DMA Form 1

DEFENSE MINERALS ADMINISTRATION
Control Slip

CONTROLLED DOCUMENT

DMA Docket No. 1722X

DO NOT DETACH THIS SLIP

Action on this document is recorded and controlled in Reports and Records Branch. Any movement of this document between divisions or offices of DMA or movement outside DMA must be reported to the Reports and Records Branch. Actions taken that affect status of the case must also be reported.

This document has been recorded as

Any action taken to change the type of request for assistance must be promptly reported to the Reports and Records Branch. Use DMA Form 2 for submitting these reports.

Routing Slip

To: Coordinating Comm. Date July 18, 1951

To: [illegible] Date [illegible]

To: [illegible] Date [illegible]

To: Reports & Records Date 9-4-51

To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

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To: _____ Date _____

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To: _____ Date _____

To: _____ Date _____

To: _____ Date _____

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DMA Form 2

DEFENSE MINERALS ADMINISTRATION
Status Change Notice

DMA Docket No. 1722-1

Tucson Mining Co.

To: Reports and Records Branch

From: LEAD ZINC BRANCH

Date: JUL 6 1951

The following action has been taken this date on the above Controlled Document

Forwarded to

Type of request changed to:

Denied ☐ Withdrawn ☐

Approved in amount of $

Other action, specify:

On hand

Interior—Duplicating Section, Washington, D. C.

FILE COPY
SURNAME:

350

Lyons (E.T.M.)
McKnight
Bishop
Billings

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

Re: Docket DMA-1722

OCT 5 1951

G.E.S.

Tucson Mining Company
133 N. Stone Avenue
Tucson, Arizona

Gentlemen:

Your application for a direct loan to bring into production the Helmet Peak mine in Pima County, Arizona, has been referred to the Defense Production Administration and the Reconstruction Finance Corporation for their review and consideration.

Your request for financial aid to explore the Tit-for-Tat, Bobby, and Bonanza groups of claims has been reviewed by the Defense Minerals Administration on the basis of a report submitted by the field team after examination of the properties. Study of this report indicates that there is little possibility of obtaining significant tonnages of ore of minable grade by further exploration. In view of this, we are unable to justify expenditure of public funds for this project. I regret, therefore, that your application must be denied.

We wish to thank you for bringing these properties to our attention.

Very truly yours,

ABB

Tom Lyon

for Tom Lyon, Director
Supply Division

dd 10/5

EJLyons:emp
G 10-1-51
Copies to: J. H. East, Jr. Region IV (2)
Chief, Lead-Zinc Br.
E. T. McKnight 4204 GSA
O. M. Bishop
Directors r. files 4214 GSA
Br. r. files 4214 GSA
Administrators f. files
DMA docket files

FILE COPY
SURNAME: 350

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

OCT 4 1951

Lyons (E.T.M.)
McKnight
Bishop
Dillinger

Q.E.C.

Re: DMA-1722
Tucson Mining Company
Tit-for-Tat, Bobby, and
Bonanza claims,
Pima County, Arizona
Lead-zinc-silver-copper
Exploration loan, $300,000

Memorandum

To: Reports and Records Unit
Administrative Management Div.

From: Chief, Lead-Zinc Branch

Subject: Recommendation for denial of application submitted by the Tucson Mining Company, to explore the Tit-for-Tat, Bobby, and Bonanza claims, Pima County, Arizona.

The original application was submitted for exploration loans on the three subject properties and also for a direct loan on the Helmet Peak mine. The present memorandum applies only to the request for exploration loans. A separate memorandum discusses the request for a direct loan on the Helmet Peak mine. The four applications were given the same docket number.

All four properties have been examined and discussed in a single report by the field team.

The applicant requested an exploration loan of $100,000 for each of the three separate properties, the Tit-for-Tat, Bobby, and Bonanza. The work proposed for each prospect was exactly the same and consisted of the following:

Geologic mapping
Twelve drill holes, either core or churn, to a depth of 800 ft.
Rehabilitation of shaft to the 200 ft. level.
Driving a 300 ft. crosscut to explore a vein structure.

The applicant evidently erred in setting up the projects because the properties are seperate and work suitable for one would not apply to the others.

All of the deposits are veins in brecciated fractures in volcanic rocks. The ore occurs as narrow, discontinuous streaks and lenses with an average width of less than 12 inches. In the Tit-for-Tat vein there are a few hundred tons of indicated and inferred ore containing about 20 oz. Ag, 23% combined zinc and lead, and 1.6% Cu. Net value of this ore, after marketing, would be about

$46 per ton, but the production cost probably would exceed $50 per ton.

The workings on the Bobby vein are inaccessible, but its similarity to the Tit-for-Tat suggest that the ore is submarginal.

No extensive work has been done on the Bonanza prospect but its narrow vein is not promising.

The examining engineer does not believe that further exploration work would disclose any significant amount of base metal ores and recommends that the application be denied. The Lead-Zinc Branch concurs with this recommendation.

The following material is attached:

3 copies Form MF-103 applying to the Tit-for-Tat property with 1 copy of report by R. J. Leonard.
3 copies of Form MF-103 applying to the Bobby group with 1 copy of report by R. J. Leonard.
3 copies of Form MF-103 applying to Bonanza and Bobby group with 1 copy of report by R. J. Leonard.
1 copy of report by J. C. Anderson on Swastika group of mines.
1 copy of transmittal letter to field team.
1 telegram, dated June 25, to Otto Herres from H.R. Freeman.
3 copies of claims map of Bobby group.

not stripped
R + R

T. P. Billings, Chief
Lead-Zinc Branch

Approved:

Tom Lyon

Director, Supply Division

EJLyons:emp
G 10-1-51
Copies to: J. H. East, Jr. Region IV (2)
Chief, Lead-Zinc Branch
E. T. McKnight 4204 GSA
O. M. Bishop
Directors r. files 4214 GSA
Br. r. files 4214 GSA
Administrators r. file
DMA docket files

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

OCT 4 1951

Memorandum

To: Reports and Records Unit
Administrative Management Div.

From: Chief, Lead-Zinc Branch

Re: DMA-1722
Tucson Mining Company
Tit-for-Tat, Bobby, and
Bonanza claims,
Pima County, Arizona
Lead-zinc-silver-copper
Exploration loan, $300,000

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1 copy of report by J. C. Anderson on Swasticka group of mines.
1 copy of transmittal letter to field team.
1 telegram, dated June 25, to Otto Herres from H.R. Freeman.
3 copies of claims map of Bobby group.

T. P. Billings, Chief
Lead-Zinc Branch

Approved:

Director, Supply Division

FILE COPY
SURNAME:

McKnight
Lean
(Ed Mote)
Billings
Tom
Moon

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

Re: Docket DMA-1722X

JUL 30 1951

Tucson Mining Company
133 N. Stone Avenue
Tucson, Arizona

Gentlemen:

Your applications (Docket DMA-1722X) for Government assistance under the provisions of the Defense Production Act of 1950 has been reviewed by the Lead-Zinc Branch of the Defense Minerals Administration. Before final decision can be taken on your property it will be necessary to obtain additional information on your property. Your applications, therefore, have been referred to Mr. J. H. East, Jr., Executive Officer, DMA Field Team, 224 New Customhouse, Denver 2, Colorado, with the request that the needed information be supplied to us.

Very truly yours,

Tom Lyon

Tom Lyon, Director
Supply Division

ETMcKNIGHT:emp
7/17/51 G
Copies to: J. H. East, Jr. Region IV (2)
Chief, Lead-Zinc Br.
E. T. McKnight 4204 GSA
R. H. Mote
Reports & Records Unit
Directors r. file 4214 GSA
Br. r. file 4214 GSA
Files

Docket 1722X

956

FILE COPY
SURNAME:

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

JUL 20 1951

McKnight
Allard
Bilsings

DMA-1722X
Tucson Mining Co.
Lead-zinc-copper
Exploration loan

Mr. J. N. East, Jr.
Executive Officer, DMA Field Team
Region IV
224 New Customhouse
Denver 2, Colorado

Dear Mr. East:

Enclosed are 4 applications submitted by the Tucson Mining Company which are being referred to the field for further information and advice. There are 3 exploration loan requests each for $100,000 on the Bonanza Group, Bobby Group and Tit-for-Tat Claim.

The work that the applicant proposes to do on each of these claims is exactly the same, namely, to complete a geologic mapping job, to drill 12 holes each to a depth of 800 feet and to retimber the vertical shaft to the 200 ft. level and crosscut south for 300 feet. It is not evident from the application whether this represents 3 separate jobs or the same job that will serve all 3 claims.

There is also included in this application a request for a straight loan for an unstated amount, although probably in excess of $200,000, to develop the ore on the Helmet Peak Mines Group. The applicant states that there are 100,000 tons of proven ore on this property, but the evidence of this is not convincing from the material submitted with the application. The ore is said to be in the brecciated andesite and its assay is given in dollars instead of metal percentages. The reported reserves date from a geologic examination made in 1926.

We do not have enough information in Washington to judge these various applications which are all included under the one docket number. The Helmet Peak Mine if briefly described by Eldred Wilson in the volume on Arizona zinc and lead deposits, published in 1950. He points out that a more detailed report is a University of Arizona thesis by M. N. Mayuga, which is presumably available to the field team for study. The other claims that the applicant proposes to explore are in the same section, township, and range, as the Helmet Peak Mine, so presumably the Mayuaga report will cover them also.

These various applications will probably have to be separated into at least 2, one covering the direct loan on the Helmet Peak Mine and the other covering exploration on the other prospects. The field

team should make a geologic appraisal of the ore reserve possibilities of the Helmet Peak Mine and of the geologic possibilities of finding new ore on the prospects proposed for exploration. If these geologic appraisals are favorable, then the engineering phases of the 2 proposals can be considered.

There is enclosed in this docket material, a geologic report on the Swastika copper and silver mining property. We can find no evidence that any Federal assistance is requested on this property and assume that the report is presented to give geologic information on land closely adjacent to that being developed by the applicant.

Very truly yours,

Tom Lyon

Tom Lyon, Chairman
Coordinating Committee

Approved:

Lowell B. Moore
For Bureau of Mines

Olav N. Rove
For Geological Survey

ETMcKNIGHT:emp
G 7/17/51
Copies to: Chief, Lead-Zinc Br.
E. T. McKnight 4204 GSA
R. H. Mote
Records and Reports Unit
Directors r. file 4214 GSA
Br. r. file 4214 GSA
Files

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

REGIONAL DIRECTOR'S
OFFICE
REGION IV
JUL 23 1951
JUL 20 1951
BUREAU OF MINES
DENVER, COLORADO

DMA-1722X
Tucson Mining Co.
Lead-zinc-copper
Exploration loan

9-27-51

Mr. J. H. East, Jr.
Executive Officer, DMA Field Team
Region IV
224 New Customhouse
Denver 2, Colorado

Dear Mr. East:

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SEP 24 1951

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Very truly yours,

Tom Lyon

Tom Lyon, Chairman
Coordinating Committee

Approved:

Lowell B. Moon
for Bureau of Mines

Olaf T. Rom
for Geological Survey

FILE COPY
SURNAME:

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

June 28, 1951

Mr. G. Warren Hassler
General Partner
133 N. Stone Avenue
Tucson, Arizona

Subject: DMA-1722X
Re: Exploration Loan -
Bonanza Group, Bobby Group,
and Helmet Peak

My dear Mr. Hassler:

Receipt is acknowledged of your application and attachments of June 18, 1951 for an exploration loan under the Defense Production Act of 1950.

The application was assigned Docket Number DMA-1722X and referred to Mr. Otto Herres, Chief, Lead-Zinc Branch on June 27, 1951.

In any future correspondence relating to your application, kindly refer to DMA-1722X.

Sincerely yours,

LANDON F. STROBEL

jc

Landon F. Strobel
Executive Secretary

L. F. Strobel:jc
cc: Strobel
File
Herres
Lyon

FILE COPY
SURNAME:

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

June 25, 1951

Mr. G. Warren Hassler
General Partner
Tucson Mining Co.
133 N. Stone Avenue
Tucson, Arizona

Subject: DMA-1722X
Re: Exploration Loan
Bobby Group, Tit-For-Tat Claim

My dear Mr. Hassler:

Receipt is acknowledged of your application and attachments of June 16, 1951 for an exploration loan under the Defense Production Act of 1950.

The application was assigned Docket Number DMA-1722X and was referred to Mr. Otto Herres, Chief, Lead-Zinc Branch on June 21, 1951.

In any future correspondence relating to your application, kindly refer to DMA-1722X.

Sincerely yours,

LANDON F. STROBEL

Landon F. Strobel
Executive Secretary

LFSTROBEL:js
cc: Strobel-2
>Files
Herres
Lyon

CLASS OF SERVICE

This is a full-rate Telegram or Cablegram unless its deferred character is indicated by a suitable symbol above or preceding the address.

WESTERN UNION

W. P. MARSHALL, PRESIDENT

Herres

DL=Day Letter
NL=Night Letter
LT=Int'l Letter Telegram
VLT=Int'l Victory Ltr.

The filing time shown in the date line on telegrams and day letters is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination

PA114 LA490

1951 JUN 25 AM 2

L.LLY002 NL PD=LOSANGELES CALIF 24=

OTTO HERRES=

DEPT OF INTERIOR DEFENSE MINERAL ADMN WASHDC=

OUR APPLICATION MAILED LOS ANGELES JUNE 20TH SHOULD BE AT YOUR OFFICE NOW PLEASE WIRE COLLECT IF ANY ADDITIONAL DATA REQUIRED=

HENRY R FREEMAN TUCSON MINING CO 5615 WEST PICO LA 19=.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 2 51951
8:30 a.m.
LANDON F. STROBEL
Executive Secretary

Referred to USGS 6/22/51
Look up for additional balances
on 8 a-form [illegible]

THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

TUCSON MINING CO.
dma-1722x

REPORT

ON THE PROPERTY OF THE

SWASTIKA COPPER AND SILVER MINING COMPANY

OLIVE CAMP, PIMA MINING DISTRICT

PIMA COUNTY, ARIZONA

by

JOHN CARTER ANDERSON, E.M.

NOTE:

In connection with the following report covering the properties of the Swastika Copper and Silver Mining Company, made by MR. JOHN CARTER ANDERSON, we desire to point out it has always been the policy of this company to seek and to follow the best technical advice possible to obtain.

Mr. Anderson is a distinguished engineer and geologist whose opinions are highly regarded and sought after by the better mining interests of the southwest.

Mr. Anderson is a member of the society of Economic Geologists, a member of the Metallurgical Society of America, a member of the American Institute of Mining Engineers, a registered engineer in Arizona, and the holder of a certificate of Reciprocal Registration from the Arizona State Board of Registration for Engineers.

Note:

The Swastika Group of mines is now owned by the MINERAL BELT MINES, INC.

JOHN CARTER ANDERSON

Consulting Mining Engineer

Arizona Office:
90 North Church St.
Tucson, Arizona

REPORT

on the property of

SWASTIKA COPPER AND SILVER MINING COMPANY

Olive Camp, Pima County, Arizona

****

LOCATION and HOLDINGS:

The Swastika Group of 12 unpatented lode mining claims and fractions, including the Richmond (Linden), Emma E, Rich Hill, Alice, Glenn, West End, Beatrice, Horse Shoe, Republic, W. K., Flora, and Gem claims, is located at Olive Camp, 21 miles southwest from Tucson, at an elevation of about 3500 feet, and is reached by wagon roads from Tucson and from Sahuarita Station on the Tucson-Nogales Branch of the Southern Pacific, which is 8 miles east.

The five northern claims of the Group, the Rich Hill, Alice, W. K., Flora, and Gem Claims are at present bonded to other parties who have sunk an old shaft on the Alice to a depth of 165 feet and are now developing on the 150 foot level.

Olive Camp lies in relatively flat country, showing but a few low hills, with marked structural breaks on all sides, and is that part of the Pima Mining District lying between the San Xavier-Mineral Hill District on the north and Twin Buttes on the south. It is distinguished from those camps by the fact that it is almost wholly an area of igneous rocks while they are areas of sedimentary rocks intruded by igneous dikes and sills.

HISTORY:

A correct knowledge and interpretation of the history of Olive Camp is essential to any consideration of its future possibilities.

Like many another silver camp of the old days in Arizona, an authentic recorded history of the Camp is lacking and the total of its past production can be but approximated by a sifting out of the stories told by the old timers.

Fortunately, in the case of Olive Camp, though its days of prosperity are now nearly 30 years back, there remain in Tucson a number of solid, trustworthy men, the foundations of whose fortunates were laid in Olive Camp, including Messrs. Frank and Warren Allison, J. K. and Seward Brown and others, whose accounts may be accepted with confidence.

The Olive, the first mine located, now called the Olivette, was located in 1886 by Frank Allison, J. K. Brown, and another, and it is said that by 1887 there were 150 men leasing in the district and that shipments of ore were maintained continuously to the year 1893 when the falling prices of lead and silver closed the mines which, with the exception of the Richmond, have never since been worked.

The Richmond and Emma E., claims of the Swastika Group are said to have produced about $100,000.00 from shallow incline shafts and small stopes. In 1913 the main working on the Richmond was gutted by leasers who took out a considerable but unknown quantity of ore and left the mine as a leaser always does, with very little in sight. No serious attempt at development has ever been made and the greatest vertical depth reached in taking out this ore was 100 feet.

Endlining the Richmond to the east and on the same or related vein system is the Annette and next to it, the Olivette. Since starting this report, the writer has again talked with Mr. Seward Brown, the original owner of the Annette. He says that he took out $65,000 and left good ore in a winze at the bottom and in the end of a drift to the west. He also says that his brother, Mr. J. K. Brown, and Mr. Frank Allison and leasers, shipped from the Olive $750,000.00 and left ore in the bottom.

Still east of the Olivette on what is known now as the Wedge group, or Whitcomb Group, dump after dump shows the extent of the old work.

The Shumaker Group adjoining the Richmond on the south was another producer and a third of a mile southeast is the Prosperity Group with large dumps at several shafts, the deepest of which is said to be 310 feet on the incline. Other claims in the district also have records of production but the principal work and the greater part of the production centers in those here named.

There is no known record of production from any of these mines that can be verified, which is not strange, owing to the manner in which mines were worked with the number of leasers shipping irregularly as they got out sufficient tonnage of high-grade ore.

This ore is reported as running from 100 ounces to 300 ounces of silver per ton with upwards of 20% lead. The higher silver values are said to have come, as is to be expected, with those ores carrying grey copper rather than with the heavy galena ores.

The various claims, such as the Richmond, Olive, Wedge, and Prosperity, are reported as having produced from $100,000.00 to $750,000.00 or more each. Allison Brothers, who besides their own production ran a store and shipped ore for many of the leasers, claim a record of over $1,000,000.00 worth of ore shipped by them and estimate the production of the District at around $3,000,000.00.

As these statements are made by men of good standing, not now interested in the properties, it is fair to accord them consideration in estimating the past returns from the camp. From all the evidence at hand and from the number and size of the old dumps, the writer feels safe in assuming that the production for the district was in excess of the lower figure and not likely over the latter. Worked even in the careless manner in which they were certainly meant a good return for the amount of work done.

MINES IN ADJOINING DISTRICTS:

Equally important is a knowledge of the mines in the San Xavier-Mineral Hill District to the north and Twin Buttes to the south. These are contact and replacement bodies of base ores in limestone, but it is believed that the source of the mineralization in all the three camps is related and that deeper development in Olive Camp may lead to similar deposits which will be much larger and more permanent than the silver veins of the camp.

Chief among these mines are the following:

The Mineral Hill Consolidated, where a body of copper ore is being developed in garnet along a sill contact of granite between Limestone and quartzite, which is increasingly large on each deeper level with a body of mill ore from 100 to 200 feet wide on the 600, the deepest developed level. From the Vulcan, $300,000,00 worth of copper ore was taken through two old inclines which reached a vertical depth of about 300 feet. Increasing water which could not be handled through the old inclines, which reached a vertical depth of about 300 feet. Increasing water which could not be handled through the old inclines, which are now caved, shut this property down. A vertical shaft is being sunk to reopen the mine.

The San Xavier, nearest of the developed mines to the Richmond, has developed a big body of lead-zinc and copper ore to a depth of several hundred feet, proving it to be increasingly larger in depth. This property is owned by the Empire Zinc Co., a subsidiary of the New Jersey Zinc Company, and will undoubtedly be equipped with reduc-works and developed continuously when the policy of that Company requires further supplies of ore. These may be considered as real mines with assured futures. Other properties which have produced some ore, but which are not yet developed to the point of permanent mines, are the San Xavier Extension and the South San Xavier.

In the Twin Buttes, the Glance, Queen, Minnie, and Senator Morgan mines have in the past produced a total of several millions of dollars worth of copper ores from granite-limestone contact deposits, and present development on the Queen and North Star is blocking out large bodies of primary copper and copper-zinc ores which promise a still bigger future for the Camp.

GENERAL GEOLOGY OF THE OLIVE CAMP:

Unlike the San Xavier-Mineral Hill and Twin Buttes Districts where large bodies of copper and zinc-lead-copper ores are found in limestone, the silver veins of Olive Camp are found in a rhyolite porphyry, which at many points resembles and has often been mistakenly called quartzite. The original extent, thickness, and age of this formation is unknown, but it is believed to be a part of one of the early Tertiary flows.

The extreme north line of the rhyolite follows a general N. 70° E. break through the Gray Copper claim of the South San Xavier and the West Extension of San Xavier and San Xavier claims of the San Xavier property.

This contact is one of shearing rather than of a single strong fault and the porphyry, if not forming the hanging wall on the vein of the San Xavier, is not far in the hanging wall. Where seen on the surface, where the road passes by the shaft on the San Xavier, the contact has a steep dip to the south the same as the Paleozic limestones. In the underground workings of the South San Xavier, the contact where first cut, about 100 feet north of the shaft on the 150 foot level, is quite steep, but it is much flatter where it crosses the shaft between the 150 and 200 foot levels.

It is believed that limestone will be found below the porphyry over the whole area of Olive Camp but at what depth it is impossible to say, as the thickness of the porphyry is unknown. South of this contact the limestone is again faulted to the surface on the Ruby, Hoosier, and Vienna claims. Here again the lime has a south dip and is in contact with the porphyry which extends then unbroken, save by later igneous intrusions, for about three miles south, where limestone hills and granite flats again limit it. To the east is uplifted limestone of Helmet Peak (mountain) and the wash covered flats which extend down to the Santa Cruz river.

On the west is a granite flat, the actual contact being covered by recent wash.

Throughout the rhyolite area, particularly in the neighborhood of the veins, there has been a slight dissemination of pyrite, some of which was sufficiently cupriferous to stain the walls of the old mine workings with copper salts.

Pieces of the wall rock taken from any of the mines at depths below surface oxidation show a few tiny crystals of pyrite. It is the oxidation of this iron which has seamed and rusted the porphyry in surface exposures.

On the Rich Hill claim of the Swastika Group, a 165 foot shaft enters intrusive granite identical in character with that responsible for the mineralization in the San Xavier-Mineral Hill and Twin Buttes districts.

Where cut in the shaft this granite has an east-west strike and a very flat dip to the south, while the main veins of the camp dip to the north. In the shaft the contact shows some alteration of the porphyry and a little sugar quartz but no mineralization. Laterial work from the station on the 150 foot level, following a streak of pyrite with a little chalcopyrite and galena having a strike N. 70° E. and a dip to the north, is now showing veinlets and bunches of galena and copper-iron sulphides and zones of alteration in the porphyry, which seems to have taken a south dip at about the same angle as the granite. The work at this point is probably but a few feet distant from the granite cut in the shaft.

