 1952, Geology of the fluorspar deposits of Illinois, Ill. Geol. Survey Bull. 70.
2. Brown, J. S., et al., 1954, Explosion well at Hicks Dome, Hardin County, Illinois, Econ. Geol. Vol. 49, no. 6.
3. Brecke, [illegible], Ostrom, [illegible], and Wicker, [illegible], 1955, Preliminary report on uranium in Hardin County, Illinois, Ill. State Geol. Survey Circular 2[illegible] (in print).

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

Item 2 describes the results of the 2,[illegible]-foot deep oil test hole in the center of the dome [illegible] on the preceding page, item 2. In summary, the hole penetrated [illegible], Silurian, and [illegible] sediments from the surface to 1,[illegible]; from 1,[illegible] to 2,[illegible] 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, [illegible] dioxide, [illegible] spectrographic analyses of eight samples [illegible] from the [illegible] of this [illegible] examination report.

Item 3 [illegible] the results of a study of the uranium possibilities of the Dome [illegible] the Illinois Geological Survey during early 1955. Much of the [illegible] given in this field examination report is taken from the Illinois [illegible] report. Item 3 is an excellent summary of the area and its uranium possibilities. The abstract of item 3 follows:

> Rick Dome in Marion County, Ill., is a broad structural dome whose specific mode of formation is not clear. Associated with it are [illegible] breccias and pericline dikes. The central part of the dome is an area of about 15 square miles underlain by rocks of Devonian-Silurian age, principally, limestone and chert bordered by black shale. The [illegible] 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 residual formation from the leaching of chert, [illegible] limestone. Chert breccias, cemented by secondary silica, also are present.
>
> Results of [illegible] samples taken from the dome and throughout the county suggest that the residual clays [illegible] within the Devonian-Silurian area of the dome are generally more radioactive than those elsewhere, though there are [illegible] exceptions. Samples of [illegible] clay, shale, and loess [illegible] concentrates from these areas are [illegible] radioactive, as measured by a laboratory [illegible] determinations made by chemical procedure on 2 samples showing [illegible] the higher uranium equivalent values were had lower [illegible] radium equivalent values. All the samples analyzed for [illegible] contained less of this element than the minimum [illegible] percent [illegible] prices are quoted by the Atomic Energy Commission.

[illegible] of the Atomic Energy Commission visited the area in March 1955 [illegible] the localized chert occurrence, locally "[illegible]", had been uncovered in the [illegible] pit, and wrote an administrative report [illegible] area. A copy of this report was obtained through [illegible] J. [illegible] Hostad of the Commission. Mr. [illegible] observation follows:

The radioactivity in the Devonian chert and red clay on the [illegible] 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 Sections [illegible], 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 central [illegible] 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. Surv., Bull. 70) 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 6,10).

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 Lake Dome and also fracturing in the fluorspar district are imaginatively 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 [illegible] analyses the uranium found so far is extremely low in grade, but radioactivity analyses are as high as 0.11 percent eU but the highest government chemical analysis for uranium is 0.006 percent U (table 1, Reynolds 3). The radioactivity in the samples taken by the government representatives, and the samples from the deep hole, is caused by thorium. The writer cannot explain the discrepancies in the chemical uranium values of the samples estimated (Reynolds 1-4, 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 minerals, in either the surface samples taken or in the eight samples from the deep drill test hole. The thorium and rare earths were concentrated, however, by bromoform-methylene iodide (specific gravity 3.3). The combined rare earth and thorium content of sample Reynolds 3 (table 1) was raised from 2-[illegible] to about 7 percent.

The origin of the potential ore minerals is unknown. Two possibilities have been considered: (1) the mineralization is related to the igneous activity that produced the lamprophyre dikes, the quartz (explosion?) breccias, and possibly the chloriper de Saits. (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 15 to 20 miles north of the Dome, train boxes of black shale that overlie Pennsylvanian coal beds, contain radioactivity as high as 0.018 percent eU. (See Patterson, J. W., 1955, Radioactivity of some coals and shales in southern Illinois, U.S. Geol. Survey TEI-606, unpublished report.)

At present, most 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 Shell 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, [illegible]), some 20 miles southeast of the Dome.

The association of rare earths and fluorite, as noted in the Shell Oil test hole, is not uncommon. According to Alim (Alim, Ibert L., 1952, Variations in chemical and physical properties of fluorite, the American Min., vol. 37, [illegible]) minor quantities of yttrium, lanthanum, europium, and ytterbium are known to be present in the fluorite lattices. The six

samples which took [illegible] Illinois-Kentucky District contained little if any of the rare earths. [illegible] of these six samples, however, were taken from near the Lone.

