DMEA Form 9
Rev. 6/57

UNITED STATES
DEPARTMENT OF THE INTERIOR
Defense Minerals Exploration Administration

OFFICIAL DOCKET FILE 29 MAY 1958 Idm-E NO. _____ DMEA NO. 4949

Application
- [ ] Denied
- [ ] Withdrawn

Contract 1196
- [ ] Terminated - Not Certified
- [ ] Terminated - Certified

- [ ] Cancelled
- [ ] Royalty Agreement

The records contained in this file are marked (x) and arranged in this order:

Folder No. 1:

Left Side

- [ ] Royalty Audits
- [ ] Certification of Discovery
- [ ] Closing Letter
- [ ] Cost Audits
- [ ] Termination Notice or Agreement
- [x] Recision Notice
- [ ] Assignment of Contract
- [ ] Contract Amendments
- [x] Contract with all exhibits and annexes
- [ ] Owner's Consent to Lien and Subordination Agreement
- [x] Application and attachments

Right Side

- [ ] Project summary (final)
- [ ] Work Completed analysis (final)
- All other material filed in chronological order including the following reports if checked:
- [ ] Field Team Semi-Annual Report for Certified Project
- [ ] Final Field Team Report (Tab)
- [ ] Operator's Final Report (Tab)
- [ ] Interim Field Team Reports
- [ ] Operator's monthly reports and all attachments
- [x] On-site Exam Report (Tab)
- [ ] Settlement Sheets
- [ ] Drill Logs

Additional Folders:

Left Side

Folders No._____: Reports
- [ ] Analysis of Semi-Annual Inspection Reports
- [ ] Project Summary (Interim) by DMEA Engineers

Right Side

- [ ] Field Team Semi-Annual Report for Certified Project
- [ ] Field Team Interim Reports
- [ ] Operator's Monthly Reports with transmittal, narrative and maps.

Folders No._____: Maps (Use pocket folder or envelope)

Folders No._____: Settlement Sheets

Folders No._____: Drill Logs

Folders No._____: Royalty material

17963

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
	Rubin	
	Dunya	
	App'd. Sel. Off.	
11/5/58	Ching	700
11/5	Knouse	700
11-5	Champlin	800
11/7	Selbridge	130
	Yopes	
	Wilson	

NOV 7 1958

Mr. Joseph H. Kanter, President
Hilary Minerals Co., Inc.
25 Broad Street
New York 4, New York

Re: Docket No. DMEA-4949 (Uranium)
Contract No. Idm-E1196
Philura and Grass Flat Claims
San Miguel County, Colorado

~~110~~
~~100~~
11/10 C 220
700
11/10 B ~~215~~

Dear Mr. Kanter:

The subject contract required that you commence work on or before August 15, 1958, and complete the work no later than October 31, 1958. The date for completing the work has passed without any work having been started.

In these circumstances it is not in the best interest of the Government to participate in the subject project and, accordingly, the Government hereby rescinds, revokes, and cancels the subject contract as of the date thereof.

Sincerely yours,

Frank E. Johnson (fw)

ACTING Director

HCRubin/hm 11/4/58
cc: Director's reading file
Operating Committee
Mr. Knouse
Mr. Ching
OME Field Team, Reg. III (2)
Mr. Rubin

8623

Extra copy

RESCISSION OF EXPLORATION PROJECT CONTRACT

It is agreed this 23d day of September, 1958, between the United States of America, acting through the Department of the Interior, Office of Minerals Exploration, and Hilary Minerals Co., Inc., that Contract No. Idm-E1196 (Docket No. DMEA-4949), dated May 29, 1958, is rescinded, revoked and canceled as of the date of the Contract without obligation one party to the other the same as if the Contract had not been executed.

IN WITNESS WHEREOF, these parties have executed this agreement as of the day and year first above written.

THE UNITED STATES OF AMERICA

By _____
Director, Office of Minerals Exploration

HILARY MINERALS CO., INC.

By _____

Title _____

Was not executed by Operator

MMC

DOCKET COPY

September 2, 1958

Docket No. DMEA-4949 (Uranium)
Contract No. Idm-E1196
Hilary Minerals Co., Inc.
Philura and Grass Flat Claims
San Miguel County, Colorado

JUSTIFICATION FOR ~~AMENDMENT NO. 1~~ Rescission

The subject contract was sent to the Field Team on May 29, 1958, for execution by the Operator. The latter delayed execution and return of the contract to the Field Team until June 27. A starting date of August 15 was inserted in the contract in accordance with the Operator's request.

On August 22 the Operator requested that the starting date be extended to October 1, 1958, and the completion date extended from October 31 to December 15, 1958. The Operator stated that it was unable to let the contract for drilling by August 15; however, its reasons for the delay in starting work are not entirely legitimate.

Extension of the starting and completion dates appear to be necessary if the exploration work is to be done. However, in view of the Operator's poor reputation for accomplishment on DMEA projects, it is recommended that the amendment provide for automatic rescission of the contract if work is not commenced on or before October 1, 1958.

Since contract costs were based on completion of the contract over a period of three months, the completion date should be extended to December 31, 1958.

Michael Ching
Michael Ching

NOTE: September 12, 1958

Because ample time had been allowed Operator for starting the work and its reasons for failure to start on time were inadequate and unacceptable, an agreement rescinding the contract was prepared in lieu of above proposed Amendment No. 1.

mc
Michael Ching

Government's copy

RECEIVED JUN 17 D.M.E.A.

MF-200
(Revised June 1954)

Docket No. DMEA 4949

Commodity Uranium

Contract No. Idm-E 1196

UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

EXPLORATION PROJECT CONTRACT[1]

It is agreed this 29 MAY 1958 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] Hilary Minerals Co., Inc., a New York corporation, whose mailing address is 729 Du Pont Building, Miami, Florida, 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-200), the attached Exhibit "A," Annex I, and map (Figure 4)

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 Colorado, County of San Miguel, and is described in Annex I.[3]

(b) The Operator represents and undertakes that:

(1) The Operator is the [4] Lessee 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 ....., page ....., 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: Royalty of 10% of the proceeds of all ores mined payable to the lessor, Beaver Mesa Uranium, Inc.

(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

[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."

of the land (lessor, seller, optionor, etc.), are attached, as follows: Consent to Lien and Subordination Agreement of Beaver Mesa Uranium, Inc.

(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 8, it shall thereafter have no claim against the land or any production therefrom except for any production referred to in Article 8(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 August 15, 1958 shall commence the work, and on or before October 31, 1958 (unless the Operator's obligation to prosecute the work is terminated—see Article 10) shall ~~either~~ have completed the work, ~~or shall have incurred allowable costs (see Article 6) in an amount not less than the estimated total allowable cost set forth in Exhibit "A"~~ except as otherwise provided in Exhibit "A" with respect to stages of work. See Article 13.

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) *Independent contracts.*—To the extent that the allowable costs are estimated in Exhibit "A" with express reference to performance by independent contractors on a unit-price basis (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations), the work may be so performed; but if the reference in Exhibit "A" to any such independent contract requires the Government's approval thereof, payments under such contract will not be allowable costs unless the Government gives its written approval of the contract. Any such independent contract shall refer to some specific and identifiable part of the work, and shall be subject to all of the pertinent terms and conditions of this exploration contract; but the Government shall not be considered a party thereto, and its rights under this contract, including the right to terminate its contributions, shall not be affected thereby. Regardless of the provisions of any such independent contract and regardless of the Government's approval thereof, the Government will participate in payments to the independent contractor only on account of work performed in accordance with the provisions of this exploration project contract, and only to the extent that the Government deems the unit prices for the work under the independent contract to be reasonable.

(c) *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.*—The estimated total allowable cost of the project, set forth in Exhibit "A," is the sum of $26,824.00. The Government shall contribute 50 percent of the allowable costs as they are incurred in a total sum not in excess of $13,412.00: *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 or not in excess of the amount of the Government's contribution to the cost of property which is or may become subject to disposal as provided in Article 9(c), whichever is greater. The Government will make its contribution on the basis of the monthly vouchers referred to in Article 7(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. "Costs incurred" mean costs that have been paid or have become due and payable, or that in the opinion of the Government have become an obligation. The Government may make payments directly to independent contractors and suppliers for the account of the Operator rather than to the Operator.

ARTICLE 6. *Estimated costs.*—(a) *Categories of costs.*—The allowable costs of the work to which the Government shall contribute are limited to those that are direct, reasonable, necessary, and that are estimated in Exhibit "A" by categories as specified in this article. If any category or subcategory is omitted from the estimate of costs, or if the word "none" is annexed to the listing thereof, costs under such category or subcategory are not allowable. Any excess over any estimate which is indicated as the maximum of any category, subcategory, or item, either as to requirement or related cost, and any excess over the estimated total allowable cost of the work, shall not be allowable. Any excess over the estimate of any category, subcategory, or item, either as to requirement or related cost, not indicated as a maximum shall be allowable within the limit of the estimated total allowable cost of the work. To the extent that excesses over maximums other than the estimated total allowable cost of the work may be necessary for the performance of the work, the Operator shall incur such excesses for his own account without contribution by the Government; but except for any such necessary excesses in categories, subcategories, or items thereunder the Operator is not obligated to incur more than his agreed percentage of the estimated, total allowable cost of the work. See Article 13.

To the extent specified in this article or in Exhibit "A" the following categories, subcategories, and elements thereof are maximums; but if not so specified either here or in Exhibit "A" they are not maximums, and may be exceeded within the limit of the estimated total allowable cost of the work:

CATEGORY (1)—INDEPENDENT CONTRACTS.—Work to be performed under independent contracts (see Article 4(b)). The estimated total amount of this category and the estimated cost of each unit of work for performance under an independent contract are maximums. See Article 13.

CATEGORY (2)—PERSONAL SERVICES.

Subcategory (a)—Supervision.—All elements of this subcategory (number of supervisors, periods of employment, rates of pay, and total) are maximums.

Subcategory (b)—Technical services.—All elements of this subcategory (number of technicians, periods of employment, rates of pay, and total) are maximums.

Subcategory (c)—Labor.

CATEGORY (3)—OPERATING MATERIALS AND SUPPLIES.—Includes such items as drill bits and steel, explosives, fuel, pipe, power, small tools costing less than $50 each, timber, track.

CATEGORY (4)—OPERATING EQUIPMENT.

Subcategory (a)—Rental.—The number of each object to be rented [6 mine cars, 1 truck], the rate of rental [$100 per month, $5 per hour], and the total of this subcategory are maximums.

Subcategory (b)—Purchases.—The estimated total of this subcategory is a maximum.

Subcategory (c)—Depreciation.—All elements of this subcategory (time periods, rate of depreciation, and subcategory total) are maximums.

CATEGORY (5)—INITIAL REHABILITATION AND REPAIRS.—Estimates under this category include all requirements and related costs, such as labor, materials and supplies, and supervision at a rate not higher than provided for in Category (2), and shall not be duplicated under any other category. The estimated total of this category is a maximum.

Subcategory (a)—Initial rehabilitation and repairs of existing buildings, fixtures, and installations (exclusive of mine workings).—The estimated total of this subcategory is a maximum.

Subcategory (b)—Initial rehabilitation and repairs of operating equipment.—The estimated total of this subcategory is a maximum.

CATEGORY (6)—NEW BUILDINGS, FIXTURES, AND INSTALLATIONS (EXCLUSIVE OF MINE WORKINGS).—Estimates under this category include all requirements and related costs, such as labor, materials and supplies, and supervision at a rate not higher than provided for in Category (2), and shall not be duplicated under any other category. The estimated total of this category is a maximum.

CATEGORY (7)—MISCELLANEOUS.—Repairs and maintenance (other than initial) of operating equipment, analytical work, prints and other reproductions, accounting, Operator's share of payroll taxes, liability insurance covering employment, travel, communications, and any other items of requirement or cost that do not fall within any of the first 6 categories.

THE ESTIMATED TOTAL ALLOWABLE COST of the work is a maximum.

(b) *Nonallowable costs.*—The following costs are not allowable for contribution by the Government:

(1) *Costs of the land,* such as rental, depreciation, depletion, or other cost of acquiring, owning, or holding possession;

(2) *Indirect costs,* such as general overhead, corporate management, interest, taxes (other than payroll and sales taxes), insurance (other than liability insurance covering employment), damages to persons, damages to property (other than necessary repairs or replacements of equipment or other property used in the work);

(3) *Previous work* performed or costs incurred before the date of this contract; and

(4) *Deferred payments.*—Any costs incurred by the Operator under any rental-purchase agreement, installment-purchase agreement, or any agreement for the purchase of goods under the provisions of which payment of the full purchase price is deferred more than 90 days from the delivery of the goods; unless the purchase agreement is approved by the Government in writing.

(c) *Reductions in costs.*—The Operator shall account for and give the Government credit for any incidental benefits, credits, or money received in the ordinary course of business in prosecuting the work (as by salvage or sale of materials or equipment, furnishing of room or board, furnishing of power or services to third persons, rebates or discounts on purchases, etc.), in the same ratio in which the Government contributes to costs; and such amounts shall be treated as a reduction in costs incurred so that they are available for use within the limit of the original estimated total cost. This provision does not apply to receipts from production which are subject to the Government's percentage royalty under the provisions of Article 8 See Article 13.

ARTICLE 7. *Reports, accounts, audits.*—(a) *Operator's records.*—The Operator shall keep suitable records and accounts of the 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. If the Government elects to audit said records and accounts relating to the exploration work by certified public accountant, it may do so as a cost of the work to which the Operator shall contribute. 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. If work under this contract is carried on in conjunction with any other operations, or if labor, supervision, services, materials, supplies, equipment, facilities, or other requirements for carrying on the work are also used in connection with other operations, the costs shall be segregated and accounted for on a basis and by methods and accounts that are satisfactory to and approved 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 detailed costs incurred during the reporting period; (2) Operator's Unit Cost and Progress Report showing the various types of work performed during the reporting period and 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 related costs incurred.

(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 8. *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 7) 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 therof 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 9. *Interests in purchased property.*—(a) *Title and ownership.*—All costs under this contract shall be incurred by the Operator in the Operator's own name and for the Operator's own account; but any property acquired to the cost of which the Government contributes shall belong to the Operator and the Government jointly in proportion to their respective contributions, although title thereto shall be taken in the name of the Operator.

(b) *Preservation of property.*—Until the final disposal of any property in which the Government has an interest the Operator shall preserve and protect same for the best interest of the Government, any reasonable and necessary costs thereof to be treated as an allowable cost of the project. After the completion of the work or termination of the Government's obligation to contribute, or when such property is not in use for or needed for the work, the Operator shall neither use it without the written consent of the Government nor without paying a reasonable rental to be fixed by the Government for its interest.

(c) *Disposal of property.*—Upon the completion of the work or termination of the Government's obligation to contribute to costs, or when the property is no longer needed for the work, the Operator shall promptly dispose of salable or salvageable property in which the Government has an interest for the joint account of the Government and the Operator, either by return to the vendor, by sale to others, or purchase by the Operator or the Government at a price at least as high as could be obtained from others, unless the Government in writing waives its interest in any such property. Without advance approval of the sales price by the Government the Operator shall not sell at any price any item of property the cost of which was more than $500, and shall not sell at less than 25 percent of the purchase price any item of property which cost $500 or less. The Government, in lieu of approving the sales price for any such item, may itself purchase the item at the best price which the Operator is able to obtain or himself cares to give. Property remaining upon any termination of the work shall be considered in groups or categories (such as drill steel, or explosives, or pipe, or rails), and if the original cost of the remaining unexpended portion of any such group or category is less than $50, the Government waives its interest therein. If necessary to accomplish the disposal of any item the Operator shall dismantle and sever it from the land, the cost thereof to be treated as a cost of the project.

(d) *Default of the Operator re disposal.*—If within 90 days after the completion of the work or termination of the Government's obligation to contribute to costs, or after the property is no longer needed for the work, or after such further time as the Government may in writing allow, the Operator has failed to sell or otherwise liquidate or dispose of any property in which the Government has an interest, the Government, at any time prior to final settlement under the contract, may pursue one of the following two courses: (1) the Government, by written notice to the Operator, may place upon such property what in its opinion is a fair valuation thereof, not in excess of the cost less 1.66 percent per month from the

date such property was purchased under this contract to the termination of said 90-day period; and such property shall thereupon be considered and accounted for as having been purchased by the Operator at the valuation so fixed by the Government; or (2) the Government may enter and take possession of such property wherever it may be found, and remove and dispose of it for the joint account of the parties.

ARTICLE 10. *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: (1) the Government shall be free of all obligation to contribute to costs not then incurred other than such as may be allowable under the provisions of the contract as necessary and incidental to winding up, reporting, and accounting; and (2) 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.

(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: (1) the Government shall be relieved of all obligation to contribute to costs not incurred when the notice was given, other than such as may be allowable by the provisions of the contract as necessary and incidental to winding up, reporting, and accounting; and (2) 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 10 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 11. *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 12. *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 13. *Changes and added provisions.*—

(a) That part of the last sentence of Article 3 beginning with the word "either" is deleted and replaced by the words "have completed the work, except as otherwise provided in Exhibit 'A' with respect to stages of work."

(b) That part of the last sentence in the first paragraph of Article 6(a) commencing after the semicolon is deleted.

(c) Categories (2) through (6) of Article 6(a) are deleted.

(d) In addition to the costs of work estimated in Exhibit "A" by categories of actual costs, the costs of work requirements specified in Exhibit "A" as "Fixed Unit Costs" ~~are~~ allowable costs of the project. The Government will contribute to the fixed unit costs as work units are performed. A "Fixed Unit Cost" is an agreed price for each unit of work to be performed regardless of costs incurred by the Operator. Costs set forth in Exhibit "A" include all allowable costs of the work to be performed under the Contract.

(e) In the last sentence of Article 6(c), the words "Article 8" are substituted for the words "Article 9."

(f) Notwithstanding any other provision of the Contract, the allowable unit cost per foot of a drilling item is the average unit cost per foot computed on the basis of all the actual unit costs of said drilling item incurred by the Operator: Provided, That the Government will not contribute to any portion of an average unit cost of a drilling item that exceeds the estimated unit cost of said item set forth in the contract.

Executed in sextuplicate the day and year first above written.

THE UNITED STATES OF AMERICA

By C. Mitteudorf
Administrator, Defense Minerals
Exploration Administration

Hilary Minerals Co., Inc.
(Operator)

By Joseph H. Kanter

Title Pres.

I, H. D. Roberts, certify that I am the Assistant secretary of the corporation named as Operator herein; that Joseph H. Kanter who signed this contract on behalf of the Operator, was then President 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.

H. D. Roberts

[CORPORATE SEAL]

Long
Sawyer
App'd. Sol. Off.
Chiang
Ellis
Chambers
Selfridge
Johnson

U. S. GOVERNMENT PRINTING OFFICE 16—70017-1

35485

EXPLORATION PROJECT CONTRACT
HILARY MINERALS CO., INC.
DOCKET NO. DMEA-4949

ANNEX I

The land referred to in Article 2 of the Contract consists of 10 unpatented lode mining claims situated in sections 32 and 33, T. 44 N., R. 18 W., and section 4, T. 43 N., R. 18 W., N.M.P.M.&B., San Miguel County, Colorado. The land is shown on the map entitled "Figure 4--Proposed Stage I Drilling on the Northern Part of the Philura Claims, Hilary Mineral Co., Inc., San Miguel County, Colorado," attached hereto and made a part hereof.

The Notices of Location of the claims to which reference is hereby made for a more complete description, are recorded in the official records of San Miguel County, Colorado as follows:

	Original		Amended	
Claim	Book	Page	Book	Page
Grass Flat	216	435	258	341
Philura No. 1	224	202	258	343
Philura No. 2	224	203	258	345
Philura No. 3	224	204	258	347
Philura No. 4	224	205	258	349
Philura No. 5	224	206	258	351
Philura No. 6	224	207	258	353
Philura No. 7	224	208	258	355
Philura No. 8	224	209	258	357
Philura No. 9	224	210	258	359

The Operator is in possession of the claims pursuant to the provisions of a Mining Lease executed January 4, 1958, by Beaver Mesa Uranium, Inc., the owner of the claims.

A Consent to Lien and Subordination Agreement executed by Beaver Mesa Uranium, Inc., is attached and made a part hereof.

MF-205
(Combines and supercedes MF-201 and MF-203)
June 1956

For Government's Use Only
EXPLORATION PROJECT CONTRACT
Operator
Docket No. DMEA- 4949
Contract No. Idm-E 1196
Contract Date 20 MAY 1958

RECEIVED MAY 9

CONSENT TO LIEN
and
SUBORDINATION AGREEMENT 1/

To the United States of America:

Referring to that certain land in the County of San Miguel, State of Colorado, described as follows: 2/

Certain lode mining claims recorded in the County Clerk and Recorders Office in Telluride, Colorado, and further described in Annex I which is attached hereto and made a part hereof.

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. Undertakes and agrees that property in which the Government may acquire an interest or equity under the contract may be dismantled, severed from the land, and removed, as may be provided in the contract; and the Government's interest and equity in such property shall be prior and superior to any adverse right or claim of the undersigned;

2. Grants to the Government a lien upon all of the undersigned's right, title, and interest in the land and upon any production of minerals therefrom, to secure the payment to the Government of a percentage royalty on production as may be provided for by the Contract;

3. Subordinates the undersigned's right, title, claim, or interest in or against the land and in any production therefrom to the rights of the Government under the contract with respect to royalty on production and liens to secure same;

4. Represents and undertakes that there is no claim, lien, or encumbrance upon the undersigned's right, title, claim, or interest in or against the land other than the following: (If "none" insert the word "none." Do not leave lines blank.)

None

1/ Mining or production from the land is not required, and in the absence of production there is no obligation to pay royalty to the Government.

2/ 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.

5. Undertakes and agrees (a) neither to commit any act nor assert any claim in conflict with the provisions of this Agreement; and (b) to give advance notice of the Government's rights under this Agreement to any subsequent transferee, mortgagee, encumbrancer, or lessee of any of the undersigned's right, title, claim, or interest in or against the land, or any production therefrom furnishing the Government with two copies of such notice; and

6. Consents to all amendments (including an agreement of termination) and assignments of the contract without notice thereof, and undertakes and agrees that this Agreement shall extend and apply thereto.

7. Added provision: None (State "None" or "See Annex No.____")

Dated this 1st day of May, 1958.

_____ [Seal] _____ [Address]

Beaver Mesa Uranium, Inc. [Seal] _____ [Address]

Alan M. Simpson [Seal] _____ [Address]

_____ [Seal] _____ [Address]

_____ [Seal] _____ [Address]

_____ [Seal] _____ [Address]

I, Mark Holloway certify that I am the Sec & Treas. (Secretary, etc.) of the corporation named herein; that Alan M. Simpson who signed this agreement was then President (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.

Mark Holloway

[Corporate Seal]

DMEA-4949

ANNEX I

Claim Name	Location Certificate Date	Location Certificate Book	Location Certificate Page	Amended Certificate Book	Amended Certificate Page
Grass Flat	2-10-53	216	435	258	341
Philura No. 1	3-19-53	224	202	258	343
Philura No. 2	3-3-53	224	203	258	345
Philura No. 3	3-3-53	224	204	258	347
Philura No. 4	3-3-53	224	205	258	349
Philura No. 5	3-3-53	224	206	258	351
Philura No. 6	3-3-53	224	207	258	353
Philura No. 7	3-3-53	224	208	258	355
Philura No. 8	3-3-53	224	209	258	357
Philura No. 9	3-3-53	224	210	258	359

EXPLORATION PROJECT CONTRACT
HILARY MINERALS CO., INC.
DOCKET NO. DMEA-4949

EXHIBIT "A"

Description of the Work

General Provisions

The work consists of exploration for uranium by core and non-core drilling to test the top sandstone layer known as the "ore-bearing sandstone" of the Salt Wash member of the Morrison formation.

Each hole shall be drilled non-core through the upper formations to the approximate position of the Salt Wash-Brushy Basin contact, then core drilled through the ore-bearing sandstone, the underlying greenish-gray mudstone, if any, and not more than 10 feet of reddish-brown mudstone.

Drilling depths are expected to average 284 feet, with the cored sections of the drill holes averaging approximately 75 feet in length. The minimum size of the core shall be BX.

All core and cuttings from the cored section of drill holes shall be saved and checked for radioactivity. Core sections indicating significant mineralization shall be split; one half shall be analyzed chemically for uranium and vanadium and one half shall be properly labeled and stored for the use of the Government. The non-mineralized core and related cuttings also shall be labeled and stored for inspection by the Government. With Government approval, the Operator may dispose of any stored samples.

All core and cuttings from the drill holes shall be logged geologically, the holes shall be probed radiometrically, and the record of such logging and probing, together with certified copies of all assay certificates, shall be submitted with the Operator's monthly progress reports.

No hole shall be drilled closer than 100 feet to the outer boundaries of the land described in Annex I.

The Government will not contribute to the cost of any incompleted drill holes.

Access roads and drill sites shall be prepared with a D-6 Caterpillar bulldozer or an equivalent unit of the same or of another make.

The project shall be supervised at all times by an experienced geologist or mining engineer, who shall devote full time to the project work.

The location, direction, inclination, and extent of all project work are subject to the approval of the Government.

The work shall be divided into three stages as hereinafter described. The Operator shall complete Stage I, and shall perform as much of Stages II and III as the Government approves in writing in advance.

Stage I

Prepare access roads and drill sites and drill 10 holes aggregating an estimated 2,840 feet as indicated on the attached map, "Figure 4", referred to in Annex I. The holes as shown on the map are located at irregular intervals ranging from 550 to 800 feet and may not be shifted more than 25 feet from the locations without prior Government approval. If the 10 holes require more than 2,840 feet of drilling to reach the desired horizon, the additional footage and funds required may, upon the written approval of the Government, be transferred and deducted from Stage III.

Stage II

Prepare access roads and drill sites and drill approximately 12 holes aggregating an estimated 3,408 feet as offsets to previously drilled holes which show favorable mineralization or highly favorable conditions for ore occurrence. Stage II holes shall be drilled not closer than 200 feet to any previously drilled hole that completely penetrated the ore-bearing sandstone. If more than 3,408 feet of drilling are required in this stage to reach the desired horizon, the additional footage and funds required may, upon the written approval of the Government, be transferred and deducted from Stage III.

Stage III

Prepare access roads and drill sites and drill not more than 12 holes aggregating not more than 3,408 feet as offsets to previously drilled holes that show significant mineralization. These offset holes shall be drilled not closer than 100 feet to any previously drilled hole that completely penetrated the ore-bearing sandstone.

Estimated Cost of the Project

Stage I

Actual Costs

Category (1) Independent Contracts

2,000 ft. non-core drilling, 0-200 ft. depth @ $1.50/ft.	$3,000.00
90 ft. non-core drilling, 200-400 ft. depth @ $1.80/ft.	162.00
750 ft. core drilling, 200-400 ft. depth @ $4.75/ft.	3,562.50

24 hrs. bulldozing @ $12.00/hr.	$288.00	

Categories (2) through (6)

None

Category (7) Miscellaneous

None except:

10 chemical sample analyses @ $5.00/ea. sample	50.00	
75 cardboard core boxes @ $1.25/each box	93.75	$7,156.25

Fixed Unit Costs (See Article 13(d))

Incidental allowance for each foot of hole drilled - 2,840 ft. @ $0.27/ft.[1]	766.80
Estimated Total Cost of Stage I	$7,923.05

Stage II

Actual Costs

Category (1) Independent Contracts

2,400 ft. non-core drilling, 0-200 ft. depth @ $1.50/ft.	$3,600.00	
108 ft. non-core drilling, 200-400 ft. depth @ $1.80/ft.	194.40	
900 ft. core drilling, 200-400 ft. depth @ $4.75/ft.	4,275.00	
24 hrs. bulldozing @ $12.00/hr.	288.00	

Categories (2) through (6)

None

Category (7) Miscellaneous

None except:

12 chemical sample analyses @ $5.00/ea. sample	60.00	
90 cardboard core boxes @ $1.25/each box	112.50	$8,529.90

Fixed Unit Costs (See Article 13(d))

Incidental allowance for each foot of hole drilled, 3,408 ft. @ $0.27/ft. 1/	$920.16
Estimated Total Cost of Stage II	$9,450.06

Stage III

Estimated Costs of Stage III are identical to those of Stage II

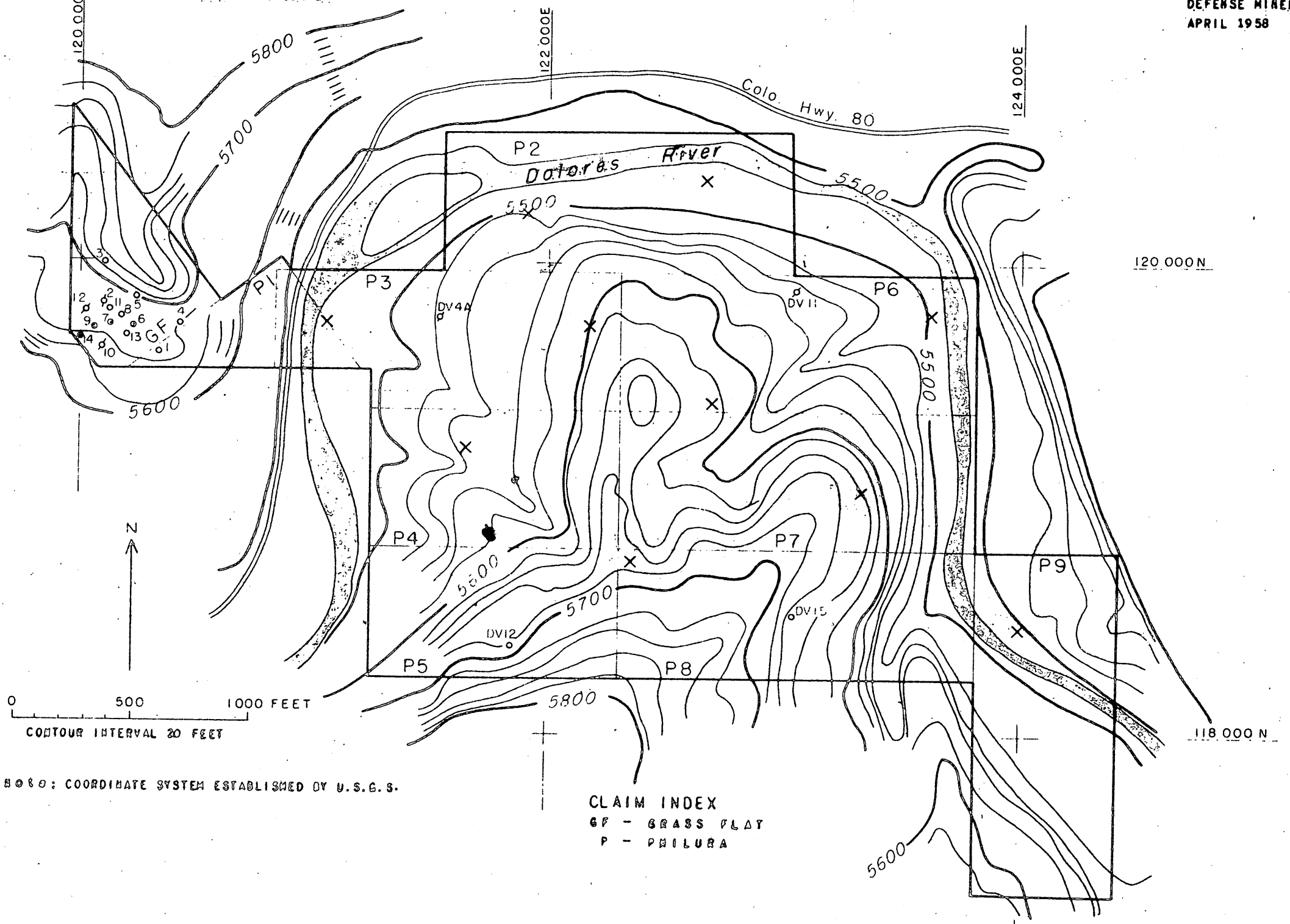
S U M M A R Y

Estimated Total Cost of Stage I	$7,923.05
Estimated Total Cost of Stage II	9,450.06
Estimated Total Cost of Stage III	9,450.06
Estimated Total Cost of the Project (rounded)	$26,824.00
Government Participation @ 50%	$13,412.00

1/ Includes all costs that might be allowable costs of the project under Categories (1) through (7) of Article 6(a), except as otherwise scheduled in Exhibit "A."

U. S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

DEFENSE MINERALS EXPLORATION ADMINISTRATION
APRIL 1958
DOCKET 4949



EXPLANATION

DRILL HOLES WITH PREFIX DV DRILLED BY U.S.G.S. HOLES WITH NO PREFIX DRILLED BY UTE URANIUM COMPANY

- ● ORE (AT LEAST 1.0 FEET OF MATERIAL CONTAINING AT LEAST 0.20 PERCENT U_3O_8
- ○ MINERALIZED (ORE GRADE, BUT LESS THAN 1.0 FEET THICK)
- ◐ WEAKLY MINERALIZED (AT LEAST 0.03 PERCENT U_3O_8, BUT LESS THAN ORE GRADE
- ○ BARREN
- × PROPOSED SITE OF DMEA STAGE I DRILL HOLE

FIGURE 4.—PROPOSED STAGE I DRILLING ON THE NORTHERN PART OF THE PHILURA CLAIMS, HILARY MINERAL CO., INC., SAN MIGUEL COUNTY, COLORADO.

BINDING COPY
D.H.E.L.
RECEIVED APR 24 1953

DATE	INITIALS	CODE

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

ORIGINAL FILE COPY
DMEA
RECEIVED MAR 3 1958

DATE	INITIALS	CODE

224 New Customhouse
Denver 2, Colorado

February 27, 1958

Memorandum

To: Secretary to the Operating Committee DMEA

From: Executive Officer, DMEA Field Team, Region III

Subject: Application for DMEA aid (Uranium) Hilary Mineral Co. Inc. (Slick Rock Group, Philura Group, Grass Flat Mine) San Miguel County, Colorado

Enclosed are two copies of the subject application in the amount of $129,122.50. One copy of the application is being retained in our file and one copy is being forwarded to the Grand Junction office DMEA.

We note that this is the fourth application for DMEA aid to be submitted on the Philura Group. THESE CLAIMS ARE SOUTH OF PROPOSED WORK

DMEA 3706 - Urado Uranium Company, application denied October 26, 1955 - DENIED WITHOUT PREJUDICE OCT 26/55 PENDING RESULTS OF USGS DRILLING

DMEA 4071 - Navjo Uranium Company, docket closed June 21, 1956

DMEA 4855 - Navjo Mineral Fund - recommended denial by this office February 17, 1958.

W H King
W. H. King
Executive Officer

Form MF-103
Revised Oct. 1957

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Budget Bureau No. 42-R1035.3
Approval expires June 30, 1958

RECEIVED MAR 3 1958

APPLICATION FOR AID IN AN EXPLORATION PROJECT

PURSUANT TO DMEA ORDER I, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

NAME OF APPLICANT (Full legal name and mailing address as it should appear on contract if one is executed)

Hilary Minerals Co., Inc.
729 DuPont Building
Miami, Florida

DMEA
DEPARTMENT OF THE INTERIOR
FEB 27 1958
REGION III
DENVER, COLORADO

APPLICANT NOT TO USE THIS BLOCK

Docket Number	4949
Date Received	3-3-58
Government Participation %	50
Region	III
Division Code	700

BUSINESS ORGANIZATION (Check one)

- Individual [ ]
- Corporation [x]
- Partnership [ ]
- Other (Specify) [ ]

State in which firm is organized: New York

LIST CORPORATE OFFICERS OR PARTNERS HERE, IF APPLICABLE

Name	Address	Title
Joseph H. Kanter	729 DuPont Bldg., Miami, Fla.	President
Leonard S. Fox	729 DuPont Bldg., Miami, Fla.	Vice-President
Leon Levy	25 Broad St., New York, N.Y.	Vice-President
Elvin Kanter	729 DuPont Bldg., Miami, Fla.	Sec.-Treas.

Mineral(s) for which you wish to explore: Uranium-vanadium

Estimated Cost of Project: $ 129,122.50

LOCATION OF PROPERTY

Name	County	State
Slick Rock Mining District	San Miguel	Colorado

GENERAL INSTRUCTIONS

Before filling out this application, please read DMEA Order-I, Revised, "Government Aid in Defense Exploration Projects." To assure prompt action, your application must provide all applicable material and information specified on the back of this application form. Avoid unnecessary correspondence and delays by submitting complete and accurate information. *Please submit four copies of this application and all accompanying papers* except as otherwise noted. Place your name and address on each sheet. Each item of information, maps, and reports required as a part of this application is described on the back of this form. Identify each attached statement by the item number to which it applies. If an item does not apply to your application, show the item number on your statement and after it write "not applicable." Maps or sketches should be used to supplement narrative descriptions of the property location and boundaries in item 1, existing mine workings and geology in item 2, and the proposed exploration project in item 4. When this information is not too complex, all of it may be shown on one map or sketch. All documents and other attachments submitted as a part of this application, except those in item 2(g) which you mark to be returned, become the property of the Government and will not be returned to the applicant. Send true copies, *not originals,* of leases, contracts, and other documents which are an essential part of your business records. *File this application with the Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest DMEA Field Office.*

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief.

February 21, 1958
Dated

Leonard S. Fox
BY (Signature)

Vice-President
Title

A wilfully false statement or certification to any Department or Agency of the United States Government is a criminal offense. U. S. Code, Title 18, Sec. 1001.

INFORMATION REQUIRED WITH THIS APPLICATION

1. *Applicant's Property Rights:*

(a) State the legal description (section, township, and range; metes and bounds; patent number of claims) of the land upon which you wish to explore and all land adjacent to the proposed project area which you own or control. Describe any part of the project land or workings which should not be subject to Government lien for royalty payments. If the land consists of unpatented claims, state the book and page number for each recorded location notice, including amended locations, and the place where recorded (courthouse, recorder's office, county, and state).

(b) State all the names by which you know the property.

(c) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise. If you are not the owner, submit with this application one exact copy of the lease, contract, or other document (with address of owner) under which you control the property.

(d) Describe all liens, mortgages, or other encumbrances on the property.

2. *Physical Description:*

(a) Describe in detail and illustrate with maps or sketches all mining or exploration operations which you know have been or are being conducted upon the lands, including existing mine workings. Describe all production facilities.

(b) State your interest, if any, in operations stated in 2*(a)*.

(c) State, as far as you know, the past and current production, supporting your statement with copies of settlement sheets, mine records, or published data if available.

(d) Describe known ore reserves on the property giving quantities and grades and sampling methods used, supporting your statement with copies of assay certificates and assay maps if available.

(e) Describe by narrative and maps or sketches the geologic features of the property, including ore minerals, geologic formations if known, and type of deposit (vein, bedded, etc.).

(f) State your reasons for expecting to find ore, and if you have sampled the area you propose to explore, show where the samples were taken, describe sampling methods used, and provide copies of assay certificates.

(g) Send with your application at least *two* copies of all geologic or engineering reports, assay maps, or technologic information which you may have, indicating on each whether you require its return to you.

3. *Accessibility of Project:*

(a) To aid DMEA representatives who may be required to examine the property, state the name and address of the person who will meet the DMEA representative; give directions for reaching the property; and describe accessibility of the property including the mine workings.

(b) Name the shipping and supply points and places where employees reside and state the distances between them and the property.

4. *The Exploration Project:*

(a) Describe fully the proposed exploration project giving individual footages and sizes of openings *for each item of work.* Use narrative, maps, plans, and longitudinal and cross sections as necessary. Show the location of the proposed work as related to geologic features such as veins, ore-bearing beds, contacts of rock formations, etc. Show also the relation of the proposed work to any existing mine workings and to *property boundaries* or to the closest identifiable corner.

(b) If an access road to the project must be built, show the location on the property map and state the length, type, and construction methods proposed.

(c) In the event that an exploration contract with DMEA is executed, how soon will the work start and how many months will be required to complete it? State your anticipated average daily or monthly rate of progress for each type of work.

5. *Experience:*

State your operating experience and background with relation to your ability to carry out this exploration project, and also that of the person or persons who will supervise the operations.

6. *Estimate of Costs:*

Furnish detailed estimates of the costs *for each item of the work proposed in 4(a)* under the headings listed below with a total for each heading and the estimated total cost of the project. Costs for any work to be performed by an independent contractor should be shown separately under category *(a)* below. Costs for any work that is not to be performed by an independent contractor should be given in detail under categories *(b)* through *(g)*.

(a) Independent contracts. State the cost of any proposed independent contract for the performance of all or any part of the work, expressed in units of work, such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved. Cost estimates should be supported by bids from three contractors if possible. *(Note* – If none of the work is to be contracted, write "none" after this item.)

(b) Personal services. For necessary supervision, engineering and geological services, and labor, include an itemized schedule of numbers, classes, rates of wages, salaries or fees, and periods of employment. State whether these technicians and employees are available.

(c) Operating materials and supplies. List items of material and supplies with their cost. Include under this heading power, water, and fuel, and units of equipment and tools costing less than $50 each.

(d) Operating equipment. List items of operating equipment to be used giving specifications and indicating how each item is to be acquired – i.e., rented, purchased, or provided by the applicant. If it is rented or purchased, state the estimated rental or purchase price. If it is to be furnished by the applicant, give its present fair market value.