Also, intruding the rhyolite and best seen between the mines and the north line of the rhyolite are tongues of adnesite porphyry and a similar but more coarsely crystalline rock which are younger than the intrusive granite. At surface no connection can be traced between these andesite dikes and the mineralization. However, the dump at the Alpha and one of the dumps at the Olivette, that of the shaft on the north-south vein which crosses the main east-west vein, show some of the andesite.

Deeper development in the district must prove the relation of these two intrusives to the mineralization, but the writer is very sure that one or both of them are responsible for the ore deposition. As the granite has been so clearly proven to be associated with the origin of the ore bodies in the adjacent limestone areas, it is expected that a similar relation exists here.

The presence of grey copper in the ores from the Olivette and the Alpha where andesite intrusions have been found, and the presence of galena only in the veins on the Swastika group, where granite has been found, may indicate that both of them were mineralizers.

The writer first became interested in the possibilities of the Olive Camp when making a study of the geology of one of the mines in the San Xavier-Mineral Hill District. Since then he has spent much time in a study of Olive Camp to determine, if possible, what chances exist for finding larger bodies of ore at depth. This study has strengthened his belief that all veins of Olive Camp owe their origin to the intrusion of underlying formations by granitic or porphyritic rocks related to those which mineralized the limestone in the adjacent districts. The siliceous porphyry being more uniform in structure, harder and less yielding than the limestones, was cracked and fissured rather than penetrated by these intrusions and in these cracks and fissures was localized the travel of the mineralizing solutions which accompanied the intrusions, and so were formed the silver veins of the Camp.

TUCSON MINING CO.

Following the progression of mineralization which has been observed by the writer in his study of a large number of mines and mining districts in southwestern Arizona, it is his belief that if these veins are followed down below their present workings there will be a gradual change from lead-silver ores of the past to ores containing more and more zinc and finally to copper. If these veins continue on down to an intrusive contact, as it is believed they will, they may be expected to change in strike and dip to conform with the strike and dip of the intrusive and will then continue on down as contact veins. If in depth, limestone is found under the porphyry, as is the firm belief of the writer that there will be at some depth, there are good reasons to expect that copper deposits will have been developed on the contact with the intrusive, similar to the big contact copper deposits on either side of the camp. Herein lies, the writer believes, the real future of the district.

Unquestionably the porphyry is older than the uplift of the sediments, as it is intruded by the same granite which elsewhere in the district intruded and uplifted the limestone.

While there is yet no definite evidence to prove it, it is thought to be a part of one of the early Tertiary flows which covered the country. While the crystallization of the component minerals, especially the quartz, is better developed than in most of the rhyolite flows, it nowhere shows the coarsely crystaline texture to be expected in a mass of plutonic rock of this extent, and on the hilltops it shows the characteristic felsitic texture of a surface flow.

The general geological history of this part of Arizona can perhaps best be pictured by conceiving of a vast extent of sedimentary formations of Paleozic and Mesozoic age, in places wholly or in part eroded away, then covered by a succession of andesitic and rhyolitic flows in early Tertiary time, covering the country as an ice sheet covers the northern waters in winter. Into this cover of sediments and flows was intruded in Tertiary time a batholitic mass of granite which broke up just as in the spring break up, the thick sheet of ice is broken up and engulfed by the water. Thus you see great blocks of the older formations floating as in a sea of granite in all directions and dipping at all angles, sometimes near together, sometimes widely separated by broad stretches of granite, sometimes exposing one of the lower beds of the series on surface and sometimes all but submerged in the granite. Subsequently faulting and erosion has carved the country into high and low relief and filled many a broad valley with a great thickness of wash which still further obscures the correlation of the formations in one camp with those in another.

In the case of the sedimentary rocks, which on fossil and lithological evidence can be studied and named and an age relation carried through and rocks of the same age recognized in many widely separated exposures. Much valuable work has been done along this line by Dr. Ransome, of the U. S. Geological Survey, in his paper,

"Some Paleozoic Sections in Arizona and their Correlation," and by others, but no attempt has ever been made to work out the much harder problem of a correlation of the igneous flow rocks which covered these sediments. The writer has not been able to find a single exposure of the rhyolite of Olive Camp where it is in other than fault contact with limestone which bound it on three sides, but feels quite sure that it is a part of these Tertiary flows, probably a thick one, and that at some depth below the present surface will be found the same series of Paleozoic sediments which abut its margins.

It has been widely believed to be the rule that the big end of an ore deposit was up and that a vein of good width and value could normally be expected to decrease in size and value with depth. However, the writer's observations and studies in southwestern Arizona are teaching him to look for exactly the opposite under certain geological conditions.

During the period of ore deposition which followed the intrusion of the granite batholith, extensive development of great fissure veins such as are found in other mining districts seem to have been lacking. Instead, contact and replacement bodies were formed in the intruded rocks near the intrusive granitic rocks or their related porphyritic offshoots. Travel of mineralizing solutions which accompanied these intrusions was confined to the contacts or to minor cracks and fissures and not to one or more main trunk channels such for instance as the big fault fissure gold veins in the flow rocks around Oatman.

Dikes and sills of porphyry reached far higher in the intruded rocks than the main contact and thus opened a way of escape for the solutions. Owing to the quick cooling of these dikes and sills, however, the upper, thinner portions were not open to the circulation of mineralizing solutions long enough for any large deposits to form on their contacts, nor was the force of the intrusion at its upper limit great enough to open big fractures in the intruded rocks. Some solutions carrying the lower temperature minerals, might, however, reach this high before their passage was sealed off, and branching off through such minor fractures as were developed, form small lead-silver veins. At greater depth and under slower cooling conditions, where the channels to the main magmatic mass below remained open a longer time, there was a long continued ore deposition, in favorable formations the solutions spreading farther and farther from the contact at greater depth.

The resultant ore deposit may never have reached to the present surface, or may be represented by surface outcrops almost insignificant in appearance and value. The outcrops of this type of deposit will vary in attractive appearance in proportion to the depth to which erosion has uncovered them. But at any point between the smallest of ore and the main contact below, if the structural conditions and enclosing wall rocks are favorable to the deposition of ores it is

probable that the big end of the deposit is down. A good illustration of this type of deposit is found at the Mineral Hill Consolidated where an intrusive sill of granite between quartzite and lime has formed a contact deposit of copper in the limestone which is much bigger and more continuous on each deeper level.

On surface there are scattering out-crops of copper carbonates below which shoots of carbonate ore were worked out to the 300 foot level without finding any big or continuous shoot of ore. On the 500 foot level, large bodies of garnet-chalcopyrite ore were found on top of the granite sill and on the 600 foot level, the garnet zone is still bigger. A cross-section of the ore deposit would be two inverted wedges. One of granite tapering out thinner and thinner as it approaches the surface and a similar one of ore.

MINERALIZATION:

The ores of the district as so far developed are of two classes: those silver-lead ores carrying their silver values in association with galena, and those in which the silver values are associated with grey copper. This second class of ore carries the higher silver values, shipments running up to 300 ounces of silver per ton, being reported. The straight galena ores are not known to have carried higher than 100 ounces silver per ton. The galena ores may be expected to carry less silver in depth, while the silver value in the veins carrying gray copper may persist to somewhat greater depths. Zinc blende is beginning to show in the ore from the bottom of the Richmond, as is also a little chalcopyrite or cupriferous pyrite; and according to Mr. Seward Brown, the bottom of the Annette and Olive beins was showing some zinc.

The zonal arrangement of the different metals in veins has been noted by a number of students of ore deposits in different regions, and the observations of the writer are continually adding proof to the zonal theory of the deposition of metals in southwestern Arizona. Of the commonly mined metals in Arizona the main contacts show, as a rule, clean copper-iron ores. At some distance above the contact the admixture with zinc begins, and still higher the ore will likely contain lead-zinc-copper, then lead-zinc, and in the more superficial veins, lead-silver. The vertical extent of these zones is variable, and there is usually a considerable overlapping of one zone with the next higher, which has given rise to the complex ores which are characteristic of many districts in this region. However, with few exceptions, it is safe to predict that the superficial lead-silver veins, from which the old timers took greater or less amounts of shipping ore, will have a limited vertical range, and that deeper development will find first zincy lead ores and finally copper ores. These ores will be lower in grade than the surface ores, but the increase in size of the deposit may far more than offset the lowering in grade.

The mines that are paying the great dividends in these days are the mines with large bodies of low grade ores, and in the opinion of the writer, the possibilities of silver veins like those of Olive Camp should not be considered as dependent on the finding of more and larger bodies of silver ores that the old timers took, but as to whether or not they are leaders to a large deposit of base metal ores. It is of course possible for properly directed lateral work byond the limited old workings to find additional shoots of the same silver ores, and once a working shaft is connected with the bottom of the old workings on the Richmond, drifts should be run as long as there is a vein to follow, even though the ore streak is very small, for the old timers found their ore by following the vein though it pinched down to but half an inch of ore.

VEIN SYSTEM:

The original vein of the Richmond has nearly an east-west strike and a dip of 25 to 50 degrees to the north, flattening somewhat in depth. This, or a parallel vein continues east and west through the endlining claims for a total distance of perhaps a mile, and several different ore shoots have been worked on the different claims. In the main incline of the Richmond it has well marked walls from 2 to 6 feet apart with vein filling of crushed country rock through which run streaks and veinlets of galena ore. The widest of these streaks now to be seen in the mine, in an east drift on the 90 foot level, is but 4 inches wide but it is reported, and is indicated by the old filled stopes, that these streaks would open out to as much as 3 feet in width. This seems to have been characteristic of the ore shoots in all of the old mines. A similar and probably related vein is opened on the Emma E. Claim, endlining the Richmond on the west, by a number of small inclines, which from the dump, must have followed one of these ore shoots.

In the main incline on the Richmond this east-west vein is cut by branching fractures of varying strike and dip, some of which show galena. It appears that there may be a series of small branching and intersecting fissures any of which may contain ore.

On the bottom level, about 80 feet northwest of the shaft is a 50 foot winze. Above this is an old partly filled stope about 40 feet long and extending at least that far above the level. It is here that the leaser in 1913 is said to have taken out the ore he shipped. The vein in the stope is quite flat and where the winze was sunk, is crossed by another break dipping about 55° which is the one followed by the winze. The main vein dips off in the hanging wall of the winze. Small stringers of galena show in both veins, but at this point are not of workable size.

Early in this year, the winze was sunk to 50 feet below the level, and 38 feet below the level a flat slip with a slight dip to the southwest crossed the winze, cutting off the slips on which it was sunk. Below this, all four sides of the winze showed low grade ore. The writer saw this showing when the winze was about 18 inches below the slip, and at that time noted with great interest the change and

manner in which the decending slips seemed to cut off. Above the slip is the north dipping vein with a little quartz and galena, below it is largely quartz and some galena. The winze continued in this ore for about 12 feet, cutting off in the bottom on another flat slip. All sides of the winze were in ore and some very good pieces of galena were taken out, but with the lower slip, water came into the shaft, rising nearly to the upper slip. This shut down the work as there was no way to handle the water.

The writer regrets very much that he did not have an opportunity to see the bottom of the winze before it was flooded and note exactly the change that came in below the ore for this is apparently a flat vein, probably conforming in strike and dip to the underlying property intrusion. This would have done much to furnish the information which is essential to a proper location of any new work. While the ore is not of shipping grade, it is mill ore and apparently a much stronger vein than those originally worked. Its encounter greatly increased the writer's opinion of the future possibilities of the property and confirmed his belief that the property warrants the expenditure of the amount necessary to prove it. It strengthens his theory as to the manner of formation of these veins, as does in a fuller measure, the finding of the intrusive granite in the bottom of the Rich Hill shaft.

About 230 feet northwest of this incline is a vertical shaft 65 feet deep, 4 ft. x 6 ft. in the clear and partly timbered, which was sunk as a prospect shaft by leasers. A little above the bottom, it cuts an east-west vein showing manganese stained quartz with some lead-silver values. This is probably a parallel vein in the hanging wall of the one in the incline and like it, may open out to workable size and value at some points. It appears to be widening fast in the few feet in which itis exposed.. None of the veins of Olive Camp have a strong outcrop, and while a number of ore shoots have been opened along a certain general strike, one cannot on surface follow on the vein from one end to the other end, but it is believed that at depth they will all be found to be in some manner connected.

On the Rich Hill claim several old cuts and shallow shafts open a well marked fault with a strike of about N. 70° E. and a dip to the north, showing some quartz and mineralization. The same break is opened again on the Alice claim to the east by a shaft originally 70 feet deep with small stope drifts at about 40 feet and at bottom. This work shows some quartz and a little mineralization but the vein is faulted just below 70 feet by a fault with a flat dip to the west. The present leasers have sunk this inclined shaft to 165 feet, cutting intrusive granite at 155 feet. In the shaft the upper contact of the granite has a flat dip to the south and a nearly east-west strike. On the 150 foot level they have cross-cut north and south in badly shattered rhyolite with tiny seams of pyrite and

occasionally of galena through it. About 40 feet south of the shaft a drift turns N. 70 ° E. following a north dipping seam of pyrite beyond which small bunches and seams of phyrite and galena with a little chalcopyrite apparently dipping to the south are coming in. Some of these bunches of galena are very solid and heavy and of high grade. Zones of alteration in the rhyolite have a flat dip to the south and about like that of the granite in the shaft and probably in sympathy with it. The granite contact cannot be far distant and it appears as though mineralization was turning south to follow the contact. A winze is being started at this point and its progress will be watched with great interest.

RECOMMENDATIONS FOR DEVELOPMENT:

It is out of the question to carry on new development through the old incline. It would entail an added cost of mining that would soon exceed the cost of sinking a working shaft. The 65 foot vertical shaft might be continued but it is 190 feet west of the bottom of the winze and for a connection, would take 100 feet of sinking and 190 feet of cross-cutting. It would probably encounter the vein before going that distance, but our present knowledge of the way the vein is going is so limited that it might easily miss it until driven to a connection. And it is very probable that it would be found to be so located with respect to the ore that it would require excessively long cross-cuts on lower levels. If this shaft were deepened, it would have to be stripped and retimbered to make it 4 ft. x 7 ft. in the clear as with water to be handled, it is too small for the work to be done.

The few feet of sinking that was done in the winze last winter did more to predict a future for the property than all the work ever done in Olive Camp, and a few more feet of work there may easily do as much good in guiding the real work of development.

When the further development of this property is undertaken, it will be necessary to make provision for the handling of the water for it is certain that water must be handled in the sinking. The amount of water met in any of the old mines was small and can be easily handled in a vertical shaft with modern equipment. The greatest flow known in the Camp is that met by Mr. Charles Taylor on the 200 foot level of the Bonanza, the claim just north of the Richmond. In his recent work on that claim, he has had to handle a flow of about 40 gallons a minute from the 200 foot level. A small gas engine driven generator to furnish power for electric pumping will be the least expensive and most efficient provision for pumping water.

If, at that time, this equipment be utilized to get the water out of the winze to permit the doing of a little more work there with a windlass, or preferably by raising out to surface above the winze and then doing a little more work on the vein, the cost would be saved times over by determining the correct location of the new shaft. Not over 70 feet of raising will be necessary to connect this winze with the surface, and it could be done without any stops for hoisting and letting the muck fill up the winze and the old stopes and drifts on

the bottom level. Then the winze could be cleaned out rapidly, using the 8 H.P. gasoline hoist belonging to the property, then raise timbers up and use as a working shaft until enough was learned to show where the new shaft should be sunk.

As soon as a little additional work in the bottom of the winze has determined the question of the strike and dip of the vein there discovered and whether or not the north veins end on that vein or continue below it, a new shaft should be started to develop this ore showing at depth. At the present stage of development, a one and one-half compartment shaft 4 ft. x 7 ft. in the clear and timbered with 6" x 6" timbers is amply large to test the ground with the least expense and it is big enough to handle any high-grade ore that may be found in extending the old workings. It should be planned, located, and equipped to go at least 500 feet, with connections with the vein at 100 foot levels. On the correct location of the shaft will depend the distances to be cross-cut on the several levels and a poorly located shaft may easily entail excessive expense in cross-cutting.

Coincidentally with the deeper development of the property as soon as connection is made with the bottom of the old workings, drifts should be started to find shoots of high-grade ore which might easily pay very well for the work done.

CONCLUSIONS:

As with everything else which is under development in this region, the possibilities of the Swastika property cannot be judged nor measured by the size or value of the ore exposures left by old leasers who worked the mines for the high-grade silver ores. There is the possibility of finding other shoots of ore than those formerly worked, by well directed development, and in a property like the Swastika, where so small a proportion of the length of the veins have been prospected, and where the continuation of this vein system on adjoining property yielded such large returns, the chance for finding profitable shoots of high-grade ore well warrant their development.

The real future of the property lies in finding in depth of larger and more permanent bodies of base ores. The writer has made a long study of the geological conditions governing the formation of such deposits in southwestern Arizona and has tried in this report to clearly set forth his reasons for believing that the lead-silver veins of this property may lead down to them.

He believes therefore, that the development of this property is a good mining speculation with possibilities of profit more than warranting the risk of development.

Faithfully submitted,

(signed)
John Carter Anderson

Tucson, Arizona
August 30th, 1920

Copy: original on file

To be attached to form 103 - TIT-for-TAT CLAIM

1. - A limited partnership

2. - General Partner:
G. Warren Hassler, 665 S. Hobart Blvd., Los Angeles, Calif.

Limited Partners:

Jane Gleason McNeil, 192 S. Commonwealth, Los Angeles, Calif.	$1000
C. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1000
Mrs. C. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1000
Oberg Bros. Const. Co., 401 W. Florence Blvd., Inglewood, Calif.	1000
Charles C. Newkirk, Jr. 6311 Fulton St., Van Nuys, Calif.	1000
DeSoto Book, 1120 N. Las Palmas Ave., Los Angeles, Calif.	1500
Arthur J. Larson, 732 South Adams, Glendale, Calif.	1000
Harold C. Whitlessey, 525 N. Normandie Ave., Los Angeles, Calif.	5250
Mrs. S. Paul Ward, 605 Mission St., S. Pasadena, Calif.	1000
Theo. Nowak, Jr., 937 S. 3rd Ave., Los Angeles, Calif.	1000
Clinton C. Campbell, 1176 N. Holliston Ave., Pasadena, Calif.	1000
Nathan Stein, 2405 22nd St., Santa Monica, Calif.	1000
Dr. Louis Einzig, 9730 Wilshire Blvd., Beverly Hills, Calif.	1000
Kenneth D. Caldwell, 1021 Stone Canyon Rd., W.Los Angeles, Calif.	1000
Sam Firks, 937 S. Mansfield Ave., Los Angeles 36, Calif.	833.34
Irving Feinteeh, 9500 Cresta Drive, Los Angeles, Calif.	833.33
Lou Towne, 11962 Foxboro Drive, Los Angeles, Calif.	833.33
Max Goldring, 10440 Wyton Drive, Los Angeles, Calif.	1000
Richard Miller, 5615 West Pico Blvd., Los Angeles 19, Calif.	8750

3. - Not a corporation

4. - Mining experience together with general business experience of:

(a) Mr. Warren Hassler, acting for Tucson Mining Co. - 15 years
(b) Mr. Sam Coldren, resident superintendent in charge - 27 years Seventeen of which have been as an operating mining engineer and executive. Member A.I.M.E. 1957

5. - Lessee

6. - No claims against the property

7. - Letter attached

8. - No debts. Current payroll being handled by private funds.

9. - Prepared to invest $50,000.00

10. - (a) TIT-FOR-TAT CLAIM. Comprised of 1 claim on which three shallow shafts show mineralization but no ore of commercial grade and quantity.

(b) Within the N.W. Quarter, Sec. 11, Tns. 17S. Rng 12E G. and S.R. B. & M., Pima County, Arizona.

11. - Known as the TIT-FOR-TAT.

12. - The Tucson-Twin Buttes Highway passes through the [redacted]. This highway connects the property with a spur of the S.P. railroad at Sahuarita. Ore is being hauled from the adjoining San Xavier Mine to the mill at Sahuarita over this road daily.

13. - Water is available at N.E. section of the property being the pumped discharge from San Xavier Mine. Power is available from a high tension line which traverses the westerly extensions of the property.

14. - One small toolroom and change house.
One small dynamite magazine.

15. - The ore can be treated in the mill of the Eagle-Pitcher Mining Co. located a distance of 9 miles by truck highway from the property.

It may also be shipped by rail from this point to the A.S.R. Co's mill at Deming, New Mexico, or to the El Paso Smelter.

16. - (a) Three shafts have been sunk on the property, the deepest (at present time must be retimbered in order to enter) reputedly about 400 feet in depth.

The dumps indicate several mineralized areas were penetrated.

There has been no known production other than shipment of surface float ores, and small quantities of lead and zinc sulphides encountered during the work done for annual assessment.

Lack of funds reputedly caused suspension of work.

(b) The San Xavier Mine operated by the Eagle-Pitcher Mining Co. is currently producing between 300 and 400 tons per day of zinc-lead-silver ore.

(c) SEE HELMET PEAK APPLICATION

17. - The property is not in production

18. - There are no known ore reserves of commercial grade.

19. - Several mineralized veins traverse the property.

20. - Exploration for lead and zinc ores will be conducted.

21. - The proposed work will consist of:

(a) Complete geological mapping by a qualified geologist. Estimated time required -- 1 week.

(b) The drilling by diamond or churn drill of more or less twelve holes to a depth of 800 feet each.

(c) Re-timbering the vertical shaft to the 200' level and driving an X-cut southerly a distance of 300' to explore the vein structure apparent on the surface.

Estimated time required for this work -- 10 months.

22. - Mineralization of surface outcrops and proximity to prove ore deposits.

Report on area of which this property is a part, is attached.
Report by R. J. Leonard.

23. - (a) Estimated expense in connection with geological mapping preliminary to drilling program (21-a) including assistants' salaries $1,000

Churn or diamond drilling — to be done by contract at an estimated cost of

$7.50 per foot for 4800 feet and	$36,000
$8.50 per foot for 4800 feet or a	40,800
Total contract cost of	$76,800

Retimbering of the vertical shaft (21-c)

45 sets @ $80.00 per set placed	$ 3,600

X-cutting 300 ft. to explore the mineralized structure (21-e)

@ $17.00 per foot	$ 5,100

A total of $86,500.00 for 21-a-b-c

(b) Supervision to consist of:

One resident engineer in charge - per year - - - - - - - -	$ 8,000
One assistant engineer - - - - - per year - - - - - - - -	4,000
One mine foreman @ $13.00 per day	

(c)

One office and warehouse bldg.	$ 1,200
One change room for employees	600
One hoist house	800
One shaft head frame	2,000
	$ 4,600

(d) Included in 23-c

(e)

One mine hoist	$ 2,500
One 210 c.f.m. compressor	3,000
One rock drill & equipment	500
	$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-c

(i) Cost of sub-station and power line . . . . . $ 8,000

24. - Time schedule:

Geological mapping - 1 week	$ 1,000

Drilling will depend upon availability of contractors and will vary if work is done by churn drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each	$ 76,800

Re-timbering vertical shaft.
Estimated: 2 sets placed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 8 timbers with hanging rods. Placed . . . . . $ 3,600

X-cutting 300 ft. from shaft @ 4' per day (21-e) - 2½ months work incidental to above 1/2 mo. . . . . $ 5,100

Supervision - 10 months	$ 12,980
	$ 98,480
Surplus for unexpected contingencies	1,520
	$100,000

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14. - One small toolroom and change house.
One small dynamite magazine.

