DMA Form 1

DEFENSE MINERALS ADMINISTRATION
Control Slip

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DMA Docket No. 3490

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Exploration Assistance

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Routing Slip

To:	700	Date	9/14/54
To:	Oper. Com.	Date	9-29-54
To:	Oper Com	Date	10-4-54
To:	Oper Com	Date	10-29-54
To:	Oper Com	Date	12-13-54
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Surname copy 700

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

Ching
Alles
Chamber

Mr. W. H. King
Executive Officer
DMEA Field Team, Region IV
224 New Customhouse Building
Denver 2, Colorado

Re: Docket No. DMEA-3490 (Uranium)
Mid-Continent Uranium Corporation
UV and Elk Van claims
Garfield County, Colorado

Dear Mr. King:

Enclosed are the original and five copies of a proposed short-form contract with the captioned Operator, executed by the Administrator.

If you and the Operator find the contract in order, please have it executed by the latter and make the usual distribution of the copies.

Please note that the above docket number covers the proposed work on the UV and Elk Van claims which was included in the original application. This part of the proposed work has been separated from Docket No. DMEA-3360 and given its own docket and contract numbers.

Sincerely yours,

Chairman, Operating Committee

Enclosures 6

MChing/gla
9-22-54
cc to: Admr. Reading File
Operating Committee
Docket
Messrs. J. E. Crawford, Rm. 3641
A. P. Butler, Jr., Rm. 5227
J. O. Hosted, Rm. 3210, GSA
Code 700
Mr. Ching

APPROVED:

Member, Bureau of Mines

Member, Geological Survey

file - in docket order
Code 700

Docket copy

MF-200A
(Revised June 1954)

Docket No. DMEA 3490

Commodity Uranium

Contract No. Idm-E

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

It is agreed this [illegible] 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] Mid-Continent Uranium Corporation, a corporation organized and existing under the laws of the State of Colorado, whose mailing address is Box 883 Grand Junction, Colorado, hereinafter called the "Operator," as follows:

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

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 Garfield, and is described in Annex I.[3]

(b) The Operator represents and undertakes that:

(1) The Operator is the [4] owner of [5] entire interest in the land, in possession and entitled to possession for all of the purposes of this contract, under and by virtue of [6] unpatented mining claims recorded in Book see, see Annex I., 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: none

(c) The Subordination Agreement of the holder of any claim, lien, or encumbrance listed above, and (if the Operator does not hold the legal title) the Consent to Lien of any holder of the legal title of the land (lessor, seller, optionor, etc.), are attached, as follows: .....

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

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

ARTICLE 3. *The exploration project.*—The project is a search for indicated or undeveloped deposits of ....Uranium.... The work to be performed is described in Exhibit "A." The Operator on or before ....90 days from date* shall commence the work, and on or before ....6 months from date* (unless the Operator's obligation to complete the work is terminated—see Article 8) shall complete the work.

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

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

ARTICLE 5. *Contribution by the Government.*—A fixed cost for each unit of work to be performed (per foot of drifting, per foot of drilling, per hour of operations, etc.) is hereby agreed upon, and is set forth in Exhibit "A" in connection with the estimated total cost of the project in the sum of $....10,810.00.... The Government will contribute ....75.... percent of the fixed unit costs as work is performed, in a total sum not in excess of $....8,107.50....: *Provided,* That until the Operator has rendered to the Government his final report, and any final auditing required by the Government has been made, and a final settlement of the contract has been made, the Government may withhold from the last voucher or vouchers such sums as it sees fit not in excess of 10 percent of the estimated total cost of the work. The Government will make its contribution on the basis of the monthly vouchers referred to in Article 6(b), but all payments by the Government are provisional only, subject to audit, until the account between the Operator and the Government is finally audited and settled. To the extent that excesses over fixed unit costs or any excess over the estimated total cost may be necessary for the performance of the work, the Operator shall incur and pay such excesses for his own account without contribution by the Government. The Government may make payments directly to independent contractors and suppliers for the account of the Operator rather than to the Operator.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

ARTICLE 11. *Changes and added provisions.*—

* The word "date" in Article 3 refers to the date of the contract.

Executed in sextuplicate the day and year first above written.

THE UNITED STATES OF AMERICA

MID-CONTINENT URANIUM CORPORATION
(Operator)

By .....

Administrator, Defense Minerals Exploration Administration

By .....

.....

Hoffland
Ching
Ellis
Chamberlain

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

.....

[CORPORATE SEAL]

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

EXPLORATION PROJECT CONTRACT
MID-CONTINENT URANIUM CORPORATION
DOCKET NO. DMEA-3490

ANNEX I

The land referred to in Article 2 of the contract form consists of the following 33 unpatented mining claims:

Claim	Book	Page	Claim	Book	Page
UV-1	275	3	UV-16	275	19
UV-2	275	5	UV-17	275	20
UV-3	275	6	UV-18	275	21
UV-4	275	7	UV-19	275	22
UV-5	275	8	UV-20	275	23
UV-6	275	9	UV-21	275	24
UV-7	275	10	UV-22	275	25
UV-8	275	11	UV-23	275	26
UV-9	275	12	UV-24	275	27
UV-10	275	13	UV-25	275	28
UV-11	275	14	UV-26	275	29
UV-12	275	15	UV-27	275	30
UV-13	275	16	UV-28	275	31
UV-14	275	17	UV-29	275	32
UV-15	275	18	UV-30	275	33

Elk Van-1	205	516
Elk Van-2	205	516
Elk Van T.-2	205	517

EXPLORATION PROJECT CONTRACT
MID-CONTINENT URANIUM CORPORATION
DOCKET NO. DMEA-3490

EXHIBIT "A"

Description of the Work

The work shall consist of exploration by diamond drilling on the land described in Article 2 of the contract and shown on the attached map labeled Figure 2. The location, direction, and extent of all work are subject to the approval of the Government.

Drill a single row of 16 holes spaced at intervals of approximately 500 feet as indicated on Figure 2. Fifteen of the holes are to test the Morrison formation and will average approximately 150 feet in depth. One hole, either on the UV-22 or UV-24 claim, is to be extended to the base of the Entrada sandstone and will be approximately 350 feet in depth.

All core showing uranium or vanadium mineralization shall be split, one-half to be assayed and one-half to be stored in core boxes for Government use. All holes shall be probed radiometrically and logged geologically, and the results of such probing and logging shall be submitted to the Government with the Operator's monthly reports. All chemical analyses shall be for both uranium and vanadium.

Estimated Cost of the Project

Agreed Unit Costs

2600 feet diamond drilling @ $4.10/ft.	$10,660.00	
30 chemical analyses @ $5.00 each	150.00	
Estimated total cost of the project		$10,810.00
Government participation @ 75%		8,107.50

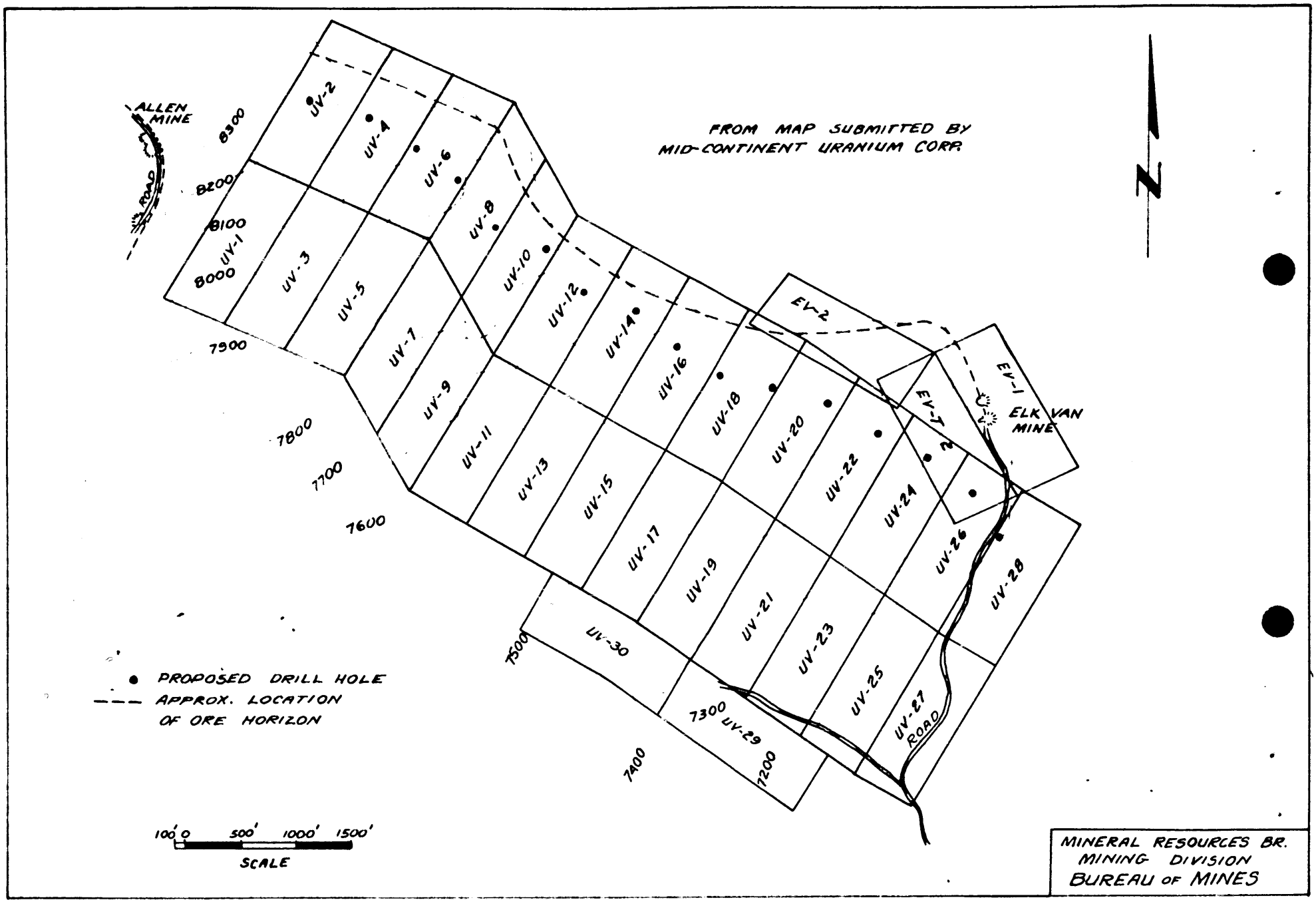

FIG. 2 - PROPOSED CORE DRILL HOLES, UV AND ELK VAN CLAIMS, MID-CONTINENT URANIUM CORP., GARFIELD COUNTY, COLO., DMEA 3360

IN REPLY REFER TO:

Defense Minerals Administration
RECEIVED
DEC 15 1954

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

December 14, 1954

Docket

Mr. W. P. Williams
U. S. Geological Survey
P. O. Box 360
Grand Junction, Colorado

Re: DMEA Docket 3490
Mid-Continent Uranium Co.
U-V and Elk Van Claims
Garfield County, Colorado

Dear Bill:

While in Mr. C. O. Mittendorf's office on December 10, I was shown a letter from Mr. Norm Ebbley which concerned the denial by DMEA of the above application, and which requested reconsideration of the application. The letter noted that a copy was being sent to you so you are undoubtedly familiar with its contents.

Mr. Mittendorf called attention to that section of the letter which noted the application had received approval from the Field Team but had been denied in Washington. He commented on the fact that admission by the Field Team to the applicant, of the contents of their report, places DMEA in an embarrassing position, particularly in those instances where the application is denied. The same situation would, of course, be true if DMEA were to make public the contents of field reports recommending denial, except that the shoe would be on the other foot. It was to avoid situations like this that the decision was made early in the DMA program not to reveal the contents of field reports to the applicant and for the Field Team to avoid making any comments either oral or written that could be construed as being a commitment on the part of the Government. All Field Teams are operating under these instructions.

From what I have heard of Ebbley he is definitely not to be trusted, and in this particular instance he probably is misquoting you in an endeavor to put pressure on the reconsideration of his application. I am calling it to your attention, however, as you are definitely acting contrary to established principles if you make any comment to the applicant on the contents of a field report.

Since returning to Washington I have discussed with DMEA the manner in which field examiners review DMEA applications with the AEC. I have called attention to the fact that AEC does not give written comments on the applications, and have suggested that some

sort of understanding be reached with AEC whereby either they give us a written comment or else permit us to include their comments in our reports. Such a comment would not only make the AEC attitude a matter of record but would also be more informative to DMEA than the stock sentences now used in our reports, which merely note that the application has been called to the attention of the AEC and that they have been asked for help and advice. These sentences do not inform anyone of the help and advice that was given, or if any was given at all. I realize, as you pointed out to me, that in many instances there are no data in AEC files on the applicant's property and that in other instances the information is confidential, but in such cases I believe we would be better off if we obtained from AEC the simple statement that they have no data or else are unable to give it to us.

In an effort to obtain the AEC view on this proposal we had a meeting with Ernie Gordon and Joe Hosted in Mr. Mittendorf's office on December 10. At that meeting Mr. Gordon stated the AEC would cooperate with DMEA in any proposal DMEA wished to make. I suspect DMEA will issue definite instructions on the matter of obtaining and exchanging information with the AEC, in the near future. However, until we receive those instructions I suggest that we do not change our present reporting procedure as a change at this stage might only complicate matters.

Sincerely,

Thor H. Kiilsgaard
Staff Assistant for DMEA

CC: C. O. Mittendorf

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

Ching
Ellis
Gehan
Kilgoore
Selfridge
Johnson

Mr. Norman E. Ebbley
P. O. Box 883
Grand Junction, Colorado

DEC 14 1954

Re: Docket No. DMEA-3490 (Uranium)
Mid-Continent Uranium Corp.
UV and Elk Van Claims
Garfield County, Colorado

Dear Mr. Ebbley:

This will reply to your letter of December 1, 1954, requesting reconsideration of your application for exploration assistance on the subject property, which application was denied by our previous review dated October 21, 1954.

You state your understanding that the Field Team had endorsed the proposed project, and you imply that recent activities in the area have developed geologic information which adds merit to your original proposal.

The Field Team approved a modified program on the basis of reports by the field examiners. These reports, however, strongly qualified the recommendations contained therein and pointed out many factors which were unfavorable to the project which, coupled with information already in our possession, led us to conclude that the probability of making a significant discovery was not sufficiently promising to justify Government participation.

Some of these unfavorable factors are as follows:

1. Practically the sole justification for the proposed program is that a significant discovery in the Rifle Creek area would help the ore supply problem of the mill and encourage other exploration in the area. The chances for making such a significant discovery are considered very remote.

2. The known deposits in the Morrison formation of the Rifle Creek area are small, and there is no Morrison sandstone exposed in the area which is geologically favorable for larger deposits. Total production from the known deposits probably does not exceed 200 tons.

3. The ore deposits on the Elk Van and Allen claims are extremely spotty and the recorded production from the properties amounts to only 10 and 20 tons, respectively.

4. Ore deposits in the Entrada sandstone are known in the Rifle and Garfield mines, but the ore is so low in average uranium content that it cannot be considered as uranium ore under present conditions. As you are aware, vanadium is not included in the list of commodities eligible for exploration assistance.

5. The project is "wildcat" in nature, designed principally to obtain geologic information, and has some of the features of prospecting, for which exploration aid is not given.

If the recent exploration activities to which you refer have added new facts which would tend to nullify the foregoing considerations, we shall be glad to consider such additional information.

Sincerely yours,

C. O. Mittendorf

Administrator

MChing/COMittendorf/gla/fw/gla
12-13-54
cc to: Admr.'s Reading File
Operating Committee
Docket
Messrs. J. E. Crawford, Rm. 3641
T. H. Kiilsgaard, Rm. 5224
J. O. Hosted, Rm. 3210, GSA
M. Ching
Code 700
DMEA Field Region IV (2) w/2cc of incoming letter from Mr. Ebbley

12/6/54 gla

REGISTERED PROFESSIONAL ENGINEER
STATE OF COLORADO

P. O. BOX 883
GRAND JUNCTION, COLO.

NORMAN E. EBBLEY
MINING GEOLOGIST

December 1, 1954

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
DEC 6 1954

Defense Minerals Exploration Administration
Department of the Interior
Washington 25, D. C.

RE: Docket No. DMEA-3490 (Uranium)
UV and Elk Van Claims
Garfield County, Colorado

Dear Mr. Mittendorf:

Reference is made to your letter of October 21, 1954 in which Mid-Continent Uranium Corporation's application for exploration assistance on subject property was denied.

After receiving your letter careful consideration was again given to the possibilities of disclosing minable ore reserves on the UV-Group of claims. Recent conferences with the field teams of both the U. S. Geologic Survey and the U. S. Bureau of Mines has reaffirmed my original understanding that they approved and recommended the revised program as submitted by Mid-Continent July 9, 1954 requesting DMEA assistance for a limited exploration, which if carried to completion upon direction of the Survey would total $19,520.

Recent activities in the West Elk Creek area have discovered several promising uranium properties, as substantiated by the attached press clipping, which is only one of several appearing lately in various Colorado papers.

Because of: the past production from the UV-Group of claims; the almost total lack of previous exploration; the formations existing that are favorable for uranium ore occurrences; the favorable recommendations of the combined field teams of the USGS and the USBM; it is respectfully requested that your office review the application for DMEA assistance on the UV and Elk Van claims.

Any additional information that you may require will be promptly furnished upon request.

Yours very truly,

Norman E. Ebbley

cc: Bill Williams, USGS

Garfield Land Leased for Exploration

Nov. 1954

GLENWOOD SPRINGS — Two large acreages in Garfield county were leased Friday for uranium exploration by local ranchers to uranium interests of Colorado Springs, headed by Roy Holt.

First lease signed by Mr. Holt, representative of a St. Louis oil company, was for a miner's lease on 300 acres of property owned by Mr. and Mrs. Charles O. Shanks, owners of the famous Shanks apple orchard nine miles west of Glenwood Springs, for a six months contract for exploration work on their property, with an option to renew for 5½ more years.

Mr. Holt said that two geologists of the oil company he represents would move onto the property within the next 10 days. After completion of their survey, a core drilling crew will probe the Morrison formation running through the property. This ranch is directly across the Colorado river from a known uranium deposit recently discovered by Bill McDonald of Glenwood Springs.

The other lease signed in a local attorney's office Friday called for leasing of property on West Elk Creek owned by Ralph Dodo, with terms stated to be about the same as on the Shanks lease. No price was disclosed in either transaction.

The McDonald find has been worked recently by experienced miners and has shown a continued improvement in quality of ore from .22 to .66 per cent. The McDonald Revelation Mine No. 1 has been the only active uranium mine in Garfield county to produce ore so far.

700

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

Ching
Ellis
Kiilsgaard
Hedges
Selfridge
H. Johnson

OCT 21 1954

Mr. Norman Ebbley, Director
Mid-Continent Uranium Corporation
Box 883
Grand Junction, Colorado

Re: Docket No. DMEA-3490 (Uranium)
UV and Elk Van claims
Garfield County, Colorado

Dear Mr. Ebbley:

Your application for aid in an exploration project and other data available to us in Washington concerning your subject property have been reviewed.

Projects approved by the Defense Minerals Exploration Administration must, in its judgment, show definite promise of yielding materials of acceptable grade in quantities that will significantly improve the mineral supply position for the National Defense Program.

Careful study of all our information indicates to us that the probability of disclosing minable ore reserves by your proposed program is not sufficiently promising to justify Government participation. We regret to advise you, under these circumstances, that your application for exploration assistance is denied.

We wish to thank you for your interest in the Defense Minerals Program and for bringing your property to our attention.

Sincerely yours,

C. O. Mittendorf

Administrator

MChing/gla
10-19-54
cc to: Admr. Reading File
Operating Committee
Docket ✓
Messrs: J. E. Crawford, Rm. 3641
A. P. Butler, Jr., Rm. 5227
J. O. Hosted, Rm. 3210, GSA
Code 700
Mr. Ching
DMEA Field Team, Region IV (2)

R.C.G.

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

October 7, 1954

Memorandum

To: The Administrator

From: George C. Selfridge
Special Assistant

Subject: Docket No. DMEA-3360 - Uranium
Mid-Continent Uranium Corporation
Sec. 2, T. 23 S., R. 21 E.
Grand County, Utah

As explained in the writer's memorandum of October 7, 1954, relating to Docket No. DMEA-3360 - Uranium, Mid-Continent Uranium Corporation, UW and Elk Van claims, Garfield County, Colorado, approval of the proposed contract by the Operating Committee was held in abeyance until the members had an opportunity to discuss general exploration policy with Messrs. Mitterdorf and Johnson and secure more information concerning the project. More information was secured the morning of October 4 at a conference attended by R. D. Trace, C. Withington, T. Killingsord, all of the Survey, and the writer. The project and policy were discussed with Mr. Johnson at the Committee meeting of October 4, and the contract was approved.

As the writer analyzed the docket rather carefully searching for answers to questions raised by the Ribley report, he is noting below the rather weak justification in the field report supporting the project. Probably the main trouble is the lack of sufficient comment and detail on the part of the examining group in its report. Omissions sometimes can be as damaging as reported adverse factors. The Ribley report accompanying the application was not discussed, nor was any mention made concerning AEC's attitude toward the project.

The Ribley report on the Yellow Cat area gives a general history of the area and discusses certain geologic and mineralization occurrences. It states that the Thompson's area is on the northeast flank of the Salt Valley anticline. During 1951-1953 the Geological Survey drilled some 1700 holes in the Yellow Cat area and the area east to Squaw Park, a distance of approximately 12 miles. Ribley considers that much of the drilling was too shallow to penetrate the fourth

sandstone rim, as described by him, some 160 to 200 feet below the original ore-producing horizon. He states that recent drilling to greater depth has discovered several mines at this lowest horizon. The mines with tonnage figures are mentioned on page 21 of the report. He states that part of the area will have to be redrilled. During the discussion with the Survey members the writer received the impression that the Survey drilling had been sufficiently deep.

The report states that the Survey has drilled 1000 holes of the 1700 in an area of approximately 2.5 square miles (this is more or less one hole for an area 160 feet square) in parts of Sec. 36, T. 22 S., R. 21 E.; Sec. 31, T. 22 S., R. 22 E.; Sec. 1, T. 23 S., R. 21 E., and Sec. 6, T. 23 S., R. 22 E. Page 20 of the report discusses a channel trending east and west for at least two miles that has an average width of about 300 feet north and south. The majority of the ore bodies recently discovered were found to occur in this thick sandstone channel. Extension of the channel east and west by further drilling has not as yet been endeavored. New occurrences in the sections described above are shown in Figure 2 of Ebbley's report. Because the new occurrences are shown to be rather widely scattered, there was some question as to whether the 300 feet might be a typographical error and that 3000 feet was intended.

Ebbley states that Government drilling established the fourth rim containing the new ore bodies. He also mentions that the Survey drilled two holes on the eastern side of the subject section which indicated favorable sandstone thicknesses of in excess of 40 feet. He makes no mention of the types of mudstone or sandstone found nor of the presence or absence of carbonaceous material. He then recommends that consideration should be given to the possibility of locating the extension of the fourth rim sandstone channel found to run east and west through Sec. 31, T. 22 S., R. 22 E. He then seemingly digresses to discuss the ore-bearing sandstone channels in the Yellow Cat area in general. The impression conveyed by the report on quick reading was that this main channel might pass through the subject section. Figure 2 of the Ebbley report shows that the new channel trending west could not possibly pass through the subject section without swinging sharply southward.

The Bureau's section of the field report by McLellan mentions the matter of channels, but does not describe any one in particular with regard to location, trend, size, or number of ore bodies. He suggests that a known channel from the areas to the east might swing into the subject section. The main ore-bearing area is 1.5 miles east of the subject section. In contrast, in the section of the field report by Mobley, of the USGS, no mention is made of channels as such. He

speaks of a local thickening of the sandstone lenses. He also sets forth the criteria used in judging the favorability of ground that might contain ore bodies. These are set forth in Table 1, page 4, of his report. Both of the field men mentioned, as did Ebbley, the two holes drilled on the subject section. These were barren. None of the reports mentioned why the Survey did no further drilling. McLellan did mention that the section was not further considered for exploration under the Survey drilling program presently being conducted in the Yellow Cat area.

The matter of channels and ~~the~~ drill holes was discussed with Messrs. Trace and Withington. They stated that there were several channels in the Yellow Cat area which were more easily identified as true channels than in many other sections of the Plateau. They stated that the main channel on which the larger, recently discovered ore bodies were found really trends somewhat north of west rather than east-west. This channel has been delineated by the Survey for approximately one and one-half miles. It could not be traced east of Sec. 32, T. 22 S., R. 22 E. It is presently being drilled westward in Sec. 36, T. 22 S., R. 21 E. The reason that the Survey did not continue drilling in the subject section after completing the two barren holes was that these two holes represented the remaining footage of a drilling contract. When a new contract was signed, the Survey believed that the possibilities of finding ore in Sec. 36, T. 22 S., R. 21 E. were better than in the subject section and therefore did not continue drilling there. The Survey men also mentioned an ore body in either Sec. 1 or 12 of T. 23 S., R. 21 E. that had been drilled by the Survey. Withington believed that the channel containing this ore body should pass close to the southeast corner of the subject section. Based on the discussion, it would seem that there is little likelihood that the main channel on which the Survey is drilling could pass through the subject section. The other channel must end before reaching Sec. 2 or swing and pass either between the two barren drill holes or south of the subject section. It could enter the section from the south.

A study of Figure 2 shows that the newly discovered ore bodies have an apparent alignment to the northeast as did the older known ore bodies. This was also discussed. Apparently the newly found ore bodies, in part at least, also have their long axes trending northeastward. They are still being developed. This raises an interesting question with regard to the size of the favorable area. No ore was found to the east of Sec. 32, T. 22 S., R. 22 E. If the favorable ground follows the pattern shown in Fischer and Hilpert's Report, Geological Survey Bulletin 988-A, 1952, Geology of the Uravan Belt, it would be that the favorable ground does not extend too much further westward. This can be proved only by drilling. It would have been interesting to know how many holes the Survey drilled in unfavorable ground east of the subject section and the two barren drill holes and west of the

newly discovered body shown in Sec. 1, T. 23 S., R. 21 E., in Figure 2 of Ebblay's report.

The Survey field men thought that the channels trending somewhat north of west might have been influenced by the structural high existing in the Thompson's area. They thought that if this was a positive area during Salt Wash time the channels would approximately parallel such a high. Both definitely felt that channels would be found in the subject section which, aside of the two drill holes, has had no exploration or development. There has been no production, nor are there ore reserves of any type.

George C. Selfridge

George C. Selfridge

GCSelfridge/esf
(10/7/54)

cc to: Docket
Admr. R. File
Messrs.: Mittendorf
Johnson
Selfridge

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

October 7, 1954

Memorandum

To: The Administrator

From: George C. Selfridge
Special Assistant

Subject: Docket No. 3490 - Uranium
Mid-Continent Uranium Corporation
UV and Elk Van claims
Garfield County, Colorado

The subject docket and Docket No. 3360, each with a proposed contract for the same corporation, were submitted to the Operating Committee on September 29. After much discussion concerning the proposed contracts, it was decided that they should be held in abeyance until the Committee had an opportunity to discuss with Messrs. Mittendorf and Johnson a general policy regarding future applications such as these on Plateau uranium projects. The decision was based on (1) the "wildcat" or general prospecting nature of the projects, (2) a change in Survey and AEC drilling policy, whereby closely-spaced drilling to extend known uranium areas or trends will be abandoned for far-spaced drilling patterns in the search for new uranium areas, (3) a probable increase in the number of uranium applications on "longer shot" projects with the abandonment of close-drilling by the Government, and (4) rearrangement of Survey personnel with some members either new to the Plateau or to DMEA work.

At the meeting it was first thought that the subject application should be denied and Docket No. 3360 be approved, but it was then decided to hold both for further discussion and possibly receipt of more information from the field team, which had made no mention of AEC's reaction to the proposed projects. Before the meeting of the Operating Committee with Mr. Johnson on October 4, both projects were discussed with R. D. Trace, C. Withington - who had just come to Washington from doing Plateau work, and T. Kiilsgaard to secure a better background for judging uranium applications of this type. Docket No. 3360 will be discussed in a separate memorandum.

Reading of the subject docket and accompanying field report gave the impression that the Rifle Creek area project had been recommended for reasons other than ones based on sound geological evidence or inference.

The writer then analyzed the field report listing the data generally favorable to the project and those generally unfavorable. The only favorable item noted was the statement that the known uranium occurrences in the Morrison formation are of ore grade.

The unfavorable items as listed by the writer are as follows:

(1) The closing statements in R. P. Fischer's report of July 17, 1954--"If a significant deposit of uranium ore could be found in the Rifle Creek area, not only would it materially help the ore supply problem of the mill, but the discovery would also encourage other exploration in the area. These factors must be considered almost the sole justification for this recommendation, for admittedly the chances for a significant discovery are considered very slim indeed."

(2) Total production from the Morrison formation in the Rifle Creek area probably does not much exceed 200 tons.

(3) The deposits (Morrison) of the area are small. The known deposits in the Morrison are less than 100 feet across, and the orebodies within these are only a few yards in diameter.

(4) The recorded production of the Elk Van claims is 10 tons and of the Allen group 20 tons.

(5) The Allen and Elk Van deposits in the Morrison are extremely spotty.

(6) The project is wildcat in nature.

(7) The chances of discovering significant reserves are poor.

(8) Fischer believes that the chances are very slim of finding large deposits on the UV group of claims, or even finding ground favorable for large deposits.

(9) There are no exposures of geologically favorable sandstone in the area. The relative thinness, in part, of the sandstone as noted in the geologic column of Fischer's report could be interpreted as unfavorable to mineralization.

(10) There has been no production from the UV claims.

(11) There has been no exploration or development on the UV claims.

(12) The proposed holes are to be drilled solely for geologic information (favorable ground) rather than for finding ore.

(13) There are only two mines in the Entrada sandstone. The uranium content in these is low, and they are not being mined for uranium at the present time (reserves are large).

Under conclusions and recommendations Fischer mentions, "Furthermore, the proposal to drill 16 'preliminary holes' for geologic information is somewhat contrary to the writer's experience with DMEA projects as it might be necessary to consider another DMEA application and prepare another contract if favorable results are obtained from these 16 holes." This does raise a question. Unless ore were intersected, it would be difficult for DMEA to certify a discovery solely on the presence of favorable ground, a term which is not defined in the field report.

The writer noted that the field report made no mention of anomalies. The project is way outside the uranium belt as defined by Fischer. There is some question as to just what a single fence with holes spaced at 500-foot intervals would show. In addition, the Morrison formation in the Rifle Creek area has a different source origin as was recollected by the writer and verified by the Survey members attending the conference on the project. Messrs. Trace and Withington were ~~both~~ pessimistic concerning the project.

George C. Selfridge

George C. Selfridge

Selfridge

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

October 7, 1954

Memorandum

To: The Administrator

From: George C. Selfridge
Special Assistant

Subject: Docket No. 3390 - Uranium
Mid-Continent Uranium Corporation
UV and Elk Van claims
Garfield County, Colorado

The subject docket and Docket No. 3360, each with a proposed contract for the same corporation, were submitted to the Operating Committee on September 29. After much discussion concerning the proposed contracts, it was decided that they should be held in abeyance until the Committee had an opportunity to discuss with Messrs. Hittendorf and Johnson a general policy regarding future applications such as these on Plateau uranium projects. The decision was based on (1) the "wildcat" or general prospecting nature of the projects, (2) a change in Survey and AEC drilling policy, whereby closely-spaced drilling to extend known uranium areas or trends will be abandoned for far-spaced drilling patterns in the search for new uranium areas, (3) a probable increase in the number of uranium applications on "longer shot" projects with the abandonment of close-drilling by the Government, and (4) rearrangement of Survey personnel with some members either new to the Plateau or to DMEA work.

At the meeting it was first thought that the subject application should be denied and Docket No. 3360 be approved, but it was then decided to hold both for further discussion and possibly receipt of more information from the field team, which had made no mention of AEC's reaction to the proposed projects. Before the meeting of the Operating Committee with Mr. Johnson on October 4, both projects were discussed with R. D. Trace, C. Withington - who had just come to Washington from doing Plateau work, and T. Kilingsard to secure a better background for judging uranium applications of this type. Docket No. 3360 will be discussed in a separate memorandum.

Reading of the subject docket and accompanying field report gave the impression that the Rifle Creek area project had been recommended for reasons other than ones based on sound geological evidence or inference.

The writer then analyzed the field report listing the data generally favorable to the project and those generally unfavorable. The only favorable item noted was the statement that the known uranium occurrences in the Morrison formation are of ore grade.

The unfavorable items as listed by the writer are as follows:

(1) The closing statements in R. P. Fischer's report of July 17, 1954--"If a significant deposit of uranium ore could be found in the Rifle Creek area, not only would it materially help the ore supply problem of the mill, but the discovery would also encourage other exploration in the area. These factors must be considered almost the sole justification for this recommendation, for admittedly the chances for a significant discovery are considered very slim indeed."

(2) Total production from the Morrison formation in the Rifle Creek area probably does not much exceed 200 tons.

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(11) There has been no exploration or development on the UV claims.

(12) The proposed holes are to be drilled solely for geologic information (favorable ground) rather than for finding ore.

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George C. Selfridge (by ESF)
George C. Selfridge

GCSelfridge/esf
(10/7/54)

cc to: Admr. R. File
Docket
Messrs: Mittendorf
Johnson
Selfridge

September 20, 1954

Memorandum

To: The Administrator, DMEA
Through: Mr. E. W. Ellis

From: Acting Assistant Solicitor, Defense Minerals

Subject: Mid-Continent Uranium Corporation, Docket No. DMEA 3490 (Uranium)

Attached is a contract covering the above-described project in satisfactory legal form for execution, subject to the attachment of the map referred to therein.

J. L. Hofflund

J. L. Hofflund
Acting Assistant Solicitor
Defense Minerals

Attachments: 8

JLHofflund:bbh
9-17-54

Copy to: Mr. Ellis (2)
Mr. Hofflund
Chron.
Docket (DMEA)
Solicitor's docket

Surname copy

Ching
Ellis

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

September 14, 1954

Memorandum

To: Acting Assistant Solicitor, DMEA

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

Subject: Docket No. DMEA-3490
Mid-Continent Uranium Corporation
30 UV claims numbered 1 through 30;
Elk Van-1, 2 and 3 claims
Garfield County, Colorado

Please prepare a short-form contract in accordance with the draft attached.

Copies of Figure 2 to be attached to the contract are being photostated.

Another docket (DMEA-3360) covers the area in Grand County, Utah, described in the instant application, and a separate contract has been drafted to cover that portion of the Applicant's property.

/s/ Ernest Wm. Ellis

Ernest Wm. Ellis

Attachments with docket

MChing/gla

cc to: Docket
Code 700
Mr. Ching

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

September 14, 1954

Memorandum

To: Ernest William Ellis, DMEA Member
Uranium Commodity Committee, Room 4640

From: H. D. Keiser, Bureau of Mines Member
Uranium Commodity Committee

Subject: Field Team Report of Examination, DMEA Docket 3360, ✓ 3490
Mid-Continent Uranium Corporation, Box 883, Grand Junction, Colorado.

I have reviewed the subject report and concur with the conclusions of the Field Team.

It is recommended that (1) in the instance of the UV and Elk Van claims, Garfield County, Colo., exploration be authorized at a total cost of $10,783 with Government participation of 75 percent or $8,087.25; (2) in the instance of school section 2, T. 23 S., R 22 E., Grand County, Utah, the application for an exploration loan be denied; and (3) in the instance of school section 2, T 23 S., R. 21 E., Grand County, Utah, exploration be authorized at a total cost of $102,409.00 with Government participation of 75 percent or $76,806.75.

The report has been forwarded to the Chief, Minerals Division, Bureau of Mines, in accord with the routing slip attached thereto.

H. D. Keiser

E. Wm. Ellis, DMEA Member, Uranium Commodity Committee

September 9, 1954

Arthur P. Butler, Jr., USGS Member, Uranium Commodity Committee

a 3490

Field Team Report of Examination, DMEA Docket 3360 (uranium), Mid-Continent Uranium Corp., applicant, Box 883, Grand Junction, Colo.; UV and Elk Van claims, SW part unsurveyed T. 4 S., R. 91 W., Garfield County, Colorado

The Mid-Continent Uranium Corp. entered one application for Government assistance to explore for uranium ore in the Morrison formation in the Rifle district, Colo., and Thompson district, Utah. Because the areas are a long distance apart and because the possible merits of the two areas are not interrelated, the examining members of the Field Team wrote separate reports on each area.

Only a few uranium ore bodies are known in the Morrison formation of the Rifle district, these are small and scattered. They have produced about 200 tons of ore. There is practically no exploration back of the outcrop of the Morrison in the district.

The proposed exploration consists 16 core drill holes, one of which would be deep enough to penetrate the Entrada sandstone, totalling about 2,600 feet. Total cost is estimated to be $10,783, Government's share $8,087.25.

The geologist examiner believes that the proposed exploration is well conceived, although admittedly "wildcat", and is worth undertaking only on the chance of finding favorable ground that might contain larger deposits than those now known in the Morrison formation in the area. But he also believes that the need for a local supply of uranium ore for the Rifle Mill, and the encouragement that discovery of ore would lead to other exploration, justifies one long shot gamble in an area where little is known about the possible occurrence and distribution of uranium deposits.

I concur with the conclusions of the examining geologists and the recommendation of the Field Team that Government assistance be granted for the amount and to perform the work specified in the report.

Copy to: E. Wm. Ellis (2)

E. Wm. Ellis, DMEA Member, Uranium Commodity Committee

September 9, 1954

Arthur P. Butler, Jr., DMEA Member, Uranium Commodity Committee

a3490

Field Team Report of Examination, DMEA Docket 3360 (Uranium), Mid-Continent Uranium Corp., applicant, Box 883, Grand Junction, Colo.; school sections 2, T. 23 S., R. 22 E., and 2, T. 23 S., R. 21 E., Grand County, Utah

The request for Government assistance to explore for uranium at the locations identified in the subject above were made part of an application that included an area in Garfield County, Utah. The Field Team wrote separate reports on the two areas, because their merits are not interdependent and they are a long distance apart.

Proposals and Comment

The examining members of the Field Team found that investigation and drilling by the Geological Survey showed that sec. 2, T. 23 S., R. 22 E. was unfavorable for the occurrence of uranium deposits. They recommended that it be eliminated from consideration. Drilling in four stages was recommended for sec. 2, T. 23 S., R. 21 E., with each successive stage after stage 1 subject to DMEA approval. Maximum footage would be 38,250 feet, and estimated total cost would be $102,409.00, the Government's share $76,806.75. Stage 1 would consist of holes 800 feet apart in two lines across the section to search for favorable ground and ore. The remaining stages would define better limits of favorable ground and ore.

Comment

The Morrison formation is the principal host rock for uranium ore in the Thompson's district and underlies the applicant's property. Section 2, T. 23 S., R. 21 E. is about 1.5 miles west of the larger deposits in the area. The Morrison formation in that section has some features generally considered favorable for ore deposits, but the section has not been tested by exploration. The recommended plan of exploration appears soundly conceived as a means of determining the favorability of the property and search for ore in any favorable ground found.

