MME Form 52
Jan. 1959

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF MINERALS EXPLORATION

FOR GOVERNMENT USE ONLY
Operator
Docket No. OME –
Contract No. 14-23-090 –
Contract Date

LIEN AND SUBORDINATION AGREEMENTS[1]

To the United States of America:

That certain land in the County of Iron, State of Utah,

described as follows:[2] Sixteen unpatented, full-size lode claims covering portions of unsurveyed sections 5,6,7,8, and 17 of T36S, R14W, S.L.B.&M. named: Tip Top, Tip Top Nos. 1 to 5 incl., Lone Hill, Lone Hill Nos. 1&2, Black Top, West Side, Round Hill, Round Hill Nos. 1 to 4 incl.

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Cotter Corporation[3]

hereinafter called the "Operator". In consideration for and as an inducement to the Government executing the Contract, the undersigned:

1. (a) Being the owner of an interest in the land, hereby grants to the Government a lien upon all of his right, title, and interest in the land and upon any production of minerals therefrom to secure the payment to the Government of the royalty on production provided for by the Contract, and agrees if the Operator's interest should be surrendered or terminated at any time prior to the expiration of the rights of the United States under said Contract to pay royalty to the Government according to the terms of said Contract; or

(b) Being the holder of a claim, lien, or encumbrance against the land, hereby subordinates his claim, lien, or encumbrance in or against the land and in any production therefrom to the rights of the Government under the Contract with respect to royalty on production and liens to secure same.[4]

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

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

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3/ Insert name exactly as it appears in the Application MME Form 40.

4/ Subparagraph 1(a) does not apply to the holder of a claim, lien, or encumbrance.

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

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

6. Added provisions _____ (State "None" or "See Annex No.____".)

Dated this_____day of_____, 19____.

x Hebes M. Holt	(Seal)	_____	(Street) (City & State)
x H. Wayne Holt	(Seal)	_____	(Street) (City & State)
x George S. Holt	(Seal)	_____	(Street) (City & State)
Romand L. Hunt	(Seal)	Enterprise, Utah	(Street) (City & State)
Notary Public Commission Expires 8-1-71	(Seal)	_____	(Street) (City & State)
_____	(Seal)	_____	(Street) (City & State)

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

_____
(Corporate Seal)

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x H. Wayne Holt	(Seal)	_____	(Street) (City & State)
x George S. Holt	(Seal)	_____	(Street) (City & State)
Romand L. Hunt	(Seal)	Enterprise, Utah	(Street) (City & State)
Notary Public Commission Expires 8-1-71	(Seal)	_____	(Street) (City & State)
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x H. Wayne Holt	(Seal)	_____	(Street) (City & State)
x George S. Holt	(Seal)	_____	(Street) (City & State)
Romand L. Hunt	(Seal)	Enterprise, Utah	(Street) (City & State)
Notary Public Commission Expires 8-1-71	(Seal)	_____	(Street) (City & State)
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MME Form 9
Rev. Nov. 65

UNITED STATES
DEPARTMENT OF THE INTERIOR
Geological Survey

OFFICIAL DOCKET FILE

Contract No. _____ Docket No. 6760

Application
- [ ] Denied
- [x] Withdrawn

Contract
- [ ] Terminated - Not Certified
- [ ] Terminated - Certified
- [ ] Cancelled
- [ ] Royalty Agreement

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

Folder No. 1:

Left Side

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

Right Side

- [ ] Project Summary (final)
- [ ] Work Completed Analysis (final)
- All other material filed in chronological order including the following reports if checked:
- [ ] Field Team Semiannual Report for Certified Project
- [ ] Final Field Team Report (Tab)
- [ ] Operator's Final Report (Tab)
- [ ] Interim Field Team Reports
- [ ] Operator's monthly reports and all attachments
- [x] On-site Exam. Report (Tab) 12/69 F.O. memo 3/18/70
- [ ] Settlement Sheets
- [ ] Drill Logs

Additional Folders:

Left Side

Folders No. _____: Reports
- [ ] Analysis of Semiannual Inspection Reports
- [ ] Project Summary (Interim) by MME Engineers

Right Side

- [ ] Field Team Semiannual Report for Certified Project
- [ ] Field Team Interim Reports
- [ ] Operator's Monthly Reports with Transmittal, Narrative and Maps

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

Folders No. _____: Settlement Sheets

Folders No. _____: Drill Logs

Folders No. _____: Royalty Material

72195-65

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
FEDERAL CENTER, DENVER, COLORADO 80225
Office of Minerals Exploration
Building 53 Room 203

OFFICIAL COPY
RECEIVED
NOV 18 1968
INTERIOR DOC. ...

November 15, 1968.

Mr. Harold Kirkemo
Office of Minerals Exploration
U. S. Geological Survey
Department of Interior
Washington, D. C. 20242

Dear Kirk:

Herein is enclosed one copy of the Cotter Corporation's application for Office of Minerals Exploration assistance to explore the Metal Enterprise property, Iron County, Utah for silver. I have briefly reviewed the application for completeness. It lacks letters requesting financial support from respective financial institutions from which there are answering letters of denial. Mr. G. R. Jordan, mining engineer, has been informed of this oversight and he indicated that the proper letters would be forthcoming.

An early review of the Cotter Corporation's capitalization and assets should be undertaken to ascertain if it qualifies for Office of Minerals Exploration assistance.

Most sincerely,

J. L. Gualtieri

J. L. Gualtieri
Geologist

MME Form 40
Jan. 65

Budget Bureau No. 42-R1508
Approval expires Dec. 31, 1968

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR FINANCIAL ASSISTANCE IN MINERALS EXPLORATION

Pursuant to Public Law 85–701 (72 Stat. 700; 30 U.S.C. 641)

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

COTTER CORPORATION
POST OFFICE BOX 751
CANON CITY, COLORADO 81212

OME Region III
RECEIVED
NOV 1 - 1968
Denver, Colorado

APPLICANT DO NOT USE THIS BLOCK

DOCKET NUMBER: 6760
DATE RECEIVED: 11/18/68
REGION: III
DIVISION CODE:

BUSINESS ORGANIZATION *(Check one)*

- INDIVIDUAL [ ]
- CORPORATION [X]
- PARTNERSHIP [ ]
- OTHER *(Specify)* [ ]

LIST CORPORATE OFFICERS OR PARTNERS HERE, IF APPLICABLE

NAME	ADDRESS	TITLE
Donald B. Anderson	P. O. Box 1000, Roswell, N.M.	President
Joe W. Lackey	P. O. Box 1000, Roswell, N.M.	Vice President
David P. Marcott	P. O. Box 751, Canon City, Colo.	Executive Vice President
Jesse Link, Jr.	P. O. Box 1000, Roswell, N.M.	Treasurer
S. H. Cavin	P. O. Box 1000, Roswell, N.M.	Secretary

STATE IN WHICH FIRM IS ORGANIZED: New Mexico

MINERAL(S) FOR WHICH YOU WISH TO EXPLORE: Silver

ESTIMATED COST OF PROJECT: $70,180.70

PROPERTY NAME	LOCATION COUNTY	STATE
Metal Enterprise	Iron	Utah

GENERAL INSTRUCTIONS

Before filling out this application, please read the *OME Regulations for Obtaining Federal Assistance in Financing Explorations for Mineral Reserves* (30 CFR Chap. III). To assure prompt action, your application must provide all applicable material and information specified on the back of this application form. Avoid unnecessary correspondence and delays by submitting complete and accurate information. *Please submit two copies of this application and all accompanying papers* except as otherwise noted. Place your name and address on each sheet. Each item of information, maps, and reports required as a part of this application is described on the back of this form. Identify each attached statement by the item number to which it applies. If an item does not apply to your application, show the item number on your statement and after it write "not applicable." Maps or sketches should be used to supplement narrative descriptions of the property location and boundaries in item 2, existing mine workings and geology in item 3, and the proposed exploration work in item 5. When this information is not too complex, all of it may be shown on one map or sketch. All documents and other attachments submitted as a part of this application, except those in item 3(g) which you mark to be returned, become the property of the Government and will not be returned to the applicant. Send true copies, *not originals*, of leases, contracts, and other documents which are an essential part of your business records. *File this application with the Office of Minerals Exploration, Department of the Interior,* ~~Washington, D.C., or with the nearest OME Field Office.~~ Washington, D. C., 20242, or with the nearest OME Field Office.

CERTIFICATION

The undersigned, whether as an individual, corporate officer, partner, or otherwise, both in his own behalf and acting for the applicant, certifies that the information set forth in this form and accompanying papers is correct and complete, to the best of his knowledge and belief, and that he would not ordinarily undertake the proposed exploration under current conditions and circumstances at his sole expense.

October 31, 1968
DATED

David P. Marcott
BY *(Signature)*

Executive Vice President
TITLE

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

INFORMATION REQUIRED WITH THIS APPLICATION

1. Financial Eligibility:

(a) Submit evidence of efforts made within 90 days preceding the filing of this application to obtain credit from your bank of account and at least one other banking institution or other private source of credit. Such evidence shall include true copies of correspondence which show: (1) date of loan request, (2) amount and terms requested, (3) proposed use of loan funds, and (4) the replies from credit sources. If the loan was offered under terms which you consider unreasonable, state why you consider them so.

(b) List names and addresses of affiliated, parent, or controlling companies or organizations and state extent and nature of their interest.

(c) State how you propose to furnish your share of the cost of the exploration work.

2. Applicant's Rights in Land:

(a) State your interest in the land and mineral rights, whether owner, lessee, purchaser under contract, or other. If you are not the owner, submit one true copy of the lease, contract, or other document (with address of owner) under which you control the property. Describe all liens, mortgages, or other encumbrances on the land and state book and page number and official place where recorded.

(b) State the legal description (section, township, and range; metes and bounds; patent number of claims) of the land upon which you wish to explore and all adjacent land which you own or control. Describe any part of the land or workings which should not be subject to Government royalty and liens. If the land consists of unpatented claims, state book and page number for each recorded location notice, including amended locations, and official place where recorded. State all the names by which you know the property.

(c) For all land or mineral rights encumbered or not owned, submit five copies of Lien and Subordination Agreements on MME Form 52. If the agreements cannot be obtained, state reasons and provide copies of letters of refusal.

3. Physical Description:

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

(b) State your interest, if any, in operations described in (a).

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

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

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

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

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

4. Accessibility of Property:

(a) To aid the OME representative who may examine the property, state name and address of person who will meet him; give directions for reaching the property; and describe accessibility of property and of any mine workings.

(b) Name the shipping and supply points and state the distances to the property.

5. Exploration Work:

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

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

(c) If an OME contract is executed, state how soon thereafter work would be started and finished. State your anticipated average daily or monthly rate of progress for each type of work.

6. Experience:

State your operating experience and background to conduct this exploration work and also that of the person who will supervise the work.

7. Estimate of Costs:

Furnish detailed estimates of the necessary costs *for each item of the work proposed in 5(a)* under the headings listed below with a total for each heading and the estimated total cost of the work. Costs for any work to be performed by an independent contractor should be listed separately under category (a) below. Costs for any work that is not to be performed by an independent contractor should be listed under categories (b) through (g).

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

(b) Personal services. The cost of supervision, engineering and geological services, outside consultants, and labor should be itemized by numbers and classes of employees; rates of wages, salaries or fees; and periods of employment. State whether these services are available.

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

(d) Operating equipment. List items of equipment and tools costing $50 or more per unit. Give specifications and indicate how each item is to be acquired—i.e., rented, purchased or provided by the applicant. If rented or purchased, state the estimated rental or purchase price. If furnished by the applicant, state condition and present fair market value.

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

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

(g) Miscellaneous. Describe the type and estimate the cost of repairs and maintenance of the operating equipment listed in 7(d). Do not repeat initial repairs listed in 7(e). Show also the costs of analytical work, accounting, workmen's compensation and employees' liability insurance, payroll taxes, and other required costs that do not fall within the previous categories. [*Note*—The Government will not contribute to costs incurred before the date of the contract, or to costs of or incident to: (1) acquiring, using, or possessing land and any existing improvements, facilities, buildings, installations, and appurtenances, or the depreciation and depletion thereof; (2) general overhead, corporate management, interest and taxes (other than payroll and sales taxes); (3) insurance (other than employees' liability insurance); and (4) damages to persons or property (other than authorized repair to or replacement of equipment or other property used in the work).]

COTTER CORPORATION
DIAL 275-3367
P. O. BOX 751 — 410 MACON AVE.
CANON CITY, COLORADO 81212

October 31, 1968

OME Region III
RECEIVED
NOV 1 - 1968
Denver, Colorado

Mr. J. William Hasler, Field Officer Region III
Office of Minerals Exploration, U.S.G.S.
Denver Federal Center - Building 53 - Rooms 200-201
Denver, Colorado 80225

Dear Mr. Hasler:

I am enclosing two copies of Cotter Corporation's Application for Assistance in exploring a potential silver property in Utah.

I hope that this application is acceptable and all information has been furnished. If changes are necessary, please contact the writer or Mr. Don Atkinson at this address.

Very truly yours,

COTTER CORPORATION

G. Robert Jordan

G. Robert Jordan
Mining Engineer

GRJ:nr

Enclosures - 2

cc: correspondence
numerical file

7272

Cotter Corporation
P.O. Box 751
Canon City, Colorado 81212

1. FINANCIAL ELIGIBILITY

(a) Efforts were made to borrow funds from three banks including our bank of account. The ensuing letters of refusal are attached hereto.

(b) Cotter Corporation is an independent company and is not affiliated with any other company in any manner.

(c) Cotter Corporation's share of the cost of the exploration program will be furnished out of its cash flow from its other activities.

CAPITAL AND SURPLUS $3,500,000

THE FIRST NATIONAL BANK

DOUGLAS W. CALDWELL
SENIOR VICE PRESIDENT

October 1, 1968

Mr. David P. Marcott
Senior Vice President
Cotter Corporation
410 Macon Avenue
Canon City, Colorado

Dear Mr. Marcott:

In reference to the Cotter Corporation's request for a $70,000 loan to be used in connection with out-of-state activities, this is to advise that this bank is not interested in the loan. It has been a long time policy of this bank not to extend credit to firms located in the area of our Correspondent Banks, and located outside of our normal trade territory of Pueblo County.

NG

Very truly yours,

DW Caldwell
Senior Vice President

DWC:rk

FREMONT NATIONAL BANK

CANON CITY, COLORADO 81212

A. J. CRONK
PRESIDENT

October 3, 1968

Mr. David P. Marcott
Executive Vice President
Cotter Corporation
410 Macon Avenue
Canon City, Colorado

Dear Mr. Marcott:

Our Discount committee has discussed your application for a loan of $70,000 to the Cotter Corporation for the purpose of test drilling in the State of Utah.

Our committee has taken the position that the test drilling is highly speculative and for that reason could not be considered a bankable loan.

We wish to thank you most kindly for coming to us.

Sincerely yours,

President

AJC/amj

3

THE FIRST NATIONAL BANK

CANON CITY, COLORADO, 81212

OFFICERS
LESTER R. PAGELS
PRESIDENT

NELSON MOORHEAD
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LESTER R. PAGELS
ROBERT W. REAM
JOHN E. SLOTHOWER
L. C. SLOTHOWER JR.
BYRON E. TOTTEN

3 October 1968

Mr. David P. Marcott
Executive Vice President
Cotter Corporation
410 Macon Avenue
Canon City, Colorado

Dear Mr. Marcott:

We have had an opportunity to discuss your loan application of $70,000.00. At the time you applied for this loan, you indicated the proceeds would be used for test drilling in the State of Utah.

We greatly appreciate the business which Cotter Corporation has done with us for the past several years. At this particular time we are unable to give you a favorable consideration to your request. Our loans are at an all time high and the local demand for credit is also at an all time high. We feel that since your main offices are not located here in Canon City and that since the proceeds on the loan would be used out of the state, we are unable to give approval to your request at this time.

N.G.

Very truly yours,

Lester R. Pagels
President

LRP:cc

Cotter Corporation
P.O. Box 751
Canon City, Colorado 81212

2. APPLICANT'S RIGHTS IN LAND

(a) Interest in land and mineral rights.

Cotter Corporation is the lessee of a group of sixteen unpatented lode claims owned by Heber M. Holt, George S. Holt and H. Wayne Holt, all of Enterprise, Utah. Cotter Corporation is the owner of twenty-five lode claims, known as the Bright Angel claims, adjoining the Holt claims. Cotter Corporation became the lessee of the Holt claims and owner of the Bright Angel claims by way of an assignment from Maurice Castagne, Carl Vanlaningham, Jack Marzo, Jim Kelle and Erik Bruner, who held the original lease on the Holt claims and ownership of the Bright Angel claims. A copy of both the original lease and the subsequent assignment are located in Appendix A of this application.

There are no known liens, mortgages, or other encumbrances on either group of claims.

(b) Legal description

The Metal Enterprise property is situated in an unorganized mining district in Iron County, Utah, and covers portions of unsurveyed sections 5, 6, 7, 8, and 17, T. 36 S., R. 14 W., Salt Lake Base and Meridian. The property consists of forty-one unpatented, standard size (600 feet by 1500 feet) lode claims. Sixteen of the claims are owned by Heber M. Holt and sons, and twenty-five of the claims are owned by Cotter Corporation. A map showing the unsurveyed position of the claims is located in Appendix B of this application.

Cotter Corporation wishes to explore the total property with O.M.E. assistance, thus all of the property would be subject to Government royalty and liens.

Listed below are the names of each claim under the heading of each owner, giving the book and page number where they are recorded at the Iron County Recorder's Office in Parowan, Utah.

List of Claims

Holt Claims

Name	Book No.	Page No.
Tip Top	Q	305
Tip Top No. 1	Q	305
Tip Top No. 2	Q	306

Cotter Corporation
P.O. Box 751
Canon City, Colorado 81212

Holt Claims (con't)

Name	Book No.	Page No.
Tip Top No. 3	Q	306
Tip Top No. 4	Q	307
Tip Top No. 5	Q	307
Lone Hill	Q	308
Lone Hill No. 1	Q	308
Lone Hill No. 2	Q	309
Black Top	128	61
West Side	128	60
Round Hill	128	58
Round Hill No. 1	128	58
Round Hill No. 2	128	59
Round Hill No. 3	128	59
Round Hill No. 4	128	60

Cotter Corporation Claims

Name	Book No.	Page No.
Bright Angel No. 1	128	578
Bright Angel No. 2	128	578
Bright Angel No. 3	128	579
Bright Angel No. 4	128	579
Bright Angel No. 5	128	580
Bright Angel No. 6	128	580
Bright Angel No. 7	128	581
Bright Angel No. 8	128	581
Bright Angel No. 9	128	582
Bright Angel No. 10	128	582
Bright Angel No. 11	128	583
Bright Angel No. 12	128	583
Bright Angel No. 13	128	584
Bright Angel No. 14	128	584
Bright Angel No. 15	128	585
Bright Angel No. 16	128	585
Bright Angel No. 17	128	586
Bright Angel No. 18	128	586
Bright Angel No. 19	128	587
Bright Angel No. 20	128	587
Bright Angel No. 21	128	588
Bright Angel No. 22	128	588
Bright Angel No. 23	128	589
Bright Angel No. 24	128	589
Bright Angel No. 25	128	590

The property has been variously known as; the Blair property, the Holt Silver property, the Tip Top property, R. J. Pinder Silver Prospect, and currently, the Metal Enterprise property.

(c) Land not owned.

Located in Appendix C of this application are five copies of MME Form 52, signed by Heber M. Holt, George S. Holt, and H. Wayne Holt.

3. PHYSICAL DESCRIPTION

(a) Mining or exploration operations.

On the following page is a preliminary geologic map of a portion of the property showing the location of three shafts and several small open cuts across veins. The shafts were sunk by a Mr. Blair between 1890 and 1905. The easternmost shaft shown on the map is reportedly 125 feet deep, with drifts on the 60 and 125 foot levels. The center shaft is only about 50 feet deep and does not appear to have any lateral workings from it. The westernmost shaft is reportedly 200 feet deep, and is probably connected to a caved adit located in Silver Canyon. Also in the map area are numerous small shafts and open cuts which explore portions of almost all of the veins. All workings are presently inaccessible, and it is not known just how much ore was produced from any of them.

At some time later than 1959, a St. George, Utah based exploration firm drilled two, 400 feet deep holes on the property to test, at depth, the easternmost vein shown on the map.

Since these holes were drilled, there has been only a limited amount of annual assessment work done on the property, but nothing that could be called a mining or exploration program.

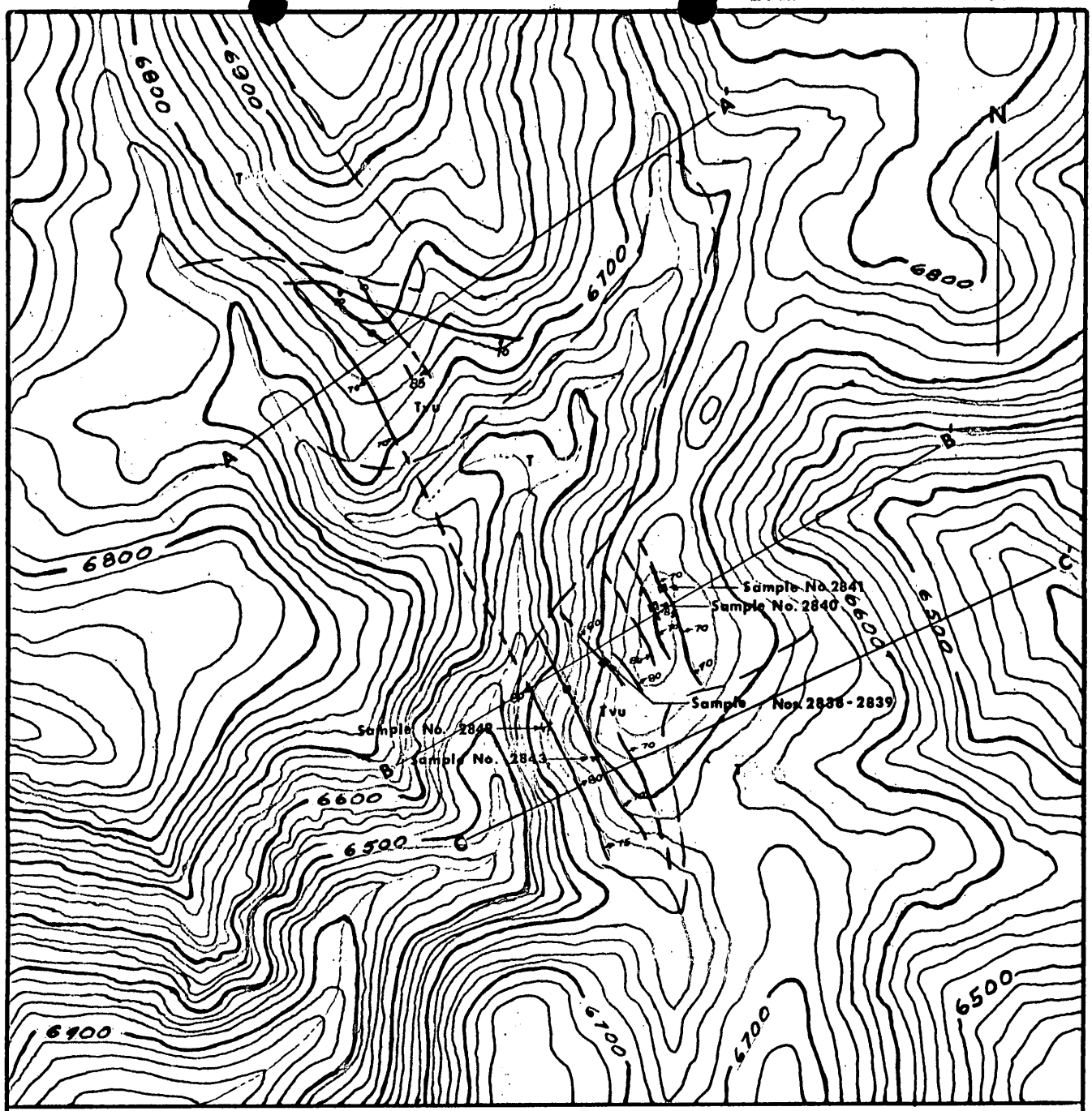
(b) Interest in previously described workings.

Cotter Corporation is not presently interested in any of the existing workings located on the property.

(c) Past and current production.

There is no current production from the property, and there is no way of determining previous production, as no records were kept. Reportedly, the bulk of the ore produced in the period between 1890 and 1905 was sent to the Silver Reef mill at Leeds, Utah, or to Milford, Utah.

FIGURE 2



EXPLANATION

- Tvu — Tertiary Volcanics - Undifferentiated
- T — Talus
- Quartz – Carbonate Vein
- Shaft
- Open Cut

Contours from USGS 7.5 Min. Silver Peak Quadrangle–See Plate1 for location

METAL ENTERPRISE

UTAH SILVER PROPERTY

PRELIMINARY GEOLOGIC MAP

2-15-67 Scale 1" 500' EWB

(d) Ore reserves.

Not enough information is available to establish ore reserves at the property.

(e) Geologic features.

Starting on the following page is a portion of a preliminary geologic report on The Metal Enterprise property which was written at an earlier date by Erik Bruner, a Cotter Corporation geologist. It is meant to cover all items asked for under section (e).

Cotter Corporation
P.O. Box 751
Canon City, Colorado 81212

PRELIMINARY GEOLOGIC REPORT

on the

METAL ENTERPRISE SILVER PROPERTY

IRON COUNTY, UTAH

by

ERIK BRUNER - GEOLOGIST

Cotter Corporation
P.O. Box 751
Canon City, Colorado 81212

INTRODUCTION

This examination was made in order to establish the areal extent and the potential of silver mineralization at the Metal Enterprise property, and also to consider the possibility of replacement-type mineralization at depth.

Three days in December, 1966 were spent mapping in semi-detail that portion of the vein system surrounding the area of previous mining activity. Samples were taken of material from three dumps on the property and of some of the surface vein exposures. Also, part of this time was spent on a visit to the nearby Escalante Mine, and on a trip up Bullion Canyon, northwest of the property, to examine the projection of the mineralized zone at a lower elevation. An additional five days in January, 1967 were spent tracing out the northwest extension of the veins of the Metal Enterprise property, and staking an additional twenty-five claims to cover this area.

LOCATION and OWNERSHIP

The property is located approximately 19 miles due west of Cedar City, Utah, and covers portions of unsurveyed sections 5, 6, 7, 8, and 17, of Township 36 South, Range 14 West, Salt Lake Base and Meridian. The property may be reached by driving west from Cedar City 25.5 miles via State Highway #56, turning right at Joel Spring Canyon Road, and turning left after 1.6 miles, and then following an unimproved bulldozer road for 1.5 miles. The area of the property is within U.S.G.S., Iron Springs, Utah -- 15 minute quadrangle sheet, and Silver Peak, Utah -- 7.5 minute quadrangle sheet.

The property consists of forty-one unpatented lode mining claims, twenty-five of them owned by Cotter Corporation and sixteen of them under lease-option by Cotter Corporation from Mr. Heber M. Holt and sons of Enterprise, Utah. The claims are shown on Plate 2 in the pocket of this report and are named as follows:

METAL ENTERPRISE CLAIMS - BRIGHT ANGEL

#1 through #25.

HOLT CLAIMS - TIP TOP, and TIP TOP #1 through #5; ROUND HILL, and ROUND HILL #1 through #4; LONE HILL, and LONE HILL #1 and #2; BLACK TOP, and WEST SIDE.

Cotter Corporation
P.O. Box 751
Canon City, Colorado 81212

HISTORY

The first mining in the area of the Metal Enterprise property was done in 1890 by a Mr. Blair, who sank three shafts on the property and did some drifting along the veins. Most of the material removed during this period was shipped by wagon to the Silver Reef mill, about 33 miles to the South. Work stopped around 1905, probably due to the length of the haul and the low price of silver, which was about 70¢/oz at the time.

In 1959, Mr. Holt relocated the old property, and has kept up annual assessment work to the present time. Two holes were drilled at the property by a company out of St. George, Utah, but were drilled at too steep an angle to intersect any of the veins.

GEOGRAPHY

The Holt property is situated in the southwest portion of the Antelope Range. Elevations range from 6,000 feet in the valley to 7,400 feet at the extreme northwest end of the property. Topography is moderate to rugged and is likely controlled by faults.

The area is drained by several small, intermittant streams, the two largest being in Silver Canyon and Bullion Canyon. These streams run only in times of heavy rainfall or during spring runoff and could not be utilized for exploration or mining purposes. Also, there are no springs in the immediate area.

There is a rather dense growth of both Juniper and Piñon covering most of the property which would be of limited use as mine timber. The climate is generally arid, probably averaging ten to fifteen inches of precipitation per year. There is about one to two feet of snow which remains on the higher and shaded slopes of the property throughout the winter season. This would be of little hinderance to a full-time operation. Temperatures in the area generally vary from a minimum of 0°F. in winter to a maximum of 95°F. in summer.

Rock exposures in the area are limited to the very tops of hills and ridges. The sides of the hills and the canyons are covered with a thick layer of talus. Tracing out veins, faults, and contacts is also made difficult by the dense growth of Piñon and Juniper.

Cotter Corporation
P.O. Box 751
Canon City, Colorado 81212

GEOLOGY

Previous Work

The bulk of geologic work in this area is concerned with the iron ore occurrences to the east and southeast of the property (Black and Mackin, 1967; Butler, 1920; Cook, 1950; Leith and Harder, 1908; Mackin, 1954; Ratté, 1963; and Young, 1947). Butler (1920) described similar occurrences to the mineralization at the Metal Enterprise property in the State Line and Gold Springs districts and the Escalante district. Also, there are several unpublished reports dealing with the Escalante mine and one published paper by Hewlett and Faick (1961). To date, no geologic reports specifically dealing with the area of the Metal Enterprise property have been published.

LITHOLOGY

Sedimentary Rocks

There are no sedimentary rocks exposed on the Metal Enterprise property; however, they are exposed in Bullion Canyon, northwest of the property, and at Iron Mountain, southeast of the property, as well as many other places in the district. Since these sedimentary rocks have a very good potential for replacement type mineralization, especially the Homestake limestone, and do underlie the Metal Enterprise property at not too great a depth, they will be described here in some detail. Information was gathered mainly from Mackin (1954) and various other sources.

Carmel Formation (Upper Jurassic)

Homestake Limestone - The Homestake limestone is the oldest rock exposed in the district and forms the innermost belt of sediments dipping outward from the Three Peaks - Granite Mountain - Iron Mountain intrusives. It is 220 to 250 feet thick in the Granite Mountain area and is comprised of a basal siltstone layer, 20 to 30 feet thick, that is highly resistant to metallization; gray, "blue", and black limestone, which is massive to thick bedded; and an upper silty limestone, which is around 20 feet thick. In general, only the lowermost 100 to 120 feet of the Homestake is replaced, but in areas of intense mineralization the full thickness of the limestone may be replaced.

LITHOLOGY (con't)

Entrada Sandstone - The Homestake limestone grades upward into a gray and maroon shale which is the basal, 40 feet thick unit of the Entrada sandstone. The remainder of the Entrada is shale, siltstone, and interbedded coarse sandstone. The Entrada is distinctively maroon in color and ranges from 0 to 220 feet thick in the area.

Iron Springs Formation (Upper Cretaceous)

The Iron Springs formation rests unconformably on the Entrada sandstone and is composed of lenticular beds of sandstone, shale, conglomerate, and fresh water limestone. The lower 400 feet of the formation has been subdivided into three units, A, B, and C, by Mackin (1954) on the basis of their conglomerate content. The remainder of the formation consists of gray, brown, and red sandstone, siltstone, and shale with minor lenses of fresh water limestone and conglomerate. Total formational thickness varys from 0 to 3,000 feet.

Likely, the sediments exposed in the vicinity of the two shafts southwest of Bullion Canyon (pl. 1) are within the lower 400 feet of the Iron Springs formation, since there is a considerable thickness of alternating sandstone and conglomerate lenses there. More study must be devoted to this area since it has an important bearing on the depth of the underlying Homestake formation.

Claron Formation (Eocene)

The Claron formation unconformably overlies the Iron Springs formation and is composed of conglomerate, red and gray sandstone and siltstone, and pink and white limestone. Total thickness in the Granite Mountain area is around 1,400 feet.

IGNEOUS ROCKS

Volcanics

Volcanic rocks, consisting mostly of a series of Tertiary ignimbrites, make up the main mass of the Antelope Range and are the only rocks exposed on the Metal Enterprise property. Rocks of this general type cover most of the mountain ranges of southwestern Utah and are considered by Mackin (1960) to be of great areal extent and to be quite useful in working out problems of regional structure. The following descriptions were taken mainly from Mackin's (1960) work.

IGNEOUS ROCKS (con't)

Needles Range Formation (Early or Middle Oligocene)

The Needles Range formation is the oldest portion of the ignimbrite series exposed in the Iron Springs district. It is around 50 feet thick in this area and thickens to the north. In the vicinity of its type section, on the east side of the Needles Range (northwest of the Antelope Range,) it is described as rhyolitic, victric - lithic ignimbrite, pink to dark red-brown in color.

Isom Formation (Upper Oligocene)

The Isom formation consists of a sequence of ignimbrites and lava flows with intercalated sedimentary rocks. The type locality is near Isom Creek in the northwest portion of the Iron Springs district. It is divided into two members, the principal one being the Bald Hills member, which is a sheet of porphyry of latitic composition, glassy to lithoidal in texture, and black to dark red-brown in color, with strong platy parting. The uppermost member of the Isom formation is a sheet of latite porphyry rarely more than 40 feet thick, lithoidal in texture, and purplish gray in color, with light gray lenticules. This unit is designated the Hole-in-the-Wall member.

Quichapa Formation (Upper Oligocene)

The Quichapa formation rests conformably on the underlying Isom formation, and is the principal ignimbrite series in the Iron Springs area. It is comprised of four distinct members, each with a characteristic lithology.

Leach Canyon Tuff - The basal member is designated the Leach Canyon Tuff and is 450 to 500 feet thick, gray to flesh in color, and has a matrix the texture of unglazed porcelain, which encloses fragments of dark red felsite, light gray pumice and other rocks, along with crystals of quartz, feldspar, biotite, and other pyrogenic minerals. The Lithic fragments constitute 10% of the rock and the pyrogenic minerals 15-25%.

Swett Tuff - The Swett Tuff is only 30 to 35 feet in thickness and is characterized by a low content of mineral grains, a rarity of foreign rock fragments, and a high degree of induration. In many respects it resembles the overlying Bauers Tuff, except that it does not contain sanadine and has a high plagioclase content.

IGNEOUS ROCKS (con't)

Bauers Tuff - The Bauers Tuff is around 200 to 250 feet thick and is composed of a basal vitrophyre; a middle lithoidal phase, characterized by a conspicuous compaction foliation; and an upper non-foliated lithoidal phase. Generally the rock is strongly indurated and red to deep red-brown in color. Foreign rock fragments are rare and pyrogenic minerals constitute 10 to 15% of the rock. Foliation is made apparent by parallellism of light gray lenticules, 0 to 5 inches thick, and up to many feet in length.

Harmony Hills Tuff - The Harmony Hills Tuff is the uppermost member of the Quichapa formation and is 300 to 350 feet thick. It is tan to light red-brown in color, with grains of biotite, plagioclase and other pyrogenic minerals making up 30 to 45% of the rock. The biotite grains are cleavage flakes which are oriented subparallel to the base of the rock. It is only moderately indurated and in general shows no signs of welding.

Andesite (?) Porphyry and Volcanic Breccia

While not enough time was spent at the Metal Enterprise property to exactly determine the volcanic sequence, it is very likely that the rocks present in the area are within the Quichapa formation. This is based on the similarity of the rocks noted on the property to the description of the Quichapa as given by Mackin. Two rock units, however, do not fit into the described sequence. One, located mainly in the area of Figure 2, is an andesite (?) porphyry, and the other is a volcanic breccia, located near the central portion of the property. The andesite (?) porphyry shows characteristics of being a flow, such as vesicular structure, rather than being an ignimbrite. Much more field work is necessary in order to exactly determine and describe the relationship between all the volcanics present on the Metal Enterprise property.