15. - The ore can be treated in the mill of the Eagle-Pitcher Mining Co. located a distance of 9 miles by truck highway from the property.

It may also be shipped by rail from this point to the A.S.R. Co's mill at Deming, New Mexico, or to the El Paso Smelter.

16. - (a) Three shafts have been sunk on the property, the deepest (at present time must be retimbered in order to enter) reputedly about 400 feet in depth.

The dumps indicate several mineralized areas were penetrated.

There has been no known production other than shipment of surface float ores, and small quantities of lead and zinc sulphides encountered during the work done for annual assessment.

Lack of funds reputedly caused suspension of work.

(b) The San Xavier Mine operated by the Eagle-Pitcher Mining Co. is currently producing between 500 and 400 tons per day of zinc-lead-silver ore.

(c) SEE HELMET PEAK APPLICATION

17. - The property is not in production

18. - There are no known ore reserves of commercial grade.

19. - Several mineralized veins traverse the property.

20. - Exploration for lead and zinc ores will be conducted.

21. - The proposed work will consist of:

(a) Complete geological mapping by a qualified geologist. Estimated time required — 1 week.

(b) The drilling by diamond or churn drill of more or less twelve holes to a depth of 800 feet each.

(c) Re-timbering the vertical shaft to the 200' level and driving an X-cut southerly a distance of 300' to explore the vein structure apparent on the surface.

Estimated time required for this work — 10 months.

22. - Mineralization of surface outcrops and proximity to prove ore deposits.

Report on area of which this property is a part, is attached.
Report by R. J. Leonard.

23. - (a) Estimated expenses in connection with geological mapping preliminary to drilling program (21-a) including assistants' salaries $1,000

Churn or diamond drilling — to be done by contract at an estimated cost of

$7.50 per foot for 4800 feet and	$36,000
$8.50 per foot for 4800 feet or a	40,800
Total contract cost of	$76,800

Retimbering of the vertical shaft (21-e)
45 sets @ $80.00 per set placed . . . . . $ 3,600

X-cutting 300 ft. to explore the mineralized structure (21-e)
@ $17.00 per foot . . . . . $ 5,100

A total of $86,500.00 for 21-a-b-e

(b) Supervision to consist of:

One resident engineer in charge - per year - - - - - - - -	$ 8,000
One assistant engineer - - - - - per year - - - - - - - -	4,000
One mine foreman @ $13.00 per day	

(c)

One office and warehouse bldg.	$ 1,200
One change room for employees	600
One hoist house	800
One shaft head frame	2,000
	$ 4,600

(d) Included in 23-c

(e)

One mine hoist	$ 2,500
One 210 c.f.m. compressor	3,000
One rock drill & equipment	500
	$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-e

(i) Cost of sub-station and power line . . . . . $ 8,000

24. - Time schedule:
Geological mapping - 1 week . . . . . $ 1,000

Drilling will depend upon availability of contractors and will vary if work is done by churn drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each . . . . . $ 76,800

Re-timbering vertical shaft.
Estimated: 2 sets placed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 6 timbers with hanging rods. Placed . . . . . $ 3,600

X-cutting 300 ft. from shaft @ 4' per day (21-e) - 2½ months work incidental to above 1/2 mo. . . . . $ 5,100

Supervision - 10 months . . . . . $ 12,000

$ 98,480
Surplus for unexpected contingencies 1,520
$100,000

To be attached to Form 103 - TIT-for-TAT CLAIM

1. - A limited partnership

2. - General Partner:
G. Warren Hassler, 665 S. Hobart Blvd., Los Angeles, Calif.

Limited Partners:

Jane Gleason McNeil, 192 S. Commonwealth, Los Angeles, Calif.	$1000
O. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1000
Mrs. O. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1000
Oberg Bros. Const. Co., 401 W. Florence Blvd., Inglewood, Calif.	1000
Charles C. Newkirk, Jr. 6311 Fulton St., Van Nuys, Calif.	1000
DeSoto Bock, 1120 N. Las Palmas Ave., Los Angeles, Calif.	1500
Arthur J. Larson, 732 South Adams, Glendale, Calif.	1000
Harold C. Whitlesey, 525 N. Normandie Ave., Los Angeles, Calif.	3250
Mrs. S. Paul Ward, 605 Mission St., S. Pasadena, Calif.	1000
Theo. Nowak, Jr., 937 S. 3rd Ave., Los Angeles, Calif.	1000
Clinton C. Campbell, 1176 N. Holliston Ave., Pasadena, Calif.	1000
Nathan Stein, 2405 22nd St., Santa Monica, Calif.	1000
Dr. Louis Einzig, 9730 Wilshire Blvd., Beverly Hills, Calif.	1000
Kenneth D. Caldwell, 1021 Stone Canyon Rd., W.Los Angeles, Calif.	1000
Sam Firks, 937 S. Mansfield Ave., Los Angeles 36, Calif.	833.34
Irving Feintech, 9500 Cresta Drive, Los Angeles, Calif.	833.33
Lou Towne, 11962 Foxboro Drive, Los Angeles, Calif.	833.33
Max Goldring, 10440 Wyton Drive, Los Angeles, Calif.	1000
Richard Miller, 5615 West Pico Blvd., Los Angeles 19, Calif.	8750

3. - Not a corporation

4. - Mining experience together with general business experience of:

(a) Mr. Warren Hassler, acting for Tucson Mining Co. - 15 years
(b) Mr. Sam Coldren, resident superintendent in charge - 27 years Seventeen of which have been as an operating mining engineer and executive. Member A.I.M.E. 1937

5. - Lessee

6. - No claims against the property

7. - Letter attached

8. - No debts. Current payroll being handled by private funds.

9. - Prepared to invest $50,000.00

10. - (a) TIT-FOR-TAT CLAIM. Comprised of 1 claim on which three shallow shafts show mineralization but no ore of commercial grade and quantity.

(b) Within the N.W. Quarter, Sec. 11, Tns. 17S. Rug 12E G. and S.R. B. & M., Pima County, Arizona.

11. - Known as the TIT-FOR-TAT.

12. - The Tucson-Twin Buttes Highway passes through the property. This highway connects the property with a spur of the S.P. railroad at Sahuarita. Ore is being hauled from the adjoining San Xavier Mine to the mill at Sahuarita over this road daily.

13. - Water is available at N.E. section of the property being the pumped discharge from San Xavier Mine. Power is available from a high tension line which traverses the westerly extensions of the property.

14. - One small toolroom and change house.
One small dynamite magazine.

15. - The ore can be treated in the mill of the Eagle-Pitcher Mining Co. located a distance of 9 miles by truck highway from the property.

It may also be shipped by rail from this point to the A.S.R. Co's mill at Deming, New Mexico, or to the El Paso Smelter.

16. - (a) Three shafts have been sunk on the property, the deepest (at present time must be retimbered in order to enter) reputedly about 400 feet in depth.

The dumps indicate several mineralized areas were penetrated.

There has been no known production other than shipment of surface float ores, and small quantities of lead and zinc sulphides encountered during the work done for annual assessment.

Lack of funds reputedly caused suspension of work.

(b) The San Xavier Mine operated by the Eagle-Pitcher Mining Co. is currently producing between 300 and 400 tons per day of zinc-lead-silver ore.

(c) SEE HELMET PEAK APPLICATION

17. - The property is not in production

18. - There are no known ore reserves of commercial grade.

19. - Several mineralized veins traverse the property.

20. - Exploration for lead and zinc ores will be conducted.

21. - The proposed work will consist of:

(a) Complete geological mapping by a qualified geologist. Estimated time required -- 1 week.

(b) The drilling by diamond or churn drill of more or less twelve holes to a depth of 800 feet each.

(c) Re-timbering the vertical shaft to the 200' level and driving an X-cut southerly a distance of 300' to explore the vein structure apparent on the surface.

Estimated time required for this work -- 10 months.

22. - Mineralization of surface outcrops and proximity to prove ore deposits.

Report on area of which this property is a part, is attached.
Report by R. J. Leonard.

23. - (a) Estimated expense in connection with geological mapping preliminary to drilling program (21-a) including assistants' salaries $1,000

Churn or diamond drilling -- to be done by contract at an estimated cost of

$7.50 per foot for 4800 feet and	$36,000
$8.50 per foot for 4800 feet or a	40,800
Total contract cost of	$76,800

Retimbering of the vertical shaft (21-c)
45 sets @ $80.00 per set placed . . . . . $ 3,600

X-cutting 300 ft. to explore the mineralized structure (21-c)
@ $17.00 per foot . . . . . $ 5,100

A total of $86,500.00 for 21-a-b-c

(b) Supervision to consist of:

One resident engineer in charge - per year - - - - - - - -	$ 8,000
One assistant engineer - - - - - per year - - - - - - - -	4,000
One mine foreman @ $13.00 per day	

(c)

One office and warehouse bldg.	$ 1,200
One change room for employees	600
One hoist house	800
One shaft head frame	2,000
	$ 4,600

(d) Included in 23-c

(e)

One mine hoist	$ 2,500
One 210 c.f.m. compressor	3,000
One rock drill & equipment	500
	$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-c

(i) Cost of sub-station and power line . . . . . $ 8,000

24. - Time schedule:
Geological mapping - 1 week . . . . . $ 1,000

Drilling will depend upon availability of contractors and will vary if work is done by churn drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each . . . . . $ 76,800

Re-timbering vertical shaft.
Estimated: 2 sets placed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 8 timbers with hanging rods. Placed . . . . . $ 3,600

X-cutting 300 ft. from shaft @ 4' per day (21-c) - 2½ months work incidental to above 1/2 mo. . . . . $ 5,100

Supervision - 10 months . . . . . .

Surplus for unexpected contingencies . . . . . .
TOTAL . . . . . .

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. dmu 1722 X

Date received 6-25-51

Participation

Department of the Interior
Defense Minerals Administration
JUN 25 1951
Executive Secretary

Name and address of applicant

Green Mining Co.
250 Nelson Bldg.
Green, Arizona.

Date

FILL IN THIS BLOCK

Date of application June 18th, 1951 Estimated cost $100,000.00

Mineral or metal Lead-Zinc-Copper Percentage of Government participation 50%

Location of mine Pima Mining District
PIMA COUNTY, ARIZONA.

Date of filing MF-100 May 29, 1951 DMA Docket Number, if available

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.

(*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.

*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.

*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.

*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.

15. State in detail how the ore could be shipped and how and where milled.

*16. History:

(*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.

(*b*) State briefly the known history and production of adjoining and neighboring properties.

(*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

*17. Production:

(*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)

(*a*) Describe the ore or mineral deposits briefly.

(*b*) Submit available maps and assay data.

(*c*) Give estimated tonnage and grade of each class of ore reserves.

19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?

21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

NOTE.—The Government will not participate in a project that will require more than 2 years to complete.

22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:

(*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.

(*b*) Supervisors, by numbers and positions, with salaries of each.

(*c*) Cost of necessary repairs to existing facilities, structures, and buildings.

(*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.

(*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.

(*f*) Cost of rental for equipment which the operator proposes to rent.

(*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.

(*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.

(*i*) Cost of power, water, utilities, and any other items not provided for above.

24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co. (Name of company) — By G. Wasson Hassler (Signature of authorized official)

June 20 1951 (Date) — General Partner (Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. dma 1722 X

Date received 6-25-51

Participation

Tucson Mining Co.
350 N. Stone Ave.
Tucson, Arizona.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
Washington
JUN 25 1951
LANDON F. SPROUL
Executive Secretary

Name and address of applicant

Date June 18th, 1951

FILL IN THIS BLOCK

Date of application June 18th, 1951 Estimated cost $100,000.00

Mineral or metal Lead-zinc-Copper Percentage of Government participation 50%

Location of mine Pima Mining District
PIMA COUNTY, ARIZONA.

Date of filing MF-100 May 29, 1951 DMA Docket Number, if available

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.

    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

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*11. State the present and former names of the property, if any.

*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.

*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.

*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.

15. State in detail how the ore could be shipped and how and where milled.

*16. History:

    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.

    (*b*) State briefly the known history and production of adjoining and neighboring properties.

    (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

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	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)

    (*a*) Describe the ore or mineral deposits briefly.

    (*b*) Submit available maps and assay data.

    (*c*) Give estimated tonnage and grade of each class of ore reserves.

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THE EXPLORATION

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21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.

22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:

    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.

    (*b*) Supervisors, by numbers and positions, with salaries of each.

    (*c*) Cost of necessary repairs to existing facilities, structures, and buildings.

    (*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.

    (*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.

    (*f*) Cost of rental for equipment which the operator proposes to rent.

    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.

    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.

    (*i*) Cost of power, water, utilities, and any other items not provided for above.

24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co.
(Name of company)

By G. Warren Hassler
(Signature of authorized official)

June 20 / 1951
(Date)

General Partner
(Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

June 25, 1951

Mr. O. Warren Hassler
General Partner
Tucson Mining Co.
133 W. Stone Avenue
Tucson, Arizona

Subject: DMA-1722X
Re: Exploration Loan
Bobby Group, Tit-For-Tat Claim

My dear Mr. Hassler:

Receipt is acknowledged of your application and attachments of June 18, 1951 for an exploration loan under the Defense Production Act of 1950.

The application was assigned Docket Number DMA-1722X and was referred to Mr. Otto Herres, Chief, Lead-Zinc Branch on June 21, 1951.

In any future correspondence relating to your application, kindly refer to DMA-1722X.

Sincerely yours,

LANDON F. STROBEL

Landon F. Strobel
Executive Secretary

LFSTROBEL:js
cc: >Strobel-2
Files
Herres
Lyon

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. DMA - 1722X

Date received 6/21/51

Participation

[redacted]

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 21 1951
LANDON F. STROBEL
Executive Secretary

Name and address of applicant

Date [redacted]

FILL IN THIS BLOCK

Date of application June 18th 1951 Estimated cost $100,000.00

Mineral or metal Lead-Zinc-Copper Percentage of Government participation 50%

Location of mine PIMA MINING DISTRICT
PIMA COUNTY, ARIZONA.

Date of filing MF-100 DMA Docket Number, if available

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
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6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.
    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

    NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.
*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.
*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.
*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.
15. State in detail how the ore could be shipped and how and where milled.
*16. History:
    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.
    (*b*) State briefly the known history and production of adjoining and neighboring properties.
    (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.
*17. Production:
    (*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)
    (*a*) Describe the ore or mineral deposits briefly.
    (*b*) Submit available maps and assay data.
    (*c*) Give estimated tonnage and grade of each class of ore reserves.
19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?
21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.

22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:
    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.
    (*b*) Supervisors, by numbers and positions, with salaries of each.
    (*c*) Cost of necessary repairs to existing facilities, structures, and buildings.
    (*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.
    (*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.
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    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.
    (*i*) Cost of power, water, utilities, and any other items not provided for above.
24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co. (Name of company) By L. Wasson Kessler (Signature of authorized official)

May 28, 1951 (Date) General Partner (Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

To be attached to Form 103 - TIT-for-TAT CLAIM

1. - A limited partnership

2. - General Partner:
G. Warren Hassler, 665 S. Hobart Blvd., Los Angeles, Calif.

Limited Partners:

Jane Gleason McNeil, 192 S. Commonwealth, Los Angeles, Calif.	$1000
C. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1000
Mrs. C. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1000
Oberg Bros. Const. Co., 401 N. Florence Blvd., Inglewood, Calif.	1000
Charles C. Newkirk, Jr. 6311 Fulton St., Van Nuys, Calif.	1000
DeSoto Book, 1120 N. Los Palmas Ave., Los Angeles, Calif.	1500
Arthur J. Larson, 752 South Adams, Glendale, Calif.	1000
Harold C. Whitlessey, 525 N. Normandie Ave., Los Angeles, Calif.	3250
Mrs. S. Paul Ward, 605 Mission St., S. Pasadena, Calif.	1000
Theo. Nowak, Jr., 957 S. 3rd Ave., Los Angeles, Calif.	1000
Clinton C. Campbell, 1176 N. Hollister Ave., Pasadena, Calif.	1000
Nathan Stein, 2405 22nd St., Santa Monica, Calif.	1000
Dr. Louis Kinzig, 9730 Wilshire Blvd., Beverly Hills, Calif.	1000
Kenneth D. Caldwell, 1021 Stone Canyon Rd., W.Los Angeles, Calif.	1000
Sam Firks, 957 S. Mansfield Ave., Los Angeles 36, Calif.	833.34
Irving Feinteeh, 9500 Cresta Drive, Los Angeles, Calif.	833.33
Lou Towne, 11962 Foxboro Drive, Los Angeles, Calif.	833.33
Max Goldring, 10440 Wyton Drive, Los Angeles, Calif.	1000
Richard Miller, 5615 West Pico Blvd., Los Angeles 19, Calif.	8750

3. - Not a corporation

4. - Mining experience together with general business experience of:

(a) Mr. Warren Hassler, acting for Tucson Mining Co. - 15 years
(b) Mr. Sam Coldron, resident superintendent in charge - 27 years Seventeen of which have been as an operating mining engineer and executive. Member A.I.M.E. 1937

5. - Lessee

6. - No claims against the property

7. - Letter attached

8. - No debts. Current payroll being handled by private funds.

9. - Prepared to invest $50,000.00

10. - (a) TIT-FOR-TAT CLAIM. Comprised of 1 claim on which three shallow shafts show mineralization but no ore of commercial grade and quantity.

(b) Within the N.W. Quarter, Sec. 11, Tns. 17S. Rng 12E G. and S.R. B. & M., Pima County, Arizona.

11. - Known as the TIT-FOR-TAT.

12. - The Tucson-Twin Buttes Highway passes through the property. This highway connects the property with a spur of the S.P. railroad at Sahuarita. Ore is being hauled from the adjoining San Xavier Mine to the mill at Sahuarita over this road daily.

13. - Water is available at N.E. section of the property being the pumped discharge from San Xavier Mine. Power is available from a high tension line which traverses the westerly extensions of the property.

14. - One small toolroom and change house.
One small dynamite magazine.

15. - The ore can be treated in the mill of the Eagle-Pitcher Mining Co. located a distance of 9 miles by truck highway from the property.

It may also be shipped by rail from this point to the A.S.R. Co's mill at Deming, New Mexico, or to the El Paso Smelter.

16. - (a) Three shafts have been sunk on the property, the deepest (at present time must be retimbered in order to enter) reputedly about 400 feet in depth.

The dumps indicate several mineralized areas were penetrated.

There has been no known production other than shipment of surface float ores, and small quantities of lead and zinc sulphides encountered during the work done for annual assessment.

Lack of funds reputedly caused suspension of work.

(b) The San Xavier Mine operated by the Eagle-Pitcher Mining Co. is currently producing between 300 and 400 tons per day of zinc-lead-silver ore.

(c) SEE HELMET PEAK APPLICATION

17. - The property is not in production

18. - There are no known ore reserves of commercial grade.

19. - Several mineralized veins traverse the property.

20. - Exploration for lead and zinc ores will be conducted.

21. - The proposed work will consist of:

(a) Complete geological mapping by a qualified geologist. Estimated time required — 1 week.

(b) The drilling by diamond or churn drill of more or less twelve holes to a depth of 800 feet each.

(c) Re-timbering the vertical shaft to the 200' level and driving an X-cut southerly a distance of 300' to explore the vein structure apparent on the surface.

Estimated time required for this work — 10 months.

22. - Mineralization of surface outcrops and proximity to prove ore deposits.

Report on area of which this property is a part, is attached.
Report by R. J. Leonard.

23. - (a) Estimated expense in connection with geological mapping preliminary to drilling program (21-a) including assistants' salaries $1,000

Churn or diamond drilling -- to be done by contract at an estimated cost of

$7.50 per foot for 4800 feet and	$36,000
$8.50 per foot for 4800 feet or a	40,800
Total contract cost of	$76,800

Retimbering of the vertical shaft (21-c)
45 sets @ $80.00 per set placed . . . . . $ 3,600

X-cutting 300 ft. to explore the mineralized structure (21-c)
@ $17.00 per foot . . . . . $ 5,100

A total of $86,500.00 for 21-a-b-c

(b) Supervision to consist of:

One resident engineer in charge - per year - - - - - - - -	$ 8,000
One assistant engineer - - - - - per year - - - - - - - -	4,000
One mine foreman @ $13.00 per day	

(c)	One office and warehouse bldg.	$ 1,200
	One change room for employees	600
	One hoist house	800
	One shaft head frame	2,000
		$ 4,600

(d) Included in 23-c

(e)	One mine hoist	$ 2,500
	One 210 c.f.m. compressor	3,000
	One rock drill & equipment	500
		$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-c

(i) Cost of sub-station and power line . . . . . $ 8,000

24. - Time schedule:

Geological mapping - 1 week . . . . . $ 1,000

Drilling will depend upon availability of contractors and will vary if work is done by churn drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each . . . . . $ 76,800

Re-timbering vertical shaft.
Estimated: 2 sets placed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 8 timbers with hanging rods. Placed . . . . . $ 3,600

X-cutting 300 ft. from shaft @ 4' per day (21-c) - 2½ months work incidental to above 1/2 mo. . . . . $ 5,100

Supervision - 10 months	$ 12,980
	$ 98,480
Surplus for unexpected contingencies	1,520
	$100,000

Dma - 1722 X

ZIPF, LARKIN & DONAHUE
ATTORNEYS AT LAW
133 NORTH STONE
TUCSON, ARIZONA
TELEPHONES 4-0479·4-0470

HENRY G. ZIPF
F. EDWARD LARKIN
JOHN L. DONAHUE, JR.

June 19, 1951

Mr. Otto Herres
Lead-Zinc Division
Defense Minerals Administration
Interior Building
Washington 25, D.C.

Dear Sir:

We are enclosing application for government loan on the TIT-FOR-TAT CLAIM.

Very truly yours,
TUCSON MINING COMPANY

Resident Engineer

SC:jc

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 21 1951
LANDON F. STROBEL
Executive Secretary

dma 17227

ZIPF, LARKIN & DONAHUE
ATTORNEYS AT LAW
133 NORTH STONE
TUCSON, ARIZONA
TELEPHONES 4-0479·4-0470

HENRY G. ZIPF
F. EDWARD LARKIN
JOHN L. DONAHUE, JR.

June 19, 1951

Mr. Otto Herres
Lead-Zinc Division
Defense Minerals Administration
Interior Building
Washington 25, D.C.

Dear Sir:

We are enclosing application for government loan on the BONANZA GROUP and BOBBY GROUP.

Very truly yours,
TUCSON MINING COMPANY

Resident Engineer

SC:jc

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 25 1951
LANDON F. STROBEL
Executive Secretary

JUN 27 1951

Dma-1722 X

ZIPF, LARKIN & DONAHUE
ATTORNEYS AT LAW
133 NORTH STONE
TUCSON, ARIZONA
TELEPHONES 4-0479·4-0470

HENRY G. ZIPF
F. EDWARD LARKIN
JOHN L. DONAHUE, JR.

June 19, 1951

Mr. Otto Herres
Lead-Zinc Division
Defense Minerals Administration
Interior Building
Washington 25, D.C.