Recommendation

I concur with the recommendation of the Field Team that Government assistance be granted to the applicant up to the Government's share of the maximum cost of $102,409.00. There is no geologic advantage in combining a contract for this area with that in the Colorado area, but it might be to the Government's advantage to do so.

Copy to: E. Wm. Ellis (2)

9/13/5 vgla

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

224 New Customhouse
Denver 2, Colorado

August 31, 1954

Memorandum

To: Secretary to the Operating Committee, Defense Minerals Exploration Administration

From: DMEA Field Team, Region IV

Subject: Report of Examination, DMEA Docket 3360 (Uranium) Mid-Continent Uranium Corporation (UV and Elk Claims) Garfield County, Colorado, and (School Sections), Grand County, Utah.

a3490

Enclosed are the original and three copies of the report of examination on the subject properties.

We recommend that a unit cost contract or contracts be awarded the applicant based on the report of the field examiners. Enclosed are nine copies each of Figures 1 and 3 for use in the contract. - to 700

W. H. King
W. H. King

E. N. Haushman
for A. H. Koschmann

Enclosures

cc: APButler w/copy of Report of Exam.

Reviewed by
DMEA OPERATING COMMITTEE
9-10-54
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Mining Division
Region IV

August 31, 1954

Memorandum

To: DMEA Field Team, Region IV

From: Chief, Mining Division, Region IV

Subject: Report of Examination, DMEA Docket 3360 a3490 (Uranium)
Mid-Continent Uranium Corporation (UV and Elk Van Claims)
Garfield County, Colorado, and (School Sections)
Grand County, Utah.

Enclosed are two separate complete reports on the Garfield County, Colorado, and Grand County, Utah properties of the applicant.

In the case of the Garfield County, Colorado, report the engineer examiner recommends a modified program consisting of 15 core drill holes spaced at 500-foot intervals on the UV claims. The estimated average depth is 150 feet to test the Morrison formation. He also recommends one core drill hole on the UV-22 or UV-24 claim to test the Entrada sandstone at an estimated depth of 350 feet. The estimated total cost of this project is $10,783.00.

On the School Section in T. 23 S., R. 21 E. the engineer examiner recommends a drilling program to be set up in four stages at a total cost of $102,409.00.

We concur in the recommendations of the engineer examiner.

W H King
W. H. King

Enclosures

Reviewed by
DMEA OPERATING COMMITTEE
9-10-54
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Region IV

Building 20, Room 137
Denver Federal Center
Denver 2, Colorado
August 6, 1954

Memorandum

To: Executive Officer, DMEA Field Team, Region IV

From: Chief, Mineral Resources Branch, Mining Division, Region IV

Subject: DMEA 3360 (Uranium Mid-Continent Uranium Corporation (U V and Elk Van claims) Garfield County, Colorado, and (School Section 2, T. 23 S., R. 21 E., and School Section 2, T. 23 S., R. 22 E., S. L. M.) Grand County, Utah

Enclosed herewith are separate "Summary, Conclusions, and Recommendations," by R. P. Fischer and C. H. Mobley, Geological Survey, and R. R. McLellan, Bureau of Mines, and of McLellan's separate engineering reports on the two properties included in the subject docket.

Two separate complete reports have been prepared on the Garfield County, Colorado and the Grand County, Utah properties of the applicant. You can recommend preparation of individual contracts or a combined contract to the Administrator, as you see fit. It would appear that contracts could probably be administered more advantageously in the field if they were drawn up separately.

In the case of the Garfield County, Colorado report, McLellan concludes that the U V claims present a possibility for "wildcat" exploration that could result in the discovery of small reserves of low-grade uranium ore. He recommends a program slightly modified from the applicant's comprising 15 core drill holes spaced at 500-foot intervals drilled on the U V claims to an estimated average depth of 150 feet to test the Morrison formation and one core drill hole on the U V-22 or U V-24 claim drilled to an estimated depth of 350 feet to test the Entrada sandstone or a total footage of 2,600 feet at a cost estimated as $4.147 a foot, or a total overall cost of $10,783.00.

On the School Section properties located in Grand County, Utah, McLellan concludes sec. 2, T. 23 S., R. 22 E., S. L. M. does not show sufficient promise of containing uranium deposits to merit exploration. However, he considers sec. 2, T. 23 S., R. 21 E. does have enough potential. He recommends no consideration of the first-mentioned section, but on sec. 2, T. 23 S., R. 21 E. he recommends an exploration project set up in four stages:

Reviewed by
DMEA OPERATING COMMITTEE
9-10-54
(date)

Stage 1 to consist of 30 holes in two fences of 15 holes each on 200-foot centers, core and non-core drilling, totaling approximately 6,750 feet; Stage 2, 15 holes on 200-foot centers as an optional fence between to the two Stage 1 fences, totaling approximately 3,375 feet of core and non-core drilling; Stage 3, drilling up to 75 holes on 300-foot centers to test favorable ground indicated by Stages 1 and 2, totaling approximately 16,875 feet of core and non-core drilling; and Stage 4, drilling 50 offset holes to test ground proven favorable by holes in Stages 1, 2, and 3, totaling approximately 11,250 feet of core and non-core drilling. Location of drill holes for Stages 2, 3, and 4 require prior approval from DMEA Region IV Field Team, and no holes in any stage are to be drilled closer than 50 feet to a previously drilled hole. Drilling footage aggregates 38,250 feet and McLellan estimates costs as $2.677 a foot, or a total, if all drilling is authorized, of $102,409.00. A unit-cost, short-form contract is suggested in both cases.

I concur with the engineer's conclusions and recommendations.

The brochure forwarded with your memorandum of June 22, 1954, instructing us to make a field examination and report and also the additional material forwarded with your memorandum of July 1, 1954, are both returned herewith.

W. M. Traver

W. M. Traver

enclosures

cc 10
DMEA 3360
DMEA Chron

WMT/pam

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA 3360, Mid-Continent Uranium Corporation

School Section 2, T. 23 S., R. 21 E., S. L. M. and

School Section 2, T. 23 S., R. 22 E., S. L. M.

Grand County, Utah

Uranium

C. H. Mobley, Geologist
Geological Survey

R. R. McLellan, Mining Engineer
Bureau of Mines

July 21, 1954

Reviewed by
DMEA OPERATING COMMITTEE
9-10-54
(date)

DMEA 3360

MID-CONTINENT URANIUM CORPORATION
SCHOOL SECTION 2, T. 23 S., R. 21 E., S. L. M. AND
SCHOOL SECTION 2, T. 23 S., R. 22 E., S. L. M.
GRAND COUNTY, UTAH

Summary, Conclusions, and Recommendations

By C. H. Mobley
Geologist
Geological Survey

R. R. McLellan
Mining Engineer
Bureau of Mines

Reviewed by
DMEA OPERATING COMMITTEE

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DMEA 3360

MID-CONTINENT URANIUM CORPORATION
SCHOOL SECTION 2, T. 23 S., R. 21 E., S. L. M. AND
SCHOOL SECTION 2, T. 23 S., R. 22 E., S. L. M.
GRAND COUNTY, UTAH

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

By C. H. Mobley and R. R. McLellan

The Mid-Continent Uranium Corporation of Grand Junction, Colo., applied to the Defense Minerals Exploration Administration for assistance to explore for uranium on two school sections (sec. 2, T. 23 S., R. 21 E., and sec. 2, T. 23 S., R. 22 E., S. L. M.) in the Thompsons or Yellow Cat area of Grand County, Utah. The applicant proposed to drill a total of 65,000 feet of core and air-drill holes at a total estimated cost of $142,500.00 with Government participation 75 percent or $106,875.00.

The two school sections were inspected by DMEA representatives on July 7, 1954, in company with H. E. Kobley of the Mid-Continent Uranium Corporation. On that date, it was concluded that a program of exploration with Government participation could be justified for one of the sections only. This decision is based upon geologic information compiled by the Geological Survey as a result of intensive exploration in the Thompsons area.

The uranium deposits in the Yellow Cat area occur through a stratigraphic interval of about 250 feet in the sandstone beds of the Salt Wash member of the Jurassic Morrison formation. Nearly all of the larger deposits are located about 1-1/2 miles east of sec. 2, T. 23 S., R. 21 E., S. L. M. and about 4 miles west of sec. 2, T. 23 S., R. 22 E., S. L. M. The Geological Survey tested the latter section with 19 wagon drill holes none of which encountered favorable or mineralized ground.

It was concluded by the DMEA examining team that no additional exploration should be conducted on this section with Government funds. The Geological Survey drilled two widely spaced holes on sec. 2, T. 23 S., R. 21 E., S. L. M. with unfavorable results; however, it was concluded that additional exploration is justified on this section.

The following program of exploration is recommended for school section 2, T. 23 S., R. 21 E., S. L. M., Grand County, Utah:

Stage 1	Drill 30 holes (two fences of 15 holes each on 200-foot centers) totaling approximately 6,750 feet of core and non-core drilling.
Stage 2	Drill 15 holes on 200-foot centers as an optional fence between Stage 1 fences totaling approximately 3,375 feet of core and non-core drilling.
Stage 3	Drill up to 75 holes on moderate spaced centers of about 300 feet to test favorable ground encountered by previous stages--total of approximately 16,875 feet of core and non-core drilling.
Stage 4	Drill up to 50 offset holes to test ground in vicinity of favorable holes of previous stages--total of approximately 11,250 feet of core and non-core drilling.

Drill hole locations for Stages 2, 3, and 4 will be subject to prior approval from the DMEA Region IV Field Team. No holes shall be closer than 50 feet to any previously drilled hole.

The average depth of drilling is estimated to be 225 feet and will cost approximately $2.25 per foot for contract drilling. The total cost per foot is estimated to be $2.677 for 38,250 feet of drilling or a total of $102,409.00 for the entire program of exploration with Government participation at 75 percent or $76,806.75. A unit-cost short-form type contract is suggested.

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MID-CONTINENT URANIUM CORPORATION
SCHOOL SECTION 2, T. 23 S., R. 21 E., S. L. M. AND
SCHOOL SECTION 2, T. 23 S., R. 22 E., S. L. M.
GRAND COUNTY, UTAH

Engineering Report

By R. R. McLellan
Mining Engineer
Bureau of Mines

Reviewed by
DMEA OPERATING COMMITTEE

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MID-CONTINENT URANIUM CORPORATION
SCHOOL SECTION 2, T. 23 S., R. 21 E., S. L. M. AND
SCHOOL SECTION 2, T. 23 S., R. 22 E., S. L. M.
GRAND COUNTY, UTAH

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SCHOOL SECTION 2, T. 23 S., R. 21 E., S. L. M. AND
SCHOOL SECTION 2, T. 23 S., R. 22 E., S. L. M.
GRAND COUNTY, UTAH

ENGINEERING REPORT

By R. R. McLellan

INTRODUCTION

The Mid-Continent Uranium Corporation of Grand Junction, Colo., has applied to the Defense Minerals Exploration Administration for assistance to explore for uranium on two school sections in the Thompsons or Yellow Cat area of Grand County, Utah. The company proposes to explore the school sections by drilling approximately 65,000 feet of core and air-drill holes at an estimated total cost of $142,500.00. Government participation at 75 percent amounts to $106,875.00.

The sections were inspected on July 7, 1954, by the writer and W. P. Williams and C. H. Mobley of the Geological Survey accompanied by N. E. Ebbley of the Mid-Continent Uranium Company. All parties concerned agreed upon submitting for approval a revised program in which one school section will be eliminated entirely and the proposed drilling on the second section will be accomplished in four stages. The maximum footage to be drilled amounts to 38,250 feet at a total cost estimated to be $102,409.00 of which Government participation will be 75 percent or $76,806.75. The program may be terminated at the completion of any single stage if favorable ground is not encountered.

ACKNOWLEDGMENTS

The inspecting team was assisted by N. E. Ebbley who represented the Mid-Continent Uranium Corporation during the field examination.

LOCATION, TOPOGRAPHY, AND PHYSICAL FEATURES

The school sections are described as sec. 2, T. 23 S., R. 21 E. and sec. 2, T. 23 S., R. 22 E., S. L. M. (fig. 1) in the Thompson or Yellow Cat area of Grand County, Utah. These sections are readily accessible from U. S. Highway 6 by traveling 13 miles south on a dirt mine road which joins the highway 5 miles east of Thompson, Utah. The sections are 6 miles apart on an east-west line and straddle a heavily explored area which in the past produced considerable tonnage of vanadium ore and more recently has shown an increasing production and reserve of uranium ore. The relief is comparatively low and vegetation is extremely sparse which nearly eliminates the necessity of road building or clearing for drill sites. The region is semi-arid and is suited to year around surface operations. Occasional periods of wet weather may temporarily interrupt transportation on the dirt roads due to extreme mud conditions. All materials, supplies, and equipment are hauled by truck to the area. Water for core drilling must be hauled for distances up to 15 miles. A camp will be established on the property as accommodations are limited in the nearby town of Thompson. Labor and drill contractors are fairly plentiful. The sections are within 95 miles of Grand Junction, Colo., which is a major distribution point for supplies, equipment, and labor, and also is an ore treatment center.

HISTORY AND PRODUCTION

The school sections under consideration were leased from the State of Utah by E. E. Ebbley on March 5, 1954. Ebbley assigned the leases to the Mid-Continent Uranium Corporation on June 1, 1954, to conform with DMEA requirements.

No underground exploration or development has been attempted on either section; consequently, no production is recorded. Two core drill holes were completed by the Geological Survey on sec. 2, T. 23 S., R. 21 E., S. L. M. and 19 wagon drill holes were completed on sec. 2, T. 23 S., R. 22 E., S. L. M. None of the holes encountered uranium mineralization. Neither section was considered for exploration under the Geological Survey drilling program presently being conducted in the Yellow Cat area.

OWNERSHIP AND EXTENT

Both school sections originally were leased from the State of Utah by N. E. Ebbley on March 5, 1954. Ebbley assigned the lease to the Mid-Continent Uranium Corporation on June 1, 1954. Photostatic copies of the leases and assignments were submitted to the DMEA with the application.

DESCRIPTION OF THE DEPOSITS

An accumulation of drilling conducted by the Geological Survey since 1950 or 1951 in the Yellow Cat area has resulted in the establishment of considerable reserve most of which is limited to an area of approximately 3 square miles which presently is under development by several companies. With few exceptions, the ore deposits have been small though comparatively numerous throughout several horizons in the Salt Wash member of the Morrison formation. The deposits appear to be localized within irregular channels where the host rock has thickened noticeably. The most successful method of prospecting the area has been to locate the channels and to confine most of the drilling along the course of the channels.

The beds have a slight dip not exceeding 4 degrees; consequently, the deposits are relatively flat. The ratio of uranium to vanadium apparently

varies considerably from one deposit to the next and may show extreme variation within a single deposit. It was noted that the usual occurrence of blue clay above and below the ore deposits may present a mining problem in supporting the roof of underground workings. Timbering or roof bolting is necessary if any thickness of clay is encountered above a deposit. Occasionally the deposits are sufficiently near the ground surface to be mined by open pit operations.

Any mineable deposits encountered on the applicant's property undoubtedly will be similar in scope and grade to those that have been discovered in the past in the Yellow Cat area.

MINEABLE ORE RESERVES

No reserves of any type have been established on either school section.

PRESENT STATUS

Exploration to date consists of two diamond drill holes on sec. 2, T. 23 S., R. 21 E., S. L. M. and 19 wagon drill holes on sec. 2, T. 23 S., R. 22 E., S. L. M., all of which failed to show uranium or vanadium mineralization. No development work has been accomplished in either section. No mining or milling equipment was on the property on the date of the examination.

PROJECT PROPOSALS WITH COSTS

The applicant originally proposed the following program of exploration:

(a) Independent contracts

sec. 2, T. 23 S., R. 21 E., S. L. M.

Phase 1 - Three fences totaling 48 holes, average depth 200 feet

Phase 2 - Staggered grid, 102 holes average depth 200 feet

Total 150 holes, 30,000 feet at $2.00 average per foot	$60,000.00

sec. 2, T. 23 S., R. 22 E., S. L. M.

Approximately 150 holes, staggered grid pattern, average depth 130 feet	
Total 20,000 feet at $1.50 per foot	30,000.00

Both sections additional drilling

Approximately 100 offset holes averaging 150 feet in depth--15,000 feet of air-blast rotary hole at $1.50 per foot	22,500.00

(b) Labor and supervision

Two samplers (3 months at $375.00 per month)	2,250.00
One geologist (4 months, includes final report)	2,000.00
Expenses for above three men ($5.00/day/man)	1,350.00
Consultant, total 30 days	1,500.00
Transportation for labor and supervision	500.00

(c) Operating material and supplies

Fuel for 1/2-ton truck and jeep	380.00
Core boxes	1,500.00
Miscellaneous drafting, office, and report supplies	100.00

(d) Operating equipment

One 1/2-ton pick-up truck	2,100.00
One universal jeep	1,850.00
One radiation counter and probe	500.00
Combination supply and office trailer	1,200.00

(e) Miscellaneous

Analytical work	2,000.00
Accounting	300.00
Workman's Compensation, insurance, payroll taxes, etc. (5 percent)	250.00
Equipment insurance and liability	50.00

(f) Contingencies (approximately 9.5 percent of total ($12,381.33) use	$ 12,170.00
Total estimated cost of Thompsons area phase	$142,500.00
Government participation at 75 percent	$106,875.00

Upon inspecting the school sections and after evaluating the results of the various drilling projects conducted by the Geological Survey, it was agreed that all exploration should be confined to sec. 2, T. 23 S., R. 21 E., S. L. M. The other section was considered unfavorable for several reasons. The northern portion of the section was tested with 19 wagon drill holes--all blank. The ore horizon is exposed by erosion and apparently is without uranium mineralization along a strip paralleling and including the east line and extending from the south line to the north line. The ore horizon also is exposed extensively by erosion near the south line with no uranium mineralization in evidence. The adjoining half section to the north was extensively drilled by the Geological Survey with poor results.

It was concluded that a known channel might swing into sec. 2, T. 23 S., R. 21 E., S. L. M. thus providing a suitable target for exploration drilling. Two of the three north trending fences of holes that were proposed by the applicant are recommended for Stage 1 of the project. An optional fence may be drilled as Stage 2 in the event the first two fences prove indecisive in determining the existence of a channel within the section. The holes in each fence will be spaced at intervals of 200 feet. Should a favorable trend be established by the fences, Stage 3 consisting of a maximum of 75 holes will be drilled on approximately 300-foot centers to prospect for mineralized or ore-bearing ground and to trace a possible channel. Should Stage 3 be successful, Stage 4 authorizes 50 additional holes to be used for offset drilling in the vicinity of favorable holes

completed in any of the previous stages. The results of each stage should be evaluated by all parties concerned before drilling commences on a succeeding stage. Should the results of any single stage prove completely unfavorable, the project should be terminated. The proposed drilling plan is shown on figure 2.

The following costs are estimated for the revised program of core and air-blast rotary drilling in sec. 2, T. 23 S., R. 21 E., S. L. M.:

(a) Independent contracts

Stage 1 -	Two fences totaling 30 holes, average depth 225 feet, total 6,750 feet at $2.25 average cost per foot*	$15,187.50
Stage 2 -	Optional center fence of holes to be drilled only if outer fences prove to be indecisive in locating favorable channels or trends: 15 holes, average 225 feet, total 3,375 feet, at $2.25 per foot*	7,593.75
Stage 3 -	Grid pattern of holes eliminated in favor of progressive drilling to follow possible trends located by Stage 1 and 2 holes. No hole should be drilled closer than 50 feet to any completed holes; 75 holes, average depth 225 feet, total 16,875 feet, at $2.25 per foot*	37,968.75
Stage 4 -	A maximum of 50 holes to offset any previous holes showing favorable mineralization; average depth 225 feet, total 11,250 feet, at $2.25 per foot*	25,312.50

*Revised estimates indicate that approximately 50 percent of the footage will be cored at a cost of $3.00 per foot and that the remaining footage will be non-coring at $1.50 per foot or an average of $2.25 per foot for the total.

(b) Labor and supervision

Operating four drilling units and averaging 400 feet per day, the actual drilling should be completed in about 4 months' time utilizing the following personnel:

One sampler (4 months at $465.00 per month)	$1,860.00	
One geologist (5 months at $590.00 per month)	2,950.00	
One part-time consultant (30 days at $50.00 per day)	1,500.00	
Labor and supervision		$ 6,310.00
(c) Operating materials and supplies		
Fuel for 1/2-ton pick-up truck $150.00 per month	600.00	
Core boxes (mineralized sections only to be saved for splitting and storage)	500.00	
Miscellaneous	100.00	
Operating materials and supplies		1,200.00
(d) Operating equipment		
1/2-ton pick-up truck, $150.00 per month	600.00	
One universal jeep, $100.00 per month	400.00	
One radiation counter and probe $62.50 per month	250.00	
Combination supply and office trailer	280.00	
Operating equipment		1,530.00
(e) Miscellaneous		
Analytical work--approximately 400 combined vanadium and uranium tests at $5.00 each	2,000.00	
Accounting	140.00	
Workman's Compensation, insurance etc. (5 percent)	240.00	
Equipment insurance and liability	50.00	
Miscellaneous		2,430.00

(f) Contingencies (since all drilling will be done by independent contract and the company will have relatively little equipment or personnel involved, it is

believed that the contingency item should be reduced from 10 percent to 5 percent	$ 4,876.50
Total cost of project	$102,409.00
Amount cost per foot for 38,250 feet of drilling	$2.677
Government participation at 75 percent	$76,806.75

The contract should specify that cuttings from air-blast holes in the ore horizons shall be collected at intervals of no less than 2 feet and shall be split and a portion retained until the hole is probed. A mechanical cutting catcher should be required for sampling purposes. All core showing uranium or vanadium mineralization should be split, half to be assayed and half to be stored in boxes for core storage. There is no need to retain barren core after logging has been completed. Each hole, core or air blast, should be logged geologically and the logs should be submitted with the operator's monthly reports. Probing results also should be submitted for comparison purposes.

Summary of Costs

(a) Independent contracts

Stage 1 -	30 holes, 6,750 feet of core and non-core drilling, average cost $2.25 per foot	$ 15,187.50
Stage 2 -	15 optional holes, 3,375 feet of core and non-core drilling, average cost $2.25 per foot	7,593.75
Stage 3 -	75 holes, 16,875 feet of core and non-core drilling, average cost $2.25 per foot	37,968.75
Stage 4 -	50 offset holes, 11,250 feet of core and non-core drilling average cost $2.25 per foot	25,312.50

(b) Labor and supervision	$ 6,310.00
(c) Operating materials and supplies	1,200.00
(d) Operating equipment	1,530.00
(e) Miscellaneous	2,430.00
(f) Contingencies	4,876.50
Total cost	$102,409.00
Average cost per foot for 38,250 feet of drilling	$2.677
Government participation at 75 percent	$76,806.75

CONCLUSIONS

It is concluded that sec. 2, T. 23 S., R. 21 E., S. L. M. may contain favorable ore-bearing trends or channels extending from the adjoining sections to the east, and, therefore, merits exploration by drilling. Since there is relatively little subsurface information available from the section, all exploration should be conducted in stages to allow flexibility and to prevent excessive expenditures should the first one or two stages prove unfavorable.

It is further concluded that sec. 2, T. 23 S., R. 22 E., S. L. M. does not show sufficient promise of containing deposits of uranium ore to merit additional exploration.

RECOMMENDATIONS

It is recommended that four stages of exploration as previously described be approved for sec. 2, T. 23 S., R. 21 W., S. L. M. The exploration will consist of a maximum of 38,250 feet of core and non-core drilling at predetermined locations. The total expenditure will not exceed $102,409.00 of which the Government will participate in the amount of $76,806.75, or 75 percent of the total.

UNITED STATES
DEPARTMENT OF THE INTERIOR
DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA 3360, Mid-Continent Uranium Corporation

W V and Elk Fan claims

Garfield County, Colorado

Uranium

R. N. McLellan, Mining Engineer
Bureau of Mines

R. P. Fischer, Geologist
Geological Survey

July 21, 1954

Reviewed by
DMEA OPERATING DIRECTOR
9-10-54

DMEA 3360

MID-CONTINENT URANIUM CORPORATION
U V AND ELK VAN CLAIMS
GARFIELD COUNTY, COLORADO

Summary, Conclusions, and Recommendations

By R. R. McLellan
Mining Engineer
Bureau of Mines

R. P. Fischer
Geologist
Geological Survey

Reviewed by
DMEA OPERATING COMMITTEE

9-10-54
(date)

RMRA 3360

MID-CONTINENT URANIUM CORPORATION
U V AND ELK VAN CLAIMS
GARFIELD COUNTY, COLORADO

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

By R. R. McLellan and R. P. Fischer

The Mid-Continent Uranium Corporation of Grand Junction, Colo., applied for assistance to explore for uranium on 30 U V and 3 Elk Van mining claims in the Rifle district of Garfield County, Colo. The applicant proposed to core drill 16 preliminary holes estimated to average 260 feet in depth and to aggregate 4,160 feet of drilling at a total estimated cost of $17,500.00. The objective of the holes, spaced at intervals of 300 feet along a line through the U V claims, is to test the Morrison formation for favorable areas and for possible uranium or vanadium mineralization.

In the Rifle district, Colo., vanadium-uranium deposits occur in both the so-called Entrada sandstone and the Morrison formation. Although the deposits in the Entrada are large, the ore is so low in average uranium content that it is not considered uranium ore under present conditions, and hence there appears to be no justification to explore for uranium deposits in the Entrada. The deposits in the Morrison formation, on the other hand, have enough uranium to qualify as uranium ore, but the known deposits are small. Nevertheless, the small amount of exploration requested in this instance appears justified as a "wildcat" exploration project, even though the chances of finding deposits that would make significant reserves are considered poor.

The applicant's estimated average depth for the holes is considered to be excessive; consequently, the original program was revised slightly to reduce the total footage and the total expenditure. The total footage for 16 holes is estimated to be 2,600 feet which at $4.147 per foot will cost approximately $10,783.00. The Government participation will amount to 75 percent, or $8,087.25. The location of the holes will remain as submitted by the applicant; however, one deep hole should be drilled to the base of the Entrada sandstone either on the U V-22 or U V-24 claim.

The following program of exploration set up on a unit-cost short-form contract is recommended for approval:

(1) Drill 16 holes spaced at intervals of 500 feet as indicated on the accompanying illustrations.

(2) Fifteen of the above holes will test the Morrison formation and will average approximately 150 feet in depth. One hole, either on the U V-22 or U V-24 claim will be extended to the base of the Entrada sandstone and may be 350 feet in depth.

(3) The total footage required is estimated to be 2,600 feet and will cost approximately $10,783.00 or $4.147 per foot--Government participation 75 percent or $8,087.25.

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MID-CONTINENT URANIUM CORPORATION
U V AND ELK VAN CLAIMS
GARFIELD COUNTY, COLORADO

Engineering Report

By R. R. McLellan
Mining Engineer
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MID-CONTINENT URANIUM CORPORATION
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ILLUSTRATIONS

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1. Location map, U V and Elk Van claims, Mid-Continent Uranium Corporation, Garfield County, Colo. 2

2. Proposed core drill holes, U V and Elk Van claims, Mid-Continent Uranium Corporation, Garfield County, Colo. 5

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MID-CONTINENT URANIUM CORPORATION
U V AND ELK VAN CLAIMS
GARFIELD COUNTY, COLORADO

ENGINEERING REPORT

By R. R. McLellan

INTRODUCTION

The Mid-Continent Uranium Corporation of Grand Junction, Colo., has applied to the Defense Minerals Exploration Administration for assistance to explore for uranium on the U V group of 35 mining claims in Garfield County, Colo. The company proposed core drilling a row of 16 preliminary holes spaced at intervals of 500 feet to test the underlying strata for favorable sand and for favorable mineralization. In the event that the results of the drilling are encouraging, the company proposed to request additional funds to continue the exploration in greater detail. The company estimates that the total cost would not exceed $17,500.00 of which the Government will contribute 75 percent, or $13,125.00.

The U V claims were inspected on July 8, 1954, by the writer, R. P. Fischer and W. P. Williams of the U. S. Geological Survey accompanied by N. E. Ebbley of the Mid-Continent Uranium Corporation. It was concluded that the U V claims are in a sufficiently favorable area to justify the preliminary drilling proposed by the applicant company. The program was modified slightly to reduce the average depth of holes and thus the expenditures. The revised drilling program recommended for approval consists of 2,600 feet of core drilling to be expended in approximately 15 holes averaging 150 feet in depth and in one hole about 350 feet in depth. The spacing and location of the holes remains as proposed by

the company. The total cost is estimated to be $10,783.00 with Government participation of 75 percent, or $8,087.25.

ACKNOWLEDGMENTS

The examining team was accompanied and assisted by Norman E. Ebbley who represented the Mid-Continent Uranium Corporation during the field examination.

LOCATION, TOPOGRAPHY, AND PHYSICAL FEATURES

The 35 U V claims adjoin West Elk Creek canyon on the southwest, approximately 8 to 10 miles northwest of the town of New Castle, Colo. (fig. 1). Specifically, the claims are in secs. 29, 30, 31, and 32, T. 4 S., R. 91 W., Garfield County, Colo., and are accessible by traveling from New Castle 6.5 miles northwest on State Highway 329, then branching left across West Elk Creek for 0.6 mile to the mine access road. The mine road is 2 to 3 miles in length and completely traverses the claims.

The area is of moderate relief with the claims roughly paralleling and slightly overlapping the steep southeast slope of West Fork Elk Creek canyon. The greater portion of the area covered by the claims is relatively smooth and slopes 8 to 10 degrees east. The altitude ranges from 6,500 to 8,365 feet.

Vegetation is thick and scrubby with intertangled masses of oak and bush brush which largely obscures the rock formations. Heavy snows may interrupt surface operations during the winter months.

The claims are readily accessible to supply and milling centers on U. S. Highway 6. Heavy equipment may be obtained at Grand Junction, Colo., 90 miles distant and small materials and supplies may be obtained at Rifle, New Castle, and Glenwood Springs, all of which are within 25 miles of the claims.

Labor is plentiful and the claims are within commuting distance of the above-mentioned towns. Water for mining and drilling purposes is plentiful nearby. The U. S. Vanadium Corporation mill is in operation at Rifle and will provide an outlet for comparatively low-grade ores that may be discovered.

HISTORY AND PRODUCTION

With the exception of the Rifle mine approximately 2 miles west of the U V claims, there has been little activity in the area. The Rifle mine was first operated in the early 1920's and has developed a tremendous deposit of vanadium ore containing a small amount of uranium. The first discoveries made in the vicinity of the U V claims are believed to have been made in the early 1940's on the Elk Van and Allen claims. The U V claims were staked in 1953 and 1954 between the above-mentioned groups. Short drifts were driven on surface exposures on the Elk Van and Allen claims resulting in a limited production from both properties. Recorded production from the Elk Van property amounts to 10 tons of ore containing an average of 0.23 percent U_3O_8 and 2.15 percent V_2O_5. Production from the Allen group amounts to 20 tons containing an average of 0.19 percent U_3O_8 and 3.07 percent V_2O_5. No production has come from the U V claims.

OWNERSHIP AND EXTENT

The 30 U V claims and 3 Elk Van claims are owned in equal share by S. L. R. McNichols, 728 Symes Building, Denver, Colo., Philip Shairman, 228 Cooper Building, Denver, Colo., and Norman E. Kebley, Box 883, Grand Junction, Colo. The Allen group of claims is not included in the application.

Following are the recorded claims considered in this application:

Claim	Book	Page	Claim	Book	Page
U V-1	275	3	U V-16	275	19
U V-2	275	5	U V-17	275	20
U V-3	275	6	U V-18	275	21
U V-4	275	7	U V-19	275	22
U V-5	275	8	U V-20	275	23
U V-6	275	9	U V-21	275	24
U V-7	275	10	U V-22	275	25
U V-8	275	11	U V-23	275	26
U V-9	275	12	U V-24	275	27
U V-10	275	13	U V-25	275	28
U V-11	275	14	U V-26	275	29
U V-12	275	15	U V-27	275	30
U V-13	275	16	U V-28	275	31
U V-14	275	17	U V-29	275	32
U V-15	275	18	U V-30	275	33

Claim	Book	Page
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Elk Van-2	205	516
Elk Van T-2	205	517

DESCRIPTION OF THE DEPOSITS

With the exception of the Rifle deposit the discoveries thus far made in the vicinity of the U V claims have been very small lenticular pods or rolls of ore with a comparatively high ratio of vanadium to uranium. The Allen and Elk Van deposits likewise appear to be extremely spotty and limited in extent and occur in the lower portion of the Morrison formation within a few feet stratigraphically of the upper contact of the Entrada sandstone. Unfortunately, the eroded edge of ore horizon is completely covered by overburden and thick vegetation along the canyon wall where normally the outcrop would be evident and easily prospected. Carnotite and dark vanadium minerals were noted in a sandy shale or mudstone zone

up to 24 inches thick in the short Elk Van drift. More extensive vanadium mineralization was noted in a sandstone exposed by the Allen workings. Most of the vanadium bearing rock appears to be weakly radioactive and contains scattered pods and lenses of higher grade uranium mineralization.

Since no exploration or development has been done on the U V claims, the nature of any deposits that might exist on these claims can be inferred only from the limited information obtained from the few surrounding deposits that have been explored by prospecting or mining.

MINEABLE ORE RESERVES

No known mineable reserves exist on the U V or the Elk Van claims.

PRESENT STATUS

One 50-foot drift, a shallow open pit, and a limited amount of rim stripping comprise the exploration and development on the claims. No mining or milling equipment was on the property on the date of the examination. Roads and drill sites have been prepared by the applicant.

PROJECT PROPOSALS WITH COSTS

Although the known deposits on or adjacent to the area proposed for exploration generally are small and have a low uranium content, the possibility of encountering a large deposit is not too unreasonable as shown by the early discovery of the exceptionally large Rifle deposit a short distance away. The applicant company proposes to core drill a single row of 16 holes spaced at intervals of 500 feet to test the ore-bearing formation. (fig. 2)

Should uranium or vanadium mineralization or a favorable ground be encountered the company will request assistance to complete additional drilling. In the event the holes are unfavorable, no additional work will be considered. After consulting with the company representative, it was felt advisable to reduce the average depth per hole and to make a few revisions in the estimated costs. The number and location of the holes remain as proposed by the applicant.

The estimated depth to the base of the Morrison formation along the line of drill holes probably will range from 75 to 200 feet with an average depth of about 150 feet. One hole is recommended to be drilled through the Entrada sandstone on the possibility that vanadium ore might be encountered in the same horizon as exposed in the Rifle and Garfield mines. This hole will be 300 to 350 feet in depth and should be drilled on the U V No. 22 or U V No. 24 claim at a site approximately 1,000 feet southwest of the Elk Van workings.

Following are the estimated costs:

(a) Independent contracts:

15 core drill holes, average depth 150 feet; 1 hole, 350 feet; total 16 holes, 2,600 feet at $3.00 per foot		$ 7,800.00

(b) Labor and supervision:

The company will hire the following personnel for a period of 1 to 2 months:		
One geologist (1-1/2 months)	$885.00	
Consulting engineer-geologist (10 days)	500.00	
Labor and supervision		1,385.00

(c) Operating materials and supplies:

Fuel for truck and jeep	$105.00	
Core boxes	250.00	
Miscellaneous	75.00	
Operating materials and supplies		$ 430.00

(d) Operating equipment

Rental on 1/2-ton truck, jeep and trailer (1 month)		400.00

(e) Miscellaneous:

Analytical work (approximately 30 combination U_3O_8 and V_2O_5 at $5.00 each	$150.00	
Accounting	25.00	
Workman's Compensation Insurance etc.	60.00	
Equipment insurance and liability	20.00	
Miscellaneous		255.00

(f) Contingencies (bulldozing, etc.)

Approximately 5 percent of total $10,270.00	513.00
Total cost of project	$10,783.00
Total cost per foot for 2,600 feet of drilling	$4.147
Government participation--75 percent	$8,087.25

All core will be retained in standard core boxes until suitable geologic logs can be prepared. Core showing uranium or vanadium mineralization will be split, half of which will be assayed and half will be retained for permanent record. Logs and assay information will be submitted to the Government by the operator.

Summary of Costs

Independent contracts	$ 7,800.00
Labor and supervision	1,385.00
Operating materials and supplies	430.00
Operating equipment	400.00
Miscellaneous	255.00
Contingencies	513.00
Total cost	$10,783.00
Total cost per foot for 4,000 feet of core drilling	$4.147
Government participation--75 percent	$8,087.25

CONCLUSIONS

The U V claims are between two groups of claims from which about 30 tons of ore was produced from a limited amount of work on surface exposures. It is believed that a few preliminary core drill holes located on the applicant's claims between these deposits may encounter favorable formations or perhaps traces of mineralization which will be of aid in preparing a more extensive program of exploration. Although the known uranium occurrences in the Rifle area are small and comparatively insignificant, additional exploration may result in the discovery of more important and worthwhile deposits; therefore, a limited amount of core drilling with Government participation is believed justified on the U V and Elk Vam claims.

RECOMMENDATIONS

It is recommended that an exploration program be approved consisting of 16 core drill holes totaling approximately 2,600 feet of drilling. The recommended locations of the holes are indicated on figure 2 of this report. The total expenditure should not exceed $10,783.00, or $4.147 per foot of drilling. Government participation will amount to 75 percent or $8,087.25. A unit-cost short-form contract is suggested.

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Defense Minerals Exploration Administration
Denver Federal Center
Denver 2, Colorado

July 22, 1954

Memorandum

To: DMEA Field Team, Region IV

From: A. H. Koschmann

Subject: DMEA Docket 3360, Mid-Continent Uranium Corporation, UV and Elk Van claims, Rifle district, Garfield County, Colorado

Enclosed are 11 copies of a geologic report by R. P. Fischer of the U. S. Geological Survey covering the above docket.

It has been recommended that the application be approved even though the chances of finding significant reserves are not good. Fischer calculates that only 2,600 feet of drilling, rather than the 4,160 feet estimated by the applicant, is needed to test the ground. He recommends that the proposed drill holes be spaced and located in accordance with the application.

Also enclosed are 9 extra copies of the map accompanying this report.

A. H. Koschmann

A. H. Koschmann
Supervising Geologist
Colorado-Wyoming

Enclosures (11)

Reviewed by
DMEA OPERATING COMMITTEE
9-10-54
(date)

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
P. O. BOX 360
GRAND JUNCTION, COLO.

July 17, 1954

Memorandum

To: A. H. Koschmann, Field Team, Region IV

From: W. P. Williams

Subject: DMEA 3360, Mid-Continent Uranium Corp., UV and Elk Van claims, Rifle district, Garfield County, Colo. (Uranium)

Transmitted herewith are eleven copies of a geologic report on the subject application. The Mid-Continent Uranium Corp., applied for assistance to explore for uranium deposits in the Rifle district, Colorado, and the Thompson district, Utah. The proposed work consists mainly of diamond drilling at an estimated total cost of $160,000.

The geologic report transmitted herewith, covering the Rifle district portion of the application, was prepared by R. P. Fischer. A geologic report for the Thompson district portion of the application is being prepared by C. M. Mobley, and Mobley's report will be forwarded to you as soon as it is finished.