INTRUSIVES

No intrusive rocks were noted at the Metal Enterprise property, but since they are located to the east and southeast of the property and have an important bearing of mineralization in the district they will be described here.

INTRUSIVES (con't)

Situated within 15 miles of the Metal Enterprise property are three intrusives, three to five miles in diameter, aligned along an approximately N.50°E. line. Iron Mountain is southwesternmost and Three Peaks northeasternmost, with Granite Mountain being in between. All of the intrusives are of the same quartz monzonite composition and are of the same age, which is given by Armstrong (1963, p. 79) as 24 m.y. for the Three Peaks intrusive. This would put the age of the intrusives as near the beginning of the Miocene, and later than the age of the Quichapa volcanics.

Most of the earlier reports concerning the Iron Springs area describe these intrusives as being laccoliths; however, later work by Ratte (1963), based on the results of deep drilling and the presence of discordant contacts with the intruded sedimentary rocks, shows them to be stocks or at least stocklike, with a combination of both concordant and discordant features.

In general, the three aligned intrusives were all emplaced along a Laramide structure defined by Mackin (1960, p. 100) as the Iron Springs Gap structure; a foreland de collement thrust which brought the Jurassic Carmel formation over the Cretaceous Iron Springs formation, the plane of gliding being a gypsiferous horizon in the lower part of the Carmel. Both Mackin (1954) and Ratté (1963, p. 111) give extended accounts of the mode of emplacement of the intrusives. This consisted of a combination of magmatic stoping through the massive Navajo Sandstone, which underlies the Carmel formation, and spreading out along the aforementioned gypsiferous bed at the base of the Carmel. This caused bulging of the overlying sediments and resulted in many of the laccolithic features noted by the first geologists to describe the area. There is much evidence of other intrusives which have been emplaced along the Iron Springs Gap structure (Mackin, 1954; Granger, 1963, p. 149; Threet, 1963, p. 143) but which have not yet been uncovered by erosion.

Mackin (1954) and Ratté (1963) describe three separate zones within the quartz monzonite porphyry intrusives, each representing a different phase of crystallization of the bodies. The first of these, described as the peripheral shell, represents the chilled border zone of the intrusive and is finer grained than the rest of the body. The minerals within this zone are fresh, and show little sign of alteration. This zone ranges in thickness from 100 to 200 feet. The second zone, which forms the interior of the intrusive masses, is much coarser grained than the peripheral shell, and the minerals within it show the effect of deuteric alteration. The third zone is called the zone of selvage joints, and is located between the inner zone and the peripheral shell. It is characterized by a number of tensional joints, being of the radical, concentric, and oblique type, which have undergone bleaching along their margins.

INTRUSIVES (con't)

This bleaching zone extends from less than an inch to more than six inches away from the joints. The bleaching is due to a loss of iron from this zone, which was deposited as magnetite and/or hematite within the joints themselves and as replacement deposits in the Homestake limestone. Mackin (1954) considers the iron derived from these selvage joint zones to be the direct source of the mineralizing emanations for the district. More will be said about the nature of the alteration and mineralization of the intruded wall rocks in a later section of this report.

STRUCTURAL HISTORY

The Iron Springs - Antelope Range area is located within the Great Basin geologic province, about 20 miles west of the Hurricane fault, which is generally regarded as the western margin of the Colorado Plateau. It is an area of two recognized periods of pre-intrusive structural deformation, domal uplift caused by intrusive activity, and concurrent and later subsidence of the surrounding area.

The first period of recognized structural deformation likely occurred within the early part of the Cretaceous period and is described by Mackin (1954) as the Post-Entrada-Pre-Iron Springs deformation. This took place after deposition of the Entrada, but before the underlying Homestake was completely lithified, and resulted in the uplift of a horst-like block in the vicinity of the Three Peaks - Granite Mountain - Desert Mound area. Most of the Entrada and part of the Homestake were then eroded from this area before the Iron Springs formation was deposited.

The second period of structural deformation occurred in the Cretaceous - Tertiary or Laramide interval and resulted in the previously mentioned Iron Springs Gap structure. This approximately N.50°E. trending decollement thrust and anticlinal fold structure formed an important locus for later Miocene intrusive activity.

The Claron formation was then deposited on an erosion surface which had cut down the Laramide folds to a level plane. Spreading of the Needles Range ignimbrites over the Claron began in Oligocene Time, possibly while the Claron was still being deposited.

Emplacement of the quartz monzonite porphyry intrusives began in Miocene Time, after the deposition of the Quichapa ignimbrites. This resulted in domal uplifts and related faulting along the zone of the Iron Springs Gap structure. Thickness of the cover over these intrusives at the time of doming is estimated by Mackin (1954) to have been 3,000 to 6,000 feet.

STRUCTURAL HISTORY (con't)

Subsidence in the Basin and Range province began in Oligocene Time and intensified through the Miocene and later Tertiary. It was also in the Miocene that the Hurricane fault began to form.

Thus, in the Iron Springs - Antelope Range area, there was a combination of domal uplift caused by intrusive activity and Basin and Range-type subsidence going on at the same time. It is likely that most of the faults and deformation in the Antelope Range formed at this time and also the broad tensional zone of weakness which was later mineralized at the Metal Enterprise property.

ECONOMIC GEOLOGY

Iron Deposits

The most significant economic features of the Iron Springs area are the deposits of iron ore associated with the previously described quartz monzonite porphyry intrusives. Most of the early workers, when describing these deposits, tended to make the formation of vein deposits of magnetite within the intrusives, and the replacement deposits of hematite and magnetite in the Homestake limestone surrounding them, special cases of ore deposition. Mackin (1954) proposed a theory of "deuteric release" of residual iron-rich fluid from the zone of selvage joints in the intrusive to account for the iron ore deposits. Also, little study was given to pre-ore alteration of the Homestake limestone. It was generally considered that the iron bearing fluids directly replaced the limestone without the previous formation of skarn (Park and McDiarmid; 1964, page 265). Ratté (1963, p. 95), however, has shown that the development of skarn was an important event preceding ore deposition. He also shows that rather than the ore deposition being a special case of "deuteric release", it more closely follows along the lines of conventional hydrothermal deposition.

Formation of skarn was largely restricted to the basal siltstone of the Homestake. The introduction of large amounts of Si, Al, Fe, Mg, Na, P and to some extent F, caused such minerals as diopside, tremolite-actinolite, phlogopite, wollastonite, vesuvianite, hedenbergite, scapolite and quartz to be formed in place in the siltstone, and fine grained andradite in the limestone. Solutions high in iron later moved through the rock that was formerly siltstone and replaced the former limestone. Ratté (1963, p. 54) gives an extensive list of gangue minerals occuring with the iron ore which include chalcopyrite, bornite, and galena. There is some evidence of zoning, as the bulk of the sulfides were deposited farthest away from the intrusive. Generally, however, the gangue minerals are in such minor amounts that they seldom present any problem in beneficiating the iron ore.

ECONOMIC GEOLOGY (con't)

Magnetite, apatite, phlogopite and diopside formed early in the paragenetic dequence, while copper and iron sulfides, carbonate and quartz were later, and commonly occur in vugs. Ratté (1963, p. 59) describes an epithermal siliceous vein containing Hg, Te, As and Sb, cutting the main ore body at Desert Mound (northeast of Iron Mountain), which he feels represents the latest stage of mineralization in the district.

Base and Precious Metal Deposits

Very little has been written covering non ferrous mineral deposits in this part of the state. Butler (1920) described the epithermal gold-silver deposits of the Gold Springs and State Line districts, 30 miles northwest of the Metal Enterprise property, and the Escalante silver-lead-copper deposit in the Escalante district, 16 miles west of the Metal Enterprise property.

Gold Springs and State Line Districts

In the Gold Springs and State Line districts, gold-silver mineralization is within well defined quartz-carbonate veins. Wall rock is generally Early Tertiary andesite-trachyte-latite ignimbrites. The veins are typically epithermal and are banded and crustified. Quartz as chalcedony and small crystals is the most abundant gangue mineral, followed by calcite, adularia and flourite. The veins are not uniformly metalliferous and gold-silver mineralization is confined to distinct shoots. Gold and silver values range from the two being nearly equal in parts of the district to other parts where the silver greatly predominates.

Escalante District

In the Escalante district the veins strike north to northeast and are within the same type of volcanics as those in the State Line and Gold Springs districts to the northwest. At the Escalante mine, there is only one vein which has been extensively prospected. It strikes N. 25 E. and dips 70-80 degrees N. W. and has been traced on the surface for more than 3,000 feet. It is more a silicified zone than a true quartz vein, but portions of it show typical epithermal banding and crustified structure. There is very little evidence of mineralization on the surface and only an occasional chrysocolla stain was noted.

ECONOMIC GEOLOGY (con't)

However, material on the stockpile from the underground development shows abundent coatings and stains of chrysocolla and descloizite (lead-zinc vanadate) in a gangue of chalcedonic quartz, calcite, fluorite, adularia and barite. It is reported that values begin to increase only at depths greater than 100 feet below the surface.

The most striking feature of the Escalante deposit is the uniformity of values in the portion of the vein so far drilled. S.S. Arentz (1962), in an unpublished report on the Escalante mine, states that one churn drill hole and ten diamond drill holes were drilled to depths ranging from 150 feet to 700 feet and were equally spaced along 2,200 feet of fissure. This drilling disclosed an ore body containing an estimated 300,000 tons averaging from 28 to 30 ounces of silver per ton and also containing an estimated average of .01 ounce per ton Au, 0.50% Cu, 1.50% Pb and 1% zn. Mining the Escalante deposit would doubtless be a very profitable venture if the water problem were not so great.

Metal Enterprise Property

At the Metal Enterprise property, a number of quartz-carbonate veins, striking around N.40°W. with steep dips to the northeast and southwest, are located within a well defined silicified zone more than 500 feet wide and over two miles long. Rocks within this zone vary, but are probably all within the Quichapa formation of Upper Oligocene ignimbrites. There are anywhere from three to eight and possibly more veins across this silicified zone. The veins are probably continuous along the full length of the zone but were only mapped along the tops of ridges and hills where talus cover was not great (pl. 1). Not enough detail mapping was done to show any overall pattern to the vein system. Locally, deflections and intersections have a bearing on vein width, but generally they range from 2 to 15 feet wide, the average being 5 to 6 feet.

In the vicinity of Figure 2, the veins strike N.27°W. and dip steeply to the northeast and southwest. Three of the most prominent veins have had limited development work and some production, but there is no record of either grade or tonnage.

Individually, the veins show banding, crustification and are fairly vuggy - all evidence of open space filling under epithermal conditions. Gangue minerals are mainly chalcedonic and crystalline quartz with varying amounts of calcite and barite. Adularia and fluorite, if present at all, are in minor quantity. On the surface, the veins show little evidence of metallic mineralization, but zones of boxwork and limonite gossan were noted. All samples taken of vein material on the

ECONOMIC GEOLOGY (con't)

surface did contain more than one ounce of silver per ton. Samples taken from the dumps of the three shafts show abundant chrysocolla staining and also contain malachite, azurite, descloizite, wad, limonite and possibly cuprite. One 2mm thick stringer of chalcocite was noted near the footwall of one of the veins, but that was the only sulfide seen. No silver mineral as such was noted, however, it would probably be the chloride, cerargyrite, in combination with the other minerals present.

Samples taken from the dumps of the three shafts indicate that silver values will increase below the leached, near surface, zone of the veins. A sample taken from the dump of the center 50 feet deep shaft carried 2.0 ounces per ton in silver, while a sample from the dump of the 125 foot dump east shaft ran 9.6 ounces per ton in silver. Samples of dump material are not really indicative of the value of mineralization at depth, however, since most of the best material was hauled to the mill in the course of mining.

Source of the mineralizing fluids at the Metal Enterprise property is a matter for open debate. No doubt they are the result of Miocene intrusive activity in this area, but there is no direct evidence to link them with the three or possibly more intrusives that formed the iron ore deposits in the district.

If the strike of the silicified zone on the Metal Enterprise property is extended to the southeast, it will intersect the western side of Iron Mountain in the Milner Hill area. It is possible to say that the mineralizing fluids traveled out laterally from this intrusive and formed the quartz-carbonate veins. However, the deposits associated directly with these intrusives contain little values other than iron. Veins in the Metal Enterprise silicified zone show no decrease in width or intensity at the northwestern limit of the property, which is over six miles from Iron Mountain. Sediments in the Bullion Canyon area, in the vicinity of the two shafts (pl. 1), show the effects of intense silicification, and a vein that one of the shafts is in contains values of gold, silver, copper, and lead (Au, .01 ounces per ton, Ag, .50 ounces per ton, Cu, .60%, Pb .20%), and this is over seven miles from Iron Mountain. Also the existance of an epithermal vein at Desert Mound, in one of the iron orbodies, which contains Hg, Te, As, and Sb should theoretically be even farther away from this location than the Metal Enterprise veins which contain Ag, Cu, Pb, and Zn, in order to fit Emmon's system of mineral zoning, that is, if these intrusives are the source of epithermal mineralization in this area.

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ECONOMIC GEOLOGY (con't)

I suggest that the source of the mineralizing fluids, which formed the veins at the Metal Enterprise property, rose vertically along a weak, tensional zone from a magma source at depth, possibly also the source of the intrusives with which the iron deposits are associated. This would make the Homestake limestone, or indeed any other reactive rock directly below the Metal Enterprise property, a good target for deep exploration in hopes of finding base metal replacement-type deposits. Of course, much more field work and exploration will have to be done in this area to give substance to any theory of ore deposition at the Metal Enterprise property. ?

/s/ Erik Bruner
Geologist

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3. PHYSICAL DESCRIPTION (con't)

(f) Reasons for expecting to find ore.

Based on Cotter Corporation samples and the sampling of others, there is a silver mineralization of varying grade all along the quartz-carbonate vein set where it is exposed on ridge shown on the map marked Figure 2. Since this is the most accessible part of the property at present, we propose to do our preliminary work here. Possibly, sampling of the vein set, where exposed, for the entire length of the Metal Enterprise property would show similar surface values, as shown by sample No. 2854 (pl. 1) which assayed 1.40 ounces per ton in silver.

As noted in the various geological reports accompanying this application, there is a close similarity in mineralization between the Metal Enterprise property and the State Line, Gold Springs, and Escalante districts, all located in this same general area of Utah. Other quartz-carbonate vein deposits in volcanics which have had moderate to substantial production are too numerous to mention.

Also, another possibility for ore mineralization is in the underlying reactive rocks below the Metal Enterprise property. The most intriguing of these is the Homestake Limestone which is extensively replaced by iron minerals at all the nearby iron mines. That mineralization does extend down into the sediments is shown in Bullion Canyon, northwest of the Metal Enterprise property. There, the same wide silicified zone, noted in volcanics at the Metal Enterprise property, is exposed in quartzite and conglomerate of what is very likely the Iron Springs formation. Within this silicified zone are numerous veins showing copper carbonate stains and varying amounts of limonite gossan. Two samples taken of vein material in this area (No. 2844 and 2403) show a slight increase in lead and copper values over those samples taken from veins in the volcanics. There is no reason to assume that a silicified zone 300 to 500 feet wide, traceable for over a length of over two miles, and exposed for a vertical distance of over 1400 feet should not extend to some depth in the sediments below the Metal Enterprise property.

For the above reasons, we feel than an exploration program at the Metal Enterprise property should be twofold in nature. First, the vein set should be explored throughout its vertical extent at one location. This will establish the zone of near surface leaching, the depth of oxidation, the depth to the water table, the possibility of a supergene sulfide zone, and the nature of the unoxidized or primary mineralization. Also to be tested is the nature of the mineralization in the underlying sediments, hopefully in the Homestake Limestone, if it is possible to do so from this first location. Naturally, the tenor of the mineralization in each zone will be a critical factor in deciding the nature of future drilling.

If the first part of an exploration program reveals ore, then future work will be concentrated on determining the lateral extent of mineralization. That is, if mineralization persists uniformly over a considerable lateral extent, as it does at the Escalante Mine, or if it is confined to distinct oreshoots, and in either case what possible tonnage and grade could be developed on the property.

Sampling:

Sample locations are shown on plate 1 in the pocket of this application. Descriptions and values of samples are as follows:

Samples 1 - 7:

These samples were taken by Maurice Castagne, mine manager for Cotter Corporation, on his first examination of the property.

#1 - Grab of dark colored vein material on dump east of shaft:
Au = Trace, Ag = 2.0 oz./ton, Cu = Nil, Ni = Nil.

#2 - Same location, grab of light colored vein materials:
Au = 16.0 oz./ton, Cu = Nil, Co = Nil, Ni = Nil.

#3 - Grab of dump material from center shaft:
Au = Trace, Ag = .6 oz./ ton, Cu = Nil, Co = Nil, Ni = Nil.

#4 - Grab of dump material from west shaft dump:
Au = Trace, Ag = 4 oz./ton, Cu = Nil, Co = Nil, Ni = Nil, Wo = .12%.

#5 - Chip sample of outcrop 150 feet southeast of center shaft:
Au = Trace, Ag = 4 oz./ton.

#6 - Chip sample of #2 vein outcrop:
Au = Nil, Ag = 2.0 oz./ton.

#7 - Chip sample of #2 vein outcrop:
Au = Trace, Ag = 6.0 oz./ton.

Composite 1 through 7 - Spectographic analysis - see copies of assay certificates.

The following samples were taken by Erik Bruner during various trips to the property.

Sample No. 2838 - Grab of chrysocolla stained vein material from the dump of the 150 foot west shaft:
Au = .03 oz./ton, Ag = 3.7 oz./ ton, Cu = .15%.

Sample No. 2839 - Grab of "barren" looking vein material same location as 2838:
Au = .01 oz./ton, Ag = 1.4 oz./ton.

Sample No. 2840 - Grab of chrysocolla and manganese bearing vein material from dump center, 50 foot deep shaft:
Au = .02 oz./ton, Ag = 2.1 oz./ton.

Sample No. 2841 - Grab of chrysocolla bearing vein material from dump of 125 foot deep, east shaft:
Au = Trace, Ag = 9.6 oz./ton.

Sample No. 2841 - Grab of vein material on dump from small open cut on the westernmost vein:
Au = .03 oz./ton, Ag = 2.8 oz./ton.

Sample No. 2843 - Grab of "barren" looking vein material blasted from the outcrop of second westernmost vein:
Au = .03 oz./ton, Ag = 1.3 oz./ton.

Sample No. 2844 - Grab of vein material on dump of shaft southwest of Bullion Canyon (pl. 1):
Au = .01 oz./ton, Ag = 0.5 oz./ton, Cu = .60%, Pb = .20%.

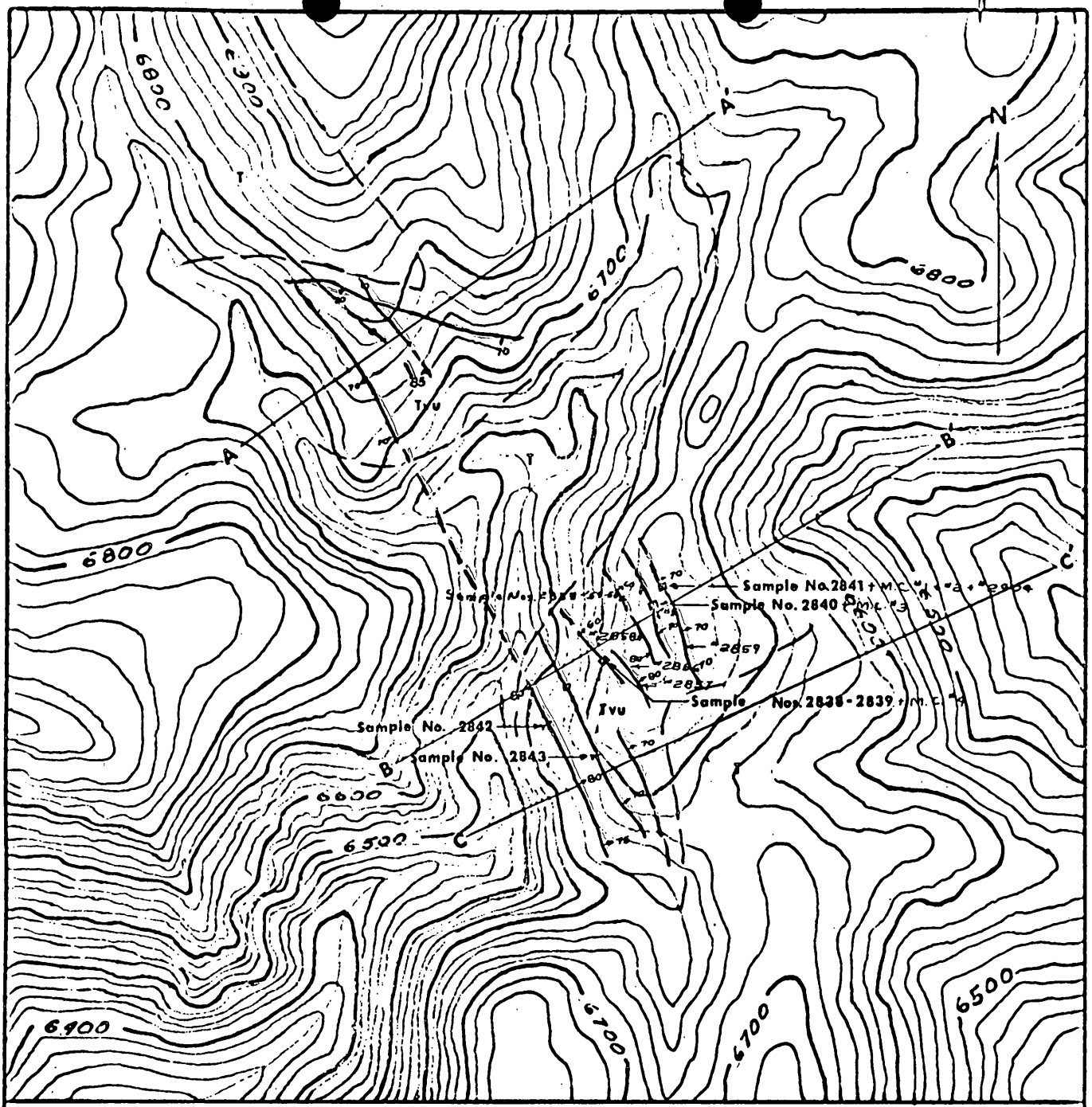
Sample No. 2845 - Grab of "barren" looking vein material from outcrop of vein near center of Metal Enterprise property (pl. 1)
Au = .01 oz./ton, Ag = 1.4 oz./ton.

These samples were taken by Carl Vanlaningham and Erik Bruner during the latter part of June, 1967 while doing annual assessment on the Holt claims.

Sample No. 2853 - Channel-chip, 1.2 feet wide, of the chrysocolla and descloizite footwall portion of a 5.2 feet wide, N.60°W. trending, 60°NE. dipping quartz-carbonate vein:
Au = Trace, Ag = 2.20 oz./ton.

Sample No. 2854 - Channel-chip, 2 feet wide, of center portion of vein described under sample No. 2853:
Au = Trace, Ag = .20 oz./ton.

FIGURE 2



EXPLANATION

- Tvu — Tertiary Volcanics - Undifferentiated
- T — Talus
- Quartz - Carbonate Vein
- Shaft
- Open Cut

Contours from USGS 7.5 Min. Silver Peak Quadrangle-See Plate1 for location

METAL ENTERPRISE

UTAH SILVER PROPERTY

PRELIMINARY GEOLOGIC MAP

2-15-67 Scale 1" 500' EWB

P. O. BOX 1888
165 SOUTH WEST TEMPLE ST.

CERTIFICATE OF ASSAY

TELEPHONE EM 3-2563

BLACK & DEASON

ASSAYERS AND CHEMISTS

Westec Corporation

SALT LAKE CITY, UTAH 84110 October 27, 1966

ASSAY PER TON OF 2000 POUNDS

NAME	NO.	GOLD OUNCES	VALUE GOLD PER TON	SILVER OUNCES	WET LEAD %	COPPER %	~~INSOLUBLE~~ Cobalt ~~XXXXX~~	ZINC %	~~XXX~~ Nickel ~~XXX~~	~~XXX~~ Tungsten ~~XXX~~ %	%
#1 BLAIR DUMP DARK		Trace		2.0		None	None		None		
2 " " LIGHT		Trace		16.0		None	None		None		
3 NO 2 SHAFT DUMP		Trace		0.6		None	None		None		
4 WEST SHAFT DUMP		Trace		4.0		None	None		None	0.12	
5 OUTCROP 150' S.E. OF NO 2		Trace		4.0							
6 OUTCROP WEST RIDGE		Trace		2.0							
7 OUTCROP WEST RIDGE		Trace		6.0							

CHARGE $ 78.00

V E Warsley

METALLURGICAL LABORATORIES, INC. CHEMISTS • ASSAYERS • SPECTROGRAPHERS

1142 HOWARD STREET • SAN FRANCISCO, CALIFORNIA 94103 • AREA CODE 415 863-8575

Submitted by Black & Deason
P. O. Box 1888
Salt Lake City, Utah

Date December 7, 1966

Sample of Mineral

Qualitative Spectrographic Analysis

METALS FOUND AND PERCENTAGE RANGE

P. O. No.

Lab. No. 7174

SAMPLE MARK	LESS THAN 0.01%	.01 TO .10%	.10 TO 1.0%	1.0 TO 10.0%	MAJOR
Comp. 1-7	Vanadium	Lead	Aluminum	Barium	Silicon
	Beryllium	Sodium	Strontium	Iron	
	Boron	Potassium	Magnesium	Calcium	
	Zirconium	Titanium	Manganese		
	Nickel	Silver	Copper		
	Cobalt		Zinc		

REMARKS:

METALLURGICAL LABORATORIES, INC.

By [signature]
SPECTROCHEMIST

MET LAB FORM 14

Shop No. 2246
File No. 568 V 0

Date 10 Dec 1966

VALUES
Latest Quotation

1 oz. Gold.....
1 oz. Silver.....
1 lb. Copper.....
1 lb. Lead.....
1 lb. Zinc.....

THIS CERTIFIES
Samples submitted for assay contain as follows:

Arizona Assay Office

815 NORTH FIRST STREET
Phone: 253-4001

MR.CARL VON LANINGHAM
Box 331
Cave Creek Arizona

Phoenix, Arizona 85001
P. O. BOX 1148

Short Ton ..... 2000 Lbs.
Short Ton Unit ..... 20 Lbs.
Long Ton ..... 2240 Lbs.
Long Ton Unit ..... 22.4 Lbs.

MARKS	SILVER PER TON Ozs.	SILVER PER TON Tenths	VALUE PER TON	GOLD PER TON Ozs.	GOLD PER TON 100ths	VALUE PER TON	TOTAL VALUE PER TON of Gold & Silver	PERCENTAGE COPPER	PERCENTAGE LEAD	REMARKS
2838	3	7	$4.62		.03	$1.05		0.15		
2839	1	4	$1.75		.01	$.35				
2840	2	1	$2.62		.02	$.70				
2841	9	6	$12.00	TRACE						
2842	2	8	$ 3.50		.03	$1.05				
2843	1	3	$ 1.62		.03	$1.05				
2844		5	$.62		.01	$.35		0.60	0.20	

Charges $ 30.00 PAID

Assayer

JACK STONE

REGISTERED ASSAYER
CERTIFICATE EXPIRES
E. A.
DEC. 31, 19
ARIZONA, U.S.A.

ANDY CHUKA, PRINT

P. M. CRISMON, Pres.

CRISMON & NICHOLS

ASSAYERS AND CHEMISTS

229-231 SOUTH WEST TEMPLE STREET

Phone 363-7417 | P. O. Box 1708

REPORT OF ASSAY

SALT LAKE CITY, UTAH 84110 July 11, 1967

Metal Enterprise

WE HAVE ASSAYED YOUR seven SAMPLES AND FIND them TO CONTAIN AS FOLLOWS:

DESCRIPTION	NO.	OZS. GOLD PER TON	OZS. SILVER PER TON	PER CENT LEAD	PER CENT COPPER	PER CENT ZINC	PER CENT INSOL.	PER CENT IRON	PER CENT	VALUE OF GOLD PER TON
	2853C	Trace	2.20							
	2854B	Trace	0.20							
	2855D	Trace	0.20							
	2856A	Trace	3.40							
	2857B	Trace	1.20							
	2858C	Trace	0.60							
	2859D	Trace	1.00							

REMARKS: Canvas sack being mailed under separate cover.

CHARGES $ 21.00 Paid

CRISMON & NICHOLS

By P. M. Crismon

P. M. CRISMON, Pres.

CRISMON & NICHOLS

ASSAYERS AND CHEMISTS

229-231 SOUTH WEST TEMPLE STREET

Phone 363-7417 | P. O. Box 1708

REPORT OF ASSAY

SALT LAKE CITY, UTAH 84110 February 7, 1967

Metal Enterprise

WE HAVE ASSAYED YOUR one SAMPLES AND FIND it TO CONTAIN AS FOLLOWS:

DESCRIPTION	NO.	OZS. GOLD PER TON	OZS. SILVER PER TON	PER CENT LEAD	PER CENT COPPER	PER CENT ZINC	PER CENT INSOL.	PER CENT IRON	PER CENT	VALUE OF GOLD PER TON
	2845	0.01	1.40							35¢

REMARKS:

CHARGES $ 3.00 Paid

CRISMON & NICHOLS

By P. M. Crismon

TO: Prospect.

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

RECEIVED DEC - 1 '67

DATE 11-22-67

MARKED	U_3O_8 G/L	U_3O_8 %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %			
#2404 - Hoit Utah			6.563	.	.107		.845				
#2403 Bullion Canon Ut-6			.263	.	.470		.795				
~~[illegible]~~			~~[illegible]~~		~~[illegible]~~		~~[illegible]~~				

cc: DPM WEG CO
DRA MINE
MP DL

Lynn Baughton
CHIEF CHEMIST

Erik Bruner

Sample No. 2855 - Channel-chip, 2 feet wide, of hangingwall portion of the vein described under Sample No. 2853: Au = Trace, Ag = .20 oz./ton.

Sample No. 2856 - Grab of material blasted from the outcrop of a 4.5 feet wide quartz-carbonate vein.

Sample No. 2857 - Grab of material blasted from the outcrop of a 3.0 feet wide quartz-carbonate vein.

Sample No. 2858 - Grab of material blasted from the outcrop of a 5.0 feet wide quartz-carbonate vein: Au = Trace, Ag = .60 oz./ton.

Sample No. 2859 - Grab of material blasted from the side of a small pit in a 5.4 feet wide quartz-carbonate vein: Au = Trace, Ag = 1.00 oz./ton.

These samples were taken by Erik Bruner and Don Atkinson of Cotter Corporation on November 27, 1967.

Sample No. 2404 - Grab sample from stockpile near collar of easternmost shaft on Holt claims: Ag = 6.564 oz./ton, Pb = .107%, Cu = .845%.

Sample No. 2403 - Grab sample from dump of shaft in silicified vein on hillside southeast of Bullion Canyon (see pl. 1).

(g) Copies of reports are in Appendix D. Return not requested.

4. ACCESSIBILITY OF PROPERTY

(a) Directions.

Name and address of person who will meet the OME representative is:

G. Robert Jordan
Post Office Box 751
Canon City, Colorado 81212

The property can be reached by driving west 25.5 miles from Cedar City, Utah via stste highway #56, turning right at Joel Spring Canyon Road, and turning left after 1.6 miles, and then following an unimproved bulldozer road for 1.5 miles. The bulldozer road ends in the approximate center of the Holt claims. The surface of the property is readily

accessible by hiking. All mine workings would be accessible only by using ropes or possibly a chain ladder.

(b) Shipping and supply points.

Cedar City, Utah would be the main shipping and supply point. It is approximately 29 miles by road east of the property.

5. EXPLORATION WORK

(a) Proposed exploration work.

The following pages show in both plan and section the proposed preliminary exploration drilling program of Cotter Corporation at the Metal Enterprise property. Six diamond drill holes from two sites are proposed. The two sites are shown on the included plan map and the depth and inclination of the holes are shown on the included section.

From drill site No. 1, we propose:

Drill Hole No. 1 - 0 inclination, 900 feet total depth.
Drill Hole No. 2 - (-) 18° inclination, 850 feet total depth.
Drill Hole No. 3 - (-) 40° inclination, 600 feet total depth.
Drill Hole No. 4 - (-) 60° inclination, 800 feet total depth.

From drill site No. 2, we propose:

Drill Hole No. 5 - (-) 45° inclination, 1000 feet total depth.
Drill Hole No. 6 - (-) 75° inclination, 2000 feet total depth.

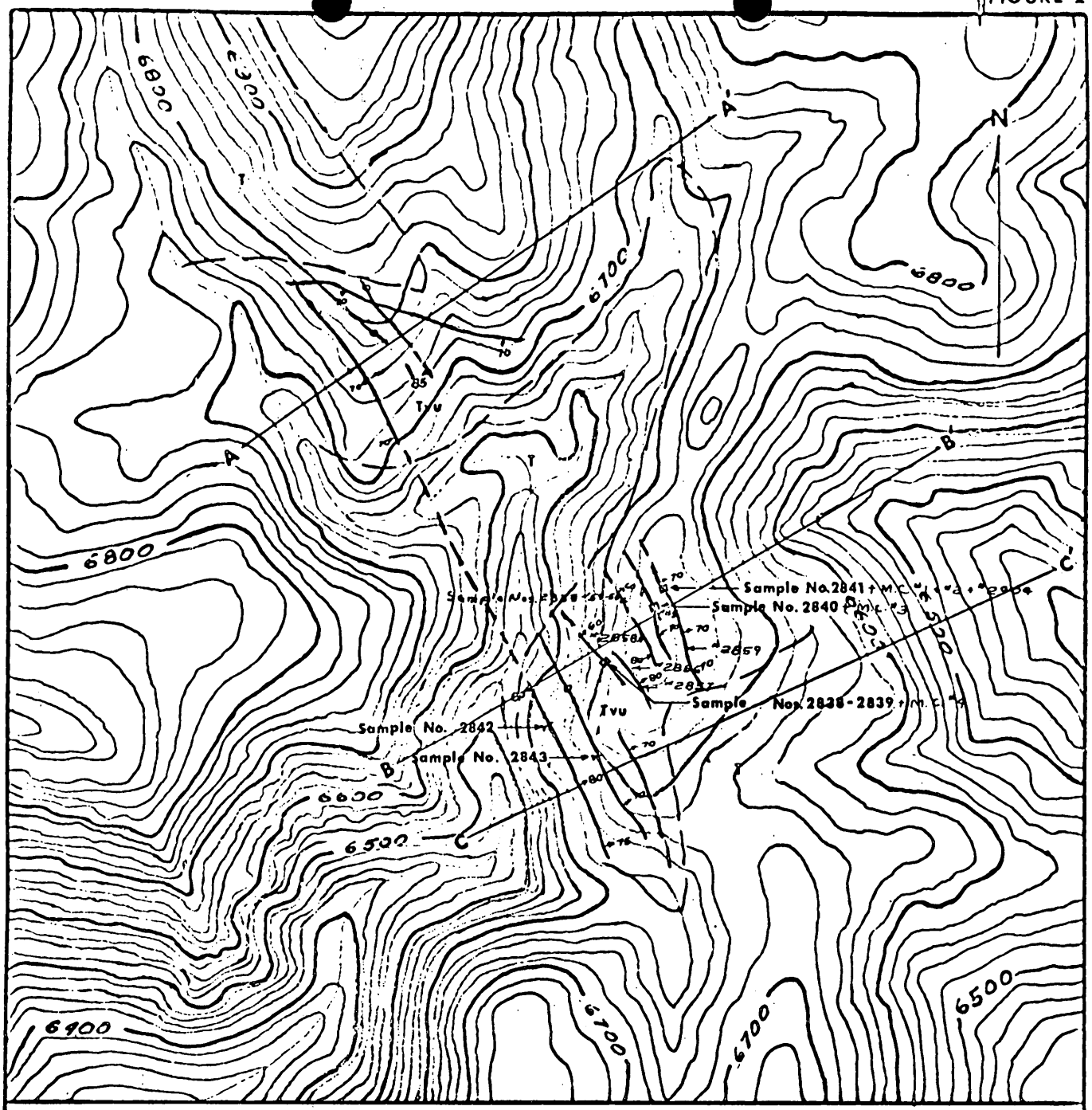
From drill site No. 1, the holes will all have a bearing of N.60°E., and from drill site No. 2, the holes will both have a bearing of S.60°W.