Dear Sir:

We are enclosing application for government loan on the BOBBY GROUP.

Very truly yours,
TUCSON MINING COMPANY

Resident Engineer

SC:jc

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 21 1951
Executive Secretary

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. DMA-1722X

Date received 6/21/51

Participation

Tucson Mining Co
133 N. Stone Av.
Tucson, Arizona.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 21 1951
LANDON F. STROBEL
Executive Secretary

Name and address of applicant

Date June 18th 1951

FILL IN THIS BLOCK

Date of application June 18th 1951

Estimated cost $100,000.00

Mineral or metal Lead-zinc-copper

Percentage of Government participation 50%

Location of mine Pima Mining District
Pima County, Arizona.

Date of filing MF-100

DMA Docket Number, if available

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.
    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

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*11. State the present and former names of the property, if any.

*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.

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State amount of power to be used, rate per hour or other cost, and source.

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15. State in detail how the ore could be shipped and how and where milled.

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    (*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)
    (*a*) Describe the ore or mineral deposits briefly.
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    (*c*) Give estimated tonnage and grade of each class of ore reserves.

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THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?

21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

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22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:
    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.
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24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

(Name of company)	By J. Warren Kessler (Signature of authorized official)
(Date)	General Partner (Title)

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 ag of the United States as to any matter within its jurisdiction.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. DMA-1722X

Date received 6/20/51

Participation

Tucson Mining Co.
133 N. Stone Av.
Tucson, Arizona.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 21 1951
LANDON F. STROBEL
Executive Secretary

Name and address of applicant

Date June 18th, 1951

FILL IN THIS BLOCK

Date of application June 18th, 1951

Estimated cost $100,000.00

Mineral or metal Lead-zinc-copper

Percentage of Government participation 50%

Location of mine Pima Mining District
Pima County, Arizona

Date of filing MF-100

DMA Docket Number, if available

INSTRUCTIONS

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(Date)	General Partner (Title)

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16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. DMA - 1722 X

Date received 6/21/51

Participation

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 21 1951
LANDON F. STROBEL
Executive Secretary

Tucson Mining Co.
133 N. Stone Av.
Tucson, Arizona.

Name and address of applicant

Date June 18th, 1951

FILL IN THIS BLOCK

Date of application June 18th, 1951

Estimated cost $100,000.00

Mineral or metal Lead-zinc-copper

Percentage of Government participation 50%

Location of mine Pima Mining District
Pima County, Arizona

Date of filing MF-100 _____

DMA Docket Number, if available _____

INSTRUCTIONS

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7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.
    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

    NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings fr any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.

*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.

*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.

*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.

15. State in detail how the ore could be shipped and how and where milled.

*16. History:
    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.
    (*b*) State briefly the known history and production of adjoining and neighboring properties.
    (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

*17. Production:
    (*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)
    (*a*) Describe the ore or mineral deposits briefly.
    (*b*) Submit available maps and assay data.
    (*c*) Give estimated tonnage and grade of each class of ore reserves.

19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?

21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.

22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:
    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.
    (*b*) Supervisors, by numbers and positions, with salaries of each.
    (*c*) Cost of necessary repairs to existing facilities, structures, and buildings.
    (*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.
    (*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.
    (*f*) Cost of rental for equipment which the operator proposes to rent.
    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.
    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.
    (*i*) Cost of power, water, utilities, and any other items not provided for above.

24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

(Name of company)	By J. Warren Kessler (Signature of authorized official)
(Date)	General Partner (Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

To be attached to form 103 - BOBBY GROUP

1. - A limited partnership

2. - General Partner:
G. Warren Hassler, 665 So. Hobart Blvd., Los Angeles, Calif.

Limited Partners:

Jane Gleason McNeil, 192 S. Commonwealth, Los Angeles, Calif.	$1,000
O. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1,000
Mrs. O. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1,000
Oberg Bros. Const. Co., 401 W. Florence Blvd., Inglewood, Calif.	1,000
Charles C. Newkirk, Jr., 6311 Fulton St., Van Nuys, Calif.	1,000
DeSoto Bock, 1120 N. Las Palmas Ave., Los Angeles, Calif.	1,500
Arthur J. Larson, 732 South Adams, Glendale, Calif.	1,000
Harold C. Whitlesey, 525 N. Normandie Ave., Los Angeles,4,Calif.	3,250
Mrs. S. Paul Ward, 605 Mission St., South Pasadena, Calif.	1,000
Theo. Nowak, Jr., 937 S. 3rd Ave., Los Angeles, Calif.	1,000
Clinton C. Campbell, 1176 N. Holliston Ave., Pasadena, Calif.	1,000
Nathan Stein, 2405 22nd St., Santa Monica, Calif.	1,000
Dr. Louis Einzig, Suite 227, 9730 Wilshire Blvd., Beverly Hills, Calif.	1,000
Kenneth D. Caldwell, 1021 Stone Canyon Rd., W.LosAngeles, Calif.	1,000
Sam Firks, 937 S. Mansfield Ave., Los Angeles 36, Calif.	833.34
Irving Feintech, 9500 Cresta Drive, Los Angeles, Calif.	833.33
Lou Towne, 11962 Foxboro Drive, Los Angeles, Calif.	833.33
Max Goldring, 10440 Wyton Drive, Los Angeles, Calif.	1,000
Richard Miller, 5615 West Pico Blvd., Los Angeles 19, Calif.	8,750

3. - Not a corporation

4. - Mining experience together with general business experience of:

(a) Mr. Warren Hassler, acting for Tucson Mining Co. - 15 years
(b) Mr. Sam Coldren, resident superintendent in charge. 27 years
Seventeen of which have been as an operating mining engineer and executive. Member A.I.M.E. 1937.

5. - Lessee

6. - No claims against the property

7. - Letter attached

8. - No debts. Current payroll being handled by private funds.

9. - Prepared to invest $50,000.00

10. - (a) Bobby Group. Comprised of 6 claims on which three shallow shafts show mineralization but no ore of commercial grade and quantity.

(b) Within the N.W. Quarter, Sec. 11, Tns. 17S. Rug. 12E, G. and S. R. B. & M., Pima County, Arizona.

11. - Known as the Bobby Group.

12. - The Tucson-Twin Buttes Highway passes through the southerly claims. This highway connects the property with a spur of the S.P. railroad at Sahuarita. Ore is being hauled from the adjoining San Xavier Mine to the mill at Sahuarita over this road daily.

13. - Water is available at N.E. section of the Bobby No. 1 Claim, being the pumped discharge from San Xavier Mine. Power is available from a high tension line which traverses the westerly extensions of the property.

14. - One small toolroom and change house.
One small dynamite magazine.

15. - The ore can be treated in the mill of the Eagle-Pitcher Mining Co. located a distance of 9 miles by truck highway from the property.

It may also be shipped by rail from this point to the A.S.&R. Co.'s mill at Deming, New Mexico, or to the El Paso Smelter.

16. - (a) Three shafts have been sunk on the property, the deepest (at present time must be retimbered in order to enter) reputedly about 400 feet in depth.

The dumps indicate several mineralized areas were penetrated.

There has been no known production other than shipment of surface float ores, and small quantities of lead and zinc sulphides encountered during the work done for annual assessment.

Lack of funds reputedly caused suspension of work.

(b) The San Xavier Mine operated by the Eagle-Pitcher Mining Co. is currently producing between 300 and 400 tons per day of zinc-lead-silver ore.

(c) SEE HELMET PEAK APPLICATION

17. - The property is not in production

18. - There are no known ore reserves of commercial grade.

19. - Several mineralized veins traverse the property.

20. - Exploration for lead and zinc ores will be conducted.

21. - The proposed work will consist of:

short info

(a) Complete geological mapping by a qualified geologist. Estimated time required -- 1 week.

(b) The drilling by diamond or churn drill of more or less twelve holes to a depth of 800 ft. each.

(c) Re-timbering the vertical shaft to the 200' level and driving an X-cut southerly a distance of 300' to explore the vein structure apparent on the surface.
Estimated time required for this work -- 10 months.

22. - Mineralization of surface outcrops and proximity to proven ore deposits.

Report on area of which this property is a part, is attached. Report by R. J. Leonard.

23. - (a) Estimated expense in connection with geological mapping preliminary to drilling program (21-a) including assistants' salaries..... $1,000

Churn or diamond drilling -- to be done by contract at an estimated cost of
$7.50 per foot for 4800 ft. and
$8.50 per foot for 4800 ft. or a
Total contract cost of.....$36,000
40,800
$76,800

Retimbering of the vertical shaft (21-c)
45 sets @ $80.00 per set placed.....$ 3,600

X-cutting 300 ft. to explore the mineralized structure (21-c) @ 17.00 per ft. .....$ 5,100

A total of $86,500.00 for 21-a-b-c.

(b) Supervision to consist of:

One resident engineer in charge - per year - - - - - - - -$ 8,000
One assistant engineer - - - - - per year - - - - - - - - - 4,000
One mine foreman @ $13.00 per day.

(c) One office and warehouse bldg.....$ 1,200
One change room for employees..... 600
One hoist house..... 800
One shaft head frame..... 2,000
$ 4,600

(d) Included in 23-c

(e) One mine hoist.....$ 2,500
One 210 c.f.m. compressor..... 3,000
One rock drill & equipment..... 500
$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-c

(i) Cost of sub-station and power line.....$ 8,000

24. - Time schedule:
Geological mapping - 1 week - - - - - - - - - - - - - - - $ 1,000

24. - Cont'd.

Drilling will depend upon availability of contractors and will vary if work is done by churn drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each.....	$76,800
Re-timbering vertical shaft.	
Estimated: 2 sets placed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 8 timber with hanger rods Placed.....	3,600
X-cutting 300 ft. from shaft @ 4' per day (21-c) - 2½ months work incidental to above 1/2 mo.....	5,100
Supervision - 10 months.....	12,980
	$98,480
Surplus for unexpected contingencies	1,520
TOTAL.....	$100,000

To be attached to form 105 - BOBBY GROUP

1. - A limited partnership

2. - General Partner:
G. Warren Hassler, 665 So. Hobart Blvd., Los Angeles, Calif.

Limited Partners:

June Gleason McNeil, 192 S. Commonwealth, Los Angeles, Calif.	$1,000
O. K. Kringlen, 9930 E. Logden St., Temple City, Calif.	1,000
Mrs. O. K. Kringlen, 9930 E. Logden St., Temple City, Calif.	1,000
Cherg Bros. Const. Co., 401 W. Florence Blvd., Inglewood, Calif.	1,000
Charles C. Hedrick, Jr., 6511 Fulton St., Van Nuys, Calif.	1,000
DeSoto Rock, 1120 N. Las Palmas Ave., Los Angeles, Calif.	1,500
Arthur J. Lorenz, 732 South Adams, Glendale, Calif.	1,000
Harold C. Whitlesey, 325 N. Normandie Ave., Los Angeles,4,Calif.	5,250
Mrs. S. Paul Ward, 605 Mission St., South Pasadena, Calif.	1,000
Theo. Novak, Jr., 957 S. 3rd Ave., Los Angeles, Calif.	1,000
Clinton C. Campbell, 1176 N. Ballister Ave., Pasadena, Calif.	1,000
Nathan Stein, 2405 22nd St., Santa Monica, Calif.	1,000
Dr. Louis Minnig, Suite 207, 9730 Wilshire Blvd., Beverly Hills, Calif.	1,000
Kenneth D. Caldwell, 1021 Stone Canyon Rd., W.LosAngeles, Calif.	1,000
Sam Fisher, 957 S. Mansfield Ave., Los Angeles 36, Calif.	833.34
Irving Feinteeh, 9300 Cresta Drive, Los Angeles, Calif.	833.33
Lou Tagan, 11962 Foxhere Drive, Los Angeles, Calif.	833.33
Max Goldring, 10440 Wyton Drive, Los Angeles, Calif.	1,000
Richard Miller, 5615 West Pico Blvd., Los Angeles 19, Calif.	8,750

3. - Not a corporation

4. - Mining experience together with general business experience of:

(a) Mr. Warren Hassler, acting for Tucson Mining Co. - 15 years
(b) Mr. Sam Goldrem, resident superintendent in charge. 27 years
Seventeen of which have been as an operating mining engineer and executive. Member A.I.M.E. 1957.

5. - Lessee

6. - No claims against the property

7. - Letter attached

8. - No debts. Current payroll being handled by private funds.

9. - Prepared to invest $30,000.00

10. - (a) Bobby Group. Comprised of 6 claims on which three shallow shafts show mineralization but no ore of commercial grade and quantity.

(b) Within the N.W. Quarter, Sec. 11, Tns. 17S. Rng. 12E, G. and S. R. B. & M., Pima County, Arizona.

11. - Known as the Bobby Group.

12. - The Tucson-Twin Buttes Highway passes through the southerly claims. This highway connects the property with a spur of the S.P. railroad at Sahuarita. Ore is being hauled from the adjoining San Xavier Mine to the mill at Sahuarita over this road daily.

13. - Water is available at N.E. section of the Bobby No. 1 Claim, being the pumped discharge from San Xavier Mine. Power is available from a high tension line which traverses the westerly extensions of the property.

14. - One small toolroom and change house.
One small dynamite magazine.

15. - The ore can be treated in the mill of the Eagle-Pitcher Mining Co. located a distance of 9 miles by truck highway from the property.

It may also be shipped by rail from this point to the A.S.&R. Co.'s mill at Deming, New Mexico, or to the El Paso Smelter.

16. - (a) Three shafts have been sunk on the property, the deepest (at present time must be retimbered in order to enter) reputedly about 400 feet in depth.

The dumps indicate several mineralized areas were penetrated.

There has been no known production other than shipment of surface float ores, and small quantities of lead and zinc sulphides encountered during the work done for annual assessment.

Lack of funds reputedly caused suspension of work.

(b) The San Xavier Mine operated by the Eagle-Pitcher Mining Co. is currently producing between 300 and 400 tons per day of zinc-lead-silver ore.

(c) SEE HELMET PEAK APPLICATION

17. - The property is not in production

18. - There are no known ore reserves of commercial grade.

19. - Several mineralized veins traverse the property.

20. - Exploration for lead and zinc ores will be conducted.

21. - The proposed work will consist of:

(a) Complete geological mapping by a qualified geologist. Estimated time required — 1 week.

(b) The drilling by diamond or churn drill of more or less twelve holes to a depth of 800 ft. each.

(c) Re-timbering the vertical shaft to the 200' level and driving an I-cut southerly a distance of 300' to explore the vein structure apparent on the surface.
Estimated time required for this work — 10 months.

22. - Mineralization of surface outcrops and proximity to proven ore deposits.

Report on area of which this property is a part, is attached. Report by R. J. Leonard.

23. - (a) Estimated expense in connection with geological mapping preliminary to drilling program (21-a) including assistants' salaries..... $1,000

Churn or diamond drilling — to be done by contract at an estimated cost of
$7.50 per foot for 4800 ft. and
$8.50 per foot for 4800 ft. or a
Total contract cost of.....$36,000
40,800
$76,800

Retimbering of the vertical shaft (21-a)
45 sets @ $80.00 per set placed.....$ 3,600

X-cutting 300 ft. to explore the mineralized structure (21-c) @ 17.00 per ft. .....$ 5,100

A total of $86,500.00 for 21-a-b-c.

(b) Supervision to consist of:

One resident engineer in charge - per year - - - - - - - - -$ 8,000
One assistant engineer - - - - - per year - - - - - - - - - 4,000
One mine foreman @ $15.00 per day.

(c) One office and warehouse bldg.....$ 1,200
One change room for employees..... 600
One hoist house..... 800
One shaft head frame..... 2,000
$ 4,600

(d) Included in 23-c

(e) One mine hoist.....$ 2,500
One 210 c.f.m. compressor..... 3,000
One rock drill & equipment..... 500
$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-c

(i) Cost of sub-station and power line.....$ 8,000

24. - Time schedule:
Geological mapping - 1 week - - - - - - - - - - - - - - - $ 1,000

24. - Cont'd.

Drilling will depend upon availability of contractors and will vary if work is done by steam drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each..... $76,800

Re-timbering vertical shaft.

Estimated: 2 sets planed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 8 timber with hanger rods Planed..... 3,600

Re-cutting 500 ft. from shaft @ 4' per day (21-e) - 2½ months work incidental to above 1/2 mo..... 5,100

Supervision - 10 months..... 12,000

$96,700

Surplus for unexpected contingencies 1,300

TOTAL.....$100,000

To be attached to f[illegible] 103 - BOBBY GROUP

1. - A limited partnership

2. - General Partner:
G. Warren Hassler, 665 So. Hobart Blvd., Los Angeles, Calif.

Limited Partners:

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(c) Re-timbering the vertical shaft to the 200' level and driving an X-cut southerly a distance of 300' to explore the vein structure apparent on the surface.
Estimated time required for this work -- 10 months.

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$8.50 per foot for 4800 ft. or a
Total contract cost of.....$36,000
40,800
$76,800

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45 sets @ $80.00 per set placed.....$ 3,600

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A total of $86,500.00 for 21-a-b-c.

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One assistant engineer - - - - - per year - - - - - - - - - 4,000
One mine foreman @ $15.00 per day.

(c) One office and warehouse bldg.....$ 1,200
One change room for employees..... 600
One hoist house..... 800
One shaft head frame..... 2,000
$ 4,600

(d) Included in 23-c

(e) One mine hoist.....$ 2,500
One 210 c.f.m. compressor..... 3,000
One rock drill & equipment..... 500
$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-c

(i) Cost of sub-station and power line.....$ 8,000

24. - Time schedule:
Geological mapping - 1 week - - - - - - - - - - - - - - - $ 1,000

24. - Cont'd.

Drilling will depend upon availability of contractors and will vary if work is done by churn drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each..... $76,800

Re-timbering vertical shaft.

Estimated: 2 sets placed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 8 timber with hanger rods Placed..... 3,600

X-cutting 300 ft. from shaft @ 4' per day (21-s) - 2½ months work incidental to above 1/2 mo..... 5,100

Supervision - 10 months..... 12,980

$98,480

Surplus for unexpected contingencies 1,520

TOTAL.....$100,000

UNIVERSITY OF ARIZONA

TUCSON

College of Mines and Engineering
Department of Geology & Mineralogy

November 21st, 1929

Mr. A. L. Fritz
Tucson, Arizona

Dear Sir:

In accordance with your request, I here present an opinion on certain phases of the Geology of the Olive Camp area of the Pima Mining District, Pima County, Arizona.

It is the intention to discuss here not the detailed geology of individual properties, but rather the larger geological features of the area and district generally, which are of fundamental importance in the matter of ore occurence.

The discussion and opinion are based on brief personal observations made in the field, aided by a study of reports prepared by mining engineers and geologists for mining companies, by reports and maps prepared in the course of advanced degree studies by graduate students in Geology at the University of Arizona, and by the literature and government maps of the area and region.

The rocks of the immediate area comprise pre-Cambrian (?) granite, Mesozoic (Cretaceous) arkosic sedimentary beds, intrusive granitic rocks, and volcanic rocks which are chiefly andesite. The volcanics are either late Cretaceous or early Tertiary in age. Just outside of the area, particularly to the northward, occur thick formations of Paleozoic Limestone in quartzite.

The major structure of the area can not be definitely determined by the available surface or near surface geology. It is clear, however, that a great amount of fracturing, accompanied no doubt by at least some faulting has occured throughout the area. It is possible that folding is the most extensive type of minor deformation within the area and the cause of fracturing and faulting. Or it may be that the fractures were generated by stresses resulting from the uneven settling of a large volume of volcanic material from deep-seated to superficial positions. Or perhaps vertical upthrust of intruding magmas may have caused fracturing and faulting.

Mineralization apparently has been widespread. The rocks along fractures observed, whether on the surface or underground, have been more or less extensively altered. Ore deposition, in varying degree, seems

to have occurred wherever a master fracture was available to act as a channelway for ore-bearing solutions. The ore deposits are, in the main, of the fissure-filled type, locallized along major fractures, at the intersection of fractures, and in the brecciated zones.

It is fairly certain that intrusive granitic rocks underlie at variable depth the entire district of which the Olive Camp area forms a part. These intrusive rocks were probably the source of all primary mineralization in the district. The ore deposits that have been developed in the past in the Olive Camp area have been chiefly small high-grade silver-lead bodies, formed mainly by fissure-filling, but perhaps to some extent by wall-rock replacement, in the near-surface Cretacceous sedimentary and volcanic formations. In areas to the north and south important copper and zinc developments have been made and from which considerable tonnages of ore have been mined in the past. These deposits are principally replacement bodies in Paleozoic limestone. It appears, therefore, that replacement bodies in limestone form the important type of ore deposits for the district.

The question of major structures, and character and thickness of formations forming that structure, thus appear to be the essential questions relative to the probability of extensive ore occurrence at depth in the Olive Camp area. If the ore-bearing limestone formations of the Mineral Hill-San Xavier area to the north and of the Twin Buttes area to the south are continuous or occur under the Olive Camp area, then the probability of occurence of important commercial ore deposits at depth in the latter area is greatly increased. The problem would then become one of probable depth to the favorable horizon and the determination of dominant or master fracture zones.

Mr. J. C. Anderson, in his report on the Swastika property, page 4, sets forth certain evidence and a statement of belief that limestone does occur below the superficial formations of the area. That there is more than a possibility that these Paleozoic limestone formations do exist below the surface formations in the Olive Camp area is not an idle statement nor one made for convenience. Even brief field study of the stratigraphy and structure in this area and that immediately to the north, in the San Xavier area, justify the statement that this stratigraphy condition might exist. But more convincing still are similar indications in the results of recent detailed geologic mapping in that area to the immediate north.

The Olive Camp area appears to be a depressed geologic structure--either a down-warped (synclinal) or a down-faulted area.

The Paleozoic limestone formations of the San Xavier area distinctly dip to the south (20° - 25°), apparently plunging under the Olive Camp area. The contact between Paleozoic limestone and Cretaceous arkosic beds occur along the southern border of the San Xavier area. The origin of this contact is not clearly indicated; it may be a normal formation contact, produced by a break or time interval in the deposition of sediments which formed the beds; or it may be a fault contact, produced by a major rupture. If this contact is an unconformity, as the first case suggests, the limestones extend to the southward uninterruptedly below the Olive Camp area. In the event that it is a fault contract, the limestones with their overlying sedimentary beds and volcanic formations, in the Olive Camp block have

have been faulted downward.

There is some basis, of course, for expecting that additional underground development may disclose other small high-grade silver-bearing ore shoots, such as were formerly worked in the area, or perhaps larger veins and breccia bodies or ore of commercial grade and size. But it is more logical to expect that, if commercially important ore bodies are to be developed in the area, they still occur as metasomatic replacement and contact deposits in limestone.

The problem of developing possible large ore bodies in the Olive Camp area thus resolves itself, in this opinion, to first ascertaining the presence or absence of underlying limestone beds.

Preferrably, such development should be carried on by drilling operations. And in so doing, if the location of drill holes is carefully planned, it is probable that relatively near-surface vein or breccia type of deposits of value may be encountered while the deeper prospecting is in progress.

The depth at which the limestone, if present, may occur is highly problematical; if in a synclinal structure, it may be comparatively shallow, if block-faulted, it may lie much deeper - 2000 feet or more.

Yours very truly,

(signed) R. J. Leonard

Copy: Original on file

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. DMA 17222 X

Date received 6-25-51

Participation

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 25 1951
LARSON F. STROBEL
Executive Secretary

Tucson Mining Co.
133 N.Stone Ave.
Tucson,Arizona.