Reynolds prospect - the highest radioactivity occurrence in the same area is in the Reynolds cut at anomaly "100" (see map 2, table 1 - Reynolds 1-6). The sludge pond at the site of the oil test hole also contains scattered 1- to [illegible]-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 the oil test hole. The cut is about 20 feet deep, where samples Reynolds 1-6 were taken on the vertical face of the hill side (maps 2 and 3). Except the chert, all of the material exposed in the cut is highly weathered. A highly radioactive "vein" of intermixed yellow clay zones and yellow clay and chert beds or fragments is present in the vertical face of the cut. The "vein" is about 11 feet wide, trends [illegible] 2-30 [illegible], and dips steeply northwest. A "horse" of essentially barren [illegible] 4 feet wide occurs within the "vein" near the northwest wall [illegible]. Both the southwest and northwest 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 5 with Reynolds 1-6.)

Within the highly radioactive yellow clay "vein", some of the chert occurs in [illegible] 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 most it occurs as pebbles and boulders in random fashion.

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Figure 4 - Reynolds 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 pasty mass which leaks dirty; 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. In these fissures and intercourses, radioactive substances in the groundwater may have become concentrated in the yellow clay 'veins' by adsorption on the clay particles." (2) On 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, and doming of formations that has taken place, the mineralized breccia found in the hanging wall test pits, the concentration of thorium and rare earths in the veinlike structure, and the presence of rare earths in the nearby 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 eliminated until more data are obtained.

The combined thorium and rare earth content of the "vein", however, is as much as [illegible] percent in the Reynolds cut. The chemical 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 exposed zone.

Past Production:

There has never been any mining operation on the road 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 Owensboro and Elizabethtown, Kentucky, about 10 miles distant; Paducah, Kentucky, 30 miles distant; Harrisburg, Illinois, 20 miles distant; Evansville, Indiana, 60 miles distant. Power is available along 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 some dry sampling, analyses and mapping. The first trench will be at "Mr. Ely 100" at Reynolds cut and will be 250' x 50' x 20'. The second trench will be an extension and deepening of the trench at the Hamp oil hole sludge pond and will be 60' x 50' x 20'. The cost of this work is 20¢/cu.yd. which appears reasonable and adequate to do a workmanlike job.