It is proposed that the drilling be divided into two phases. Phase I will include holes DDH 2, DDH 4, and DDH 5 for a total of 2650 feet as shown in red on Figure 4. If insufficient mineralization is encountered after these holes are completed, the project should end at this time. If sufficient mineralization is found in the drilling of these three holes, the project should move forward into Phase II.

Phase II consists of drilling holes DDH 1, DDH 3, and DDH 6 for a total of 3500 feet as shown in blue on Figure 4 to complete the project.

Shown also on the accompanying section map are the theoretical downward projections of the main quartz-carbonate veins exposed on the surface. We feel that the proposed holes will adequately explore the downward extension of the quartz-carbonate veins from a depth of 250 feet to a depth of 1250 feet from the top of the hill.

FIGURE 2



EXPLANATION

Tvu	Tertiary Volcanics - Undifferentiated
T	Talus
	Quartz - Carbonate Vein
	Shaft
	Open Cut

Contours from USGS 7.5 Min. Silver Peak Quadrangle - See Plate I for location

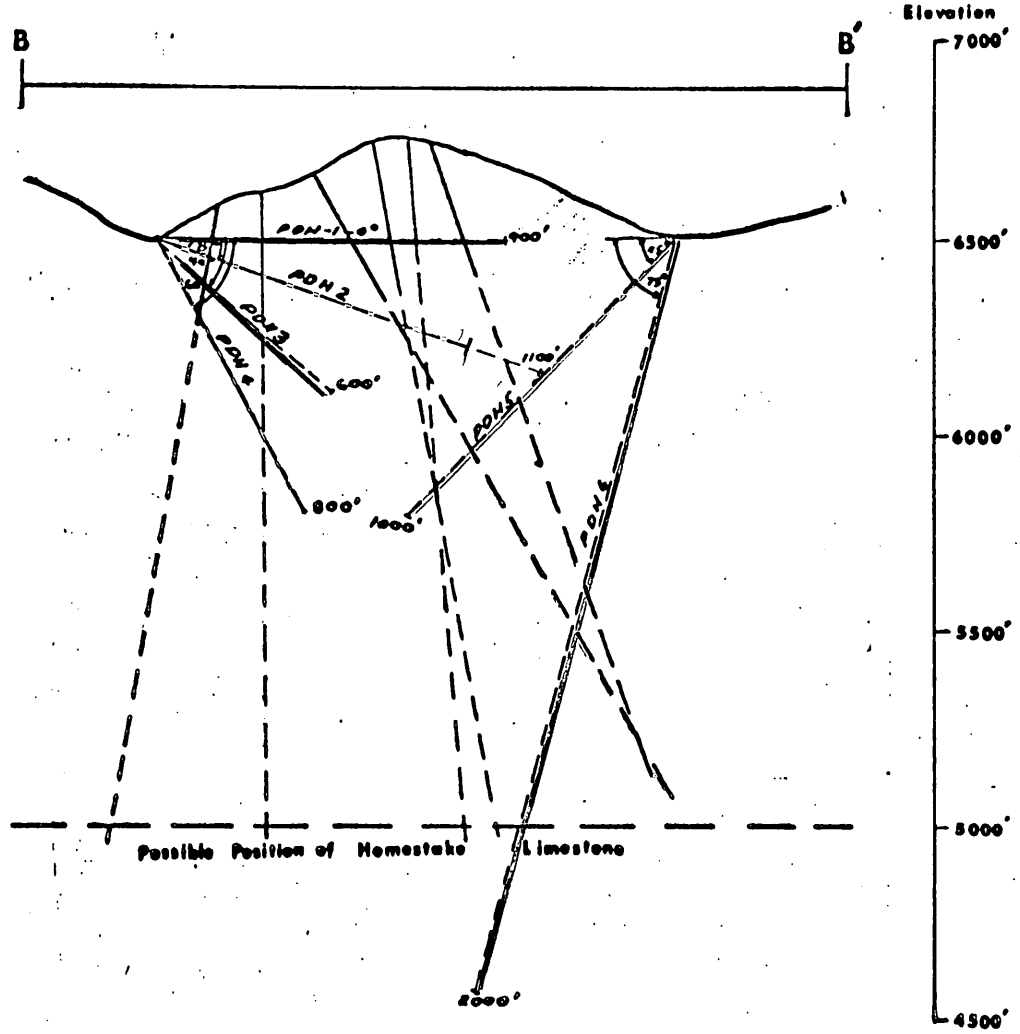
METAL ENTERPRISE

UTAH SILVER PROPERTY

PRELIMINARY GEOLOGIC MAP

2-15-67 Scale 1" 500' EWB

FIGURE 4



Phase I—

Phase II—

METAL ENTERPRISE

UTAH SILVER PROPERTY

SECTION MAP OF PROPOSED DIAMOND DRILLING – 6400 FEET TOTAL

2-15-67 Scale 1" = 500' EWB

EXPLORATION WORK (con't)

Relation of the two proposed drill sites to existing workings is shown on the included plan map. Both drill sites are in the SW$\frac{1}{4}$ of unsurveyed Section 8, T. 36 S., R. 14 W. Drill site No. 1 will be 2550 feet from Silver Peak on a bearing of N.83°E. Drill site No. 2 will be 3750 feet from Silver Peak on a bearing of N.75°E. Drill site No. 1 is located within Tip Top No. 5 claim and site No. 2 is within Tip Top No. 3 claim.

(b) Access Road.

An access road and the two drill sites will be prepared as part of the annual assessment work for the Holt Claims.

(c) Time Schedule.

If an OME contract is executed, the time until the start of the project will depend mainly on how soon a drilling contractor would be able to move onto the property. Using a daily average advance of 30 feet per shift and drilling two shifts per day, Phase I should be completed about two months after it starts allowing for a normal amount of down time and moving time. If the project is carried over into Phase II, an additional 2$\frac{1}{2}$ months will be required for completion.

OME

6. EXPERIENCE

Cotter Corporation has several years experience in mineral exploration, mining and milling. At the present time, they are operating a uranium mill at Canon City, Colorado and are producing uranium ore from the Schwartzwalder Mine near Golden, Colorado and from the Orphan Mine at Grand Canyon, Arizona.

The full-time engineer assigned to the project is:

G. Robert Jordan
Post Office Box 751
Canon City, Colorado 81212

Cotter Corporation
P.O. Box 751
Canon City, Colorado 81212

7. ESTIMATE OF COST - PHASE I

(a) Independent Contracts.

Mobilization - Equipment and Personnel $ 350.00

Drilling three holes, estimated 2650 feet 18,557.50

Depth, feet	NC	NX	BX	AX or EX
Drilling overburden or driving collar pipe 0-100 @ $8.25/ft.				
0- 250	7.30	6.95	6.70	6.50
250- 500	7.65	7.30	6.95	6.75
500- 750	8.00	7.65	7.30	7.00
750-1000	8.35	7.95	7.65	7.25
1000-1250	8.70	8.30	7.95	7.50
1250-1500	9.05	8.65	8.30	7.75
1500-1750	9.80	8.95	8.65	8.00
1750-2000	10.55	9.30	8.95	8.50

Reaming - all sizes
200 4.20/ft 840.00

Setting and pulling casing
10 hours @ 14.50/hr. 145.00

Casing lost or left in hole 500.00

Sizes:	4 inch	NX	BX	AX	EX
Cost /ft.	4.15	3.30	3.00	2.00	1.75

Freight allowance:
20 cwt. @ 1.25/cwt. 25.00

Cementing and redrilling
14.50/hour 24 hours 348.00

Additives:
10 sacks @ 7.50/sack 75.00

Cement (Lumnite):
10 sacks @ 7.83/sack 78.30

Mud:
12 sacks @ 4.50/sack 54.00

Water truck rental
2 months @ 220.00/month 440.00

Water truck mileage
1800 miles @ 12¢/mile 216.00

Truck driver, including F.I.C.A., etc.
240 hours @ 4.00/hour 960.00

Standby time - delay
12 hours @ 14.50/hour 174.00

ESTIMATE OF COST - PHASE I (con't)

Core boxes	
NX - 155 boxes @ 1.00/box	$ 155.00
BX - 125 boxes @ 1.00/box	125.00
(b) Personal Services.	
Sub-category (a) Supervision and Technical Services	
1. Geologist	
2 months @ 1250.00/month	2,500.00
2. Supervision - Chief Geologist	
3 trips @ 250.00/trip	750.00
(c) Gasoline for pickup	
3600 miles @ 12¢/mile	432.00
(d) Pickup rental	
2 months @ 150.00/month	300.00
(e) Assays	
200 @ 10.00/assay	2,000.00
Office Expense	
2 months @ 50.00/month	100.00
Insurance, payroll taxes, F.I.C.A., etc.	
2 months @ 275.00/month	550.00
	$29,348.80

PHASE II

Actual Costs

(a) Independent contracts

Roads and drill sites - None

Mobilization - None

Drilling three holes, estimate 3500 feet $26,327.50

Depth feet	NC	NX	BX	AX	EX
		(see first phase)			

Reaming	
300 feet @ 4.20/ft.	1,260.00
Setting and pulling casing	
15 hours @ 14.50/hour	217.50

Cotter Corporation
P.O. Box 751
Canon City, Colorado 81212

ESTIMATE OF COSTS - PHASE II (con't)

Casing lost in hole					$ 600.00
Sizes:	4 inch	NX	BX	AX	
Cost/foot	4.15	3.30	3.00	2.00	
Freight allowance:					
30 cwt. @ 1.25/cwt.					37.50
Cementing and redrilling:					
36 hours @ 14.50/hour					522.00
Additives:					
20 sacks @ 7.50/sack					150.00
Cement:					
30 sacks @ 7.83/sack					234.90
Mud:					
20 sacks @ 4.50/sack					90.00
Water truck rental:					
2½ month @ 220.00/month					550.00
Water truck mileage:					
2200 miles @ 12¢/mile					264.00
Truck driver, including F.I.C.A., etc.					
300 hours @ 4.00/hour					1,200.00
Standby time:					
18 hours @ 14.50/hour					261.00
Core boxes:					
NX - 200 boxes @ 1.00/box					200.00
BX - 135 boxes @ 1.00/box					135.00
(b) Personal services					
Supervision and Technical Services					
1. Geologist					
2½ months @ 1,250.00/month					3,125.00
2. Supervision					
3 trips @ 250.00/trip					750.00

Cotter Corporation
P.O. Box 751
Canon City, Colorado 81212

ESTIMATE OF COSTS - PHASE II (con't)

(c)	Gasoline for pickup	$ 648.00
(d)	Pickup rental: $2\frac{1}{2}$ months @ 150.00/month	375.00
(e)	Assays: 300 @ 10.00/assay	3,000.00
	Office Expense: $2\frac{1}{2}$ months @ 50.00/month	125.00
	Insurance, payroll taxes, F.I.C.A., etc. $2\frac{1}{2}$ months @ 275.00/month	687.50
	Phase II	$40,759.90
	Phase I	29,348.80
	Total	$70,108.70

DIAMOND CORE DRILLING
DIAMOND DRILLING EQUIPMENT
GROUTING
FOUNDATION TESTING
MINING
QUARRYING
SHAFT SINKING
TUNNEL DRIVING
MINE PLANT DESIGN
AND FABRICATION

Boyles Bros.
DRILLING COMPANY
CONTRACTORS-ENGINEERS-GEOLOGISTS
General Offices and Plant
1624 Pioneer Road P. O. Box 58 Phone 487-7595
SALT LAKE CITY, UTAH 84110
Cable: BOYLESCO

BRANCH OFFICES
ARIZONA (PHOENIX)
CALIFORNIA (AUBURN)
COLORADO (GOLDEN)
KENTUCKY (LOUISVILLE)
NEVADA (SPARKS)
WASHINGTON (SPOKANE)
CHILE (SANTIAGO)
CABLE BOYLESBROS
MEXICO, D.F.
PERU (LIMA)
CABLE: BOYLESCOP

August 8, 1968

Cotter Corporation
Box 751
Canon City, Colorado

Attention: Mr. G. R. Jordan

Gentlemen:

We submit the following for your consideration, to drill exploration hole in Iron County, Utah.

1. Mobilization - $350.00.

2. Drilling overburden or driving collar pipe, 0 to 100 feet @ $8.25 per foot.

3. Coring

	NC	NX	BX	AX or EX
0 to 250 feet	$7.30	$6.95	$6.70	$6.50
250 to 500 "	7.65	7.30	6.95	6.75
500 to 750 "	8.00	7.65	7.30	7.00
750 to 1,000 "	8.35	7.95	7.65	7.25
1,000 to 1,250 "	8.70	8.30	7.95	7.50
1,250 to 1,500 "	9.05	8.65	8.30	7.75
1,500 to 1,750 "	9.80	8.95	8.65	8.00
1,750 to 2,000 "	10.55	9.30	8.95	8.50

4. Reaming - $4.20 per foot all sizes.

5. Cementing or drilling cement - $14.50 per hour plus cost of cement or cement substitutes used.

6. Mud and additives at list price.

7. Roads, stations, sump pits will be furnished by owner with no charge to Boyles.

8. Delay asked for or caused by owner - $14.50 per hour. This rate is in effect for probes, surveys, working on lost circulation, or other extra work using Boyles crew.

9. Water truck, if furnished by Boyles, at the rate of $220.00 per month plus 12¢ per mile driven. If distance to water makes a driver necessary, his wages, taxes and insurance would be a charge item.

10. Casing left by request or we are unable to recover, would be charged for at list price less 10%.

11. Diamond bit cost that exceeds $1.20 a foot would be charged all excess over $1.20 as verified by our suppier's cut-out.

12. Cardboard core boxes - $1.00 per box.

The AX and EX prices are the same as we never have an improvement in these sizes. We do not recommend EX because of the difficulties it presents to a good core recovery.

We will send our mud cost sheet because it is difficult to determine what might have to be used to keep holes in condition to keep from cementing excessively.

We hope this is what you asked for. May we again express our thanks for calling on us. If there are any questions please feel free to contact us.

Very truly yours,

J. F. Brennan

J. F. Brennan
District Manager

JFB:bg

BID INFORMATION

For: Cotter Corporation -Box 95 Grand Canyon, Arizona 86023

Project: Metal Enterprises drilling exploration near Cedar City, Utah

1. Mobilization & demobilization			$1.00 per mile
2. Moving & setting up from hole to hole			$10.50 per hr.
3. Overburden drilling			$4.60 per ft.
4. Drilling: (wireline)	(NX)	(BX)	
0 to 500'	$7.85 per ft.	$7.60 per ft.	
500 to 1000'	$8.35 " "	$8.10 " "	
1000 to 1500'	$8.90 " "	$8.35 " "	
5. Reaming			$4.10 per ft.
6. Casing lost or ordered in place			3.50 /ft. NX $3.00 /" BX
7. Cementing & drilling cement			$12.50 per hr. + cost of cment.
8. Delays or standby time			$ 10.50 per hr.
9. Drill Mud			$ 2.50 per 50# bag.
Mud Additives			$ At cost
10. Water Charge:			$ See below
LL. Installing & Retrieving casing			$ 12.50 per hr.

Remarks:

(a) Diamond bits used will be billed to your company less $2.00 per ft. of hole drilled.
(b) Access roads and drill sites are to be prepared by your company in advance.
(c) Water Charge-$15.00 per shift for the use of the water truck + .10¢ per mile when used only.
(d) This is an estimate NOT A BID. We have to inspect the drill sites before we can offer a firm bid.

METLER BROS. DRILLING CORPORATION

Longyear

E. J. LONGYEAR COMPANY
GENERAL OFFICES, 76 SOUTH 8th STREET
MINNEAPOLIS, MINNESOTA 55402, U.S.A.
TELEPHONE (612) 339-7631 • CABLE LONGCO

OUR '91 75TH YEAR '66

P. O. Box 15218
865 West 2600 South
Salt Lake City, Utah
February 6, 1968

Cotter Corporation
P. O. Box 95
Grand Canyon, Arizona 86023

Attention Mr. Erik Bruner

Gentlemen:

In response to your recent request for a general cost estimate for drilling a silver-copper prospect near Cedar City, Utah, we are pleased to submit the following:

1. We understand that the project as now planned will consist of approximately 6,400 linear feet of drilling in six (6) holes to be drilled from two drill sites. The inclination of the holes will range from horizontal to a minus 75° as measured from the horizontal.

2. The overburden is not expected to exceed 50 feet in depth. The formation is to consist of rhyolitic volcanics.

3. We also understand that water is available from a well approximately seven (7) miles from the proposed drilling sites, and would have to be hauled by tank truck.

4. We further understand that you will provide, without charge, tractor service as required for maintenance of access roads and preparation of drill sites.

5. For this work we propose to furnish one Longyear diamond core drill of suitable capacity and design. We propose to operate the drill a minimum of two-eight hour shifts per day, six days per week, and employ a driller-foreman to supervise and direct the drilling operations.

6. We will carry public liability insurance covering personal injury and property damage, and Workmen's Compensation insurance, and also all-risk insurance on the drilling equipment protecting against loss by theft, fire, flood, landslides and other similar hazards. Certificates showing the coverage referred to will be furnished upon request.

7. Based on the conditions as outlined, we quote as follows:

a) Mobilization and demobilization of personnel and drilling equipment - $500.00 Lump Sum

b) Overburden drilling -

0 - 50' in depth $ 9.00/ft.

c) Diamond core drilling -

(For holes with an inclination of 40° or steeper, as measured from the horizontal.)

	BQWL	AQWL
0 - 500' in depth	$ 8.00/ft.	$ 7.75/ft.
500 - 1000' in depth	$ 8.50/ft.	$ 8.25/ft.
1000 - 1500' in depth	$ 9.00/ft.	$ 8.75/ft.
1500 - 2000' in depth	$10.00/ft.	$ 9.75/ft.

(For holes with inclination from horizontal to 40°, as measured from the horizontal.)

0- 500' in depth	$ 8.75/ft.	$ 8.50/ft.
500 - 1000' in depth	$ 9.25/ft.	$ 9.00/ft.
1000 - 1500' in depth	$ 9.75/ft.	$ 9.50/ft.
1500 - 2000' in depth	$10.75/ft.	$10.50/ft.

d) Reaming for casing, if and when required - All Sizes - $ 3.45/ft.

e) Cementing, waiting for cement to set, drilling out cement, and any other drill hole stabilizing operations - $16.50/hr.

f) Casing left in hole at your request - 100% List Price
Casing lost in hole - 80% List Price

g) Drill hole inclination tests and delays for your convenience, or for which you are responsible - $14.50/hr.

h) Cement, drill mud, and drill mud additives to be invoiced to you at our cost, f.o.b. job site.

i) Rig Time - this charge to apply to all time spent in moving, rigging up and down, installing and pulling casing - $14.50/hr. with two-man crew.

j) Water tank truck rental - $350.00 per month.

8. Drill cores will be turned over to your representative at the individual drill hole locations in core boxes supplied by you.

February 6, 1[illegible]

9. Statements covering the work performed will be prepared as promptly as possible after the first of each month, and payment shall be due within twenty days from date of invoice.

10. We appreciate the opportunity to quote on this project, and hope that we will be able to work with you on this, if your OME loan is approved.

Sincerely,

E. J. Longyear Company

D. F. Crotty

Manager, Rocky Mt. Zone
Contract Drilling

DFCrotty:ec

OFFICIAL COPY
O. M. E.
RECEIVED
NOV 18 1968
INITIALS CODE

ASSIGNMENT

This assignment is entered into as of this 5th day of February, 1968, between MAURICE CASTAGNE, CARL VANLANINGHAM, JACK MARZO, JIM KELLE and ERIK BRUNER, as assignors and COTTER CORPORATION (N.S.L.), a New Mexico corporation, as assignee.

In consideration of ten dollars and other valuable consideration paid by assignee to assignors, assignors hereby assign, set over, sell and release to assignee:

(1) All of assignors' right, title, and interest in the Bright Angel Nos. 1 to 25, inclusive, unpatented lode mining claims situated in unsurveyed Sections 5, 6, 7, 8, 17 and 18, Township 36 South, Range 14 West, Salt Lake Base and Meridian, Iron County, Utah, which claims are more particularly described in location certificates recorded on January 20, 1967, in Book 128, Pages 578 to 590 of the records of Iron County, Utah,

RESERVING to assignors a royalty of five per cent (5%) of the net smelter returns on all minerals or mineral products produced, saved and sold from the Bright Angel claims. "Net smelter returns" shall mean the net proceeds received for minerals or mineral products sold to a bona fide third party purchaser after deductions by such purchaser of smelting costs, treatment charges, penalties, transportation costs and other proper charges.

If assignors own a lesser interest in the claims or any part thereof than the entire and undivided mineral estate (except any minerals covered by the Mineral Leasing Act of February 25, 1920, as amended), then the royalties hereby reserved shall be paid by assignee only in the proportion which the interest of assignors bears to the whole and undivided mineral title on that portion of the claims from which the ore is extracted.

(2) The entire right, title and interest of the lessee named in that certain Mining Lease and Option Agreement entered into as of the 1st day of January, 1967, between Heber M. Holt, George S. Holt and H. Wayne Holt, as Lessors and Maurice Castagne,

as Lessee, covering the following lode mining claims situated in Iron County, Utah:

Tip Top
Tip Top Nos. 1 to 5 inclusive
Lone Hill
Lone Hill Nos. 1 and 2
Black Top
West Side
Round Hill
Round Hill Nos. 1 to 4 inclusive

Assignee shall have and hold the above described leased property for and during the remaining unexpired term of the lease and any extension or renewals thereof granted by the lessors, subject to the terms and conditions of said lease.

EXECUTED as of the date first above written.

Maurice Castagne

Carl Vanlaningham

Jack Marzo

Jim Kelle

Erik Bruner

STATE OF Arizona }
COUNTY OF Coconino } ss.

On the 5th day of February, A.D. 1968, personally appeared before me Maurice Castagne, the signer of the above instrument, who duly acknowledged to me that he executed the same.

My commission expires Aug 20, 1969.

Margaret B. Patton
Notary Public, residing at
Grand Canyon, Ariz.

STATE OF Arizona }
COUNTY OF Coconino } ss.

On the 5th day of February, A.D. 1968, personally appeared before me Carl Vanlaningham, the signer of the above instrument, who duly acknowledged to me that he executed the same.

My commission expires Aug. 20, 1969.

Margaret B. Patton
Notary Public, residing at
Grand Canyon, Arizona

STATE OF Arizona }
COUNTY OF Coconino } ss.

On the 5th day of February, A.D. 1968, personally appeared before me Jack Marzo, the signer of the above instrument, who duly acknowledged to me that he executed the same.

My commission expires Aug. 20, 1969.

Margaret B. Patton
Notary Public, residing at
Grand Canyon, Ariz.

STATE OF Arizona }
COUNTY OF Coconino } ss.

On the 5th day of February, A.D. 1968, personally appeared before me Jim Kelle, the signer of the above instrument, who duly acknowledged to me that he executed the same.

My commission expires Aug 20, 1969.

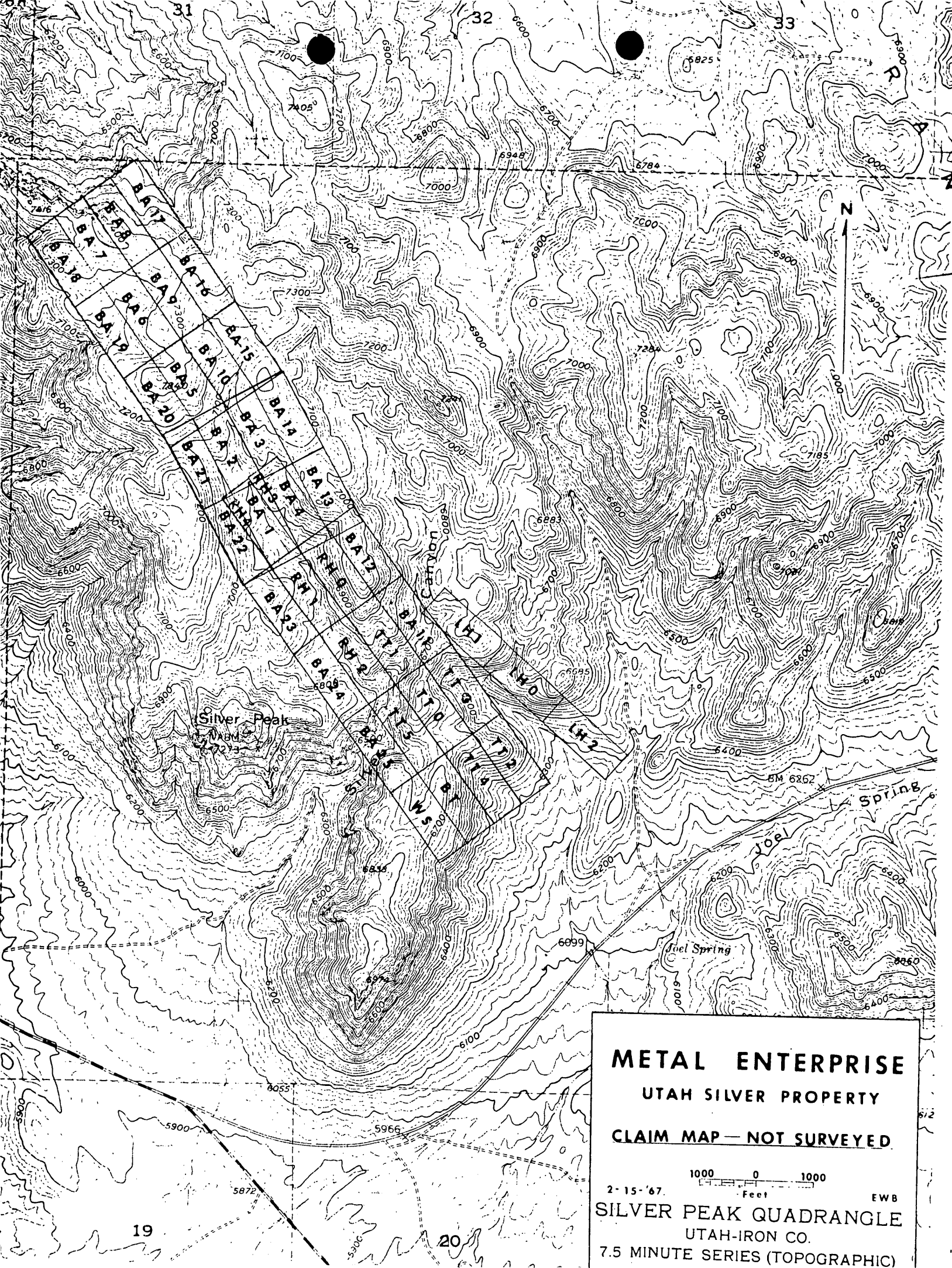
Margaret B Patton
Notary Public, residing at
Grand Canyon, Arizona

STATE OF Arizona }
COUNTY OF Coconino } ss.

On the 5th day of February, A.D. 1968, personally appeared before me Erik Bruner, the signer of the above instrument, who duly acknowledged to me that he executed the same.

My commission expires Aug 20, 1969.

Margaret B. Patton
Notary Public, residing at
Grand Canyon, Arizona


METAL ENTERPRISE
UTAH SILVER PROPERTY
CLAIM MAP — NOT SURVEYED
1000 0 1000
Feet
2-15-'67.
EWB
SILVER PEAK QUADRANGLE
UTAH-IRON CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)
Silver Peak
Joel Spring
Joel Spring
Canyon
N
31
32
33
19
20
BA 17
BA 18
BA 7
BA 8
BA 16
BA 9
BA 6
BA 19
BA 15
BA 10
BA 5
BA 20
BA 14
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TT 11
WS
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LH 2
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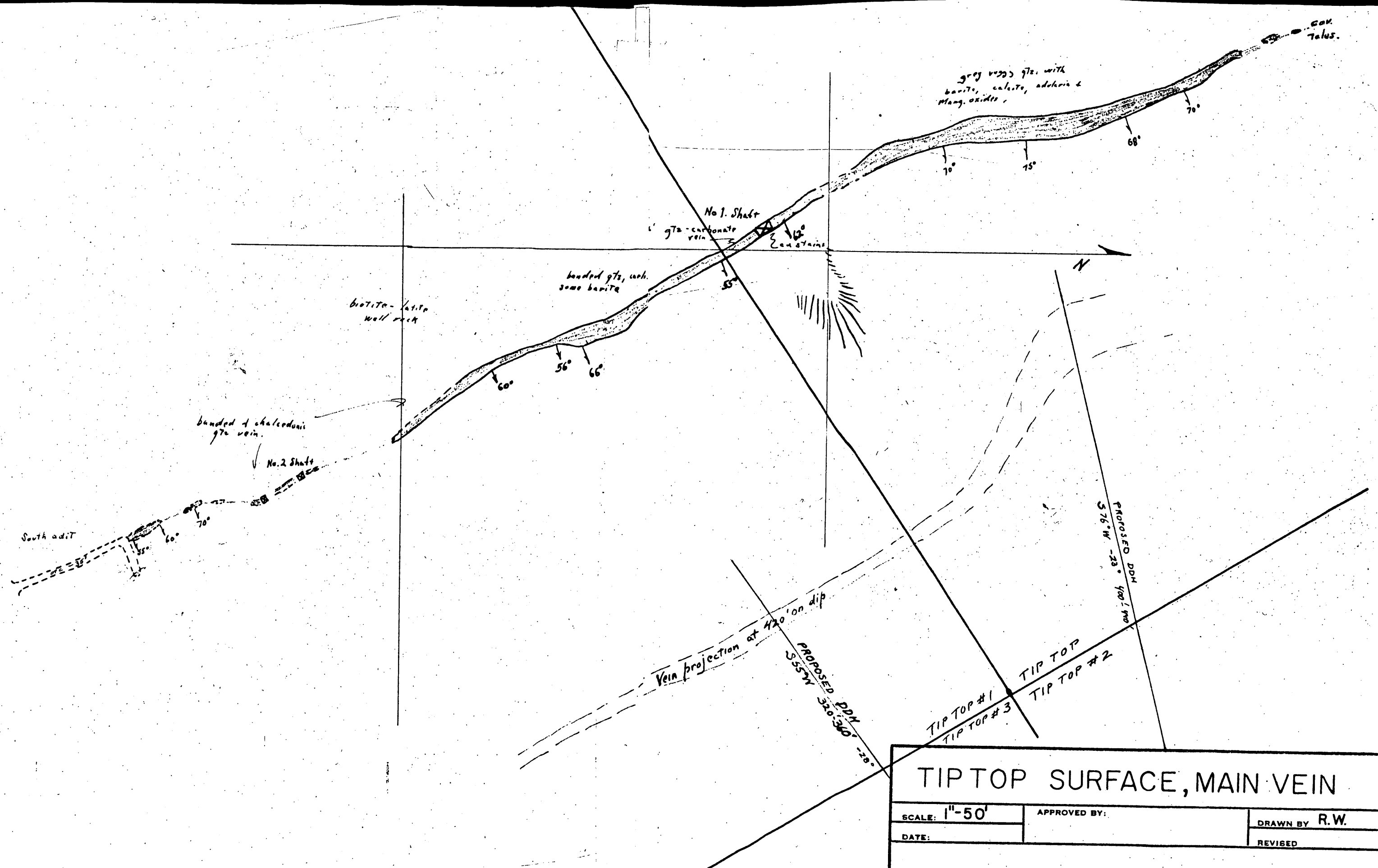
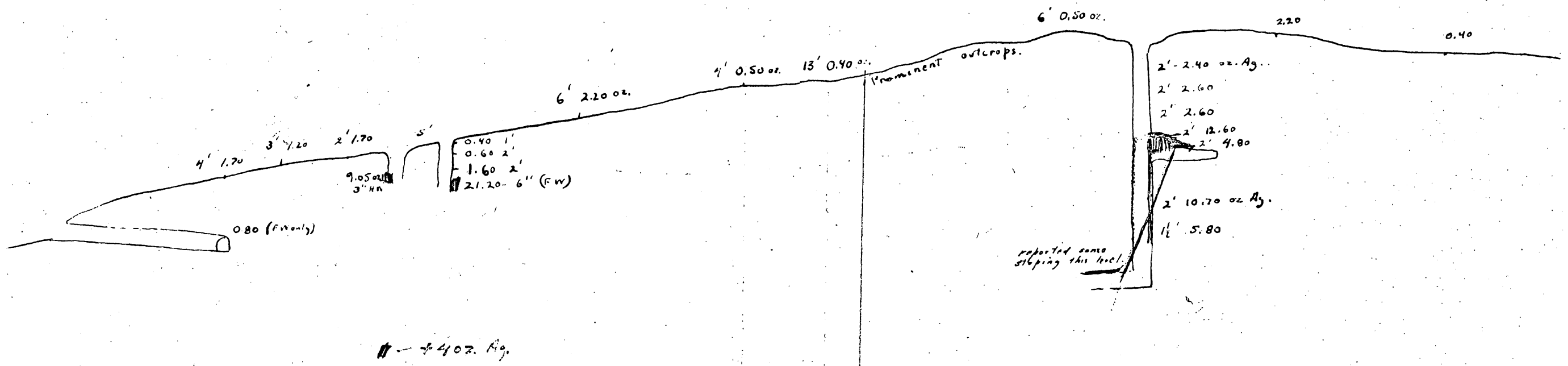


