DMA Form 1

DEFENSE MINERALS ADMINISTRATION
Control Slip

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DMA Docket No. DMEA-3186

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1 cy to USBM, USGS & DOCKET

Routing Slip

To:	Code 400	Date	10-6-53
To:	Oper Comm	Date	10-7-53
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CONTROLLED DOCUMENT

DOCKET
Surname:
Martin
Newcomb
Mottendorf

NOV 9 - 1954

Mr. Peter H. Toepfer
Courtney Hotel
Philipsburg, Montana

Re: Docket No. DMEA 3186 - Manganese
Mrs. Jennie M. Moore
Mystery Manganese Mine
Granite County, Montana

Dear Mr. Toepfer:

This will acknowledge receipt of your letter of November 2, 1954, enclosing photostatic copy of Mr. J. T. Pardee's letter dated October 14, 1954, to Mrs. Jennie M. Moore, Philipsburg, Montana, for which we thank you.

Sincerely yours,

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

NOTE TO FIELD TEAM, REGION II:

Mr. Toepfer's letter states: "I certainly feel that the Quinlan report, leaving out all reference to this Pardee report, showed a complete lack of objectivity." We note that J. J. Quinlan's report of November 25, 1953, refers specifically to U. S. Geological Survey Bulletins 725 and 922-G on pages 2 and 3 respectively.

cc: Docket
Code 400
Adm. Read. File
Oper. Committee
G. DeHuff, USBM
T. Kiilsgaard, USGS

WSMartin/ls
11-5-54

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
NOV 5 - 1954

Peter H. Toepfer
Courtney Hotel
Philipsburg, Montana
Nov. 2, 1954

Defense Minerals Exploration Adm.
Washington 25, D.C.

Re: Docket No. DMEA 3186 -Mn
Mystery manganese mine
Granite County, Montana.

WSM

Dear Sirs,

I am enclosing the photostat of a letter, which I wish to have entered in your docket regarding this property. Similar photostats are now on file in the Spokane offices of the Bureau of Mines and the Geological Survey. In my opinion, as well as your own, more confidence can be placed in the judgement of Mr. Pardee than that of the geologist who recommended refusal of a loan on this property. Mr. Pardee, as you may recall, examined the Mystery property while it was in operation, and his report is in U.S.G.S. Bull 725. I certainly feel that the Quinlan report, leaving out all reference to this Pardee report, showed a complete lack of objectivity. I feel that the points raised in my letter of April 28, 1954 should have been resolved in my favor.

In view of the fact that the Spokane office has agreed to a re-examination of the property by a senior geologist, I will withhold further comment in regard to your unfavorable conclusion regarding the granting of this loan.

I am not unacquainted with the DMEA program. While working for the Bureau of Mines, I made at least a six examinations on properties considered for loans, and no report of mine need be hidden in confidential files. Look up the Pungo Fluorspar, Idaho; Togo-Turk Copper, Washington; or the West Exposure Lead Zinc, Montana. You will see that my reports are objective, the good and bad points being stressed equally, and no effort being made to direct a verdict.

Yours truly,

Peter H. Toepfer

Peter H. Toepfer

Philipsburg, Montana.
October 14- 1954.

Mrs. Jennie M. Moore
Philipsburg, Montana.

c/o Courtney Hotel.

Dear Jennie Moore;

Replying to your recent inquiry regarding the Mystery mining property situated just east of the city of Philipsburg, I wish to state that I remember the property very well, having made a report of the area some years ago for the U.S. Geological Survey, which report is known as U.S.G.S. Bulletin 922-G. & U.S.G.S. Bulletin 725.

I have always considered this to be a good property, worthy of exploration and development, and there is no reason at this time to cause me to change my opinion.

Sincerely,

J. T. Pardee

DOCKET
400 SURNAME
Martin
Selfridge
Mathewson

NOV 1 - 1954

Mr. W. E. Weissenborn, Executive Officer
DMEA Field Team, Region II
South 157 Howard Street
Spokane 4, Washington

Re: Docket No. DMEA 3186 - Manganese
Mrs. Jennie M. Moore
Mystery Manganese Mine
Granite County, Montana

Dear Mr. Weissenborn:

This will acknowledge receipt of copies of your letter of October 25, 1954, to Mrs. Jennie Moore, and her letter to you regarding the subject application.

We note that at Mr. Quinlan's suggestion you have scheduled another examination of her property.

We agree that an independent opinion by another geologist may be desirable in this instance, and we shall await your new field report.

Sincerely yours,

George C. Selfridge

Chairman, Operating Committee (2165)

APPROVED:

J. H. Hedges (2165)
Member, Bureau of Mines

Thor H. Kiilsgaard (2165)
Member, Geological Survey

WSMARTIN:foc
10-29-54
cc to: Docket
Code 400
Adm. Reading File
Operating Comm.
FT. REG. II
Gilbert DeHuff, USBM
Thor H. Kiilsgaard, USGS

R.G.S.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
OCT 28 1954

xxxxxxxxxxxxxxxxxx
Do. 157 Howard Street
Spokane 4, Washington

October 25, 1954

WSM

Mrs. Jennie M. Moore
Philipsburg
Montana

Re: Docket No. DMEA-3186 (manganese)
Mystery Manganese Mine
Granite County, Montana (Denied)

Dear Mrs. Moore:

This will acknowledge your letter of October 17, 1954, stating that you are anxious to have a re-examination made of the Mystery group of claims. Normally we do not make a re-examination of a property unless more work has been done on the property and a new application has been submitted. However, because Mr. Quinlan himself has requested that another examination be made of your property in order to have an independent opinion by another geologist, we have agreed to schedule another examination.

If you will let us know when the ladderways in the shaft are repaired, we will schedule an examination as soon after as possible.

We will not be able to have Mr. Weeks made the examination as he will not be available at this time. However, we are planning to send one of our experienced men. You may be assured that a thorough and impartial examination will be made.

Sincerely yours,

A. E. Weissenborn
Executive Officer, DMEA
Field Team, Region II

cc: USBM (2) w/cy incoming
DMEA (2) "
Quinlan "
Vhay "

Philipsburg, Montana
October 17- 1954.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
OCT 28 1954

United States Geological Survey,

Spokane, Wash.

Attention:
Mr. Weissenborn.

Dear Sir:-

Pursuant to my recent conversation with your Mr. James Quinlan relative to the re-examination of my property, the Mystery group of mining claims, I wish to state that I am eager to have such examination made.

As I would like to acquire some depth to the present shaft, I am having the ladder-ways repaired in order to facilitate inspection of this part of the property. This work will require from a week to ten days for completion and I will notify you when it is completed at which time I would greatly appreciate your earnest effort for an early re-examination of the property so that I could make another application for Government exploration funds. I would like to have a chance to talk this over with you so as to get the best results with any funds allowed by the government.

Mr. Quinlan informed me I could request any geologist I wished from your office to make such examination so I would appreciate if you could send Mr. Weeks.

Thanking you for your earnest consideration of this property, I am

Very truly,

/s/ Mrs. Jennie M. Moore

C
O
P
Y

400

SURNAME
DOCKET
Martin
FR Johnson

JUN 1 5 1954

Mr. Peter H. Toepfer
Dee-Bar-Two Lodge
Conner, Montana

Re: Docket No. DMEA-3186 (Manganese)
Mrs. Jennie H. Moore
Mystery Manganese Mine
Granite County, Montana

Dear Mr. Toepfer:

This will acknowledge receipt of your letter of June 7, 1954, regarding the subject property. Undoubtedly, our letters crossed in the mail and by now you should have our letter of June 8, 1954 in reply to your letter of April 28, 1954.

I regret the delay in replying to your previous letter. However, a complete review was made of all the information available to us concerning the subject property, which took considerable time.

I wish to call to your attention that the reports from our Field Teams are for the confidential use of the Government only and are not made available to the public. You may be assured that data furnished by the applicant, as well as the information obtained by the Field Team, are given careful consideration in arriving at any decision.

Sincerely yours,

C. O. Mittendorf (fw)

Administrator

WSMartin/FRJohnson/foc
6-15-54
cc to: Docket
Code 400
Admr. Reading File
Operating Comm.
FT. REG. 2
G. DeHuff, USBM
L. Pavlides, USGS

R.C.B.

DOCKET
Surname:
Martin
Hedges
Thorp
Seffredge

Mr. Peter H. Toepfer
Dee-Bar-Two Lodge
Conner, Montana

Re: Docket No. DMEA 3186-Manganese
Mrs. Jennie M. Moore
Mystery Manganese Mine
Granite County, Montana

Dear Mr. Toepfer:

This will acknowledge receipt of your letter of June 7, 1954, regarding the subject property.

Please consider our letter of June 8, 1954, as a reply to your above letter with which it apparently crossed in the mail.

Sincerely yours,

ACTING Administrator

Copy to: Field Team, Reg. 2
Docket
Code 400
Adm. Reading File
Operating Committee
G. DeHuff, USBM
L. Pavlides, USGS

WSMartin/ls
6/11/54

Docket

Peter H. Toepfer
Dee-Bar-Two Lodge
Conner, Montana
June 7, 1954

Department of Defense Minerals Exploration
JUN 10 1954

C. O. Mittendorf
Defense Minerals Exploration Adm.
Washington 25, D.C.

Re: Docket No. DMEA 3186 - Mn
Mystery Manganese Mine
Granite County, Montana.

WSM

Dear Sir,

Over a month ago, I submitted a supplementary report to my original report on the Mystery property, the loan application accompanying the original report having been turned down. I am very anxious to have my reports reviewed by your office inasmuch as I feel certain that a number of false statements appear in the report of the DMEA field geologist. The points in contention can be easily judged by yourselves from U.S.G.S. publications and from data available in your files. I feel certain that the main reasons given for turning down the loan, will prove to be false, and geological approval for the loan will be granted.

I have been denied an opportunity to see the DMEA geologist's report, a policy which I believe leads to prejudiced and slipshod work by the Government men. However, the geologist verbally gave me his reasons for turning down the loan. If those same reasons appear in his report, a check of the references given in my supplementary report will prove his reasons false.

The property owner and myself are very anxious to begin work on this property. Your rejection has considerably upset our plans, but we still intend to go ahead. Please let me know how soon we can expect a decision from your reconsideration of this loan application.

Yours truly,

Peter H. Toepfer

Peter H. Toepfer.

Redeemed
reply mailed
June 8.

400

DOCKET

JUN - 8 1954

Mr. Peter Toepfer
14509 East Mercy
Trentwood, Washington

Re: Docket No. DMRA 3186 - Manganese
Mrs. Jennie M. Moore
Mystery Manganese Property
Granite County, Montana

Dear Mr. Toepfer:

Reference is made to the above-docketed application for exploration assistance, denied by letter of January 4, 1954, and to your letter of April 28, 1954, requesting reconsideration of the subject application.

We have carefully reviewed the data contained in the subject docket, paying particular attention to the points raised in your letter of April 28, 1954. This information, however, was insufficient to alter our former conclusion that: ". . . the probability of disclosing minable ore reserves by your proposed program is not sufficiently promising to justify Government participation."

All denials of requests for exploration assistance by the Defense Minerals Exploration Administration are made, however, without prejudice to the property. Any significant results of new work thereon that might materially alter our conclusions could, of course, be furnished to this Administration at any time. Such information should refer to the present docket and be accompanied by a revised application on Form MF-103.

Sincerely yours,

K. O. Mittendorf (fw)

Administrator

Copy to: Mrs. Jennie M. Moore
422 E. Foothill Blvd.
Glendora, California

cc: DOCKET
FT, REG. II
CODE 400
ADMIN. READ. FILE
GILBERT DE HUFF, USBM
LOUIS PAVLIDES, USGS
OPERATING COMMITTEE

FARutledge/ls
6/4/54

Docket

IN REPLY REFER TO:

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

Defense Minerals Administration
RECEIVED
MAY 19 1954

May 18, 1954

Memorandum

WSM

To: Mr. W. S. Martin, DMEA

From: Louis Pavlides, USGS

Subject: Request by P. T. Toepfer for reconsidering denial of exploration assistance to DMEA-3186 (Manganese), Mystery Manganese Property, Granite County, Montana

Mr. P. T. Toepfer has requested the subject docket be reconsidered for exploration assistance. He takes strong issue with J. J. Quinlan's conclusion that the vein structures of the Mystery and Taylor-Knapp properties are not continuous and also objects to the generalization that the location of the Mystery property in a fringe area of the district, where past exploration has shown the deposits to be small and insignificant, is not a justifiable consideration in evaluating the subject property. The veins on the property, however, were also evaluated by Mr. Quinlan strictly on their own merits. These were found to be narrow, manganese mineralization along them is spotty, and evidence for significant replacement bodies (from which most of the production in the district has come) along them is absent.

I concur with the Field Team's conclusions in their letter of May 3, in that J. J. Quinlan's report of November 25, 1953 presents sufficient evidence to justify denying the subject application and that Mr. Toepfer has not furnished any fundamentally new information which requires changing the original recommendation for denial.

Louis Pavlides

Louis Pavlides
Geologist

Copy retained

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

~~WASHINGTON 25, D.C.~~
So. 157 Howard Street
Spokane 4, Washington

May 3, 1954

Mr. George C. Selfridge, Chairman
Operating Committee, DMEA
Department of the Interior
Washington 25, D. C.

Re: Docket No. DMEA-3186 (manganese)
Mystery Manganese Mine
Granite County, Montana

Dear Mr. Selfridge:

Enclosed are two copies of a letter on the cited application, dated April 28, 1954, from Mr. Peter H. Toepfer which were delivered in person to this office. One copy of a map was received to accompany this letter, which is included.

Mr. Toepfer has, on numerous occasions, called at this office to discuss the Mystery Manganese property. Although we have never shown him the Field Team report on this application, we have discussed the geologic features of the property as we saw them, and as they have been described in publications dealing with that part of the Philipsburg area. It is from this background that Toepfer has written the enclosed letter in which he points out why he is in disagreement with DMEA's denial of the application.

We believe J. J. Quinlan's memorandum of November 25, 1953, presents sufficient evidence to justify denial of the cited application. After studying Toepfer's enclosed letter we see no reason for changing our recommendations for denial. We will, however, make another field examination and review the applicant's proposal if the Operating Committee believes that Toepfer's letter justifies such a review.

By Field Team, Region II

Wing G. Agnew, Acting Exec. Officer
U. S. Bureau of Mines

Thor H. Kiilsgaard, Acting Member
U. S. Geological Survey

Enclosures

cc: USBM (2)
Quinlan

Peter H. Toepfer
14509 E. Heroy
Trentwood, Washington
April 28, 1954

RECEIVED
APR 28 1954
U. S. G. S.
SPOKANE, WASH.

Defense Minerals Exploration Adm.
Washington 25, D.C.

Re: Docket No. 3186 - Manganese
Mystery Manganese Mine
Granite County, Montana.

Dear Sirs,

I am the engineer who submitted Mrs. Moore's DMEA application, and am in receipt of your letter of Jan. 4, 1954, denying the loan.

I have since seen Quinlan of the U.S.G.S., and while I was denied the opportunity of seeing his report which recommended turning down the application, he verbally outlined his reasons. We appear to be in complete disagreement on a number of major points. This letter and its accompanying map will present my viewpoint. Certainly there is more to the Mystery property than the "small, scattered deposits of marginal-grade manganese ore" mentioned in your letter of Jan. 4. My report was written objectively, the good points being given equal treatment with the bad points. I shall assume that the field team report had equal objectivity.

Quinlan stated to me that the veins on the Mystery property are not continuations of the productive Durango, Huffman, and Horton veins on the adjoining Taylor-Knapp property. I have just returned from Philipsburg where I obtained a map of the Taylor-Knapp workings. By matching up property lines, the accompanying small scale map was made, and proves the veins to be identical. As DMEA loans have been granted Taylor-Knapp for drifting to within a short distance of the Mystery property line, you should be able to check this with maps in your posession.

Quinlan stated that the Horton (Mystery) ore-bodies have been formed at the intersection of two separate veins. This would imply that the ore has been formed in a breccia zone, but no breccia is present. A superficial examination would indicate two veins to be present, and this was also my original thought. However, my survey showed a crosscut to have been driven to undercut an outcrop of the supposed northern branching vein. (Section B-B on accompanying map) No vein structure was disclosed in the crosscut. As no veins in the vicinity dip northward through a vertical distance of 80 feet, the vein would have been cut if present. The outcrop must therefore be considered the upper part of the Horton vein, whose lower part has been displaced by the sheeted zone.
Sheeting is prominent throughout these ore-bodies, and U.S.G.S. Bull. 922-G states sheeted zones crossing the original silver vein structures to be the primary ore-body control of the district. With sheeted zones so prominent here, there seems to be no reason for advancing for this district, a new theory of ore control by intercepting veins.

A projection of the sheeted zones which form the Horton (Mystery) ore-bodies, shows this zone to project directly toward the Durango ore-bodies on the Taylor-Knapp property. Surface exposures of the

sheeted zone shows it to be present crossing the Huffman vein within the Mystery property. This is why my application called for drifting from the Mystery tunnel along the Huffman vein, as I believe new ore-bodies will be found when the sheeted zone is reached. Opposing this, Quinlan states that this area is beyond the productive manganese area, that there are no surface indications of an ore-body, and only a narrow silver vein is present on the surface. This latter statement is true, and in my opinion, is evidence of ore-bodies in the sheeted zone below. The displacement by the sheeted zone would prevent further ascent of the manganese solutions, trapping and depositing them within the sheeted zone.

Let us consider the history of the large Durango ore-body on the Taylor-Knapp property. On the surface, it is a relatively narrow vein, the surface showings no better than those of this same vein on the Mystery property. The ore above adit level was said to be only 15% Mn in grade, and there were said to be no indications of ore-bodies at this level. In 1939, two leasors sunk a winze, disclosing an ore-body which caved before they did much mining. In 1943, Angus MacDonald and associates sunk another winze, against the firm advice of five geologists who stated that this area was beyond the productive manganese area, that there were no surface indications of an ore-body, and that production above adit level had been marginal in grade. Well, Gus sank anyway, to discover the very large and high-grade Durango ore-body. The geologists have had to retreat westward with their "margin of the productive area", but nothing daunted, are now firmly trying to hold the western Taylor-Knapp property line.

Quinlan seems to feel that deposits west of the axis of the Philipsburg anticline are small and of no account. This discredits not only the Mystery property, but also the ore-bodies known to be present on the Wenger No. 2, White Horse, Morning, and Pocahontas veins, and along the Redemption fault. These properties are almost entirely in the hands of individuals who cannot afford the expense of development. The ore deposits along the Redemption fault are known to be large and high-grade, but the ground is heavy and not suited to the open stoping methods used by leasors. The Redemption fault is definitely on the west flank of the anticline. There is no geologic reason for discounting the west half of the Philipsburg anticline.

The Mystery property has had considerable production in view of the fact that only a slight amount of exploration for manganese was ever conducted. The production was obtained by simply following surface exposures. Here are my estimates, based upon width and grade of samples taken from the remaining ore exposures:

Durango Vein:			
Murphy ore-body	(12' x 80' x 34')	32,640 cu ft	10.67% Mn
Surface stoping	(6.5' x 130' x 15')	12,675 cu ft	21.85% Mn
Cole adit	(2.3' x 20' x 60')	2,760 cu ft	19.40% Mn
Huffman Vein:			
Hartley adit	(2.05' x 20' x 60')	8,610 cu ft	24.00% Mn
Horton Vein:			
Main ore-bodies	(20' x 20' x 230') less 1/3 waste ---	61,333 cu ft	19.35% Mn
Mystery adit	(8' x 35' x 12')	3,360 cu ft	24.25% Mn
Lower ore-body	(14' x 16' x 50')	11,200 cu ft	23.16% Mn

These figures indicate a total ore-body and vein volume (not stope volume) of 132,578 cu ft mined. At 12 cu ft to the ton, this would indicate a production of 11,050 tons. This is hardly insignificant, for such shallow development.

As to grade, my sampling of the remaining ore on the sides of the main stope indicates a grade of 19.35% Mn. Pardee, in U.S.G.S. Bull. 725 (page 173) describes the ore being mined at the time of his visit as being between 38 and 44% Mn. My sampling is indicative of the cut-off grade rather than the actual grade of ore mined.

So I am asking for reconsideration of my loan application. I feel exploration, which this property has never received, is fully justified. I feel the program I have outlined has a very good chance of success, and if successful, would lead to further development all along the west side of the Philipsburg district. As soon as I learn what parts of my proposed program meet your geological approval, I will revise my costs on a unit-cost basis.

I am not alone in my feeling that under the DMEA program, the larger companies are given whatever they ask for, while small individuals are subjected to time-consuming obstacles that generally block their plans. I would appreciate an answer as soon as possible. With a DMEA loan, the owner and myself will be able to carry out the program. Without the loan, three other parties have offered to carry out the full program without Government assistance.

Yours truly,

Peter H. Toepfer

Peter H. Toepfer

Carbon copies and maps to:
Mrs. Jennie M. Moore
Spokane office, U.S. Bureau of Mines
Spokane Office, U.S. Geological Survey
M. E. Volin, Chief, U.S. Bureau of Mines, Minneapolis, Minn.

U. S. Government Messenger Envelope

Standard Form No. 65 (Rev. 1/46)

1. Use blocks consecutively, one at a time.
2. Void previous block.
3. Write clearly.

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Library Miss Atkinson	RUN STOP	Lutha Scott AMEA - Rm - 3538	RUN STOP
Geol. Surv. Mr. Lak	RUN STOP		RUN STOP
Mrs Mathwood Geological Survey Rm 1244 G.S. Bldg	RUN STOP 29A		RUN STOP
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UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
WASHINGTON 25, D.C.
So. 157 Howard Street
Spokane 4, Washington

April 12, 1954

Mr. Peter Toepfer
14509 E. Marey
Trentwood, Washington

Re: Docket No. DMEA-3186 (Manganese)
Mystery Manganese Mine
Granite County, Montana
(Denied)

Dear Mr. Toepfer:

Reference is made to your visits of March 31 and April 5, 1954, to this office at which times the Mystery manganese exploration loan application was discussed. We have reviewed the information available on the property and have given careful consideration to the revised program you propose.

In our opinion, present knowledge of the manganese deposits of the Philipsburg district and the showings on the Mystery property precludes the undertaking of an extensive exploration program at the property at this time. A limited program such as you now propose was considered at the time the loan application was considered. It was rejected because there appeared to be little possibility of making a significant discovery. Projects undertaken by the Defense Minerals Exploration Administration must, in its judgment, show definite promise of yielding materials of acceptable grade in quantities that will significantly improve the mineral position of the National Defense Program.

We would be glad to consider a new application on the Mystery property at any time there is new evidence which might alter the decision regarding participation in exploration at the property. Exploration along the lines suggested by you may provide such evidence. However, until there is new evidence submitted we do not think that there is any basis for our recommending to the Operating Committee that they alter their decision, nor do we see any justification for another field examination by Field Team members.

By Field Team, Region II

A. E. Weissenborn, Executive Officer
U. S. Geological Survey

Wing G. Agnew, Member
U. S. Bureau of Mines

cc: USBM (2)
DMEA (2)
Quinlan

400

Chapman
Martin
DeHuff
Chamberlin
Thayer
Hedges

JAN - 4 1954

Mrs. Jennie M. Moore
422 East Foothill Boulevard
Glendora, California

Re: Docket No. DMEA 3186
Mystery Manganese Mine- Manganese
Granite County, Montana

Dear Mrs. Moore:

Your application for exploration assistance and other data pertaining to the subject property available to us in Washington have been carefully reviewed.

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

Careful study of all our information, although noting small scattered deposits of marginal grade manganese ore, indicates to us that the probability of disclosing minable ore reserves by your proposed program of exploration is not sufficiently promising to justify Government participation. Under these circumstances we regret to inform you that your application for exploration assistance is denied.

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

Sincerely yours,

C. O. Mittendorf (RW)

Administrator

TLChapman:foc
12-29-53
cc: Docket
Code 400
FT. Reg. 2
Admr. Reading File
Gilbert DeHuff, USBM
Louis Pavlides, USGS

R.C.S.
1-4-54

STANDARD FORM NO. 64

Office Memorandum • UNITED STATES GOVERNMENT

TO : Administrator, DMEA

DATE: 12-30-53

FROM : Iron and Ferro-Alloys Division, DMEA

SUBJECT: Denial of exploration project in the amount of $83,500.00
Docket No. DMEA 3186 - Manganese
Mystery Manganese Mine
Granite County, Montana

The denial of the subject application by this Division is based on the following information:

1. Applicant applied for a loan of $83,500.00 to cover bulldozing, rehabilitation of tunnel and shaft, approximately 1,575 feet of drifting and crosscutting, 190 feet of raising and 300 feet of diamond drilling.

2. A total of approximately 2,500 feet of drifting and crosscutting has been carried out on the property, with some raising and sinking.

3. Past production from the property, mainly by leasers amounted to approximately 10,000 tons of ore with a value of about $80,000.00. This ore generally averaged between 20 and 30 percent manganese and was oxidized.

4. The Mystery mine is on the western margin of the manganese producing area of the Philipsburg District. The manganese deposits of the district lie mainly in the Paleozoic limestones and are usually related to east-west and northwest-southeast striking fissure veins. The veins have been mined mainly for base and precious metals. Only two replacement bodies of any significance have been found on the Mystery property. Most of the ore has come in pods at vein intersections. General indications are that the Mystery property is to the west of the main production area of the district.

5. Practically all the ore developed has been mined and there is little or no ore reserve on the property. Indications are that there is small possibility of finding a substantial tonnage of ores of a minable grade.

6. The geologist of the examining field team recommends denial of the project. The mining engineer of the examining field team suggests re-evaluation of the project. The Field Team recommends denial.

7. The Commodity Divisions of the Geological Survey and Bureau of Mines concur in the denial of the project.

W S Martin

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

Chapman
Martin
Dettloff

12-30-53

Administrator, DMEA

Iron and Ferro-Alloys Division, DMEA

Denial of exploration project in the amount of $83,500.00
Docket No. DMEA 3186 - Manganese
Mystery Manganese Mine
Granite County, Montana

The denial of the subject application by this Division is based on the following information:

1. Applicant applied for a loan of $83,500.00 to cover bulldozing, rehabilitation of tunnel and shaft, approximately 1,575 feet of drifting and crosscutting, 190 feet of raising and 300 feet of diamond drilling.

2. A total of approximately 2,500 feet of drifting and crosscutting has been carried out on the property, with some raising and sinking.

3. Past production from the property, mainly by leasers amounted to approximately 10,000 tons of ore with a value of about $80,000.00. This ore generally averaged between 20 and 30 percent manganese and was oxidized.

4. The Mystery mine is on the western margin of the manganese producing area of the Philipsburg District. The manganese deposits of the district lie mainly in the Paleozoic limestones and are usually related to east-west and northwest-southeast striking fissure veins. The veins have been mined mainly for base and precious metals. Only two replacement bodies of any significance have been found on the Mystery property. Most of the ore has come in pods at vein intersections. General indications are that the Mystery property is to the west of the main production area of the district.

5. Practically all the ore developed has been mined and there is little or no ore reserve on the property. Indications are that there is small possibility of finding a substantial tonnage of ores of a minable grade.

6. The geologist of the examining field team recommends denial of the project. The mining engineer of the examining field team suggests re-evaluation of the project. The Field Team recommends denial.

7. The Commodity Divisions of the Geological Survey and Bureau of Mines concur in the denial of the project.

TLChapman:foc
12-30-53
cc: Docket
Code 400
Admr. Reading File

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

R.C.G.
1-4-54

Docket

IN REPLY REFER TO:

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

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
DEC 21 1953

December 17, 1953

Memorandum

To: Mr. W. S. Martin, DMEA

From: Louis Pavlides, USGS

Subject: Field Team Report, DMEA-3186 (Manganese), Mrs. Jennie M. Moore, Mystery Manganese Property, Granite County, Mont.

WSM

The applicant proposed to explore 3 vein structures on the subject property, called the Durango, True (Huffman) and Horton veins, which the applicant believes are extensions of the same veins from the adjoining Taylor-Knapp property. The Field Team has demonstrated this correlation is not possible, although the applicants "Durango" and "True" veins do belong to the same vein systems containing most of the important manganese ore bodies in the district, namely, east-west and north-west, south-east striking veins. Past mining operations on this property have shown that the production has come from replacement ore bodies in the limestone wall adjacent to the veins. Ore from the veins themselves was minor. The Field Team evaluation of each of the veins proposed for exploration has been unfavorable, in that the vein structures are narrow, mineralization is generally spotty and evidence for significant replacement bodies along them are absent.