(e) Initial rehabilitation and repairs. Describe the type and the cost of necessary *initial* rehabilitation or repair of existing buildings, fixtures, installations (exclusive of mine workings), and movable operating equipment now owned by the applicant, which will be used on the exploration project.

(f) New buildings, fixtures, installations. Describe each building, fixed improvement, and installation to be purchased, constructed, or installed for the exploration project stating specifications and cost including labor, materials and supervision.

(g) Miscellaneous. For the operating equipment listed in 6*(d)*, describe the type and estimate the cost of repairs and maintenance expected during project operations. Do not repeat initial repairs listed in 6*(e)*. Show also the costs of analytical work, accounting, workmen's compensation and employees' liability insurance, payroll taxes, and other required costs that do not fall within the previous categories.

Note – No items of general overhead, corporate management, interest, taxes (other than payroll and sales taxes), or any other indirect costs, or work performed or costs incurred before the date of the contract, should be included in the estimate of costs.

7. *(a)* State whether you are prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation stated in Sec. 7 of DMEA Order–1, Revised.

(b) Explain to what extent you propose to furnish your share of the costs by providing money, by use of equipment owned by you, or otherwise.

* * * * *

INT.-DUP. SEC., WASH., D.C. 25960

OFFICIAL FILE COPY
DMEA
RECEIVED MAR. 3 1958

DATE	INITIALS	CODE

INDEX

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Text (Information required with this application commensurate with Form MF-103) . . . . . 1 - 8

Appendix:

Exhibit 1, Map of Philura claims . . . . . Pocket

Exhibit 2, List of claims in DMEA application 9

Exhibit 3, Geologic map of Slick Rock area . . . . . Pocket

Exhibit 4, Lease . . . . . 10 - 24

Exhibit 5, Grass Flat mine map . . . . . Pocket

Exhibit 6, 14 Drill logs - Ute Uranium, Inc.
19 Drill logs - U. S. Geological Survey . . . . . 25 - 61

Exhibit 7, Summary of drilling by U. S. Geological Survey . . 62

Exhibit 8, Three bids submitted by drilling contractors . . 63 - 65

INFORMATION REQUIRED WITH THIS APPLICATION

1. Applicant's Property Rights:

(a) The area to be explored contains 51 unpatented mining claims (or fractions thereof) (Exhibit 1 and 2) in Sections 32 and 33, T 44 N, R 18 W and in Sections 4 and 9, T 43 N, R 18 W, NMPM, San Miguel County, State of Colorado (Exhibit 3).

The applicant also holds under lease a group of claims lying south and adjacent to the claims mentioned above. However, the area containing this southern group is currently regarded as geologically unfavorable.

Book and page number (for each recorded claim - location notice) and recording information for the 51 unpatented claims subject to this application are listed in Exhibit 2).

(b) This application refers to those 51 claims known as the Slick Rock group, the Philura group and the Grass Flat Mine.

(c) The applicant is the lessee of the claims in question. The lessor is the Beaver Mesa Uranium Company of Grand Junction, Colorado. (See Exhibit 4 for copy of lease.)

(d) The lessee is obligated to pay ten percent gross royalty to the lessor on all ores shipped from the property.

2. Physical Description:

(a) One mine exists on the property. Known as the Grass Flat Mine (see map--Exhibit 5), it was in production from July, 1955 until July, 1957, at which time, all machinery and fixtures were removed from the property. The only facility remaining in the vicinity is a small bunk house which is actually located on a nearby claim known as the Hawkeye claim. During the two-year period indicated, the Grass Flat Mine was worked by Ute Uranium, Inc. whose operations lasted only until all available bonus payments were received. The bonus applied to the Grass Flat mining claim and the adjacent claims, Philura 1 through 8. No application has been made for bonus consideration on the remaining claims.

The Ute Uranium company had obtained an easement in order that shipping ore from the Grass Flat mine could be carried out through the adjacent Hawkeye mine. Neither of these mines is now in operation, however, they are open and available for inspection.

Uranium ore from the Grass Flat mine was shipped to Uravan, Colorado.

(b) The applicant had no interest in the property when the operations as stipulated above were underway. The mine was inoperative when the current lease was initiated.

(c) Ute Uranium, Inc. produced 2,770.77 tons of ore which averaged 0.195% U_3O_8 and 0.834% V_2O_5. (Individual settlement sheets are on file with the AEC, Grand Junction, Colorado.)

(d) Ore reserves are calculated from information shown on the UP 1-14 logs, plus the U. S. Geological Survey logs (see Exhibit 6 and 7), and from the habits of the ore as found in the Grass Flat and adjacent mines. Only a small tonnage of ore shows on the southwest working face in the Grass Flat mine. Two holes in areas not yet mined out are classified as ore holes, and four are classified as mineralized. There is only one ore hole in the area from which 2,770 tons have been mined out. This would indicate that at least 3,000 tons of 0.20 grade material may be present near the drill holes 6, 7, 10 and 14.

(e) The general geographic and geologic features of the area are described by Cater on the enclosed geologic map (Exhibit 3). Only those detailed features not mentioned before are considered in this application.

The known occurrences of commercial ore in the Slick Rock Mining District are in a general north-south belt which is part of the Uravan mineral belt. The individual ore deposits are located in the thicker portions of the Salt Wash sandstones, most of which, show sedimentary trends to the east or southeast. Studies by many geologists on the outcrops, in the mines and of the numerous drill cores have resulted in the following items, listed in their order of importance:

(1) Color of sandstone where oxidized should be light brown (not some shade of red). Unoxidized sandstone should be light gray.
(2) Thickness should be over 35 feet and preferably around 50 to 60 feet.
(3) Thickness of adjacent (usually below) mudstone should be over one foot and bleached to a green-gray instead of the normal red.
(4) The more abundant the carbon, the more favorable the sandstone.
(5) A favorable sandstone will contain a moderate amount of green-gray mudstone distributed throughout the sandstone as streaks, galls, or disseminated between the grains.

The thickness of the ore-bearing sandstone, as determined in the 33 holes already drilled, ranges from 11 to 124 feet. The uranium-vanadium mineralization is most often found in the upper 60 feet of the Salt Wash sandstone. The ore may be present at any one or more horizons in the sandstone such as is found in UP-9 and 14 drill holes. The ore is present as high-grade rolls or tabular streaks with some low-grade material, however, a combination of many rolls together in a very favorable sandstone may yield tens of thousands of tons.

The most abundant ore minerals are carnotite, uraninite, coffinite and some micaceous vanadium minerals. Not much carnotite will be found below the zone of oxidation.

(f) The studies on all available data indicate that the Salt Wash sandstone is favorable for ore in all of the claims except that near drill holes DV-17, 19 and 24. This unfavorable area appears to be an oval-shaped portion about 3000 feet east-west and 1,500 feet north-south. The finding of deposits in the Slick Rock District has shown that once an area is definitely established as favorable, it is merely a matter of drilling a sufficient number of holes along the sedimentary trends until ore is found. To date, most of the ore bodies are less than 100 feet long, ~~and in a general~~ oval shape. It has also been found that where any mineralization is found, at least small ore bodies are nearby.

(g) See Cater's report on reverse side of geologic map (Exhibit 3); also see list of literature cited.

3. Accessibility of Project:

(a) Raymond C. Robeck, consultant geologist, will be available to assist the DMEA field team in its appraisal of the property. Mr. Robeck can be reached at 535 Orchard Ave., Grand Junction, Colorado (CH 2-4943).

The property is accessible over State Highway 80 from Naturita or Dove Creek, Colorado. The Grass Flat mine is open for inspection, however, a temporary door has been nailed over the entrance on the Hawkeye claim. A few small roof cave-ins have occurred. Therefore, due caution should be taken when inspecting the mine. The air vent is open and operating by normal draft; thus, the air is safe for inspection purposes.

(b) Supplies are available at Grand Junction, Norwood or Dove Creek, Colorado. Dove Creek, 25 miles south of the property, is the nearest town. There are no camp facilities on the property. The applicant's contractors will furnish their own camp.

4. The Exploration Project:

(a) The applicant proposes to explore for uranium-vanadium deposits in the Salt Wash sandstone. All exploration will entail drilling from the surface. It is proposed to plug-bit most of the drill holes down to approximately 10 feet above the top of the Salt Wash; then to core (Bx, and in an emergency Ax) through the ore-bearing sandstone; and then at least 5 feet but no more than 15 feet into the underlying ~~red mudstone~~. All holes will be probed and recorded on tape. Chemical assays will be made on all radioactivity above .02% eU_3O_8.

It is proposed that 3 holes be drilled with a plugged bit all the way through the ore-bearing sandstone. These hole locations are marked on the claims map (Exhibit 1) where the 'X' mark is circled. They should be drilled as inexpensively as possible in order to determine more exactly the extent of the unfavorable area. If favorable mineralized sandstone is found in these holes, it is proposed that cored offsets be drilled in Stage II.

The total depth of the holes will range from 100 feet near the outcrop to about 500 feet in the most northeastern holes. Most of the holes will be between 250 and 350 feet deep. The total of 53 holes in Stage I will effect approximately 16,300 feet of drilling. It is estimated that an approximate 30 percent of the footage will be cored. The sandstones are quite variable in thickness; thus, a reasonable margin of safety has been added.

Workers in the area believe that the best opportunity for finding substantial ore bodies lies in the northwest portion of the claims group, and that the number and size of ore bodies will decrease to the southeast. The entire drilling program is set up to follow this theory. It is therefore proposed that 8 holes be drilled as 100-foot offsets to the mineralized holes UP-2, 6 and DW-4A, 11, 3A (see Exhibit 1 and 5). Other holes in the Grass Flat mine area will be on 200 or 400-foot spacing. Southeast of claim Philura 9, the spacing changes to 500 feet and finally to about 1,000-foot centers in the southeast area.

It is proposed that Stage II drilling shall consist of 50 holes for a total of 15,000 feet, 30 percent of which will be cored. Every hole will be cored (Bx or possibly Ax). Stage II holes will be drilled as 100 or 200-foot offsets to holes found to be mineralized or to contain very favorable sandstone. Five or six holes may be drilled to prove up any favorable sedimentary trends.

(b) Roads exist into most of the area. They will require repairs. New drill sites will be established. These items will require 350 hours of D-7 caterpillar operation. The roads will be improved to satisfy only minimum requirements for moving the truck-mounted drill safely to the drill sites. To prepare sites for Stage II, 200 hours will be required.

(c) Work will commence as soon as possible after a contract is signed or within two months. Stage I should be completed within 5 months after drilling begins. Stage II should be completed within 3 months after drilling begins. Indications are that the project should be completed within 13 months. It is anticipated that the drilling will progress at the rate of at least 250 feet per 10-hour working day.

5. Experience

The stock of Hilary Minerals Co., Inc. is owned by the Warner-Kanter companies, Miami, Florida and Oppenheimer & Co., New York. The Warner-Kanter firm has completed over fifty million dollars worth of building construction in Cincinnati, Washington, D.C. and St. Louis during the past seven years. Oppenheimer & Co., 25 Broad Street, New York City, is a member of the New York Stock Exchange. Hilary's Board of Directors includes Mr. Ralph Stillman, president of the Grace National Bank, New York City, and Mr. Max Oppenheimer, president of Oppenheimer & Co.

Hilary's current minerals activity includes the exploration program for uranium ore in No Name Canyon, San Juan County, Utah, under the direction of Mr. Raymond C. Robeck, whose geological background is depicted on the following page. Mr. Robeck will delegate daily field-work assignments to two geologists and/or engineers.

The Hilary Minerals company is also completing negotiations for exploration programs in the states of Arizona, Colorado, Wyoming and Montana. These programs include the development of manganese and cobalt properties.

RAYMOND C. ROBECK, Consulting Geologist
535 Orchard Avenue, Grand Junction, Colorado

This paper is intended to present information on my geological experience.

I worked for the Dept. of Geology during the six years I spent studying at the University of Wisconsin, preparing the fossil and rock collections for classroom study. In 1941 I received a Bachelor of Philosophy degree. I worked for the Wisconsin Geological Survey during the summer of 1941 doing field work on the glacial geology to find usable gravel deposits. Graduate study and work on a Master's thesis was interrupted in 1942 when the Army requested that I work as a civilian for the Army Map Service in Washington,D.C. preparing bomb target charts for the Air Corps.

In September 1943 I joined the Fuels Branch of the U.S.Geological Survey. For the next two years I was engaged in geologic "spot" studies for the immediate war effort. The projects were all field mapping accompanied by drilling programs involving considerable self supervision and initiative. These projects were: coal at Paonia, Colorado; at Coos Bay, Oregon and Coaldale, Nevada. Asphalt, at Santa Rosa (Prelim Map 44); at Gallup, New Mexico and at Uvalde, Texas. Detailed work also was done on the oil shale at Rifle, Colorado.

The year of 1946 was spent doing geologic field mapping, logging of well cuttings and assisting in the direction of geophysical crews for the Texas Company. Mapping covered the area west of the Cascade Mountains and from Salem, Oregon, north to the Canadian border. The same type of field work was done for the Amerada Petroleum Corporation in central Kansas and northwest Arizona in 1947.

In October 1947 I rejoined the Fuels Branch of the U.S.G.S. and spent two years in detailed studies of uranium in the Chattanooga shale throughout eastern United States. A year was spent on geologic studies of fuels in the Glenwood Springs, Colorado, area. I spent several months in Korea and Japan studying the coal of Korea. During this time, I was evacuated twice when the Communists moved forward. Then I spent 2-1/2 years making a study of the coal resources of Mexico. Several weeks of this time were spent studying the fluorite deposits and the water resources of Coahuila. A detailed reconnaissance report and map were made of the coal fields of Coahuila, Mexico. In July 1953 I started a project on the geology of uranium in the San Rafael Swell, Utah. This project was completed on July 1,1956, at which time I resigned from the U.S.Geological Survey to set up private practice as a consulting geologist.

Projects since July 1956 have included mapping and drilling for uranium and jade deposits, appraisals of uranium and oil properties and mapping of surface and subsurface structures on oil properties.

Each of the above projects involved the use of air photos, plane table methods and altimeter surveys for the making of geologic maps. Intensive and extensive stratigraphic and structural studies were made in connection with most of the projects. Mine mapping and various types of surface and subsurface sampling were done in order to estimate reserves.

I was born in Denver, Colorado, in 1919. I married in 1953 and now have two daughters.

6. Estimate of Costs (a through g):

All work will be done on a contract basis. Equipment will be rented. (See Exhibit 8 for drilling bids from 3 drilling contractors.)

Stage I

Drilling	
53 holes, 16,300 feet (Using 2 or 3 drills simultaneously)	
Plugging at $2.10, 11,400 feet	$23,940.00
Coring at $4.75, 4,900 feet	23,275.00
Dozer work, 350 hours at $15.00	5,250.00
Geologist, assistant geologist and camp expenses 110 days at $100	11,000.00
Supervisor (R. Robeck), 25 days at $100.00	2,500.00
Instruments: probe and surveying - 110 days at $16.00	1,760.00
Reproductions, maps, logs, etc.	200.00
Core boxes (510) at $1.25	637.50
Accounting, typing	300.00
Chemical assays, 40 at $3.50	140.00
Total, Stage I	$69,002.50

Stage II

Drilling 50 holes, 15,000 feet	
Plugging, 10,500	$22,050.00
Coring, 4,500	21,375.00
Dozer work, 200 hours at $15	3,000.00
Geologist, assistant geologist and expenses - 90 days at $100	9,000.00
Supervisor, 20 days at $100.00	2,000.00
Instrument, 90 days at $16.00	1,440.00
Reproduction	80.00
Core boxes (500)	625.00
Accounting, etc.	200.00
Chemical assays, 100 at $3.50	350.00
Total Stage II	$60,120.00
Grand Total	129,122.50
Government's share at 50%	64,561.25

7. Sharing of Costs:

(a) Hilary Minerals Co., Inc. is prepared to furnish its share of the cost of the proposed project in accordance with the regulations on Government participation stated in Sec. 7 of DMEA Order -1, Amended.

(b) The applicant proposes to furnish its share of the costs by providing money.

Claim Name	Location Date	Recorded Book	Page
Grass Flat	2/10/53	216	435
Philura 1	3/19/53	224	202
2	3/3/53	224	203
3	3/3/53	224	204
4	3/3/53	224	205
5	3/3/53	224	206
6	3/3/53	224	207
7	3/3/53	224	208
8	3/3/53	224	209
9	3/3/53	224	210
10	3/3/53	224	211
11	3/3/53	224	212
12	3/2/53	224	213
13	2/28/53	224	214
14	3/3/53	224	215
15	3/3/53	224	216
16	3/3/53	224	217
17	3/3/53	224	218
18	3/2/53	224	219
19	3/2/53	224	220
20	3/2/53	224	221
21	2/28/53	224	222
22	3/4/53	224	223
23	3/4/53	224	224
24	3/4/53	224	225
25	3/4/53	224	226
26	3/4/53	224	227
27	3/4/53	224	228
28	3/4/53	224	229
29	3/4/53	224	230
30	2/28/53	224	231
31	3/4/53	224	232
32	3/4/53	224	233
33	3/4/53	224	234
34	3/4/53	224	235
35	3/4/53	224	236
36	3/4/53	224	237
37	2/28/53	224	238
38	2/28/53	224	239
39	2/28/53	224	240
42	2/27/53	224	243
43	2/27/53	224	244
44	2/27/53	224	245
45	2/26/53	224	246
46	2/26/53	224	247
47	2/27/53	224	248
48	2/26/53	224	249
49	2/26/53	224	250
50	2/26/53	224	251
Philura A Fraction	6/1/55	258	335-336
Philura B Fraction	6/1/55	258	337-338

Recorded at the Court House, San Miguel County, Telluride, Colorado

MINING LEASE

THIS LEASE entered into this _____ day of _____, 195___, by and between BEAVER MESA URANIUM, INC., a Nevada corporation authorized to do business in the State of Colorado, whose address is 1129 Colorado Avenue, Grand Junction, Colorado, hereinafter referred to as Lessor, and HILARY MINERALS CO., INC., a New York corporation authorized to do business in the State of Colorado, whose address is 1642 Detroit Street, Denver, Colorado, hereinafter referred to as Lessee,

WITNESSETH:

RECITALS

Lessor is the owner of those eighty-five (85) unpatented lode mining claims located in the County of San Miguel, Colorado, as listed on Exhibit "A" attached hereto and made a part hereof, and as described with more particularity on that certain map marked Exhibit "B" attached hereto and made a part hereof.

Now, therefore, for and in consideration of the royalty to be paid and the covenants hereinafter set out to be kept and performed by the Lessee, the Lessor does hereby lease unto the Lessee those mining claims as described in Exhibits "A" and "B", for the purposes as hereinafter set out.

I. APPLICATION FOR DMEA LOAN

(a) Lessee agrees that it will within sixty (60) days after the date of execution of this lease, file with the Defense Minerals Exploration Administration, an application for a loan covering exploratory work to be performed upon those claims as described in Exhibits "A" and "B"; and that simultaneously with the filing thereof, Lessee will mail a copy of said application to the Lessor at its address as herein stated. In the event the Lessee fails to file such application in the manner and time as

above described, this lease shall automatically terminate without liability, and neither party shall have further obligations to or claims against the other party.

(b) If said application is rejected, or denied, the Lessee, in order to continue under this lease, must expend in exploration or development work upon said claims, the sum of Three Thousand Dollars ($3,000.00) each three (3) months commencing from the date that said application is rejected. Allowable exploration or development expenditures shall include those incurred for drilling, roadwork, excavating, shaft sinking, drifting, raising, tunneling, EXCLUDING, HOWEVER, administration, engineering, surveying and geological work.

(c) If said application is granted, Lessee or its assignees agree to comply diligently with the terms and conditions of said DMEA agreement, and should Lessee or its assignees wish to relinquish said agreement, the same will be assigned to the Lessor subject to the approval of the Defense Minerals Exploration Administration.

II. TITLE (SPECIAL WARRANTY)

Lessor agrees to warrant and defend its possessory rights to those claims described in Exhibits "A" and "B" unto Lessee, its successors or assigns, against, and only against, the claims and demands of any and all persons claiming, or to claim, by, through, or under said Lessor, subject, however, to any exceptions as set out herein, or described in said Exhibits "A" and "B".

To the knowledge of Lessor there are no outstanding liens or claims asserted against any of said mining claims herein described.

III. TERM

This lease shall continue in full force and effect, subject, however, to forfeiture or surrender as hereinafter described, so long as Lessee expends $3,000.00 each three months in exploratory or development work as heretofore defined; or, should Lessee discover commercial ores, then so long as said ores are mined in accordance with paragraph IV hereof.

IV. MINING AND MAINTENANCE

(a) Should commercial ores be discovered upon said claims, Lessee agrees to diligently and continuously perform development work and mining until said ores shall be mined out in accordance with good mining practices and as hereinafter provided in a manner necessary to good and economical mining, to the end that the greatest tonnage possible will be mined and produced therefrom with due regard to the development and preservation of said mining premises as a workable mining property, and that Lessee will not permit said tonnage to be decreased because of any other interests or mining interests that Lessee may have or hereafter acquire during the period that this lease is in force and effect. Pillars shall not be removed without written consent of the Lessor first had and obtained.

Subject to the rights of the United States Government and of any person with rights by or through it who does not object thereto, the Lessee may stock-pile ores and waste materials on the premises in such amounts as may be necessary in obtaining marketable quantities on ores; and in the event that the duly constituted purchasing agencies should suspend purchasing for a period of time, then the Lessee may stock-pile ores until a market is available and operations may be conducted at a profit.

(b) Upon discovery of commercial ores, Lessee agrees to expend a minimum of $3,000.00 each three months in carrying on development or mining, and as long as development and mining is carried on there shall be no abrogation under paragraph I(d), above.

Lessee shall keep all drifts, tunnels, shafts, winzes, and other workings thoroughly drained and clear of loose rock and rubbish and in a safe and secure condition unless prevented from doing so by extraordinary mining casualty, and to leave the floor of all cross-cuts and other workings in good, even, unobstructed condition at all times and to store no waste underground or fill in any stopes without the written consent of the Lessor.

Lessee agrees to cover and maintain in a safe condition all shafts and other openings not in use.

Lessee also agrees to mine and deliver the ore hereunder so as to preserve the greatest value thereof and not to "High Grade" the ore, that is, not to mine and deliver the better grade ore and leave ore of lower but commercial grade unmined to the loss or detriment of the Lessor.

V. ROYALTY

Lessee agrees to pay to the Lessor ten per cent (10%) of the "proceeds" of all ores mined and shipped or sold from said claims. "Proceeds" herein are defined as follows: that money received from all ores mined and shipped or sold from said claims, plus any and all bonuses and development allowance paid by any governmental agency or ore buyer, excluding, however, the allowance paid by the Atomic Energy Commission for hauling, which allowance shall be the sole property of Lessee.

VI. COMPLIANCE WITH HEALTH AND SAFETY

Lessee agrees to comply with all health and safety regulations and all other requirements of the federal, state and local governments, including, but not by way of limitation, to do all necessary timbering and other work to maintain the mine in safe operating condition, to provide and maintain first aid equipment at the mine to meet the approval of the State Mine Inspector, to keep the ore clean of injurious materials, to remove barren materials to locations on said premises designated by Lessor at which it will not affect future mining or drilling operations.

VII. POSTING CLAIMS

Lessee agrees to forthwith post, and at all times keep posted, in conspicuous places upon the premises, notices stating that the Lessee is performing work as Lessee on the premises and that the right, title and interest of the Lessor shall not be subject to any lien or encumbrance arising from the Lessee's operations thereon, and that the Lessor shall not be liable for any claim arising from the Lessee's operations hereunder, including, but not limited to, death and injuries to persons and damage to property.

VIII. COMPLIANCE WITH LABOR LAWS

To the extent that such statutes may apply, Lessee agrees to comply with all applicable statutes with respect to labor employed by the Lessee on the work, including, but not limited to, the Fair Labor Standards Act and the Walsh-Healey Act, and to protect and indemnify the Lessor against any pay-roll taxes or contributions imposed with respect to any employees of the Lessee by any applicable law dealing with old-age benefits, unemployment compensation, accident compensation, health insurance, and related subjects.

IX. LIABILITY AND WORKMEN'S COMPENSATION

Lessee agrees, before commencing work hereunder and thereafter, to insure, at the cost and expense of Lessee, each and every workman employed in, about or upon the work, compensation provided for, in, and by each and every statute applicable thereto, with respect to Workmen's Compensation and/or Employer's Liability, and to pay and discharge, or otherwise dispose of, any and all claims, suits, actions, and demands of any nature whatsoever for injury to persons, including death resulting therefrom, and loss of, or damage to, property caused by or in connection with the performance of the work, and to procure, prior to the commencement of the work hereunder, and to maintain at the cost and expense of the Lessee during the period this lease is in force and effect, Public Liability Insurance in a reputable and financially responsible insurance company, properly safeguarding the Lessee against liability for injury to persons, including injury resulting in death, and loss of and damage to property in amounts acceptable to the Lessor. Lessee further agrees to furnish to the Lessor written certificates from insurance carriers, or from appropriate governmental authorities, establishing that said insurance has been procured and is being properly maintained and that the premiums therefor are paid, and specifying the names of the insurors, the respective policy numbers of the policies, and the expiration dates thereof. All such insurance policies shall provide that in the event of cancellation thereof, written notice of cancellation shall be given to the Lessor at least five (5) days prior to the effective date of such cancellation.

In the event the Lessee contracts with or hires an Independent Contractor to perform all or part of the work, evidence of insurance coverage as above provided furnished by such Independent Contractor shall be satisfactory compliance with the requirements of this paragraph.

X. RIGHT TO INSPECT PREMISES

Lessee agrees to permit the Lessor, its employees, and agents full and free access at all reasonable times to the demised premises and to the mine or mines thereon for purposes of inspection, mapping, surveying, the taking of ore samples and/or conducting exploration work thereon, including drilling. Further, should the Lessor desire to develop and mine other ore bodies not within the boundaries of the demised premises, the Lessor shall have the right to use the shaft to be sunk by Lessee on said demised premises for the purpose of driving tunnels to other ore bodies of the Lessor and to raise shafts or inclines to the surface from such tunnels. Provided, however, that the exploration work and use of the Lessee's shaft shall not unreasonably interfere with the Lessee's operations hereunder.

XI. KEEPING AND FURNISHING RECORDS

(a) Lessee agrees that it will at all times keep proper records of the following:

A. Shifts worked
B. Tonnage and grade of ore mined
C. Development and exploration work performed.

and Lessee will allow the Lessor, its employees or its representative to inspect the aforesaid records at all reasonable times.

(b) Lessee agrees to keep accurate records and accounts of all operations under this lease and shall permit Lessor, or its agents, to inspect and make copies of the same at all reasonable times. These records shall include, but not by way of limitation, copies of all maps, surveys, exploratory drilling logs, geological and assay reports and other operational data prepared from or connected with the leased premises. Lessee agrees that said records shall be made available for inspection or copying by the lessor at the convenient office within the City of Grand Junction, Colorado.

(c) Lessee agrees that it will instruct the mill to furnish Lessor with a copy of all settlement sheets affecting ores mined and shipped or sold from those claims as described herein.

XII. PAYMENT OF COSTS

Lessee agrees to promptly pay all costs and expenses of the work, including, but not limited to, labor, equipment, materials and supplies, and not to permit any laborer's, mechanic's, materialmen's or any other liens or charges to be made upon the demised premises arising out of the operations to be performed by the Lessee under the terms hereof, and to indemnify and save harmless the Lessor from any and all liens or charges made upon said claims caused by the operations of the Lessee hereunder.

XIII. INDEMNITY

Lessee agrees to indemnify and save harmless the Lessor from any and all claims of every nature whatsoever arising from, or out of the Lessee's operations hereunder including any claims by employees or third parties.

XIX. ANNUAL LABOR

Lessee agrees to perform all necessary annual labor upon the herein described claims and to record affidavits thereof not later than May 1 of each year, ~~including~~ excluding the assessment year ending June 30, 1956, and to present satisfactory evidence to the Lessor of the performance of said work and of the recording of said affidavits, not later than May 10 of each year. Failure to comply with this paragraph shall automatically cause this lease to terminate, time being the essence thereof, and it shall not be necessary to effectuate a forfeiture nor shall paragraph XXIX be complied with.

XX. EXTRA LATERAL RIGHTS

It is agreed that the Lessee shall be limited to mining within the vertical planes of the demised premises, and shall not extend its workings beyond such vertical planes without the written consent of the Lessor.

XXI. ASSIGNMENT OR SUBLETTING

Lessee may, at its sole discretion, assign or sublet the lease or any portion thereof; provided, that Lessee shall remain liable for the performance of the agreement and covenants herein contained, as if no assignment, unless the Lessor otherwise agrees in writing.

XXII. TAXES

Lessee agrees to pay all taxes or assessments made upon machinery, temporary structures, equipment, tools, and implements owned by the Lessee and used by the Lessee on the demised premises in its operations hereunder; and to pay any and all taxes assessed against said claims, but not limited to all taxes or assessments upon the extraction, severance, and or production of ores from the demised premises upon ore produced hereunder.

XXIII. DEPLETION

Lessor shall be entitled to claim ten per cent depletion and Lessee shall be entitled to claim ninety per cent thereof.

XXIV. CONTROL OF THE WORK

Lessee shall at all times, during the term of this lease, have and exercise full and complete direction and control of the work to be performed hereunder.

XXV. [illegible]

[illegible] as in paragraph [illegible] above, [illegible] [illegible] of [illegible] authorized agents, [illegible] [illegible] [illegible], or other flammable materials [illegible] [illegible], and shall [illegible] where such [illegible] can be [illegible] at a reasonable profit, the agreement shall not [illegible] [illegible] such period [illegible] buying and [illegible] [illegible] [illegible] by the Lessor during such period. For breach or failure to perform any covenant or condition hereof [illegible] the Lessee shall not be granted for cancellation [illegible] [illegible] such breach or failure to perform is caused or [illegible] [illegible] prevented by extreme weather conditions, explosion, [illegible] [illegible] casualty, fire, flood, or any civil or military [illegible], [illegible], riots, strikes, Acts of God, or while any such circumstance or condition shall continue to exist, provided, however, that the Lessee shall notify the Lessor in writing specifying the condition so existing and Lessee shall in such event use a reasonable diligence to remove such preventing cause and upon its [illegible] to thereafter promptly resume work.

XXVI. SURRENDER AND ABANDONMENT

Lessee may surrender this lease and abandon its rights [illegible] at any time by giving Lessor ninety (90) days' notice [illegible] writing, provided that either (1) the said notice is given at least ninety (90) days before the end of the assessment year, or (2) the assessment work has been done by Lessee and affidavits [illegible] the current assessment year as required by law. Such [illegible] shall terminate all obligations of Lessee [illegible], those previously accrued.

XXVII. DEFINITION OF BOUNDARIES

[illegible], should any question arise as to the exact boundaries of [illegible] claims, the boundaries as set out in exhibit "B" shall govern.

XXVIII. [illegible]

Except as provided in Paragraph II herein, it is mutually understood and agreed that this lease is granted only under such title as the Lessor may now hold or hereafter acquire and that in the event the Lessor shall hereafter be divested of such title, the Lessor shall not be liable for any damages sustained by the Lessee, nor shall the Lessee attempt to hold the Lessor liable in damages or otherwise on account of the Lessee's possession thereof being destroyed or interrupted.

XXIX. FORFEITURE

(a) Time shall be of the essence hereof, and, except as in Paragraph XIX hereof the Lessor may terminate this lease upon violation by the Lessee of any covenant or agreement herein contained by giving thirty (30) days' notice in writing to the Lessee in the manner as hereinafter provided, setting out therein the violations complained of, provided, however, that during said thirty-day period the Lessee shall have the right to correct and remedy said violation or violations and avoid forfeiture thereunder. In the event Lessee fails to correct or remedy said violation or violations in said thirty-day period this lease shall be terminated and Lessee shall have no further right hereunder. Forfeiture under the circumstances as above set out is optional with the Lessor, and nothing herein contained shall prevent Lessor, if it so elects, to proceed with or avail itself of its remedies at law or in equity.

XXX. REMOVAL OF EQUIPMENT

Lessee shall have thirty (30) days after the effective date of surrender or forfeiture in which to remove from said claims any and all of its equipment and machinery. All improvements which are attached to the surface, including but not by way of limitation, ore bins, houses, rails, water and pipe lines, and

timber in place, which shall become the property of the [illegible] [illegible] [illegible] [illegible] [illegible]

XXXI. NOTICES

Any notice, request or demand which is to be given, or may be given, or which is contemplated by this lease, shall be given by registered mail, addressed to the parties at the addresses hereinabove set out, and shall be deemed to have been given and received on the date of the sender's receipt. Provided, however, personal service upon the lessee or any of its duly authorized agents or representatives shall be deemed sufficient service of notice and no mailing of notice as above set out shall be necessary.

XXXII. SUBSEQUENT CHANGES

It is understood and agreed that no change, alteration, or modification of this lease or any of the covenants and agreements herein contained shall be effective unless made in writing and signed by the parties hereto.

XXXIII. REPRESENTATIONS

This lease contains the entire agreement of the parties hereto, and the parties agree that no promises or representations have been made by either of them as to the amount of ore or the value thereof on the demised premises or any other promises or representations of any nature to the other which are not set forth herein and which shall be binding upon them.

XXXIV. BENEFITS

This lease shall be binding upon and inure to the benefits of the successors and duly authorized assigns of the parties hereto.

XXXV. AUTHORITY TO EXECUTE

The parties hereto warrant that the officers who have signed this agreement on behalf of said corporations have authority

to sign, and that said corporations are empowered to enter into the above and foregoing lease and agreement; and either party will, upon request, furnish to the other party, a resolution by the board of directors authorizing the entry of the party into this lease and agreement.

WITNESS the signatures of the parties.

BEAVER MESA URANIUM, INC.

By Alan W. Simpson
President

ATTEST: Mark Halloway
Secretary

Lessor

HILARY MINERALS CO., INC.

By _____
President

ATTEST:

_____
Secretary

Lessee

EXHIBIT A

CLAIM NAME	LOCATION CERTIFICATE BOOK	LOCATION CERTIFICATE PAGE	AMENDED LOCATION CERTIFICATE BOOK	AMENDED LOCATION CERTIFICATE PAGE
Doss No. 1	216	331	264	101
Doss No. 2	216	332	264	103
Doss No. 3	216	332	264	105
Doss No. 4	216	333	264	107
Doss No. 5	216	333	264	109
Grass Flat	216	435	258	341
Philura No. 1	224	202	258	343
Philura No. 2	224	203	258	345
Philura No. 3	224	204	258	347
Philura No. 4	224	205	258	349
Philura No. 5	224	206	258	351
Philura No. 6	224	207	258	353
Philura No. 7	224	208	258	355
Philura No. 8	224	209	258	357
Philura No. 9	224	210	258	359
Philura No. 10	224	211	261	99
Philura No. 11	224	212	261	101
Philura No. 12	224	213	261	103
Philura No. 13	224	214	261	105
Philura No. 14	224	215	261	107
Philura No. 15	224	216	261	109
Philura No. 16	224	217	261	111
Philura No. 17	224	218	261	113
Philura No. 18	224	219	261	115
Philura No. 19	224	220	261	117
Philura No. 20	224	221	261	119
Philura No. 21	224	222	261	121
Philura No. 22	224	223	261	123
Philura No. 23	224	224	261	125
Philura No. 24	224	225	261	127
Philura No. 25	224	226	261	129
Philura No. 26	224	227	261	131
Philura No. 27	224	228	261	133
Philura No. 28	224	229	261	135
Philura No. 29	224	230	261	137
Philura No. 30	224	231	261	139
Philura No. 31	224	232	261	141
Philura No. 32	224	233	261	143
Philura No. 33	224	234	261	145
Philura No. 34	224	235	261	147
Philura No. 35	224	236	261	149
Philura No. 36	224	237	261	151
Philura No. 37	224	238	261	153
Philura No. 38	224	239	261	155
Philura No. 39	224	240	261	157
Philura No. 42	224	243	261	163
Philura No. 43	224	244	261	165
Philura No. 44	224	245	261	167
Philura No. 45	224	246	261	169
Philura No. 46	224	247	261	171
Philura No. 47	224	248	261	173
Philura No. 48	224	249	261	175
Philura No. 49	224	250	261	177

EXHIBIT A

CLAIM NAME	LOCATION CERTIFICATE BOOK	LOCATION CERTIFICATE PAGE	AMENDED LOCATION CERTIFICATE BOOK	AMENDED LOCATION CERTIFICATE PAGE
Philura No. 50	224	251	261	179
Philura No. 52	224	253	261	183
Philura No. 53	224	254	261	185
Philura No. 54	224	255	261	187
Philura No. 55	224	256	261	189
Philura No. 56	224	257	261	191
Philura No. 60	224	261	261	199
Philura No. 61	224	262	261	201
Philura No. 62	224	263	261	203
Philura No. 63	224	264	261	205
Philura No. 64	224	265	261	207
Philura No. 65	224	266	261	209
Philura No. 66	224	267	261	211
Philura No. 67	224	268	261	213
Philura No. 68	224	269	261	215
Philura No. 69	224	270	261	217
Philura No. 70	224	271	261	219
Philura No. 71	224	272	261	221
Philura No. 72	224	273	261	223
Philura No. 73	224	274	261	225
Philura No. 74	224	275	261	227
Philura No. 75	224	276	261	229
Philura No. 76	224	277	261	231
Philura No. 77	224	278	261	233
Philura No. 78	224	279	261	235
Philura No. 80	224	280	261	237
Philura No. 81	224	281	261	239
Doss "A" Fraction	258	331		
Doss "B" Fraction	258	333		
Philura "A" Fraction	258	335		
Philura "B" Fraction	258	337		
Philura No. 82	258	339		

Excluding therefrom all conflicts with Full Moon No. 2, Full Moon No. 3, Full Moon No. 9, Half Moon No. 1, Half Moon No. 2, Full Moon No. 5, Full Moon No. 7, Spur, Spur No. 2, Darrel, Wonder, Rosa L. lode mining claims and excluding therefrom all conflicts with Lots 6, 7, and 8, Section 32, T44N, R18W, NMPM; Section 5, T43N, R18W, NMPM; E1/2 W1/2 of Section 10, T43N, R18W, NMPM.

Exhibit 6

ORIGINAL

DRILL HOLE LOG

SIMPSON & WOODARD EXPLORATION CO.

Type of Drill: Diamond Ax

Logged For: Ute Uranium, Inc.

Drill-hole No.: UP - 1

Total depth: 213'

Collar elev.: T P

Area: Slick Rock

COORDINATES

North 119,608 East 120,~~316~~ 321

Tie:

Claim: Philura No. 1

Date started: May 1954

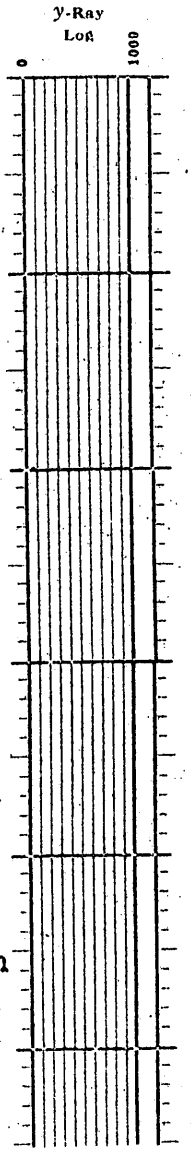
Date completed: May 1954

Logged by: A.M.S.

Summary of log: Favorable; OBSS 163-203 Thick 35'; SS color LBr/Gy; MS under OBSS Gn 2'; Cbn. A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	133.0					Overburden
133.0	168.0	MS	R			
168.0	173.0	SS	L Br	M		
173.0	179.0	SS	Gy	MF	A	A, Cbn. streaks
179.0	200.0	SS	Br	MF		S, limonite specks
200.0	203.0	SS	Gy	MF	A	S, pyrite
203.0	205.0	MS	Gn			
205.0	213.0	MS	R			S, R, SS in more than 2" ribs
						Drilled by Johnson & Youvon

γ-Ray Log



SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. UP - 1

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COLORADO PRINTING CO., GRAND JUNCTION

ORIGINAL

DRILL HOLE LOG

SIMPSON & WOODARD
EXPLORATION CO.

Type of Drill: Diamond Ax

Logged For: Ute Uranium, Inc.

Drill-hole No.: UP - 2
Total depth: 215'
Collar elev.: T P
Area: Slick Rock

COORDINATES
North 119,811' East 120,077'
Tie:

Claim: Grass Flat
Date started: May 1954
Date completed: May 1954
Logged by: A.M.S.

Summary of log: Favorable ; OBSS 168-210 Thick 42' ; SS color Br/Gy ; MS under OBSS R ; Cbn. A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	95.0	MS				Overburden
95.0	115.0	SS	Wh	F		
115.0	165.0	MS	R			S, SS ribs
165.0	168.0	MS	Dk/Bl			
168.0	170.0	SS			A	A, Cbn. streaks
170.0	172.0	MS	Bl			
172.0	185.0	SS	Gy		S	
185.0	194.0	SS	Br		N	Br. specks
194.0	195.0	SS	Gy		A	Sampled, A. Cbn. specks
195.0	204.0	SS	Gy		S	S, Cbn. streaks
204.0	206.4	SS	DkGy		A	Sampled, A, Cbn. specks & streaks
206.4	210.0	SS	Wh/LGy		S	
210.0	215.0	MS/SS	R			
						Drilled by Johnson & Youvon

γ-Ray Log
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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5
195.0	1.0'	0.04	0.02	Tr	Tr
206.4	2.4'	0.02	0.03	Tr	Tr

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant

OBSS—ore bearing sandstone

Hole No. UP - 2

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DRILL HOLE LOG

SIMPSON & WOODARD EXPLORATION CO.