TIP TOP SURFACE, MAIN VEIN

SCALE: 1"-50'	APPROVED BY:	DRAWN BY R.W.
DATE:		REVISED

OFFICIAL
COPY
O. M. K.
RECEIVED
NOV 18 1975



TIP TOP LONGITUDINAL SECTION

SCALE: 1"-50'	APPROVED BY:	DRAWN BY R.V.W.
DATE: 6-59		REVISED

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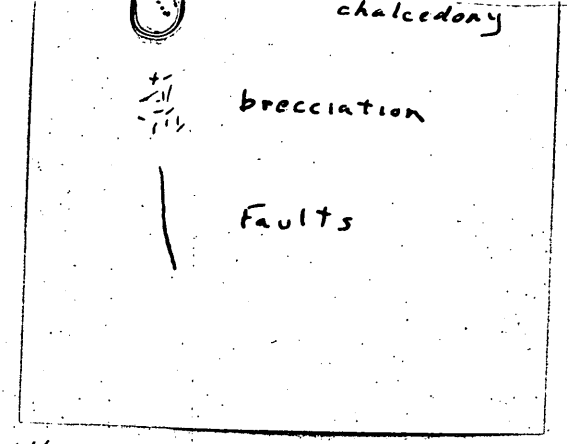
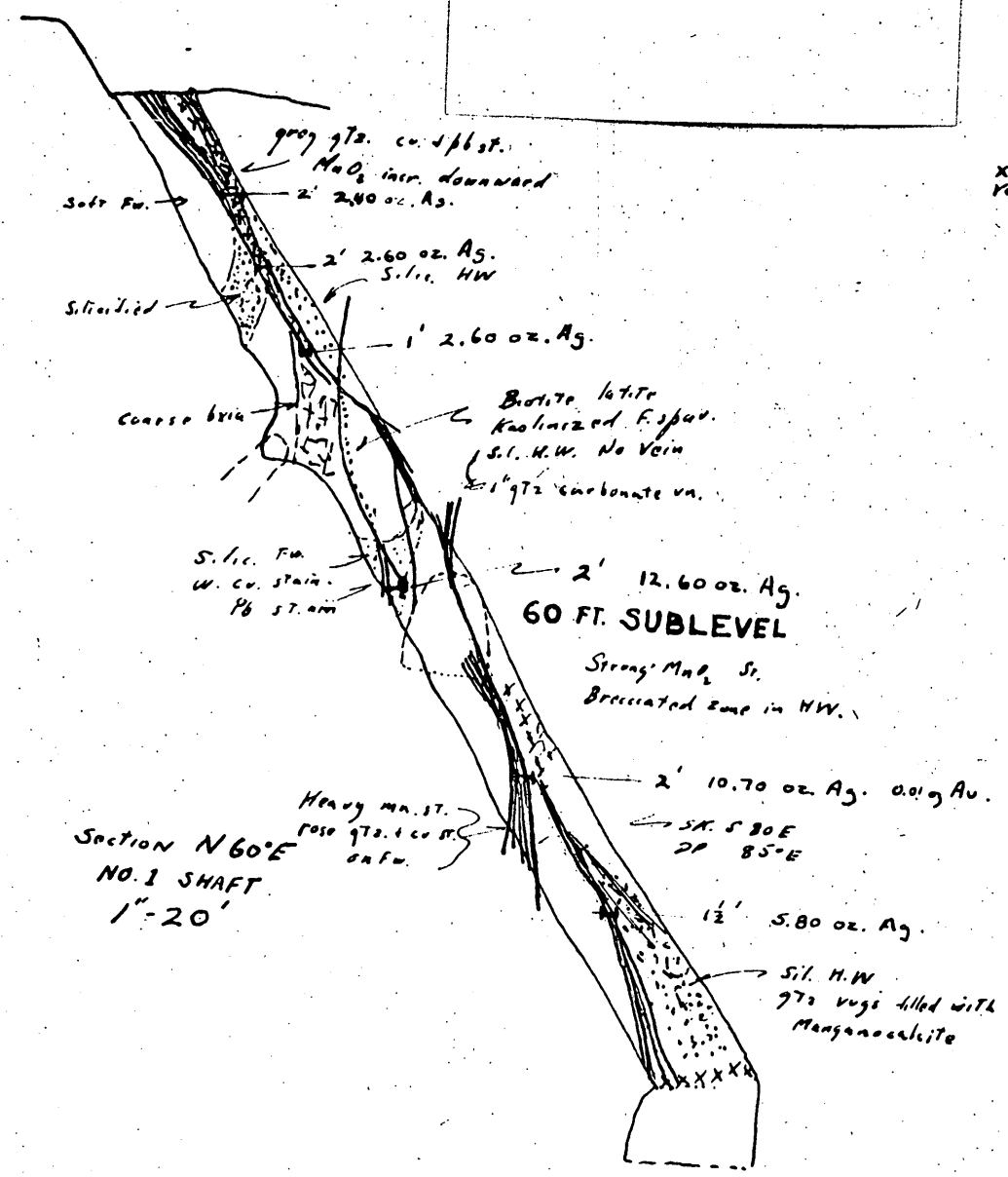
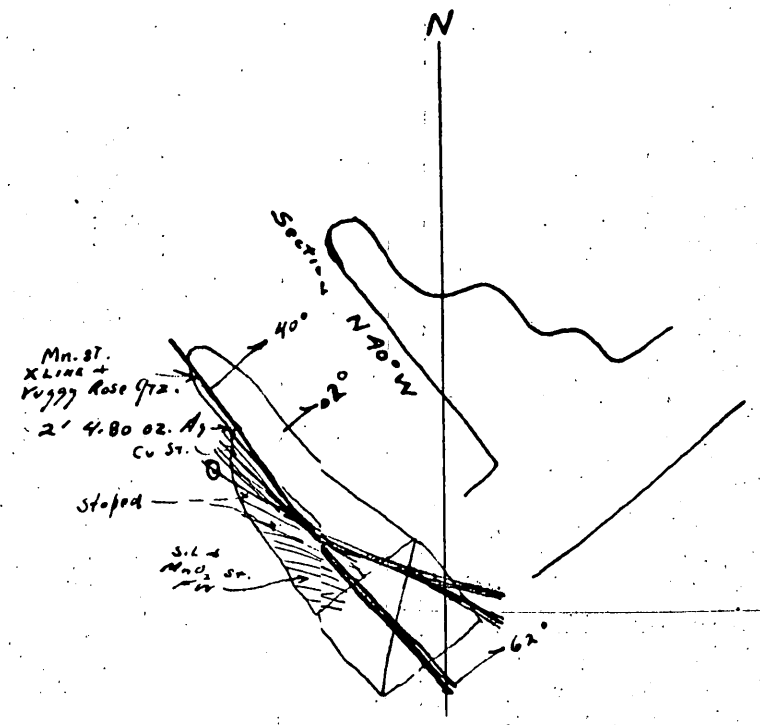
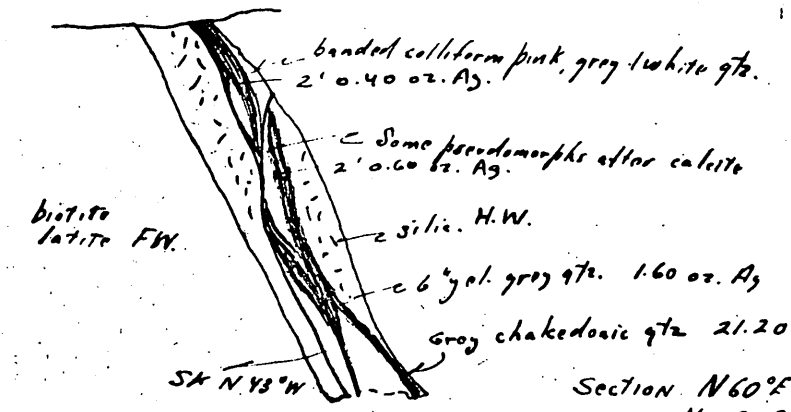


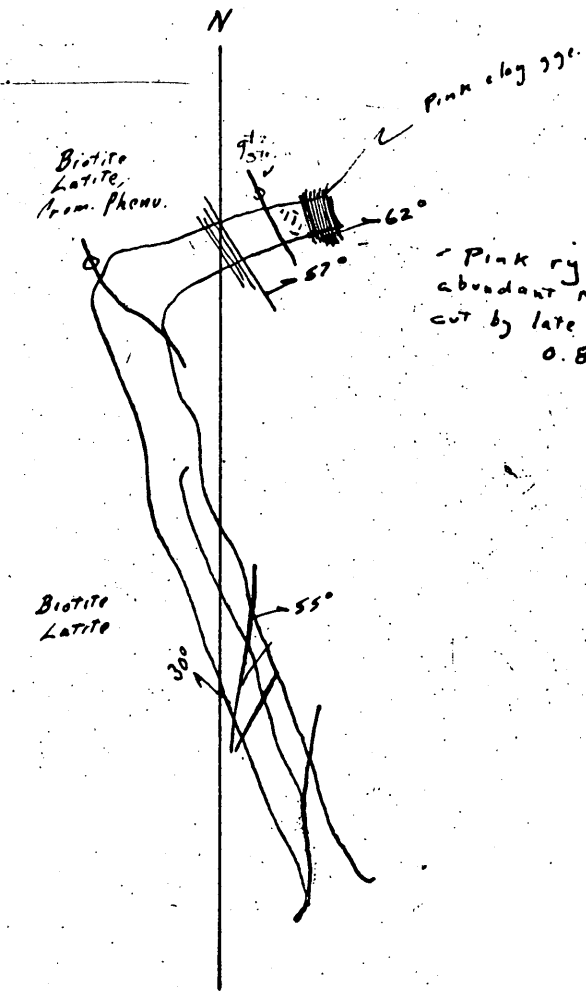




PLAN - 60' Sublevel



Section N60°E Looking North
No. 2 Shaft
1"-20'



PLAN - SOUTH ADIT
1"-20'

TIP TOP MINE GEOLOGY

SCALE: 1"-20'	APPROVED BY:	DRAWN BY R
DATE: 7-59		REVISED

OFFICIAL
COPY
O. M. E.
RECEIVED
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MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
5/18/70	Peterson	120
		120
		220

AIRMAIL

Cotter Corporation
P. O. Box 751
Canon City, Colorado 81212

MAY 18 1970

Re: OME-6760 (Silver)
Cotter Corporation
Metal Enterprise Property
Iron County, Utah

Gentlemen:

We have been informed by Mr. J. William Hasler of our Denver office of Cotter Corporation's decision to withdraw the subject application. Accordingly, we are considering the application as having been withdrawn and are placing it in our inactive file.

Sincerely yours,

Harold Kirkemo (gla)

Harold Kirkemo
Chief, Office of
Minerals Exploration

cc: Director's Reading File
Mineral Resources
OME docket
OME Reading file
OME Region III
Mr. Peterson

ECPeterson/gla 5-18-70

Statement in next file

6760

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
FEDERAL CENTER, DENVER, COLORADO 80225

Office of Minerals Exploration
Building 53 Room 200

May 8, 1970

CHIEF
O. M. E.
RECEIVED
MAY 12 1970
INITIALS CODE

Memorandum

To: Chief, Office of Minerals Exploration

From: Field Officer, Region III

Subject: OME-6760 (Silver)
Cotter Corporation
Metal Enterprise Claim
Iron County, Utah

Mr. Robert F. Hartman, geologist, Cotter Corporation informed this office by telephone on April 23, 1970 that Cotter Corporation was returning the Metal Enterprise Claims, Iron County, Utah to their lessors, Mssrs. Heber M. Holt, George S. Holt and Wayne Holt, all of Enterprise, Utah, and does not wish to pursue, therefore wishes to withdraw their application.

Mr. Hartman indicated the applicant company would notify the Office of Minerals Exploration that they wished to withdraw the application. Since we have heard nothing from the applicant since April 23, 1970 I will recommend that the application be withdrawn and the applicant be notified of our action.

J. William Hasler

J. William Hasler,
Field Officer, Region III
Office of Minerals Exploration

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
FEDERAL CENTER, DENVER, COLORADO 80225

Office of Minerals Exploration
Building 53 Room 200

March 18, 1970

COPY
O. M. E.
RECEIVED
MAR 19 1970

INITIALS	CODE
gla	120
bal	120
HK	120
	120

Memorandum

To: Chief, Office of Minerals Exploration

From: Field Officer, Region III

Subject: OME-6760 (Silver)
Cotter Corporation
Metal Enterprise Property
Iron County, Utah

Transmitted herewith is a report of examination on the subject property recommending that at least Phase I drilling be completed under an OME contract. The examining geologist believes there is a possibility of discovering new reserves of silver at depth along veins on the Metal Enterprise property.

Enclosed are extra copies of Figures 2, 3, and 5 if they are needed for a contract.

J. William Hasler

J. William Hasler,
Field Officer, Region III
Office of Minerals Exploration

Enclosure

REPORT OF EXAMINATION

OF THE

METAL ENTERPRISE PROPERTY

OWNED AND LEASED BY

COTTER CORPORATION

IRON COUNTY, UTAH

OME-6760 (Silver)

By

J. William Hasler, Geologist

U. S. Geological Survey

December 1969

On-site Exam Report

ILLUSTRATIONS

Figure 1.--Index map, Metal Enterprise Property, Iron County, Utah.

2.--Claim Map, Metal Enterprise Property, Iron County, Utah.

3. Preliminary Geologic Map of Metal Enterprise Property, Iron County, Utah.

4.--Cross sections A-A', B-B', and C-C', Metal Enterprise Property, Iron County, Utah.

5.--Proposed Diamond Drill Holes, Metal Enterprise Property, Iron County, Utah.

Plate 1.--Topographic Map showing property boundaries.

Introduction

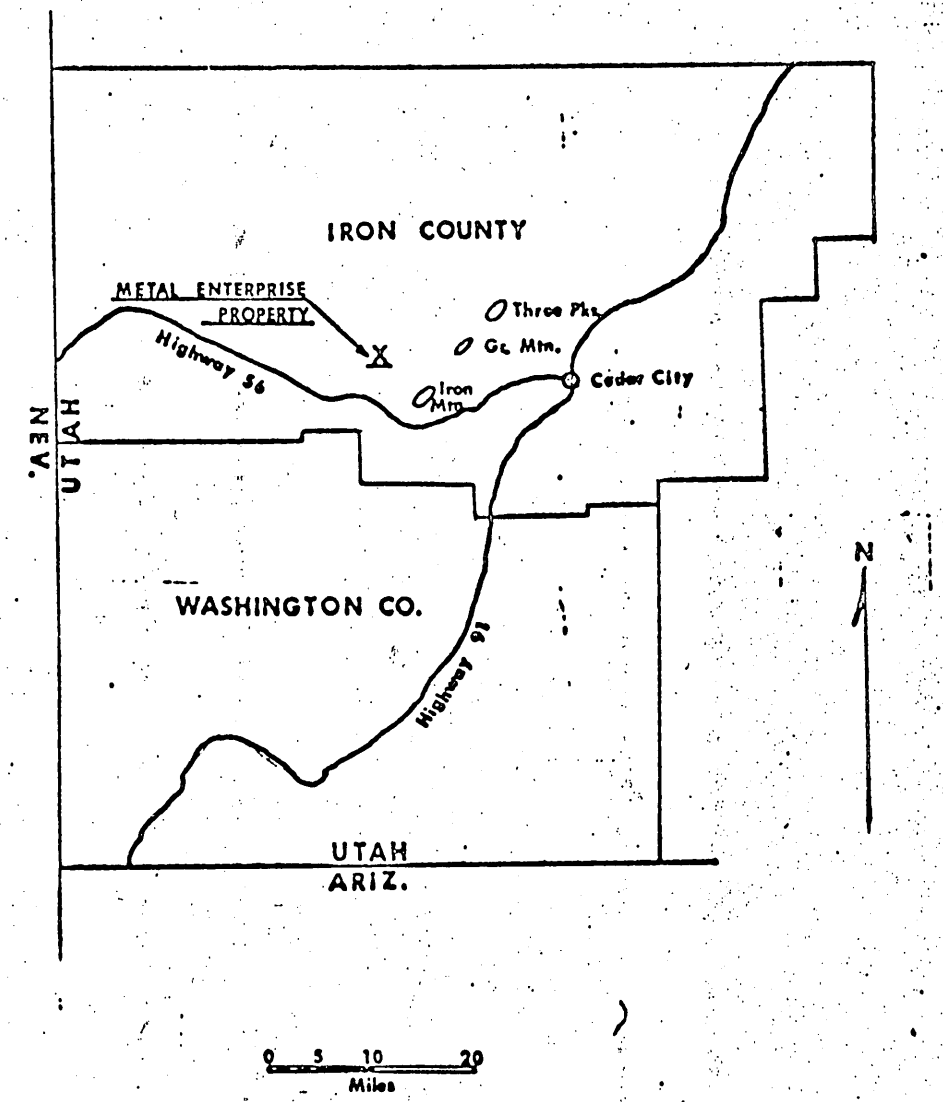
The Cotter Corporation, P. O. Box 751, Canon City, Colorado 81212 applied to the Office of Minerals Exploration for financial assistance in minerals exploration to explore for silver at the Metal Enterprise mine in unsurveyed sections 5, 6, 7, 8 and 17, T. 36 S., R. 14 W., SLBM, Iron County, Utah, Figure 1. The application was referred to the field and an examination was made June 10 and 11, 1969. The examining geologist was accompanied by Mr. Donald Atkinson, Cotter Corporation, geologist, and Mr. Larry Vanlandingham, also a representative of the applicant.

Property

The Metal Enterprise property is located in an unorganized mining district in Iron County, Utah, and covers portions of unsurveyed sections 5, 6, 7, 8 and 17, T. 36 S., R. 14 W., Salt Lake Base and Meridian. The property consists of forty-one unpatented lode mining claims. Sixteen of the claims are owned by Heber M. Holt and sons, and twenty-five of the claims are owned by Cotter Corporation. Figure 2. The property may be reached by driving west from Cedar City 25.5 miles via Utah State Highway No. 56, turning right at Joel Spring Canyon Road, and turning left after 6.1 miles, then following an unimproved bulldozer road for 1.5 miles. The area lies within the U.S.G.S. Iron Mountain, Utah -- 15 minute quadrangle sheet, and Silver Peak, Utah 7.5 minute quadrangle sheet.

U.S.D.I
GEOLOGICAL SURVEY

OME DOCKET 6760



METAL ENTERPRISE

UTAH SILVER PROPERTY

INDEX MAP

2-13-67 BWB

Figure 1

GEOLOGICAL SURVEY

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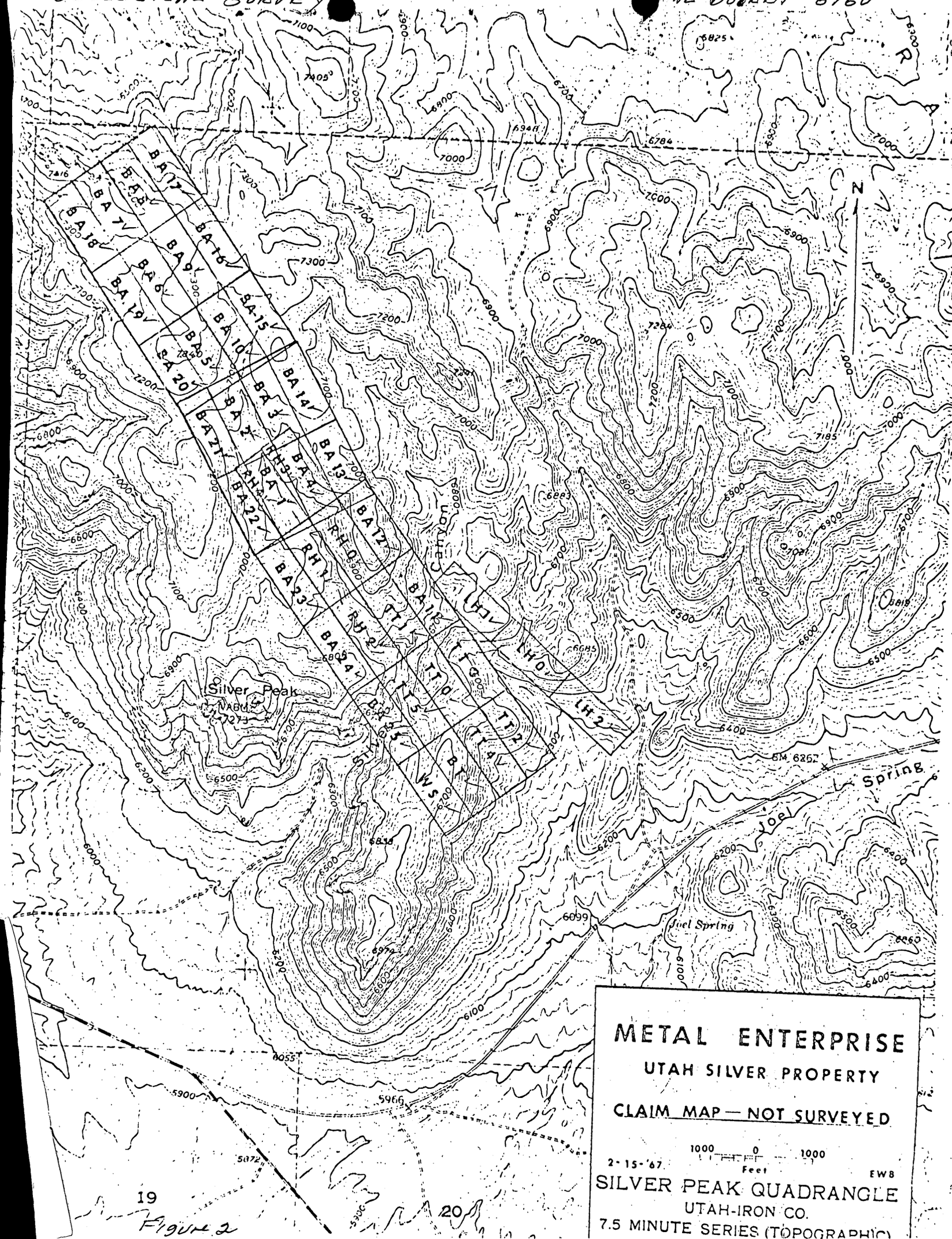

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Figure 2

20

Cotter Corporation is the lessee of a group of sixteen unpatented lode claims owned by Heber M. Holt, George S. Holt, and Wayne Holt, all of Enterprise, Utah. Figure 2. The applicant corporation is the owner of twenty five lode claims, known as the Bright Angel claims, adjoining the Holt claims. The applicant corporation became the lessee of the Holt claims and owner of the Bright Angel claims by way of an assignment from Maurice Castagne, Carl Vanlaningham, Jack Marzo, Jim Kelle and Erik Bruner, who held the original lease on the Holt claims and ownership of the Bright Angel claims.

There are no known liens, mortgages, or other encumbrances on either group of claims.

Listed below are the names of each claim under the heading of owner, showing the book and page number as they are recorded at the Iron County Recorder's Office, Parowan, Utah.

List of Claims

Holt Claims

Name	Book No.	Page No.
Tip Top	Q	305
Tip Top No. 1	Q	305
Tip Top No. 2	Q	306
Tip Top No. 3	Q	306
Tip Top No. 4	Q	307
Tip Top No. 5	Q	307
Lone Hill	Q	308
Lone Hill No. 1	Q	308
Lone Hill No. 2	Q	309
Black Top	128	61
West Side	128	60
Round Hill	128	58
Round Hill No. 1	128	58
Round Hill No. 2	128	59
Round Hill No. 3	128	59
Round Hill No. 4	128	60

List of Claims (cont.)

Cotter Corporation Claims

Name	Book No.	Page No.
Bright Angel No. 1	128	578
Bright Angel No. 2	128	578
Bright Angel No. 3	128	579
Bright Angel No. 4	128	579
Bright Angel No. 5	128	580
Bright Angel No. 6	128	580
Bright Angel No. 7	128	581
Bright Angel No. 8	128	581
Bright Angel No. 9	128	582
Bright Angel No. 10	128	582
Bright Angel No. 11	128	583
Bright Angel No. 12	128	583
Bright Angel No. 13	128	584
Bright Angel No. 14	128	584
Bright Angel No. 15	128	585
Bright Angel No. 16	128	585
Bright Angel No. 17	128	586
Bright Angel No. 18	128	586
Bright Angel No. 19	128	587
Bright Angel No. 20	128	587
Bright Angel No. 21	128	588
Bright Angel No. 22	128	588
Bright Angel No. 23	128	589
Bright Angel No. 24	128	589
Bright Angel No. 25	128	590

Lien and subordination agreements MME Form 52 have been executed on the sixteen unpatented, full-size lode claims between Cotter Corporation and the Holts, executed and they accompany the application.

History and Production

The property has been variously known as: the Blair property, the Holt Silver property, the Tip Top property, R. J. Pinder Silver Prospect, and currently, the Metal Enterprise property. Several shafts, Figure 3, in report of examination and Plate 1, in application, have been sunk on the veins as well as several small cuts and trenches across the veins. The shafts were sunk by a Mr. Blair between 1890 and 1905. The easternmost shaft is reportedly 125 feet deep, with drifts on the 60 and 125 foot levels. The center shaft is only about 50 feet deep and does not appear to have any lateral workings from it. The westernmost shaft is reportedly 200 feet deep, and is probably connected to a caved adit located in Silver Canyon. There are numerous other small shafts in the map area as well as open cuts that expose portions of almost all of the veins. All workings are presently inaccessible, and it is not known just how much ore was mined from any of them.

At some time later than 1959, a St. George, Utah based exploration firm drilled two, 400 foot deep holes on the property to test the easternmost vein shown on the map. The holes were drilled at too steep an angle to intersect any of the veins.

Since these holes were drilled, there has been only a limited amount of annual assessment work done on the property.

There is no current production from the property, and there is no way of determining previous production, as no records were kept. Reportedly, the bulk of the ore produced in the period between 1890 and 1905 was sent to the Silver Reef mill at Leeds, Utah, or to Milford, Utah.

Geography

The Holt or Metal Enterprise property is situated in the southwest portion of the Antelope Range. Elevations range from 6,000 feet in the valley to 7,400 feet at the extreme northwest end of the property. Topography is moderate to rugged and appear likely to be controlled by faults.

The area is drained by several small, intermittant streams, the two largest being in Silver Canyon and Bullion Canyon. These streams run only in times of heavy rainfall or during spring runoff and could not be utilized for exploration or mining purposes. Also there are no springs in the immediate area.

There is a rather dense growth of both Juniper and Pinon covering most of the property which would be of limited use as mine timber. The climate is generally arid, probably averaging ten to fifteen inches of precipitation per year. There is about one to two feet of snow which remains on the higher and shaded slopes of the property throughout the winter season. This would be of little hindrance to a fulltime operation. Temperatures in the area generally vary from a minimum of 0°F. in winter to a maximum of 95°F. in summer.

Rock exposures in the area are limited to the very tops of hills and ridges. The sides of the hills and the canyons are covered with a thick layer of talus, and tracing veins, faults, and contacts is made difficult by this dense growth of Pinon and Juniper.

Geology

Previous Work

The bulk of geologic work in this area is concerned with the iron occurrences to the east and southeast of the property (Black and Mackin, 1967; Butler, 1920; Cook, 1950; Leith and Harder, 1908; Mackin, 1954; Ratte', 1963; and Young, 1947). Butler (1920) described similar occurrences to the mineralization at the Metal Enterprise property in the State Line and Gold Springs districts and the Escalante district. Also, there are several unpublished reports dealing with the Escalante mine and one published paper by Hewlett and Faick (1961). To date, no geologic reports specifically dealing with the area of the Metal Enterprise property have been published.

Stratigraphy

Sedimentary Rocks

There are no sedimentary rocks exposed on the Metal Enterprise property; however, they are exposed in Bullion Canyon, northwest of the property, and at Iron Mountain, southeast of the property, as well as many other places in the district. Since these sedimentary rocks have a very good potential for replacement type mineralization, expecially the Homestake limestone, and do underlie the Metal Enterprise property at not too great a depth, they will be described here in some detail. Information was gathered mainly from Mackin (1954) and various other sources.

Carmel Formation (Upper Jurassic)

Homestake Limestone.--The Homestake Limestone is the oldest rock exposed in the district and forms the innermost belt of sediments dipping outward from the Three Peaks-Granite Mountain-Iron Mountain intrusives. It is 220 to 250 feet thick in the Granite Mountain area and is comprised of a basal siltstone layer, 20 to 30 feet thick, that is highly resistant to metallization; gray, "blue", and black limestone, which is massive to thick bedded; and an upper silty limestone, which is around 20 feet thick. In general, only the lowermost 100 to 120 feet of the Homestake is replaced, but in areas of intense mineralization the full thickness of the limestone may be replaced.

Entrada Sandstone.--The Homestake Limestone grades upward into a gray and maroon shale which is the basal, 40 feet thick unit of the Entrada Sandstone. The remainder of the Entrada is shale, siltstone, and interbedded coarse sandstone. The Entrada is distinctively maroon in color and ranges from 0 to 220 feet thick in the area.

Iron Springs Formation (Upper Cretaceous)

The Iron Springs formation rests unconformably on the Entrada sandstone and is composed of lenticular beds of sandstone, shale, conglomerate, and fresh water limestone. The lower 400 feet of the formation has been subdivided into three units, A, B, and C, by Mackin (1954) on the basis of their conglomerate content. The remainder of the formation consist of gray, brown, and red sandstone, siltstone, and shale with minor lenses of fresh water limestone and conglomerate. Total formational thickness varys from 0 to 3,000 feet.

Likely, the sediments exposed in the vicinity of the two shafts southwest of Bullion Canyon (pl. 1) are within the lower 400 feet of the Iron Springs formation, since there is a considerable thickness of alternating sandstone and conglomerate lenses there. More study must be devoted to this area since it has an important bearing on the depth of the underlying Homestake formation.

Claron Formation (Eocene)

The Claron formation unconformably overlies the Iron Springs formation and is composed of conglomerate, red and gray sandstone and siltstone, and pink and white limestone. Total thickness in the Granite Mountain area is around 1,400 feet. The Claron formation is equivalent to the Wasatch Formation of Late Cretaceous-Early Eocene age. The Claron formation is overlain by up to 2,000 feet of Tertiary lavas and pyroclastics.

Igneous Rocks

Volcanics

Volcanic rocks, consisting mostly of a series of Tertiary ignimbrites, make up the main mass of the Antelope Range and are the only rocks exposed on the Metal Enterprise property. Rocks of this general type cover most of the mountain ranges of southwestern Utah and are considered by Mackin (1960) to be of great areal extent and to be quite useful in working out problems of regional structure. The following descriptions were taken mainly from Mackin's (1960) work.

Needles Range Formation (Early or Middle Oligocene)

The Needles Range formation is the oldest portion of the ignimbrite series exposed in the Iron Springs district. It is around 50 feet thick in this area and thickens to the north. In the vicinity of its type section, on the east side of the Needles Range (northwest of the Antelope Range), it is described as rhyolitic, victric-lithic ignimbrite, pink to dark red-brown in color.

Isom Formation (Upper Oligocene)

The Isom formation consists of a sequence of ignimbrites and lava flows with intercalated sedimentary rocks. The type locality is near Isom Creek in the northwest portion of the Iron Springs district. It is divided into two members, the principal one being the Bald Hills member, which is a sheet of porphyry of latitic composition, glassy to lithoidal in texture, and black to dark red-brown in color, with strong platy parting. The uppermost member of the Isom formation is a sheet of latite porphyry rarely more than 40 feet thick, lithoidal in texture, and purplish gray in color, with light gray lenticules. This unit is designated the Hole-in-the-Wall member.

Quichapa Formation (Upper Oligocene)

The Quichapa formation rests conformably on the underlying Isom formation, and is the principal ignimbrite series in the Iron Springs area. It is comprised of four distinct members, each with a characteristic lithology.

Leach Canyon Tuff.--The Basal member is designated the Leach Canyon Tuff and is 450 to 500 feet thick, gray to flesh in color, and has a matrix the texture of unglazed porcelain, which encloses fragments of dark red felsite, light gray pumice and other rocks, along with crystals of quartz, feldspar, biotite, and other pyrogenic minerals. The lithic fragments constitute 10% of the rock and the pyrogenic minerals 15-25%.

Swett Tuff.--The Swett Tuff is only 30 to 35 feet in thickness and is characterized by a low content of mineral grains, a rarity of foreign rock fragments, and a high degree of induration. In many respects it resembles the overlying Bauers Tuff, except that it does not contain sanadine and has a high plagioclase content.

Bauers Tuff - The Bauers Tuff is around 200 to 250 feet thick and is composed of a basal vitrophyre; a middle lithoidal phase, characterized by a conspicuous compaction foliation; and an upper non-foliated lithoidal phase. Generally the rock is strongly indurated and red to deep red-brown in color. Foreign rock fragments are rare and pyrogenic minerals constitute 10 to 15% of the rock. Foliation is made apparent by parallelism of light gray lenticules, 0 to 5 inches thick, and up to many feet in length.

Harmony Hills Tuff - The Harmony Hills Tuff is the uppermost member of the Quichapa formation and is 300 to 350 feet thick. It is tan to light red-brown in color, with grains of biotite, plagioclase and other pyrogenic minerals making up 30 - 45% of the rock. The biotite grains are cleavage flakes which are oriented subparallel to the base of the rock. It is only moderately indurated and in general shows no signs of welding.

Andesite (?) Porphyry and Volcanic Breccia

While not enough time was spent at the Metal Enterprise property to exactly determine the volcanic sequence, it is very likely that the rocks present in the area are within the Quichapa formation. This is based on the similarity of the rocks noted on the property to the description of the Quichapa as given by Mackin. Two rock units, however, do not fit into the described sequence. One, located mainly in the area of Figure 2, is an andesite (?) porphyry, and the other is a volcanic breccia, located near the central portion of the property. The andesite (?) porphyry shows characteristics of being a flow, such as vesicular structure, rather than being ignimbrite. Much more field work is necessary in order to exactly determine and describe the relationship between all the volcanics present

on the Metal Enterprise property.

Intrusives

No intrusive rocks were noted at the Metal Enterprise property, but since they are located to the east and southeast of the property and have an important bearing on mineralization in the district they will be described here.

Situated within 15 miles of the Metal Enterprise property are three intrusives, three to five miles in diameter, aligned along an approximately N. 50° W. line. Iron Mountain is the southwesternmost intrusive. Three Peaks northeasternmost intrusive, with the Granite Mountain intrusive lying in between. All of the intrusives are of the same quartz monzonite composition and are of the same age, which is given by Armstrong (1963, p. 79) as 24 m.y. for the Three Peaks intrusive. This would put the age of the intrusives as near the beginning of the Miocene, and later than the age of the Quichapa volcanics.

Most of the earlier reports concerning the Iron Springs area describe these intrusives as being laccoliths; however, later work by Ratté (1963), based on the results of deep drilling and the presence of discordant contacts with the intruded sedimentary rocks, shows them to be stocks or at least stocklike, with a combination of both concordant and discordant features.

In general, the three aligned intrusives were all emplaced along a Laramide structure defined by Mackin (1960, p. 100) as the Iron Springs Gap structure; a foreland de collment thrust which brought

the Jurassic Carmel formation over the Cretaceous Iron Springs formation, the plane of gliding being a gypsiferous bed at the base of the Carmel. This caused bulging of the overlying sediments and resulted in many of the laccolithic features noted by the first geologists to describe the area. There is much evidence of other intrusives which have been emplaced along the Iron Springs Gap Structure (Mackin, 1954; Granger, 1963, p. 149; Threet, 1963, p. 143) but which have not yet been uncovered by erosion.

Mackin (1954) and Ratté (1963) describe three separate zones within the quartz monzonite porphyry intrusives, each representing a different phase of crystallization of the bodies. The first of these described as the peripheral shell, represents the chilled border zone of the intrusive and is finer grained than the rest of the body. The minerals within this zone are fresh, and show little sign of alteration. This zone ranges in thickness from 100 to 200 feet. The second zone, which forms the interior of the intrusive masses, is much coarser grained than the peripheral shell, and the minerals within it show the effect of deuteric alteration. The third zone is called the zone of the selvage joints, and is located between the inner zone and the peripheral shell. It is characterized by a number of tensional joints, being of radical, concentric, and oblique type, which have undergone bleaching along their margins. This bleaching zone extends from less than an inch to more than six inches away from the joints. The bleaching is due to a loss of iron from this zone, which was deposited as magnetite and/or hematite within the joints themselves and as replacement deposits in the Homestake limestone. Mackin (1954) considers the iron derived from

these selvage joint zones to be the direct source of the mineralizing emanations for the district.

Structural History

The Iron Springs - Antelope Range area is located within the Great Basin geologic province, about 20 miles west of the Hurricane fault, which is generally regarded as the western margin of the Colorado Plateau. It is an area of two recognized periods of pre-intrusive structural deformation, domal uplift caused by intrusive activity, and concurrent and later subsidence of the surrounding area.

The first period of recognized structural deformation likely occurred within the early part of the Cretaceous period and is described by Mackin (1954) as the Post-Entrada-Pre-Iron Springs deformation. This took place after deposition of the Entrada, but before the underlying Homestake was completely lithified, and resulted in the uplift of a horst-like block in the vicinity of the Three Peaks - Granite Mountain - Desert Mound area. Most of the Entrada and part of the Homestake were then eroded from this area before the Iron Springs formation was deposited.

The second period of structural deformation occurred in the Cretaceous - Tertiary or Laramide interval and resulted in the previously mentioned Iron Springs Gap structure. This approximately N. 50° E. trending decollement thrust and and anticlinal fold structure formed an important locus for later Micene intrusive activity.

The Claron formation was then deposited on an erosion surface which had cut down the Laramide folds to a level plane. Spreading

of the Needles Range ignimbrites over the Claron began in Oligocene Time, possibly while the Claron was still being deposited.

Emplacement of the quartz monzonite porphyry intrusives began in Miocene Time, after the deposition of the Quichapa ignimbrites. This resulted in domal uplifts and related faulting along the zone of the Iron Springs Gap structure. Thickness of the cover over these intrusives at the time of doming is estimated by Mackin (1954) to have been some 3,000 to 6,000 feet.

Subsidence in the Basin and Range province began in Oligocene Time and intensified through the Miocene and later Tertiary. It was also in the Miocene that the Hurricane fault began to form.