The Field Team in its summary statement recommends a denial of the subject application and further points out that the "Mystery property is on the extreme western margin of the Philipsburg manganese area. Past exploration has shown the deposits in this western area to be small and insignificant. The application indicates that the grade of most of the ore mined in the past has been marginal."

I concur with the Field Team in recommending a denial on this property.

Louis Pavlides

Louis Pavlides
Geologist

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
~~WASHINGTON 25, D.C.~~
So. 157 Howard Street
Spokane 4, Washington

DEC 3 - 1953

December 2, 1953

Mr. George C. Selfridge, Chairman
Operating Committee, DMEA
Department of the Interior
Washington 25, D. C.

WSM

Re: Docket No. DMEA-3186 (Manganese)
Mrs. Jennie M. Moore
Mystery Manganese Property
Granite County, Montana

Dear Mr. Selfridge:

Enclosed are the originals and three copies of memoranda from J. D. Bardill, U. S. Bureau of Mines, and J. J. Quinlan, U. S. Geological Survey, regarding a field examination of the Mystery property.

Mr. Bardill points out that although the application was submitted in considerable detail it contains several omissions and he suggests that several changes should be made in the cost estimates to facilitate administration of the contract. At the time of the field examination Mr. Toepfer, the applicant's engineer, agreed to revise the cost estimates and submit additional data as requested of him. We have recently learned that Mr. Toepfer will not be able to submit this additional data until spring because of more pressing duties elsewhere. It is, therefore, recommended that DMEA continue to process the application as this additional requested data will be of little value, provided the Operating Committee accepts the Field Team's recommendation for denial of the application.

Mr. Quinlan points out that the Mystery property is on the extreme western margin of the Philipsburg manganese area. Past production has shown the deposits in this western area to be small and insignificant. Considering that proposed exploration will explore manganese structures which past exploration has shown to be relatively unproductive, it is recommended that the application be denied.

By DMEA Field Team, Region II

A. E. Weissenborn

A. E. Weissenborn, Executive Officer
(U. S. Geological Survey)

M. E. Volin

M. E. Volin, Member
(U. S. Bureau of Mines)

Enclosures
cc: USBM (2)
Quinlan

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

1201 N. Division St.
Spokane 2, Washington
October 12, 1953

gcl
6/7/54

MEMORANDUM

To: DMEA Field Team, Region II

From: John D. Bardill, Bureau of Mines

Subject: Field examination, Docket No. DMEA 3186 (manganese)
Mrs. Jennie M. Moore, Mystery Manganese Mine, Granite County, Montana

The above named application was forwarded to the Chairman, Operating Committee, DMEA, Washington, D.C. on October 1, 1953.

The subject property was visited October 8, 1953 accompanied by James J. Quinlan, geologist, U. S. Geological Survey, and Peter H. Toepfer, representing Mrs. Jennie M. Moore, the applicant. The primary purpose of my examination was to evaluate the applicant's cost estimates and plans for the entire exploration project, including rehabilitation of the Mystery Tunnel and Owens Shaft and Drift, and secondly, to jointly appraise the applicant's geologic objectives of the project with Messrs. Quinlan and Toepfer.

Although the application was submitted in considerable detail an analysis of the cost estimates disclosed some omissions and suggested several changes to facilitate the operation and administration of the contract.

The application gives a detailed breakdown of cost estimates, item by item, including labor, supplies, equipment purchases, equipment rentals and partial unit costs for drifting, trenching and raising. A contract drafted on this basis of partial unit costs plus many separate additional equipment rentals tends to complicate the administration and accounting of the contract. It was suggested that the entire proposal be resubmitted on a complete unit cost basis for Mystery Tunnel and Owens Shaft and Drift rehabilitation, raises, drifts and trenches, plus allowances for managerial and engineering services, accounting, and assaying. Applicant's representative was of the opinion that such a plan would necessitate large initial expenditures for equipment and supplies which would jeopardize their working capital funds. It was explained that this would not necessarily be the case if purchases and rentals were made on a pay as you go basis. Applicant has agreed to submit a proposal on a unit cost basis, with a complete cost breakdown of each type of work.

Applicant was advised to submit an appraisal of the probable outcome of the project with a guesstimate of the possible tonnages that might be inferred by the proposed exploration, development, mining, beneficiation, and marketing costs, Government repayment royalties and other expenses pertinent to the exploration of the property. Such an appraisal will necessarily be founded on estimates and inferences but may be indicative and of some value in evaluating applicant's proposal.

My examination of the Mystery Tunnel concurred with applicant's estimate for timbering the adit portal, timbering the cave in the adit, snow shed, purchase and installation of track, air, water lines and ventilation tubing. A major oversight by applicant is the rehabilitation of the tunnel. A large portion of the tunnel is only about 3½ to 4 feet in width and many places are less than 6 feet high. Since the plan is to use a compressed air trammer, the tunnel must be widened. Mr. Toepfer was advised to reconsider the cost of rehabilitating the Mystery Tunnel and add the cost of slabbing the sides and back of the tunnel.

The ladders in the Owens Shaft were considered unsafe by both of us so that these workings were not examined. The shaft definitely needs new ladders and guides for the skip.

The geological phases of the examination will be discussed by Mr. Quinlan in a separate memorandum.

John D. Bardill

John D. Bardill

Orig. & 3 cys - Wash.
USGS (2)
DMEA
M/D
JDB/he

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION
~~WASHINGTON 25, D.C.~~
So. 157 Howard Street
Spokane 4, Washington

November 25, 1953

gcl 6/7/54

Memorandum

To: DMEA Field Team, Region II

From: J. J. Quinlan, Geologist, U. S. Geological Survey

Subject: Field examination, Docket No. DMEA 3186 (manganese)
Mrs. Jennie M. Moore, Mystery property, Granite County, Montana

Introduction

This memorandum is intended to evaluate the manganese exploration possibilities of the Mystery property, Granite County, Montana, with reference to the subject exploration loan application submitted by Mrs. Jennie M. Moore of Glendora, California.

The property was examined by the author on October 8 and 9, 1953. Mr. John D. Bardill, U. S. Bureau of Mines, participated in the examination on October 8. The primary purpose of Mr. Bardill's examination was to evaluate the applicant's cost estimates and project plans. Mr. Bardill's findings are contained in his memorandum of October 12, 1953. Mr. Peter H. Toepfer, an engineer representing the applicant, accompanied DMEA field examiners during the examination.

The DMEA field examiners did not inspect the workings from the Owens shaft because the ladders in the shaft were unsafe.

The subject application, Docket No. DMEA 3186, is the second application to be submitted by Mrs. Moore on the Mystery property. The original application, Docket No. DMEA-2179, was submitted October 10, 1951, under the property name Lucy, N. G., Mountain View and Grey claims. This application was withdrawn from the active file without prejudice by the DMEA on September 26, 1953, because the applicant failed to provide technical data requested of her.

Recommendation

It is recommended that the Mrs. Jennie M. Moore's application for exploration assistance to explore the Mystery property be denied.

Location and Accessibility

The Mystery property is in sec. 30, T. 7 N., R. 13 W., M.P.M. Philipsburg mining district, Granite County, Montana. The property is one-half mile east of Philipsburg, Montana and adjoins the Taylor-Knapp Company's (Dockets DMEA 42 and 1902) property on the west. The Camp Creek county road and power lines to the Taylor-Knapp property cross the southern part of the property.

The mine and ranching town of Philipsburg, Montana is on U. S. Highway 10A, 29 miles north of Anaconda, Montana, and 26 miles south of Drummond, Montana. It is serviced by a branch line of the Northern Pacific Railroad, which joins the main line at Drummond. Philipsburg serves as a delivery point for manganese ore purchased by General Services Administration.

The property is at an altitude of approximately 5,700 feet. Winter weather prevails at the property between November and April. The winters are generally severe with considerable snow and sub-zero temperatures. These winter weather conditions cause some inconveniences but do not seriously hamper winter mining operations in the district.

Property and Ownership

The Mystery property consists of the following patented lode mining claims: N.G., Survey No. 9359; Mountain View, Survey No. 9359; Evergreen, Survey No. 9369; Lucy, Survey No. 10,851; Grey, Survey No. 10,851; and Rescue, Survey No. 10,851. Of these six claims, the applicant wishes to include only the N. G., Mountain View, Lucy and Grey claims in the applied-for contract as the other two claims are not pertinent to the immediate exploration area. These claims are shown on Map No. 1 accompanying the application. A copy of this map is attached to this memorandum for illustrative purposes.

The claims are owned by the applicant, Mrs. Jennie M. Moore, 422 E. Foothill Boulevard, Glendora, California.

Geology

The geology of the Philipsburg district and its manganese deposits are described in the following publications:

Emmons, W. H., and Calkins, F. C., Geology and ore deposits of the Philipsburg quadrangle, Montana: U. S. Geol. Survey Prof. Paper 78, 1913

Pardee, J. T., Deposits of manganese ore in Montana, Utah, Oregon and Washington: U. S. Geol. Survey Bull. 725, pp. 146-174, 1921

Goddard, E. N., Manganese deposits of Philipsburg, Granite County, Montana, a preliminary report: U. S. Geol. Survey Bull. 922 G, pp. 157-204, 1940

The reader is referred to these publications for a detailed discussion of the manganese deposits of the district.

The manganese deposits of the district are east of Philipsburg and are confined to an area approximately two square miles in size. For the most part, the deposits occur in Paleozoic limestones along the eastern limb of the Philipsburg anticline adjacent to the Philipsburg batholith, and, to a lesser extent, along the nose of the anticline. The deposits are closely related to east-west and northwest-southeast striking fissure veins, and are of two types: ~~fissure veins and~~ irregular and tabular replacement deposits in limestone adjacent to the fissure veins. The veins themselves are principally valued for base and precious metals; however, some manganese is obtained from them.

The Mystery property is on the western margin of the manganese producing area. Production records from the property are not available, but Mrs. Moore's original application, DMEA Docket No. 2179, placed the value of manganese dioxide production at $75,000 to $80,000, "as well as a large amount of ore that has been stolen and of which there is no record." It is apparent from the application that the property has operated only during periods of high manganese prices and that it has been necessary to concentrate most of the ore to make a marketable product. Discounting the applicant's statement that a large amount of ore has been stolen, which is doubted, the value of the production indicates that at best total production from the property has amounted to only several thousand tons of ore. This is also apparent from the size and amount of stoping along the vein structure. It is estimated that total production from the property has amounted to less than 10,000 tons of manganese ore.

Attached to this memorandum is a geologic map showing the northern portion of the manganese producing area. This map has been prepared from a map in the Spokane office files of the Geological Survey and in small part from maps submitted by the applicant. The map from the Spokane office files is an enlargement of Plate 26, U. S. Geological Survey Bulletin 922 with additions by R. H. Thurston, U. S. Geological Survey. The attached map illustrates the relationship between the structures the applicant wishes to explore and those which have been major producers in the northern part of the district.

The Mystery property is on the western part of the broad and crenulated nose of the Philipsburg anticline. Therefore, structurally it must be considered as being on the fringe of the known manganese area. The property is underlain by massive dolomitic limestone of the Upper Hasmark formation (Cambrian age) and Calcarious shales and limestones of the overlying Red Lion formation (Cambrian age). The applicant's proposed exploration is to be confined to the upper Hasmark formation which is considered to be a favorable stratigraphic horizon for ore in the district.

The applicant wishes to explore three vein structures which the applicant's engineer believes are extentions of the Durango, True (Huffman), and Horton veins from the neighboring Taylor-Knapp property. Replacement ore bodies in limestones bordering these three structures have been an important source of manganese at the Taylor-Knapp property. Perusal of the geologic map of the northern part of the manganese area, which is attached to this memorandum, will show that it is not possible to make such a correlation; however, it should be pointed out that the applicant's "Durango" and "True" veins do belong to the same vein systems as those structures with which most of the important manganese ore bodies are associated, i.e., eastwest and northwest-southeast striking veins.

The application contains a set of geologic and assay maps illustrating in detail the structures the applicant wishes to explore. The vein structures are essentially narrow and the manganese values spotty, but it has been possible to stope sections of the veins in the Murphy, Cole and Hartley adits. Inspection of these workings indicates that bodies mined along the vein were irregular and averaged less than 5 feet wide. It is believed that in some of the higher grade sections, past operators may have mined sections of the vein as narrow as 2 feet. It is apparent that the manganese ore from the veins themselves is relatively unimportant, tonnagewise. This is not only true at the Mystery property but throughout the district. The important manganese ore bodies are those replacement bodies in the limestone wall adjacent to the veins.

Only two replacement bodies of any significance have been found on the Mystery property. These are the Murphy ore body along the "Durango" vein and the Powder Tunnel ore body along the "Horton" vein.

The Murphy ore body occurs in limestone beds near the base of the upper Red Lion formation (see applicant's Map No. 2). It is apparently controlled by the vein, bedding, and cross faulting, and is irregular in nature. It is estimated from the size of the stope that the heart of the body contained about 1,300 tons of ore and that another 1,000 tons was realized from the vein proper in the immediate vicinity.

The Powder Tunnel ore body occurs in the Hasmark limestone. This body is an irregular pod-like mass associated with a northwest-southwest striking fissure vein ("Horton" vein) near its intersection with an east-west striking fissure vein. It appears to be controlled by an irregular brecciated zone in the immediate vein wall. The size of the stope indicates that the body must have been about 50 feet long, 20 to 25 feet high and 12 feet wide. Similar but much smaller pod-like bodies occur along the vein for a distance of 150 feet northwest of the principal body. The applicant's Map No. 3 shows a similar body on the 100 level of the Owens shaft immediately under the principal body. This body was not inspected as it was not believed safe to enter the Owens shaft. It is estimated that a maximum of 5,000 to 6,000 tons of ore could have come from Powder Tunnel body and similar but smaller bodies in the immediate vicinity.

It should be pointed out that this is a different interpretation of the Powder Tunnel ore body than that given by the applicant's engineer who believes the ore is more or less controlled by a bedding shear zone 160 feet wide. The longitudinal section on the applicant's Map No. 3 illustrates this and shows six separate ore beds. I failed to see this relationship in the stope, although there is a definite suggestion that the body does pitch to the west. In fairness to the applicant's engineer it should be pointed out that there is evidence of considerable bedding plane shearing in the area. However, I could not find evidence to support the theory that it is the primary ore control. Granted it probably is one of the ore control factors, but the irregular nature of the brecciated zone does not suggest that it is the primary control.

Evaluation of Proposal

"Durango" Vein

The applicant proposes to extend the Mystery tunnel drift on the "Durango" vein 203 feet west and 253 feet east. In addition, a 190-foot raise to the surface is proposed from near the end of the proposed east drift extention. All of the proposed work would be in the uppermost part of the Hasmark formation except maybe the last few feet of raise which might be in the lower shale member of the Red Lion formation, depending on the exact location of the raise.

The "Durango" vein, where exposed in the Hasmark formation in the Mystery tunnel and in trenches east of the applicant's property, is very tight and contains no evidence of any large replacement bodies. In the Mystery tunnel east drift the vein averages less than 1.5 feet in width and in the west drift it is only a sharp fracture which becomes almost impossible to follow. The sample data contained in the application shows that the vein in the east drift averages 32 percent manganese, which is the highest average for any section of vein sampled by the applicant's engineer.

Inasmuch as the vein structure is narrow and there is no evidence of large replacement bodies along it, within the Hasmark formation, the applicant's proposed exploration is considered

as being of a wild-cat nature and is not recommended.

"True" Vein

The applicant proposes to extend the Mystery tunnel east drift on the "True" vein 250 feet to the east to explore the vein under the Hartley adit workings. If this work proves successful the applicant then proposes to extend the drift an additional 290 feet to the east end line of the property. All of the proposed work would be within the Hasmark formation.

Where exposed in the Mystery tunnel the "True" vein is a narrow quartz vein varying in width from 0.3 to 2.5 feet. It is practically devoid of manganese but the applicant's samples indicate that it does contain a few ounces of silver. The "True" vein has been stoped for manganese in the Hartley workings. These stopes are narrow averaging about 4 feet in width and are very irregular. The applicant reports that 250 tons of ore, averaging 27.6 percent manganese, were mined from these workings. The True vein is also exposed in the workings east of the Hartley adit. Here again, as in the Mystery tunnel, the vein is narrow and practically devoid of manganese.

The applicant's engineer contends that ore bodies similar to the Powder Tunnel body should be found along the "True" vein where the same bedding shear zone, which he believes controls the Powder tunnel body, crosses the "True" vein. As explained in the section on geology, I do not believe this bedding shear zone is a primary ore control. In fact, I would like to point out that no large ore bodies are indicated on the surface where the projection of this zone intersects the "True" vein. The applicant's engineer also contends that this same bedded zone may be related to the Durango ore body of the Taylor-Knapp Company. A study of the geologic map of the northern part of the manganese area, which is attached to this memorandum, will show that this is not so.

The proposed drift extention would explore the vein only 35 feet below the winze from the Hartley working. This winze was sunk at the intersection of the vein with a small replacement ore body out along a favorable bed. This bed averages less than 2 feet in width and the manganese only extends a short distance out from the main fissure along it. Therefore, it is considered a relatively insignificant structure.

Inasmuch as the "True" vein structure is known to be narrow where exposed and there is little evidence of any replacement bodies of any consequence along it no exploration is recommended.

"Horton" Vein

The applicant proposed to drift 130 feet westward on the "Horton" vein from the stope on the 100 level off the Owens

shaft. Also, the applicant proposes to crosscut 50 feet south from the 100 level Owens shaft station to cut the "Horton" vein and then drift 400 feet eastward on the vein. If no ore is found in the first 100 feet of drift the applicant then proposes to test the drift walls with 100-foot diamond drill holes.

The "Horton" vein is considered to be the best manganese structure exposed on the Mystery property. However, it is essentially narrow and the Powder Tunnel replacement body and related smaller bodies found along it are relatively insignificant. Therefore, no exploration is recommended along it.

The applicant also proposes to trench between the Owens shaft and the caved shaft 150 feet to the east. This work is not recommended because the Owens vein, like the other structures, is narrow and there are few if any replacement bodies of any significance along it.

Summary Statement

The Mystery property is on the extreme western margin of the Philipsburg manganese area. Past exploration has shown the deposits in this western area to be small and insignificant. The application indicates that the grade of most of the ore mined in the past has been marginal.

The applicant's proposed program is to be considered more or less as wild-cat exploration. Considering that it will explore manganese structures, which past exploration has shown to be relatively unproductive, the exploration program is not recommended.

Enclosures- 2

Distribution:
DMEA (Orig. & 3)
USBM
USGS
Docket
Quinlan

Mystery Manganese Mine, Docket No. DMEA 3186
Granite County, Montana

REHABILITATION

Mystery Tunnel.				
	Supplies and Labor	$6,071.00		Cost per foot
	Supervision, Accounting			
	Trucking	1,760.00		
			$7,831.00	
Owens Shaft	Supplies and Labor	3,058.00		
	Supervision, Accounting			
	Trucking	886.00	3,944.00	
DRIFTING (Mystery Tunnel Level				
	Supervision	2,405.00		
	Accounting	215.00		
	Trucking	537.00		
	Rental	2,698.00		
	Purchases	2,656.00		
	Installation & Repairs	1,814.00		
	705' drift at $23.50	16,568.00		
			26,893.00	$38.15
DRIFTING. (Owens shaft)				
	Supervision	955.00		
	Accounting	85.00		
	Trucking	213.00		
	Rental	1,072.00		
	Rental (hoist	930.00		
	Purchases	1,055.00		
	Purchases (Skip & cable)	651.00		
	Installation & Repairs	721.00		
	280' drift at $26.00	7,280.00		
			12,962.00	$46.30
TRENCING			336.00	
CONTINGENCIES			1,384.00	
ASSAYING			150.00	
Total			$53,500.00	

10,000

FILE COPY
SURNAME:

400

Rutledge
Martin
Hedges
Selbridge
Fitzpatrick

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

OCT - 8 1953

Mrs. Jennie M. Moore
422 E. Foothill Boulevard
Glendora, California

Re: Docket No. DMEA 3186 - Manganese
Mystery Manganese mine
Granite County, Montana

Dear Mrs. Moore:

Reference is made to the above-docketed application for exploration assistance which has been reviewed by the Iron and Ferro-Alloys Division of the Defense Minerals Exploration Administration and referred to Mr. A. E. Weissenborn, Executive Officer, DMEA Field Team, Region II, South 157 Howard Street, Spokane 4, Washington, for a field examination of the property.

The Regional Office will contact you at an early date with regard to an examination of your property. Any assistance that you can render the members of the field team during the examination will be appreciated.

Sincerely yours,

C. O. Mittendorf (fw)

Administrator

FARUTLEDGE:FOC
10-7-53
cc: Docket
Code 400
Adm. Reading File
Operating Comm.
FT. Reg.2
Gilbert DeHuff, USBM
Lewis Pavlibes, USGS

R.C.B.
10-8-53

FILE COPY
SURNAME:

400

Rutledge
Martin
Selfridge
Fitzhugh

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

OCT - 8 1953

Mr. A. E. Weissenborn, Executive Officer
DMEA Field Team, Region II
South 157 Howard Street
Spokane 4, Washington

Re: Docket No. DMEA 3186 - Manganese
Mrs. Jennie M. Moore
Mystery Manganese mine
Granite County, Montana

Dear Mr. Weissenborn:

Reference is made to the subject docket and your letter of October 1, 1953, which states that you are scheduling an early examination of the property.

We will, therefore, hold this application in abeyance until the report and recommendations by the Field Team are received.

Sincerely yours,

George C. Selfridge
Chairman, Operating Committee (JHB)

APPROVED:

J. H. Hedges (JHB)
Member, Bureau of Mines

T. P. Thayer (JHB)
Member, Geological Survey

FARutledge:foc
10-7-53
cc: Docket
Code 400
Admr. Reading File
Operating Committee
FT. Reg. 2
Gilbert DeHuff, USBM
Lewis Pavlibes, USGS

R. C. G. 10-8-53

Mrs. Jennie M. Moore
422 E. Foothill Blvd.
Glendora, California

October 6, 1953
Subject: DMEA-3186
Re: Exploration Assistance
Mystery Manganese Mine

Dear Mrs. Moore:

The receipt of your application dated September 21, 1953, for exploration assistance under the Defense Production Act of 1950, as amended, is hereby acknowledged.

Your application has been assigned Docket Number DMEA-3186 and referred to the Iron & Ferro-Alloy Division.

Kindly refer to DMEA-3186 in any future correspondence relating to your application.

Sincerely yours,

ROBERT E. ADAMS

Robert E. Adams
Chief, Operations Control
and Statistics Division

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

October 6, 1953

Memorandum

To: Executive Officer, DMEA Field Team, Region II

From: Chief, Operation's Control and Statistics Division

Subject: Assignment of Docket Number DMEA-3186

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

- 3186 Mrs. Jennie M. Moore
DMEA

ROBERT E. ADAMS

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

~~WASHINGTON, D.C.~~
So. 157 Howard Street
Spokane 4, Washington

October 1, 1953

Mr. George C. Selfridge, Chairman
Operating Committee, DMEA
Department of the Interior
Washington 25, D. C.

Re: Application (Manganese)
Jennie M. Moore
Mystery Manganese Mine
Granite County, Montana

Dear Mr. Selfridge:

Enclosed are three copies of an application submitted by Mrs. Jennie M. Moore of Glendora, California, for exploration of the Mystery Manganese mine in Granite County, Montana.

This is the second application to be filed by Mrs. Moore on the Mystery property. The original application, Docket No. DMEA-2179, was filed October 10, 1951, under the property name of Lucy, N. G., Mountain View and Grey claims. This application was withdrawn from the active file without prejudice by the DMEA on September 26, 1952, because Mrs. Moore failed to provide DMEA with technical data requested of her. The new application is much more complete than the original application and contains a definite exploration proposal and cost analysis, which the original application lacked.

The Mystery property adjoins the Taylor-Knapp property (Dockets DMEA-42 and 1902) on the west. The proposed exploration will explore for oxide manganese ore at shallow depth along the Durango, True and Horton veins on the west limb of the Philipsburg anticline.

Our files do not contain sufficient information on the Mystery property to make a critical analysis of the application at this time. Considering that the property adjoins the Taylor-Knapp property and the proposed exploration will explore extensions of vein structures explored under the Taylor-Knapp contracts, it is believed that the property merits serious consideration. Therefore, a field examination will be scheduled at an early date, possibly next week.

Sincerely yours,

A. E. Weissenborn

A. E. Weissenborn
Executive Officer, DMEA
Field Team, Region II

Enclosures
cc: USBM (2)
Quinlan

RECEIVED
BUREAU OF MINES
SEP 21 1953
SPOKANE, WASH.

MF-103
(Revised April 1952)

UNITED STATES DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS EXPLORATION ADMINISTRATION

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

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

Not to be filled in by applicant

Docket No. DMEA-3186
Metal or Mineral
Date Received 10-6-53
Estimated Cost
Participation (Government %)

INSTRUCTIONS

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

Mrs. Jennie M. Moore
422 E. Foothill Blvd.
Glendora, California.

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

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

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

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

3. *Applicant's property rights.*—(*a*) State the legal description of the land upon which you wish to explore, including all land which you possess or control that may be benefited by the exploration, and excluding any land or interest in land which is not to be included in the exploration project contract The following patented mining claims located in Section 30 T-7-N, R-13-W, Granite County, Montana.

Sur. No. 9359 - N.G.
Sur. No. 9359 - Mountain View
Sur. No. 10851 - Lucy
Sur. No. 10851 - Grey

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

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

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

(*e*) If you own the land, describe any liens or encumbrances on it None

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

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

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

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

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

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

16—66551-1

See accompanying report, written specifically for this application.

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

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

(*c*) The work will start within 30 days but not before April 1 and be completed within 14 months from the date of an exploration project contract.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Explain in detail on acompanying paper.

CERTIFICATION

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

Dated Sept. 21, 1953, 195...

Mrs. Jennie M. Moore
(Applicant)

By Peter H. Toepfer
(Peter H. Toepfer)
Philipsburg, Montana.

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

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

ANSWERS TO MF-103
Mystery Manganese Application

DEPARTMENT OF THE INTERIOR
Bureau Mines Information
RECEIVED
OCT 2 1953

(5a) Mineral: Manganese (black oxide)

(5b) Accompanying report and maps fully outline the proposed exploration program, and give reasons for belief in its success. In summation, the program is as follows:

STAGE I

Time Schedule: 0 - 7 Months.

(General) Purchase and rental of equipment and supplies, installation of transformer for electric power, installation of equipment (including transportation costs), repair of compressor house and hoist house, and building of warehouse and change room.

(1) Rehabilitation of Mystery Tunnel to points of beginning of exploratory drifting on Durango and True veins. Requires cleaning of tunnel for distance of 1035 feet. Requires 50 feet of timbering in caved section and 20 feet of timbering at portal. Requires 200 feet of snow shed over outside track. Requires installation of 1265 feet of track, 1230 feet of air and water lines, and 1050 feet of ventilation tubing.

(2) Exploratory drift 203 feet westward on Durango vein from within Mystery Tunnel. (See Map #2 and page 6 of report). Requires 1075-foot tram at beginning. Will not require timbering.

(3) Exploratory drift 252 feet eastward on Durango vein from within Mystery Tunnel. (See Map #2 and page 6 of report). Requires 1095-foot tram at beginning. Will not require timbering.

(4) Exploratory drift 250 feet eastward on True vein from within Mystery Tunnel. (See Map #4 and page 10 of report). Requires 620-foot tram at beginning. May require minor amount of timbering.

(5) Rehabilitation of Owens Shaft and Drift on the 100-foot level. Requires new timbers for skip guides and new ladders. Requires sinking another 10 feet for skip pocket. Requires cleaning of drift and 20 feet of timbering through caved stope. Requires installation of 200 feet of track, and 255 feet of air line, water line, and ventilation tubing.

(6) Exploratory drift 130 feet westward on Horton vein from west end of workings on 100-foot level of Owens Shaft. (See Map #3 and page 8 of report). Requires 100-foot hoist and 165-foot tram at beginning. May require minor amount of timbering.

(7) Exploratory crosscut 50 feet south from Owens Shaft on the 100-foot level to intercept the Horton vein; to be followed by 100 feet of drifting eastward on Horton vein. (See Map #3 and page 8 of report). Requires 100-foot hoist at beginning. Should not require timbering.

(8) Bulldozer trenching 24 hours in the vicinity of the caved shaft east of the Owens Shaft, to determine vein structure and value, and its relationship to the Owens vein. (See Map #3 and page 9 of the report). Bulldozing to be done by contract.

