DMEA 3235

DOCKET INDEX

ACTION DOCUMENTS

1	APPLICATION		DATE RECEIVED	1/18/54
2	CONTRACT		DATE	8/9/54
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4	CERTIFICATION		DATE	
5	AUDIT REPORT		DATE	
6	AMENDMENTS - NUMBERS	1	DATE	11/30/54
		2		4/14/55
		3		6/30/55

Pulsin 8/3/5

RECEIVED

No. 3 JUL - 5 1955

AMENDMENT OF CONTRACT: No. Idm-E698

Contract Docket No. DMEA-3235, dated August 9, 1954, ~~between~~ the United States of America and Willden and Petty, a partnership consisting of Earl B. Willden, Al Willden and Lionel A. Petty is hereby amended as follows, effective May 15, 1955:

> Referring to Amendment No. 2, dated April 14, 1955, item "2" change the date "May 15, 1955" to read "June 15, 1955".
>
> Referring to "Annex I", attached to Exploration Project Contract form MF-200(A) (February 1952), which is substituted in lieu of Article 6 of the contract form, further referring to "Annex I" item "b.(2)", "for a period of eleven years" is substituted "for a period of ten years".

This amendment shall not be construed to increase the estimated total cost of the project, the amount of the Government's contribution, or any item of allowable cost which is expressly designated "allowable maximum".

Dated JUN 30 1955 gr

WILLDEN AND PETTY

By Earl B. Willden
Earl B. Willden, Partner

By Al Willden
Al Willden, Partner

By Lionel A. Petty
Lionel A. Petty, Partner

UNITED STATES OF AMERICA

By W. M. Traver
W. M. Traver, Executive Officer,
DMEA Field Team, Region III

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
1600 EAST FIRST SOUTH STREET
SALT LAKE CITY 1, UTAH

DMEA
Date Rec'd.
JUN 16 1955
BUREAU OF MINES
Denver, Colorado

June 14, 1955

RECEIVED
JUL - 5 1955

Memorandum

To: W. M. Traver, Executive Officer, DMEA Field Team, Region III

From: Stephen R. Wilson

Subject: Docket No. DMEA-3215 (Tungsten), Contract Idm-E698, Willden and Petty, Millard County, Utah

Attached are the original and eight copies of a letter received from the subject operator requesting an extension of the recess period as allowed by Amendment No. 2. The operator's letter is dated June 2, 1955.

The inspecting engineer recommends that the recess period be extended to June 15, 1955. This period appears sufficient to allow the operator to resume diamond drilling. I concur in the recommendation made by the inspecting engineer.

Stephen R. Wilson

Stephen R. Wilson

Enclosure

cc: J. Bruce Clemmer

S. R. Wilson

June 13, 1955

M. H. Howes

RECEIVED

JUL - 5 1955

Docket No. DMEA-3238 (Tungsten), Contract Ida-8893, Willden and Petty, Millard County, Utah. Memorandum report on operator's request to extend the recess period allowed in Amendment No. 2

Amendment No. 2 of the contract states, "It is agreed that work under the Contract shall be recessed from on or about November 16, 1954, and will be resumed on or before May 15, 1955."

A letter from the operator to S. R. Wilson, dated June 2, 1955, requested that the recess period be extended, because of a delay in resuming contract work caused by difficulty in obtaining repair parts for the diamond-drill machine. The operator has reported that the parts have been received and that the drillers plan to start drilling not later than June 6, 1955.

It is recommended that the recess period be extended for 1 month or until June 15, 1955.

M. H. Howes

M H Howes

Al Willden | WILLDEN BROTHERS | Earl Willden

DELTA, UTAH

June 2, 1955

RECEIVED
JUL - 5 1955

S. R. Wilson
U. S. Bureau of Mines
1600 East 1st South
Salt Lake City, Utah

Dear Sir:

We have been unable to start our drilling operation on the Willden and Petty property which is under Docket DEDA-2228, Contract Ida-2228 as scheduled, for the following reasons.

The drilling rig was moved onto the property on May 13. However, when drilling operations were started it was found that the rig did not work because of several parts that had become worn. The drillers upon checking in Delta for parts, were unable to ascertain them, and consequently no drilling has been done. I have been checking with the drillers and the parts for the drilling rig are now here, and drilling should commence on the property not later than June 6. The reason why I have not informed you sooner of this delay was that the drillers figured that the parts would come any day, but they did not.

We assure you that this delay was wholly unintentional and purely for mechanical failure of the drilling rig. We do not wish to jeopardize our contract with you, but we are fully aware that we have not started the drilling operation as soon as agreed upon.

If for any reason this delay has affected the terms of our contract, kindly let us know at once, as now that the rig is in working order we will complete the drilling operation as quickly as possible.

Very truly yours,

/s/ Al Willden

lh

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
1600 EAST FIRST SOUTH STREET
SALT LAKE CITY 1, UTAH

DMEA
Date Rec'd.
JUN 16 1955
BUREAU OF MINES
Denver, Colorado

RECEIVED
JUL - 5 1955

June 14, 1955

Memorandum

To: W. M. Truver, Executive Officer, DMEA Field Team, Region III

From: Stephen R. Wilson

Subject: Docket No. DMEA-2303 (Tungsten), Contract Ida-2606, Willden and Petty, Millard County, Utah

Attached are the original and eight copies of a letter received from the subject operator requesting an extension of the recess period as allowed by Amendment No. 2. The operator's letter is dated June 2, 1955.

The inspecting engineer recommends that the recess period be extended to June 15, 1955. This period appears sufficient to allow the operator to resume diamond drilling. I concur in the recommendation made by the inspecting engineer.

Stephen R. Wilson
Stephen R. Wilson

Enclosure

cc: J. Bruce Clemmer

S. R. Wilson

RECEIVED
JUL - 5 1955

June 13, 1955

M. H. Howes

Docket No. DMEA-3235 (Tungsten), Contract Idm-1693, Willden and Petty, Millard County, Utah. Memorandum report on operator's request to extend the recess period allowed in Amendment No. 2

Amendment No. 2 of the contract states, "It is agreed that work under the Contract shall be recessed from on or about November 15, 1954, and will be resumed on or before May 15, 1955."

A letter from the operator to S. R. Wilson, dated June 2, 1955, requested that the recess period be extended, because of a delay in resuming contract work caused by difficulty in obtaining repair parts for the diamond-drill machine. The operator has reported that the parts have been received and that the drillers plan to start drilling not later than June 6, 1955.

It is recommended that the recess period be extended for 1 month or until June 15, 1955.

M. H. Howes

M. H. Howes

Al Willden WILLDEN BROTHERS Earl Willden

DELTA, UTAH

June 2, 1955

S. R. Wilson
U. S. Bureau of Mines
1600 East 1st South
Salt Lake City, Utah

Dear Sir:

We have been unable to start our drilling operation on the Willden and Petty property which is under Docket [illegible], Contract [illegible] as scheduled, for the following reasons.

The drilling rig was moved onto the property on May 13. However, when drilling operations were started it was found that the rig did not work because of several parts that had become worn. The drillers upon checking in Delta for parts, were unable to ascertain them, and consequently no drilling has been done. I have been checking with the drillers and the parts for the drilling rig are now here, and drilling should commence on the property not later than June 6. The reason why I have not informed you sooner of this delay was that the drillers figured that the parts would come any day, but they did not.

We assure you that this delay was wholly unintentional and purely for mechanical failure of the drilling rig. We do not wish to jeopardize our contract with you, but we are fully aware that we have not started the drilling operation as soon as agreed upon.

If for any reason this delay has affected the terms of our contract, kindly let us know at once, as now that the rig is in working order we will complete the drilling operation as quickly as possible.

Very truly yours,

/s/ Al Willden

lh

Rec'd in 5/25/5

No. 2

AMENDMENT OF CONTRACT: No. Id.-E698

Contract Docket No. DMEA 3235, dated August 9, 1954, between the United States of America and Willden and Petty, a partnership consisting of Earl B. Willden, Al Willden and Lionel A. Petty, is hereby amended as follows, effective February 9, 1955:

1. Referring to Exhibit "A" attached to Exploration Project Contract form MF-200(A) (February 1952), heading "Description of the Work", details of holes to be drilled, in lieu of drilling Hole No. 2 to its maximum depth of 250 feet at the location specified therefor, instead two holes will be drilled to a maximum depth of 125 feet each at the location shown on the map "Figure 4" which is attached hereto and made a part of this amendment. One hole will be drilled vertical and the other hole will be drilled on a bearing of N 30° E inclined at an angle of 60 degrees.

2. It is agreed that work under the Contract shall be recessed from on or about November 10, 1954 and will be resumed on or before May 15, 1955.

3. Referring to "Article 3. Exploration project" of Exploration Project Contract form MF-200(A), following the words "and shall bring the project to completion within a period of" delete "six (6) months" and in lieu thereof substitute "one (1) year".

This amendment shall not be construed to increase the estimated total cost of the project, the amount of the Government's contribution, or any item of allowable cost which is expressly designated "allowable maximum".

Dated APR 14 1955

WILLDEN AND PETTY

By Earl B. Willden
Earl B. Willden, Partner

By Al Willden
Al Willden, Partner

By Lionel A. Petty
Lionel A. Petty, Partner

UNITED STATES OF AMERICA

By W. M. Traver
W. M. Traver, Executive Officer, DMEA Field Team, Region III

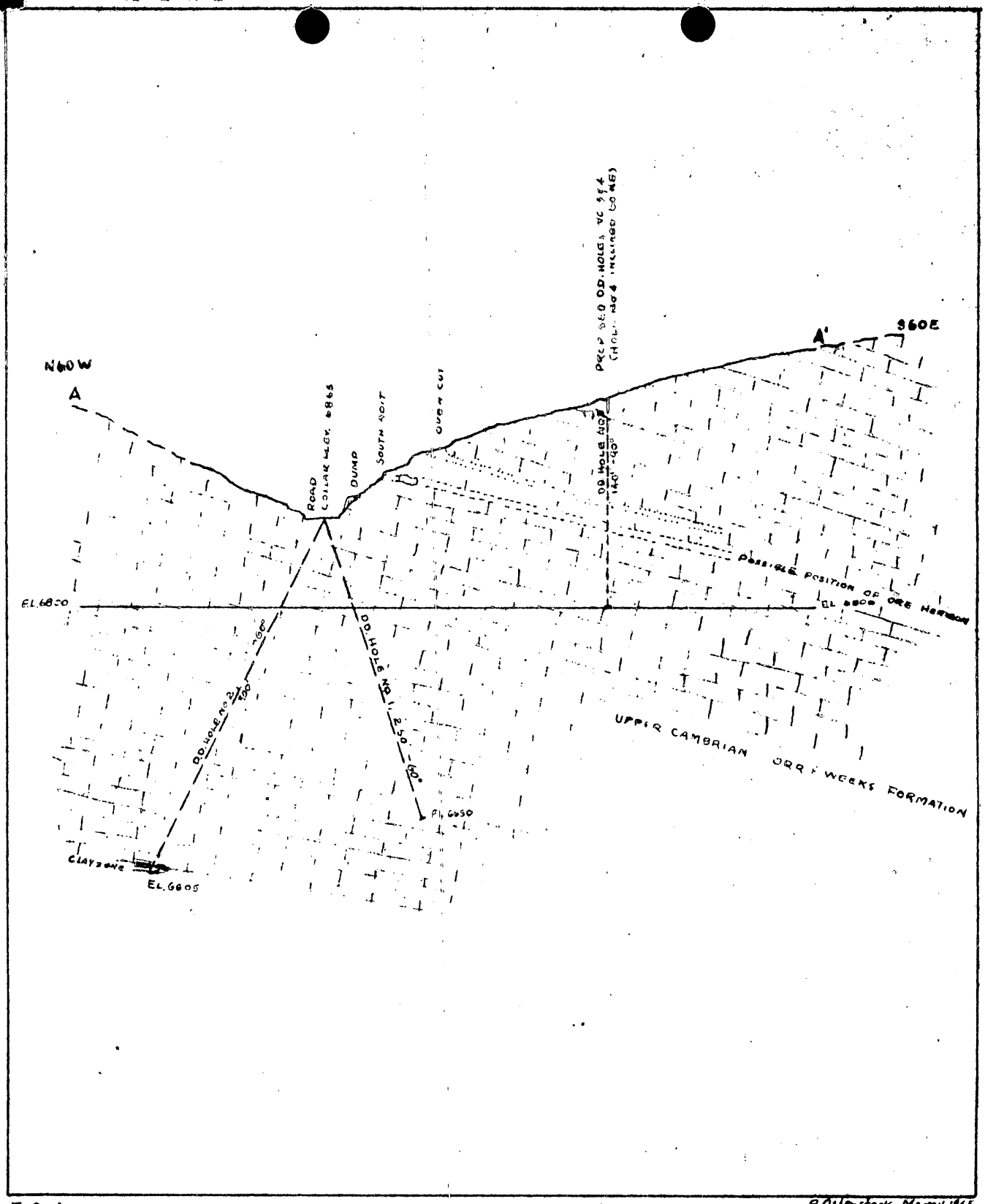


FIG. 4

R. Osterstock, March 1955

VERTICAL PROJECTION OF DIAMOND DRILL EXPLORATION OF THE BROWN QUEEN MINE AREA, MILLARD COUNTY, UTAH

LOOKING NORTHEAST

HORIZONTAL AND VERTICAL SCALE

0 100 200 300 FEET

Assumed Datum Plane

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

DMEA
Date Rec'd
MAR 17 1955
BUREAU OF MINES
Denver Colorado

March 16, 1955

Memorandum

To: Field Team, Region III

From: E. N. Harshman

Subject: DMEA Docket 325 (tungsten), Contract DMe-X 698, Willden and Petty, Brown Queen Mine, Millard County, Utah. Request for amendment.

Enclosed are the original and 8 copies of a memorandum report by R. W. Osterstock, U. S. Geological Survey, covering a request by the operators for revision of the exploration program.

The original program was designed to explore for tactite bodies in limestone stratigraphically below the known tactite-bearing horizon in the Brown Queen mine. In drilling two of the three holes authorized in the contract, data were obtained indicating that it is improbable that lower tactite-bearing horizons exist, and Osterstock concludes that the remaining drilling should be used in exploring for tungsten ore in the down-dip extension of the Brown Queen mine ore horizon.

The two short holes proposed by Osterstock have my approval.

E. N. Harshman

E. N. Harshman
Member, Field Team

Enclosures (9)

ENHarshman:arh

222 So. West Temple, Room 203
Salt Lake City 1, Utah
March 14, 1955

Memorandum

To: R. M. Hershman, DMEA Field Team, Region III

From: S. W. Osterstock

Subject: DMEA Docket 3235 (Tungsten) Willden and Petty, Brown Queen Mine, Millard County, Utah.

On December 3, 1954 the subject operators requested a recess of operations through the winter months, the operators further requested a revision of the diamond drilling program as outlined under Exhibit A of contract Idm-2693. The suggested revision involves drilling for the down dip projection of the known ore bodies in the Brown Queen mine.

Two of the three originally proposed diamond drill holes have been completed; hole number 1 (formerly hole #3) to a depth of 250 feet and hole number 2 (formerly hole #1) to a depth of 300 feet (see figs. 3 and 4). The first hole drilled to the northeast under the best near-surface showings of tungsten mineralization encountered only a few very thin tactite zones, none of which contained assayable amounts of tungsten. Most of the hole was in bleached, white to light gray, thin bedded recrystallized limestone. This hole bottomed at 250 feet in pale gray recrystallized limestone. The second hole drilled was inclined 60° west for maximum stratigraphic penetration. Only a few thin tactite zones were encountered in the predominantly recrystallized pale gray to white, thin bedded, impure limestone. No assayable amounts of tungsten mineralization were present in the core. The second hole bottomed in a creamy clay zone, the origin of which is conjectural, it may be ascribed to gouge along a flat (thrust?) fault or clay-mineral alteration of an impure bed in the Cambrian section.

Summarizing the data gained in the drilling of the above two holes, it is apparent that the frequency of occurrence of the tactite zones below the present ore horizon is markedly less than had been anticipated, nor is there any other evidence of increasing proximity to a hidden intrusive body with depth. It must, therefore, be deduced that the localization of the tactite exposed in the mine workings must be due almost

entirely to the existence of particular beds which have been particularly susceptible to lime silicate replacement and alteration. It has been demonstrated that no intrusive body exists immediately below the mine workings. Consequently, it is assumed that considerable lateral migration of the mineralizing agents has taken place. The regionally persistent nearly north strike and gentle easterly dip of the strata in the mine area predicate an eastward source of the mineralizing agents in order to comply with the physical requirement of escape in a direction of decreasing pressure, ergo, up dip.

It is concluded that the extreme selectivity of lime silicate alteration will confine the potential scheelite bearing tactite zone to a thin persistent horizon which can be projected southeast of the present mine workings (see fig. 4). As was noted in the original geologic report all of the known occurrences of scheelite in the Brown Queen Mine area are confined to tactite zones and the tactite zones themselves are further confined to particular beds which have been especially amenable to lime silicate alteration. It should be pointed out that the existence of tactite does not necessarily portend the existence of scheelite.

It is recommended that an amendment to the existing contract be executed which will provide for the elimination of the 250 foot drill hole inclined 50° South and the substitution of two drill holes of 125 feet each to be located at the position noted on figure 4 accompanying this report. The new holes to be designated thus: DD Hole No. 3 - 125 feet, vertical hole. DD Hole No. 4 - 125 feet, N. 30° E. inclined 60°. These revised exploration proposals have been discussed with and approved by the applicants.

R. W. Caterstock

RWC/rs
cc: S. R. Wilson

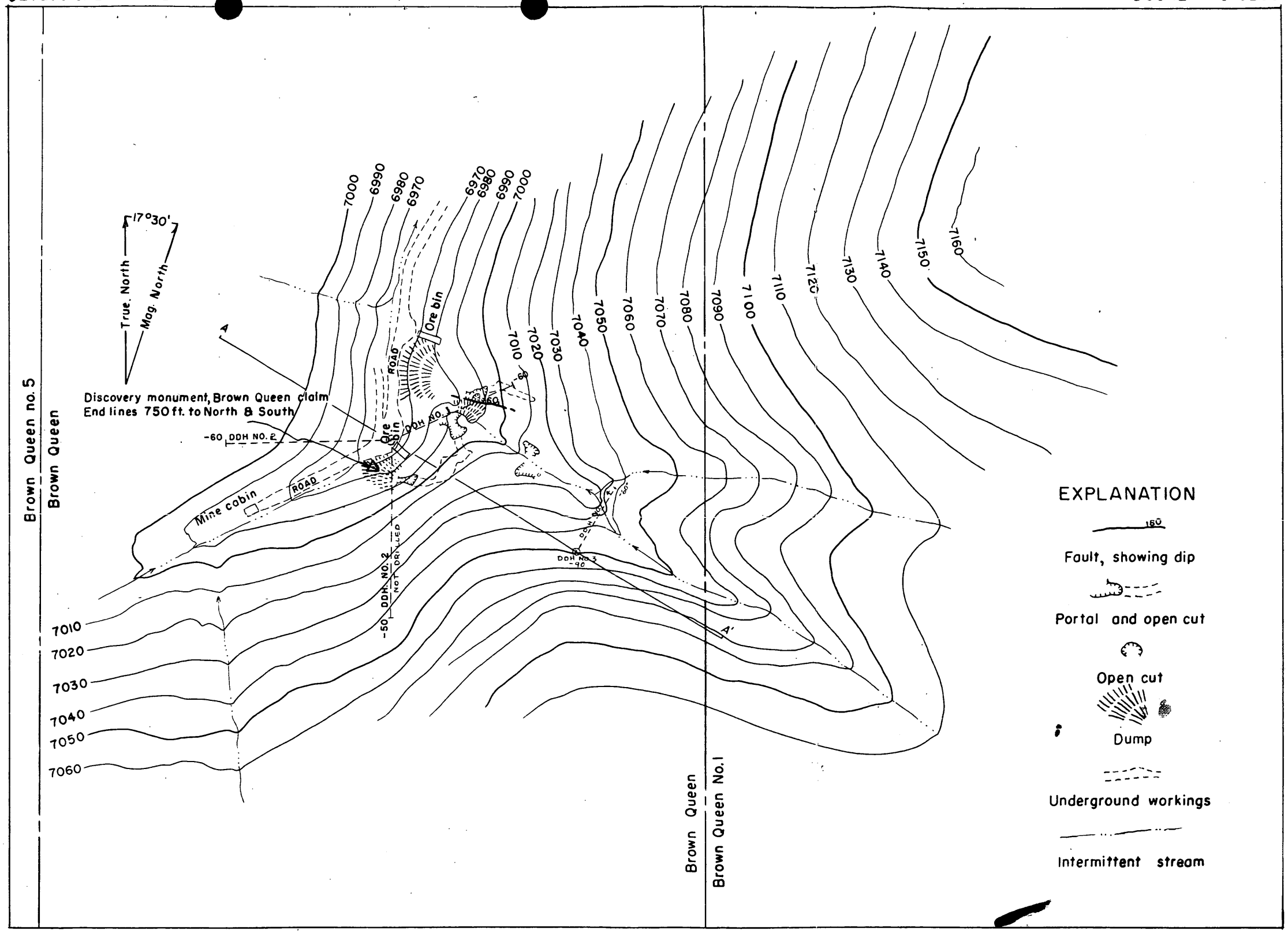


FIG. 2

By R. W. Osterstock and C. G. Tillman May 1954

MAP OF BROWN QUEEN MINE AREA
HOUSE RANGE, MILLARD COUNTY, UTAH

0 100 200 300
Scale

Contour interval 10 ft.; Datum assumed

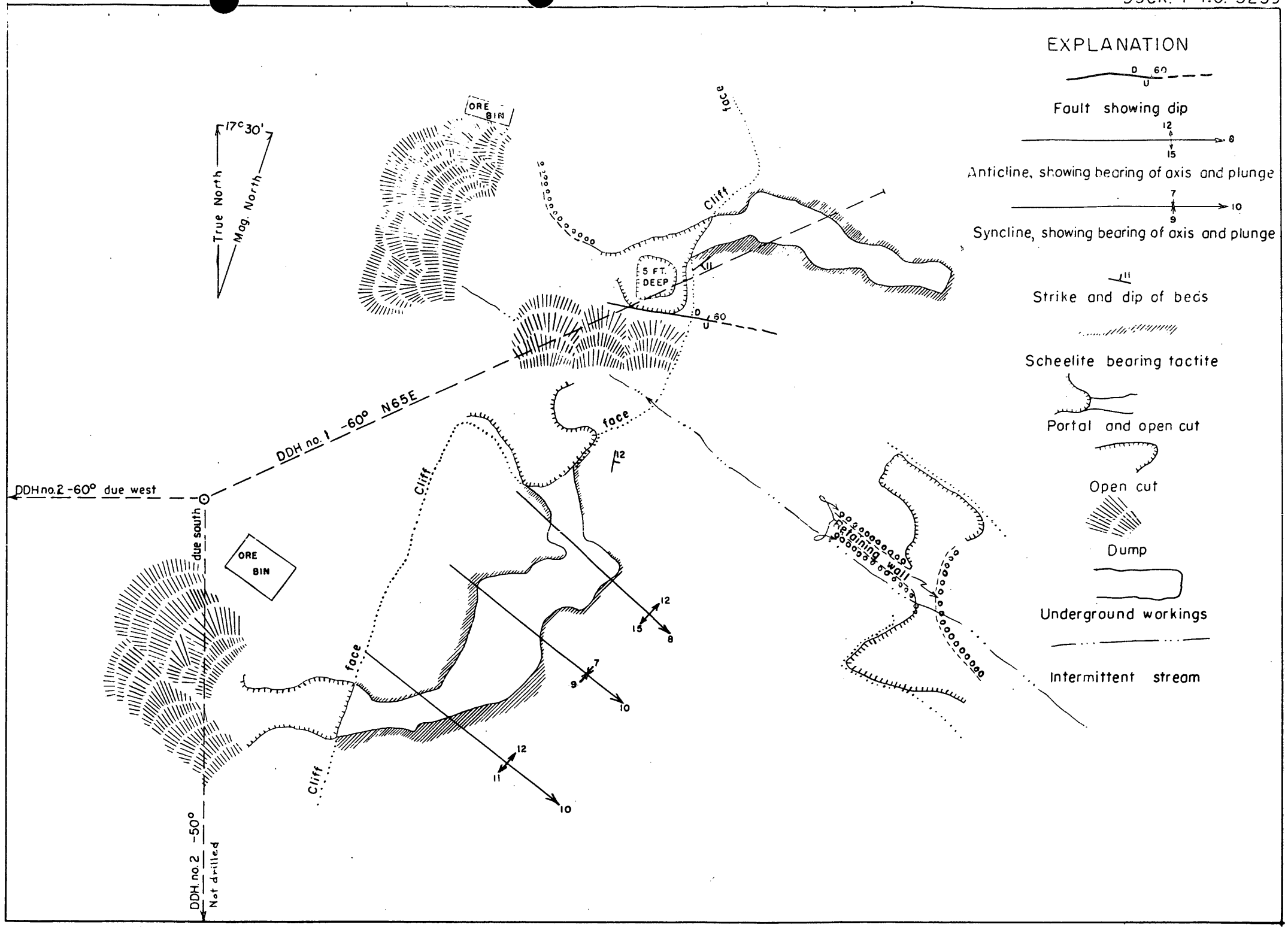


FIG. 3

MAP OF BROWN QUEEN MINE
HOUSE RANGE, MILLARD COUNTY, UTAH

0 20 40 60 ft.
Scale

By R. W. Osterstock and C. G. Tillman May, 1954

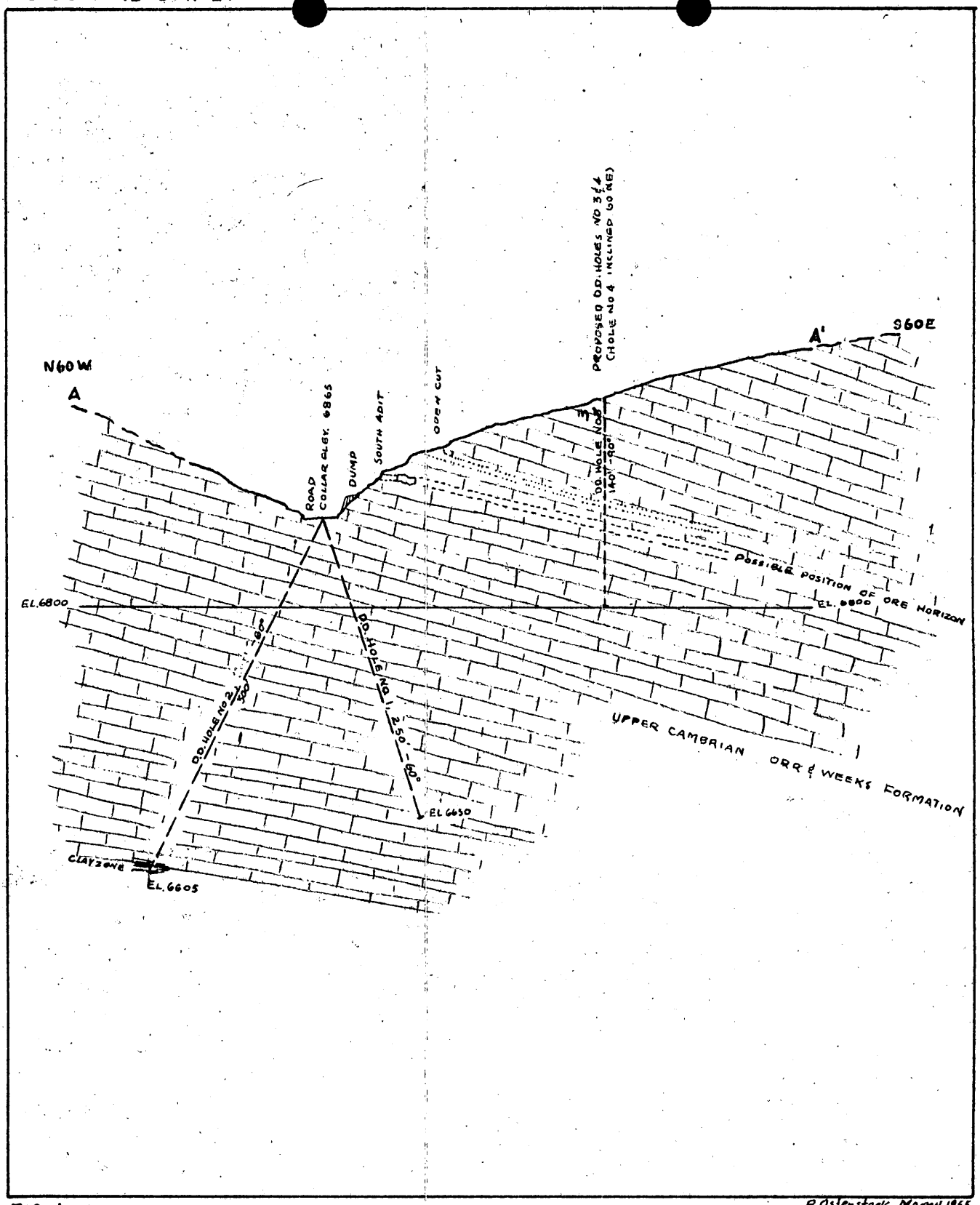


FIG. 4

R. Osterstock, March 1955

VERTICAL PROJECTION OF DIAMOND DRILL EXPLORATION OF THE BROWN QUEEN MINE AREA, MILLARD COUNTY, UTAH

LOOKING NORTHEAST

HORIZONTAL AND VERTICAL SCALE

0 100 200 300 FEET

Assumed Datum Plane

Contin No. 1 1-4-5

AMENDMENT OF CONTRACT: No. 13m-E698

Contract Docket No. DMEA 3235, dated August 9, 1954, between the United States of America and Willden and Petty, a partnership consisting of Earl B. Willden, Al Willden and Lionel A. Petty, is hereby amended as follows, effective as of the date of the contract:

> Referring to EXHIBIT "A" attached to Exploration Project Contract form MF-200(A) (February 1952), caption "Estimated Costs of the Project" delete the following: Assaying as required to a maximum of $200.00 and in lieu thereof substitute the following: "A maximum of 40 tungsten assays at $5.00 each." Delete footnote "3/" in its entirety and in lieu thereof substitute the following: "3/ claims for reimbursement for analysis charges are to be supported with a copy of assay return showing results.