Name and address of applicant

Date June 18th, 1951

FILL IN THIS BLOCK

Date of application June 18th, 1951 Estimated cost $100,000.00

Mineral or metal Lead-Zinc-Copper Percentage of Government participation 50%

Location of mine PIMA MINING DISTRICT.
PIMA COUNTY, ARIZONA.

Date of filing MF-100 May 29th, 1951 DMA Docket Number, if available

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
SEP 24 1951

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.

    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

    NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.

*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.

*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.

*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.

15. State in detail how the ore could be shipped and how and where milled.

*16. History:

    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.

    (*b*) State briefly the known history and production of adjoining and neighboring properties.

    (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

*17. Production:

    (*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)

    (*a*) Describe the ore or mineral deposits briefly.

    (*b*) Submit available maps and assay data.

    (*c*) Give estimated tonnage and grade of each class of ore reserves.

19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?

21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.

22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:

    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.

    (*b*) Supervisors, by numbers and positions, with salaries of each.

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    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.

    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.

    (*i*) Cost of power, water, utilities, and any other items not provided for above.

24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co. (Name of company)

By G. Warren Kessler (Signature of authorized official)

June 20, 1951 (Date)

General Partner (Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. dma 1722 X

Date received 6-25-51

Participation

Tucson Mining Co.
133 N. Stone Av.
Tucson, Arizona.

Name and address of applicant

Department of the Interior
Defense Minerals Administration
Washington
JUN 25 1951
Mail & Files
Executive Section

Date June 18th, 1951

FILL IN THIS BLOCK

Date of application June 18th, 1951 Estimated cost $100,000.00

Mineral or metal Lead-Zinc-Copper Percentage of Government participation 50%

Location of mine Pima Mining district.
PIMA COUNTY, ARIZONA.

Date of filing MF-100 May 29, 1951 DMA Docket Number, if available

INSTRUCTIONS

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THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?
21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

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22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

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23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:
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    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.
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24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co. (Name of company) — By G. Warren Hassler (Signature of authorized official)

June 20 1951 (Date) — General Partner (Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

To be attached form 103 - BONANZA GROUP and BOBBY GROUP.

1. - A limited partnership

2. - General Partner:
G. Warren Hassler, 665 S. Hobart Blvd., Los Angeles, Calif.

Limited Partners:

Jane Gleason McNeil, 192 S. Commonwealth, LosAngeles, Cal.	$1000
O. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1000
Mrs. O. K. Kringlen, 9950 E. Logden St., Temple City, Cal.	1000
Oberg Bros. Const. Co., 401 W. Florence Blvd. Inglewood, Cal.	1000
Charles O. Newkirk, Jr., 6311 Fulton St., VanNuys, Calif.	1000
DeSoto Bock, 1120 N. Las Palmas Ave., Los Angeles, Calif.	$500
Arthur J. Larson, 732 South Adams, Glendale, Calif.	1000
Harold C. Whitlesey, 525 N. Normandie Ave., LosAngeles, Cal.	3250
Mrs. S. Paul Ward, 605 Mission St., S.Pasadena, Calif.	1000
Theo. Nowak, Jr., 937 S. 3rd Ave., Los Angeles, Cal.	1000
Clinton C. Campbell, 1176 N. Holliston Ave., Pasadena, Cal.	1000
Nathan Stein, 2405 22nd St., Santa Monica, Calif.	1000
Dr. Louis Einzig, 9730 Wilshire Blvd., Beverly Hills, Cal.	1000
Kenneth D. Caldwell, 1021 Stone Canyon Rd., W.LosAngeles, Cal.	1000
Sam Firks, 937 S. Mansfield Ave., Los Angeles 36, Cal.	833.34
Irving Feintech, 9500 Cresta Drive, Los Angeles, Cal.	833.33
Lou Towne, 11962 Foxboro Drive, Los Angeles, Calif.	833.33
Max Goldring, 10440 Wyton Drive, Los Angeles, Calif.	1000
Richard Miller, 5615 West Pico Blvd., Los Aggeles 19, Cal.	8750

3. - Not a corporation

4. - Mining experience together with general business experience of:

(a) Mr. Warren Hassler, acting for Tucson Mining Co. - 15 yrs.
(b) Mr. Sam Coldren, resident superintendent in charge - 27 yrs. Seventeen of which have been as an operating mining engineer and executive. Member A.I.M.E. 1937

5. - Lessee

6. - No claims against the property

7. - Letter attached

8. - No debts. Current payroll being handled by private funds.

9. - Prepared to invest $50,000.00

10. - (a) Bonanza Group. Comprised of 8 claims on which three shallow shafts show mineralization but no ore of commercial grade and quantity. Bobby Group of 7 claims w/2 deeper shafts.

(b) Within the N.W. Quarter, Sec. 11, Tns. 17S. Rug 12E G. and S. R. B. & M., Pima County, Arizona.

11. Known as the Bonanza Group and Bobby Group.

12. The Tucson-Twin Buttes Highway passes through the southerly claims. This highway connects the property with a spur of the S.P. railroad at Sahuarita. Ore is being hauled from the adjoining San Xavier Mine to the mill at Sahuarita over this road daily.

13. Water is available at N.E. section of the Bonanza, being the pumped discharge from San Xavier Mine. Power is available from a high tension line which traverses the westerly extensions of the property.

14. One small toolroom and change house.
One small dynamite magazine.

15. The ore can be treated in the mill of the Eagler-Pitcher Mining Co. located a distance of 9 miles by truck highway from the property.

It may also be shipped by rail from this point to the A.S.&R. Co.'s mill at Deming, New Mexico, or to the El Paso Smelter.

16.- (a) Three shafts have been sunk on the property, the deepest (at present time must be retimbered in order to enter) reputedly about 400 feet in depth. One new shaft is being sunk - now 142 feet deep.

The dumps indicate several mineralized areas were penetrated.

There has been no known production other than shipment of surface float ores, and small quantities of lead and zinc sulphides encountered during the work done for annual assessment.

Lack of funds reputedly caused suspension of work.

(b) The San Xavier Mine operated by the Eagle-Pitcher Mining Co. is currently producing between 300 and 400 tons per day of zinc-lead-silver ore.

(c) SEE HELMET PEAK APPLICATION

17. The property is not in production

18. There are no known ore reserves of commercial grade.

19. Several mineralized veins traverse the property.

20. Exploration for lead and zinc ores will be conducted.

21. The proposed work will consist of:

(a) Complete geological mapping by a qualified geologist. Estimated time required -- 1 week.

(b) The drilling by diamond or churn drill of more or less twelve holes to a depth of 800 ft. each.

(c) Re-timbering the vertical shaft to the 200' level and driving an X-cut southerly a distance of 300' to explore the vein structure apparent on the surface.

Estimated time required for this work -- 10 months.

22. Mineralization of surface outcrops and proximity to proven ore deposits.

Report on area of which this property is a part, is attached. Report by R. J. Leonard.

23. (a) Estimated expense in connection with geological mapping preliminary to drilling program (21-a) including assistants' salaries $1,000

Churn or diamond drilling -- to be done by contract at an estimated cost of

$7.50 per foot for 4800 feet and	$36,000
$8.50 per foot for 4800 feet or a	40,800
Total contract cost of	$76,800

Retimbering of the vertical shaft (21-c)
45 sets @ $80.00 per set placed . . . . . $ 3,600

X-cutting 300 ft. to explore the mineralized structure (21-c) @ $17.00 per foot . . . . . $ 5,100

A total of $86,500.00 for 21-a-b-c.

(b) Supervision to consist of:

One resident engineer in charge - per year - - - - - -	$ 8,000
One assistant engineer - - - - - per year - - - - - -	4,000
One mine foreman @ $13.00 per day.	

(c)

One office and warehouse bldg.	$ 1,200
One change room for employees	600
One hoist house	800
One shaft head frame	2,000
	$ 4,600

(d) Included in 23-c

(e)

One mine hoist	$ 2,500
One 210 c.f.m. compressor	3,000
One rock drill & equipment	500
	$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-c

(i) Cost of sub-station and power line . . . . . $ 8,000

24. Time schedule:
Geological mapping - 1 week . . . . . $ 1,000

24. - Cont'd.

Drilling will depend upon availability of contractors and will vary if work is done by churn drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each	$76,800
Re-timbering vertical shaft. Estimated: 2 sets placed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 8 timber with hanger rods Placed	3,600
X-cutting 300 ft. from shaft @ 4' per day (21-c) - 2½ months work incidental to above 1/2 mo.	5,100
Supervision - 10 months	12,980
	$98,480
Surplus for unexpected contingencies	1,520
TOTAL	$100,000

UNIVERSITY OF ARIZONA

TUCSON

College of Mines and Engineering
Department of Geology & Mineralogy

November 21st, 1929

Mr. A. L. Fritz
Tucson, Arizona

Dear Sir:

In accordance with your request, I here present an opinion on certain phases of the Geology of the Olive Camp area of the Pima Mining District, Pima County, Arizona.

It is the intention to discuss here not the detailed geology of individual properties, but rather the larger geological features of the area and district generally, which are of fundamental importance in the matter of ore occurence.

The discussion and opinion are based on brief personal observations made in the field, aided by a study of reports prepared by mining engineers and geologists for mining companies, by reports and maps prepared in the course of advanced degree studies by graduate students in Geology at the University of Arizona, and by the literature and government maps of the area and region.

The rocks of the immediate area comprise pre-Cambrian (?) granite, Mesozoic (Cretaceous) arkosic sedimentary beds, intrusive granitic rocks, and volcanic rocks which are chiefly andesite. The volcanics are either late Cretaceous or early Tertiary in age. Just outside of the area, particularly to the northward, occur thick formations of Paleozoic Limestone in quartzite.

The major structure of the area can not be definitely determined by the available surface or near surface geology. It is clear, however, that a great amount of fracturing, accompanied no doubt by at least some faulting has occured throughout the area. It is possible that folding is the most extensive type of minor deformation within the area and the cause of fracturing and faulting. Or it may be that the fractures were generated by stresses resulting from the uneven settling of a large volume of volcanic material from deep-seated to superficial positions. Or perhaps vertical upthrust of intruding magmas may have caused fracturing and faulting.

Mineralization apparently has been widespread. The rocks along fractures observed, whether on the surface or underground, have been more or less extensively altered. Ore deposition, in varying degree, seems

to have occurred wherever a master fracture was available to act as a channelway for ore-bearing solutions. The ore deposits are, in the main, of the fissure-filled type, localized along major fractures, at the intersection of fractures, and in the brecciated zones.

It is fairly certain that intrusive granitic rocks underlie at variable depth the entire district of which the Olive Camp area forms a part. These intrusive rocks were probably the source of all primary mineralization in the district. The ore deposits that have been developed in the past in the Olive Camp area have been chiefly small high-grade silver-lead bodies, formed mainly by fissure-filling, but perhaps to some extent by wall-rock replacement, in the near-surface Cretaceous sedimentary and volcanic formations. In areas to the north and south important copper and zinc developments have been made and from which considerable tonnages of ore have been mined in the past. These deposits are principally replacement bodies in Paleozoic limestone. It appears, therefore, that replacement bodies in limestone form the important type of ore deposits for the district.

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The Paleozoic limestone formations of the San Xavier area distinctly dip to the south (20° - 25°), apparently plunging under the Olive Camp area. The contact between Paleozoic limestone and Cretaceous arkosic beds occur along the southern border of the San Xavier area. The origin of this contact is not clearly indicated; it may be a normal formation contact, produced by a break or time interval in the deposition of sediments which formed the beds; or it may be a fault contact, produced by a major rupture. If this contact is an unconformity, as the first case suggests, the limestones extend to the southward uninterruptedly below the Olive Camp area. In the event that it is a fault contract, the limestones with their overlying sedimentary beds and volcanic formations, in the Olive Camp block have

have been faulted downward.

There is some basis, of course, for expecting that additional underground development may disclose other small high-grade silver-bearing ore shoots, such as were formerly worked in the area, or perhaps larger veins and breccia bodies or ore of commercial grade and size. But it is more logical to expect that, if commercially important ore bodies are to be developed in the area, they still occur as metasomatic replacement and contact deposits in limestone.

The problem of developing possible large ore bodies in the Olive Camp area thus resolves itself, in this opinion, to first ascertaining the presence or absence of underlying limestone beds.

Preferrably, such development should be carried on by drilling operations. And in so doing, if the location of drill holes is carefully planned, it is probable that relatively near-surface vein or breccia type of deposits of value may be encountered while the deeper prospecting is in progress.

The depth at which the limestone, if present, may occur is highly problematical; if in a synclinal structure, it may be comparatively shallow, if block-faulted, it may lie much deeper - 2000 feet or more.

Youre very truly,

(signed) R. J. Leonard

Copy: Original on file

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. dma 172121X

Date received 6-25-51

Participation

Pima Mining Co.
100 Broadway
San Francisco

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 25 1951
LANDON F. STORY
Executive Secretary

Name and address of applicant

Date

FILL IN THIS BLOCK

Date of application June 18th, 1951

Estimated cost $100,000.00

Mineral or metal Lead-Zinc-Copper

Percentage of Government participation 50%

Location of mine Pima Mining District.
PIMA COUNTY, ARIZONA

Date of filing MF-100 May 29, 1951

DMA Docket Number, if available

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
SEP 24 1951

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

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16—64067-1

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10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.
    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

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*11. State the present and former names of the property, if any.
*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.
*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.
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15. State in detail how the ore could be shipped and how and where milled.
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    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.
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    (*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
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(2) Milling				
(3) Shipped or sold				

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    (*a*) Describe the ore or mineral deposits briefly.
    (*b*) Submit available maps and assay data.
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THE EXPLORATION

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21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.
22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

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    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.
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    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.
    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.
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24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co. (Name of company) By G. Warren Hassler (Signature of authorized official)

June 20, 1951 (Date) General Partner (Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

To be attached to form 103 - BONANZA GROUP and BOBBY GROUP. TUCSON MINING CO.

1. - A limited partnership

2. - General Partner:
G. Warren Hassler, 665 S. Hobart Blvd., Los Angeles, Calif.

Limited Partners:

Jane Gleason McNeil, 192 S. Commonwealth, LosAngeles, Cal.	$1000
O. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1000
Mrs. O. K. Kringlen, 9950 E. Logden St., Temple City, Cal.	1000
Oberg Bros. Const. Co., 401 W. Florence Blvd. Inglewood, Cal.	1000
Charles O. Newkirk, Jr., 6311 Fulton St., VanNuys, Calif.	1000
DeSoto Beck, 1120 N. Las Palmas Ave., Los Angeles, Calif.	2500
Arthur J. Larson, 732 South Adams, Glendale, Calif.	1000
Harold C. Whitlesey, 525 N. Normandie Ave., LosAngeles, Cal.	3250
Mrs. S. Paul Ward, 605 Mission St., S.Pasadena, Calif.	1000
Theo. Nowak, Jr., 937 S. 3rd Ave., Los Angeles, Cal.	1000
Clinton C. Campbell, 1176 N. Holliston Ave., Pasadena, Cal.	1000
Nathan Stein, 2405 22nd St., Santa Monica, Calif.	1000
Dr. Louis Kinsig, 9730 Wilshire Blvd., Beverly Hills, Cal.	1000
Kenneth D. Caldwell, 1021 Stone Canyon Rd., W.LosAngeles, Cal.	1000
Sam Firks, 937 S. Mansfield Ave., Los Angeles 36, Cal.	833.34
Irving Feintech, 9500 Cresta Drive, Los Angeles, Cal.	833.33
Lou Towne, 11962 Foxboro Drive, Los Angeles, Calif.	833.33
Max Goldring, 10440 Wyton Drive, Los Angeles, Calif.	1000
Richard Miller, 5615 West Pico Blvd., Los Angeles 19, Cal.	8750

3. - Not a corporation

4. - Mining experience together with general business experience of:

(a) Mr. Warren Hassler, acting for Tucson Mining Co. - 15 yrs.
(b) Mr. Sam Coldren, resident superintendent in charge - 27 yrs. Seventeen of which have been as an operating mining engineer and executive. Member A.I.M.E. 1937

5. - Lessee

6. - No claims against the property

7. - Letter attached

8. - No debts. Current payroll being handled by private funds.

9. - Prepared to invest $50,000.00

10. - (a) Bonanza Group. Comprised of 8 claims on which three shallow shafts show mineralization but no ore of commercial grade and quantity. Bobby Group of 7 claims w/2 deeper shafts.

(b) Within the N.W. Quarter, Sec. 11, Tns. 17S. Rug 12E G. and S. R. B. & M., Pima County, Arizona.

11. Known as the Bonanza Group and Bobby Group.

12. The Tucson-Twin Buttes Highway passes through the southerly claims. This highway connects the property with a spur of the S.P. railroad at Sahuarita. Ore is being hauled from the adjoining San Xavier Mine to the mill at Sahuarita over this road daily.

13. Water is available at N.E. section of the Bonanza, being the pumped discharge from San Xavier Mine. Power is available from a high tension line which traverses the westerly extensions of the property.

14. One small toolroom and change house.
One small dynamite magazine.

15. The ore can be treated in the mill of the Eagler-Pitcher Mining Co. located a distance of 9 miles by truck highway from the property.

It may also be shipped by rail from this point to the A.S.&R. Co.'s mill at Deming, New Mexico, or to the El Paso Smelter.

16.- (a) Three shafts have been sunk on the property, the deepest (at present time must be retimbered in order to enter) reputedly about 400 feet in depth. One new shaft being sunk -- now 142 feet deep.

The dumps indicate several mineralized areas were penetrated.

There has been no known production other than shipment of surface float ores, and small quantities of lead and zinc sulphides encountered during the work done for annual assessment.

Lack of funds reputedly caused suspension of work.

(b) The San Xavier Mine operated by the Eagle-Pitcher Mining Co. is currently producing between 300 and 400 tons per day of zinc-lead-silver ore.

(c) SEE HELMET PEAK APPLICATION

17. The property is not in production

18. There are no known ore reserves of commercial grade.

19. Several mineralized veins traverse the property.

20. Exploration for lead and zinc ores will be conducted.

21. The proposed work will consist of:

(a) Complete geological mapping by a qualified geologist. Estimated time required -- 1 week.

(b) The drilling by diamond or churn drill of more or less twelve holes to a depth of 800 ft. each.

(c) Re-timbering the vertical shaft to the 200' level and driving an X-cut southerly a distance of 300' to explore the vein structure apparent on the surface.

Estimated time required for this work -- 10 months.

22. Mineralization of surface outcrops and proximity to proven ore deposits.

Report on area of which this property is a part, is attached. Report by R. J. Leonard.

23. (a) Estimated expense in connection with geological mapping preliminary to drilling program (21-a) including assistants' salaries $1,000

Churn or diamond drilling -- to be done by contract at an estimated cost of

$7.50 per foot for 4800 feet and	$36,000
$8.50 per foot for 4800 feet or a	40,800
Total contract cost of	$76,800

Retimbering of the vertical shaft (21-c)
45 sets @ $80.00 per set placed . . . . . $ 3,600

X-cutting 300 ft. to explore the mineralized structure (21-c) @ $17.00 per foot . . . . . $ 5,100

A total of $86,500.00 for 21-a-b-c.

(b) Supervision to consist of:

One resident engineer in charge - per year - - - - - -	$ 8,000
One assistant engineer - - - - - per year - - - - - -	4,000
One mine foreman @ $13.00 per day.	

(c)

One office and warehouse bldg.	$ 1,200
One change room for employees	600
One hoist house	800
One shaft head frame	2,000
	$ 4,600

(d) Included in 23-c

(e)

One mine hoist	$ 2,500
One 210 c.f.m. compressor	3,000
One rock drill & equipment	500
	$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-c

(i) Cost of sub-station and power line . . . . . $ 8,000

24. Time schedule:
Geological mapping - 1 week . . . . . $ 1,000

24. - Cont'd.

Drilling will depend upon availability of contractors and will vary if work is done by churn drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each	$76,800
Re-timbering vertical shaft. Estimated: 2 sets placed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 8 timber with hanger rods Placed	3,600
X-cutting 300 ft. from shaft @ 4' per day (21-c) - 2½ months work incidental to above 1/2 mo.	5,100
Supervision - 10 months	12,980
	$98,480
Surplus for unexpected contingencies	1,520
TOTAL	$100,000

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. Dma - 1722X

Date received 6/21/51

Participation

Tucson Mining Co.
133 N. Stone Av.
Tucson, Arizona.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 21 1951
LINCOLN F. STROBEL
Executive Secretary

Name and address of applicant

Date June 18th, 1951

FILL IN THIS BLOCK

Date of application June 18th, 1951

Estimated cost $ 100,000 00

Mineral or metal Lead-Zinc-Copper

Percentage of Government participation 50 %

Location of mine PIMA MINING DISTRICT
PIMA COUNTY, ARIZONA.

Date of filing MF-100 May 29, 1951

DMA Docket Number, if available

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

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16—64067-1

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CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co. (Name of company)

By G. Wesson Kessler (Signature of authorized official)

May 28, 1951 (Date)

General Partner (Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. DMA-1722X

Date received 6/21/51

Participation

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 21 1951
LANDON F. STROBEL
Executive Secretary

Tucson Mining Co.
133 W. Stone Av.
Tucson, Arizona.

Name and address of applicant

Date June 18th, 1951

FILL IN THIS BLOCK

Date of application June 18th, 1951 Estimated cost $100,000.00

Mineral or metal Lead-Zinc-Copper Percentage of Government participation 50%

Location of mine PIMA MINING DISTRICT
PIMA COUNTY, ARIZONA.

Date of filing MF-100 _____ DMA Docket Number, if available _____

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24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co.
(Name of company)

By L. Warren Hassler
(Signature of authorized official)

May 28, 1951
(Date)

General Partner
(Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. DMA-1722X

Date received 6/21/51

Participation

Tucson Mining Co.
133 N. Stone Av.
Tucson, Arizona.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 21 1951
LANDON F. STROBEL
Executive Secretary

Name and address of applicant

Date June 18th, 1951

FILL IN THIS BLOCK

Date of application JUNE 18th, 1951 Estimated cost $100,000.00

Mineral or metal Lead-Zinc-Copper Percentage of Government participation 50%

Location of mine PIMA MINING DISTRICT
PIMA COUNTY, ARIZONA.

Date of filing MF-100 DMA Docket Number, if available

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.
    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

    NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.
*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.
*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.
*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.
15. State in detail how the ore could be shipped and how and where milled.
*16. History:
    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.
    (*b*) State briefly the known history and production of adjoining and neighboring properties.
    (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.
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    (*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
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(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)
    (*a*) Describe the ore or mineral deposits briefly.
    (*b*) Submit available maps and assay data.
    (*c*) Give estimated tonnage and grade of each class of ore reserves.
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THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?
21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.
22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:
    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.
    (*b*) Supervisors, by numbers and positions, with salaries of each.
    (*c*) Cost of necessary repairs to existing facilities, structures, and buildings.
    (*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.
    (*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.
    (*f*) Cost of rental for equipment which the operator proposes to rent.
    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.
    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.
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CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co. (Name of company) By G. Warren Parker (Signature of authorized official)

May 28, 1951 (Date) General Partner (Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. dma/1702X

Date received 6-25-51

Participation

Tucson Mining Co.
135 N. Stone Av.
Tucson, Arizona.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 25 1951

Date June 18th, 1951

Name and address of applicant

FILL IN THIS BLOCK

Date of application June 18th, 1951 Estimated cost $100,000.00

Mineral or metal Lead-Zinc-Copper Percentage of Government participation 50%

Location of mine Pima Mining District.
PIMA COUNTY, ARIZONA.