Fischer concludes that the proposed work in the Rifle district is well conceived as a "wildcat" exploration project, and he recommends that the application be approved even though he considers the chances of finding significant reserves not good. He calculates that only 2,600 feet of drilling, rather than the 4,160 feet estimated by the applicant, is needed to test the ground. Fischer recommends that the proposed drill holes be spaced and located in accordance with the application.

We are also sending herewith nine extra copies of the map accompanying Fischer's report.

WPWilliams

W. P. Williams
Geologist

WPW/mlr

Enclosures

Reviewed by
DMEA OPERATING COMMITTEE
9-10-54
(date)

UNITED STATES DEPARTMENT OF THE INTERIOR

DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION
REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA 3360, Mid-Continent Uranium Corp., UV and Elk Van claims, Rifle district, Garfield County, Colorado

Uranium

Geologic Report

by

R. P. Fischer
U. S. Geological Survey

July 17, 1954

Reviewed by
DMEA OPERATING COMMITTEE
9-10-54
(date)

DMEA 3360 (Uranium)

Mid-Continent Uranium Corp., UV and Elk Van claims,
Rifle district, Garfield County, Colorado

INTRODUCTION AND SUMMARY

The Mid-Continent Uranium Corporation applied (DMEA 3360) for assistance to explore two sections of land in the Thompson district, Utah, and 33 claims in the Rifle district, Colorado. This report deals only with the area in the Rifle district; the work applied for in Utah is treated in a separate report prepared by C. M. Mobley.

The 33 claims in the Rifle district consist of a group of 30 UV claims and three Elk Van claims. They are approximately 15 miles northeast of Rifle, Colo. (fig. 1).

A field examination of the UV and Elk Van claims was made on July 8, accompanied by R. R. McLellan, USBM, W. P. Williams, USGS, and N. E. Ebbley, representing the applicant.

In the Rifle area vanadium-uranium deposits occur in both the so-called Entrada sandstone and the Morrison formation. Although the deposits in the Entrada are large, they are too low in uranium to be mined as uranium ore under present conditions. All of the known deposits in the Morrison formation are small and the total production from these probably does not much exceed 200 tons; the uranium content of these deposits, however, is large enough for the ore to be sold as uranium ore.

The applicant proposed to drill 16 "preliminary holes", estimated to average 260 feet deep and to total 4,160 feet of drilling, at a total estimated cost of $17,500. The proposed holes are on 500-foot centers along a line through the UV group of claims. The objective of these preliminary holes is to test the Morrison formation for favorable ground that might contain deposits larger than those known in the Morrison in the area. From this standpoint the objective and plan of operation are well conceived for a "wildcat" exploration project, and it is recommended that the application be approved, even though the chances of finding deposits that would yield significant reserves are considered very slim. It is recommended that the holes be drilled at the sites proposed by the applicant. Drilling depths, however, are expected to be less than those estimated; probably only 2,600 feet of drilling will be needed in these holes. Cost estimates for this work will be included in the engineering report on this application.

GENERAL GEOLOGY

The following description of the geology of the Rifle area, as well as the accompanying map (fig. 1), is taken from a preliminary report by Fischer, Stokes, and Smith, "Geology of the Rifle Creek vanadium area, Garfield County, Utah", U. S. Geological Survey open-file report, 1945:

> Geology.--The area lies on part of the Grand Hogback monocline, a fold which flanks the White River Plateau uplift to the north and east and exposes rocks ranging from pre-Cambrian to Tertiary in age. The map shows the Jurassic formations, part of the underlying Triassic and overlying Cretaceous formations, and also Quaternary (?) landslides. The significant lithologic features, topographic expression, and variations in thickness of these rocks are summarized below.

Quaternary (?) landslides:

	Feet
Mostly Dakota (?) and Morrison rocks, in jumbled masses; form uneven topography. Map pattern superimposed on patterns showing bedrock geology.	0 - 250±

Upper Cretaceous:

Mancos shale.--Shale, gray to dark gray, thin-bedded with sandy and limy beds; forms valleys and minor scarps. Only basal part mapped. Total thickness. .	5,000
Dakota (?) sandstone.--Sandstone, light brown and light gray, fine- to coarse-grained, partly conglomeratic, with brown to dark-gray, carbonaceous shale in middle; sandstone mostly weathers dark, forms cliffs and dip slopes.	80

Upper Jurasic:

Morrison formation.-- Shale, predominantly green and gray but in part vari-colored, with thin lenticular sandstone, siltstone, and limestone beds.	350
Sandstone and shale, gray, lenticular, sandstone is partly conglomeratic; vanadium-bearing just east of sec. 25, T. 4 S., R. 92 S.	15 - 30
Shale, light red and purple, with thin, lenticular, bluish-gray partly recrystallized limestone in middle.	40 - 50
Sandstone, lenticular, medium-grained and greenish-gray or fine-grained and red or gray, interbedded with red, green, or gray shale; sandstones near the top are vanadium-bearing in places	70 - 80

Entire formation is poorly exposed, but the thicker sandstones and limestones form cliffs or poorly-defined scarps and dip slopes in places.

Feet

Entrada sandstone.--Upper unit: Sandstone, white to light gray, predominantly fine-grained but with large, well-rounded grains scattered through it; cross-bedded with curved planes that are not inclined in a common direction, soft and friable, weathering to rounded cliffs or steep slopes; ore-bearing at the Garfield mine and at places at the Rifle mine . . . . . 70 - 125

Lower unit: Sandstone, light brown, fine-grained, hard, with large-scale cross-bedding inclined southward; forms rough, nearly vertical cliff; contains the principal ore body in the Rifle mine. . . . . 30 - 75

The total thickness of the Entrada is fairly constant locally but decreases gradually eastward from 175 to 140 feet. Each unit alone, however, has a greater local range in thickness than do the two units combined, for the upper unit was deposited on a partly uneven, eroded surface of the lower unit, so that a local thickening of one is accompanied by a compensating thinning of the other. Only the upper unit resembles the Entrada of western Colorado and eastern Utah.

Triassic:

"Red Beds".--Red, fine-grained sandstone and shale, forming steep slopes; in places a thin zone at the top is altered to a limy, light-colored rock that is in part vanadium-bearing . . . . . 300±

The rocks in the area dip southward at moderately low angles, but this attitude is modified locally by faults and minor flexures. Some of the flexures probably are the surface expressions of underlying faults (see geologic structure map). Although some of the faults are steeply inclined, most are vertical, and all are projected vertically on the geologic structure map and the structure sections. Low-angle reverse faults, with displacements ranging from a small fraction of an inch to as much as a foot, are common in the massive sandstone beds, especially the Entrada. In the Rifle and Garfield mines, all of these faults dip southward, and for the most part follow the bedding planes or cut across the beds at small angles.

The competent sandstones are highly jointed. Most of the joints strike northeast, northwest, or east, and dip steeply to the north, but a few strike north. Few joints can be traced as much as a hundred feet along a single sandstone bed, and not many cross from one sandstone bed to another.

ORE DEPOSITS

The known vanadium-uranium deposits in the Rifle Creek area are in the so-called Entrada sandstone and the Morrison formation (see stratigraphic section above). Although the deposits in these two formations have some similar geologic characteristics, they are enough different to be described separately and they offer different exploration problems.

Deposits in the so-called Entrada sandstone are known only in the Rifle and Garfield mines. They consist of ore minerals impregnating massive sandstone and form tabular bodies of large size; in the Rifle mine the deposit has been mined continuously for more than 5,000 feet. Production from the Rifle and Garfield mine total more than 1/2 million tons of ore, the grade of which averaged about 2 percent V_2O_5 and less than 0.1 percent U_3O_8. Similar geologic and grade relationships characterize the Entrada deposits known in three areas on the west side of the San Juan Mountains in southwestern Colorado. Thus, it appears that the deposits in the Entrada sandstone are relatively large, but the ore is so low in average uranium content that it is not considered uranium ore under present conditions. The Rifle mine has a large tonnage of developed reserves which are not being mined at present because of their low uranium content.

Prospecting at the outcrop has resulted in the discovery of several deposits in the Morrison formation in the Rifle Creek area (fig. 1). A few other similar deposits in this formation are also known east and west of the area shown on the map. All of the known deposits are in sandstone and sandy shale beds and occur from 50 to 140 feet above the base of the formation. The ore minerals impregnate the rock and replace plant fossils. The deposits occur as poorly defined and partly discontinuous layers that range from a few inches to a couple feet in thickness. All of the known deposits are small and probably are not much more than 100 feet across. Within these deposits the "ore bodies" (masses of minable thickness and grade) are scattered without apparent system, are irregularly shaped, and are not more than a few yards across.

According to AEC records, ore produced from the Morrison formation in the Rifle Creek area from 1948 through April 1954 totals 109.22 tons, averaging 0.17 percent U_3O_8 and 1.7 percent V_2O_5. Production from the Morrison deposits in the Rifle Creek area during World War II probably did not exceed 100 tons; there is no recorded production prior to this war.

EXPLORATION REQUESTED BY THE APPLICANT

The application requests assistance for exploration in the Thompson district, Utah, and the Rifle district, Colorado. This report deals only with the work in Colorado; the work applied for in Utah is considered in a separate report by C. M. Mobley, USGS.

In the Rifle Creek area the application proposes to drill "16 preliminary holes", on approximately 500-foot centers, along a line through the UV claim group. Access roads and drill sites have already been prepared by the applicant; the approximate locations of the proposed drill holes are shown on a map accompanying the application.

The application proposes to drill 4 of the 16 holes through the Entrada sandstone, to test for deposits in that formation; presumably the other holes are intended to bottom at the base of the Morrison formation. Maximum hole depth is estimated to be 300 feet and average hole depth about 260 feet. Total estimated footage is 4,160 feet. Applicant's cost estimates are summarized below:

Drilling, 4,160 feet at $3.00 per foot	$12,480
Labor, supervision, consultants	2,200
Material and supplies	670
Equipment	630
Miscellaneous	475
Contingencies	1,045
	$17,500

The 16 holes proposed by the application are called "preliminary holes" and are intended to test for ground geologically favorable for ore. The application states: "Additional holes to be drilled, based upon the results of the initial holes, have not been shown. It is believed advisable to apply for additional DMEA aid only after the initial program as outlined is completed and the results are known".

During the field examination Ebbley further emphasized that the objective of the proposed drilling was solely for geologic information rather than ore-finding. If the drilling was successful in finding favorable ground, or even if mineralized material was cut by a hole, additional drilling would be necessary to demonstrate a minable deposit. This drilling could be financed either privately or by another DMEA application.

Ebbley also believes, as does the writer, that the deposits of the size and type known in the Morrison formation in the Rifle Creek area are not large enough to justify the proposed exploration. Rather, the proposed work can be considered worth undertaking only on the chance of finding favorable ground that might contain larger deposits than those known in the Morrison formation in the area.

CONCLUSIONS AND RECOMMENDATIONS

Prospecting

From the standpoint of the objectives stated in the application and by Ebbley during the field examination, the proposed work is well conceived as an exploration project, although admittedly it is of a "wildcat" character. Furthermore, the proposal to drill 16 "preliminary holes" for geologic information is somewhat contrary to the writer's experience with DMEA projects as it might be necessary to consider another DMEA application and prepare another contract, if favorable results are obtained from these 16 holes.

Because the known deposits in the Morrison formation in the Rifle Creek area are all small, and because no sandstone geologically favorable for larger deposits is exposed in the area, the writer believes that the chances are very slim of finding large deposits on the UV group of claims, or even finding ground favorable for large deposits. Nevertheless, because of the need of a local supply of uranium ore, the writer believes that the Government is justified in taking one "long shot" in this area, and for that reason it is recommended that a small amount of exploration be approved and that a contract be prepared to do the work. The Rifle mill of the U. S. Vanadium Company is almost solely dependent upon ore shipped more than 100 miles from southwestern Colorado and southeastern Utah. If a significant deposit of uranium ore could be found in the Rifle Creek area, not only would it materially help the ore supply problem of the mill, but the discovery would also encourage other exploration in the area. These factors must be considered almost the sole justification for this recommendation, for admittedly the chances for a significant discovery are considered very slim indeed.

It is recommended that the 16 holes proposed by the applicant be approved and drilled at the sites indicated in the application. Drilling depths estimated by the applicant, however, are thought to be in error, due to failure to realize that the so-called Entrada sandstone is probably as much as 140-150 feet thick in the vicinity of the UV claims, or approximately 100 feet thicker than figured by the applicant. Furthermore, it is recommended that only one hole instead of four be drilled through the so-called Entrada sandstone, as there is practically no chance of finding reserves of uranium ore in the Entrada. The one hole, however, is recommended to obtain geologic information and on the chance that it might find some vanadium ore of the type present at the Garfield and Rifle mines. The hole should be drilled on the UV No. 22 or UV No. 24 claim, at a site approximately 1,000 feet west or southwest of the Elk Van prospect. This hole will be 300-350 feet deep. The other 15 holes will probably range from about 75 to 200 feet deep, and will probably average about 150 feet deep. (Note: Because of poor exposures in the area of the claims, and because the topographic control used in compiling the accompanying map may not be very accurate, drilling depths can be considered only estimates. However, if a contract is prepared for the work as well as for some drilling in Utah, footage could be "borrowed" by contract amendment from the Utah work, if the present footage estimates are low.) The table below summarizes estimates of drilling depths:

15 holes, ranging from 75 to 200 feet deep, averaging 150 feet deep	2,250 feet
1 hole (on UV No. 22 or UV No. 24 claim) estimated maximum depth	350 feet
	2,600 feet

Cost estimates will be presented in the engineering report.

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Defense Minerals Exploration Administration
Denver Federal Center
Denver 2, Colorado

July 26, 1954

Memorandum

To: DMEA Field Team, Region IV

From: A. H. Koschmann

Subject: DMEA Docket 3360, Mid-Continent Uranium Corporation, Grand County, Utah

Enclosed are 11 copies of the geologic report by C. M. Mobley of the U. S. Geological Survey covering the above docket.

Mr. Mobley recommends that no exploration be approved in school section 2, T. 23 S., R. 22 E., S.L.M., because that section has been drilled by the U. S. Geological Survey with unfavorable results. He does recommend exploration in school section 2, T. 23 S., R. 21 E., S.L.M. Mr. Mobley's proposed program, which is acceptable to the applicant, consists of 4 stages with a maximum of 170 core-drill holes totaling 38,200 feet of drilling. Exploration under stage 2, 3, and 4 must be approved by the Government prior to inauguration of work under those stages.

Also enclosed are 9 extra copies of the maps accompanying the report.

E. M. Hawkmann
for A. H. Koschmann
Supervising Geologist
Colorado-Wyoming

Enclosures (38)

Reviewed by
DMEA OPERATING COMMITTEE
9-10-54
(date)

IN REPLY REFER TO:

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

July 23, 1954

Memorandum

To: A. H. Koschmann, Field Team, Region IV

From: W. P. Williams

Subject: DMEA 3360, Mid-Continent Uranium Corp., School sections (sec. 2, T. 23 S., R. 21 E., and sec. 2, T. 23 S., R. 23 E., S.L.M.,) Yellow Cat area, Thompson district, Grand County, Utah

Transmitted herewith are eleven copies of the geologic report prepared by C. M. Mobley, covering the subject property. This report covers the Yellow Cat portion of the application in the Thompson district. Another area in the Rifle district, in the same application, was described in a report by R. P. Fischer, which was transmitted to you on July 17, 1954.

Mobley's report covers two school sections. No exploration is recommended in sec. 2, T. 23 S., R. 22 E., S.L.M., because that section has already been drilled by the U. S. Geological Survey. A drilling program modified from the applicant's proposal is recommended in the other school section, sec. 2, T. 23 S., R. 21 E., S.L.M. This section lies about 1-1/2 miles west of the major producing area in the Thompson district. Mobley's proposed program consists of a maximum of 170 core-drill holes totaling 38,200 feet of drilling.

We are also enclosing nine extra copies of the maps accompanying the report.

/s/ W. P. Williams

W. P. Williams
Geologist

WPW/mlr

Enclosures

Reviewed by
DMEA OPERATING COMMITTEE
9-10-54
(date)

UNITED STATES DEPARTMENT OF THE INTERIOR

DOUGLAS McKAY, SECRETARY

DEFENSE MINERALS EXPLORATION ADMINISTRATION
REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMEA 3360, Mid-Continent Uranium Corp., School sections (sec. 2, T. 23 S., R. 21 E., and sec. 2, T. 23 S., R. 22 E., S.L.M.,) Yellow Cat area, Thompson district, Grand County, Utah

Uranium

Geologic Report

by

C. M. Mobley
U. S. Geological Survey

July 22, 1954

Reviewed by
DMEA OPERATING COMMITTEE
9-10-54
(date)

DMEA 3360

INTRODUCTION AND SUMMARY

Mid-Continent Uranium Corp., of Grand Junction, Colorado, have applied (DMEA 3360) to the Defense Minerals Exploration Administration for a loan to explore for uranium. This report covers two school sections (sec. 2, T. 23 S., R. 21 E., and sec. 2, T. 23 S., R. 22 E., Salt Lake meridian) in the Yellow Cat area, Thompson district, Grand County, Utah (fig. 1). The proposed exploration for 400 drill holes was estimated to cost $142,500.00.

The two school sections were examined on July 7, 1954, in company with R. R. McLellan and R. T. Forest, engineers, U. S. Bureau of Mines, W. P. Williams, and E. S. Santos, geologists, U. S. Geological Survey, and N. E. Ebbley, representative for Mid-Continent Uranium Corp.

The uranium deposits in the Yellow Cat area occur through a stratigraphic interval of about 250 feet in the sandstone beds of the Salt Wash member of the Jurassic Morrison formation.

School sec. 2, T. 23 S., R. 22 E., S.L.M., has been tested by U. S. Geological Survey drilling. It is recommended that the Government not enter into a contract with the applicant to do the proposed exploration in that section.

Four stages of exploration drilling are recommended in school sec. 2, T. 23 S., R. 21 E., S.L.M. This section lies about 1 1/2 miles west of the major producing area in the Thompson district.

These recommendations were agreed upon by R. R. McLellan and are acceptable to N. E. Ebbley.

GEOLOGY

The exposed rocks in the Yellow Cat area range from the Jurassic Entrada formation to the Cretaceous Dakota formation and consist of exposures of the Jurassic Summerville formation, the Salt Wash and the Brushy Basin members of the Jurassic Morrison formation, and the Cretaceous Burro Canyon formation.

The Salt Wash member in sec. 2, T. 23 S., R. 22 E., S.L.M., is about 150-feet thick and consists of two or more light-red to light-gray discontinuous sandstone beds, which are from a few feet to more than 30 feet in thickness. The beds are separated by red-brown mudstone and reddish, thin interbedded layers of sandstone and siltstone. The gray-green mudstone present under some of the sandstone beds is from a few inches to more than 5 feet in thickness. The exposed rocks strike about N. 45° W. and dip about 4° NE.

The Salt Wash member in sec. 2, T. 23 S., R. 21 E., S.L.M., is about 250 feet thick and consists of four or more light-red to light-gray discontinuous sandstone beds, which are from a few feet to more than 60 feet in thickness. The beds are separated by red-brown mudstone and reddish, thin interbedded layers of sandstone and siltstone. The gray-green mudstone present under some of the s andstone beds is from a few inches to more than 10 feet in thickness. The exposed rocks strike about N. 37° E., and dip about 3° NW.

ORE DEPOSITS

Ore deposits in the Yellow Cat area occur in most of the thicker sandstone beds through a stratigraphic interval of about 250 feet. These sandstone beds are called the "ore-bearing sandstone". The larger deposits usually occur in the lower 125 feet of the Salt Wash member. Carbonaceous material is nearly always found associated within or near the deposits. The thicker ore-bearing sandstones are usually underlain and overlain with gray-green mudstone. The combined thickness of the gray-green mudstone above and below the ore-bearing sandstone ranges from a film to more than 20 feet. The areas of gray mudstone are several times larger in plan view than the associated mineralized rock and offer more sizable "targets" in delineating favorable ground.

Table 1 shows the geologic criteria used by the Geological Survey to determine favorable, semi-favorable, and unfavorable ground in the Yellow Cat area.

The ore deposits range in size from thin irregular layers less than 5 feet wide and 15 feet long to more than 200 feet wide and 1,400 feet long in which ore ranges through a vertical interval of more than 16 feet and averages about 3 feet in thickness. The deposits range from a few tons to several thousand tons.

Nearly all of the larger deposits are located about 1-1/2 miles east of sec. 2, T. 23 S., R. 21 E., S.L.M. and about 4 miles west of sec. 2, T. 23 S., R. 22 E., S.L.M. There are no mines or prospects on the applicant's property.

Table 1. Geologic criteria used to determine favorable, semi-favorable, and unfavorable ground in the Yellow Cat area, Thompson district, Grand County, Utah

I. Thickness of ore-bearing sandstone (exclusive of mudstone lenses).

Rating	Thickness (in feet)
8	40 or more
6	30 to 40
4	20 to 30
2	10 to 20
0	0 to 10

II. Combined thickness of gray mudstone at top and base of ore-bearing sandstone.

Rating	Thickness (in feet)
8	13 or more
6	9 to 13
4	5 to 9
2	1 to 5
0	0 to 1

III. Carbonaceous material within the ore-bearing sandstone.

Rating	
2	Present
0	None

Rating	
9 to 18	Favorable
5 to 9	Semi-favorable
0 to 5	Unfavorable

PREVIOUS EXPLORATION

Since October 1951 the U. S. Geological Survey, on behalf of the Atomic Energy Commission, has conducted an exploration drilling program in the Yellow Cat area to search for uranium deposits.

In sec. 2, T. 23 S., R. 22 E., S.L.M., the U. S. Geological Survey completed 19 wagon-drill holes (fig. 2). In sec. 2, T. 23 S., R. 21 E., S. L. M., two widely spaced diamond-drill holes were completed (fig. 3). None of these holes cut favorable ground or mineralized ground.

PROPOSED EXPLORATION

The applicant proposed the following plan of exploration.

School sec. 2, T. 23 S., R. 21 E., S. L. M.

Phase I: Three fences of 16 holes each on about 200-foot centers.

Phase II: One hundred and two holes on a staggered grid pattern on about 300-foot centers.

A total of 150 holes averaging 200 feet in depth.

School sec. 2, T. 23 S., R. 22 E., S.L.M.

Approximately 150 holes on a staggered grid pattern on about 300-foot centers. Average depth of about 130 feet.

About 1/3 of the above footage would be cored and the remainder plugged with an air drill. An additional 100 holes averaging 150 feet in depth were proposed to outline and sample ore bodies found by the previous drilling.

A total of 400 drill holes estimated to cost $112,500.00 was proposed by the applicant. Labor, supervision, material, and supplies were estimated to cost $30,000.00. The total cost of the project was estimated to be $142,500.00.

RECOMMENDED EXPLORATION

School sec. 2, T. 23 S., R. 21 E., S. L.M.

Four stages of drilling are recommended; each following stage to be authorized only after the results of the preceding stage have been evaluated.

Stage I: Two fences of 15 holes each spaced on 200-foot centers (fig.3).

Stage II: One fence of 15 holes, spaced on 200-foot centers, between the two fences drilled in stage I.

Stage III: Seventy-five holes on moderate-spaced centers (about 300 feet) in favorable ground found by stages I and II to search for deposits.

Stage IV: Fifty holes for additional moderate-spaced drilling and close-spaced drilling to outline roughly the deposits.

All holes will average about 225 feet in depth. A maximum of 170 holes, totalling 38,250 feet, are recommended.

It is recommended that the applicant use the geologic criteria established by the U. S. Geological Survey (table 1) to determine favorable, semi-favorable, and unfavorable ground.

School sec. 2, T. 23 S., R. 22 E., S.L.M.

No exploration is recommended for this section. The ground underlain by the ore-bearing sandstone has been tested by the Geological Survey. No favorable ground or mineralized ground was found by this drilling (fig. 2).

CONCLUSIONS AND RECOMMENDATIONS

Mid-Continent Uranium Corp. proposed exploration in two school sections (sec. 2, T. 23 S., R. 21 E., and sec. 2, T. 23 S., R. 22 E., S.L.M.) in the Yellow Cat area, Thompson district, Grand County, Utah. A total of 400 drill holes estimated to cost $142,500.00 was proposed.

Nearly all of the large uranium deposits in the Yellow Cat area occur in the thicker sandstone beds, in the lower 125 feet of the Salt Wash member of the Jurassic Morrison formation. These beds are called the ore-bearing sandstone.

The U. S. Geological Survey drilled 19 holes on sec. 2, T. 23 S., R. 22 E., S.L.M. None of the holes cut favorable or mineralized ground. No additional drilling is recommended for this section.

The Geological Survey drilled two widely spaced holes on sec. 2, T. 23 S., R. 21 E., S.L.M. These holes were barren and in unfavorable ground. This section lies about 1-1/2 miles west of the larger deposits in the Yellow Cat area. Four stages of drilling are recommended for this section; each following stage of drilling to be authorized only after the results of the preceding stages have been evaluated. The geologic criteria established by the Geological Survey to determine favorable, semi-favorable, and unfavorable ground is recommended to be used by the applicant. The plan of drilling was agreed upon by R. R. McLellan and was acceptable to N. E. Ebbley, representative for the applicant.

(3rd. Copy of Four)
To Field Team

REGISTERED PROFESSIONAL ENGINEER
STATE OF COLORADO

P. O. BOX 883
GRAND JUNCTION, COLO.

NORMAN E. EBBLEY
MINING GEOLOGIST

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
Denver, Colorado
JUL 21 1954
JUL 23 1954

~~DMEA-3360~~
DMEA-3490

May 24, 1954

The Defense Minerals Exploration Administration,
Department of the Interior,
Washington 25, D. C.

Gentlemen:

Attached is an application in quadruplicate for financial assistance for an exploration project to determine the uranium potential of two separate properties.

As part of the application there is attached copies of two reports covering these properties. It has been necessary to make certain changes and additions to the reports to conform to the scope of DMEA Order 1. Directly following this letter is a brief outline of these changes.

The application is for $100,000 to be expended on an exploration project - the applicant contributing 25 per cent of this amount.

Yours very truly,

Mid-Continent Uranium Corporation

Norman E. Ebbley

Director

Amendments to the Attached Reports

Thompsons' District, Grand County, Utah Report

The proposed exploration project is to be confined to the two Utah State School Sections. The remainder of the property discussed in the report (19 mining claims) is relatively shallow ground and will be drilled shortly under an assessment work program. The 19 claims are not considered as part of the area to be explored under the DMEA exploration project.

Additional study of the two School sections since the report was prepared has indicated the advisability of revising the original drilling program slightly. Separate maps outlining the proposed pattern of holes are included, as well as a separate detailed cost estimate of the work involved.

Other than these changes the report is complete in containing such information as: applicant's property rights, physical description, accessibility, past production, geologic features, maps and sketches, etc.

UV-Group of Uranium Claims Report

The exploration project as outlined on page 11 of the DMEA Application is somewhat changed from the Recommended Exploration Program as discussed in the report. The program and cost estimates have been revised to conform to MF-103.

The two Allen claims, discussed under Property and Ownership page 8 in the report covering this property, were later dropped and are not included in the area to be explored under the proposed DMEA exploration project. The 30 UV claims and the three Elk Van claims are now owned outright by the applicant.

A map separate from those in the report is attached showing the proposed pattern of holes. A revised detailed cost estimate of the work involved is also attached.

* * * * * * * * *

Please note for convenience and brevity the photostats of the Utah State Leases omit portions of the standard Articles where there have been no changes or entries.

COPY

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

Defense Minerals Administration
Form Approved.
Budget Bureau No. 42-R1035.2.

MAY 21 1954

APPLICATION FOR AID IN AN EXPLORATION PROJECT, PURSUANT TO DMEA ORDER 1, UNDER THE DEFENSE PRODUCTION ACT OF 1950, AS AMENDED

Not to be filled in by applicant

Docket No. ~~3360~~ 3490
Metal or Mineral Uranium
Date Received
Estimated Cost $10,810
Participation (Government %)

INSTRUCTIONS

1. *Name of applicant.*—(*a*) State here your full legal name, in the form in which you will wish to contract, and your mailing address:

Mid-Continent Uranium Corporation
Box 283
Grand Junction, Colorado

(*b*) If other than an individual, add to your name above whether a corporation, partnership, etc., and the name of the State in which incorporated or otherwise organized.

(*c*) If a corporation, add to above statement, titles, names and addresses of officers.

(*d*) If a partnership, add to the above statement the names and addresses of all partners.

2. *General.*—Read DMEA Order 1, "Government Aid in Defense Exploration Projects," before completing this application. Submit this application and all accompanying papers in quadruplicate (four copies), with your name and address on each sheet of the application and on all accompanying papers. Where sufficient space is not provided on the form for all required information, state it on an accompanying paper, with a reference in each case to the instruction to which it refers by number. Comply with all applicable instructions; or, if not applicable, so state. File the application with Defense Minerals Exploration Administration, Department of the Interior, Washington 25, D. C., or with the nearest field executive officer thereof.

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract

Refer to attached sheet, page 1.

(*b*) State any mine name by which the property is known. Refer to attached sheet, page 1.

(*c*) State your interest in the land, whether owner, lessee, purchaser under contract, or otherwise

Refer to attached sheet, page 1.

(*d*) If you are not the owner, submit with this application a copy of the lease, contract, or other document under which you control the property. Photostats of Utah State leases attached.

(*e*) If you own the land, describe any liens or encumbrances on it Land in Colorado owned outright by Applicant. Utah State leases draw 12½ % royalty to the state.

(*f*) If the land consists of unpatented claims, add to the description above, the book and page numbers for each recorded location notice. Refer to attached sheet, page 1.

4. *Physical description.*—(*a*) Describe in detail any mining or exploration operations which have been or now are being conducted upon the land, including existing mine workings and production facilities. State your interest, if any, in such operations. Also describe accessibility of mine workings for examination purposes. Answered in detail in the two reports attached.

(*b*) State past and current production, and ore reserves, if any, giving quantities and grades. Ditto.

(*c*) Describe the geologic features of the property, including mineralization, type of deposit (vein, bedded, etc.), and your reasons for wishing to explore. Illustrate with maps or sketches. Send with your application (but not necessarily as a part of it) any geologic or engineering report, assay maps, or other technologic information you may have, indicating on each whether you require its return to you. Answered in detail in attached two reports.

(*d*) State the facts with respect to the accessibility of the project: Access roads, distances to shipping, supply and residence points. Ditto.

(*e*) State the availability of manpower, materials, supplies, equipment, water, and power.

Ditto.

16—66551-1

5. *The exploration project.*—(*a*) State the mineral or minerals for which you wish to explore Uranium

(*b*) Describe fully the proposed work, including a map or sketch of the property showing a plan (and cross sections if needed) of any present mine workings, and the location of the proposed exploration work as related to such features as contacts, veins, ore-bearing beds, etc. Answered in detail in attached reports, and revised program and cost estimates.

(*c*) The work will start within 30 days and be completed within 4 months from the date of an exploration project contract.

(*d*) State the operating experience and background of the applicant with relation to the ability to carry out such exploration project, and also that of the person or persons who will supervise the operations. Refer to attached sheet, page 2.

6. *Estimate of costs.*—Furnish a detailed estimate of the costs of the proposed work (you will have to use a separate sheet), under the following headings. Add the totals under all headings to give the estimated total cost of the project: See page 2

(*a*) *Independent contracts.*—(Note.—If the applicant does not intend to let any of the work to contractors, write "none" after this item. To the extent that the work is to be contracted, do not repeat the cost of the contract-work in subsequent items.) State the cost of any proposed independent contracts for the performance of all or any part of the work, expressed in terms of units of work (such as per foot of drilling, per foot of drifting, per hour of bulldozer operations, per cubic yard of material moved, etc.).

(*b*) *Labor, supervision, consultants.*—Include an itemized schedule of numbers, classes and rates of wages, salaries or fees for necessary labor, supervision and engineering and geological consultants.

(*c*) *Operating materials and supplies.*—Furnish an itemized list, including items of equipment costing less than $50 each, and power, water and fuel.

(*d*) *Operating equipment.*—Furnish an itemized list of any operating equipment to be rented, purchased, or which is owned and will be furnished by the Operator, with the estimated rental, purchase price, or suggested use-allowance based on present value, as the case may be.

(*e*) *Rehabilitation and repairs.*—Furnish a detailed list showing the cost of any necessary initial rehabilitation or repairs of existing buildings, installations, fixtures, and movable operating equipment, now owned by the Operator and which will be devoted to the exploration project.

(*f*) *New buildings, improvements, installations.*—Furnish a detailed list showing the cost of any necessary buildings, fixed improvements, or installations to be purchased, installed or constructed for the benefit of the exploration project.

(*g*) *Miscellaneous.*—Furnish a detailed list showing the cost of repairs to and maintenance of operating equipment (not including initial rehabilitation or repairs of the Operator's equipment), analytical work, accounting, workmen's compensation and employers' liability insurance, and payroll taxes.

(*h*) *Contingencies.*—Give an estimate of any necessary allowances for contingencies not included in the costs stated above.

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

7. (*a*) Are you prepared to furnish your share of the cost of the proposed project in accordance with the regulations on Government participation (Sec. 7, DMEA No. 1)? Yes.

(*b*) How do you propose to furnish your share of the costs?

[X] Money [ ] Use of equipment owned by you [ ] Other

Explain in detail on acompanying paper.

CERTIFICATION

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

Dated May 20, 1954

Mid-Continent Uranium Corporation
(Applicant)

By Norman E. Bailey
Director

Title 18, U. S. Code (Crimes), Section 1001, makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

U. S. GOVERNMENT PRINTING OFFICE 16—66551-1

3. Applicant's property rights:

(a)

All of Section 2, Township 23 South, Range 21 East, Salt Lake Meridian,
All of Section 2, Township 23 South, Range 22 East, Salt Lake Veridian,
both sections in Grand County, Utah.

Thirty-three (33) contiguous mining claims located in Sections 29, 30, 31, and 32, Township 4 South, Range 91 West, Garfield County, Colorado.

(b)

There is no name conected with the two Utah State School Sections.
The property in Colorado is now known as the UV-Group. (Includes 30 UV claims and three Elk Van claims.

(c)

The two School Sections in Utah are leased from the State at 12½ percent royalty.
The property described in Colorado in owned by the above corporation.

(f)

UV-Group, Garfield County, Colorado:

Claim	Book	Page
UV-1	275	3
UV-2	275	5
UV-3	275	6
UV-4	275	7
UV-5	275	8
UV-6	275	9
UV-7	275	10
UV-8	275	11
UV-9	275	12
UV-10	275	13
UV-11	275	14
UV-12	275	15
UV-13	275	16
UV-14	275	17
UV-15	275	18
UV-16	275	19
UV-17	275	20
UV-18	275	21
UV-19	275	22
UV-20	275	23
UV-21	275	24
UV-22	275	25
UV-23	275	26
UV-24	275	27
UV-25	275	28
UV-26	275	29
UV-27	275	30
UV-28	275	31
UV-29	275	32
UV-30	275	33
Elk Van-1	205	516
Elk Van-2	205	516
Elk Van T.-2	205	517

Assessment work has been completed on all of the above claims for the fiscal year ending June 30, 1954.

COPY

5. The exploration project:

(d)
Directly following are resumes of the operating experiences and background of the applicants. The applicants who will be in charge of the exploration project as well as supervise the development and mining operations are:

R. E. Williams, and
Norman Ebbley

COPY

NORMAN EBBLEY
Box 883
Grand Junction, Colo.

EXPERIENCE RECORD

January 1953 to the present time:

Consulting Engineer for the Uranium Ore Producers Association, an organization of the independent operators in the uranium-vanadium fields in Colorado, Arizona, Utah, New Mexico, and South Dakota. This work consisted mainly of examination and mining consulting.

October 1951 to January 1953:

General Manager of the Skidmore Mining Company. This organization mined uranium-vanadium ore in the Colorado Plateau area. During this period the production rate was increased from an average of 200 tons to an excess of 1,000 tons per month. The General Manager was directly responsible for all phases of the operation and had from 30 to 35 men working under him. In addition he was responsible for all examination and exploration work on properties under lease or option to purchase by the Skidmore Mining Company.

March 1949 to October 1951:

General Manager of the Camp Bird Mine (for King Lease, Inc.) at Ouray, Colorado. The operation consisted of breaking between 250 and 300 tons per day in mining lead, zinc, copper, silver, and gold ore. The mining method installed was a combination of shrinkage stopes and mechanical loading from draw points. The mine operated a 150-ton per day concentrator. The manager was directly responsible for all phases of the underground and milling operations. Both phases of the operation employed from 60 to 100 men.

November 1947 to March 1949:

Mining Engineer for the U. S. Geological Survey in charge of Exploration on the Colorado Plateau Project. Responsible for all phases of the diamond drilling exploration and prepared estimates of ore reserves based on drilling and sampling data and prepared technical reports covering the project. Supervised subordinate professional, clerical and sub-professional personnel and worked without assistance in certain assignments of specialized scientific and technical difficulty. Rating P-5.

March 1942 to July 1947:

Various duties of a Bureau of Mines project engineer. Sampling of old properties, investigation of old mine shafts in the Leadville, Colorado, area, supervision of diamond and churn drilling operation, retimbering and maintenance of Leadville Drainage Tunnel, report writing and mapping. Four years in Alaska and two and one-half in Colorado with U. S. Bureau of Mines. P-4 rating.

November 1938 to March 1942:

Geologist, mining engineer, and construction foreman for the various properties owned and operated by the Day Mines Inc., Wallace, Idaho. In charge of general outside construction work, road construction, sewer line construction, building construction, etc. In charge of diamond drill procedure, underground mapping and geology.

June 1937 to November 1938: (Overlap job)

Acquired leases on various mining properties and subleting to other operators in Shoshone County, Idaho. In full charge of all operations.

Sept. 1936 to November 1937: (Overlap job)

Had mining drift contract for 3,000 feet of tunnel and drift from the Callahan Lead Zinc Company on their Vulcan Tunnel job at Wallace, Idaho. Own supervisor of the contract.

June 1936 to Sept. 1936: (Overlap job)

Engineer in charge of drilling and estimating on placer gold prospects at Wallace, Idaho, for the Days Mines Inc.

1936 to 1938: (Overlap job)

Shoshone County Engineer (elective job). Not much activity so carried this work along with my other work.

March 1934 to June 1936:

Mining Engineer and geologist for the Nabesna Gold Mining Company in Alaska. Also did the diamond drill work at the mine as well as part time mine shifter.

November 1933 to March 1934:

Flood control engineer surveying and estimating flood damage in Shoshone County, Idaho.

1930 to 1933:

During the summers of this period worked in the placer field in Alaska. Work consisted of churn-drilling, estimating and common laborer. Finished college spring of 1933. During these years I served at times as a qualified black-smith, electric-arc and acetylene welder, explosive engineer, bulldozer and shovel operator.

ROBERT E. WILLIAMS
Norwood, Colorado.
Born March 12, 1913

EXPERIENCE RECORD

November 1953 to the present time:

General manager for the Four Corners Uranium Corporation, in charge of the McKee properties in the Bull Canyon area. This operation is at present producing approximately 1,000 tons of uranium ore per month. A drilling exploration program is being carried out; the first contract being for 130,000 feet.

January 1951 to November 1953:

Manager in charge of the McKee uranium mines under a leasing program.

1948 through 1950:

Operated a sawmill in the Norwood area for self.

1947 to first of 1948:

Operated the Columbus Mine in Silverton, Colorado under lease. Lead, zinc, silver, gold, copper property.