This amendment shall not be construed to increase the estimated total cost of the project, the amount of the Government's contribution, or any item of allowable cost which is expressly designated allowable maximum.

Dated: NOV 30 1954

WILLDEN AND PETTY

By Earl B. Willden
Earl B. Willden, partner

By Al Willden
Al Willden, partner

By Lionel A. Petty
Lionel A. Petty, partner

UNITED STATES OF AMERICA

By W. H. King
W. H. King, Executive Officer
DMEA Field Team, Region IV

MF-200 (A)
(February 1952)

DOCKET NO. DMEA 3235

COMMODITY Tungsten

Idm-E698

10/20/54 Approved

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

EXPLORATION PROJECT CONTRACT[1]
(Short Form)

IT IS AGREED this 9th day of August, 1954, between the United States of America, acting through the Department of the Interior, Defense Minerals Exploration Administration, hereinafter called the "Government," and[2] Willden and Petty, Delta, Utah, a partnership consisting of Earl B. Willden, Al Willden, and Lionel A. Petty, all of Delta, Utah

hereinafter called the "Operator," as follows:

ARTICLE 1. *Authority for contract.*—This agreement is entered into under the authority of the Defense Production Act of 1950, as amended, pursuant to DMEA Order 1 entitled "Government Aid in Defense Exploration Projects."

ARTICLE 2. *Operator's property rights.*—With respect to that certain land situated in the State of Utah, County of Millard, described as follows:[3] Brown Queen, Brown Queen No. 1, Brown Queen No. 2, Brown Queen No. 3, Brown Queen No. 4, Brown Queen No. 5, Brown Queen No. 6, and Brown Queen No. 7, unpatented claims all located in T-18-S, R-14-W and filed and recorded at Millard County Courthouse, Fillmore, Utah.

the Operator represents and undertakes:[4]

(*a*) That the Operator is the owner, in possession and entitled to possession, and that the property is subject only to the following claims, liens, or encumbrances as to each of which the subordination agreement of the holder is attached: None

The Operator shall devote the land and all existing improvements, facilities, buildings, installations, and appurtenances to the purposes of the exploration project without any allowance for the use, rental value, depreciation, depletion, or other cost of acquiring, owning, or holding possession thereof.

ARTICLE 3. *Exploration project.*—The Operator, within Thirty (30) days from the date of this contract shall commence work on a project of exploration for[5] Tungsten

in or upon the described land; and shall bring the project to completion within a period of six (6) months from the date of this contract. The work to be performed is more fully described in Exhibit "A" attached hereto, which, with any maps or drawings thereto attached, are made a part of this contract. The Government will contribute to the cost of this work as hereafter provided. The work shall be performed by the Operator or by independent contractor or contractors efficiently, expertly, in a workmanlike manner, in accordance with good mining standards and State regulations for health and safety and for workmen's compensation and employers' liability insurance, with suitable and adequate equipment, materials, and labor, to bring the project to completion within the time fixed. The Government shall have the right to enter and observe and inspect the work at all reasonable times, and the Operator shall provide the Government with all available means for doing so. The Government may consult with and advise the Operator on all phases of the work.

ARTICLE 4. *Costs of the project.*—The agreed, estimated costs of performing the work, expressed in terms of units of work to be performed (per foot of drifting, per foot of drilling, per cubic yard of material to be moved, etc.) are set forth in Exhibit "A," attached hereto. The Government will pay seventy-five (75) percent of these agreed, estimated costs, as they accrue, for units of work actually performed that conform with the description or specifications for the work set forth in this contract, in an aggregate total amount not in excess of $4,620.00, which is 75 percent of $6,160.00, the agreed, estimated total cost of the project in which the Government will participate: *Provided,* That until the Operator's final report and final accounting have been rendered to the Government and any final check or 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 ten (10) percent of the maximum total which the Government might have been called upon to pay under the terms of the contract. The Government may, as it sees fit, make payments direct to the Operator's independent contractors, if any, for the account of the Operator, rather than to the Operator.

ARTICLE 5. *Reports, accounts, audits.*—(*a*) *Progress reports.* The Operator shall provide the Government with monthly reports of units of work performed under the contract, in quintuplicate (five copies), upon forms provided by the Government. These progress reports shall be certified by the Operator, and shall constitute both the Operator's invoice of units of work performed on the project during the period covered by the report and his voucher for repayment by the Government, unless the Government requires the use of a standard voucher form with invoice attached. Progress reports shall include surface and/or underground engineering-geological maps or sketches showing the progress of the exploration, with assay-reports on samples taken concurrently with the advance in mineralized ground.

[1] If sufficient space is not provided in any blank, use an extra sheet of paper and refer to it in the blank.
[2] State name, address, and nature of organization if any.
[3] Give legal description or enough to identify the property, particularly excluding any land or interest therein to which the Government's lien is not to attach or the production from which is not to be subject to the Government's percentage royalty.
[4] Strike out the provision not applicable.
[5] Name of mineral or minerals.

(*b*) *Final report.*—Upon completion of the exploration work or termination of the contract the Operator shall provide the Government with an adequate geological and engineering report, in quintuplicate (five copies), including an estimate of ore reserves resulting from the exploration work.

(*c*) *Compliance with requirements.*—If, in the opinion of the Government, any of the Operator's reports are insufficient or incomplete, the Government may procure the making or completion of such reports and attachments as an expense of the exploration work; and the Government may withhold approval and payment of any vouchers depending upon insufficient or incomplete reports.

(*d*) *Accounts and audits.*—The Operator shall keep suitable records and accounts of the units of work performed, which the Government may inspect and audit at any time. The Government may at any time require a check of the work performed and an audit of the Operator's records and accounts, by a certified public accountant or otherwise, the cost thereof to be treated as a cost of the project. The Operator shall keep and preserve said records and accounts for at least 3 years after the completion of the project or the termination of this contract. Upon the completion of the project or termination of the contract the Operator shall render a final account and statement of work performed to accompany his final report.

~~ARTICLE 6. *Repayment by Operator.* (*a*) If, at any time, the Government considers that a discovery or a development from~~ which production may be made has resulted from the exploration work, the Government, at any time not later than 6 months after the Operator has rendered the required final report and final account, may so certify in writing to the Operator. The certification shall describe broadly or indicate the nature of the discovery or development. In the event of such certification, any minerals mined or produced from the land described in Article 2 within 10 years from the date of this contract, including any mined or produced before the certification, shall be subject to a percentage royalty which the Operator or his successor in interest shall pay to the Government, upon the net smelter returns, the net concentrator returns, or other net amounts realized from the sale or other disposition of any such production, in whatever form disposed of, including ore, concentrates, or metal, until the total amount contributed by the Government, without interest, is fully repaid, or said 10 years have elapsed, whichever occurs first, as follows:

(1) One and one-half (1½) percent of any such net amounts not in excess of eight dollars ($8.00) per ton.

(2) One and one-half (1½) percent of any such net amounts, plus one-half (½) percent of such net amounts for each additional full fifty cents ($0.50) by which such net amounts exceed eight dollars ($8.00) per ton, but not in excess of five (5) percent of such net amounts.

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

(*b*) As here used, "net smelter returns," "net concentrator returns," and "other net amounts realized from the sale or other disposition," mean gross revenue from sales, or if not sold, the market value of the material after it is mined in the form in which and the place where it is held. In the case of integrated operations in which the material is not disposed of as such, these terms mean what is or would be the gross income from mining operations for percentage depletion purposes in income-tax determination.

(*c*) To secure the payment of its percentage royalty, the Government shall have and is hereby granted a lien upon the land described in Article 2 and upon any production of minerals therefrom, until the royalty claim is extinguished by lapse of time or is fully paid.

(*d*) This article is not to be construed as imposing any obligation on the Operator or the Operator's successor in interest to engage in any mining or production operations. **See Annex I substituted for Article 6.**

ARTICLE 7. *Assignment, transfer, or loss of Operator's interest.*—Without the written consent of the Government, the Operator shall not assign or otherwise transfer or hypothecate this contract or any rights thereunder. The Operator shall not make any voluntary nor permit any involuntary transfer or conveyance of the Operator's rights in the land described in Article 2, without making suitable provision for the preservation of the Government's right to a percentage royalty on production and lien for the payment thereof; *Provided,* that mere failure by the Operator to maintain the Operator's rights in the land, without any consideration running to the Operator other than relief from the cost of maintaining such rights (as by surrender of a leasehold, failure to perform assessment work, or failure to exercise an option), coupled with complete abandonment by the Operator of all interest in or operations on the land for a period of 10 years from the date of this contract, shall not constitute such a transfer or conveyance. Should the Operator make or permit any transfer or conveyance in violation of this provision, the Operator shall be and remain liable for payment to the Government of the same amounts, at the same times, as would have been paid under the terms of the percentage royalty on production. If for any reason the net smelter returns, net concentrator returns, or other net amounts realized from the sale or other disposition of such production are not available as a means of measuring the amount of the Operator's liability, the amount thereof shall be estimated as well as may be, and in the event of dispute as to such estimates, the determination thereof by the Administrator of Defense Minerals Exploration Administration or by his successor shall be final and binding upon the Operator.

ARTICLE 8. *Termination and completion.*—The Government may, at any time, by written notice to the Operator, terminate this contract: (*a*) If the Operator fails to provide his share of the money necessary to prosecute operations pursuant to the terms of the contract; (*b*) if the Operator, in the opinion of the Government, fails to prosecute operations pursuant to the terms of the contract; or (*c*) if, in the opinion of the Government, operations up to the time of the notice have not indicated the probability of making any worth while discovery and in the opinion of the Government further operations are not justified.

ARTICLE 9. *Changes and added provisions* .....

Executed in sextuplicate the day and year first above written.

Earl Williams
Al W Williams
Lionel A. Petty
(Operator)

By .....

THE UNITED STATES OF AMERICA

By W H King
Executive Officer, DMEA
Field Team, Region IV

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—66329-1

DMEA DOCKET 3235

EXHIBIT "A"

Description of the Work

Diamond drill three holes, fanned out from a point in the bottom of the canyon, approximately 30 feet N 35° E of the discovery monument of the Brown Queen claim to explore the tactite zones in the vicinity of the granite stock intrusive for occurrences of scheelite and other tungsten minerals. Location of drill holes are shown on attached maps.

The approximate attitude and maximum depth of the drill holes are to be as follows: 1/

Hole No.	Inclination	Direction	Maximum Depth
1	-60°	West	300 feet
2	-50°	South	250 feet
3	-60°	N 65° E	250 feet
		Total Maximum Footage	800 feet

All core is to be split and one-half stored in suitable core boxes and retained for the use of the Government. The mineralized portions of the remaining core are to be assayed for WO_3 content.

1/ In the event intrusive rocks are encountered in the drill holes before their maximum footages are completed, the drill holes should be continued no more than 25 feet in the intrusives in order to insure that the main intrusive body is being penetrated rather than a dike or sill.

Estimated Costs of the Project

A maximum of 800 feet of diamond core drilling at $7.45 per foot, including all costs for supervision, engineering, labor, equipment, supplies, core boxes and other costs incurred in obtaining and storing the core.....	$5,960.00	2/
Assaying as required to a maximum of $200.00...	200.00	3/
Total Estimated Cost.....	$6,160.00	
Government Participation at 75%....	$4,620.00	

2/ Reimbursement for diamond drilling will be on the basis of holes completed to their objective and charges must be supported by a certified copy of the drill logs of the hole or holes for which reimbursement is claimed.

3/ Requests for the reimbursement of the Government's portion of assaying charges is to be supported by suitable copies of assay invoices showing charges and results.

ANNEX I

The following provisions are in lieu of Article 6:

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 the Operator has rendered the final report and final account, 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, for 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 raw 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:

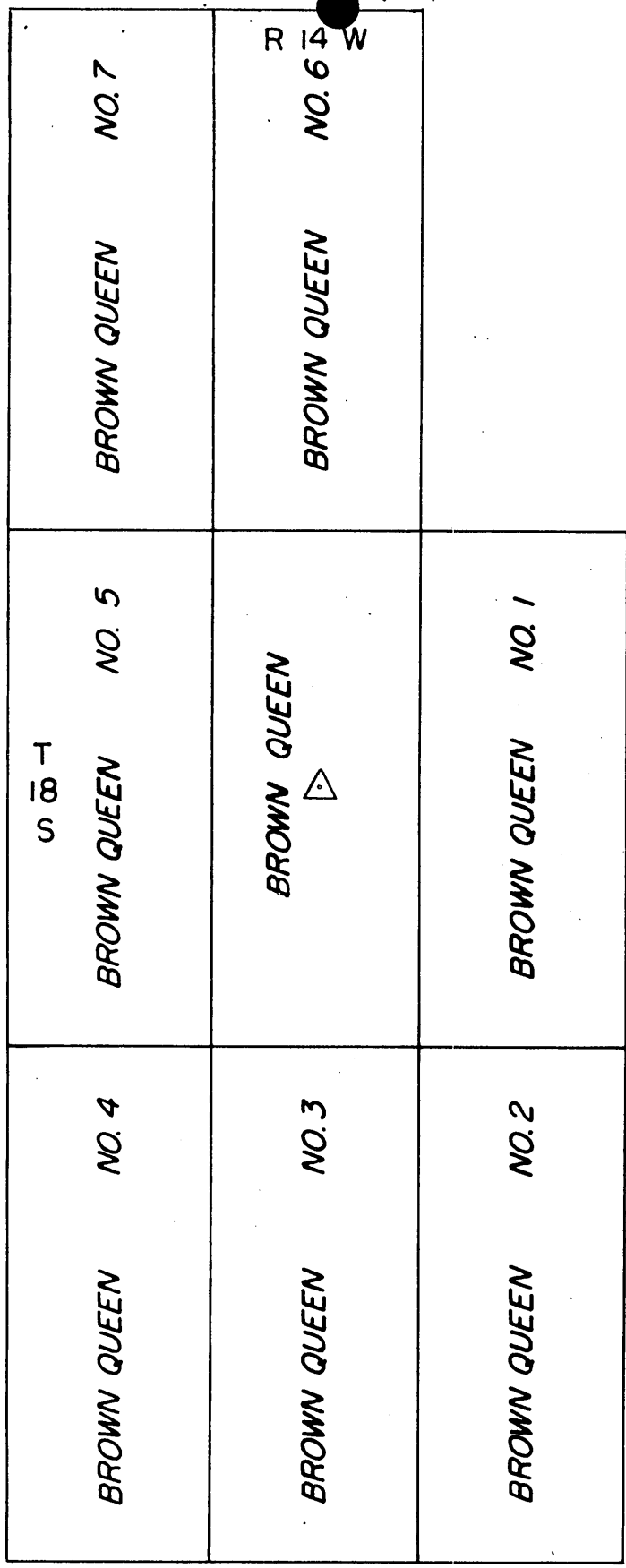
> One and one-half ($1\frac{1}{2}$) percent of amounts ("gross proceeds" or "value") not in excess of eight dollars ($8.00) per ton of production in the form in which sold, held, or used, plus one-half ($\frac{1}{2}$) percent for each additional full fifty cents ($0.50) by which such amounts exceed eight 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 ($1\frac{1}{2}$) percent; on an amount of ten dollars ($10.00) per ton, three and one-half ($3\frac{1}{2}$) percent.)

f. 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.

g. 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.

h. 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 mining or production operations.

i. 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.

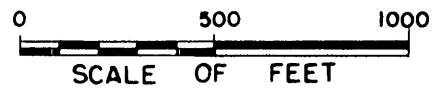


LEGEND

△ LOCATION MONUMENT

NOTE

PRESENT MINE WORKINGS ARE LOCATED IN CENTER OF BROWN QUEEN CLAIM.



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

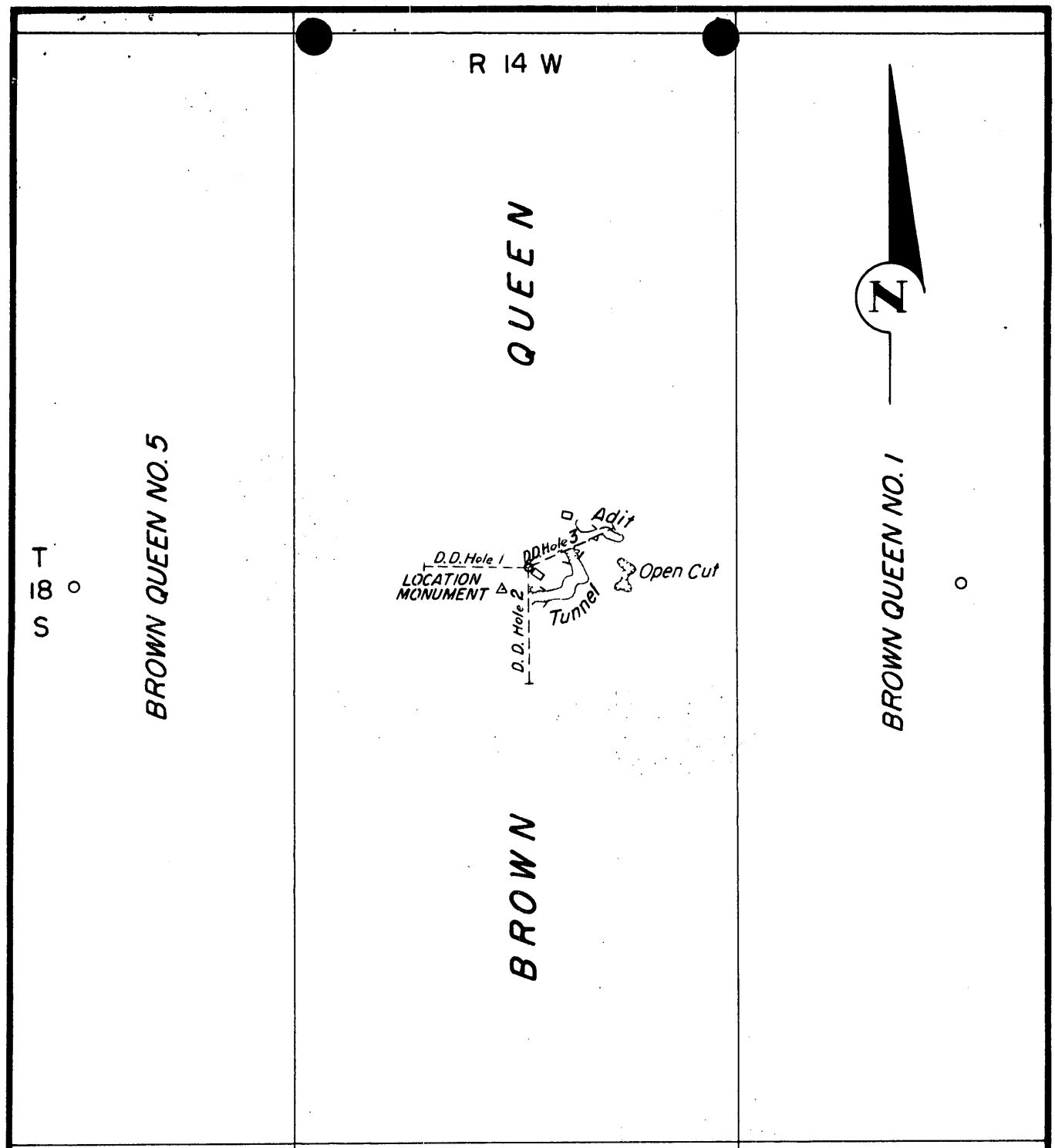
Fig. 2 DMEA Docket No. 3235

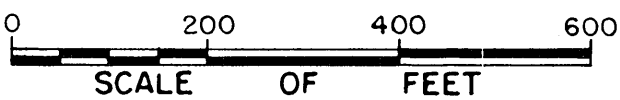
Claim Map

WILLDEN AND PETTY
BROWN QUEEN GROUP

MILLARD COUNTY, UTAH

ENGINEER: *M. H. HOWES*	DATE: JUNE 22, 1954
TRACED: JUNE, 1954; A.P.T.S.	700 - 187 - E
CHECKED:	





U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

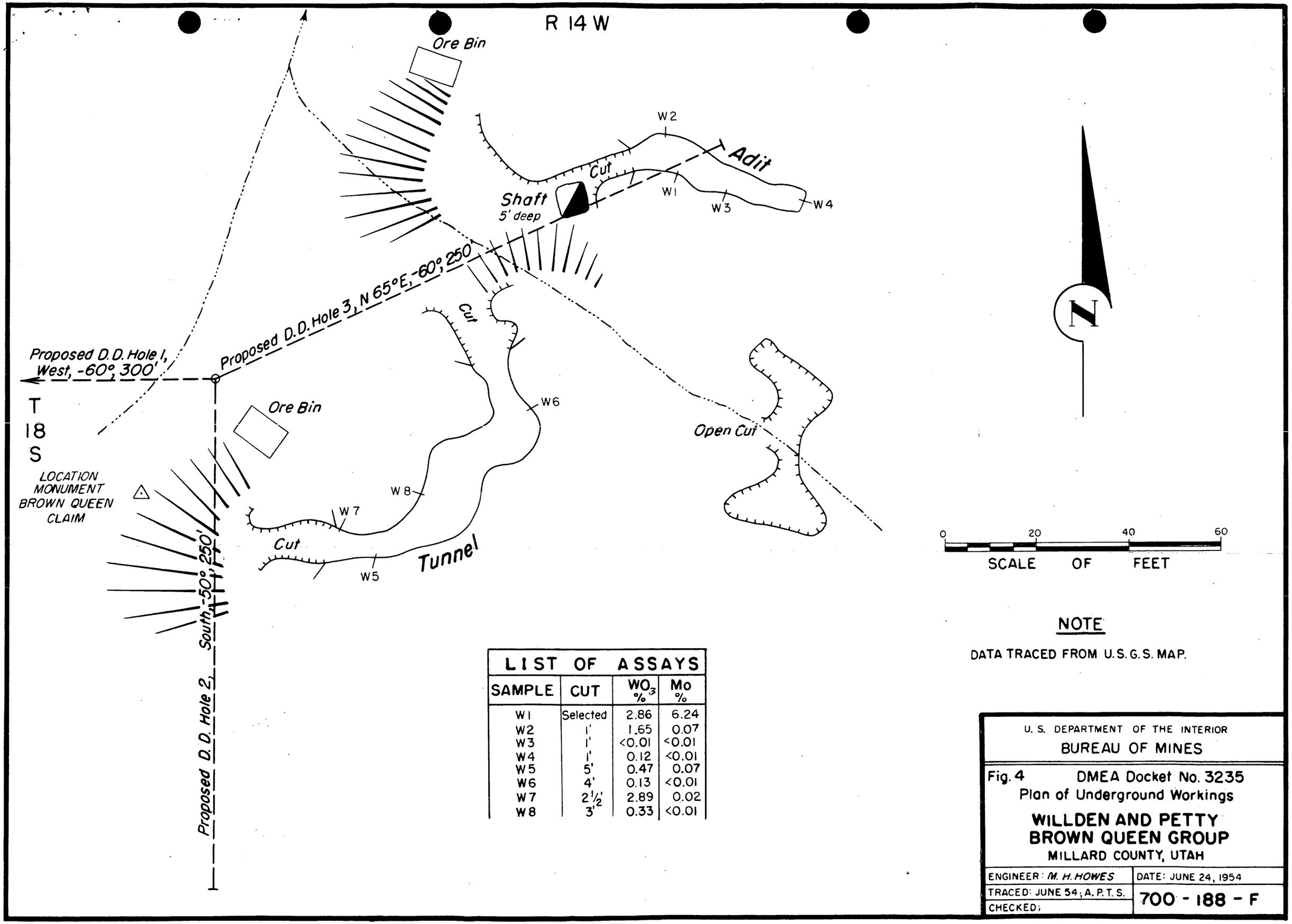
Fig. 3 DMEA Docket No. 3235

Location of Mine Workings

WILLDEN AND PETTY
BROWN QUEEN GROUP

MILLARD COUNTY, UTAH

ENGINEER: *M. H. HOWES*	DATE: JUNE 21, 1954
TRACED: JUNE, 1954; A.P.T.S.	700 - 186 - E
CHECKED:	



NOTE

DATA TRACED FROM U.S.G.S. MAP.