Thus, in the Iron Springs - Antelope Range area, there was a combination of domal uplift caused by intrusive activity and Basin and Range-type subsidence going at the same time. It is likely that most of the faults and deformation in the Antelope Range formed at this time and also the broad tensional zone of weakness which was later mineralized at the Metal Enterprise property.

Economic Geology

Iron Deposits

The most significant economic features of the Iron Springs area are the deposits of iron ore associated with the previously described quartz monzonite porphyry intrusives. Most of the early workers, when describing these deposits, tended to make the formation of vein deposits of magnetite within the intrusives, and the replacement deposits of hematite and magnetite in the Homestake limestone surrounding them, special cases of ore deposition. Mackin (1954) proposed a theory of

"deuteric release" of residual iron-rich fluid from the zone of selvage joints in the intrusive to account for the iron ore deposits. Also, little study was given to pre-ore alteration of the Homestake limestone. It was generally considered that the iron bearing fluids directly replaced the limestone without the previous formation of skarn (Park and McDiarmid; 1964, p. 265). Ratté (1963, p. 95), however, has shown that the development of skarn was an important event preceding ore deposition. He also shows that rather than the ore deposition being a special case of "deuteric release", it more closely follows along the lines of conventional hydrothermal deposition.

Formation of skarn was largely restricted to the basal siltstone of the Homestake. The introduction of large amounts of Si, Al, Fe, Mg, Na and P and to some extent F, caused such minerals as diopside, tremolite-actinolite, phlogopite, wollastonite, vesuvianite, hedenbergite, scapolite and quartz to be formed in place in the siltstone, and fine grained andradite in the limestone. Solutions high in iron later moved through the rock that was formerly siltstone and replaced the former limestone. Ratté (1963, p. 54) gives an extensive list of gangue minerals occurring with the iron ore which include chalcopyrite, bornite, and galena. There is some evidence of zoning, as the bulk of the sulfides were deposited farthest away from the intrusive. Generally, however, the gangue minerals are in such minor amounts that they seldom present any problem in beneficiating the iron ore.

Magnetite, apatite, phlogopite and diopside formed early in the paragenetic sequence, while copper and iron sulfides, carbonate and

quartz were later, and commonly occur in vugs. Ratté (1963, p. 59) describes an epithermal siliceous vein containing Hg, Te, As and Sb, cutting the main ore body at Desert Mount (northeast of Iron Mountain), which he feels represents the latest stage of mineralization in the district.

Base and Precious Metal Deposits

Very little has been written covering non-ferrous mineral deposits in this part of the state. Butler (1920) described the epithermal gold-silver deposits of the Gold Springs and State Line district, 30 miles northwest of the Metal Enterprise property, and the Escalante silver-lead-copper deposit in the Escalante district, 16 miles west of the Metal Enterprise property.

Gold Springs and State Line Districts

In the Gold Springs and State Line district, gold-silver mineralization is within well defined quartz-carbonate veins. Wall rock is generally Early Tertiary andesite-trachyte-latite ignimbrites. The veins are typically epithermal and are banded and crustified. Quartz as chalcedony and small crystals is the most abundant gangue mineral, followed by calcite, adularia and flourite. The veins are not uniformly metalliferous and gold-silver mineralization is confined to distinct shoots. Gold and silver values range from the two being nearly equal in parts of the district to other parts where the silver greatly predominates.

Escalante District

In the Escalante district the veins strike north to northeast and are within the same type of volcanics as those in the State Line and

and Gold Springs districts to the northwest. At the Escalante mine, there is only one vein which has been extensively prospected. It strikes N. 25 E. and dips 70 - 80 degrees N. W. and has been traced on the surface for more than 3,000 feet. It is more a silicified zone than a true quartz vein, but portions of it show typical epithermal banding and crustified structure. There is very little evidence of mineralization on the surface and only an occasional chrysocolla stain was noted. However, material on the stockpile from the underground development shows abundant coatings and stains of chrysocolla and descloisite (lead-zinc vanadate) in a gangue of chalcedonic quartz, calcite, fluorite, adularia and barite. It is reported that values begin to increase only at depths greater than 100 feet below the surface.

The most striking feature of the Escalante deposit is the uniformity of values in the portion of the vein so far drilled. Samuel S. Arentz (1962), in an unpublished report on the Escalante mine, states that one churn drill hole and ten diamond drill holes were drilled to depths ranging from 150 feet to 700 feet and were equally spaced along 2,200 feet of fissure. This drilling disclosed an ore body containing an estimated 300,000 tons averaging from 28 to 30 ounces of silver per ton and also containing an estimated average of .01 ounce per ton Au, 0.50% Cu, 1.50% Pb and 1% Zn. During a recent informal conversation with Mr. Samuel Arentz of Escalante Silver Mines, Inc., OME-6373, on February 18, 1970 in Denver, Colorado, I was informed that through an agreement with Anglo American Corporation of South Africa Ltd. additional exploration diamond drilling from depths ranging from 150

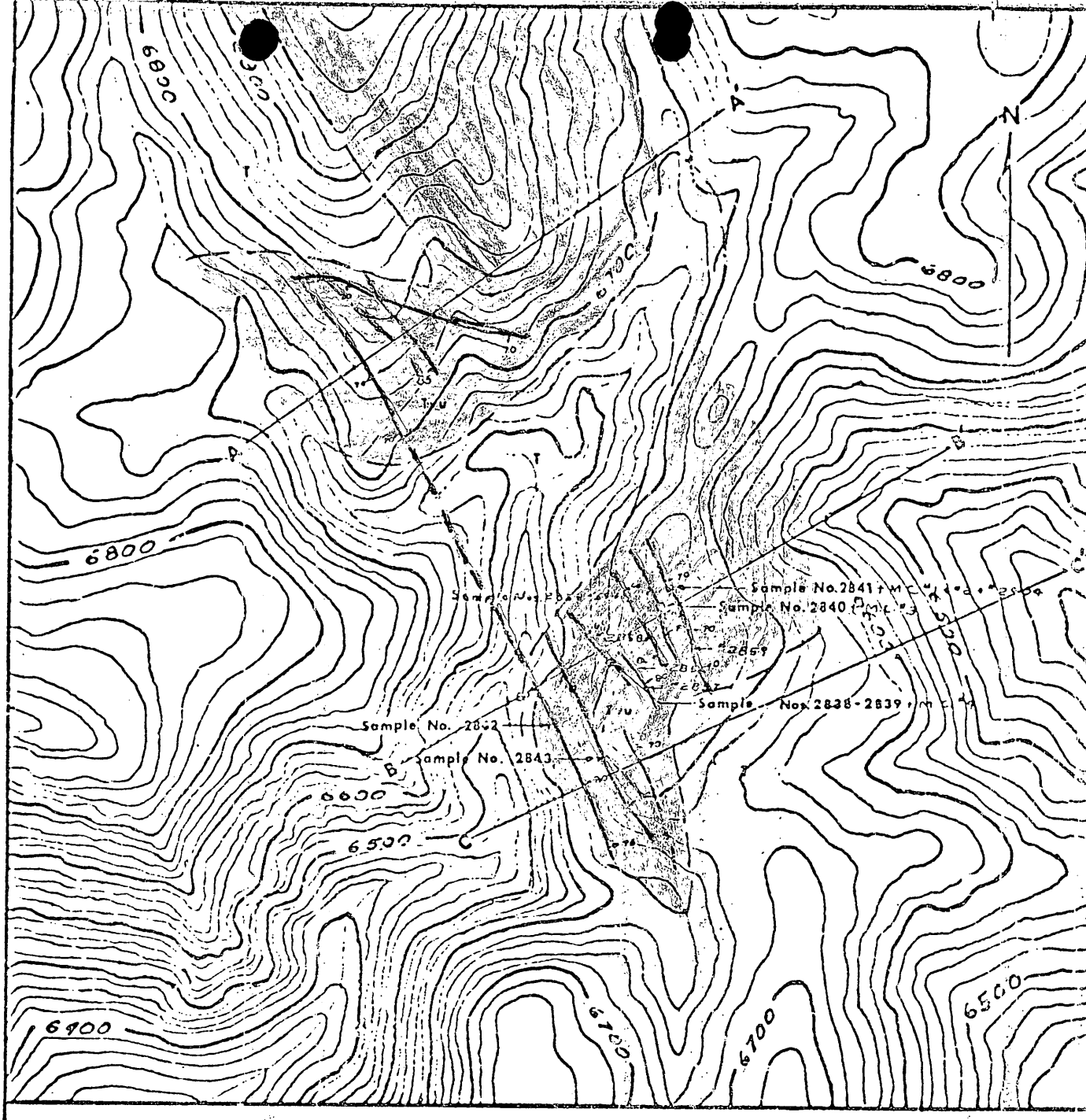
feet to 700 feet, for a distance northward of some 2,200 feet along the Escalante vein had been completed during 1969, and that between 300,000 and 800,000 tons of reserves was discovered that ranged in silver values from 10 - 15 oz. silver per ton to a quoted average value of 28-30 ounces silver per ton, and containing some lead values, to a quoted estimated (applicant's report) average of 0.01 oz. Au per ton, 0.50% Pb, and 1% Zn per ton. At current prices of $1.89 Ag, $35.00 Au, $0.56 Cu, $.1650 Pb and $.1550 Zn gross values of this ore would range from about $51.80 to $66.92 per ton. The vein is reported to average 16 feet in width, and could be mined to a depth of 700 feet with present pumping facilities. The mineralized material in the vein is still oxidized at a depth of 700 feet. Mr. Allen Heyl, Geologist, U. S. Geological Survey, visited the Escalante Silver Mine on May 24, 1969 and obtained information from a Mr. N. Atamanick, an Engineer from Canadian Rock Company Ltd., Contractor, Clarkson, Ontario, who was completing some pumping experiments on the property. They were then pumping some 11,000 gallons of water per minute and keeping the mine dry to a depth of 700 feet. The contractor stated that they were all set to pump as much as 20,000 - 30,000 gallons of water per minute if necessary to keep the cone of water depressed from the mine area. The contractor indicated that the Escalante vein may be mined as a vertical open stope, that is 2200 feet long by 700 feet in depth, and 16 feet wide. Mr. Samuel Arentz indicated that the water pumped from the mine area could be sold to local ranchers in the Escalante Valley, and the negotiations were under way. The water is considered good, clean water, thus its

sale to users is effected by either Federal or Utah State water regulations. Based on available data presented here there could be an ore reserve of 500,000 tons of ore having a gross value of approximately $50.00 per ton, there is a possible gross value of at least $25,000,000.00 in silver, copper, lead and zinc contained in the Escalante vein as herein described. The exploration work performed under OME contract 6373 explored the Escalante vein southward and did not result in the discovery of ore grade material, consequently no certification of discovery was made.

Metal Enterprise Property

At the Metal Enterprise property, a number of quartz-carbonate veins, striking around N. 40° W. with steep dips to the northeast and southwest, are located within a well defined silicified zone more than 500 feet wide and over two miles long. Rocks within this zone vary, but are probably all within the Quichapa formation of Upper Oligocene ignimbrites. There are anywhere from three to eight and possibly more veins across this silicified zone. The veins are probably continuous along the full length of the zone but were only mapped along the tops of ridges and hills where talus cover was not great (pl. 1). Not enough detail mapping was done to show any overall pattern to the vein system. Locally, deflections and intersections have a bearing on vein width, but generally they range from 2 to 15 feet wide, the average being 5 to 6 feet.

The veins strike N. 27° W., and dip steeply to the northeast and southwest (Fig. 3). Three of the most prominent veins have had



EXPLANATION

Tvu — Tertiary Volcanics - Undifferentiated

T — Talus

Quartz - Carbonate Vein

Shaft

Open Cut

Contours from USGS 7.5 Min. Silver Peak Quadrangle - See Plate 1 for location

OME DOCKET 6760

METAL ENTERPRISE

UTAH SILVER PROPERTY

PRELIMINARY GEOLOGIC MAP

2-15-67 Scale 1" 500' EWB

Figure 3

limited development work and some production, but there is no record of either grade or tonnage.

Individually, the veins show banding, crustification and are fairly vuggy - all evidence of open space filling under epithermal conditions. Gangue minerals are mainly chalcedonic and crystalline quartz with varying amounts of calcite and barite. Adularia and fluorite, if present at all, are in minor quantity. On the surface, the veins show little evidence of metallic mineralization, but zones of boxwork and limonite gossan were noted. All samples taken of vein material on the surface did contain more than one ounce of silver per ton. Samples taken fom the dumps of the three shafts show abundant chrysocolla staining and also contain malachite, azurite, descloizite, wad, limonite and possibly cuprite. One 2 mm thick stringer of chalcocite was noted near the footwall of one of the veins, but that was the only sulfide seen. No silver mineral as such was noted, however, it would probably be the chloride, cerargyrite, in combination with the other minerals present.

Samples taken from the dumps of the three shafts indicate that silver values will increase below the leached, near surface, zone of the veins. A sample taken from the dump of the center 50 foot deep shaft assayed 2.0 ounces silver per ton, while a sample from the dump of the 125 foot dump east shaft ran 9.6 ounces silver per ton. Samples of dump material are not really indicative of the value of mineralization at depth, however, since most of the best material was undoubtedly hauled to the mill in the course of mining.

Source of the mineralizing fluids at the Metal Enterprise property

is a matter for open debate. No doubt they are the result of Miocene intrusive activity in this area, but there is no direct evidence to link them with the three or possibly more intrusives that formed the iron ore deposits in the district.

If the strike of the silicified zone on the Metal Enterprise property is extended to the southeast, it will intersect the western side of Iron Mountain in the Milner Hill area. It is possible to say that the mineralizing fluids traveled laterally from this intrusive and formed the quartz-carbonate veins. However, the deposits associated directly with these intrusives contain little values other than iron. Veins in the Metal Enterprise silicified zone show no decrease in width or intensity at the northwestern limit of the property, which is over six miles from Iron Mountain. Sediments in the Bullion Canyon area, in the vicinity of the two shafts (pl. 1), show the effects of intense silicification, and a vein that one of the shafts is in contains values of gold, silver, copper, and lead (Au,.01 ounces per ton, Ag, .50 ounces per ton, Cu, .60% Pb .20%), and this is over seven miles from Iron Mountain. Also the existence of an epithermal vein at Desert Mound, in one of the iron ore bodeis, which contains Hg, Te, As, and Sb should theoretically be even farther away from this location than the Metal Enterprise veins whihc contain Ag, Cu, Pb, and Zn, in order to fit Emmon's system of mineral zoning, that is, if these intrusives are the source of epithermal mineralization in this area.

Mr. Bruner suggests that the source of the mineralizing fluids, which formed the veins at the Metal Enterprise property, rose vertically

along a weak, tensional zone from a magma source at depth, possibly also the source of the intrusives with which the iron deposits are associated. This would make the Homestake limestone, or indeed any other reactive rock directly below the Metal Enterprise property, a good target for deep exploration in hopes of finding base metal replacement-type deposits.

References Cited

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Applicant's reasons for expecting to find ore

Based on Cotter Corporation samples and the sampling of others, there is a silver mineralization of varying grade all along the quartz-carbonate vein system where it is exposed on the ridge shown on figure 3. Since this is the most accessible part of the property at present, we proposed to do our preliminary work here. Possibly, sampling of the vein system, where exposed, for the entire length of the Metal Enterprise property would show similar surface values, as shown by sample No. 2845 (pl. 1) which assayed 1.40 ounces per ton in silver.

As noted in the various geological reports accompanying this application, there is a close similarity in mineralization between the Metal Enterprise property and the State Line, Gold Springs, and Escalante districts, all located in this same general area of Utah. Other quartz-carbonate vein deposits in volcanics which have had moderate to substantial production are too numerous to mention.

Also, another possibility for ore mineralization is in the underlying reactive rocks below the Metal Enterprise property. The most intriguing of these is the Homestake Limestone which is extensively replaced by iron minerals at all the nearby iron mines. Mineralization extends into the sediments is shown in Bullion Canyon, northwest of the Metal Enterprize property. There, the same wide silicified zone, noted in volcanics at the Metal Enterprise property, is exposed in quartzite and conglomerate of what is very likely the Iron Springs formation. Within this silicified zone are numerous veins showing copper carbonate stains and varying amounts

of limonite gossan. Two samples taken of vein material in this area (No. 2844 and 2403) show a slight increase in lead and copper values over those samples taken from veins in the volcanics. There is no reason to assume that a silicified zone 300 to 500 feet wide, traceable for over a length of two miles, and exposed for a vertical distance of over 1400 feet should not extend to some depth in the sediments below the Metal Enterprise property.

For the above reasons, the applicant feels that an exploration program at the Metal Enterprise property should be twofold in nature. First, the vein system should be explored throughout its vertical extent at one location. This should establish the zone of near surface leaching, the depth of oxidation, the depth to the water table, the possibility of a supergene sulfide zone, and the nature of the unoxidized or primary mineralization. Also to be tested is the nature of the mineralization in the underlying sediments, hopefully in the Homestake Limestone, if it is possible to do so from this first location. Naturally, the tenor of the mineralization in each zone will be a critical factor in deciding the nature of future drilling.

If the first part of an exploration program reveals ore, then future work will be concentrated on determining the lateral extent of mineralization. That is, if mineralization persists uniformly over a considerable lateral extent, as it does at the Escalante Mine, or if it is confined to distinct oreshoots.

Sampling:

Sampling locations are shown on plate 1 in the pocket of this application. Descriptions and values of samples are as follows:

Samples 1 - 7:

These samples were taken by Maurice Castagne, mine manager for Cotter Corporation, on his first examination of the property.

#1 - Grab of dark colored vein material on dump east of shaft:

Au = Trace, Ag = 2.0 oz./ton, Cu = Nil, Ni = Nil

#2 - Same location, grab of light colored vein materials:

Au = 16.0 oz./ton, Cu = Nil, Co = Nil, Ni = Nil

#3 - Grab of dump material from center shaft:

Au = Trace, Ag = .6 oz./ton, Cu = Nil, Co - Nil, Ni = Nil

#4 - Grab of dump material from west shaft dump:

Au = Trace, Ag = 4 oz./ton, Cu = Nil, Co = Nil, Ni = Nil

Wo = .12%

#5 - Chip sample of outcrop 150 feet southeast of center shaft:

Au = Trace, Ag = 4 oz./ton.

#6 - Chip sample of #2 vein outcrop:

Au = Nil, Ag = 2.0 oz./ton

#7 - Chip sample of #2 vein outcrop:

Au = Trace, Ag = 6.0 oz./ton

Composite 1 through 7 - Spectrographic analysis - see copies of assay certificates.

The following samples were taken by Erik Bruner during various trips to the property:

Sample No. 2838 - Grab of chrysocolla stained vein material from the dump of the 150 foot west shaft:

Au = .03 oz./ton, Ag = 3.7 oz./ton, Cu = .15%

Sample No. 2839 - Grab of "barren" looking vein material same location as 2838:

Au = .01 oz./ton, Ag = 1.4 oz./ton

Sample No. 2840 - Grab of chrysocolla and manganese bearing vein material from dump center, 50 foot deep shaft:

Au = .02 oz./ton, Ag = 2.1 oz./ton

Sample No. 2841 - Grab of chrysocolla bearing vein material from dump 125 foot deep, east shaft:

Au = Trace, Ag = 9.6 oz./ton

Sample No. 2842 - Grab of vein material on dump from small open cut on the westernmost vein:

Au = .03 oz./ton, Ag = 2.8 oz./ton

Sample No. 2843 - Grab of "barren" looking vein material blasted from the outcrop of second westernmost vein:

Au = .03 oz./ton, Ag = 1.3 oz./ton

Sample No. 2844 - Grab of vein material on dump of shaft southwest of Bullion Canyon (pl. 1):

Au = .01 oz./ton, Ag = 0.5 oz./ton, Cu = .60%, Pb = .20%

Sample No. 2845 - Grab of "barren" looking vein material from outcrop of vein near center of Metal Enterprise property (pl. 1)

Au = .01 oz./ton, Ag = 1.4 oz./ton

The following samples were taken by Carl Vanlaningham and Erik Bruner during the latter part of June, 1967 while doing annual assessment on the Holt claims:

Sample No. 2853 - Channel-chip, 1.2 feet wide, of the chrysocolla and descloisite footwall portion of a 5.2 foot wide, N. 60° W. trending, 60° NE dipping quartz-carbonate vein:

Au = Trace, Ag = 20 oz./ton

Sample No. 2855 - Channel-chip, 2 feet wide, of hangingwall portion of the vein described under Sample No. 2853:

Au - Trace, Ag = .20 oz./ton

Sample No. 2856 - Grab of material blasted from the outcrop of a 4.5 feet wide quartz-carbonate vein

Au = Trace, Ag = 3.4 oz./ton

Sample No. 2857 - Grab of material blasted from the outcrop of a 3.0 feet wide quartz-carbonate vein

Au = Trace, Ag = 1.20 oz./ton

Sample No. 2858 - Grab of material blasted from the outcrop of a 5.0 feet wide quartz-carbonate vein:

Au = Trace, Ag = .60 oz./ton

Sample No. 2859 - Grab of material blasted from the side of a small pit in a 5.4 feet wide quartz-carbonate vein:

Au = Trace, Ag = 1.00 oz./ton

The following samples were taken by Erik Bruner and Don Atkinson of Cotter Corporation on November 27, 1967:

Sample No. 2404 - Grab sample from stockpile near collar of easternmost shaft on Holt claims:

Ag = 6.564 oz./ton, Pb = .107%, Cu = .845%.

P. O. BOX 1888
165 SOUTH WEST TEMPLE ST.

CERTIFICATE OF ASSAY

TELEPHONE EM 3-2563

BLACK & DEASON

ASSAYERS AND CHEMISTS

Westco Corporation

SALT LAKE CITY, UTAH 84110 October 27, 1966

ASSAY PER TON OF 2000 POUNDS

NAME	NO.	GOLD OUNCES	VALUE GOLD PER TON	SILVER OUNCES	WET LEAD %	COPPER %	Cobalt ~~INSOLUBLE~~	ZINC %	Nickel ~~XXXX~~	Tungsten ~~XXXX~~	%
#1 Blain Dump DARK		Trace		2.0		None	None		None		
2 " " LIGHT		Trace		16.0		None	None		None		
3 No 2 SHAFT Dump		Trace		0.6		None	None		None		
4 WEST SHAFT Dump		Trace		4.0		None	None		None	0.12	
5 OUTCROP 150' S.E. OF NO 2		Trace		4.0							
6 OUTCROP WEST RIDGE		Trace		2.0							
7 OUTCROP WEST RIDGE		Trace		6.0							

CHARGE $ 78.00

Weversley

Shop No. 2246
File No. 568 V O

Date 10 Dec 1966

VALUES
Latest Quotation

1 oz. Gold.....
1 oz. Silver.....
1 lb. Copper.....
1 lb. Lead.....
1 lb. Zinc.....

THIS CERTIFIES
Samples submitted for assay contain as follows:

Arizona Assay Office

815 NORTH FIRST STREET
Phone: 253-4001

Phoenix, Arizona 85001
P. O. BOX 1148

MR. CARL VON LANINGHAM
Box 331
Cave Creek Arizona

Short Ton ..... 2000 Lbs.
Short Ton Unit ..... 20 Lbs.
Long Ton ..... 2240 Lbs.
Long Ton Unit ..... 22.4 Lbs.

MARKS	SILVER PER TON Ozs.	SILVER PER TON Tenths	VALUE PER TON	GOLD PER TON Ozs.	GOLD PER TON 100ths	VALUE PER TON	TOTAL VALUE PER TON of Gold & Silver	PERCENTAGE COPPER	PERCENTAGE LEAD	REMARKS
2838	3	7	$4.62		.03	$1.05		0.15		
2839	1	4	$1.75		.01	$.35				
2840	2	1	$2.62		.02	$.70				
2841	9	6	$12.00	TRACE						
2842	2	8	$ 3.50		.03	$1.05				
2843	1	3	$ 1.62		.03	$1.05				
2844		5	$.62		.01	$.35		0.60	0.20	

Charges $ 30.00 PAID

Assayer

JACK STONE

ANDY CHUKA, PRINT

CRISMON & NICHOLS

ASSAYERS AND CHEMISTS

229-231 SOUTH WEST TEMPLE STREET

SALT LAKE CITY, UTAH 84110

PHONE 363-7417

P. M.

REPORT OF ASSAY

July 11, 1967

Metal Enterprise

WE HAVE ASSAYED YOUR seven SAMPLES AND FIND them TO CONTAIN AS

DESCRIPTION	NO.	OZS. GOLD PER TON	OZS. SILVER PER TON	PER CENT LEAD	PER CENT COPPER	PER CENT ZINC	PER CENT INSOL.	PER CENT IRON	PER CENT	VA
	2853C	Trace	2.20							
	2854B	Trace	0.20							
	2855D	Trace	0.20							
	2856A	Trace	3.40							
	2857B	Trace	1.20							
	2858C	Trace	0.60							
	2859D	Trace	1.00							

REMARKS: Canvas sack being mailed under separate cover.

CRISMON & NICHOLS

CHARGES $ 21.00 Paid

P. M. CRISMON, Pres.

CRISMON & NICHOLS

ASSAYERS AND CHEMISTS

229-231 SOUTH WEST TEMPLE STREET

SALT LAKE CITY, UTAH 84110

PHONE 363-7417

P.

REPORT OF ASSAY

February 7,

Metal Enterprise

WE HAVE ASSAYED YOUR one SAMPLES AND FIND it TO CONTAIN AS

DESCRIPTION	NO.	OZS. GOLD PER TON	OZS. SILVER PER TON	PER CENT LEAD	PER CENT COPPER	PER CENT ZINC	PER CENT INSOL.	PER CENT IRON	PER CENT	V
	2845	0.01	1.40							

REMARKS:

CRISMON & NICHOLS

TO: Prospect.

Certificate Of Assay

from

COTTER CORPORATION
ANALYTICAL DEPARTMENT
P. O. Box 751
Canon City, Colorado 81212

RECEIVED DEC 1 '67

DATE 11-22-67

MARKED	U_3O_8 G/L	U_3O_8 %	Ag Oz./Ton	Au Oz./Ton	Pb %	Zn %	Cu %	Cd %			
#2404 - Mont Utah			6.563	.	.107		.845				
#2403 Bullion Canon Ut. 6			.263	.	.470		.785				
~~[illegible]~~			~~[illegible]~~	—	~~[illegible]~~	—	~~[illegible]~~	—			

cc: DPM WEG CO
DRA MINE
MP DL

Lynn Boughton
CHIEF CHEMIST

Erik Bruner

1142 HOWARD STREET • SAN FRANCISCO, CALIFORNIA 94103 • AREA CODE 415 863-857

Submitted by Black & Deason
P. O. Box 1888
Salt Lake City, Utah

Date December 7, 1966

Sample of Mineral

Qualitative Spectrographic Analysis

METALS FOUND AND PERCENTAGE RANGE

P. O. No.

Lab. No. 7174

SAMPLE MARK	LESS THAN 0.01%	.01 TO .10%	.10 TO 1.0%	1.0 TO 10.0%	MAJOR
Comp. 1-7	Vanadium	Lead	Aluminum	Barium	Silico
	Beryllium	Sodium	Strontium	Iron	
	Boron	Potassium	Magnesium	Calcium	
	Zirconium	Titanium	Manganese		
	Nickel	Silver	Copper		
	Cobalt		Zinc		

REMARKS:

METALLURGICAL LABORATORIES, IN

By [signature]
SPECTROCHEMIST

Sample No. 2403 - Grab sample from dump of shaft in silicified vein on hillside southeast of Bullion Canyon (see pl. 1)

Ag = 0.263 oz./ton, 0.490% Pb, 0.795% Zn

Applicant's proposed exploration program

Cotter Corporation proposed drilling at the Metal Enterprise property, consists of six diamond drill holes from two sites as shown on figure 4 and 5. The two sites are shown on the included plan map and the depth and inclination of the holes are shown on the included section.

From drill site No. 1, the applicant proposes the following (Fig. 5).

Drill Hole No. 1 - 0 inclination, 900 feet total depth.

Drill Hole No. 2 - (-) 18° inclination, 850 feet total depth.

Drill Hole No. 3 - (-) 40° inclination, 600 feet total depth.

Drill Hole No. 4 - (-) 60° inclination, 800 feet total depth.

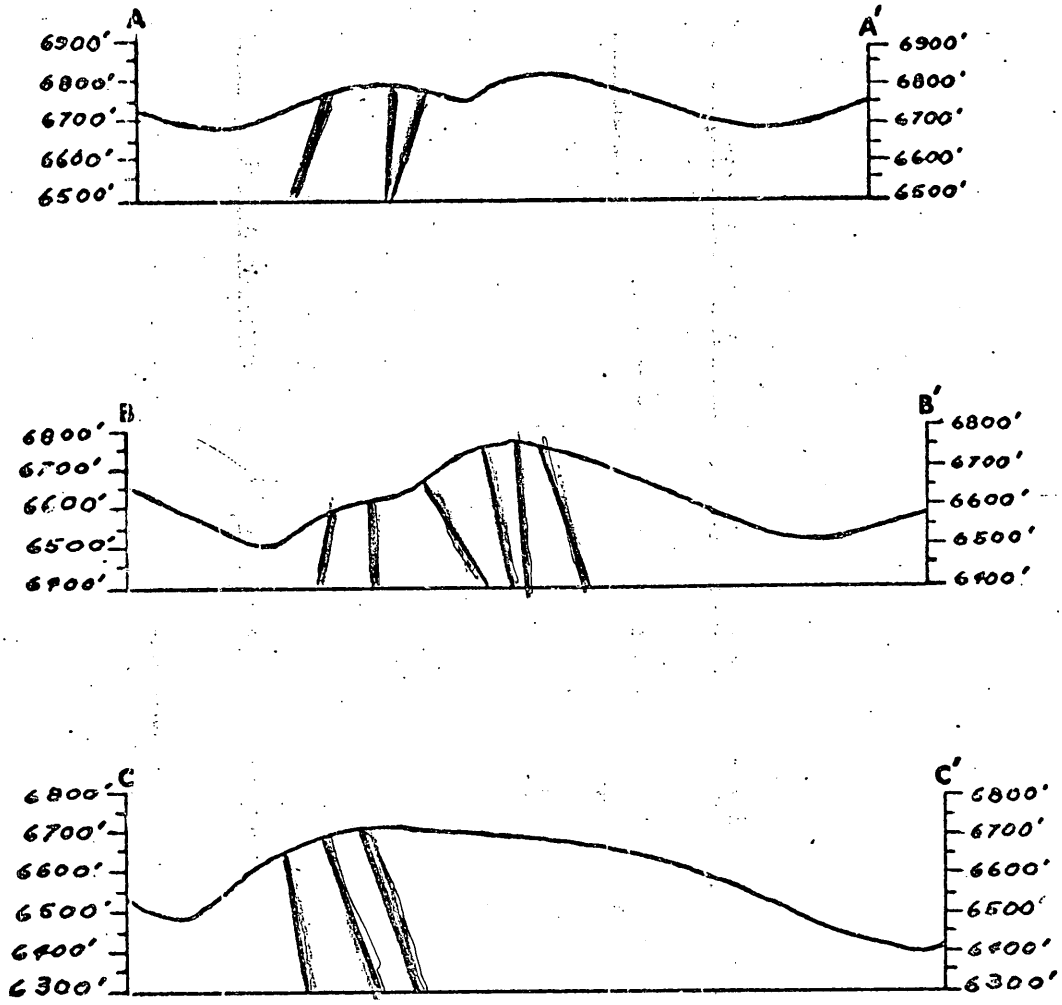
From drill site No. 2, the applicant proposes the following: (Fig. 5).

Drill Hole No. 5 - (-) 45° inclination, 1,000 feet total depth.

Drill Hole No. 6 - (-) 75° inclination, 2,000 feet total depth.

From drill site No. 1, the holes will all have a bearing of N. 60° E and from drill site No. 2, the holes will both have a bearing of S. 60° W.

It is proposed that the drilling be divided into two phases. Phase I will include holes DDH 2, DDH 4, DDH 5 for a total of 2,650 feet as shown in red on figure 5. If insufficient mineralization is encountered after these holes are completed, the project should end



OME 6760

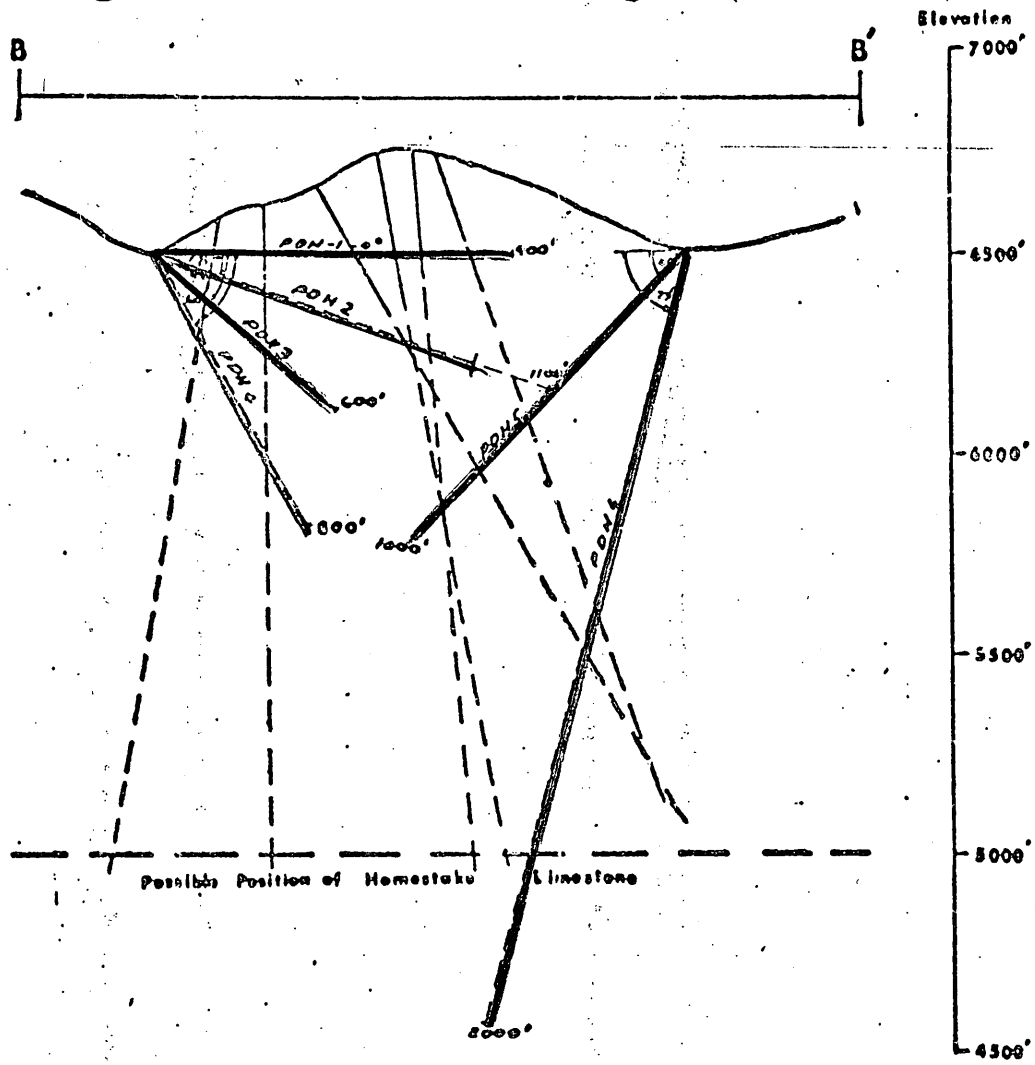
METAL ENTERPRISE

UTAH SILVER PROPERTY

CROSS SECTIONS FROM FIGURE 2
IN APPLICATION

2-15-87 Scale 1"=500' EWB

Figure 4



Phase I [redacted]

Phase II [redacted]

OME DOCKET 6760

METAL ENTERPRISE

UTAH SILVER PROPERTY

SECTION MAP OF PROPOSED DIAMOND DRILLING – 6400 FEET TOTAL

2-13-67 Scale 1" = 500' EWB

Figure 5

at this time. If sufficient mineralization if found in the drilling of these three holes, the project should move into Phase II.