Type of Drill: Diamond Ax

Logged For: Ute Uranium, Inc.

Drill-hole No.: UP - 3

Total depth: 215'

Collar elev.: T P

Area: Slick Rock

COORDINATES

North: 119,971' East: 120,083'

Tie:

Claim: Grass Flat

Date started: May 1954

Date completed: May 1954

Logged by: A.M.S.

Summary of log: Favorable ; OBSS. 165-190' Thick 25' ; SS color LBr. ; MS. Gn 5' ; Cbn. N
Semi-Favorable 195-210' 15' Br/Gy under OBSS Gn 2' S

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	165.0	MS	R			Overburden
165.0	190.0	SS	LBr	MF	N	Clean SS
190.0	195.0	MS	Gn			
195.0	210.0	SS	Gy/Br	MF	S	S, Br. Specks
210.0	212.0	MS	Gn			
212.0	215.0	MS	R			

Drilled by Johnson & Youvon

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. UP - 3

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DRILL HOLE LOG

ORIGINAL

SIMPSON & WOODARD EXPLORATION CO.

Type of Drill: Diamond Ax

Logged For: Ute Uranium, Inc.

Drill-hole No.: UP - 4

Total depth: 228'

Collar elev.: T P

Area: Slick Rock

COORDINATES

North: 119,745 East: 120,425

Tie:

Claim: Grass Flat

Date started: May 1954

Date completed: May 1954

Logged by: A.M.S.

Summary of log: semi-favorable OBSS 188'-218' Thick. 30'; SS color Gy/Br; MS under OBSS R; Cbn. A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	123.0					Overburden
123.0	136.0	SS	Wh	M	N	Clean SS
136.0	188.0	MS	R			
188.0	195.0	SS	Gy/Br	MF		S, limonite specks
195.0	203.0	SS		MF	A	Much Cbn. in seams & specks
203.0	218.0	SS		F	S	
218.0	228.0	SS/MS	R			

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Drilled by Johnson & Youvon

SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. UP - 4

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ORIGINAL

DRILL HOLE LOG

SIMPSON & WOODARD EXPLORATION CO.

Type of Drill: Diamond Ax

Logged For: Ute Uranium, Inc.

Drill-hole No.: UP - 5

Total depth: 215'

Collar elev.: T. P

Area: Slick Rock

COORDINATES

North: 119,839 East: 124,219

Tie:

Claim: Grass Flat

Date started: May 1954

Date completed: May 1954

Logged by: A.M.S.

Summary of log: Semi-favorable OBSS 202'-213' Thick. 11'; SS color LGy; MS under OBSS R; Cbn. A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	155.0	MS	R			Overburden
155.0	200.0	MS	R			
200.0	202.0	MS	Gn			
202.0	207.0	SS	Gy	MF	A	Much Cbn. in seams
207.0	213.0	SS	LGy	F	S	
213.0	215.0	MS	R			
						Drilled by Johnson & Youvon

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. UP - 5

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ORIGINAL

DRILL HOLE LOG

SIMPSON & WOODARD
EXPLORATION CO.

Type of Drill: Diamond Ax

Logged For: Ute Uranium, Inc.

Drill-hole No.: UP - 6
Total depth: 203'
Collar elev.: T P
Area: Slick Rock

COORDINATES
T North 119,723 East 120,206
P Tie

Claim: Grass Flat
Date started: May 1954
Date completed: May 1954
Logged by: A.M.S.

Summary of log: Favorable ; OBSS 166-197 Thick 31' ; SS color LGy/Br ; MS under OBSS Gn. 5' ; Cbn. A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	163.0	MS	R			Overburden
163.0	166.0	MS/ST	Bl			50% MS
166.0	169.0	SS	LGy	MF		
169.0	174.5	SS	Gy	MF	A	
174.5	175.0	SS	Gy/Br	F		Sampled #1
175.0	190.7	SS	Gy	F	A	
190.7	191.0	SS	LGy/Bk	MF		Sampled #2
191.0	194.0	SS	LGy	MF		
194.0	194.3	SS	Bk	F		Sampled #3
194.3	197.0	SS	LGy	MF	S	
197.0	202.0	MS/SS	Gn			S, Gy SS ribs less than 2"
202.0	203.0	SS	R			
						Drilled by Johnson & Youvon

γ-Ray Log
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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5
175.0	0.5'	0.08	0.05	Tr	Tr
191.0	0.3'	0.26	0.74	.20	.50
194.3	0.3	0.04	0.16	Tr	.10

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. UP - 6

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DRILL HOLE LOG

SIMPSON & WOODARD EXPLORATION CO.

Type of Drill: Diamond Ax

Logged For: Ute Uranium, Inc.

Drill-hole No.: UP - 7

Total depth: 205'

Collar elev.: T P

Area: Slick Rock

COORDINATES

North 119,723 East 120,206

Tie: [illegible]

Claim: Grass Flat

Date started: June 1954

Date completed: June 1954

Logged by: A.M.S.

Summary of log: Favorable; OBSS 155-191 Thick 36'; SS color Gy/Br; MS under OBSS Gn 3'; Cbn. A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	155.0					MS, overburden
155.0	162.0	SS	LBy	M	S	
162.0	165.5	SS	Wh	MF	N	Clean SS
165.5	168.5	SS	Gy	MF	A	Sampled
168.5	171.5	SS	LGy	MF	A	A, Cbn. streaks
171.5	173.0	SS	Gy/Bk	F	A	Sampled
173.0	175.0	SS	LGy	MF	S	
175.0	191.0	SS	LBr	MF	N	Clean SS
191.0	194.0	MS	Gn			
194.0	201.0	SS	LBr	MF	N	
201.0	205.0	SS/MS	R			50% MS

Drilled by Ute Uranium, Inc.

γ-Ray Log 0 — 1000

CODE

SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5
167.2	1.7'	0.10	0.15	0.10	0.10
168.7	1.5'	0.21	0.28	0.20	0.30
172.7	1.0'	0.11	0.09	0.10	0.10

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant

OBSS—ore bearing sandstone

Hole No. UP - 7

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COLORADO PRINTING CO., GRAND JUNCTION

DRILL HOLE LOG

SIMPSON & WOODARD
EXPLORATION CO.

Type of Drill: Diamond Ax

Logged For: Ute Uranium, Inc.

Drill-hole No.: UP - 8
Total depth: 230'
Collar elev.: T P
Area: Slick Rock

COORDINATES
North 119,742 East 120,158
Tie

Claim: Grass Flat
Date started: June 1954
Date completed: June 29, 1954
Logged by: A.M.S.

Summary of log: Favorable; OBSS 178-225' Thick 47'; SS color Gy/Br; MS under OBSS R; Cbn. A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	175.0					MS, overburden
175.0	178.0	MS	Gn			
178.0	187.0	SS	LGy	MF	A	A, Cbn. streaks; some Gn MS pebbles
187.0	188.0	MS	Gn			
188.0	225.0	SS	LBr	MF	N	SS, mostly clean
225.0	230.0	MS	R			

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. UP - 8

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COLORADO PRINTING CO., GRAND JUNCTION

DRILL HOLE LOG

SIMPSON & WOODARD EXPLORATION CO.

Type of Drill: Diamond Ax

Logged For: Ute Uranium, Inc.

Drill-hole No.: UP - 9

Total depth: 205'

Collar elev.: T. P.

COORDINATES: North 119,727 East 120,033

Tie: 119,730 [illegible]

Claim: Grass Flat

Date started: July 1954

Date completed: July 1954

Area: Slick Rock

Logged by: A.M.S.

Summary of log: Favorable; OBSS 150-203.5' Thick 53.5' SS color LBr/Gy MS under OBSS R; Cbn. A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	145.0					Overburden & MS
145.0	150.0	MS	Gn			
150.0	154.0	SS	Gy	M	S	S, Gn. MS pebbles
154.0	156.0	SS	Gy	M	A	Mineralized
156.0	161.0	SS	L.Br	MF	S	Light colored SS, fairly clear
161.0	169.5	SS	L.Br	MF	A	A, Cbn. streaks & specks
169.5	175.0	SS	LGy/Bk	MF	A	Mineralized
175.0	192.0	SS	L.Br	MF	S	S, Gn. MS pebbles
192.0	203.5	SS	LGy	F	S	S, Gn. MS streaks
203.5	205.0	MS	R			

y-Ray Log: 0 — 1000

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Drilled by Ute Uranium, Inc.

SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5
155.0	0.9'	0.23	0.35		
155.3	0.3'	0.36	1.50		
156.3	1.0'	0.18	0.13		
170.4	0.9'	0.04	0.46		
171.4	1.5'	0.44	2.99		
173.3	1.4'	0.06	0.51		
174.0	0.7'	0.43	1.42		
175.0	1.0'	0.03	0.63		
176.5	1.5'	0.19	0.99		
177.0	0.5'	0.05	0.51		

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. UP - 9

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COLORADO PRINTING CO., GRAND JUNCTION

DRILL HOLE LOG

SIMPSON & WOODARD EXPLORATION CO.

Type of Drill: Diamond Ax

Logged For: Ute Uranium, Inc.

Drill-hole No.: UP - 10

Total depth: 193'

Collar elev.: T P

Area: Slick Rock

COORDINATES: North 119,636 East 120,078

Tie: [illegible]

Claim: Grass Flat

Date started: July 1954

Date completed: July 1954

Logged by: A.M.S.

Summary of log: Favorable ; OBSS 130'-190' Thick 60' ; SS color Gy ; MS under OBSS R ; Cbn. A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	130.0					Overburden
130.0	171.0	SS	LGy	MF	A	S, Gn MS streaks & pebbles
171.0	173.0	MS	Gn			
173.0	190.0	SS	Gy	MF	S	Few Cbn. streaks
190.0	193.0	MS	R			

y-Ray Log 0 1000

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Drilled by Ute Uranium, Inc.

SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5
150.0	1.8	0.07	0.54		
153.0	1.5	0.10	0.03		

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. UP - 10

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COLORADO PRINTING CO., GRAND JUNCTION

DRILL HOLE LOG

SIMPSON & WOODARD EXPLORATION CO.

Type of Drill Diamond Ax

Logged For Ute Uranium, Inc.

Drill-hole No. UP - 11

Total depth 207'

Collar elev. T P

Area Slick Rock

COORDINATES

T North 119,772 East 120,104

Tie 119,772.9 120,115.6

Claim Grass Flat

Date started July, 1954

Date completed July, 1954

Logged by A.M.S.

Summary of log Favorable : OBSS 170-203' Thick 33' : SS color D.Gy : MS under OBSS Gn. 3' : Cbn. A, S

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	163.0					Overburden
163.0	170.0	MS	Gn			
170.0	173.0	SS	Gy	MF	A	A, Cbn. seams
173.0	174.0	SS	Wh			
174.0	176.0	SS	Dk.Gy	F	A	mineralized
176.0	196.0	SS	L.Br.	MF	S	S, MS, Gn. pebbles
196.0	197.0	MS	Gn			
197.0	198.0	SS	Dk.Gy	MF	S	mineralized
198.0	203.0	SS	Dk.Gy	MF	S	S, Gn. MS pebbles
203.0	206.0	MS	Gn			
206.0	207.0	MS	R			

Drilled by Ute Uranium, Inc.

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY % U_3O_8	LAB ASSAY % V_2O_5	FIELD EST. % U_3O_8	FIELD EST. % V_2O_5
[illegible]	[illegible]				

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. UP - 11

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DRILL HOLE LOG

SIMPSON & WOODARD EXPLORATION CO.

Type of Drill Diamond Ax

Logged For Ute Uranium, Inc.

Drill-hole No. UP - 12
Total depth 210'
Collar elev. T P
Area Slick Rock

COORDINATES
North 119,792 East 120,012
Tie

Claim Grass Flat
Date started July, 1954
Date completed July, 1954
Logged by A.M.S.

Summary of log Favorable ; OBSS 155'-202' Thick 47' ; SS color Gy ; MS under OBSS Gn. 4' ; Cbn. A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	155.0					Overburden & MS
155.0	182.0	SS	LGy	M	N	
182.0	190.0	SS	Gy	MF	S	S, Gn. MS pebbles
190.0	190.5	SS	Gy	MF	A	Mineralized, sampled
190.5	199.0	SS	Gy	M	S	S, Cbn. streaks
199.0	202.0	SS	D.Gy	MF	A	Cbn. streaks and specks
202.0	206.0	SS/MS	Gn			Small amts. of SS
206.0	210.0	MS	R			

γ-Ray Log 0 1000

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Drilled by Ute Uranium, Inc.

SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5
190.5	0.5'	0.08	0.28	0.5	0.20

Abbreviations

Wh--white	CG--conglomerate
Br--brown	SS--sandstone
R--red	MS--mudstone
Gy--gray	ST--siltstone
Bl--blue	F--fine
Gn--green	M--medium
Yw--yellow	C--coarse
Bk--black	N--none
Pp--purple	S--sparse
Cbn--carbon	A--abundant
OBSS - ore bearing sandstone	

Hole No. UP - 12

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DRILL HOLE LOG

SIMPSON & WOODARD
EXPLORATION CO.

Type of Drill Diamond Ax

Logged For Ute Uranium, Inc.

Drill-hole No. UP - 13
Total depth 205'
Collar elev. T P
Area Slick Rock

COORDINATES
North 119,691 East 120,183
Tie

Claim Grass Flat
Date started Aug. 1954
Date completed Aug. 1954
Logged by A.M.S.

Summary of log Favorable ; OBSS 155'-205' Thick 47' ; SS color Gy ; MS under OBSS Gn 1' ; Cbn. A, S

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	155.0					Overburden
155.0	180.0	SS	Gy	MF	A	A, Cbn. seams
180.0	202.0	SS	Gy	F	S	S, Gn. MS, seams
202.0	203.0	MS	Gn			
203.0	205.0	MS	R			
						Drilled by Ute Uranium, Inc.

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY U_3O_8	LAB ASSAY V_2O_5	FIELD EST. U_3O_8	FIELD EST. V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. UP - 13

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ORIGINAL

DRILL HOLE LOG

SIMPSON & WOODARD EXPLORATION CO.

Type of Drill: Diamond AX

Logged For: Ute Uranium, Inc.

Drill-hole No.: UP - 14

Total depth: 191'

Collar elev.: T ... P

Area: Slick Rock

COORDINATES: T North 119,673 East 120,008; P Tie 119,6548 119,982.5

Claim: Grass Flat

Date started: Aug. 1954

Date completed: Aug. 1954

Logged by: A.M.S.

Summary of log: Favorable ; OBSS 147'-187' Thick 40' ; SS color Gy ; MS under OBSS R ; Cbn A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	145.0					Overburden, MS
145.0	147.0	MS	Gn			
147.0	151.4	SS	Br			S, limonite specks
151.4	152.7	SS	DkGy	MF	A	Mineralized, sampled
152.7	155.0	SS	Gy	MF	S	" " " "
155.0	156.1	SS	Gy/Bk	F	A	" " " "
156.1	157.0	SS	Gy	F	S	" " " "
157.0	158.0	SS	Bk	MF	S	" " " "
158.0	160.5	SS	Gy	MF	A	" " " "
160.5	170.0	SS	LGy	MF	S	S, Gn. MS, seams
170.0	170.8	SS	Gy	F	A	mineralized, sampled
170.8	178.0	SS	LGy	MF	S	
178.0	180.0	SS	Gy	MF	A	
180.0	187.0	SS	LGy	MF	S	
187.0	191.0	MS	R			

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY % U_3O_8	LAB ASSAY % V_2O_5	FIELD EST. % U_3O_8	FIELD EST. % V_2O_5
152.7	1.3'	0.07	0.66		
155.0	2.3'	0.08	0.50		
156.1	1.1'	0.34	0.83		
157.0	0.9'	0.08	0.56		
158.0	1.0'	0.10	0.73		
160.5	2.5'	0.03	0.22		
170.8	0.8'	0.16	0.46		

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. UP - 14

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COLORADO PRINTING CO., GRAND JUNCTION

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-4A
Total depth 201.5
Collar elev. T 5520.6 P
Area Slick Rock

COORDINATES
North 119776 East 121,531
Tie Sec.32, T44N, R18W
Co.State-San Miguel, Colo.

Claim
Date started
Date completed 4-30-54
Logged by NLA

Summary of log 1st ss unfavor OBSS 75-86 Thick 11 ; SS color LGy ; MS GyGn/RBr ; Cbn. N
2nd ss-semifavorable 122-140 18 LGy GyGn
3rd ss-unfavorable 161-171 10 LGy under OBSS GyGn S N

DEPTH Base From	Thick To	Rock	Color	Grain	Carbon	REMARKS
75.0	75.0					Plug Bit
85.9	10.9	Ss	LGy	M	N	Very hard at base
122.0	36.1	Ms/St	RBr		N	Thin hard ss ribs up to 2' thick- locally sandy - mot GyGn
122.3	0.3	Ms	GyGn		N	
140.2	17.9	SS	LGy	F/MF	S	RBr Ms in ss 123.9-124.3- Very hard at top and base - 0.1' GyGn Ms Sm 123.8
142.2	2.0	Ms/St	GyGn		N	
160.7	8.5	Ms/St	RBr		N	Mot GyGn - thin hard ss ribs
170.7	10.0	Ss	LGy	VF/F	N	
171.0	0.3	St	GyGn		N	
201.5	30.5	Ms/St	RBr		N	Mot GyGn - locally sandy - Quartzite rib 0.5' thick near base

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-11
Total depth 340.0
Collar elev. T 5586.8 P
Area Slick Rock

COORDINATES
North 119,773 East 122,893
Tie Sec.33 T44N, R18W
Co.State- San Miguel, Colo.

Claim
Date started
Date completed 5-5-54
Logged by NLA

Summary of log Favorable; OBSS 249-286 Thick 37; SS color LGy; MS under OBSS GyGn; Cbn. S

DEPTH Base	DEPTH Thick	DESCRIPTION Rock	Color	Grain	Carbon	REMARKS
180.0	180.0					Plug Bit
190.4	10.4	Ms/St	RBr		N	Mot GyGn- locally sandy
198.0	7.6	SS	LGy	F	N	Probably local rib in RBr Ms
200.6	2.6	Ms	RBr		N	
210.3	9.7	SS	LGy/R	F	N	Very muddy
216.8	6.5	Ms/St	RBr		N	Sandy- mot GyGn
234.1	17.3	SS	RBr/LGy	F/MF	N	RBrMs in top of unit grades to GyGn in lower portions
246.6	12.5	St	RBr		N	Mot GyGn- Thin SS ribs
249.0	2.4	Ms	GyGn		N	
286.3	37.3	SS	LGy	F/M	S	Cbn fM 276.2'
289.7	3.4	Ms	GyGn		N	
292.9	3.2	St	RBr		N	Mot GyGn
304.4	11.5	SS	LR/Lgy	F	S	Cbn in basal 2'
340.0	34.6	Ms/St	RBr		N	Thin SS ribs - mot GyGn
305.4	1.0	Ms	GyGn		S	Cbn in basal 0.2'

γ-Ray Log 0 1000

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white
Br—brown
R—red
Gy—gray
Bl—blue
Gn—green
Yw—yellow
Bk—black
Pp—purple
Cbn—carbon
OBSS—ore bearing sandstone
CG—conglomerate
SS—sandstone
MS—mudstone
ST—siltstone
F—fine
M—medium
C—coarse
N—none
S—sparse
A—abundant

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-12
Total depth 320.0
Collar elev. T 5663.4 P
Area Slick Rock

COORDINATES
North 118,888 East 122,115
Tie Sec. 32 T44N R18W
Co. State- San Miguel, Colo.

Claim Philura # 5
Date started
Date completed 5-7-54
Logged by NLA

Summary of log 1st ss Favor, OBSS 185-254 Thick 69; SS color LGy; MS GyGn under OBSS; Cbn S

DEPTH Base (From)	DEPTH Thick (To)	Rock	Color	Grain	Carbon	REMARKS
180.0	180.0					Plug Bit
185.4	5.4	Ms/St	RBr		N	Mot GyGn Thin ss ribs
234.5	49.1	ss	LGy	MF	S	Cbn fm 229.0-230.4 MsSm confined
						to basal part
234.8	0.3	Ms	GyGn		N	
236.8	2.0	Ss	LGy	MF	A	Tightly cemented
254.0	12.2	Ss	LGy	F/MF	A	Cbn particles throughout
256.5	2.5	MS	GyGn		N	Silty
266.5	10.0	Ms/St	RBr		N	Mot GyGn
266.7	0.2	Ms	LGyGn		N	
271.4	4.7	Ss	LGy	F	N	GyGn Fm mot RBr
283.7	12.3	Ms/St	RBr		N	Mot GyGn- thin, hard ss ribs
301.2	17.5	Ss	LRBr	F	N	RBr Ms split 288.6'-289.2
302.4	1.2	St	RBr		N	
306.4	4.0	Ss	LRBr	F	N	
307.3	0.9	St	RBr		N	
316.0	8.7	SS	LR/LGy	MF	N	
332.0	16.0	Ms/St	RBr		N	Mot GyGn - thin ss ribs

y-Ray Log 0 1000

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white
Br—brown
R—red
Gy—gray
Bl—blue
Gn—green
Yw—yellow
Bk—black
Pp—purple
Cbn—carbon
OBSS—ore bearing sandstone
CG—conglomerate
SS—sandstone
MS—mudstone
ST—siltstone
F—fine
M—medium
C—coarse
N—none
S—sparse
A—abundant

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-15
Total depth 4435
Collar elev. T 5654.2 P
Area Slick Rock Co. San Miguel, Colorado

COORDINATES
North 118,505 East 123,047
Tie

Claim
Date started
Date completed 5-13-54
Logged by ELB

Summary of log Semi-fav ; OBSS 291-347 Thick 55.1 ; SS color LGy ; MS under OBSS Gn,E ; Cbn S-A

DEPTH Base from	DEPTH Thick to	Rock	Color	Grain	Carbon	REMARKS
190.0	190.0	st/ms	r/GyGra		N	Plug Bit
225.8	35.1	st/MS	r/gyGn			Mottled BlGn Thick Calc SS ribs
235.1	9.2	ss	GnGy	F	N	Tight Calcareous
261.6	26.5	ms/st	r/rBr		N	Mottled BlGn,Thin sandy ribs
271.1	9.5	ss	rGy	F	N	R,MS Split; Calcite Cement
290.7	19.6	ms/st/ss	r/rGy	F	N	Mottled GyGn; SS Tight
291.4	0.7	ms	GyGn		N	
341.5	55.1	ss	LGy	F/M	S-A	MS R lower part-Calcareous
376.1	29.6	ms/st	RBr		N	Mottled GyGn, Sandy ribs
416.2	40.1	ss	lr,rGy	F/M.F	N	Calcareous
443.5	27.3	MS/ST	R/RGy			Mottled GyGn; Sandy in part
						BBY Probed 4435, Barren

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV 16A
Total depth 312.0
Collar elev. T 5497.4 P
Area Slick Rock-

COORDINATES
North 117,276 East 124,725
Tie Sec.4,T43N,R18W
Co.State-San Miguel, Colorado

Claim
Date started
Date completed 5-20-54
Logged by WBG

Summary of log unfavorable OBSS 189-208 Thick 19 ; SS color Gy ; MS GN ; Cbn. S
semi-favorable 216-258 42 LGy under OBSS GN A

DEPTH Base (From)	DEPTH Thick (To)	Rock	Color	Grain	Carbon	REMARKS
75.0	75.0					Plug Bit - No Core
99.4	24.4	MS/ST	R/GN		N	QTZC ribs in places
126.0	27.5	SS/CG	R/WH	M/C		Basal 12' is CG
189.1	62.2	MS/St	R/GN		N	Thin QTZC ribs
207.7	18.6	SS	Gy	M-MF	S	S: LIM Stains
209.2	1.5	MS	GN		A	
215.4	6.2	MS	R		N	
215.7	0.3	MS	GN-GY		N	
257.8	42.1	SS	LGY	M-MF	A	GYGn Split 248.7 to 250.3, very carbonaceous
258.2	0.4	MS	GN-GY		N	
288.8	30.6	MS/ST	R/Gn		N	
309.1	20.3	SS	Br/LGy	M-MF	S	GnMs seams in Basal 5'
309.4	0.3	MS	GN		N	Mottled Red
312.0	2.6	MS	R		N	

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white
Br—brown
R—red
Gy—gray
Bl—blue
Gn—green
Yw—yellow
Bk—black
Pp—purple
Cbn—carbon
OBSS—ore bearing sandstone
CG—conglomerate
SS—sandstone
MS—mudstone
ST—siltstone
F—fine
M—medium
C—coarse
N—none
S—sparse
A—abundant

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV - 3A
Total depth 434'
Collar elev. T P
Area Slick Rock

COORDINATES
North 116 369 East 126 630
Tie Sec 3 T43N R18W

Claim Philura No. 13
Date started
Date completed May 4, 1954
Logged by W.B.G.

Summary of log Favorable ; OBSS 311-374 Thick 63 ; SS color L Gy ; MS under OBSS Gn ; Cbn A

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	250.0					Plug
250.0	272.8	SS	L.Br	F/C	N	A Hematite - A Bk OP - A A R MS Pbl. (Acces. Minerals)
272.8	275.5	MS	Gy Gn		N	Mot. R
275.5	310.9	MS/ST	R		N	Mot. Gn
310.9	374.2	SS	Lt. Gy	M/MF	A	A Cbn Debris between 340.2 - 342.6 A Bk OP - A Gn MS Pbl. Alt. Fld.
374.2	385.6	MS/ST	R/Gn		N	Mot. Gn
385.6	392.0	SS	R	F/VF	N	A Pyrite Stains A Bk OP (Acces. Minerals) S, F, Gy (MS in SS)
392.0	434.0	MS/ST	R/GyGn		N	

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5
22.2					
23.1	0.9	0.010			
322.3					
323.2	0.9	0.014			

Logged between 3.8' - 434.0'

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. DV - 3A

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-17
Total depth 289.3
Collar elev. T 5557.5 P
Area Slick Rock

COORDINATES
North 115,868 East 125,307
Tie Sec.4,T43N, R18W
Co.State-San Miguel,Colorado

Claim
Date started
Date completed 5-13-54
Logged by NLA

Summary of log Semifavorable; OBSS 2 Thick 29; SS color LGy/R; MS GyGn/RBr; Cbn. S
186-215 under OBSS

DEPTH Base From	Thick To	Rock	Color	Grain	Carbon	REMARKS
150.0	150.0					Plug Bit
186.6	36.6	ST/Ms	RBr		N	Mot GyGn-Thin hard SS
						ribs-Ls rib 160.9-161.2
189.0	2.4	SS	LGy/LR	F	N	
189.3	0.3	ST	RBr		N	
190.1	0.8	SS	LGy	F	N	
190.3	0.2	MS	GyGn		N	
193.4	3.1	SS	LGy	F	N	Mot RBr
194.0	0.6	SS	RBr	F	N	Cg/213.5-214.0 - Cbn 201.5 -
215.4	21.4	SS	RGy	F/MF	A	205.5 - Cbn + Bk;op in same zone
215.5	0.1	MS	GyGn		N	
236.4	20.9	MS/ST	RLr		N	Mot GyGn- Locally sandy
256.6	20.2	SS	LGy	C/MF	N	
289.3	32.7	MS/St	RBr		N	Mot GyGn - Thin, hard LGy,
						RBr SS Ribs.

y-Ray Log 0 1000

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SAMPLE BASE	THICK	LAB ASSAY (%) U_3O_8	V_2O_5	FIELD EST. (%) U_3O_8	V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-48
Total depth 358.0
Collar elev. T 5801.6 P
Area Slick Rock

COORDINATES
North 115,709 East 123,441
Tie T45N R18W

Claim Public Land
Date started
Date completed 7-30-54
Logged by GCS

Summary of log Favorable; OBSS 51' 253-304 Thick 51'; SS color Gy; MS Gy .8' under OBSS; Cbn. Trace

DEPTH Base	DEPTH Thick	Rock	Color	Grain	Carbon	REMARKS
171.5	171.5					Plug Bit no core
173.5	2.0	Ss	Gr	M		Calc. 3%, int Ms GnGy 173.4-173.6
174.1	0.8	Ls	Gr	Dense		
174.4	0.3	Cs	Gr			Calc. 2% int.
175.0	0.6	Cs	GnGy			Calc. 3%
178.2	3.2	St/ss/st	GnGy	MF		Calc. 2%, int.
187.5	4.3	Ss	GrGn	VF		
183.2	5.0	Cs	RBr			
188.7	1.2	Ms	GnGy			Ms, D R; 188.5'-188.7'
189.9	1.2	Ss	GyGn	F		Calc. 1%, int.
191.9	2.0	Ms	D R Br			Calc. 2%, int.
193.2	1.3	St	GyGn/RBr			Calc. 3% int.
196.3	3.1	Ms	BrR/GyGn			Calc. 2% int.
223.8	27.5	St/Ms	BrR			Calc.2% int.
226.1	2.3	Ss	GnGy	VF		Calc. 2% int
227.3	1.2	Ms	BrR			Ms,GyGn, spots 5%
228.8	1.5	Ss	Gy	VF		Calc. 1% int.
230.1	1.3	St	BrR			
231.4	1.3	Ss	Gy	VF		Calc. 1% int.
246.1	14.7	St/Ms	BrR			Calc.,Tr; int. MsGyGn, 2%
250.4	4.3	SS	GnGy/RBr	VF		Calc. 1% int. Ms; RBr 248.6-248.8
253.1	2.7	MS	BrR/GnGy			Calc. 2% int.
276.6	23.5	Ss	Gy	F		Alt. Feldspars; 1%
281.8	5.2	St/Ms	RBr/GnGy			Calc. Tr, int.
304.0	22.2	SS	Gy			Calc; Tr; int.
304.8	0.8	Cs/Ms	Gy			
306.2	1.4	Ss	Gy	VF		Calc; 2%, Int.
309.5	3.3	Ms/St	DGy			Calc. 2% int.
312.2	2.7	Ss	Gy	GF		Alt.Feldspar; 1%; Calc. 2%, int.
313.3	1.1	St/Ms/St	D Gy			Calc., 3%, int.
314.2	0.9	Ss	Gy	F		Calc., 3%, int.
315.9	1.7	Ss	D Gy	VF		Calc. 1%, int.
320.8	4.9	Cs/St	GnGy/GyR			Calc.Tr int

y-Ray Log 0 — 1000

SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

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Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill.....

Drill-hole No. DV-48

Total depth.....

Collar elev.....T.....P

Area.....

COORDINATES

North.....East.....

Tie.....

Claim.....

Date started.....

Date completed.....

Logged by.....

Summary of log.. .....; OBSS.....Thick.....; SS color.....; MS under OBSS.....; Cbn.....

DEPTH Base	DEPTH Thick	DESCRIPTION Rock	Color	Grain	Carbon	REMARKS
327.3	6.5	Ss	LRGy	F		Calc. 2% int RGn, MS, 320.9-321.2'
340.4	13.1	Ms/St	GyGn/RBr			Calc.1% int.
357.0	16.6	Ss	GyR	F		Calc.1% int
358.0	1.0	Ms	BrR			Calc. 3%, int.

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
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Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No.....

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-18
Total depth 609.2
Collar elev. T 5820.6 P
Area Slick Rock

COORDINATES
North 114,579 East 123,892
Tie Sec.4, T43N R18W
Co. State-San Miguel, Colo.

Claim
Date started
Date completed 5-21-54
Logged by DRS

Summary of log Favorable; OBSS 207-280 Thick 73'; SS color LGy; MS Gn under OBSS; Cbn A

DEPTH Base	DEPTH Thick	Rock	Color	Grain	Carbon	REMARKS
80.0	80.0					Plug Bit, No Core
84.7	4.7	Ms/St	LBr/LGnGy		N	
98.3	13.6	Ss	VlBrGy	M/C	N	Ch granules at bottom
110.0	15.7	Ms/St	LGnGy/ RBr		N	GnGy predominates
126.2	12.2	Ss	VLBrGy	F/M/C	N	A cly ChP and granules in bottom .6' Cg at 121,125'
173.4	47.2	Ms/St	LGrGy/ RBr		N	GnGy above 142', some bleached St ribs in lower part
196.6	23.2	Ss	LBrGy/ LGy	VF/F	S	
206.2	9.6	Ms/St	RBr		N	
206.5	0.3	Ms/St	GnGy		N	
279.7	73.2	Ss	LGy	VF/F	S-A	.8',.4',.6' GnGy MS splits at 268.0',271.9',274.4' Calcite most A, 269.4'-279.7' MS most A, 268.0-279.7'. A pyrite with cbn 11' at Base
280.4	0.7	Ms	GnGy		N	
288.0	7.6	St/Ms	RBr		N	LGnGy at top
310.7	22.7	Ss	LRBr	F/M	N	Some St ribs with A RBR int Ms
315.5	4.8	Ms/St	RBr		N	Some mottled GnGy around St Nobs
373.1	7.6	Ss	LRBr	VF	N	LGy at base with A calcite GnGy MS
353.8	30.7	Ms/St	RBr/GnGy		N	RBr predominates, GnGy color around st splits
373.3	19.5	Ss	LRBr/LGy	F/M	S	Ms GnGy near base
392.1	18.8	Ms/St	RBr		N	silty parts bleached GnGy
440.7	48.6	Ss	LRBr	F/M	S	422.4-424.0 RMS split
448.0	7.3	Ms/St	RBr		N	Gradational into ss below
474.4	26.4	Ss	RBr/LRBr	VF/M	N	Top 10' RBr, 3' RBr MS at 458'
480.0	5.6	Ms	RBr		N	Silty, GyGn near top, bottom
494.2	1922	Ss	LRBr/RBr	VF/M/F	N	
509.8	10.6	Ms/Ss/ St	RBr	VF/F	N	S mottled GnGy in MS

y-Ray Log 0 — 1000

SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD TEST (%) U_3O_8	FIELD TEST (%) V_2O_5

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Abbreviations

Wh—white
Br—brown
R—red
Gy—gray
Bl—blue
Gn—green
Yw—yellow
Bk—black
Pp—purple
Cbn—carbon
OBSS—ore bearing sandstone

CG—conglomerate
SS—sandstone
MS—mudstone
ST—siltstone
F—fine
M—medium
C—coarse
N—none
S—sparse
A—abundant

Hole No.

Page Two of Two

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-18
Total depth 609.2
Collar elev. T 5820.6 P
Area Slick Rock

COORDINATES
North 114,579 East 123,892
Tie Sec. 4, T43N R18W
Co. State-San Miguel, Colo.

Claim Philura No. 14
Date started
Date completed 5-21-54
Logged by DRS

Summary of log Favorable ; OBSS 207-280 Thick 73' ; SS color LGy ; MS under OBSS Gn ; Cbn A

DEPTH Base From	DEPTH Thick To	Rock	Color	Grain	Carbon	REMARKS
520.4	10.6	SS	LRBr	F	N	Dense
558.2	37.8	Ms/St/ Ss	RBr/LGyGn	VF	A	Cbn A at 538.0 in Gy MS S calcite in lower half
571.5	13.3	Ss	LBr/LRBr	M	N	Gradational into St below
609.2	37.7	St/Ms	RBr/LRBr		N	S mottled GnGy MS, St

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-19
Total depth 337.5
Collar elev. 5700 T P
Area Slick Rock

COORDINATES
North 125,455 East 117,580
Tie Sec.4, T43N R 18W
Co.State-San Miguel,Colo.

Claim
Date started
Date completed 5-10-54
Logged by ELB

Summary of log Semifavorable, OBSS 235-300 Thick 65; SS color Br/BlGy LGy MS Gn under OBSS Gn; Cbn. N S

	DEPTH Base From	DEPTH Thick To	Rock	Color	Grain	Carbon	REMARKS
	140.0	140.0	SS/CG	Br/Gy/ BlGy	VC-M	N	Plug Bit
	154.0	14.0	SS/CG	BrGy/ BlGy	VC-M	N	CG Find; "Xmas Tree"
	187.6	33.6	Ms/St/	BlGn/R	F	N	R MS mottle BlGn Cont' F SS ribs
	196.8	9.2	Ss	BlGy	F	N	R/Gn Ms split 189.1
	235.4	38.6	Ms/St	R		N	Mottled GyGn; Thin Ss ribs
top -	254.6	19.2	Ss	LGy	F	N	
	255.0	0.4	Ms	Gn		N	
	276.2	21.2	St/Ss/	R/RGy	VF	N	Mottled BlGn
	300		Ms				
base - OBSS	300.2	24.0	SS	LGy	F	S	
	300.5	0.3	Ms	GyGn		N	
	307.9	7.4	Ms	R		N	
	312.5	4.6	MS	RGy	F	N	
	337.5	25.0	Ms/St	R		N	Mottled BlGn SS rib 323.5-325.1/

γ-Ray Log 0 1000

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill: Core By U.S.G.S.

Drill-hole No. DV-22 | COORDINATES | Claim: Philura No. 22

Total depth: 310.0' | North: East: | Date started:

Collar elev. 5915' T P | Tie: | Date completed: 5-24-54

Area: Slick Rock | Sec.4, T43N, R18W, NMPM | Logged by: N.L.A.

Summary of log: Semi-favorable OBSS 210-276' Thick 68'; SS color LGy; MS under OBSS Gy.Gn; Cbn. N

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	100.0					Plug bit
100.0	148.0	MS//ST	R.Br		N	Local, thin, hard Fgr, R-Gy SS ribs - Mot. Gy-Gn.
148.0	151.5	SS	LGy	MF	N	MS in SS; S, Gy. Int.
151.5	152.9	MS	RBr		N	
152.9	159.6	SS	LGy	MF	N	MS in SS; A, R.Br, Gy, Gn.MS
159.6	209.8	MS//ST	RBr		N	Thin, hard SS ribs; mot. Gy-Gn. sandy in basal part
209.8	210.1	ST	D.Gy		N	Sandy
210.1	217.6	SS	L.Gy	F/MF	N	Gradational contacts above & below. MS in SS; S, Gy-Gn. Fm; Int.
217.6	218.8	MS	Gy.Gn		N	
218.8	278.3	SS	L.Gy	F/M	N	MS in SS; A, Gy-Gn.Sm. Pb.
278.3	310.0	MS//ST	RBr		N	Mot. Gy-Gn - thin hard SS ribs

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No. DV-22

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~~EXHIBIT No. 1~~

COLORADO PRINTING CO., GRAND JUNCTION

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-23
Total depth 435.2
Collar elev. T 5550.8 P
Area Slick Rock

COORDINATES
North 115,387 East 128,199
Tie Sec.4 T43N R18W

Claim Philura No.
Date started
Date completed 5-28-54
Logged by ELB

Summary of log Semi Fav ; OBSS 380-400 Thick 19.7 ; SS color LGy ; MS Blgn/ under OBSS GyGn ; Cbn N

DEPTH Base	DEPTH Thick	Rock	Color	Grain	Carbon	REMARKS
300.0	300.0					Plug Bit
305.4	5.4	SS	RGy/GnGy	F	N	Tight
360.4	55.0	Ms/St	R		N	Mottled BlGn A, tight ss ribs
						(Fine, 1.0'-2.0' thick)
366.8	6.4	Ss	LRGy	F		Mn Stained lower part
379.8	13.0	St/ss/	R/Gy	F	N	Mottled BlGn in part
		Ms				
379.9	0.1	MS	BlGn		N	
394.6	19.7	Ss	LGy	F/M	N	A; Gn Sm, Int.
401.1	0.5	Ms	GyGn		N	
435.2	34.1	Ms/St	R		N	Mottled GyGn A; F, Tight
						ss ribs up to 1.5' thick

γ-Ray Log 0 1000

Barren

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white
Br—brown
R—red
Gy—gray
Bl—blue
Gn—green
Yw—yellow
Bk—black
Pp—purple
Cbn—carbon
OBSS—ore bearing sandstone

CG—conglomerate
SS—sandstone
MS—mudstone
ST—siltstone
F—fine
M—medium
C—coarse
N—none
S—sparse
A—abundant

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-24
Total depth 470.0
Collar elev. 5765.0 T. 5679.0 P
Area Slick Rock

COORDINATES
North 126,835 East 115,070
Tie Sec.4, T43N, R18W
Co.Stete-San Miguel, Colo.