1945 through 1946:

Operated sawmill in the Norwood area for self.

1937 through 1944:

Worked for the Telluride Mines Company as shift boss.

Year 1936:

Leased from the Golden Cycle Corporation at Cripple Creek, Colo.

Year 1935:

Leased at the Smuggler-Union Mine at Telluride, Colorado.

Year 1934:

Contract mining at the Pride of the West Mine at Silverton, Colo.

1932 and 1933:

Leased from the Telluride Mines Company, at Telluride, Colo.

COPY

LEW D. WILLIAMS
Norwood, Colorado.

EXPERIENCE RECORD

1919 to 1932:

First staked and mined uranium-vanadium claims in 1919. Mined intermittently along with ranching and sawmill work until 1932.

1932 to 1936:

Elected County Commissioner in 1932, Montrose County. Was in charge of road construction in western Montrose County. Built State Highway 141 from Uravan north to Mesa County line, as well as many of the mine roads in Montrose County.

1936 to present:

Staked and purchased uranium mining claims in the Bull Canyon area in 1936 and have operated these properties until the present time.

Elected to State Senate in 1938, and have held this post until the present.

President of the Farmers Water Development Company 1933 to 1953.

Director of the National Farm Loan Association, 1928 to 1954.

Director of the Southwestern Water Conservation Board, 1942 to present.

At the present son Roger Williams operates the applicants ranching interests, while the applicant is confining his activities entirely to uranium mining.

COPY

STEPHEN L. R. McNICHOLS
728 Symes Building
Denver 2, Colorado

EXPERIENCE RECORD

This applicant has been actively engaged in uranium mining for the past several years in the Bull Canyon Mining District in San Miguel and Montrose Counties, Colorado.

The applicant has also been representing, as legal counsel, in excess of 350 uranium producers for a period of three years and is entirely familiar with mining production and the economic problems connected with the uranium industry.

COPY

6. Estimates of Cost:

As indicated in the attached letter of transmittal and Amended Report the recommended exploration program and cost estimates as outlined in the two reports (refer to the attached Thompsons Area Report and the UV-Group of Uraniun Claims Report) have been revised to conform to the scope of DMEA Order 1, Application for Aid in an Exploration Project.

The following estimates of drilling and other costs on the two properties are based upon what is considered sufficient concentration of holes to determine the presence of favorable ore bearing sandstones and probable ore bodies, endeavoring to "not go beyond a reasonable delineation and sampling of the ore."

The pattern of holes does not appear excessive when it is considered that the USGS has a concentration of 1,000 holes in an area of less than two square miles; the center of this area being approximately 1½ miles east of Sec. 2, T. 23 S., R. 21 E., SLM, and located between the two School Sections under consideration for this proposed DMEA drilling project.

The following estimates are based upon a total of 300 initial holes for the two School Sections which contain a total of 1,062.8 acres, or about 1.66 square miles.

Thompsons Area (Two School Sections)

(a) Independent Contracts:
It is contemplated to do all phases of the drilling under contract, includes equipment, labor, water, power, fuel, etc., on a per foot basis.

Sec. 2, T. 23 S., R. 21 E., SLM
Phase 1 - Three fences totalling 48 holes, av. depth 200 ft.

Phase 2 - Staggered grid, 102 holes, av. depth 200 ft.

Total 150 holes, 30,000 ft. @ $2.00 av. per ft.* $60,000.00

* It is estimated that 1/3 of the footage will be cored at a cost of $3.00 per ft. The remaining footage will be air-blast rotary hole at $1.50 per ft. Total $60,000.

Sec. 2, T. 23 S., R. 22 E., SLM
Approx. 150 holes, staggered grid pattern, av. depth 130 ft. Total 20,000 ft. (19,500) @ $1.50 per ft. ** 30,000.00

**It is estimated that 1/3 of the footage will be cored at a cost of $2.50 per ft. The remaining footage will be air-blast rotary hole at $1.06 per foot. Total $30,000.

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6. (a) Continued:

Both Sections Additional Drilling
After the initial holes as outlined above have been drilled it is estimated that an additional 100 holes averaging 150 feet in depth will have to be drilled as further exploratory holes under the classification of "reasonable delineation" to roughly outline and sample expected ore bodies:

15,000 ft. of air-blast rotary hole @ $1.50 per ft.	$22,500.00

Total Contract Drilling Thompsons Area $112,500.00

(b) Labor, supervision, consultants:

It is estimatedthat the above listed drilling can be accomplished within 70 working days, utilizing 6 drilling units. Additional full time labor (not included in (a) above) would consist of two samplers and one geologist. In addition an engineer-geologist consultant would work part time in an advisory capacity and aid in the final analysis and report on the program:

Two samplers (3 months @ $375.00 per month)	2,250.00
One geologist (4 months, includes final report)	2,000.00
Expenses for above 3 men ($5.00/day/man)	1,350.00
Consultant, total 30 days	1,500.00
Transportation (travel) costs for total (b) above	500.00

(c) Operating material and supplies:

Fuel for ½-ton truck and jeep	380.00
Core boxes	1,500.00
Misc. drafting, office, and report supplies	100.00

(d) Operating equipment:

One ½-ton pickup truck	2,100.00
One universal jeep	1,850.00
One radiation counter and probe	500.00
Combination supply and office trailor	1,200.00

(e) Rehabilitation and repairs: None

(f) New building, improvements, installation: None

(g) Contingencies: Next page.

(h) Miscellaneous: Next page.

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(Miscellaneous continued)

Analytical work	$2,000.00
Accounting	300.00
Workmen's Comp., Ins., Payroll tax, etc., (5% Approx.)	250.00
Equipment Ins. and liability	50.00

(h) Contingencies:

Approx. 9.5 % of total ($12,381.35), use	12,170.00
Estimated cost of Thompsons Area Phase	$142,500.00

Estimated undepreciated value of disposable equipment at end of this phase of program based on 36 months life is $5,000.00

UV-Group, West Elk Creek Area.

This phase of the program to follow the Thompson's drilling. Please refer to UV-Group Report under "Recommended Exploration Program" pages 16-18. These estimates have been revised to conform to MF-103. It is contemplated to do all phases of the drilling under contract. The drill roads and drill sites have already been constructed as assessment work for fiscal year ending June 30, 1954. The drill sites have been established as near as possible on 500-foot centers rather than as originally shown on 1,000-foot centers.

Recent surveys (since the snow has left the area) indicate that the average depth to the base of the Entrada sandstone is from 250 to 300 feet, It is suggested that if 25 percent of the holes drilled had the base of the Entrada as their target then the average depth of all holes would be approximately 260 feet.

(a) Independent contracts:

The 16 preliminary holes as indicated would total 4,160 feet @ $3.00 per foot coring	12,480.00

Additional holes to be drilled based upon the results of the initial holes have not been shown. It is believed advisable to apply for additional DMEA aid only after the initial program as outlined is completed and the results are known.

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(b) Labor, supervision, consultants:

It is estimated that the above listed drilling can be accomplished within 25 working days utilizing 2 drilling units. Additional full time labor (not included in (a) above) would consist of one geologist and one sampler. A consultant engineer-geologist would work part time in an advisory capacity and aid in the final analysis and report on the program:

One sampler (1 month)	$375.00
One geologist (1½ month, includes final report)	750.00
Expenses for above 2 men ($5.00/day/man)	375.00
Consultant, total 10 days	500.00
Transportation (travel) for total (b) above	200.00

(c) Operating material and supplies:

Fuel for truck and jeep	95.00
Core boxes	500.00
Misc. drafting, office, and report supplies	75.00

(d) Operating equipment:

Depreciation on ½-ton truck, jeep and supply trailor from Thompson's program, 1 month	630.00

(e) & (f) None.

(g) Miscellaneous:

Analytical work	300.00
Accounting	100.00
Workmen's Comp., Ins., payroll taxes, etc. (5% approx.)	60.00
Equipment Ins. and liability	15.00

(h) Contingencies:

Approx. 6.5 % of total ($1,069.57), use	1,045.00
Estimated Cost of UV-Group Area Phase	$17,500.00

Estimated undepreciated value of disposable equipment at end of this phase of program based on 36 month life is $4,400.00.

Total of both the Thompson's Area and the UV-Group Area projects:	$160,000.00

COPY

Proof Read

MINERAL LEASE NO. 5825

UTAH STATE LEASE
FOR

APPLICATION NO. 4249 GRANT School

URANIUM AND VANADIUM

THIS INDENTURE OF LEASE AND AGREEMENT entered into in duplicate this 5th day of March 19 54, by and between the State Land Board, acting in behalf of the State of Utah, hereinafter called the Lessor, and

Norman E. Ebbley
c/o Emerson C. Willey
Boston Building
Salt Lake City, Utah

party of the second part, hereinafter called the Lessee, under and pursuant to Title 65, Utah Code Annotated, 1953.

WITNESSETH: That the Lessor, in consideration of the rents and royalties to be paid and the covenants to be observed by the Lessee, as hereinafter set forth, does hereby grant and lease to the Lessee the exclusive right and privilege to mine, remove, and dispose of all of the said minerals in, upon, or under the following described tract of land situated in Grand County, State of Utah, to-wit:

All of Section Two (2), Township Twenty-three (23) South, Range Twenty-two (22) East, Salt Lake Meridian,

containing a total of 665.04 acres, more or less, together with the right to use and occupy so much of the surface of said land as may be required for all purposes reasonably incident to the mining, removal, and disposal of said minerals, according to the provisions of this lease, for a period of ten years, beginning January 2nd, first succeeding the date of issuance hereof, and as long thereafter as said minerals may be produced in commercial quantities from said lands, upon condition that at the end of each twenty (20) year period succeeding the first day of the year in which this lease is issued, such re-adjustment of terms and conditions may be made as the Lessor may determine to be necessary in the interest of the State.

ARTICLE I

It is expressly understood and agreed that this lease is granted subject in all respects to and under the conditions of the laws of the State of Utah and existing Rules and Regulations or Rules and Regulations as may be hereafter approved and adopted by the State Land Board.

ARTICLE II

It is further expressly understood and agreed that this lease covers only the mining, removal, and disposal of the minerals specified in this lease, but the Lessee shall promptly notify the Lessor of the discovery of any minerals excepting those enumerated herein.

ARTICLE III

The Lessee in consideration of the granting of the rights and privileges aforesaid, hereby covenants and agrees as follows:

FIRST: To pay to the Lessor as rental for the land covered by this lease the sum of Fifty (50) Cents per acre per annum. All such annual payments of rental to be made in advance on the 2nd day of January of each year, except the rental for the year in which this lease is issued, which is payable on the execution of this lease, such rental to be credited against the royalties as they accrue for the year.

SECOND: To pay a royalty of 12½% of the gross amount received for or the gross value of the leased substances, including the State's royalty share of any bonus received by the Lessee from the sale of the leased substances. The basis for computing the amount due to the Lessor shall be as follows:

(a) If the leased substance extracted are sold under a bonafide contract of sale the amount of money or its equivalent actually received by the owner, Lessee, or other person operating the leased premises from the sale of the leased substances less a reasonable cost, if any, of transporting the leased substances from the place where extracted to the place where under the contract of sale,

ARTICLE XI

LESSEE agrees to observe faithfully the provisions of Title 65, Chapter 1, Section 18, Utah Code Annotated 1953.

IN WITNESS WHEREOF, the parties have hereunto subscribed their names the day and year first above written.

STATE OF UTAH, STATE LAND BOARD

By .....
EXECUTIVE SECRETARY — LESSOR

APPROVED AS TO FORM:
E. R. CALLISTER
ATTORNEY GENERAL
By .....

.....

.....

.....
LESSEE

STATE OF UTAH
COUNTY OF SALT LAKE } ss.

On the 29 day of March 19 54, personally appeared before me A. N. Smith who being by me duly sworn did say that he is the Executive Secretary of the State Land Board of the State of Utah and that said instrument was signed in behalf of said Board by resolution of the Board, and said A. N. Smith acknowledged to me that said Board executed the same in behalf of the State of Utah.

Given under my hand and seal this 1 day of March 19 54

My commission Expires: October 13, 1956

.....
Notary Public, residing at: Salt Lake City, Utah

STATE OF ~~UTAH~~ COLORADO,
COUNTY OF M E S A. } ss.

On the 24th day of March 19 54, personally appeared before me NORMAN EBBLEY the signer of the above instrument, who duly acknowledged to me that executed the same.

Given under my hand and seal this 24th day of March 19 54

My commission Expires:
4/18/56

.....
Notary Public, residing at:
Grand Junction, Colorado

STATE OF UTAH
COUNTY OF } ss.

On the day of 19 , personally appeared before me

who being by me duly sworn did say that he is an officer of and that said instrument was signed in behalf of said corporation by resolution of its Board of Directors, and said acknowledged to me that said corporation executed the same.

Given under my hand and seal this day of 19

My commission Expires:

.....
Notary Public, residing at:

Proof Read

MINERAL LEASE NO. 5824

UTAH STATE LEASE
FOR

APPLICATION NO. 4248

GRANT School

URANIUM AND VANADIUM

THIS INDENTURE OF LEASE AND AGREEMENT entered into in duplicate this 5th day of March 1954, by and between the State Land Board, acting in behalf of the State of Utah, hereinafter called the Lessor, and

Norman E. Ebbley
c/o Emerson C. Willey
Boston Building
Salt Lake City, Utah

party of the second part, hereinafter called the Lessee, under and pursuant to Title 65, Utah Code Annotated, 1953.

WITNESSETH: That the Lessor, in consideration of the rents and royalties to be paid and the covenants to be observed by the Lessee, as hereinafter set forth, does hereby grant and lease to the Lessee the exclusive right and privilege to mine, remove, and dispose of all of the said minerals in, upon, or under the following described tract of land situated in Grand County, State of Utah, to-wit:

All of Section Two (2), Township Twenty-three (23) South, Range Twenty-one (21) East, Salt Lake Meridian,

containing a total of 397.76 acres, more or less, together with the right to use and occupy so much of the surface of said land as may be required for all purposes reasonably incident to the mining, removal, and disposal of said minerals, according to the provisions of this lease, for a period of ten years, beginning January 2nd, first succeeding the date of issuance hereof, and as long thereafter as said minerals may be produced in commercial quantities from said lands, upon condition that at the end of each twenty (20) year period succeeding the first day of the year in which this lease is issued, such re-adjustment of terms and conditions may be made as the Lessor may determine to be necessary in the interest of the State.

ARTICLE I

It is expressly understood and agreed that this lease is granted subject in all respects to and under the conditions of the laws of the State of Utah and existing Rules and Regulations or Rules and Regulations as may be hereafter approved and adopted by the State Land Board.

ARTICLE II

It is further expressly understood and agreed that this lease covers only the mining, removal, and disposal of the minerals specified in this lease, but the Lessee shall promptly notify the Lessor of the discovery of any minerals excepting those enumerated herein.

ARTICLE III

The Lessee in consideration of the granting of the rights and privileges aforesaid, hereby covenants and agrees as follows:

FIRST: To pay to the Lessor as rental for the land covered by this lease the sum of Fifty (50) Cents per acre per annum. All such annual payments of rental to be made in advance on the 2nd day of January of each year, except the rental for the year in which this lease is issued, which is payable on the execution of this lease, such rental to be credited against the royalties as they accrue for the year.

SECOND: To pay a royalty of 12½% of the gross amount received for or the gross value of the leased substances, including the State's royalty share of any bonus received by the Lessee from the sale of the leased substances. The basis for computing the amount due to the Lessor shall be as follows:

(a) If the leased substance extracted are sold under a bonafide contract of sale the amount of money or its equivalent actually received by the owner, Lessee, or other person operating the leased premises from the sale of the leased substances less a reasonable cost, if any, of transporting the leased substances from the place where extracted to the place where under the contract of sale, the leased substances are to be delivered.

ARTICLE XI

LESSEE agrees to observe faithfully the provisions of Title 65, Chapter 1, Section 18, Utah Code Annotated 1953.

IN WITNESS WHEREOF, the parties have hereunto subscribed their names the day and year first above written.

STATE OF UTAH, STATE LAND BOARD

By A. N. Smith
EXECUTIVE SECRETARY LESSOR

APPROVED AS TO FORM:
E. R. CALLISTER
ATTORNEY GENERAL
By [signature]

Norman Ebbley
LESSEE

STATE OF ~~UTAH~~
COUNTY OF SALT LAKE } ss.

On the 29 day of March 19 54, personally appeared before me A. N. Smith who being by me duly sworn did say that he is the Executive Secretary of the State Land Board of the State of Utah and that said instrument was signed in behalf of said Board by resolution of the Board, and said A. N. Smith acknowledged to me that said Board executed the same in behalf of the State of Utah.

Given under my hand and seal this 29 day of March 19 54

My commission Expires: October 13, 1956

[signature]
Notary Public, residing at: Salt Lake City, Utah

STATE OF ~~UTAH~~ COLORADO,
COUNTY OF MESA. } ss.

On the 24th day of March 19 54, personally appeared before me NORMAN EBBLEY the signer of the above instrument, who duly acknowledged to me that he executed the same.

Given under my hand and seal this 24th day of March 19 54.

My commission Expires:
4/18/56

[signature]
Notary Public, residing at:
Grand Junction, Colorado

STATE OF UTAH
COUNTY OF } ss.

On the day of 19, personally appeared before me

who being by me duly sworn did say that he is an officer of and that said instrument was signed in behalf of said corporation by resolution of its Board of Directors, and said acknowledged to me that said corporation executed the same.

Given under my hand and seal this day of 19

My commission Expires:

Notary Public, residing at:

Location with respect to known mines and deposits.

① 2 miles east of the Rifle Mine which is on East Rifle Creek. From 1943 thru 1948 the Rifle mine produced 600 tons ore per month averaging 1.87% V_2O_5 but containing only 0.04% U_3O_8. Average thickness of deposit about 7 ft. Ore found in about zone in lower part of Entrada sandstone

② The Allen Mine is 750 west of the property and the Elk Van mine is on the Elk Van claims. Ore found in shaley mudstone 12 to 24 inches thick about 80-100 feet above the Entrada. Working short drifts back from mine.

Production from Allen = 20 tons .19% U_3O_8 & 3.07% V_2O_5

Production from Elk Van - 10 tons 0.24% U_3O_8 & 2.15% V_2O_5.

Total production Rifle Creek and from 1948 - 1954 = 109 tons of .17% U_3O_8 and 1.7% V_2O_5.

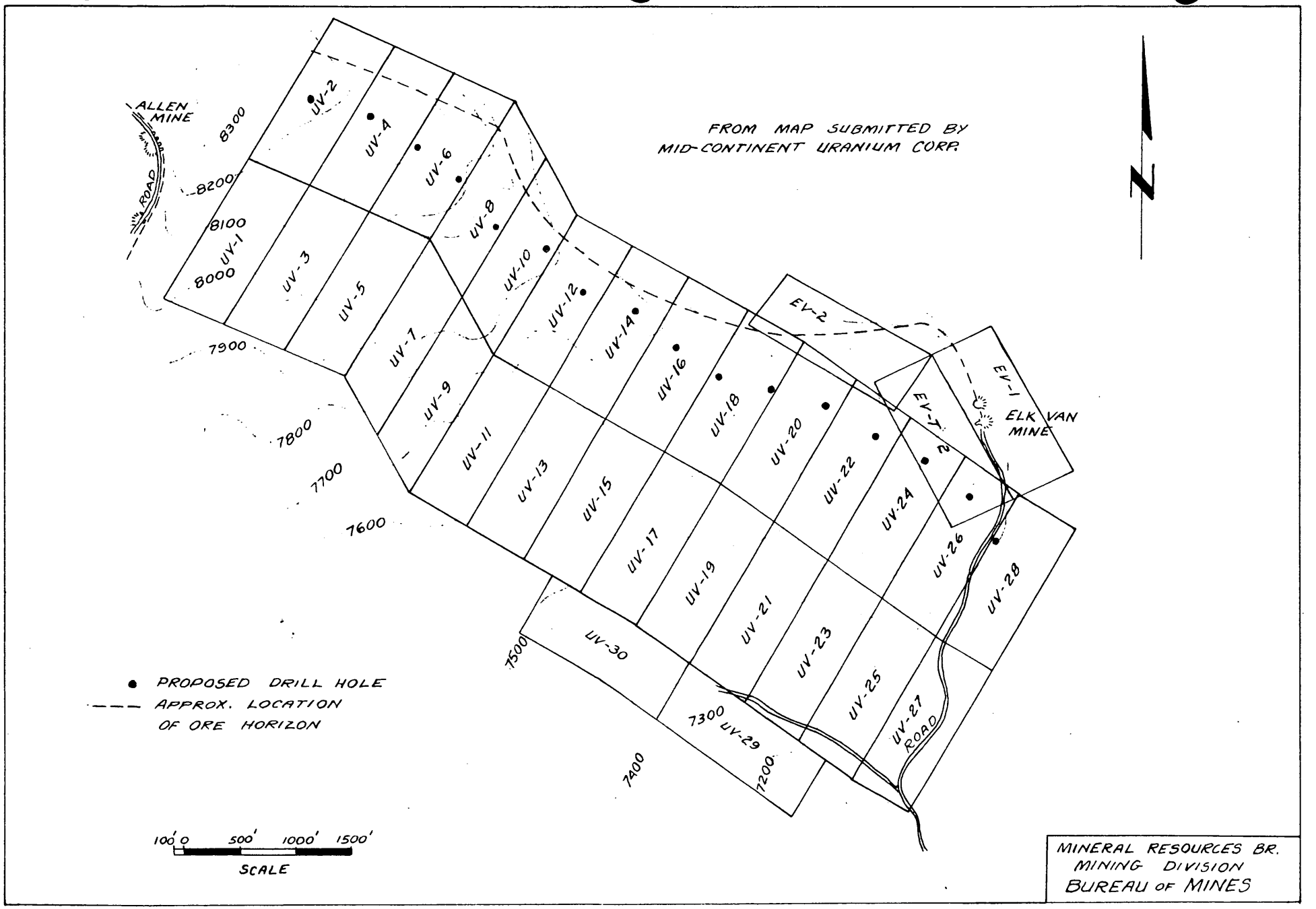

FIG. 2 - PROPOSED CORE DRILL HOLES, UV AND ELK VAN CLAIMS, MID-CONTINENT URANIUM CORP., GARFIELD COUNTY, COLO., DMEA 3360

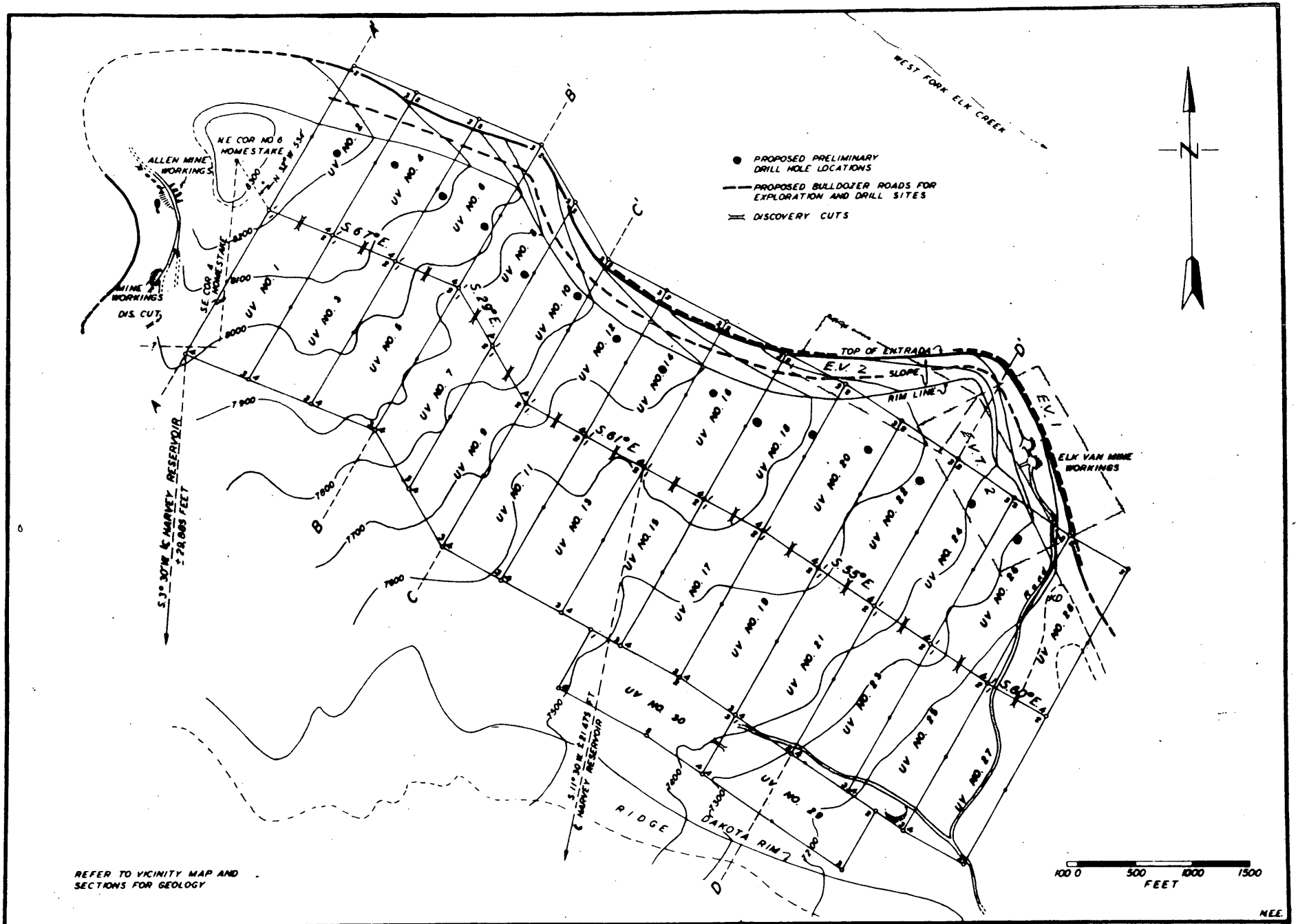

FIG. 2 CLAIM MAP OF UV GROUP - WEST ELK MINING DISTRICT - GARFIELD CO., COLORADO

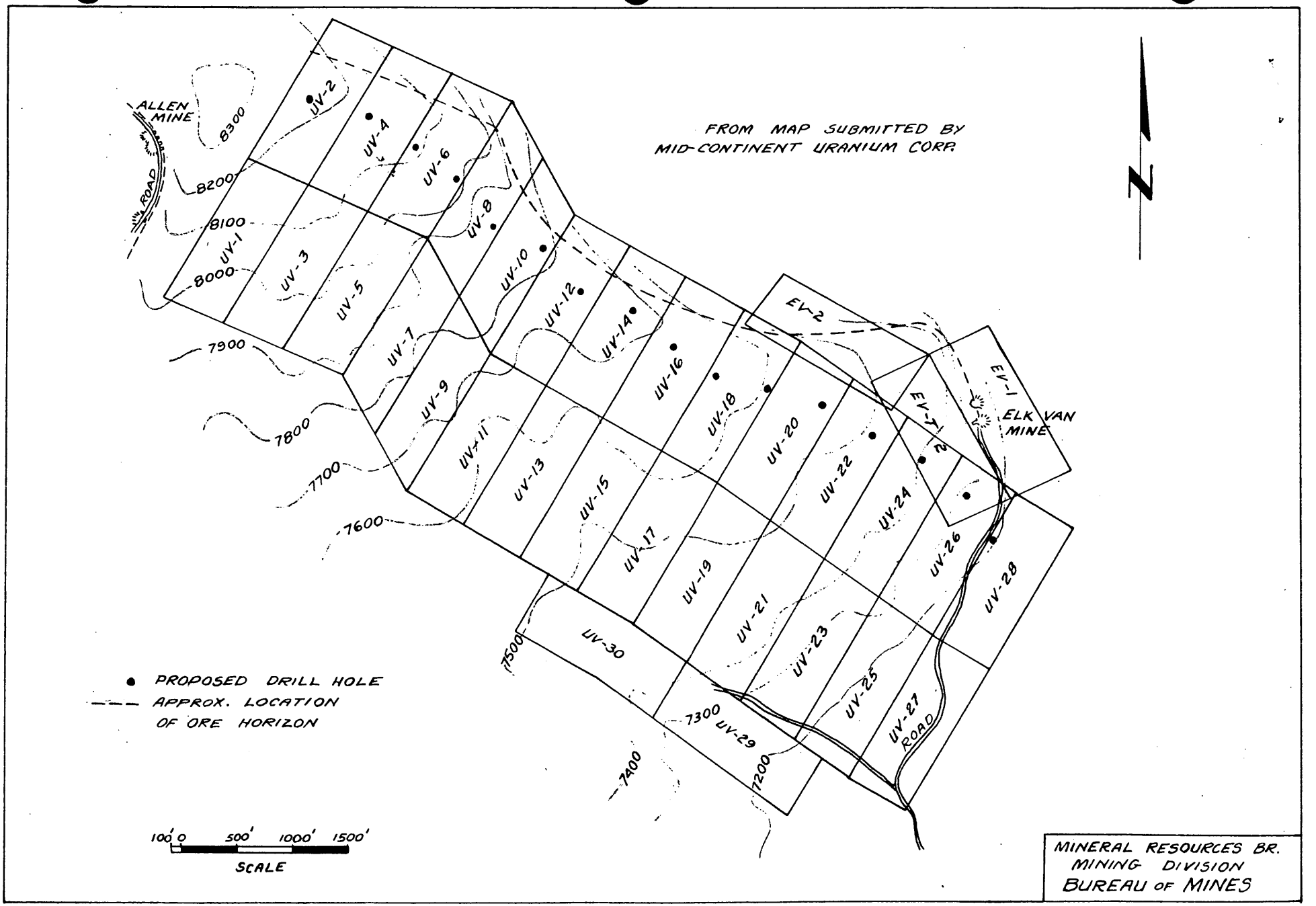

FIG. 2 - PROPOSED CORE DRILL HOLES, UV AND ELK VAN CLAIMS, MID-CONTINENT URANIUM CORP., GARFIELD COUNTY, COLO., DMEA 3360

DEPT. OF THE INTERIOR
Bureau of Mines Administration
RECEIVED
MAY 21 1954

REPORT ON THE

UV - GROUP OF URANIUM CLAIMS

(Includes Allen and Elk Van Properties)

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WEST FORK ELK CREEK

Garfield County, Colorado

—1954—

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NORMAN E. EBBLEY

Mining Geologist

REGISTERED PROFESSIONAL ENGINEER
STATE OF COLORADO

P. O. BOX 883
GRAND JUNCTION, COLO.

NORMAN E. EBBLEY
MINING GEOLOGIST

January 15, 1954

Mr. Stephen L. R. McNichols
and
Mr. Philip Shaiman
728 Symes Building
Denver, Colorado

Gentlemen:

Pursuant to your request, I am herewith submitting for your consideration a report on the UV-Group of uranium claims located near the West Fork of Elk Creek, Garfield County, Colorado.

The report covers the geology of the area, assay and production records, and a suggested plan for an exploratory program.

In my estimation, the property has considerable merit. It is recommended as an excellent area in which commercial uranium-vanadium ore bodies are likely to be discovered with the expenditure of the exploratory budget, as outlined in this report.

Yours very truly,

Norman E. Ebbley

Norman E. Ebbley,
Mining Geologist

NEE/hjl

Enclosure

Report on the

UV - GROUP OF URANIUM CLAIMS

(Includes Allen and Elk Van Properties)

West Fork Elk Creek

Garfield County, Colorado

-1954-

NORMAN E. EBBLEY

Mining Geologist

ABSTRACT

This report describes a group of thirty-five (35) contiguous mining claims located in the West Elk Creek area of Garfield County, Colorado. Included in the report is a description of the geologic features with accompanying geologic maps and vertical section maps showing theoretical subsurface structure throughout several sections. An endeavor has been made to appraise the area's possibilities by comparison with the accepted Geologic Guides established by the statistical results obtained from a study of over 10,000 drill holes put down by the joint efforts of the United States Geological Survey and the Atomic Energy Commission.

Basically, these favorable criteria consist of: (1) the thickness and color of the ore-bearing sandstone; (2) the type of altered mudstone usually underlying the ore-bearing sandstone; and (3) the extent of the carbonaceous constituents of the sandstone. Field studies of the area covered by this report indicate the presence of a favorable percentage of all of the above-mentioned criteria; and in addition, the property has the most important criteria of all--the actual past production of a good grade commercial ore.

The almost total lack of surface prospecting in the area and the complete absence to date of any subsurface exploratory work indicates, with the presence of the above-mentioned favorable criteria and ore-bearing formations, the advisability of a combination surface and subsurface exploratory drilling program. It is anticipated that a preliminary exploration program, as outlined in this report, will cost approximately $17,500; and will establish commercial ore bodies of uranium-vanadium ores.

INTRODUCTION

General - Colorado Plateau Area

The economic history of uranium prior to 1942 is well covered by several publications, a few of which are listed.[1/] From the start of the last World War, the production figures of radioactive materials have been highly restricted information. The Atomic Energy Act of 1946 "for the development and control of atomic energy" provided for a Domestic Uranium Program which established a graduated price schedule for domestic ores.

The Atomic Energy Commission's first policy was outlined in Circular No. 3, dated April 9, 1948. The initial price schedule proved to be too low, as the majority of the ore producers were suffering a loss in their operations. Accordingly, the Commission issued Circular No. 5, effective February 1949, alleviating to some extent the small producer's plight. In general, Circular No. 5 provided for: (a) Security in capitol investments by extending the minimum price guaranteed to June 30, 1954; (b) Provision for a development allowance of 50 cents per pound of U_3O_8 in ores containing more than 0.15

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1/ De Ment, J., and Dake, H. C., "Uranium and Atomic Power", New York, Chemical Pub. Co., 1941; rev. edition, 1945; "Rarer Metals", New York, Chemical Pub. Co.

De Ment, J., and Dake, H. C., "Uranium Minerals Handbook", Mineralogist Pub. Co., 1945

Thom, E. M., "Bibliography of North American Geology", 1929-1949, U. S. Geol. Survey Bull. 937(1944); 1940 and 1941, Ibid., Bull. 938(1942); 1942 and 1943, Ibid., Bull. 949(1945)

Tyler, P. M., "Radium", U. S. Bur. Mines Inf. Circ. 6312(1930)

U. S. Atomic Energy Commission, "Selected Bibliography on Atomic Energy", Washington, 1948

per cent U_3O_8; (c) Certain adjustments in the price curve of ores assaying between 0.1 per cent U_3O_8 and 0.2 per cent U_3O_8; and (d) Certain restrictions on the refractory high lime ores were removed. As a result of the upward revisions made by the Commission, lessees and small producers were very active throughout the remainder of 1949.

Rapidly increasing labor and material costs again forced the Commission to revise its policy, price-wise; and on March 1, 1951, the price schedule was raised and extended through March 31, 1958.[2/] On September 23, 1953, the same price schedule was extended to cover the period through March 31, 1962.[3/] An initial production bonus, under Domestic Uranium Program Circular No. 6, established March 1, 1951,[4/] was, on September 23, 1953, extended through February 28, 1957.[5/]

The United States Geological Survey had begun a systematic investigation of the Colorado Plateau Area as early as 1939; and in 1947, launched a full scale geologic and exploratory drilling program to determine the actual uranium potential of the Plateau. While centering attention on the direct problem of finding uranium reserves, the Geological Survey investigation, in addition, has assembled general as well as specific information in the belief that all of it sooner or later will be found to be pertinent to the "Classification, examination, and preparation of plans for complete development" of the uranium country.

.....

2/ See Appendix No. 3

3/ See Appendix No. 5

4/ See Appendix No. 4

5/ See Appendix No. 5

The Grand Junction Operations Office of the Commission has been the hub of all activities being carried out in the uranium-vanadium region. Some of the more important activities of the Commission since the initiation of the program have been: (1) The leasing of the wartime Durango plant to the Vanadium Corporation of America which has expanded the plant's processing facilities; (2) Remodeling the Monticello mill and installing an efficient sampling unit; (3) Aiding the Geological Survey program by the construction of field camps for drilling and geologic personnel, road construction and maintenance, and automotive and equipment maintenance; (4) Exercising jurisdiction in selection of the areas to be withdrawn from the right of mineral entry and the release of these areas or portions thereof in the event that no uranium deposits are found; (5) Licensing all transfers, distributors, and processors of source material under the Atomic Energy Act, and exercising complete authority on "security", especially directed toward refined concentrates; (6) Actual small-scale mining of some deposits on government-owned claims to determine accurate production costs for comparative value, as well as the leasing of government claims to operators; and (7) Maintaining a staff of Commission geologists and engineers and entering into drilling contracts on projects patterned after the work done by the Geological Survey.

In any analysis of the "economics" of uranium mining, the observer finds himself up against a stone wall. In endeavoring to logically work out an operation cost of production per pound for uranium against base value per pound received, the analyst finds that the situation is far removed from being in a state of equilibrium. Supply and demand which normally determine the price that a product will bring do not affect the domestic uranium

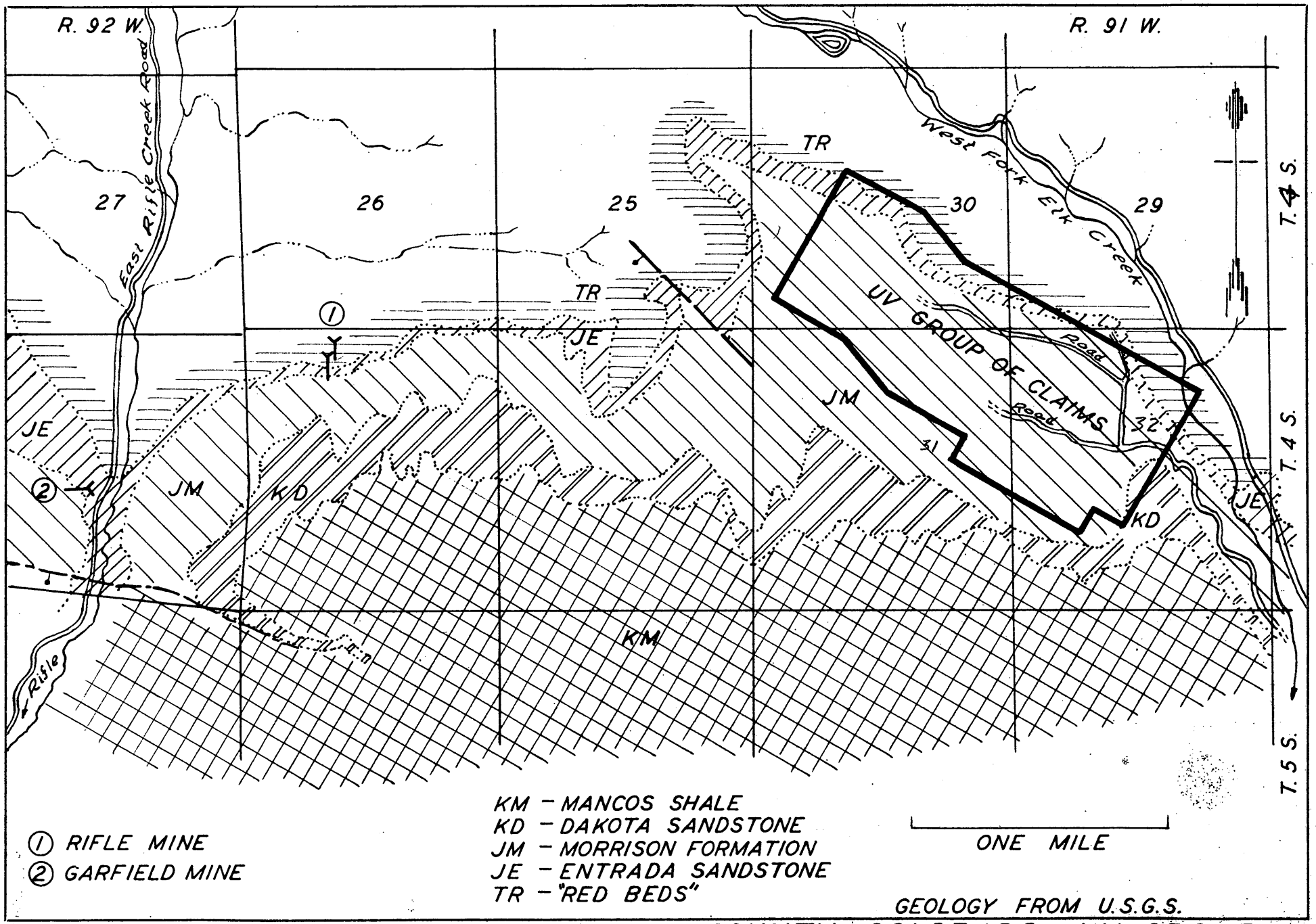
industry, as the government exercises a monopoly and arbitrarily sets the price. Thus, the "sliderule" usually used to determine the feasibility of any particular business project cannot be applied to domestic uranium production, due to several factors that are responsible. The costly program being carried out by the Commission in maintaining the source material supply, normally assumed by private industry in other fields, is, in this case, not considered in over-all cost of production. This figure, which may reach 20-25 million dollars a year, naturally tends to depress the price paid for domestic uranium, even though the United States may be paying as much as $30 per pound for processed foreign U_3O_8 product.