ANSWERS TO MF-103
Mystery Manganese Application

STAGE II

Time Schedule: 7 - 12 months

(1) Exploratory raise 190 feet to surface following Durango vein from end of east exploratory drift (Stage I, part 3). (See Map #2 and page 6 of report). Raise to consist of two raw chutes and a manway measuring 3.5 x 6 feet inside of timbers. Requires 1335-foot tram.

(2) Continuation of exploratory drifting in Stage I, part 4. Exploratory drift additional 290 feet eastward on True vein on Mystery Tunnel level. (See Map #4 and page 10 of report). Requires 870-foot tram at beginning. May require minor amount of timbering.

(3) Continuation of exploratory drifting in Stage I, part 7. Exploratory drift additional 300 feet eastward on Horton vein on 100-foot level of Owens Shaft. (See Map #3 and page 8 of report). Requires 100-foot hoist and 150-foot tram at beginning. Should not require timbering.

(5c) The work will start within 30 days and be completed within 13 months from the date of the exploration contract.

(5d) The applicant has owned this property from the beginning of the manganese production there, and is an accomplished businesswoman.

Operations under the proposed DMEA program will be under the direction of Peter H. Toepfer, a mining engineer formerly with Region II of the Bureau of Mines, and who has had 8 years of experience in mining operations in the vicinity of Philipsburg. Toepfer will have a monetary investment in this property, and a definite interest in the successful outcome of this program. Refer to M.E. Volin, Chief, Mining Division, Region II, U.S. Bur. Mines, Spokane, Washington.

Supplement Sheet A

BREAKDOWN OF COSTS
(Divided by parts as listed in answer to 5b)

STAGE I
(GENERAL)

Rental Equipment:

Air Compressor (315 cfm) with 75 hp electric motor Price new $3,300 plus $1,510 for motor & starter Rental 5 mos @ $249.00	$ 1,245.00
Receiver Tank (32 cu ft) Price new $500.00 Rental 5 mos. @ $50.00	250.00
4 Jackleg Drifters (Thor Pneumatic) (Price new $665.00 each) Rental 5 mos. @ $70.00 each	1,400.00
Trammer (Universal Trammair, Model 3684) (Price new $2,000.00) Rental 5 mos. @ $175.00	875.00
Mine Hoist with 30 hp electric motor & reducer (Price second hand estimated $3,100.00) Rental 3 mos. @ $310.00	930.00
	4,700.00

Equipment to be Purchased:

Water Pump (Jaeger) with 1 hp electric motor Price new $250.00	250.00
2 Blowers (Coppus TM-4) with 1 hp electric motors Price new $255.00 each	510.00
6 6-foot Drill Steels with carbide insert bits Price new $20.50 each	123.00
150 feet, Air Line Hose (with couplings) Price new $25.00 per 50 feet	75.00
150 feet, Water Line Hose (with couplings) Price new $21.00 per 50 feet.	63.00
4 Water Tanks (submarines) Price new $70.00 each	280.00
6 Mucking Sheets, steel, 1/4" x 4 ft x 5 ft. Price $15.00 each	90.00
9 Ore Cars (16 cu ft) Price reconditioned $200.00 each	1,800.00
Skip (20 cu ft)(built to order) Price estimated	615.00
Small Tools & Miscellaneous Hardware (Picks, shovels, bars, wrenches, blow torch, grease guns, jim crow, crow bars, double and single jacks, axes, saws, hammers, block & tackle, etc.)	500.00
	4,306.00

Supplement Sheet B

BREAKDOWN OF COSTS

(Divided by parts as listed in answer to 5b)

STAGE I
(GENERAL)

Equipment to be Purchased (cont.):	4,362.00
200 feet of Hoist Cable (3/8") Price 18¢ per ft.	$ 36.00
2 Electric Heaters (for change room)	20.00
	4,362.00
Installations and Repairs:	
Installation of Transformer and Wiring of Motors	535.00
Installation and transportation of compressor	250.00
Installation and transportation of mine hoist	250.00
Transportation of other equipment listed	200.00
Repair of Compressor House	150.00
Repair of Hoist House	150.00
Building of Tool House & Change Room. (12 ft x 20 ft with partition. Includes stove, water heater, shower, benches, and pulley hangers)	1,000.00
	2,535.00
General Services:	
Mine Manager (to also act as engineer and geologist) (Add 12% for insurance, taxes, & social security) 8 months @ $600 +12%	5,376.00
Truck Rental with Driver. (part time) 8 months @ $150	1,200.00
Accountant (part time) 8 months @ $60.00	480.00
Assays 100 assays @ $1.50	150.00
SUBTOTAL (GENERAL COSTS - STAGE I) 7,206.00	$ 18,803.00

(1)(REHABILITATION OF MYSTERY TUNNEL)

NOTE: Labor figured at $15.29 per man-shift, plus 12% for insurance, taxes, social security, thus figuring $17.12 per man-shift.

Labor:	
Cleaning Drift and laying track (1265 ft) 2 men - 46 days @ $17.12	$ 1,574.04
Timbering (70 ft)(Timber to be cut on property) 2 men - 7 days @ $17.12	239.68
Installation of air and water lines and ventilation tubing. 2 men - 10 days @ $17.12	342.40

Supplement Sheet C

BREAKDOWN OF COSTS
(Divided by parts as listed in answer to 5b)

STAGE I

(1)(REHABILITATION OF MYSTERY TUNNEL)

Labor (cont.):

Building Snow Shed over outside track. (200 ft) (Includes tearing down old buildings for lumber) 2 men - 15 days @ $17.12	$ 513.60
Supply Purchases:	
2530 ft. of 14-lb mine rail (used)(Includes track spikes, fish plates, bolts, & 4 switches) 6.5 tons @ $130.00 per ton.	845.00
600 Track Ties @ 40¢	240.00
Wedges	10.00
Purchase of old buildings for lumber.	150.00
1230 ft. of 2" std. blk. pipe (air line) Price new 55¢ per ft.	676.50
Valves, fittings, & couplings (2") figured at 20% of pipe cost)	135.30
1230 ft. of 1" std. blk. pipe (water line) Price new 20¢ per ft.	246.00
Valves, fittings, & couplings (1") figured at 20% of pipe cost	49.20
1050 ft. of 12" ventilation tubing, complete with couplings and hangers. Price new, $1.00 per ft.	1,050.00
SUBTOTAL (REHABILITATION OF MYSTERY TUNNEL)	$ 6,071.72

(2)(WEST DURANGO EXPLORATORY DRIFT)

203 feet of drifting @ $23.50 per foot. (Includes direct costs only (Labor, supplies, power, etc.) and takes into consideration long tram to mine dump.)	$ 4,770.50
SUBTOTAL (WEST DURANGO EXPLORATORY DRIFT)	$ 4,770.50

(3)(EAST DURANGO EXPLORATORY DRIFT)

252 feet of drifting @ $23.50 per foot.	$ 5,922.00
SUBTOTAL (EAST DURANGO EXPLORATORY DRIFT)	$ 5,922.00

(4)(EAST TRUE EXPLORATORY DRIFT)

250 feet of drifting @ $23.50 per foot.	$ 5,875.00
SUBTOTAL (EAST TRUE EXPLORATORY DRIFT)	$ 5,875.00

Supplement Sheet D

BREAKDOWN OF COSTS
(Provided by parts as listed in answer to 5b)

STAGE I

(5)(REHABILITATION OF OWENS SHAFT AND DRIFT)

Labor:

Replacing shaft timber for skip guides, emplacing rail for skip guides, and replacing ladders. 3 men - 15 days @ $17.12	$ 770.40
Sinking shaft additional 10 feet, and building skip pocket, chute, and grizzly. 3 men - 8 days @ $17.12	410.88
Cleaning Drift and laying track (200 ft.) 3 men - 7 days @ $17.12	359.52
Timbering in caved stope. (20 ft.)(Timber to be cut on property.) 3 men - 3 days @ $17.12	154.08
Installation of air and water lines, and ventilation tubing. (250 feet) 3 men - 3 days @ $17.12	154.08

Supply Purchases:

620 feet of 14-lb. mine rail. (used)(includes track spikes, fish plates, bolts, & 1 switch) 1.5 tons @ $130 per ton.	195.00
100 Track Ties @ 40¢	40.00
Wedges	5.00
510 feet of 2" std. blk. pipe. (air line) Price new 55¢ per ft.	280.50
Valves, fittings, & couplings (2") (figured at 20% of pipe cost)	56.10
510 feet of 1" std. blk. pipe. (water line) Price new 20¢ per ft.	102.00
Valves, fittings, & couplings. (1") (figured at 20% of pipe cost)	20.40
510 feet of 12" ventilation tubing, complete with couplings and hangers. Price new, $1.00 per ft.	510.00
SUBTOTAL (REHABILITATION OF OWENS SHAFT)	$ 3,057.96

(6)(WEST HORTON EXPLORATORY DRIFT)

130 feet of drifting @ $26.00 per foot. Includes direct costs only (labor, supplies, power, etc.) and takes into consideration the 100-foot hoist to surface and two transfers.	$ 3,380.00
SUBTOTAL (WEST HORTON EXPLORATORY DRIFT)	$ 3,380.00

Supplement Sheet E

BREAKDOWN OF COSTS
(Divided by parts as listed in answer to 5b)

STAGE I

(7)(EAST HORTON EXPLORATORY DRIFT)

150 feet of drifting @ $26.00 per foot.	$ 3,900.00
SUBTOTAL (EAST HORTON EXPLORATORY DRIFT)	$ 3,900.00

(8)(BULLDOZER TRENCHING)

24 hours of bulldozer trenching @ $14.00 per hr. (By Contract)(Includes all costs of work with D-6 or larger bulldozer, including operator)	$ 336.00
SUBTOTAL (BULLDOZER TRENCHING)	$ 336.00

(CONTINGENCIES)

Sum reserved for unforseen contingencies; such as unforseen necessity of timbering, drifting through unexpected heavy ground, indirect costs due to strikes or severe weather or power failures, etc. (Figured at 2 1/2% of total cost, approx.)	$ 1,383.82
SUBTOTAL (CONTINGENCIES)	$ 1,383.82

TOTAL ESTIMATED COST --- STAGE I --- $ 53,500.00

Supplement Sheet F

BREAKDOWN OF COSTS
(Divided by parts as listed in answer to 5b)

STAGE II
(GENERAL)

Rental Equipment:	
Air Compressor(315 cfm) with 75 hp electric motor Rental 5 mos. @ $249.00	$ 1,245.00
Receiver Tank (32 cu ft) Rental 5 mos. @ $50.00	250.00
2 Jackleg Drifters (Thor Pneumatic) Rental 5 mos. @ $70.00 each	700.00
Trammer (Universal Trammair, Model 3684) Rental 5 mos. @ $175.00	875.00
Mine Hoist with 30 hp electric motor & reducer. Rental 3 mos. @ $310.00	930.00
Stoper (Thor Pneumatic. Medium) Price new $735.00 Rental 5 mos @ $70.00	350.00
Tugger Hoist (1000# pull) Price new $980.00 Rental 5 mos. @ $80.00	400.00
Equipment to be Purchased:	
2 sets Drill Steel (carbide insert bits) (30" - 48" - 66" lengths to set) Average price per steel, $15.00	90.00
400 ft of tugger hoist cable (5/16") Price, 8.4¢ per ft.	33.60
General Services:	
Mine Manager 5 months @ $600.00 plus 12%	3,360.00
Accountant (part time) 5 months @ $60.00	300.00
Truck Rental with Driver (part time) 5 months @ $150.00	750.00
Assays 100 assays @ $1.50	150.00
SUBTOTAL (GENERAL COSTS - STAGE II)	$ 9,433.60
(1)(EAST DURANGO EXPLORATORY RAISE) 190 feet of raising @ $26.00 per foot. Includes direct costs only (labor, supplies, power, etc.) and takes into consideration long tram to mine dump.)	$ 4,940.00
SUBTOTAL (EAST DURANGO EXPLORATORY RAISE)	$ 4,940.00

Supplement Sheet G

BREAKDOWN OF COSTS
(Divided by parts as listed in answer to 5b)

STAGE II

(2)(EAST TRUE EXPLORATORY DRIFT CONTINUATION)
290 feet of drifting @ $23.50 per foot. $ 6,815.00

SUBTOTAL (EAST TRUE EXPLORATORY DRIFT CONTINUATION) $ 6,815.00

(3)(EAST HORTON EXPLORATORY DRIFT CONTINUATION)
300 feet of drifting @ $26.00 per foot. $ 7,800.00

SUBTOTAL(EAST HORTON EXPLORATORY DRIFT CONTINUATION) $ 7,800.00

(CONTINGENCIES)
Sum reserved for unforseen contingencies; such as unforseen necessity of timbering, drifting through unexpected heavy ground, indirect costs due to strikes or severe weather or power failures, etc. $ 1,011.40
(figured at 2 1/2% of total, approx.)

SUBTOTAL (CONTINGENCIES) $ 1,011.40

TOTAL COST --- STAGE II --- $ 30,000.00

TOTAL COST - STAGE I $ 53,500.00
TOTAL COST - STAGE II 30,000.00

TOTAL COST OF PROJECT - $ 83,500.00

ANSWERS TO MF-103
Mystery Manganese Application

STAGE I

NOTE: For detailed cost breakdowns, see supplemental sheets A thru G.

(6a)(Independant Contracts)

Rehabilitation of Mystery Tunnel (see sheets A,B,& C) (Includes $500.00 item for small tools) 1035 feet of rehabilitation @ $6.35 per foot	$ 6,572.25
West Durango Exploratory Drift (see sheet C) 203 feet of drifting @ $23.50 per foot	4,770.50
East Durango Exploratory Drift (see sheet C) 252 feet of drifting @ $23.50 per foot	5,922.00
East True Exploratory Drift (see sheet C) 250 feet of drifting @ $23.50 per foot	5,875.00
West Horton Exploratory Drift (see sheet D) 130 feet of drifting @ $26.00 per foot	3,380.00
East Horton Exploratory Drift (see sheet E) 150 feet of drifting @ $26.00 per foot	3,900.00
Bulldozer Trenching (see sheet E) 24 hours of bulldozer trenching @ $14.00 per hr.	336.00
SUBTOTAL - INDEPENDANT CONTRACTS	$ 30,755.75

(6b)(Labor, Supervision, Consutants)

General (see sheet B)

NOTE: Labor, including additional pay for foreman and Saturday overtime, figured as averaging $15.29 per man-shift.

Mine Manager (to also act as engineer and geologist) 8 months @ $600.00	$ 4,800.00
SUBTOTAL - LABOR, SUPERVISION, CONSULTANTS	$ 4,800.00

(6c)(Operating Materials and Supplies)

General (see sheets A & B)

6 6-foot Drill Steels with carbide insert bits Price new, $20.50 each	$ 123.00
150 feet, Air Line Hose (with couplings) Price new, $25.00 per 50 feet.	75.00
150 feet, Water Line Hose (with couplings) Price new, $21.00 per 50 feet.	63.00
6 Mucking Sheets, steel, 1/4" x 4 ft x 5 ft. Price new, $15.00 each	90.00
200 feet of Hoist Cable (3/8") Price new, 18¢ per foot	36.00
SUBTOTAL - OPERATING MATERIALS & SUPPLIES	$ 387.00

ANSWERS TO MF-103
Mystery Manganese Application

STAGE I (cont.)

(6d)(Operating Equipment)
General (sheets A & B)

Air Compressor (315 cfm) with 75 hp electric motor Price new, $3,300 plus $1,510 for motor & starter Rental 5 mos. @ $249.00	$ 1,245.00
Receiver Tank (32 cu ft) Price new, $500.00 Rental 5 mos. @ $50.00	250.00
4 Jackleg Drifters (Thor Pneumatic) Price new, $665.00 each Rental 5 mos. @ $70.00 each	1,400.00
Trammer (Universal Trammair, Model 3684) Price new, $2,000.00 Rental, 5 mos. @ $175.00	875.00
Mine Hoist with 30 hp electric motor & reducer Price second hand estimated $3,100.00 Rental, 3 mos. @ $310.00	930.00
Water Pump (Jaeger) with 1 hp electric motor Price new, $250.00	250.00
2 Blowers (Coppus TM-4) with 1 hp electric motors Price new, $255.00 each	510.00
4 Water Tanks (submarines) Price new, $70.00 each	280.00
9 Ore Cars (16 cu ft) Price reconditioned, $200.00 each	1,800.00
Skip (20 cu ft)(built to order) Price estimated	615.00
2 Electric Heaters (large size) Price estimated	20.00
SUBTOTAL - OPERATING EQUIPMENT	$ 8,175.00

(6e)(Rehabilitation and Repairs)
General (see sheet B)

Repair of Compressor House	$ 150.00
Repair of Hoist House	150.00
Rehabilitation of Owens Shaft and Drift (see sheet D)	
Rehabilitation of Shaft	770.40
Completion of skip pocket and shaft station	410.88
Cleaning Drift and laying track	599.52

ANSWERS TO MF-103
Mystery Manganese Application

STAGE I (cont.)

(6e)(Rehabilitation and Repairs)(cont.)	
Rehabilitation of Owens Shaft and Drift. (cont.)	
Timbering in caved stope.	$ 154.08
Installation of air and water lines and ventilation tubing	1,123.08
SUBTOTAL - REHABILITATION AND REPAIRS	$ 3,357.96
(6f)(New Buildings, Improvements, Installations)(~~$~~	
General (see sheet B)	
Installation and transportation of operating Equipment	$ 1,235.00
Building of Tool House and Change Room. (12 ft x 20 ft with partition. Includes stove, water heater, shower, benches, and pulley hangers)	1,000.00
SUBTOTAL - NEW BUILDINGS & INSTALLATIONS	$ 2,235.00
(6g)(Miscellaneous)	
General (see sheet B)	
Truck rental with driver (part time) 8 months @ $150.00	$ 1,200.00
Accountant (part time) 8 months @ $60.00	480.00
Assays 100 assays @ $1.50	150.00
Insurance, taxes, social security (figured 12% of manager's salary)	576.00
SUBTOTAL - MISCELLANEOUS	$ 2,406.00
(6h)(Contingencies)(sheet E)	
Sum reserved for unforseen contingencies; such as unforseen necessity of timbering, drifting through heavy ground, and indirect costs due to strikes, severe weather, power failures, etc. (figured at approx 2 1/2% of total cost)	$ 1,383.29
SUBTOTAL - CONTINGENCIES	$ 1,383.29

ESTIMATED TOTAL COST - STAGE I ---------- $ 53,500.00

ANSWERS TO MF-109
Mystery Manganese Application

STAGE II

(6a)(Independant Contracts)

East Durango Exploratory Raise (see sheet F)	
190 feet of raising @ $26.00 per foot	$ 4,940.00
East True Exploratory Drift Continuation (sheet G)	
290 feet of drifting @ $23.50 per foot	6,815.00
East Horton Exploratory Drift Continuation (sheet G)	
300 feet of drifting @ $26.00 per foot	7,800.00
SUBTOTAL - INDEPENDANT CONTRACTS	$ 19,555.00

(6b)(Labor, Supervision, Consultants)

General (sheet F)	
Mine Manager	
5 months @ $600.00	$ 3,000.00
SUBTOTAL - LABOR, SUPERVISION, CONSULTANTS	$ 3,000.00

(6c)(Operating Materials and Supplies)

General (sheet F)	
2 sets stoper Drill Steel	
(30" - 48" - 66" lengths to set)	
Average price per steel, $15.00	$ 90.00
400 ft of tugger hoist cable (5/16")	
Price, 8.4¢ per foot	33.60
SUBTOTAL - OPERATING MATERIALS & SUPPLIES	$ 123.60

(6d)(Operating Equipment)

General (sheet F)	
Air Compressor (315 cfm) with 75 hp electric motor	
Rental, 5 mos. @ $249.00	$ 1,245.00
Receiver Tank (32 cu ft)	
Rental, 5 mos. @ $50.00	250.00
2 Jackleg Drifters (Thor Pneumatic)	
Rental, 5 mos. @ $70.00 each	700.00
Trammer (Universal Trammair, Model 3684)	
Rental, 5 mos @ $175.00	875.00
Mine Hoist with 30 hp electric motor & reducer	
Rental, 3 mos @ $310.00	930.00
Stoper (Thor Pneumatic, Medium)	
Price new, $735.00	
Rental, 5 mos. @ $70.00	350.00
Tugger Hoist (1000 # pull)	
Price new, $980.00	
Rental, 5 mos. @ $80.00	400.00
SUBTOTAL - OPERATING EQUIPMENT	$ 4,750.00

ANSWERS TO MF-103
Mystery Manganese Application

STAGE II (cont.)
(6e)(Rehabilitation and Repairs)
None

(6f)(New Buildings, Improvements, Installations)
None

(6g)(Miscellaneous)
General (see sheet F)

Truck rental with driver (part time) 5 months @ $150.00	$ 750.00
Accountant (part time) 5 months @ $60.00	300.00
Assays 100 assays @ $1.50	150.00
Insurance, taxes, social security (figured 12% of manager's salary)	360.00
SUBTOTAL - MISCELLANEOUS	$ 1,560.00

(6f)(Contingencies)(sheet G)

Sum reserved for unforseen contingencies. (figured approx. 2 1/2% of total cost)	$ 1,011.40
SUBTOTAL - CONTINGENCIES	$ 1,011.40

ESTIMATED TOTAL COST - STAGE II --- $ 30,000.00

ESTIMATED TOTAL COST OF PROJECT --- $ 83,500.00

RECEIVED
SEP 21 1953
U. S. G. S.
SPOKANE, WASH.

THE MYSTERY MANGANESE MINE
FLINT CREEK DISTRICT
GRANITE COUNTY, MONTANA.

SUMMARY

The Mystery group of patented mining claims covers the western ends of three of the most highly productive manganese veins within the Philipsburg area. The property has never been in the hands of a strong mining company, but rather has been intermittantly operated by leasors. Their work was confined to mining the most easily accessible ore, and no attempt has been made to develop reserves nor develop the mine for a long term operation. To reopen the mine, an exploration and development program will have to precede the actual operation, and the geological conditions are favorable to the success of this program.

It is expected that the exploration program will be done with Government assistance under the DMEA program. Under this program, 75% of the exploration cost will be carried by the Government, to be repaid by 5% royalties applied upon ore discovered under the program and mined during the next ten years. It is expected that the ore will be sold under the Government stock-piling program, which provides a favorable guaranteed market to June 30, 1958.

The ore is manganese dioxide, and is found in veins and in closely associated large ore-bodies. Past records indicate that much of the ore can be shipped without milling. However, the examination shows that concentration will be required for the profitable mining of the bulk of the ore. Milling need only be simple crushing, screening, jigging, and tabling, and an easily obtained 40% Mn concentrate will obtain an attractive price under the Government stock-piling program.

The exploration program is roughly estimated to cost $100,000.00 of which 75% may be loaned by the Government. Very likely, the first ore mined would be high-grade suitable for direct shipment. Plans for further development and building the mill will be decided upon on the completion of the exploration program.

HISTORY AND OWNERSHIP

The Flint Creek (Philipsburg) mining district was an important silver-producing area until the decline in the price of silver in 1892. Large-scale mining activity was dormant from this time until World War I. During World War I, the district suddenly sprung into prominence as a producer of manganese ore. During 1917 and 1918, Montana supplied nearly two-thirds of the total domestic production, and nearly one-sixth of the total domestic production and imports combined. The Philipsburg district supplied 71% of the Montana production.

The manganese mining in the Philipsburg district was established on a peace-time basis as the manganese dioxide found ready acceptance for battery use for which it is peculiarly suited. Increased activity occurred during World War II.

At present, there are two active manganese concentrating mills and one zinc, lead-silver flotation mill in the district. "Dry" silver ore produced incidental to the manganese mining is shipped directly to the smelter. Some attention is now being directed to tungsten (scheelite) occurrences on the west side of the district.

The Mystery property, with which this report specifically deals, first received mention in U.S.G.S. Prof. Paper 78, 1913, where the Mystery Tunnel is described. This long adit, cross-cutting the structure for a distance of over 900 feet, was driven during the early silver mining period. Three of the major veins of the district and a number of minor veins were cut, but none of the ore occurrences was commercial. The manganese encountered was considered of no economic value.

The Mystery (N.G. Group) is later described in U.S.G.S. Bull. 725, 1921. At this time, the ore-bodies on the Horton vein were being mined. The manganese deposits at Philipsburg are also described in U.S.G.S. Bull. 922-G, 1940. The Mystery property is not specifically mentioned as it was inactive at the time.

The property has only been operated by leasors, and has never been in the hands of a strong operating company. Leasing operations on manganese ore began in 1917. The main operations were conducted on the easily accessible ore-bodies on the Horton vein, the ore being concentrated in a small, two-cell jig. These operations ended in about 1925 when the remaining active stope caved. During this period, a smaller production was obtained from the Mystery Tunnel on the Horton vein, and from surface workings on the Durango vein. Recent operations, during and since World War II, have resulted in production from the True vein and from the Murphy ore-body on the Durango vein. During this recent period, the Owens Shaft was sunk to a depth of 100 feet and a drift was run westward in the hope of getting below the caved stope on the lower Horton ore-body. This drift did not have sufficient depth, and entered the caved stope on the surface of the rubble. There has been no further mining activity since 1951.

The Mystery property, consisting of three full claims and three fractions, all patented, is owned by Mrs. Jennie M. Moore of Glendora, California. The property covers between 80 and 90 acres. The claims are as follows: (See Map #1)

Sur. No. 9359	N.G.	Sur. No. 10851	Lucy
Sur. No. 9359	Mountain View	Sur. No. 10851	Grey
Sur. No. 9369	Evergreen	Sur. No. 10851	Rescue

LOCATION AND ACCESSIBILITY

The Mystery property lies one-half mile east of Philipsburg, on the west flank of the Flint Creek Range. The elevation at the site of operations is about 5,700 feet above sea level; about 400 feet higher than the railroad loading area which is about 2 miles distant by a well-maintained road of moderate grade.

Philipsburg is the terminus of a branch line of the Northern Pacific Railroad, and manganese ore purchased under the Government stockpiling program is paid for f.o.b. this point. Philipsburg is an active mining center with a population of 1300. Anaconda is 29 miles, and Butte is 54 miles distant by highway.

TOPOGRAPHY AND CLIMATE

Topographically, the Mystery property consists of steeply rolling prairie, deeply incised on the south by the valley of Camp Creek. The elevation within the property ranges between

5,500 and 6,000 feet. The area is unglaciated, and except in the valley and side gulch bottoms, the soil cover is thin.

During an average winter, the snow will probably not exceed 4 feet in depth, and snow will remain on the ground from mid-November through mid-April. The temperature in winter will occasionally drop to -30°F, and during severe winters, as many as 30 days of subzero weather can be expected. The county road, passing within 100 feet of the main site of operations, is maintained throughout the year.

MINING AND MILLING FACILITIES

Experienced mine labor is available locally. Mining supplies can be purchased at Philipsburg or at Butte. Mine timbers are purchased from local sawyers.

A 23,000-volt power line extends into the Philipsburg mining district, and a power line with stepped-down voltage extends to the Owens Shaft. This would be the site of the mine plant and mill. A compressor here would supply air to the Mystery Tunnel workings and to the workings on the Horton ore-bodies.

A good millsite is available at the Owens Shaft, though an additional area will have to be leveled by bulldozing. There is adequate dump room, and good unloading facilities as the millsite is next to the county road. Some ore will necessarily come from outlying workings within the property, and some ore would probably be purchased from independant operators. Ore from the Mystery Tunnel would have to be elevated to this millsite, but a millsite at the Mystery Tunnel below would have none of the above-mentioned advantages, and ice would build up on the flat valley floor in winter.

Camp Creek flows through the millsite. Its minimum normal flow is doubled by water pumped from the shafts of the Moorlight Mining Company. However, the minimum normal flow should be sufficient for operating a 50-ton jig and table mill.

GENERAL GEOLOGY

The manganese deposits at Philipsburg are found within an area 2 miles long in a north-south direction and 1 mile wide, this area being immediately east of the town. Structurally, this area is a broad anticline of paleozoic sedimentaries which plunges 30° to the north. Erosion has planed the anticlinal surface, exposing the successive formations in the geological column. The summit of the anticline is broad, but the sides are tightly compressed and have steep dips. The east side of the anticline is bounded by intrusive granodiorite of the Philipsburg Batholith, the contact plane being vertical and the intrusive forming the higher mountain area to the east. The granite extends south of the manganese mining area, and small outliers of granite are exposed to the west. To the north, any further deposits would be concealed below the vast column of paleozoic sedimentaries. The intrusive granite is assumed to underlie the manganese-producing area.