Phase II consists of drilling holes DDH-1, DDH-3, and DDH-6 for a total of 3,500 feet as shown in blue on Figure 5 to complete the project.

The applicant feels that the proposed holes will adequately explore the downward extension of the quartz-carbonate veins from a depth of 250 feet to a depth of 1250 feet from the top of the hill.

Relation of the two proposed drill sites to existing workings is shown on the included plan map. Both drill sites are in the SW-1/4 of unsurveyed Section 8, T. 36 S., R. 14 W. Drill site No. 1 will be 2550 feet from Silver Peak on a bearing of N. 83° E. Drill site No. 2 will be 3750 feet from Silver Peak on a bearing of N. 75° E. Drill site No. 1 is located within Tip Top No. 5 claim and site No. 2 is within Tip Top No. 3 claim.

(b) Access Road

An access road and the two drill sites will be prepared as part of the annual assessment work for the Holt Claims.

(c) Time Schedule

If an OME contract is executed, the time until the start of the project will depend mainly on how soon a drilling contractor would be able to move onto the property. Using a daily average advance of 30 feet per shift and drilling two shifts per day, Phase I should be completed about two months after it starts allowing for a normal amount of down time and moving time. If the project is carried over into Phase II, an additional 2-1/2 months will be required for completion.

OME

6. EXPERIENCE

Cotter Corporation has several years experience in mineral exploration, mining and milling. At the present time, they are operating a uranium mill at Canon City, Colorado and are producing uranium ore from the Schwartzwalder Mine near Golden, Colorado and from the Orphan Mine at Grand Canyon, Arizona.

FINANCIAL ELIGIBILITY

(a) Efforts were made to borrow funds from three banks including our bank of account. The ensuing letters of refusal are attached hereto.

(b) Cotter Corporation is an independent company and is not affiliated with any other company in any manner.

(c) Cotter Corporation's share of the cost of the exploration program will be furnished out of its cash flow from its other activities.

Conclusions and Recommendations

A detailed study of the quartz-carbonate mineral bearing veins trending northwesterly across the Metal Enterprise Property, Iron County, Utah indicates that there may be a chance of discovering new reserves of silver ore as a result of a proposed exploration program.

Sampling of the various veins, and especially the Tip Top vein, from dumps, and from the veins themselves, taken on the surface or underground indicates that there is a rather pervasive and constant degree of mineralized material in the veins.

Grab samples from dumps, and various vein material showed assays ranging from 0.23 oz. Ag, to as much as 16.0 oz. Ag per ton. Gold values from these samples ranged from a trace to 0.03 oz. Au per ton and contained some copper, lead and zinc.

Sampling underground of the Tip Top vein from the No. 1 shaft shows the vein to average 1.75 feet wide with a range in width from 0.6 feet to as much as 8 feet. Silver assays average 6.11 oz. per ton. Some 13 samples contained silver assays ranging from 0.40 oz. Ag per ton to 21.20 oz. Ag per ton. All 13 samples contained some silver and they averaged 5.67 oz. Ag per ton.

Sampling from the No. 2 shaft on the Tip Top vein shows the vein to average 1.5 feet wide and to have an average grade of 1.64 oz. Ag per ton.

A grab sample from the 40-foot No. 3 shaft on the Tip Top mine assayed 10.60 oz. Ag per ton. An 8-foot sample from the No. 4 shaft assayed 2.70 oz. Ag per ton.

The Tip Top vein as sampled and mapped on the Metal Enterprise property shows consistant mineralized material over a strike length of at least 2,100 feet. Several other northwesterly striking veins exposed on the Metal Enterprise property can be traced for strike lengths from 20 feet to as long as 800 feet. Silver assays are not great, but range from 0.6 oz. Ag per ton to as high as 21.20 oz. Ag per ton. The most reliable samples that were actually taken from veins in place indicate that exploration at depth as proposed by the applicant may indeed increase values and would intersect possible ore shoots along the vein systems.

The intense silicification, the strong quartz-carbonate veins traversing the Metal Enterprise property are very similar in nature and in mineral content as the Escalante vein referred to earlier in this report. If further exploration of the Tip Top and other veins proved as fruitful as the exploratio work northward along the Escalante vein there is a good possibility of discovering silver reserves in excess of the cost of the currently proposed program. The terrane on the Metal Enterprise property allows for greater exploration above the water table. There is as much as 260 feet of back above the creek level on some of the veins, whereas the water table at the Escalante Mine lies at a depth of 180 feet. The 170 foot level of the Escalante mine was about 10 feet above the water table. Should the water table lie at a similar level on the Metal Enterprise property there could still be as much as 440 feet of vertical extent above and below a working level from the creek level near either of the diamond drill sites, before the water table would conceivably be encountered.

It is recommended that a contract be executed to complete Stage I of the applicant's exploration program as proposed herein to explore at depth the Tip Top and the various other veins that traverse the Metal Enterprise property as shown on Figure 5.

Estimate of Cost -- Phase I

The applicant's costs appear to be in line except for personal services. I would recommend one supervising geologist at $1250 per month for the two months, and allow costs for the Chief Geologist, for perhaps one trip, totalling $250.00. Assaying costs quoted were $10.00 for 200 samples. Charles O. Parker and Company, Denver, Colorado price list for assaying is as follows:

Gold and silver (same sample)	$2.50	$2.50
Copper, lead, zinc each	$1.50	$4.50
Total costs for assaying each sample		$7.00

200 samples at $7.00 = $1,400.00

Root and Simpson, Inc., Metallurgical Chemists and Assayers, Denver, Colorado, lists the following prices for assaying:

Gold and silver (same sample	$4.50		$4.50
Copper, lead, zinc, each	$3.00	or	$9.00
			$13.50

The applicant company may do their own assaying, if so the price they quote at $10.00 should be used for the contract price. Using the applicant's cost estimate for Phase I drilling less the amount I suggested for Chief Geologist costs totalling $250.00 makes the total estimated costs for Phase I drilling $28,848.80. Government participation at 75% for silver would be an estimated $21,636.60.

Should Phase I prove successful Phase II drilling as proposed by the applicant may well be warranted. If this be the case a contract should be written to include both phase I and phase II for a total

estimated cost of $69,108.70 . Government participation for both phases at 75 percent for silver would be $51,831.52.

(a) Independent Contracts.

Mobilization - Equipment and Personnel $350.00

Drilling three holes, estimated 2,650 feet 18,557.50

Depth, feet	NC	NX	BX	AX or EX
Drilling overburden or driving collar pipe				
0 - 100 @ $8.25/ft.				
0 - 250	7.30	6.95	6.70	6.50
250 - 500	7.65	7.30	6.95	6.75
500 - 750	8.00	7.65	7.30	7.00
750 - 1000	8.35	7.95	7.65	7.25
1000 - 1250	8.70	8.30	7.95	7.50
1250 - 1500	9.05	8.65	8.30	7.75
1500 - 1750	9.80	8.95	8.65	8.00
1750 - 2000	10.55	9.30	8.95	8.50

Reaming - all sizes

200 4.20/ft 840.00

Setting and pulling casing

10 hrs. @ $14.50/hr 145.00

Casing lost or left in hole 500.00

Sizes:	4 inch	NX	BX	AX	EX
Cost/ft.	4.15	3.30	3.00	2.00	1.75

Freight allowance:

20 cwt @ $1.25/cwt. 25.00

Cementing and redrilling	
$14.50/hour 24 hours	348.00
Additives:	
10 sacks @ $7.50/sack	75.00
Cement (Lumnite):	
10 sacks @ $7.83/sack	78.30
Mud:	
12 sacks @ $4.50/sack	54.00
Water truck rental	
2 months @ $220.00/month	440.00
Water truck mileage	
1800 miles @ $0.12/mile	216.00
Truck driver, including F.I.C.A., etc.	
240 hours @ $4.00/hour	960.00
Standby time - delay	
12 hours @ $15.50/hour	174.00
Core boxes	
NX - 155 boxes @ $1.00/box	155.00
BX - 125 boxes @ $1.00/box	125.00
(b) Personal Services	
Sub-category (a) Supervision and Technical Services	
1. Geologist	
2 months @ $1250.00/month	2,500.00
2. Supervision - Chief Geologist	
1 trip @ $250.00/trip	250.00

(c) Gasoline for pickup

3600 miles @ $0.12/mile	$432.00

(d) Pickup rental

2 months @ $150.00/month	$300.00

(e) Assays

200 @ $10.00/assay	2,000.00
Office Expense	
2 months @ $50.00/month	100.00
Insurance, payroll taxes, F.I.C.A., etc.	
2 months @ $206.25/month	412.50
	$28,711.30

Government participation at 75% will be $21,533.47

Phase II

Actual Costs

(a) Independent contracts

Roads and drill sites - None

Mobilization - None

Drilling three holes, estimate 3500 feet $26,327.50

Depth feet	NC	NX	BX	AX	EX

(see first phase)

Reaming

300 feet @ $4.20/ft.	$ 1,260.00

Setting and pulling casing

15 hours @ $14.50/hour	217.50

Casing lost in hole 600.00

Sizes	4 inch	NX	BX	AX
Cost/foot	4.15	3.30	3.00	2.00

Freight allowance:	
30 cwt. @ $1.25/cwt.	$37.50
Cementing and redrilling:	
36 hours @ $14.50/hour	522.00
Additives:	
20 sacks @ $7.50/sack	150.00
Cement:	
30 sacks @ $7.83/sack	234.90
Mud:	
20 sacks @ $4.50/sack	90.00
Water truck rental:	
2-1/2 months @ $220.00/month	550.00
Water truck mileage:	
2200 miles @ $ 12¢/mile	264.00
Truck driver, including F.I.C.A., etc.	
300 hours @ $4.00/hour	1,200.00
Standby time:	
18 hours @ $14.50/hour	261.00
Core boxes:	
NX - 200 boxes @ $1.00/box	200.00
BX - 135 boxes @ $1.00/box	135.00
(b) Personal services	
Supervision and Technical Services	
1. Geologist	
2-1/2 months @ $1,250.00/month	3,125.00
2. Supervision	
1 trip at $250.00/trip	250.00

ESTIMATE OF COSTS -- PHASE II (Cont.)

(c)	Gasoline for pickup	$648.00
(d)	Pickup rental	
	2-1/2 months @ $150.00/month	$375.00
(e)	Assays:	
	300 @ $10.00/assay	3,000.00
	Office Expense:	
	2-1/2 months @ $50.00/month	125.00
	Insurance, payroll taxes, F.I.C.A., etc. (@ $.1375%)	
	2-1/2 months @ $185.62/month	464.05
	Phase II	$40,036.45
	Phase I	28,711.30
	Total	$68,747.75

Government participation for Phase I and Phase II at 75% for silver would total an estimated $51,560.82

For Contractors

GEOLOGICAL SURVEY

OMIE DOCKET 6760

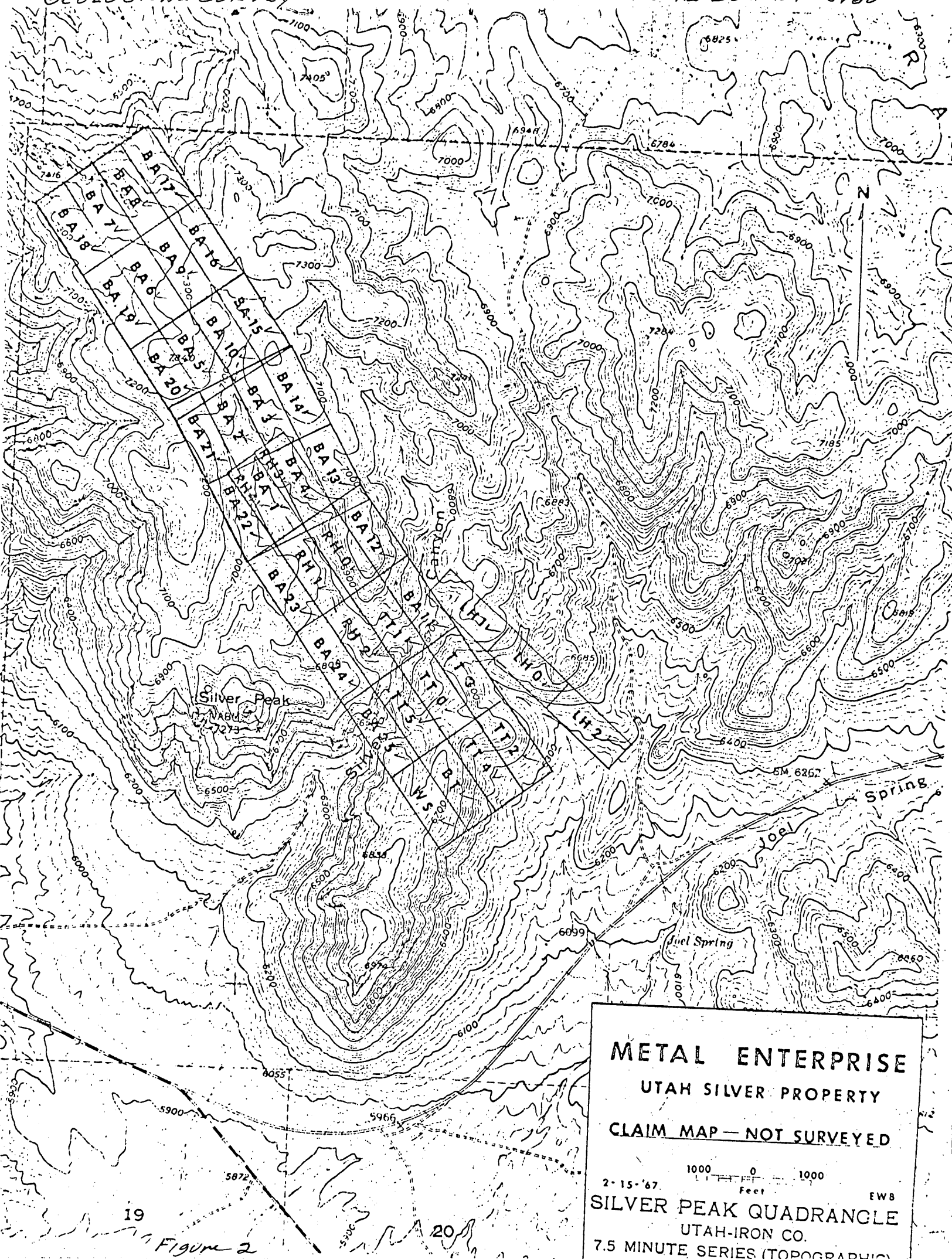
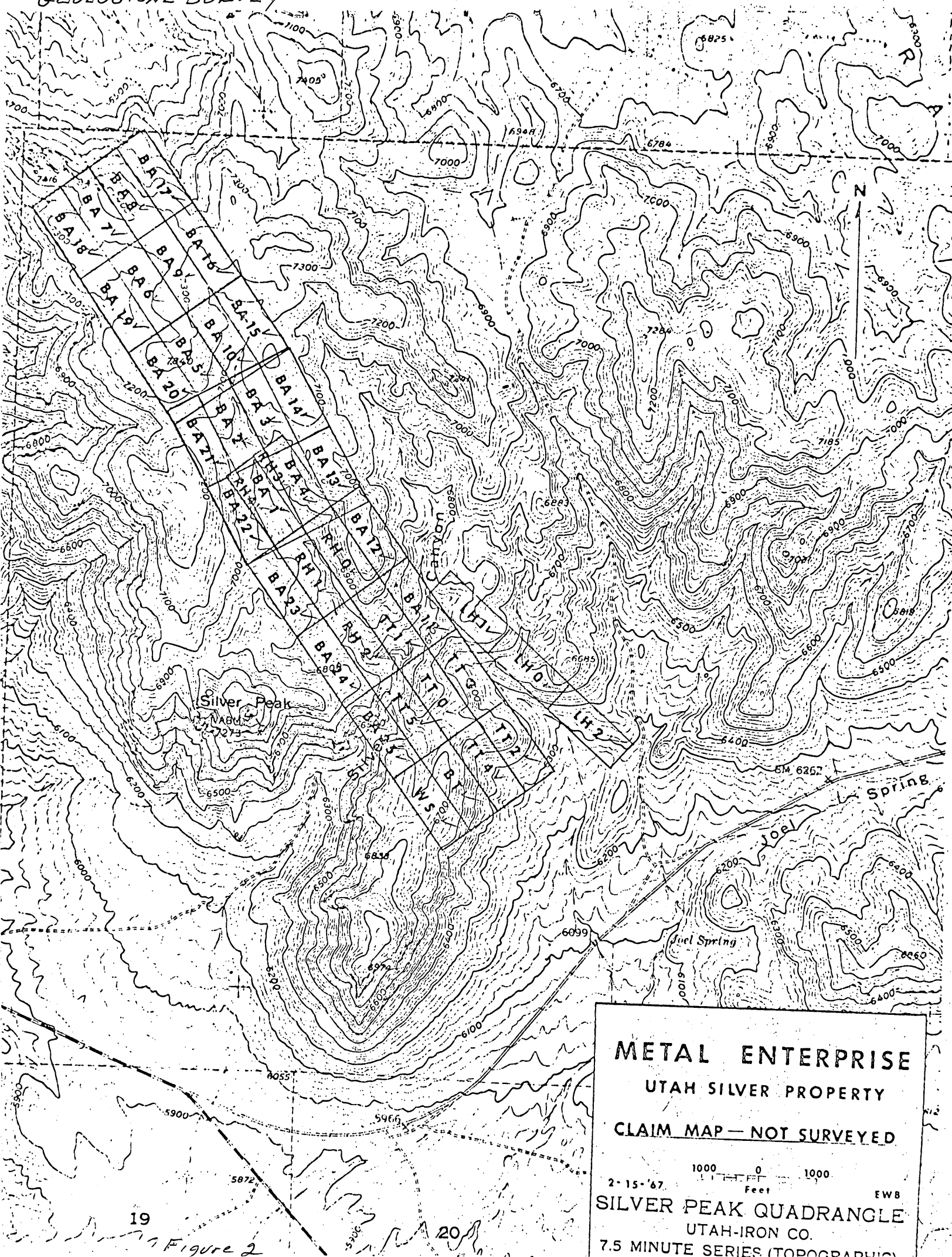


Figure 2

OIME DOCKET 6760

GEOLOGICAL SURVEY



GEOLOGICAL SURVEY

OME DOCKET 6760

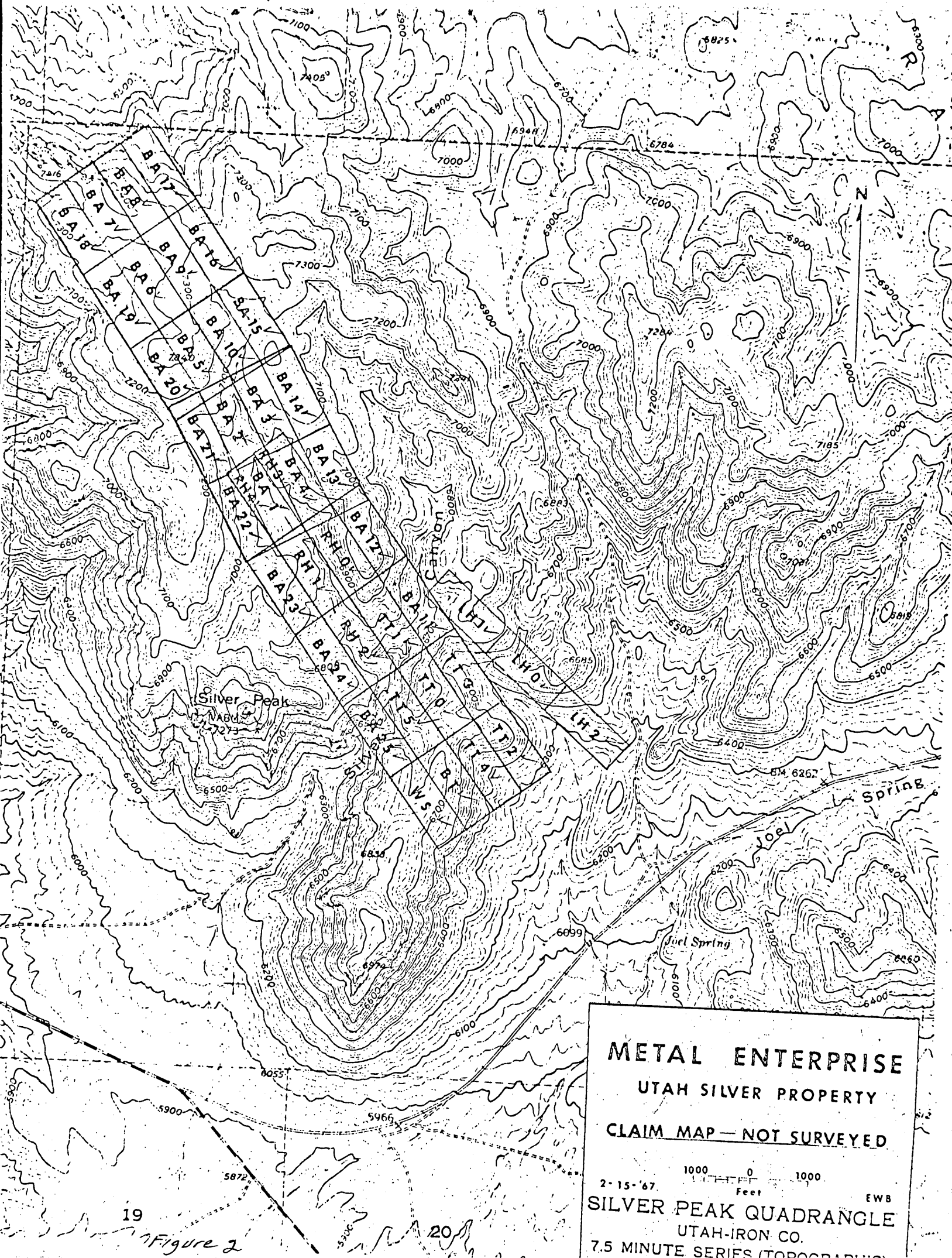


Figure 2

GEOLOGICAL SURVEY

OME DOCKET 6760

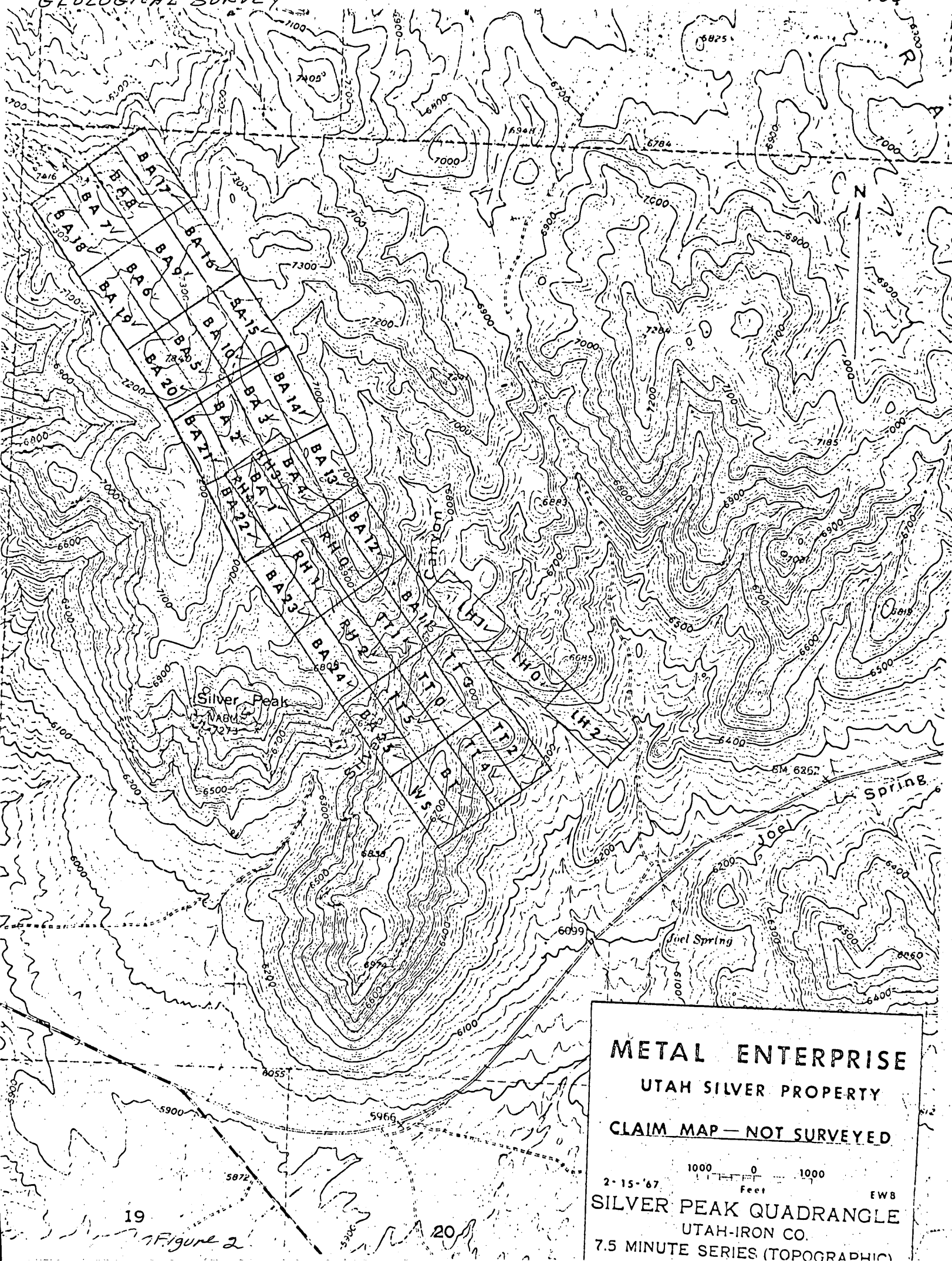


Figure 2

GEOLOGICAL SURVEY

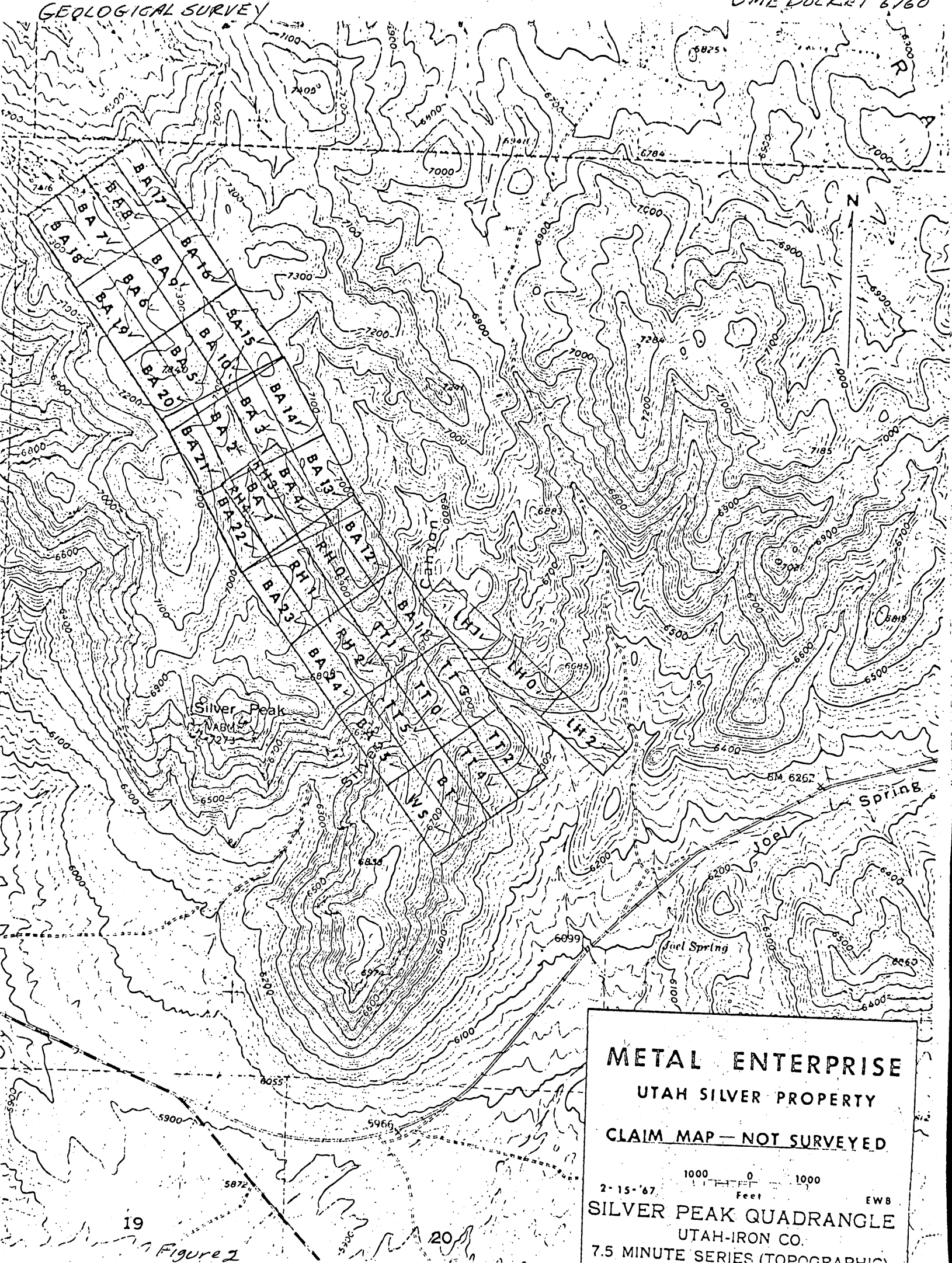
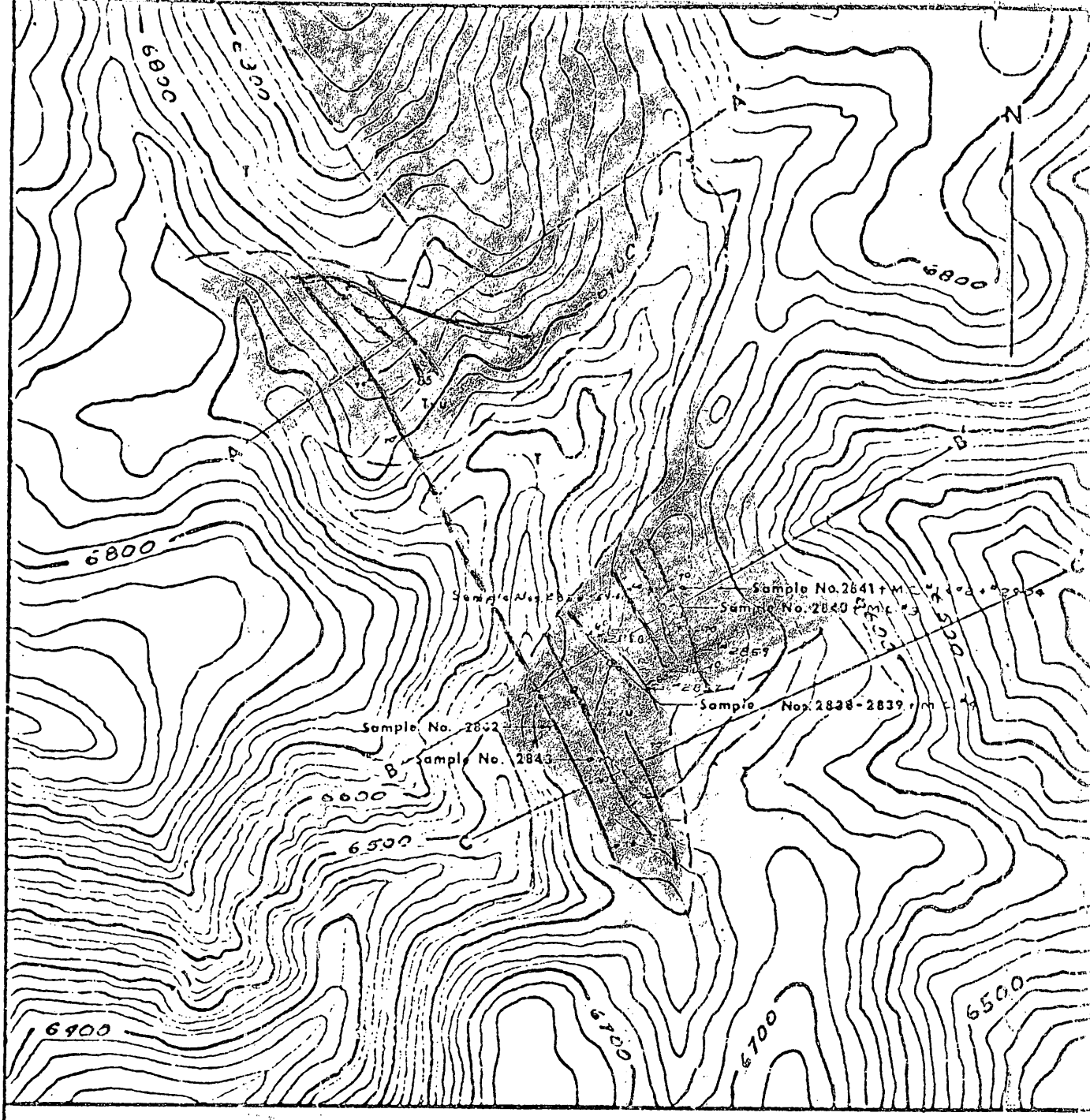


Figure 2

For control of use
if needed



EXPLANATION

- Tvu — Tertiary Volcanics - Undifferentiated
- T — Talus
- Quartz - Carbonate Vein
- Shaft
- Open Cut