LOCATION AND ACCESSIBILITY

The area covered by the 35 claims of the UV-Group is located to the southwest of West Elk Creek Canyon, approximately 8-10 miles northwest of the town of New Castle, Colorado. Figure No. 1 is a vicinity map showing the location of the property with relation to the Rifle mine on East Rifle Creek.

Both creeks, Rifle and Elk, flow into the Colorado River about 8 miles from where they are shown in Figure 1. Both New Castle and Rifle, 17 miles apart, are located on paved U. S. Highway No. 6. The road from New Castle up the West Fork of Elk Creek is a state maintained graveled road. The Allen and Elk Van workings can each be reached by jeep roads, approximately 3 miles from the West Fork of Elk Creek road.

Mining machinery and supplies are available in Grand Junction, Colorado, 80 miles west of New Castle, by both rail and motor transport.



EAST RIFLE CREEK AREA - GARFIELD COUNTY, COLORADO - UV GROUP

Fig. 1

PHYSICAL FEATURES AND CLIMATE

Topographically, the area under consideration is of moderate relief. The sheer canyons and broad fairly flat mesas of the Colorado Plateau area farther southwest are greatly modified in the Rifle-New Castle area due to more extensive faulting action that has tilted the sediments and permitted greater erosion. The ridge near the Allen property has an elevation of 8,365 feet above sea level, and slopes off 8 to 10 degrees to the West Fork of Elk Creek valley at the east end of Figure 1, where the elevation is only 6,500 feet. The valley of West Elk is quite narrow, not exceeding 600 feet, in that portion shown on the map. Refer to the Claim Map, Figure No. 2, for contours in the vicinity of the UV-Group of claims.

The vegetation covering the area is fairly thick, and in some places makes travel on foot difficult. The larger trees are native spruce and pine, with a scattering of dwarf cedar. Many of the larger trees are suitable for mine timbers. The major part of the area is covered with a thick growth of oak and buck brush which greatly obscures the outcropping rock formations.

The climate is typical of the Western Slope of Colorado, characterized by fairly hot dry summers and cold winter months. The coldest month is January, having an average mean temperature of 24 degrees above zero, compared with the hottest month, July, which has an average mean temperature of 78.2 degrees. The average annual precipitation, measured over a period of years, is 9.06 inches.

LABOR AND LIVING CONDITIONS

Grand Junction, which is the center of uranium mining activities, has a population of about 25,000 people. The increasing interest in uranium and the decline of Colorado's once thriving lead-zinc-silver mining

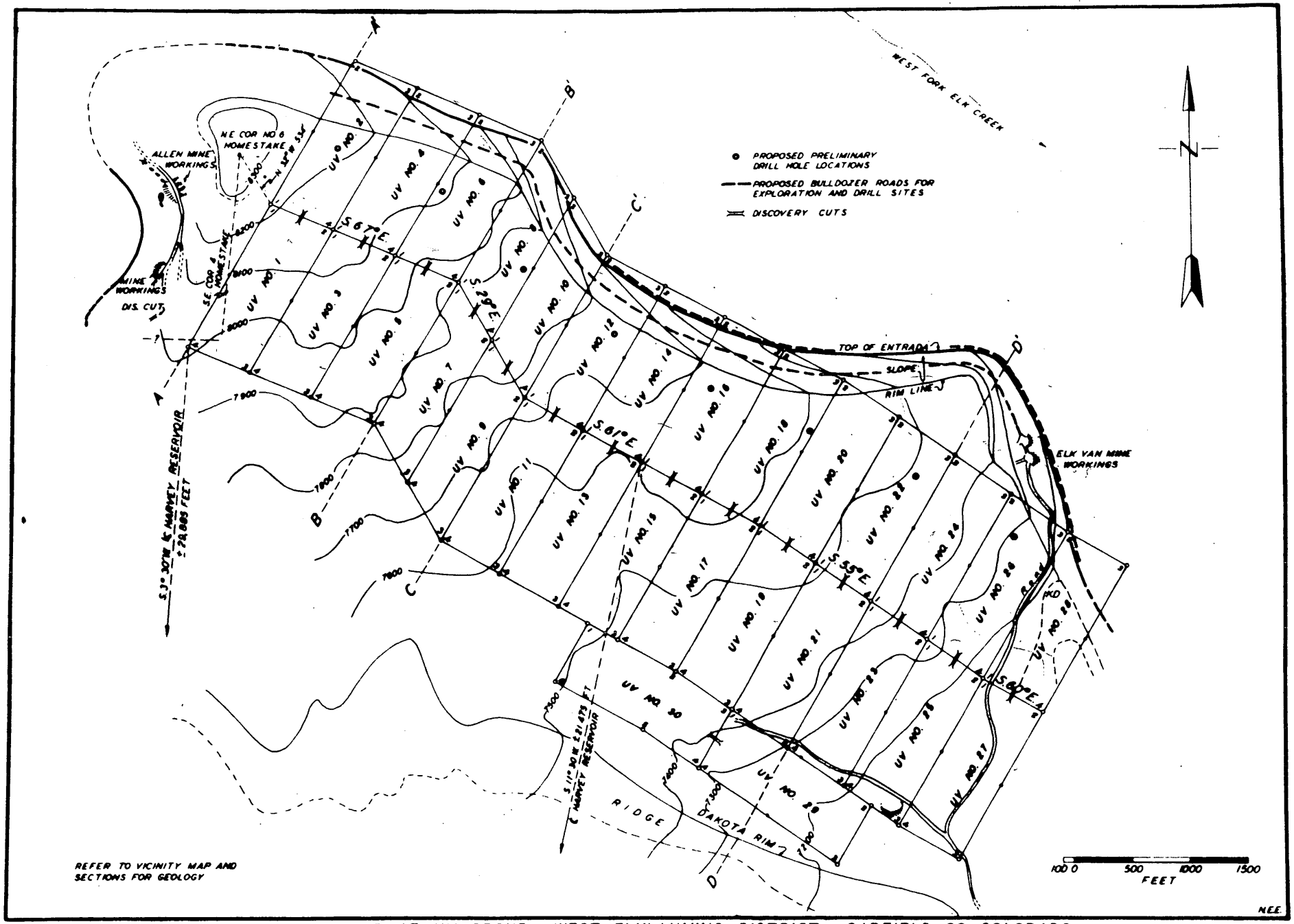


FIG 2 CLAIM MAP OF UV GROUP - WEST ELK MINING DISTRICT - GARFIELD CO., COLORADO

industry and the closing of a large percentage of Colorado's coal mines have resulted in an influx of experienced hardrock miners--more than the uranium industry can absorb. Consequently, labor at the present time is no problem.

Base wages for common labor vary from $1.25 to $1.50 per hour. Experienced miners obtain from $1.75 to $2.00 per hour; diamond drill operators, $2.50 per hour; and carpenters and bulldozer operators, from $2.50 to $3.00 per hour.

The cost of food and supplies is normal to the whole of Colorado. Most camp boarding houses in the uranium area operate at a cost of from $2.50 to $3.00 per man per day. There are no housing facilities on the property--the nearest places being New Castle, Rifle, and Glenwood Springs which is 13 miles east of New Castle.

HISTORY AND REFERENCES

General Area

Reconnaissance surveys of the Rifle area were begun by the Geological Survey as early as 1900, but little attention was given to the uranium-vanadium occurrences until 1940.[6/] At that time, a detailed study was made of the vanadium mineralization occurring in the altered zone in the lower part of the Entrada formation.

The United States Vanadium mine, later to be known as the Rifle mine of that company, was first put into operation in the early 1920's.

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6/Fischer, R. P., 1942, "Vanadium Deposits of Colorado and Utah", U. S. Geol. Survey Bull. 936-P

Richard, Forbes, "Gold Ore Near New Castle", Min. Sci. Press, vol. 99, p. 503, 1909

State of Colorado, Mineral Resources Board publication, 1937 to present

Refer to Figure No. 1 for location. The ore was found to outcrop in an altered zone in the lower part of the Entrada sandstone formation, a cross-bedded, orange and white sandstone of upper Jurassic age. This formation in most exposures of the Colorado Plateau area is a massive smooth sandstone given the local name of "the slick rim". In the Rifle area, the Entrada is somewhat broken in appearance and has eroded, leaving a more vertical and rugged face than usual. It overlays the Carmel "Red Beds" formation of the area--a red sandstone and mudstone of upper Jurassic age also. The altered ore zone, although not continuous, was exposed for 1,900 feet along the rim at the Rifle mine. The ore dipped 30 degrees toward the south, and later mining proved the ore body to extend east and west over 5,000 feet along the strike and 500 feet down the dip toward the south. Several thousand feet of the ore horizon did not outcrop.

Production reached its peak during the years from 1943 through 1948, during which time the production averaged nearly 600 tons per month of ore averaging about 1.87 per cent V_2O_5. The ore deposit at the outcrop was from 3 to 4 feet in thickness; and back from the rim, reached at times thicknesses normal to the dip of 27 feet. It is understood the average thickness of all the ore mined was 7 feet. During this period, the U_3O_8 content of the ore averaged 0.04 per cent, which was not recovered. Since that time, these tailings have been remilled to recover the uranium and the vanadium content.

PROPERTY AND OWNERSHIP

The property discussed in this report includes 35 unpatented claims, consisting of three Elk Van claims, two Allen claims, and thirty UV claims. Total acreage covered by the claims could not be accurately determined, as

all of the corners of the Allen and the Elk Van claims could not be found on the ground, and the absence of maps showing the claims precluded any accurate plotting of the claims on the UV claim map, Figure No. 2. Accordingly, when the 30 UV claims were staked, a certain amount of overlapping was necessary to prevent leaving uncovered fractions. It is estimated that the total acreage covered is approximately 680 acres. The Elk Van claims were amended January 31, 1941; and are now known as the Elk Van Tunnel No. 2, Elk Van No. 1 Lode, and the Elk Van No. 2 Lode. The No. 1 and No. 2 lodes are 600 x 1,500 feet, while the Tunnel No. 2 claim is described as covering 3,000 x 3,000 feet. There is some question as to the legality of this claim. A further endeavor should be made to locate the exact position of the Elk Van and Allen claims on the ground, so they can be oriented with respect to the UV claims on the map--thus indicating the existence of any possible fractions that should be covered.

The 30 UV claims are owned in equal share by S. L. R. McNichols, 728 Symes Building, Denver, Colorado; Philip Shaiman, 228 Cooper Building, Denver, Colorado; and Norman Ebbley, Box 883, Grand Junction, Colorado. The three Elk Van claims and the two Allen claims are under option to purchase by the above-mentioned parties.

ORE DEPOSITS

General Geology[7/]

As illustrated by the geology shown on the vicinity map, Figure No. 1, the group of claims covers the area from the Dakota formation on the south past the outcropping of the Entrada to the north--thus covering most of the Morrison formation that would not be too deep to explore by drilling. The overlying Mancos shale formation forms the capping to the south of the Dakota formation. The major portion of the commercial ore bodies of the Colorado Plateau has been found in the Salt Wash sandstone member of the Morrison formation overlying the Entrada sandstone. The Salt Wash member consists of interbedded predominant sandstone lenses with minor mudstone layers. The sandstone beds range from about 20 feet to over 80 feet in thickness, and average about 50 feet.

The ore bodies are very irregular tabular layers that form "rolls" of considerable thickness, sometimes in excess of 20 feet. Generally they lie parallel to the bedding, but do not necessarily conform to the beds in detail. Frequently, the rolls or longitudinal direction of the ore bodies are roughly parallel. The deposits range in size from only a few tons of ore to

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7/Coffin, R. C., 1921, "Radium, Uranium, and Vanadium Deposits of Southwestern Colorado", Colorado Geol. Survey Bull. 16

Work cited in footnote No. 6

Fischer, R. P., 1950, "Uranium-bearing Sandstone Deposits of the Colorado Plateau", Econ. Geol., vol. 45, pp. 1-11

Fischer, R. P., Hilpert, L. S., Schumacher, J. I., Cater, F. W., Strobell, J. D., Jr., Crain, L. C., Phoenix, D. A., and Trace, R. D., 1951, "Summary of Investigations Through 1950 of the Carnotite-bearing Sandstones of the Colorado Plateau" (report, in files of the U. S. Geol. Survey)

those exceptions containing from 60 to 100 thousand tons. Probably the average mined throughout the Plateau might be less than 2,000 tons of ore, averaging 0.28 per cent U_3O_8 and 2 per cent V_2O_5. The origin of the uranium-vanadium mineralization in the ore has not been determined, although most geologists agree that its occurrence was probably a result of post precipitation from ground-water solutions after the sedimentation of the sands.

In any discussion of the geologic probability of making a significant ore discovery in any of the Colorado Plateau area, several factors must be considered. It is relatively true that certain geologic criteria have been established during the past few years--primarily through observation and experience of actual mining operations, commonly called "hindsight" in less technical fields. However, it is now recognized that such factors as favorable areas, favorable stratigraphic formations, special horizons or beds within these formations, localized characteristics of these special horizons or beds--such as thickness, texture, and composition of the sand rock, and established trends or channels within the areas, are all factors that had an apparent effect on ore deposition. Although these criteria are important to the extent of determining favorable locations for exploration in a new or unknown area, they are still secondary to one important factor--that is the presence of known ore bodies or the record of actual production.

The present trend of thought of practical geologists who have had occasion to work in the Colorado Plateau is that, in an unknown, unproductive area, the above-listed criteria are of major significance in considering an exploration program. When commercial ore bodies have been mined within the area, these criteria are of lesser importance, although they are used to establish the exploratory pattern in the search for additional ore deposits

in the area. In other words, if commercial ore bodies of appreciable size have been mined in the area--that in itself is the criteria, regardless of the presence or absence of so-called favorable geologic conditions.

Occurrence of Deposit

The ore occurrences are found in the Salt Wash member of the Morrison formation of Jurassic Age. The deposits are bedded and irregular in shape and size. The only mineral of commercial value mined from the property has been carnotite which is a potassium uranium vanadate, with the following chemical composition: $K_2O \cdot 2UO_2 \cdot V_2O_5 nH_2O$. In practice, the payment of the ore is based upon the percentages of U_3O_8 and V_2O_5 at their various prices per pound and grade.

The ore exposed and mined in both the Allen and the Elk Van workings occurred in a shaley mudstone zone from 12 to 24 inches in thickness. The ore horizon appears to be about 80 to 100 feet above the Entrada sandstone, and whether the occurrence is in the first or second rim was not determined due to the talus and overburden obscuring much of the hillside.

In the case of the area covered by the UV Group, all of the favorable conditions are present: (1) A favorable general area, considering the uranium-vanadium production from the ground covered by the claims and considering the exceptionally large ore bodies mined in the lower Entrada at the Rifle and Garfield mines; (2) Favorable productive Salt Wash formations and fair-to-good characteristics of the various sandstone rims within the Salt Wash; and (3) The most important, the known appreciable production of both high-grade and medium-grade ores from rim exposures from the only two areas prospected--and these being one and one-half miles apart at either end of the ground under consideration.

There are no operations at the present time. Past mining operations were carried out on the Elk Van group of three claims and on the Allen property consisting of two claims. The mining was confined mainly to rim exposures and consisted of relatively short drifts, from 10 to 50 feet back from the rim, and shallow open cuts. There is no equipment on the properties at the present time. All workings are accessible for examination, and can be readily reached by jeep road.

SAMPLING AND ANALYSES

Samples cut from the ore exposures gave the following radiometric analyses for U_3O_8 on a Minerals Geiger counter, previously calibrated with known standards:

Location	Sample No.	Thickness Inches	U_3O_8 Per Cent
Allen	1	24	0.15
Allen	2	18	0.38
Allen	3	12	0.25
Allen	4	6	0.29
Elk Van	5	18	0.40
Elk Van	6	18	0.26
Elk Van	7	?	0.60

Ore records of shipments are listed below. (Refer to Appendix for copies of Ore Settlement Sheets.)

Allen Property (Summers of 1949, 1950, and 1951)

Dry Lbs.	%U_3O_8	%V_2O_5	Lbs. x %U_3O_8	Lbs. x %V_2O_5
4,440	0.20	2.00	888.00	8,880.00
12,410	0.13	3.91	1,613.30	48,523.10
1,370	0.08	4.12	109.60	5,644.40
7,590	0.28	3.35	2,125.20	25,426.50
14,270	0.10	2.34	1,427.00	33,391.80
200	7.10	9.14	1,420.00	1,828.00
40,280			7,583.10	123,693.80

Weighted Averages: 0.19 per cent U_3O_8, 3.07 per cent V_2O_5

Value per ton:

Value U_3O_8	0.19 =	3.8 lbs. @ $3.30/lb.	=	$12.54
Dev. Allow.		3.8 lbs. @ $0.50/lb.	=	1.90
Value V_2O_5	3.07 =	61.4 lbs. @ $0.31/lb.	=	19.03
		Total Value	=	$33.47 per ton*

Under the New Uranium Bonus Schedule for mining properties that have produced less than 10,000 pounds of uranium oxide (during the period from April 9, 1948, to February 28, 1957), the above-given value per ton would actually be:

Ore produced from the Allen property = $45.99 per ton

.....

* No consideration has been given to the Haulage Allowance as this usually offsets actual cost of ore transportation, nor to the ten-to-one limitation for vanadium payment as special arrangement with the mills can be made for full payment. Please note the USV Ore Settlement sheets for the Elk Van ores in Appendix, illustrating this point.

Elk Van Property (Summer, 1951)

Dry Lbs.	%U_3O_8	%V_2O_5	Lbs. x %U_3O_8	Lbs. x %V_2O_5
4,184	0.31	3.15	1,297.04	13,179.60
7,454	0.22	2.84	1,639.88	21,169.36
8,381	0.22	1.03	1,843.82	8,632.43
20,019			4,780.74	42,981.39

Weighted Averages: 0.24 per cent U_3O_8, 2.15 per cent V_2O_5

Value per ton:

Value U_3O_8	0.24 =	4.80 lbs. @ $3.50/lb.	=	$16.80
Premium No. 1	=	0.80 lbs. @ $0.75/lb.	=	0.60
Dev. Allow.	=	4.80 lbs. @ $0.50/lb.	=	2.40
Value V_2O_5	2.15 =	43.00 lbs. @ $0.31/lb.	=	13.33
		Total Value	=	$33.13 per ton*

Under the New Uranium Bonus Schedule for mining properties that have produced less than 10,000 pounds of uranium oxide (during the period from April 9, 1948, to February 28, 1957), the above-given value per ton would actually be:

Ore produced from the Elk Van property = $49.93 per ton

.....

* No consideration has been given to the Haulage Allowance as this usually offsets actual cost of ore transportation, nor to the ten-to-one limitation for vanadium payment as special arrangement with the mills can be made for full payment. Please note the USV Ore Settlement sheets for the Elk Van ores in Appendix, illustrating this point.

RECOMMENDED EXPLORATION PROGRAM

In any exploratory program to prospect the area in question, consideration should be given first to possible rim outcroppings under the talus and other overburden. It is suggested the sequence of exploratory work be as follows:

(1) Excavate a road with a bulldozer above the Entrada from the Elk Van workings northwesterly along the side hill to explore for additional outcrops of uranium ore. The distance from the Elk Van workings to the point north of the Allen workings is approximately 8,000 feet, and in no place along this stretch has there been any exploration or prospecting of any nature. This work would also provide relatively shallow drilling sites to explore the first rim and the altered zone in the lower part of the Entrada sandstone. In any drilling program in this area, a percentage of the holes should have as their target the base of the Entrada sandstone to explore this zone for possible vanadium ore bodies.

(2) Cut a road at the base of the Entrada sandstone for several thousand feet northwest of and in the vicinity of the Elk Van workings to explore the altered zone at the base of the Entrada sandstone. In this vicinity, the contact between the Entrada and the "Red Beds" shows an altered zone in places up to one foot in thickness. However, talus covers most of the base of the Entrada sandstone.

(3) A preliminary drilling program,based upon the results of 1 and 2 above, should be undertaken as follows:

   (a) Drill shallow holes along the road,as outlined in 1 above.

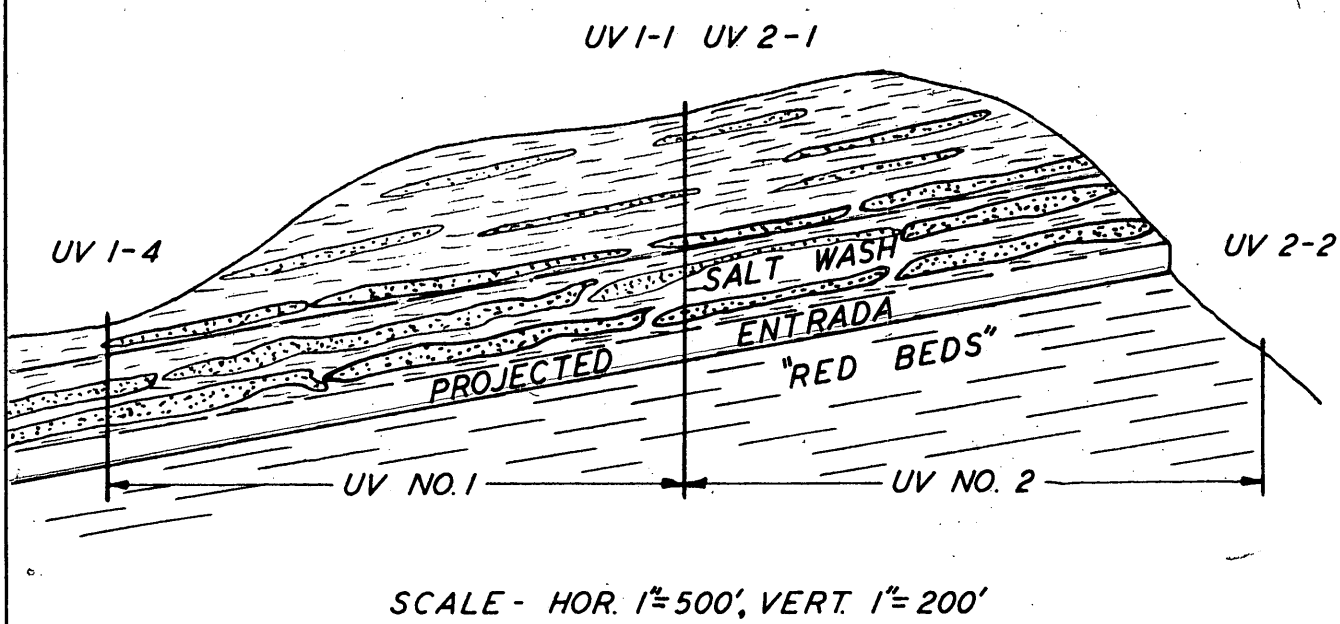
   (b) Drill a row of holes on 1,000-foot centers back from and parallel to the rim, as shown on the claim map.

(c) Depending upon the results obtained from this work, the next step would be to drill out any ore holes encountered, endeavoring to block out ore reserves, and continue the general exploratory drilling progressively back from the rim toward the south.

It is anticipated the depth to the ore horizon in the Salt Wash member of the Morrison along the top of the rim may vary from 140 to 160 feet, and the depth to the top of the "Red Beds" should average about 260 feet. These depths will become greater toward the south, as the average dip of the beds to the south is slightly steeper than the slope of the surface. Refer to Figures Nos. 3, 4, 5, and 6 which illustrate theoretical geology through Sections A-A, B-B, C-C, and D-D, as shown on claim map, Figure No. 2.

After 8 to 10 holes have been drilled back from and parallel to the top of the rim, sufficient geologic information (in addition to the information gained from 3a above) should have been obtained to establish locations and trends of the most favorable sandstones. Geologic sections drawn in various directions from the hole data should establish: (1) Trends of favorable formations which will indicate locations for the remainder of the holes to be drilled; and (2) Possible ore bodies or mineralized areas which will determine further hole locations.

Drill roads and holes on top of the rim should be located to take advantage of the numerous gulches that run parallel to the rim--thus greatly reducing total hole depths. It should be stressed that the modicum amount of exploration previously done on these properties is such that the main Salt Wash has virtually been unexplored. It is ventured that exploratory drilling should discover more substantial ore deposits within the massive



Upper red line denotes relative position of the ore horizon mined at both the Elk Van and the Allen workings. Position of the ore horizon mined with relation to the separate sandstone "Rims" (First, second, or third) of the Salt Wash member of the Morrison Formation is not known due to overburden and talus that obscures the outcrops.

Drill holes should penetrate to the "Red Beds" to explore the altered zone at the top of the "Red Beds". The high grade ores (mainly vanadium) mined at the Rifle and the Garfield mines occurred at this horizon, represented by the lower red line.

Average depth of drill holes in this area, as indicated by above Section A-A', would be approximately 220 feet to reach the "Red Beds".

Estimated Dip of the Entrada sandstone at this point is 12 degrees to the South.

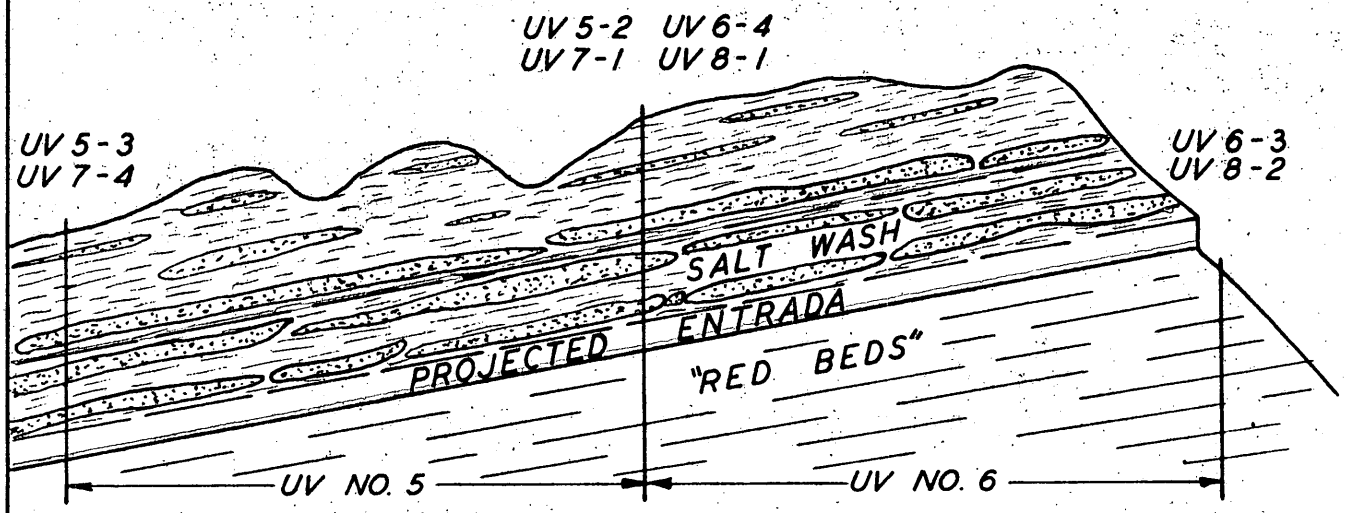
Refer to Claim Map of UV Group, West Elk Mining District, Garfield County, Colorado.

(Theoretical Section - Brunton Survey)

Fig. 3

SECTION B-B'

N. 30° E.



SCALE - HOR. 1"=500', VERT. 1"=200'

Upper red line denotes relative position of the ore horizon mined at both the Elk Van and the Allen workings. Position of the ore horizon mined with relation to the separate sandstone "Rims" (First, second, and third) of the Salt Wash member of the Morrison Formation is not known due to overburden and talus that obscures the outcrops.

Drill holes should penetrate to the "Red Beds" to explore the altered zone at the top of the "Red Beds". The high grade ores (mainly vanadium) mined at the Rifle and the Garfield mines occurred at this horizon, represented by the lower red line.

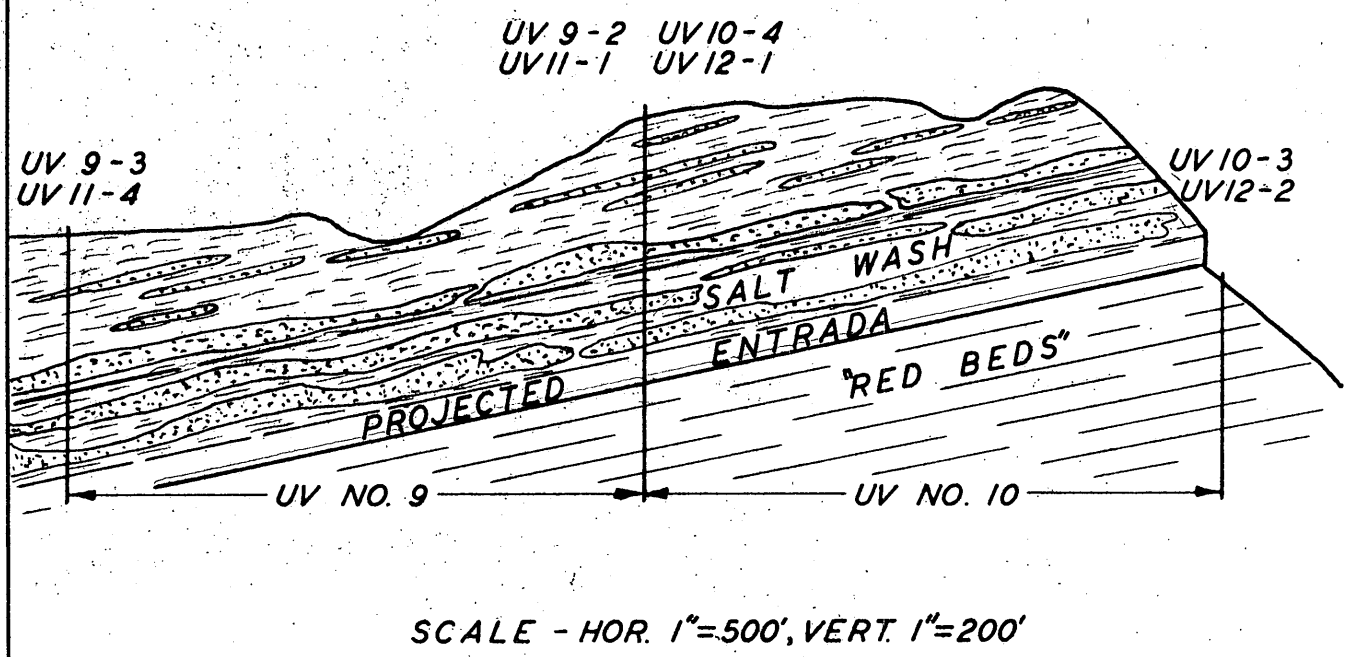
Average depth of drill holes in this area, as indicated by above Section B-B', would be approximately 240 feet to reach the "Red Beds".

Estimated Dip of the Entrada sandstone at this point is 12 degrees to the South.

Refer to Claim Map of UV Group, West Elk Mining District, Garfield County, Colorado.

(Theoretical Section - Brunton Survey)

Fig. 4



Upper red line denotes relative position of the ore horizon mined at both the Elk Van and the Allen workings. Position of the ore horizon mined with relation to the separate sandstone "Rims" (First, second, third, etc.) of the Salt Wash member of the Morrison Formation is not known due to overburden and talus obscuring the outcrops.

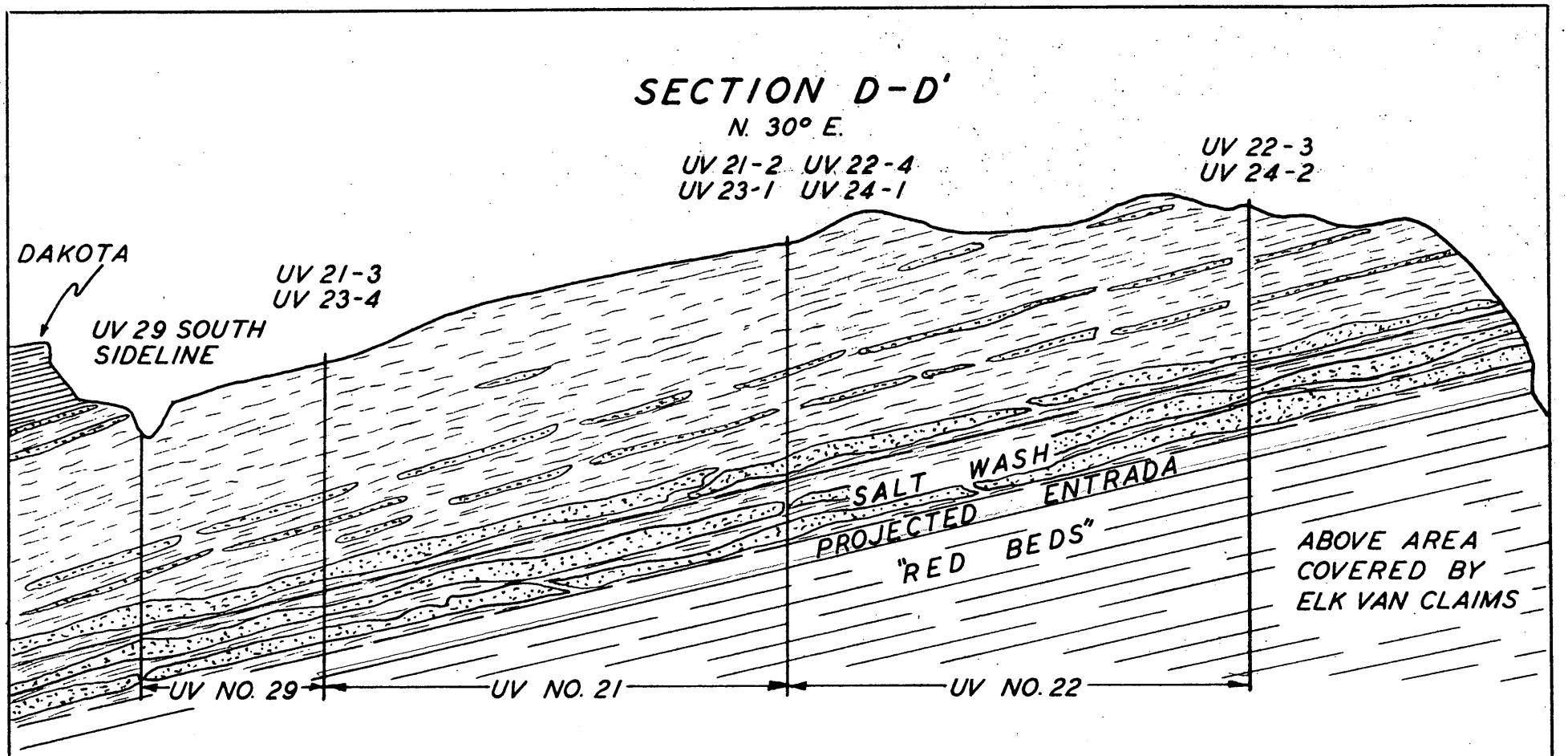
Drill holes should penetrate to the "Red Beds" to explore the altered zone at the top of the "Red Beds". Average depth of drill holes in this area, as indicated by above Section C-C', would be approximately 240 feet to reach the "Red Beds".

Estimated Dip of the Entrada sandstone at this point is 14 degrees to the South.

Refer to Claim Map of UV Group, West Elk Mining District, Garfield County, Colorado.

(Theoretical Section - Brunton Survey)

Fig. 5



SCALE - HOR. 1"=500', VERT. 1"=200'

(Refer to Claim Map of UV Group, West Elk Mining District, Garfield County, Colorado.)

Upper red line denotes relative position of the ore horizon mined at both the Elk Van and the Allen workings. Position of the ore horizon mined with relation to the separate sandstone "Rims" (First, second, third, etc.) of the Salt Wash member of the Morrison Formation is not known due to the overburden and talus obscuring the outcrops. Drill holes should penetrate to the "Red Beds" to explore the altered zone at the top of the "Red Beds", represented by the lower red line. Average depth of drill holes in this area, as indicated by the above Section D-D', would be approximately 350-400 ft. to reach the "Red Beds". Estimated Dip of the Entrada at this Section is 15 degrees to the South.

(Theoretical Section - Brunton Survey)

Fig. 6

sandstone lenses of the Salt Wash, rather than in the plated slate and mudstone beds that so far have produced the uranium ore.

Estimated cost of the exploratory program, as outlined, is as follows:

1.	Bulldozer work above the Entrada sandstone	$ 1,400
2.	Bulldozer work at the base of the Entrada	400
3.	(a) Drilling along road (1)	2,000
	(b) Preliminary drilling on top of rim (16 holes)	12,000
	(c) Additional development drilling (not estimated)	-
	Total contract work	$15,800
	Supervision, sampling, assaying, evaluating, and miscellaneous contingencies, approx. 10 per cent	1,700
	Total for preliminary exploratory program	$17,500

CONCLUSION

It is anticipated that the aforementioned exploratory program will demonstrate the economic possibilities of the property and will discover uranium ore bodies of commercial value.

In brief, the property has all of the salient features necessary to meet the accepted Geologic Guides established by the Geological Survey's program of exploration on the Colorado Plateau. The favorable criteria of thickness and color of the sandstone lenses, the underlying altered mudstones, the existence of carbonaceous materials in the sandstones, and the record of past production of commercial grade uranium ores are all present.

The program as suggested will consist of sampling of surface deposits exposed by bulldozer roads and trenches and the sampling and radiometric logging of subsurface structures through drill holes. It is felt that the

favorable factors considered in passing upon this property might be listed as follows:

(1) The strategic importance of the mineral involved--Carnotite, an ore of uranium and vanadium. The guaranteed price under the present schedule is until March 31, 1962. The Bonus for new production has been extended until February 28, 1947.