Date of filing MF-100 May 29, 1951 DMA Docket Number, if available

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
SEP 24 1951

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

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9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

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16—64067-1

THE PROPERTY

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*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.

*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.

*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.

15. State in detail how the ore could be shipped and how and where milled.

*16. History:

(*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.

(*b*) State briefly the known history and production of adjoining and neighboring properties.

(*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

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(*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)

(*a*) Describe the ore or mineral deposits briefly.

(*b*) Submit available maps and assay data.

(*c*) Give estimated tonnage and grade of each class of ore reserves.

19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?

21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

NOTE.—The Government will not participate in a project that will require more than 2 years to complete.

22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:

(*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.

(*b*) Supervisors, by numbers and positions, with salaries of each.

(*c*) Cost of necessary repairs to existing facilities, structures, and buildings.

(*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.

(*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.

(*f*) Cost of rental for equipment which the operator proposes to rent.

(*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.

(*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.

(*i*) Cost of power, water, utilities, and any other items not provided for above.

24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co. (Name of company) — By G. Warren Kessler (Signature of authorized official)

June 20, 1951 (Date) — General Partner (Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

To be attached form 103 - BONANZA GROUP and BOBBY GROUP

1. - A limited partnership

2. - General Partner:
G. Warren Hassler, 665 S. Hobart Blvd., Los Angeles, Calif.

Limited Partners:

Jane Gleason McNeil, 192 S. Commonwealth, LosAngeles, Cal.	$1000
O. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1000
Mrs. O. K. Kringlen, 9950 E. Logden St., Temple City, Cal.	1000
Oberg Bros. Const. Co., 401 W. Florence Blvd. Inglewood, Cal.	1000
Charles O. Neukirk, Jr., 6311 Fulton St., VanNuys, Calif.	1000
DeSoto Bock, 1120 N. Las Palmas Ave., Los Angeles, Calif.	1500
Arthur J. Larson, 732 South Adams, Glendale, Calif.	1000
Harold C. Whitlesey, 525 N. Normandie Ave., LosAngeles, Cal.	3250
Mrs. S. Paul Ward, 605 Mission St., S.Pasadena, Calif.	1000
Theo. Nowak, Jr., 937 S. 3rd Ave., Los Angeles, Cal.	1000
Clinton C. Campbell, 1176 N. Holliston Ave., Pasadena, Cal.	1000
Nathan Stein, 2405 22nd St., Santa Monica, Calif.	1000
Dr. Louis Kinzig, 9730 Wilshire Blvd., Beverly Hills, Cal.	1000
Kenneth D. Caldwell, 1021 Stone Canyon Rd., W.LosAngeles, Cal.	1000
Sam Firks, 937 S. Mansfield Ave., Los Angeles 36, Cal.	833.34
Irving Feintech, 9500 Cresta Drive, Los Angeles, Cal.	833.33
Lou Towne, 11962 Foxboro Drive, Los Angeles, Calif.	833.33
Max Goldring, 10440 Wyton Drive, Los Angeles, Calif.	1000
Richard Miller, 5615 West Pico Blvd., Los Aggeles 19, Cal.	8750

3. - Not a corporation

4. - Mining experience together with general business experience of:

(a) Mr. Warren Hassler, acting for Tucson Mining Co. - 15 yrs.
(b) Mr. Sam Coldren, resident superintendent in charge - 27 yrs. Seventeen of which have been as an operating mining engineer and executive. Member A.I.M.E. 1937

5. - Lessee

6. - No claims against the property

7. - Letter attached

8. - No debts. Current payroll being handled by private funds.

9. - Prepared to invest $50,000.00

10. - (a) Bonanza Group. Comprised of 8 claims on which three shallow shafts show mineralization but no ore of commercial grade and quantity. Bobby Group of 7 claims w/2 deeper shafts.

(b) Within the N.W. Quarter, Sec. 11, Tns. 17S. Rug 12E G. and S. R. B. & M., Pima County, Arizona.

11. Known as the Bonanza Group, and Bobby Group.

12. The Tucson-Twin Buttes Highway passes through the southerly claims. This highway connects the property with a spur of the S.P. railroad at Sahuarita. Ore is being hauled from the adjoining San Xavier Mine to the mill at Sahuarita over this road daily.

13. Water is available at N.E. section of the Bonanza, being the pumped discharge from San Xavier Mine. Power is available from a high tension line which traverses the westerly extensions of the property.

14. One small toolroom and change house.
One small dynamite magazine.

15. The ore can be treated in the mill of the Eagler-Pitcher Mining Co. located a distance of 9 miles by truck highway from the property.

It may also be shipped by rail from this point to the A.S.&R. Co.'s mill at Deming, New Mexico, or to the El Paso Smelter.

16.- (a) Three shafts have been sunk on the property, the deepest (at present time must be retimbered in order to enter) reputedly about 400 feet in depth. One new shaft being sunk - now 142 feet deep.

The dumps indicate several mineralized areas were penetrated.

There has been no known production other than shipment of surface float ores, and small quantities of lead and zinc sulphides encountered during the work done for annual assessment.

Lack of funds reputedly caused suspension of work.

(b) The San Xavier Mine operated by the Eagle-Pitcher Mining Co. is currently producing between 300 and 400 tons per day of zinc-lead-silver ore.

(c) SEE HELMET PEAK APPLICATION

17. The property is not in production

18. There are no known ore reserves of commercial grade.

19. Several mineralized veins traverse the property.

20. Exploration for lead and zinc ores will be conducted.

21. The proposed work will consist of:

(a) Complete geological mapping by a qualified geologist. Estimated time required -- 1 week.

(b) The drilling by diamond or churn drill of more or less twelve holes to a depth of 800 ft. each.

(c) Re-timbering the vertical shaft to the 200' level and driving an X-cut southerly a distance of 300' to explore the vein structure apparent on the surface.

Estimated time required for this work -- 10 months.

22. Mineralization of surface outcrops and proximity to proven ore deposits.

Report on area of which this property is a part, is attached. Report by R. J. Leonard.

23. (a) Estimated expense in connection with geological mapping preliminary to drilling program (21-a) including assistants' salaries $1,000

Churn or diamond drilling — to be done by contract at an estimated cost of

$7.50 per foot for 4800 feet and	$36,000
$8.50 per foot for 4800 feet or a	40,800
Total contract cost of	$76,800

Retimbering of the vertical shaft (21-c)
45 sets @ $80.00 per set placed . . . . . $ 3,600

X-cutting 300 ft. to explore the mineralized structure (21-c) @ $17.00 per foot . . . . . $ 5,100

A total of $86,500.00 for 21-a-b-c.

(b) Supervision to consist of:

One resident engineer in charge - per year - - - - - -	$ 8,000
One assistant engineer - - - - - per year - - - - - -	4,000
One mine foreman @ $13.00 per day.	

(c)

One office and warehouse bldg.	$ 1,200
One change room for employees	600
One hoist house	800
One shaft head frame	2,000
	$ 4,600

(d) Included in 23-c

(e)

One mine hoist	$ 2,500
One 210 c.f.m. compressor	3,000
One rock drill & equipment	500
	$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-c

(i) Cost of sub-station and power line . . . . . $ 8,000

24. Time schedule:
Geological mapping - 1 week . . . . . $ 1,000

24. - Cont'd.

Drilling will depend upon availability of contractors and will vary if work is done by churn drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each	$76,800
Re-timbering vertical shaft.	
Estimated: 2 sets placed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 8 timber with hanger rods Placed	3,600
X-cutting 300 ft. from shaft @ 4' per day (21-c) - 2½ months work incidental to above 1/2 mo.	5,100
Supervision - 10 months	12,980
	$98,480
Surplus for unexpected contingencies	1,520
TOTAL	$100,000

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. DMA - 1722X

Date received 6/21/51

Participation

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 21 1951
LANDON F. STROBEL
Executive Secretary
Date [illegible]

Name and address of applicant

[illegible] Mining Co.
[illegible] Dr.
[illegible], Arizona

FILL IN THIS BLOCK

Date of application [illegible]

Estimated cost [illegible]

Mineral or metal [illegible]

Percentage of Government participation [illegible]

Location of mine [illegible]

[illegible]

Date of filing MF-100

DMA Docket Number, if available

INSTRUCTIONS

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16—64067-1

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(Name of company)

By L. Warren Harper
(Signature of authorized official)

(Date)

General Partner
(Title)

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*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

To be attached to Form 105 - BOBBY GROUP

1. - A limited partnership

2. - General Partner:
G. Warren Hassler, 665 So. Hobart Blvd., Los Angeles, Calif.

Limited Partners:

Jane Gleason McNeil, 192 S. Commonwealth, Los Angeles, Calif.	$1,000
O. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1,000
Mrs. O. K. Kringlen, 9950 E. Logden St., Temple City, Calif.	1,000
Oberg Bros. Const. Co., 401 W. Florence Blvd., Inglewood, Calif.	1,000
Charles C. Newkirk, Jr., 6311 Fulton St., Van Nuys, Calif.	1,000
DeSoto Book, 1120 N. Las Palmas Ave., Los Angeles, Calif.	1,500
Arthur J. Larson, 732 South Adams, Glendale, Calif.	1,000
Harold C. Whitlesey, 525 N. Normandie Ave., Los Angeles,4,Calif.	3,250
Mrs. S. Paul Ward, 605 Mission St., South Pasadena, Calif.	1,000
Theo. Nowak, Jr., 957 S. 3rd Ave., Los Angeles, Calif.	1,000
Clinton C. Campbell, 1176 N. Hellisten Ave., Pasadena, Calif.	1,000
Nathan Stein, 2405 22nd St., Santa Monica, Calif. Calif.	1,000
Dr. Louis Einzig, Suite 227, 9750 Wilshire Blvd., Beverly Hills,	1,000
Kenneth D. Caldwell, 1021 Stone Canyon Rd., W.LosAngeles, Calif.	1,000
Sam Pirkn, 957 S. Mansfield Ave., Los Angeles 36, Calif.	833.34
Irving Feinteeh, 9500 Cresta Drive, Los Angeles, Calif.	833.33
Lou Tuhne, 11962 Foxboro Drive, Los Angeles, Calif.	833.33
Max Goldring, 10440 Wyton Drive, Los Angeles, Calif.	1,000
Richard Miller, 5613 West Pico Blvd., Los Angeles 19, Calif.	8,750

3. - Not a corporation

4. - Mining experience together with general business experience of:

(a) Mr. Warren Hassler, acting for Tucson Mining Co. - 15 years
(b) Mr. Sam Coldren, resident superintendent in charge. 27 years Seventeen of which have been as an operating mining engineer and executive. Member A.I.M.E. 1957.

5. - Lessee

6. - No claims against the property

7. - Letter attached

8. - No debts. Current payroll being handled by private funds.

9. - Prepared to invest $50,000.00

10. - (a) Bobby Group. Comprised of 6 claims on which three shallow shafts show mineralization but no ore of commercial grade and quantity.

(b) Within the N.W. Quarter, Sec. 11, Tns. 17S. Rng. 12E, G. and S. R. B. & M., Pima County, Arizona.

11. - Known as the Bobby Group.

12. - The Tucson-Twin Buttes Highway passes through the southerly claims. This highway connects the property with a spur of the S.P. railroad at Sahuarita. Ore is being hauled from the adjoining San Xavier Mine to the mill at Sahuarita over this road daily.

13. - Water is available at N.E. section of the Bobby No. 1 Claim, being the pumped discharge from San Xavier Mine. Power is available from a high tension line which traverses the westerly extensions of the property.

14. - One small toolroom and change house.
One small dynamite magazine.

15. - The ore can be treated in the mill of the Eagle-Pitcher Mining Co. located a distance of 9 miles by truck highway from the property.

It may also be shipped by rail from this point to the A.S.&R. Co.'s mill at Deming, New Mexico, or to the El Paso Smelter.

16. - (a) Three shafts have been sunk on the property, the deepest (at present time must be retimbered in order to enter) reputedly about 400 feet in depth.

The dumps indicate several mineralized areas were penetrated.

There has been no known production other than shipment of surface float ores, and small quantities of lead and zinc sulphides encountered during the work done for annual assessment.

Lack of funds reputedly caused suspension of work.

(b) The San Xavier Mine operated by the Eagle-Pitcher Mining Co. is currently producing between 300 and 400 tons per day of zinc-lead-silver ore.

(c) SEE HELMET PEAK APPLICATION

17. - The property is not in production

18. - There are no known ore reserves of commercial grade.

19. - Several mineralized veins traverse the property.

20. - Exploration for lead and zinc ores will be conducted.

21. - The proposed work will consist of:

(a) Complete geological mapping by a qualified geologist. Estimated time required — 1 week.

(b) The drilling by diamond or churn drill of more or less twelve holes to a depth of 300 ft. each.

(c) Re-timbering the vertical shaft to the 200' level and driving an X-cut southerly a distance of 300' to explore the vein structure apparent on the surface.
Estimated time required for this work — 10 months.

22. - Mineralization of surface outcrops and proximity to proven ore deposits.

Report on area of which this property is a part, is attached. Report by R. J. Leonard.

23. - (a) Estimated expense in connection with geological mapping preliminary to drilling program (21-a) including assistants' salaries..... $1,000

Churn or diamond drilling -- to be done by contract at an estimated cost of
$7.50 per foot for 4800 ft. and
$8.50 per foot for 4800 ft. or a
Total contract cost of.....$36,000
40,800
$76,800

Retimbering of the vertical shaft (21-c)
45 sets @ $80.00 per set placed.....$ 3,600

X-cutting 300 ft. to explore the mineralized structure (21-c) @ 17.00 per ft. .....$ 5,100

A total of $86,500.00 for 21-a-b-c.

(b) Supervision to consist of:

One resident engineer in charge - per year - - - - - - - -$ 8,000
One assistant engineer - - - - - per year - - - - - - - - - 4,000
One mine foreman @ $15.00 per day.

(c) One office and warehouse bldg.....$ 1,200
One change room for employees..... 600
One hoist house..... 800
One shaft head frame..... 2,000
$ 4,600

(d) Included in 23-c

(e) One mine hoist.....$ 2,500
One 210 c.f.m. compressor..... 3,000
One rock drill & equipment..... 500
$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-c

(i) Cost of sub-station and power line.....$ 8,000

24. - Time schedule:
Geological mapping - 1 week - - - - - - - - - - - - - - - $ 1,000

24. - Cont'd.

Drilling will depend upon availability of contractors and will vary if work is done by churn drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each..... $76,800

Re-timbering vertical shaft.

Estimated: 2 sets placed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 8 timber with hanger rods Placed..... 3,600

X-cutting 300 ft. from shaft @ 4' per day (21-e) - 2½ months work insidental to above 1/2 mo..... 5,100

Supervision - 10 months..... 12,980

$98,480

Surplus for unexpected contingencies 1,520

TOTAL.....$100,000

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. dma 17222 X

Date received 6-25-51

Participation

Tucson Mining Co.
133 N. Stone Av.
Tucson, Arizona.

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
RECEIVED
JUN 25 1951
LANDON F. STROM
Executive Secretary

Name and address of applicant

Date June 18th, 1951

FILL IN THIS BLOCK

Date of application June 18th, 1951 Estimated cost $100,000.00

Mineral or metal Lead-Zinc-Copper Percentage of Government participation 50%

Location of mine Pima Mining District
PIMA COUNTY, ARIZONA.

Date of filing MF-100 May 29, 1951 DMA Docket Number, if available

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.
    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

    NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.

*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.

*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.

*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.

15. State in detail how the ore could be shipped and how and where milled.

*16. History:
    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.
    (*b*) State briefly the known history and production of adjoining and neighboring properties.
    (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.

*17. Production:
    (*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)
    (*a*) Describe the ore or mineral deposits briefly.
    (*b*) Submit available maps and assay data.
    (*c*) Give estimated tonnage and grade of each class of ore reserves.

19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?

21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.

22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:
    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.
    (*b*) Supervisors, by numbers and positions, with salaries of each.
    (*c*) Cost of necessary repairs to existing facilities, structures, and buildings.
    (*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.
    (*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.
    (*f*) Cost of rental for equipment which the operator proposes to rent.
    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.
    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.
    (*i*) Cost of power, water, utilities, and any other items not provided for above.

24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co. (Name of company) — By G. Warren Hassler (Signature of authorized official)

June 20, 1951 (Date) — General Partner (Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

To be attached to Form 103 - BONANZA GROUP and BOBBY GROUP

1. - A limited partnership

2. - General Partner:
G. Warren Hassler, 665 S. Hobart Blvd., Los Angeles,Calif.

Limited Partners:

Jane Gleason McNeil, 192 S. Commonwealth, LosAngeles,Cal.	$1000
O. K. Kringlen, 9950 E. Logden St., Temple City,Calif.	1000
Mrs. O. K. Kringlen, 9950 E. Logden St.,TEmple City,Cal.	1000
Oberg Bros. Const. Co., 401 W. Florence Blvd.Inglewood,Cal.	1000
Charles O. Newkirk, Jr., 6311 Fulton St.,VanNuys,Calif.	1000
DeSoto Bock, 1120 N. Las Palmas Ave., Los Angeles,Calif.	1500
Arthur J. Larson, 732 South Adams, Glendale, Calif.	1000
Harold C. Whitlesey, 525 N. Normandie Ave.,LosAngeles,Cal.	3250
Mrs. S. Paul Ward, 605 Mission St.,S.Pasadena,Calif.	1000
Theo. Nowak, Jr.,937 S. 3rd Ave., Los Angeles,Cal.	1000
Clinton C. Campbell, 1176 N. Holliston Ave.,Pasadena,Cal.	1000
Nathan Stein, 2405 22nd St., Santa Monica, Calif.	1000
Dr. Louis Einzig, 9730 Wilshire Blvd., Beverly Hills,Cal.	1000
Kenneth D. Caldwell, 1021 Stone Canyon Rd.,W.LosAngeles,Cal.	1000
Sam Firks, 937 S. Mansfield Ave., Los Angeles 36, Cal.	833.34
Irving Feintech, 9500 Cresta Drive, Los Angeles, Cal.	833.33
Lou Towne, 11962 Foxboro Drive, Los Angeles, Calif.	833.33
Max Goldring, 10440 Wyton Drive, Los Angeles, Calif.	1000
Richard Miller, 5615 West Pico Blvd., Los Aggeles 19,Cal.	8750

3. - Not a corporation

4. - Mining experience together with general business experience of:

(a) Mr. Warren Hassler, acting for Tucson Mining Co. - 15 yrs.
(b) Mr. Sam Coldren, resident superintendent in charge - 27 yrs. Seventeen of which have been as an operating mining engineer and executive. Member A.I.M.E. 1937

5. - Lessee

6. - No claims against the property

7. - Letter attached

8. - No debts. Current payroll being handled by private funds.

9. - Prepared to invest $50,000.00

10. - (a) Bonanza Group. Comprised of 8 claims on which three shallow shafts show mineralization but no ore of commercial grade and quantity. Bobby Group of 7 claims w/2 deeper shafts.

(b) Within the N.W. Quarter, Sec. 11, Tns. 17S. Rug 12E G. and S. R. B. & M., Pima County, Arizona.

11. Known as the Bonanza Group, and Bobby Group.

12. The Tucson-Twin Buttes Highway passes through the southerly claims. This highway connects the property with a spur of the S.P. railroad at Sahuarita. Ore is being hauled from the adjoining San Xavier Mine to the mill at Sahuarita over this road daily.

13. Water is available at N.E. section of the Bonanza, being the pumped discharge from San Xavier Mine. Power is available from a high tension line which traverses the westerly extensions of the property.

14. One small toolroom and change house.
One small dynamite magazine.

15. The ore can be treated in the mill of the Eagler-Pitcher Mining Co. located a distance of 9 miles by truck highway from the property.

It may also be shipped by rail from this point to the A.S.&R. Co.'s mill at Deming, New Mexico, or to the El Paso Smelter.

16.- (a) Three shafts have been sunk on the property, the deepest (at present time must be retimbered in order to enter) reputedly about 400 feet in depth. One new shaft being sunk -- now 142 feet deep.

The dumps indicate several mineralized areas were penetrated.

There has been no known production other than shipment of surface float ores, and small quantities of lead and zinc sulphides encountered during the work done for annual assessment.

Lack of funds reputedly caused suspension of work.

(b) The San Xavier Mine operated by the Eagle-Pitcher Mining Co. is currently producing between 300 and 400 tons per day of zinc-lead-silver ore.

(c) SEE HELMET PEAK APPLICATION

17. The property is not in production

18. There are no known ore reserves of commercial grade.

19. Several mineralized veins traverse the property.

20. Exploration for lead and zinc ores will be conducted.

21. The proposed work will consist of:

(a) Complete geological mapping by a qualified geologist. Estimated time required -- 1 week.

(b) The drilling by diamond or churn drill of more or less twelve holes to a depth of 800 ft. each.

(c) Re-timbering the vertical shaft to the 200' level and driving an X-cut southerly a distance of 300' to explore the vein structure apparent on the surface.

Estimated time required for this work -- 10 months.

22. Mineralization of surface outcrops and proximity to proven ore deposits.

Report on area of which this property is a part, is attached. Report by R. J. Leonard.

23. (a) Estimated expense in connection with geological mapping preliminary to drilling program (21-a) including assistants' salaries $1,000

Churn or diamond drilling -- to be done by contract at an estimated cost of

$7.50 per foot for 4800 feet and	$36,000
$8.50 per foot for 4800 feet or a	40,800
Total contract cost of	$76,800

Retimbering of the vertical shaft (21-c)
45 sets @ $80.00 per set placed . . . . . $ 3,600

X-cutting 300 ft. to explore the mineralized structure (21-c) @ $17.00 per foot . . . . . $ 5,100

A total of $86,500.00 for 21-a-b-c.

(b) Supervision to consist of:

One resident engineer in charge - per year - - - - - -	$ 8,000
One assistant engineer - - - - - per year - - - - - -	4,000

One mine foreman @ $13.00 per day.

(c)

One office and warehouse bldg.	$ 1,200
One change room for employees	600
One hoist house	800
One shaft head frame	2,000
	$ 4,600

(d) Included in 23-c

(e)

One mine hoist	$ 2,500
One 210 c.f.m. compressor	3,000
One rock drill & equipment	500
	$ 6,000

(f) -
(g) -

(h) Explosives, etc. included in estimates 21-a-b-c

(i) Cost of sub-station and power line . . . . . $ 8,000

24. Time schedule:
Geological mapping - 1 week . . . . . $ 1,000

24. - Cont'd.

Drilling will depend upon availability of contractors and will vary if work is done by churn drill or by diamond drill and will include time required for moving rigs and set ups.

Estimated: 7 months of 26 days each	$76,800
Re-timbering vertical shaft.	
Estimated: 2 sets placed per shift - More or less one month of 26 days @ $80.00 per set including 6 x 8 timber with hanger rods Placed	3,600
X-cutting 300 ft. from shaft @ 4' per day (21-c) - 2½ months work incidental to above 1/2 mo.	5,100
Supervision - 10 months	12,980
	$98,480
Surplus for unexpected contingencies	1,520
TOTAL	$100,000

UNIVERSITY OF ARIZONA

TUCSON

College of Mines and Engineering
Department of Geology & Mineralogy

November 21st, 1929

Mr. A. L. Fritz
Tucson, Arizona

Dear Sir:

In accordance with your request, I here present an opinion on certain phases of the Geology of the Olive Camp area of the Pima Mining District, Pima County, Arizona.