Following the solidification of the batholitic crust, a series of vertical east-west tension fissures was produced in the sedimentaries, extending eastward into the granite. Silver-bearing quartz introduced

into these fissures produced the "dry" silver ore for which this camp was first noted.

Closely following the introduction of the quartz-silver ore, the sedimentaries were subjected to bedding plane shearing. At the Hope silver mine, north of the manganese-producing area, these shears were occupied by quartz-silver ores which would indicate the shearing and the introduction of silver to have been contemporaneous. On the Mystery property, the shears only rarely show introduction of the silver-bearing quartz.

The shear zones, the important ones of which reach thicknesses of as much as 160 feet, softened the country rock and offset the previously-existing silver veins. The displacement effected was minor, and at the Horton ore-bodies on the Mystery property, this displacement approximated the width of the shear zone.

At a still later stage of batholitic cooling, the manganese mineralization was introduced. The manganese ascended along the pre-existing silver veins which provided the most suitable channels of weakness. Softened limestone wall rock was replaced by rhodochrosite (manganese carbonate) which is the primary manganese mineral. Upon reaching the softened limestone of the shear zones, this too was replaced outward from the veins to form the larger ore-bodies. This particularly appears to have been the case where the displacement of the vein by the shear zone blocked further ascent.

The manganese deposits, being limestone replacements, are thus dependant upon the country rock. While the fissure veins in the granite to the east and southeast show the introduction of manganese, the wall rock was not suitable for replacement.

The anticline of paleozoic sedimentaries is made up largely of dolomitic limestones suitable for replacement. The major veins within the Mystery property are within the Hasmark Limestone and the overlying Red Lion formation. The Hasmark is a massive pure dolomitic limestone between 800 and 1,000 feet in thickness. It is the most important of the ore-bearing formations in the manganese area. The top of the Hasmark is considered a particularly important horizon, as bedding plane shearing is most likely to occur on the formational contacts. A transitional bed of shaley limestone about 25 feet thick separates the Hasmark from the Red Lion. The Red Lion formation is from 225 to 350 feet thick. The lower part is thin-bedded shaley limestone made up of alternating limestone and siliceous shale beds. The upper part grades into massive limestone. From observations on the Mystery property, the lower part of the Red Lion is poorly suited to manganese mineralization.

The limestone country rock drains outward to springs west of Philipsburg. The workings on the Mystery property are dry. Though the Owens Shaft is located next to Camp Creek, the water table will probably not be encountered until the shaft reaches a depth of about 300 feet. Above this water table, the original rhodochrosite has been completely altered to pyrolusite and psilomelane, the dioxides of manganese. Rhodochrosite can ultimately be expected with greater depth.

While this report is written with the expectation that the property will be operated to supply manganese for the Government stock pile, its normal outlet would be for battery manganese. This is purchased on a MnO_2 basis. The ore from the Mystery property

has a fairly constant ratio of 1.46% MnO_2 for each percent of manganese. Philipsburg manganese is said to enjoy a premium in the battery trade, as through some little-understood property of crystal structure it is considered superior to other sources of equal grade.

GEOLOGY OF THE DEPOSITS

Durango Vein (Within the Red Lion Formation)(See Map #2)

Within the Mystery property, the outcrops of the Durango vein are confined to the Red Lion formation. The Cole Adit begins in the transitional shale at the base of the Red Lion, its course westward bringing it stratigraphically higher. The ore is generally low-grade and narrow. A small stope was carried upward to the surface at the best showing. Here, samples taken over a distance of 20 feet indicated the width to be 2.3 feet and the grade to be 19.40% Mn. Surface pits elsewhere within the lower shaley beds of the Red Lion uniformly failed to show commercial ore. My conclusion is that the lower Red Lion is not favorable for further exploration on this property.

On the west slope of the hill, the Durango vein outcrops are within massive limestone of the upper Red Lion. Here, shallow surface stoping is almost continuous for 250 feet to the Murphy ore-body. These shallow workings stop at a depth which conforms to the contact of the massive limestone with the shaley limestone; another indication that the lower Red Lion is unfavorable for manganese mineralization. A small block of ore remains east of the Murphy Adit but sampling shows it to be uncommercial. Samples of ore mined from the surface averaged 6.45 feet in width and 21.85% Mn in grade for a length of 130 feet along the vein. Without the prospect of further depth, the remaining tonnage is slight.

The Murphy ore-body appears to be associated with a thrust fault which crosses the vein. The faulting caused shearing normal to the direction of faulting and this shear zone, as well as the vein structure, received manganese mineralization. Assays of the ore-body in the walls of the Murphy Adit gave an average of 8.95% Mn for the 40.4 feet sampled. Samples taken at the winze collar are more indicative of the grade mined, averaging 16.05% Mn. Samples taken for a distance of 69.3 feet along the walls of the stope at the bottom of the winze averaged 10.65% Mn. It is apparent that the remaining ore in the Murphy ore-body is low-grade material, and only a very small reserve remains above the present workings. As the lower Red Lion would be encountered just below the bottom of the workings, it is doubtful whether the ore-body continues in depth. The dump should be sampled as a possible source of mill feed. If the dump is suitable for this purpose and is removed, bulldozing should be done to determine whether the ore-body extends westward and can be mined by open pit methods.

Westward from the Murphy dumps, the exposures of the vein are low-grade and generally narrow. The vein pinches out in this direction.

Other than sampling the Murphy dumps as a possible source of mill feed, no exploration nor development is to be recommended on the Durango vein within the Red Lion formation.

Durango Vein (within the Hasmark Limestone)(See Map #2)

The Mystery Tunnel cuts the Durango vein within the Hasmark Limestone, drifts extending short distances along it. At the point of interception, the vein is not well-defined, consisting of widely scattered, narrow stringers. In view of the persistance of the vein on the surface and eastward from the Mystery property, this is assumed to be an unusual condition. The vein becomes well-defined in the drift eastward but as the drift was driven for silver exploration, the drift follows the side of the manganese vein without exposing its full thickness. The full thickness is exposed where a short raise has been driven. Here, assays show the ore to be 36.10% Mn in grade and 1.65 feet in width for a distance of 22 feet, the eastern continuation of this ore-shoot being incompletely exposed. The ore is hard and well-suited to selective mining. The vein dips very steeply and the walls are very good.

The Hasmark Limestone is the most productive formation in the district, and the Durango-Bay Horse vein is one of the large producers of manganese eastward from the Mystery property. The top of the Hasmark is considered a particularly favorable horizon as it is a zone of weakness where bedding plane faulting often has occurred with the consequent formation of large ore-bodies adjoining the veins

* It is recommended that a drift 203 feet long be driven westward along the Durango vein from the present Mystery Tunnel workings. This would carry the drift into the transitional shale at the base of the Red Lion formation.
* It is also recommended that a drift 252 feet long be driven eastward from these workings. This would carry the drift to the property line as determined by the Apex law. This work would be entirely within the Hasmark and on the Durango vein.
* From the farter end of this east drift, it is recommended that a raise 190 feet long be driven on the vein to the surface. This raising would be within the Hasmark almost the entire distance, reaching the base of the Red Lion at the surface.

This exploration is expected to be successful, being entirely within very favorable ground. If successful, ultimately the raise can be widened to become the shaft from which deeper development of the Durango vein can be carried out.

Horton Vein and Ore-Bodies (Hasmark Limestone)(See Map #3)

The main production from the Mystery property has been from the Horton ore-bodies. The Horton vein is one of the most important manganese-producing veins in the district.

Within the Mystery property, the Horton vein was presumably a narrow, nearly vertical silver vein at the close of the silver mineralization. The vein is believed to have followed a very straight course in an east-west line. Bedding plane shearing following the silver mineralization crossed the vein structure

and offset it. This shear zone strikes between N 41°E and N 56°E, dips between 35° and 25° NW, and is observed intersecting the vein through an area 160 feet wide in longitudinal section. Within the sheared area, the vein is deflected to a N 65°W strike and a 75°S dip. When the manganese mineralization was introduced, it rose vertically along the silver vein, replaced the soft, altered wall rock, and upon reaching the sheared area, replaced the altered limestone of the shear zone to form the large ore-bodies. As the upper part of the vein was offset by the shearing, the manganese mineralization did not continue into the silver vein above the shear zone. Shearing was not uniform within the zone, thus accounting for the separate ore-bodies.

Ore-Body No. 1 is the uppermost of the series. Its western tip is shown in the stope above the Mystery Tunnel. Its eastern end was originally exposed on the surface and has been mined in the surface cut. Only limited sampling could be done, and the average grade of the samples was 24.25% Mn. The maximum observed width was 14 feet, while the surface workings indicate a maximum width of 20 feet. The ore-body plunges west at a low angle for a distance of 120 feet. Of this distance, 45 feet appears to still remain in place. The maximum thickness observed was 14 feet, but the surface workings indicate a still greater thickness.

The stope above the Mystery Tunnel does not appear to have extended any distance beyond the present accessible area. The ore would have required jig milling and no provision for transporting the ore up to the jig mill is apparent. It appears that the bulk of the ore between the Mystery Tunnel and the surface workings above, still remains in place.

It is recommended that the loose gob in the Mystery Tunnel stope be cleaned out, being piled for future mill feed. The first back pillar opening in the west drift should be timbered for a raise to be extended directly upward on the vein to the surface workings. Sample 53-80 should be indicative of the grade of ore to be found within the vein on this course, it assaying 25.35% Mn for a width of 3.6 feet. The raise, 48 feet in height, would serve to explore the unworked section of the vein, as well as explore the vein walls to show the extent of Ore-Body No. 1. On the basis of present knowledge, an estimated 1,200 tons of ore of 24.80% Mn grade may be developed.

Ore-Bodies Nos. 2,3,4,& 5 had best be considered as a single unit. Samples taken averaged 19.35% Mn. The width of the ore-bodies measured from 14 to 22 feet. The ore-bodies plunge westward at low angles for a maximum measured distance of 90 feet. The thickness of the ore zone is about 45 feet, of which 40% is estimated to have been ore. West of the Powder Tunnel, only remnants of these ore-bodies appear to remain. East of the large open stope in the Powder Tunnel, an unknown quantity of ore appears to remain, its mining having been prevented when the back of the open stope caved. The ore can be mined cleanly, and the waste can advantageously be used for fill.

Exploration and development of Ore-Bodies Nos. 2,3,4,& 5 would best be delayed until the Horton vein is explored from the drift level at the bottom of the Owens Shaft. Productive ore-shoots

found on the Horton vein below these ore-bodies would ultimately be mined upward to develop Ore-Bodies Nos. 2,3,4,& 5 at the lowest and most advantageous points.

Ore-Body No. 6 was mined from a winze said to be 186 feet deep, and which was located on the vein at the point where the Powder Tunnel enters the large open stope. The collar of this winze is now concealed by the cave-in which occurred in this open stope. The first 35 feet of this winze was along the side of Ore-Bodies Nos. 2,3,4,& 5. The next 30 feet was on the Horton vein, but the ore was narrow and uncommercial. At a depth of 65 feet, the ore had widened to 2.5 feet and was of good grade, though this commercial ore extended only 20 feet laterally along the vein. At this depth of 65 feet, the winze enters the caved stope area and no further detailed observations can be made. The major part of the caved opening is 14 feet wide, 16 feet high, and 50 feet long. It would certainly appear that the ore-body was unusually wide and statements made by the miners confirm this. They state that at the time the stope caved, faces of ore 3 sets wide remained on the stope boundaries, and that this ore was very high-grade. The drift from the bottom of the Owens Shaft enters the caved opening on top of the rubble. Just below this drift level, a bedding plane shear was mineralized outward and had been stoped to a horizontal width of 28 feet. The stope of Ore-Body No. 6 caved due to the opening of this wide area.

Further exploration and development of No. 6 Ore-Body would best be carried out in the future when the Owens Shaft has been deepened another 100 feet. No further deepening is to be recommended until exploration on the present Owens Drift level has given a better understanding of these deposits.

* It is recommended that the Owens Drift be carried through the open caved stope and 130 feet westward along the Horton vein. The Horton vein at the west end of this stope is a barren but strong shear. Nevertheless, there is good reason for believing further ore-shoots similar to No. 6 Ore-Body will be found westward below the vein areas that were productive on the surface. This drift would explore the Horton vein on this level as far west as the Mystery Tunnel. Ventilation could be secured by blasting out the timbers holding back the gob in the original winze.

The Owens Shaft was sunk to a depth of 100 feet on a vein parallel to the Horton and about 45 feet north of it. The outcrops of the Horton and Owens veins are concealed eastward below the creek bottom land. As the Horton vein system has been highly productive in the mining properties to the east, this intervening area deserves exploration.

* It is recommended that 50 feet of cross-cutting be done south from the bottom of the Owens Shaft to cut the Horton vein, and from this point, 400 feet of drifting be carried eastward on the vein to the property line. If no ore is found in the first 100 feet of drifting, it would be advisable to diamond drill to the north and to the south for distances of 100 feet to see whether a parallel structure has received the principal mineralization.

Diamond drilling is not to be generally recommended, as results in manganese oxide ore give no knowledge of its grade nor width. Cores are unobtainable in soft ore and sludges are often lost due to the porous nature of the ore. In larger ore-bodies, the ore often occurs as hard nubbins in a soft gangue which also precludes obtaining core. Any showing obtained by diamond drilling would have to be proven by exploratory drifting, so the advice of competent man in the district is to explore known vein structures by drifting.

The dump of the caved shaft 150 feet east of the Owens Shaft shows abundant oxide manganese, and may prove to be the continuation of the Owens vein. The structure is concealed below the creek bottom land.

* It is recommended that bulldozer trenching be conducted at the collar of the caved shaft and at a point intermediate between there and the Owens Shaft to reveal the structure and its extent.

No exploration is recommended westward from the Mystery Tunnel on the Horton vein. The manganese occurs in pockets, and the vein shows signs of pinching out. In depth, closer to its batholitic origin, commercial ore may be found westward, but this should not be considered at present.

True Vein (Hasmark Limestone)(See Map #4)

No exploration is recommended on the True vein west of the Mystery Tunnel. The surface showings are weak, and the Mystery Tunnel cuts only narrow silver veinlets at its interception.

High-grade, hard manganese ore was mined from the Hartley Adit. The average of samples taken from the stope faces and pillars showed an average of 24.00% Mn in grade and 2.05 feet in width for a distance of 105 feet along the vein. A negligible reserve remains. Shipping records show that 250 tons of ore averaging 40.25% MnO_2 were mined. This is the equivalent of 27.60% Mn. This ore was shipped without milling. No further exploration is recommended in the Hartley Adit nor in the surface area eastward where only silver veinlets are found on the course of the vein.

It is noted that the Horton ore-bodies were formed by a wide zone of bedding plane faulting striking northeast and dipping about 30° NW. The projection of this faulting would intercept the True vein below the Hartley Adit, and presumably would form a similar set of ore-bodies. In confirmation of this, the incline in the Hartley Adit follows a narrow, mineralized bedding plane shear which projects as an isolated shear just above the main zone of faulting. Further confirmation appears in the lack of manganese mineralization in the silver veinlets east of the Hartley Adit. Bedding plane shearing could have blocked the manganese from rising along the True vein, just as shearing at the Horton vein blocked the further ascent of manganese above the ore-bodies. Furthermore, this area on the True vein may be directly on line between the Horton ore-bodies and the large ore-bodies mined on the Durango vein on the Moorlight Mining Company property. These latter ore-bodies are no longer accessible for examination so this correlation cannot be confirmed.

* It is recommended that a drift 540 feet long be driven eastward on the True vein from the Mystery Tunnel. This would carry the drift to the eastern property line. This drift would explore the possible occurrence of a new ore-body zone on this horizon, and failing in this, would still serve to explore the Hartley ore-shoot at greater depth.

This exploration drift would be stopped at 250 feet if no favorable structure were found in this distance. If a new zone of ore-bodies is found, it could be mined through a vertical shaft reaching the surface near the portal of the Hartley Adit, and this shaft would later be used for further development in depth.

RESERVES

This property has been operated by a succession of small leasors. As is to be expected, all easily accessible ore has been mined, and no ore reserves have been developed. Exploration to prove reserves will be the first step required.

MINING METHODS

The vein deposits are almost vertical, the walls are good, and the demarkation between ore and limestone is sharp. Open stulled stoping is the general practise in mining the veins. The stopes do not require filling, and occasional narrow sections of the veins are left as pillars. The veins swell and pinch in thickness within short distances, the thickness varying from mere seams to 4 feet, and occasionally thicknesses of 10 feet are found.

The ore-body deposits are erratic in shape. Some are broad, and have limited vertical dimensions. These are formed in sheared limestone which has been replaced outward from the veins. Other ore-bodies are broad replacements adjoining the vein structure, and have extended vertical dimensions. These appear to form where fault offsets prevented further ascent of the manganese solutions.

Stoping these ore-bodies requires support of the opened ground. In the past, square-set and open stoping has been practised. Unfortunately, filling the stopes was not generally done and ultimately the stopes would collapse and the remaining ore would be abandonned. At present, the larger mining companies are using cut-and-fill and filled square-set stoping. This results in complete mining and safer working conditions. Pumping tailings into the mine for fill is not practised, mainly because the mills are not close to the working shafts. With a mill located at the Owens Shaft, tailings could be used advantageously on the Mystery property. The solid support offered by the tailings would eliminate a large part of the stope timbering.

MILLING METHODS

The two methods of milling used in the preparation of battery manganese are wet tabling and dry magnetic separation. The milling to prepare the ore for the Government stockpiling program will not require as high a degree of concentration, and a 40% Mn concentrate will probably prove the best economic product. An elaborate mill

will not be required for this, and very likely, satisfactory results will be obtained by crushing to minus 1/2 inch, separating the fines from the coarse by screening, jigging the coarse, and tabling the fines. Much of the ore mined should be over 30% Mn in grade and can be shipped without milling.

GOVERNMENT ASSISTANCE AND MARKETS

Under the Government DMEA program, 75% of the cost of authorized manganese exploration is furnished on a loan basis to be repaid from a 5% royalty on ore mined from new discoveries made in this exploration. The Government's share of the exploration costs is paid on a monthly basis upon their receiving the receipted bills for authorized expenditures.

It is felt that the exploration program outlined in this report will completely qualify for this Government assistance.

Under the Government stockpiling program, extended to June 30, 1958, manganese oxide ores and concentrates are purchased f.o.b. depot, Philipsburg, Montana. The ore must be amenable to beneficiation within the following limits:

Manganese (minimum)	40.0%
Iron (maximum)	16.0%
Silica plus alumina (maximum)	15.0%
Phosphorus (maximum)	0.3%
Copper plus lead plus zinc, of which not more than 0.25% may be copper (maximum)	1.0%

Assays made during the preparation of this report, and past experience in the sale of ore from the Mystery property, show that the ore will easily meet these specifications.

Oxide ore is purchased in 5-ton minimum lots and paid for ~~ap~~ according to the following schedule:

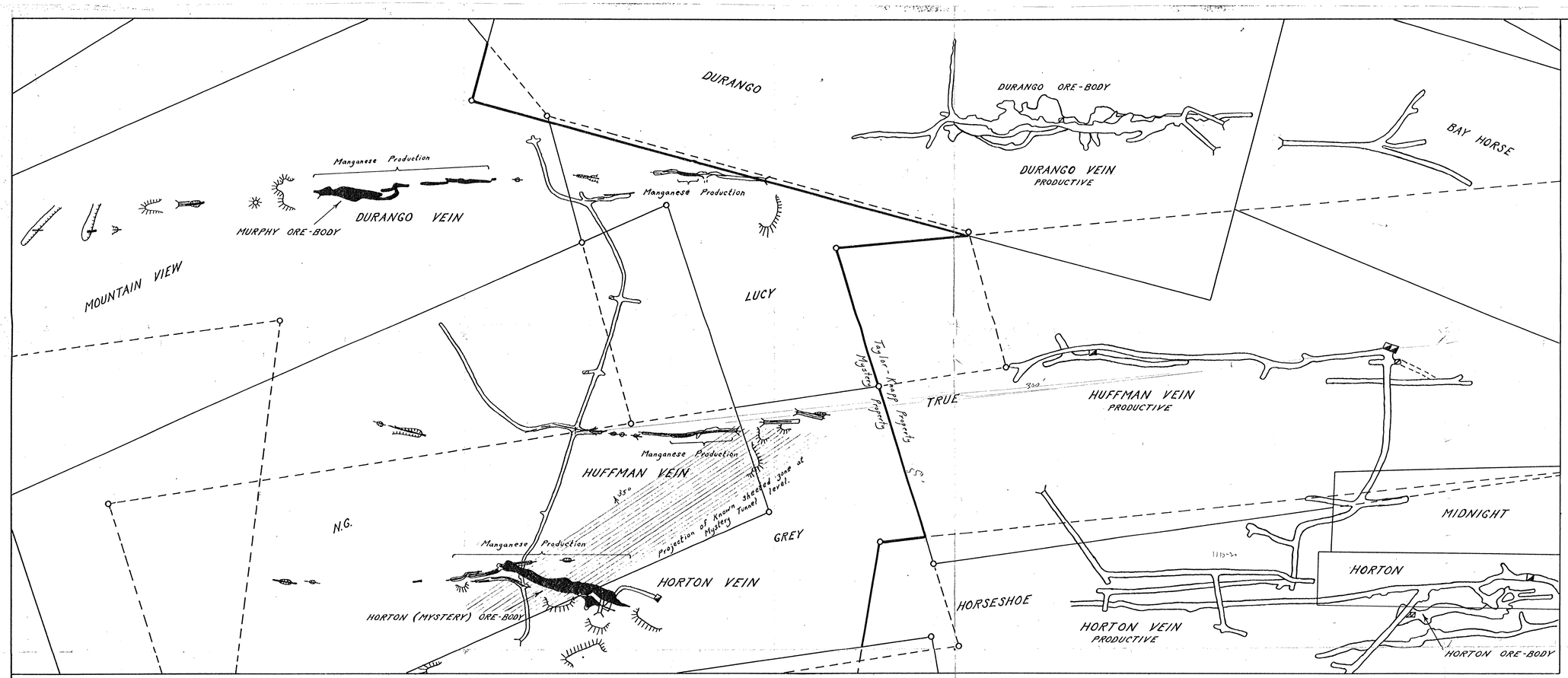
% Mn	per long dry ton	% Mn	per long dry ton	% Mn	per long dry ton	% Mn	per long dry ton
18	$ 4.87	24	$18.01	30	$31.33	36	$45.60
19	7.08	25	19.82	31	33.61	37	47.32
20	9.18	26	21.83	32	35.94	38	49.89
21	11.35	27	24.51	33	38.22	39	51.62
22	13.60	28	26.45	34	40.64		
23	15.61	29	29.09	35	43.09		

With 200-ton lots, which are aggregated by the Government, payment is made on the basis of milling recovery of manganese at a rate of $2.30 per long ton unit, with premiums and penalties and various charges deducted. The prices obtained for 200-ton lots will generally exceed those listed on the above schedule, and take into consideration ore over 39% Mn in grade.

Peter H. Toepfer

Peter H. Toepfer
Mining Engineer.

Philipsburg, Montana
Sept. 10, 1953

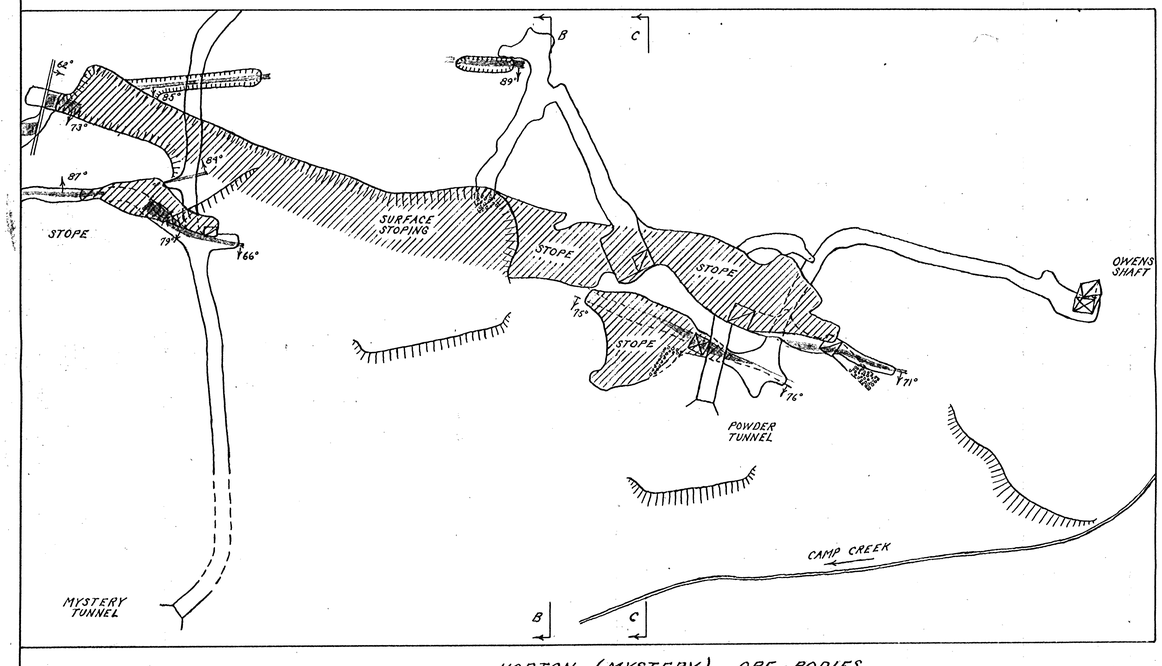


NORTH

SCALE: 1" = 100 Ft.

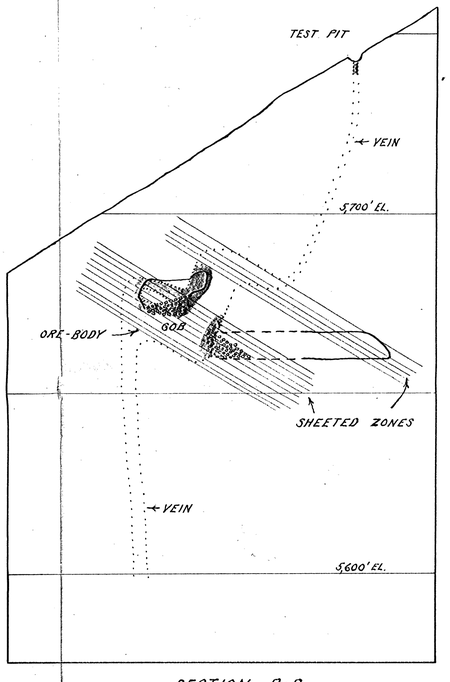
PLAN
RELATIONSHIP OF DURANGO, HUFFMAN, AND HORTON VEINS ON MYSTERY AND TAYLOR-KNAPP PROPERTIES.

HEAVY LINE DENOTES MYSTERY AND TAYLOR-KNAPP PROPERTY LINE.