(2) As discussed under the description of the geology, the probabilities of the Salt Wash formations containing ore bodies are excellent.

(3) The availability of manpower, materials, supplies, equipment, and water are above average.

(4) The accessibility is far above average, being only two miles from a good yearly maintained gravel road and only eight miles from a U. S. paved highway.

(5) Production of a good-grade uranium-vanadium ore has come from two areas widely separated, even though very little prospecting or exploration have been done on any of the ground.

Respectfully submitted,

Norman Ebbley

Norman Ebbley, Mining Geologist

APPENDIX CONTENTS

1. Ore Settlements Allen Claims.

2. Ore Settlements (3) Elk Van Claims.

3. Excerpts Atomic Energy Commission Regulations for Purchasing Uranium-Vanadium Ores, March 1, 1951.

4. Excerpts from Atomic Energy Commission Circular on the Uranium Bonus, February 28, 1951.

5. Excerpts from Atomic Energy Commission Press Release, September 23, 1953, Extending Uranium Ore Price and Initial Production Bonus.

Appendix 1

ORE SETTLEMENTS FROM ALLEN CLAIMS

Date	Pounds (Dry)	Per Cent U_3O_8	Per Cent V_2O_5
12/8/49	4,440	0.20	2.00
7/24/50	12,410	0.13	3.91
8/21/50	1,370	0.08	4.12
11/28/50	7,590	0.28	3.35
7/24/51	14,270	0.10	2.34
8/24/51	200	7.10	9.14
	Weighted Averages	0.19	3.07

Above ore shipped to U.S.V. mill at Rifle, Colorado.

Appendix 2-1

UNITED STATES VANADIUM COMPANY
A Division of Union Carbide and Carbon Corporation

ORE SETTLEMENT

Receiving Station: Rifle, Colorado — Grand Junction, Colorado: May 22, 1951
Liquidation No. 1870 — Lot No. 14439 — Shipper's Lot No. 1
Bought of: Moscon Bros. & Olsen — A.E.C. License No. P-269
Address: RR #2, Elmwood Springs, Colorado — Date Received: 5-22-51
Type of Ore: Carnotite — Mining Claim: Elk Van Tunnel — Mining Tested: Mesa Verde, Garfield County — File No. B-N

Lot No.	Net Weight Pounds	% H_2O	Dry Weight Pounds	SETTLEMENT ASSAYS U_3O_8	V_2O_5	$CaCO_3$	CONTENTS POUNDS U_3O_8	V_2O_5	$CaCO_3$
	4340	3.6	4183.96	0.31	3.15		12.97	131.79	

PRICE FOR ABOVE CONTENTS (REVISED)

	Pounds	Per Lb.	Dry Short Tons	Per Ton	Value	Total Value
U_3O_8 Payment	12.97	3.50	2.09	21.70	45.40	
Development Allowance	12.97	.50	2.09	3.11	6.49	
Excess 4 lbs Per Ton 2.20 (Prem.)	4.60	.75	2.09	1.65	3.45	
Total U_3O_8 Payment						55.34
V_2O_5 Payment	131.79	.31	2.09	19.55	40.85	
Total V_2O_5 Payment						40.85
Haulage Allowance 17 Miles 2.17 Wet Tons @ .00 per wet ton mile						2.21
Total U_3O_8, V_2O_5 and Haulage Payment						98.40

I certify that I am the lawful owner or authorized Representative of the Lawful Owner of the Ore described in this Settlement Sheet and have legal right to deliver the same to the United States Vanadium Company, a Division of Union Carbide and Carbon Corporation.

I certify that I hold the A. E. C. Source Material License numbered above.

I hereby transfer to the United States Vanadium Company, a Division of Union Carbide and Carbon Corporation, effective as of the date of delivery of the ore, all my right, title and interest in and to said ore.

I will accept the amount as shown above as "Total U_3O_8, V_2O_5 and Haulage Payment" for sums due to me on account of the ore deliveries described herein.

Voucher Number	5-370	Date	5-22-51
Check Number	11863	Date	5-23-51
Approved for Payment			

Seller or Agent

2-51 3M-Wilson & Young

1 TB

Appendix 2-2

UNITED STATES VANADIUM COMPANY
A Division of Union Carbide and Carbon Corporation

ORE SETTLEMENT

Receiving Station Rifle, Colorado — Grand Junction, Colorado, August 24, 1951
Liquidation No. 2261 — Lot No. 16450 — Shippers Lot No. 3
Bought of Moscow Bros. & Olsen — A.E.C. License No. P-769
Address Route 2, Grand Junction, Colorado
Type of Ore Carnotite — Date Received 8-12-51
Mining Claim Elk Dam Tunnel — Mining District Unorganized Garfield County — File No. 8107

Lot No.	Net Weight Pounds	% H_2O	Dry Weight Pounds	SETTLEMENT ASSAYS			CONTENTS POUNDS		
				U_3O_8	V_2O_5	$CaCO_3$	U_3O_8	V_2O_5	$CaCO_3$
	8570	2.2	8381.46	0.22	1.03		18.44	86.33	

PRICED PER A.E.C. CIRCULAR NO. 5 Revised

	POUNDS	PER LB.	DRY SHORT TONS	PER TON	VALUE	TOTAL VALUE
U_3O_8 Payment	18.44	3.50	4.19	15.40	64.54	
Development Allowance	18.44	.50	4.19	2.20	9.22	
Excess 4 lbs per ton form	1.68	.75	4.19	.30	1.26	
Total U_3O_8 Payment						75.02
V_2O_5 Payment	86.33	.31	4.19	6.39	26.76	
Total V_2O_5 Payment						26.76
Haulage Allowance 17 Miles 4.29 Wet Tons @ .06 per wet ton mile						4.38
Total U3O8, V2O5 and Haulage Payment						106.16

I certify that I am the lawful owner or authorized Representative of the Lawful Owner, of the Ore described in this Settlement Sheet and have legal right to deliver the same to the United States Vanadium Company, a Division of Union Carbide and Carbon Corporation.

I certify that I hold the A. E. C. Source Material License numbered above.

I hereby transfer to the United States Vanadium Company, a Division of Union Carbide and Carbon Corporation, effective as of the date of delivery of the ore, all my right, title and interest in and to said ore.

The amount set opposite "Total U3O8, V2O5 and Haulage Payment" shown above constitutes the entire amount payable to me in respect of ore deliveries described herein and is accepted by me in full payment thereof.

Voucher Number	8-479	Date	8-27-51
Check Number	12787	Date	8-27-51
Approved for Payment			

Seller or Agent

6-51-1500 SENTINEL PRINTERS

1

Appendix 2-3

UNITED STATES VANADIUM COMPANY
A Division of Union Carbide and Carbon Corporation

ORE SETTLEMENT

Receiving Station Rifle, Colorado — Grand Junction, Colorado, July 5, 1951
Liquidation No. 2030 — Lot No. 15230 — Shippers Lot No. 2
Bought of Morrison Brown & Olsen — A.E.C. License No. P-769
Address Route 2 Glenwood Springs, Colo
Type of Ore Carnotite — Date Received 6-21-51
Mining Claim Elk Van Tunnel — Mining District Unorganized Garfield Co — Pile No. B1N

Lot No.	Net Weight Pounds	% H_2O	Dry Weight Pounds	SETTLEMENT ASSAYS U_3O_8	SETTLEMENT ASSAYS V_2O_5	SETTLEMENT ASSAYS $CaCO_3$	CONTENTS POUNDS U_3O_8	CONTENTS POUNDS V_2O_5	CONTENTS POUNDS $CaCO_3$
	7830	4.8	7454.16	0.22	2.84		16.40	211.70	

PRICED PER A.E.C. CIRCULAR NO. 5 Revised

	POUNDS	PER LB.	DRY SHORT TONS	PER TON	VALUE	TOTAL VALUE
U_3O_8 Payment	16.40	2.50	3.73	15.29	57.40	
Development Allowance	16.40	.50	3.73	2.20	8.20	
Excess 4 lbs per ton premium	1.48	.75	3.73	.30	1.11	
Total U_3O_8 Payment						66.71
V_2O_5 Payment	211.70	.31	3.73	19.60	65.63	
Total V_2O_5 Payment						65.63
Haulage Allowance 17 Miles 3.92 Wet Tons @ .06 per wet ton mile						4.00
Total U3O8, V2O5 and Haulage Payment						136.34

I certify that I am the lawful owner or authorized Representative of the Lawful Owner, of the Ore described in this Settlement Sheet and have legal right to deliver the same to the United States Vanadium Company, a Division of Union Carbide and Carbon Corporation.

I certify that I hold the A. E. C. Source Material License numbered above.

I hereby transfer to the United States Vanadium Company, a Division of Union Carbide and Carbon Corporation, effective as of the date of delivery of the ore, all my right, title and interest in and to said ore.

The amount set opposite "Total U3O8, V2O5 and Haulage Payment" shown above constitutes the entire amount payable to me in respect of ore deliveries described herein and is accepted by me in full payment thereof.

Voucher Number	7-133	Date	7-6-51
Check Number	9957	Date	7-6-51
Approved for Payment	[signature]		

Seller or Agent

8-51—1500 SENTINEL PRINTERS

Appendix 3

EXCERPTS FROM ATOMIC ENERGY COMMISSION REGULATIONS

FOR PURCHASING URANIUM-VANADIUM ORES

Effective March 1, 1951

"(Domestic Uranium Program Circular 5, Revised)

"PART 60 - DOMESTIC URANIUM PROGRAM

"GUARANTEED MINIMUM PRICE FOR URANIUM-BEARING CARNOTITE-TYPE OR ROSCOELITE-TYPE ORES OF COLORADO PLATEAU AREA

. . .

"Section 60.5 (c) Definitions. As used in this section and in 60.5a, the term 'buyer' refers to the U. S. Atomic Energy Commission, or its authorized purchasing agent. The term 'ore' does not include mill tailings or other mill products. The term 'seller' refers to any person offering uranium ores for delivery to the Commission. Weights are avoirdupois dry weights, unless otherwise specifically provided.

"(d) Deliveries of not to exceed 1,000 tons per year. To aid small producers, any one seller may deliver without a written contract but otherwise in accordance with this circular up to, but not exceeding, 1,000 short tons (2,000 pounds per ton) of ores during any calendar year.

"(e) Deliveries in excess of 1,000 tons per year. Sellers desiring to deliver in excess of 1,000 short tons (2,000 pounds per ton) of ores during any calendar year will be required to enter into a contract with the Commission providing for, among other things, a rate of delivery and the total quantity of ore to be delivered.

"(f) Delivery. Seller, at his own expense, shall deliver and unload all ores at the buyer's depot at Monticello, Utah. Deliveries shall be in lots of not less than 10 short tons (2,000 pounds per ton) unless special arrangements have been agreed upon by buyer, but such lots may be delivered in more than one load. Days and hours during which ore may be delivered will be posted at the depot.

"(g) Weighing, sampling and assaying. Buyer will bear the cost of weighing, sampling, and assaying. The net weight of each load will be determined by the buyer's weighmaster on scales which will be provided by the buyer at or in the vicinity of the purchase depot and such weight will be accepted as final. A weight ticket will be furnished seller or his representative for each load. Each lot of ores will be sampled promptly by the buyer according to standard practice and such sampling will be accepted as final. . . .

"(h) Payment. Buyer will make payment promptly but payment will not be made until an entire minimum lot of ten short tons (2,000 pounds per ton) has been delivered and accepted, unless special arrangements have been agreed upon by buyer, in which case there may be an extra charge for assaying and sampling. Moisture determinations, analyses and settlement sheets, together with the check in payment, will be mailed to seller. . . .

"60.5a. Schedule I; minimum prices, specifications, and conditions--(a) Prices. Payment for delivery of the ores will be computed on the following basis:

"(1) Uranium. (i) Ores assaying less than 0.10 percent: no payment. Any such ores which are delivered to the purchase depot shall, unless otherwise specifically agreed to by buyer, become the property of the buyer as liquidated damages for buyer's expense of weighing, sampling, and assaying, and after sampling may be placed in process, comingled, or otherwise disposed of by buyer. If seller has any question as to the quality of his ore, it is suggested that before shipment and delivery to the purchase depot a representative sample be submitted to the buyer or to one of the umpires for assay at seller's expense. The buyer at its discretion may assay a limited number of samples without charge.

"(ii) Ores assaying 0.10 percent U_3O_8 and more, as follows:

U308 Assay:	Payment per Pound U308
0.10 percent	$1.50
0.11 percent	1.70
0.12 percent	1.90
0.13 percent	2.10
0.14 percent	2.30
0.15 percent	2.50
0.16 percent	2.70
0.17 percent	2.90
0.18 percent	3.10
0.19 percent	3.30
0.20 percent and more	3.50

"(iii) Premiums on uranium: $0.75 per pound for each pount of U_3O_8 in excess of 4 pounds U_3O_8 per short ton (2,000 pounds per ton) of ore and an additional premium of $0.25 per pound for each pound in excess of ten pounds U308 per short ton. Fractional parts of a pound will be paid for on a pro rata basis to the nearest cent.

"(2) Vanadium. V_2O_5 at $0.31 per pound up to, but not exceeding, ten pounds of V_2O_5 for each pound of U_3O_8 contained in ores. No factor will be included for V_2O_5 in excess of ten pounds for each pound of U_3O_8, although

buyer may, from time to time, publicly announce that, for limited periods by written agreements with individual producers, V_2O_5 in excess of ten-to-one will be paid for. Any such announcement will be made by posting a notice to this effect at the Monticello depot and through such other channels as are deemed suitable to achieve maximum dissemination among producers. Excess V_2O_5 shall be deemed to be buyer's property.

"(3) Allowances. (i) A development allowance of $0.50 per pound U_3O_8 contained in ores assaying 0.10 percent U_3O_8 or more in recognition of the expenditures necessary for maintaining and increasing developed reserves of uranium ores. Fractional parts of a pound will be paid for on a pro rata basis to the nearest cent. Sellers accepting this allowance are deemed to agree to spend such funds for the development or exploration of their properties. Sellers delivering less than 1,000 short tons per calendar year will not be required to submit an accounting record of expenditures for development or exploration pursuant to this agreement but sellers delivering in excess of 1,000 short tons per calendar year will be required, under the terms of their contracts, to submit proof satisfactory to the Commission that funds equivalent to the amount received as development allowance have been spent for development or exploration either during the contract period or within six months thereafter, unless otherwise provided in the contract.

"(ii) A haulage allowance of 6¢ per ton mile for transportation of ore paid for under §§60.5 and 60.5a from the mine where produced to the purchase depot specified by the Commission, up to a maximum of 100 miles. The haulage distance from the mine to the purchase depot will be determined by the Commission and its decision will be final. Tonnages for purposes of this allowance shall be calculated on the basis of natural weights rather than dry weights.

"(4) Adjustment of assays. Assays shall be adjusted to the nearest 0.01 percent for purposes of payment.

"(b) Quality and size. Ores will not be accepted by buyer under §§60.5 60.5a which, in buyer's judgment:

"(1) Contain less than 0.10 percent U_3O_8;
"(2) Contain more than three parts of lime ($CaCO_3$) to one part of V_2O_5, or a total of more than 6 percent lime in the ore;
"(3) Contain impurities deleterious to buyer's extraction process or for any other reason are not amenable to it;
"(4) Contain lumps in excess of twelve inches in size.

"NOTE: The Commission will be interested in discussing arrangements for delivery to it of types of uranium-bearing materials other than those for which guaranteed prices have been established, such as tailings, mill products, and ores of types not acceptable under §§60.5 and 60.5a.

"(60 Stat. 755-775; 42 U. S. C. 1801-1819. Interpret or apply sec. 5, 60 Stat. 761, 42 U. S. C. 1805)

"Effective March 1, 1951 through March 31, 1958.

"Dated at Washington, D. C., this 26th day of February 1951.

"By order of the Commission.

M. W. Boyer, General Manager"

Appendix 4

EXCERPTS FROM AEC CIRCULAR ON THE URANIUM BONUS

February 28, 1951

"1. Effective March 1, 1951, to March 1, 1954, the Commission will pay a new graduated bonus of up to $35,000, depending upon the quantity and grade of ore, for initial production and delivery of acceptable uranium ore from new and certain existing mining properties.

"The new bonus, which is described in AEC Domestic Uranium Program Circular No. 6, 'Bonus for Initial Production of Uranium Ore from Domestic Mining Properties,' to be issued shortly, provides for the following:

"1. For new mining properties, bonus payments will be made on each pound of uranium oxide in acceptable ore delivered to qualified mills or Commission ore-buying stations up to and including the first 10,000 pounds.

"2. For mining properties which have produced less than 10,000 pounds of uranium oxide during the period April 9, 1948, to March 1, 1951, bonus payments will be made on the difference between what the mining property has delivered between April 9, 1948, and March 1, 1951, and 10,000 pounds. For example, the owner of a mine that has produced 4,000 pounds of uranium oxide between April 9, 1948, and March 1, 1951, may be eligible to receive a bonus on each new pound produced up to and including the next 6,000 pounds.

"3. Bonus payments per pound of uranium oxide in acceptable ores produced from qualified mining properties will range from $1.50 for those ores assaying 0.10% uranium oxide to $3.50 for ores assaying 0.20% or more. Thus the maximum bonus which may be obtained for production from new mines will range from $15,000 to $35,000, depending upon the grade of ore delivered.

"Payments under the new bonus plan will be made for all eligible ores purchased after March 1, 1951. Payments will be made directly by the Commission and not by the receiving station or mill, and will be in addition to purchase payments made pursuant to ore buying schedules. Before bonus payments will be made, the producer must make application to the Commission and the Commission must certify that the mine is eligible for the bonus."

Appendix 5

EXCERPTS FROM AEC PRESS RELEASE, SEPTEMBER 23, 1953,

EXTENDING URANIUM ORE PRICE AND INITIAL PRODUCTION BONUS

"The Commission's Domestic Uranium Program Circular 5, Revised, has been extended to cover the period through March 31, 1962, from its previous expiration date of March 31, 1958. This circular, which went into effect on March 1, 1951, provides guaranteed minimum base prices for the uranium oxide content of carnotite-type and roscoelite-type ores of the Colorado Plateau area. The price schedule ranges from $1.50 to $3.50 per pound of uranium oxide content, depending upon the grade of the ore, together with certain allowances and premiums.

"Domestic Uranium Program Circular 6, which established a bonus for initial and certain other production of uranium ores from domestic mines delivered under its terms between March 1, 1951 and February 28, 1954, now has been extended through February 28, 1957."

REPORT ON

CERTAIN MINING CLAIMS AND SCHOOL SECTIONS

in the

THOMPSONS DISTRICT, GRAND COUNTY, UTAH

•

COMPRISING 1,455 ACRES

in the

YELLOW CAT AREA

•

NORMAN E. EBBLEY

Mining Geologist

— 1954 —

March 15, 1954

Mr. S. L. R. McNichols
Mr. Philip Shaiman
Mr. Lew Williams
Mr. Robert Williams

Gentlemen:

Pursuant to your request, I am herewith submitting for your consideration a report on certain mining claims and Utah State School Sections, which our group controls, in the Yellow Cat area, Thompsons District, Grand County, Utah. Specifically the ground includes (all in S.L.M., Grand County, Utah):

Sec. 2, T. 23 S., R. 21 E. and Sec. 2, T. 23 S., R. 22 E.
Silver Top Claims, 1 thru 5, Sec. 34, T. 22 S., R. 22 E.
Mack Claims, 1 thru 6, and 1 thru 3, (total nine)
Sec. 6, T. 23 S., R. 23 E.
Mack Claims, 4 thru 6, Sec. 7, T. 23 S., R. 23 E;
Mack Claims 2 & 3, Sec. 5, T. 23 S., R. 23 E.

The report covers the geology of the area, production records, and a suggested plan for an exploratory drilling program.

In my estimation, the properties discussed in this report have considerable merit. The Yellow Cat is recommended as an excellent area in which additional commercial uranium-vanadium ore bodies are likely to be discovered. Recently discovered major ore deposits and trends of favorable sandstone channels adjacent to areas controlled by our group indicate the advisability of an exploratory drilling program, estimated to cost $100,000.

Yours very truly,

Norman E. Ebbley

NEE:plw

Enclosure

Report on

CERTAIN MINING CLAIMS AND SCHOOL SECTIONS

in the

THOMPSONS DISTRICT, GRAND COUNTY, UTAH

Comprising 1,455 Acres

in the

Yellow Cat Area

NORMAN E. EBBLEY

Mining Geologist

-1954-

ABSTRACT

This report describes the uranium-vanadium potential of nineteen mining claims and two Utah State School Sections, totalling 1,455 acres, located in the Thompsons Area, Grand County, Utah. Included in the report is a description of the geologic features of the area with accompanying geologic maps. An endeavor has been made to appraise the ground with reference to guides established by past Geologic Survey drilling on adjacent properties.

It has been stressed that, although the government has drilled over 1,700 core and wagon drill holes in the general area much of the past drilling is now considered to have been too shallow. A concentration of over 1,000 holes in one area of only two square miles has established a definite fourth rim ore-bearing sandstone channel. Iso-pack mapping of the sandstone thicknesses shows that the favorable sandstone channel runs east and west, and it is apparent that further drilling endeavoring to extend the channel into the ground covered by this report is warranted.

Recent discoveries of rich ore deposits in this channel foreshadows an economic revival of the district. Recently drilled ore bodies, now being developed preparatory to mining, indicate proven reserves several times greater than the total past production from the Thompsons area.

The almost total lack of exploratory drilling of the fourth sandstone rim in any of the ground discussed in this report points to the advisability of a combination core and wagon drilling program. It is anticipated that a preliminary exploration program, as outlined in this report, will cost approximately $100,000, and will establish commercial ore bodies of uranium-vanadium ores.

INTRODUCTION

General - Colorado Plateau Area

Vanadium and uranium ores have been found to occur widely distributed throughout Western Colorado and Eastern Utah and recently commercial deposits have been found and mined in South Dakota, New Mexico, Arizona and Wyoming.

The majority of the ore occurrences are replacement deposits and impregnations of rare minerals in the Salt Wash member of the Morrison formation of upper Jurassic age and in the Shinarump Conglomerate of Triassic age.

The economic history of uranium prior to 1942 is well covered by several publications, a few of which are listed.[1/] From the start of the last World War the production figures of radioactive materials have been highly restricted information. The Atomic Energy Act of 1946 "for the

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1/De Ment, J., and Dake, H. C., "Uranium and Atomic Power", New York, Chemical Pub. Co., 1941; rev. edition, 1945; "Rarer Metals", New York, Chemical Pub. Co.

De Ment, J., and Dake, H. C., "Uranium Minerals Handbook", Mineralogist Pub. Co., 1945

Thom, E. M., "Bibliography of North American Geology", 1929-1949, U. S. Geol. Survey Bull. 937(1944); 1940 and 1941, Ibid., Bull. 938(1942); 1942 and 1943, Ibid., Bull. 949(1945)

Tyler, P.M., "Radium", U. S. Bureau Mines Inf. Circ. 6312(1930)

U. S. Atomic Energy Commission, "Selected Bibliography on Atomic Energy", Washington, 1948

Fisher, R. P., "Vanadium Deposits of Colorado and Utah", U. S. Geol. Survey Bull., 1942

development and control of atomic energy" provided for a Domestic Uranium Program which established a graduated price schedule for domestic ores.

The Atomic Energy Commission's first policy was outlined in Circular No. 3, dated April 9, 1948. The initial price schedule proved to be too low, as the majority of the ore producers were suffering a loss in their operations. Accordingly, the Commission issued Circular No. 5, effective February 1949, alleviating to some extent the small producer's plight.

Increased material and labor costs again forced the Commission to revise its policy price-wise, and on March 1, 1951, the price schedule was raised and extended through March 31, 1958.[2/] On September 23, 1953, the same price schedule was extended to cover the period through March 31, 1962.[3/] An initial production bonus, under Domestic Uranium Program Circular No. 6, established March 1, 1951,[4/] was, on September 23, 1953, extended through February 28, 1957.[5/] It has been recently announced by the Atomic Energy Commission that the payments under the production bonus are now amounting to approximately $3,000,000 a year.

At the present time production of uranium-vanadium type ores has far out-distanced the milling phase of the program. The number of mills in the area having an estimated combined capacity of about 1,700 tons per

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2/ See Appendix No. 3

3/ See Appendix No. 5

4/ See Appendix No. 4

5/ See Appendix No. 5

day will consequently have to be increased to prevent the further accumulation of excessive stockpiles that present a possible economic hazard for the processing companies. At present the mining of uranium ores is actively and openly being curtailed by the United States Vanadium Corporation and other producers of semi-amenable ores. The milling companies are naturally limited in their ability to carry large inventories of purchased ores in their stockpiles as they are not reimbursed for the payment to the miner for these ores until they have produced a refined product which they in turn can sell to the Atomic Energy Commission. However, even under the best of conditions, it would be eighteen months to two years before proposed new mills could be put into operation.

LOCATION AND ACCESSIBILITY

The Thompsons area has its long axis east and west and lies approximately six miles south of the road running between Cisco and Thompsons, Utah. Refer to Index map, Figure No. 1. The area embraces about 200 square miles of territory in the Canyon Lands Subdivision of the Colorado Plateau. At the present time there are two partially graveled roads running from the main east-west highway south into the Yellow Cat area, which is in the center of the area under consideration. A recent appropriation has been earmarked to build a new all-weather highway due south from the main highway into the center of the Yellow Cat area.

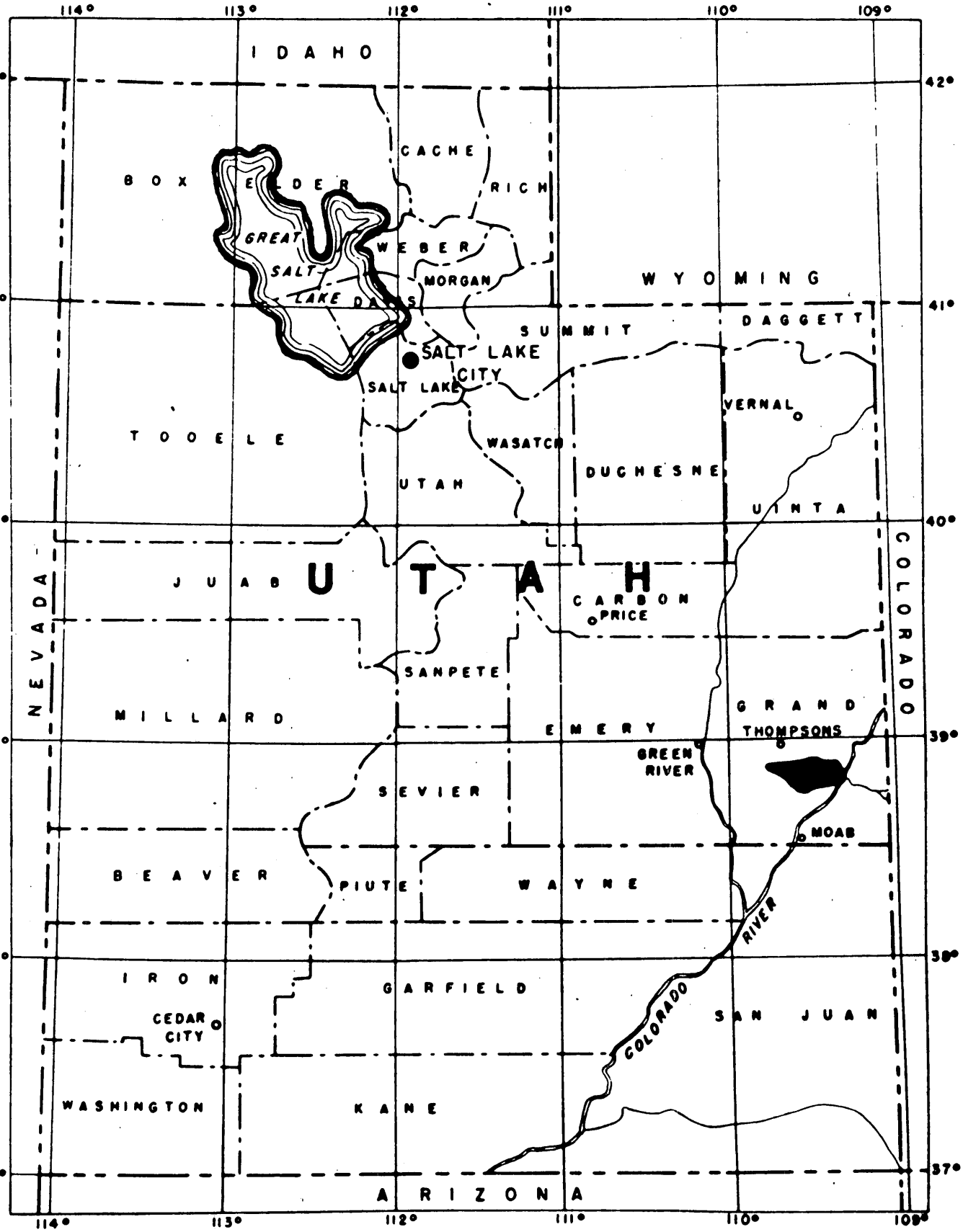


FIGURE 1 INDEX MAP OF UTAH SHOWING LOCATION OF THOMPSONS AREA

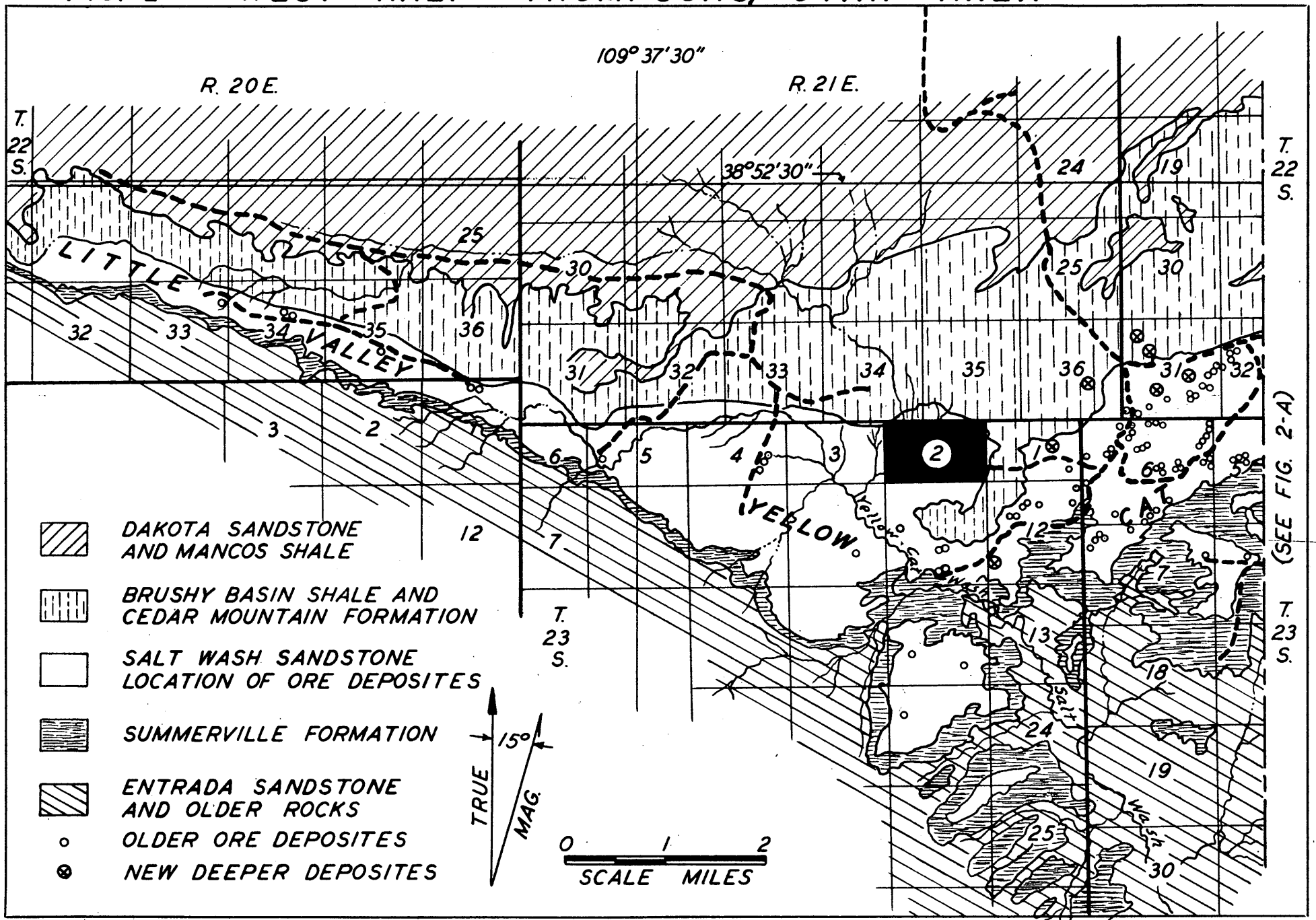
Figures 2 and 2A are vicinity maps showing the location of the property under consideration. Although the area is criss-crossed with arroyos and gulches, there are no perennial, through-flowing, streams with the exception of the Colorado River which flows southwesterly a few miles south of the general area. Road construction within the area itself is no problem as the surface overlying the Salt Wash formation is comparatively flat, it being possible to drive a jeep almost anywhere in the area even without the benefit of roads. Mining machinery and supplies are available in Grand Junction, Colorado, 80 miles east of Thompsons, and in Moab, Utah, approximately 40 miles south of Thompsons.

PHYSICAL FEATURES AND CLIMATE

Topographically, the area under consideration is of moderate relief. The roads into the area from the main highway traverse relatively flat, rolling country and then drop only slightly into the vicinity of the Yellow Cat mines. The exposed Salt Wash formation extends east and west about twenty-five miles and varies in width from one-half mile to two and a half miles north and south.

There is very little vegetation of any sort in the area with almost no trees. The Thompsons and surrounding area is primarily used as a winter grazing range for sheep. The climate is typical of east-central Utah and of west-central Colorado characterized by hot dry summers and cold winters. Rainfall is light. The U. S. Weather Bureau records, taken at Thompsons, show an annual average percipitation of 8.5 inches

FIG. 2 WEST HALF THOMPSONS, UTAH AREA



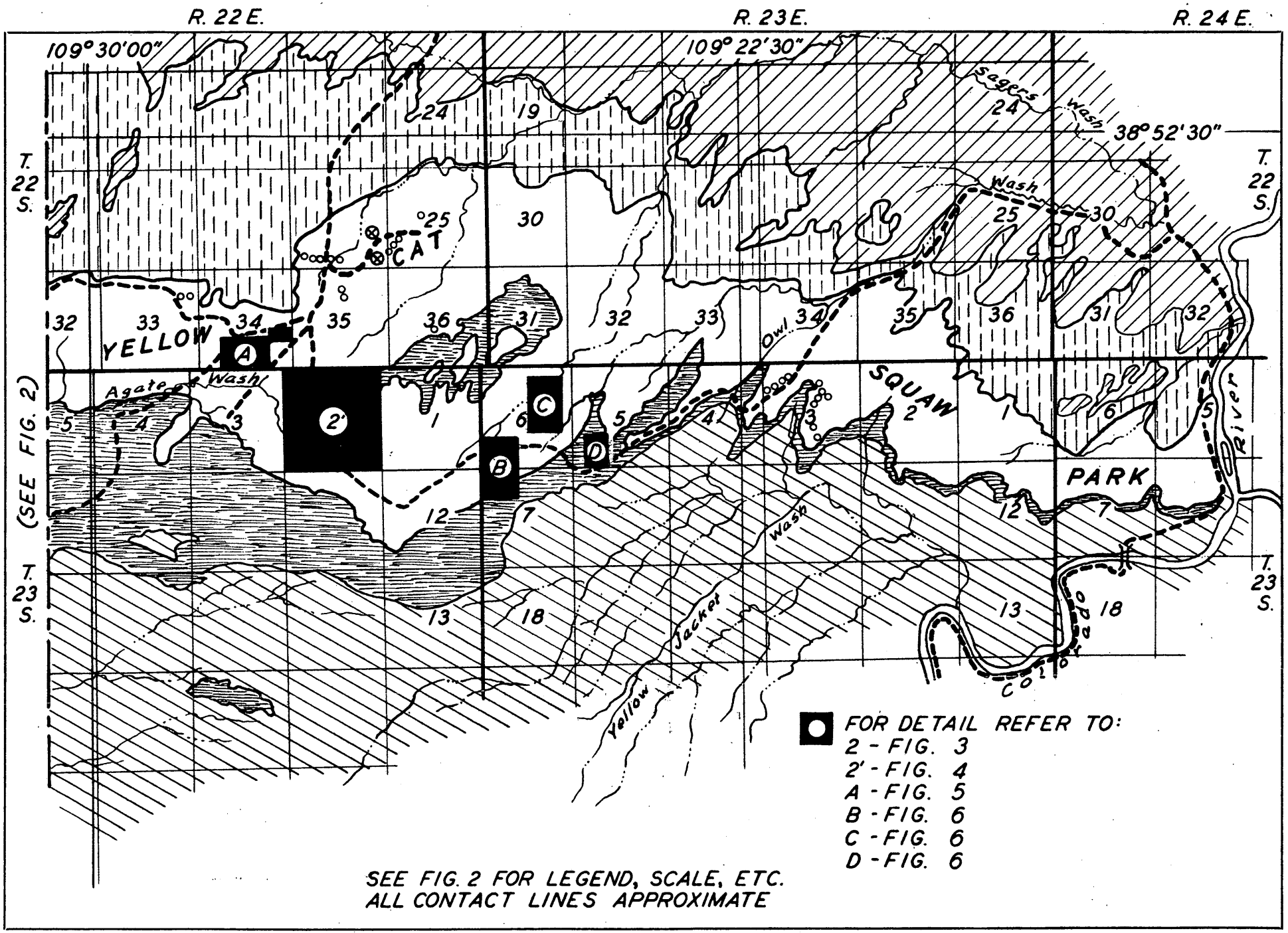


FIG. 2A EAST HALF THOMPSONS, UTAH AREA

over a period of thirty-three years. The coldest month is January, having an average mean temperature of 22 degrees above zero, compared with the hottest month, July, which has an average mean temperature of 83.4 degrees.

LABOR AND LIVING CONDITIONS

Grand Junction, which is the center of uranium mining activities, has a population of about 25,000 people. The increasing interest in uranium and the decline of Colorado's once thriving lead-zinc-silver mining industry and the closing of a large percentage of Colorado's coal mines have resulted in an influx of experienced hardrock miners--more than the uranium industry can absorb. Consequently, labor at the present time is no problem.

Base wages for common labor vary from $1.25 to $1.50 per hour. Experienced miners obtain from $1.75 to $2.00 per hour; diamond drill operators, $2.50 per hour; and carpenters and bulldozer operators, from $2.50 to $3.00 per hour.

The cost of food and supplies is normal to the whole of Colorado and Utah. Most camp boarding houses in the uranium field operate at a cost of from $2.50 to $3.00 per man per day. There are no housing facilities in the Yellow Cat area and the present operating companies are transporting their personnel back and forth from Thompsons and Cisco where there is limited living quarters.