Claim Philura No19
Date started
Date completed 6-2-54
Logged by WBG

Summary of log ss.2 semifavor OBSS 387-415 Thick 28 ; SS color LGy ; MS Gn ; Cbn A
ss.3 unfavorable 421-440 19 LGy under OBSS Gn S

	DEPTH Base	DEPTH Thick	Rock	Color	Grain	Carbon	REMARKS
	310.0	310.0					Plug Bit- No Core
	312.1	2.1	SS	WH	MF-F	N	Tightly cemented
	354.4	42.3	Ms/St	R		N	Tight R SS ribs
	355.2	0.8	St	Gy/Gn		N	
No.1	364.0	8.8	Ss	LGy	MF	S	
	366.7	2.7	Ms/St	R/GyGn		N	
	376.9	10.2	Ss	LGy	M/MF	N	
	377.3	0.4	St	GyGn		N	
	387.0	9.7	Ms/St	R		N	Mot Gn
No.2	415.0	28.0	SS	LGy	MF-F	A	
	421.3	6.3	Ms	R		N	
No.3	440.2	18.9	Ss	LGy		S	
	441.0	0.8	Ms	Gn		N	
	470.0	29.0	Ms/St	R			Mot Gn in places
							Barren Hole

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white
Br—brown
R—red
Gy—gray
Bl—blue
Gn—green
Yw—yellow
Bk—black
Pp—purple
Cbn—carbon
OBSS—ore bearing sandstone
CG—conglomerate
SS—sandstone
MS—mudstone
ST—siltstone
F—fine
M—medium
C—coarse
N—none
S—sparse
A—abundant

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-25
Total depth 496.0
Collar elev. T 5821.5 P
Area Slick Rock

COORDINATES
North 113,531 East 127,018
Tie Sec.4 T43N R18W
Co.State-San Miguel,Colo.

Claim Philura No.27
Date started
Date completed 6-10-54
Logged by NLA

Summary of log Semifavorable; OBSS 332-456 Thick 124; SS color LGy; MS under OBSS LGyGn; Cbn S

DEPTH Base From	DEPTH Thick To	Rock	Color	Grain	Carbon	REMARKS
300.0	300.0					Plug Bit
303.7	3.7	St	LGyGn		N	
332.3	28.6	Ms/St/	RBr/GyGn		N	Mottled-thin, tight, sandy ribs
334.1	1.8	Ss	LRBr/LGy	MF	N	Mottled
360.7	26.6	Ss	LGy	F/MF	S	Cbn 357.2' to base of unit- charcoal nature
361.0	0.3	Ms	GyGn		N	Sandy
362.5	1.5	SS	LGy	F	S	
369.7	17.2	Ms/St	RBr		N	Sandy in basal 5', mottled GyGn
406.2	26.5	SS	LGy	F/MF	S	Cbn fm in basal 8'
406.5	0.3	St	GyGn		N	
410.0	3.5	Ss	LGy	VF	N	Hard
429.2	19.2	Ms/St	RBr		N	Thin, hard ss ribs, mot GyGn
431.6	2.4	Ss	LR	F	N	Tightly cemented
431.9	0.3	Ms	RBr		N	
456.0	24.1	Ss	LGy	F/MF	S	Locally hard + calcareous
457.1	1.1	St.	Gy		N	
496.0	38.9	Ss/ms/ St	RBr/LR		N	ss ribs up to 5' thick, F grained hard, LR

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SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white
Br—brown
R—red
Gy—gray
Bl—blue
Gn—green
Yw—yellow
Bk—black
Pp—purple
Cbn—carbon
OBSS—ore bearing sandstone
CG—conglomerate
SS—sandstone
MS—mudstone
ST—siltstone
F—fine
M—medium
C—coarse
N—none
S—sparse
A—abundant

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-26
Total depth 477.5
Collar elev. T 5756.1 P
Area Slick Rock

COORDINATES
North 113,223 East 127,990
Tie Sec.4, T43N, R18W
Co.State-San Miguel, Colo.

Claim Philura No.29
Date started
Date completed 6-7-54
Logged by NLA

Summary of log Unfavorable; OBSS 379-401, 425-443; Thick 22, 18; SS color LGy, LR/LGy Br; MS GyGn, under OBSS GyGn; Cbn N, N

DEPTH Base From	Thick To	Rock	Color	Grain	Carbon	REMARKS
330.0	330.0					Plug Bit
337.6	7.6	SS	LGy	F-VF	N	
378.6	41.0	Ms/St/	RBr/GyGn	F-VF	N	
		Ss				
400.7	22.1	Ss	LGy	F	N	
401.0	0.3	Ms	LGyGn		N	
424.8	23.8	Ms/St/	RBr/Gy	F-VF	N	Grades into unit below
		Ss				
443.0	18.2	SS	LR/LGyBr	F-MF	N	LR in top 3' - A,Bk;op in top 3'
						locally tight
477.5	34.5	Ms/St/	RBr/LGy	F-VF	N	Tight Ss R; bs
		Ss				

γ-Ray Log 0 1000

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SAMPLE BASE	THICK	LAB ASSAY (%) U_3O_8	V_2O_5	FIELD EST. (%) U_3O_8	V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No.

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV-51
Total depth 278.0
Collar elev. T 5765.8 P
Area Slick Rock

COORDINATES
North 113,464 East 125,386
Tie Sec.4, T43N, R18W
Co.State- San Miguel,Colo.

Claim
Date started
Date completed 7-26-54
Logged by NLA

Summary of log Semifavorable; OBSS 151-253 Thick 102; SS color LGy; MS under OBSS GyGn; Cbn. S

DEPTH Base from	DEPTH Thick ft	Rock	Color	Grain	Carbon	REMARKS
110.0	110.0					Plug Bit
151.1	41.1	Ms/St	RBr		N	Mot GyGn - Thin, Hard ss ribs
172.8	26.7	SS	LGy	F	N	Tightly cemented at top
173.0	0.2	Ms	GyGn		N	Silty
175.2	2.2	SS	LRBr-LGy	F	N	Tight
178.7	4.5	SS	LGy	F	N	Tightly cemented at top
180.3	0.6	St	RBr		N	Mot GyGn
184.0	3.7	Ms	RBr		N	Tight SS rib at top
187.3	3.3	St	GyGn		N	Sandy-Grades between above +
						below units
189.0	1.7	SS	DGy	MF	A	
196.0	7.0	SS	LBr	FMF	N	Very tight + hard at top
196.1	0.1	Ms	GyGn		N	
216.9	20.8	Ms/St	RBr		N	Locally sandy - mot GyGn
236.8	19.9	SS	LGy	F	VS	Locally LR in upper part - RBr;Ms;
						F in top part only
237.4	0.6	St	GyGn		N	
253.4	15.6	SS	LRBr/LGy	F/MF	N	Very muddy in top 6'
278.0	25.0	Ms/Ss	RBr-LR	F	N	SS ribs tightly cemented

y-Ray Log 0 1000

SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant
OBSS—ore bearing sandstone	

Hole No.

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DATE	INITIALS	CODE

For Log

DRILL HOLE LOG

Logged For

Type of Drill AX

Drill-hole No. DV 106
Total depth 424'
Collar elev. T 5971.4 P
Area Slick Rock

COORDINATES
North 111891 East 126625
Tie Sec 4 T43N R18W

Claim Philura No. 33
Date started
Date completed July 15, 1955
Logged by W.B.R./N.L.A.

Summary of log Unfavorable ; OBSS 350-389 Thick 39 ; SS color LG/LR under OBSS MS R Br ; Cbn N

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	230.0					Plug
	15.0	MS	R Br		N	Mot. Gy Gn
	35.0	MS	Gy Gn/R Br		N	
	40.0	MS	R Br		N	
	75.0	MS	Gy Gn		N	
	85.0	MS/SS	Gy Gn/L Gy	F	N	
	90.0	MS	Gy Gn		N	
	105.0	MS	R Br		N	Mot. Gy Gn
	135.0	SS	L Br	F	N	S Gy Gn MS in SS; S Lim
	145.0	MS/SS	GyGn/L Gy	F	N	S; Pyrite, Limonite, Barite
	165.0	SS	L Br	MF	N	S; Gy Gn MS
						S Lim, Bk OP (Acces. Minerals)
	185.0	MS	L Gy Gn		N	
	200.0	MS	Gy Gn		N	Limonitic Nodules 190-195
	220.0	MS/SS	LGy Gn	M	N	
	230.0	SS/MS	LGy/DGy	M	N	S Lim - End plug bit zone
						Begin coring at 230.0'
	245.5	MS	Gy Gn		S	Calc; A/S/A - Acces. Minerals
						Cbn. flakes in upper 1'
	246.5	ST	L R Br		N	A Calc; Gradational Contacts
	251.7	SS	L Gy	VF	N	Calc A/M/A; Med Int Gy Gn
						MS in SS S Bk OP
	253.4	MS	Gy Gn		N	Calc S/A; Sandy in lower half
						Local small Ls Nodules
	264.0	MS	R Br		N	Calc A/S; Thin tight SS Ribs
	274.9	SS	L Gy	F-M	N	Gy Gn ST Seams 269.1-269.7,
						272.6-272.8; 273.2-274.1
						A Calc in SS (Acces. Minerals)
						A Gy Gn Seams (MS in SS)
						S/A Calc. in MS
	290.7	Cgl.	L Gy	M-VC	N	M-A Calc; S Wh Gy Pbl MS in SS
						Alt. ch. Feld - ? Pb

γ-Ray Log 0 1000

SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5
290.7					
291.3	0.6	e 0.029	0.1		

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant

OBSS—ore bearing sandstone

Hole No. DV 106

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DATE	INITIALS	CODE

DRILL HOLE LOG

Logged For

Type of Drill AX

Drill-hole No. DV 106
Total depth 424'
Collar elev. T5971.4 P
Area Slick Rock

COORDINATES
North 111891 East 126625
Tie Sec 4 T43N R18W

Claim Philura No. 33
Date started
Date completed July 15, 1955
Logged by W.B.R./N.L.A.

Summary of log Unfavorable ; OBSS 350.389 Thick 39 ; SS color LG/LR MS under OBSS R Br ; Cbn. N

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	DESCRIPTION REMARKS
	294.0	MS/SS	Gy Gn	F - VF	N	A Gy Gn Int MS in SS Calc A/S/A
	349.6	MS/ST	R Br		N	Locally Sandy - Mot. Gy Gn -LG; Ls 316.2 - 316.7 - Grad. Zone 343.0 - 349.6
	369.3	SS	LGy/LR	VF-F	N	S; Ch Bk OP (Acces. Minerals) A/S/A Calc (Acces. Minerals) M; R Br; Sm Int (MS in SS) LR in top 1/2 only - Top SMS
	369.5	MS	Gy Gn		N	S Calc
	375.4	MS	R Br		N	M-A Calc.
	388.3	SS	L Gy	MF-M	N	M-A Calc; S Gy Gn P Fm (MS in SS)
	388.6	ST	Gy Gn		N	Tr; R Br; Mot.
	424.0	MS/ST	R Br		N	Mot. Gy Gn, Locally Sandy L Gy, SS rib 396.5-401.0

γ-Ray Log 0 1000

SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) eU3O8	LAB ASSAY (%) V2O5	FIELD EST. (%) U3O8	FIELD EST. (%) V2O5
272.9	1.2	0.019			
273.9	1.0	0.012			
280.8	2.7	0.005			
285.9	5.1	0.010			
290.0	0.9	0.037			

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant

OBSS—ore bearing sandstone

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RECEIVED MAR 3 1958

DATE	INITIALS	CODE

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV 107
Total depth 459'
Collar elev. 5853.4 T 5853.4 P
Area Slick Rock

COORDINATES
North 111867 East 128452
Tie
Sec. 9 T43N R18W

Claim Philura No. 36
Date started
Date completed July 19, 1955
Logged by W.B.R.

Summary of log Unfavorable; OBSS 322-391 Thick 69; SS color L Br; MS L Gy; Cbn N
L Gy under OBSS

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	215.0					Plug
	25.0	MS	R Br		N	10% Alt Gy Gn MS
	30.0	MS	R Br/GyGn		N	
	40.0	SS	Br	M	N	A Intbd. R Br MS
	50.0	MS	Gy Gn		N	
	65.0	MS	Gy Br		N	
	75.0	LS	D Gy		N	Silty
	85.0	MS/LS	Gy/R Br		N	
	90.0	MS	Gy Br			
	115.0	MS	GyGn/R Br		N	
	130.0	SS	Br	F	N	A Lim; 15% intbd R Br Gy MS
	145.0	MS	Gy;GyGn		N	Sandy
	155.0	SS	L Br	F	N	A int. MS
	175.0	SS	L Gy	MF	N	S Dop; S Barite; A int Gy R Br MS
	185.0	SS/MS	Gy/GyGn	M	N	
	215.0	MS	Gy, GyGn		N	5% R Br MS
						End Plug Zone
	236.4	MS	LGn/GyGn		S	T Pyrite; Locally very sandy
	254.8	ST/SS/MS				
			GyGn/Br	VF, F	T	S Biot
	264.0	SS	L Gy	F	N	Cg Locally; S Barite; 5-10% L Gy MS
	278.1	SS	L Gy	MC	M	Cg; M Barite
	283.3	MS/ST/SS				
			Gy Gn	VF	N	25% Int Gy Gn MS
	308.0	SS	L Gy	MC	S	Cg; A P int Gy Gn MS
	312.9	ST/MS	LGnGy		N	
	321.8	MS/ST/SS				
			R Br	VF	N	A int R Br MS Partially Alt.
	338.0	SS	LBrLGy	F	N	8% int L Gy MS
	340.3	MS/SS	R Br	VF	N	60% R Br int MS Alt at Top
	347.3	SS	L Gy	VF	N	10% int L Gy MS; S Dop; M ch

γ-Ray Log 0 — 1000

SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) XXXX $CaCO_3$	FIELD EST. (%) V_2O_5
269.7					
271.4	1.7	0.087	0.1	4.83	
273.0	1.6	0.071	0.1	3.75	
274.5	1.5	e0.029	0.12		
276.2	1.7	0.085	0.21	3.45	
276.6					
277.8	1.2	0.044	0.1	9.45	
283.6					
284.2	0.6	e0.028	0.1		
303.0- 303.3	0.3	e0.028	0.1		
308.0- 308.3	0.3	0.083	0.1	7.50	

Abbreviations

Wh—white	CG—conglomerate
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Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant

OBSS—ore bearing sandstone

DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV 107
Total depth 459'
Collar elev. 5853.4 T5853.4 P
Area Slick Rock

COORDINATES
North 111867 East 128452
Tie Sec 9 T43N R18W

Claim Philura No. 36
Date started
Date completed July 19, 1955
Logged by W.B.R.

Summary of log Unfavorable ; OBSS 322-391 Thick 69 ; SS color L Br ; MS L Gy ; Cbn. N
L Gy under OBSS

DEPTH From	To	Rock	Color	Grain	Carbon	REMARKS
~~36~~	365.2	MS/ST	R Br		N	
	366.5	MS	Gy Gn		N	Sandy
	391.2	SS	L Br	F	T	0.4' MS split 379.8; 10% int SM Lt Gy MS
	402.0	MS/SS	R Br	VF	T	30% int R Br MS; S Dop in SS
	409.5	SS	LBr/LGy	VF-F	T	15% int SM LGy MS
	412.8	MS/SS	R Br	VF	N	25% int R Br MS
	418.6	SS	LR Br	F	N	20% int. SM L Gy MS
	419.8	MS	R Br		N	Sandy
	425.6	SS	L Gy	VF	T	10% int L Gy MS
	432.3	SS/MS	D Gy	VF	VA	A int SM MS
	441.7	SS	L Gy	F	T	A Gy Gn MS; SM, P in lower .5'
	451.5	MS	R Br		N	
	459.0	SS	R Br	F	N	25% R Br MS; M Dop

y-Ray Log
0 — 1000

Gamma Log

Base	Thick	eU3O8
219.2	0.8	0.005
252.9	1.2	0.010
253.8	0.9	0.011
264.5	3.3	0.005
266.6	2.1	0.011
270.0	3.4	0.018
270.8	0.8	0.076
271.4	0.6	0.062
274.4	3.0	0.016
275.3	0.9	0.090
276.5	1.2	0.030
277.6	1.1	0.049
278.5	0.9	0.015
283.6	1.1	0.024
286.0	0.7	0.010

SAMPLE BASE	THICK	LAB ASSAY (%) e U_3O_8	V_2O_5	FIELD EST. (%) U_3O_8	V_2O_5
290.2	0.8	0.011			
291.3	1.1	0.010			
294.0	0.8	0.014			
296.1	1.2	0.010			
299.1	3.0	0.010			
300.5	1.4	0.010			
301.5	1.0	0.010			
302.3	0.8	0.022			
304.3	2.0	0.010			
306.5	2.2	0.010			
307.2	0.7	0.072			
308.9	1.7	0.005			

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant

OBSS—ore bearing sandstone

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DRILL HOLE LOG

Logged For

Type of Drill

Drill-hole No. DV 108
Total depth 524'
Collar elev. T 5708.7 P
Area

COORDINATES
North 111952 East 129978
Tie
Sec 10, T43N, R18W

Claim Philura No. 38
Date started
Date completed July 27, 1955
Logged by W.B.R/ B.R.S.

Summary of log Semi-Favorable ; OBSS 323-397 Thick 74' ; SS color L Gy ; MS under OBSS GnGyRBr Cbn. S - M

DEPTH From	DEPTH To	Rock	Color	Grain	Carbon	REMARKS
0.0	175.0	MS/SS/ ST/MS				Plug Bit - Has detailed logging on U.S.G.S. log.
175.0	236.8	SS/ST/ MS	L Gn Gy	SF - M	N	A int Gy Gn MS; in places dense some C.S. Layers MS predominate; S, R Carbonate 203; Top 3.4'; SS; S R Br bottom 20'
	294.7	SS	L GyGn	F/M	S	A int Gn Gy MS
	299.8	ST/MS	LGnGy		N	A sand in ST; A $CaCO_3$
	322.2	SS/ST/ MS	LGyGn/ RBr/LGy	SS F-M	N	VA $CaCO_3$
	322.5	MS	LGnGy		N	
	337.3	SS	L Gy	VF-M	S	A int Wh, Gn, Gy; Mod. Gn Gy seams p near base
	338.1	MS/LS/ SS	LGnGy	SS F	N	MS, LS P int in F SS
	347.3	MS/ST	R Br		N	S Mot. GnGy; Mod. L S P
	363.0	SS	L Gy	VF-F	S	Gradational to ST above VA Gn Gy MS P SM int
	367.6	MS/ST	RBrGnGy		N	
	397.0	SS	L Gy	VF-F	M	SA int SM P Gn Gy MS
	398.1	MS	RBrGnGy		N	
	415.5	SS	LR Br			
			Ly Br	VF-F	N	A int R Br MS
	441.8	MS/ST/ SS	R Br Gn Gy	SS F	N	A int R, Gn, MS
	444.2	CS	LGnGy		N	Ground up; S R Br
	470.3	SS	L R Br	F	N	A int R Br MS
	473.0	MS	R Br		N	
	474.5	SS	L Y Br	F	N	A Bk OP
	476.5	MS	R Br		N	
	497.1	SS	LRBr/ LGyBr	F	N	A int SM R Br MS; LGy lower 5'
	524.0	MS/ST	RBrGnGy		N	L Gn Gy LS 519-520

γ-Ray Log 0 1000

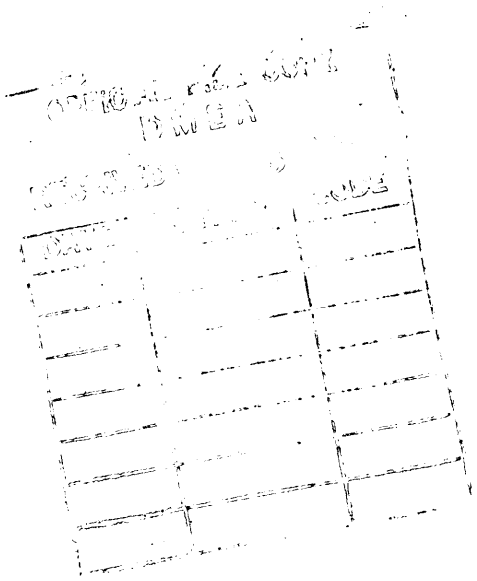
SAMPLE BASE	SAMPLE THICK	LAB ASSAY (%) U_3O_8	LAB ASSAY (%) V_2O_5	FIELD EST. (%) U_3O_8	FIELD EST. (%) V_2O_5
	Barren				

Abbreviations

Wh—white	CG—conglomerate
Br—brown	SS—sandstone
R—red	MS—mudstone
Gy—gray	ST—siltstone
Bl—blue	F—fine
Gn—green	M—medium
Yw—yellow	C—coarse
Bk—black	N—none
Pp—purple	S—sparse
Cbn—carbon	A—abundant

OBSS—ore bearing sandstone

Hole No. DV 108



Summary of drilling by U.S. Geological Survey

No.	Total Depth	Thickness-OBSS	TD and Elev. Base of OBSS		Salt Wash - Mineralization
DV-4A	202	18	171	5350	Mineralized
11	340	37	286	5301	.34.03, .3'-.02
12	332	69	254	5409	N
15	444	55	347	5307	N
16A	312	42	258	5239	N
3A	434	63	374	5126	.9'-.01, .9'-.014
17	289	29	215	5343	N
48	358	51	304	5498	N
18	609	73	280	5541	N
19	338	24	300	5410	N
22	310	68	276	5639	N
23	435	20	400	5151	N
24	470	28	440	5325	N
25	496	124	456	5365	N
26	478	40	443	5313	N
51	278	102	253	5513	N
106	424	39	389	5582	N
107	459	69	391	5462	N
108	524	74	397	5312	N

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AVERY & JOHNSTON DRILLING CO.
633 24-Road
Grand Junction, Colo.

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December 6, 1957

Raymond C. Roebeck
Hilary Minerals Corp.
535 Orchard Ave.
Grand Junction, Colo.

Dear Mr. Roebeck:

Thank you for giving us the opportunity to bid on your proposed drilling operations in the Slick Rock Mining District, San Miguel County, Colorado. Our bid is:

Plug bit drilling:

0 to 200' @ $1.50 Per. Ft.
200' to 400' @ $1.80 " "
400' to 550' @ $2.15 " "

Coreing:

0 to 200' @ $3.50 Per. Ft.
200' to 400' @ $4.75 " "
400' to 550' @ $5.25 " "

Sincerely,

Ralph Avery

AVERY & JOHNSTON DRILLING CO.

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DATE INITIALS CODE

Dec.16, 1957
Grand Jct. Colo.

Dear Sir:

In reply to your letter requesting bids on Hilary Minerals Corp. in the Slick Rock Mining area, we submit the following bid.

Depth	Plug	Core
0.00-200 ft.	$2.35	$3.35
200- 400 ft.	$2.60	$4.20
400- 500 ft.	$3.25	$5.00

We will drill Bx core and request permission to reduce to Ax in case of trouble with hole. $12.50 per hour standby for probing holes, waiting for drill sites. There will be a charge of $500.00 for move in time. If the drilling exceeds 3000 ft. this will be returned.

This bid may be raised or lowered upon inspection of the property.

Thank you,

(signed)
Louis Ausmus
V + A Drilling Corp.
2837 North Ave.
Grand Junction, Colo.

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DATE	INITIALS	CODE

December 10, 1957

Mr. Raymond C. Robeck
Hilary Minerals Corporation
535 Orchard Avenue
Grand Junction, Colorado

Dear Sir:

In reply to your letter dated December 2, 1957, please accept the following quotations as our preliminary bid for your D.M.E.A. loan proposal for a minimum total footage of 16,000 feet to a maximum depth per hole of 500 feet on your Philura group of claims in Sections 32 and 33, Township 44 North, Range 18 West, and in Sections 4 and 9, Township 43 North, Range 18 West, taking a minimum of 70 feet of BX core per hole:

	Price per Foot	
Depth	Plug Bit	Core
0-100 feet	$ 2.50	$ 3.25
100-200 feet	2.75	3.75
200-300 feet	3.00	4.50
300-400 feet	3.50	5.25
400-500 feet	4.00	6.00

Standby time would be charged at the rate of $15 per hour. You would be expected to construct the drill sites and do any road work necessary to the drill sites.

We would plan on plugging size 3-7/8" to 4-1/4" and core BX size and would plan on an estimated 75 feet of plug bit drilling and 50 feet of core per shift per drill and would run two drills.

Very truly yours,

MINERALS ENGINEERING COMPANY

Edson Foster

Edson Foster
Drill Superintendent

EF/k

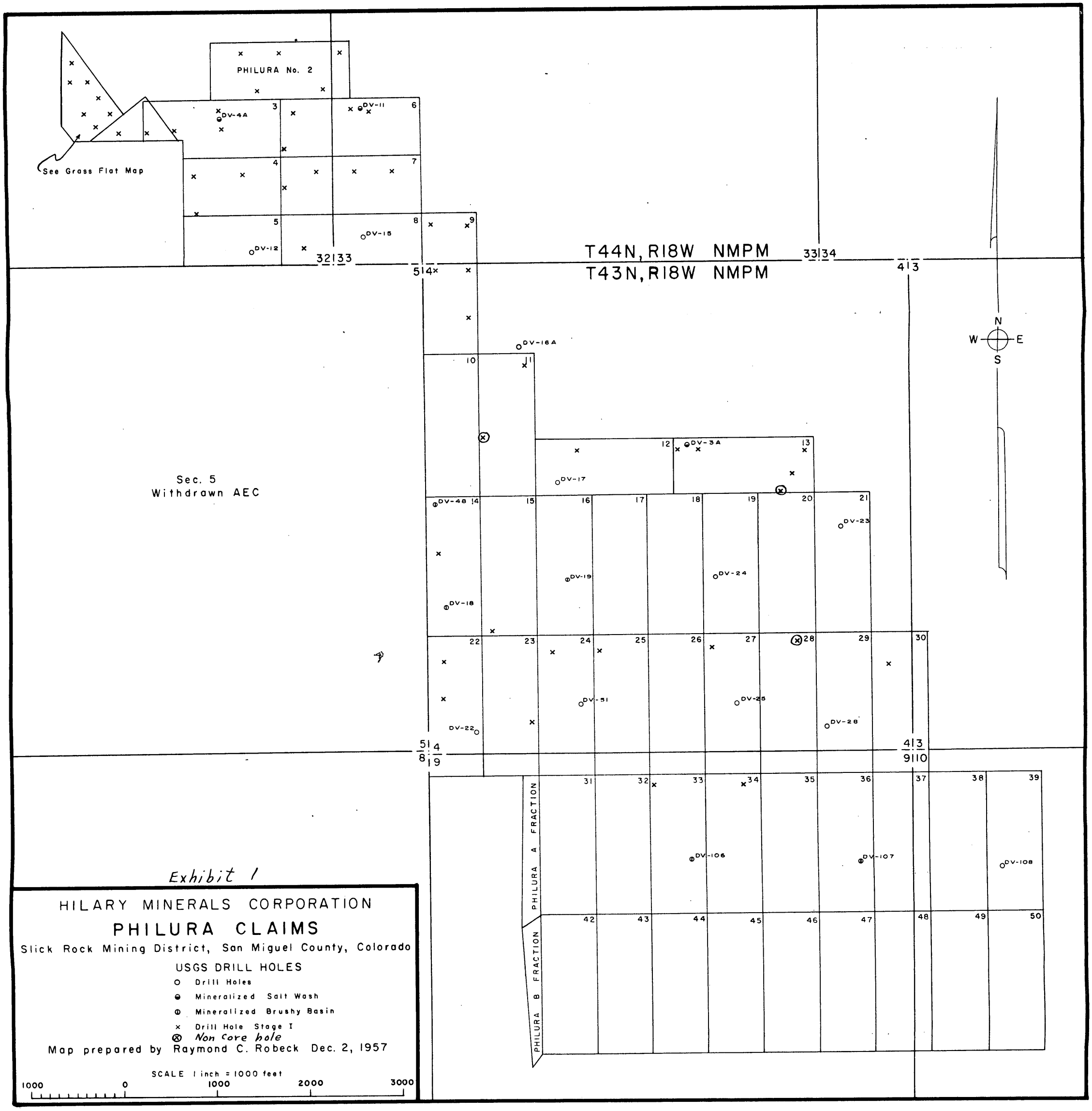
PHILURA No. 2
See Grass Flat Map
T44N, R18W NMPM
T43N, R18W NMPM
32|33
33|34
5|4
4|3
5/8 | 4/9
4/3 | 9/10
Sec. 5
Withdrawn AEC
DV-4A
DV-11
DV-12
DV-15
DV-16A
DV-17
DV-3A
DV-48
DV-18
DV-19
DV-24
DV-23
DV-22
DV-51
DV-25
DV-26
DV-106
DV-107
DV-108
PHILURA A FRACTION
PHILURA B FRACTION
N
W
E
S
Exhibit 1
HILARY MINERALS CORPORATION
PHILURA CLAIMS
Slick Rock Mining District, San Miguel County, Colorado
USGS DRILL HOLES
Drill Holes
Mineralized Salt Wash
Mineralized Brushy Basin
Drill Hole Stage I
Non core hole
Map prepared by Raymond C. Robeck Dec. 2, 1957
SCALE 1 inch = 1000 feet
1000 0 1000 2000 3000

Exhibit 1

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DATE	INITIALS	CODE

DMEA Form 7
(12-56)

SOLICITOR

3 1958

C

INTERIOR DEPT.

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Date	Surname	Code
11/3/58	Ching	700
11/3	Knouse	700
		140

November 3, 1958

Memorandum

To: Associate Solicitor
Division of Mineral Resources

From: F. L. Knouse, Acting Chief
Division of Rare and Miscellaneous Metals

Subject: Unilateral Rescission
Docket No. DMEA-4949 (Uranium)
Contract No. Idm-E1196
Hilary Minerals Co., Inc.,
Philura and Grass Flat Claims
San Miguel County, Colorado

An agreement entitled Rescission of Exploration Project Contract was forwarded on September 24 to the subject Operator for execution.

To date, it has failed to execute the agreement or respond in any way. Under these circumstances, will you kindly prepare the necessary document to unilaterally rescind the contract.

/s/ F. L. Knouse

F. L. Knouse

MChing/gla
cc to: Mr. Ching

8623

DMEA Form 7
(12-56)

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Date	Surname	Code
10/31/58	Ching	700
10/31	Kwan	700
10/31	[illegible]	130
10/31	Mato	130
"	Nelson	130
"	Johnson	110
		~~100~~
11/3	C	~~700~~ 220
		700

OCT 31 1958

Department of the Interior

OME

1490108, Salaries and Expenses
Office of Minerals Exploration,
Interior, 1959

T E L E T Y P E

J. W. TOWNSEND, EXECUTIVE OFFICER
OME FIELD TEAM, REGION III
224 NEW CUSTOMHOUSE BUILDING
DENVER, COLORADO

RE MR. HARSHMAN'S TELETYPE OCTOBER 29, HILARY MINERALS CO. INC., DOCKET 4949, OPERATOR HAS FAILED TO RESPOND TO DIRECTOR'S LETTER OF SEPTEMBER 24. WE WILL NOW PREPARE A UNILATERAL RESCISSION.

George C. Selfridge

ACTING CHAIRMAN, OPERATING COMMITTEE (HB)

MChing/gla
10-31-58
cc to: Director's Reading File
Operating Committee
THKiilsgaard, 5224
Mr. Ching

8623

Mr. George Selfridge

OFFICIAL FILE COPY
O. M. E.
RECEIVED OCT 30 1958

DATE	INITIALS	CODE
10/30	C	220
	Ching	700

DN 235 BUR MINES 10-29-58 12-37

CHAIRMAN, OPERATING COMMITTEE, OME

RE DOCKET DMEA 4949, CONTRACT IDM-E1196, HILARY MINERALS CO INC. PLEASE TELETYPE ADVICE AS TO STATUS OF RESCINDING THE CONTRACT.

E N HARSHMAN

LAST WORD FIRST LINE CO.,

Denver, Colo.

OFFICIAL

BUREAU OF MINES
MAIL ROOM
WASHINGTON, D. C.

OCT 29 2 56 PM '58

m 7

OFFICIAL FILE COPY

Date	Surname	Code
9/19/58		700
9/22	Knouse	700
9/22	Talbut	800
"	Johnson	110
"	Whitbeday	100
9/24	C O	220
		700
9/23	Selfridge	

SEP 24 1958

Mr. Joseph H. Kanter
Hilary Minerals Co., Inc.
25 Broad Street
New York 4, New York

Re: Docket No. DMEA-4949 (Uranium)
Contract No. Idm-E1196
Philura and Grass Flat Claims
San Miguel County, Colorado

9/23 Nelson 1130
9/23 Caravagale 1130

Dear Mr. Kanter:

In accordance with our telegram of September 17, we are enclosing the original and four copies of an agreement entitled "Rescission of Exploration Project Contract," signed by the Acting Director.

Please have the original and all copies of the agreement signed by an official of the Hilary Minerals Co., Inc., authorized to sign such an instrument, the signer's title inserted, the corporate seal affixed, and the original and all copies, except the copy marked "Operator's copy," promptly returned to this office.

The Office of Minerals Exploration is the successor agency to the Defense Minerals Exploration Administration.

Sincerely yours,

S

Director

Enclosures

FLKnouse/gla
9-19-58
cc to: Director's Reading File
Operating Committee
THKiilsgaard, 5224
FLKnouse
Mr. Ching
DMEA Field Team, Region III (2)

8623

DMEA Form 7
(12-56)

OFFICE OF MINERALS EXPLORATION

OFFICIAL FILE COPY

Date	Surname	Code
9/12/58	Ching	700
9/12	Kuoste	700
9-15	Chambers	800
		130
		110
		100
		220
		700

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Mr. J. W. Townsend
Alternate Acting Executive Officer
DMEA Field Team, Region III
224 New Customhouse Building
Denver 2, Colorado

Re: Docket No. DMEA-4949 (Uranium)
Contract No. Idm-E1196
Hilary Minerals Co., Inc.
Philura and Grass Flat Claims
San Miguel County, Colorado

Dear Mr. Townsend:

In accordance with our teletype of September 9, we are enclosing the original and four copies of an agreement entitled "Rescission of Exploration Project Contract," signed by the Administrator. Two extra copies are enclosed for the Field Team's use.

If you and the Operator find the agreement in order, please have the Operator execute it as indicated and make the usual distribution thereafter.

Sincerely yours,

Enclosures

Chairman, Operating Committee

APPROVED:

Member, Bureau of Mines

Member, Geological Survey

MChing/gla
9-12-58
cc to: Admr.'s Reading File
Operating Committee
THKiilsgaard, 5224
Mr. Ching

P.S. In your transmittal letter you should advise the Operator that the Office of Minerals Exploration is successor agency to the Defense Minerals Exploration Administration.

8623

Excerpt from Mr. Mittendorf's diary, 9/17/58:

Late yesterday I signed a telegram to Joseph Kanter advising him that we could not comply with his request for an extension of time and were mailing a rescission agreement. This relates to DMEA-4949, Hilary Minerals Co.

This morning Kanter's brother, a Washington lawyer, phoned me to plead for a reconsideration. He freely admitted that we had every right to declare the contract in default and take the action proposed.

I told him there was nothing in the docket that justified our compliance with the request. I pointed out how dilatory his brother had been and cited the fact that the contract had been in default a week before he requested an amendment to nullify the default.

I was told that the local Kanter would prepare a strong justification which I could use as the basis for reversing my present plan of action. He said he could assure us that the work would be started by October 1 and would be completed by winter. I told him that would not be an appropriate justification; he must justify their not getting started and their not having already completed the work.

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
9/16/58	Knouse	700
9/17	Jackson	800
9/16	Selfridge	120
	Ebert	110
16	Fullerton	100
9/18	C	220
		700

HC Q

1490108, Salaries and Expenses,
Office of Minerals Exploration,
Interior, 1959

JOSEPH H. KANTER
HILARY MINERALS CO., INC.
25 BROAD STREET
NEW YORK 4, NEW YORK

REURLET TO TOWNSEND, DATED SEPTEMBER 8, CONTRACT IDM-E1196, UNABLE TO ACT FAVORABLY ON YOUR REQUEST. FORWARDING CONTRACT RESCISSION AGREEMENT.

C. O. Mittendorf (for)

C. O. MITTENDORF,
ACTING DIRECTOR
OFFICE OF MINERALS EXPLORATION

FLKnouse/gla
9-16-58
cc to: Director's Reading File
Operating Committee
THKiilsgaard, 5224
FLKnouse

DMEA Field Team, Region III (2)

8623

OFFICIAL FILE COPY
DMEA
RECEIVED SEP 15 1958

DATE	INITIALS	CODE
9/15	C	220
		130
9/16	~~Kramer~~ (Ching)	700

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

224 New Customhouse
Denver 2, Colorado
September 10, 1958

Memorandum

To: Chairman, Operating Committee, DMEA

From: Acting Executive Officer, DMEA Field Team, Region III

Subject: Docket No. DMEA 4949 (Uranium), Contract No. Idm-E1196, Hilary Minerals Co., Inc. (Philura and Grass Flat claims), San Miguel County, Colorado

Enclosed for your information are the original and two copies of a letter from the subject Operator, dated September 8, 1958, relative to the requested extension of the contract starting date.

A rescission agreement is being prepared by your office to rescind, revoke, and cancel the contract.

E. N. Harshman

E. N. Harshman

Enclosures

Hilary Minerals Co., Inc.

25 BROAD STREET
NEW YORK 4, NEW YORK

928 NORTH BEND ROAD
CINCINNATI 24, OHIO

OFFICIAL FILE COPY
DMEA
RECEIVED SEP 15 1958
DATE | INITIAL | CODE

September 8, 1958

DMEA
DEPARTMENT OF THE INTERIOR
SEP 10 1958
REGION III
DENVER, COLORADO

Mr. J. W. Townsend,
Alternate Acting Executive Officer,
DMEA Field Team, Region III,
U. S. Department of the Interior,
224 New Customhouse,
Denver 2, Colorado.

Re: Docket DMEA 4949 (Uranium)
Contract No. IDm-E1196
Hilary Minerals Co., Inc.
(Philura and Grass Flats claims)
San Miguel County, Colorado

Dear Mr. Townsend:

On August 22, 1958, we forwarded to you a request that an extension be made until October 1, 1958. If this extension is to be granted, I would like to know so that I can let the contracts for this drilling in order to comply with the October 1st commencement date.

Very truly yours,

HILARY MINERALS CO., INC.

J H Kanter

Joseph H. Kanter
President

K:r

OFFICIAL FILE COPY

Date	Surname	Code
9/9/58	Ching	700
9/9	Everett	700
9/9	[illegible]	130
9/9	Johnson	110
"	Butterworth	100
9/9	C	220
		700

9/9 McMahon 130
9/9 Nelson 130

SEP 9 1958

Department of the Interior

DMEA

14X4401(01) Revolving Fund, Defense Production Act, Interior, (Transfer to Office of Secretary)

T E L E T Y P E

J. W. TOWNSEND
ALTERNATE ACTING EXECUTIVE OFFICER
DMEA FIELD TEAM, REGION III
224 NEW CUSTOMHOUSE BUILDING
DENVER, COLORADO

RE HILARY MINERALS CO., INC. DOCKET 4949 OPERATOR'S REASONS FOR FAILURE TO START WORK BY AUGUST 15 AND CONSEQUENT REQUEST FOR EXTENSION OF STARTING AND COMPLETION DATES INADEQUATE AND UNACCEPTABLE. WE ARE PREPARING RESCISSION AGREEMENT IN LIEU OF PROPOSED AMENDMENT.

George C. Selfridge

CHAIRMAN, OPERATING COMMITTEE (2/2)

MChing/gla
9-9-58
cc to: Admr.'s Reading File
Operating Committee
THKiilsgaard, 5224
Mr. Ching
Confirmation to Region III

8623

Form 7
(56)

OFFICIAL FILE COPY

Date	Surname	Code
9/8/58	Ching	700
		[redacted]
		140

INTERIOR DEPT. INTERIOR DEPT.
SEP 10 1958 SEP 9 - 1958
SOLICITOR SOLICITOR

September 8, 1958

Memorandum

To: Associate Solicitor
Division of Mineral Resources

From: F. L. Knouse,
Division of Rare and Miscellaneous Metals

Subject: Docket No. DMEA-4949 (Uranium)
Contract No. Idm-E1196
Hilary Minerals Co., Inc.
Philura and Grass Flat Claims
San Miguel County, Colorado

Please prepare a rescission agreement between the Government and Hilary Minerals Co., Inc., rescinding and cancelling the subject contract as of the date of the contract, without any obligations whatever one party to the other, the same as if said contract had never been entered into.

/s/ F.L. Knouse
F. L. Knouse

MChing/gla

RECEIVED
SEP 1 1958
ASSOC. SOLICITOR
MINERAL RESOURCES

8623

Operator in default.

Poor reasons for not starting.

Failed to furnish FT requested information.

Bad experience with Kanter on previous contract.

Ample time allowed for starting. No guarantee work would begin if time extended or completed if started.

FEJohnson

RM-6 REFERENCE SLIP

56 DEFENSE MINERALS EXPLO ION ADMINISTRATION

	INITIALS	DATE
1. ~~Asso. Solicitor, Rm. 6042~~		9/2
2. Mr. Ching, Rm. 4445		
3.		
4.		
5.		
FROM: F. L. Knouse	JLK	9/2

FOR: Check items for action desired

X Action ____ Reply for signature of ____

X Approval ____ Investigate ____ Surname

____ Comment ____ Recommendations ____ Signature

____ Conference ____ Rewrite ____ File

____ Instructions ____ Your information

REMARKS:

For preparation of Amendment No. 1 in accordance with the attached draft.

RECEIVED INTERIOR DEPT.