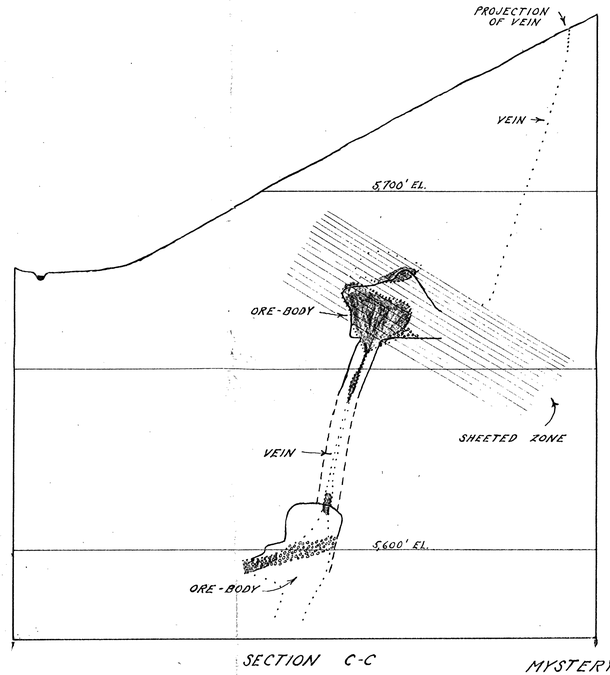


HORTON (MYSTERY) ORE-BODIES

SCALE: 1" = 20 Ft



SECTION B-B



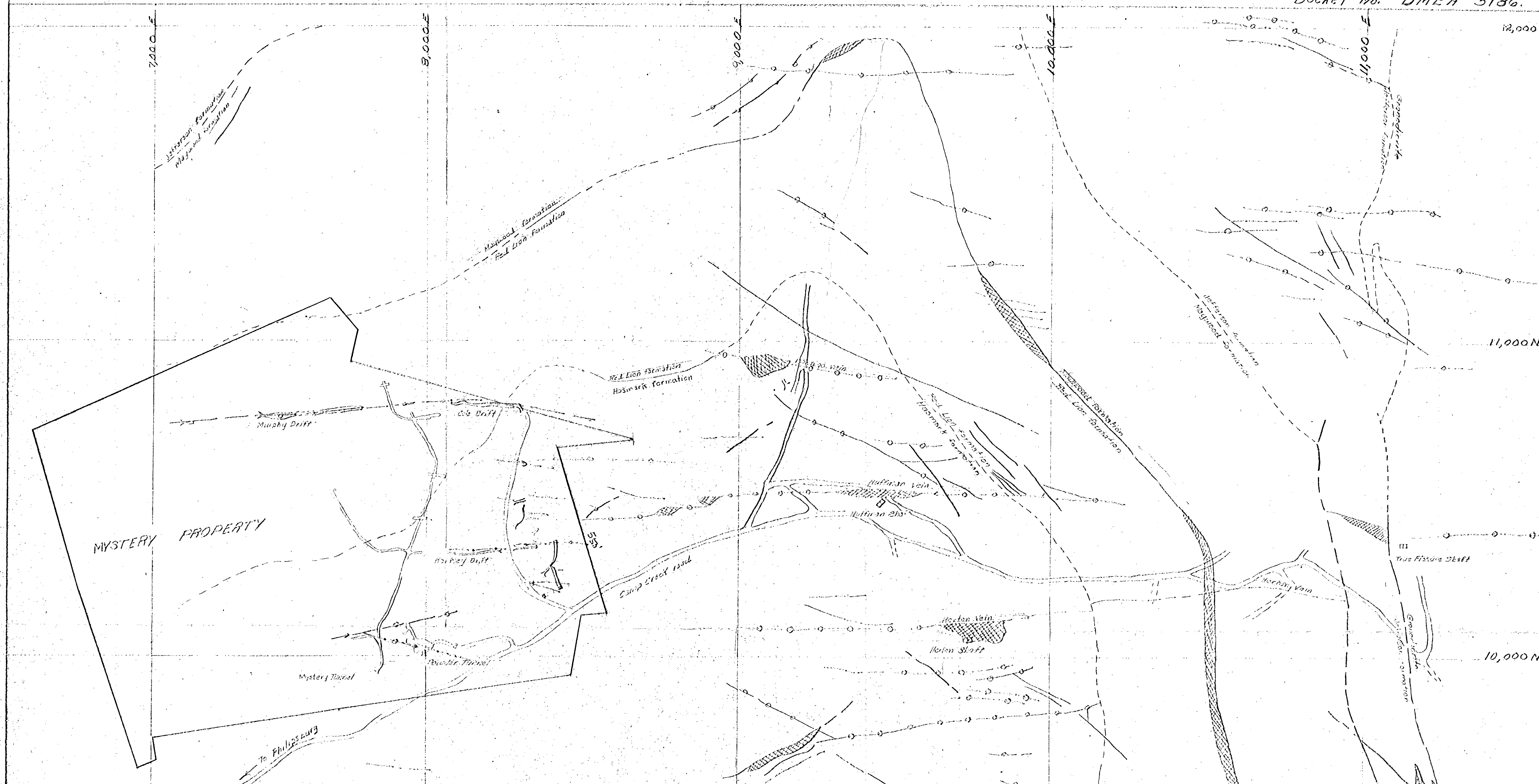
SECTION C-C

MYSTERY MANGANESE MINE

GRANITE COUNTY, MONTANA

APRIL, 1951 PETER H. TOEPFER

Docket No: DMEA 3186.

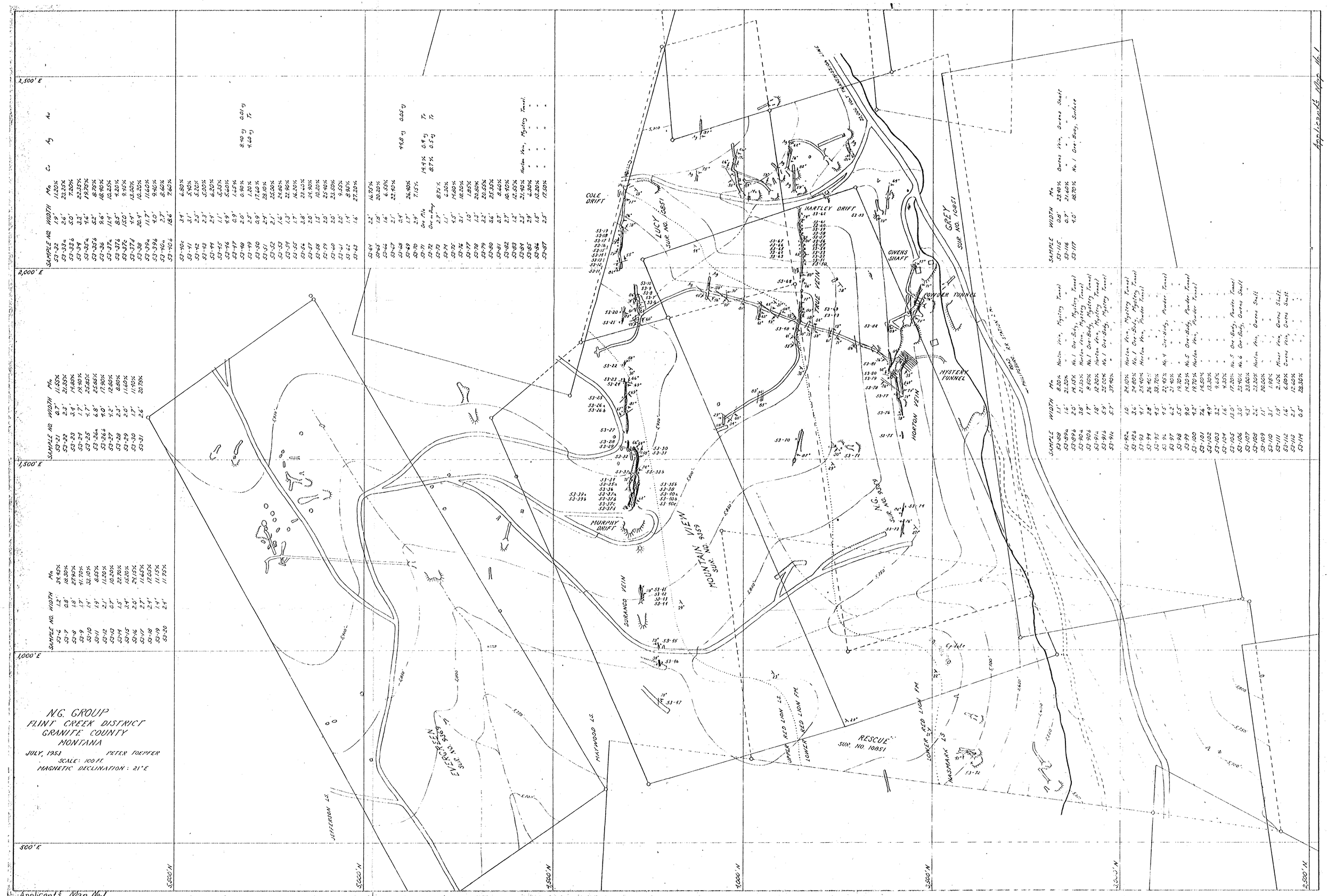


After – Plate 26, U.S.G.S. Bull. 922 (1940)
with additions by R.H. Thurston 1950.
Minor additions in vicinity of Mystery
Property from maps by P.H. ~~Toohey~~ Toepfer 1953.

Geologic Map of Part of Manganese Area,
Philipsburg District – Granite County, Mont.

Scale: 1" = 200'.

This map is prepared to show
relationship of Mystery Property
to principal structures northern
part of the Philipsburg Manganese
Area.



SAMPLE NO.	WIDTH	Mn	
53-32	1.9'	11.20%	
53-33a	2.6'	23.20%	
53-33b	3.0'	7.20%	
53-34	3.3'	23.35%	
53-35a	1.6'	19.70%	
53-35b	5.2'	8.70%	
53-36	3.6'	18.90%	
53-37a	1.1'	11.20%	
53-37b	8.5'	10.25%	
53-37c	1.0'	9.40%	
53-37d	4.1'	13.30%	
53-38	26.4'	10.20%	
53-39a	1.1'	11.40%	
53-39b	1.0'	9.40%	
53-40	2.7'	8.60%	
53-40a	18.6'	7.60%	

SAMPLE NO.	WIDTH	Mn	Cu	Ag	Au
53-40c	3.4'	6.80%			
53-41	3.1'	5.70%			
53-42	2.5'	5.20%			
53-43	2.3'	5.00%			
53-44	2.4'	6.20%			
53-45	1.1'	5.35%			
53-46	4.9'	5.60%			
53-47	0.9'	1.65%			
53-48	2.0'	0.90%		8.90 oz	0.01 oz
53-49	2.5'	1.20%		7.60 oz	Tr.
53-50	0.9'	17.60%			
53-51	2.4'	28.10%			
53-52	2.1'	25.00%			
53-53	1.6'	24.80%			
53-54	1.3'	22.90%			
53-55	1.7'	16.20%			
53-56	3.8'	23.00%			
53-57	2.0'	35.90%			
53-58	1.5'	10.20%			
53-59	2.0'	23.40%			
53-60	2.0'	23.70%			
53-61	2.0'	9.55%			
53-62	1.4'	8.90%			
53-63	1.6'	27.20%			

SAMPLE NO.	WIDTH	Mn	
53-64	2.2'	16.75%	
53-65	1.8'	20.20%	
53-66	2.0'	6.40%	
53-67	2.1'	22.40%	
53-68	2.9'		
53-69	2.9'	26.40%	
53-70	2.9'	7.15%	
53-71	Ore Pile		
53-72	Ore on Dump		
53-73	2.7'	8.70%	
53-74	1.1'	6.30%	
53-75	1.5'	19.80%	
53-76	3.1'	12.30%	
53-77	1.0'	1.85%	
53-78	1.3'	20.30%	
53-79	3.2'	20.35%	
53-80	3.6'	25.30%	
53-81	2.7'	8.40%	
53-82	2.7'	10.40%	
53-83	1.2'	12.35%	
53-84	2.3'	21.40%	Horton Vein, Mystery Tunnel
53-85	2.9'	6.30%	" " " "
53-86	1.5'	13.20%	" " " "
53-87	2.5'	17.30%	" " " "

SAMPLE NO.	WIDTH	Mn	
53-2	1.2'	34.40%	
53-7	0.8'	18.30%	
53-8	1.3'	27.90%	
53-9	1.7'	11.70%	
53-10	1.4'	32.10%	
53-11	1.9'	8.85%	
53-12	2.1'	11.20%	
53-13	0.7'	10.20%	
53-14	1.5'	22.80%	
53-15	3.4'	15.20%	
53-16	2.0'	24.15%	
53-17	2.7'	11.65%	
53-18	2.4'	17.05%	
53-19	1.4'	11.15%	
53-20	2.4'	11.70%	

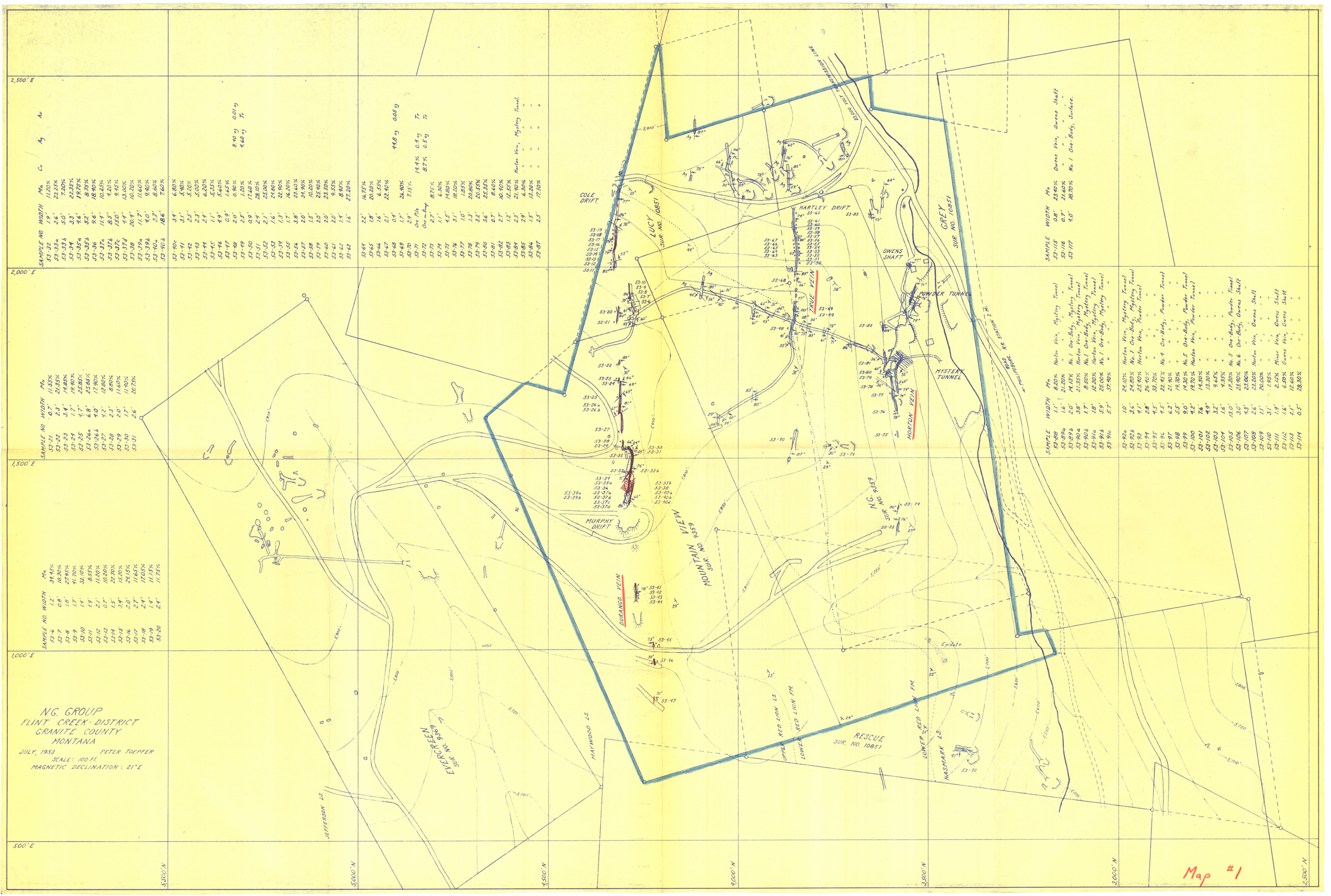
SAMPLE NO.	WIDTH	Mn	
53-21	0.7'	11.55%	
53-22	2.6'	21.30%	
53-23	2.3'	21.40%	
53-24	1.4'	19.40%	
53-25	1.7'	22.60%	
53-26a	6.8'	25.60%	
53-26b	1.0'	17.90%	
53-27	1.2'	12.80%	
53-28	2.3'	8.80%	
53-29	2.0'	11.60%	
53-30	1.7'	11.90%	
53-31	2.6'	20.75%	

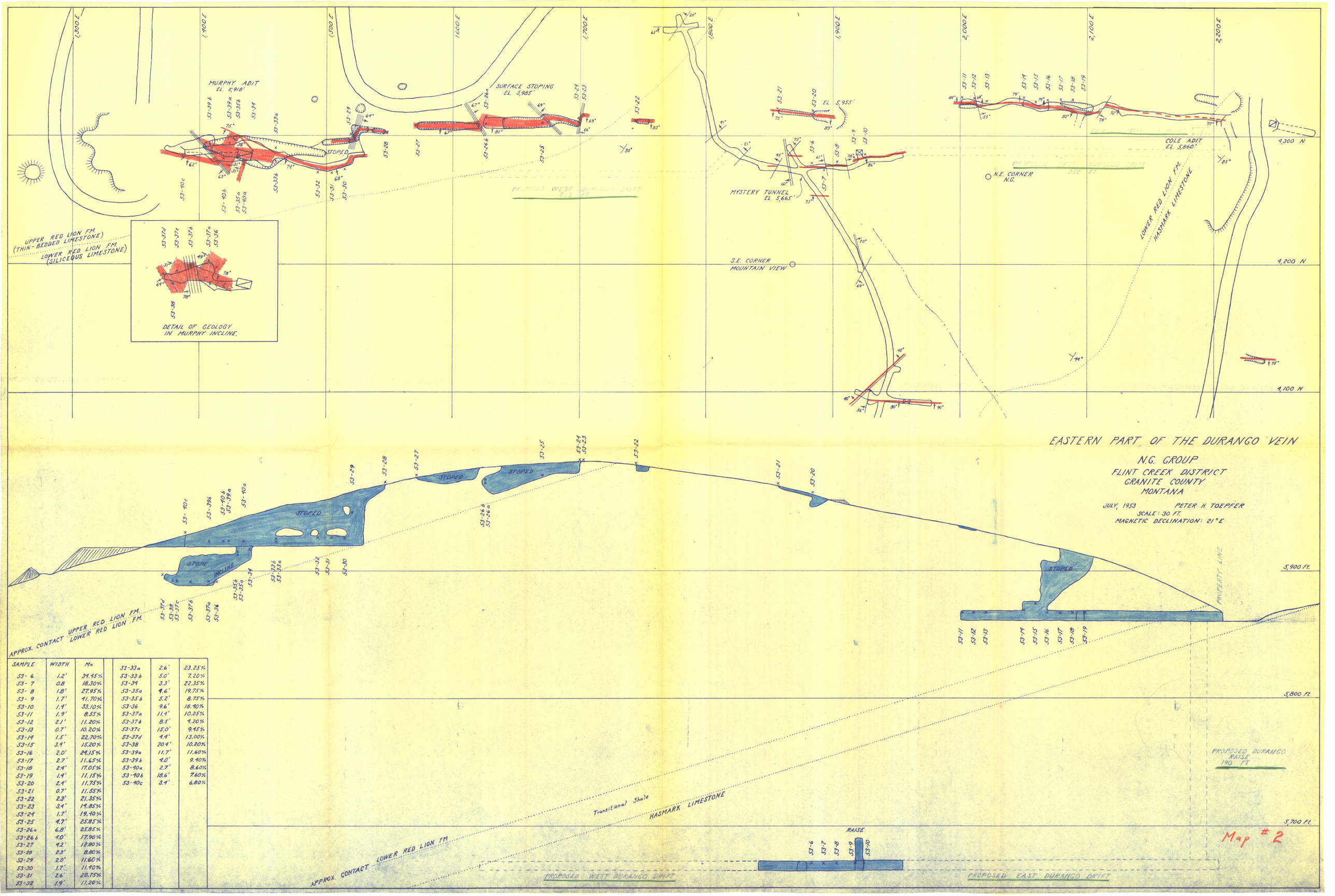
SAMPLE	WIDTH	Mn	
53-115	0.8'	23.40%	Owens Vein, Owens Shaft
53-116	0.7'	21.60%	" " " "
53-117	4.0'	18.70%	No. 1 Ore-Body, Surface

SAMPLE	WIDTH	Mn	
53-89	1.1'	8.20%	Horton Vein, Mystery Tunnel
53-89a	1.6'	21.20%	" " " "
53-89b	2.5'	14.15%	No. 1 Ore-Body, Mystery Tunnel
53-90a	3.8'	21.35%	Horton Vein, Mystery Tunnel
53-90b	1.7'	8.50%	No. 1 Ore-Body, Mystery Tunnel
53-91a	1.5'	12.20%	Horton Vein, Mystery Tunnel
53-91b	5.9'	25.00%	No. 1 Ore-Body, Mystery Tunnel
53-91c	5.7'	37.90%	" " " "

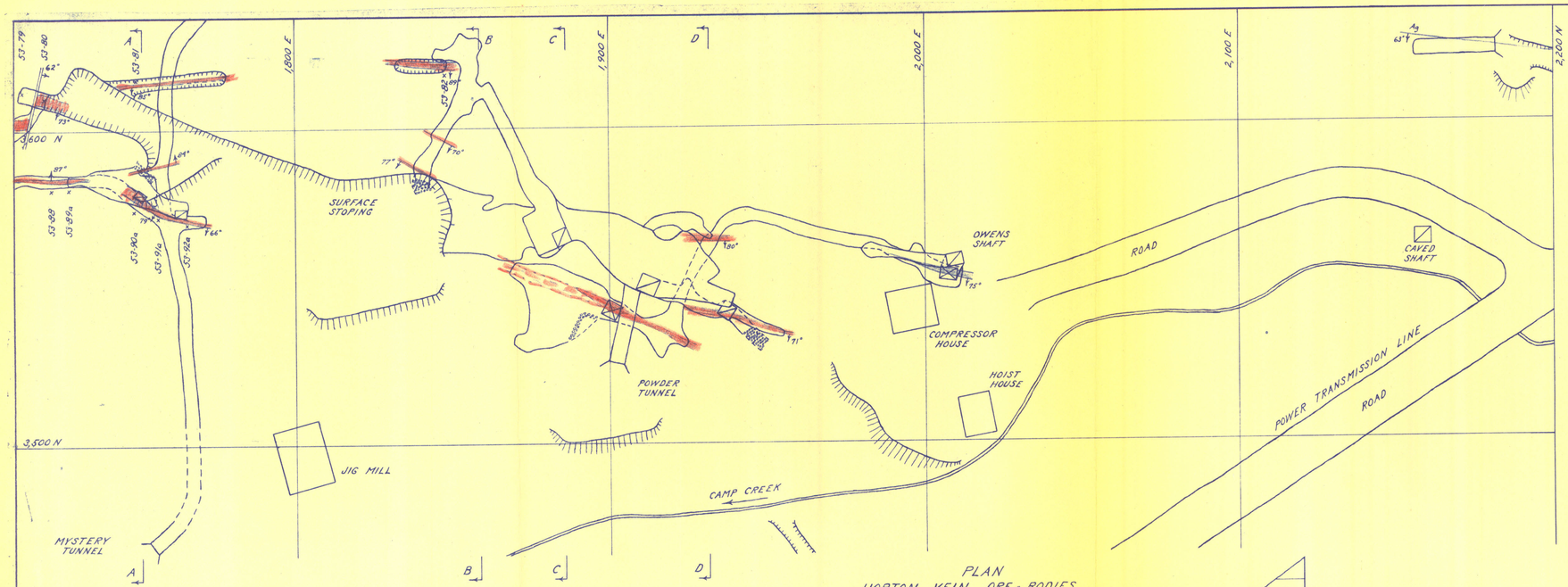
SAMPLE	WIDTH	Mn	
53-92a	1.0'	24.10%	Horton Vein, Mystery Tunnel
53-92b	3.6'	24.80%	No. 1 Ore-Body, Mystery Tunnel
53-93	4.1'	25.90%	Horton Vein, Powder Tunnel
53-94	2.8'	26.40%	" " " "
53-95	4.5'	33.70%	No. 4 Ore-Body, Powder Tunnel
53-96	4.5'	22.40%	" " " "
53-97	6.2'	21.40%	" " " "
53-98	3.5'	19.70%	No. 5 Ore-Body, Powder Tunnel
53-99	9.0'	19.30%	Horton Vein, Powder Tunnel
53-100	4.2'	19.70%	" " " "
53-101	7.6'	19.50%	" " " "
53-102	4.9'	13.30%	" " " "
53-103	3.2'	9.65%	" " " "
53-104	1.6'	9.30%	" " " "
53-105	13.0'	17.20%	No. 5 Ore-Body, Powder Tunnel
53-106	3.0'	23.40%	No. 6 Ore-Body, Owens Shaft
53-107	4.3'	23.00%	" " " "
53-108	2.1'	23.20%	Horton Vein, Owens Shaft
53-109	1.1'	20.00%	" " " "
53-110	3.1'	1.95%	" " " "
53-111	1.9'	2.15%	Minor Vein, Owens Shaft
53-112	1.6'	6.80%	Owens Vein, Owens Shaft
53-113	2.1'	12.30%	" " " "
53-114	0.5'	28.30%	" " " "

B-2025

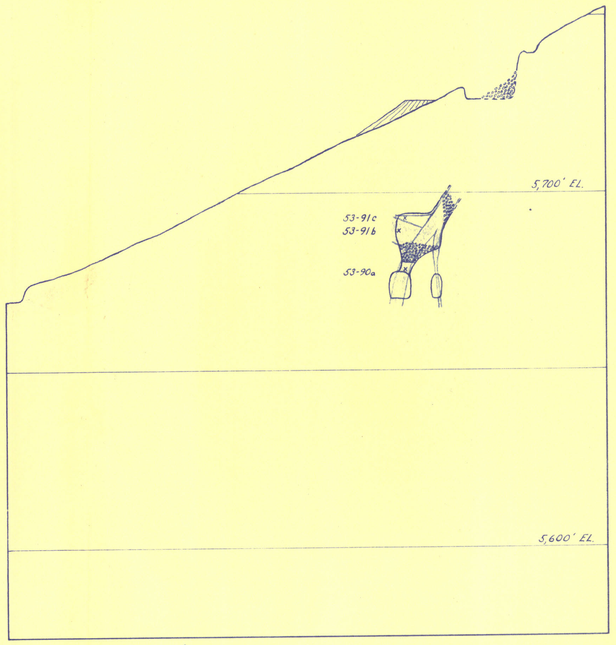

N.G. GROUP
FLINT CREEK DISTRICT
GRANITE COUNTY
MONTANA
JULY, 1953
PETER TOEPFER
SCALE: 100 FT.
MAGNETIC DECLINATION: 21° E
COLE DRIFT
LUCY SUR. NO. 10851
HARTLEY DRIFT
OWENS SHAFT
POWDER TUNNEL
MISTERY TUNNEL
GREY SUR. NO. 10851
TRUE VEIN
HORTON VEIN
MURPHY DRIFT
MOUNTAIN VIEW SUR. NO. 9359
N.G. SUR. NO. 9359
DURANGO VEIN
EVERGREEN SUR. NO. 9359
JEFFERSON LS.
MAYWOOD LS.
UPPER RED LION LS.
LOWER RED LION FM.
RESCUE SUR. NO. 10851
MASMARK LS.
Epidote
Map #1