LIST OF ASSAYS			
SAMPLE	CUT	WO_3 %	Mo %
W1	Selected	2.86	6.24
W2	1'	1.65	0.07
W3	1'	<0.01	<0.01
W4	1'	0.12	<0.01
W5	5'	0.47	0.07
W6	4'	0.13	<0.01
W7	2½'	2.89	0.02
W8	3'	0.33	<0.01

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Fig. 4 DMEA Docket No. 3235
Plan of Underground Workings

WILLDEN AND PETTY
BROWN QUEEN GROUP
MILLARD COUNTY, UTAH

ENGINEER: *M. H. HOWES*	DATE: JUNE 24, 1954
TRACED: JUNE 54; A. P. T. S.	700 - 188 - F
CHECKED:	

DOCKET
SURNAME

400 Chapman
Martin
Chambers
Yeffman

MAY 21 1956

Milliken and Petty
Delta, Utah

Re: Docket No. DMEA 3235 - Tungsten
Brown Queen Claims
Millard County, Utah
Contract No. Idm-8698

Gentlemen:

This is with reference to the subject contract between you and the Government.

It is not our intention to issue a certification of discovery or development which would create a lien against the subject property. We are, therefore, closing our books and records with respect to this project. Your attention is called, however, to the provisions of the contract which require the operator to keep and preserve certain records for the period indicated.

We regret that the work performed did not result in a discovery or development. Your participation in the exploration program, however, is sincerely appreciated.

Sincerely yours,

C. O. Mittendorf

Administrator

TLChapman/fcc
5-7-56
cc to: Docket
Code 400
Admr. Read. File
Operating Comm.
FT. REG. III
R. W. Holliday, USBM
T. H. Kiilsgaard, USGS

RCS.

IN REPLY REFER TO:

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

May 17, 1956

Re: DMEA 3235, Idm-E698 - Tungsten
Willden and Petty
Brown Queen Claims
Millard County, Utah
Est. Application: $20,095.27
Est. Recommended: $6,160.00

Memorandum

To: W. S. Martin, Defense Minerals Exploration Administration

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

Subject: Review of Final Field Team report.

The applicants requested assistance in an exploratory work program, the cost of which was estimated as $20,095.27.

The examiners recommended a drilling program consisting of 800 feet of drilling, the estimated cost of which was $6,160.00, and of which $5,811.00 was expended. The work was planned to prospect for 1- to 5-foot scheelite-bearing tabular tactite masses in limestone. The tactitic alteration appears to favor two beds of the limestone. As for the immediate area no masses of granite or similar rocks, commonly associated with tactitic alteration, have been found.

The drilling pattern apparently was based on the assumption that an igneous rock is accountable for the tactite and might be reached by angle and vertical drilling and no attempt was made to extend, by 'close in' drilling, the remnants of the partially eroded and mined small ore bodies.

The drilling for the relatively long projections of the small ore masses, holes 2A and 2B, showed specks of scheelite and powellite in recrystalized limestone which may be the down dip extensions of the beds which where mined are altered to tactite.

Holes 1 and 3, down holes from a drill site 30 feet below the outcrops, intersected beds of limestone of various degrees of purity and alteration, containing specks of powellite and scheelite. The mineralization is thus shown to be widespread but generally very low grade.

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MAY 17 1956

The examiners conclude:

> No additional exploration of the Brown Queen property, with Government assistance, appears warranted at this time. If the property owners are able to obtain new data tending to make other target areas (appear) favorable for tungsten mineralization, consideration should then be given for further exploration. Inasmuch as no commercial ore was discovered on the DMEA project work, and because the estimated reserves are small, no certification of discovery is recommended.

Reference to the map, Fig. 3A of the Final Report, on which are shown the locations and assays of samples taken, suggests there are four faces at which mining might be continued. The places are where samples 1, 2, 5, and 7-8 were taken.

I agree with the conclusions of the examiners and concur with the recommendation of the examiners and the Field Team that no certification of discovery be issued.

N. E. Nelson

N. E. Nelson

DOCKET
SURNAME
Chapman
Martin

May 7, 1956

MEMORANDUM

To: Administrator, DMEA

From: Iron and Ferro-Alloys Division, DMEA

Subject: Memorandum of Non-discovery
Docket No. DMEA 3235 - Tungsten
Willden and Petty
Brown Queen Claims
Millard County, Utah
Contract No. Idm-E698

This Division hereby concludes that the work done on the subject property, as described under the contract, has resulted in no discovery or development from which commercial production may be made.

Operator: Willden and Petty (Earl B. Willden, Al Willden, Lionel A. Petty) Delta, Utah.

Property: The property included in this contract is owned by the Operators and is located in the southeast part of T. 18, S., R. 14, W., S. L. B. & M. (unsurveyed) Millard County, Utah, and is recorded as follows:

Claim Name	Book No.	Page No.
Brown Queen	12 of M.L.	476
Brown Queen, No. 1	12 of M.L.	484
Brown Queen, No. 2	12 of M.L.	484
Brown Queen, No. 3	12 of M.L.	485
Brown Queen, No. 4	12 of M.L.	485
Brown Queen, No. 5	12 of M.L.	494
Brown Queen, No. 6	12 of M.L.	495
Brown Queen, No. 7	13 of M.L.	258

Contract: Effective August 9, 1954, a contract was prepared to drill three diamond drill holes not to exceed a total depth of 800 feet to explore the tactite zone in the vicinity of the intrusives, at an estimated cost of $6,160.00, Government participation, 75 percent, $4,620.00. Three amendments were written; the first made a change in assaying costs per sample,

and No. 2 allowed a recess and changed location of diamond drill holes and number of holes without change in cost. No. 3 changed royalty payments to 11 years.

Work Completed: Four diamond drill holes were completed for a total of 780 feet, with a total cost for the project of $5,811.00, Government participation $4,358.25.

Geology: The Brown Queen mine lies in a section more than 10,000 feet thick of Cambrian quartzite, limestone and shale. Granitic stocks have intruded the limestones and some thin beds of tactite have been formed. Tungsten mineralization in the form of scheelite occurs in the thin sporadic tactites in thin veinlets, pods, lenses and disseminations. Scheelite emplacements apparently have been highly selective, with the result that large parts of the tactite are barren.

History: The tungsten deposits of the Brown Queen claims were discovered by tracing scheelite float with ultraviolet light. The claims were located in 1951 by the present owners who prospected the area with a 40 feet inclined shaft, a 5 feet pit, a 70 feet adit and approximately 400 square feet of open cuts. They mined and shipped about 260 tons of ore averaging 2 percent WO_3.

Ore Values & Tonnage: No ore of commercial grade was found or indicated during the DMEA program. The work showed that there was little probability of finding any significant tonnage of ore in the area.

Comments: The examining staffs of the Geological Survey and the Bureau of Mines, conclude that there is little possibility of finding any significant tonnage of tungsten ores and recommend non-certification. The Field Team, and the Commodity [redacted] of the Geological Survey and the Bureau of Mines concur in these recommendations.

W. S. Martin, Chief
Iron and Ferro-Alloys Division

TLChapman/foc
5/7/56
cc to: Docket
Code 400
Admr. Read. File
Oper. Comm.

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

May 7, 1956

MEMORANDUM

To: Administrator, DMEA

From: Iron and Ferro-Alloys Division, DMEA

Subject: Memorandum of Non-discovery
Docket No. DMEA 3235 - Tungsten
Willden and Petty
Brown Queen Claims
Millard County, Utah
Contract No. Idm-E698

This Division hereby concludes that the work done on the subject property, as described under the contract, has resulted in no discovery or development from which commercial production may be made.

Operator: Willden and Petty (Earl B. Willden, Al Willden, Lional A. Petty) Delta, Utah.

Property: The property included in this contract is owned by the Operators and is located in the southeast part of T. 18, S., R. 14, W., S. L. B. & M. (unsurveyed) Millard County, Utah, and is recorded as follows:

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Brown Queen, No. 3	12 of N.L.	485
Brown Queen, No. 4	12 of N.L.	485
Brown Queen, No. 5	12 of N.L.	494
Brown Queen, No. 6	12 of N.L.	495
Brown Queen, No. 7	13 of N.L.	258

Contract: Effective August 9, 1954, a contract was prepared to drill three diamond drill holes not to exceed a total depth of 800 feet to explore the tactite zone in the vicinity of the intrusives, at an estimated cost of $6,160.00, Government participation, 75 percent, $4,620.00. Three amendments were written; the first made a change in assaying costs per sample,

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

RECEIVED
MAY 8 - 1956

May 5, 1956

Memorandum

To: W. S. Martin, Chief, Iron and Ferroalloys Division-DMEA
Through: Chief, Branch of Ferrous Metals & Ferroalloys

From: R. W. Holliday, Commodity Specialist, Branch of Ferrous Metals & Ferroalloys

Subject: Review of Final Report
Docket No. 3235
Brown Queen Claims
Millard County, Utah
Earl B. Willden and Lionel A. Petty
Delta, Utah

Subject report recommends that no certification of discovery be issued and that no additional Government participation be considered unless the property owners are able to obtain favorable additional data.

I concur with this recommendation.

R W Holliday
R. W. Holliday

and No. 2 allowed a recess and changed location of diamond drill holes and number of holes without change in cost. No. 3 changed royalty payments to 11 years.

Work Completed: Four diamond drill holes were completed for a total of 780 feet, with a total cost for the project of $5,811.00, Government participation $4,358.25.

Geology: The Brown Queen mine lies in a section more than 10,000 feet thick of Cambrian quartzite, limestone and shale, Granitic stocks have intruded the limestones and some thin beds of tactite have been formed. Tungsten mineralization in the form of scheelite occurs in the thin sporadic tactites in thin veinlets, pods, lenses and disseminations. Scheelite emplacements apparently have been highly selective, with the result that large parts of the tactite are barren.

History: The tungsten deposits of the Brown Queen claims were discovered by tracing scheelite float with ultraviolet light. The claims were located in 1951 by the present owners who prospected the area with a 40 foot inclined shaft, a 5 foot pit, a 70 foot adit and approximately 400 square feet of open cuts. They mined and shipped about 260 tons of ore averaging 2 percent WO_3.

Ore Values & Tonnage: No ore of commercial grade was found or indicated during the DMEA program. The work showed that there was little probability of finding any significant tonnage of ore in the area.

Comments: The examining staffs of the Geological Survey and the Bureau of Mines, conclude that there is little possibility of finding any significant tonnage of tungsten ores and recommend non-certification. The Field Team, and the Commodity Divisions of the Geological Survey and the Bureau of Mines concur in these recommendations.

W S Martin
W. S. Martin, Chief
Iron and Ferro-Alloys Division

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

RECEIVED
APR 23 1956

224 New Customhouse
Denver 2, Colorado

April 18, 1956

Memorandum

To: Secretary to the Operating Committee, DMEA

From: DMEA Field Team, Region III

Subject: Docket DMEA-3235 (Tungsten), Contract Idm-E698, Willden and Petty
Millard County, Utah - Final Report

Enclosed are the original and three copies of a joint engineering and geologic report dated April 12, 1956, from M. H. Howes, Mining Engineer, Bureau of Mines, and R. W. Osterstock, Geologist, Geological Survey, and transmittal thereof from Stephen R. Wilson and R. W. Osterstock dated April 13, 1956, pertaining to the work completed under Contract Idm-E698.

The original and one copy of the Operator's final report were forwarded to the Chairman, Operating Committee, DMEA, by memorandum of February 13, 1956.

Final payment to the Operator was processed by this office September 15, 1955, in conformance with the Report of Review of contract expenditures by the Contract Administration and Audit Division dated September 13, 1955.

The exploration work consisted of 780 feet of diamond drilling in four holes at a total accepted cost of $5,811.00, in which the Government participated to the extent of 75%, or an amount of $4,358.25.

The exploration work did not result in a significant discovery or development of tungsten ore. Therefore, no certification of such is recommended.

DMEA Field Team, Region III

By W. M. Traver
W. M. Traver

E. N. Harshman
E. N. Harshman

Reviewed by
DMEA OPERATING COMMITTEE
4-25-56
(date)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
1600 EAST FIRST SOUTH STREET
SALT LAKE CITY 1, UTAH

DMEA
Date Rec'd
APR 18 1956

BUREAU OF MINES
Denver, Colorado

MINE DEPOSITS
RECEIVED
APR 16 1956

GEOLOGICAL SURVEY
DENVER, COLORADO

RECEIVED
APR 23 1956

April 13, 1956

Memorandum

To: Executive Officer, DMEA Field Team, Region III
Through: E. N. Harshman

From: Stephen R. Wilson
R. W. Osterstock

Subject: Docket No. DMEA-3235 (Tungsten), Contract Idm-E698, Willden and Petty, (Brown Queen claims), Millard County, Utah

Enclosed are the original and eight copies of a final engineering and geologic report covering all work completed under the subject contract. The authors of the report are M. H. Howes and R. W. Osterstock.

Exploration completed on the property consisted of 780 feet of diamond drilling in four holes. All holes were drilled from the surface. No ore was discovered by the DMEA work and no Certification of Discovery or Development is recommended.

Stephen R. Wilson
Stephen R. Wilson
Supervising Mining Engineer

R. W. Osterstock
R. W. Osterstock
Geologist

Enclosure

cc: J. B. Clemmer

Reviewed by
DMEA OPERATING COMMITTEE
4-25-56
(date)

RECEIVED
APR 23 1956

WILLDEN AND PETTY
BROWN QUEEN CLAIMS
MILLARD COUNTY, UTAH
DMEA-3235, Idm-E698
Tungsten

Final Engineering and Geologic Report

By M. H. Howes
Mining Engineer
Bureau of Mines

R. W. Osterstock
Geologist
Geological Survey

April 12, 1956

Reviewed by
DMEA OPERATING CONTRACTOR
4-25-56
(Date)

WILLDEN AND PETTY
BROWN QUEEN CLAIMS
MILLARD COUNTY, UTAH

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Final engineering and geologic report	
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Location and accessibility	2
Property	3
History and production	3
Geology	4
Description of the contract work	9
Expenditures	14
Conclusions and recommendations	14
Appendix - Logs of diamond drill holes	16

ILLUSTRATIONS

Fig. 1 Location map, Willden and Petty, Brown Queen claims, Millard County, Utah
Fig. 2 Topographic map
Fig. 2A Claim map
Fig. 3 Geologic plan of underground workings
Fig. 3A Plan of underground workings, showing sample locations
Fig. 4 Vertical projection of diamond drill holes

INTRODUCTION

Application was made January 3, 1954, under docket DMEA-3235, by the partnership of Willden and Petty, for Government aid on a tungsten exploratory project estimated to cost $20,095.27. The applicant proposed a project consisting of 300 feet of shaft sinking, 100 feet of drifting, and 600 feet of diamond drilling to search for tungsten ores on the Brown Queen group of claims, Millard County, Utah.

The property was examined in April 1954 by M. H. Howes, Bureau of Mines, and in May 1954 by C. G. Tillman and R. W. Osterstock, Geological Survey, to appraise the feasibility of the project.

Because of strong showings of scheelite-bearing tactite in underground workings on the property, the field examiners recommended that the Government approve an exploratory drilling program. DMEA contract Idm-E698 was signed August 9, 1954, allowing 800 feet of diamond core drilling at a total cost of $6,160.

LOCATION AND ACCESSIBILITY

The Brown Queen claims are situated on the east side of Bird Canyon, in the rugged terrain of the House Range, 2 miles south of Marjum Pass and about three-fourths of a mile north of Amassa Valley, Millard County, Utah. The area lies in the southeast part of T. 18 S., R. 14 W., S.L.B. and M. (unsurveyed). Delta, Utah, on the main line of the Union Pacific Railroad, is approximately 50 miles east of the property. Delta is the nearest rail shipping point and source of manpower and supplies (fig. 1).

The climate is arid. Summers and hot and dry and winters are cold, with moderate snow.

PROPERTY

Earl B. Willden, Al Willden, and Lionel A. Petty, all of Delta, Utah, doing business as Willden and Petty, a partnership, own the following eight unpatented lode mining claims (fig. 2A), which are recorded at the Millard County Courthouse, Fillmore, Utah:

Claim	Book	Page
Brown Queen	12 of N.L.	476
" " No. 1	"	484
" " No. 2	"	484
" " No. 3	"	485
" " No. 4	"	485
" " No. 5	"	494
" " No. 6	"	495
" " No. 7	13 of N.L.	258

HISTORY AND PRODUCTION

The tungsten deposit on the Brown Queen claims was discovered by tracing scheelite float to the outcrop, by means of ultraviolet light. Lode claims were located by the present owners in the spring of 1951, after which the mineralization was followed by sinking a 40-foot flat incline, and a 5-foot shaft, and driving a 70-foot irregular adit. Approximately 400 square feet of open cuts were also excavated (figs. 3 and 3A).

No production was recorded from the immediate vicinity of the Brown Queen mine prior to claim staking by the operators. The owners reported in their application that as a result of development operations about 260 tons of ore averaging 2 percent WO_3 was produced and shipped. No ore has been shipped from the Brown Queen mine since the date of the application.

Other tungsten mining in the region has been confined in a large sense to that area near the crest of the intrusive mass. A few gold prospects are located near the mouth of Bird Canyon about three-fourths of a mile north of the Brown Queen claims. It is doubtful that substantial production has resulted from these workings.

GEOLOGY

The Brown Queen mine, near the head of north-draining Bird Canyon, high on the east flank of the House Range, lies in an extremely thick (more than 10,000 feet) Cambrian section which includes quartzite, shale, and limestone in the lower quarter and predominantly limestone in the upper three quarters. The mine is located in the "Orr" and "Weeks" formation which H. E. Wheeler (Cambrian sequence of the House Range, Guidebook to the Geology of Utah, No. 6, 1951) has grouped together because of their close similarity and intergradational character. These strata are mostly medium gray, thick to thin bedded arenaceous limestones and shales.

The entire stratigraphic sequence forms a typical basin-range fault block known as the House Range. The strata have been intruded by an irregular granitic stock of Tertiary age which, with its gentle doming action, has produced a system of quaquaversal dips in the intruded sediments.

The nearest known exposed contact between the granitic rock and the sediments is at the northern edge of Amassa Valley approximately three-fourths of a mile south of the Brown Queen area. The operators

report having located several small dike-like bodies of granitic rock in the hills surrounding the mine. Such dikes are likely offshoots from the main intrusive mass; however they were not observed in the field.

The strata exposed adjacent to the Brown Queen claims exhibit a northerly strike and gentle, easterly dip. This attitude is characteristic of the basin and range fault block mountains. The attitude of the sediments further implies the lack of doming influence which might be attributed to the granitic stock. The rocks are essentially undisturbed by minor faults.

Where the granitic stock is in contact with the limestone, particularly near the crest of the intrusion, a typical suite of calc-silicate minerals has been developed in the limestone. This tactitic material shows a distinct preference for certain beds. It is noteworthy that the amount of tactitization is inversely proportional to the distance from the intrusive contact; in addition the development of tactite is a much more selective process away from the intrusion.

Tungsten mineralization at the Brown Queen property is confined to tactite zones which are sporadically developed in susceptible limestone beds. Tungsten in the form of scheelite is present as thin veinlets and disseminations in the tactite as well as in small higher grade pods and lenses. The tactite zones following the bedding form a section composed of "layers" of dark red-brown to green calc-silicates separated by bleached and commonly recrystallized beds of limestone, some of which contain considerable tremolite.

The tactite "beds" are generally less than 2 feet thick and average perhaps 8 inches. In the immediate vicinity of the mine workings tactite constitutes no more than 20 percent of the exposed section; upward from the mine the tactitic zones occur even less frequently and are generally thinner.

Three gentle southeasterly plunging anticlinal flexures were noted in the southernmost mine workings. These minor structures are superimposed on the north-striking, east-dipping beds. It is doubtful that the folds exercise any degree of ore control as there is no marked increase in either the grade or size of the scheelite-bearing bodies on or near the flexures. Only one fault is noted in the mine area; this westerly striking, northerly dipping structure occurs near the portal of the northernmost adit. The fault, with apparent normal movement, has dropped the beds and tactite zone about five feet on the north. The small amount of widely scattered scheelite grains which occur in the fault is probably drag along the fault. The only remaining feature which may, in a sense, be termed a structural control is the attitude of the bedding within which the deposits have formed. The persistent northerly strike and gentle easterly dip of the enclosing beds is a projectable feature. Tactitic development within certain of the more receptive limestone beds, were the process itself more persistent, should also lend itself to projection. A fuller discussion of this hypothetical ore control will be found under the section concerning the results of the completed exploratory program.

Scheelite is the only tungsten mineral of economic significance. The ultraviolet light indicates the presence of small amounts of powellite in association with the scheelite. These minerals occur as pods, lenses, veinlets and widespread disseminations in the tactitic material. In general, each of the above-noted types is composed of minute concentrations of fine-grained scheelite and minor powellite, classification as to type being dependent upon the overall form of the ore mineral concentration. All of the mineralization of possible economic interest has been confined to the tactite zones which are locallized by bedding in the original limestones. A few isolated grains of scheelite and powellite noted in limestone in the drill cores appear to have no significance. The gangue minerals are principally those of the tactite zones; garnet, diopside, epidote, clinoziosite, manganosiderite (?), calcite, and some quartz both as a clear-to-smoky crystalline type and fine-grained, red-to-gray chalcedonic type. Because of the less than minable thickness of the average scheelite-bearing tactite bodies, it is also necessary to include the bleached and recrystallized limestone country rock as gangue.

It is of major importance to take cognizance of the fact that, although a particular zone of tactite may appear to be persistent, this feature in nowise affects the likelihood that the zone will contain scheelite. The emplacement of scheelite within these tactite zones was apparently a highly selective process with the consequent result that some, if not most of the zones, are entirely barren of tungsten mineralization.

The apparent selectivity of the process of ore mineralization leads to the assumption that the deposition of most of the ore post-dates the development of the tactite, however the extremely intimate relationship between the scheelite and the tactite indicates contemporaneous deposition.

In their application, the owners of the Brown Queen property estimated that 500 tons of ore averaging 2 percent WO_3 was "in sight." There can be no question that this estimate is high both in tonnage and grade and certainly is presumptuous in classification.

In the northernmost workings of the Brown Queen mine, the 40-foot adit shows some tungsten mineralization on both walls throughout its entire length. The limiting feature is the thickness of the mineralized zone which in places is less than 2 inches. In the southernmost operation which is serviced by arcuate workings, open at both ends, there is tungsten mineralization over a distance of about 60 feet along the strike of the beds. As in the northern workings, this mineralization exhibits rapid pinching and swelling. At no point in any of the underground openings does the thickness of an individual ore "bed" exceed 2 feet. Continued mining operations will of necessity be highly selective with the result that perhaps one-half of the total mineralized footage may be exploited by work beyond the exposure. Total mineralized footage is estimated at 85 for the northern adit (40 + 40 walls + 5 at face) and 60 for the southernmost workings, or 145 feet; of this figure about 75 feet may be subject to continued mining. Observation of the

worked out portions of the mine leads to the conclusion that minable ~~thickness~~ width within this 75 feet may be safely projected no more than 10 feet. It is estimated that the average thickness within this postulated reserve block will be 1 foot. The reserve "block" is therefore estimated to contain 750 cubic feet or about 75 tons. The grade of this ore on the basis of past production will be from 1 to 2 percent. This ore reserve must of necessity be classified as inferred.

DESCRIPTION OF THE CONTRACT WORK

In setting up the exploratory program at the Brown Queen property it was presumed that the scheelite-bearing tactite beds are contact phenomena which would not be conspicuous at great distance from the contact. It was recognized that certain rock types (probably those most nearly approaching the composition of tactite and consequently requiring less change by introduction and subtraction of material) would be more susceptible and might therefore contain tactite at greater distances from the intrusive mass. Information leading to the above hypotheses was gained from observation of the major tungsten-producing properties in the area near the head of Amassa Valley. In this area, the most persistent tactite zones have been developed in the limestone units immediately in contact with the intrusion. In addition, these same tactite beds carry the bulk of the tungsten mineralization. Tactitization away from the contact was found to be less persistent and more selective.

Comparison of the Brown Queen area with the Amassa Valley deposits therefore indicates that the Brown Queen area must be higher in the section relative to the position of the intrusive mass. Thus penetration of the section was expected to reveal an increasing frequency of scheelite-bearing tactite beds and ultimately an intrusive mass.

The applicant proposed to sink a 300-foot shaft (deepening the present 5-foot shaft), to drift 100 feet, and to core drill 600 feet. This plan was predicated on the assumption that the small east-striking, steeply north-dipping fault near the northern adit, being the only near-vertical structure in the mine area, must have served as an access channelway for rising tungsten-rich solutions. Examination of this structure indicates that it is far too minor to have affected any substantial degree of ore locallization had it been pre-mineral.

An alternate exploratory program consisting of three diamond drill holes was mutually agreeable to the parties concerned. Upon the completion of two of the holes with negative results, it was decided that continued exploration should be confined to the down-dip projections of the known ore bodies. Consequently the contract was amended to permit drilling two holes behind the known ore bodies (fig. 2).

Contract Idm-E698 was signed August 9, 1954. The contract states that the project will start within 30 days and be completed within a period of 6 months from the effective date. Description of the work, under exhibit "A" of the contract, is as follows:

Diamond drill three holes, fanned out from a point in the bottom of the canyon, approximately 30 feet N. 35° E. of the discovery monument of the Brown Queen claim to explore the tactite zones in the vicinity of the granite stock intrusive for occurrences of scheelite and other tungsten minerals. Location of drill holes are shown on attached maps.

The approximate attitude and maximum depth of drill holes are to be as follows:1/

Hole No.	Inclination	Direction	Maximum Depth
1	-60°	West	300 feet
2	-50°	South	250 feet
3	-60°	N. 65° E.	250 feet

Total Maximum Footage ---------- 800 feet.

All core is to be split and one-half stored in suitable core boxes and retained for the use of the government. The mineralized portions of the remaining core are to be assayed for WO_3 content.

A maximum of 800 feet of diamond core drilling at $7.45 per foot, including all costs for supervision, engineering, labor, equipment, supplies, core boxes and other costs incurred in obtaining and storing the core — $5,960.00 2/

Assaying as required to a maximum of $200 ---------- 200.00 3/

Total Estimated Cost ---------- $6,160.00

Government Participation at 75 percent -------- $4,620.00

1/ In the event intrusive rocks are encountered in the drill holes before their maximum footages are completed, the drill holes should be continued no more than 25 feet in the intrusives in order to insure that the main intrusive body is being penetrated rather than a dike or sill.

2/ Reimbursement for diamond drilling will be on the basis of holes completed to their objectives and charges must be supported by a certified copy of the drill logs of the hole or holes for which reimbursement is claimed.

3/ Requests for the reimbursement of the Government's portion of assaying charges is to be supported by suitable copies of assay invoices showing charges and results.

Changes to the contract were made by three amendments.

Amendment No. 1, effective as of the date of the contract, is as follows:

Referring to Exhibit "A", caption "Estimated Costs of the Project" delete the following: "Assaying as required to a maximum of $200.00" and in lieu thereof substitute the following: "A maximum of 40 tungsten assays at $5.00 each." Delete footnote "3/" in its entirety and in lieu thereof substitute the following: "3/ Claims for reimbursement for analysis charges are to be supported with a copy of assay return showing results".