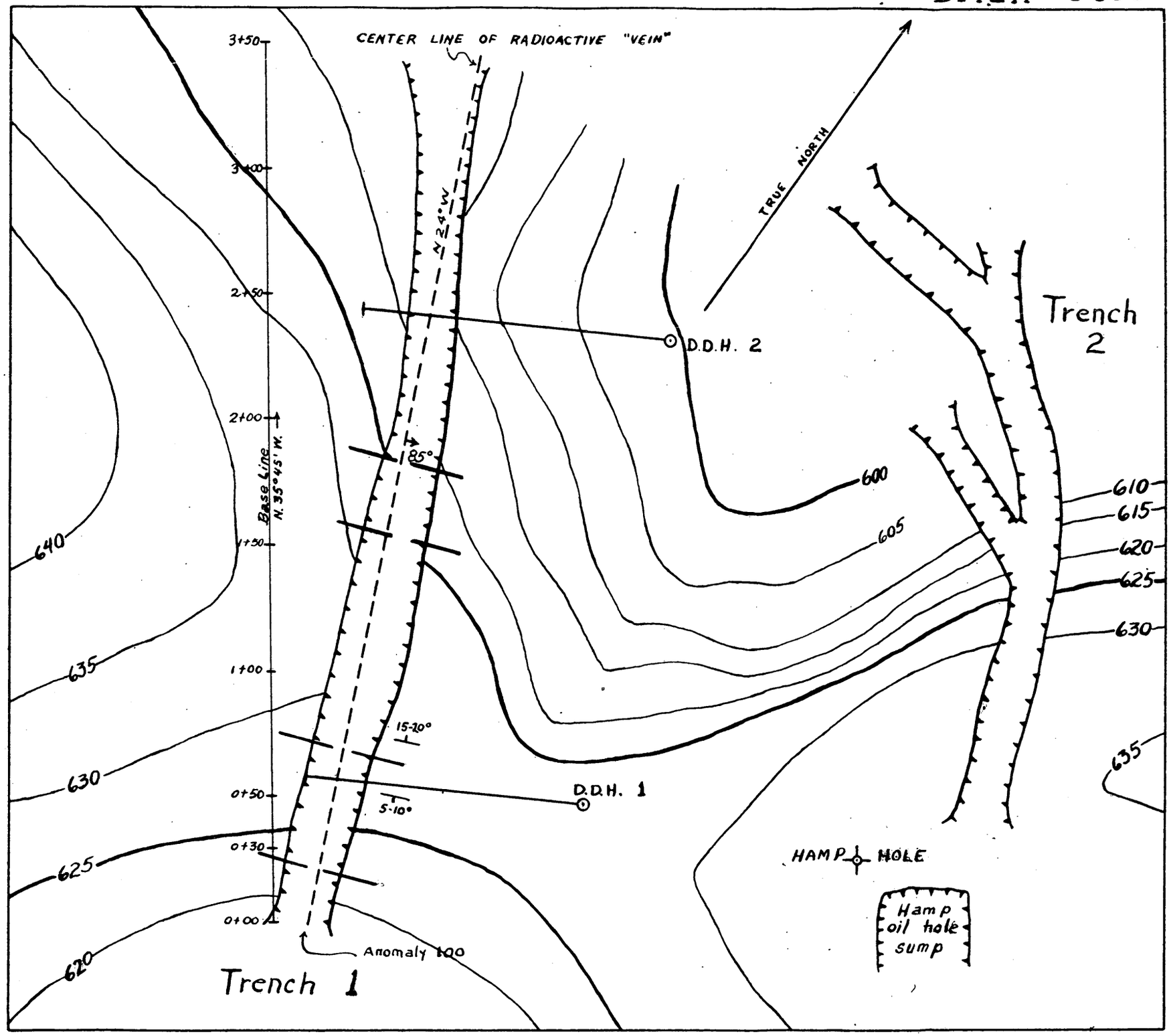
The 100 feet of core drilling would be approved by the field team only if a fairly continuous and mineralized "vein" is exposed in the trenching. A small amount of drill footage is proposed at this time in order to test the feasibility of a larger scale core drilling program and also to test the "vein" 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 step should be shaft sinking or drilling. The former is believed to be preferable if the depth of weathering is shallow. One or possibly two drill holes