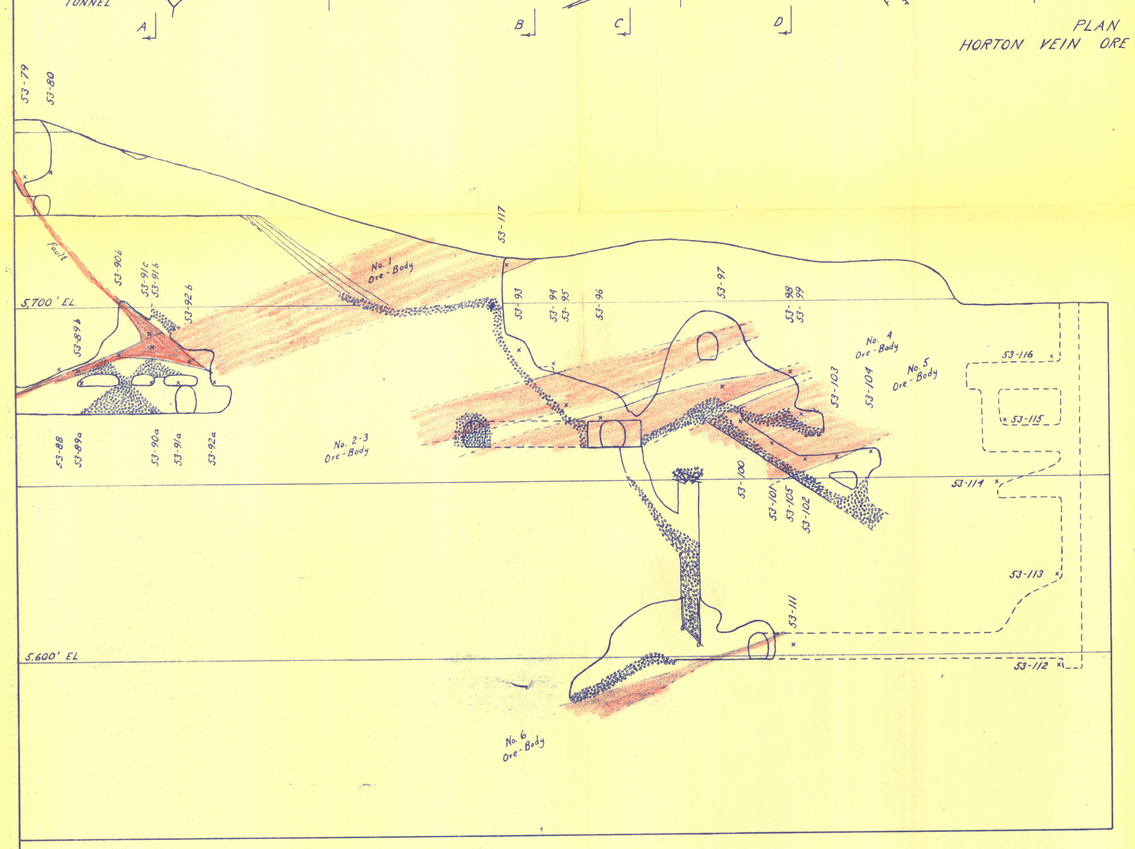
SAMPLE	WIDTH	Mn				
53-6	1.2'	34.45%		53-33a	2.6'	23.25%
53-7	0.8	18.30%		53-33b	5.0'	7.20%
53-8	1.8'	27.95%		53-34	3.3'	22.35%
53-9	1.7'	41.70%		53-35a	4.6'	19.75%
53-10	1.4'	33.10%		53-35b	5.2'	8.75%
53-11	1.9'	8.55%		53-36	9.6'	18.40%
53-12	2.1'	11.20%		53-37a	11.4'	10.25%
53-13	0.7'	10.20%		53-37b	8.5'	4.20%
53-14	1.5'	22.70%		53-37c	15.0'	9.45%
53-15	3.4'	15.20%		53-37d	4.4'	13.00%
53-16	2.0'	24.15%		53-38	20.4'	10.20%
53-17	2.7'	11.65%		53-39a	11.7'	11.60%
53-18	2.4'	17.05%		53-39b	4.0'	9.40%
53-19	1.4'	11.15%		53-40a	2.7'	8.60%
53-20	2.4'	11.75%		53-40b	18.6'	7.60%
53-21	0.7'	11.55%		53-40c	3.4'	6.80%
53-22	2.3'	21.35%				
53-23	3.4'	14.85%				
53-24	1.7'	19.40%				
53-25	4.7'	25.85%				
53-26a	6.8'	25.85%				
53-26b	4.0'	17.90%				
53-27	4.2'	12.80%				
53-28	2.3'	8.80%				
53-29	2.0'	11.60%				
53-30	1.7'	11.40%				
53-31	2.6'	20.75%				
53-32	1.9'	11.20%				



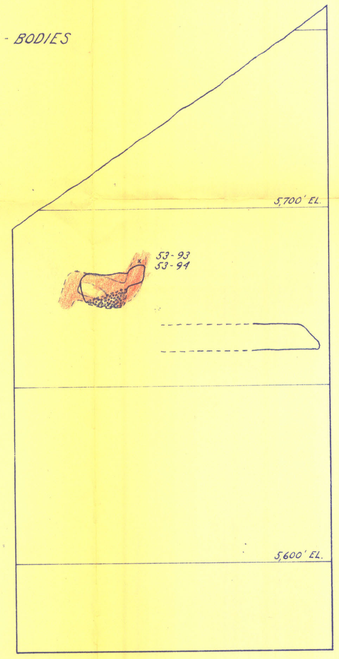
PLAN
HORTON VEIN ORE-BODIES



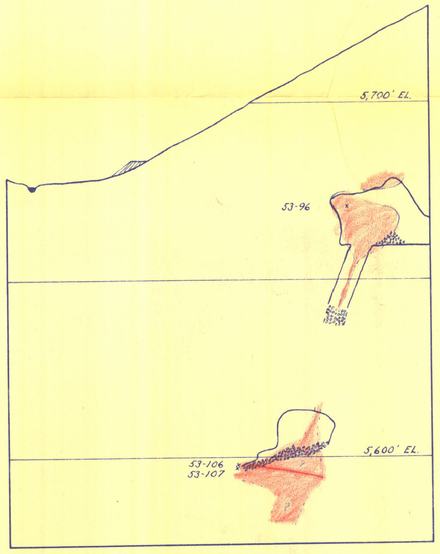
CROSS-SECTION A-A



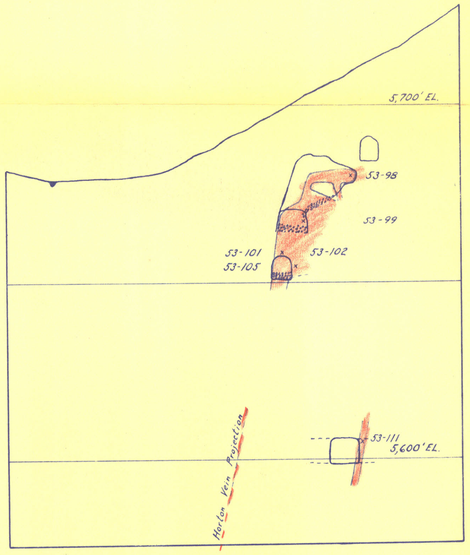
LONGITUDINAL SECTION
HORTON VEIN ORE-BODIES



CROSS-SECTION B-B



CROSS-SECTION C-C



SECTION D-D

SAMPLE	WIDTH	Mn	DESCRIPTION
53-79	3.2'	20.55%	Horton Vein
53-80	3.6'	25.35%	" "
53-81	0.7'	8.60%	Minor Vein
53-82	2.7'	10.40%	" "
53-88	1.1'	8.20%	Horton Vein
53-89a	1.6'	21.20%	" "
53-89b	2.0'	14.15%	No. 1 Ore-Body
53-90a	3.8'	21.35%	Horton Vein
53-90b	1.7'	8.50%	No. 1 Ore-Body
53-91a	1.8'	12.20%	Horton Vein
53-91b	5.9'	25.00%	No. 1 Ore-Body
53-91c	5.7'	37.40%	" " "
53-92a	1.0'	24.10%	Horton Vein
53-92b	3.6'	24.80%	No. 1 Ore-Body
53-93	4.1'	25.40%	No. 2-3 Ore-Body
53-94	2.8'	26.40%	" " "
53-95	4.5'	33.70%	" " "
53-96	4.5'	22.45%	No. 4 Ore-Body
53-97	6.2'	21.40%	" " "
53-98	5.5'	19.70%	" " "
53-99	9.0'	19.30%	No. 5 Ore-Body
53-100	4.2'	19.70%	" " "
53-101	7.6'	19.50%	" " "
53-102	4.9'	13.30%	" " "
53-103	3.2'	9.65%	Horton Vein
53-104	1.6'	4.35%	" "
53-105	13.0'	17.20%	No. 5 Ore-Body
53-106	3.0'	23.10%	No. 6 Ore-Body
53-107	4.3'	23.00%	" " "
53-108	2.6'	23.20%	Horton Vein
53-109	1.1'	20.00%	" "
53-110	3.1'	1.95%	" "
53-111	1.9'	2.15%	Minor Vein
53-112	1.6'	6.50%	Owens Vein
53-113	2.1'	12.60%	" "
53-114	0.5'	28.30%	Owens Vein
53-115	0.8'	23.40%	" "
53-116	0.7'	21.60%	" "
53-117	4.0'	18.70%	No. 1 Ore-Body

Map #5
Mystery Manganese DMEA

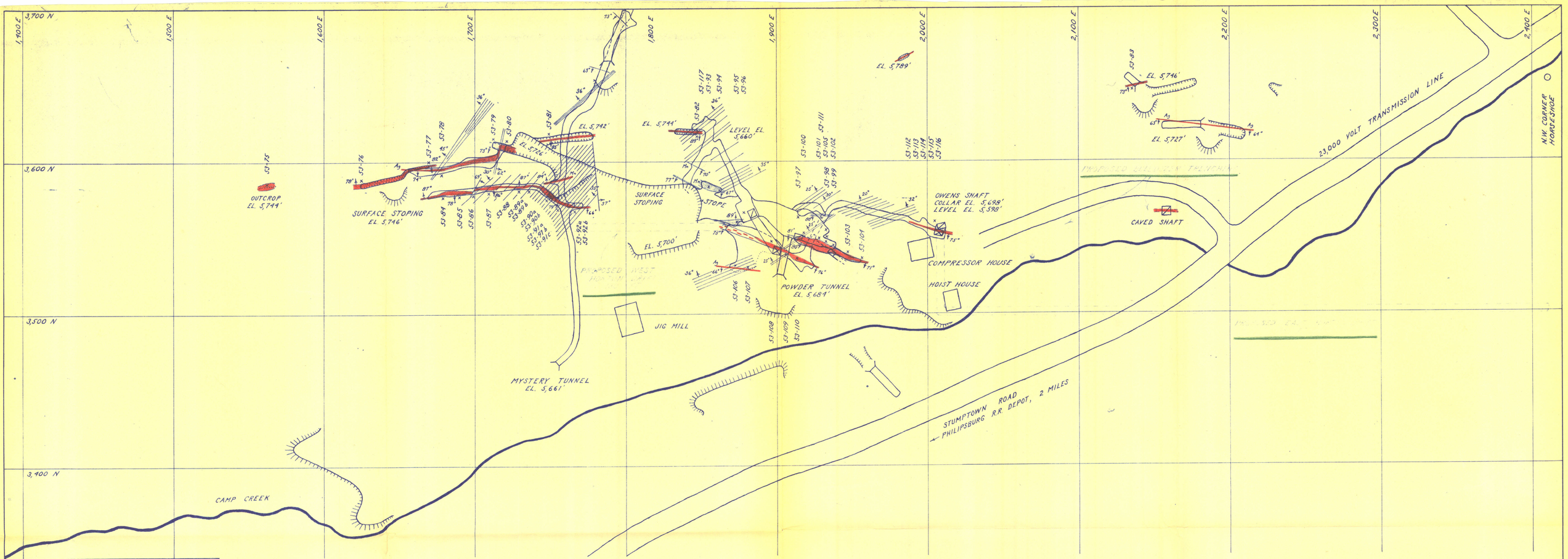
THE HORTON ORE-BODIES

N.G. GROUP

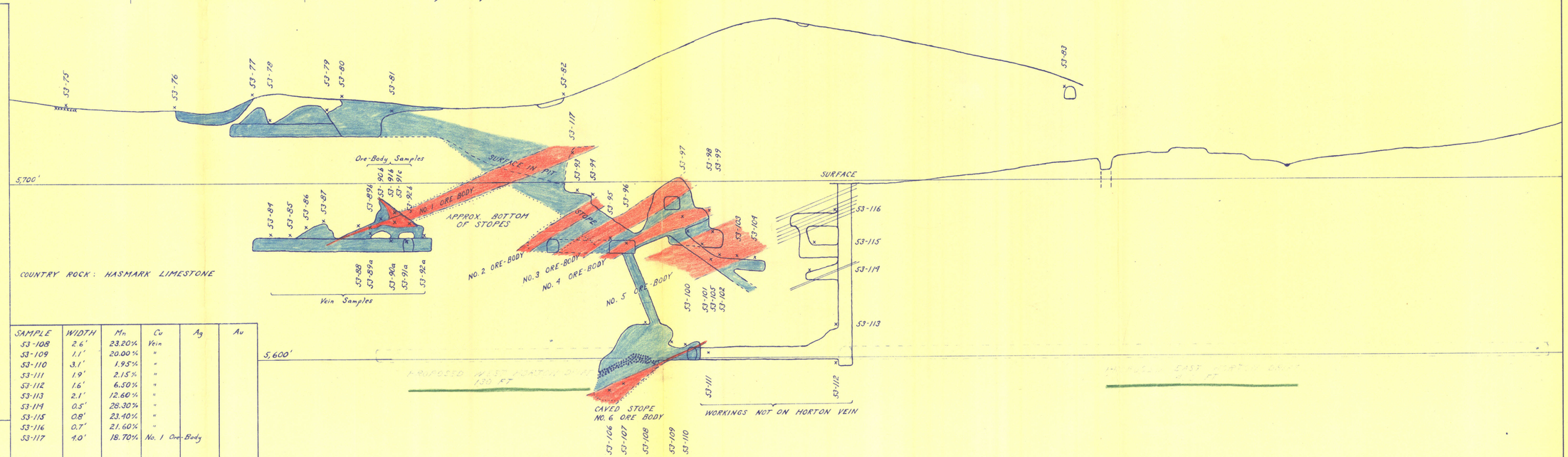
FLINT CREEK DISTRICT
GRANITE COUNTY
MONTANA

AUGUST, 1953 PETER H. TOEPFER

SCALE: 20 FT.
MAGNETIC DECLINATION: 21° E



SAMPLE	WIDTH	Mn	Cu	Ag	Au
53-75	4.5'	14.80 %	Vein		
53-76	3.1'	18.20 %	"		
53-77	1.0'	1.85 %	"		
53-78	1.3'	20.80 %	"		
53-79	3.2'	20.55 %	"		
53-80	3.6'	25.35 %	"		
53-81	0.7'	8.60 %	"		
53-82	2.7'	10.40 %	"		
53-83	1.2'	12.55 %	"		
53-84	2.3'	21.40 %	"		
53-85	2.9'	6.30 %	"		
53-86	1.5'	13.20 %	"		
53-87	2.5'	17.50 %	"		
53-88	1.1'	8.20 %	"		
53-89 a	1.6'	21.20 %	"		
53-89 b	2.0'	14.15 %	No. 1 Ore Body		
53-90 a	3.8'	21.35 %	Vein		
53-90 b	1.7'	8.50 %	No. 1 Ore Body		
53-91 a	1.8'	12.20 %	Vein		
53-91 b	5.9'	25.00 %	No. 1 Ore Body		
53-91 c	5.7'	37.40 %	" " "		
53-92 a	1.0'	24.10 %	Vein		
53-92 b	3.6'	24.80 %	No. 1 Ore Body		
53-93	4.1'	25.40 %	Vein		
53-94	2.8'	26.40 %	"		
53-95	4.5'	33.70 %	"		
53-96	4.5'	22.45 %	No. 4 Ore Body		
53-97	6.2'	21.40 %	" " "		
53-98	5.5'	19.70 %	" " "		
53-99	9.0'	14.30 %	No. 5 Ore Body		
53-100	4.2'	19.70 %	Vein		
53-101	7.6'	14.50 %	"		
53-102	4.9'	13.30 %	"		
53-103	3.2'	9.65 %	"		
53-104	1.6'	4.35 %	"		
53-105	13.0'	17.20 %	No. 5 Ore Body		
53-106	3.0'	23.40 %	No. 6 Ore Body		
53-107	4.3'	23.00 %	" " "		



SAMPLE	WIDTH	Mn	Cu	Ag	Au
53-108	2.6'	23.20 %	Vein		
53-109	1.1'	20.00 %	"		
53-110	3.1'	1.95 %	"		
53-111	1.9'	2.15 %	"		
53-112	1.6'	6.50 %	"		
53-113	2.1'	12.60 %	"		
53-114	0.5'	28.30 %	"		
53-115	0.8'	23.40 %	"		
53-116	0.7'	21.60 %	"		
53-117	4.0'	18.70 %	No. 1 Ore-Body		

THE HORTON VEIN

N.G. GROUP

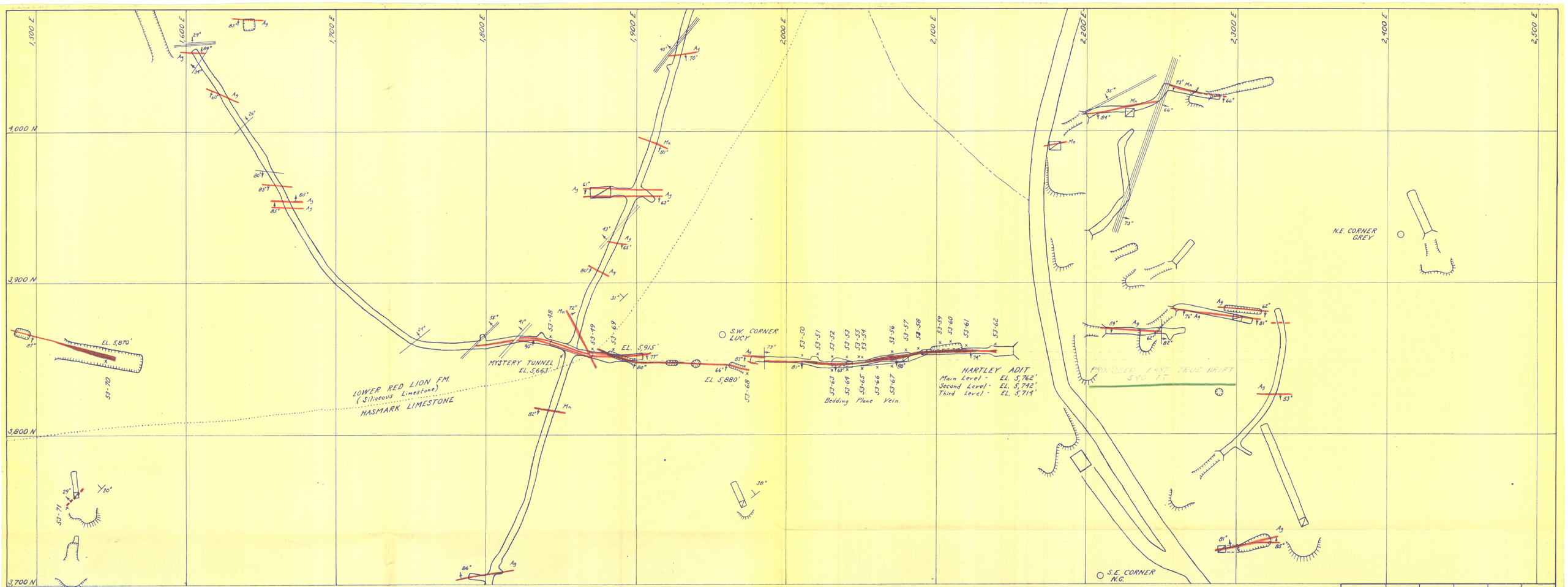
FLINT CREEK DISTRICT
GRANITE COUNTY
MONTANA

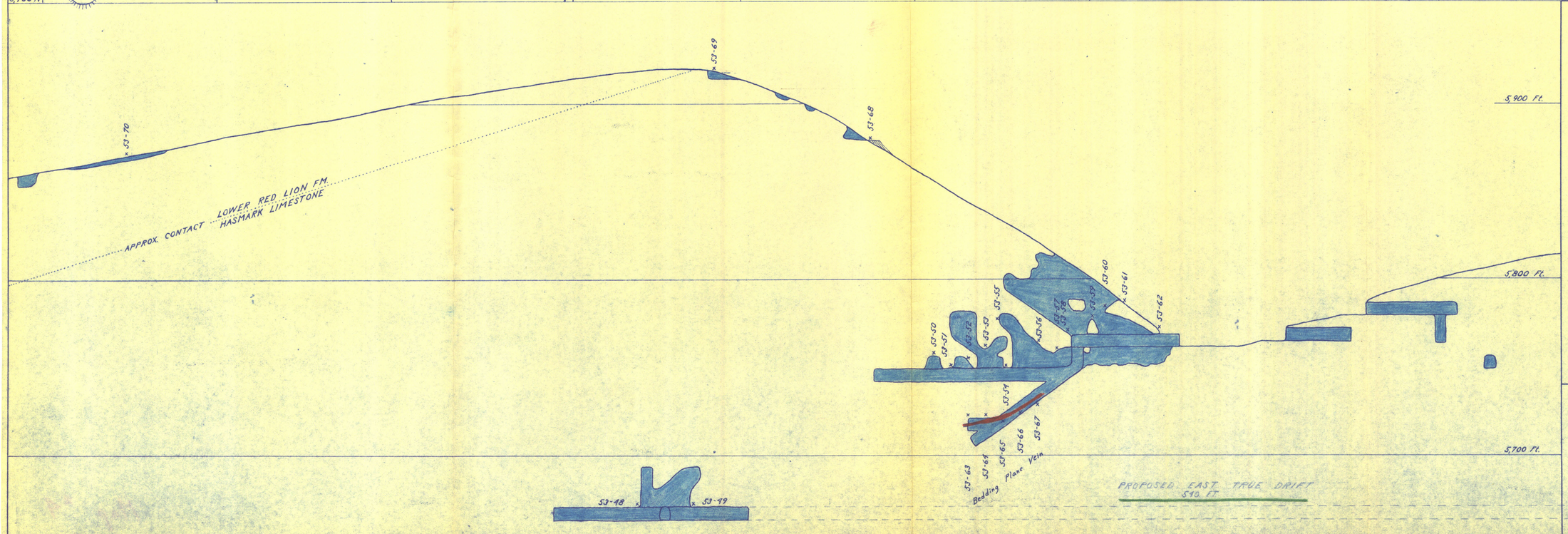
AUGUST, 1953 PETER H. TOEPFER

SCALE: 30 Ft.

MAGNETIC DECLINATION: 21° E

Map #3





SAMPLE	WIDTH	Mn	Cu	Ag	Au
53-48	2.0'	0.9%		8.10 oz	0.01 oz
53-49	2.5'	1.2%		1.60 oz	Tr.
53-50	0.9'	17.6%			
53-51	2.4'	28.1%			
53-52	2.1'	25.0%			
53-53	1.6'	24.8%			
53-54	1.3'	22.9%	—		
53-55	1.7'	16.2%			
53-56	3.8'	23.6%			
53-57	2.0'	34.9%			
53-58	1.5'	10.2%			
53-59	2.0'	25.40%			
53-60	2.0'	23.50%			
53-61	2.0'	9.55%			
53-62	1.4'	8.95%			
53-63	1.6'	27.20%	Bedding	Plane	Vein
53-64	2.2'	16.75%	"	"	"
53-65	1.8'	20.20%	"	"	"
53-66	1.6'	6.55%	"	"	"
53-67	2.1'	22.40%	"	"	"
53-68	0.4'			14.8 oz	0.05 oz.
53-69	1.7'	26.40%			
53-70	2.9'	7.15%			
53-71	Ore Pile		14.4%	0.4 oz	Tr

Map #4

THE TRUE VEIN

N.G. GROUP

FLINT CREEK DISTRICT
GRANITE COUNTY
MONTANA

AUGUST, 1953 PETER H. TOEPFER

SCALE: 30 FT.

MAGNETIC DECLINATION: 21° E

RECEIVED
APR 28 1954
U. S. G. S.
SPOKANE, WASH.

Peter H. Toepfer
14509 E. Heroy
Trentwood, Washington
April 28, 1954

Defense Minerals Exploration Adm.
Washington 25, D.C.

Re: Docket No. 3186 - Manganese
Mystery Manganese Mine
Granite County, Montana.

Dear Sirs,

I am the engineer who submitted Mrs. Moore's DMEA application, and am in receipt of your letter of Jan. 4, 1954, denying the loan.

I have since seen Quinlan of the U.S.G.S., and while I was denied the opportunity of seeing his report which recommended turning down the application, he verbally outlined his reasons. We appear to be in complete disagreement on a number of major points. This letter and its accompanying map will present my viewpoint. Certainly there is more to the Mystery property than the "small, scattered deposits of marginal-grade manganese ore" mentioned in your letter of Jan. 4. My report was written objectively, the good points being given equal treatment with the bad points. I shall assume that the field team report had equal objectivity.

Quinlan stated to me that the veins on the Mystery property are not continuations of the productive Durango, Huffman, and Horton veins on the adjoining Taylor-Knapp property. I have just returned from Philipsburg where I obtained a map of the Taylor-Knapp workings. By matching up property lines, the accompanying small scale map was made, and proves the veins to be identical. As DMEA loans have been granted Taylor-Knapp for drifting to within a short distance of the Mystery property line, you should be able to check this with maps in your possession.

Quinlan stated that the Horton (Mystery) ore-bodies have been formed at the intersection of two separate veins. This would imply that the ore has been formed in a breccia zone, but no breccia is present. A superficial examination would indicate two veins to be present, and this was also my original thought. However, my survey showed a crosscut to have been driven to undercut an outcrop of the supposed northern branching vein. (Section B-B on accompanying map) No vein structure was disclosed in the crosscut. As no veins in the vicinity dip northward through a vertical distance of 80 feet, the vein would have been cut if present. The outcrop must therefore be considered the upper part of the Horton vein, whose lower part has been displaced by the sheeted zone.

Sheeting is prominent throughout these ore-bodies, and U.S.G.S. Bull. 922-G states sheeted zones crossing the original silver vein structures to be the primary ore-body control of the district. With sheeted zones so prominent here, there seems to be no reason for advancing for this district, a new theory of ore control by intercepting veins.

A projection of the sheeted zones which form the Horton (Mystery) ore-bodies, shows this zone to project directly toward the Durango ore-bodies on the Taylor-Knapp property. Surface exposures of the

sheeted zone show it to be present crossing the Huffman vein within the Mystery property. This is why my application called for drifting from the Mystery tunnel along the Huffman vein, as I believe new ore-bodies will be found when the sheeted zone is reached. Opposing this, Quinlan states that this area is beyond the productive manganese area, that there are no surface indications of an ore-body, and only a narrow silver vein is present on the surface. This latter statement is true, and in my opinion, is evidence of ore-bodies in the sheeted zone below. The displacement by the sheeted zone would prevent further ascent of the manganese solutions, trapping and depositing them within the sheeted zone.

Let us consider the history of the large Durango ore-body on the Taylor-Knapp property. On the surface, it is a relatively narrow vein, the surface showings no better than those of this same vein on the Mystery property. The ore above adit level was said to be only 15% Mn in grade, and there were said to be no indications of ore-bodies at this level. In 1939, two leasers sunk a winze, disclosing an ore-body which caved before they did much mining. In 1943, Angus MacDonald and associates sunk another winze, against the firm advice of five geologists who stated that this area was beyond the productive manganese area, that there were no surface indications of an ore-body, and that production above adit level had been marginal in grade. Well, Gus sank anyway, to discover the very large and high-grade Durango ore-body. The geologists have had to retreat westward with their "margin of the productive area", but nothing daunted, are now firmly trying to hold the western Taylor-Knapp property line.

Quinlan seems to feel that deposits west of the axis of the Philipsburg anticline are small and of no account. This discredits not only the Mystery property, but also the ore-bodies known to be present on the Wenger No. 2, White Horse, Morning, and Pocahontas veins, and along the Redemption fault. These properties are almost entirely in the hands of individuals who cannot afford the expense of development. The ore deposits along the Redemption fault are known to be large and high-grade, but the ground is heavy and not suited to the open stoping methods used by leasers. The Redemption fault is definitely on the west flank of the anticline. There is no geologic reason for discounting the west half of the Philipsburg anticline.

The Mystery property has had considerable production in view of the fact that only a slight amount of exploration for manganese was ever conducted. The production was obtained by simply following surface exposures. Here are my estimates, based upon width and grade of samples taken from the remaining ore exposures:

Durango Vein:			
Murphy ore-body	(12' x 80' x 34')	32,640 cu ft	10.67% Mn
Surface stoping	(6.5' x 130' x 15')	12,675 cu ft	21.85% Mn
Cole adit	(2.3' x 20' x 60')	2,760 cu ft	19.40% Mn
Huffman Vein:			
Hartley adit	(2.05' x 20' x 60')	8,610 cu ft	24.00% Mn
Horton Vein:			
Main ore-bodies	(20' x 20' x 230') less 1/3 waste ---	61,333 cu ft	19.35% Mn
Mystery adit	(8' x 35' x 12')	3,360 cu ft	24.25% Mn
Lower ore-body	(14' x 16' x 50')	11,200 cu ft	23.16% Mn

These figures indicate a total ore-body and vein volume (not stope volume) of 132,578 cu ft mined. At 12 cu ft to the ton, this would indicate a production of 11,050 tons. This is hardly insignificant, for such shallow development.

As to grade, my sampling of the remaining ore on the sides of the main stope indicates a grade of 19.35% Mn. Pardee, in U.S.G.S. Bull. 725 (page 173) describes the ore being mined at the time of his visit as being between 38 and 44% Mn. My sampling is indicative of the cut-off grade rather than the actual grade of ore mined.

So I am asking for reconsideration of my loan application. I feel exploration, which this property has never received, is fully justified. I feel the program I have outlined has a very good chance of success, and if successful, would lead to further development all along the west side of the Philipsburg district. As soon as I learn what parts of my proposed program meet your geological approval, I will revise my costs on a unit-cost basis.

I am not alone in my feeling that under the DMEA program, the larger companies are given whatever they ask for, while small individuals are subjected to time-consuming obstacles that generally block their plans. I would appreciate an answer as soon as possible. With a DMEA loan, the owner and myself will be able to carry out the program. Without the loan, three other parties have offered to carry out the full program without Government assistance.