HISTORY 6/

General - Colorado Plateau Area

Radioactive minerals were known to exist in the sandstones of Western Colorado as early as 1880. Deposits of vanadium and uranium ores, now known as Carnotite, were first produced on a small scale in 1898, and from 1911 to 1923 these deposits were worked extensively for radioactive uranium ores principally for the radium content. As early as 1910 several large companies acquired properties in the region and shipments of carnotite ore to radium extraction plants in France were made. Similar plants were built in the United States which produced 10.5 grams of radium in 1913, and 22.4 grams in 1914.

An almost complete cessation of mining activity occurred in 1915 due to the discovery of the rich uranium deposits of the Belgium Congo. A mill and roasting plant at Uravan, having a capacity of 125 tons per day, was completed in 1936 by the United States Vanadium Corporation. About the same time smaller plants were built at Cedar and Gateway, Colorado. By 1938, after the period of comparative inactivity, production primarily for vanadium had achieved respectable proportions and new impetus was given to the production of this metal by the United States entry into World War II in December 1941. During the war years several

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6/Fischer, R. P., "Vanadium Deposits of Colorado and Utah"; U. S. Geol. Survey Bull. 936-P, 1943, P. 363-394

Stokes, Wm. Lee, "Uranium-Vanadium Deposits of the Thompsons Area, Grand County, Utah", Utah Geol. and Minerological Sur. Bull. 46, 1952

new treatment plants for vanadium ores were completed in the area. At that time it was not publicly known that uranium was of major interest at these plants. New plants to beneficiate these ores were built at Monticello, Utah; and Durango, Colorado, and older plants were rehabilitated at Naturita and Uravan, Colorado.

Due to the small, irregular-shaped, ore bodes the extra production necessary to keep the mills at full capacity had to come from the small operators whose funds generally did not permit them to maintain the necessary development and exploratory programs ahead of actual mining operations. A survey by government agencies indicated that an extensive exploratory program would be necessary to maintain production and accordingly the U. S. Bureau of Mines in 1941 began a drilling program on a cooperative basis with the Geological Survey. The Survey's phase of the program was to furnish maps, suggest drill sites, and log drill cores. The principle objective of this program was to enlarge the known ore bodies by development drilling rather than to discover new ore bodies by exploratory drilling, although consideration was also given to this phase of the program. As a result of the Bureau's drilling program approximately 16,000 tons of ore valued at $270,000 was mined by the small operators throughout the area while the project was in operation. When the Bureau's program was finished in December 1943, a total of 895 diamond core drill holes were completed having a total length of 38,510 feet.

The smaller producers in the region were forced to cease operations in December 1943 due to increased imports of foreign uranium and vanadium ores which caused the demand for domestic ores to decline markedly.

The Geological Survey had begun a systematic investigation of the Colorado Plateau Area as early as 1939, and in 1947 both the Geological Survey and the Atomic Energy Commission launched a full-scale geologic and exploratory drilling program to determine the actual uranium potential of the Plateau. While centering attention on the direct problem of finding uranium reserves, the investigation, in addition, has assembled general as well as specific information in the belief that all of it sooner or later will be found to be pertinent to the "classification, examination and preparation of plans for complete development" of the uranium country. The Atomic Energy Commission through their Grand Junction Operations Office have been the center of all activity being carried out in the uranium-vanadium region.

Thompsons Area

As seen in Index Map, Fig. 1, the Thompsons area is located in central Eastern Utah near the Colorado-Utah border. The specific area in question is situated on the northeast flank of the Salt Valley anticline in Grand County, Utah. The ore occurrences are found in the Salt Wash member of the Morrison Formation and occur through a vertical range of 200 feet, from the upper conglomerate member of the Salt Wash to within 50 or 60 feet of the underlying Summerville Formation.

In 1942 the Geological Survey initiated a program of geologic studies in the Thompsons area as an integral part of the general survey of domestic uranium-vanadium reserves. Investigations of the area by the Geological Survey were under the direction of R. P. Fischer. Geologic features of the area were mapped on aerial photographs by Wm. Lee Stokes in 1943, and 1944. Topographic and geologic maps were completed of the central part of the Thompsons area which is known as the "Yellow Cat" in 1943, as most of the important deposits of ore were first developed in this area. From 1951 through 1953 the Survey carried out an extensive diamond drilling program mainly in the Yellow Cat vicinity but extending easterly to the Squaw Park area, a distance of approximately twelve miles. The drilling was confined entirely to the Salt Wash Formation--the preliminary drilling being done on a widely-spaced grid pattern for geologic and subsurface structural information. Unfortunately the major part of this drilling proved later to be too shallow as it explored only the upper Salt Wash rims below the Brushy Basin Formation. Approximately a year ago considerable deeper drilling was done in the central Yellow Cat area, which previously had produced most of the ore. This deeper drilling proved to be very successful and explored and developed five or six large and valuable ore bodies in what is probably the fourth rim below the base of the Brushy Basin formation. This ore would lie from 160 to 200 feet stratigraphically below the horizon that had produced the early ore in the district as exemplified by the Cactus Rat ore occurrence in the upper sandstone

conglomerate. At the present time five of these lower ore bodies are being developed by inclines and shafts. The recent deeper drilling by the Survey indicates that although over 1,700 exploratory holes have been drilled in the Yellow Cat area the largest percentage of these must be discounted as being too shallow to explore the horizon containing the newly discovered ore bodies. In other words, most of this area must be re-drilled; not only on closer centers but to depths that will reach the fourth and even fifth rims, directly over the Summerville formation.

PROPERTY AND OWNERSHIP

The property discussed in this report includes 19 unpatented mining claims and two Utah State School Sections:

	Approx. Acres
Sec. 2, T. 23 S., R. 21 E., S.L.M., Grand County, Utah	
Refer to Fig. No. 3 for detail of Section.	
Utah State School Section all embraced in Uranium Mineral Lease No. M.L.A. No. 4248 in the name of Norman Ebbley	397.76
Sec. 2, T. 23 S., R. 22 E., S.L.M., Grand County, Utah	
Refer to Fig. No. 4 for detail of Section.	
Utah State School Section all embraced in Uranium Mineral Lease No. M. L. A. No. 4249 in the name of Norman Ebbley	665.04
Sec. 34, T. 22 S., R. 22 E., S.L.M., Grand County, Utah	
Refer to Fig. No. 5 for detail of claims.	
Silver Top No. 1 Claim	20.66
Silver Top No. 2 Claim	20.66
Silver Top No. 3 Claim	20.66
Silver Top No. 4 Claim	20.66
Silver Top No. 5 Claim	20.66

Sec. 6, T. 23 S., R. 23 E., S.L.M., Grand County, Utah	
Refer to Fig. No. 6 for detail of claims.	
Mack No. 1 Claim	20.66
Mack No. 2 Claim	20.66
Mack No. 3 Claim	20.66
Mack No. 4 Claim	20.66
Mack No. 5 Claim	20.66
Mack No. 6 Claim	20.66
Mack No. 1 Claim (in addition to No. 1 above)	20.66
Mack No. 2 Claim (in addition to No. 2 above)	20.66
Mack No. 3 Claim (in addition to No. 3 above)	20.66
Sec. 7, T. 23 S., R 23 E., S.L.M., Grand County, Utah	
Refer to Fig. 6 for detail of claims.	
Mack No. 4 Claim	20.66
Mack No. 5 Claim	20.66
Mack No. 6 Claim	20.66
Sec. 5, T. 23 S., R. 23 E., S.L.M., Grand County, Utah	
Refer to Fig. 6 for detail of claims.	
Mack No. 2 Claim	20.66
Mack No. 3 Claim	20.66
Total acres	1,455.34

Equivalent in area to 72.7 mining claims.

Refer to Figs. 2 and 2A for locations of described property. Under the regulations of the Utah State Land Board, the State receives a royalty of 12½ per cent net mill on all ores produced and sold from school sections. Refer to Appendix No. 2 for excerpts from the Utah State Land Board Lease Agreements on school sections.

The mining claims are under option to purchase by Senator S. L. R. McNichols, 728 Symes Building, Denver, Colorado; Philip Shaiman, 228 Cooper Building, Denver, Colorado; Senator Lew Williams, Norwood, Colorado; Robert Williams, Norwood, Colorado; and Norman Ebbley, Box 883, Grand Junction, Colorado. The school sections listed are held under lease in equal share by the above mentioned parties.

ORE DEPOSITS

General Geology 7/

The rocks exposed in the Thompsons area consist entirely of sediments of Jurassic and Cretaceous age. The broad valley traversed by the highway between Cisco and Thompsons is composed of Mancos shale, a soft, gray, homogeneous formation that usually erodes into low rolling topography. Many of the lower beds in the Mancos shale contain organic content and certain beds are highly bituminous. Directly underlying the Mancos shale is the Dakota sandstone, a relatively hard formation that caps irregular mesas and forms cliffs and dip slopes above the more easily eroded Cedar Mountain formation. The Dakota is a wide spread continental formation made up of inter-stratified shales, sandstones and conglomerates with minor carbonaceous beds. The formation varies in thickness in this particular area from 40 to 110 feet, and a predominance of chert and quartzite pebbles are found in the lower part of the formation. A resistant bed at the base forms a wide dip slope.

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7/Coffin, R. C., 1921, "Radium, Uranium, and Vanadium Deposits of Southwestern Colorado", Colorado Geol. Survey Bull. 16

Fischer, R. P., 1950, "Uranium-Bearing Sandstone Deposits of the Colorado Plateau", Econ. Geol., vol. 45, pp. 1-11

Fischer, R. P., Hilpert, L. S., Schumacher, J. I., Cater, F. W., Strobell, J. D., Jr., Crain, L. C., Phoenix, D. A., and Trace, R. D., 1951, "Summary of Investigations Through 1950 of the Carnotite-bearing Sandstones of the Colorado Plateau" (report, in files of the U. S. Geol. Survey)

Dane, C. H., "Geology of the Salt Valley Anticline and Adjacent Areas, Grand County, Utah", U. S. Geol. Survey Bull. 863, 184 pp., 1935.

Work cited in footnote No. 6

Directly beneath the Dakota sandstone is found the Cedar Mountain formation, formerly mapped as upper Morrison, and for this reason has not been differentiated from the Brushy Basin on the geologic maps, Figs. 2 and 2A. The rock composition of the Cedar Mountain formation and the underlying Brushy Basin shale is very similar, both containing a predominence of mudstone, having varied colored tints with many calcareous nodules and lenses of siltstone, and conglomerate. The total thickness of the Cedar Mountain formation is approximately 110 feet. The bottom marker bed is a quartzitic conglomerate about 15 feet in thickness and forms a more persistent cliff and horizon marker than the Dakota sandstone. Underlying the Cedar Mountain is found the Morrison formation which is broken down into two members----the upper member, the Brushy Basin shale, and the lower member, the Salt Wash sandstone. The Brushy Basin shale in the Yellow Cat area reaches a thickness of over 300 feet and consists mainly of banded mudstones and shales varying in colors from pink-red to yellow and brown. The formation contains a few thin lenses of grey coarse sandstone which are very lenticular in shape, and that form vertical cliffs where eroded.

The lower part of the Morrison formation, the Salt Wash sandstone member, has a thickness of over 230 feet in the Yellow Cat area. The contact between the Salt Wash sandstone and the Brushy Basin shale is not a definite stratigraphic plane but is usually determined by the local position of the uppermost sandstone conglomerate beds of the Salt Wash member. The Salt Wash sandstone usually forms benches, dip slopes, or shallow ravines, and is amenable to surface and sub-surface prospecting

at moderate depths. The Brushy Basin shale, on the other hand, generally always forms a steep slope that presents a difficult drilling problem. The Salt Wash sandstone member contains the carnotite deposits in the Yellow Cat area and in some places, five separate sandstone beds or rims have been determined. The uppermost or first rim is a conglomeratic sandstone that contains much limonite stain, plant impressions, silicified bones and wood, and is ore-bearing in many places. The next, or second rim, is also conglomeratic in texture, is from 10 to 15 feet in thickness, and is also ore-bearing in several places. A light red mudstone, approximately 20 feet in thickness, separates the first and second sandstone rims. Below the second ore-bearing sandstone lies a red mudstone usually from 5 to 8 feet in thickness. Directly under this mudstone is a third sandstone rim, a white to grey, medium-grained, soft sugary formation, that forms slopes and cliffs up to 60 feet in thickness. This particular rim contained the ore deposits mined in the Little Pittsburg mine.

Directly underlying this massive sandstone occur a series of alternating mudstones and siltstones, having a cumulative thickness of approximately 35 feet. Underlying this series of relatively thin beds is found another massive, light grey, sandstone containing an abundance of small grey clay pellets in layers one-half to one inch thick. This fourth sandstone rim is cliff forming and has, about nine feet from its base, a persistent layer of green-grey clay that is traceable over a wide area, and which has the same stratigraphic position as several thin ore bodies. From all indications, the recently discovered deeper ore

bodies occur in this sandstone horizon. Directly underneath lie an alternating series of about ten mudstones and siltstones which have an accumulative thickness of between 50 and 60 feet. These members lie directly over the Summerville formation.

The Summerville formation in the Thompsons area averages about 50 feet in thickness and consists of argillaceous and arenaceous components to an extent that true sandstones or mudstones are seldom observed. Several thin lenses of limestone appear and there exists a predominence of concretionary oval masses of chert from five to ten feet in diameter in the middle part of the formation. Locally the Summerville appears as broad flat surfaces, redish in color. Although the contact between the Summerville and the underlying Entrada sandstone is easily determined and can be accurately mapped, this does not hold true with the overlying Salt Wash sandstone contact. This contact has been roughly established at the horizon where the thin red shales and chert constituents disappear and the lighter colored, sandy, lenticular beds appear. However, this contact is not sharp and in places Morrison sands are found in upper Summerville and red thin-bedded shales are found in the lower Morrison.

The pre-Summerville rocks have not been differentiated on the geologic maps, Figs. 2 and 2A, with only the contact between the Summerville and the Entrada shown. The Entrada formation in this area is a grey to orange, clean, massive fine grained sandstone, forming either smooth cliffs or wide bedrock benches over many square miles south of the outcrop of the Summerville formation. In places it shows

thicknesses of 350 feet and can be traced for hundreds of miles as a smooth cliff-forming sandstone. The predominent structural feature of the region is a northwest trending anticline, the crest of which has been dropped by a complicated fault system into a structural trough. The area under consideration is on the northeast flank of the fold outside of the area of major movement.

Occurrence of Deposits

In general the ore deposits of the Colorado Plateau area have been found in three main formations, the Morrison, Entrada and Shinarump. Many theories have been advanced endeavoring to explain why commercial concentrations of uranium and vanadium, which are widely disseminated in the earth's crust, have been formed in these formations. Some of these theories as proposed are: (1) They are the result of hydrothermal action, and therefore are related to deep-seated fractures, the deposition coming from nearby primary ore occurrences. (2) They are syngenetic accumulations laid down in close association with organic materials. (3) They are syngenetic accumulations of detrital mineral particles laid down with other inorganic constitutents of the enclosing rock. (4) They originated later than the enclosing rock by concentrations of ground water in the proximity of organic accumulations or under the influence of obscure physical or chemical factors not now easily detected. Although the origin of the uranium-vanadium mineralization in the ore has not been agreed upon, accumulated observations seem to point that its occurrence was probably a result of post-precipitation from ground

water solutions, after the sedimentation of the sands.

The major portion of the commercial ore bodies of the Colorado Plateau have been found in the Salt Wash sandstone member of the Morrison formation, overlying the Entrada sandstone. Generally the ore bodies are very irregular, tabular, layers that form "rolls" of considerable thickness, sometimes in excess of 20 feet. Usually they lie parallel to the bedding, but do not necessarily conform to the beds in detail. Frequently the rolls or longitudinal direction of the ore bodies are roughly parallel. The deposits have been observed to vary in size from only a few tons of ore to those exceptions containing from 60 to 100 thousand tons. Probably the average mine throughout the Plateau might be less than two thousand tons of ore, averaging 0.28 per cent U_3O_8 and 2.00 per cent V_2O_5. The deposits of the Morrison formation have usually been referred to as "Carnotite" deposits to distinguish them from similar deposits in the Entrada sandstone which have been termed the "Roscolite" deposits. Recent major discoveries of large ore deposits in the Shinarump formation foreshadows the probability that in the future production from this formation may outdistance that from the Morrison and other formations.

In the Yellow Cat area the ore was evidently formed by selective mineralization of the sandstone, concentration of minerals around fossil organic remains, and absorbtion by certain types of clay material. Recent deeper drilling has indicated that the more continuous massive sandstones are more likely to contain uranium-vanadium deposits than are the discontinuous ones. The sandstone lenses with thicknesses in excess of thirty feet appear to be more favorable for the occurrence of ore deposits. In general the mudstones and siltstones are barren of mineralization.

Early mining in the area produced mainly carnotite-type ores, which are a potassium uranium vanadate, with the following chemical composition: $K_2O.2UO_2.V_2O_5nH_2O$. Recent ore bodies found in the lower, or fourth rim, have produced green micaceous vanadium types of mineralization, and vanoxite, a black hydrous vanadium oxide, as well as sub-carnotite type ores. The older ore bodies, characterized by curving zones of mineralization or "rolls", varied in size from thin irregular layers a few feet in extent to masses several hundred feet in length, containing several hundred tons of ore. Curving planes of weakness on one side of the ore body usually separated heavily mineralized rock or ore from barren sandstone. Frequently, the side opposite from the curved surface graded from ore into waste gradually and in many instances consisted of an "assay" wall. In some ore bodies mineralized halos or aureoles of lower grade material were observed to grade out from the commercial ore. Rolls generally lie with the long axis parallel to the stratification planes of the sand rock, but do not seem to be controlled in any manner by the bedding planes. In thin-bedded sandstones and shales, the deposits are usually tabular and confined along the bedding planes with the greater dimensions corresponding to the stratification of the replaced rock.

The recently explored deeper ore deposits found to occur in the fourth sandstone rim have not been developed or mined to a sufficient extent to determine their shape or characteristics. However, estimates from drill logs and assays indicate that several of these deposits will contain commercial ore in excess of 25,000 tons, of grades averaging from 0.30 to 0.40 percent U_3O_8 and 2.00 to 2.50 percent V_2O_5.

The Geological Survey's drilling program in the Thompsons area to date includes over 1,700 diamond core and wagon drill holes spread over a total of 30 square miles or roughly 30 Sections. Of this number, over 1,000 holes were concentrated in one area containing about two and one-half square miles: Parts of Sec. 36, T. 22 S., R. 21 E.; Sec. 31, T. 22 S., R. 22 E.; Sec. 1, R. 23 S., T. 21 E.; and Sec. 6, T. 23 S., R. 22 E. Drilling to date has proven the channel runs east and west for at least two miles and has an average width of about 300 feet north and south. The majority of the new ore bodies recently discovered have been found to occur in this thick sandstone channel. The extension of the channel east and west by further drilling has not as yet been endeavored.

Production

There appear to be no production records prior to 1935, but from that time through 1953 a total of 32,500 tons of uranium-vanadium ore was produced from the Thompsons area, mainly from the Yellow Cat vicinity. Indicating the relative small size of the ore bodies mined during that period is the fact that only two properties, the Pittsburgh No. 5 and the Cactus Rat mine, are credited with production in excess of 1,000 tons. The average grade of ore produced has been estimated at 0.25 per cent U_3O_8 and 1.50 per cent V_2O_5, or a value of about $30 per ton. Thus, the total production from the area during this period would amount to about one million dollars.

In striking contrast to the above production figures are the following estimates of some of the recently discovered ore deposits in

the fourth rim sandstone channel previously described. These ore bodies are now being developed with shafts and inclines.

Blackstone (Sec. 31, T. 22 S., R. 22 E.)

Three ore bodies with an estimated 25,000 tons.
Estimated average grade 0.30 per cent U_3O_8; 2.25 per cent V_2O_5.
Estimated value $1,000,000, plus two $35,000 production bonuses.

Utah Alloys (Sec. 31, T. 22 S., R. 22 E.)
(Sec. 12, T. 23 S., R. 21 E.)

Two ore bodies. No estimated tonnage and grade.
One deposit reported worth in excess of $1,000,000.
Other deposit reported about 5,000 tons of ore.

Strategic Minerals Shaft (Sec. 36, T. 21 E., R. 22 S.)

Incomplete data on last drilling.
Present estimate indicates 20 - 25 thousand tons of ore.
Estimated average grade 0.40 per cent U_3O_8; 2.25 per cent V_2O_5.
Estimated value of $1,250,000, plus production bonus of $35,000.

John Incline (Sec. 1, T. 23 S., R. 21 E.)

Estimated tonnage 5,000.
Estimated average grade 0.35 per cent U_3O_8; 2.00 per cent V_2O_5.
Estimated value $215,000, plus production bonus of $35,000.

RECOMMENDED EXPLORATION PROGRAM

The following estimates of drilling costs on the various claims and School Sections are based upon what is considered sufficient concentration of holes to determine the presence of favorable ore bearing sandstones and trends within these formations. If ore bodies are encountered with the drill holes these deposits would be delimited with additional closely spaced holes at the expense, footage-wise, of the preliminary drill pattern. In the event many widely spaced ore holes

were drilled additional drill footage would have to be allocated to the area as development drilling.

Sec. 2, T. 22 S., R. 21 E. (Refer to Fig. 3)

This Utah State School Section, totalling 397.76 acres, is, in the writer's opinion, potentially some of the best ground in the entire Thompsons area. It is directly west and adjacent to the sections in which the concentrated government drilling has established the fourth rim sandstone channel containing the recently discovered rich ore bodies. The possibilities of extending this channel westerly into Sec. 2 by further drilling are excellent.

The only two holes drilled on Sec. 2 are on the extreme east side line and indicated favorable sandstone thicknesses in excess of 40 feet. The major portion of the relatively flat surface of Sec. 2 corresponds to the upper or conglomeratic sandstone rim -- thus drilling depths would probably average from 150-200 feet to reach the base of fourth sandstone rim. In general, drilling on Sec. 2 would explore all of the Salt Wash sandstone rims that have produced ore bodies in the Yellow Cat area.

In any exploratory drilling program on this section, consideration should be given to the possibility of locating the extension of the fourth rim sandstone channel found to run east and west through Sec. 31, T. 22 S., R. 22 E. As the ore bearing sandstone channels in the Yellow Cat area appear to have their long axis east and west, the preliminary drilling program should consist of at least two fences north and south across the section. These holes should be on 200-foot centers

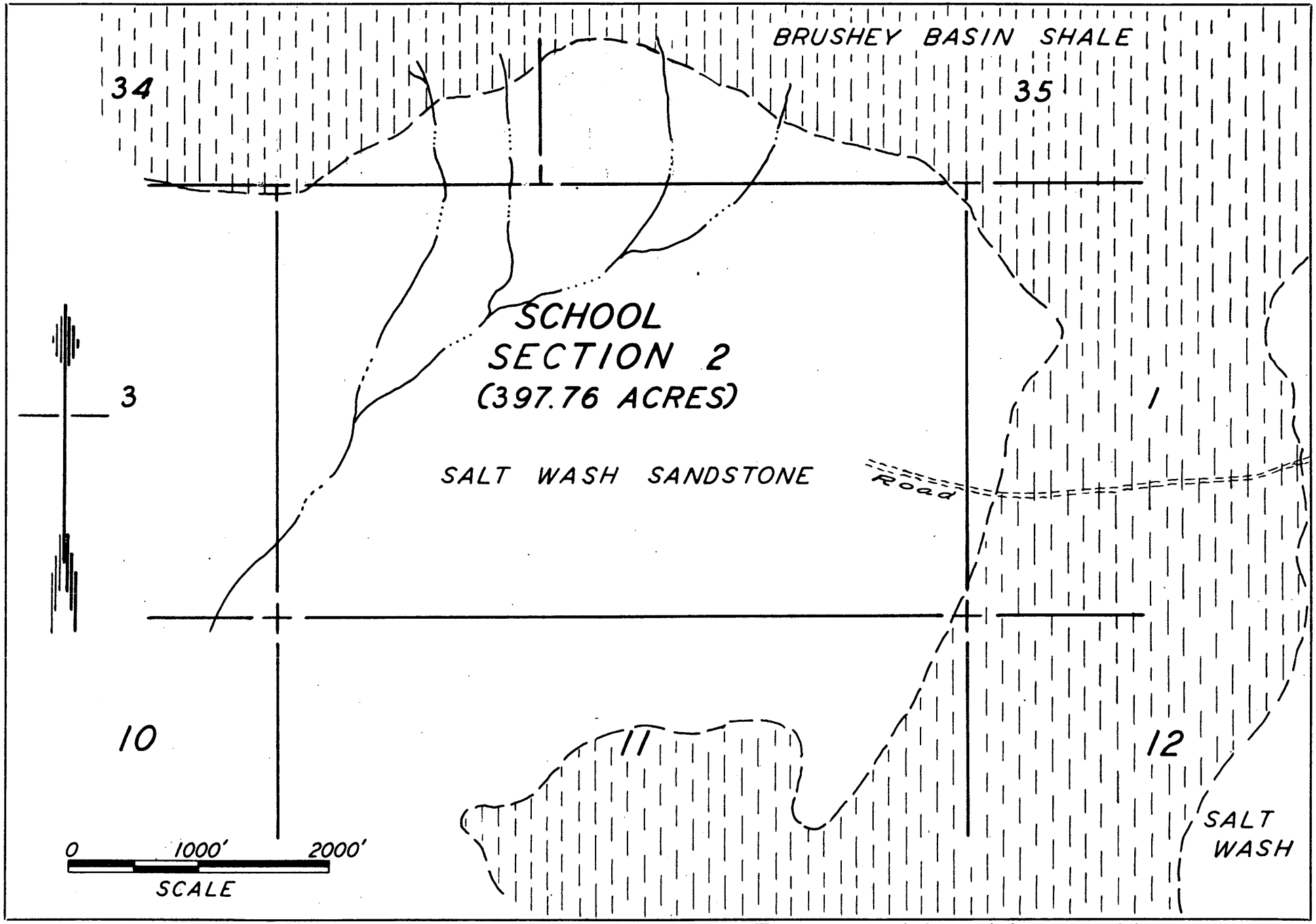


FIG. 3 SEC. 2, T. 23 S. R. 21 E. S.L.M. M.L.A. NO. 4248

and have as their target the base of the fourth sandstone rim, with a few holes penetrating into the Summerville formation.

Sufficient information should be derived from these holes to determine if favorable sandstone thicknesses are present, as well as possible trends of these thicker sands. Additional drilling would then be patterned to trace the channels. It is estimated that 26,000 feet of progressive, non-grid, drilling, mainly non-coring, at a cost of $40,000, should be sufficient to prove out this section.

Sec. 2, T. 23 S., R. 22 E. (Refer to Fig. 4)

This Utah State School Section, with a total of 665.04 acres, is perhaps less favorably located than the previously described section, due to the failure of government drilling to discover any ore deposits east of Sec. 32, T. 22 S., R. 22 E. As previously mentioned, however, the widely spaced drilling in this area was generally too shallow to explore the fourth sandstone rim, thus, past drilling must be mainly discounted. The only drilling done on this section was on the north end utilizing wagon drills to shallow depths. As the third rim still remains, forming the greater part of the surface of the section, it is questionable if the fourth rim has been explored by any of the holes.

Average drilling depth would probably be about 140 feet to bottom the fourth rim. It is estimated that 150 holes at a cost of $30,000 should be sufficient to prove out this section.

Silver Top Claims (Refer to Fig. 5)

These five claims are located in Sec. 34, T. 22 S., R. 22 E., and total 103.3 acres. The area covered by the claims is similar to the

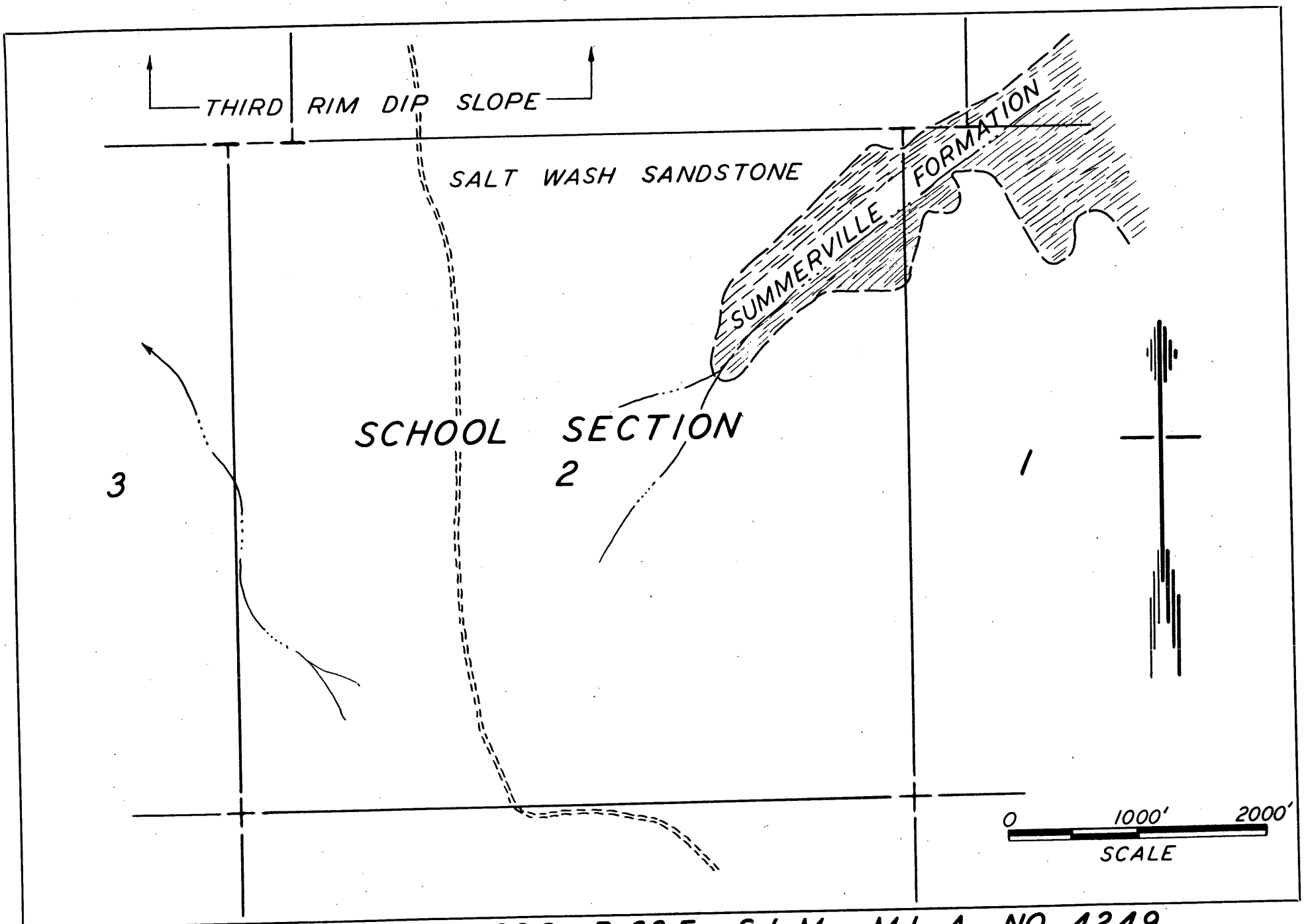


FIG. 4 SEC. 2, T. 23 S., R. 22 E. S.L.M. M.L.A. NO. 4249

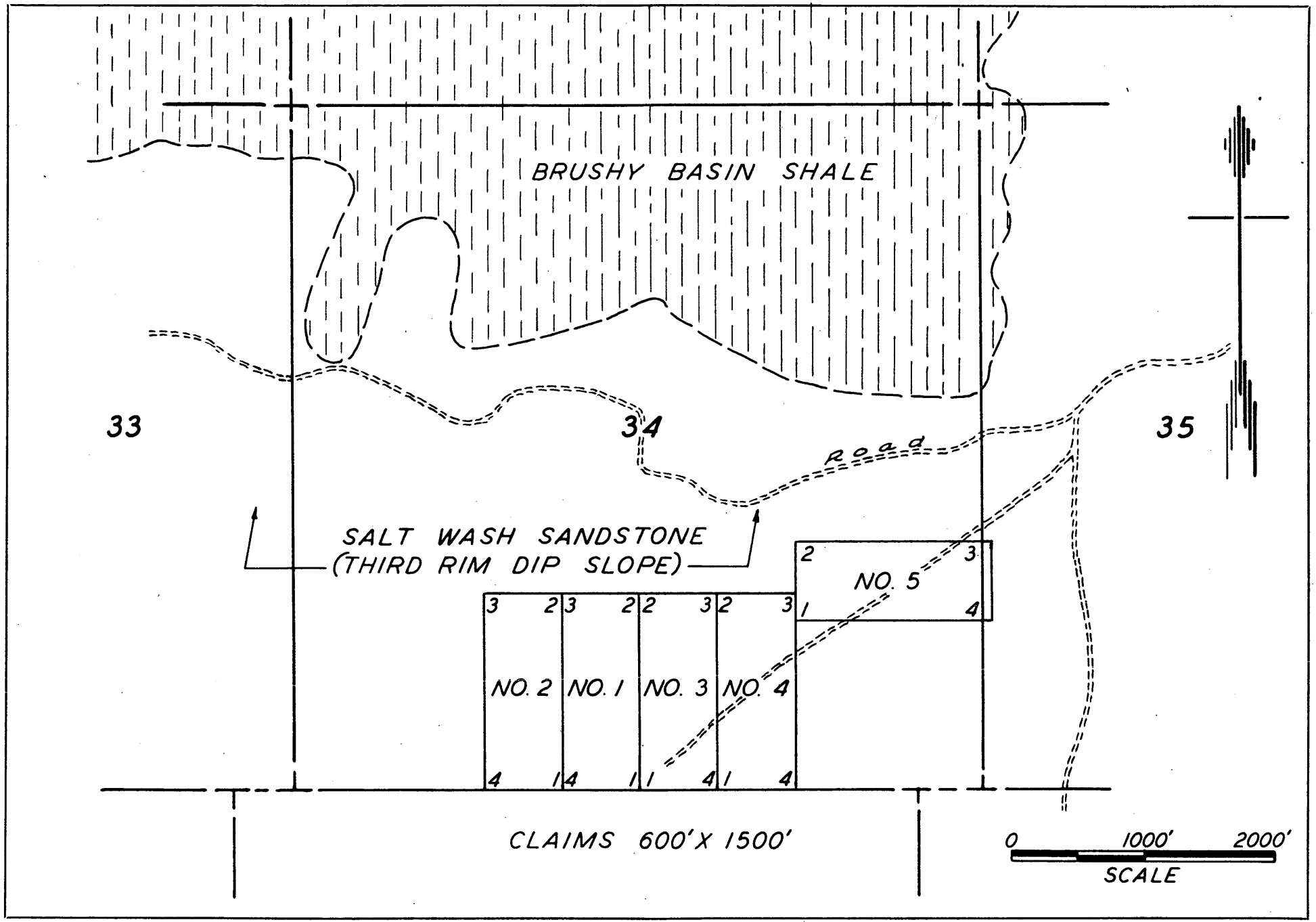


FIG. 5 SILVER TOP CLAIMS, SEC. 34, T. 22 S., R. 22 E.

previously described School section, as the third sandstone rim forms a dip slope.

The claims are in an excellent area and have not been properly explored by drilling. A preliminary drilling program of 75 holes costing $15,000 should determine if commercial ore bodies are present in the area covered by the five claims.

Mack Claims (Refer to Fig. 6)

The 14 Mack Claims, located in Secs. 5, 6, and 7, T. 23 S., R. 23 E., are perhaps of lesser importance than the other ground discussed. The claims cover areas where the first and second, and in some instances the third, sandstone rims are missing. However, this situation has its advantages from an exploration standpoint as the area can be rapidly and inexpensively drilled to explore for ore deposits in the fourth rim.

Most of the drilling on these claims would be shallow -- from 40 to 100 feet in depth. It is estimated that an expenditure of $10,000 in preliminary wagon and core drilling would probably be sufficient to determine if favorable sandstones and ore deposits are present. Additional development drilling may be required if the existance of ore deposits were determined.

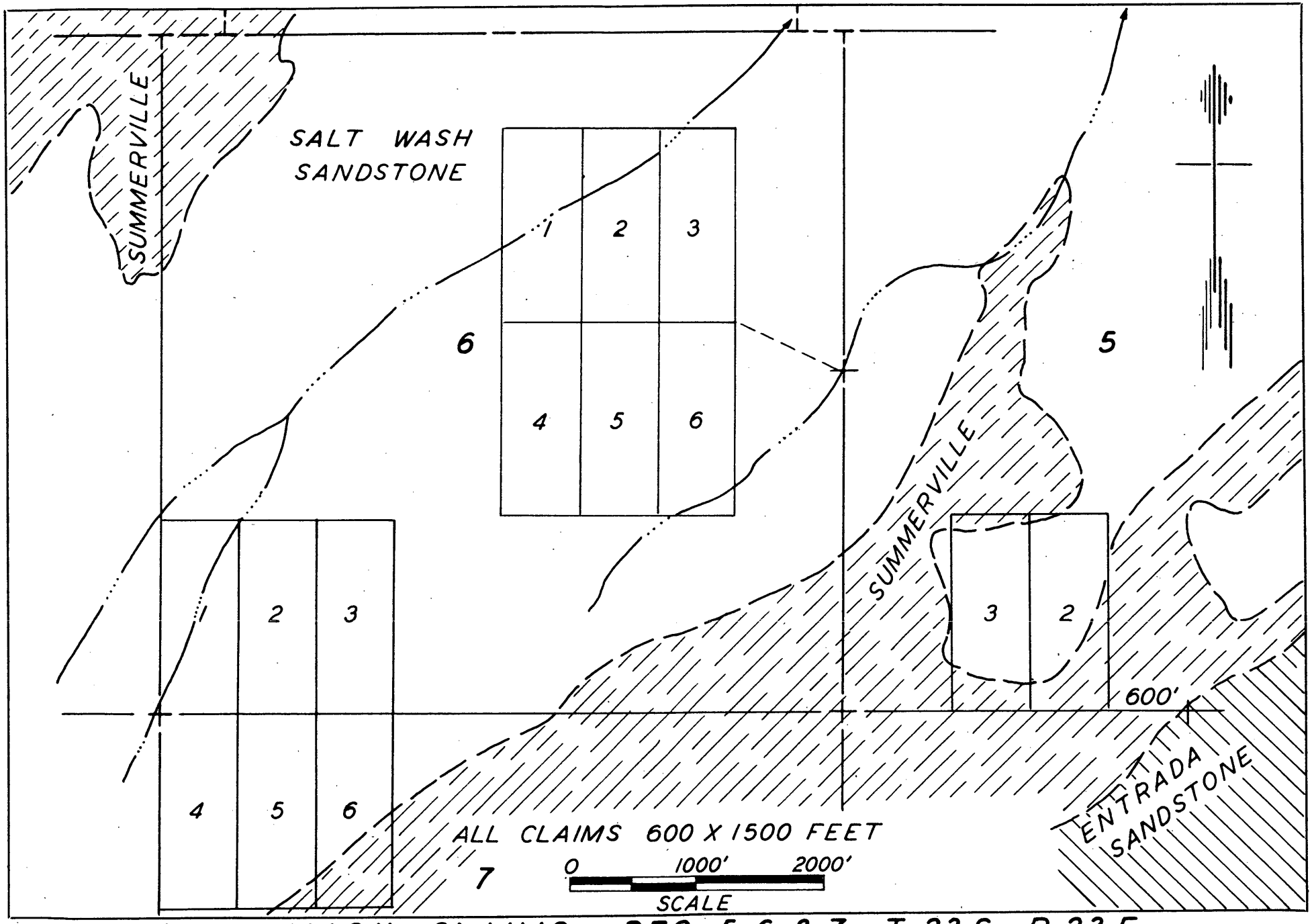


FIG. 6 MACK CLAIMS, SEC. 5 6 & 7, T. 23 S., R. 23 E.