would allow the operator and field team to control geology plan, if so desired, further exploration. The exact location of the hole(s) would be determined after the trenching is completed.

Two hundred feet of core have been requested at a price of $/foot 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.

[illegible]
[illegible] Geophysical Engineer

[illegible]
Geologist

October 21, 1955



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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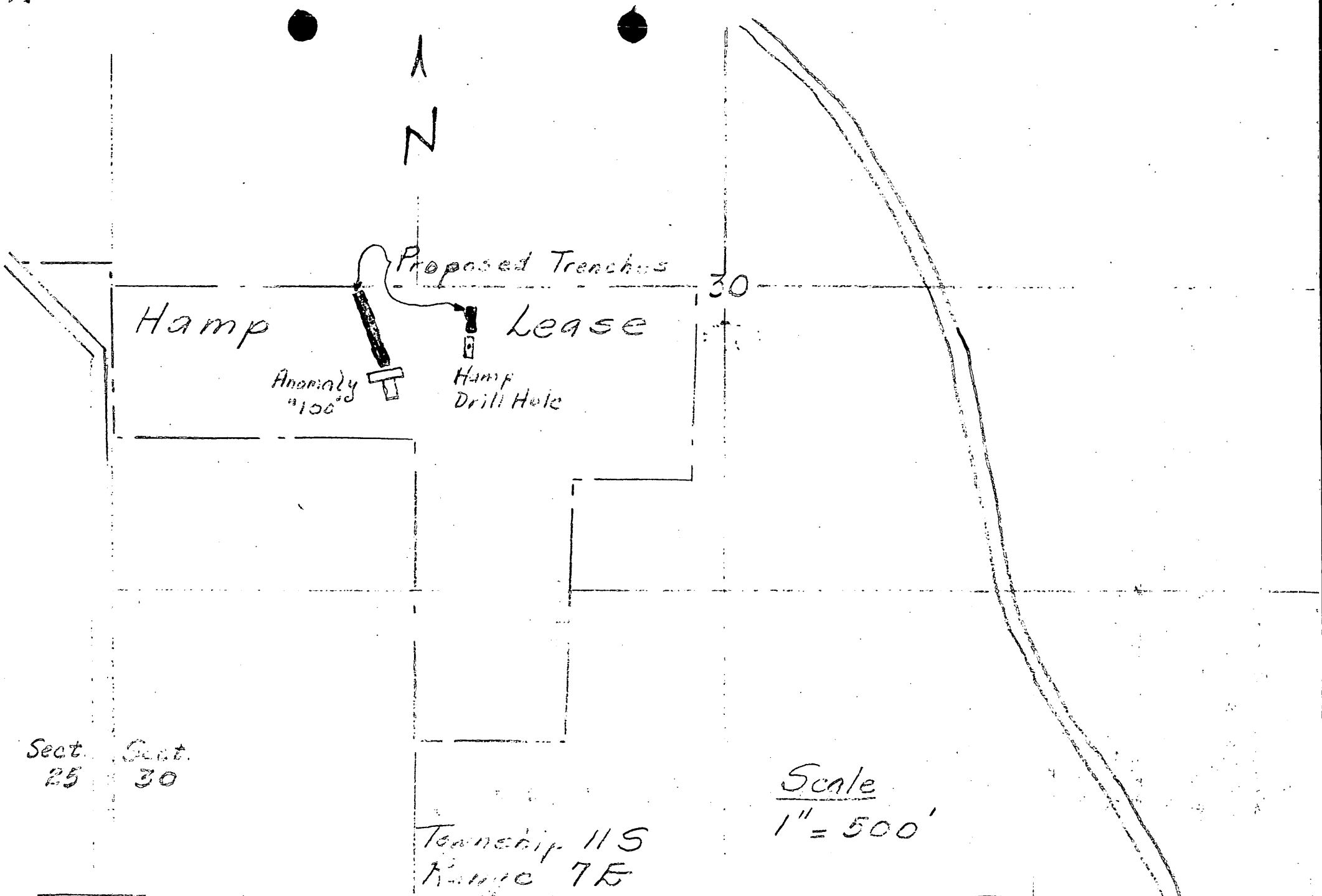