Yours truly,

Peter H. Toepfer

Peter H. Toepfer

Carbon copies and maps to:
Mrs. Jennie M. Moore
Spokane office, U.S. Bureau of Mines
Spokane office, U.S. Geological Survey
M. E. Volin, Chief, U.S. Bureau of Mines, Minneapolis, Minn.

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

XXXXXXXXXXXXXXXXX
So. 157 Howard Street
Spokane 4, Washington

November 25, 1953

Memorandum

To: DMEA Field Team, Region II

From: J. J. Quinlan, Geologist, U. S. Geological Survey

Subject: Field examination, Docket No. DMEA 3186 (manganese)
Mrs. Jennie M. Moore, Mystery property, Granite County, Montana

Introduction

This memorandum is intended to evaluate the manganese exploration possibilities of the Mystery property, Granite County, Montana, with reference to the subject exploration loan application submitted by Mrs. Jennie M. Moore of Glendora, California.

The property was examined by the author on October 8 and 9, 1953. Mr. John D. Bardill, U. S. Bureau of Mines, participated in the examination on October 8. The primary purpose of Mr. Bardill's examination was to evaluate the applicant's cost estimates and project plans. Mr. Bardill's findings are contained in his memorandum of October 12, 1953. Mr. Peter H. Toepfer, an engineer representing the applicant, accompanied DMEA field examiners during the examination.

The DMEA field examiners did not inspect the workings from the Owens shaft because the ladders in the shaft were unsafe.

The subject application, Docket No. DMEA 3186, is the second application to be submitted by Mrs. Moore on the Mystery property. The original application, Docket No. DMEA-2179, was submitted October 10, 1951, under the property name Lucy, N. G., Mountain View and Grey claims. This application was withdrawn from the active file without prejudice by the DMEA on September 26, 1953, because the applicant failed to provide technical data requested of her.

Recommendation

It is recommended that the Mrs. Jennie M. Moore's application for exploration assistance to explore the Mystery property be denied.

See Maps No. 6, 6a

Location and Accessibility

The Mystery property is in sec. 30, T. 7 N., R. 13 W., M.P.M. Philipsburg mining district, Granite County, Montana. The property is one-half mile east of Philipsburg, Montana and adjoins the Taylor-Knapp Company's (Dockets DMEA 42 and 1902) property on the west. The Camp Creek county road and power lines to the Taylor-Knapp property cross the southern part of the property.

The mine and ranching town of Philipsburg, Montana is on U. S. Highway 10A, 29 miles north of Anaconda, Montana, and 26 miles south of Drummond, Montana. It is serviced by a branch line of the Northern Pacific Railroad, which joins the main line at Drummond. Philipsburg serves as a delivery point for manganese ore purchased by General Services Administration.

The property is at an altitude of approximately 5,700 feet. Winter weather prevails at the property between November and April. The winters are generally severe with considerable snow and sub-zero temperatures. These winter weather conditions cause some inconveniences but do not seriously hamper winter mining operations in the district.

Property and Ownership

The Mystery property consists of the following patented lode mining claims: N.G., Survey No. 9359; Mountain View, Survey No. 9359; Evergreen, Survey No. 9369; Lucy, Survey No. 10,851; Grey, Survey No. 10,851; and Rescue, Survey No. 10,851. Of these six claims, the applicant wishes to include only the N. G., Mountain View, Lucy and Grey claims in the applied-for contract as the other two claims are not pertinent to the immediate exploration area. These claims are shown on Map No. 1 accompanying the application. A copy of this map is attached to this memorandum for illustrative purposes.

The claims are owned by the applicant, Mrs. Jennie M. Moore, 422 E. Foothill Boulevard, Glendora, California.

Geology

The geology of the Philipsburg district and its manganese deposits are described in the following publications:

Emmons, W. H., and Calkins, F. C., Geology and ore deposits of the Philipsburg quadrangle, Montana: U. S. Geol. Survey Prof. Paper 78, 1913

Pardee, J. T., Deposits of manganese ore in Montana, Utah, Oregon and Washington: U. S. Geol. Survey Bull. 725, pp. 146-174, 1921

Goddard, E. N., Manganese deposits of Philipsburg, Granite County, Montana, a preliminary report: U. S. Geol. Survey Bull. 922 G, pp. 157-204, 1940

The reader is referred to these publications for a detailed discussion of the manganese deposits of the district.

The manganese deposits of the district are east of Philipsburg and are confined to an area approximately two square miles in size. For the most part, the deposits occur in Paleozoic limestones along the eastern limb of the Philipsburg anticline adjacent to the Philipsburg batholith, and, to a lesser extent, along the nose of the anticline. The deposits are closely related to east-west and northeast-southeast striking fissure veins, and are of two types: ~~fissure veins and~~ irregular and tabular replacement deposits in limestone adjacent to the fissure veins. The veins themselves are principally valued for base and precious metals; however, some manganese is obtained from them.

The Mystery property is on the western margin of the manganese producing area. Production records from the property are not available, but Mrs. Moore's original application, DMEA Docket No. 2179, placed the value of manganese dioxide production at $75,000 to $80,000, "as well as a large amount of ore that has been stolen and of which there is no record." It is apparent from the application that the property has operated only during periods of high manganese prices and that it has been necessary to concentrate most of the ore to make a marketable product. Discounting the applicant's statement that a large amount of ore has been stolen, which is doubted, the value of the production indicates that at best total production from the property has amounted to only several thousand tons of ore. This is also apparent from the size and amount of stoping along the vein structure. It is estimated that total production from the property has amounted to less than 10,000 tons of manganese ore.

Attached to this memorandum is a geologic map showing the northern portion of the manganese producing area. This map has been prepared from a map in the Spokane office files of the Geological Survey and in small part from maps submitted by the applicant. The map from the Spokane office files is an enlargement of Plate 26, U. S. Geological Survey Bulletin 922 with additions by E. N. Thurston, U. S. Geological Survey. The attached map illustrates the relationship between the structures the applicant wishes to explore and those which have been major producers in the northern part of the district.

The Mystery property is on the western part of the broad and arcuated nose of the Philipsburg anticline. Therefore, structurally it must be considered as being on the fringe of the known manganese area. The property is underlain by massive dolomitic limestone of the Upper Hasmark formation (Cambrian age) and Calcarious shales and limestones of the overlying Red Lion formation (Cambrian age). The applicant's proposed exploration is to be confined to the upper Hasmark formation which is considered to be a favorable stratigraphic horizon for ore in the district.

The applicant wishes to explore three vein structures which the applicant's engineer believes are extentions of the Durango, True (Hafman), and Norton veins from the neighboring Taylor-Knapp property. Replacement ore bodies in limestones bordering these three structures have been an important source of manganese at the Taylor-Knapp property. Perusal of the geologic map of the northern part of the manganese area, which is attached to this memorandum, will show that it is not possible to make such a correlation; however, it should be pointed out that the applicant's "Durango" and "True" veins do belong to the same vein system as those structures with which most of the important manganese ore bodies are associated, i.e., eastwest and northwest-southeast striking veins.

The application contains a set of geologic and assay maps illustrating in detail the structures the applicant wishes to explore. The vein structures are essentially narrow and the manganese values spotty, but it has been possible to stope sections of the veins in the Murphy, Cole and Hartley adits. Inspection of these workings indicates that bodies mined along the vein were irregular and averaged less than 5 feet wide. It is believed that in some of the higher grade sections, past operators may have mined sections of the vein as narrow as 2 feet. It is apparent that the manganese ore from the veins themselves is relatively unimportant, tonnagewise. This is not only true at the Mystery property but throughout the district. The important manganese ore bodies are those replacement bodies in the limestone wall adjacent to the veins.

Only two replacement bodies of any significance have been found on the Mystery property. These are the Murphy ore body along the "Durango" vein and the Pewter Tunnel ore body along the "Norton" vein.

The Murphy ore body occurs in limestone beds near the base of the upper Red Lion formation (see applicant's Map No. 2). It is apparently controlled by the vein, bedding, and cross faulting, and is irregular in nature. It is estimated from the size of the stope that the heart of the body contained about 1,500 tons of ore and that another 1,000 tons was realized from the vein proper in the immediate vicinity.

The Powder Tunnel ore body occurs in the Hasmark limestone. This body is an irregular pod-like mass associated with a northwest-southwest striking fissure vein ("Horton" vein) near its intersection with an east-west striking fissure vein. It appears to be controlled by an irregular brecciated zone in the immediate vein wall. The size of the stope indicates that the body must have been about 50 feet long, 20 to 25 feet high and 12 feet wide. Similar but much smaller pod-like bodies occur along the vein for a distance of 150 feet northwest of the principal body. The applicant's Map No. 3 shows a similar body on the 100 level of the Owens shaft immediately under the principal body. This body was not inspected as it was not believed safe to enter the Owens shaft. It is estimated that a maximum of 5,000 to 6,000 tons of ore could have come from Powder Tunnel body and similar but smaller bodies in the immediate vicinity.

It should be pointed out that this is a different interpretation of the Powder Tunnel ore body than that given by the applicant's engineer who believes the ore is more or less controlled by a bedding shear zone 160 feet wide. The longitudinal section on the applicant's Map No. 3 illustrates this and shows six separate ore beds. I failed to see this relationship in the stope, although there is a definite suggestion that the body does pitch to the west. In fairness to the applicant's engineer it should be pointed out that there is evidence of considerable bedding plane shearing in the area. However, I could not find evidence to support the theory that it is the primary ore control. Granted it probably is one of the ore control factors, but the irregular nature of the brecciated zone does not suggest that it is the primary control.

Evaluation of Proposal

"Durango" Vein

The applicant proposes to extend the Mystery tunnel drift on the "Durango" vein 205 feet west and 253 feet east. In addition, a 190-foot raise to the surface is proposed from near the end of the proposed east drift extention. All of the proposed work would be in the uppermost part of the Hasmark formation except maybe the last few feet of raise which might be in the lower shale member of the Red Lion formation, depending on the exact location of the raise.

The "Durango" vein, where exposed in the Hasmark formation in the Mystery tunnel and in trenches east of the applicant's property, is very tight and contains no evidence of any large replacement bodies. In the Mystery tunnel east drift the vein averages less than 1.5 feet in width and in the west drift it is only a sharp fracture which becomes almost impossible to follow. The sample data contained in the application shows that the vein in the east drift averages 32 percent manganese, which is the highest average for any section of vein sampled by the applicant's engineer.

Inasmuch as the vein structure is narrow and there is no evidence of large replacement bodies along it, within the Hasmark formation, the applicant's proposed exploration is considered

as being of a wild-cat nature and is not recommended.

"True" Vein

The applicant proposes to extend the Mystery tunnel east drift on the "True" vein 250 feet to the east to explore the vein under the Hartley adit workings. If this work proves successful the applicant then proposes to extend the drift an additional 290 feet to the east end line of the property. All of the proposed work would be within the Hasmark formation.

Where exposed in the Mystery tunnel the "True" vein is a narrow quartz vein varying in width from 0.3 to 2.5 feet. It is practically devoid of manganese but the applicant's samples indicate that it does contain a few ounces of silver. The "True" vein has been stoped for manganese in the Hartley workings. These stopes are narrow averaging about 4 feet in width and are very irregular. The applicant reports that 250 tons of ore, averaging 27.6 percent manganese, were mined from these workings. The True vein is also exposed in the workings east of the Hartley adit. Here again, as in the Mystery tunnel, the vein is narrow and practically devoid of manganese.

The applicant's engineer contends that ore bodies similar to the Powder Tunnel body should be found along the "True" vein where the same bedding shear zone, which he believes controls the Powder tunnel body, crosses the "True" vein. As explained in the section on geology, I do not believe this bedding shear zone is a primary ore control. In fact, I would like to point out that no large ore bodies are indicated on the surface where the projection of this zone intersects the "True" vein. The applicant's engineer also contends that this same bedded zone may be related to the Durango ore body of the Taylor-Knapp Company. A study of the geologic map of the northern part of the manganese area, which is attached to this memorandum, will show that this is not so.

The proposed drift extension would explore the vein only 35 feet below the winze from the Hartley working. This winze was sunk at the intersection of the vein with a small replacement ore body out along a favorable bed. This bed averages less than 2 feet in width and the manganese only extends a short distance out from the main fissure along it. Therefore, it is considered a relatively insignificant structure.

Inasmuch as the "True" vein structure is known to be narrow where exposed and there is little evidence of any replacement bodies of any consequence along it no exploration is recommended.

"Horton" Vein

The applicant proposed to drift 130 feet westward on the "Horton" vein from the stope on the 100 level off the Owens

shaft. Also, the applicant proposes to crosscut 50 feet south from the 100 level Owens shaft station to cut the "Horton" vein and then drift 400 feet eastward on the vein. If no ore is found in the first 100 feet of drift the applicant then proposes to test the drift walls with 100-feet diamond drill holes.

The "Horton" vein is considered to be the best manganese structure exposed on the Mystery property. However, it is essentially narrow and the Powder Tunnel replacement body and related smaller bodies found along it are relatively insignificant. Therefore, no exploration is recommended along it.

The applicant also proposes to trench between the Owens shaft and the caved shaft 150 feet to the east. This work is not recommended because the Owens vein, like the other structures, is narrow and there are few if any replacement bodies of any significance along it.

Summary Statement

The Mystery property is on the extreme western margin of the Philipsburg manganese area. Past exploration has shown the deposits in this western area to be small and insignificant. The application indicates that the grade of most of the ore mined in the past has been marginal.

The applicant's proposed program is to be considered more or less as wild-cat exploration. Considering that it will explore manganese structures, which past exploration has shown to be relatively unproductive, the exploration program is not recommended.

Enclosures- 2

Distribution:
DMEA (Orig. & 3)
USBM
USGS
Docket
Quinlan

RECEIVED
SEP 29 1953
U. S. G. S.
SPOKANE, WASH.

THE MYSTERY MANGANESE MINE
FLINT CREEK DISTRICT
GRANITE COUNTY, MONTANA.

SUMMARY

The Mystery group of patented mining claims covers the western ends of three of the most highly productive manganese veins within the Philipsburg area. The property has never been in the hands of a strong mining company, but rather has been intermittantly operated by leasors. Their work was confined to mining the most easily accessible ore, and no attempt has been made to develop reserves nor develop the mine for a long term operation. To reopen the mine, an exploration and development program will have to precede the actual operation, and the geological conditions are favorable to the success of this program.

It is expected that the exploration program will be done with Government assistance under the DMEA program. Under this program, 75% of the exploration cost will be carried by the Government, to be repaid by 5% royalties applied upon ore discovered under the program and mined during the next ten years. It is expected that the ore will be sold under the Government stock-piling program, which provides a favorable guaranteed market to June 30, 1958.

The ore is manganese dioxide, and is found in veins and in closely associated large ore-bodies. Past records indicate that much of the ore can be shipped without milling. However, the examination shows that concentration will be required for the profitable mining of the bulk of the ore. Milling need only be simple crushing, screening, jigging, and tabling, and an easily obtained 40% Mn concentrate will obtain an attractive price under the Government stock-piling program.

The exploration program is roughly estimated to cost $100,000.00 of which 75% may be loaned by the Government. Very likely, the first ore mined would be high-grade suitable for direct shipment. Plans for further development and building the mill will be decided upon on the completion of the exploration program.

HISTORY AND OWNERSHIP

The Flint Creek (Philipsburg) mining district was an important silver-producing area until the decline in the price of silver in 1892. Large-scale mining activity was dormant from this time until World War I. During World War I, the district suddenly sprung into prominence as a producer of manganese ore. During 1917 and 1918, Montana supplied nearly two-thirds of the total domestic production, and nearly one-sixth of the total domestic production and imports combined. The Philipsburg district supplied 71% of the Montana production.

The manganese mining in the Philipsburg district was established on a peace-time basis as the manganese dioxide found ready acceptance for battery use for which it is peculiarly suited. Increased activity occurred during World War II.

At present, there are two active manganese concentrating mills and one zinc, lead-silver flotation mill in the district. "Dry" silver ore produced incidental to the manganese mining is shipped directly to the smelter. Some attention is now being directed to tungsten (scheelite) occurrences on the west side of the district.

The Mystery property, with which this report specifically deals, first received mention in U.S.G.S. Prof. Paper 78, 1913, where the Mystery Tunnel is described. This long adit, cross-cutting the structure for a distance of over 900 feet, was driven during the early silver mining period. Three of the major veins of the district and a number of minor veins were cut, but none of the ore occurrences was commercial. The manganese encountered was considered of no economic value.

The Mystery (N.G. Group) is later described in U.S.G.S. Bull. 725, 1921. At this time, the ore-bodies on the Horton vein were being mined. The manganese deposits at Philipsburg are also described in U.S.G.S. Bull. 922-G, 1940. The Mystery property is not specifically mentioned as it was inactive at the time.

The property has only been operated by leasors, and has never been in the hands of a strong operating company. Leasing operations on manganese ore began in 1917. The main operations were conducted on the easily accessible ore-bodies on the Horton vein, the ore being concentrated in a small, two-cell jig. These operations ended in about 1925 when the remaining active stope caved. During this period, a smaller production was obtained from the Mystery Tunnel on the Horton vein, and from surface workings on the Durango vein. Recent operations, during and since World War II, have resulted in production from the True vein and from the Murphy ore-body on the Durango vein. During this recent period, the Owens Shaft was sunk to a depth of 100 feet and a drift was run westward in the hope of getting below the caved stope on the lower Horton ore-body. This drift did not have sufficient depth, and entered the caved stope on the surface of the rubble. There has been no further mining activity since 1951.

The Mystery property, consisting of three full claims and three fractions, all patented, is owned by Mrs. Jennie M. Moore of Glendora, California. The property covers between 80 and 90 acres. The claims are as follows: (See Map #1)

Sur. No. 9359	N.G.	Sur. No. 10851	Lucy
Sur. No. 9359	Mountain View	Sur. No. 10851	Grey
Sur. No. 9369	Evergreen	Sur. No. 10851	Rescue

LOCATION AND ACCESSIBILITY

The Mystery property lies one-half mile east of Philipsburg, on the west flank of the Flint Creek Range. The elevation at the site of operations is about 5,700 feet above sea level; about 400 feet higher than the railroad loading area which is about 2 miles distant by a well-maintained road of moderate grade.

Philipsburg is the terminus of a branch line of the Northern Pacific Railroad, and manganese ore purchased under the Government stockpiling program is paid for f.o.b. this point. Philipsburg is an active mining center with a population of 1300. Anaconda is 29 miles, and Butte is 54 miles distant by highway.

TOPOGRAPHY AND CLIMATE

Topographically, the Mystery property consists of steeply rolling prairie, deeply incised on the south by the valley of Camp Creek. The elevation within the property ranges between

5,500 and 6,000 feet. The area is unglaciated, and except in the valley and side gulch bottoms, the soil cover is thin.

During an average winter, the snow will probably not exceed 4 feet in depth, and snow will remain on the ground from mid-November through mid-April. The temperature in winter will occasionally drop to -30°F, and during severe winters, as many as 30 days of subzero weather can be expected. The county road, passing within 100 feet of the main site of operations, is maintained throughout the year.

MINING AND MILLING FACILITIES

Experienced mine labor is available locally. Mining supplies can be purchased at Philipsburg or at Butte. Mine timbers are purchased from local sawyers.

A 23,000-volt power line extends into the Philipsburg mining district, and a power line with stepped-down voltage extends to the Owens Shaft. This would be the site of the mine plant and mill. A compressor here would supply air to the Mystery Tunnel workings and to the workings on the Horton ore-bodies.

A good millsite is available at the Owens Shaft, though an additional area will have to be leveled by bulldozing. There is adequate dump room, and good unloading facilities as the millsite is next to the county road. Some ore will necessarily come from outlying workings within the property, and some ore would probably be purchased from independant operators. Ore from the Mystery Tunnel would have to be elevated to this millsite, but a millsite at the Mystery Tunnel below would have none of the above-mentioned advantages, and ice would build up on the flat valley floor in winter.

Camp Creek flows through the millsite. Its minimum normal flow is doubled by water pumped from the shafts of the Moorlight Mining Company. However, the minimum normal flow should be sufficient for operating a 50-ton jig and table mill.

GENERAL GEOLOGY

The manganese deposits at Philipsburg are found within an area 2 miles long in a north-south direction and 1 mile wide, this area being immediately east of the town. Structurally, this area is a broad anticline of paleozoic sedimentaries which plunges 30° to the north. Erosion has planed the anticlinal surface, exposing the successive formations in the geological column. The summit of the anticline is broad, but the sides are tightly compressed and have steep dips. The east side of the anticline is bounded by intrusive granodiorite of the Philipsburg Batholith, the contact plane being vertical and the intrusive forming the higher mountain area to the east. The granite extends south of the manganese mining area, and small outliers of granite are exposed to the west. To the north, any further deposits would be concealed below the vast column of paleozoic sedimentaries. The intrusive granite is assumed to underlie the manganese-producing area.

Following the solidification of the batholitic crust, a series of vertical east-west tension fissures was produced in the sedimentaries, extending eastward into the granite. Silver-bearing quartz introduced

into these fissures produced the "dry" silver ore for which this camp was first noted.

Closely following the introduction of the quartz-silver ore, the sedimentaries were subjected to bedding plane shearing. At the Hope silver mine, north of the manganese-producing area, these shears were occupied by quartz-silver ores which would indicate the shearing and the introduction of silver to have been contemporaneous. On the Mystery property, the shears only rarely show introduction of the silver-bearing quartz.

The shear zones, the important ones of which reach thicknesses of as much as 160 feet, softened the country rock and offset the previously-existing silver veins. The displacement effected was minor, and at the Horton ore-bodies on the Mystery property, this displacement approximated the width of the shear zone.

At a still later stage of batholitic cooling, the manganese mineralization was introduced. The manganese ascended along the pre-existing silver veins which provided the most suitable channels of weakness. Softened limestone wall rock was replaced by rhodochrosite (manganese carbonate) which is the primary manganese mineral. Upon reaching the softened limestone of the shear zones, this too was replaced outward from the veins to form the larger ore-bodies. This particularly appears to have been the case where the displacement of the vein by the shear zone blocked further ascent.

The manganese deposits, being limestone replacements, are thus dependant upon the country rock. While the fissure veins in the granite to the east and southeast show the introduction of manganese, the wall rock was not suitable for replacement.

The anticline of paleozoic sedimentaries is made up largely of dolomitic limestones suitable for replacement. The major veins within the Mystery property are within the Hasmark Limestone and the overlying Red Lion formation. The Hasmark is a massive pure dolomitic limestone between 800 and 1,000 feet in thickness. It is the most important of the ore-bearing formations in the manganese area. The top of the Hasmark is considered a particularly important horizon, as bedding plane shearing is most likely to occur on the formational contacts. A transitional bed of shaley limestone about 25 feet thick separates the Hasmark from the Red Lion. The Red Lion formation is from 225 to 350 feet thick. The lower part is thin-bedded shaley limestone made up of alternating limestone and siliceous shale beds. The upper part grades into massive limestone. From observations on the Mystery property, the lower part of the Red Lion is poorly suited to manganese mineralization.

The limestone country rock drains outward to springs west of Philipsburg. The workings on the Mystery property are dry. Though the Owens Shaft is located next to Camp Creek, the water table will probably not be encountered until the shaft reaches a depth of about 300 feet. Above this water table, the original rhodochrosite has been completely altered to pyrolusite and psilomelane, the dioxides of manganese. Rhodochrosite can ultimately be expected with greater depth.

While this report is written with the expectation that the property will be operated to supply manganese for the Government stock pile, its normal outlet would be for battery manganese. This is purchased on a MnO_2 basis. The ore from the Mystery property

has a fairly constant ratio of 1.46% MnO_2 for each percent of manganese. Philipsburg manganese is said to enjoy a premium in the battery trade, as through some little-understood property of crystal structure it is considered superior to other sources of equal grade.

GEOLOGY OF THE DEPOSITS

Durango Vein (Within the Red Lion Formation)(See Map #2)

Within the Mystery property, the outcrops of the Durango vein are confined to the Red Lion formation. The Cole Adit begins in the transitional shale at the base of the Red Lion, its course westward bringing it stratigraphically higher. The ore is generally low-grade and narrow. A small stope was carried upward to the surface at the best showing. Here, samples taken over a distance of 20 feet indicated the width to be 2.3 feet and the grade to be 19.40% Mn. Surface pits elsewhere within the lower shaley beds of the Red Lion uniformly failed to show commercial ore. My conclusion is that the lower Red Lion is not favorable for further exploration on this property.

On the west slope of the hill, the Durango vein outcrops are within massive limestone of the upper Red Lion. Here, shallow surface stoping is almost continuous for 250 feet to the Murphy ore-body. These shallow workings stop at a depth which conforms to the contact of the massive limestone with the shaley limestone; another indication that the lower Red Lion is unfavorable for manganese mineralization. A small block of ore remains east of the Murphy Adit but sampling shows it to be uncommercial. Samples of ore mined from the surface averaged 6.45 feet in width and 21.85% Mn in grade for a length of 130 feet along the vein. Without the prospect of further depth, the remaining tonnage is slight.

The Murphy ore-body appears to be associated with a thrust fault which crosses the vein. The faulting caused shearing normal to the direction of faulting and this shear zone, as well as the vein structure, received manganese mineralization. Assays of the ore-body in the walls of the Murphy Adit gave an average of 8.95% Mn for the 40.4 feet sampled. Samples taken at the winze collar are more indicative of the grade mined, averaging 16.05% Mn. Samples taken for a distance of 69.3 feet along the walls of the stope at the bottom of the winze averaged 10.65% Mn. It is apparent that the remaining ore in the Murphy ore-body is low-grade material, and only a very small reserve remains above the present workings. As the lower Red Lion would be encountered just below the bottom of the workings, it is doubtful whether the ore-body continues in depth. The dump should be sampled as a possible source of mill feed. If the dump is suitable for this purpose and is removed, bulldozing should be done to determine whether the ore-body extends westward and can be mined by open pit methods.

Westward from the Murphy dumps, the exposures of the vein are low-grade and generally narrow. The vein pinches out in this direction.

Other than sampling the Murphy dumps as a possible source of mill feed, no exploration nor development is to be recommended on the Durango vein within the Red Lion formation.

Durango Vein (within the Hasmark Limestone)(See Map #2)

The Mystery Tunnel cuts the Durango vein within the Hasmark Limestone, drifts extending short distances along it. At the point of interception, the vein is not well-defined, consisting of widely scattered, narrow stringers. In view of the persistance of the vein on the surface and eastward from the Mystery property, this is assumed to be an unusual condition. The vein becomes well-defined in the drift eastward but as the drift was driven for silver exploration, the drift follows the side of the manganese vein without exposing its full thickness. The full thickness is exposed where a short raise has been driven. Here, assays show the ore to be 36.10% Mn in grade and 1.65 feet in width for a distance of 22 feet, the eastern continuation of this ore-shoot being incompletely exposed. The ore is hard and well-suited to selective mining. The vein dips very steeply and the walls are very good.

The Hasmark Limestone is the most productive formation in the district, and the Durango-Bay Horse vein is one of the large producers of manganese eastward from the Mystery property. The top of the Hasmark is considered a particularly favorable horizon as it is a zone of weakness where bedding plane faulting often has occurred with the consequent formation of large ore-bodies adjoining the veins

* It is recommended that a drift 203 feet long be driven westward along the Durango vein from the present Mystery Tunnel workings. This would carry the drift into the transitional shale at the base of the Red Lion formation.
* It is also recommended that a drift 252 feet long be driven eastward from these workings. This would carry the drift to the property line as determined by the Apex law. This work would be entirely within the Hasmark and on the Durango vein.
* From the farter end of this east drift, it is recommended that a raise 190 feet long be driven on the vein to the surface. This raising would be within the Hasmark almost the entire distance, reaching the base of the Red Lion at the surface.

This exploration is expected to be successful, being entirely within very favorable ground. If successful, ultimately the raise can be widened to become the shaft from which deeper development of the Durango vein can be carried out.

Horton Vein and Ore-Bodies (Hasmark Limestone)(See Map #3)

The main production from the Mystery property has been from the Horton ore-bodies. The Horton vein is one of the most important manganese-producing veins in the district.

Within the Mystery property, the Horton vein was presumably a narrow, nearly vertical silver vein at the close of the silver mineralization. The vein is believed to have followed a very straight course in an east-west line. Bedding plane shearing following the silver mineralization crossed the vein structure

and offset it. This shear zone strikes between N 41°E and N 56°E, dips between 35° and 25° NW, and is observed intersecting the vein through an area 160 feet wide in longitudinal section. Within the sheared area, the vein is deflected to a N 65°W strike and a 75°S dip. When the manganese mineralization was introduced, it rose vertically along the silver vein, replaced the soft, altered wall rock, and upon reaching the sheared area, replaced the altered limestone of the shear zone to form the large ore-bodies. As the upper part of the vein was offset by the shearing, the manganese mineralization did not continue into the silver vein above the shear zone. Shearing was not uniform within the zone, thus accounting for the separate ore-bodies.