It is the intention to discuss here not the detailed geology of individual properties, but rather the larger geological features of the area and district generally, which are of fundamental importance in the matter of ore occurence.

The discussion and opinion are based on brief personal observations made in the field, aided by a study of reports prepared by mining engineers and geologists for mining companies, by reports and maps prepared in the course of advanced degree studies by graduate students in Geology at the University of Arizona, and by the literature and government maps of the area and region.

The rocks of the immediate area comprise pre-Cambrian (?) granite, Mesozoic (Cretaceous) arkosic sedimentary beds, intrusive granitic rocks, and volcanic rocks which are chiefly andesite. The volcanics are either late Cretaceous or early Tertiary in age. Just outside of the area, particularly to the northward, occur thick formations of Paleozoic Limestone in quartzite.

The major structure of the area can not be definitely determined by the available surface or near surface geology. It is clear, however, that a great amount of fracturing, accompanied no doubt by at least some faulting has occured throughout the area. It is possible that folding is the most extensive type of minor deformation within the area and the cause of fracturing and faulting. Or it may be that the fractures were generated by stresses resulting from the uneven settling of a large volume of volcanic material from deep-seated to superficial positions. Or perhaps vertical upthrust of intruding magmas may have caused fracturing and faulting.

Mineralization apparently has been widespread. The rocks along fractures observed, whether on the surface or underground, have been more or less extensively altered. Ore deposition, in varying degree, seems

to have occurred wherever a master fracture was available to act as a channelway for ore-bearing solutions. The ore deposits are, in the main, of the fissure-filled type, locallized along major fractures, at the intersection of fractures, and in the brecciated zones.

It is fairly certain that intrusive granitic rocks underlie at variable depth the entire district of which the Olive Camp area forms a part. These intrusive rocks were probably the source of all primary mineralization in the district. The ore deposits that have been developed in the past in the Olive Camp area have been chiefly small high-grade silver-lead bodies, formed mainly by fissure-filling, but perhaps to some extent by wall-rock replacement, in the near-surface Cretacceous sedimentary and volcanic formations. In areas to the north and south important copper and zinc developments have been made and from which considerable tonnages of ore have been mined in the past. These deposits are principally replacement bodies in Paleozoic limestone. It appears, therefore, that replacement bodies in limestone form the important type of ore deposits for the district.

The question of major structures, and character and thickness of formations forming that structure, thus appear to be the essential questions relative to the probability of extensive ore occurrence at depth in the Olive Camp area. If the ore-bearing limestone formations of the Mineral Hill-San Xavier area to the north and of the Twin Buttes area to the south are continuous or occur under the Olive Camp area, then the probability of occurence of important commercial ore deposits at depth in the latter area is greatly increased. The problem would then become one of probable depth to the favorable horizon and the determination of dominant or master fracture zones.

Mr. J. C. Anderson, in his report on the Swastika property, page 4, sets forth certain evidence and a statement of belief that limestone does occur below the superficial formations of the area. That there is more than a possibility that these Paleozoic limestone formations do exist below the surface formations in the Olive Camp area is not an idle statement nor one made for convenience. Even brief field study of the strat'graphy and structure in this area and that immediately to the north, in the San Xavier area, justify the statement that this stratigraphy condition might exist. But more convincing still are similar indications in the results of recent detailed geologic mapping in that area to the immediate north.

The Olive Camp area appears to be a depressed geologic structure--either a down-warped (synclinal) or a down-faulted area.

The Paleozoic limestone formations of the San Xavier area distinctly dip to the south (20° - 25°), apparently plunging under the Olive Camp area. The contact between Paleozoic limestone and Cretaceous arkosic beds occur along the southern border of the San Xavier area. The origin of this contact is not clearly indicated; it may be a normal formation contact, produced by a break or time interval in the deposition of sediments which formed the beds; or it may be a fault contact, produced by a major rupture. If this contact is an unconformity, as the first case suggests, the limestones extend to the southward uninterruptedly below the Olive Camp area. In the event that it is a fault contract, the limestones with their overlying sedimentary beds and volcanic formations, in the Olive Camp block have

have been faulted downward.

There is some basis, of course, for expecting that additional underground development may disclose other small high-grade silver-bearing ore shoots, such as were formerly worked in the area, or perhaps larger veins and breccia bodies or ore of commercial grade and size. But it is more logical to expect that, if commercially important ore bodies are to be developed in the area, they still occur as metasomatic replacement and contact deposits in limestone.

The problem of developing possible large ore bodies in the Olive Camp area thus resolves itself, in this opinion, to first ascertaining the presence or absence of underlying limestone beds.

Preferrably, such development should be carried on by drilling operations. And in so doing, if the location of drill holes is carefully planned, it is probable that relatively near-surface vein or breccia type of deposits of value may be encountered while the deeper prospecting is in progress.

The depth at which the limestone, if present, may occur is highly problematical; if in a synclinal structure, it may be comparatively shallow, if block-faulted, it may lie much deeper - 2000 feet or more.

Yours very truly,

(signed) R. J. Leonard

Copy: Original on file

Form MF-103
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Budget Bureau No. 42-R1035.
Approval expires 6-30-51.

APPLICATION FOR AID FOR AN EXPLORATION PROJECT PURSUANT TO MINERAL ORDER 5, UNDER DEFENSE PRODUCTION ACT OF 1950

DO NOT FILL IN THIS BLOCK

Docket No. dma 1722 X

Date received 6-25-51

Participation

Tucson Mining Co.
133 N. Stone Ave.
Tucson, Arizona.

Name and address of applicant

DEPARTMENT OF THE INTERIOR
Defense Minerals Administration
JUN 25 1951
Date Received June 18th, 1951

FILL IN THIS BLOCK

Date of application June 18th, 1951

Estimated cost $100,000.00

Mineral or metal Lead-Zinc-Copper

Percentage of Government participation 50%

Location of mine Pima Mining District
PIMA COUNTY, ARIZONA

Date of filing MF-100 May 29, 1951

DMA Docket Number, if available

INSTRUCTIONS

Read Mineral Order 5, Regulations Governing Government Aid in Defense Projects, before completing this application. Submit four signed copies of the application to Defense Minerals Administration, Department of the Interior, Washington 25, D. C., or to the nearest field executive officer thereof, with your name and address on each sheet of the application and all accompanying papers. If any question is inapplicable, or if you cannot answer it, so state on the form. Where the space provided for answer is insufficient, answer on a separate sheet, annex it to the application form, and refer to it in space for answer. If the application is approved, you will be presented with an exploration project contract on Form MF-200, for your signature.

THE APPLICANT

*1. Is applicant an individual, partnership, or corporation?
*2. If a partnership, state names and addresses of partners.
*3. If a corporation, state names and addresses of officers, directors, and five largest stockholders.
*4. Describe the mining and general business experience of (*a*) the applicant, and (*b*) the person or persons who will manage the project.
*5. Are you the owner or the lessee of the property?
6. If owner, state what claims, liens, or encumbrances, if any, are against the property.
7. If lessee, attach a copy of the lease and state if it is in good standing.

NOTE.—It will be necessary to procure and attach to the exploration project contract agreements of claimants, lienors, encumbrances and lessors subordinating their interests in the property to the interest of the Government under the contract.

8. Furnish current financial statement, showing assets and liabilities, and a profit and loss statement.
9. How much money is applicant prepared to invest in proposed project? Is it sufficient to pay your part of the cost of the project as detailed in question 23 of this application form, in accordance with the regulations on Government participation (Section 9 of Mineral Order 5)?

*If you have already answered these questions on MF-100, you are not required to answer the questions for this application.

16—64067-1

THE PROPERTY

10. (*a*) Give a description of the real property that will be in any way involved in the exploration project, including any existing mine or operating property.
    (*b*) Give the legal description of the exact parcel, plot, or area upon which the exploration is to be conducted.

    NOTE.—If both areas are the same, so state. The only obligation to repay the Government is from the net earnings from any commercial discovery made in the area specified in (*b*) above in which the exploration is to be conducted, and the expenditure of funds which may be charged as costs of the project must be limited to that area or to work necessary to perform the exploration in that area.

*11. State the present and former names of the property, if any.
*12. State, in detail, the location of the property with reference to towns, railroads, roads, shipping points, including distances and directions and kinds and conditions of roads.
*13. State source and quantity of water available for operations and its sufficiency at all seasons.
State amount of power to be used, rate per hour or other cost, and source.
*14. Describe any existing useable facilities, equipment, buildings, or structure now on the property that will be devoted to the exploration work.
15. State in detail how the ore could be shipped and how and where milled.
*16. History:
    (*a*) Give a statement, as complete as possible, of previous exploration, development, operation, and production of property, with reasons for any past suspensions of operations.
    (*b*) State briefly the known history and production of adjoining and neighboring properties.
    (*c*) Furnish any available (private) reports that may apply to this application, including results of mine examinations, recommended exploration and development, and metallurgical investigations.
*17. Production:
    (*a*) If mine is in production, furnish the following information:

	Tons per day	*Grade or analysis*	*Cost per ton*	*Net value per ton*
(1) Mining				
(2) Milling				
(3) Shipped or sold				

*18. Ore or mineral reserves: (If property is or has been operating.)
    (*a*) Describe the ore or mineral deposits briefly.
    (*b*) Submit available maps and assay data.
    (*c*) Give estimated tonnage and grade of each class of ore reserves.
19. State any conditions or circumstances regarding the property not sufficiently brought out by the foregoing questions.

THE EXPLORATION

20. For what mineral or minerals and for what types of deposits and ores will the exploration be conducted?
21. Describe briefly, but concisely, the proposed work and the estimated time required to complete it.

    NOTE.—The Government will not participate in a project that will require more than 2 years to complete.
22. Furnish statement of the geological basis of the project with particular emphasis on factors leading the operator to expect the finding of commercial ore bodies. This statement should be accompanied by supporting maps such as geological maps, maps of the proposed openings and assay maps, sample lists, and other pertinent data.

THE REQUIREMENTS AND COSTS

23. Tabulate in the form of an itemized statement with a sum for each item the estimated requirements and costs of the project so that the total will give the estimated cost of the project in which the Government will participate, as follows:
    (*a*) Labor, by numbers and classes (miners, muckers, millmen, etc.), with wages of each.
    (*b*) Supervisors, by numbers and positions, with salaries of each.
    (*c*) Cost of necessary repairs to existing facilities, structures, and buildings.
    (*d*) Cost of necessary installation or construction of additional facilities, structures, and buildings.
    (*e*) Cost of items of equipment, not now owned by the applicant which must be purchased for operations at a cost of $50 or more each.
    (*f*) Cost of rental for equipment which the operator proposes to rent.
    (*g*) Rental value of items of equipment which the operator now owns and which will be devoted to the work.
    (*h*) Cost of materials and supplies, including items of equipment costing less than $50 each.
    (*i*) Cost of power, water, utilities, and any other items not provided for above.
24. Furnish a time schedule of the project, stated in terms of months after project is approved, showing progress expected to be accomplished and the money expected to be spent.

CERTIFICATION

The undersigned company, and the official executing this certification on its behalf, hereby certify that the information contained in this form and accompanying papers is correct and complete to the best of their knowledge and belief.

Tucson Mining Co. (Name of company) By G. Warren Hassler (Signature of authorized official)

June 20, 1951 (Date) General Partner (Title)

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.

*Same as footnote on page 1.

16—64067-1 U. S. GOVERNMENT PRINTING OFFICE

Form MF-101
(April 1951)

U. S. DEPARTMENT OF THE INTERIOR
DEFENSE MINERALS ADMINISTRATION

Form approved.
Budget Bureau No. 42-R1027.

(MF-101 Should Be Filed With General Technical Data Form MF-100)

APPLICATION FOR GOVERNMENT LOAN

In Excess of $50,000

Under the Defense Production Act of 1950

NOT TO BE FILLED IN BY APPLICANT

Docket No. DMA 17223X

Date received 6-25-51

Name and address of applicant

Tucson Mining Co.
133 N. Stone Av.
Tucson, Arizona

Date of application

Amount of loan requested

Terms of loan requested

If you have already filed MF-100, give dates filed May 29, 1951, type of assistance requested ....., DMA docket number (if available) .....

INSTRUCTIONS

Application should be filed with Defense Minerals Administration, Department of the Interior, Washington 25, D. C. Submit four copies of this application with four copies of General Technical Data Form MF-100. If the latter form has been filed previously with an application for Government assistance, it is not necessary to file it again. However, the applicant should indicate in space provided above the type of assistance previously applied for (loans, procurement contract, etc.) and DMA docket number, if available.

Name and address of applicant should be stamped or typed on each sheet of the application and all accompanying papers. *When a question is inapplicable, it should be so stated on the form.* Additional sheets may be attached in answering any questions or in supplying additional information. IF YOU CANNOT ANSWER A QUESTION, SO STATE. If a question is answered elsewhere in the application, indicate where answered. It is not necessary to answer it again.

1. PURPOSE OF LOAN:

Give a brief general statement of the purpose of the loan requested, including in the table below estimated amounts for such major purposes as land acquisition, building construction, purchase of plant, purchase of equipment, working capital, repayment of debt, etc. Statement should make clear whether funds will be used for expansion of capacity, development of technological processes, or production of essential materials.

General Statement. To rehabilitate present mine workings, develop, and prepare for mining the known ore body construct a concentrating plant.

NATURE OF EXPENDITURE	AMOUNT
	$250,000.00
TOTAL AMOUNT APPLIED FOR	

2. PROPOSED METHOD FOR REPAYMENT OF LOAN:

Royalty Payments from the Sale of Concentrates

16—64203-1

3. ALTERNATIVE METHODS OR FACILITIES:

Are there available alternative methods or facilities to accomplish the same purpose as that for which these funds are intended? (For instance, unused capacity, possibility of multiple-shift operations, idle facilities, readily convertible equipment, subcontracting.) If answer is yes, explain why alternatives are not used.

---

4. OWNERSHIP OF PROPERTY:

(*a*) Attach copy of the deeds, leases, or other documents conveying to applicant the present interest of the applicant in the mining property.
(*b*) If applicant has assignment of a lease or other document, attach also a copy of such lease or other document. If any such documents are executed under a power of attorney or a trust agreement, attach copy of such power of agreement.
(*c*) Include all recording data if available, giving page, book number, and where recorded.
(*d*) If property is held under lease, state whether lessor will subordinate royalties to Government interest under terms of assistance now applied for.
(*e*) Outline briefly any agreement or close affiliation of applicant with other individuals or concerns (whether through stock ownership, partnership, interlocking directorates, mutuality of management, or otherwise) that may have a bearing on this project.
(*f*) Give names and addresses, so far as known, of former owners and lessees of property.
(*g*) State in detail all expenditures made on property by applicant; also state amount expended by owner (if other than the applicant) or by any other person who has a remaining interest in the property.
(*h*) State nature and amount of existing liens against property or against future production (e. g., unliquidated RFC development loans, etc.).

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5. LEGAL DESCRIPTION OF PROPERTY:

(*a*) Give name and mineral survey number of patented claims, if any, and a map.
(*b*) Give names, dates of location, and place, date book, and page record of all unpatented locations, and a map.
(*c*) If property is other than mining claims, give description by lot numbers, metes and bounds, or according to accepted legal practice.
(*d*) If mineral rights are separated from surface rights, or if any conflicting or overlapping rights exist in the property give full explanation.

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6. SAMPLING AND ASSAYING:

Describe how and by whom sampling was done, whether by grab, channel, drill, or otherwise, and state by whom analyses were made. Furnish assay certificates or copies thereof and assay maps, if available.

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7. CLIMATE:

Describe climate insofar as it affects project (rainfall, snowfall, temperature range).

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8. NEEDED FACILITIES AND LABOR:

(*a*) Describe in detail and give estimated cost (power, housing, etc.). List equipment needed and give estimated cost.
(*b*) State total number and classes (miners, muckers, milling, etc.) of men that will be employed during a representative payroll period when maximum production is reached.
(*c*) State number of shifts now being operated and number to be operated under maximum production.

---

9. EXPLORATION AND/OR DEVELOPMENT (answer only if applicable):

(*a*) Destribe in detil what work is to be done, using maps to show location and extent and explain purposes thereof. Include description of any necessary rehabilitation work, clean-up, unwatering, etc.
(*b*) Give detailed costs (per foot, and total for each phase of project) of the foregoing.
(*c*) State time required to complete.
(*d*) State expected tonnage and grade of ore that will be developed.
(*e*) Describe probable mining method briefly and estimate cost per ton to mine and mill. State grade of ore mined and mining costs (if known), in operations on this property and in neighboring operations, past or current.

---

10. MINING (answer only if applicable):

(*a*) Describe mining methods briefly, whether proposed or already in use.
(*b*) Itemize rehabilitation and other initial expenses, including equipment, buildings, roads, etc.
(*c*) Give actual (current) or estimated mining costs, suitably detailed, per ton of ore. Include all operating expenses.
(*d*) State time required to reach given rate of production.

16—64203-1

15. RECENT EFFORTS TO OBTAIN CREDIT:

(*a*) Banks—List names and addresses of all banks of deposit of applicant within the last 5 years: (*Mark with an asterisk* (*) *bank or banks in which deposits are now kept*).

(*b*) State efforts to obtain credit, within 60 days preceding date of application, from banks, the Reconstruction Finance Corporation, or other sources, results and reasons if refused. (NOTE.—Section 302 of the Defense Production Act of 1950 states that a loan may be extended "only to the extent that it is not otherwise available on reasonable terms." Accordingly, applicant should show that it has applied to each bank named in (*a*) above, or explain the reason for not doing so. The fact that a loan of the particular maturity and terms applied for is refused by a bank or banks is not sufficient to comply with the statute, if credit on reasonable terms is available. State whether a bank will participate in the loan, and if so, state name of bank and amount of participation. Full particulars must be given.) List the names and addresses of banks and other lending institutions to which applications for credit have been made, and in each case state date of application, amount of credit available, if any, maximum term for which credit is available, what consideration, if any, was given to possible guarantee of loan under Federal Reserve Regulation V, and reason for refusal or reason loan was not obtained. Indicate whether or not application was definitely refused for further credit on any basis:

16. FEDERAL AID:

What other forms of Government financial assistance, if any, have been received or requested by the applicant in connection with the purposes of the loan herein applied for? If applicant plans to request such assistance in the future, give details:

17. MANAGEMENT, INSURANCE, ETC.:

These subjects should be fully covered in statements attached hereto. Outline past management experience or other basis for showing competence of the applicant to perform in accordance with expressed purpose of the application. If it is proposed to construct or acquire new facilities (including equipment), state estimated cost and basis of such estimate, form and terms of payment, and from whom purchases of facilities will be made. State whether applicant, or the business or plant, has been in receivership, bankruptcy, in hands of creditors, committee, or whether applicant has effected a compromise with creditors, and if so, discuss fully. List type and amount of insurance carried on plant property. Describe briefly any pending or threatened litigation affecting applicant.

11. MILLING (answer only if applicable):

(*a*) If ore is to be treated in applicant's mill or in a leased mill:

(1) State capacity, percentage of extraction, ratio of concentration, and submit flow sheet of mill.
(2) Describe mill building, condition of same, etc.
(3) Give inventory of equipment in mill building. State whether in good working condition.
(4) State rental cost if leased mill.
(5) State whether there is ample room for disposal of tailings.
(6) State whether tailings pollute any streams, lakes, or other sources of water supply.
(7) Submit tables showing complete total tonnage treated, tonnage of concentrates made, and analyses of heads, concentrates, and tailings, for the last year of operation.
(8) State itemized cost of remodeling, additional equipment, repairs, and other initial expenses to start milling. State time required to start operation.
(9) Give detailed milling cost, actual (current) or estimated, per ton of ore treated and ton of concentrates produced.

(*b*) If ore is to be treated in (sold to) a custom mill:

(1) State name, address, and owner of custom mill.
(2) Submit complete records of past shipments, if any, including latest year's settlement sheets.
(3) If no past history of custom milling, submit open schedule or special agreement with proposed custom mill.
(4) Give distances and current rail freight rates and trucking rates involved in shipment of ore to custom mill.
(5) Estimate net mill returns per ton of ore, and per day, month, or year.

(*c*) If applicant proposes to build a mill:

(1) Describe proposed milling operation.
(2) Submit a flow sheet of the proposed mill, and state capacity.
(3) Submit copies of all metallurgical or other tests.
(4) Describe mill site, showing location of mill with respect to mine.
(5) State whether there is ample room for disposal of tailings.
(6) State whether tailings may pollute any streams, lakes, or other sources of water supply.
(7) Submit detailed cost of proposed mill.
(8) Submit, if available, plans and specifications of proposed mill.
(9) Submit estimated milling cost per ton of ore, percentage recovery, ratio of concentration, grade of concentrate, and cost per ton of concentration. Include all operating costs.
(10) Estimate time required to complete construction.

12. SMELTING (answer only if applicable):

(*a*) If ore or concentrates are to be sold to a custom smelter:

(1) Give name and location of smelter.
(2) Submit complete record of past shipments and returns, so far as available, including settlement sheets for latest year of operation.
(3) If no current smelting contract is in effect, submit open schedule of smelter or special agreement from smelting company.
(4) Give distances and current rail freight and trucking rates involved in shipment of ore or concentrates to smelter.
(5) Estimate smelter returns of the project, per ton of ore or concentrates and per day, month, or year.

13. TIMING:

(*a*) On what date(s) are the requested funds needed? _____

_____

(*b*) On what expected date(s) will applicant begin to use such funds and obtain output from the use of such funds? Wherever possible, give planned schedule of output. _____

_____

14. CERTIFICATE OF NECESSITY:

Have you filed or do you intend to file applications for necessity certificates for tax amortization (under section 124A of the Internal Revenue Code)? If so, indicate below:

Date of Application (a)	Government File No. (b)	(Estimated) Total of Facilities in Dollars on Each Application (c)	If Final Action Has Been Taken, Give Date of— (d)	
			Issuance	Denial

16—64203-1

21. COMPENSATION SCHEDULE—continued:

The term "compensation," as used herein and such schedule, shall include all salaries, fees, bonuses, commissions, retainers, regular drawing accounts, and other payments, direct or indirect, in money or otherwise, for personal services.

Name (a)	Position (b)	Compensation Paid During Previous Fiscal Year (c)	Present Compensation (d)

22. COLLATERAL:

(*a*) The applicant offers the following-described collateral as security for repayment of the loan applied for:

Description (a)	Date Acquired (b)	Cost (c)	Book Value (Net) (d)	Appraised* Value (e)
Property now held:				
To be acquired:				

Future Production Description	Date Expected To Reach Full Production	Gross Value	Net Value

*This column need be filled in only if a recent appraisal has been made. If so, identify appraiser below.

Name (a)	Title (b)	Date (c)

(*b*) Describe existing liens, if any, on property listed above.