Figure 1. PLAN OF HAMP LEASE - HICK'S DOME
Hardin County, Illinois

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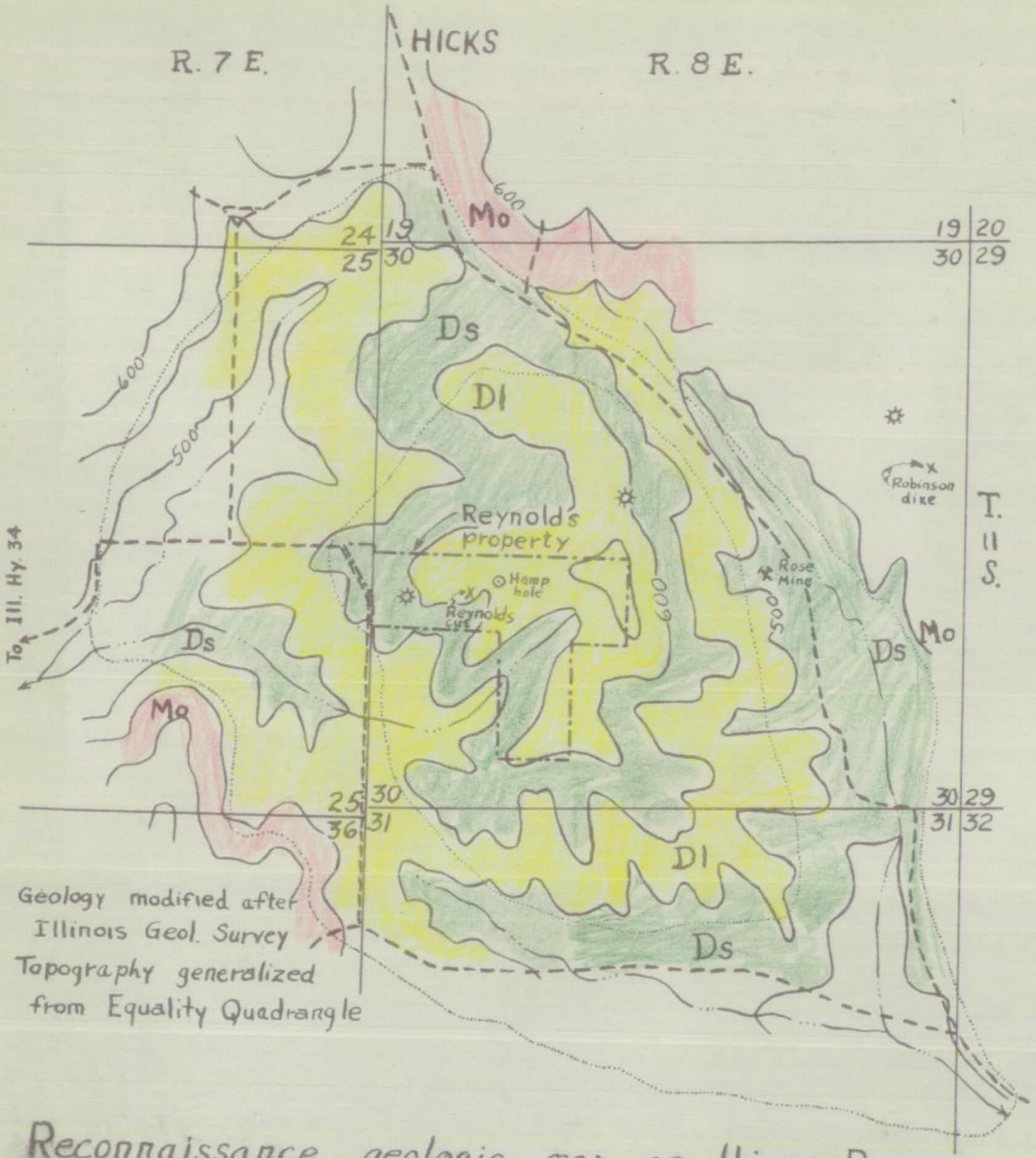
NOV - 2 1955