Ore-Body No. 1 is the uppermost of the series. Its western tip is shown in the stope above the Mystery Tunnel. Its eastern end was originally exposed on the surface and has been mined in the surface cut. Only limited sampling could be done, and the average grade of the samples was 24.25% Mn. The maximum observed width was 14 feet, while the surface workings indicate a maximum width of 20 feet. The ore-body plunges west at a low angle for a distance of 120 feet. Of this distance, 45 feet appears to still remain in place. The maximum thickness observed was 14 feet, but the surface workings indicate a still greater thickness.

The stope above the Mystery Tunnel does not appear to have extended any distance beyond the present accessible area. The ore would have required jig milling and no provision for transporting the ore up to the jig mill is apparent. It appears that the bulk of the ore between the Mystery Tunnel and the surface workings above, still remains in place.

It is recommended that the loose gob in the Mystery Tunnel stope be cleaned out, being piled for future mill feed. The first back pillar opening in the west drift should be timbered for a raise to be extended directly upward on the vein to the surface workings. Sample 53-80 should be indicative of the grade of ore to be found within the vein on this course, it assaying 25.35% Mn for a width of 3.6 feet. The raise, 46 feet in height, would serve to explore the unworked section of the vein, as well as explore the vein walls to show the extent of Ore-Body No. 1. On the basis of present knowledge, an estimated 1,200 tons of ore of 24.80% Mn grade may be developed.

Ore-Bodies Nos. 2,3,4,& 5 had best be considered as a single unit. Samples taken averaged 19.35% Mn. The width of the ore-bodies measured from 14 to 22 feet. The ore-bodies plunge westward at low angles for a maximum measured distance of 90 feet. The thickness of the ore zone is about 45 feet, of which 40% is estimated to have been ore. West of the Powder Tunnel, only remnants of these ore-bodies appear to remain. East of the large open stope in the Powder Tunnel, an unknown quantity of ore appears to remain, its mining having been prevented when the back of the open stope caved. The ore can be mined cleanly, and the waste can advantageously be used for fill.

Exploration and development of Ore-Bodies Nos. 2,3,4,& 5 would best be delayed until the Horton vein is explored from the drift level at the bottom of the Owens Shaft. Productive ore-shoots

found on the Horton vein below these ore-bodies would ultimately be mined upward to develop Ore-Bodies Nos. 2,3,4,& 5 at the lowest and most advantageous points.

Ore-Body No. 6 was mined from a winze said to be 186 feet deep, and which was located on the vein at the point where the Powder Tunnel enters the large open stope. The collar of this winze is now concealed by the cave-in which occurred in this open stope. The first 35 feet of this winze was along the side of Ore-Bodies Nos. 2,3,4,& 5. The next 30 feet was on the Horton vein, but the ore was narrow and uncommercial. At a depth of 65 feet, the ore had widened to 2.5 feet and was of good grade, though this commercial ore extended only 20 feet laterally along the vein. At this depth of 65 feet, the winze enters the caved stope area and no further detailed observations can be made. The major part of the caved opening is 14 feet wide, 16 feet high, and 50 feet long. It would certainly appear that the ore-body was unusually wide and statements made by the miners confirm this. They state that at the time the stope caved, faces of ore 3 sets wide remained on the stope boundaries, and that this ore was very high-grade. The drift from the bottom of the Owens Shaft enters the caved opening on top of the rubble. Just below this drift level, a bedding plane shear was mineralized outward and had been stoped to a horizontal width of 28 feet. The stope of Ore-Body No. 6 caved due to the opening of this wide area.

Further exploration and development of No. 6 Ore-Body would best be carried out in the future when the Owens Shaft has been deepened another 100 feet. No further deepening is to be recommended until exploration on the present Owens Drift level has given a better understanding of these deposits.

* It is recommended that the Owens Drift be carried through the open caved stope and 130 feet westward along the Horton vein. The Horton vein at the west end of this stope is a barren but strong shear. Nevertheless, there is good reason for believing further ore-shoots similar to No. 6 Ore-Body will be found westward below the vein areas that were productive on the surface. This drift would explore the Horton vein on this level as far west as the Mystery Tunnel. Ventilation could be secured by blasting out the timbers holding back the gob in the original winze.

The Owens Shaft was sunk to a depth of 100 feet on a vein parallel to the Horton and about 45 feet north of it. The outcrops of the Horton and Owens veins are concealed eastward below the creek bottom land. As the Horton vein system has been highly productive in the mining properties to the east, this intervening area deserves exploration.

* It is recommended that 50 feet of cross-cutting be done south from the bottom of the Owens Shaft to cut the Horton vein, and from this point, 400 feet of drifting be carried eastward on the vein to the property line. If no ore is found in the first 100 feet of drifting, it would be advisable to diamond drill to the north and to the south for distances of 100 feet to see whether a parallel structure has received the principal mineralization.

Diamond drilling is not to be generally recommended, as results in manganese oxide ore give no knowledge of its grade nor width. Cores are unobtainable in soft ore and sludges are often lost due to the porous nature of the ore. In larger ore-bodies, the ore often occurs as hard nubbins in a soft gangue which also precludes obtaining core. Any showing obtained by diamond drilling would have to be proven by exploratory drifting, so the advice of competent man in the district is to explore known vein structures by drifting.

The dump of the caved shaft 150 feet east of the Owens Shaft shows abundant oxide manganese, and may prove to be the continuation of the Owens vein. The structure is concealed below the creek bottom land.

* It is recommended that bulldozer trenching be conducted at the collar of the caved shaft and at a point intermediate between there and the Owens Shaft to reveal the structure and its extent.

No exploration is recommended westward from the Mystery Tunnel on the Horton vein. The manganese occurs in pockets, and the vein shows signs of pinching out. In depth, closer to its batholitic origin, commercial ore may be found westward, but this should not be considered at present.

True Vein (Hasmark Limestone)(See Map #4)

No exploration is recommended on the True vein west of the Mystery Tunnel. The surface showings are weak, and the Mystery Tunnel cuts only narrow silver veinlets at its interception.

High-grade, hard manganese ore was mined from the Hartley Adit. The avergge of samples taken from the stope faces and pillars showed an average of 24.00% Mn in grade and 2.05 feet in width for a distance of 105 feet along the vein. A negligible reserve remains. Shipping records show that 250 tons of ore averaging 40.25% MnO_2 were mined. This is the equivalent of 27.60% Mn. This ore was shipped without milling. No further exploration is recommended in the Hartley Adit nor in the surface area eastward where only silver veinlets are found on the course of the vein.

It is noted that the Horton ore-bodies were formed by a wide zone of bedding plane faulting striking northeast and dipping about 30° NW. The projection of this faulting would intercept the True vein below the Hartley Adit, and presumably would form a similar set of ore-bodies. In confirmation of this, the incline in the Hartley Adit follows a narrow, mineralized bedding plane shear which projects as an isolated shear just above the main zone of faulting. Further confirmation appears in the lack of manganese mineralization in the silver veinlets east of the Hartley Adit. Bedding plane shearing could have blocked the manganese from rising along the True vein, just as shearing at the Horton vein blocked the further ascent of manganese above the ore-bodies. ? Furthermore, this area on the True vein may be directly on line between the Horton ore-bodies and the large ore-bodies mined on the Durango vein on the Moorlight Mining Company property. These latter ore-bodies are no longer accessible for examination but maps do exist so this correlation cannot be confirmed.

* It is recommended that a drift 540 feet long be driven eastward on the True vein from the Mystery Tunnel. This would carry the drift to the eastern property line. This drift would explore the possible occurrence of a new ore-body zone on this horizon, and failing in this, would still serve to explore the Hartley ore-shoot at greater depth.

This exploration drift would be stopped at 250 feet if no favorable structure were found in this distance. If a new zone of ore-bodies is found, it could be mined through a vertical shaft reaching the surface near the portal of the Hartley Adit, and this shaft would later be used for further development in depth.

RESERVES

This property has been operated by a succession of small leasors. As is to be expected, all easily accessible ore has been mined, and no ore reserves have been developed. Exploration to prove reserves will be the first step required.

MINING METHODS

The vein deposits are almost vertical, the walls are good, and the demarkation between ore and limestone is sharp. Open stulled stoping is the general practise in mining the veins. The stopes do not require filling, and occasional narrow sections of the veins are left as pillars. The veins swell and pinch in thickness within short distances, the thickness varying from mere seams to 4 feet, and occasionally thicknesses of 10 feet are found.

The ore-body deposits are erratic in shape. Some are broad, and have limited vertical dimensions. These are formed in sheared limestone which has been replaced outward from the veins. Other ore-bodies are broad replacements adjoining the vein structure, and have extended vertical dimensions. These appear to form where fault offsets prevented further ascent of the manganese solutions.

Stoping these ore-bodies requires support of the opened ground. In the past, square-set and open stoping has been practised. Unfortunately, filling the stopes was not generally done and ultimately the stopes would collapse and the remaining ore would be abandonned. At present, the larger mining companies are using cut-and-fill and filled square-set stoping. This results in complete mining and safer working conditions. Pumping tailings into the mine for fill is not practised, mainly because the mills are not close to the working shafts. With a mill located at the Owens Shaft, tailings could be used advantageously on the Mystery property. The solid support offered by the tailings would eliminate a large part of the stope timbering.

MILLING METHODS

The two methods of milling used in the preparation of battery manganese are wet tabling and dry magnetic separation. The milling to prepare the ore for the Government stockpiling program will not require as high a degree of concentration, and a 40% Mn concentrate will probably prove the best economic product. An elaborate mill

will not be required for this, and very likely, satisfactory results will be obtained by crushing to minus 1/2 inch, separating the fines from the coarse by screening, jigging the coarse, and tabling the fines. Much of the ore mined should be over 30% Mn in grade and can be shipped without milling.

GOVERNMENT ASSISTANCE AND MARKETS

Under the Government DMEA program, 75% of the cost of authorized manganese exploration is furnished on a loan basis to be repaid from a 5% royalty on ore mined from new discoveries made in this exploration. The Government's share of the exploration costs is paid on a monthly basis upon their receiving the receipted bills for authorized expenditures.

It is felt that the exploration program outlined in this report will completely qualify for this Government assistance.

Under the Government stockpiling program, extended to June 30, 1958, manganese oxide ores and concentrates are purchased f.o.b. depot, Philipsburg, Montana. The ore must be amenable to beneficiation within the following limits:

Manganese (minimum)	40.0%
Iron (maximum)	16.0%
Silica plus alumina (maximum)	15.0%
Phosphorus (maximum)	0.3%
Copper plus lead plus zinc, of which not more than 0.25% may be copper (maximum)	1.0%

Assays made during the preparation of this report, and past experience in the sale of ore from the Mystery property, show that the ore will easily meet these specifications.

Oxide ore is purchased in 5-ton minimum lots and paid for ~~at~~ according to the following schedule:

% Mn	per long dry ton	% Mn	per long dry ton	% Mn	per long dry ton	% Mn	per long dry ton
18	$ 4.87	24	$18.01	30	$31.33	36	$45.60
19	7.08	25	19.82	31	33.61	37	47.32
20	9.18	26	21.83	32	35.94	38	49.89
21	11.35	27	24.51	33	38.22	39	51.62
22	13.60	28	26.45	34	40.64		
23	15.61	29	29.09	35	43.09		

With 200-ton lots, which are aggregated by the Government, payment is made on the basis of milling recovery of manganese at a rate of $2.30 per long ton unit, with premiums and penalties and various charges deducted. The prices obtained for 200-ton lots will generally exceed those listed on the above schedule, and take into consideration ore over 39% Mn in grade.

Peter H. Toepfer

Peter H. Toepfer
Mining Engineer.

Philipsburg, Montana
Sept. 10, 1953

UNITED STATES
DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION
~~WASHINGTON 25, D. C.~~
1201 North Division Street
Spokane 2, Washington

February 26, 1953

MEMORANDUM

To: DMEA Field Team, Region II

From: John D. Bardill, Bureau of Mines, and
J. J. Quinlan, Geological Survey.

Subject: General Washington et al claims - (W. A. Boon)
Henderson District, Granite County, Montana
Docket No. DMEA 2597 (tungsten)

RECOMMENDATIONS

It is recommended that the application to sample the side-hill eluvium on the south and east slopes of Sunrise Mountain be transferred to the inactive file until applicant presents evidence that the lower portion of the eluvium can be mined profitably. When applicant presents this additional information, the following program is recommended as a modification of his original proposal.

1. Bulldoze one and possibly two trenches, each trench not to exceed 1750 feet in length, and total trenching not to exceed 3500 feet. The first trench should follow approximately the 5,600 foot contour on the side-hill. The second trench will be contingent on favorable showings of scheelite in the first trench and should approximately follow the 5,900 foot contour.

2. Take 50- to 100-ton representative samples from the trenches and wash them in the plant. These samples will be screened, jigged, and beneficiated by gravity-magnetic separation procedures to determine scheelite content per cubic yard and tungsten grade of the final concentrate.

3. Carefully map and sample any tungsten-bearing veins in the bedrock exposed in the trenches.

The estimated cost of this program is $3,630.

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

CONCLUSIONS AND SUMMARY

Preliminary sampling of alluvium at various points on the side of Sunrise Mountain indicates scheelite in all samples, and further investigation is warranted. Inasmuch as applicant plans to placer mine a portion of the side-hill placer near the base of the mountain in conjunction with his placer operation in Henderson Gulch, it would be well to await the results of this operation before undertaking further sampling.

Applicant's proposal specified over 10,000 feet of trenching but this is considered excessive. It is believed that 3500 feet of trenching and sampling will adequately test the area.

INTRODUCTION

An examination was made January 13, 1953 to appraise W. A. Moon's application for exploration assistance to test the Henderson Gulch hillside alluvium. Mr. Moon and Mr. F. A. Hancock, an engineer for the applicant, accompanied the examining team during part of the examination.

Unusually mild weather left the side of the mountain free of snow and ground unfrozen on the day of the examination. Four grab samples were taken of the sidehill soil and the area was lamped at night with an ultraviolet light.

LOCATION AND ACCESSIBILITY

The Henderson Gulch side-hill placer deposit is on the south and east slopes of Sunrise Mountain, approximately 11 miles north of Philipsburg, Montana.

The deposit is readily accessible, being 5 miles by county road west of Stone, on U. S. Highway 10A, 14 miles south of Drummond and 13 miles north of Philipsburg. Stone is a siding on the Philipsburg branch of the Northern Pacific Railroad which joins the main trans-continental line at Drummond.

Winter weather conditions generally render placer operations impracticable between November and May.

PROPERTY

The applicant states that the property consists of five adjoining patented claims in Sec. 35, T. 9 N., R. 14 W., and Sec. 2, T. 8 N., R. 14 W., Henderson Mining District, Granite County, Montana. These claims are:

	Survey Number	Patent Number
General Washington Lode Mining Claim	4581	26386
Free (Trade) Coinage Lode Mining Claim	4576	26309
Rosebud Lode Mining Claim	4578	26309
Amended Bland Lode Mining Claim	5386	31219
Minnie Lode Mining Claim	4574	30998

Reportedly, these claims are held under lease and bond from Senator Murray and Associates of Butte, Montana.

COMPETENCE OF APPLICANT

Applicant for several years was superintendent of the bucket-line dredging operations during the time the H. & H. Mines, Inc. successfully placer mined the adjoining ground for scheelite and gold. Mr. Moen is believed to be a competent and efficient operator.

PAST PRODUCTION

There has been no production from the hillside eluvium.

GEOLOGY

Scheelite occurring in the Henderson Gulch side-hill placer deposit is believed to have been derived from the extremely low-grade Henderson Gulch tungsten deposit. This deposit is described by S. W. Hobbs in an unpublished U. S. Geological Survey report, "Report on the Henderson Gulch Tungsten Deposit, Granite County, Montana," 1942, and by Robert J. Rundhausen in U. S. Bureau of Mines R. I.-4513, "Investigation of Henderson Gulch Tungsten Deposit, Granite County, Montana," 1949. The geological description herein is partly from these reports, supplemented by observations made during the field examination.

The area is underlain by both sedimentary and igneous rocks. The sedimentary rocks consist of a series of impure limestones, calcareous shales and argillites belonging to the Newland formation of Algonkian age. These rocks generally strike north and dip gently west. The sedimentary rocks are cut by a N. 60° E. trending tongue-like body of granodiorite. Work completed by the Bureau of Mines has exposed a part of this igneous rock body immediately west and southwest of the side-hill placer. Furthermore, the Bureau's work indicated that the igneous rock body crops out over an area of approximately 57 acres in Henderson Gulch and that it is at a lower elevation than the greater part of the side-hill placer. These relationships are shown on the two maps accompanying this memorandum. Figure I has been prepared by the Bureau of Mines from Bureau data obtained during the Bureau project. On this has been plotted samples taken ~~by the applicant, and~~ by the DMEA examining team. Figure II is from Hobb's report.

[illegible]

[illegible]

[illegible]

Inasmuch as the side-hill placer is covered by overburden it is evident that the igneous body may extend into the side-hill placer area; also there is the possibility that the granitic body extends into the side-hill placer area, being covered by a thin shell of sedimentary rocks.

Contact metamorphism adjacent to the igneous body has produced a zone a few hundred feet wide in which the sedimentary rocks contain some garnet, epidote, diopside, and quartz. Sedimentary rock found on the talus slopes in the side-hill placer area contain thin seams of garnet, epidote, quartz, and minor scheelite. Undoubtedly, some of these rocks have come from outside the immediate contact zone.

Most of the scheelite is reported to occur within the granodiorite. Minor occurrences also have been noted in the immediate contact zone. The bulk of the scheelite is associated with quartz and pyrite in fractures and narrow seams in both the igneous body and immediate contact zone. Scheelite noted on the joint surfaces of sedimentary rocks found in the talus slopes indicates that mineralization extends out some distance from the contact.

Minor amounts of scheelite have been noted in the Sunrise vein. The predominate mineral assemblage of this vein is quartz, pyrite, and chalcopyrite. This vein crops out on Henderson Mountain approximately 2400 feet northwest of the igneous body and is above the side-hill placer area. The vein averages 3½ feet in width, strikes N. 10° E., and dips 15° to 37° N. W., which is nearly the same as the strike and dip of the Newland beds in which it lies.

Though the mineral assemblage of the Henderson Gulch deposit is characteristic of contact metamorphic deposits, field relationships indicate that the deposit is of hydrothermal origin. The scheelite is concentrated with quartz, sulfides, and in some instances with silicate mineral along joints and fractures. Undoubtedly, there has been some reaction with the calcareous sediments or even with the igneous rocks; however, this reaction has been a small factor in ore formation. The ore is controlled by fracturing and has been reported to be most extensive within the igneous rock body and to some extent in the immediate contact zone. However, the occurrence of scheelite in the Sunrise vein and also on joint surfaces of sedimentary rock fragments in the talus suggest that it also occurs in seams, veinlets, and veins within the sediments. The extent of these seams veinlets, and veins is concealed by overburden.

RECOVERABLE RESERVES

There is not sufficient information to permit an accurate yardage estimate; however, some general rough approximations can be made.

[illegible]

The area under consideration is about 1600 feet long parallel to the creek and extends up the hillside for a distance over 1000 feet. The following yardage may be calculated in the area:

$$\frac{1600' \times 1000' \times 10'}{27'} = 592{,}000 \text{ cubic yards}$$

This yardage is only a fraction of the total ultimately available if the eluvium can be mined economically.

Overburden on the hillside is believed to exceed 10 feet in depth as seen in the several accessible exposures shown on the attached map (Fig. 1). The depth on the south slope of Sunrise Mountain evidently increases downstream eastward and probably reaches its maximum in the area under consideration. This relationship is roughly indicated in the trenching done by the Bureau of Mines just west of the area to be sampled. The following table (from R.I. 4513) shows depths of overburden found in the Bureau trenches:

Table I

Trench No.	Location	Length - Ft.	Average depth of Overburden - Ft.
1	100 ft. west	170	12.3
2	600 " "	140	13.3
3	900 " "	190	4.6
4	1200 " "	150	7.1

Two samples from trenches 1 and 2 near the bottom of Sunrise Mountain as reported in Bureau of Mines Report of Investigations 4513, established the presence of scheelite.

One sample of eluvium taken by Bureau of Mines engineers from a short adit and two samples from a trench in the fall of 1952, designated as C-5, C-6, and C-7, were beneficiated at the Bureau laboratory at Albany, Oregon. These samples weighed about 80 pounds each. None of the sample cuts reached bedrock. There is some question as to whether these cuts are uphill or downhill from the granite-limestone contact.

Each sample was passed over a vibrating screen with 1/4-inch square mesh. The undersize was treated on a Deco laboratory jig to produce a rougher concentrate and reject a clean tailing. This rougher concentrate was screened on 28-mesh, and the oversize was reduced through 28-mesh and recombined with the undersize. This combined material was hydraulically classified, and the separate spigot fractions were tabled to produce rougher table concentrates and clean tailings. The rougher table concentrates were combined, dried, and passed over the cross-belt magnetic separator at high intensity to concentrate the scheelite in the non-magnetic tailings. The non-magnetic tailings fraction from this operation was again hydraulically classified, and the spigot fractions were separately passed over the shaker table to produce a final WO_3

concentrate, middlings, and tailings. As an additional operation, the minus 28-mesh material from the rougher jig circuit was submitted to tabling to produce a scavenger concentrate in order to determine the efficiency of the jigging operation. Very little additional scheelite was obtained.

Concentrates analyzing 22.8, 19.1, and 20.2 percent WO_3 with ratios of concentration ranging from 1 to 2072 to 1 to 5488 resulted from the above treatment. The three respective samples represented average grades of 0.111, 0.250, and 0.162 pounds WO_3 per cubic yard of alluvium.

Concentrates of the above grade have a market value of about $38 per unit of contained WO_3. Recoverable value of tungsten per cubic yard thus would be $0.21, $0.47, and $0.31 respectively for samples C-5, C-6, and C-7.

The K. & K. Mines, Inc. land plant for several years treated the jig concentrates from the bucketline dredge and produced a plus 60 percent WO_3 concentrate. The dredge operated in Henderson Creek in a downstream area adjoining the sites from which the Bureau samples were taken. Both areas probably have the same source of the scheelite because the gold and tungsten contents of the alluvium became lower the farther downstream the dredge operated. Consequently, it seems likely that a high-grade concentrate might be recovered from the alluvium despite the contradictory laboratory test results, one that could be marketed at $60 to $65 per unit WO_3.

Four grab samples designated HG-1, HG-2, HG-3 and HG-4 were taken by the examining team; their locations are shown on the attached map (Figure 1).

While these samples must be considered more qualitative than quantitative, they were taken to prove or disprove the presence of scheelite uphill from previous samples. None of the sample cuts reached bedrock.

The samples weighing from 30 to 60 pounds each were screened on an 8-mesh screen to simulate applicant's trommel screen. The plus 8-mesh and minus 8-mesh were weighed and the latter assayed for tungsten. Because of the minute quantities of tungsten in the alluvium it was not practicable to obtain samples large enough to permit actual concentrations of the scheelite by jigging and tabling. Ratios of concentration for the Bureau samples ranging from 1 to 2072 to 1 to 5488 indicate that over 1000-pound samples would have to be taken to give appreciable amounts of scheelite for testing purposes.

The assay results show the total free scheelite and scheelite attached to the gangue, and not necessarily that recoverable by placer treatment methods. The scheelite weight per cubic yard of alluvium includes only the scheelite content of the minus 8-mesh material.

This preliminary qualitative sampling clearly indicates that the alluvium contains scheelite. Because of the absence of bedrock in the area, the source of the scheelite is not definitely known.

APPLICANT'S PROPOSAL

Applicant is preparing to placer mine and treat the alluvium in Henderson Creek Gulch adjacent to the side-hill deposit with a dragline, screening, and jig plants with final beneficiation of the jig concentrate in the old gravity-magnetic separation plant. This operation is being financed with funds from DMA 1060 Production Loan.

The screening and jig plants have a capacity of about 3,000 cubic yards daily, whereas the capacity of the dragline shovel is about 1,500 cubic yards.

Applicant wishes to mine simultaneously the side-hill alluvium at the rate of 1,500 yards per day with a dragline and portable screening plant to maintain the jig plant at capacity.

Applicant proposes about nine bulldozer cut trenches roughly totaling 10,700 feet, spaced about 200 feet apart on the side of Sunrise Mountain. Approximate locations of the proposed trenches are shown on the accompanying sketch map.

Applicant estimates the following costs for the project:

<u>Purchased:</u>

Sample sacks, containers, etc.	$ 250.
Transportation of samples	100.
Assaying, about 200 samples	600.
Small tools, screens, etc.	150.

<u>Furnished by Applicant:</u>

Mill plant power, water, utilities & supplies for concentrating samples	$ 750.
Incidentals	150.
Part-time engineering and supervision	500.
Sampler, part-time	350.
Surveying and mapping	300.
Accounting	225.
	$3,375.
775 hours D-7 or D-8 bulldozer rental at $15/hour.	$11,625.
Total	$15,000.

The proposed trenching seems excessive in amount because the lower portion of the eluvium would be sampled as the valley alluvium is mined.

SUGGESTED PROPOSAL

Applicant should mine and treat the creek bottom alluvium as planned under the terms of his DMA 1060 production loan contract for about two months to determine operating costs and cut-off grade. A few days plant size test run should be made of the lower side-hill eluvium adjacent to the creek bottom for the same purpose. If the results of this test indicate a possible profitable operation, then the following alternate proposal to test the side-hill eluvium at higher elevation is suggested in lieu of applicant's proposal:

1. Bulldoze a trench to bedrock following the hillside on approximately the 5600-foot contour through the Minnie, General Washington, and Free Coinage claims. This trench should not exceed 1750-feet in length.

2. Lamp the trench with ultraviolet light to locate any scheelite zones, and map them. Map and sample any occurrences of scheelite in bedrock.

3. Procure representative samples of approximately 100 tons each from one or more of the scheelite zones. Treat the samples in the screening, jig and gravity-magnetic separation plants to determine quantity of scheelite per cubic yard and grade of concentrate.

4. If eluvium contains sufficient scheelite for a profitable operation, bulldoze a similar trench at approximately the the 5900-foot contour and proceed as in 2 and 3 above.

COST ESTIMATE

The following estimated costs are considered adequate for the alternate proposal:

3500 feet of trenching at 300 ft./day with bulldozer rental at $15/hr.	$1,440.
Access road for hauling samples to mill, 2 days bulldozing	240.
Assaying, 50 samples at $5.00	250.
Hauling 400 tons of samples to mill at $1/ton	400.
Labor, supplies, power, to screen, jig and gravity and magnetically separate samples	600.
Surveying and mapping	200.
Engineering and supervision	500.
Total	$3,630.

It is realized that the above estimate is not sufficiently detailed to allow preparation of a contract. These details can be worked out if the applicant's operation on the lower ground indicates that a contract is warranted.

ADDITIONAL COMMENTS

The Field Team has been requested to comment on the proposal and to answer specific questions regarding the application as itemized in a letter of July 10, 1952, from Frank E. Johnson, Chairman, Operating Committee, to the Executive Officer, Region II.

Answers to questions 1 - 5 inclusive have been explained in the appraisal of the application and the suggested alternate proposal.

Question 6: Does it appear feasible to bulldoze material for 1000 feet or more just to sample? How accurate would the samples be for any stretch of trench?

The plan would be to cut a contour trench to bedrock around the hillside, pushing the material over the side and exposing a clean bottom. The side-hill slopes about 40 degrees. An ultraviolet light would be employed to delineate the scheelite-bearing zones in the trench. A small power shovel loading machine (such as Hyster) would be used to sample the trench. Samples of 50 to 100 tons should be taken for accurate results.

Question 7: What problems will arise in disposing of the material taken from the hillside?

Applicant explained that he intends to work uphill on benches with a dragline and portable screening plant, discarding the coarse material to a wastedump down-slope behind the screen on previously worked ground. The fine scheelite-bearing alluvium would be trucked to the jig plant for further concentration. Accumulated fine jig tailings at the plant in the creek bottom could be pumped further downstream when necessary.

J. D. Bardill

J. J. Quinlan

Enclosures

Orig. & 3 - Wash.
USGS - 2
DMEA
M/D
JDB/vf