Contours from USGS 7.5 Min. Silver Peak Quadrangle-See Plotat for location

OME DOCKET 6760

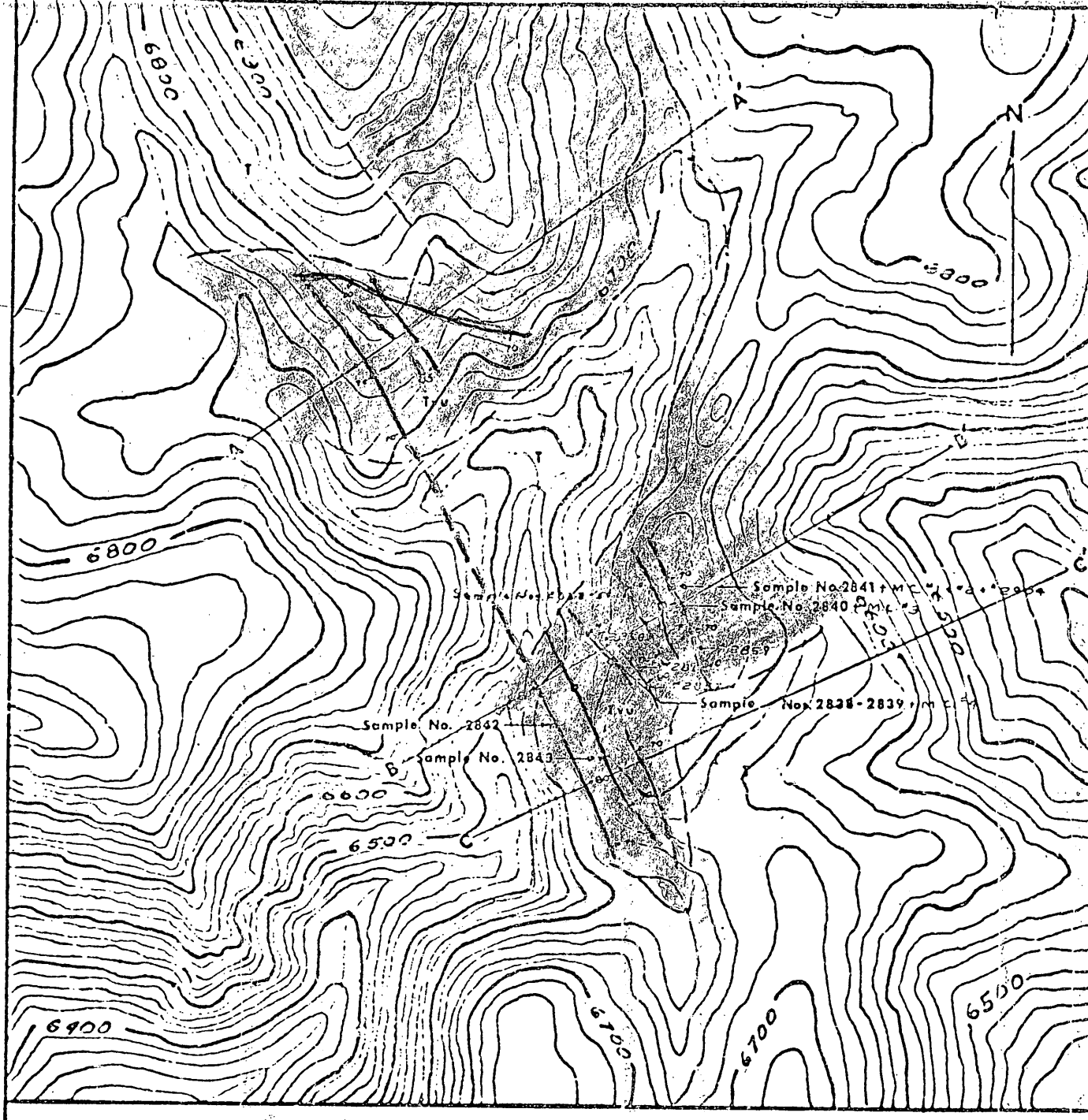
METAL ENTERPRISE

UTAH SILVER PROPERTY

PRELIMINARY GEOLOGIC MAP

2-15-67 Scale 1" 300' EWS

Figure 3



EXPLANATION

Tvu — Tertiary Volcanics - Undifferentiated

T — Talus

Quartz - Carbonate Vein

Shaft

Open Cut

Contours from USGS 7.5 Min. Silver Peak Quadrangle - See Plate 1 for location

OME DOCKET 6760

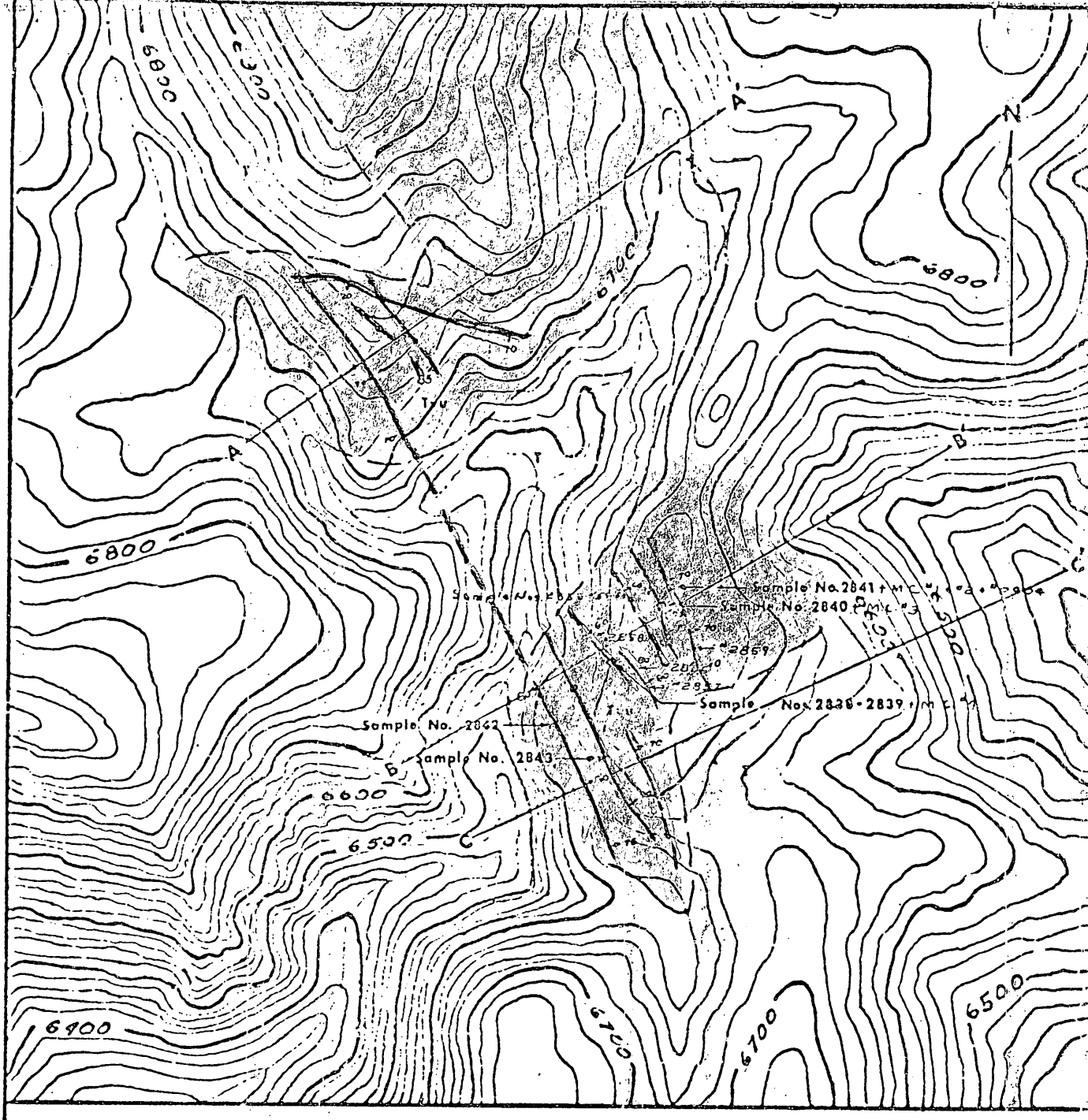
METAL ENTERPRISE

UTAH SILVER PROPERTY

PRELIMINARY GEOLOGIC MAP

2-13-67 Scale 1" 300' EWB

Figure 3



EXPLANATION

- Tvu — Tertiary Volcanics - Undifferentiated
- T — Talus
- Quartz - Carbonate Vein
- Shaft
- Open Cut

Contours from USGS 7.5 Min. Silver Peak Quadrangle - See Plotol for location

OME DOCKET 6760

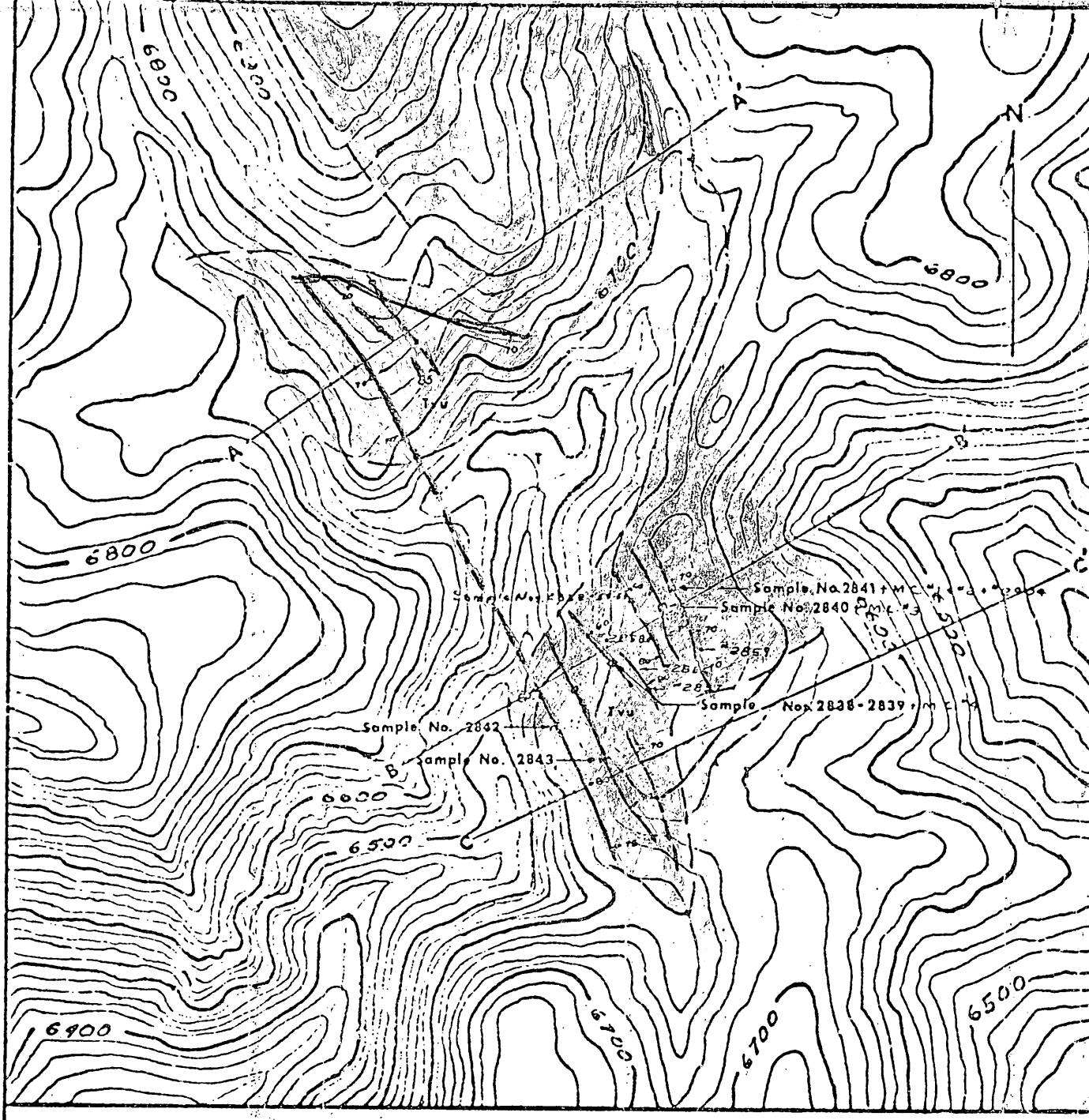
METAL ENTERPRISE

UTAH SILVER PROPERTY

PRELIMINARY GEOLOGIC MAP

2-15-67 Scale 1" 500' EWD

FIGURE 3



EXPLANATION

- Tvu — Tertiary Volcanics - Undifferentiated
- T — Talus
- Quartz - Carbonate Vein
- Shaft
- Open Cut

Contours from USGS 7.5 Min. Silver Peak Quadrangle - See Plate 1 for location

OME DOCKET 6760

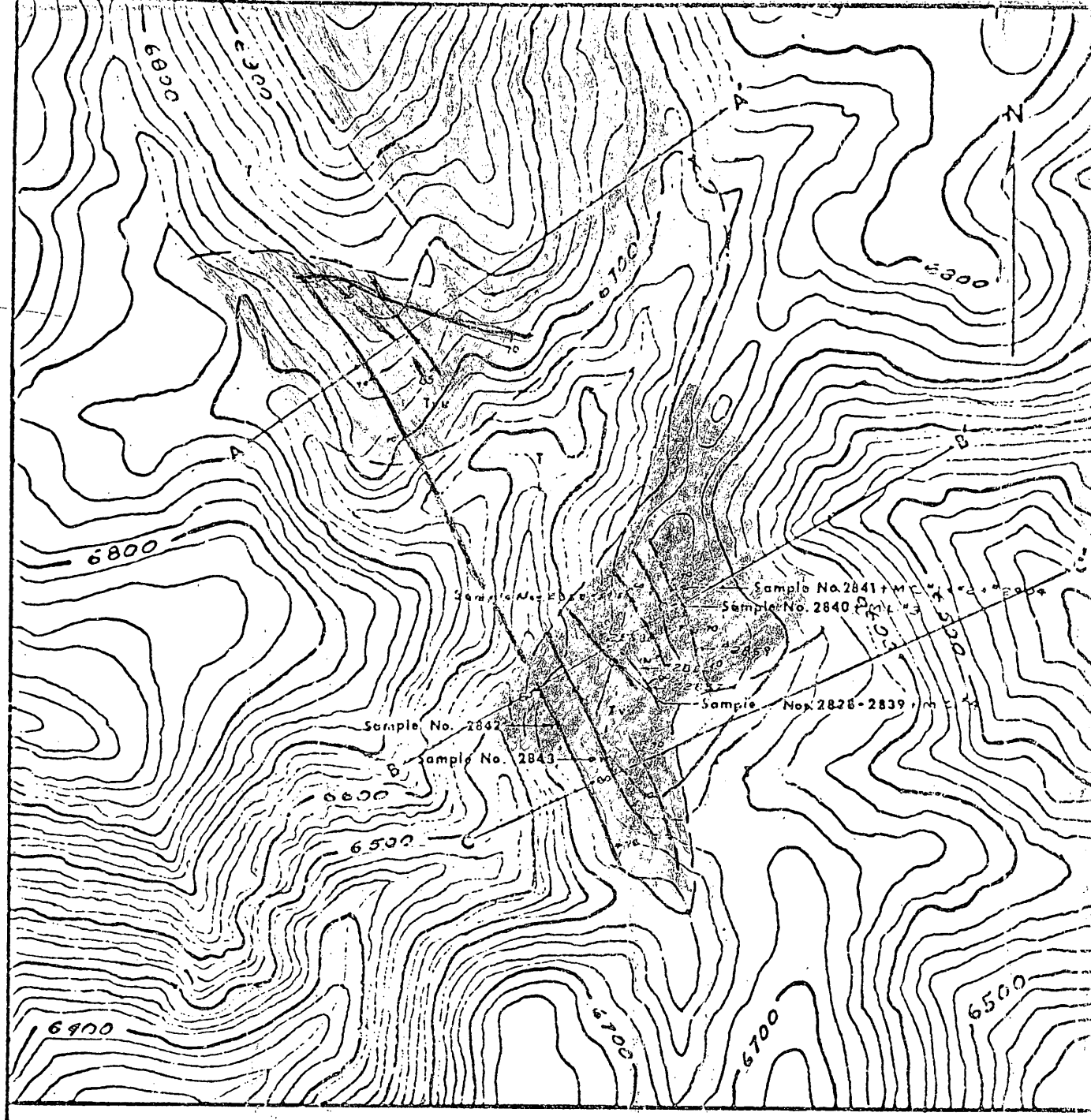
METAL ENTERPRISE

UTAH SILVER PROPERTY

PRELIMINARY GEOLOGIC MAP

2-15-67 Scale 1" 200' EWB

Figure 3



EXPLANATION

Tvu — Tertiary Volcanics - Undifferentiated

T — Talus

Quartz - Carbonate Vein

Shaft

Open Cut

Contours from USGS 7.5 Min. Silver Peak Quadrangle - See Plate I for location.

OME DOCKET 6760

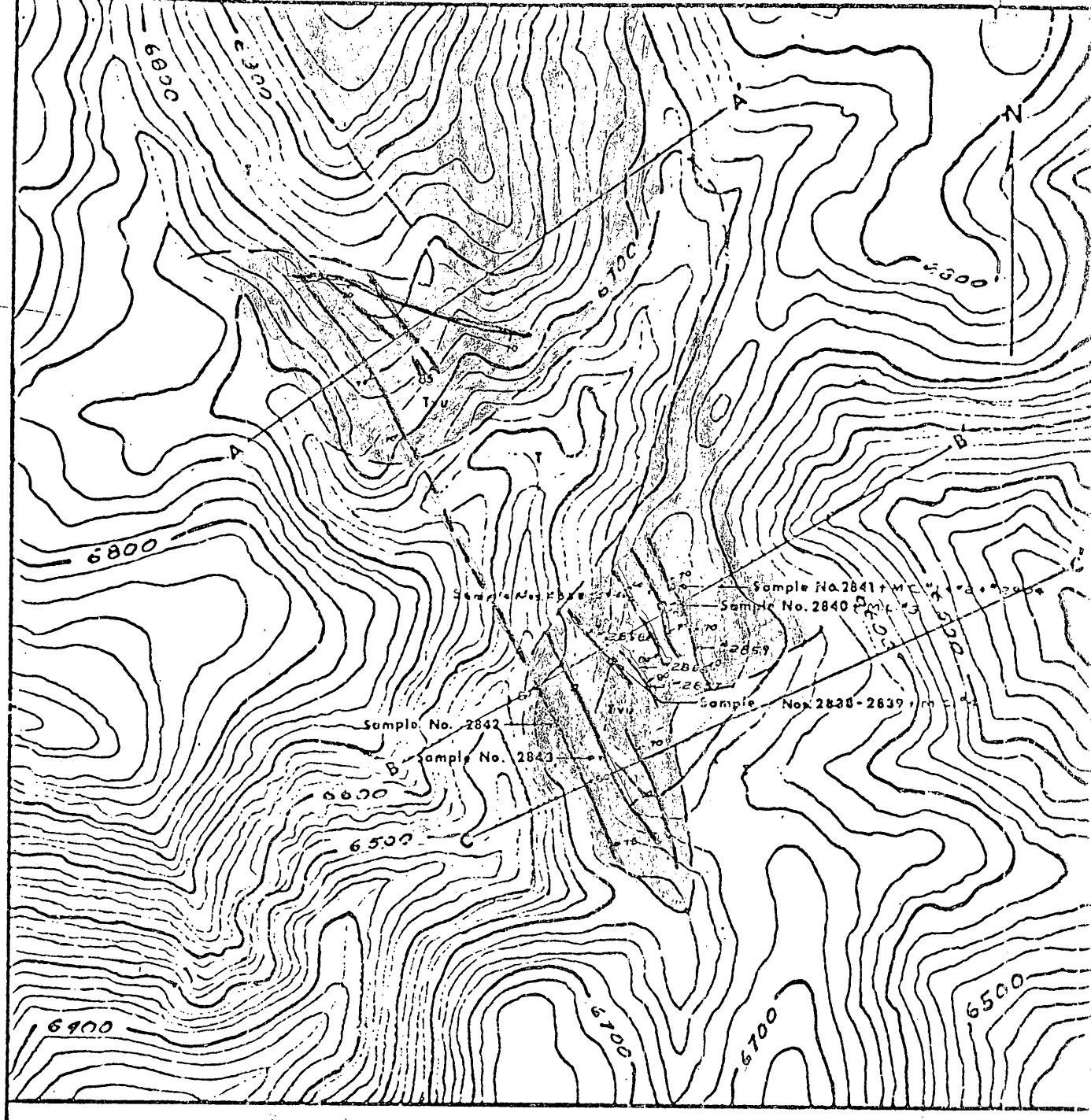
METAL ENTERPRISE

UTAH SILVER PROPERTY

PRELIMINARY GEOLOGIC MAP

2-15-67 Scale 1" 300' RWB

Figure 3



EXPLANATION

- Tertiary Volcanics - Undifferentiated
- Talus
- Quartz - Carbonate Vein
- Shaft
- Open Cut

Contours from USGS 7.5 Min. Silver Peak Quadrangle - See Plate 1 for location

ONE DOCKET 6760

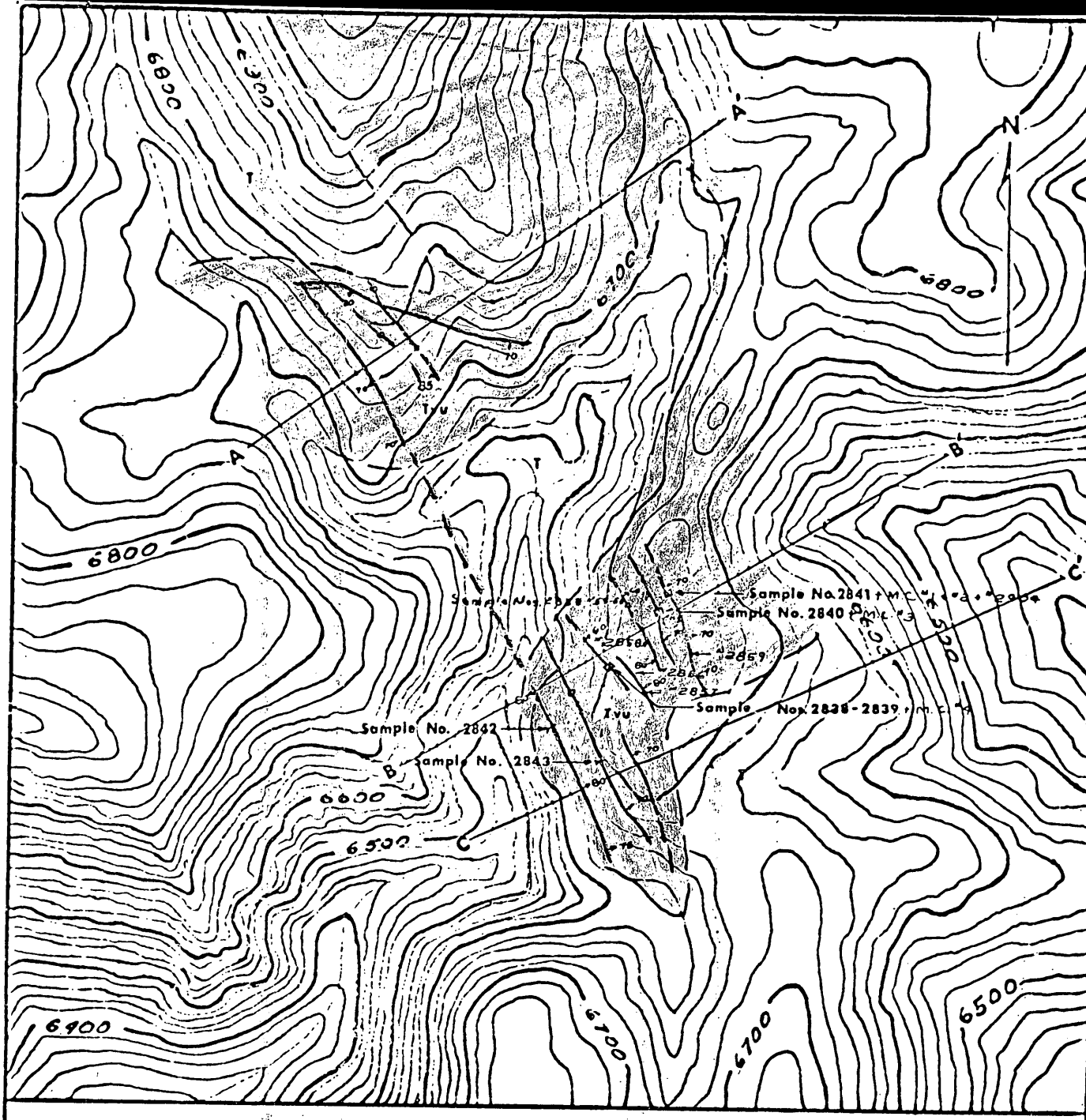
METAL ENTERPRISE

UTAH SILVER PROPERTY

PRELIMINARY GEOLOGIC MAP

2-15-67 Scale 1" 500' EWB

Figure 3



EXPLANATION

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- T — Talus
- Quartz – Carbonate Vein
- Shaft
- Open Cut

Contours from USGS 7.5 Min. Silver Peak Quadrangle–See Plate1 for location

Figure 3

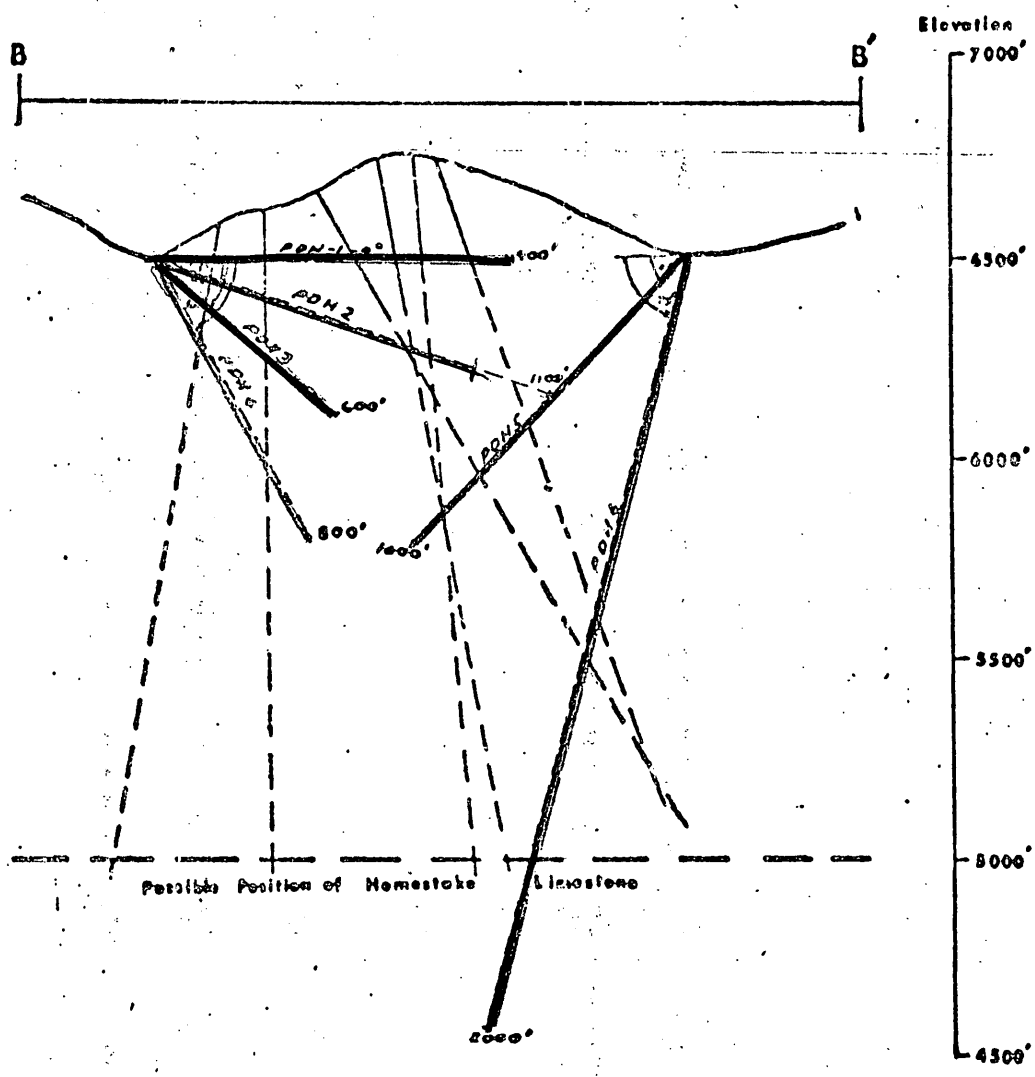
OME 6760

METAL ENTERPRISE

UTAH SILVER PROPERTY

PRELIMINARY GEOLOGIC MAP

2-15-67 Scale 1" 500' EWB



Phase I [redacted]

Phase II [redacted]

DME DOCKET 6760

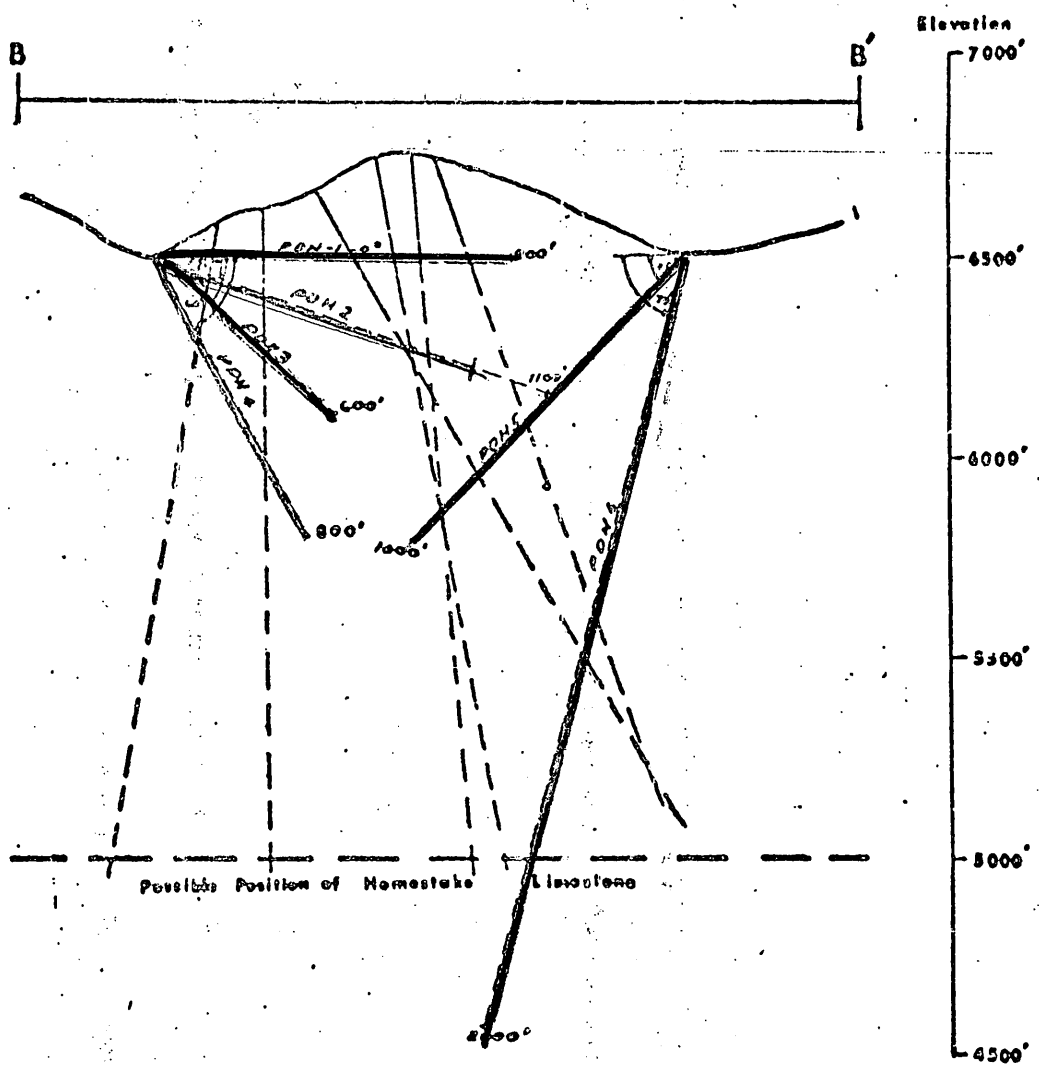
METAL ENTERPRISE

UTAH SILVER PROPERTY

SECTION MAP OF PROPOSED DIAMOND DRILLING – 6400 FEET TOTAL

2-13-67 Scale 1" = 500' EWB

Figure 5



Phase I [redacted]

Phase II [redacted]