Figure 2
DMEA 3855



EXPLANATION

Mo
Mississippian, Osage fm.

Ds
Devonian shale

Dl
Devonian limestone

Geologic contact (approximate)

Breccia

Pit or open cut

Fluorspar mine

Graded road

0 1/4 1/2 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

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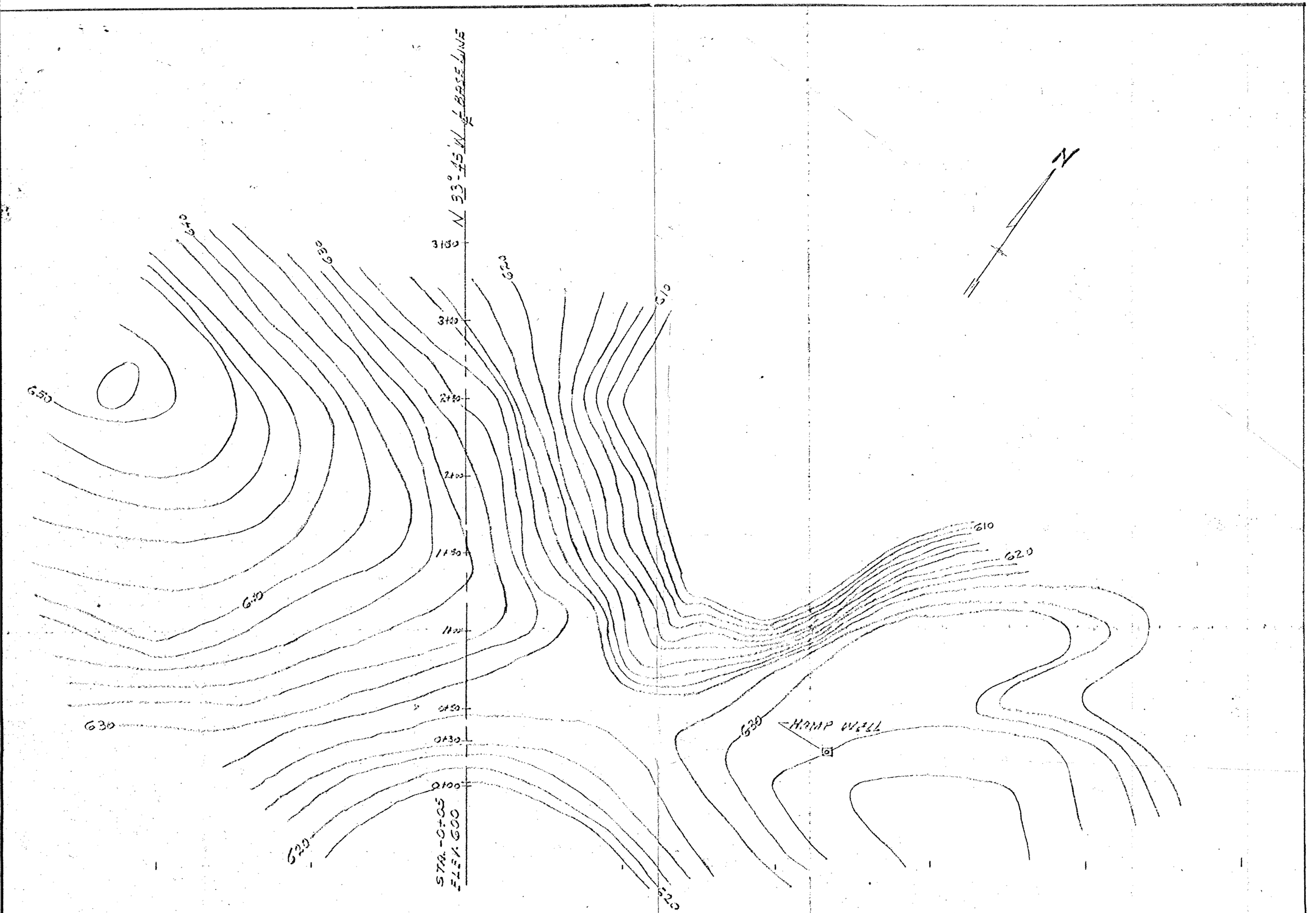
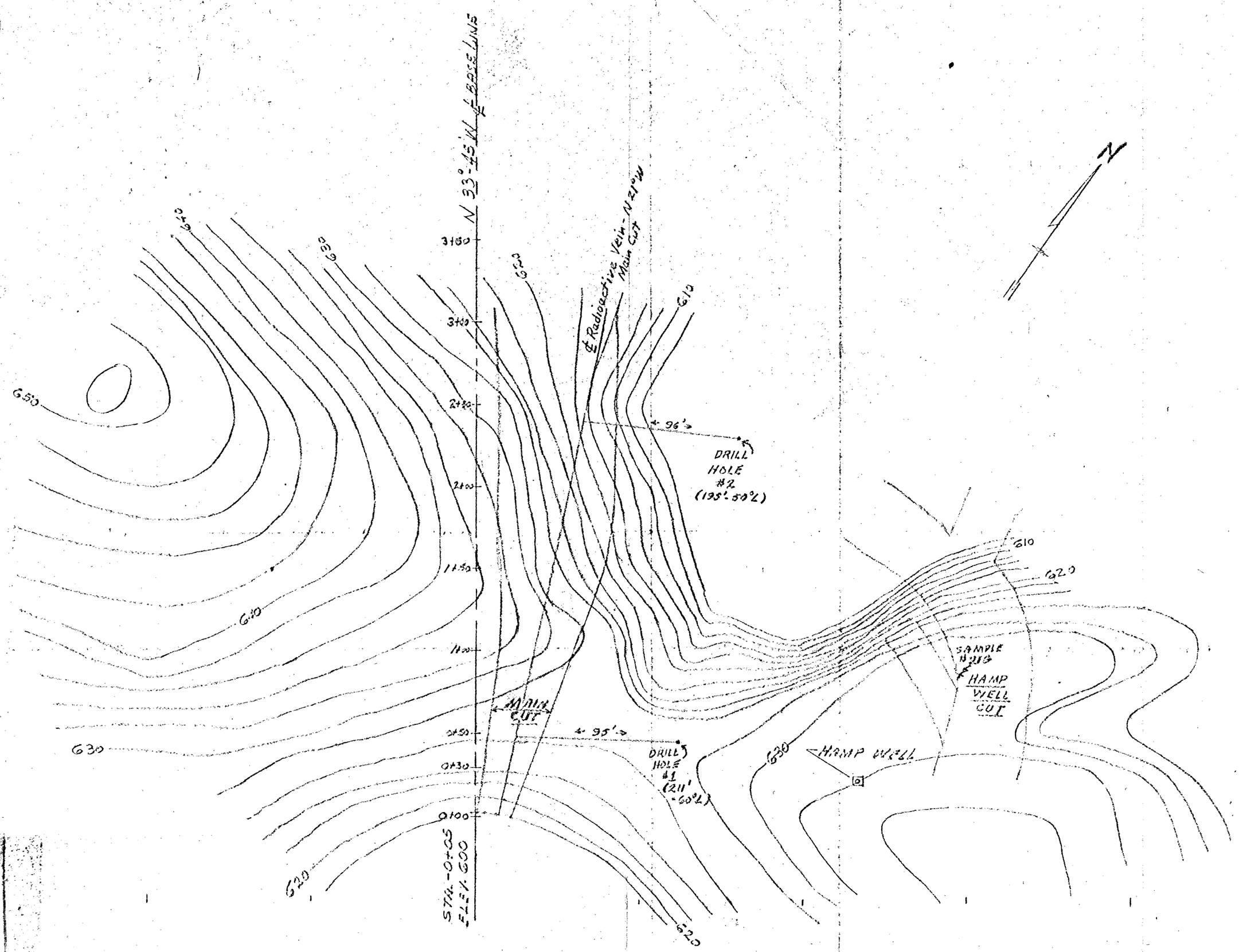