SEP 3 1958 SEP 3 - 1958

ASSOC. SOLICITOR
MINERAL RESOURCES

SOLICITOR

INT.-DUP. SEC., WASH., D.C.

M8278

9/5/58

Mr. Ching: Returned per conversation with Mr. Mittendorf 9/5.

R. P. Dwyer

DRAFT
9/2/58
MChing/gla

AMENDMENT NO. 1

It is agreed this day of , 1958, between the UnitedStates of America, acting through the Department of the Interior, Defense Minerals Exploration Administration, and Hilary Minerals Co., Inc., that Exploration Project Contract No. Idm-E1196, Docket No. DMEA-4949, dated May 29, 1958, hereinafter called the "Contract," is amended as follows:

1. The date fixed in Article 3 of the Contract, on or before which the work shall commence, is extended from August 15 to October 1, 1958.

2. The date fixed in Article 3 of the Contract, on or before which the work shall be completed, is extended from October 31 to December 31, 1958.

3. It is ~~of~~ the essence of this Contract that the work be commenced on or before October 1, 1958, and if not so commenced the Contract shall be and is hereby rescinded and cancelled as of the date of the Contract without any obligations whatsoever one party to the other, the same as if said Contract had never been entered into.

IN WITNESS WHEREOF, these parties have executed this agreement as of the day and year first above written.

THE UNITED STATES OF AMERICA

By_____
Administrator, Defense Minerals Exploration Administration

HILARY MINERALS CO., INC.
By_____
Title_____

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

224 New Customhouse
Denver 2, Colorado
August 25, 1958

8/29 C 220 130 700

Memorandum

To: Chairman, Operating Committee, DMEA

From: Alternate Acting Executive Officer, DMEA Field Team, Region III

Subject: Docket No. DMEA 4949 (Uranium) Contract Idm-E1196, Hilary Minerals Company, Inc., (Philura and Grass Flats claims) San Miguel County, Colorado

Enclosed are the original and two copies of a letter from the subject Operator dated August 22, 1958, requesting that the contract starting date be extended from August 15, 1958, to October 1, 1958, and that the completion date be extended from October 31, 1958, to December 15, 1958.

We recommend that the extensions be granted as requested by the Operator; however, due to our previous experience with Hilary Minerals Co., Inc. under Contract Idm-E1056, and with Kanter-Levy Company, Contract Idm-E1173, which is also headed by Joseph Kanter, we further recommend that recitation be included in the amendment to the effect that if work is not commenced on or before October 1, 1958, the contract is rescinded.

J. W. Townsend

J. W. Townsend

Enclosure

Hilary Minerals Co., Inc.

25 BROAD STREET
NEW YORK 4, NEW YORK

928 NORTH BEND ROAD
CINCINNATI 24, OHIO

DMEA
DEPARTMENT OF THE INTERIOR
AUG 25 1958
REGION III
DENVER, COLORADO

August 22, 1958

Mr. J. W. Townsend,
Alternate Acting Executive Officer,
DMEA Field Team, Region III,
U. S. Department of the Interior,
224 New Customhouse,
Denver 2, Colorado.

Re: Docket DMEA 4949 (Uranium)
Contract No. Idm-E1196
Hilary Minerals Company, Inc.
(Philura and Grass Flats claims)
San Miguel County, Colorado

Dear Mr. Townsend:

Please accept this letter as our request that the starting date of August 15, 1958 be extended to October 1, 1958, and that the termination date be extended to December 15, 1958.

There are several reasons why we have been unable to commence operations as of August 15th. The press of some very important business negotiations in one of our other corporations has made it impossible for the contracts to be let for the drilling. In addition, because of the geographical distance, we had hoped to keep our administration costs down and work this project together with another project of drilling in that area. A delay in the other project made a trip to the West not feasible this month.

We would certainly appreciate it if you could, therefore, extend the commencement date.

Very truly yours,

HILARY MINERALS CO., INC.

J H Kanter

Joseph H. Kanter
President

K:r

OFFICIAL FILE COPY
DMEA
RECEIVED 29 1958
DATE

OFFICIAL FILE COPY
DMEA
RECEIVED AUG 21 1958

DATE	INITIAL	CODE
8/21	H.J.	225
8/21	[illegible]	800
8/22	[illegible]	700

224 New Customhouse
Denver 2, Colorado

August 19, 1958

Mr. Joseph H. Kanter, President
Hilary Minerals Company, Inc.
928 North Bend Road
Cincinnati 24, Ohio

Re: Docket No. DMEA-4949 (Uranium)
Contract No. Idm-K1196
Hilary Minerals Company, Inc.
(Philura and Grass Flats claims)
San Miguel County, Colorado

Dear Mr. Kanter:

On advice from you by letter of June 27, 1958, the date of August 15, 1958 was fixed in Article 3 of the contract as the date on or before which work was to be commenced. Since the established commencement date has passed and we have not heard from you regarding start of the work, we would appreciate advice by return mail as to the date work under the contract was started.

In conjunction with the start of work under the contract, we will appreciate the information requested in the last paragraph of our letter to you, dated July 2, 1958, regarding the name, address and telephone number of the geologist or mining engineer who will have charge of the project work for you and who will devote full time to the work, as prescribed in the contract.

didn't answer

Very truly yours,

Original signed by
J. W. TOWNSEND

J. W. Townsend
Alternate Acting Executive Officer
DMEA Field Team, Region III

JWT:bh
cc: Chmn. Op. Comm.(2)
Harshman
Hasler
Robertson, DMEA/GJ
DMEA/DFC
Correspondence File
Cooper
Chron.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
224 New Customhouse
Denver 2, Colorado
July 2, 1958

OFFICIAL FILE COPY
DMEA
RECEIVED JUL 7 1958

DATE	INITIALS	CODE
7/7	CG	220
7/7	B	215
7/7	FLC	700

Memorandum

To: Chairman, Operating Committee, DMEA

From: Alternate Acting Executive Officer, DMEA Field Team, Region III

Subject: Docket No. DMEA 4949 (Uranium), Contract ~~No. Idm-E1196, Hilary~~ Minerals Co., Inc. (Philura and Grass Flats claims), San Miguel County, Colorado

Enclosed are the following, pertaining to the subject matter:

1. The Government's and Audit copies of Contract No. Idm-E1196, which was forwarded by your letter of May 29, 1958 for the signature of the Applicant, provided that a suitable final starting date was inserted under Article 3.

2. Two copies of the Operator's letter of June 27, 1958, whereby the executed copies of the contract were returned to this office.

3. Two copies of a letter from this office, dated July 2, 1958, whereby we forwarded the "Operator's Copy" of the contract, blank report forms, instructions relative to reporting on work performed under the contract, and procedures to be followed in communicating with this office in all matters pertaining to the contract.

4. Two copies of a letter to the Operator, dated July 2, 1958, containing advice relative to the contract and request for the name, address, and telephone number of the person who will have charge of the project work.

The executed copies of the contract were received in this office July 2, 1958, via air mail special delivery. The cancellation on the envelope containing the copies of the contract indicates that it was stamped out in Cincinnati, Ohio, June 30, 1958, and received in Denver, Colorado, July 1, 1958 at 6:00 p.m.

The contract, dated May 29, 1958, provides for exploration work estimated to cost $26,824.00, toward which the Government will contribute 50 percent, or not in excess of $13,412.00.

Copies of the contract have been distributed to the Finance Office and others concerned in Region III.

J. W. Townsend

Enclosures

DMEA
DEPARTMENT OF THE INTERIOR
JUL 2 - 1958
REGION III
DENVER, COLORADO

Air Mail
Special Delivery

928 North Bend Road
Cincinnati 24, Ohio
June 27, 1958

Mr. J. W. Townsend,
Alternate Acting Executive Officer,
DMEA Field Team, Region III,
U. S. Department of the Interior,
224 New Customhouse,
Denver 2, Colorado.

Re: Docket #DMEA 4949 (Uranium)
Proposed Contract #Idm-E1196
Hilary Minerals Co., Inc.
(Philura and Grass Flat claims)
San Miquel County, Colorado.

Dear Mr. Townsend:

I am returning to you the Government's, the Audit, Finance Office, and Field Team copies of the proposed Exploration Project Contract No. Idm-E1196, Docket DMEA 4949, which has been properly signed. We would appreciate having until August 15, 1958 to commence work on this project.

Very truly yours,

Joseph H. Kanter

K:r

Encls. (4)

OFFICIAL FILE COPY
DMEA
RECEIVED JUN 7 1958
DATE | INITIALS | CODE

OFFICIAL FILE COPY
DMEA
RECEIVED JUL 7 1958
DATE | INITIALS | CODE

[illegible] New Customhouse
Denver 2, Colorado

CERTIFIED MAIL

JUL 2 1958

Uranium Minerals Co., Inc.
[illegible] Building
Miami, Florida

Re: Docket No. [illegible] (Uranium)
Contract No. [illegible]
Uranium Minerals Co., Inc.
(Fulton and Green Flats claims)
San Miguel County, Colorado

Gentlemen:

Enclosed is the "Operator's Copy" of Exploration Project Contract No. [illegible], Docket No. [illegible].

Also enclosed are six copies of Form [illegible], "Operator's Monthly Report and Voucher," and six copies of Form [illegible], "Operator's Unit Cost and Footage Report." At the end of the first calendar month after work is commenced, and monthly thereafter, you are required to submit the original and four copies of each form to the

Defense Minerals Exploration Administration
P. O. Box [illegible]
Grand Junction, Colorado.

The extra copy is for your records.

Forms [illegible] and [illegible] are to be combined into five sets of one of each form. Each set of the combined forms is to be accompanied by a map or sketch, showing the location and extent of work performed, and a signed narrative report which describes the work performed, conditions encountered, and results of the work. The monthly accounting report will not be processed for reimbursement unless it is accompanied by a signed narrative report and other required or pertinent data. Additional copies of Forms [illegible] and [illegible] will be sent you each month on receipt of your report for the prior month.

The U. S. Geological Survey and the U. S. Bureau of Mines maintain a field office in the AEC Compound at Grand Junction, Colorado. DMEA representatives of the two Services can be contacted as follows:

G. W. Snoke, Geologist, Geological Survey;
H. E. Salsbury, Mining Engineer, Bureau of Mines
Telephone, Grand Junction, Chapel 3-2110, Ext. 272 or 282;
P. O. Box [illegible], Grand Junction, Colorado.

For your information, and in reply to many questions that have been asked, after Forms RP-10A and RP-10A are received, an engineer will check progress on the project and review your accounts, after which the report Form will be forwarded to this office for administrative consideration and validating. If the report is in order, a check will be issued by the Treasury Department for the Government's portion of the approved costs. If you have any difficulty in completing these forms and the reports, please call on either the field representative or this office for assistance.

In the matter of your claim for reimbursement of drilling costs under the terms of the contract, reimbursement to you will be on the basis of a hole or holes completed to the objective, which has, or have been, drilled in compliance with the conditions under the "General Provisions" portion of Exhibit "A" of the contract and the special conditions pertaining to drilling under such clause. However, your monthly report should include only such holes which are completed to that extent and the required records make a part of your claim for reimbursement.

The contract is payment on Form RP-[illegible], and under its provisions and as outlined in Exhibit "A" attached to the contract, the allowable costs are a combination of "Actual Costs" and "Flat Rate Costs," with established maximum average unit costs for the drilling and maximum unit costs which are to be allowed for the other items of work under Category (1). Under the provisions of Article 8 of the contract, the work outlined in Exhibit "A" under Category (2) is to be performed by an independent contractor. The actual costs of the work completed under Category (2) are to be recorded under Item (1) on Form RP-10A, and must be supported and documented by a signed or certified true copy of the billing from the independent contractor. The costs of camp houses and sample employees under Category (7) are to be recorded under Item (7) on Form RP-10A. In reference to camp houses, you are to report only the quantity used in each reporting period, and the charge must be documented by a copy of the original invoice for the purchase of the camp house. The number of sample employees reported must be documented by a copy of the payroll which is signed or certified true copy of the billing from the manager. Average reported on the basis of the "Flat Rate Costs" must be documented, as they are otherwise validated. However, where an "Actual Cost" basis are to be reported on Form RP-10A under Item (1). For further information relative to documentation of costs, please refer to instructions on the reverse side of Form RP-10A. Also, please refer to instructions on the reverse side of Form RP-10A regarding preparation of that form.

In reference to the drilling work under Category (1) of Exhibit "A", please refer to added provisions under Article 13(g) of the contract dealing to the average unit costs. If costs incurred any month cause the average unit cost to be in excess of the maximum allowable average unit cost, no more costs will be reimbursed, subject to reimbursement at a later date without the aggregate of such reimbursements, should the costs incurred in any subsequent month cause the average unit cost to fall below the maximum allowable average unit cost. The foregoing applies to each separate class of drilling under each unit "Stage."

[illegible]

In the event you desire to perform the work under Stage(s) (1) on company account instead of subcontracting it, as provided in the contract, it will be necessary that you request and obtain an appropriate amendment to the contract before reimbursement can be made to you for the Government's portion of the allowable incurred costs.

Your requests to this office for work approval, changes in the contract, or any other communication pertaining to operations under the contract, must be in writing, of which please supply the original and five copies, each copy complete with maps or other pertinent data. Such requests for action by this office must pertain to one matter only. Such requests are not to be incorporated in your narrative report accompanying monthly progress report Forms ES-1075 and ES-1044.

The location of the work to be performed under Stage I is indicated on the map, "Figure 1," attached to the contract. Should conditions encountered necessitate any appreciable change in the location or direction of any of the work, approval of this office for the change must be obtained prior to performance of the work. Otherwise, the work may not be acceptable for reimbursement to you under the terms of the contract.

Your attention is directed to the provision that work under both Stages II and III is contingent upon results of the work completed under the prior Stage and that performance of the work is subject to the prior written approval of the Government.

When work under a stage has been completed, or sufficiently so to permit evaluation of results of the work, you must request approval from this office for the work you propose to perform under the next stage. Your request for the work approval must be in triplicate, each copy complete with a map showing the locations of holes previously drilled and the locations of the holes you propose to drill under the next stage. Your request should be complete with drill logs, results of radioactivity probing, chemical analyses, and any other pertinent data which will be of value to the Government in appraising the work performed under the prior stage.

If work under Stage I is completed in its entirety before you request approval for work under Stage II, you should anticipate a suspension of operations between stages of work, to enable the Government geologist and engineer to evaluate results of the work performed and make their recommendations to this office relative to the additional work you propose.

To eliminate as much delay to operations as possible, if that is of serious consideration, you should expedite the forwarding of results of the work completed and your request for the Government's approval of the additional work you propose.

No oral statement of any person shall be construed to modify or change the terms of the contract. Field representatives of the Government are not authorized to approve any changes in the work program or contract provisions. Such approval can only be given by the Washington Office, NASA, or by the NASA Field Team, Region III.

It is a regulation that reimbursement for the cost of work accomplished prior to the date of the contract will not be allowed. It is a requirement and inconvenience that we realize this office is without the full and valuable assistance which has resulted.

Very truly yours,

Original signed by
J. W. TOWNSEND

Alternate Acting
Executive Officer, NASA
Field Team, Region III

Enclosures

JWT:pel

cc: Chem. Op. Comm. (2)
Finance Office, Reg. III
Assignment File, Reg. III
Harrison
Hailer
NASA/Hr.Jct.
NASA/NPC
Contrac. file
Treasurer
Chron.

[illegible] New Customhouse
Denver 2, Colorado
July 2, 1958

CERTIFIED MAIL

Mr. Joseph E. Hunter, President
Hilary Minerals Co., Inc.
[illegible] North Bend Road
Cincinnati 24, Ohio

Re: Docket No. DMEA 4949 (Uranium)
Contract No. IAm-H196
Hilary Minerals Co., Inc.
(Hallock and Grace Flats claims)
San Miguel County, Colorado

Dear Mr. Hunter:

Enclosed are the "Operator's Copy" of Exploration Project Contract No. IAm-H196 and a letter of this same date containing information and procedures to be followed in conjunction with administration of the contract.

The date of August 15, 1958 has been inserted in Article 3 of the contract form, as requested in your letter of June 27, 1958, whereby you returned the executed copies of the contract to this office.

Before start of work under the contract, please advise the name, address, and telephone number of the geologist or mining engineer who will have charge of the project work for you and who will devote full time to the work as prescribed in the contract.

Very truly yours,

Original signed by
J. W. TOWNSEND

J. W. Townsend
Alternate Acting Executive Officer
DMEA Field Team, Region III

JWT:jrl

Enclosures

cc: Chem. Op. Comm. (2)
Hardman
Hunter
DMEA/Sr.Jct.
DMEA/DFC
Carnes. file
Townsend
Chrom.

DMEA
RECEIVED JUN 20 1958
CODE
6/20 C 220
" Kanter 700

224 New Customhouse
Denver 2, Colorado
June 18, 1958

Mr. Joseph H. Kanter
928 North Bend Road
Cincinnati 24, Ohio

Re: Docket No. DMEA 4949 (Uranium)
Proposed Contract No. Idm-E1196
Hilary Minerals Co., Inc.
(Philura and Grass Flat claims)
San Miquel County, Colorado

Dear Mr. Kanter:

In reference to your letter of June 16, 1958, and as you were advised in the last paragraph of our letter of June 2, 1958, the contract must be signed and post marked for return to this office not later than June 30, 1958, for it to become effective.

Very truly yours,

J. W. Townsend
Alternate Acting Executive Officer
DMEA Field Team, Region III

JWT:dp

cc: Chmn. Op. Comm. 2) w/cy
Harshman) Appli-
DMEA/GJ) cant's
Hasler) letter
DMEA/DFC) of
Docket) 6-16-58
Townsend
Chron.

DMEA
DEPARTMENT OF THE INTERIOR
JUN 18 1958
REGION III
DENVER, COLORADO

OFFICIAL FILE COPY
DMEA
RECEIVED JUN 20 1958
DATE | INITIAL | CODE

928 North Bend Road
Cincinnati 24, Ohio
June 16, 1958

Mr. James Townsend,
Alternate Acting Executive Officer,
DMEA Field Team, Region III,
United States Dept. of the Interior,
224 New Customhouse,
Denver 2, Colorado.

Re: Docket No. DMEA 4949 (Uranium)
Proposed Contract No. Idm-E1196
Hilary Minerals Co., Inc.
(Philura and Grass Flat claims)
San Miquel County, Colorado.

Dear Mr. Townsend:

We have received Release of June 6, 1958, regarding termination of DMEA contracts.

In regard to the above file, must this contract be signed prior to June 30, 1958 in order to be effective?

Very truly yours,

Joseph H. Kanter

K:r

OFFICIAL FILE COPY

Date	Surname	Code
5/26	Ching	700
5/26	Ellis	700
5-26	Chambers	200
5/28	GLS	130
"	Johnson	110
"	Mitchell	200
		240
5/29	C	220
		200

MAY 29 1958

Mr. E. N. Harshman
Acting Executive Officer
DMEA Field Team, Region III
224 New Customhouse Building
Denver 2, Colorado

Re: Docket No. DMEA-4949 (Uranium)
Hilary Minerals Co., Inc.
Philura and Grass Flat Claims
San Miguel County, Colorado

Dear Mr. Harshman:

Enclosed are the original and four copies of a proposed long-form contract between the Government and Hilary Minerals Co., Inc., signed by the Administrator. The contract consists of Form MF-200, Annex I, a Consent to Lien and Subordination Agreement, Exhibit "A" (4 pages), and a map (Figure 4). Also enclosed are two extra copies each of Annex I, Exhibit "A," and the map (Figure 4), for the use of the Field Team.

If you and the Applicant find the proposed contract satisfactory, it is ready for the signature of the Applicant, provided that a suitable final starting date is inserted under Article 3. The Applicant should be warned to expedite the signature because of a possible June 30 deadline.

The examiners' Revised Estimated Costs of May 6, 1958, have been incorporated into the contract without significant change.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee

Enclosures
APPROVED:

Frank D. Lamb

Member, Bureau of Mines

Thor H. Kiilsgaard

Member, Geological Survey

MChing/izm 5-26-58
cc: Mr. Ching
Admr.'s Reading File
Operating Committee
THKiilsgaard, 5224

8623

OFFICIAL FILE COPY

Date	Surname	Code
5/12	Ching	700
"		140

INTERIOR DEPT.
MAY 13 1958
SOLICITOR

May 12, 1958

Memorandum

To: Associate Solicitor
Division of Mineral Resources

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

Subject: Proposed Contract
Docket No. DMEA-4949 (Uranium)
Hilary Minerals Co., Inc.
Philura and Grass Flat Claims
San Miguel County, Colorado

Please prepare a long-form contract between the Government and Hilary Minerals Co., Inc., in accordance with the attached draft.

Eight copies of the map (Figure 4) are attached for use with the contract.

Five Consent to Lien and Subordination Agreement forms, executed by Beaver Mesa Uranium, Inc., are also attached for use with the contract.

/s/ Ernest Wm. Ellis

Ernest Wm. Ellis

Attachments

MChing/izm 5-12-58
cc: Mr. Ching

RECEIVED
MAY 13 1958
ASSOC. SOLICITOR
MINERAL RESOURCES

8623

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
5/12	Ellis	700

May 12, 1958

Memorandum

To: The Files

From: Michael Ching, Mining Engineer
Division of Rare and Miscellaneous Metals

Subject: Proposed Contract Costs
Docket No. DMEA-4949 (Uranium)
Hilary Minerals Co., Inc.
Philura and Grass Flat Claims
San Miguel County, Colorado

The following costs are based upon those recommended by the field examiners in a report, dated April, 1958. A change was made to correct a mistake by the examiners on the estimated cost of the core drilling, which was based upon the lowest of three bids. Also, the Incidental Cost for drilling was reduced from $0.44 per foot to $0.27 by reducing the time factor from 5 months to 3 months. This was done by basing drilling progress on two drill shifts per day instead of on one.

Actual Costs

6,800 ft. non-core drilling, 0-200 ft. depths, @ $1.50/ft.	$10,200.00	
306 ft. non-core drilling, 200-400 ft. depths, @ $1.80/ft.	550.80	
2,550 ft. core drilling, 200-400 ft. depths, @ $4.75/ft.	12,112.50	
72 hrs. bulldozing @ $12/hr.	864.00	
34 chemical sample analyses @ $5/sample	170.00	
255 cardboard core boxes @ $1.25/each	318.75	$24,216.05

Fixed Unit Costs

Incidental Allowance

Supervisor and technical services			
Engineer-geologist, 3 mos. @ $600/mo.		$1,800.00	
Operating material and supplies, 3 mos. @ $55/mo.		165.00	
Operating Equipment,			
Trailer rental, 3 mos. @ $50/mo.	$150.00		
Depreciation, 3 mos, @ $60/mo.	180.00	330.00	
Miscellaneous,			
Accounting, 3 mos. @ $50/mo.	$150.00		
Payroll taxes @ 7%	126.00	276.00	

8623

Total, 9656 ft. drilling @ $0.27/ft. (rounded)	$2,607.12
Estimated Total Cost of the Contract (rounded)	$26,824.00

Michael Ching

Michael Ching

MChing/izm 5-12-58
cc: Mr. Ching

P. S. See Revised Estimated Costs of Examiners in Memorandum, dated May 6, 1958, which arrived after above was written.

mc

DRAFT
MChing/izm
5-12-58

MF-200
(Revised June 1954)

Docket No. DMEA 4949

Commodity Uranium

Contract No. Idm-E

UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

EXPLORATION PROJECT CONTRACT[1]

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] Hilary Minerals Co., Inc., a New York corporation, whose mailing address is 729 Du Pont Building, Miami, Florida, 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-200), the attached Exhibit "A," Annex I, ~~and~~ Annex II, and map (Figure 4)

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 Colorado, County of San Miguel, and is described in Annex I.[3]

(b) The Operator represents and undertakes that:

(1) The Operator is the [4] Lessee 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 ....., page ....., 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: Interest of Beaver Mesa Uranium, Inc.

(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

[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."

of the land (lessor, seller, optionor, etc.), are attached, as follows: Consent to Lien and Subordination Agreement of Beaver Mesa Uranium, Inc.

(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 8, it shall thereafter have no claim against the land or any production therefrom except for any production referred to in Article 8(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 ..... shall commence the work, and on or before October 31, 1958 (unless the Operator's obligation to prosecute the work is terminated—see Article 10) shall either have completed the work or shall have incurred allowable costs (see Article 6) in a sum not less than the estimated total allowable cost set forth in Exhibit "A." See Annex II

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) *Independent contracts.*—To the extent that the allowable costs are estimated in Exhibit "A" with express reference to performance by independent contractors on a unit-price basis (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations), the work may be so performed; but if the reference in Exhibit "A" to any such independent contract requires the Government's approval thereof, payments under such contract will not be allowable costs unless the Government gives its written approval of the contract. Any such independent contract shall refer to some specific and identifiable part of the work, and shall be subject to all of the pertinent terms and conditions of this exploration contract; but the Government shall not be considered a party thereto, and its rights under this contract, including the right to terminate its contributions, shall not be affected thereby. Regardless of the provisions of any such independent contract and regardless of the Government's approval thereof, the Government will participate in payments to the independent contractor only on account of work performed in accordance with the provisions of this exploration project contract, and only to the extent that the Government deems the unit prices for the work under the independent contract to be reasonable.

(c) *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.*—The estimated total allowable cost of the project, set forth in Exhibit "A," is the sum of $26,824.00. The Government shall contribute 50 percent of the allowable costs as they are incurred in a total sum not in excess of $13,412.00: *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 or not in excess of the amount of the Government's contribution to the cost of property which is or may become subject to disposal as provided in Article 9(c), whichever is greater. The Government will make its contribution on the basis of the monthly vouchers referred to in Article 7(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. "Costs incurred" mean costs that have been paid or have become due and payable, or that in the opinion of the Government have become an obligation. The Government may make payments directly to independent contractors and suppliers for the account of the Operator rather than to the Operator.

ARTICLE 6. *Estimated costs.*—(a) *Categories of costs.*—The allowable costs of the work to which the Government shall contribute are limited to those that are direct, reasonable, necessary, and that are estimated in Exhibit "A" by categories as specified in this article. If any category or subcategory is omitted from the estimate of costs, or if the word "none" is annexed to the listing thereof, costs under such category or subcategory are not allowable. Any excess over any estimate which is indicated as the maximum of any category, subcategory, or item, either as to requirement or related cost, and any excess over the estimated total allowable cost of the work, shall not be allowable. Any excess over the estimate of any category, subcategory, or item, either as to requirement or related cost, not indicated as a maximum shall be allowable within the limit of the estimated total allowable cost of the work. To the extent that excesses over maximums other than the estimated total allowable cost of the work may be necessary for the performance of the work, the Operator shall incur such excesses for his own account without contribution by the Government; but except for any such necessary excesses in categories, subcategories, or items thereunder the Operator is not obligated to incur more than his agreed percentage of the estimated, total allowable cost of the work. **See Annex II**

To the extent specified in this article or in Exhibit "A" the following categories, subcategories, and elements thereof are maximums; but if not so specified either here or in Exhibit "A" they are not maximums, and may be exceeded within the limit of the estimated total allowable cost of the work:

CATEGORY (1)—INDEPENDENT CONTRACTS.—Work to be performed under independent contracts (see Article 4(b)). The estimated total amount of this category and the estimated cost of each unit of work for performance under an independent contract are maximums. **See Annex II**

CATEGORY (2)—PERSONAL SERVICES.

Subcategory (a)—Supervision.—All elements of this subcategory (number of supervisors, periods of employment, rates of pay, and total) are maximums.

Subcategory (b)—Technical services.—All elements of this subcategory (number of technicians, periods of employment, rates of pay, and total) are maximums.

Subcategory (c)—Labor.

CATEGORY (3)—OPERATING MATERIALS AND SUPPLIES.—Includes such items as drill bits and steel, explosives, fuel, pipe, power, small tools costing less than $50 each, timber, track.

CATEGORY (4)—OPERATING EQUIPMENT.

Subcategory (a)—Rental.—The number of each object to be rented [6 mine cars, 1 truck], the rate of rental [$100 per month, $5 per hour], and the total of this subcategory are maximums.

Subcategory (b)—Purchases.—The estimated total of this subcategory is a maximum.

Subcategory (c)—Depreciation.—All elements of this subcategory (time periods, rate of depreciation, and subcategory total) are maximums.

CATEGORY (5)—INITIAL REHABILITATION AND REPAIRS.—Estimates under this category include all requirements and related costs, such as labor, materials and supplies, and supervision at a rate not higher than provided for in Category (2), and shall not be duplicated under any other category. The estimated total of this category is a maximum.

Subcategory (a)—Initial rehabilitation and repairs of existing buildings, fixtures, and installations (exclusive of mine workings).—The estimated total of this subcategory is a maximum.

Subcategory (b)—Initial rehabilitation and repairs of operating equipment.—The estimated total of this subcategory is a maximum.

CATEGORY (6)—NEW BUILDINGS, FIXTURES, AND INSTALLATIONS (EXCLUSIVE OF MINE WORKINGS).—Estimates under this category include all requirements and related costs, such as labor, materials and supplies, and supervision at a rate not higher than provided for in Category (2), and shall not be duplicated under any other category. The estimated total of this category is a maximum.

CATEGORY (7)—MISCELLANEOUS.—Repairs and maintenance (other than initial) of operating equipment, analytical work, prints and other reproductions, accounting, Operator's share of payroll taxes, liability insurance covering employment, travel, communications, and any other items of requirement or cost that do not fall within any of the first 6 categories.

THE ESTIMATED TOTAL ALLOWABLE COST of the work is a maximum.

(b) *Nonallowable costs.*—The following costs are not allowable for contribution by the Government:

(1) *Costs of the land,* such as rental, depreciation, depletion, or other cost of acquiring, owning, or holding possession;

(2) *Indirect costs,* such as general overhead, corporate management, interest, taxes (other than payroll and sales taxes), insurance (other than liability insurance covering employment), damages to persons, damages to property (other than necessary repairs or replacements of equipment or other property used in the work);

(3) *Previous work* performed or costs incurred before the date of this contract; and

(4) *Deferred payments.*—Any costs incurred by the Operator under any rental-purchase agreement, installment-purchase agreement, or any agreement for the purchase of goods under the provisions of which payment of the full purchase price is deferred more than 90 days from the delivery of the goods; unless the purchase agreement is approved by the Government in writing.

(c) *Reductions in costs.*—The Operator shall account for and give the Government credit for any incidental benefits, credits, or money received in the ordinary course of business in prosecuting the work (as by salvage or sale of materials or equipment, furnishing of room or board, furnishing of power or services to third persons, rebates or discounts on purchases, etc.), in the same ratio in which the Government contributes to costs; and such amounts shall be treated as a reduction in costs incurred so that they are available for use within the limit of the original estimated total cost. This provision does not apply to receipts from production which are subject to the Government's percentage royalty under the provisions of Article 9. **See Annex II**

ARTICLE 7. *Reports, accounts, audits.*—(a) *Operator's records.*—The Operator shall keep suitable records and accounts of the 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. If the Government elects to audit said records and accounts relating to the exploration work by certified public accountant, it may do so as a cost of the work to which the Operator shall contribute. 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. If work under this contract is carried on in conjunction with any other operations, or if labor, supervision, services, materials, supplies, equipment, facilities, or other requirements for carrying on the work are also used in connection with other operations, the costs shall be segregated and accounted for on a basis and by methods and accounts that are satisfactory to and approved 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 detailed costs incurred during the reporting period; (2) Operator's Unit Cost and Progress Report showing the various types of work performed during the reporting period and 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 related costs incurred.

(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 8. *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 7) 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 therof 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 9. *Interests in purchased property.*—(a) *Title and ownership.*—All costs under this contract shall be incurred by the Operator in the Operator's own name and for the Operator's own account; but any property acquired to the cost of which the Government contributes shall belong to the Operator and the Government jointly in proportion to their respective contributions, although title thereto shall be taken in the name of the Operator.

(b) *Preservation of property.*—Until the final disposal of any property in which the Government has an interest the Operator shall preserve and protect same for the best interest of the Government, any reasonable and necessary costs thereof to be treated as an allowable cost of the project. After the completion of the work or termination of the Government's obligation to contribute, or when such property is not in use for or needed for the work, the Operator shall neither use it without the written consent of the Government nor without paying a reasonable rental to be fixed by the Government for its interest.

(c) *Disposal of property.*—Upon the completion of the work or termination of the Government's obligation to contribute to costs, or when the property is no longer needed for the work, the Operator shall promptly dispose of salable or salvageable property in which the Government has an interest for the joint account of the Government and the Operator, either by return to the vendor, by sale to others, or purchase by the Operator or the Government at a price at least as high as could be obtained from others, unless the Government in writing waives its interest in any such property. Without advance approval of the sales price by the Government the Operator shall not sell at any price any item of property the cost of which was more than $500, and shall not sell at less than 25 percent of the purchase price any item of property which cost $500 or less. The Government, in lieu of approving the sales price for any such item, may itself purchase the item at the best price which the Operator is able to obtain or himself cares to give. Property remaining upon any termination of the work shall be considered in groups or categories (such as drill steel, or explosives, or pipe, or rails), and if the original cost of the remaining unexpended portion of any such group or category is less than $50, the Government waives its interest therein. If necessary to accomplish the disposal of any item the Operator shall dismantle and sever it from the land, the cost thereof to be treated as a cost of the project.

(d) *Default of the Operator re disposal.*—If within 90 days after the completion of the work or termination of the Government's obligation to contribute to costs, or after the property is no longer needed for the work, or after such further time as the Government may in writing allow, the Operator has failed to sell or otherwise liquidate or dispose of any property in which the Government has an interest, the Government, at any time prior to final settlement under the contract, may pursue one of the following two courses: (1) the Government, by written notice to the Operator, may place upon such property what in its opinion is a fair valuation thereof, not in excess of the cost less 1.66 percent per month from the

date such property was purchased under this contract to the termination of said 90-day period; and such property shall thereupon be considered and accounted for as having been purchased by the Operator at the valuation so fixed by the Government; or (2) the Government may enter and take possession of such property wherever it may be found, and remove and dispose of it for the joint account of the parties.

ARTICLE 10. *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: (1) the Government shall be free of all obligation to contribute to costs not then incurred other than such as may be allowable under the provisions of the contract as necessary and incidental to winding up, reporting, and accounting; and (2) 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.

(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: (1) the Government shall be relieved of all obligation to contribute to costs not incurred when the notice was given, other than such as may be allowable by the provisions of the contract as necessary and incidental to winding up, reporting, and accounting; and (2) 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 10 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 11. *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 12. *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 13. *Changes and added provisions.*—

See Annex II

Executed in sextuplicate the day and year first above written.

THE UNITED STATES OF AMERICA

By .....

.....
(Operator)

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—70617-1

DOCKET NO. IMEA -4949
HILARY MINERALS CO., INC.

ANNEX I

The land referred to in Article 2 of the Contract consists of 10 unpatented lode mining claims situated in sections 32 and 33, T. 44 N., R. 18 W., and section 4, T. 43 N., R. 18 W., N.M.P.M. & B., San Miguel County, Colorado. The land is shown on the map entitled "Figure 4 - Proposed Stage I Drilling on the Northern Part of the Philura Claims, Hilary Mineral Co., Inc., San Miguel County, Colorado," attached hereto and made a part hereof.

The notices of location of the claims are recorded in the official records of San Miguel County, Colorado as follows:

	Original		Amended	
Claim	Book	Page	Book	Page
Grass Flat	216	435	258	341
Philura No. 1	224	202	"	343
" " 2	"	203	"	345
" " 3	"	204	"	347
" " 4	"	205	"	349
" " 5	"	206	"	351
" " 6	"	207	"	353
" " 7	"	208	"	355
" " 8	"	209	"	357
" " 9	"	210	"	359

ANNEX II

(a) That part of the last sentence of Article 3 beginning with the word "either" is deleted and replaced by the words "have completed the work, except as otherwise provided in Exhibit "A" with respect to stages of work."

(b) That part of the last sentence in the first paragraph of Article 6(a) commencing after the semicolon is deleted.

(c) Categories (2) through (6) of Article 6(a) are deleted.

(d) In addition to the costs of work estimated in Exhibit "A" by categories of actual costs, the costs of work requirements specified in Exhibit "A" as "Fixed Unit Costs" are allowable costs of the project. The Government will contribute to the fixed unit costs as work units are performed. A "Fixed Unit Cost" is an agreed price for each unit of work to be performed regardless of costs incurred by the Operator. Costs set forth in Exhibit "A" include all allowable costs of the work to be performed under the Contract.

(e) In the last sentence of Article 6(e), the words "Article 8" are substituted for the words "Article 9."

(f) Notwithstanding any other provision of the Contract, the allowable unit cost per foot of a drilling item is the average unit cost per foot computed on the basis of all the actual unit costs of said drilling item incurred by the Operator: Provided, That the Government will not contribute to any portion of an average unit cost of a drilling item that exceeds the estimated unit cost of said item set forth in the contract.

EXHIBIT "A"

Description of the Work

General Provisions

The work consists of exploration for uranium by core and non-core drilling to test the top sandstone layer of the Salt Wash member of the Morrison formation, known as the "ore-bearing sandstone."

Each hole shall be drilled non-core through the upper formations to the approximate position of the Salt Wash-Brushy Basin contact, and then core drilled through the ore bearing sandstone, the underlying greenish gray mudstone, if any, and not more than 10 feet of reddish brown mudstone.

Drilling depths are expected to average 284 feet, and the cored sections of the drill holes are expected to average 75 feet in length. The minimum size of the core shall be BX.

All core and cuttings from the cored section of drill holes shall be saved and checked for radioactivity. Core sections indicating significant mineralization shall be split; one-half shall be analyzed chemically for uranium and vanadium and one-half shall be properly labeled and stored for the use of the Government. The non-mineralized core and related cuttings also shall be labeled and stored for inspection by the Government. Any stored samples may be disposed of by the Operator after approval of the Government has been secured.

All core and cuttings from the drill holes shall be logged geologically and the holes probed radiometrically, and the record of such logging and probing, together with certified copies of all assay certificates, shall be submitted with the Operator's monthly progress reports.

No hole shall be drilled closer than 100 feet to the outer boundaries of the land described in Annex I.

No contribution shall be made by the Government for incompleted drill holes.

Access roads and drill sites shall be prepared with a D-6 bulldozer or an equivalent unit of the same or other make.

The project shall be supervised at all times by an experienced geologist or mining engineer, who shall devote full time to the project work.

The location, direction, inclination, and extent of all project work are subject to the approval of the Government.

The work shall be divided into three stages as hereinafter described. The Operator shall complete Stage I, and shall perform as much of Stages II and III as the Government approves in writing in advance.

Stage I

Prepare access roads and drill sites and drill 10 holes aggregating an estimated 2,840 feet as indicated on the map (Figure 4) referred to in Annex I. The holes are located at irregular intervals ranging from 550 to 800 feet and may not be shifted more than 25 feet from the locations shown without the prior approval of the Government. If the 10 holes require more than 2,840 feet of drilling to reach the desired horizon, the additional footage and funds required may, upon the written approval of the Government, be transferred and deducted from Stage III.

Stage II

Prepare access roads and drill sites and drill approximately 12 holes aggregating an estimated 3,408 feet as offsets to previously drilled holes which show favorable mineralization or highly favorable conditions for ore occurrence. Stage II holes shall be drilled not closer than 200 feet to any previously drilled hole that completely penetrated the ore-bearing sandstone. If more than 3,408 feet of drilling are required in this stage to reach the desired horizon, the additional footage and funds required may, upon the written approval of the Government, be transferred and deducted from Stage III.

Stage III

Prepare access roads and drill sites and drill not more than 12 holes aggregating not more than 3,408 feet as offsets to previously drilled holes that show significant mineralization. These offset holes shall be drilled not closer than 100 feet to any previously drilled hole that completely penetrated the ore-bearing sandstone.

Estimated Cost of the Project

Stage I

Actual Costs

Category (1) Independent Contracts

2,000 ft. non-core drilling, 0-200 ft. depths, @ $1.50/ft.	$3,000.00
90 ft. non-core drilling, 200-400 ft. depths, @ $1.80/ft.	162.00
750 ft. core drilling, 200-400 ft. depths, @ $4.75/ft.	3,562.50
24 hrs. bulldozing @ $12/hr.	288.00

Categories (2) through (6)

None

Category (7) Miscellaneous

None Except

10 chemical sample analyses @ $5/sample	$50.00	
75 cardboard core boxes @ $1.25/each	93.75	$7,156.25

Fixed Unit Costs (See Annex II-d)

Incidental allowance for each foot of hole drilled - 2,840 ft. @ $0.27/ft.1/	766.80
Estimated Total Cost of Stage I	$7,923.05

Stage II

Actual Costs

Category (1) Independent Contracts

2,400 ft. non-core drilling, 0-200 ft. depths, @ $1.50/ft.	$3,600.00	
108 ft. non-core drilling, 200-400 ft. depths, @ $1.80/ft.	194.40	
900 ft. core drilling, 200-400 ft. depths, @ $4.75/ft.	4,275.00	
24 hrs. bulldozing @ $12/hr.	288.00	

Category (2) through (6)

None

Category (7) Miscellaneous

None Except

12 chemical sample analyses @ $5/sample	60.00	
90 cardboard core boxes @ $1.25/each	112.50	$8,529.90

Fixed Unit Costs (See Annex II-d)

Incidental allowance for each foot of hole drilled, 3,408 ft. @ $0.27/ft.[1]	920.16
Estimated Total Cost of Stage II	$9,450.06

Stage III

Estimated costs of Stage III are identical to those of Stage II

Summary of Costs

Estimated Total Cost of Stage I	$7,923.05
Estimated Total Cost of Stage II	9,450.06
Estimated Total Cost of Stage III	9,450.06
Estimated Total Cost of the Project (rounded)	$26,824.00
Government Participation @ 50%	$13,412.00

1/Includes all costs that might be allowable costs of the project under Categories (1) through (7) of Article 6(a), except as otherwise scheduled in Exhibit "A."