Amendment No. 2, effective February 9, 1955, is as follows:

1. Referring to Exhibit "A", heading "Description of the Work", details of holes to be drilled, in lieu of Hole No. 2 to its maximum depth of 250 feet at the location specified therefor, instead two holes will be drilled to a maximum depth of 125 feet each at the location shown on the map (fig. 3). One hole will be drilled vertical and the other hole will be drilled on a bearing of N. 30° E. inclined at an angle of 60°.

2. It is agreed that work under the Contract shall be recessed from on or about November 10, 1954, and will be resumed on or before May 15, 1955.

3. Referring to "Article 3" of the contract, following the words "and shall bring the project to completion within a period of" delete "six (6) months" and in lieu thereof substitute "one (1) year".

Amendment No. 3, effective May 15, 1955, is as follows:

Referring to Amendment No. 2, dated April 14, 1955, item "2" change the date "May 15, 1955" to read "June 15, 1955".

Referring to "Annex I", attached to the contract, which is submitted in lieu of Article 6 of the contract form, further referring to "Annex I" item "b.(2)", "for a period of eleven years" is substituted for "for a period of ten years".

The drilling project was started August 19, 1954, on contract hole No. 3. This hole was drilled N. 65° E., at an inclination of

minus 60° and was completed to a total depth of 250.8 feet September 14, 1954, 250 feet of which was allowed for payment. Contract hole No. 1 was started September 16, 1954, west, at an inclination of minus 60°, and was completed to a total depth of 300 feet prior to November 10, 1954 (fig. 4).

Neither of these holes revealed the anticipated increasing frequency of occurrence of the tactite zones, nor is there any indication of increasing proximity to an intrusive mass. These discouraging results necessitated a review of the exploratory program which resulted in the decision to explore for the down dip projection of the known ore bodies along what was presumed to be a reasonably persistent tactitized limestone bed. Consequently, contract hole No. 2 to be drilled south, minus 50°, 250 feet, was eliminated and two 125-foot holes were substituted, No. 2A drilled vertically and No. 2B drilled N. 30° E. at minus 60°, through the projected scheelite-bearing zones.

None of the drill holes encountered commercial amounts of tungsten mineralization. The first two holes did not reveal the expected increase in the amount of tactitization and therefore tend to negate the hypothesis that an intrusive mass exists at depth. The two shorter holes failed to reveal the tungsten-bearing tactite zones as projected from the outcrop, thus indicating the lack of persistence of these zones.

Perhaps the only real value of the completed exploratory program is illustration of the lack of persistence and extreme selectivity of the development of scheelite-bearing tactites on the fringe area of an intrusive mass. It no longer seems likely that a hidden intrusive mass

underlies the Brown Queen area. With such ephemeral controls as slight changes in the original composition of the sedimentary rock, no ore targets are presented and consequently no methodical approach to exploration is possible.

EXPENDITURES

The project was terminated after completion of 780 feet of the allowable amount of 800 feet of diamond core drilling at $7.45 per foot for a total cost of $5,811. This cost was verified in a Report of Review by Donald T. Finch, auditor, Contract administration and Audit Division. Total cost to the Government at 75 percent participation is $4,358.25.

CONCLUSIONS AND RECOMMENDATIONS

It is known that the tungsten mineralization on the Brown Queen claims is confined to tactitic material which has developed along certain favorable bedding horizons. It was demonstrated by the exploratory program that the susceptibility of the bedding planes to tactitization must vary considerably, inasmuch as known tactite "beds" are not persistent features and are not subject to projection. Observation of other scheelite-producing properties in the region leads to the conclusion that the most persistent and best mineralized zones are those which formed at or near the intrusive contact where the intensity of the attending physico-chemical processes was sufficient to lessen the degree of selectivity so apparent away from the contact.

No additional exploration of the Brown Queen property, with Government assistance, appears warranted at this time. If the property owners are able to obtain new data tending to make other target areas favorable for tungsten mineralization, consideration should then be given for further exploration. Inasmuch as no commercial ore was discovered on the DMEA project work, and because the estimated reserves are small, no certification of discovery is recommended.

APPENDIX

Logs of Diamond Drill Holes

Hole No. 3

Dip: -65° Bearing: N. 65° E. Depth: 250 feet

0 - 10	White, crystalline limestone
10 - 23.6	White, crystalline limestone; few thin, impure shaly beds.
23.6 - 34.5	White, crystalline limestone; dip averages 45° with core.
34.5 - 45.7	White, crystalline limestone, some impure beds, some calcite veinlets, some quartz; speck of scheelite in quartz at 44'.
45.7 - 66.5	White and gray, impure, thin-bedded limestone.
66.5 - 88.9	White, gray and brown, impure, thin-bedded limestone, some crystalline quartz at 72' in broken breccia zone; speck of scheelite at 80'.
88.9 - 98.5	White and gray, impure, thin-bedded limestone.
98.5 - 108	White and gray, impure, thin-bedded limestone; core at 50° angle with beds; speck scheelite at 99.5'.
108 - 117.9	White and gray, impure, thin-bedded limestone; few thin, impure bands of lime silicates.
117.9 - 141.2	White and gray, impure, thin-bedded limestone; speck of scheelite at 139'.
141.2 - 151.6	White and gray, impure, thin-bedded limestone; some bleaching.
151.6 - 162.8	White and gray, impure, thin-bedded limestone and impure metamorphic, shaly material.
162.8 - 184.8	White and gray, impure, thin-bedded limestone; speck of scheelite at 186'.
184.8 - 219	White and gray, impure, thin-bedded limestone; some yellow, sporadic flecks of powellite; speck of scheelite at 199'; rubble zone at 221'.
219 - 250'	Mostly pale gray to white, thin-bedded, recrystalline limestone bed averaging 45° angle with core.

Hole No. 1

Dip: -60° Bearing: West Depth: 300 feet

0 - 19.6	Pale gray and white, recrystalline limestone.
19.6 - 39.4	Mostly white limestone; few thin calcite stringers; bed 45° angle with core.
39.4 - 48.5	Mostly white, recrystalline limestone; vuggy open spaces; impure beds; calcite stringers
48.5 - 68.8	Mostly white, recrystalline limestone; regular bedded; few impure bands.
68.8 - 77	Light gray to white, recrystalline limestone; very uniform.
77 - 86.1	Light gray to white, recrystalline limestone, with few impure bands; bed average 50° angle with core.
86.1 - 108.6	Light gray to white, recrystalline limestone, but getting grayer, few quartz lined vugs; broken zone at 100'.
108.6 - 159	Gray-brown and white, thin-bedded, recrystalline limestone; few dark gray and brown, impure shaly bands; speck of scheelite at 135'; broken zone at 147'-148'; healed with quartz and calcite.
159 - 197.7	Gray-blue limestone, few white and dark gray bands; core bed 60°. Powellite in banded veinlet 1/4" thick at 170.5', some bleaching. Quartz and calcite crystals on bedding planes at 184'-188'.
197.7 - 217	Regular gray, gray-blue, crystalline limestone, some bleaching; few thin, impure beds; bedding 50° angle with core at 206.8'.
217 - 236	Mostly gray, crystalline limestone with some bleaching; some brown, impure bands near bottom of interval.
236 - 259.1	Broken core, mostly brown and white, impure limestone.
259.1 - 300	Much brown, impure limestone; broken core; white clay for last 4' of hole.

Hole No. 2A

Dip: Vertical Depth: 125 feet

0	- 24	Bleached, recrystalline limestone.
24	- 36	Broken and sealed limestone.
36	- 40	Bleached, recrystalline limestone.
40	- 55	Broken, recrystallized limestone, partially recemented, some open spaces lined with aragonite, few inches clay gouge.
55	- 68	Bleached, thin-bedded, recrystalline limestone.
68	- 89	Bleached, recrystalline limestone; few thin argillite bands; few specks powellite at 69', thin 1/4" "band" of powellite, nearly vertical at 71'; few coarse grains scheelite at 80'.
89	- 125	Tight, recemented breccias; few thin 1'-2' unbrecciated bands; cementing agent reddish; some silicification. Thin vertical band powellite 1/4" at 89'; thin vertical band powellite and specks at 90.5'; extremely brecciated at 103'-111'.

Hole No. 2B

Dip: -60° Bearing: N. 30° E. Depth: 105 feet

0	- 50	White and light gray, recrystalline limestone, bleached, partially silicified; few thin dark argillite bands. Specks of scheelite and powellite at 25'; bedding makes 50° angle with core at 30'; specks of scheelite and powellite 34'-36'; bedding makes 35° angle with core at 37'; specks of scheelite and powellite 39'-46'.
50	- 58	Dark argillite bands comprise 30 percent of core; specks of scheelite and powellite at 51'.
58	- 105	White, gray and tan, recrystalline limestone; some silicification; minor breccia zone recemented on bottom section; more massive at 58'; bedding makes 40° angle with core at 65'; specks of scheelite and powellite at 68.2'; bedding makes 45° angle with core at 70'; specks of scheelite and powellite at 70.1'-86'; bedding makes 45° angle with core 91'-95'; specks of scheelite and powellite at 105'.

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

RECEIVED
FEB 15 1956

224 New Customhouse
Denver 2, Colorado

February 13, 1956

Memorandum

To: Chairman, Operating Committee, DMEA

From: Executive Officer, DMEA Field Team, Region III

Subject: Docket DMEA 3235 (Tungsten), Contract Idm-E698, Willden and Petty, Millard County, Utah

In compliance with the "Special Notice" instructions contained in the "Minutes, Operating Committee," No. 622, dated January 27, 1956, we are enclosing the original and one copy of the Operator's Final Report.

The Field Team's Final Report will be forwarded as soon as the engineering and geologic sections are available.

W. M. Traver

W. M. Traver

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
1600 EAST FIRST SOUTH STREET
SALT LAKE CITY 1, UTAH

RECEIVED
DMEA FEB 15 1956
Date Rec'd.
AUG 22 1955
BUREAU OF MINES
Denver, Colorado

August 19, 1955

Memorandum

To: W. M. Traver, Executive Officer, DMEA Field Team, Region III

From: Stephen R. Wilson

Subject: Docket No. DMEA-3235 (Tungsten), Contract Idm-E698, Willden and Petty, Millard County, Utah

Enclosed are five copies of a final report received from the subject contractor. The report describes all diamond drilling completed under terms of the contract.

Although the operator's report is deficient in discussion of the geology, ore reserves and costs of the work, it is recommended that it be accepted as fulfilling Article 5(b) of the contract.

Stephen R. Wilson
Stephen R. Wilson

Enclosure

cc: J. B. Clemmer

RECEIVED
FEB 15 1956

FINAL REPORT
WILLDEN & PETTY
DELTA, UTAH
Docket No. DMEA 3235
Contract No. Idm-E698

Originally there were to be drilled three holes, the approximate attitude and maximum depth of drill holes were as follows:

Hole No.	Inclination	Direction	Maximum Depth
1	-60	West	300 feet
2	-50	South	250 feet
3	-60	N 65 E	250 feet
		Total Maximum Footage	800 feet

Hole No. 3 was drilled first. Considerable difficulty was experienced in drilling this hole, and the water was frequently lost. A fault was encountered which was badly shattered. Little or no mineralization was encountered.

Hole No. 1 was drilled secondly. Drilling tools were lost and considerable difficulty was experienced in recovering them. Water was frequently lost and a considerable quantity of cement was used. Little or no mineralization was encountered. Granite was not encountered in either Hole No. 3 or Hole No. 1. Since litle or no mineralization nor the granite was encountered in either Hole No. 1 or 3 it was felt that it was inadvisable to drill No. 2 hole. Therefore a request for contract amendment was made and it was decided to drill two holes to a maximum depth of 125 feet each at a location approximately 200 feet South-Easterly from the drill station. The new drilling location was both higher in elevation and strategraphically. The reason for selecting this new location was to explore beddings located at a higher topography than those encountered in drilling Holes No. 3 and No. 1.

One hole was drilled vertical and the other hole was drilled on a bearing North 30 East inclined at an angle of 60 . The vertical hole was drilled first. This hole was completed to a depth of 125 feet. The 60 hole was drilled to a depth of 105 feet at which time the bit, core barrel, and 40 feet of rod was lost and was unrecoverable. Because there was little or no mineralization encountered in the vertical hole and little or no mineralization encountered in the 60 hole to the 105 foot depth, it was deemed inadviseable to discontinue drilling operation. The contract called for a total cost of $6160.00 for the drilling of 800 feet. 730 feet were drilled at a total cost of $5438.50.

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

RECEIVED
AUG 29 1955

224 New Customhouse
Denver, Colorado

August 26, 1955

Memorandum

To: Chairman of the OperatingCommittee, DMEA

From: Executive Officer, DMEA Field Team, Region III

Subject: Docket DMEA 3235 (Tungsten), Contract Idm-E698, Willden and Petty, Brown Queen Property, Millard County, Utah

Enclosed for your files are four copies of an interim geologic report, dated August 23, 1955, by R. W. Osterstock, Geological Survey, covering work completed under Contract Idm-E698, with transmittal dated August 24, 1955, by E. N. Harshman, Member, Field Team, Region III.

W. M. Traver

Enclosures

IN REPLY REFER TO:
DMEA

Date Rec'd.
AUG 25 1955
BUREAU OF MINES
Denver, Colorado

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

August 24, 1955

RECEIVED
AUG 29 1955

Memorandum

To: Executive Officer, DMEA Field Team, Region III

From: E. N. Harshman

Subject: Interim report, DMEA Docket 3235 (tungsten), Contract Idm-E698, Willden and Petty, Brown Queen property, Millard County, Utah

Enclosed are the original and eight copies of an interim report by R. W. Osterstock, U. S. Geological Survey, describing the results of core drilling of the two holes authorized in Amendment No. 2 to the subject contract.

The reference to figure 4, made in the second paragraph on page 1 of the memorandum, apparently refers to figure 4 accompanying Amendment No. 2 to the contract.

The memorandum is self-explanatory. Four copies should be sent to the Chairman of the Operating Committee for information purposes.

E. N. Harshman

E. N. Harshman
Member, Field Team

Enclosures (9)

MINERAL DEPOSITS
DMEA
RECEIVED
AUG 24 1955
U. S.
GEOLOGICAL SURVEY
DENVER, COLORADO

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Room 208, 222 So. West Temple
Salt Lake City 1, Utah
August 23, 1955

RECEIVED
AUG 29 1955

Memorandum

To: E. N. Harshman, DMEA Field Team, Region III

From: R. W. Osterstock

Subject: Interim Report, Docket DMEA 3235 (Tungsten) Willden and Petty, Brown Queen Property, Millard County, Utah.

A brief inspection of the subject property was conducted August 13, 1955 by R. W. Osterstock (USGS). The operators were not present in the field, however they were contacted in Delta, Utah where the diamond drill core is stored.

Diamond drill holes Nos. 3 and 4 as authorized under amendment No. 2 to the existing contract, have been completed essentially as proposed in the amended contract. Diamond drill hole No. 3 was drilled vertically to a depth of 125 feet (see Fig. 4). Diamond drill hole No. 4 was drilled -60° N. 30° E. to a depth of 105 feet at which point the hole was abandoned when the core barrel became lodged in the hole and could not be recovered.

Brief logs of the holes are as follows:

Brown Queen DDH No. 3 -90° (core recovery 83%)

Interval		Description
0-24		Bleached, recrystallized regular bedded limestone.
24-36		Broken and sealed recrystallized limestone.
36-40		Bleached recrystallized regular bedded limestone.
40-55		Broken, partially recemented recrystallized, few open spaces lines with aragonite crystals.
	51'	2-3 inches of clay gouge.
55-68		Bleached, thin bedded recrystallized limestone.
	61'	few small grains of powellite.
68-89		Bleached recrystallized limestone with few thin argillaceous bands.
	69'	few specks of powellite.
	71'	Thin (1/4 inch) nearly vertical band of powellite.
	80'	few coarse crystals of scheelite.
	89'	thin (1/4 inch) vertical stringer of powellite.
89-125		Tight, recemented breccia, cementing agent reddish colored, minor silicification throughout interval few thin (1-2 inch) less competent argillaceous bands not brecciated

90.5'	thin (1/4 inch) band of powellite at 0° angle with core - small amounts of disseminated powellite over 6 inch interval.
103'-111'	extreme brecciation.

Brown Queen DDH No. 4, -60° N. 30° E., (core recovery 74%)

Interval	Description
0'-50'	White to light gray recrystallized limestone, bleached and partially silicified, few thin dark argillaceous bands.
25'	specks of powellite.
30'	bedding makes 50° angle w/core.
34.1'	thin streak of powellite.
35.1'	few scattered grains of powellite.
35.5'	few scattered grains of powellite.
36.3'	thin veinlet of powellite.
37'	Bedding mades 35° angle w/core.
39'	thin streak of powellite.
44'	few fine grains of scheelite.
45.5'	few fine grains of scheelite.
46'	few thin stringers of scheelite.
50'-58'	Dark argillaceous bands make up 30% of interval.
51'	few specks of powellite
58'-105'	White, gray and tan recrystallized limestone with some silicification.
58'	thin recemented breccia zone.
	Section becomes thicker bedded from this point down.
65'	Bedding makes 40° w/core.
68.2'	few specks of scheelite.
70.1'	few specks of scheelite.
86.0'	few disseminated grains of powellite.
91.0'	Bedding makes 45° angle w/core.
104.8'	few specks of powellite.

Perhaps the most noteworthy feature of these drill holes is the fact that neither hole shows any appreciable increase in tungsten content in the zone of down dip projections of the ore bodies mined from the surface. Tactite, in which the tungsten minerals occur at the surface, has been best developed along particularly receptive bedding units. It was felt, therefore, that the down dip projections of known tungsten bearing tactites from the surface would provide a logical exploration objective. The drilling program has demonstrated that the tactitized beds are not susceptible to projection, probably because of an irregular lensatic nature. The small amount of scheelite and powellite noted in drill holes 3 and 4 only serves to illustrate the ephemeral nature of the ore control.

The diamond drilling program has exhausted the most likely exploration ventures in the Brown Queen area at least until some further information is developed regarding the locallizing controls for the tungsten bearing tactite.

R. W. Osterstock

August 3, 1955

Memorandum

To: Miss Curtin, Statistics and Control Division, DMEA

From: Hazel Berry, Operating Committee, DMEA HB

Subject: Amendments to Contracts

Attached are the following docket copies of amendments to contracts which have been reviewed and approved by the Commodity Divisions, Contract Administration and Audit Division, and the Legal Division. The official dockets are also attached.

DMEA-3235, Idm-E698, Willden and Petty, Amendment No. 1.

DMEA-3382, Idm-E721, John McManmon, Amendment No. 1.

Enclosures (2)

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

RECEIVED
JUL - 5 1955

224 New Customhouse
Denver, Colorado

June 30, 1955

Memorandum

To: Chairman, Operating Committee

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

Subject: Docket 3235 (Tungsten), Contract Idm-E698, Willden and Petty, Millard County, Utah

Enclosed are the original and two copies of Amendment No. 3 to Contract Idm-E698. Also enclosed are three sets of data relevant thereto.

Copies of the amendment have been given to the operator, the Finance Office, Region III, and a copy has been retained for our files.

W. M. Traver

W. M. Traver

Enclosures

RECEIVED
AUG 2 1955
GENERAL COUNSEL
DEFENSE MINERALS
ADMINISTRATION

7

DOCKET
Surname:

Martin
Butler
Hedges
Kiilsgaard
Selfridge
Hyman
Whitaker

JUN 20 1955

Interior Department
Defense Minerals Exploration
Administration
14X4401(01) Revolving Fund,
Defense Production Act,
Interior (Allocated Working Fund
to the Office of the Secretary

INTERIOR DEPT.
JUN 20 1955
SOLICITOR

TELETYPE

Mr. W. M. Traver, Executive Officer
DMEA Field Team, Region III
224 New Customhouse Bldg.
Denver 2, Colorado

Reurtt June 17, Docket DMEA 3235-Tungsten, Willden and Petty, Contract Idm-E698. You are hereby authorized and requested to prepare amendment allowing extension of date resumption of operations with extension of royalty repayment time from 10 years to 11 years.

George C. Selfridge
Chairman, Operating Committee

cc: Docket
Code 400
Oper. Committee
Adm. Read. File
Thor Kiilsgaard, USGS
Robt. Holliday, USBM
FT, Reg. 3 - Denver

WSMartin/ls
6/20/55

R.C.S.

C

Mr. George Selfridge

RECEIVED
JUN 17 1955

DN 235 BUR MINES 6-17-55 8-42 AM

CHAIRMAN, OPERATING COMMITTEE, DMEA

REFERENCE DOCKET DMEA 3235, CONTRACT IDM-E698, WILLDEN AND PETTY, BECAUSE OF FAILURE OF DRILL RIG OPERATOR REQUESTS EXTENSION OF DATE OF RESUMPTION OF OPERATIONS TO JUNE 6. PLEASE TELETYPE ADVICE IN THE MATTER.

W M TRAVER

Denver, Colo.

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

224 New Customhouse
Denver 2, Colorado

June 8, 1955

Memorandum

To: Chairman, Operating Committee, DMEA

From: Executive Officer, DMEA Field Team, Region III

Subject: Docket DMEA-3235 (Tungsten), Contract Idm-E698, Willden and Petty (Brown Queen area), Millard County, Utah

Enclosed for your information are four copies of an interim report from R. W. Osterstock, geologist, USGS dated May 31, 1955 and transmittal thereof from E. N. Harshman dated June 3, 1955 relative to operations under the subject contract.

W. M. Traver

Enclosures

IN REPLY REFER TO:

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

DMEA
Date Rec'd
JUN 6 1955
BUREAU OF MINES
Denver, Colorado

June 3, 1955

Memorandum

To: Field Team, Region III

From: E. N. Harshman

Subject: DMEA Docket 3235 (Tungsten), Contract Idm-E698), Willden and Petty, Brown Queen area, Millard County, Utah - Interim report

Enclosed are the original and 8 copies of an interim report by R. W. Osterstock, U. S. Geological Survey, covering his inspection of work under the subject contract.

Four copies of the memorandum should be sent to the Washington DMEA staff for their information.

E. N. Harshman

E. N. Harshman
Member, Field Team

Enclosures (9)

ENHarshman:arh

222 So. West Temple, Room 208
Salt Lake City 1, Utah
May 31, 1955

Memorandum

To: E. N. Harshman, DMEA Field Team, Region III

From: R. W. Osterstock

Subject: DMEA Docket 3235 (Tungsten) Willden & Petty, Brown Queen area, Millard County, Utah.

A brief inspection of the subject property was conducted May 10, 1955 for the purpose of spotting the drill site. Although the diamond drill had not yet arrived on the property, Mr. Earl Willden informed me that it was expected to arrive before May 15 and that the operations would be resumed as soon as the equipment was in position. The revised diamond drilling program is authorized under Amendment No. 2 to the existing contract Idm-E698.

Other than the two inclined drill holes authorized under Exhibit A of the original contract the only work accomplished on the Brown Queen group is small "dog-hole" driven about 10 feet easterly from the old face of the southernmost adit of the Brown Queen mine. It is doubtful that any production was realized from this work, although I have not checked this with the operators as they were not present during the examination.

R. W. Osterstock

RWO/rs
cc: S. R. Wilson

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

May 27, 1955

Memorandum

To: Miss Curtin, Statistics and Control Division

From: Hazel Berry, Operating Committee

Subject: (by 257) Amendments to Contracts

Attached are the following docket copies of amendments to contracts which have been reviewed and approved by the Commodity Divisions, Contract Administration and Audit Division, and the Legal Division. The official dockets are also attached.

Willden and Petty, DMEA-3235, Idm-E698, Amendment No. 2.

Williams and Williams, DMEA-3483, Idm-E748, Amendment No. 2.

Ernest Crowder, DMEA-3549, Idm-E756, Amendment No. 1.

Dan C. Peacock, et al, DMEA-3638, Idm-E777, Amendment No. 1.

Attachments 4

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

224 New Customhouse
Denver 2, Colorado

April 14, 1955

Memorandum

To: Chairman, Operating Committee, DMEA

From: Executive Officer, DMEA Field Team, Region III

Subject: Docket DMEA 3235 (Tungsten), Contract Idm-E698, Willden and Petty, Millard County, Utah

Enclosed are the original and two copies of Amendment No. 2 to Contract Idm-E698 which has been executed to authorize a change in the location of holes to be drilled, authorize a recess of operations for sufficient time to resolve the matter relative to the change in work, and extends the period for completion of the project work from 6 months to one year. Also enclosed are four sets of data relevant to the amendment.

Copies of the amendment have been given to the operator, the Finance Office, Region III, and a copy has been retained for our files.

W. M. Traver

W. M. Traver

Enclosures

RECEIVED

MAY 24 1955

GENERAL COUNSEL
DEFENSE MINERALS
ADMINISTRATION

7

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

DMEA
Date Rec'd
MAR 17 1955
BUREAU OF MINES
Denver, Colorado

March 16, 1955

Memorandum

To: Field Team, Region III

From: E. N. Harshman

Subject: DMEA Docket M55 (tungsten), Contract Idm-E 698, Willden and Petty, Brown Queen Mine, Millard County, Utah. Request for amendment.

Enclosed are the original and 8 copies of a memorandum report by R. W. Osterstock, U. S. Geological Survey, covering a request by the operators for revision of the exploration program.

The original program was designed to explore for tactite bodies in limestone stratigraphically below the known tactite-bearing horizon in the Brown Queen mine. In drilling two of the three holes authorized in the contract, data were obtained indicating that it is improbable that lower tactite-bearing horizons exist, and Osterstock concludes that the remaining drilling should be used in exploring for tungsten ore in the down-dip extension of the Brown Queen mine ore horizon.

The two short holes proposed by Osterstock have my approval.

E. N. Harshman

E. N. Harshman
Member, Field Team

Enclosures (9)

ENHarshman:arh

222 So. Main Temple, Room 208
Salt Lake City 1, Utah
March 14, 1955

Memorandum

To: E. B. Burnham, DMEA Field Team, Region III

From: R. W. Gutenstock

Subject: DMEA Project 3235 (Tungsten) Willden and Butty, Brown Queen Mine, Millard County, Utah.

On December 3, 1954 the subject operators requested a recess of operations through the winter months, the operators further requested a revision of the diamond drilling program as outlined under Exhibit A of contract Idm-8698. The suggested revision involves drilling for the down dip projection of the known ore bodies in the Brown Queen mine.

Two of the three originally proposed diamond drill holes have been completed; hole number 1 (formerly hole #3) to a depth of 250 feet and hole number 2 (formerly hole #1) to a depth of 300 feet (see figs. 3 and 4). The first hole drilled to the northeast under the best near-surface showings of tungsten mineralization encountered only a few very thin tactite zones, none of which contained assayable amounts of tungsten. Most of the hole was in bleached, white to light gray, thin bedded recrystallized limestone. This hole bottomed at 250 feet in pale gray recrystallized limestone. The second hole drilled was inclined 60° west for maximum stratigraphic penetration. Only a few thin tactite zones were encountered in the predominantly recrystallized pale gray to white, thin bedded, impure limestone. No assayable amounts of tungsten mineralization were present in the core. The second hole bottomed in a creamy clay zone, the origin of which is conjectural, it may be ascribed to gouge along a flat (thrust?) fault or clay-mineral alteration of an impure bed in the Cambrian section.