-TOPOGRAPHIC MAP OF AREA TO BE EXCAVATED-
EXPLORATION PROJECT - DOCKET No. DMEA-3855
HARDIN Co. ILL. - SEC. 30, T.11S., R.8E.
"HICKS DOME AREA"

CONTOURS 2' INT.
SCALE 1" = 50'
4-14-56 W.H.S.

B.M. - BASE ON TOP OF
COLLAR ON HAMP WELL
ELEV. 630' A.S.L.



- TOPOGRAPHIC MAP OF AREA TO BE EXCAVATED -
EXPLORATION PROJECT - DOCKET No. DMEA - 3855
HARDIN Co. ILL. - SEC. 30, T. 11 S., R. 8 E.
"HICKS DOME AREA"

CONTOURS 2' INT.
SCALE - 1" = 50'
4-14-56 W.W.S.
APPVD. - B.L. Baxter
B.M. - BASE ON TOP OF COLLAR ON HAMP WELL
ELEV. 630' A.S.L.

Sample Designation 1/	Type of material	eU USBM Coll. Pk.	eU USBM Tuscaloosa	eU USGS Wash. Denver	U_3O_8 Van. Corp. of Amer.	U USGS Wash.	CaF_2 USGS Denver	Calculated thorium 2/ USBM Coll. Pk.	Th USGS Wash.
Reynolds 1	Yellow clay, some chert	.032	.036	.035	.05	.004	—	.15	0.3
" 2	Mostly chert, some yell. clay	<.005	.004	.003	.03	.001	—	<.02	0.1
" 3	Yellow clay	.091	.11	.094	.13	.008	—	.45	0.6
" 4	Mostly chert, some yell. clay	.020	.025	.022	.06	.003	—	.10	0.2
" 5	Mostly yellow clay, some chert	.033	.039	.036	.02	.004	—	.15	0.2
" 6	Yellow clay, some red clay	.044	.050	.042	.07	.004	—	.20	0.3
" 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	>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, Ba, Nb, Pr, Tb	Cu, Dy, Yb, V, Er, Ni, Gd	Cr, Ga, Lu Sc	Be, Mo	Ag
" 2	Si	—	Fe	Al	Mn, Ti, K, P	Y, Mg, Ba, Ce Ca, 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	Dr, Ga, Co, Eu Sc, Cr, Lu	Be, Mo	Ag
" 5	Si	Al	Fe	—	Y, P, Ti, Mg, K, Th, Ba, Ce, Ca, La	Nd, Pb, Sr	Yb, Er, Pr, B, Mn, Na, V	Cu, Dy, Yb, Tb, Gd, Zr	Ni, Sc, Cr Eu, Ga, Lu	Be, Mo	Ag
" 6	Si	Al	Fe	Ti	Y, Ba, Ca, 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, Y, Cu	Co, Ga	La, Yb Y, Pb Nd, Zr, Mo Sc	—	Yb, Ag, Be
" 8	Si	Fe, Al	Ti, Mg	Ca, K, Na	Ni, Y, Ba, Ce	Mn. Nd	Cu, 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 Y, 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
	xx.	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, Ce, 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	>10	75	1-10	.5-5	.1-1	.08-.8	.05-.5	.03-.3	.02-.2	.01-.1	.008-.08	.005-.05	.003-.03	<.01	<.005	.00x	.00x−	.000x+	Trace	Type of sample	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
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'	