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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DMEA
RECEIVED MAY 12 1958

DATE		CODE
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224 New Customhouse
Denver 2, Colorado
May 8, 1958

Memorandum

To: Chairman, Operating Committee

From: Acting Executive Officer, DMEA Field Team, Region III

Subject: Docket No. DMEA 4949 (Uranium) Hilary Mineral Co., Inc. (Grass Flat and Philura claims) San Miguel County, Colorado. Revised estimated cost of recommended project

This has further reference to your teletype dated May 2, 1958, on the subject docket.

Enclosed are the original and two copies of revised estimated costs of the recommended exploration program.

E. N. Harshman

E. N. Harshman

HMC

IN REPLY REFER TO:

DMEA

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
P. O. Box 360
Grand Junction, Colorado

DEPARTMENT OF THE INTERIOR
MAY 7 1958
REGION III
DENVER, COLORADO

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DATE		

May 6, 1958

Memorandum

To: Acting Executive Officer, DMEA Field Team, Region III

From: H. F. Robertson

Subject: DMEA 4949 (Uranium), Hilary Mineral Co., Inc. (Grass Flat and Philura claims), San Miguel County, Colorado. Revised estimated cost of recommended project.

Enclosed is a revision of the cost estimate for the subject proposed project to replace the cost estimate included in the Joint Report of Examination (p. 16 through 19). Attention is called to two major changes in the original estimate as follows:

1. The correct core drilling price of $4.75 per foot, as bid by Avery and Johnston Drilling Co., is now used in the computation of the drilling costs.

2. The revised estimated cost is based on the use of two drill rigs, averaging about 75 feet per day per rig, thus reducing the incidental allowance to $0.27 per foot of accepted drilling and the estimated time for project completion to a maximum of 3 months. Under normal conditions, it is doubtful that more than one drill rig would be assigned to work on a project of this size. The scarcity of new exploration projects has resulted in most drilling firms having idle drill equipment which could be employed. On this basis, it is possible that a drilling contractor would be willing to furnish 2 rigs even though the firm footage in the contract amounts to only 2,840 feet combined core and non-core drilling in Stage I.

In accordance with the revised cost estimate, the alternate exploration program recommended by the examining team consists of a maximum of 34 holes at an estimated maximum total cost of $26,748.17. Government participation at 50 percent of the approved costs would be a maximum of $13,374.00.

M. K. Lakebury
For H. F. Robertson,
Mining Engineer

HFR/bh
Enclosures

Revised Estimated Cost of Recommended Project

All Stages Combined

(1) Independent Contracts

Drilling, non-core		
0-200 feet - 6,800 feet at $1.50/ft.	$10,200.00	
200-400 feet - 306 feet at $1.80/ft.	550.80	
Drilling, core		
200-400 feet - 2,550 feet at $4.75/ft.	12,112.50	
Bulldozing, D-6 Caterpillar or equivalent		
70 hours at $12.00/hr.	840.00	
Total independent contracts		$23,703.30

(2) Supervision and Technical Services

1 full-time engineer-geologist		
3 months at $600/mo.	$ 1,800.00	
Total supervision and technical services		$ 1,800.00

(3) Operating Materials and Supplies

Surveying, drafting, and office supplies		
3 months at $25.00/mo.	$ 75.00	
Fuel and repairs on field vehicle		
3 months at $40.00/mo.	120.00	
Total operating materials and supplies		$ 195.00

(4) Operating Equipment

Rental-trailer for field office		
3 months at $50.00/mo.	$ 150.00	
Depreciation charge for operating equipment on 60 month basis		
3 months at $60.00/mo.	180.00	
Total operating equipment		$ 330.00

(5) and (6) Rehabilitation, Repairs, New Buildings, Improvements, etc.

None

(7) Miscellaneous

Accounting, 3 months at $50.00/mo.	$ 150.00	
Chemical assays, maximum of 34 samples assayed for U_3O_8 at $3.50/sample	119.00	
Compensation insurance and payroll taxes at 7 percent of $1,800.00	126.00	
Core boxes - 255 boxes at $1.25 each	318.75	
Total miscellaneous		$ 713.75
Total estimated cost of Project		$26,742.05

Overall cost per foot of drilling $\frac{\$26,742.05}{9,656 \text{ ft.}}$ = $ 2.77

Incidental allowance per foot (Total cost less independent contracts, core boxes, and assays) $\frac{\$2,601.00}{9,656 \text{ ft.}}$ = $ 0.27

Summary of Costs Suggested for Contract Use

Stage I - 10 holes - Estimated time for completion - 1 month

Actual Cost Items:

Independent Contracts		
Drilling, non-core		
0-200 ft. - 2,000 feet at $1.50/ft.	$3,000.00	
200-400 ft. - 90 feet at $1.80/ft.	162.00	
Drilling, core		
200-400 ft. - 750 feet at $4.75/ft.	3,562.50	
Bulldozing, D-6 Caterpillar or equiv. 22 hours at $12.00/ft.	264.00	
Total actual cost items, Stage I		$ 6,988.50

Fixed Unit Cost Items:

Chemical assays for U_3O_8 10 samples at $3.50 each	$ 35.00	
Core boxes - 75 boxes at $1.25 each	93.75	
Incidental allowance 2,840 feet at $0.27/ft.	766.80	
Total fixed unit cost items		$ 895.55
Total Stage I		$ 7,884.05

Stage II - 12 holes - Estimated time for completion - 1 month

Actual Cost Items:

Independent Contracts

Drilling, non-core		
0-200 ft. - 2,400 feet at $1.50/ft.	$3,600.00	
200-400 ft. - 108 feet at $1.80/ft.	194.40	
Drilling, core		
200-400 ft. - 900 feet at $4.75/ft.	4,275.00	
Bulldozing, D-6 Caterpillar or equivalent		
24 hours at $12.00/hr.	288.00	
Total actual cost items, Stage II		$8,357.40

Fixed Unit Cost Items:

Chemical assays for U_3O_8		
12 samples at $3.50 each	$ 42.00	
Core boxes - 90 boxes at $1.25 each	112.50	
Incidental allowance		
3,408 feet at $0.27/ft.	920.16	
Total fixed unit cost items, Stage II		$1,074.66
Total Stage II		$9,432.06

Stage III - 12 holes - Estimated time for completion - 1 month

Actual Cost Items:

Independent Contracts

Drilling, non-core		
0-200 ft. - 2,400 feet at $1.50/ft.	$3,600.00	
200-400 ft. - 108 feet at $1.80/ft.	194.40	
Drilling, core		
200-400 ft. - 900 feet at $4.75/ft.	4,275.00	
Bulldozing, D-6 Caterpillar or equivalent		
24 hours at $12.00/hr.	288.00	
Total actual cost items, Stage III		$8,357.40

Fixed Unit Cost Items:

Chemical assays for U_3O_8		
12 samples at $3.50 each	$ 42.00	
Core boxes - 90 boxes at $1.25 each	112.50	
Incidental allowance		
3,408 feet at $0.27/ft.	920.16	
Total fixed unit cost items, Stage III		$ 1,074.66
Total Stage III		$ 9,432.06
Total estimated cost of Project		$26,748.17
Government participation at 50 percent (rounded)		$13,374.00

WARNER-KANTER COMPANIES

CINCINNATI, OHIO ST. LOUIS, MISSOURI WASHINGTON, D.C.

928 North Bend Road
Cincinnati 24, Ohio

May 7, 1958

DATE		
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Mr. George C. Selfridge,
Chairman, Operating Committee,
U.S. Dept. of the Interior,
Interior Building,
Washington 25, D. C.

Re: Docket No. DMEA 4949 (Uranium)
(Grass Flat and Philura claims)
San Miquel County, Colorado

Dear Mr. Selfridge:

In accordance with letter from Mr. E. N. Harshman, Department of the Interior, Denver, Colorado, we are forwarding herewith original and four copies of Consent to Lien, properly executed by Beaver Mesa Uranium, Inc.

Very truly yours,

Joseph H. Kanter

Joseph H. Kanter

K:r

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DMEA
RECEIVED MAY 8 1958

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

Date May 7, 1958

DMEA Docket No. 4949
DMEA Contract No.
Commodity Uranium
Name of Applicant Hilary Mineral Company
Name of property Grass Flat and Philura claims
Location of property San Miguel County, Colo.
Estimated cost of project

Memorandum

To: Ernest William Ellis, DMEA Member
Uranium Commodity Committee
From: James Paone, Bureau of Mines Member JP
Uranium Commodity Committee
Subject: Review of Field Team Report
(Application, Field Team Report, etc.)

1. Date of subject document: 4/22/58 2. Date received by reviewer: 4/24/58

3. Prior reports on this property known to reviewer: Yes ☐ No ☐

4. Prior reports on nearby properties known to reviewer: Yes ☐ No ☐

5. Information available on past production: Yes ☐ No ☐

6. Other pertinent factors known to reviewer: Yes ☐ No ☐

7. Explain items marked 'yes' above:

8. Factors meriting special consideration:
   a. Location ☐
   b. Ownership ☐
   c. Evidence of mineralization ☐
   d. Geology ☐
   e. Proposed exploration method ☐
   f. Alternate exploration method ☐
   g. Costs
   h. ☐

9. Action advised:
   a. Obtain information from applicant ☐
   b. Refer to Field Team ☐
   c. Denial ☐
   d. Agree with Field Team ☒
   e. Disagree with Field Team ☐
   f. Suggest alternate plan ☐
   g. Request another examination ☐
   h. Approval ☒
   i. Consult with Mr. _____ at _____ AEC office.

10. Remarks: (Use back of page if necessary)

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DN 235 BUE MINES 5-2-58 4-36

CHAIRMAN, OPERATING COMMITTEE, DMEA

REURTT. HILARY MINERALS, DOCKET 4949 - UNIT PRICE CORE DRILLING SHOULD BE $4.75. WE CONCUR THREE MONTH BASIS FOR PROJECT AND REDUCED INCIDENTAL COSTS.

E N HARSHMAN

Denver, Colorado

MAY 5 9 01 AM '58

BUREAU OF MINES
MAIL ROOM
WASHINGTON, D. C.

DMEA Form 7
(12-56)

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Date	Surname	Code
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5/1	Ellis	700
5/1	GCS	130
1/a	Johnson	110
	Chronology	100
		~~340~~
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		700

MAY 2 1958

Dept. of the Interior

DMEA

14X1401(01) Revolving Fund
Defense Production Act, Interior
(Transfer to Office of Secretary)

T E L E T Y P E

E. N. HARSHMAN
ACTING EXECUTIVE OFFICER
DMEA FIELD TEAM, REGION III
224 NEW CUSTOMHOUSE BUILDING
DENVER, COLORADO

RE REPORT OF EXAMINATION HILARY MINERALS COMPANY DOCKET 4949.

1. CAN $2.60 PRICE FOR CORING BE JUSTIFIED IN VIEW OF $4.75 BID BY AVERY AND JOHNSTON AND $4.20 BID BY V AND A?

2. WOULD YOU CONCUR IN INCIDENTAL COSTS BASED ON TWO DRILL SHIFTS PER DAY AND TIME FACTOR OF THREE MONTHS?

George C. Selfridge

CHAIRMAN, OPERATING COMMITTEE (GCS)

MChing/izm 5-1-58
cc: Mr. Ching
Admr.'s ReadingFile
Operating Committee
THKiilsgaard, 5224
Confirmation copy - Reg. 3

8623

IN REPLY REFER TO:

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

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April 30, 1958

Memorandum

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

From: T. H. Kiilsgaard, U. S. Geological Survey

Subject: Review of Field Team Report, DMEA Docket 4949 (Uranium)
Hilary Mineral Company, San Miguel County, Colorado

In a well-documented report, Field Examiners recommend a modified contract for the applicant. Their conclusions are based on widespread drilling done by the Geological Survey and on production from nearby properties. They believe there is an excellent possibility of finding one or more deposits containing 2,000 to 5,000 tons of ore, averaging from 0.25 to 0.30 percent U_3O_8 and about $1\frac{1}{2}$ percent V_2O_5. They have not, however, concurred with the applicant in that they do not believe that the southern part of the applicant's property warrants exploration, as they consider these claims to be on unfavorable ground. They would instead confine all work to favorable ground at the northern part of the Philura group.

The examiners' report amply justifies DMEA participation in this contract, and I recommend that the modified program as proposed by the examiners be approved for contract.

T. H. Kiilsgaard

T. H. Kiilsgaard

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

224 New Customhouse
Denver 2, Colorado
April 22, 1958

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DATE	INITIALS	CODE
4/24	C	226
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4/28	C	220

Memorandum

To: Secretary to the Operating Committee

From: Acting Executive Officer, DMEA Field Team, Region III

Subject: Docket No. DMEA 4949 (Uranium) Hilary Mineral Company (Grass Flat and Philura claims) San Miguel County, Colorado - Joint Report of Examination

Enclosed are the original and ~~three~~ 2 copies of the Joint Report of Examination on the subject property by H. F. Robertson, USBM, and N. L. Archbold, USGS.

The field examiners conclude that the probability for making a significant discovery is sufficiently promising to justify Government participation. Accordingly, they recommend that the Applicant's work proposal be approved, as modified by them, in which the field team concurs.

Arithmetical errors have been corrected in this office with a pen in order to save time.

Also enclosed are eight extra copies of Figure 4 for use in the contract.

In accordance with the Chairman's letter dated March 13, 1958, on the subject docket Consent to Lien and Subordination Agreement forms have been forwarded the Applicant for execution by Beaver Mesa Uranium, Inc.

E. N. Harshman

E. N. Harshman

Reviewed by
DMEA OPERATING COMMITTEE
4-28-58
(date)

ON-SITE EXAM. REPORT

FOR UNITED STATES GOVERNMENT USE ONLY

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DEPARTMENT OF THE INTERIOR
APR 21 1958

UNITED STATES
DEPARTMENT OF THE INTERIOR
FRED A. SEATON, SECRETARY

REGION III DEFENSE MINERALS EXPLORATION ADMINISTRATION
DENVER, COLORADO

REPORT OF EXAMINATION BY EXAMINING TEAM
REGION III

TRANSMITTED

APR 22 1958

DMEA 4949

Hilary Minerals Company, Inc.

Philura claims

San Miguel County, Colorado

Uranium

Joint Geologic and Engineering Report

by

N. L. Archbold
U. S. Geological Survey

H. F. Robertson
U. S. Bureau of Mines

April 1958

Reviewed by
DMEA OPERATING COMMITTEE
4-28-58
(date)

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DMEA 4949
HILARY MINERALS COMPANY, INC.
PHILURA CLAIMS
SAN MIGUEL COUNTY, COLORADO

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DMEA 4949
HILARY MINERALS COMPANY, INC.
PHILURA CLAIMS
SAN MIGUEL COUNTY, COLORADO

INTRODUCTION AND SUMMARY

On February 21, 1958, Hilary Minerals Company, Inc., 729 DuPont Building, Miami, Florida, applied for assistance in the exploration of leased mining claims in the Slick Rock mining district, San Miguel County, Colorado (figs. 1 and 2). A total of 51 unpatented lode mining claims, the northwestern part of the large Philura group, was included in the proposed project area. Parts of the Philura group of claims have been concerned in three previous applications for Government participation which were subsequently denied. However, the Philura claims included in docket no. DMEA 4949 cover, in part, an area which is classed as favorable for the occurrence of uranium-vanadium minerals. The claims covering the less favorable southern four-fifths of the area were later withdrawn from the application.

The property was examined on March 13, 1958 by H. F. Robertson, U.S. Bureau of Mines, and N. L. Archbold, U. S. Geological Survey; the examining team was accompanied by the applicant's representative, Mr. Raymond C. Robeck, consulting geologist.

The project proposed by the applicant consists of a two stage drilling program designed to explore for significant uranium deposits in the uppermost ore-bearing sandstone in the Salt Wash member of the Jurassic Morrison formation. The first stage would consist of 53 holes requiring

an estimated 4,900 feet of core drilling and 11,400 feet of non-core drilling and would generally explore the more favorable parts of the project area. The second stage consists of 50 holes, totaling 4,500 feet of core drilling and 10,500 feet of non-core drilling and would be drilled as 100- or 200-foot offsets to holes found to be mineralized or to contain very favorable sandstone. The applicant estimates that his proposed project would cost $129,122.50 with DMEA participation of 50 percent or $64,561.25.

As a result of drill hole data from U. S. Geological Survey exploration programs in the Slick Rock area and from USGS drill holes on the applicant's property, the examining team does not believe the claims lying south of the Philura No. 9 cover ground favorable enough to justify Government participation. Accordingly, the program recommended by the examining team covers only the Grass Flat claim and the Philura Nos. 1 through 9 claims. Since no DMEA work is anticipated on the remainder of the area, the applicant requested that only 10 claims instead of 51 be subordinated in the event of a contract with the Defense Minerals Exploration Administration.

The exploration project recommended by the examining team consists of exploration by drilling in the northern part of the applicant's property. Approval is recommended for a three-stage program designed to test the most favorable area for uranium ore deposits in the 3,000 to 5,000 ton class. The probability of finding such deposits is considered

good enough to justify Government participation in the recommended program which would cost an estimated ~~$22,714.07~~ 22,907.19. DMEA participation at 50 percent of the total cost would be ~~$11,357.00~~ 11,453.60.

ACKNOWLEDGMENTS

Production data were obtained from records of the Atomic Energy Commission in Grand Junction, Colorado.

Drill hole data obtained by USGS exploration drilling in the Slick Rock area were used in the general evaluation of the applicant's property.

Memoranda of review by James Paone, USBM and N. E. Nelson, USGS were noted.

LOCATION, TOPOGRAPHY, AND PHYSICAL FEATURES

The Philura claims leased by the applicant cover parts of sections 32 and 33, T. 44 N., R. 18 W., and sections 4, 3, 9, and 10, T. 43 N., R. 18 W., New Mexico Principal Meridian, Slick Rock Mining District, San Miguel County, Colorado. The property is accessible over State Highway 80 from Naturita or Dove Creek, Colorado. The highway crosses the north boundary of the Philura group about one-half mile east of the Slick Rock bridge.

The project area lies on a long slope along the southwest side of the Dolores River. For the most part, the surface is smoothly rounded hills formed by erosion of the Brushy Basin shale member of the Morrison formation. Unconsolidated residual stream gravels up to 20 feet thick are present in many places, and these gravels may be difficult for rotary drills to penetrate. The southern part of the area is littered with huge Burro Canyon boulders.

Annual precipitation in the immediate area of Slick Rock is light, occurring mostly as localized downpours. The area is classed as semi-arid and supports a moderate growth of juniper and pinon on rocky terrain and abundant sagebrush where soils are thick. Cactus and sparse grass are widely distributed.

Labor, supplies, and light equipment can be obtained at Naturita or Uravan about 40 airline miles north of Slick Rock. Water for drilling and mining is easily obtainable from the Dolores River on the east side of the claim group. Domestic water is obtained from a well near the Slick Rock bridge.

Ore treatment plants are located at Uravan, Colorado, about 60 miles distant and Monticello, Utah, about 50 miles distant. Most of the uranium ore produced in the general area is hauled by truck to the Union Carbide and Nuclear Company mill at Uravan, Colorado.

HISTORY AND PRODUCTION

Exploration for uranium-vanadium deposits in the Slick Rock district dates from about 1911. The resulting discoveries were mined primarily for their radium content until 1923, when the Belgian Congo pitchblende deposits began to supply radium. The mines were mostly idle from 1923 to 1937, but since 1937, they have been mined extensively, first for vanadium and in more recent years, for both vanadium and uranium.

From 1948 to 1955 the U. S. Geological Survey, on behalf of the Atomic Energy Commission, carried on extensive exploratory drilling in the Slick Rock mining district. Nineteen of the Government-drilled holes are located on the property concerned by the subject application. In the past few years, exploration by private industry has resulted in the discovery of large uranium deposits about one mile northwest of the applicant's claims. Four nearby properties, two of which included parts of the Philura group, have been examined by DMEA personnel.

The Grass Flat mine, in the extreme northwest part of the subject property, is credited with a production of a total of 2,771 tons of ore averaging 0.19 percent U_3O_8. The mine was abandoned in November 1957 and all equipment removed from the premises. Several other mines of moderate size are currently operating to the northwest and west of the applicant's property (fig. 2). The total production from six of the nearby properties, through January 1958, is shown below. The Upper and Middle Groups and the Ellison mine are A.E.C. leases.

Mine	Tons produced	Percent U_3O_8	Percent V_2O_5
Upper Group (Mining Lease 44)	13,134	0.27	1.68
Middle Group (Mining Lease 30)	14,809	0.24	1.19
Full Moon No. 1	5,793	0.20	1.13
Hawkeye (abandoned)	1,307	0.34	1.09
Grass Flat (abandoned)	2,771	0.19	0.94
Ellison (Mining Lease 32, abandoned)	1,743	0.36	1.67

OWNERSHIP

The property included for subordination under the applicant's original proposal consisted of 48 Philura claims, 2 Philura fractions, and the Grass Flat claim, all unpatented lode mining claims and covering an area of about 970 acres (fig. 2). Since no DMEA work is recommended on the claims located south of the Philura No. 9, the applicant withdrew 39 Philura claims and the 2 Philura Fractions from the proposal. In the event of a contract, the claims which would be subordinated are the Grass Flat claim and the Philura claim Nos. 1 through 9. The applicant controls the property by means of a mining lease, dated January 4, 1958, from the owner, Beaver Mesa Uranium, Inc. Location notices of the 10 claims are recorded at Telluride, Colorado,the county seat of San Miguel County as follows:

	Location Certificate			Amended Certificate 1/	
Claim Name	Date	Book	Page	Book	Page
Grass Flat	2-10-53	216	435	258	341
Philura No. 1	3-19-53	224	202	258	343
Philura No. 2	3-3-53	224	203	258	345
Philura No. 3	3-3-53	224	204	258	347
Philura No. 4	3-3-53	224	205	258	349
Philura No. 5	3-3-53	224	206	258	351
Philura No. 6	3-3-53	224	207	258	353
Philura No. 7	3-3-53	224	208	258	355
Philura No. 8	3-3-53	224	209	258	357
Philura No. 9	3-3-53	224	210	258	359

1/ All the claims located in February and March 1953 were amended to comply with the provisions of Public Law 585.

The actual location of the claims on the ground is correctly marked by the required corner posts and discovery pits and no unresolved conflicts with other claims are noted. Thus, it appears that the applicant has adequate and valid control of the area proposed for subordination. A Consent to Lien and Subordination Agreement would be required from the owner, Beaver Mesa Uranium, Inc., whose mailing address is 1129 Colorado Ave., Grand Junction, Colorado, since a ten percent royalty on all proceeds (excluding haulage allowance) is withheld.

PRESENT STATUS

Exploration and Development

Exploratory work on the subject property has been confined to relatively close-spaced core drilling around the Grass Flat mine and wide-spaced drilling (1000 to 1500-foot) by the U. S. Geological Survey in conjunction with the Government's evaluation of the uranium potential of the Slick Rock district (figs. 2 and 4). Results of the drilling to date indicate that part of the applicant's property covers an area favorable for uranium deposits of moderate size.

Development work on the subject property consists of the Grass Flat mine, a small operation in the southwest corner of the Grass Flat claim (fig. 3). By using a modified room and pillar mining method, an irregular tabular ore deposit, 1 to 4 feet thick, was recovered. Total production from the mine, now abandoned, was 2,771 tons of ore averaging 0.19 percent U_3O_8 and 0.94 percent V_2O_5. No further mining has been undertaken since the applicant obtained the lease on the property.

Mining Equipment and Other Facilities

The applicant had no mining or exploration equipment on the property when examined. Equipment for the proposed exploration would be furnished by the independent contractor doing the work. The applicant, of course, would provide the necessary vehicle and office trailer for the geologist-supervisor.

Several access roads, some needing minor repairs, cross the property and could be utilized in the proposed drilling program. Drillsite construction should present no unusual problems.

GENERAL GEOLOGY

The Philura claims are located in the northern part of the Slick Rock mining district. The axis of the northwesterly trending Dolores anticline lies about 3 miles to the southwest of the property, and the axis of the Disappointment syncline, also trending northwesterly, lies about 2 miles to the northeast of the property. Sedimentary formations on the property strike about N.25°W. and dip as much as 15 degrees to the northeast. A northwesterly trending zone of normal faults is present on the flank of the Dolores anticline about midway between the property and the axis of the anticline, but no faults are known on the property.

Jurassic and Cretaceous formations exposed in the vicinity of the property are briefly described in Table 1. The Morrison formation of Jurassic age is the only formation exposed on the property, and the proposed exploration program is concerned only with the Morrison formation; therefore, it is the only formation that will be considered in detail.

Table 1. Sedimentary formations exposed in the vicinity of the Philura claims.

Age	Formation	Thickness in feet	Description
Cretaceous	Dakota	125	Lenticular sandstones and conglomerates with interbedded coal and carbonaceous shale. Shale dominant in lower part.
	UNCONFORMITY		
	Burro Canyon	125-260	Conglomeratic sandstone with beds of limestone, chert and green and purple shale. No carbonaceous material. Forms cliff and caps mesas.
Jurassic	Morrison	450-600	Brushy Basin member.-Reddish brown to greenish gray bentonitic mudstone with lenticular sandstone and conglomerate. Sandstone and conglomerate lenses are more abundant near base of member.
		300-350	Salt Wash member.-Lenticular, quartzose sandstones and interbedded reddish brown mudstone.
	Summerville	100-120	Reddish brown siltstone with layer of very fine reddish brown sandstone near center of formation. Contains abundant ripple marks.

The Morrison formation is divided into two parts, the Salt Wash and the overlying Brushy Basin member. The Salt Wash member ranges from 300 to 400 feet in thickness and is composed of interbedded lenticular sandstones and reddish brown mudstone. Three units are present within the Salt Wash member: (1) a basal sandstone unit 60 to 140 feet thick and composed of interconnected sandstone lenses, locally separated by mudstone seams up to 20 feet thick; (2) a central zone of reddish brown mudstone 100 to 180 feet thick and containing broad, scattered lenses of sandstone; and (3) an upper sandstone unit 15 to 120 feet thick formed by coalescing sandstone lenses, but locally containing mudstone seams up to 20 feet thick. Contacts between the three units interfinger and may be difficult to draw in individual sections or drill holes.

The Brushy Basin member of the Morrison formation ranges from 450 to 600 feet thick, though a full section is not present on the Philura claims. The member is composed of reddish brown and greenish gray bentonitic mudstone with scattered broad lenses of sandstone and conglomeratic sandstone which are more numerous toward the base of the member. Most commonly, Brushy Basin mudstone directly overlies and interfingers with the upper sandstone unit of the underlying Salt Wash member, though locally a Brushy Basin sandstone lens may lie directly on the upper sandstone unit of the Salt Wash. In individual sections and drill holes, Brushy Basin sandstone lenses can generally be detected by their conglomeratic nature, but if pebbles are absent or very sparse, such lenses can easily be mistaken for the upper sandstone unit of the Salt Wash member.

ORE DEPOSITS

All known uranium-vanadium deposits, in the vicinity of the Philura claims, occur in the Morrison formation, and all significant deposits occur in the upper sandstone unit of the Salt Wash member. Small deposits are scattered in sandstone lenses in the middle unit of the Salt Wash member and the basal part of the Brushy Basin member, but these are too small to justify an exploration program.

Deposits probably occur in the basal part of the Brushy Basin member on the Philura 10, 11, 12, 14, 15, 16, and 17 claims (fig. 2), as wide spaced drill holes in this area have penetrated mineralized Brushy Basin sandstone. Rim exposures, around the southern part of the Philura claims, indicate that small deposits are present in the middle unit of the Salt Wash member. Inasmuch as any deposits in the Brushy Basin member and middle unit of the Salt Wash member would contain less than 500 tons of ore, they are excluded from consideration in this report.

Uranium deposits occuring in the upper sandstone unit of the Salt Wash member, in the immediate vicinity of the Philura claims, generally contain from 2,000 to 5,000 tons of ore, and this is the size of deposit to be expected on the Philura claims.

Uranium deposits in the upper sandstone unit of the Salt Wash member are always associated with certain lithologic features; these features, which constitute guides to ore, are listed below.

1) Sandstone has been bleached from its original light red to light gray or yellow brown

2) Mudstone within and underlying the host sandstone has been bleached from reddish brown to greenish gray.

3) The host sandstone contains abundant coalified plant fragments.

On the basis of bleaching and presence of carbonaceous material, an area considered favorable for exploration was outlined by wide spaced U.S.G.S. drilling (fig. 2). The southern part of the area is considered marginal, whereas the northern part is considered highly favorable and merits an exploration program. Four wide-spaced holes were drilled in the northern Philura claims; of these 4 holes, 2 were mineralized, all contained carbon and bleached sandstone, the average sandstone thickness was 45 feet, and there was an average of 2.0 feet of greenish gray mudstone at the base of the sandstone. In the southern part of the Philura claims, 11 wide-spaced holes were drilled; none were mineralized in the upper sandstone unit of the Salt Wash member, all contained bleached sandstone but only 5 contained carbon, the average sandstone thickness is 40 feet, and there is an average of only 0.4 feet of greenish gray mudstone below the host sandstone.

Locally, uranium deposits appear to be associated with narrow, elongate zones of thick sandstone, which probably represent the courses of ancient streams. Such a zone of thick sandstone is exposed slightly to the north of the Hawkeye mine portal. An isopach map (fig. 3) indicates this thick sandstone trends easterly through the Grass Flat mine, then turns southward. This thick sandstone probably has an overall southeasterly trend and may extend across the northern part of the Philura claims.

Within the host sandstone, deposits are not so closely associated with these thick zones that only the thick zones should be explored, but they do merit special consideration in the later phases of drilling.

A uranium deposit is generally composed of several individual bodies. These bodies may have an irregular lenticular shape ranging up to several feet thick and up to 100 feet in diameter or they may be in the form of a "roll", a narrow elongate, flat-lying body with a crescent shaped cross section. Rolls may have a long dimension of 100 feet or more, but the narrow dimension is commonly only a few feet, thus they may be difficult to detect by exploratory drilling.

EXPLORATION

Applicant's Proposal

The applicant proposes to explore for uranium-vanadium deposits in the upper sandstone unit of the Salt Wash member of the Morrison formation by drilling from the surface. The holes would be non-core drilled to about 10 feet above the Brushy Basin-Salt Wash contact, then core drilled through the ore-bearing sandstone and not more than 15 feet into the underlying red mudstone. All holes would be logged geologically and radiometrically and significantly mineralized portions would be chemically assayed.

Exploration of the area would be accomplished by means of a two-stage program; the first stage would consist of 53 holes spaced from 200 feet to 1,000 feet apart, the spacing dependent on the location of the holes with respect to known favorable parts of the project area. The

initial drilling would include 8 holes offset 100 feet from previously drilled mineralized holes. Stage II would require 50 holes drilled as 100 or 200-foot offsets to holes found to be mineralized or to contain very favorable sandstone.

The exploration program proposed by the applicant would require an estimated 21,900 feet of non-core drilling and 9,400 feet of core drilling at an overall cost of $129,122.50. Government participation in the program would be 50 percent of the total cost or $64,561.25.

Alternate Proposal

The examining team believes that only the northern part of the Philura claims merits a DMEA exploration program; therefore, a modified program consisting of three stages is recommended. The first stage consists of ten holes placed as shown on figure 4 to cover the area on 500 to 800 foot centers. The second stage, to explore mineralized and highly favorable areas, would consist of a maximum of 12 holes drilled not less than 200 feet from any existing holes. Stage III, consisting of a maximum of 12 holes, would be used to explore for ore by offsetting previously drilled ore and well mineralized holes. Stage III holes would not be spaced less than 100 feet from any previous holes.

Holes should be non-core drilled to approximately the top of the upper sandstone unit of the Salt Wash member, then core drilled through the sandstone unit, the underlying greenish gray mudstone, and not more than 10 feet of reddish brown mudstone.

The modified program proposed by the examining team was discussed with the applicant's representative, Mr. Raymond C. Robeck. Mr. Robeck has presented the program to Hilary Minerals Company, Inc., but as yet they have not notified Mr. Robeck as to whether they concur with the suggested modification.

Estimated Cost of Alternate Proposal

The applicant's brochure included three independent contractor's bids on the proposed drilling. The bids are summarized below:

	Interval	Price per foot Non-core	Core
Avery and Johnston Drilling Co.	0-200'	$1.50	$3.50
	200-400'	1.80	4.75
	400-550'	2.15	5.25
	Standby	no charge	
V. and A. Drilling Corp.	0-200'	$2.35	3.35
	200-400'	2.60	4.20
	400-500'	3.25	5.00
	Standby	$12.50 per hour	
Minerals Engineering Company	0-100'	$2.50	$3.25
	100-200'	2.75	3.75
	200-300'	3.00	4.50
	300-400'	3.50	5.25
	400-500'	4.00	6.00
	Standby	$15.00 per hour	

The unit prices quoted by the Avery and Johnston Drilling Co. are the lowest and are normal charges for drilling in the Slick Rock area, thus are used as the basis for computation of the estimated cost of the proposed project. Only one rotary type drill rig, equipped for core

drilling will probably be assigned to the work since no guarantee can be given that more than the ten Stage I holes will be drilled. Data from the records of previous USGS work in the area indicates that the drilling rate should average approximately 75 feet per shift. Assuming that the drill will operate 25 days per month, the drilling should progress at a rate of about 1,900 feet per month. An estimated 5 months, including preliminary work and evaluation between stages, should be sufficient to complete the project.

The estimated cost of the recommended project, consisting of a maximum of 34 holes averaging 284 feet in depth, is shown below. Revisions have been made where the applicant's estimates were excessive.

(1) Independent Contracts

Drilling, non-core		
0-200 feet-6,800 feet at $1.50/ft.	$10,200.00	
200-400 ft.-306 feet at $1.80/ft.	550.80	
Drilling, core		
200-400 ft.-2,550 feet at $2.60/ft.	6,630.00	
Bulldozing, D-6 Caterpillar or equivalent		
70 hours at $12.00/hr.	840.00	
Total independent contracts		$18,220.80

(2) Supervision and Technical Services

1 full-time engineer-geologist		
(5) months at $600/mo.	$ 3,000.00	
3		
Total supervision and technical services		$ 3,000.00 1,800.00

(3) Operating Materials and Supplies

Surveying, drafting, and office supplies			
3 5 months at $15.00/mo.	$ 75.00 45.00		
Fuel and repairs on field vehicle			
3 5 months at $40.00/mo.	200.00 120.00		
Total operating materials and supplies		$ 275.00 165.00	

(4) Operating Equipment

Rental-trailer for field office			
3 5 months at $50.00/mo.	$250.00 150.00		
Depreciation (on 60 mo. basis)			
Jeep for engineer-geologist $1,800			
Transit and accessories 900			
Hole probing unit 600			
Portable light plant 300			
Total value $3,600			
$\frac{\$3,600}{60 \text{ mo.}}$ = $60.00 per month			
Depreciation			
3 5 months at $60.00/mo.	$300.00 180.00		
Total operating equipment		$ 550.00 330.00	

(5) and (6) Rehabilitation, Repairs, New Buildings, Improvements, etc.

None

(7) Miscellaneous

Accounting, 5 months at $50/mo.	$250.00 150.00		
Chemical assays, maximum of 34 samples assayed for U_3O_8 at $3.50/sample	119.00 170.00		
Compensation insurance and payroll taxes at 7 percent of $3,000.00	210.00 ~~21.00~~ 126.00		
Core boxes - 255 boxes at $1.25 each	318.75 318.75		
Total miscellaneous		$ 897.75 764.75 ~~708.75~~	
Total estimated cost of project		22,943.55 ~~$22,754.55~~	
Overall cost per foot of drilling	$\frac{22,943.55 \text{ ~~\$22,754.55~~}}{9,656 \text{ ft.}}$ =	$ ~~2.36~~ 2.38	
Incidental allowance per foot	$\frac{\$4,096.00}{9,656 \text{ ft.}}$ 4,285	$\frac{2571.00}{9656}$ $ ~~0.42~~ 0.44 0.27	

(Total cost less independent contracts, core boxes, and chemical assays)

Summary of Costs Suggested for Contract Use

Stage I - 10 holes - Estimated time for completion - 1½ months

Actual Cost Items:

Independent Contracts		
Drilling, non-core		
0-200 ft. - 2,000 ft. at $1.50/ft.	$3,000.00	
200-400 ft.- 90 ft. at $1.80/ft.	162.00	
Drilling, core		
200-400 ft.- 750 ft. at $2.60/ft.	1,950.00	
Bulldozing, D-6 Caterpillar or equiv.		
22 hours at $12.00/hr.	264.00	
Total actual cost items, Stage I		$5,376.00

Fixed Unit Cost Items:

Chemical assays for U_3O_8		
10 samples at $3.50 each	$ 35.00	
Core boxes-75 boxes at $1.25 each	93.75	
Incidental allowance	1,249.60	
2,840 feet at $0.~~42~~4/ft.	~~1,192.80~~	
		1,378.35
Total fixed unit cost items, Stage I		~~$1,321.55~~
		6,754.35
Total Stage I		~~$6,697.55~~

Stage II - 12 holes - Estimated time for completion - 1-3/4 months

Actual Cost Items:

Independent Contracts		
Drilling, non-core		
0-200 ft.-2,400 ft. at $1.50/ft.	$3,600.00	
200-400 ft.- 108 ft. at $1.80/ft.	194.40	
Drilling, core		
200-400 ft.- 900 ft. at $2.60/ft.	2,340.00	
Bulldozing, D-6 Caterpillar or equiv.		
24 hours at $12.00/hr.	288.00	
Total actual cost items, Stage II		$6,422.40

Fixed Unit Cost Items:

Chemical assays for U_3O_8		
12 samples at $3.50 each	$ 42.00	
Core boxes-90 boxes at $1.25 each	112.50	
Incidental allowance	1,499.52	
3,408 feet at $0.~~42~~4 per foot	~~1,431.36~~	
		1,654.02
Total fixed unit cost items, Stage II		~~$1,585.86~~
		8,076.42
Total Stage II		~~$8,008.26~~

Stage III - 12 holes - Estimated time for completion - 1-3/4 months

Actual Cost Items:

Independent Contracts		
Drilling, non-core		
0-200 ft.-2,400 ft. at $1.50/ft.	$3,600.00	
200-400 ft.- 108 ft. at $1.80/ft.	194.40	
Drilling, core		
200-400 ft. 900 ft. at $2.60/ft.	2,340.00	
Bulldozing, D-6 Caterpillar or equiv.		
24 hours at $12.00/hr.	288.00	
Total actual cost items, Stage III		$6,422.40

Fixed Unit Cost Items:

Chemical assays for U_3O_8		
12 samples at $3.50 each	$ 42.00	
Core boxes - 90 boxes at $1.25 each	112.50	
Incidental allowance	1,499.52	
3,408 feet at $0.~~42~~4/ft.	~~1,431.36~~	
		1,654.02
Total fixed unit items, Stage III		~~$1,585.86~~
		8,076.42
Total Stage III		~~$8,008.26~~
		22,907.19
Total for Project		~~$22,714.07~~
		11,453.60
Government participation at 50 percent (rounded)		~~$11,357.00~~

CONCLUSIONS AND RECOMMENDATIONS

The examining team concludes that there is a good possibility of finding one or more deposits, containing 2,000 to 5,000 tons of ore averaging 0.25 to 0.30 percent U_3O_8 and about 1.2 percent V_2O_5, on the northern part of the Philura group. The southern part of the group does not, at this time, merit exploration.

The alternate exploration program recommended for approval consists of a maximum of 34 holes at an estimated maximum total cost of ~~$22,714.07~~ 22,907.19. The first stage holes should be located in approximately the positions shown on figure 4; hole locations in the subsequent stages will depend on evaluation of previous drilling and should require prior approval by the Government.