Summarizing the data gained in the drilling of the above two holes, it is apparent that the frequency of occurrence of the tactite zones below the present ore horizon is markedly less than had been anticipated, nor is there any other evidence of increasing proximity to a hidden intrusive body with depth. It must, therefore, be deduced that the localization of the tactite exposed in the mine workings must be due almost

entirely to the existence of particular beds which have been particularly susceptible to lime silicate replacement and alteration. It has been demonstrated that no intrusive body exists immediately below the mine workings. Consequently, it is assumed that considerable lateral migration of the mineralizing agents has taken place. The regionally persistent nearly north strike and gentle easterly dip of the strata in the mine area predicate an eastward source of the mineralizing agents in order to comply with the physical requirement of escape in a direction of decreasing pressure, ergo, up dip.

It is concluded that the extreme selectivity of lime silicate alteration will confine the potential scheelite bearing tactite zone to a thin persistent horizon which can be projected southeast of the present mine workings (see fig. 4). As was noted in the original geologic report all of the known occurrences of scheelite in the Brown Canon Mine area are confined to tactite zones and the tactite zones themselves are further confined to particular beds which have been especially amenable to lime silicate alteration. It should be pointed out that the existence of tactite does not necessarily portend the existence of scheelite.

It is recommended that an amendment to the existing contract be executed which will provide for the elimination of the 250 foot drill hole inclined 30° South and the substitution of two drill holes of 125 feet each to be located at the position noted on figure 4 accompanying this report. The new holes to be designated thus: DD Hole No. 3 - 125 feet, vertical hole. DD Hole No. 4 - 125 feet, N. 30° E. inclined 60°. These revised exploration proposals have been discussed with and approved by the applicants.

R. W. Caterstock

RWC/rs
cc: S. R. Wilson

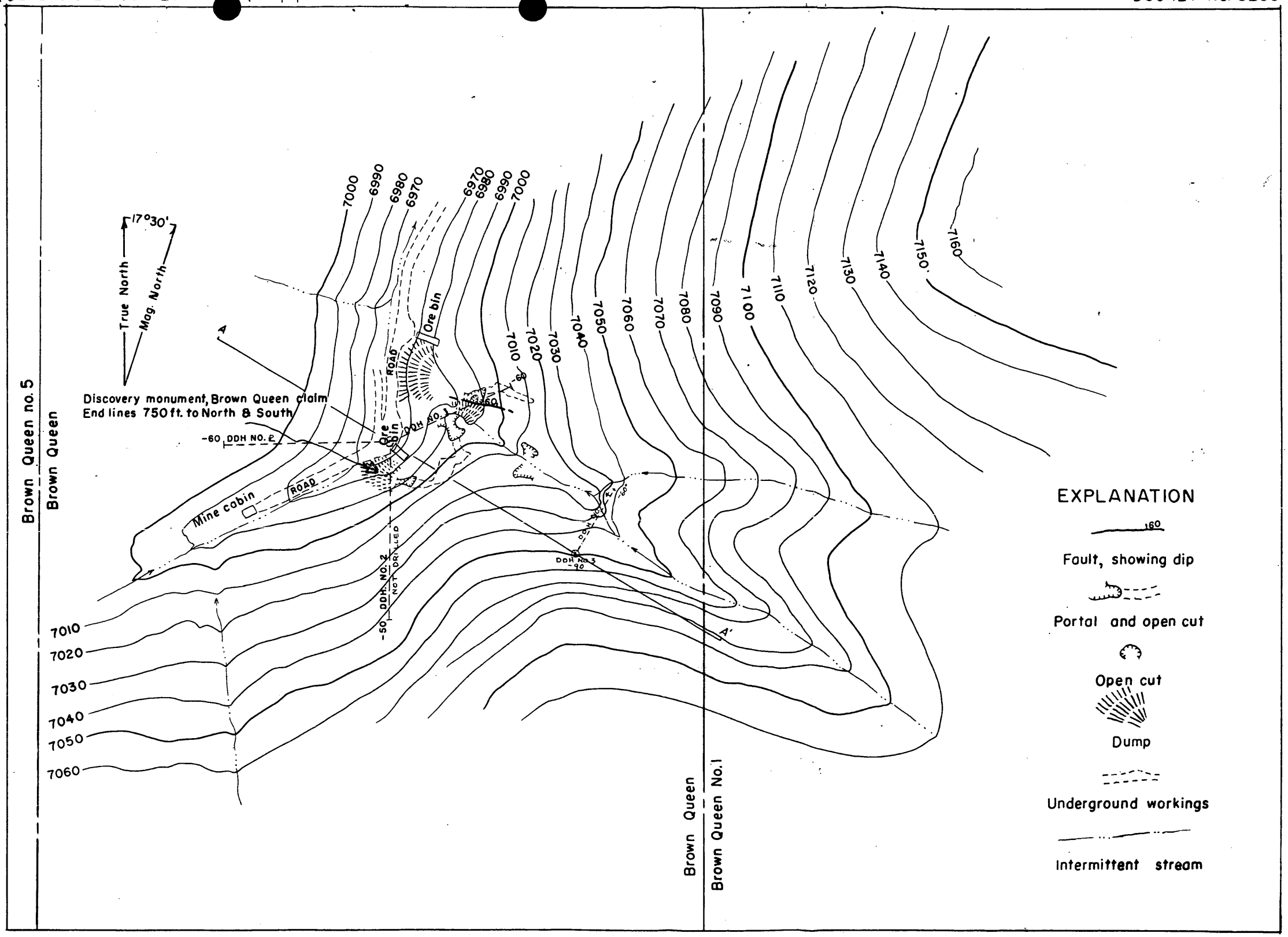

FIG. 2

By R. W. Osterstock and C. G. Tillman May 1954

MAP OF BROWN QUEEN MINE AREA
HOUSE RANGE, MILLARD COUNTY, UTAH

0 100 200 300
Scale

Contour interval 10 ft.; Datum assumed

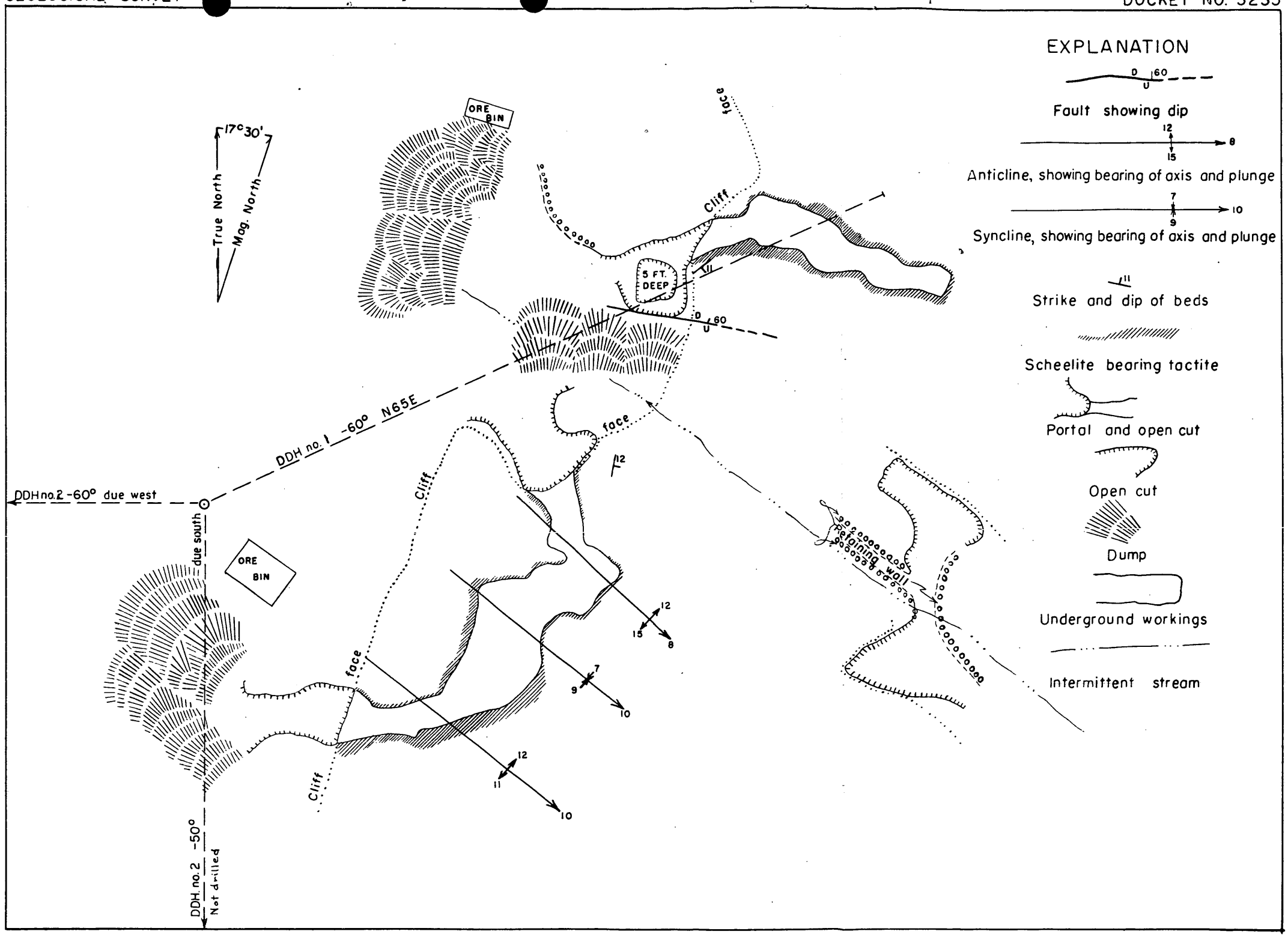

FIG. 3

MAP OF BROWN QUEEN MINE
HOUSE RANGE, MILLARD COUNTY, UTAH

0 20 40 60 ft.
Scale

By R. W. Osterstock and C. G. Tillman May, 1954

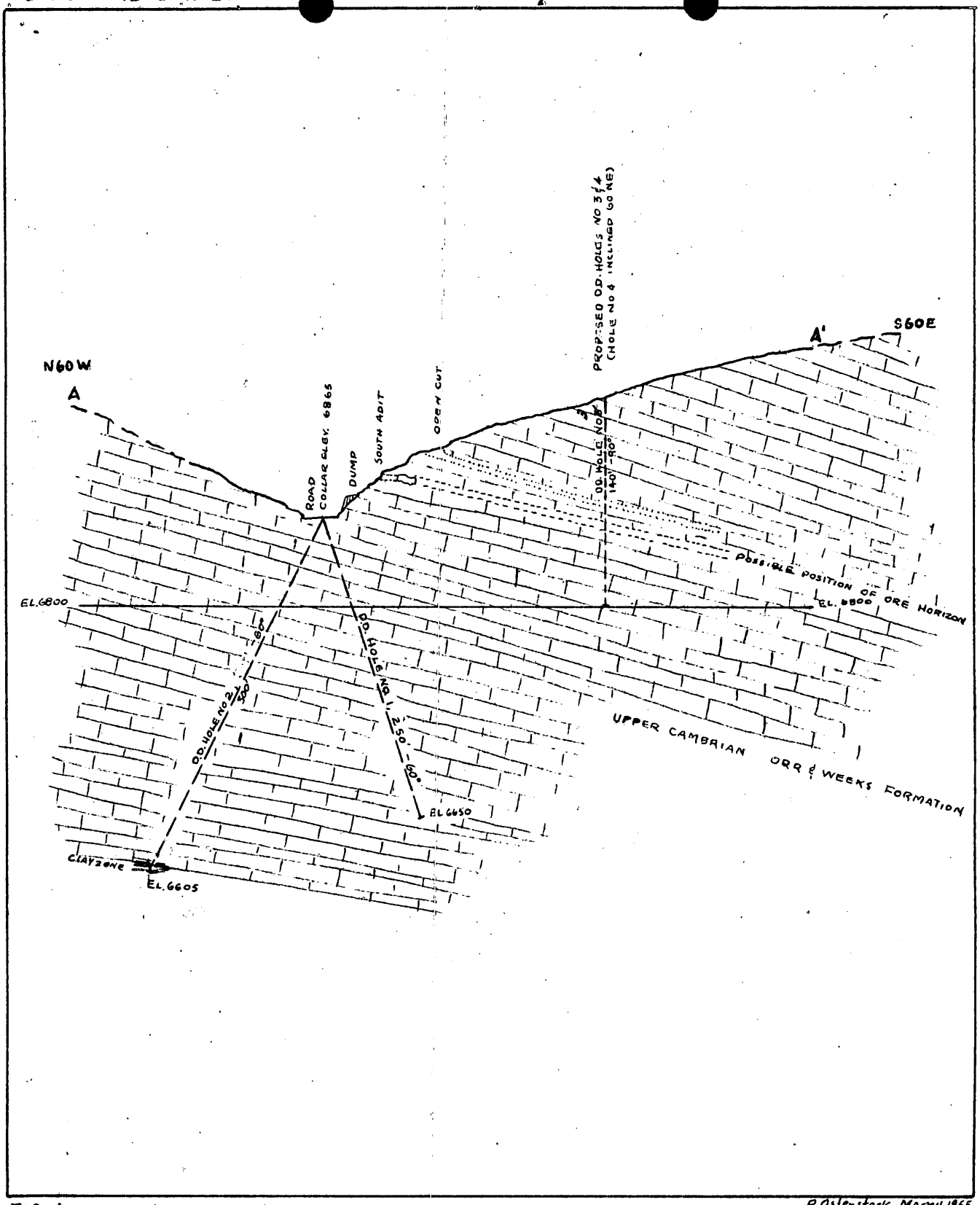

FIG. 4

R. Osterstock, MARCH 1955

VERTICAL PROJECTION OF DIAMOND DRILL EXPLORATION OF THE BROWN QUEEN MINE AREA, MILLARD COUNTY, UTAH

LOOKING NORTHEAST

HORIZONTAL AND VERTICAL SCALE

0 100 200 300 FEET

Assumed Datum Plane

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
1600 EAST FIRST SOUTH STREET
SALT LAKE CITY 1, UTAH

DMEA
Date Rec'd.
MAR 17 1955
BUREAU OF MINES
Denver, Colorado

March 16, 1955

Memorandum

To: W. H. Travor, Executive Officer, DMEA Field Team, Region III

From: Stephen R. Wilson

Subject: Docket No. DMEA-2321 (Tungsten), Contract IdA-2000, Willden and Petty, Millard County, Utah

Attached are eight copies of a memorandum prepared by H. H. Brown relative to an amendment request received from the subject operator. Six copies of the amendment request letter dated December 3, 1954, were transmitted to your office December 9, 1954.

The inspecting engineer recommends that the contract be amended to allow a change in location of the remaining diamond drilling. Recommendation is also made that the project be recessed to May 15, 1955, and the expiration date of the contract be extended to July 15, 1955. I concur in the recommendations.

Stephen R. Wilson
Stephen R. Wilson

Enclosure

S. R. Wilson March 15, 1955

M. H. Howes

Docket No. DMEA-3235 (Tungsten), Contract Idm-8696, Willden and Petty, Millard County, Utah. Memorandum report on request of operator to change location of last diamond drill hole, and to recess the project because of adverse weather.

Since two of the three diamond-drill test holes, namely No. 3 and No. 1, have failed to encounter any tungsten mineralization or to reach the underlying quartz monzonite, the operator believes that there is very little hope of discovery in the present proposed location of the third, or No. 2 hole. The collars of the holes were located in the bottom of the gulch, several feet below the lowest ore in the mine workings. The operator suggests that there is a greater probability of the discovery of ore and the determination of its origin by drilling from a point on the hill above the mine workings, and requests permission to do this with the remaining 250 feet of allowable drilling. He also requests that the project be recessed until late April or May, 1955.

It is recommended that the contract be amended to allow drilling the remaining contract diamond-drill footage as outlined in R. W. Osterstock's memorandum to K. N. Harnham, dated March 14, 1955. It is also recommended that the operator be permitted a recess until May 15, 1955. This will necessitate extension of the contract period from the present expiration date, February 9, 1955, to July 15, 1955, to allow sufficient time to complete the drilling.

M. H. Howes

M. H. Howes

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
1600 EAST FIRST SOUTH STREET
SALT LAKE CITY 1, UTAH

December 9, 1954

Memorandum

To: W. H. King, Executive Officer, DMEA Field Team, Region IV

From: Chief, Minerals Development Branch, Mining Division, Region IV

Subject: Docket No. DMEA-2235 (Tungsten), Contract Idm-2888, Willden and Petty, Millard County, Utah

Attached are six copies of a letter from the subject operator dated December 3, 1954. The letter contains requests that the contract be amended to change the location of diamond drill holes and also that the contract period be extended. We have retained sufficient copies of the letter in this office to permit preparation of recommendations.

Stephen R. Wilson

Stephen R. Wilson

Enclosure

December 3, 1954
Delta, Utah

Mr. Stephen R. Wilson, Chief
Minerals Development Branch
1600 East First South St.
Salt Lake City 1, Utah

Re: Docket No. DMEA-3235,
Contract Idm-E698

Dear Mr. Wilson:

We find that if this project is not recessed, it will be impossible to complete the work prescribed by the expiration date of February 9, 1955 as there is now approximately six inches of snow at the mine which would make it impossible to reach the site with any kind of heavy drilling equipment. As it is so late in the season, there is little question but what the snow will remain on the ground and any storm during the winter would further hazard any contemplated drilling. Undoubtedly, work could not be commenced at the site until late April or May of 1955.

As you undoubtedly know, two of the three test holes have been drilled. One to a depth of 300 feet and the other to a depth of 250 feet, without any indication whatever of reaching granite. Both of the holes are located below the exposed ore body and as no positive indications were found, it would seem to us that a new test hole above the ore deposit would definitely tell us where the ore might have come from or whether the ore body is completely isolated. We realize that Tungsten deposits are usually patchy, but most certainly we should try every means of definitely finding out whether or not this is an economic ore body.

We will greatly appreciate your consideration of the above request. If any additional information is required kindly so inform us. If this information cannot be given by letter, we would greatly appreciate meeting with you at any time you select. We wish to think you for your fine cooperation and attention you have given this project to date.

Very truly yours,

WILLDEN AND PETTY

Al Willden

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
1600 EAST FIRST SOUTH STREET
SALT LAKE CITY 1, UTAH

DMEA
Date Rec'd.
MAR 17 1955
BUREAU OF MINES
Denver, Colorado

March 15, 1955

Memorandum

To: W. H. Traver, Executive Officer, DMEA Field Team, Region III

From: Stephen R. Wilson

Subject: Docket No. DMEA-2325 (Tungsten), Contract 2Ar-2325, Willden and Petty, Millard County, Utah

Attached are eight copies of a memorandum prepared by H. H. Raven relative to an amendment request received from the subject operator. Six copies of the amendment request letter dated November 3, 1954, were transmitted to your office December 9, 1954.

The inspecting engineer recommends that the contract be amended to allow a change in location of the remaining diamond drilling. Recommendation is also made that the project be resumed to May 15, 1955, and the expiration date of the contract be extended to July 15, 1955. I concur in the recommendations.

Stephen R. Wilson

Enclosures

S. R. Wilson March 15, 1955

M. H. Howes

Docket No. DMEA-3235 (Tungsten), Contract Idm-E698, Willden and Petty, Millard County, Utah. Memorandum report on request of operator to change location of last diamond drill hole, and to recess the project because of adverse weather.

Since two of the three diamond-drill test holes, namely No. 3 and No. 1, have failed to encounter any tungsten mineralization or to reach the underlying quartz monzonite, the operator believes that there is very little hope of discovery in the present proposed location of the third, or No. 2 hole. The collars of the holes were located in the bottom of the gulch, several feet below the lowest ore in the mine workings. The operator suggests that there is a greater probability of the discovery of ore and the determination of its origin by drilling from a point on the hill above the mine workings, and requests permission to do this with the remaining 250 feet of allowable drilling. He also requests that the project be recessed until late April or May, 1955.

It is recommended that the contract be amended to allow drilling the remaining contract diamond-drill footage as outlined in R. W. Osterstock's memorandum to E. N. Marshman, dated March 14, 1955. It is also recommended that the operator be permitted a recess until May 15, 1955. This will necessitate extension of the contract period from the present expiration date, February 9, 1955, to July 15, 1955, to allow sufficient time to complete the drilling.

M. H. Howes

M. H. Howes

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES
1600 EAST FIRST SOUTH STREET
SALT LAKE CITY 1, UTAH

December 9, 1954

Memorandum

To: W. H. King, Executive Officer, DMEA Field Team, Region IV

From: Chief, Minerals Development Branch, Mining Division, Region IV

Subject: Docket No. DMEA-3235 (Tungsten), Contract Ida-2888, Willden and Petty, Millard County, Utah

Attached are six copies of a letter from the subject operator dated December 3, 1954. The letter contains requests that the contract be amended to change the location of diamond drill holes and also that the contract period be extended. We have retained sufficient copies of the letter in this office to permit preparation of recommendations.

Stephen R. Wilson

Stephen R. Wilson

Enclosure

December 2, 1954
Delta, Utah

Mr. Stephen R. Wilson, Chief
Minerals Development Branch
1600 East First South St.
Salt Lake City 1, Utah

Re: Serial No. U-3299,
Contract Ind-1690

Dear Mr. Wilson:

We find that if this project is not resumed, it will be impossible to complete the work prescribed by the expiration date of February 9, 1955 as there is now approximately six inches of snow at the site which would make it impossible to reach the site with any kind of heavy drilling equipment. As it is so late in the season, there is little question but that the snow will remain on the ground and any storm during the winter would further hinder any contemplated drilling. Undoubtedly, work could not be commenced at the site until late April or May of 1955.

As you undoubtedly know, two of the three test holes have been drilled. One to a depth of 300 feet and the other to a depth of 250 feet, without any indication whatever of producing results. Both of the holes are located below the exposed ore body and as no positive indications were found, it would seem to us that a new test hole above the ore deposit would definitely tell us where the ore is, if it is gone from or whether the ore body is completely lost. We realize that Empire deposits are usually pretty, but not certainly we would try every means of definitely finding out whether or not this is an economic ore body.

We will greatly appreciate your consideration of the above request. If any additional information is required kindly so inform us. If this information cannot be given by letter, we would greatly appreciate meeting with you at any time you select. We wish to thank you for your fine cooperation and attention you have given this project to date.

Very truly yours,

WILLDEN AND WILLDEN

Al Willden

Al Willden

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

DEPARTMENT OF THE INTERIOR
Defense Minerals Exploration
DEC - 2 1954

224 New Customhouse
Denver 2, Colorado

November 30, 1954

Memorandum

To: Chairman, Operating Committee, DMEA

From: Executive Officer, DMEA Field Team, Region IV

Subject: Docket DMEA 3235 (Tungsten), Contract Idm-E698, Willden and Petty, Millard County, Utah

Enclosed are the original and two copies of Amendment No. 1 to Contract Idm-E698 which was prepared in this office and has been executed to establish a unit cost for assaying to effect consistency between the recitation in Exhibit "A" and the stipulations under Article 4 of the contract form.

Copies of the amendment have been given to the operator, the Finance Office, Region IV, and a copy has been retained for our files.

W. H. King

Enclosures

D
DEC 31 1954
COUNSEL
DEFENSE MINERALS
ADMINISTRATION

7

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

224 New Customhouse
Denver 2, Colorado

November 13, 1954

Messrs. Earl B. Willden,
Al Willden, and Lionel A. Petty
Willden and Petty
Delta, Utah

Re: Docket DMEA 3235 (Tungsten)
Contract Idm-E698
Willden & Petty
Millard County, Utah

Gentlemen:

Enclosed are the original and five copies of Amendment No. 1 to Contract Idm-E698, which we have prepared to establish a unit cost for assaying to effect consistency between the recitation in Exhibit A and the provisions of Article 4 of the contract form, which stipulates that all work is to be performed at an agreed unit cost.

All copies of the amendment should be signed by all three partners as indicated and returned to this office, leaving the date blank.

Upon signature by the Executive Officer, DMEA Field Team, Region IV, for the Government, a copy of the amendment will be forwarded to you.

Yours very truly,

J. F. Shaw

J. F. Shaw for
W. H. King
Executive Officer
DMEA Field Team, Region IV

Enclosures

J.Hill

Copy to: Chairman, Ap. Comm. (2)
[illegible] Roschmann
[illegible] Wilson
[illegible] Roberts
J. Townsend

sjb

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SOLICITOR
WASHINGTON 25, D. C.

October 19, 1954

Memorandum

To: The Administrator, DMEA
Attention: Mr. W. S. Martin

From: Acting Assistant Solicitor, Defense Minerals

Subject: Docket No. DMEA-3235, Willden and Petty
Contract Idm-E698 (Tungsten)

The subject contract, already executed in the field, is unobjectionable from a legal standpoint. However, we point out that it is unusual in that it does not specify the size of coring that is to be done. This office assumes that the size of the cores is of no concern in this particular case.

J. L. Hofflund

J. L. Hofflund
Acting Assistant Solicitor

Attachment
HCRubin/JLHofflund/emd

Copy to: DMEA Docket
Solicitor's Docket
W. S. Martin (2)
J. L. Hofflund
H. C. Rubin
chron.

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF THE SOLICITOR
WASHINGTON 25, D. C.

October 19, 1954

Memorandum

To: The Administrator, DMEA
Attention: Mr. W. S. Martin

WSM

From: Acting Assistant Solicitor, Defense Minerals

Subject: Docket No. DMEA-3235, Willden and Petty
Contract Idm-E698 (Tungsten)

The subject contract, already executed in the field, is unobjectionable from a legal standpoint. However, we point out that it is unusual in that it does not specify the size of coring that is to be done. This office assumes that the size of the cores is of no concern in this particular case.

True

J. L. Hofflund
Acting Assistant Solicitor

No objection to E+ and if the operator wishes to make it any larger, that would be acceptable so long as the increased cost was for the operator's sole account

Attachment

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

224 New Customhouse
Denver 2, Colorado

August 11, 1954

REGISTERED

Memorandum

To: Chairman, Operating Committee, DMEA

From: Executive Officer, DMEA Field Team, Region IV

Subject: Docket DMEA 3235 (Tungsten), Contract Idm-E698, Willden and Petty, Millard County, Utah

Enclosed are the original and two copies of Contract Idm-E698. Copies of this contract have been given to the operator, the Fiscal Officer, Region IV, and a copy has been retained for our files.

W H King
W. H. King

Encls.

RECEIVED
OCT 7 - 1954
GENERAL COUNSEL
DEFENSE MINERALS
ADMINISTRATION

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

224 New Customhouse
Denver 2, Colorado

August 17, 1954.

Memorandum

To: Chairman, Operating Committee, DMEA

From: Executive Officer, DMEA Field Team, Region IV

Subject: DMEA Docket No. 3235 (Tungsten), Contract Idm-E698, Willden and Petty, Millard County, Utah.

Enclosed are four copies of the Report of Examination of the property and two copies of Form 3b.

The contract has been prepared and is now in force.

W. H. King

W. H. King

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

224 New Customhouse
Denver 2, Colorado

July 22, 1954.

Memorandum

To: Field Team, DMEA, Region IV

From: Chief, Mining Division, Region IV

Subject: Report of Examination - DMEA Docket 3235 (Tungsten), Willden and Petty, Brown Queen claims, Millard County, Utah.

Enclosed are eight copies of the engineering report of examination on the above docket.