OME Docket 6760

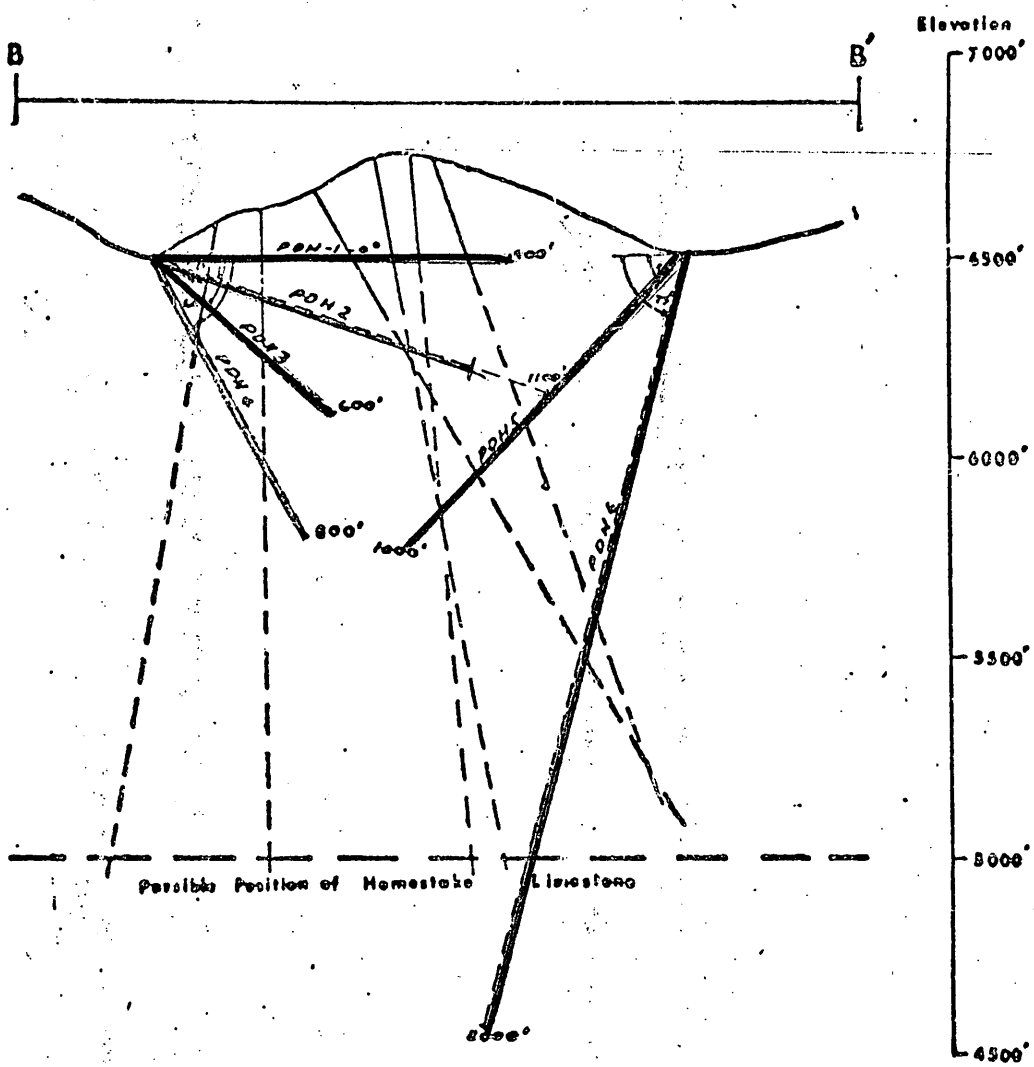
METAL ENTERPRISE

UTAH SILVER PROPERTY

SECTION MAP OF PROPOSED DIAMOND DRILLING – 6400 FEET TOTAL

2-13-87 Scale 1" = 500' EWB

Figure 5



Phase I

Phase II

OME DOCKET 6760

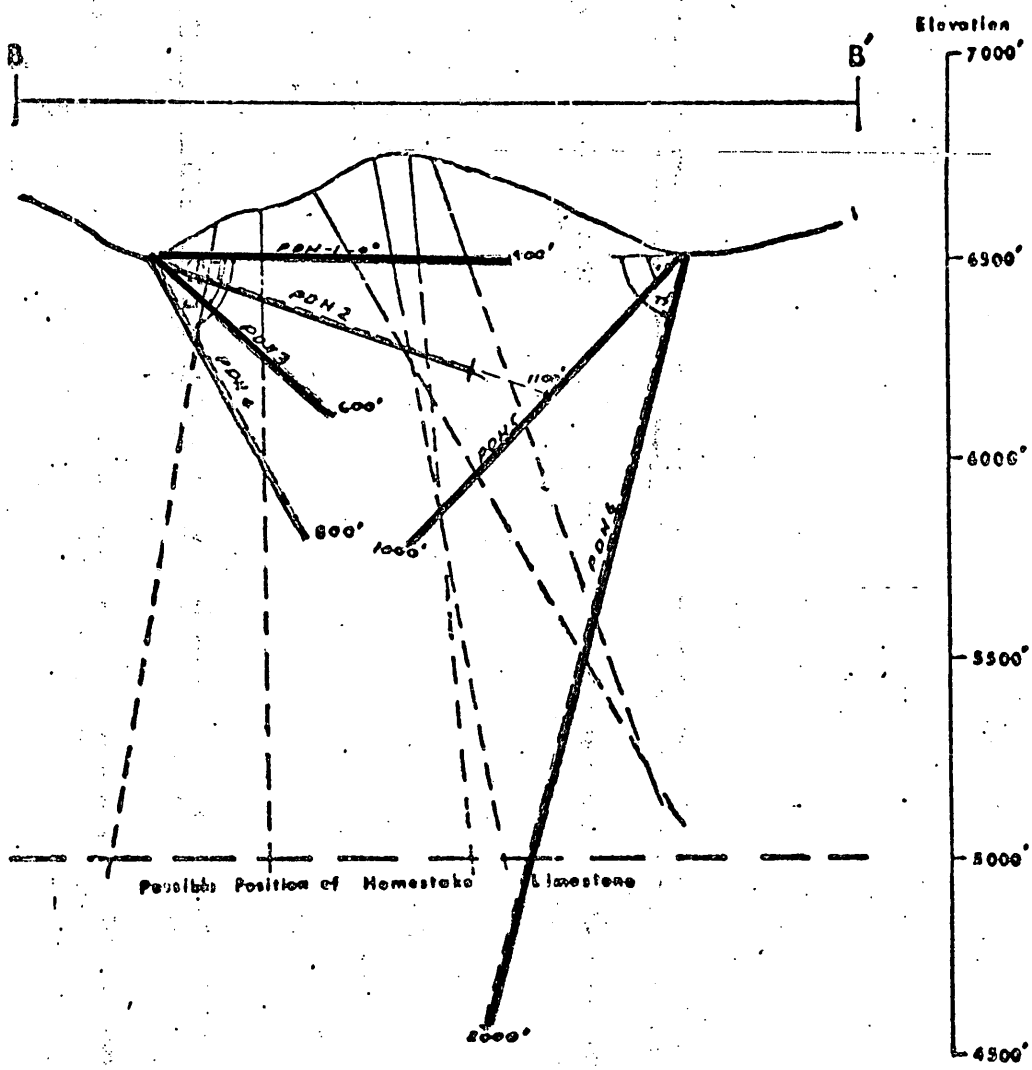
METAL ENTERPRISE

UTAH SILVER PROPERTY

SECTION MAP OF PROPOSED DIAMOND DRILLING – 6400 FEET TOTAL

2-15-67 Scale 1" = 500' EWB

Figure 5



Phase I

Phase II

DME DOCKET 6760

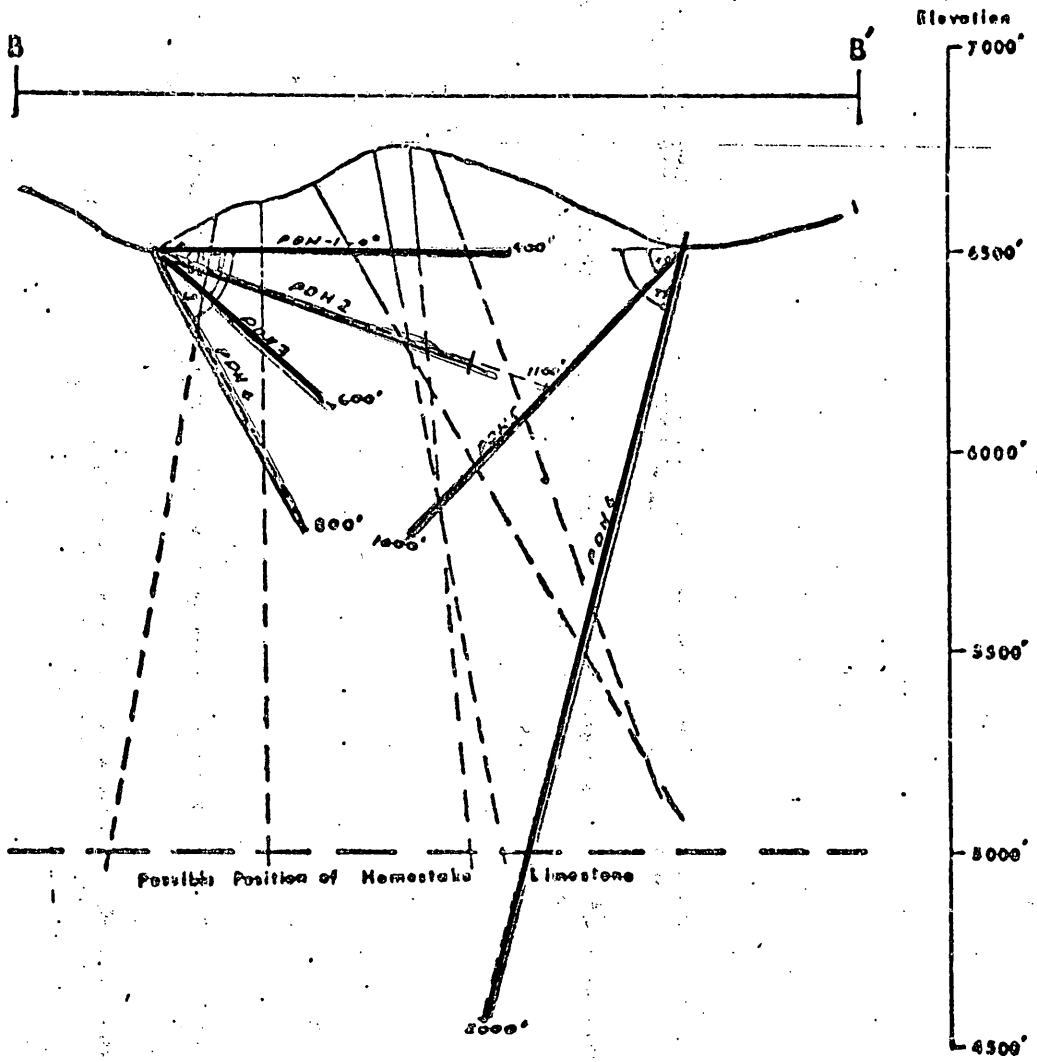
METAL ENTERPRISE

UTAH SILVER PROPERTY

SECTION MAP OF PROPOSED DIAMOND DRILLING – 6400 FEET TOTAL

2-13-87 Scale 1" = 500' EWD

Figure 5



Phase I

Phase II

OME DOCKET 6760

METAL ENTERPRISE

UTAH SILVER PROPERTY

SECTION MAP OF PROPOSED DIAMOND DRILLING – 6400 FEET TOTAL

2-25-87 Scale 1"=500' EWB

Figure 5

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
3/19/69	Peterson	120
		120
3/19	ce	220
		120M

MAR 19 1969

AIRMAIL

Cotter Corporation
P. O. Box 751
Canon City, Colorado 81212

Re: OME-6760 (Silver)
Cotter Corporation
Metal Enterprise Property
Iron County, Utah

Gentlemen:

Thank you for your letter of March 13 enclosing additional information in support of the subject application for financial assistance.

We are now referring the application for further consideration to Mr. J. William Nasler, Field Officer, Region III, Office of Minerals Exploration, Room 203 - Building 53, Denver Federal Center, Denver, Colorado 80225.

Mr. Nasler will notify you if additional information concerning the application is needed, and possibly to make arrangements for a field examination.

Sincerely yours,

Harold Kirkemo

Harold Kirkemo
Acting Chief
Office of Minerals Exploration

cc: Director's Reading File
Economic Geology File
OME Docket
OME Reading File
Region III
Mr. Peterson
130

ECPeterson/bsl 3/19/69

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
3/19/69	Peterson	120
		120
		220
		120M

AIRMAIL

MEMORANDUM

MAR 19 1969

To: Field Officer, Region III

From: Chief, Office of Minerals Exploration

Subject: OME-6760 (Silver)
Cotter Corporation
Metal Enterprise Property
Iron County, Utah

The subject application is referred to you for further consideration, a field examination if warranted, and recommendations.

The Applicant has furnished new bank correspondence. Based on the information in these letters and the financial statement previously submitted, the Cotter Corporation is eligible for Government assistance.

The proposal which divides the work into two stages is complete and well prepared, and we have no specific questions on the geology or other preliminary considerations. Previous sampling results and favorable findings noted by Erik Bruner in his report suggest that some exploration may be warranted.

A review of the cost estimate indicates that allowances for personal services are high, and these costs would necessarily need trimming if a contract is recommended.

Harold Kirkemo

Harold Kirkemo

cc: Director's Reading File
Economic Geology File
OME Docket
OME Reading File
Mr. Peterson
130

ECPeterson/bsl 3/19/69

COTTER CORPORATION
POST OFFICE BOX 1000
ROSWELL, NEW MEXICO 88201

March 13, 1969

OFFICIAL COPY
O. M. E.
RECEIVED
MAR 17 1969
INITIALS | CODE
120
120

Mr. Frank E. Johnson, Chief
Office of Minerals Exploration
United States Department of the Interior
Geological Survey
Washington, D.C. 20242

Re: OME-6760 (Silver)
Cotter Corporation
Metal Enterprise Property
Iron County, Utah

Dear Mr. Johnson:

In a letter addressed to and received by our Canon City office February 11, 1969, you requested that we submit new loan application letters to the Banks, furnishing our latest financial statement for their consideration.

Attached are copies of our letters and the banks' responses thereto. In each instance, they have declined favorable consideration.

We are hopeful that, on the basis of these new letters, you may now be in a position to determine our eligibility for the OME program.

Your consideration is appreciated.

Yours very truly,

COTTER CORPORATION

By: C. L. Pasquier, Jr.

CLPjr:sw

Enclosures

First Security Bank of Utah
NATIONAL ASSOCIATION
CEDAR CITY OFFICE
CEDAR CITY, UTAH

March 7, 1969

3-12-69
Copies to
DBA, DPM + MC
file

Mr. David P. Marcott
Executive Vice President and General Manager
Cotter Corporation
P. O. Box 1000
Roswell, New Mexico 88201

Dear Mr. Marcott:

Reference is made to your letter of December 31, 1968, in which you outlined certain mining interests that you have west of Cedar City, Utah, and also in which you requested a loan of $52,500.00 to be paid over a 5-year period in equal annual installments with interest at the rate of 7 per cent per annum on the unpaid balance.

We have received the copy of your corporation financial statement showing the comparative figures for the years 1966 and 1967. After going over the comparative statement it is evident that your corporation would not qualify for a bank loan due to the increase in your deficit at the end of 1967 compared with 1966 and the fact that your mining venture is of a rather speculative nature. It is the consensus of our loan committee that your application be declined.

Another reason for the turn down of your application is because of the unrealistic interest rate that you are willing to pay. Our standard commercial rate is 8 per cent, and there is a question as to the nature of the collateral you would be able to furnish us with on this type of a loan.

We trust that you will be able to work out some other suitable arrangement for financing. We feel that your application does not qualify under the standards of a bank such as ours.

Sincerely,

Francis W. Betenson

Francis W. Betenson
Manager

FWB/sm

Enclosure

March 5, 1969

First Security Bank of Utah
Cedar City Office
Cedar City, Utah

Attention: Mr. Francis W. Betenson, Manager

Gentlemen:

As will appear from the attached correspondence, we recently made application for a loan to enable us to begin a preliminary exploration drilling program to determine the silver potential on our Metal Enterprise Property located in Iron County, Utah, approximately nineteen miles west of Cedar City.

We shall sincerely appreciate your again considering our request for such a loan for the purpose previously stated, in light of the attached Financial Statement of December 31, 1967, the latest audited statement we now have available.

In addition to a lien on the mining claims involved, such other of our assets as might be acceptable to you as collateral could be pledged or mortgaged.

In the event you would be willing to make a loan only under terms other than those suggested by our Dr. Marcott, we shall appreciate your setting out such terms in your response.

Please return the Financial Statement after you have completed your examination thereof.

Thank you for your consideration.

Yours very truly,

COTTER CORPORATION

By: _____
C. L. Pasquier, Jr.

CLPjr:sw

Enclosure

First Security Bank of Utah
NATIONAL ASSOCIATION
SPANISH FORK OFFICE

SPANISH FORK, UTAH

March 7, 1969

3-12-69
copies to
DBA. OPM + MC
File

Cotter Corporation
P. O. Box 1000
Roswell, New Mexico 88201

Gentlemen:

Thank you for the application that you have submitted to this office for a $52,500.00 loan on a 7% interest rate to your company.

Due to the present money market situation and the general demand for credit in our area, we regret that we must decline your application at this time.

We appreciate the contact that you have made with us. Your financial statement dated December 31, 1967, is returned herewith.

Very truly yours,

Roy W. Hanson

Roy W. Hanson
Vice President

RWH:lrp

Enclosure

March 5, 1969

First Security Bank of Utah
Spanish Fork, Utah

Attention: Mr. Max Thomas
Senior Vice President

Gentlemen:

Cotter Corporation is a New Mexico corporation engaged in the mining and processing of uranium and other minerals. We have our principal office in Roswell, New Mexico and we own the Schwartzwalder Mine near Golden, Colorado, and the Orphan Mine at Grand Canyon, Arizona. The ores from these mines and other sources are transported to our mineral processing plant near Canon City, Colorado.

Cotter is the lessee of a group of sixteen unpatented mining claims owned by Heber M. Holt, George S. Holt and H. Wayne Holt, all of Enterprise, Utah. Cotter is also the owner of twenty-five unpatented mining claims, known as the Bright Angel Claims, adjoining the Holt Claims. This property is known as the Metal Enterprise Property and is located in Iron County, Utah, approximately nineteen miles directly west of Cedar City, Utah.

Geologists employed by Cotter have made an examination of the property to establish the aerial extent and the potential of silver mineralization of the property and to consider the possibilities of replacement-type mineralization at depth.

Cotter's geologists have designed a two-phase preliminary exploration drilling program involving diamond drill holes to determine the silver potential of the property. The estimated cost of the exploration program is approximately $70,000.00.

To enable us to go forward with the exploration program, we are in need of a loan of $52,500.00; such loan to be evidenced by a promissory note of Cotter Corporation secured by a first lien on our interest in the property. The loan would be repaid over a five-year period in equal annual installments with interest at the rate of 7% per year on the unpaid balance.

We shall sincerely appreciate your considering our request for such a loan for the purposes previously stated, in light of the attached Financial Statement as of December 31, 1967, the latest audited statement we now have available.

In addition to a lien on the mining claims involved, such other of our assets as might be acceptable to you as collateral could also be pledged or mortgaged.

In the event you would be willing to make a loan only under terms other than those suggested, we shall appreciate your setting out such terms in your response.

Please return the Financial Statement after you have completed your examination thereof.

Thank you for your consideration.

Yours very truly,

COTTER CORPORATION

By: _____
C. L. Pasquier, Jr.

CLPjr:sw

Enclosure

bcc: DBA
DPM
JL, jr

STATE BANK OF SOUTHERN UTAH · CEDAR CITY · UTAH

3-12-69
copies to
BSA. OPM + MC
File

March 7, 1969

C. L. Pasquier, Jr.
Cotter Corporation
P. O. Box 1000
Roswell, New Mexico 88201

Dear Mr. Pasquier:

After reviewing your request and studying your financial statement I must inform you that State Bank of Southern Utah is not in a position to grant such a loan. I am, therefore, returning your financial statement form.

Yours truly,

STATE BANK OF SOUTHERN UTAH

Robert B. White, Jr.

Robert B. White, Jr.
Executive Vice President

RBW:cu

enc.

C 2.23 f(1)

March 5, 1969

State Bank of Southern Utah
Cedar City, Utah

Attention: Mr. Robert B. White, Jr.
Executive Vice President

Gentlemen:

As will appear from the attached correspondence, we recently made application for a loan to enable us to begin a preliminary exploration drilling program to determine the silver potential on our Metal Enterprise Property located in Iron County, Utah, approximately nineteen miles west of Cedar City.

We shall sincerely appreciate your again considering our request for such a loan for the purpose previously stated, in light of the attached Financial Statement as of December 31, 1967, the latest audited statement we now have available.

In addition to a lien on the mining claims involved, such other of our assets as might be acceptable to you as collateral could also be pledged or mortgaged.

In the event you would be willing to make a loan only under terms other than those suggested by our Dr. Marcott, we shall appreciate your setting out such terms in your response.

Please return the Financial Statement after you have completed your examination thereof.

Thank you for your consideration.

Yours very truly,

COTTER CORPORATION

By: _____
C. L. Pasquier, Jr.

CLPjr:sw

Enclosure

bcc: DBA
DPM

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
2/11/69	Peterson	120
2/11/69	Kirkeno	120
		110
2/11	CAC	220
		120M

AIRMAIL

FEB 11 1969

Cotter Corporation
P. O. Box 751
Canon City, Colorado 81212

Re: OME-6760 (Silver)
Cotter Corporation
Metal Enterprise Property
Iron County, Utah

Gentlemen:

We have reviewed the information regarding the financial status of the Cotter Corporation for the purpose of determining whether the Corporation is eligible for assistance under OME regulations.

We note that in your letters to the banks there was no mention of any collateral being offered other than a lien on the mining claims where exploration is proposed. We believe that most lending institutions would be unlikely to favor such a request for risk capital under these conditions, especially if the assets of the borrower are not offered as collateral.

To further aid us in determining your eligibility for the OME program, we suggest that you submit new letters to the banks requesting a loan for the purpose previously stated, and furnishing your latest financial statement for consideration by the banks.

Sincerely yours,

FRANK E. JOHNSON (glc)

Frank E. Johnson
Chief, Office of
Minerals Exploration

cc: Director's Reading File
Economic Geology File
OME Docket
OME Reading File
Region III
Mr. Peterson

ECPeterson/bsl 2/11/69

COTTER CORPORATION
DIAL 275-3367
P. O. BOX 751 — 410 MACON AVE.
CANON CITY, COLORADO 81212

February 7, 1969

OFFICIAL
COPY
O. M. E.
RECEIVED
FEB 10 1969
INITIALS | CODE
130
120 m
120 P

Mr. Frank E. Johnson, Chief
Office of Minerals Exploration
United States Department of the Interior
Geological Survey
Washington, D. C. 20242

Re: OME-6760 (Silver)
Cotter Corporation
Metal Enterprise Property
Iron County, Utah

Dear Mr. Johnson:

Pursuant to your letter of November 21, 1968, requests for exploration loans were made to three banks servicing the area in which Cotter's proposed project is located.

The third of three letters rejecting Cotter's application for a commercial loan has just been received. The three letters of rejection, together with copies of the letters of application, are enclosed.

Also enclosed is a copy of Cotter's most recent financial statement. I believe that this completes the information requested.

May I assure you that we are very much interested in pursuing the above captioned project.

Very truly yours,

COTTER CORPORATION

David P. Marcott

David P. Marcott
Executive Vice President
and General Manager

DPM:nr

Enclosures - 7

cc: correspondence
numerical file - 7388

COTTER CORPORATION
DIAL 275-3367
P. O. BOX 751 — 410 MACON AVE.
CANON CITY, COLORADO 81212

December 31, 1968

State Bank of Southern Utah
Cedar City, Utah

Attention: W. H. Bulloch, President

Gentlemen:

Cotter Corporation is a New Mexico corporation engaged in the mining and processing of uranium and other minerals. We have our principal office in Roswell, New Mexico, and we own the Schwartzwalder Mine near Golden, Colorado, and the Orphan Mine at Grand Canyon, Arizona. The ores from these mines and other sources are transported to our mineral processing plant near Canon City, Colorado.

Cotter is the lessee of a group of sixteen unpatented mining claims owned by Heber M. Holt, George S. Holt and H. Wayne Holt, all of Enterprize, Utah. Cotter is also the owner of twenty-five unpatented mining claims, known as the Bright Angel Claims, adjoining the Holt Claims. This property is known as the Metal Enterprise Property and is located in Iron County, Utah, approximately nineteen miles directly west of Cedar City, Utah.

Geologists employed by Cotter have made an examination of the property to establish the aerial extent and the potential of silver mineralization of the property and to consider the possibilities of replacement-type mineralization at depth.

Cotter's geologists have designed a two-phase preliminary exploration drilling program involving diamond drill holes to determine the silver potential of the property. The estimated cost of the exploration program is approximately $70,000.00.

To enable us to go forward with the exploration program we are in need of a loan of $52,500.00; such loan to be evidenced by a promissory note of Cotter Corporation secured by a first lien on our interest in the property. The loan would be repaid over a five-year period in equal annual installments with interest at the rate of 7% per year on the unpaid balance.

We would appreciate your favorable consideration of this loan application. We will be happy to furnish you with any additional information which you may require in connection with this application.

Sincerely yours,

COTTER CORPORATION

David P. Marcott

David P. Marcott
Executive Vice President
and General Manager

DPM:nr

cc: correspondence
numerical file

RECEIVED JAN 20'69

STATE BANK OF SOUTHERN UTAH · CEDAR CITY · UTAH

January 15, 1969

David P. Marcott
Cotter Corporation
P. O. Box 751 - 410 Macon Ave.
Canon City, Colorado 81212

Dear Mr. Marcott:

Our bank doesn't make loans for five years nor at the rate of 7% as you suggested. Under the existing circumstances, we couldn't be of help to you at this time.

Yours truly,

STATE BANK OF SOUTHERN UTAH

Robert B. White, Jr.
Executive Vice President

RBW:cu

COTTER CORPORATION
DIAL 275-3367
P. O. BOX 751 — 410 MACON AVE.
CANON CITY, COLORADO 81212

December 31, 1968

First Security Bank of Utah
Cedar City Branch
Cedar City, Utah

Attention: F. W. Betenson, Manager

Gentlemen:

Cotter Corporation is a New Mexico corporation engaged in the mining and processing of uranium and other minerals. We have our principal office in Roswell, New Mexico, and we own the Schwartzwalder Mine near Golden, Colorado, and the Orphan Mine at Grand Canyon, Arizona. The ores from these mines and other sources are transported to our mineral processing plant near Canon City, Colorado.

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We would appreciate your favorable consideration of this loan application. We will be happy to furnish you with any additional information which you may require in connection with this application.

Sincerely yours,

COTTER CORPORATION

David P. Marcott

David P. Marcott
Executive Vice President
and General Manager

DPM:nr

cc: correspondence
numerical file

RECEIVED FEB 5 '69

First Security Bank of Utah

NATIONAL ASSOCIATION

CEDAR CITY OFFICE

CEDAR CITY, UTAH

January 30, 1969

Mr. David P. Marcott
Executive Vice President and General Manager
Cotter Corporation
Roswell, New Mexico

Dear Mr. Marcott:

Please excuse us for the long delay in answering your letter which you addressed to this office of First Security Bank whereby you requested a loan for $52,500.

This loan has been referred to our Credit and Marketing Department of First Security Bank of Utah, N. A., and it was the decision of the reviewing committee that this loan should be declined as there was very little information to go on in presenting a credit application.

We are, of course, a little bit familiar with the customers that you are dealing with on your mining properties close to Cedar City, being Heber M. Holt, George S. Holt, et al. However, due to the lack of information on your credit application it was necessary that we decline your request.

Sincerely,

Francis W. Betenson

Francis W. Betenson
Manager

FWB/sm

COTTER CORPORATION
DIAL 275-3367
P. O. BOX 751 — 410 MACON AVE.
CANON CITY, COLORADO 81212

December 31, 1968

First Security Bank of Utah
Post Office Box 390
Salt Lake City, Utah 84110

Gentlemen:

Cotter Corporation is a New Mexico corporation engaged in the mining and processing of uranium and other minerals. We have our principal office in Roswell, New Mexico, and we own the Schwartzwalder Mine near Golden, Colorado, and the Orphan Mine at Grand Canyon, Arizona. The ores from these mines and other sources are transported to our mineral processing plant near Canon City, Colorado.

Cotter is the lessee of a group of sixteen unpatented mining claims owned by Heber M. Holt, George S. Holt and H. Wayne Holt, all of Enterprize, Utah. Cotter is also the owner of twenty-five unpatented mining claims, known as the Bright Angel Claims, adjoining the Holt Claims. This property is known as the Metal Enterprise Property and is located in Iron County, Utah, approximately nineteen miles directly west of Cedar City, Utah.

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We would appreciate your favorable consideration of this loan application. We will be happy to furnish you with any additional information which you may require in connection with this application.

Sincerely yours,

COTTER CORPORATION

David P. Marcott

David P. Marcott
Executive Vice President
and General Manager

DPM:nr

cc: correspondence
numerical file

RECEIVED JAN 15'69

First Security Bank of Utah
NATIONAL ASSOCIATION

MAIN AT FIRST SOUTH OFFICE

SALT LAKE CITY, UTAH

January 13, 1969

Cotter Corporation
P. O. Box 751
Canon City, Colorado 81212

Gentlemen:

As you requested we have considered your recent application for a loan of $52,500 repayable in annual installments over a five year period, for the purpose of assisting in your exploration program.

We regret to inform you that the circumstances pertaining to the proposed loan are such that we will be unable to assist you in the matter.

Thank you for giving us an opportunity to consider your request.

Yours very truly,

H. F. Aldous

Heber F. Aldous
Vice President and Manager

HFA:lwh

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
1/15/69	Peterson	120
1/15/69	Kerkemeyer	120
		110
1/15	cal	220

AIRMAIL

Cotter Corporation
P. O. Box 751
Canon City, Colorado 81212

JAN 15 1969

Re: OME-6760 (Silver)
Cotter Corporation
Metal Enterprise Property
Iron County, Utah

Gentlemen:

On November 21, 1968, we wrote you outlining certain information which was necessary to continue the processing of your application. To date, we have not received these data. Will you please inform us of your plans regarding the application. If you have decided not to pursue it further, will you please so inform us.

Sincerely yours,

FRANK E. JOHNSON (glr)
Frank E. Johnson
Chief, Office of
Minerals Exploration

cc: Director's Reading File
Economic Geology File
OME Docket
OME Reading File
Region III
Mr. Peterson

ECPeterson/bsl 1/15/69

MME Form 7
(2/63)

OFFICIAL FILE COPY

Date	Surname	Code
11/21/68	Peterson	120
"	Kirkemo	120
		110
11/21	Cal	220
		120M

NOV 21 1968

AIRMAIL

Cotter Corporation
P. O. Box 751
Canon City, Colorado 81212

Re: OME-6760 (Silver)
Cotter Corporation
Metal Enterprise Property
Iron County, Utah

Gentlemen:

Our review of your application for exploration assistance indicates that the following additional information regarding your financial eligibility is needed before we can continue its processing.

Although you have submitted copies of letters from banks refusing to grant an exploration loan, it is also necessary for you to furnish copies of your letters to the banks requesting such a loan. Your letters should state the amount of the loan (estimated Government participation), purpose, date, and terms requested. Banks located within the lending area of the project site should be contacted for this purpose.

To aid us in determining your financial eligibility for OME assistance please submit a recent financial statement of the Cotter Corporation.

We shall be pleased to consider your application further upon receipt of the requested information; however, nothing in this letter should be construed as a commitment by the Government to grant an exploration contract.

Sincerely yours,

FRANK E. JOHNSON (gla)

Frank E. Johnson
Chief, Office of
Minerals Exploration

cc: Director's Reading File
Economic Geology File
OME Docket
OME Reading File
Region III
Mr. Peterson

ECPeterson/bsl
11/21/68

November 18, 1968

Cotter Corporation
Post Office Box 751
Canon City, Colorado 81212

Subject: OME-6760

Gentlemen:

Your application for exploration assistance, dated October 31, 1968, submitted to our office at Denver, Colorado, has been assigned Docket No. OME-6760.

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

Sincerely yours,

Frank E. Johnson
Chief, Office of
Minerals Exploration

Copy to Region III

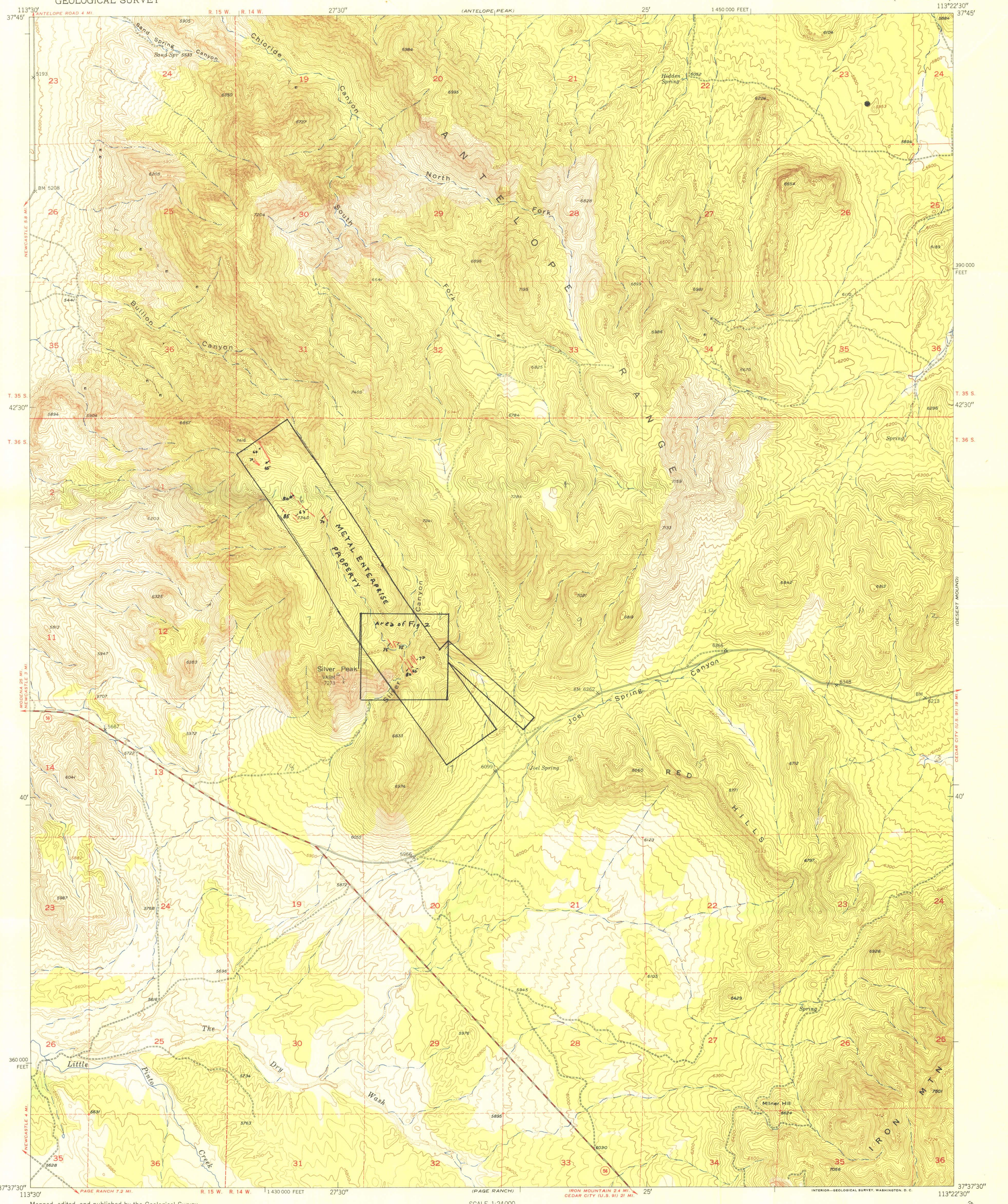
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Plate 1

SILVER PEAK QUADRANGLE

UTAH-IRON CO.

7.5 MINUTE SERIES (TOPOGRAPHIC)



INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by multiplex methods
Aerial photographs taken 1948. Field check 1950

Polyconic projection. 1927 North American datum
10,000-foot grid based on Utah coordinate system, south zone

Dashed land lines indicate approximate location

Unchecked elevations are shown in brown

All mining features on this map are inactive

16°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1950

SCALE 1:24 000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET
DATUM IS MEAN SEA LEVEL

ROAD CLASSIFICATION

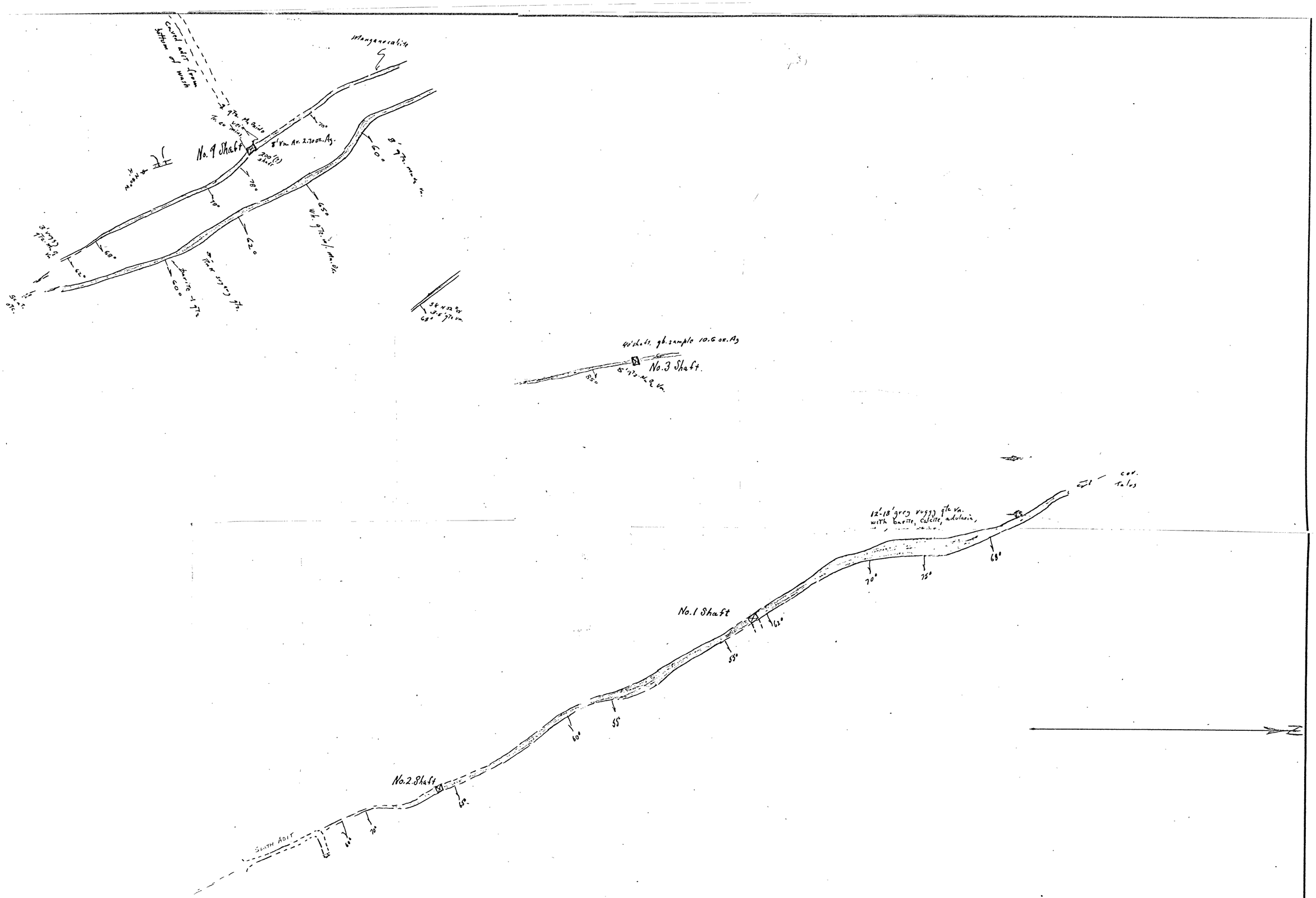
Heavy-duty — 4 LANE | 6 LANE
Medium-duty — 4 LANE | 6 LANE
Light-duty
Unimproved dirt
U. S. Route
State Route

SILVER PEAK, UTAH
N3737.5—W11322.5/7.5

EDITION OF 1951

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS

FOR SALE BY U. S. GEOLOGICAL SURVEY, FEDERAL CENTER, DENVER, COLORADO OR WASHINGTON 25, D. C.
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



TIP TOP SURFACE VEINS

SCALE: 1" = 50'	APPROVED BY:	DRAWN BY R.W.
DATE:		REVISED
		DRAWING NUMBER 4