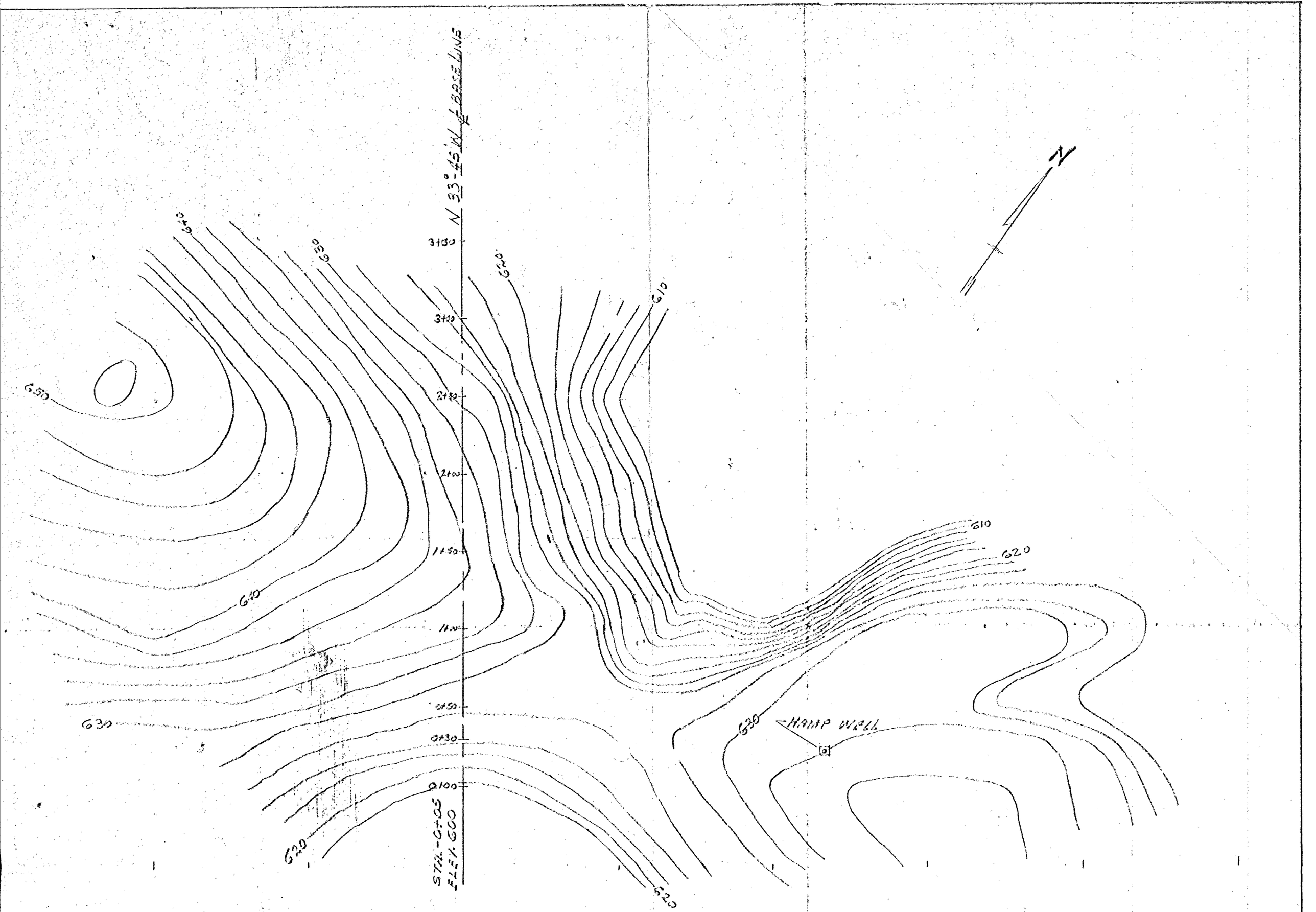
Note: All analysis figures are percent.
< less than
> greater than

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 1955, Reynolds samples in 1955.
The location of the samples are as follows:
Reynolds 1-6 and 9 are from the Reynolds cut (Fig.10). (Anomaly 100)
Reynolds 7 is from a lamprophyre dike about 2 miles southwest of Marion, Ky.
Reynolds 8 is from the Robinson lamprophyre dike (Fig.10).
Reynolds 10 is from a large boulder of intrusive(?) breccia on the Reynolds property (Fig.10).
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.

FIGURE 11.--ANALYSES OF SAMPLES FROM HICKS DOME, HARDIN COUNTY, ILLINOIS -- DMEA 3855

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



-TOPOGRAPHIC MAP OF AREA TO BE EXCAVATED-
EXPLORATION PROJECT - DOCKET No. DMEA-3335
HARDIN Co. ILL. - SEC. 30, T.11S., R.8E.
"HICKS DOME AREA"

CONTOURS 2' INT.
SCALE: 1" = 50'
4-14-56 H.H.S.

B.M. - BASE ON TOP OF
COLLAR ON HAMP WELL
ELEV. 630' A.S.L.