The applicant requested $20,095.27 to sink a shaft 300 feet and to perform 600 feet of exploratory diamond drilling.

The engineer examiner recommends a total of 800 feet of diamond drilling in three holes from a common surface location to explore the intrusive contact at a total cost of $6,160.00, Government participation $4,620.00.

We concur in this recommendation.

W. M. King

Enclosures

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

1600 EAST FIRST SOUTH STREET
SALT LAKE CITY 1, UTAH

June 28, 1954

Memorandum

To: W. H. King, Executive Officer, DMEA Field Team, Region IV

From: Chief, Minerals Development Branch, Mining Division, Region IV

Subject: Docket No. DMEA 3235 (Tungsten), Willard and Petty, Brown Queen group, Millard County, Utah

Enclosed are the original and eight copies of an engineering report covering examination of the subject property for DMEA loan appraisal. The examination was made and the report prepared by M. M. Howes. Also attached are three copies each of forms 6-803 and 6-993 and the original brochure. Ten extra prints each of figures 2, 3 and 4 of the report have been mailed under separate cover.

The applicants have requested a loan of $20,095.27 to sink a 300-foot shaft, drift 100 feet, and drill 600 feet of diamond drill holes. The examining team recommends an alternate exploratory program consisting of diamond drilling 800 feet in three holes. The total estimated cost of the alternate program is $6,160.

I concur with the recommendations of the field examiners that the applicants be granted a loan of $6,160 to perform 800 feet of diamond drilling.

Stephen R. Wilson

Stephen R. Wilson

Enclosures

IN REPLY REFER TO:

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

June 18, 1954

Memorandum

To: DMEA Field Team, Region IV

From: A. H. Koschmann

Subject: DMEA Docket 3235, Wilden & Petty (tungsten), Brown Queen Group, Millard County, Utah

Enclosed are 9 copies of a geologic report by R. W. Osterstock and C. G. Tillman, geologists, U. S. Geological Survey.

Messrs. Osterstock and Tillman believe that exploration on the subject property is warranted and have proposed a program somewhat different than that originally proposed by the applicant. This modified program has been discussed with the applicants and is satisfactory to them.

Also enclosed are 10 extra copies of the maps from the geologic report.

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

Enclosures (19)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Room 208 - 222 So. West Temple
Salt Lake City 1, Utah
June 15, 1954

Memorandum

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

From: R. W. Osterstock, for R. J. Roberts

Subject: DMEA Docket 3235 (Tungsten), Willden & Petty, Brown Queen Group, Millard County, Utah.

Enclosed are nine copies of a geologic report on the Brown Queen group, DMEA docket 3235, by R. W. Osterstock and C. G. Tillman, geologists, U. S. Geological Survey.

Willden and Petty applied for a DMEA loan to aid in exploration for scheelite on their Brown Queen claims in Millard County, Utah.

Scheelite occurs as pods and disseminations in tactite zones which are locallized by favorable beds in the Cambrian Orr and Weeks limestones and shales. The tactite zones become thicker and more abundant lower in the section indicating proximity to a concealed intrusive. The nearest exposed intrusive mass is in Amassa Valley about 1/2 mile to the south of the mine area.

It is recommended that the modified exploration program consisting of three diamond drill holes be approved for DMEA assistance.

Ralph J. Roberts

By: R. W. Osterstock

RWO/rs

INTRODUCTION

On January 3, 1954 Earl B. Willden, Al Willden, and Lionel A. Petty applied for a DMEA loan, Docket No. 3235, to aid in exploration for tungsten on the Brown Queen claims in Millard County, Utah. The property was examined May 20, 1954 by R. W. Osterstock and C. G. Tillman, geologists, U. S. Geological Survey. The owners were present during the examination.

Location and Accessibility

The eight claims comprising the Brown Queen group are probably in unsurveyed Sec. 30, T. 18 S., R. 14 W., SLB&M in Bird Canyon, House Range, Millard County, Utah. The property is reached by driving 9.8 miles southwesterly from Delta, Utah on paved U. S. Highway 6, thence 35.2 miles westerly on "old" Highway 6, thence southerly 2.4 miles on an unmarked dirt road to the mine.

History and Production

Prior to the staking by the applicants in 1951 there was no recorded production for this area. The owners report in their application that development operations have thus far produced and shipped about 260 tons of ore averaging 2 percent WO_3. Although no settlement sheets were available for inspection, the applicants recalled that two shipments of 30 and 54 tons of ore to Bishop, California assayed 2.28 and 2.67 percent WO_3 respectively; a third shipment of 56 tons of ore to Barstow, California assayed 1 percent WO_3.

GEOLOGY

The sedimentary rocks in the Brown Queen mine area are interbedded limestones and shales of the Weeks and Orr formations of Cambrian age. The thick Cambrian section, of which these strata are a part, forms a typical basin-range block known as the House Range. The rocks are intruded

by an irregular granite stock of Tertiary age which has effected very little deformation of the strata.

The nearest exposed contact between sediments and granite is at the northern edge of Amassa Valley about 1/2 mile to the south of the mine area. It is reported that several small dike-like bodies are exposed in the hills surrounding the mine, however, these were not observed.

In the Brown Queen mine area the sedimentary rocks strike north and dip gently to the east. There has been very little faulting in the mine area.

Where the Amassa Valley granite body is in contact with limestone, tactite zones have developed particularly along certain favorable beds. It is noted that the tactite zones become less frequent or more selective away from the intrusive body.

ORE DEPOSITS

Tungsten mineralization in the Brown Queen mine area is confined exclusively to tactite zones developed in limestone strata. The tactite zones follow and are locallized by the bedding, and certain beds are replaced in preference to others. As a result the section is characterized by "layers" of dark red-brown to green tactite separated by bleached beds of limestone which may have a considerable tremolite content or may be re-crystallized.

The tactite beds are commonly less than 2 feet thick and may average 8 inches. In the area of the mine they make up no more than 20 percent of the section while upward they become increasingly rare and generally thinner.

Major tungsten production in Amassa Valley, about 1 1/2 miles south of the Brown Queen area, has come from tactites locallized in a few favorable

limestone beds very close to or on the granite contact. Tactites are contact phenomena and rarely extend far from the intrusive mass. Certain rock types, however, are more susceptible to such changes and may form contact-type rocks at greater distances from the intrusive mass.

There are two very gentle (flanks dip 12°-15°) anticlinal flexures, whose axes strike and plunge southeasterly, superimposed on the north striking, east dipping beds in the most southerly of the mine workings. It is doubtful that such structures have exercised any ore control as the scheelite pods and lenses do not appear to be either larger or more abundant on the flexures. One small west striking, north dipping normal fault near the portal of the northernmost adit has offset the beds and tactite zones less than 5 feet. Minor scheelite found in the fault probably was dragged in.

The tungsten minerals are scheelite and minor powellite, they occur as pods, lenses and disseminations in the tactite zones which are locallized by bedding in the original sedimentary limestones. Gangue minerals are garnet, diopside, epidote, manganosiderite (?), calcite, and some quartz both as a clear to smoky crystalline type and a fine grained chalcedonic gray to red type. Although particular zones of tactite within the mine area are remarkably persistent the emplacement of tungsten minerals within these zones has been highly selective with the consequent result that some zones are entirely barren of ore minerals.

ORE RESERVES

The applicants have estimated that 500 tons of ore averaging 2 percent WO_3 is in sight. Probably this estimate is somewhat high in grade and should be classified as inferred rather than proven.

PROPOSED EXPLORATION

In setting up the application for a DMEA loan the applicants have placed undue emphasis on the existence of the small steeply north dipping, east striking normal fault. It was their contention that this fault, being the only near vertical structure in the area of the mine, must have served as an access channelway for rising tungsten-rich solutions. On this basis they believed a 300-foot shaft with a suitable amount of drifting would be the most advantageous method of exploring the tungsten potential at depth.

It is now believed more suitable to diamond drill the area in order to explore at depth for tactite zones of greater thickness than those noted in the mine workings, the primary target being the tactite zone immediately on the intrusive contact. This zone in the Amassa Valley region has proven to be more productive than the thinner tactites developed in the limestone beds at greater distances from the contact. It is assumed that the present mine workings are in this latter tactite zone.

The following exploration program consisting of diamond drill holes is suggested in lieu of the applicant's proposal; this program has been discussed with and approved by the applicants.

DD Hole #1: A 300-foot drill hole inclined 60° to the west. This hole will explore the limestone and tactite units with penetration of the maximum stratigraphic section.

DD Hole #2: A 250-foot drill hole inclined 50° to the south. This hole is designated to explore at depth for limestone and tactite units in a direction in which the intrusive mass is known to exist.

DD Hole #3: A 250-foot hole inclined 60° N. 65° E. This hole will explore the limestone and tactite units under the best showing in the mine workings, it will also cut the fault exposed on the surface. If scheelite bearing tactite beds are encountered, this third hole will provide data for accurate location and description and projection of the plane of the tactite zone.

In the event that intrusive rocks are encountered in the drill holes before their assigned footages are completed, the drill holes should be continued no more than 25 feet thus assuring penetration of the main intrusive body rather than a dike or sill.

CONCLUSIONS AND RECOMMENDATIONS

It is concluded that the scheelite bearing tactite zones exposed in the underground workings and on the surface in the Brown Queen mine area are stratigraphically above the most productive zones on the intrusive contact noted in the Amassa Valley district to the south.

It is recommended that DMEA enter into a contract with the applicants to explore at depth by the suggested diamond drilling program for scheelite bearing tactite zones on or near the intrusive contact.

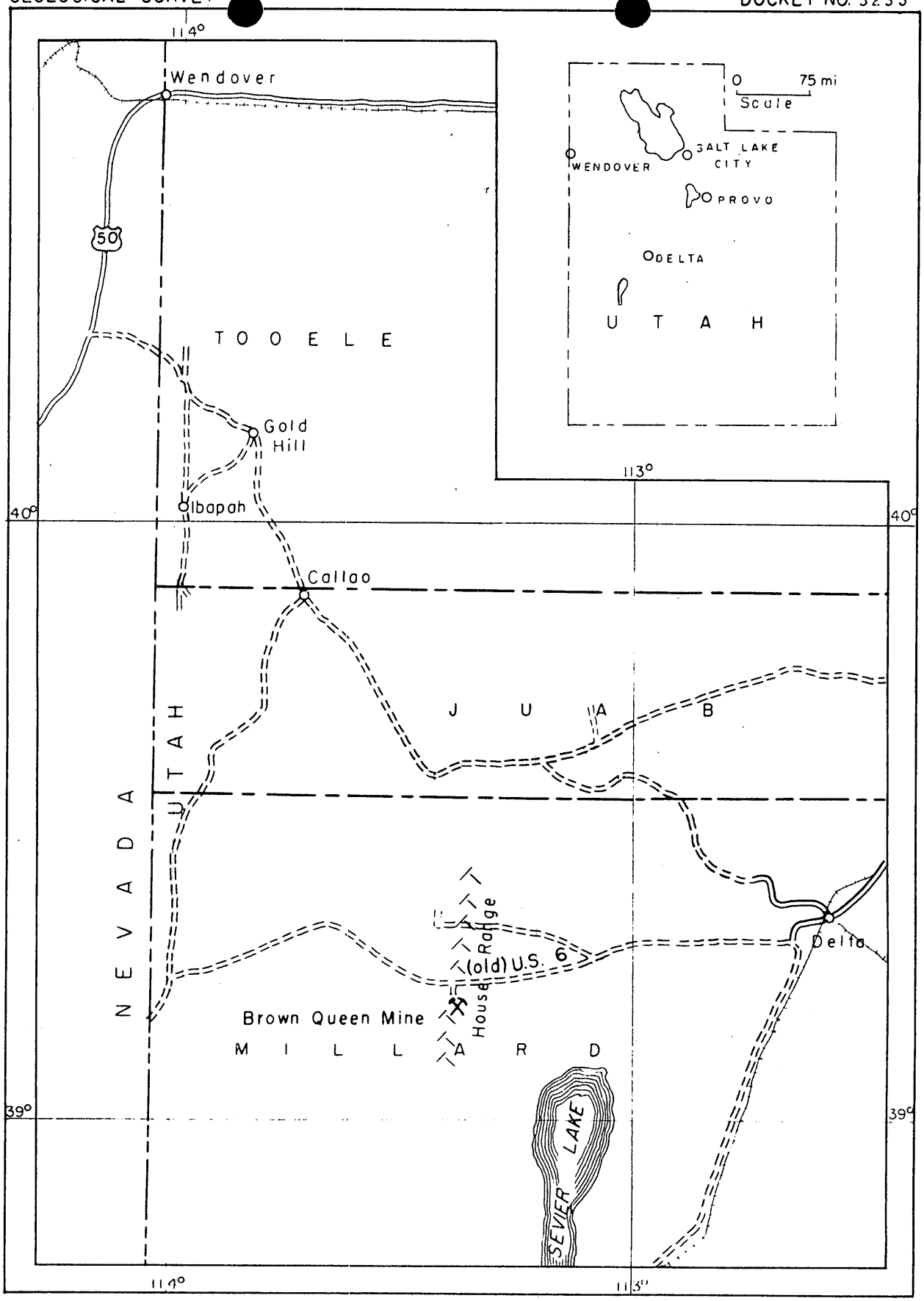

FIG I INDEX MAP OF WESTERN UTAH

0 5 10 15 20 Miles
Scale

WILLDEN AND PETTY, BROWN QUEEN GROUP
MILLARD COUNTY, UTAH
DMEA-3235
Tungsten

Engineering Report

By M. H. Howes
Mining engineer
Bureau of Mines

WILLDEN AND PETTY, BROWN QUEEN GROUP
MILLARD COUNTY, UTAH

CONTENTS

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Estimated costs	8
Conclusions and recommendations	8

ILLUSTRATIONS

Fig. 1 Location map, Brown Queen group, Millard County, Utah
Fig. 2 Claim map
Fig. 3 Location of mine workings
Fig. 4 Plan of underground workings

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Application for a DMEA loan of $20,095.27 has been made by the partnership of Willden and Petty for an exploratory project on the Brown Queen group of claims, Millard County, Utah. The property was appraised in April and May 1954 by members of the Bureau of Mines and Geological Survey.

Sedimentary rocks in the area consist of limestones and shales of Upper Cambrian age. These rocks have been intruded by a quartz monzonite stock called the Notch Peak intrusive, the north side of which outcrops about 3/4 mile south of the property. Tungsten ores occur in parallel, scheelite-bearing tactite zones, which lie along, and in proximity to, the limestone-intrusive contact. The stronger and thicker zones generally occur near the stock.

The claims are reported to have produced 260 tons of ore averaging 2 percent WO_3 from a tactite zone of 2-1/2 feet average thickness. Inferred ore reserves are estimated to be from 2,000 to 3,000 tons, averaging 0.73 percent WO_3.

The field examiners believe that a diamond drilling program is the most suitable method to explore for tungsten-bearing tactite zones below the present mine workings.

It is recommended that the applicant be granted a loan of $6,160 to conduct diamond drilling exploration as outlined in this report.

INTRODUCTION

The partnership of Willden and Petty, Delta, Utah, has made application for Government aid in a tungsten exploratory project on the Brown Queen group of claims under docket No. DMEA-3235. The proposed project, consisting of 300 feet of shaft sinking, 100 feet of drifting, and 600 feet of diamond drilling, is estimated to cost $20,095.27.

The property was examined in April and May 1954 by M. H. Howes, Bureau of Mines, and C. G. Tillman and R. W. Osterstock, Geological Survey, to appraise the feasibility of the project.

LOCATION, TOPOGRAPHY AND CLIMATE

The Brown Queen claims are situated in the southeast part of T. 18 S., R. 14 W., S.L.B. & M. (unsurveyed) (fig. 1). The claims lie on the east side of Bird Canyon, in the rugged terrain of the House Range, 2 miles south of Marjum Pass and about 3/4 mile north of Amassa Valley, Millard County, Utah. Delta, Utah, on the main line of the Union Pacific Railroad, is approximately 50 miles east of the property. Delta is the nearest rail shipping point and a source of manpower and supplies.

A custom tungsten mill approximately 11 miles west of the property has recently started operations.

The climate is arid. Summers are hot and dry and winters are cold, with moderate snow.

HISTORY AND PRODUCTION

The property was located originally by the present owners in the spring of 1951. The tungsten deposit was discovered by tracing scheelite float to the outcrop with ultraviolet light.

The applicant reports that 260 tons of ore that averaged 2 percent WO_3 has been produced and shipped from the property to date. The applicant also estimates that a reserve of approximately 500 tons of ore of the same grade is present on the property.

OWNERSHIP AND EXTENT

Earl B. Willden, Al Willden, and Lionel A. Petty, all of Delta, Utah, doing business as Willden and Petty, a partnership, Delta, Utah, located and hold the following eight unpatented lode mining claims (figs. 2 and 3), which are recorded at the Millard County Courthouse, Fillmore, Utah:

Claim	Recording Date	Book	Page
Brown Queen	Mar. 29, 1951	12 of N.L.	476
Brown Queen No. 1	Apr. 2, 1951	12 of N.L.	484
Brown Queen No. 2	Apr. 2, 1951	12 of N.L.	484
Brown Queen No. 3	Apr. 2, 1951	12 of N.L.	485
Brown Queen No. 4	Apr. 2, 1951	12 of N.L.	485
Brown Queen No. 5	Apr. 23, 1951	12 of N.L.	494
Brown Queen No. 6	Apr. 23, 1951	12 of N.L.	495
Brown Queen No. 7	Dec. 19, 1953	13 of N.L.	258

GEOLOGY

Sedimentary rocks in the House Range, in the area of Amassa Valley and Marjum Pass, consist of interbedded limestones and shales of Upper Cambrian age, which have a general north-south strike and easterly low-

angle dip. These rocks have been intruded by a quartz monzonite stock, called the Notch Peak intrusive. Adjacent to the stock the sedimentary beds dip outward in all directions, and are generally concordant with the intrusive. A number of scheelite-bearing tactite zones, ranging from a few inches in thickness to several feet, occur in limestone beds adjacent to and in the proximity of the stock, the stronger and thicker zones generally occurring near the intrusive.

Limestones are the principal rocks in the vicinity of the Brown Queen group. The beds strike in a northerly direction and dip gently to the east. The north side of the Notch Peak intrusive outcrops in Amassa Valley, about 3/4 mile south of the property. Several comparatively thin tactite zones, separated by altered limestones, were observed in and near the mine workings. The tungsten ores occur as erratic concentrations of scheelite and powellite in parts of the tactite zones.

ORE RESERVES

The tactite zone, which was followed by the underground workings, is the thickest and richest of the zones encountered in the mine area. The following eight samples (fig. 3) were taken along this zone and analyzed:

Sample	Cut	Percent WO_3	Percent Mo
W1 1/	Selected	2.86	6.24
W2	1'	1.65	0.07
W3	1'	<0.01	<0.01
W4	1'	0.12	<0.01
W5	5'	0.47	0.07
W6	4'	0.13	<0.01
W7	2-1/2'	2.89	0.02
W8	3'	0.33	<0.01
Weighted average		0.73	0.03

1/ Results not included in weighted average values.

The above tactite zone has been exposed 120 feet along the strike and 40 feet down dip with an average thickness of 2-1/2 feet. Assuming that the zone will continue along the strike and down dip for similar distances, an inferred reserve estimate of between 2,000 and 3,000 tons of 0.73 percent ore would result.

PRESENT STATUS

Present workings on the property (fig. 3) consist of a 40-foot adit or flat incline, a 70-foot irregular tunnel, a 5-foot shaft, and about 400 square feet of open cuts (fig. 4).

The only building on the property is a 10' x 15', roughly built, one-room cabin. Two ore bins of about 15 tons capacity each, have been constructed near the portals of the adit and tunnel. In addition to a few hand tools, the only mining equipment on the property is an Ingersoll-Rand, 5-1/2-inch bore, 5-inch stroke, 875-r.p.m. compressor, powered by an 8-cylinder Waukesha gasoline engine and mounted on a flatrack Ford truck.

PROPOSED EXPLORATION

The applicant has proposed sinking a 300-foot shaft (deepening the present 5-foot shaft), drifting 100 feet, and drilling 600 feet of diamond drill holes.

An alternate proposal recommended by the field examiners and concurred in by the applicant consists of drilling three diamond drill holes from a point in the bottom of the canyon approximately N. 33° E., 30 feet from the discovery monument of Brown Queen claim (figs. 3 and 4) as follows:

D. D. hole No. 1:	Drill west, -60°, 300 feet maximum, or not more than 25 feet penetration of the quartz monzonite.
D. D. hole No. 2:	Drill south, -50°, 250 feet maximum, or not more than 25 feet penetration of the quartz monzonite.
D. D. hole No. 3:	Drill N. 65° E., -60°, 250 feet maximum, or not more than 25 feet penetration of the quartz monzonite.

The diamond drilling program is planned to explore for tungsten-bearing tactite zones below the present mine workings, the principal one of which is along the limestone-intrusive contact. Hole No. 1 will be drilled at near right angles to the limestone beds and should present a good stratigraphic section, as well as explore for favorable tactite zones. Hole No. 2 will be drilled toward the known position of the intrusive stock. Hole No. 3 will explore the limestone under the best showings in the mine workings.

Eight hundred feet of diamond drill holes at 32 feet per day will require 25 days for completion.

ESTIMATED COSTS

Diamond drilling, 800 feet of holes, 7/8-inch core, at $6.00 per foot (including reaming and casing)	$4,800.00
Drayage	100.00
Water haulage	500.00
Core boxes, 20 at $3.00 each	60.00
Assaying	200.00
Supervision	500.00
Total cost	$6,160.00
Total cost per foot	7.70
Government's share (75 percent)	4,620.00
Applicant's share (25 percent)	1,540.00

The applicant reports that he is prepared to furnish equipment, labor, and cash as his share of the estimated costs.

CONCLUSIONS AND RECOMMENDATIONS

The strong showing of tungsten mineralization encountered on the property indicates that an exploratory program is desirable. The proposed diamond drilling project is believed to be the most suitable method for the discovery of thicker and stronger ore zones, and for determining the depth to the intrusive.

It is recommended that the exploratory program, as outlined in the above-proposed plans, be approved and that a Government loan be made in accordance with DMEA regulations.

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

224 New Customhouse
Denver 2, Colorado

August 12, 1954

Memorandum

To: Chairman, Operating Committee, DMEA

From: Executive Officer, DMEA Field Team, Region IV

Subject: Docket DMEA 3235 (Tungsten), Contract Idm-E698, Willden and Petty, Millard County, Utah

The effective date of Contract Idm-E698 is August 9, 1954. Will you please insert that date on the original and two copies of the contract mailed to you August 11, 1954.

W. H. King

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

224 New Customhouse
Denver 2, Colorado

August 12, 1954

Memorandum

To: Chairman, Operating Committee, DMEA

From: Executive Officer, DMEA Field Team, Region IV

Subject: Docket DMEA 3235 (Tungsten), Contract Idm-E698, Willden and Petty, Millard County, Utah

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W H King
W. H. King

REAdams/

DMEA - Department of the Interior

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

T E L E T Y P E

AUG 1 1 1954

MR. W. H. KING, EXECUTIVE OFFICER
DMEA FIELD TEAM, REGION IV
BUREAU OF MINES
224 NEW CUSTOMHOUSE BUILDING
DENVER 2, COLORADO

REURTEL 8/9/54 CONTRACT NO. IDM-2698 ASSIGNED TO DOCKET NO. DMEA-3235.

WILLDAN AND PETTY.

C. O. Mittenderf

C. O. MITTENDORF, ADMINISTRATOR

REAdams/la/8-10-54

Copy to: Adm. R. File
Mails & Files
Mr. Adams

SENT
AUG 11 1954
Clerical Service Section

IDM-E 698

7570
Parts

Mr. George Selfridge
8-9-54
Unattended service

AUG 10 1954

DN 235 BUR MINES 8-9-54 1-26 PM

CHAIRMAN OPERATING COMMITTEE DMEA

PLEASE ASSIGN A NUMBER TO CONTRACT COVERING DOCKET DMEA 3235
WILLDEN AND PETTY, A PARTNERSHIP CONCXXX CONSISTING OF EARL B. WILLDEN,
AL WILLDEN, AND LIONEL A. PETTY, DELTA, UTAH. COMMODITY TUNGSTEN.
CONTRACT DATED AUGUST 9,1954, PROPERTY IN MILLARD COUNTY, UTHXXX TXXX
UTAH. AMOUNT OF GOVERNMENT PARTICIPATION $4,620.00. TOTAL AMOUNT OF
CONTRACT $6,160.00.

W H KING

Denver, Colo.

AUG 10 10 51 AM '54
BUREAU OF MINES
MAIL ROOM
WASHINGTON, D. C.

AUG 10 9 50 AM '54
BUREAU OF MINES
MAIL ROOM
WASHINGTON, D. C.

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

224 New Customhouse
Denver 2, Colorado

July 22, 1954.

Memorandum

To: Administrator, Defense Minerals Exploration Administration

From: DMEA Field Team, Region IV

Subject: Report of Examination - DMEA Docket No. 3235 (Tungsten), Willden and Petty, Brown Queen claims, Millard County, Utah.

The application for Government assistance in exploration work estimated to cost $6,160.00 has been approved by us and a contract is being prepared.

Government participation will be 75 percent or $4,620.00.

Four copies of the Report of Examination will be forwarded when the contract is processed.

W. H. King

A. H. Koschmann

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

224 New Customhouse
Denver 2, Colorado

July 22, 1954.

Memorandum

To: Administrator, Defense Minerals Exploration Administration

From: DMEA Field Team, Region IV

Subject: Report of Examination - DMEA Docket No. 3235 (Tungsten), Willden and Petty, Brown Queen claims, Millard County, Utah.

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W. H. King
W. H. King

A. H. Koschmann
A. H. Koschmann

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

January 19, 1954

Memorandum

To: Executive Officer, DMEA Field Team, Region IV.

From: Chief, Operation's Control and Statistics Division

Subject: Assignment of Docket Number

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

DMEA - 3235 - Earl B. Willden, et al.

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

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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

Defense Minerals Administration
RECEIVED
JAN 18 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. 3235
Metal or Mineral Tungsten
Date Received
Estimated Cost $20,095
Participation (Government %) 75%

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: Earl B. Willden, Delta, Utah,
Al Willden, Delta, Utah
Lionel A. Petty, Delta, Utah, d.b.a.
Willden and Petty, a partnership, Delta, Utah

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

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

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

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

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

See Attached Papers for all questions.

(*b*) State any mine name by which the property is known.

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

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

(*e*) If you own the land, describe any liens or encumbrances on it

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

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

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

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

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

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

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

.....

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

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

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

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

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

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

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

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

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

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

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

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

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

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)?

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

☐ 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 January 9, 1954

(Applicant)

By Lionel A. Petty

Earl Willden

Al Willden

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

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

Minerals Administration
RECEIVED
JAN 18 1954

1. Name of applicant.

Earl B. Willden, Delta, Utah,
Al Willden, Delta, Utah,
Lionel A. Petty, Delta, Utah, d.b.a.
Willden and Petty, a partnership, Delta, Utah

3. Applicant's property rights.

(a) These claims are located in Millard County, Utah, approximately 50 miles west of Delta, Utah, in Bird Canyon of the Sawtooth Range, near Marjum Pass of the same range, as filed and recorded at Millard County Court House at Fillmore, Utah.