U.S. DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

DEFENSE MINERALS EXPLORATION ADMINISTRATION
APRIL 1958
DOCKET 4949

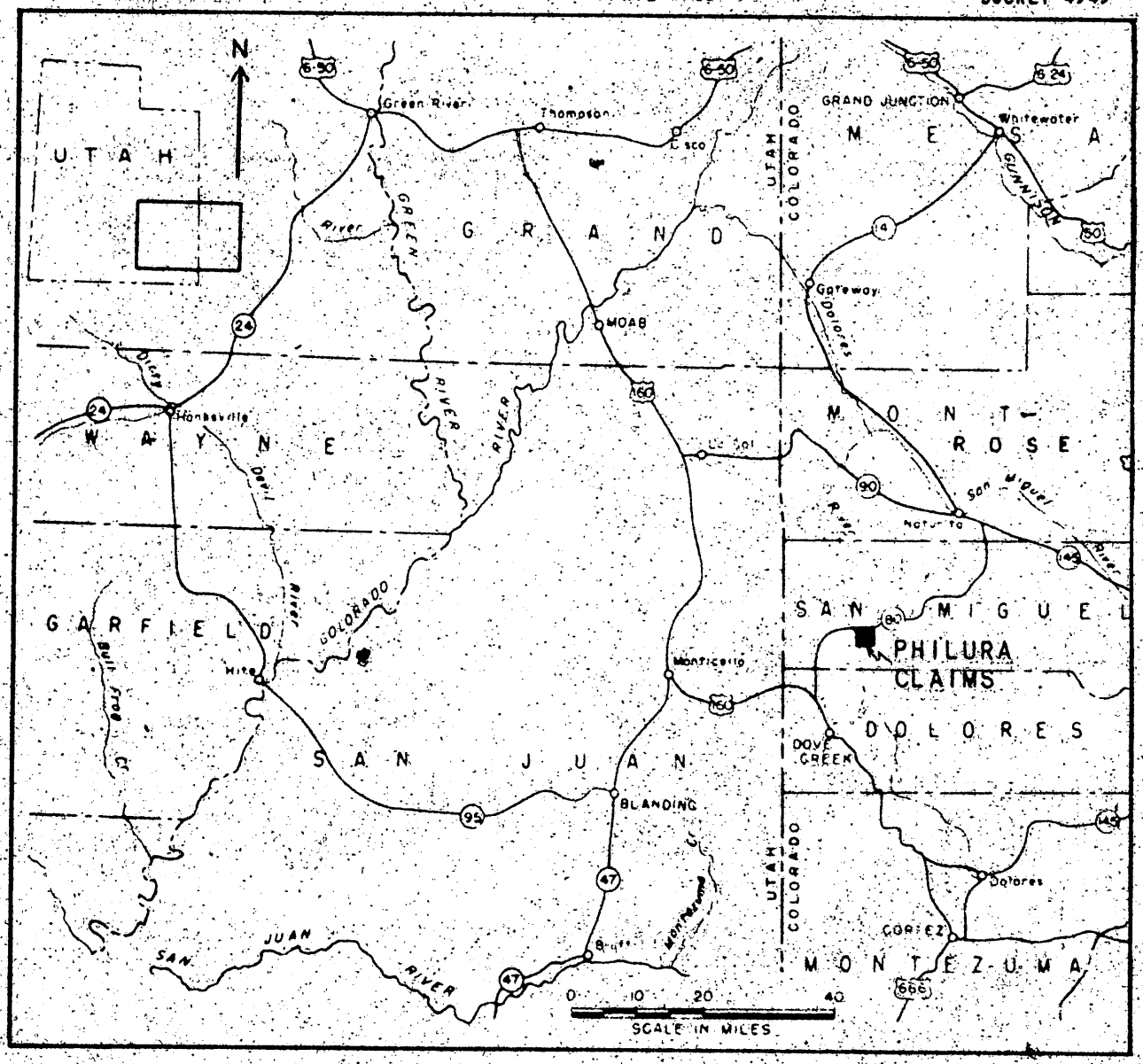

FIGURE 1.--INDEX MAP OF PART OF COLORADO PLATEAU SHOWING LOCATION OF PHILURA CLAIMS, HILARY MINERAL CO., INC., SAN MIGUEL COUNTY, COLORADO.

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DATE	INITIALS	CODE

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DEFENSE MINERALS EXPLORATION ADMINISTRATION
APRIL 1958
DOCKET 4949

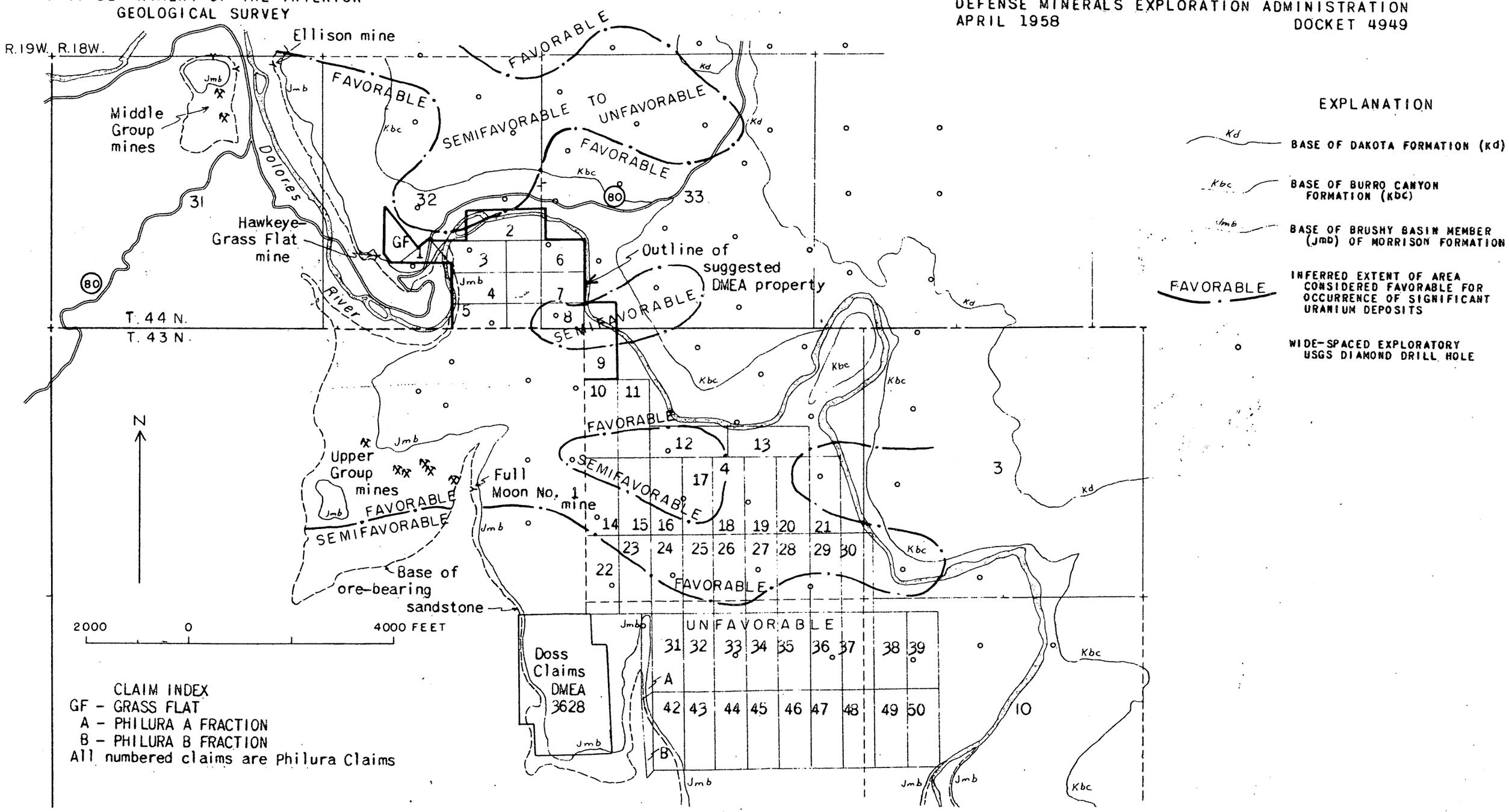

Figure 2.--MAP SHOWING GEOLOGY IN THE VICINITY OF THE PHILURA CLAIMS, HILARY MINERALS CO., INC., SAN MIGUEL COUNTY, COLORADO.

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DEFENSE MINERALS EXPLORATION ADMINISTRATION
APRIL 1958 DOCKET 4949

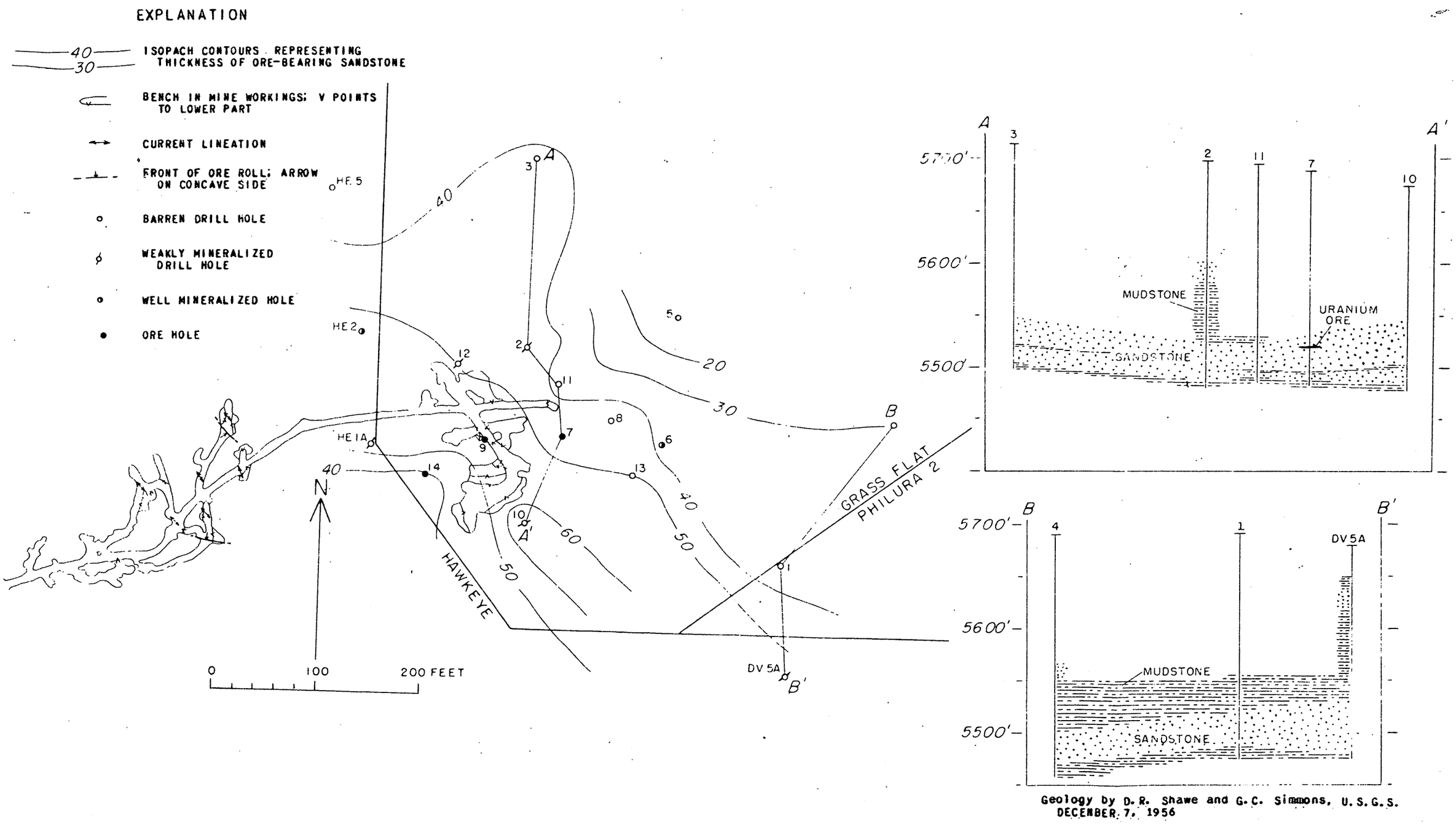

FIGURE 3.—GEOLOGIC MAP OF UNDERGROUND WORKINGS, HAWKEYE-GRASS FLAT MINE, HILARY MINERAL CO., INC., SAN MIGUEL COUNTY, COLORADO.

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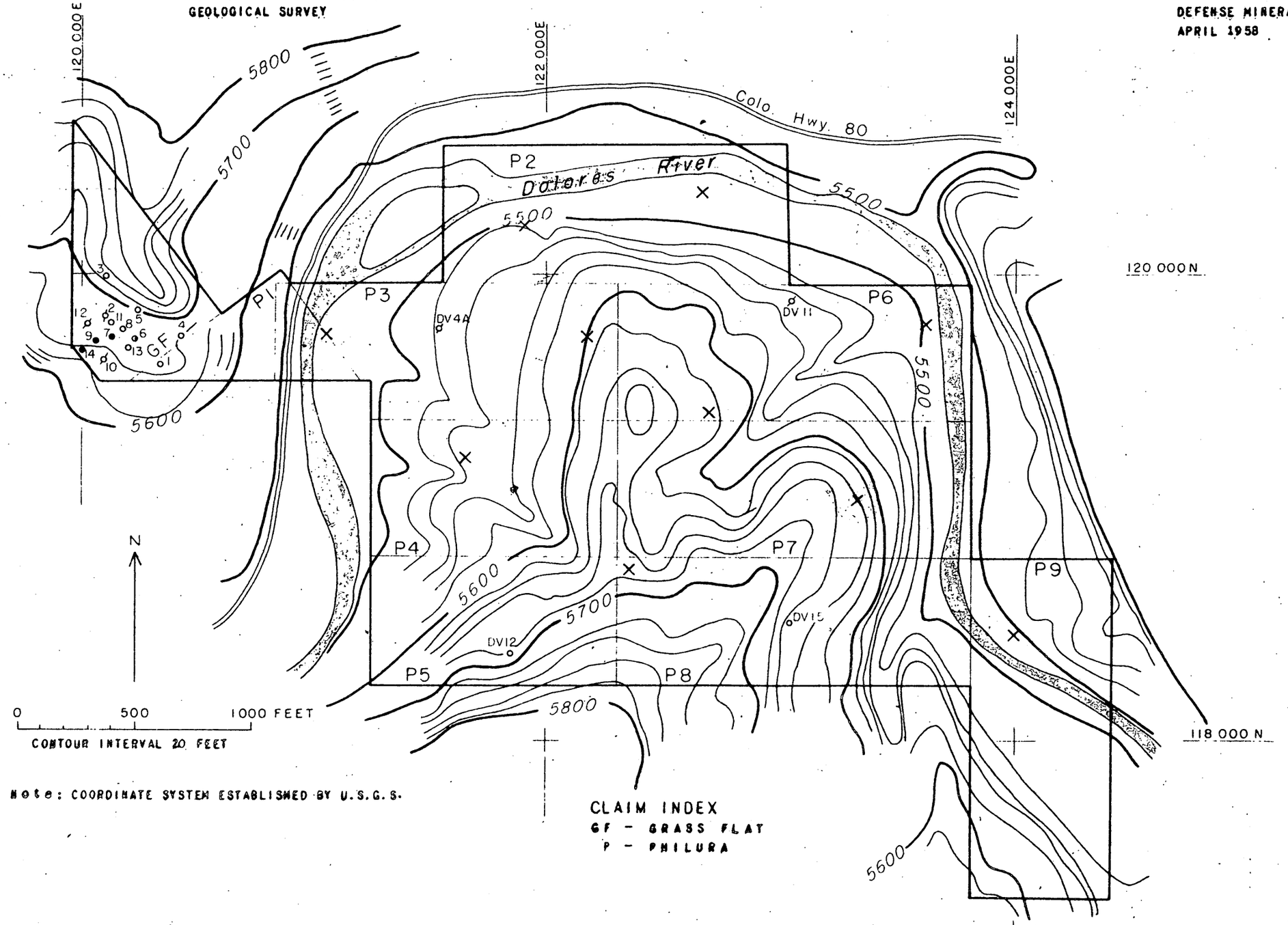
DEFENSE MINERALS EXPLORATION ADMINISTRATION
APRIL 1958 DOCKET 4949



Note: COORDINATE SYSTEM ESTABLISHED BY U.S.G.S.

EXPLANATION

DRILL HOLES WITH PREFIX DV DRILLED BY U.S.G.S. HOLES WITH NO PREFIX DRILLED BY UTE URANIUM COMPANY

- ● ORE (AT LEAST 1.0 FEET OF MATERIAL CONTAINING AT LEAST 0.20 PERCENT U_3O_8
- ○ MINERALIZED (ORE GRADE, BUT LESS THAN 1.0 FEET THICK)
- ◐ WEAKLY MINERALIZED (AT LEAST 0.03 PERCENT U_3O_8, BUT LESS THAN ORE GRADE
- ○ BARREN
- × PROPOSED SITE OF DMEA STAGE I DRILL HOLE

FIGURE 4.—PROPOSED STAGE I DRILLING ON THE NORTHERN PART OF THE PHILURA CLAIMS, HILARY MINERAL CO., INC., SAN MIGUEL COUNTY, COLORADO.

224 New Customhouse
Denver 2, Colorado
April 22, 1958

ECD APR 25 1958
CODE
4/25 H. H. 220
" Shorty 300

AIR MAIL

Mr. Joseph H. Kanter, President
Hilary Mineral Co., Inc.
729 DuPont Building
Miami, Florida

Re: Docket No. DMEA 4949 (Uranium)
(Brass Flat and Philura claims)
San Miguel County, Colorado

Dear Mr. Kanter:

Enclosed are the original and five copies of Form MF-205, Consent to Lien and Subordination Agreement. Please have all copies executed by the proper officials of Beaver Mesa Uranium, Inc.

The original and four copies of the executed Consent to Lien and Subordination Agreement should be returned to the Washington Office, DMEA in care of George C. Selfridge, Chairman, Operating Committee, U. S. Department of the Interior, Interior Building, Washington 25, D. C., as soon as possible so that they may continue to process the application. The extra copy of the Consent to Lien may be retained by Beaver Mesa Uranium, Inc.

Very truly yours,

Original signed by
E. N. HARSHMAN

E. N. Harshman
Acting Executive Officer
DMEA Field Team, Region III

HMC:dp
cc: Sec. Op. Comm. (2)
Harshman
Salsbury
Hasler
Docket
Chron.

ORIGINAL COPY
DMEA
RECEIVED 20
3/20 CR 220
3/21 FLK 700

224 New Customhouse
Denver 2, Colorado
March 17, 1958

Memorandum

To: J. W. Hasler w/enclosures - items 2-5 below
M. H. Salsbury w/enclosures - items 1-5 below

From: DMEA Field Team, Region III

Subject: Docket No. DMEA 4949 (Uranium) Hilary Minerals Company (Philura and Grass Flat claims) San Miguel County, Colorado

Enclosed is the following material relating to the subject docket.

1. Copy of application for Government assistance in exploration work under the DMEA program.

2. Memorandum of Review by James Paone, USBM

3. Memorandum of Review by N. E. Nelson, USGS

4. Letter of transmittal of the foregoing to this office dated March 13, 1958, from the Chairman, Operating Committee, DMEA.

5. Routing Control sheet.

A field examination of the property and a joint report of findings and recommendations pertaining to the Applicant's work proposal are requested.

If the field examiners recommend Government participation in the proposed exploration program, please submit 11 extra copies of each map used in the joint report which show the land to be subordinated and the location and extent of recommended work, relative to property boundaries.

Original signed by
W. H. KING
W. H. King
Executive Office

HMC:dp

cc: Sec. Oper. Comm. (2)
Harshman
DMEA/DFC
Docket
Chron.

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
3/11/58	Knoupe	700
3/12	Ellis	700
3/12	[illegible]	130
"	Glover	110
"	Fortenberry	100
3/13	C	220
		700

MAR 13 1958

Mr. W. M. King
Executive Officer
DMEA Field Team, Region III
224 New Customhouse Building
Denver 2, Colorado

Re: Docket No. DMEA-4949 (Uranium)
Hilary Minerals Company
Philura and Grass Flat Claims
San Miguel County, Colorado

Dear Mr. King:

The subject application is referred to Region III Field Team for investigation, a field examination if considered necessary, and recommendations.

Enclosed are copies of memoranda, dated March 6 and 10, 1958, from N. E. Nelson, USGS, and James Paone, USBM, respectively, relating to the proposed project. Also enclosed, for the use of the Field Team, is an extra copy of the application.

If a contract is approved, we will require the usual number of Consent to Lien and Subordination Agreement forms signed by Beaver Mesa Uranium, Inc. Therefore, if the Field Team recommends a project, it should inform the Applicant of this requirement. Also, it should advise the Applicant that early submission of these forms would expedite processing of the application, but their presentation does not imply that a contract will be granted.

Sincerely yours,

George C. Selfridge

Enclosures

Chairman, Operating Committee (GCS)

APPROVED:

Frank D. Lamb (FDL)
Member, Bureau of Mines

Thor H. Kiilsgaard (THK)
Member, Geological Survey

FLKnouse/gla
3-11-58

cc to: Admr.'s Reading File
THKiilsgaard, 5224
FLKnouse
Operating Committee

8623

DMEA Form 7
(12-56)

OFFICIAL FILE COPY

Date	Surname	Code
3/11/58	Knouse	700
3/12	Ellis	700
3/12	Selbridge	130
"	Goldman	110
"	Shuttenberg	100
		220
		700
3/12	Lamb	130
3/12	Kilgannon	130

MAR 13 1958

Mr. Leonard S. Fox
Vice President
Hilary Minerals Co., Inc.
729 DuPont Building
Miami, Florida

Re: Docket No. DMEA-4949 (Uranium)
Philura and Grass Flat Claims
San Miguel County, Colorado

Dear Mr. Fox:

The application for assistance in exploring your claims, under the captioned docket number, has been reviewed by the Division of Rare and Miscellaneous Metals of the Defense Minerals Exploration Administration. It has been referred to:

Mr. W. H. King
Executive Officer
DMEA Field Team, Region III
224 New Customhouse Building
Denver 2, Colorado

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

Sincerely yours,

R. D. Nininger (for)

Administrator

FLKnouse/gla
3-11-58
cc to: Admr.'s Reading File
FLKnouse
DMEA Field Team, Region III (2)

8623

OFFICIAL FILE COPY
DMEA
RECEIVED MAR. 10 1958

DATE	INITIALS	CODE
3/11	C	220
11	FLR	700

[illegible]
[illegible]
[illegible]
[illegible]

March 10, 1958

DMEA Report No. 4949
DMEA Contract No.
Commodity Uranium
Name of applicant Hilary Mineral Co., Inc.
Name of property Slick Rock Group, Philura Group, etc.
Location of property San Miguel County, Colo.
Estimated cost of project $129,122.50

Recommendation

For Ernest William Ellis, DMEA Member
Uranium Commodity Committee

From James Paone, Bureau of Mines Member JP.
Uranium Commodity Committee

Subject: Review of Application
(Application, Field Tour Report, etc.)

1. Date of contract documents 3/5/58. 2. Date received by reviewer 3/7/58

3. Prior reports on this property known to reviewer: Yes [ ] No [ ]

4. Prior reports on nearby properties known to reviewer: Yes [ ] No [ ]

5. Information available on past productions: Yes [ ] No [ ]

6. Other pertinent factors known to reviewer: Yes [ ] No [ ]

7. Explain items marked yes above:

8. Factors meeting special considerations:
   a. Location [ ]
   b. Ownership [ ]
   c. Evidence of mineralization [ ]
   d. Geology [ ]
   e. Proposed exploration method [ ]
   f. Alternate exploration method [ ]
   g. Costs [ ]
   h. [ ]

9. Action advised:
   a. Obtain information from applicant [ ]
   b. Refer to Field Team [ ]
   c. Denial [x]
   d. Agree with Field Team [ ]
      1. Consult with Mr. [ ] at [ ]
   e. Disagree with Field Team [ ]
   f. Suggest alternate plan [ ]
   g. Request another examination [ ]
   h. Approval [ ]

10. Remarks (Use back of page if necessary) The claims were denied under three previous applications because the area is not favorable. The applicant has done no additional work that would support of his request or alter the situation.

IN REPLY REFER TO:

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

DMEA
RECEIVED MAR 7 1958

	INITIALS	CODE
3/7	C	220
	~~EWE~~	700
	~~Hausse~~	700
	Murphy	

March 6, 1958
Re: DMEA 4949
Hilary Minerals Co.
Philura Group
San Miguel County, Colo.
$129,122.50 - Uranium

~~Memorandum~~

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

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

Subject: Review of application

The applicant requests assistance in prospecting by drilling a part of a large group of claims. A part of the area included in the claims which constitute the property was the subject of a previous application, DMEA 3706, which was denied without prejudice October 26, 1955. Another application, DMEA 4071, concerned itself with three Philura claims, numbers 57, 58 and 59. The docket was closed June 21, 1956. Application DMEA 4855 requested reinstatement of application DMEA 4071.

This application does not include the three Philura claims of dockets DMEA 4071 and 4855. Docket 4855, is in process, denial having been recommended by the Denver office February 17, 1958. Probably the 3 claims of the application lie far to the southeast of the northwesterly claims of this, 4949, application.

Judging by the drilling results of the "DV" holes, DV-4A to DV108 further prospecting of the Philura claims is not warranted. The Grass Flat claim area looks less unfavorable, but the fact that mining ceased in the Grass Flat mine tends to depreciate that slightly favorable corner. Certainly results of mining and drilling do not give whole-hearted support to the applicant's statement, "The finding of deposits in the Slick Rock District has shown that once an area is definitely established as favorable, it is merely a matter of drilling a sufficient number of holes along the sedimentary trends until ore is found. To date, most of the orebodies are less than 100 feet long, and in a general oval shape. It has also been found that where any mineralization is found, at least small ore bodies are nearby."

Referral of the application to the Field Team for an up-to-date appraisal is recommended.

N. E. Nelson

N. E. Nelson

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

March 5, 1958

Hilary Minerals Co., Inc.
729 Dupont Building,
Miami, Florida

Subject: DMEA-4949

Gentlemen:

Your application for exploration assistance, dated February 21, 1958 submitted to our office at Denver, Colorado has been assigned Docket Number DMEA-4949 and referred to the Rare & Miscellaneous Division in the Washington office. Kindly identify all future correspondence relating to your application by this Docket Number.

Sincerely yours,

Allen S. Dakan, Director
Operations Control and
Statistics Division

Copy to: Region III

OFFICIAL FILE COPY
DMEA
RECEIVED MAR 3 1958

DATE	INITIALS	CODE

224 New Customhouse
Denver 2, Colorado

February 27, 1958

Mr. J. H. Kanter, President
Hilary Minerals
729 DuPont Building
Miami, Florida

Dear Mr. Kanter:

This will acknowledge receipt of four copies of your application and letter of transmittal dated February 21, 1958. Should further information be needed, we will contact you.

Original signed by
W. H. KING

W. H. King
Executive Officer

HMC:dp

cc: Sec. Oper. Comm. (2)
Harshman
Hasler
Salsbury
DMEA/DFC
Subject
Chron.

NAME OF

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overnment Messenger Envelope

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2. Void previous block.
3. Write clearly.

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Rifkin 2122	RUN / STOP	~~Jean Donnelly~~ ~~Labor Office~~	RUN / STOP
	RUN / STOP	~~Michael Miller~~ ~~BLM~~	RUN / STOP
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Bldg.	RUN / STOP 29	~~Alexander, Opal~~ ~~Room~~	RUN / STOP
Land Management the Interior	RUN / STOP	[illegible]	RUN / STOP
[illegible]	RUN / STOP	[illegible] Rm-4454 DMEA	RUN / STOP

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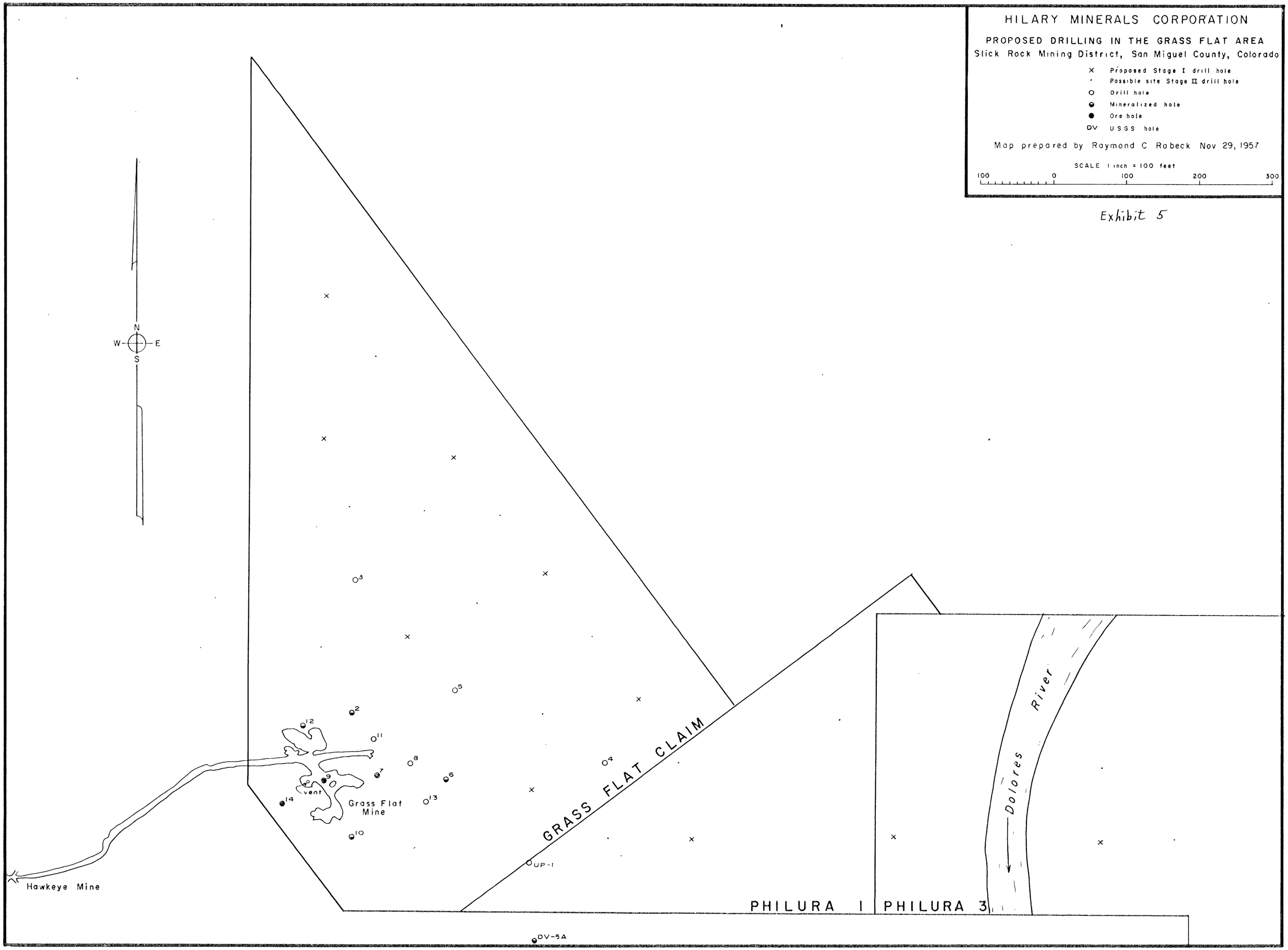
HILARY MINERALS CORPORATION
PROPOSED DRILLING IN THE GRASS FLAT AREA
Slick Rock Mining District, San Miguel County, Colorado
Proposed Stage I drill hole
Possible site Stage II drill hole
Drill hole
Mineralized hole
Ore hole
DV USGS hole
Map prepared by Raymond C Robeck Nov 29, 1957
SCALE 1 inch = 100 feet
100 0 100 200 300
N
W
E
S
GRASS FLAT CLAIM
PHILURA 1
PHILURA 3
Dolores River
Grass Flat Mine
vent
Hawkeye Mine
UP-1
DV-5A

Exhibit 5

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
W. E. WRATHER, DIRECTOR

PREPARED IN COOPERATION WITH THE
U. S. ATOMIC ENERGY COMMISSION
COLORADO GEOLOGICAL SURVEY BOARD
AND COLORADO METAL MINING FUND BOARD

GEOLOGY OF THE
HORSE RANGE MESA QUADRANGLE
COLORADO
GQ 64

EXPLANATION

QUATERNARY — *Pleistocene and Recent*

Qal — Alluvium
Light-red wind-deposited sand and silt on benches and mesa tops, reworked in part by water; Recent valley fill and stream deposits.

Qg — Terrace gravel

Qls — Landslide deposits

UNCONFORMITY

CRETACEOUS — *Lower and Upper Cretaceous*

Kd — Dakota sandstone
Yellowish, lenticular sandstone and conglomerate with interbedded carbonaceous shale and impure coal.

UNCONFORMITY

Lower Cretaceous

Kbc — Burro Canyon formation
White, gray, and red sandstone and conglomerate with interbedded green and purplish shale.

JURASSIC — *Upper Jurassic*

Jmb, Jms — Morrison formation
Variegated shale and mudstone; white, gray, rusty-red, and buff sandstone; rusty-red conglomerate; local thin limestone beds. At the top the Brushy Basin shale member, Jmb, consisting largely of bentonitic shale but including some sandstone and conglomerate lenses, and at the base the Salt Wash sandstone member, Jms, with more numerous and thicker sandstone beds.

Js — Summerville formation
Thin-bedded red, gray, green, and brown sandy shale and mudstone.

Middle and Upper Jurassic — San Rafael group

Jec — Entrada sandstone and Carmel formation undivided
Orange, buff, and white, fine-grained, massive and cross-bedded Entrada sandstone at the top. Red sandstone and mudstone of the Carmel formation at the base.

UNCONFORMITY

JURASSIC(?) — *Glen Canyon group*

Jn — Navajo sandstone
Buff and gray crossbedded fine-grained sandstone.

Jk — Kayenta formation
Irregularly bedded, red, buff, gray, and lavender shale, siltstone, and fine- to coarse-grained sandstone.

Jw — Wingate sandstone
Fine-grained reddish-brown, cliff-forming sandstone, thick-bedded, massive, and crossbedded.

TRIASSIC — *Upper Triassic*

Ꞧc — Chinle formation
Red to orange-red siltstone, with interbedded lenses of red sandstone, shale, and limestone-pebble and clay-pellet conglomerate. Lenses of quartz-pebble conglomerate and grit at base.

Contact
Dashed where approximately located.

Indefinite contact
Includes inferred contacts and indefinite boundaries of surficial deposits.

Base map by Topographic Division
U. S. Geological Survey, 1950

Geology mapped by W. L. Stokes
and D. A. Phoenix in 1945; revised by F. W. Cater, Jr., in 1949

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C. M R-6935

15°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1955

GEOLOGIC MAP
OF THE
HORSE RANGE MESA QUADRANGLE, COLORADO

By
Fred W. Cater, Jr.

Scale 1:24000

1 ½ 0 1 Mile

Contour interval 20 feet
Datum is mean sea level

1955

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
W. E. WRATHER, DIRECTOR

PREPARED IN COOPERATION WITH THE
U. S. ATOMIC ENERGY COMMISSION
COLORADO GEOLOGICAL SURVEY BOARD
AND COLORADO METAL MINING FUND BOARD

GEOLOGY OF THE
HORSE RANGE MESA QUADRANGLE
COLORADO
GQ 64

Base map by Topographic Division
U. S. Geological Survey, 1950

EXPLANATION

QUATERNARY

Pleistocene and Recent

Qal — Alluvium
Light-red wind-deposited sand and silt on benches and mesa tops, reworked in part by water; Recent valley fill and stream deposits.

Qg — Terrace gravel

Qls — Landslide deposits

UNCONFORMITY

CRETACEOUS

Lower and Upper Cretaceous

Kd — Dakota sandstone
Yellowish, lenticular sandstone and conglomerate with interbedded carbonaceous shale and impure coal.

UNCONFORMITY

Lower Cretaceous

Kbc — Burro Canyon formation
White, gray, and red sandstone and conglomerate with interbedded green and purplish shale.

JURASSIC

Upper Jurassic

Jmb, Jms — Morrison formation
Variegated shale and mudstone; white, gray, rusty-red, and buff sandstone; rusty-red conglomerate; local thin limestone beds. At the top the Brushy Basin shale member, Jmb, consisting largely of bentonitic shale but including some sandstone and conglomerate lenses, and at the base the Salt Wash sandstone member, Jms, with more numerous and thicker sandstone beds.

Middle and Upper Jurassic — San Rafael group

Js — Summerville formation
Thin-bedded red, gray, green, and brown sandy shale and mudstone.

Jec — Entrada sandstone and Carmel formation undivided
Orange, buff, and white, fine-grained, massive and cross-bedded Entrada sandstone at the top. Red sandstone and mudstone of the Carmel formation at the base.

UNCONFORMITY

JURASSIC(?)

Glen Canyon group

Jn — Navajo sandstone
Buff and gray crossbedded fine-grained sandstone.

Jk — Kayenta formation
Irregularly bedded, red, buff, gray, and lavender shale, siltstone, and fine- to coarse-grained sandstone.

Jw — Wingate sandstone
Fine-grained reddish-brown, cliff-forming sandstone, thick-bedded, massive, and crossbedded.

TRIASSIC

Upper Triassic

Tc — Chinle formation
Red to orange-red siltstone, with interbedded lenses of red sandstone, shale, and limestone-pebble and clay-pellet conglomerate. Lenses of quartz-pebble conglomerate and grit at base.

Contact
Dashed where approximately located.

Indefinite contact
Includes inferred contacts and indefinite boundaries of surficial deposits.

Fault
Dashed where approximately located; dotted where concealed. U, upthrown side; D, downthrown side.

Anticuline

Syncline

Strike and dip of beds

Structure contours
Drawn on top of Entrada sandstone; dashed where approximately located; short dashes indicate projection above surface. Contour interval 100 feet. Datum is mean sea level.

Adit

Prospect

Mine

Outline of patented claim
Located only approximately for purpose of discussion in the text (not accurate to the scale of the map).

LIST OF PATENTED CLAIMS

1. Haymaker Extension
2. Haymaker
3. Sunset
4. Rainbow
5. Last Chance
6. Cougar
7. Little Mariel
8. Chico
9. Lookout
10. Uncle Sam
11. Alice
12. Cacti
13. Mildred
14. Veta Mad
15. Georgeto
16. Dan
17. Little Yolande
18. Herbert
19. Vanadium
20. Ocumpaugh
21. Ellison
22. Hawkeye
23. Big Four
24. Grant
25. Canyon View
26. Black Fox
27. University
28. Jessie
29. Colorado Maiden
30. Ned
31. Little Dick

Hilary
Slick Rock Group of Claims

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C. M R-6935

Geology mapped by W. L. Stokes and D. A. Phoenix in 1945; revised by F. W. Cater, Jr., in 1949

TRUE NORTH
MAGNETIC NORTH
15°
APPROXIMATE MEAN DECLINATION, 1955

GEOLOGIC MAP
OF THE
HORSE RANGE MESA QUADRANGLE, COLORADO

By
Fred W. Cater, Jr.

Scale 1:24000

1 ½ 0 1 Mile

Contour interval 20 feet
Datum is mean sea level

1955

OFFICIAL FILE COPY
DMEA
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DATE | INITIALS | CODE

Hilary — Slick Rock
Philura
Exhibit 3

GEOLOGY
OF THE
HORSE RANGE MESA QUADRANGLE, COLORADO

By
Fred W. Cater, Jr.

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INTRODUCTION

The U. S. Geological Survey mapped the geology of the Horse Range Mesa quadrangle, Colo., as part of a comprehensive study of carnotite deposits. The study, covering the principal carnotite-producing area in southwestern Colorado, included detailed examination of mines and geologic mapping of eighteen 7½-minute quadrangles, of which the Horse Range Mesa quadrangle (fig. 1) is one. Parts of the text accompanying these maps have been standardized; these parts comprise some descriptions of geologic formations and general descriptions of regional structural setting, geologic history, and ore deposits. A comprehensive report presenting in greater detail the geologic features of the entire area and interpretations of these features is in preparation. Work was started in the area in 1939 with the cooperation of The Colorado State Geological Survey Board and the Colorado Metal Mining Fund Board and continued through 1945 as a wartime strategic-minerals project. Since 1947 the Geological Survey has been continuing this geologic study on behalf of the Division of Raw Materials of the Atomic Energy Commission. The Horse Range Mesa quadrangle was mapped in 1945, and some revisions were made in 1949.

The Horse Range Mesa quadrangle covers about 59 square miles in San Miguel County, Colo., and lies in the Canyon Lands division of the Colorado Plateau physiographic province. The quadrangle is a rugged area of mesas and canyons. Total relief within the quadrangle is about 2,205 feet; altitudes range from about 5,360 feet in the canyon of the Dolores River to 7,565 feet on Summit Point. The Dolores River and its tributaries drain the area.

No accurate information on rainfall is available, but the annual precipitation is probably between 10 and 15 inches; the area is semiarid and supports a moderate growth of juniper and piñon on rocky terrain and abundant sagebrush where soils are thick. Cactus and sparse grass are widely distributed. The south half of the quadrangle is accessible over a system of dry-weather roads and State Highway 80, but the north half is accessible only by horseback or by foot.

REGIONAL GEOLOGY

Rocks exposed in the 18 quadrangles mapped consist of crystalline pre-Cambrian rocks and sedimentary rocks that range from late Paleozoic to Quaternary. Crystalline rocks crop out only in the northeastern part of the area along the flanks of the Uncompahgre Plateau; the rest of the area is underlain by sedimentary rocks. The latest Paleozoic and earliest Mesozoic units wedge out northeastward against the crystalline pre-Cambrian rocks, but later Mesozoic units were deposited on top of the pre-Cambrian rocks. Over most of the region the sedimentary beds are flat lying, but in places they are disrupted by high-angle faults or are folded into northwest-trending monoclines, shallow synclines, and strongly developed anticlines. The largest of the folds is the Uncompahgre Plateau uplift, a fold nearly 100 miles long that traverses the northeastern part of the area (fig. 1). Well-developed anticlines having intrusive cores of salt and gypsum underlie Sinbad Valley, Paradox Valley, and Gypsum Valley in the central part of the area; the Dolores anticline in the southwestern part of the area probably has a salt-gypsum core, although it is not exposed (fig. 1).