CONCLUSION

Available records of production from the Yellow Cat area from 1935 through 1953 indicate a total of 32,500 tons of uranium-vanadium ore was mined having a value of about one million dollars. Recent drilling by the Geologic Survey has established locations and trends of deeper ore bearing sandstone channels containing ore deposits of major significance. Five or six new ore bodies are now being developed preparatory to mining that contain proven ore reserves many times greater than all past production from the area.

The favorable sandstone channels are at present delimited only in areas of concentrated drilling and should be traced by further exploratory drilling to determine their possible continuance into the ground discussed in this report. It is anticipated that a drilling program as outlined will establish the continuation of the favorable deeper sandstone channels and discover commercial ore deposits within these formations.

It is proposed to locate the ore bearing channels by preliminary grid-spaced drilling, and then trace these favorable thicknesses by a progressive-type pattern of hole locations.

In summary, the properties discussed have all the geologic features necessary for the presence of commercial ore deposits. In evaluating these properties consideration should be given the following salient points:

(1) Considerable production has come from the area. Present reserves of blocked-out ore, just recently discovered, are many times greater than all past production.

(2) The possibilities of extending the favorable sandstone channels into the properties discussed in this report are excellent.

(3) The availability of manpower, materials, supplies, equipment, and water for drilling purposes are above average.

(4) The accessibility is far above average, being only ten miles from a main U. S. Highway, and the location is such that year-around operations can be maintained.

(5) The strategic importance of the mineral involved -- Carnotite, an ore of uranium and vanadium. The guaranteed price under the present schedule is until March 31, 1962. The Bonus for new production has been extended until February 28, 1957. All of these properties are eligible for bonus certification.

Respectfully submitted,

Norman Ebbley, Mining Geologist

APPENDICES

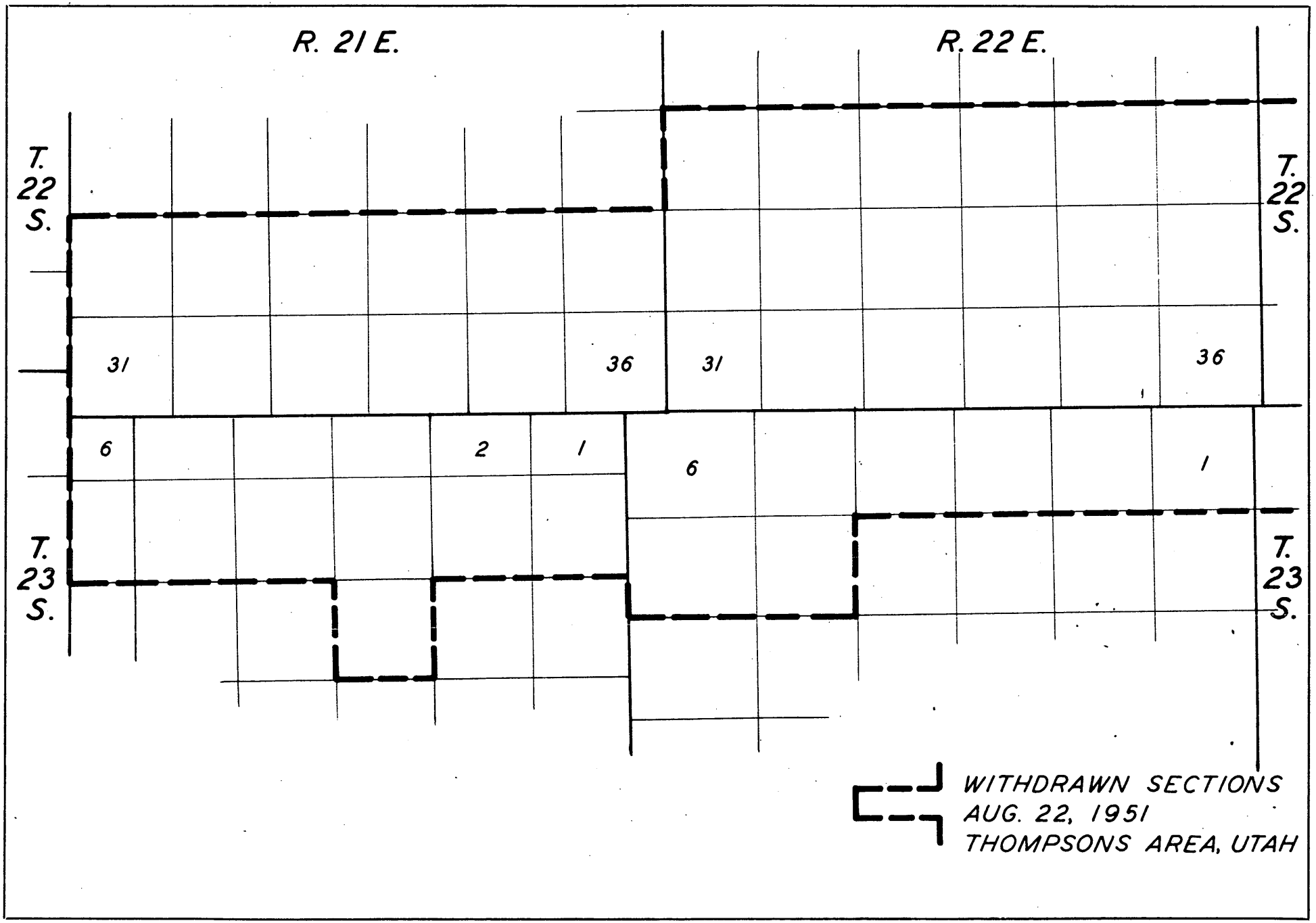
1. Map showing Government Withdrawal Boundry -- Thompsons Area.

2. Excerpts from Utah State School Section Lease.

3. Excerpts from Atomic Energy Commission Regulations for Purchasing Uranium-Vanadium Ores, March 1, 1951.

4. Excerpts from Atomic Energy Commission Circular on the Uranium Bonus, February 28, 1951.

5. Excerpts from Atomic Energy Commission Press Release, September 23, 1953, Extending Uranium Ore Price and Initial Production Bonus.



APPENDIX NO. 1 LAND WITHDRAWAL BOUNDARY P.L.O. NO. 745

Appendix 2

(Sample)

EXCERPTS FROM

UTAH STATE URANIUM AND VANADIUM MINERAL LEASE

Mineral Lease Application No. ____

Mineral Lease No. M.L.A. 4248
Grant: School

THIS INDENTURE OF LEASE AND AGREEMENT, entered into, in duplicate, this _____, by and between the State Land Board, acting in behalf of the State of Utah, hereinafter called the Lessor, and Norman Ebbley and associates, a copartnership of Grand Junction, Colorado, hereinafter called the Lessee, under the pursuant to Title 86, Chapter 1, Utah Code Annotated 1943, and Amendments thereto.

WITNESSETH: That the Lessor, in consideration of the rents and royalties to be paid and the covenants to be observed by the Lessee, as hereinafter set forth, does hereby grant and lease to the Lessee the exclusive right and privelege to mine and dispose of all of the uranium and vanadium minerals in the following described tract of land situated in Grand County, State of Utah, to-wit:

All of Section 2, T. 23 S., R. 21 E., of the S.L.M.,

containing a total of 397.96 acres, more or less, together with the right to use and occupy so much of the surface of said land as may be required for all purposes reasonably incident to the mining and removal of the uranium and vanadium minerals produced in commercial quantities from the said lands, upon condition that at the end of each Twenty-year period succeeding the first day of the year in which this lease is issued, such readjustment of terms and conditions may be made as the Lessor may determine to be necessary in the interest of the State.

ARTICLE 1

It is expressly understood and agreed that this lease is granted subject in all respects to and under the conditions of the laws of the State of Utah, and the Federal Statutes regarding the operation of Metallic mineral mines, Employer's Workman's Compensation, Workman's Insurance, Social Security and Unemployment Insurance and such existing Rules and Regulations or Rules and Regulations, hereafter adopted and approved by the State Land Board.

It is further expressly understood and agreed that this lease covers only the mining and marketing of uranium and vanadium minerals, but that should other minerals be discovered such fact shall be immediately reported to the Lessor.

ARTICLE III

The Lessee in consideration of the granting of the rights and privileges aforesaid, hereby covenant and agree as follows:

FIRST: To pay to the Lessor as annual rental for each acre covered by this lease the sum of 50¢ per acre per annum. All such annual payments of rental to be made in advance on the 2nd day of January of each year, except the 1954 rental, which is payable on the execution of this lease, such rental to be credited on the royalties to become due hereunder during the year for which said rental is paid.

SECOND: To pay to the Lessor a royalty of 12½ per cent of the proceeds for ores sold less assay charges and transportation to point of sale. All payments to be made monthly on or before the 15th day of the month next succeeding the month in which the ores are sold. Monthly statements as to the amount of production sold from the leased ground in the preceding month must be in affidavit form and shall accompany the royalty remittance. Failure to pay the rents and royalties or any of them in the manner herein provided shall constitute a default and entitle the Lessor to declare a forfeiture on this lease and to enter upon and take possession of the premises with or without process of law.

THIRD: That at the option of the Lessor it may require the payment at the mine of royalties in kind; the amount being 12½ per cent of the material produced.

FOURTH: That upon the shipment of any ore under this lease, the Lessor shall be immediately notified in writing that such shipment is being made, giving the means of transportation and the point of destination.

FIFTH: That at the option of the Lessor it may require, before the commencement of mining operations, that the Lessee shall submit a detailed plan with maps, showing the proposed method of opening the ground and that such work shall not be undertaken until the Lessor has approved such plan and that failure on the part of the Lessee to do so, if required, or to prosecute development on the lines directed, shall constitute a cause for cancellation of this lease.

SIXTH: To commence actual mining operations upon the land included herein on or before _____, and thereafter to diligently operate the property according to the plans accepted or under modifications thereof as may be acceptable to the Lessor.

SEVENTH: To at all times during the life of this lease perpetuate and protect the main line tunnels in ingress and egress to and from said lands and the air courses necessary for proper

ventilation, by means of proper pillars and timbering as may be directed by the Lessor or State Mine Inspector, whether upon this leased land or extending through adjacent lands owned or operated by the Lessee, and upon abandonment or termination of this lease from any cause, to substantially fence, fill in, cover or close all surface openings or workings, if directed to do so by said Lessor.

EIGHTH: To keep at the mine office clear, accurate and detailed maps on tracing cloth, on a scale not more than 50 feet to the inch, of the workings in each separate mine on the leased lands and on the lands adjacent, and to be so arranged with reference to a public land corner that the maps can be readily and correctly superimposed, and to furnish to the Lessor annually, or upon demand, certified copies of such maps and such written statement of operations as may be called for. All mine surveys shall be made by a licensed engineer and all maps certified to by him.

NINTH: To not assign this lease or any interest therein, nor sublet any portion of the leased premises, or any of the rights and privileges herein granted, without the written consent of the Lessor being first had and obtained.

ARTICLE VI

Upon cancellation of this lease for any cause hereunder the Lessee shall be entitled to remove from the lease holdings only their personal and movable property and that improvements attached to the land such as buildings, timbering or other construction or constructions material in place, shall remain undisturbed upon the ground and the property surrendered in good usable condition.

ARTICLE VII

It is mutually understood and agreed that the suspension of mining operations by the Lessee for a longer period than six months without the written consent of the Lessor being first had and obtained shall be a cause for forfeiture, and that upon the violation of this provision or any of the other terms of this lease the Lessor may at its option after thirty days notice by registered mail cancel this lease. After the expiration of the said thirty days and the cancellation of the lease no notice of such cancellation need be given the Lessee.

ARTICLE VIII

It is mutually understood and agreed that the Lessee may terminate this lease at any time upon giving three months notice in writing to the Lessor, and upon payment of all rents and royalties and other sums due and payable to the Lessor, and upon complying with the terms of this lease with respect to the preservation of the workings in such order and condition as to permit of the continued operation of the premises and the preservation of the mine.

ARTICLE IX

It is understood and agreed by and between the parties hereto that the Lessor, its officers and agents, shall have the right at all times to go in and upon the leased lands and premises, during the term of said lease to inspect the work done and the progress thereof on said lands and the products obtained therefrom, and to post any notices on the said land that it may deem fit and proper; and also shall permit any authorized representatives of the Lessor to examine all books and records pertaining to operations and under this lease, and to make copies of and extracts from the same, if desired.

ARTICLE X

It is mutually understood and agreed by the parties hereto that all of the terms, covenants, conditions and obligations in this lease contained, shall be binding upon the heirs, executors, administrators and assigns of the Lessee.

ARTICLE XI

It is understood and agreed that this lease is issued only under such title as the State of Utah may now hold, and that in the event the State is hereafter divested of such title, the Lessor shall not be liable for any damages sustained by the Lessee, nor shall the Lessee be entitled to or claim any refund of rentals or royalties, or other monies theretofore paid to the Lessor.

IN WITNESS WHEREOF, the parties have hereunto subscribed their names the day and year first above written.

STATE OF UTAH, STATE LAND BOARD

APPROVED AS TO FORM

BY_____

Lessor

_____

Attorney General

_____

Lessee

Appendix 3

EXCERPTS FROM ATOMIC ENERGY COMMISSION REGULATIONS

FOR PURCHASING URANIUM-VANADIUM ORES

Effective March 1, 1951

"(Domestic Uranium Program Circular 5, Revised)

"PART 60 - DOMESTIC URANIUM PROGRAM

"GUARANTEED MINIMUM PRICE FOR URANIUM-BEARING CARNOTITE-TYPE OR ROSCOELITE-TYPE ORES OF COLORADO PLATEAU AREA

. . .

"Section 60.5 (c) Definitions. As used in this section and in 60.5a, the term 'buyer' refers to the U. S. Atomic Energy Commission, or its authorized purchasing agent. The term 'ore' does not include mill tailings or other mill products. The term 'seller' refers to any person offering uranium ores for delivery to the Commission. Weights are avoirdupois dry weights, unless otherwise specifically provided.

"(d) Deliveries of not to exceed 1,000 tons per year. To aid small producers, any one seller may deliver without a written contract but otherwise in accordance with this circular up to, but not exceeding, 1,000 short tons (2,000 pounds per ton) of ores during any calendar year.

"(e) Deliveries in excess of 1,000 tons per year. Sellers desiring to deliver in excess of 1,000 short tons (2,000 pounds per ton) of ores during any calendar year will be required to enter into a contract with the Commission providing for, among other things, a rate of delivery and the total quantity of ore to be delivered.

"(f) Delivery. Seller, at his own expense, shall deliver and unload all ores at the buyer's depot at Monticello, Utah. Deliveries shall be in lots of not less than 10 short tons (2,000 pounds per ton) unless special arrangements have been agreed upon by buyer, but such lots may be delivered in more than one load. Days and hours during which ore may be delivered will be posted at the depot.

"(g) Weighing, sampling and assaying. Buyer will bear the cost of weighing, sampling, and assaying. The net weight of each load will be determined by the buyer's weighmaster on scales which will be provided by the buyer at or in the vicinity of the purchase depot and such weight will be accepted as final. A weight ticket will be furnished seller or his representative for each load. Each lot of ores will be sampled promptly by the buyer according to standard practice and such sampling will be accepted as final. . . .

"(h) Payment. Buyer will make payment promptly but payment will not be made until an entire minimum lot of ten short tons (2,000 pounds per ton) has been delivered and accepted, unless special arrangements have been agreed upon by buyer, in which case there may be an extra charge for assaying and sampling. Moisture determinations, analyses and settlement sheets, together with the check in payment, will be mailed to seller. . . .

"60.5a. Schedule I; minimum prices, specifications, and conditions--(a) Prices. Payment for delivery of the ores will be computed on the following basis:

"(1) Uranium. (i) Ores assaying less than 0.10 percent: no payment. Any such ores which are delivered to the purchase depot shall, unless otherwise specifically agreed to by buyer, become the property of the buyer as liquidated damages for buyer's expense of weighing, sampling, and assaying, and after sampling may be placed in process, comingled, or otherwise disposed of by buyer. If seller has any question as to the quality of his ore, it is suggested that before shipment and delivery to the purchase depot a representative sample be submitted to the buyer or to one of the umpires for assay at seller's expense. The buyer at its discretion may assay a limited number of samples without charge.

"(ii) Ores assaying 0.10 percent U_3O_8 and more, as follows:

U308 Assay:	Payment per Pound U308
0.10 percent	$1.50
0.11 percent	1.70
0.12 percent	1.90
0.13 percent	2.10
0.14 percent	2.30
0.15 percent	2.50
0.16 percent	2.70
0.17 percent	2.90
0.18 percent	3.10
0.19 percent	3.30
0.20 percent and more	3.50

"(iii) Premiums on uranium: $0.75 per pound for each pount of U_3O_8 in excess of 4 pounds U_3O_8 per short ton (2,000 pounds per ton) of ore and an additional premium of $0.25 per pound for each pound in excess of ten pounds U308 per short ton. Fractional parts of a pound will be paid for on a pro rata basis to the nearest cent.

"(2) Vanadium. V_2O_5 at $0.31 per pound up to, but not exceeding, ten pounds of V_2O_5 for each pound of U_3O_8 contained in ores. No factor will be included for V_2O_5 in excess of ten pounds for each pound of U_3O_8, although

buyer may, from time to time, publicly announce that, for limited periods by written agreements with individual producer, V_2O_5 in excess of ten-to-one will be paid for. Any such announcement will be made by posting a notice to this effect at the Monticello depot and through such other channels as are deemed suitable to achieve maximum dissemination among producers. Excess V_2O_5 shall be deemed to be buyer's property.

"(3) Allowances. (i) A development allowance of $0.50 per pound U_3O_8 contained in ores assaying 0.10 percent U_3O_8 or more in recognition of the expenditures necessary for maintaining and increasing developed reserves of uranium ores. Fractional parts of a pound will be paid for on a pro rata basis to the nearest cent. Sellers accepting this allowance are deemed to agree to spend such funds for the development or exploration of their properties. Sellers delivering less than 1,000 short tons per calendar year will not be required to submit an accounting record of expenditures for development or exploration pursuant to this agreement but sellers delivering in excess of 1,000 short tons per calendar year will be required, under the terms of their contracts, to submit proof satisfactory to the Commission that funds equivalent to the amount received as development allowance have been spent for development or exploration either during the contract period or within six months thereafter, unless otherwise provided in the contract.

"(ii) A haulage allowance of 6¢ per ton mile for transportation of ore paid for under §§60.5 and 60.5a from the mine where produced to the purchase depot specified by the Commission, up to a maximum of 100 miles. The haulage distance from the mine to the purchase depot will be determined by the Commission and its decision will be final. Tonnages for purposes of this allowance shall be calculated on the basis of natural weights rather than dry weights.

"(4) Adjustment of assays. Assays shall be adjusted to the nearest 0.01 percent for purposes of payment.

"(b) Quality and size. Ores will not be accepted by buyer under §§60.5 60.5a which, in buyer's judgment:

"(1) Contain less than 0.10 percent U_3O_8;
"(2) Contain more than three parts of lime ($CaCO_3$) to one part of V_2O_5, or a total of more than 6 percent lime in the ore;
"(3) Contain impurities deleterious to buyer's extraction process or for any other reason are not amenable to it;
"(4) Contain lumps in excess of twelve inches in size.

"NOTE: The Commission will be interested in discussing arrangements for delivery to it of types of uranium-bearing materials other than those for which guaranteed prices have been established, such as tailings, mill products, and ores of types not acceptable under §§60.5 and 60.5a.

"(60 Stat. 755-775; 42 U. S. C. 1801-1819. Interpret or apply sec. 5, 60 Stat. 761, 42 U. S. C. 1805)

"Effective March 1, 1951 through March 31, 1958.

"Dated at Washington, D. C., this 26th day of February 1951.

"By order of the Commission.

M. W. Boyer, General Manager"

Appendix 4

EXCERPTS FROM AEC CIRCULAR ON THE URANIUM BONUS

February 28, 1951

"1. Effective March 1, 1951, to March 1, 1954, the Commission will pay a new graduated bonus of up to $35,000, depending upon the quantity and grade of ore, for initial production and delivery of acceptable uranium ore from new and certain existing mining properties.

"The new bonus, which is described in AEC Domestic Uranium Program Circular No. 6, 'Bonus for Initial Production of Uranium Ore from Domestic Mining Properties,' to be issued shortly, provides for the following:

"1. For new mining properties, bonus payments will be made on each pound of uranium oxide in acceptable ore delivered to qualified mills or Commission ore-buying stations up to and including the first 10,000 pounds.

"2. For mining properties which have produced less than 10,000 pounds of uranium oxide during the period April 9, 1948, to March 1, 1951, bonus payments will be made on the difference between what the mining property has delivered between April 9, 1948, and March 1, 1951, and 10,000 pounds. For example, the owner of a mine that has produced 4,000 pounds of uranium oxide between April 9, 1948, and March 1, 1951, may be eligible to receive a bonus on each new pound produced up to and including the next 6,000 pounds.

"3. Bonus payments per pound of uranium oxide in acceptable ores produced from qualified mining properties will range from $1.50 for those ores assaying 0.10% uranium oxide to $3.50 for ores assaying 0.20% or more. Thus the maximum bonus which may be obtained for production from new mines will range from $15,000 to $35,000, depending upon the grade of ore delivered.

"Payments under the new bonus plan will be made for all eligible ores purchased after March 1, 1951. Payments will be made directly by the Commission and not by the receiving station or mill, and will be in addition to purchase payments made pursuant to ore buying schedules. Before bonus payments will be made, the producer must make application to the Commission and the Commission must certify that the mine is eligible for the bonus."

Appendix 5

EXCERPTS FROM AEC PRESS RELEASE, SEPTEMBER 23, 1953,

EXTENDING URANIUM ORE PRICE AND INITIAL PRODUCTION BONUS

"The Commission's Domestic Uranium Program Circular 5, Revised, has been extended to cover the period through March 31, 1962, from its previous expiration date of March 31, 1958. This circular, which went into effect on March 1, 1951, provides guaranteed minimum base prices for the uranium oxide content of carnotite-type and roscoelite-type ores of the Colorado Plateau area. The price schedule ranges from $1.50 to $3.50 per pound of uranium oxide content, depending upon the grade of the ore, together with certain allowances and premiums.

"Domestic Uranium Program Circular 6, which established a bonus for initial and certain other production of uranium ores from domestic mines delivered under its terms between March 1, 1951 and February 28, 1954, now has been extended through February 28, 1957."

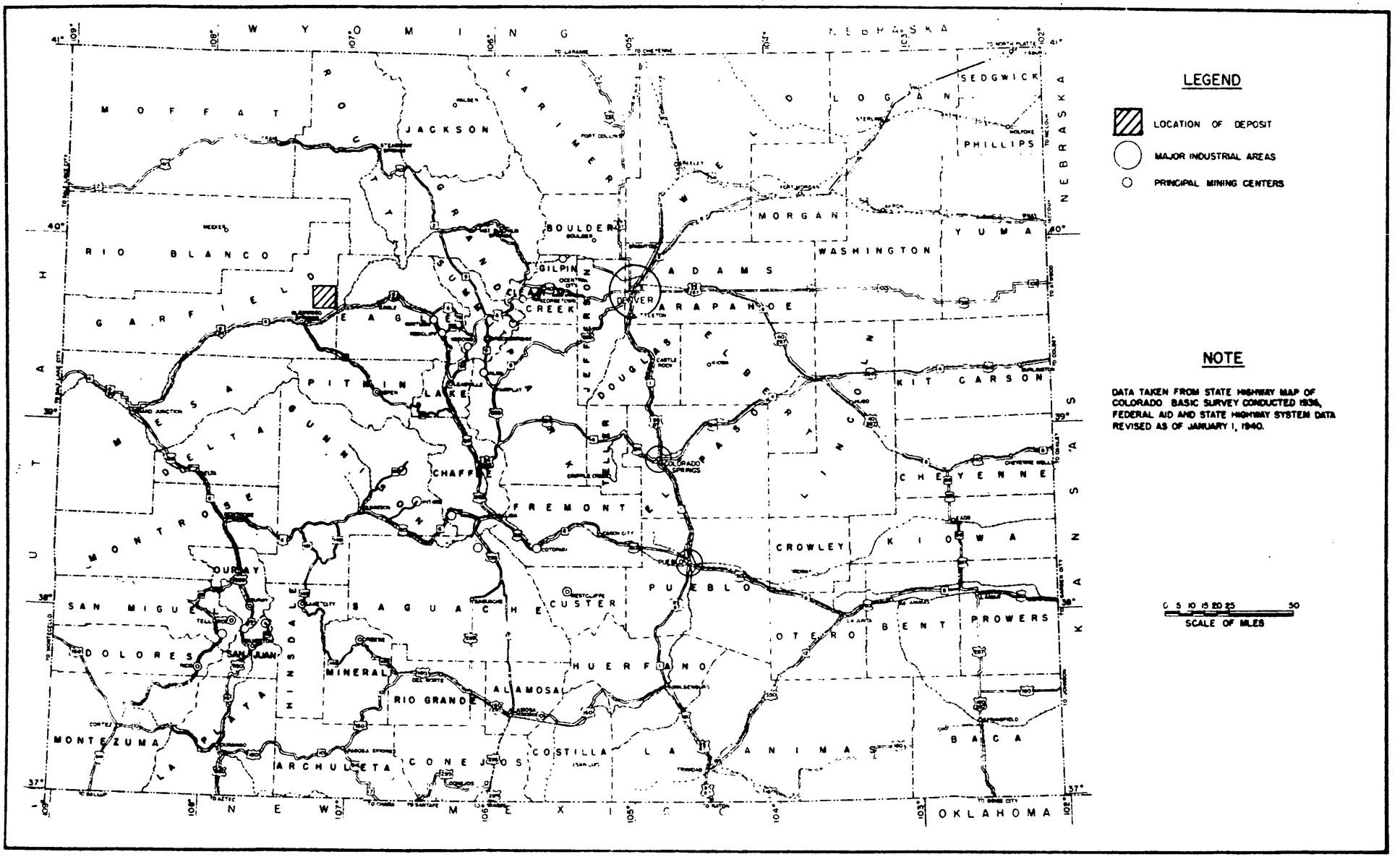


FIGURE 1 - LOCATION MAP, UV AND ELK VAN CLAIMS, MID-CONTINENT URANIUM CORP., GARFIELD COUNTY, COLO., DMEA 3360

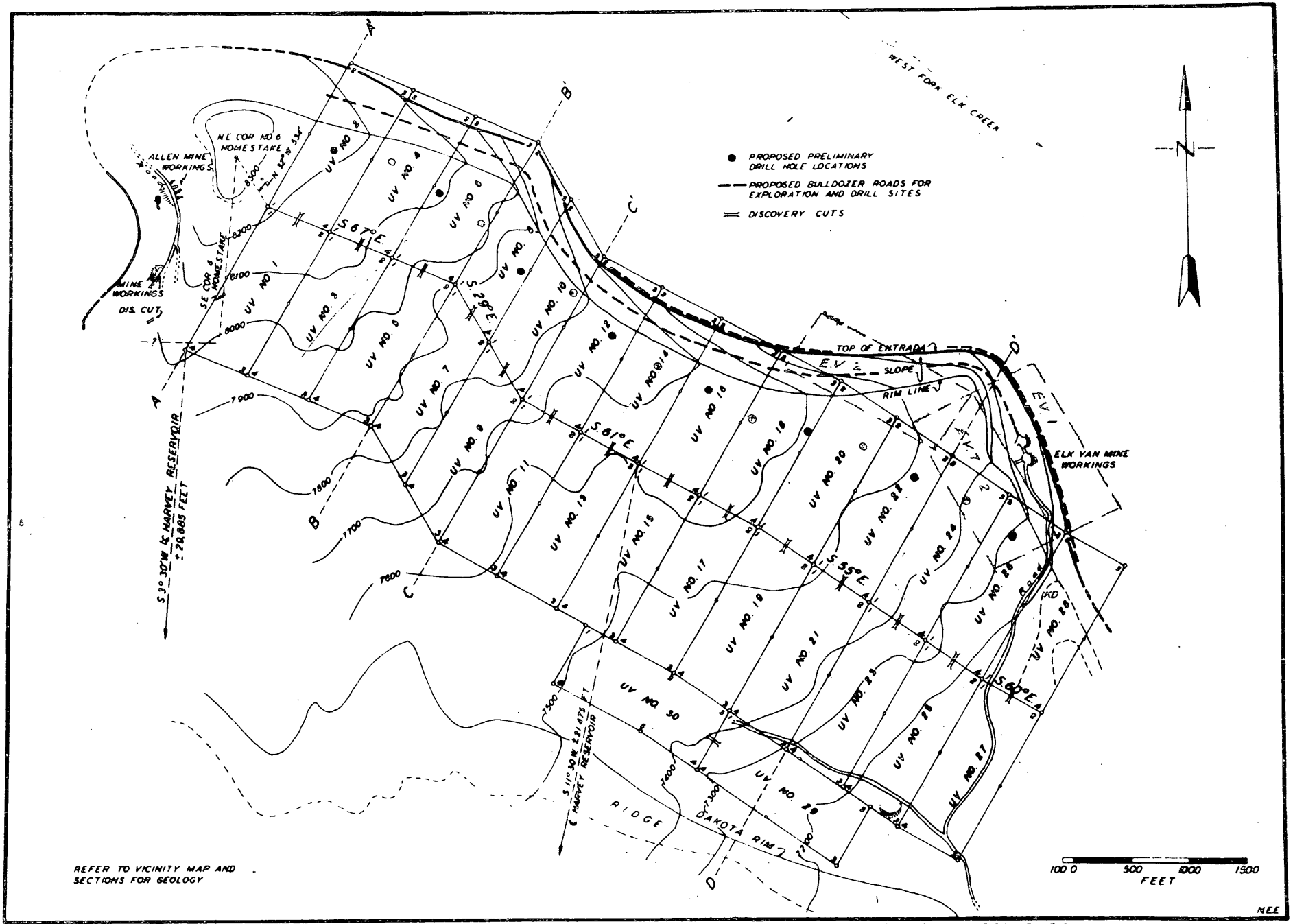
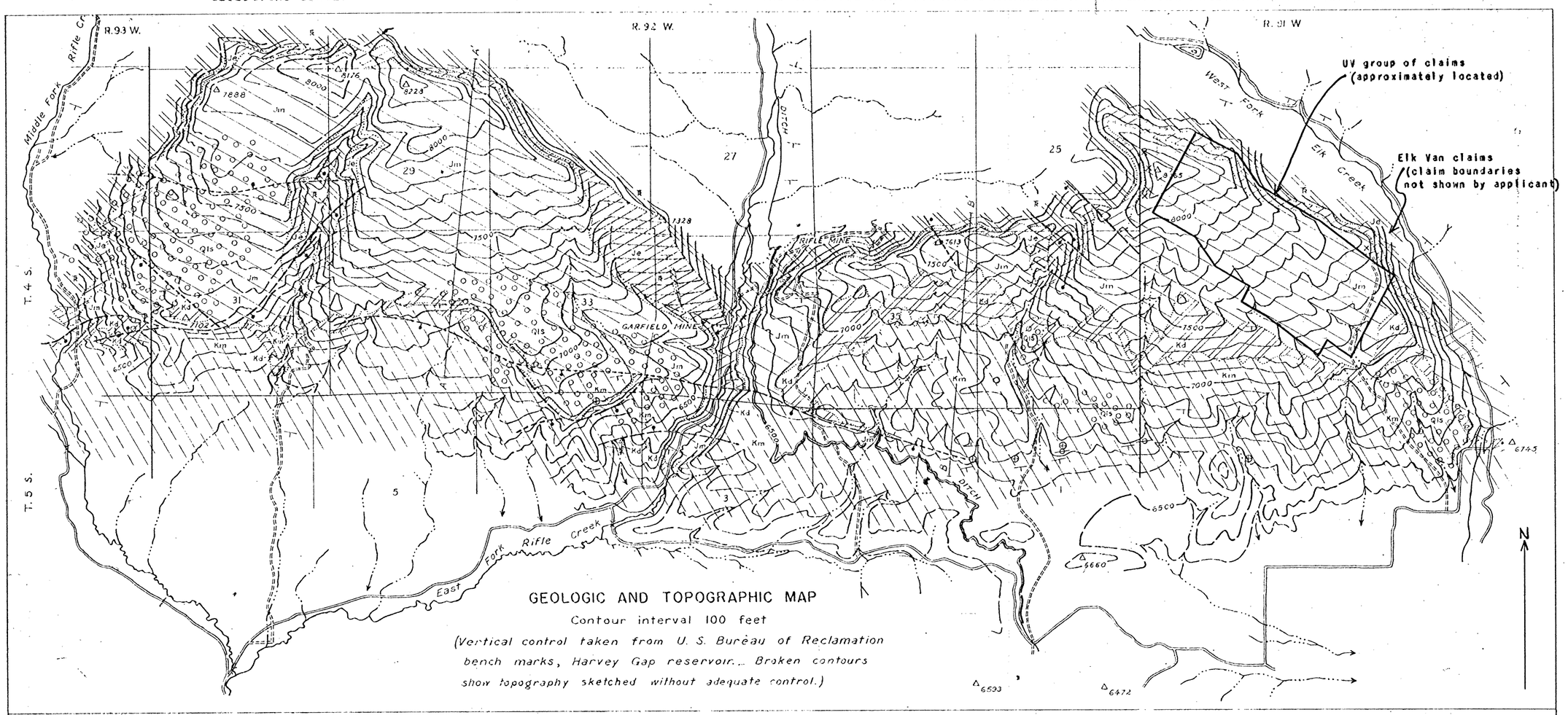


FIG 2 CLAIM MAP OF UV GROUP - WEST ELK MINING DISTRICT - GARFIELD CO., COLORADO

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

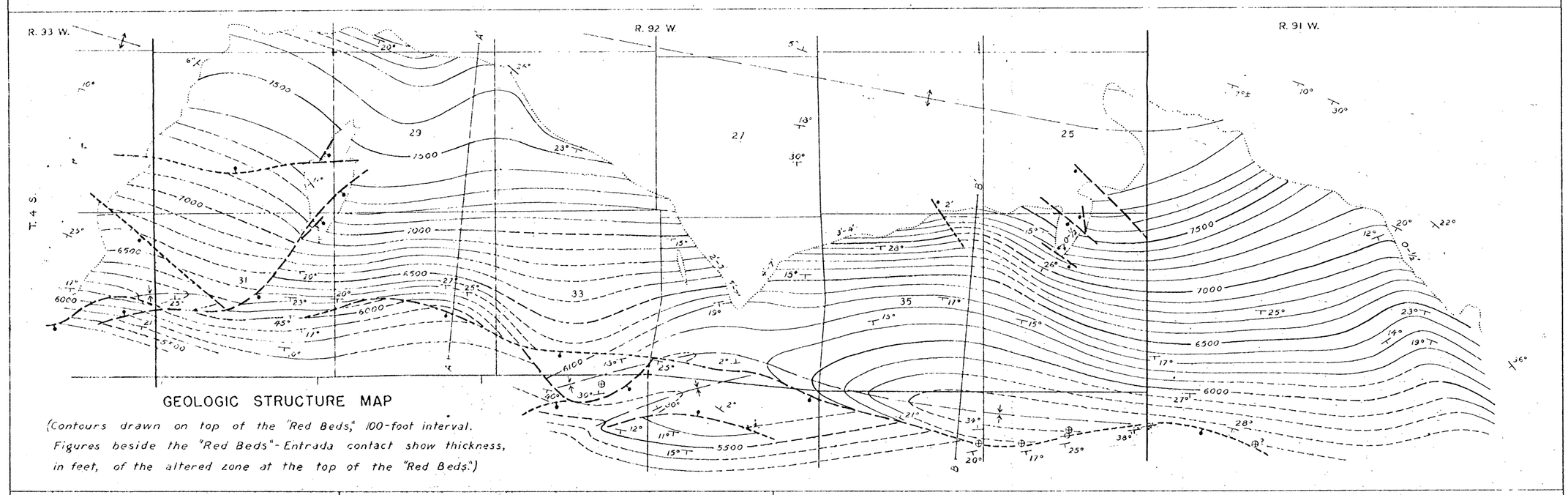
DEFENSE MINERALS EXPLORATION ADMINISTRATION DOCKET 3360
MAP MODIFIED FROM STRATEGIC MINERALS INVESTIGATIONS PRELIMINARY MAP (JAN. 1, 1945)



GEOLOGIC AND TOPOGRAPHIC MAP

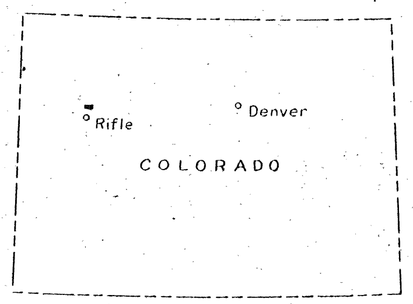
Contour interval 100 feet

(Vertical control taken from U. S. Bureau of Reclamation bench marks, Harvey Gap reservoir. Broken contours show topography sketched without adequate control.)

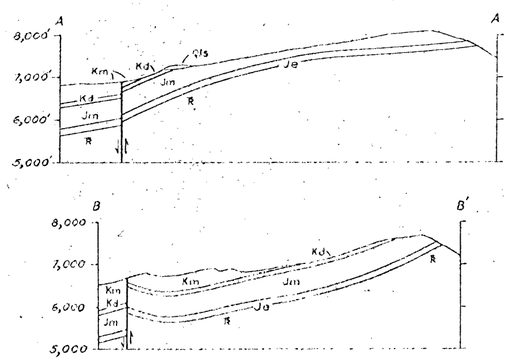


GEOLOGIC STRUCTURE MAP

(Contours drawn on top of the "Red Beds," 100-foot interval. Figures beside the "Red Beds"-Entrada contact show thickness, in feet, of the altered zone at the top of the "Red Beds.")



INDEX MAP



GEOLOGIC STRUCTURE SECTIONS

EXPLANATION

QUATERNARY (?)
- Qls — Landslide

CRETACEOUS
- Km — Mancos shale
- Kd — Dakota (?) sandstone

JURASSIC
- Jm — Morrison formation
- Je — Entrada sandstone

TRIASSIC
- R — "Red Beds"

- Fault, showing downthrown side (Long dashes show fault where well located, short dashes where covered or otherwise not well located)
- 15° — Strike and dip of beds
- Strike of vertical beds
- Flat-lying beds
- Axis of anticline
- Axis of syncline
- Working portal of vanadium mine
- × Small vanadium mine or prospect
- Land corner located

Scale 1:31,680

5,000 0 10,000 Feet

COMPILED BY R. P. FISCHER, W. L. STOKES, AND L. E. SMITH

Figure 1. RIFLE CREEK VANADIUM AREA, GARFIELD COUNTY, COLORADO