Brown Queen
Date: March 29, 1951
Hour of Filing: 10 A.M.
Book 12 of N.L.
Page 476

Brown Queen No. 1
Date: April 2, 1951
Book 12 of N.L.
Page 484

Brown Queen No. 2
Date: April 2, 1951
Book 12 of N.L.
Page 484

Brown Queen No. 3
April 2, 1951
Book 12 of N.L.
Page 485

Brown Queen No. 4
Date: April 2, 1951
Book 12 of N. L.
Page 485

Brown Queen No. 5
Date: April 23, 1951
Hour of Filing: 9 A.M.
Book 12 of N.L.
Page 494

Brown Queen No. 6
Date: April 23, 1951
Hour of Filing: 9 A.M.
Book 12 of N. L.
Page 495

Brown Queen No. 7
Date: Dec. 19, 1953
Hour of Filing: 10 A.M.
Book 13 of N.L.
Page 258

4. Physical description.

(a)

Mine Workings
One drift 45 feet long by 8 ft. wide by 6 feet depth.
One drift 40 feet long by 5 ft. wide by 6 feet depth.

Production facilities.
A compressor, jackhammer, hoses and fittings and two loading chutes and bins.

Interest in operations.
Property was located originally by the present owners and all operations to date have been made by the present owners.

Accessibility of mine workings.
Mine property is accessible by road.

(b) Past and current production, and ore reserves.
260 tons of ore averaging 2% tungsten has been shipped to date. There is estimated to be approximately 500 tons of the same quality of ore now in sight.

(c) Geologic features, type of deposit and reasons for wishing to explore.
(See Sketch enclosed)
It is desirable to sink a shaft 300 ft. in depth in the fault separating the two ore bodies.

(d) Accessibility of project.
There is a well traveled highway (Old U. S. Highway No. 6) which runs within 2½ miles of the claims. The remaining 2½ miles is of bulldozer construction.

Distances to shipping points.
This property is approximately 11 miles from the site of a new tungsten mill which is now being constructed. The mill itself is approximately 60 miles from Delta, Utah, which would be the shipping point of the concentrated ore.

(e) Availability of manpower, materials, equipment, water & power.
There would be sufficient manpower, equipment, materials and supplies available for the mine operation. Water and power are limited but would not in any way curtail operations.

5. The Exploration project.
(a) Mineral for which we wish to explore.
Tungsten

(b) Proposed work.
See enclosed sketch

(c) The work will start immediately and be completed within 24 months from the date of an exploration project contract.

(d) Operating experience and background of the applicants.
Applicants have been actively engaged in mining of various kinds for the last 30 years. Applicants would supervise all operations.

6. Estimate of Costs.

(a) Independent contracts.

300 ft. shaft @ $20.00 per foot	$6,000.00
Bulldozing - 50 hours @ $10.00 per hour	500.00
100 ft. of drift @ $15.00 per foot	1,500.00
Exploration drilling-600 ft. @ $5.00 per ft.	3,000.00
Total	$11,000.00

(b) Labor, supervision, consultants.

Geological engineering	$1,000.00
Labor contracted under (a)	
Total	$1,000.00

(c) Operating Materials and supplies.

Picks and shovels	25.00
Powder - 50 boxes @ $11.50	575.00
Fuse - 8000 feet @ $16.00 per thousand	128.00
Caps - 9 boxes @ $2.65	23.85
Carbide - 125 lbs. @ $30.00 Per hundred	37.50
800 ft. 12 lb Rail @ $1.00 per ton	160.00
Drift ties - 200 @ 25¢	50.00
Shaft ties - 300 @ $1.00	300.00
Mining Plank - 2,000 ft. @ $70 per thousand	140.00
Bits - 400 @ 50¢	200.00
Drill Steel - 15 4 ft.	
10 2 ft. @ $1.50 per ft.	120.00
Rail Spikes - 200 lbs @ 20¢	40.00
Timber Spikes - 100 lbs @ 20¢	20.00
Gas - 2400 gal. @ 25¢	600.00
Water - 10,000 gal. @ 1¢ per gal.	100.00
Pipe - 400 ft. @ 26¢	104.00
Total	$2,623.35

(d) Operating equipment.

Rental of two compressors - 6 months actual operation of the 24 month period @ $400.00 per month	$2,400.00
Rental of Jackhammer - 6 months actual operation of the 24 months period	240.00
Air Hoist - Rental 6 months actual operation of the 24 month period	200.00
Rental Ore Car - 6 months actual operation of the 24 month period	75.00
Total	$2,915.00

(e) Rehabilitation and repairs.

None

(f) New buildings, improvements, installations.

Cabin	$ 600.00
Total	$ 600.00

(g) Miscellaneous

Cost of repairs and maintenance to equipment included in rentals of equipment and contract work.

Accounting	$1,000.00
Workmens Comp. included in contract work.	
Employers' liability insurance included in contract work.	
Payroll taxes included in contract work.	
Total	$1,000.00
Grand Total	$19,138.35

(h) Contingencies.

5% of above total	$ 956.92
GRAND TOTAL	$20,095.27

7. (a) Are you prepared to furnish your share of cost?

Yes

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

Equipment and money

By the equipment now owned by the operators, the operators labor during the operation and cash as necessary for the balance.

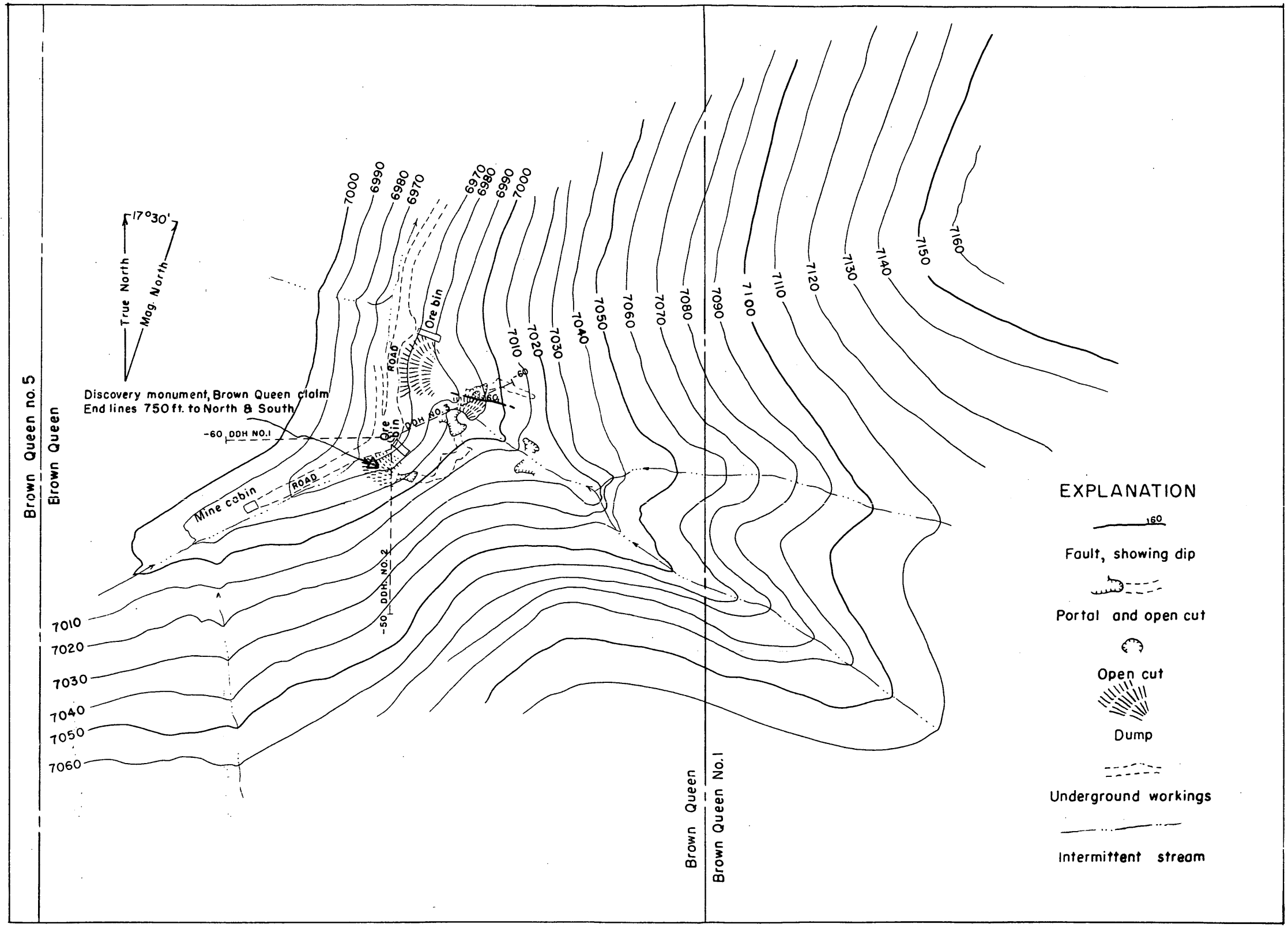


FIG. 2

By R.W. Osterstock and C.G. Tillman May 1954

MAP OF BROWN QUEEN MINE AREA
HOUSE RANGE, MILLARD COUNTY, UTAH

0 100 200 300
Scale

Contour interval 10 ft.; Datum assumed

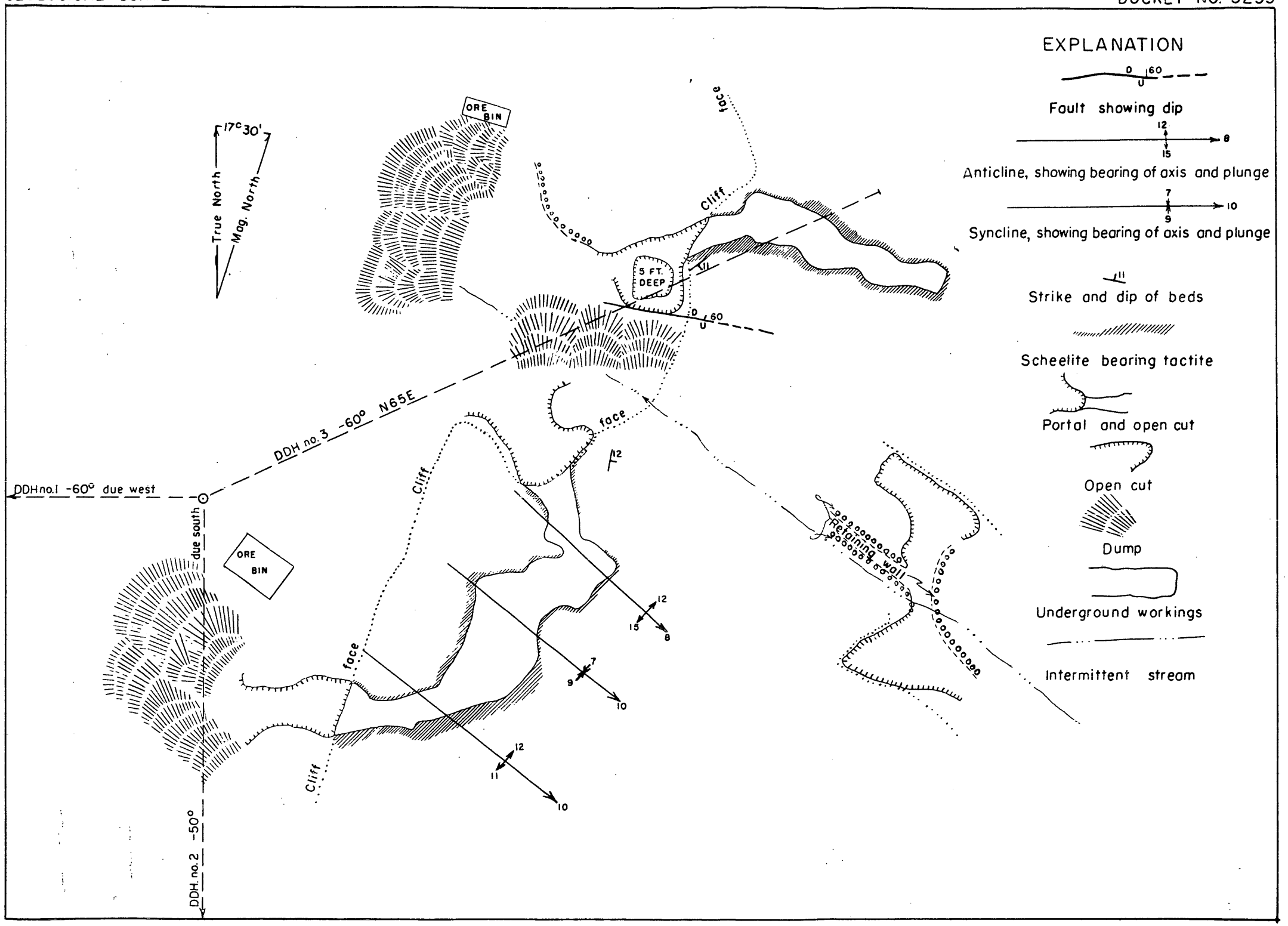
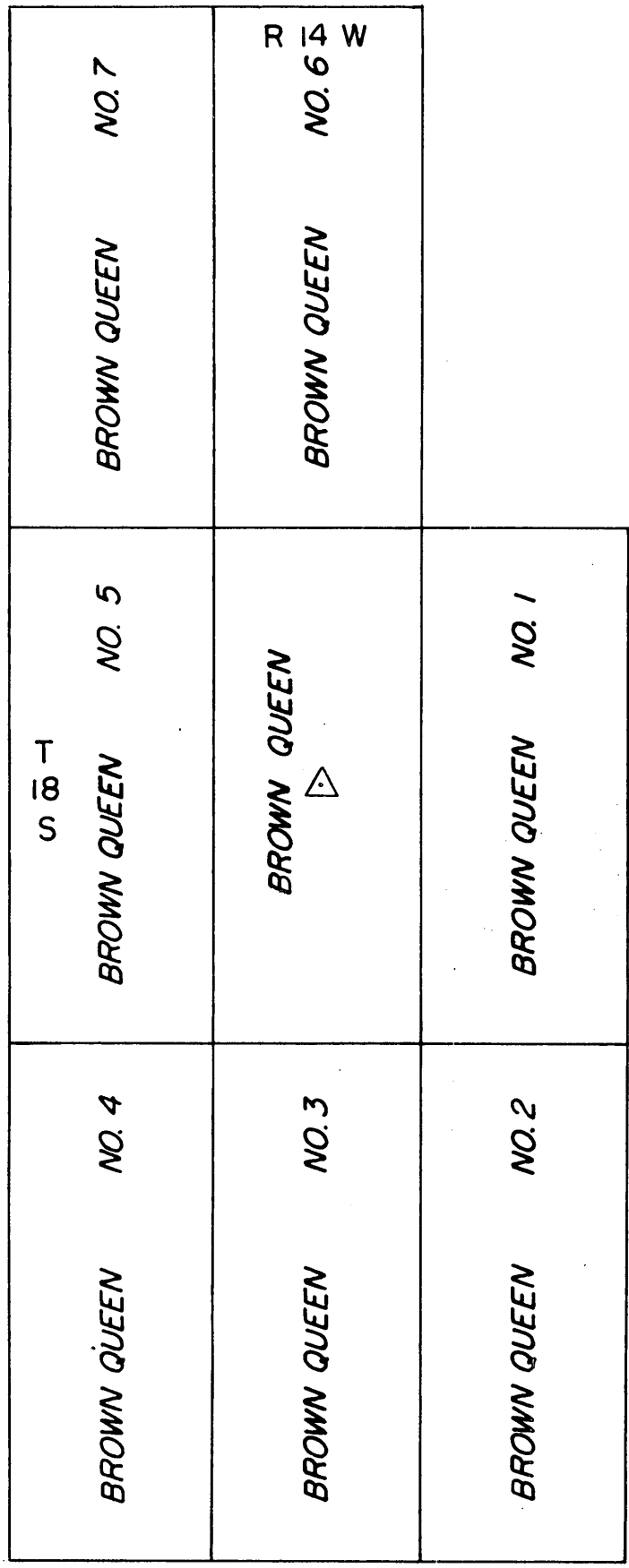


FIG. 3

By R. W. Osterstock and C. G. Tillman May, 1954

MAP OF BROWN QUEEN MINE
HOUSE RANGE, MILLARD COUNTY, UTAH

0 20 40 60 ft.
Scale

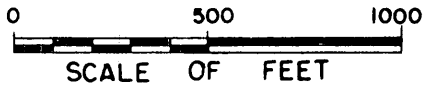


LEGEND

△ LOCATION MONUMENT

NOTE

PRESENT MINE WORKINGS ARE LOCATED IN CENTER OF BROWN QUEEN CLAIM.



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

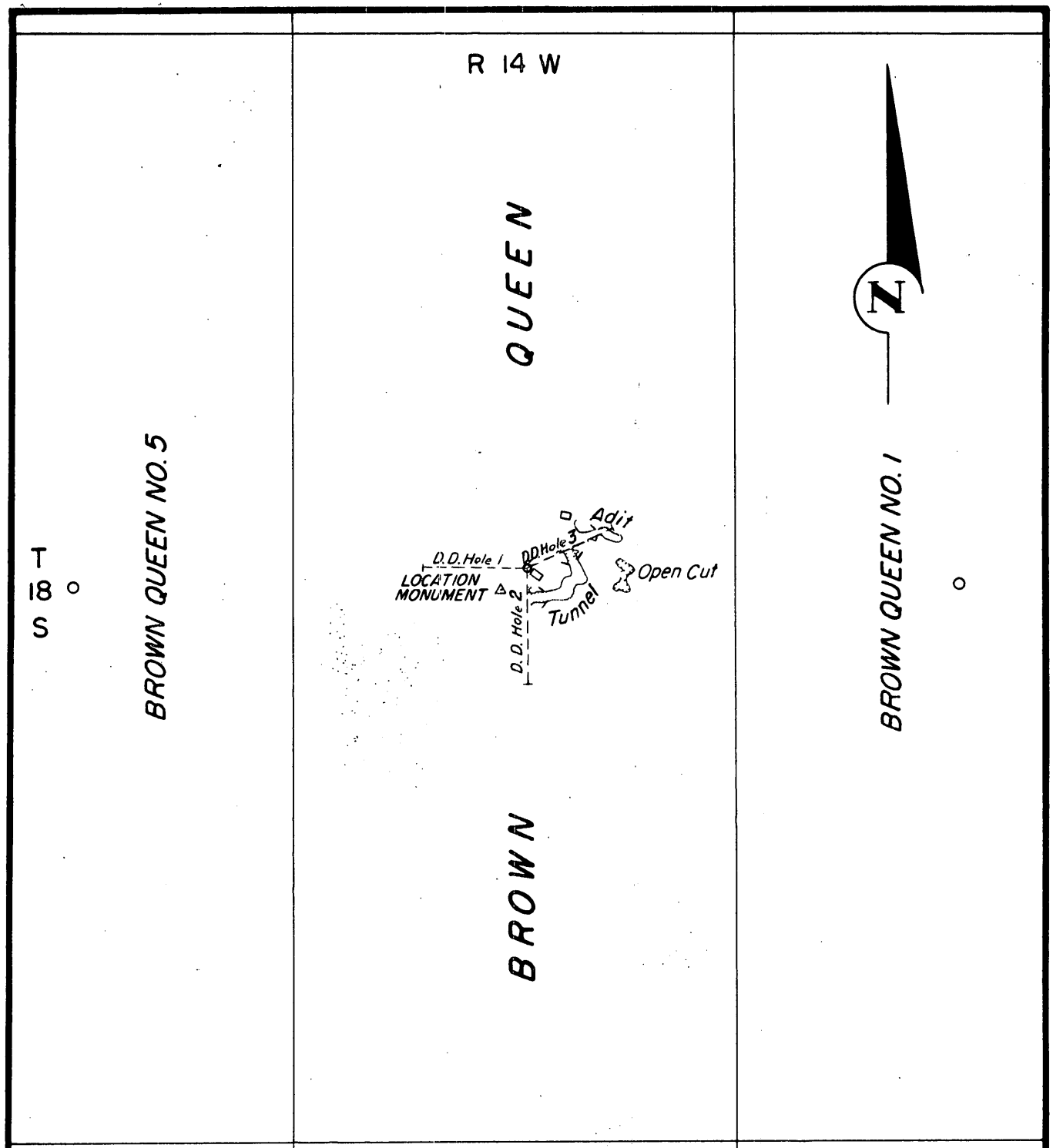
Fig. 2 DMEA Docket No. 3235

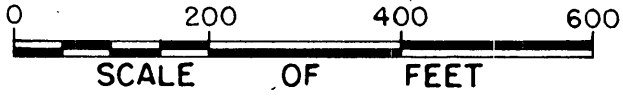
Claim Map

WILLDEN AND PETTY
BROWN QUEEN GROUP

MILLARD COUNTY, UTAH

ENGINEER: *M. H. HOWES*	DATE: JUNE 22, 1954
TRACED: JUNE, 1954; A.P.T.S.	700 - 187 - E
CHECKED:	





U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

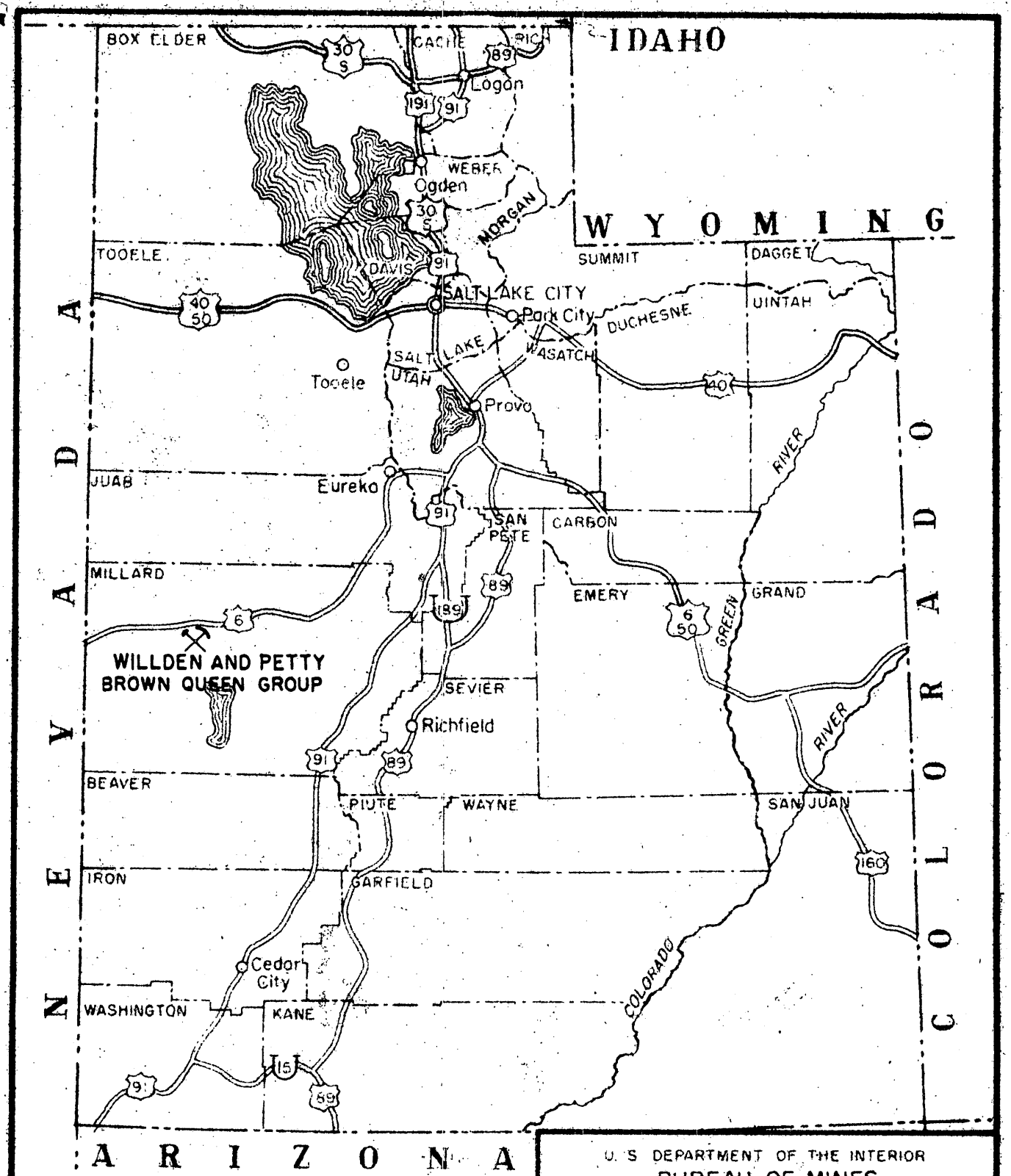
Fig. 3 DMEA Docket No. 3235

Location of Mine Workings

WILLDEN AND PETTY
BROWN QUEEN GROUP

MILLARD COUNTY, UTAH

ENGINEER: *M. H. HOWES*	DATE: JUNE 21, 1954
TRACED: JUNE, 1954; A.P.T.S.	700 - 186 - E
CHECKED:	