The Horse Range Mesa quadrangle lies in the southern part of the 18-quadrangle area between the Gypsum Valley anticline on the northeast and the Dolores anticline on the southwest.

STRATIGRAPHY

The oldest rocks exposed in the Horse Range Mesa quadrangle are the Upper Triassic rocks that crop out in Summit Canyon. Jurassic rocks crop out in the canyon walls and on the benches and slopes below the mesas; the Jurassic rocks are exposed in more than three-quarters of the total area of the quadrangle. Cretaceous rocks cap the mesas. Recent deposits of windblown material and sheet wash are widely distributed on top of the mesas and along the benches, and considerable alluvium has been deposited along the Dolores River.

The stratigraphic sequence is similar to that studied by Baker (1933) and Dane (1935) in nearby areas in Utah; most of the formations can be traced continuously from the Horse Range Mesa quadrangle into Utah.

CHINLE FORMATION

The Upper Triassic Chinle formation consists of red to orange-red siltstone, with interbedded red fine-grained sandstone, shale, and limestone-pebble and clay-pellet conglomerate. These lithologic units are lenticular and discontinuous. The lower part of the formation contains numerous lenses of a distinctive limestone-pebble and clay-pellet conglomerate; in places the lowermost lenses contain quartz pebbles or consist of a relatively clean quartz grit. These quartz-bearing lenses are probably the stratigraphic equivalent of the Shinarump conglomerate, which is widely distributed in eastern Utah and northern Arizona. Much of the Chinle formation consists of indistinctly bedded red siltstone that breaks into angular fragments. Evenly bedded shale is rare. The sandstone layers differ in bedding characteristics; some layers are massive, whereas others are crossbedded, and still others are conspicuously ripple bedded. Almost everywhere the formation crops out as a steep slope broken in places by more resistant ledges of sandstone and conglomerate.

The base of the Chinle formation is not exposed in the Horse Range Mesa quadrangle. The formation, as projected from adjoining quadrangles, probably ranges from 475 feet to 525 feet in thickness.

GLEN CANYON GROUP

The Glen Canyon group, of Jurassic(?) age, comprises, in ascending order, the Wingate sandstone, the Kayenta formation, and the Navajo sandstone.

Wingate sandstone.—The Wingate sandstone conformably overlies the Chinle formation. The sandstone is a massive, fine-grained rock composed of clean, well-sorted quartz sand. It typically crops out as an impressive red or dark-brown wall, stained and streaked in places with a surficial red and black desert varnish. Vertical joints cut the sandstone from top to bottom; the spalling of vertically jointed slabs largely causes the recession of the cliff. The sandstone is divided into horizontal layers by extensive bedding planes spaced 2 to 50 feet apart. Within each horizontal layer the sandstone is crossbedded on a magnificent scale; great sweeping tangential crossbeds of eolian type, in places extending across the entire thickness of the horizontal layer, are disposed in all directions. The sandstone is rather poorly cemented and crumbles easily; this quality probably accounts for the readiness with which the rock disintegrates in faulted areas.

In the Horse Range Mesa quadrangle the Wingate sandstone is about 275 feet thick.

Kayenta formation.—The Kayenta formation conformably overlies the Wingate sandstone; the contact between the two formations is gradational in most places. The formation is notable for its variety of rock types. Sandstone, red, buff, gray, and lavender in color, is the most abundant type; but the formation also contains considerable quantities of red siltstone, thin-bedded shale, and conglomerate. The conglomerate contains pebbles of sandstone, shale, and limestone. The sandstone is composed of rounded to subrounded quartz grains and minor quantities of mica, feldspar, and dark minerals. Most of the sandstone is thin bedded, crossbedded in part, and flaggy; some is massive. Individual sandstone beds are lenticular and discontinuous and interfinger with shale and, in places, with conglomerate. The Kayenta typically crops out in a series of benches and ledges. The ledges in many places overhang recesses where softer beds have eroded back. The lower part of the formation is more firmly cemented and forms resistant, thick ledges that protect the underlying Wingate sandstone from erosion.

The Kayenta formation in the Horse Range Mesa quadrangle ranges in thickness from 180 to 210 feet. Abrupt local changes in thickness of 10 to 20 feet are common. The irregular bedding, channel filling, and range of thickness all indicate a fluvial origin.

Navajo sandstone.—The Navajo sandstone conformably overlies the Kayenta formation. The Navajo is a gray to buff massive fine-grained clean quartz sandstone. Tangential crossbeds of tremendous size leave little doubt of the eolian origin of the sandstone. The sandstone weathers by disintegration; it tends to develop rounded topographic forms where exposed on slopes or benches and vertical cliffs where protected by overlying rocks.

The thickness of the Navajo sandstone in the Horse Range Mesa quadrangle ranges within wide limits; in McIntyre Canyon an incomplete section nearly 300 feet thick is exposed, whereas in Summit Canyon a complete section is only about 50 feet thick.

Carmel formation and Entrada sandstone.—The Carmel formation consists largely of red to buff, nonresistant, horizontally bedded siltstone, mudstone, and sandstone. In most localities the basal beds consist of reworked Navajo sandstone. Pebbles and angular fragments of white and gray chert, as much as an inch in diameter, are scattered rather abundantly through the lower part of the formation and less abundantly through the upper part. These chert pebbles and angular fragments are sufficiently abundant locally to form layers of conglomerate. In many places the upper part of the formation contains scattered barite nodules as much as an inch in diameter.

The Carmel formation ranges from 20 feet to 50 feet in thickness in the Horse Range Mesa quadrangle. This range appears to be due chiefly to deposition on an irregular, eroded surface of Navajo sandstone. No definite evidence indicates that the Carmel formation of this area is of marine origin as is the Carmel of central Utah, but the probabilities are that the Carmel of southwestern Colorado was deposited in shallow water marginal to a sea.

The Carmel formation grades upward, in most places without prominent breaks, into the Entrada sandstone. The Entrada sandstone, known locally as the "slick rim" because of its appearance, is perhaps the most picturesque of all the formations in the plateau region of Colorado. The smoothly rounded, in places bulging, orange, buff, and white cliffs formed by this sandstone are a distinctive and scenic feature of the region. Horizontal rows of pits resulting from differential weathering and ranging from a few inches to a foot or more across are characteristic of these cliffs. The Entrada consists of alternating horizontally bedded units and sweeping, eolian-type crossbedded units. The horizontally bedded units are most common in the basal part and in the uppermost, lighter colored part of the Entrada, whereas the crossbedded units are dominant in the middle part. The Entrada sandstone differs from the somewhat similar Wingate sandstone and Navajo sandstone by the sorting of sand into two distinct grain sizes. Subrounded to subangular quartz grains mostly less than 0.15 mm in diameter make up the bulk of the sandstone. The sandstone also contains larger grains, which are well rounded, have frosted surfaces, and range from 0.4 to 0.8 mm in diameter; most of these grains are quartz, but grains of chert are scattered among them. Most of the larger grains are distributed in thin layers along bedding planes.

The Entrada sandstone is 75 to 150 feet thick in the Horse Range Mesa quadrangle.

Summerville formation.—The Summerville formation generally crops out as a steep, debris-covered slope, with very few good exposures. Where exposed the Summerville exhibits a remarkably even, thin, horizontal bedding. Beds are predominantly red of various shades, although some beds are green, brown, light yellow, or nearly white. Sandy and silty shales are the most abundant kinds of rock, but all gradations from claystone to clean, fine-grained sandstone are interbedded with them. Well-rounded amber-colored quartz grains with frosted or matte surfaces are disseminated throughout most of the formation, including beds consisting almost entirely of claystone. Thin beds of authigenic red and green chert are widespread. A thin discontinuous bed of dark-gray dense fresh-water limestone occurs in the upper part of the formation. Sandstone beds are thicker and sandstone is more abundant in the lower part of the formation than in the upper part. Commonly the sandstone beds are ripple marked, and in places they show small-scale low-angle crossbedding.

The Summerville formation rests conformably on the Entrada sandstone, and, although a sharp lithologic change marks the contact, no cessation of deposition separated the two formations. The upper contact of the Summerville is uneven and channeled, and the channels are filled by the overlying basal sandstone beds of the Morrison formation. Locally, however, the contact is difficult to determine, because the overlying beds of shale and mudstone of the Morrison formation are similar to beds of the Summerville.

The Summerville formation in the Horse Range Mesa quadrangle ranges in thickness from 70 feet to 195 feet.

MORRISON FORMATION

The Morrison formation of Late Jurassic age is of special interest economically because of the uranium- and vanadium-bearing deposits it contains. The formation comprises two members in this area; the lower is the Salt Wash sandstone member, and the upper is the Brushy Basin shale member. In the Horse Range Mesa quadrangle the Morrison formation ranges in thickness from 625 to 775 feet. The Salt Wash sandstone member and the Brushy Basin shale member in general are of approximately equal thickness. In some areas, however, their thicknesses vary independently, whereas in other areas a thinning in one member is accompanied by a thickening in the other.

Salt Wash sandstone member.—The Salt Wash sandstone member ordinarily crops out above the slope-forming Summerville formation as a series of thick, resistant ledges and benches. Sandstone predominates and ranges in color from nearly white to gray, light buff, and rusty red. Interbedded with the sandstone are red shale and mudstone and locally a few thin lenses of dense gray limestone. Sandstone commonly occurs as strata traceable as ledges for considerable distances along the outcrop, but within each stratum individual beds are lenticular and discontinuous; beds wedge out laterally, and other beds occupying essentially the same stratigraphic position wedge in. Thus, any relatively continuous sandstone stratum ordinarily consists of numerous interfingering lenses, with superposed lenses in many places filling channels carved in underlying beds. Lenses are separated in places by mudstone and contain mudstone seams. Most of the sandstone is fine to medium fine grained, crossbedded, and massive; single beds or lenses may attain a maximum thickness of 120 feet. Ripple marks, current lineations, rill marks, and cut-and-fill structures indicate that the Salt Wash was deposited under fluvial conditions.

The sandstone consists largely of subangular to subrounded quartz grains; but orthoclase, microcline, and albite grains occur in combined amounts of 10 to 15 percent. Chert and heavy-mineral grains are accessory. Considerable quantities of interstitial clay and numerous clay pellets occur in places, especially near the base of some of the sandstone lenses. Fossil wood, carbonaceous matter, and saurian bones occur locally.

The Salt Wash sandstone member ranges from 28 to 370 feet in thickness. Local changes in thickness of as much as 30 feet are common.

Brushy Basin shale member.—The Brushy Basin shale member contrasts strongly in overall appearance with the underlying Salt Wash sandstone member. Although the lithologic differences are marked, the contact between the two members is gradational. The mapped contact, taken as the base of the lowermost layer of conglomerate lenses, is arbitrary in many respects and probably does not mark an identical stratigraphic horizon in all localities.

The Brushy Basin shale member consists predominantly of varicolored bentonitic shale and mudstone, with intercalated beds and lenses of conglomerate and sandstone, and a few thin layers of limestone. Because of its high proportion of soft, easily eroded bentonitic shale and mudstone, the Brushy Basin member forms smooth slopes covered with blocks and boulders weathered from the more resistant layers of the member and from the overlying formations. The shale and mudstone are thin bedded and range in color from pure white to pastel tints of red, blue, and green. Exposed surfaces of the rock are covered with a loose, fluffy layer of material several inches thick, caused by the swelling of the bentonitic material during periods of wet weather. Scattered through the shale and mudstone are thin beds of fine-grained hard silicified rock that breaks with a conchoidal fracture. The silica impregnating these beds may have been released during the devitrification of volcanic debris in adjacent beds. Beds of chert-pebble conglomerate a few inches to 25 feet thick occur at intervals throughout the member. These conglomerate beds are commonly dark rusty red and form conspicuous resistant ledges. Silicified saurian bones and wood are much more abundant in the Brushy Basin shale member than in the Salt Wash sandstone member, especially in some of the conglomerate beds.

The Brushy Basin shale member, like the Salt Wash sandstone member, undoubtedly was deposited under fluvial conditions. The conglomerate and sandstone lenses mark stream channels that crossed flood plains on which were deposited the fine-grained sediments now represented by the mudstone and shale.

The Brushy Basin shale member ranges from 330 to 425 feet in thickness in the Horse Range Mesa quadrangle; local variations in thickness of 20 to 30 feet are common throughout the quadrangle.

BURRO CANYON FORMATION

The name Burro Canyon formation was proposed by Stokes and Phoenix (1948) for the heterogeneous sequence of Lower Cretaceous conglomerate, sandstone, shale, and thin lenses of limestone that overlies the Morrison formation. The Burro Canyon characteristically crops out as a cliff or a series of thick, resistant ledges. The bulk of the formation consists of white, gray, and red sandstone and conglomerate that form beds up to 100 feet thick. These beds are massive, irregular, and lenticular. Crossbedding and festoon bedding are prevalent throughout the formation. The sandstone is poorly sorted and consists of quartz and lesser amounts of chert. The conglomerate consists largely of chert pebbles, but intermixed are pebbles of quartz, silicified limestone, quartzite, sandstone, and shale. In places the beds are highly silicified. A considerable part of the formation consists of bright-green mudstone and shale, and locally these predominate over the sandstone and conglomerate. Thin, discontinuous beds of dense gray limestone crop out in a few scattered localities. The formation was undoubtedly deposited under fluvial conditions. The lower contact is indistinct in many places and the formation appears to interfinger with the upper part of the Brushy Basin shale member; elsewhere local erosion surfaces intervene and the contact is sharp. The upper contact is an erosion surface of regional extent.

The Burro Canyon formation in the Horse Range Mesa quadrangle ranges from 90 to 230 feet in thickness; in general the formation thins toward the southwest corner of the quadrangle. Abrupt local variations in thickness of 10 to 30 feet are common.

DAKOTA SANDSTONE

The Dakota sandstone, of Early and Late Cretaceous age, consists principally of gray, yellow, and buff flaggy sandstone; less abundant are conglomerate, carbonaceous shale, and impure coal. Some of the sandstone is fine grained and thin bedded, but much of it is coarse grained and crossbedded. Scattered through the sandstone are irregular, discontinuous beds and lenses of conglomerate containing chert and quartz pebbles as much as 2 inches across. Interfingering with the sandstone beds are thin-bedded gray and black carbonaceous shales and thin coal seams and beds. Plant impressions abound in both the sandstone and the shale.

The Dakota sandstone crops out in this quadrangle as the capping beds on the mesa back of Summit Point and on Horse Range Mesa.

The entire thickness of the Dakota sandstone is not exposed in the quadrangle; the upper beds have been stripped off by erosion; but the beds that remain attain a thickness of about 50 feet.

QUATERNARY DEPOSITS

The deposits of Quaternary age consist of terrace gravel, wind-deposited material, alluvium, talus, and landslides. Extensive deposits of light-red sandy and silty material mantle the benches and mesa tops. This material appears to be mostly wind deposited, although much of it has been reworked by water and intermixed with sheet wash. These deposits have not been mapped where they are unusually spotty, discontinuous, or less than a foot thick; the greatest observed thickness in some dry washes on mesa tops is about 10 feet. Gravel and alluvium occur along the Dolores River. Considerable talus covers many of the steeper slopes. Because these various deposits, except for the terrace gravel, are difficult to differentiate in places, they have not been separated on the geologic map. Large landslides, consisting mostly of debris of the Brushy Basin, cover considerable areas in the north half of the quadrangle.

STRUCTURE

REGIONAL SETTING

Many geologic structures on the Colorado Plateau are so large that a 7½-minute quadrangle covers only a small part of any complete structural unit. The larger structural units consist of salt anticlines, 25 to 65 miles long (fig. 1); uplifted blocks, 50 to 125 miles long, bounded by monoclinal folds; and domical uplifts, 8 to 20 miles across, around stocklike and laccolithic intrusions.

The salt anticlines trend northwest and lie in a group between eastward-dipping monoclines on the west side of the Plateau and westward-dipping monoclines on the east side of the Plateau. The cores of these anticlines consist of relatively plastic salt and gypsum, derived from the Paradox member of the Pennsylvanian Hermosa formation and intruded into overlying late Paleozoic and early Mesozoic rocks. All the anticlines are structurally similar in many respects, but each exhibits structural peculiarities not common to the rest; furthermore, all are more complex than their seemingly simple forms would suggest. Faults, grabens, and collapse and slump structures alter the forms of the anticlines. Erosion has removed much of the axial parts of these anticlines, leaving exposed large intrusive masses of the Paradox member and forming valleys such as Sinbad Valley, Paradox Valley, and Gypsum Valley in Colorado and similar valleys in Utah. Alternating with these anticlines are broad, shallow, simple synclines.

STRUCTURE IN HORSE RANGE MESA QUADRANGLE

Parts of three large structural features extend across the Horse Range Mesa quadrangle; these are the southwest flank of the Gypsum Valley salt anticline, the Disappointment syncline, and the Dolores anticline. The crest of the Gypsum Valley salt anticline has collapsed, owing to the removal of much salt by solution and flowage. The southwest edge of this collapsed area is marked by the faults and the relatively sharp narrow anticline and syncline at the northeast end of Steamboat Hill. From the edge of this collapsed area the beds dip southwestward to the trough of the Disappointment syncline, a broad, shallow downwarp that plunges southeast and flattens out to the northwest. The Dolores anticline is an asymmetrical northwest-plunging fold. The northeast limb of this anticline dips much more steeply than does the southwest limb. The anticline probably has an intrusive core of salt as does the Gypsum Valley anticline, but unlike the Gypsum Valley anticline this core is nowhere exposed. Two systems of faults cut the northeast flank of the anticline, an east-trending system in the vicinity of Horse Range Mesa and a northwest-trending system in the area between Summit Canyon and Bush Canyon. A set of transverse northeast-trending faults cut the rocks in the vicinity of Cape Horn.

STRUCTURAL HISTORY

In order to understand the structural history of the Horse Range Mesa quadrangle, it is necessary to understand the structural history of the adjoining part of southwestern Colorado. Parts of this history are still in doubt, because no clear record remains of some events; the record of other events, although legible, is subject to different interpretations. All the events described in the following discussion affected the Horse Range Mesa quadrangle either directly or indirectly, although the evidence for some of them is not visible within the boundaries of the quadrangle.

Weak compressive forces, which probably began in early Pennsylvanian times, gently warped the region. This warping gave rise to the ancestral Uncompahgre highland, an element of the ancestral Rocky Mountains, and to the basin in which the Paradox member of the Hermosa formation of Pennsylvanian age was deposited. These major structural features controlled the pattern and the prevailing northwest-trending grain of the smaller structures later superimposed on them. The boundary between the highland and the basin, which is closely followed by the southwest margin of the present-day Uncompahgre Plateau, was a steep northwest-trending front, possibly a fault scarp, along which were deposited arkosic fanglomerates during late Pennsylvanian and Permian time. The older fanglomerates interfinger with Pennsylvanian marine sedimentary rocks of the Hermosa formation. The bulk of the fanglomerates probably is of Permian age and belongs to the Cutler formation. Intrusion of salt from the Paradox member, probably initiated by gentle regional deformation, began sometime during deposition of the Permian Cutler formation. Isostatic rise of salt ruptured the overlying Hermosa and Cutler formations, and at the end of Cutler deposition salt broke through to the surface. From then until flowage ceased, late in the Jurassic period, the elongate salt intrusions such as those in Paradox Valley and Gypsum Valley stood as actual topographic highs at one place or another along their lengths. The rate of upwelling of additional salt, perhaps accelerated by the increase of the static load of sediments accumulating in the surrounding areas, balanced or slightly exceeded the rate of removal of salt by solution and erosion at the surface. Consequently, all the Mesozoic formations below the Morrison formation wedge out against the flanks of the salt intrusions. Salt flowage was not everywhere continuous or at a uniform rate; rather, in many places it progressed spasmodically. Local surges of comparatively rapid intrusion gave rise to cupolas at different times and in different places along the salt masses. At the beginning of deposition of the Morrison, sediments finally covered the salt intrusions, perhaps because the supply of salt underlying the areas between the intrusions was exhausted. Relative quiescence prevailed throughout the remainder of the Mesozoic and probably through the early part of the Tertiary.

The second major period of deformation occurred in the Tertiary—probably during the Eocene (Hunt, written communication), but the date cannot be determined accurately. The region of the salt intrusions was compressed into a series of broad folds, guided and localized by the preexisting salt intrusions. Although salt flowage was renewed, it seems unlikely that any considerable amount of new salt was forced into the intrusions; flowage probably consisted largely of redistribution of the salt already present. By the end of this period of deformation these folds had attained approximately their present structural form, except for modifications imposed by later collapse of the anticlines overlying the salt intrusions. Owing to the mobility of the rocks in the cores of the anticlines, normal faulting took place along the crests of the anticlines, probably during relaxation of compressive stresses after folding ceased. At this time the crests of the anticlines in places were dropped, as grabens, several hundred to a few thousand feet. A period of crustal quiescence followed, during which the highlands overlying the anticlines and domes were reduced by erosion and topographic relief became low throughout the area.

During the middle Tertiary the entire Colorado Plateau was uplifted. This uplift rejuvenated the streams and increased ground-water circulation. The crests of the anticlines were breached, and the underlying salt was exposed to rapid solution and removal. With the abstraction of salt, renewed collapse of the anticlines began. Although much of the collapse was due directly to removal of salt by solution, it seems unlikely that all the collapse can be attributed to this process, as was believed by earlier workers in the area. Rather, much of the collapse apparently was caused by flowage of salt from the parts of the anticlines still overlain by thick layers of sediments to the parts from which the overlying sediments had been removed. Once the crests of the anticlines had been breached, the relatively plastic salt offered little support for the beds overlying the Paradox member of the Hermosa formation in the flanks of the anticlines; consequently these essentially unsupported beds slumped, probably along fractures and joints formed during earlier flexures. Small faults and folds in Quaternary deposits may indicate that collapse and local readjustments are still continuing.

MINERAL DEPOSITS

The only commercially important mineral deposits in the Horse Range Mesa quadrangle are those that contain uranium, vanadium, and radium. Although deposits containing these metals were discovered in 1899 near Roc Creek, about 22 miles north of the Horse Range Mesa quadrangle, intensive mining of these ores did not begin in the Colorado Plateau region until 1911. Thereafter the ores were mined primarily for their radium content until 1923, when the Belgian Congo pitchblende deposits began to supply radium. The mines were mostly idle from 1923 until 1937, but since 1937 they again have been exploited intensively, first for vanadium and in more recent years for both vanadium and uranium.

Most of the deposits are restricted to the upper layer of sandstone lenses in the Salt Wash sandstone member of the Morrison formation, but within this layer the deposits have a spotty distribution. Ore bodies range from small irregular masses containing only a few tons of ore to large tabular masses containing several thousands of tons; but most ore bodies are relatively small and contain only a few hundred tons. The ore consists mainly of sandstone impregnated with uranium- and vanadium-bearing minerals.

MINERALOGY

The most common ore minerals are carnotite and a fine-grained, vanadium-bearing micaceous mineral. Carnotite [$K_2(UO_2)_2(VO_4)_2 \cdot 3H_2O$] is a yellow, fine-grained, earthy or powdery material. Tyuyamunite [$Ca(UO_2)_2(VO_4)_2 \cdot nH_2O$], the calcium analogue of carnotite, is also present and is nearly indistinguishable from carnotite. The micaceous vanadium mineral, which formerly was thought to be roscoelite, is now considered to be related to the nontronite or montmorillonite group of clay minerals. It forms aggregates of minute flakes coating or partly replacing sand grains and filling pore spaces in the sandstone. It colors the rock gray. Other vanadium ore minerals present are montroseite [$nFeO \cdot nV_2O_4 \cdot nV_2O_3 \cdot nH_2O$], corvusite [$V_2O_4 \cdot 6V_2O_5 \cdot nH_2O$], and hewettite [$CaO \cdot 3V_2O_5 \cdot 9H_2O$]. Corvusite and montroseite occur together, forming compact masses of bluish-black ore, whereas hewettite commonly forms stringers and veinlets along joints and fractures. Recent deeper drilling and mining in the Plateau have indicated that below the zone of oxidation black oxides of uranium and vanadium, accompanied by pyrite and perhaps other sulfides, are more abundant, and uranyl vanadates are scarce or absent.

ORE BODIES

The ore consists mostly of sandstone selectively impregnated and in part replaced by uranium and vanadium minerals; but rich concentrations of carnotite and the micaceous vanadium clay mineral are also associated with thin mudstone partings, beds of mudstone pebbles, and carbonized fossil plant material. Many fossil logs replaced by nearly pure carnotite have been found. In general the ore minerals were deposited in irregular layers that roughly followed the sandstone beds. In most deposits the highest-grade concentrations of ore minerals occur in sharply bounded, elongate concretionary structures, called "rolls" by the miners. These rolls are encompassed by rich, veinlike concentrations of the micaceous vanadium-bearing clay mineral that curve across bedding planes. Within these rolls this mineral generally is distributed as diffusion layers, the richer layers commonly lying nearer the margins of the rolls; the distribution of carnotite in the rolls is less systematic. Margins of ore bodies may be vaguely or sharply defined. Vaguely defined margins may have mineralized sandstone extending well beyond the limits of commercial ore; on the other hand, sharply defined margins, such as occur along the surfaces of rolls, ordinarily mark the limits of both the mineralized sandstone and the commercial ore.

Although many rolls are small and irregular, the larger rolls are elongate and may extend with little change of direction for more than 100 feet. The elongate rolls in an ore body or group of ore bodies in a given area generally have a common orientation. This orientation is roughly parallel to the elongation of the ore bodies.

ORIGIN OF ORE

The origin of the uranium-vanadium ores in the Morrison formation is uncertain. In some respects the deposits are unique, and much of the evidence concerning the genesis of the ore is either not conclusive or appears to be contradictory. In this brief account only a small amount of evidence can be presented and the hypothesis can only be summarized.

Most of the deposits are closely associated with certain sedimentary features. Layers of ore lie essentially parallel to the bedding; most of the deposits occur in the thicker parts and commonly near the base of the sandstone lenses; the trend of the long direction of the deposits and the trend of the ore rolls in the sandstone are roughly parallel to the trend of the fossil logs in the sandstone and to the average or resultant dip of the crossbedding in the sandstone. These relations strongly suggest that primary structures in the sediments were instrumental in localizing most of the ore deposits.

Recent investigations have revealed new data bearing on the origin of the ores (Waters and Granger, 1953). Below the zone of oxidation some of the ore consists chiefly of oxides, such as pitchblende and low-valent oxides of vanadium, and small quantities of sulfides such as pyrite, bornite, galena, and chalcopyrite; fully oxidized and fully hydrated minerals are either rare or nonexistent. A hard variety of uraninite, previously reported only from hydrothermal deposits, has been found in the Gray Daun mine in San Juan County, Utah (Rasor, 1952), and in the Happy Jack mine in White Canyon Utah. Studies of lead-uranium ratios in ores from the Colorado Plateau indicate that, regardless of where or in what formation found, all the ores are of roughly the same age, and this age is no older than latest Cretaceous (Stieff and Stern, 1952). Some geologists believe that field relations in pre-Morrison formations at White Canyon (Benson et al., 1952) and Temple Mountain in Utah indicate that the deposits may be genetically related to faults and fractures. At the Rajah mine near Roc Creek, in Colorado, ore occurs along a fault and horsetails out into the wall rock.

Two main hypotheses have arisen to explain the origin of the ores. The oldest and probably the most widely held is the hypothesis that the ores are penesyngenetic and were formed soon after the enclosing rocks were deposited (Coffin, 1921; Hess, 1933; Fischer, 1937, 1942, 1950; and Fischer and Hilpert, 1952). Later movements of ground water may have dissolved and reprecipitated the ore constituents, but the essential materials were already present in the host rocks or in the waters permeating them. Although this hypothesis offers a reasonable explanation for the relation of ores to sedimentary features, it faces some difficulty in explaining: (1) the discrepancy between the age of the uranium and the age of the enclosing rock; (2) the broad stratigraphic distribution of uranium occurrences and association of ores with fractures in a few localities; and (3) the hydrothermal aspect of the mineral suites in some ores. The second hypothesis, and the one the author favors, is essentially a telethermal hypothesis and assumes the ore to have originated from a hypogene source. Proponents of this hypothesis believe that ore-bearing solutions originated at depth from an igneous source and ascended along fractures. After these solutions mingled with circulating ground waters the minerals precipitated in favorable beds as much as several miles from fractures. This hypothesis explains more readily the difficulties inherent in the penesyngenetic hypothesis, but it poses two other difficulties: (1) the hypothetical location of igneous source rocks, and (2) the difficulty of proving the connection between fractures and faults and the ore deposits. A third hypothesis, advanced by some geologists, suggests that the source of the ore metals was the volcanic material in the beds overlying the ore-bearing sandstones and that these metals were subsequently leached and redeposited in the beds that now contain the ore. This hypothesis encounters not only most of the difficulties in the penesyngenetic hypothesis but it presents some additional ones of its own.

SUGGESTIONS FOR PROSPECTING

Regardless of the origin of the deposits, certain habits of the deposits—habits that have been recognized through geologic mapping and exploration experience—are useful as guides for finding ore (Weir, 1952). In southwestern Colorado most of the deposits are in the uppermost sandstone stratum in the Salt Wash sandstone member of the Morrison formation. Generally the central or thicker parts of the sandstone lenses are more favorable—many deposits are in sandstone that is 40 feet or more thick; few deposits are in sandstone less than 20 feet thick. Crossbedded, relatively coarse grained sandstone is more favorable than thinly or evenly bedded, fine-grained sandstone. Light yellow-brown sandstone speckled with limonite stain is more favorable than red or reddish-brown sandstone. Sandstone that contains considerable amounts of gray, altered mudstone or is underlain by a considerable thickness of this rock, is more favorable than sandstone containing and underlain by red, unaltered mudstone—this guide is perhaps the most useful in diamond-drill exploration. If the deposits have a hypogene origin then localities where favorable host rocks are near or coextensive with areas of more intense deformation may be especially favorable for finding ore.

The southern part of the Horse Range Mesa quadrangle is probably the most likely area for finding ore because of the presence of favorable rocks. Although many of the mines are 2 or 3 miles from known faults, the presence of considerable faulting and fracturing in the general area may have some bearing on the unusual concentration of deposits in this part of the quadrangle.

THE MINES

By A. L. Bush, Henry Bell III, and C. F. Withington

Most of the deposits in the Horse Range Mesa quadrangle are in lenticular sandstone beds in the upper part of the Salt Wash sandstone member of the Morrison formation. Generally the deposits are in sandstone beds 30 to 60 feet thick. However, the deposits in a belt along the Dolores River in the southeastern part of the quadrangle are in sandstone beds 60 to 90 feet thick.

Radium group of mines.—The major deposits of the Radium group of mines, the Radium Nos. 2, 5, 6, 7, and 8 mines, have been collectively the most productive mines in the quadrangle. The Radium No. 7 mine has yielded ore measurable in tens of thousands of tons, almost twice as much as from the next largest mine.

The ore minerals, carnotite and a micaceous vanadium clay mineral, mainly impregnate the sandstone. In places fossil plant remains and mudstone pebbles in the ore are richly mineralized. Small amounts of copper are present in and near the ore, mostly as stains of the carbonates azurite and malachite; subordinately as copper-uranium and copper-vanadium minerals disseminated in the sandstone. Copper sulfide (chalcocite) nodules, about half an inch across, are also present but are rare.

The ore deposits are irregularly tabular layers that in general parallel the bedding of the sandstone but in places cut across it. Most of the deposits are rudely oval in plan, ranging in size from a few tens of feet to several hundreds of feet across. The largest deposit (at the Radium No. 7 mine) is about 800 feet long by 400 feet wide. Ore bodies within the deposits consist both of rolls, with well-defined limits, and of more gradual thickenings of the tabular layers, with less well-defined or poorly defined limits. The ore bodies are commonly podlike or crescent-shaped masses that are several feet across and range from 10 to 100 feet or more in length. A little less than half the total production probably has come from rolls.

In addition to these deposits in the Salt Wash sandstone member, two small deposits in a conglomeratic lens near the base of the Brushy Basin shale member have been mined. The ore in these deposits is patchy and of lower grade than in the deposits in the Salt Wash.

Lower group of mines.—The Lower group of mines is the second most productive in the Horse Range Mesa quadrangle. The largest deposit in this group has been mined for a distance of 1,200 feet and is essentially continuous along the outcrop for a distance of 2,000 feet. The deposit ranges in thickness from a few inches to several feet. Associated with the micaceous vanadium clay mineral and carnotite are copper carbonate stains, some disseminated copper-vanadium and copper-uranium minerals and, less commonly, nodules of copper sulfide (chalcocite). The copper-silver selenide (eucairite) has been found in small veinlets and in nodules associated with chalcocite.

The deposits in this group are typical of deposits in which rolls are well developed. The deposit consists of an essentially continuous layer of rather low-grade disseminated ore in which are well-developed rolls with sharply defined margins. These rolls may be as much as 200 feet long and 5 to 40 feet wide and are oriented in a predominantly southeast direction. Most of the production has come from these rolls, although rich concentrations of carnotite have been found in fossil logs. These fossil logs have an orientation similar to the orientation of the rolls, to the average dip direction of crossbedding, and to the long dimensions of the ore deposits.

Charles T. mines.—Production from the Charles T. mines ranks third in importance within the quadrangle. Carnotite and the micaceous vanadium clay mineral are the common ore minerals. In their most common association the ore minerals impregnate the sandstone. Many mudstone seams, pebbles, and galls, in or adjacent to the ore deposits, have a high vanadium content. Fossil logs and other carbonaceous material are richly mineralized. The ore deposits are irregularly tabular layers, rudely oval in plan. Overlapping tabular layers, generally parallel to the bedding of the sandstone, are separated by a few inches to several feet of barren sandstone. Most of the ore bodies are rolls; the largest roll is 200 feet or more long, 10 to 25 feet wide, and up to 17 feet thick. The rolls commonly are sinuous in plan, generally with a northerly or northeasterly trend. As much as 70 percent of the total ore production probably has come from rolls. The remainder has come from less well-defined masses of ore.

Georgeto and Veta Mad.—These mines are in the belt along the Dolores River where the upper sandstone beds of the Salt Wash sandstone member are 60 to 90 feet thick. The mines are in ore deposits near the middle of these thick beds. The ore minerals, carnotite and the micaceous vanadium clay mineral, are in the common associations, impregnating sandstone and replacing fossil carbonaceous material. Small amounts of gypsum are present with the replaced fossil logs. In addition, small amounts of copper are present as copper sulfide (chalcocite) nodules surrounded by a halo of copper carbonates (azurite and malachite). A few of these nodules also contain small amounts of a copper-silver selenide (eucairite).

The ore deposits are rudely oval, irregularly tabular layers. Most ore bodies consist of thickenings of the ore layer, with well-defined undulant upper and lower limits. Some rolls and a few richly mineralized fossil logs are present. Two ore layers have been productive at each mine; where these ore layers overlap they are separated by 5 to 20 feet of barren sandstone.

Upper group of mines.—The Upper group of mines lies in the top sandstone bed of the Salt Wash sandstone member. The ore consists mostly of small rolls connected by thin tabular bodies of mineralized material. They range from a few tons to a few hundred tons each. One trend of the rolls ranges from east to slightly south of east. Carbonaceous material in the form of trash and fossil logs is present. The ore consists of carnotite and the micaceous vanadium-bearing mineral. A few small pods of high-grade material have also been found.

Other mines and prospects.—Several other small mines and prospects are present in the southern half of the quadrangle. All of them are in the upper part of the Salt Wash sandstone member. They include the Middle group mines, the Ned group mines, and the Ellison mine. The ore minerals and associations are similar to those in the other mines in the quadrangle. Nearly all the deposits are small tabular layers containing rolls; most of the mining has been of these small rolls.

In the extreme northeast corner of the quadrangle there are a few small mines and prospects. All these lie in the upper part of the Salt Wash sandstone member in blocks downfaulted into Gypsum Valley. The deposits are small tabular bodies that trend northwest. The ore minerals are typical of those of the other mines in the quadrangle.

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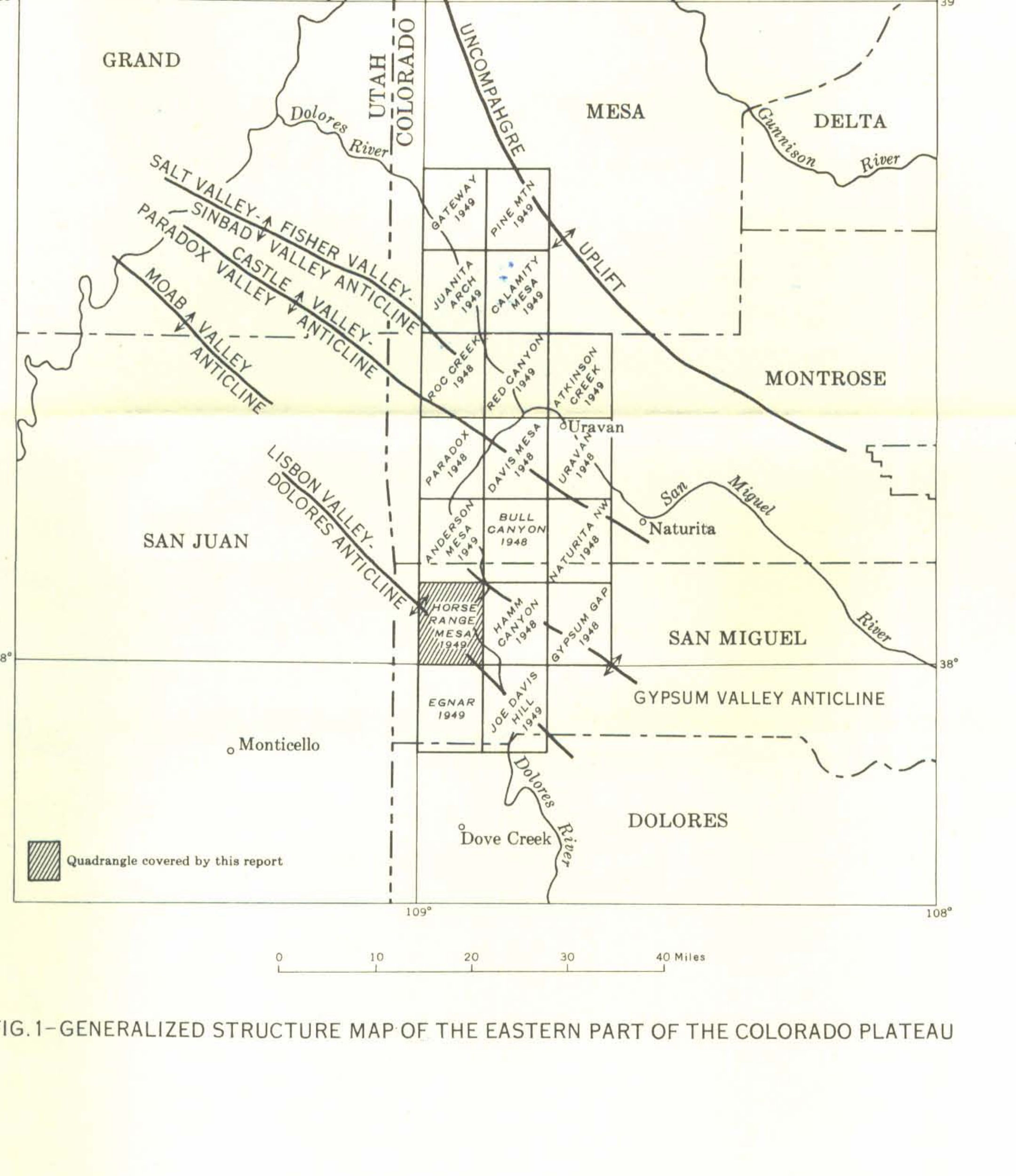
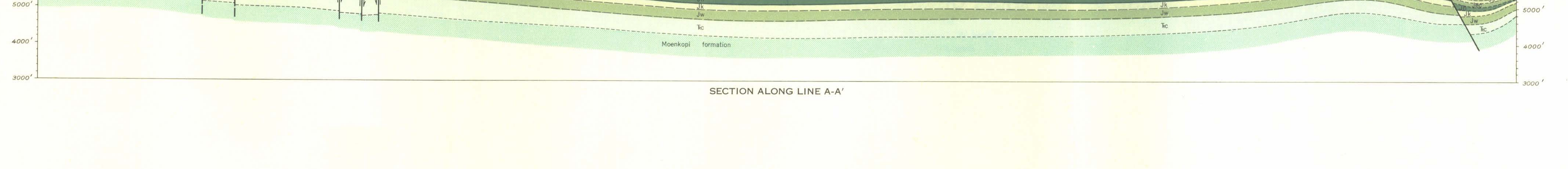


FIG. 1—GENERALIZED STRUCTURE MAP OF THE EASTERN PART OF THE COLORADO PLATEAU



SECTION ALONG LINE A-A′