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Fig. 1 DMEA Docket No. 3235

Location Map

WILLDEN AND PETTY
BROWN QUEEN GROUP

MILLARD COUNTY, UTAH

ENGINEER *M. H. Howes*	DATE: APRIL 9, 1955
TRACED APR., 1955; A.P.T.S.	700 - 195 - G
CHECKED	

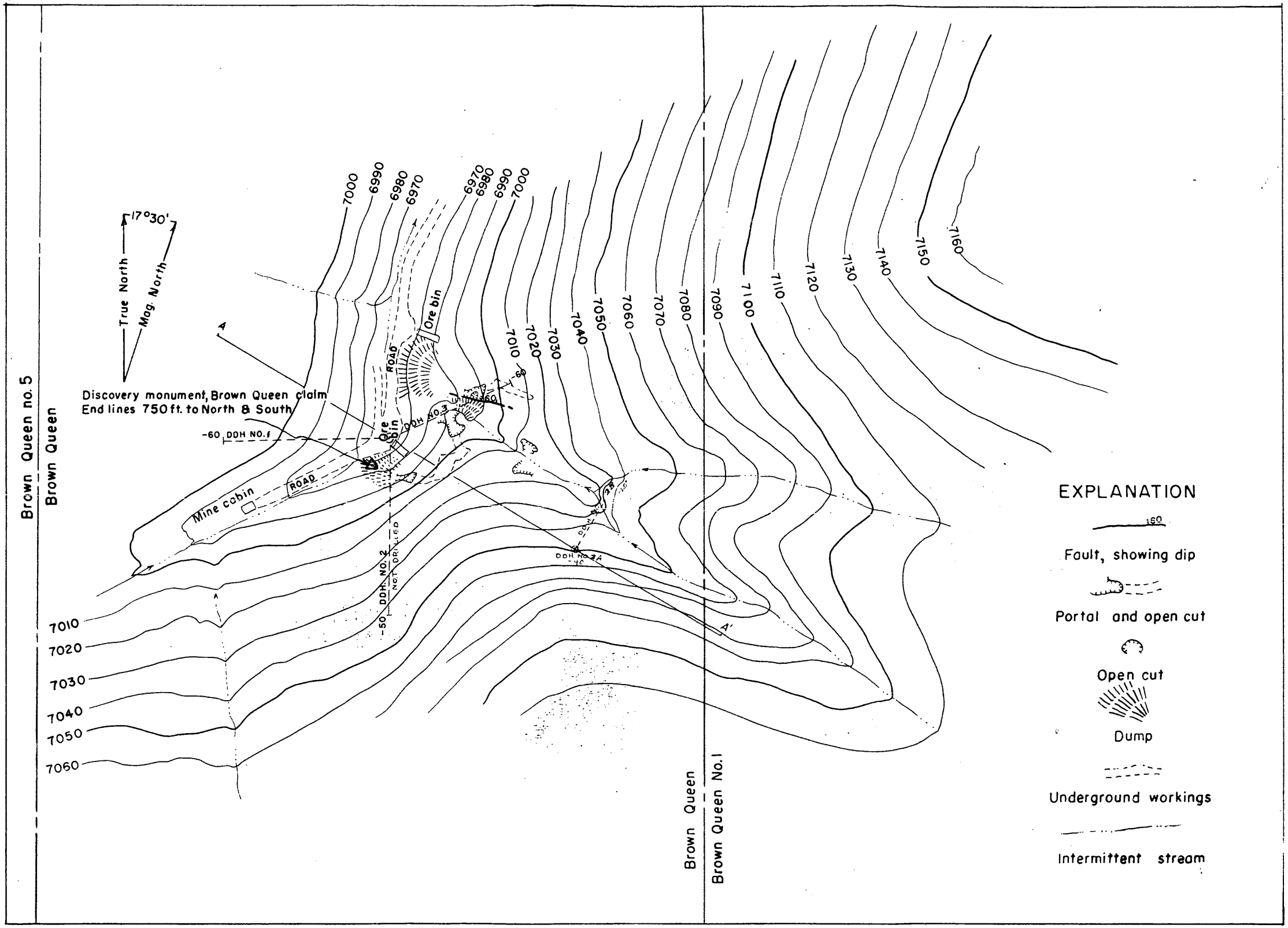


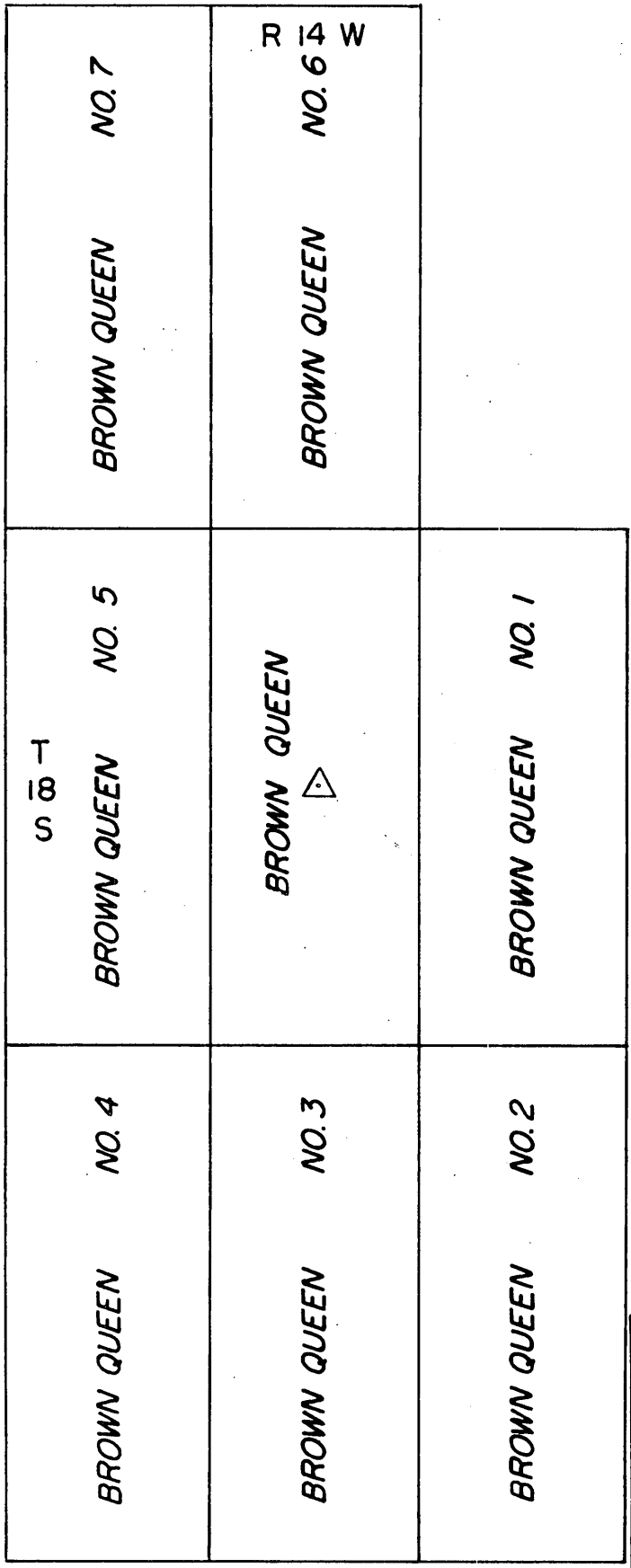
FIG. 2

MAP OF BROWN QUEEN MINE AREA
HOUSE RANGE, MILLARD COUNTY, UTAH

0 100 200 300
Scale

Contour interval 10 ft.; Datum assumed

By R.W. Osterstock and C.G. Tillman May 1954

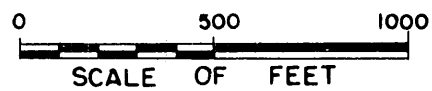


LEGEND

△ LOCATION MONUMENT

NOTE

PRESENT MINE WORKINGS ARE LOCATED IN CENTER OF BROWN QUEEN CLAIM.



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Fig. 2 A DMEA Docket No. 3235

Claim Map

WILLDEN AND PETTY
BROWN QUEEN GROUP

MILLARD COUNTY, UTAH

ENGINEER: *M. H. HOWES*	DATE: JUNE 22, 1954
TRACED: JUNE, 1954; A.P.T.S.	700 - 187 - E
CHECKED:	

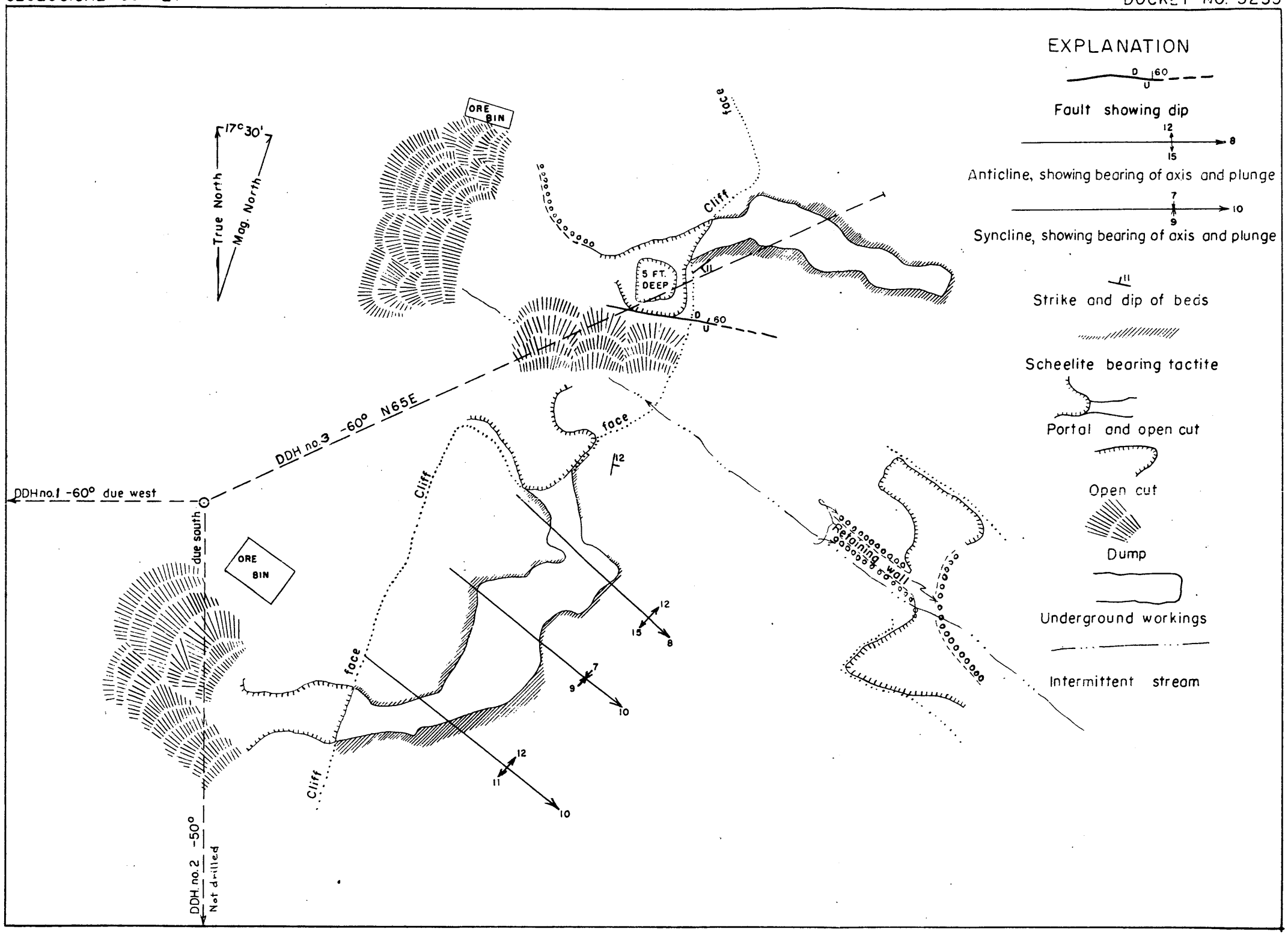
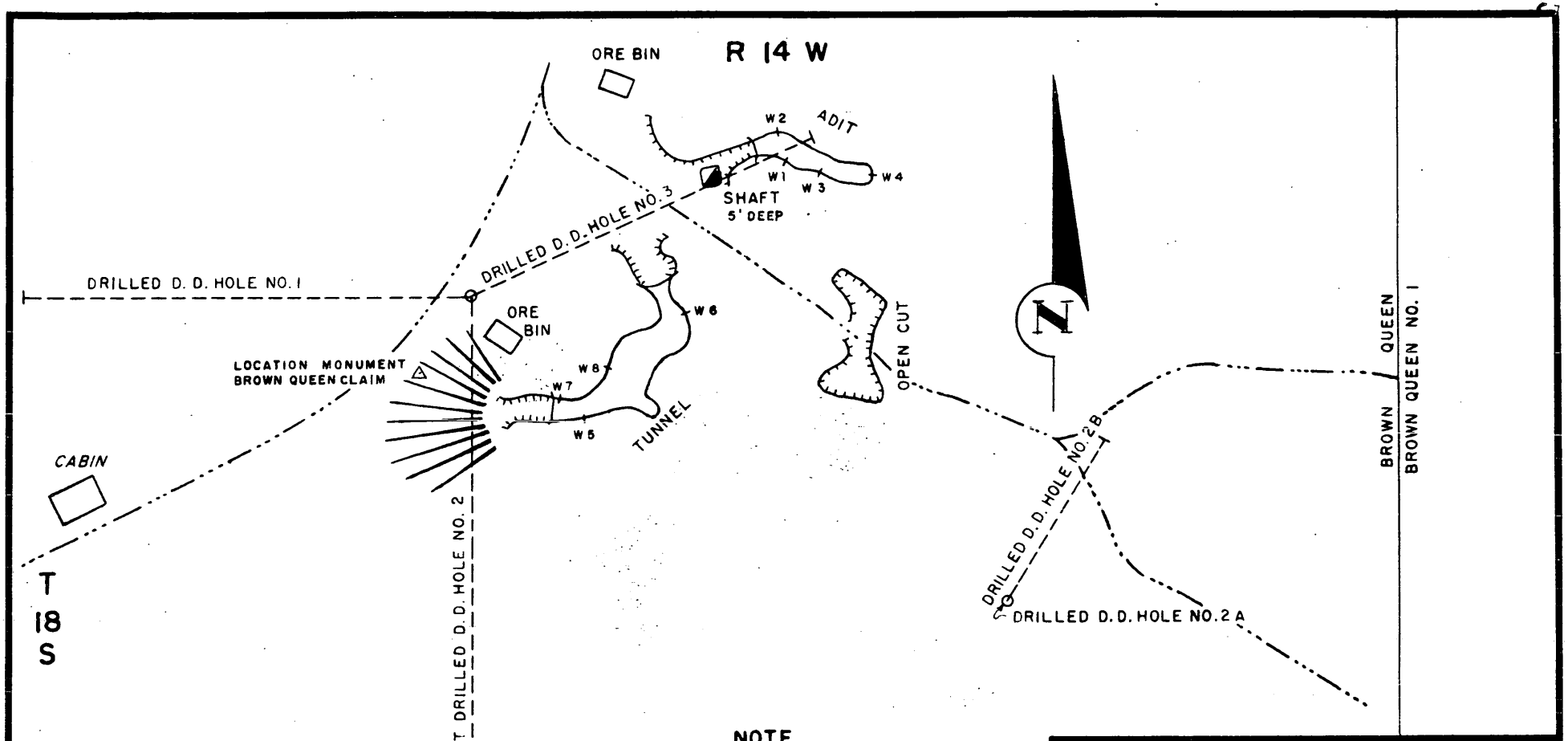


FIG. 3

MAP OF BROWN QUEEN MINE
HOUSE RANGE, MILLARD COUNTY, UTAH

0 20 40 60 ft.
Scale

By R. W. Osterstock and C. G. Tillman May, 1954



LIST OF ASSAYS			
SAMPLE	CUT	WO_3 %	MO %
W1	SELECTED	2.86	6.24
W2	1'	1.65	0.07
W3	1'	0.01	0.01
W4	1'	0.12	0.01
W5	5'	0.47	0.07
W6	4'	0.13	0.01
W7	2½'	2.89	0.02
W8	3'	0.33	0.01

NOTE

DATA TAKEN FROM U.S.G.S. MAP.

0 50 100

SCALE OF FEET

U. S. DEPARTMENT OF THE INTERIOR

BUREAU OF MINES

Fig. 3 A DMEA Docket No. 3235

Plan of Mine Workings

WILLDEN AND PETTY

BROWN QUEEN GROUP

MILLARD COUNTY, UTAH

ENGINEER: *M. H. HOWES*	DATE: APRIL 10, 1956
TRACED: APR., 1956, A.P.T.S.	700 - 196 - G
CHECKED:	

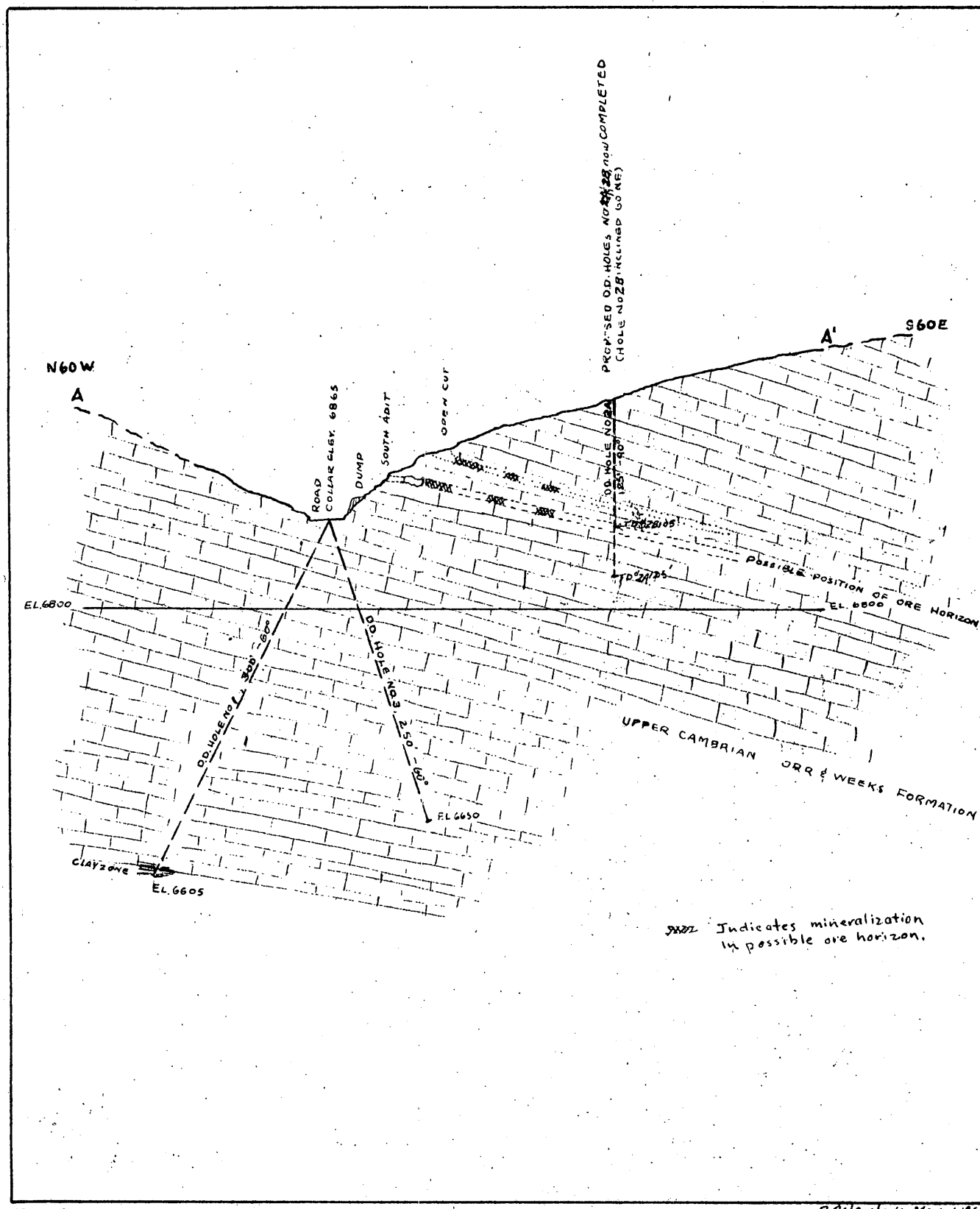


FIG. 4

R. Osterstock, March 1955
Jan. 1956

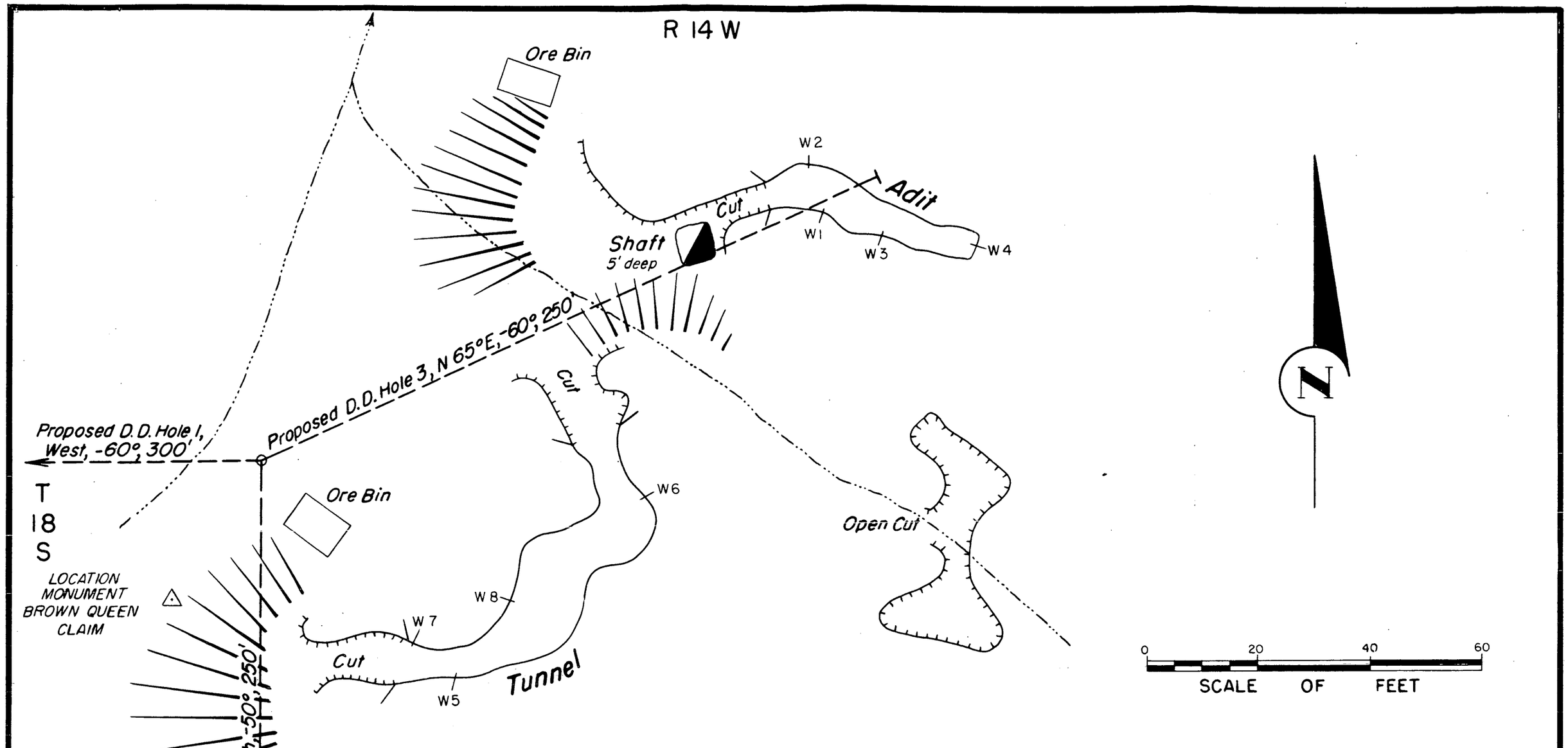
VERTICAL PROJECTION OF DIAMOND DRILL EXPLORATION OF THE BROWN QUEEN MINE AREA, MILLARD COUNTY, UTAH

LOOKING NORTHEAST

HORIZONTAL AND VERTICAL SCALE

0 100 200 300 FEET

Assumed Datum Plane



LIST OF ASSAYS			
SAMPLE	CUT	WO %	Mo %
W1	Selected	2.86	6.24
W2	1'	1.65	0.07
W3	1'	<0.01	<0.01
W4	1'	0.12	<0.01
W5	5'	0.47	0.07
W6	4'	0.13	<0.01
W7	2½'	2.89	0.02
W8	3'	0.33	<0.01

NOTE

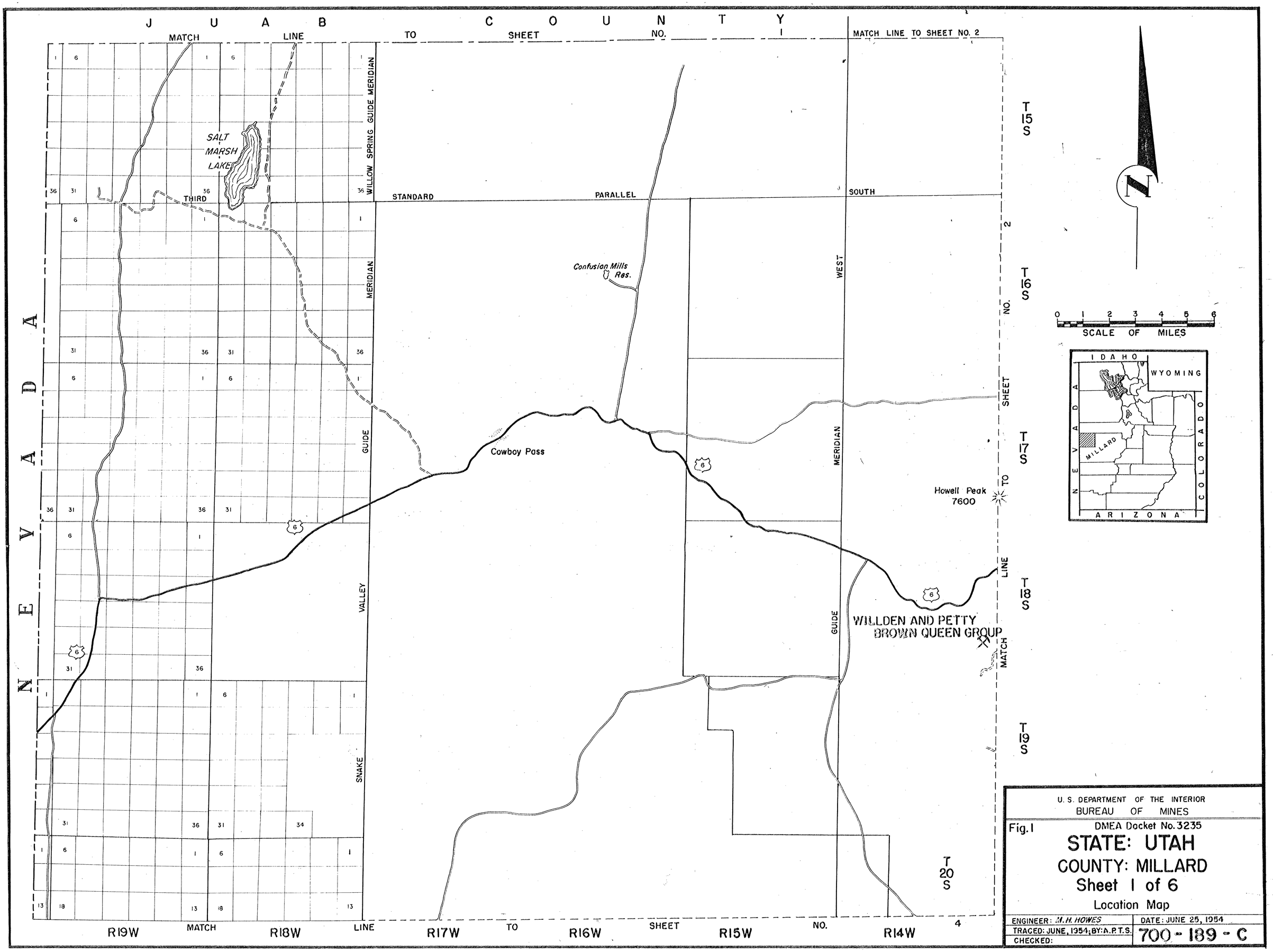
DATA TRACED FROM U.S.G.S. MAP.

U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Fig. 4 DMEA Docket No. 3235
Plan of Underground Workings

WILLDEN AND PETTY
BROWN QUEEN GROUP
MILLARD COUNTY, UTAH

ENGINEER: M. H. HOWES	DATE: JUNE 24, 1954
TRACED: JUNE 54; A. P. T. S.	700 - 188 - F
CHECKED:	



U. S. DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Fig. 1

DMEA Docket No. 3235

STATE: UTAH
COUNTY: MILLARD
Sheet 1 of 6
Location Map

ENGINEER: M.H. HOWES	DATE: JUNE 25, 1954
TRACED: JUNE, 1954; BY: A.P.T.S.	700 - 189 - C
CHECKED:	