16—64203-1

18. NAMES AND ADDRESSES OF OFFICERS, DIRECTORS, OR PARTNERS, AND IN ADDITION THERETO, THE FIVE LARGEST STOCKHOLDERS IF A CORPORATION:

Name and Address (a)	Official Title (If Officer Is Also Director, Indicate by "D") (b)	Total of Annual Salary, Commissions, Bonuses, Etc., Received From Applicant and Affiliates During Last Fiscal Year (c)	Estimated Net Worth Outside of Applicant (d)	Number of Shares Held in Applicant		Life Insurance Carried for Benefit of Applicant	
				Common (e)	Preferred (f)	Amount (g)	Net cash surrender value after loans (h)
	Total		x x x x x			x x x x x	x x x x x

19. CAPITAL STOCK ISSUES:

FOR CORPORATE APPLICANTS

Item	Authorized (a)	Outstanding (b)	Par Value (c)	Number of Shares Outstanding (d)	Dividend Rate Last Paid (e)
Common stock	$	$	$		
Preferred stock	$	$	$		

20. PURCHASE AND SALES RELATIONS WITH OTHERS:

Does applicant buy from, sell to, or use the services of, any concern or partnership in which an officer, director, large stockholder, or partner of the applicant has a substantial interest? If not, so state. If so, give names of such officers, directors, stockholders, and partners, and names of such concerns or partnerships.

Does any officer, director, large stockholder, or partner of applicant receive any commission, bonus, or other payment in cash or services from any concern or partnership with which applicant has business dealings? If not, so state. If so, give names of such offices, directors, stockholders, or partners and amounts of such commissions, bonuses, or payments.

21. COMPENSATION SCHEDULE:

Instructions: The schedule shall show the amount of compensation being paid to all employees of applicant receiving compensation at a rate in excess of $10,000 per annum, including employees paid on a part-time basis where the rate of compensation exceeds $10,000 per annum computed on a full-time basis. If applicant is a corporation, the schedule should show the compensation, regardless of amount, being paid to all officers, directors, and such stockholders as have an interest in applicant's business of 10 percent or more. If applicant is a partnership, the schedule should show the compensation being paid to, or being withdrawn by, all partners for their personal use. If applicant is an individual, the schedule should show the amount being withdrawn by applicant for his personal use. In each case the listed person's connection with the business should be indicated (i. e., whether an officer, director, stockholder, partner, owner, etc.). The calendar basis for the compensation should likewise be shown. Attorneys or firms of attorneys on a regular retainer or salary basis should be included. The schedule should include a separate notation indicating the source and amount of any compensation being paid by a company or firm directly or indirectly controlling, affiliated with or controlled by, applicant. If the space provided herein is insufficient, the schedule should be continued on the reverse side or appropriate continuation sheets should be attached.

16—64203-1

23. CURRENT FINANCIAL STATEMENT, As of _____
(Date not more than 30 days prior to date of application)

ASSETS

Current Assets			
1. Cash			$
2. Notes receivable		$	
Less reserve for doubtful notes			
3. Accounts receivable:			
Current	$		
Past due not over 4 months			
Past due over 4 months		$	
Less reserve for doubtful accounts			
4. Inventories:			
Raw materials	$		
Work in process			
Finished goods		$	
Less reserve for inventory losses			
5. Other current assets (describe)			
TOTAL CURRENT ASSETS			$
Fixed and Other Assets			
6. Plant used in business:			
Land	$		
Buildings			
7. Machinery			
8. Equipment, furniture, and fixtures		$	
Less reserve for depreciation			
9. Investments—stocks and bonds			
10. Investments in affiliated companies			
11. Receivables due from affiliated companies			
12. Real estate not used in business			
13. Due from officers, directors, employees, stockholders			
14. Deferred charges			
15. Other assets			
TOTAL ASSETS			$

LIABILITIES

Current Liabilities			
16. Notes payable (see schedule 1, page 8):			
Banks		$	
Trade creditors			
Officers, stockholders, relatives			
Insurance companies			$
17. Accounts payable			
18. Other current liabilities:			
Delinquent taxes: Real estate		$	
Delinquent taxes: Federal			
Wages and salaries			
Due officers			
Accrued interest, rent, taxes, wages, etc			
TOTAL CURRENT LIABILITIES			$
Fixed and Other Liabilities			
19. Machinery liens			
20. Mortgage debts (see schedule 2, page 8)			
21. Bonds or debentures (see schedule 2, page 8)			
22. Other liabilities			
Net Worth			
23. Common stock (if applicant is incorporated)		$	
24. Preferred stock (if applicant is incorporated)			
25. Surplus (if applicant is incorporated)			
26. Capital and surplus account (if applicant is partnership or individual)			
TOTAL LIABILITIES			$
27. Contingent liabilities (explain)			$

NOTE.—Submit copy of last available audit or of financial statement at close of last fiscal period (if such date differs from date of above statement).

10—64203-1

CURRENT FINANCIAL STATEMENT—Continued

SCHEDULE 1—NOTES PAYABLE (in detail)

NAME AND ADDRESS	MATURITY	AMOUNT	STATE AMOUNT AND CHARACTER OF COLLATERAL	NAME OF GUARANTOR(S) AND/OR ENDORSER(S)

SCHEDULE 2—MORTGAGE DEBT (real estate and/or chattels) OR BOND ISSUE

NAMES AND ADDRESSES OF HOLDERS	DATE OF MATURITY	INTEREST RATE	UNPAID PRINCIPAL AMOUNT	DATE TO WHICH INTEREST IS PAID
TOTAL	x x x x x x	x x x x x x	$	x x x x x x x x x x x x x x x x x x

If mortgage secures a bond issue, state whether bonds are principally held by management and/or stockholders or by others, and attach copy of mortgage indenture.

24. CONDENSED COMPARATIVE STATEMENT OF INCOME AND EXPENSES

For years ended _____
(Insert date of end of fiscal year)

(000.00 omitted)

	(FIGURES FOR 3 PRECEDING YEARS)			CURRENT YEAR AS OF DATE OF EXHIBIT A
	19	19	19	
1. Net sales				
2. Cost of goods sold				
3. Gross profit on sales (line 1 minus line 2)				
4. Other income (itemize)				
5. Total (line 3 plus line 4)				
6. Salaries (officers or partners)*				
7. Selling and all other expenses				
8. Total of lines 6 and 7				
9. Profit or loss before depreciation and Federal taxes (line 5 minus line 8)				
10. Depreciation				
11. Federal income and excess profits taxes				
12. Net profit or loss (line 9 minus lines 10 and 11)				
ANALYSIS OF SURPLUS				
13. Total surplus at beginning of period				
14. Net profit or loss for period				
15. Line 13 plus line 14 if profit; line 13 minus line 14 if loss				
Add:				
16. Surplus paid in during period				
17. Surplus resulting from revaluation of assets				
18. Other additions to surplus (itemize)				
19. Total of lines 15 to 18, inclusive				
Deduct:				
20. Dividends				
21. Other charges to surplus (itemize)				
22. Total of lines 20 and 21				
23. Surplus at end of period (line 19 less line 22), MUST AGREE WITH SURPLUS AS SHOWN IN BALANCE SHEETS				

*To include all payments of any kind (commissions, bonuses, withdrawals) to officers or partners.

NOTE.—If years included in the above tables are not adequately representative of applicant's financial experience, information may be submitted for additional years.

16—64203-1

25. CONDENSED COMPARATIVE STATEMENT OF CONDITION, For years ended _____
(Insert date of end of fiscal year)

(000.00 omitted. Use figures to nearest thousand. For instance, the figure $3,489.36 should be written as 3; the figure $3,689.36 should be written as 4)

ASSETS	(Figures for 3 Preceding Years)			Current Year as of Date of Exhibit A
	19	19	19	
Current Assets:				
1. Cash				
2. Receivables (after deducting reserves)				
3. Inventories				
4. Other current assets:				
Total Current Assets				
Fixed and Other Assets:				
5. Plant accounts (before depreciation):				
Machinery, equipment, etc				
Delivery equipment				
Real estate and buildings used in business				
6. Other assets (as investments, real estate not used in business, etc.):				
Total Assets				
LIABILITIES				
Current Liabilities:				
8. Notes payable				
9. Accounts payable				
10. Accrued liabilities				
11. Other current liabilities:				
Total Current Liabilities				
Fixed and Other Liabilities:				
12. Mortgage debts				
13. Debentures				
14. Other fixed liabilities:				
Reserves:				
15. Reserve for depreciation				
16. Other reserves:				
Net Worth:				
17. Common stock (issued) (if applicant is incorporated)				
18. Preferred stock (issued) (if applicant is incorporated)				
19. Surplus (if applicant is incorporated)				
20. Capital and surplus account (if applicant is partnership or individual)				
Total Liabilities				

Note.—If years included in the above table are not adequately representative of applicant's financial experience, condition statements may be submitted for additional years.

16—64203-1

COMPENSATION AGREEMENT

AGREEMENT AS TO COMPENSATION FOR SERVICES RENDERED OR TO BE RENDERED TO APPLICANT IN CONNECTION WITH APPLICATION AND/OR LOAN

To induce the United States Government and its agencies to make a loan under Sec. 302 of the Defense Production Act of 1950 to ..... (hereinafter called "Applicant") and in consideration of the making of a loan to applicant, the undersigned, having been retained by applicant for the purpose of rendering professional or other services in connection with its application for a loan or loans, hereby represents, warrants, and agrees that the undersigned has not been paid, has not made any agreement with the applicant to be paid, and has not procured any person to pay or agree to pay, and will not, directly or indirectly, charge or receive any bonus, fee, or commission in any form in connection with the said application for, or the obtaining of, the loan applied for by the applicant, or any compensation in any form for services rendered or to be rendered in connection therewith except for the services and in the amounts stated below:

NAME	DESCRIPTION OF SERVICES	AMOUNT PAID	AMOUNT TO BE PAID
		$	$

To induce the making of the loan and the employment of the undersigned by applicant, the undersigned hereby further warrants, covenants, and agrees, upon the consideration herein specified, and in consideration of the employment of the undersigned by applicant, as above recited, that if the amount of compensation stated above for any such services shall not be deemed reasonable by any agency of the United States Government, the undersigned will reduce the charge for such services to such amount as shall be deemed reasonable by such agency, and will not, directly or indirectly, charge or collect from the applicant or any other person, any sum in excess of the amount so deemed reasonable; and that if the undersigned has heretofore collected, from the applicant or any other person, as compensation for any such services, any amount deemed by such agency to be unreasonable, the undersigned will refund to applicant or such other person such sums as are in excess of the amount deemed reasonable. The undersigned further warrants, covenants, and agrees that if the amount of the compensation for any such services is not determinable at the date of application, or is not stated above, it will not collect or charge any sum as compensation for such services without the prior written approval of the Government agency with which this application is officially filed as to the nature of the services for which such compensation is to be paid and the amount of such compensation.

Witness: .....

Address of witness:

.....

Dated ....., 19....

NOTE.—Corporations must execute foregoing certificate in corporate name, by duly authorized officer, and seal must be affixed and duly attested; partnerships must execute in firm name, together with signature of a general partner. If no compensation is paid or to be paid for services rendered in connection with application or loan, this should be so stated and the applicant should sign this exhibit.

CERTIFICATION

The applicant hereby certifies that the statements made in the foregoing application, and all exhibits and documents submitted in connection therewith, are true and correct statements to the best of applicant's information and belief and are submitted as a basis for credit.

Dated June 21, 1951

Witness: Thelma H. Hardwick

(For individual applicants)

.....
(Signature)

Witness: J. Rollin Buchanan

(For partnership applicants)

TUCSON MINING CO.
(Full name of firm)

By G. Warren Kassler, a general partner.
(Signature)

(CORPORATE SEAL)

(For corporate applicants)

.....
(Full corporate name of applicant)

Attest: By .....
(Signature) (Title)

.....
(Signature) (Title)

The United States Criminal Code, U. S. C., Sec. 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.

16—64203-1 U. S. GOVERNMENT PRINTING OFFICE

To be attached to Form MF-101 - HELMET PEAK MIN

1. - Accomplished

2. - Accomplished

3. - No alternative methods of facilities to accomplish the same purpose as that for which these funds are intended, exist on the property.

4. - See letter attached

5. - CAMDEN-PROSPERITY GROUP:

(a) Tit for Tat (b) Prosperity (c) Camden (d) Camden No. 2 (e) Camden No. 3	All included in Mineral Survey No. 4048 as per attached map

6. - Sampling - by moiled channel cuts - 10 ft. intervals -- done under personal supervision of Mr. Sam S. Coldren, resident engineer.

7. - Climate - Mild winter weather, hot dry summer weather. Permits all year operation. Typical desert rainfall conditions. Water supply assured from deeper mine workings of the district and by drilling wells. The largest producing property, the San Xavier Mine pumps approximately one million gallons per day from the lower levels.

8. - (A) Power may be obtained by construction of 1/2 mile of transmission line, and installation of transformers. Present cost.....

Equipment required:

1 - Mine Hoist, size sufficient for 1,000 ft. depth. - Estimated cost.....	$6,000.00
2 - Mine Shop, Building 16 x 30 ft.	1,200.00
Equipment to include:	
(a) Steel sharpener.....	4,000.00
(b) Bit sharpenter.....	2,500.00
(c) Forge with attendant blacksmith tools	1,000.00
3 - Warehouse, with office combined	
(a) Building, 20 x 40 ft.	1,800.00
4 - Assay office	
(a) Building, 16 x 20 ft.	1,000.00
(b) Equipment sufficient for 40 determinations /day.....	5,000.00
5 - Mill Plant - capacity 150 short tons daily Constructed.....	$150,000.00

8. Cont'd.

(B) Twenty-five miners; Fifteen muckers using air hoists and scrapers, working on two shifts.

Twenty-seven men, working on three shifts, required in mill.

(C) Mine workings now in process of rehabilitation, unwatering, cleaning, retimbering levels, etc.

9. - (A) Unwatering and retimbering of the No. 1 or Main Shaft to the 250 ft. level. Drive from 250 foot level to a point below Billings Shaft (attached map) and raise for connection. Develop ore body indicated on attached map for horizontal cut and fill mining. Fill to be handled through Billings Shaft, and procured from surface, and handled to waste entry grizzly by bulldozer.

Drive 150 ft. level easterly from main shaft for exploration of that area, and connect by raises from 250 level for transmission of waste for stope filling.

(B) Cost per foot for drift work in this type of rock, averages $17.00 including necessary timber.

(C) Four months required to place the mine on a production basis of 150 tons per day, in this type of ore body.

(D) Approximately 100,000 tons of an average grade of $22.00 has been estimated. This is based on reports made by C. J. Sarle who sampled the property while the lower levels were being developed. And from recent sampling and surveys made in the "Billings" workings, recently cleaned out and sampled.

(E) Either horizontal cut and fill or top slicing may be used in this type of ore body. Probably cut and fill stopes in the principal central sections with top slicing of the fringes or irregular contacts.

No stoping of ore was done at the time the property was developed.

10.- Proposed Mining System

(A) Horizontal cut and fill stopes with raises at 100 ft. intervals, waste to be spread by scrapers powered by air operated double drum hoists, the waste to follow closely the ore cut advancing from both ends.

Top slicing of fringes or irregular contacts at extremities of the ore body.

11.- No exact estimate of the milling process applicable to this ore may be made until results of present ore testing have been obtained.

12.- The grade of the ore developed precludes direct shipment to smelter. It must be milled locally.

13.- (A) As early as possible.
(B) Immediately upon availability of funds.

14.- Intention is to file applications for necessity certificates for tax amortization.

15.- None

16. - None

17. - Fifteen years experience in mining and mining machinery business. The resident engineer employed at the property has had 27 years actual mining experience in the United States, Mexico, South America and the Philippines. Member American Institute of Mining Engineers, 1937.

Insurance - labor. Is carried with: Simis Insurance Service Agency
a branch of Lloyds, London
Office, Luhrs Building
Phoenix, Arizona

TUCSON MINING CO.
dma 1722 X

REPORT

ON THE PROPERTY OF THE

SWASTIKA COPPER AND SILVER MINING COMPANY

OLIVE CAMP, PIMA MINING DISTRICT

PIMA COUNTY, ARIZONA

by

JOHN CARTER ANDERSON, E.M.

NOTE:

In connection with the following report covering the properties of the Swastika Copper and Silver Mining Company, made by MR. JOHN CARTER ANDERSON, we desire to point out it has always been the policy of this company to seek and to follow the best technical advice possible to obtain.

Mr. Anderson is a distinguished engineer and geologist whose opinions are highly regarded and sought after by the better mining interests of the southwest.

Mr. Anderson is a member of the society of Economic Geologists, a member of the Metallurgical Society of America, a member of the American Institute of Mining Engineers, a registered engineer in Arizona, and the holder of a certificate of Reciprocal Registration from the Arizona State Board of Registration for Engineers.

Note:

The Swastika Group of mines is now owned by the MINERAL BELT MINES, INC.

TUCSON MINING CO.

JOHN CARTER ANDERSON

Consulting Mining Engineer

Arizona Office:
90 North Church St.
Tucson, Arizona

REPORT

on the property of

SWASTIKA COPPER AND SILVER MINING COMPANY

Olive Camp, Pima County, Arizona

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LOCATION and HOLDINGS:

The Swastika Group of 12 unpatented lode mining claims and fractions, including the Richmond (Linden), Emma E, Rich Hill, Alice, Glenn, West End, Beatrice, Horse Shoe, Republic, W. K., Flora, and Gem claims, is located at Olive Camp, 21 miles southwest from Tucson, at an elevation of about 3500 feet, and is reached by wagon roads from Tucson and from Sahuarita Station on the Tucson-Nogales Branch of the Southern Pacific, which is 8 miles east.

The five northern claims of the Group, the Rich Hill, Alice, W. K., Flora, and Gem Claims are at present bonded to other parties who have sunk an old shaft on the Alice to a depth of 165 feet and are now developing on the 150 foot level.

Olive Camp lies in relatively flat country, showing but a few low hills, with marked structural breaks on all sides, and is that part of the Pima Mining District lying between the San Xavier-Mineral Hill District on the north and Twin Buttes on the south. It is distinguished from those camps by the fact that it is almost wholly an area of igneous rocks while they are areas of sedimentary rocks intruded by igneous dikes and sills.

HISTORY:

A correct knowledge and interpretation of the history of Olive Camp is essential to any consideration of its future possibilities.

Like many another silver camp of the old days in Arizona, an authentic recorded history of the Camp is lacking and the total of its past production can be but approximated by a sifting out of the stories told by the old timers.

Fortunately, in the case of Olive Camp, though its days of prosperity are now nearly 30 years back, there remain in Tucson a number of solid, trustworthy men, the foundations of whose fortunates were laid in Olive Camp, including Messrs. Frank and Warren Allison, J. K. and Seward Brown and others, whose accounts may be accepted with confidence.

The Olive, the first mine located, now called the Olivette, was located in 1886 by Frank Allison, J. K. Brown, and another, and it is said that by 1887 there were 150 men leasing in the district and that shipments of ore were maintained continuously to the year 1893 when the falling prices of lead and silver closed the mines which, with the exception of the Richmond, have never since been worked.

The Richmond and Emma E., claims of the Swastika Group are said to have produced about $100,000.00 from shallow incline shafts and small stopes. In 1913 the main working on the Richmond was gutted by leasers who took out a considerable but unknown quantity of ore and left the mine as a leaser always does, with very little in sight. No serious attempt at development has ever been made and the greatest vertical depth reached in taking out this ore was 100 feet.

Endlining the Richmond to the east and on the same or related vein system is the Annette and next to it, the Olivette. Since starting this report, the writer has again talked with Mr. Seward Brown, the original owner of the Annette. He says that he took out $65,000 and left good ore in a winze at the bottom and in the end of a drift to the west. He also says that his brother, Mr. J. K. Brown, and Mr. Frank Allison and leasers, shipped from the Olive $750,000.00 and left ore in the bottom.

Still east of the Olivette on what is known now as the Wedge group, or Whitcomb Group, dump after dump shows the extent of the old work.

The Shumaker Group adjoining the Richmond on the south was another producer and a third of a mile southeast is the Prosperity Group with large dumps at several shafts, the deepest of which is said to be 310 feet on the incline. Other claims in the district also have records of production but the principal work and the greater part of the production centers in those here named.

There is no known record of production from any of these mines that can be verified, which is not strange, owing to the manner in which mines were worked with the number of leasers shipping irregularly as they got out sufficient tonnage of high-grade ore.

This ore is reported as running from 100 ounces to 300 ounces of silver per ton with upwards of 20% lead. The higher silver values are said to have come, as is to be expected, with those ores carrying grey copper rather than with the heavy galena ores.

The various claims, such as the Richmond, Olive, Wedge, and Prosperity, are reported as having produced from $100,000.00 to $750,000.00 or more each. Allison Brothers, who besides their own production ran a store and shipped ore for many of the leasers, claim a record of over $1,000,000.00 worth of ore shipped by them and estimate the production of the District at around $3,000,000.00.

As these statements are made by men of good standing, not now interested in the properties, it is fair to accord them consideration in estimating the past returns from the camp. From all the evidence at hand and from the number and size of the old dumps, the writer feels safe in assuming that the production for the district was in excess of the lower figure and not likely over the latter. Worked even in the careless manner in which they were certainly meant a good return for the amount of work done.

MINES IN ADJOINING DISTRICTS:

Equally important is a knowledge of the mines in the San Xavier-Mineral Hill District to the north and Twin Buttes to the south. These are contact and replacement bodies of base ores in limestone, but it is believed that the source of the mineralization in all the three camps is related and that deeper development in Olive Camp may lead to similar deposits which will be much larger and more permanent than the silver veins of the camp.

Chief among these mines are the following:

The Mineral Hill Consolidated, where a body of copper ore is being developed in garnet along a sill contact of granite between Limestone and quartzite, which is increasingly large on each deeper level with a body of mill ore from 100 to 200 feet wide on the 600, the deepest developed level. From the Vulcan, $300,000,00 worth of copper ore was taken through two old inclines which reached a vertical depth of about 300 feet. Increasing water which could not be handled through the old inclines, which reached a vertical depth of about 300 feet. Increasing water which could not be handled through the old inclines, which are now caved, shut this property down. A vertical shaft is being sunk to reopen the mine.

The San Xavier, nearest of the developed mines to the Richmond, has developed a big body of lead-zinc and copper ore to a depth of several hundred feet, proving it to be increasingly larger in depth. This property is owned by the Empire Zinc Co., a subsidiary of the New Jersey Zinc Company, and will undoubtedly be equipped with reduc-works and developed continuously when the policy of that Company requires further supplies of ore. These may be considered as real mines with assured futures. Other properties which have produced some ore, but which are not yet developed to the point of permanent mines, are the San Xavier Extension and the South San Xavier.

In the Twin Buttes, the Glance, Queen, Minnie, and Senator Morgan mines have in the past produced a total of several millions of dollars worth of copper ores from granite-limestone contact deposits, and present development on the Queen and North Star is blocking out large bodies of primary copper and copper-zinc ores which promise a still bigger future for the Camp.

GENERAL GEOLOGY OF THE OLIVE CAMP:

Unlike the San Xavier-Mineral Hill and Twin Buttes Districts where large bodies of copper and zinc-lead-copper ores are found in limestone, the silver veins of Olive Camp are found in a rhyolite porphyry, which at many points resembles and has often been mistakenly called quartzite. The original extent, thickness, and age of this formation is unknown, but it is believed to be a part of one of the early Tertiary flows.

The extreme north line of the rhyolite follows a general N. 70° E. break through the Gray Copper claim of the South San Xavier and the West Extension of San Xavier and San Xavier claims of the San Xavier property.

This contact is one of shearing rather than of a single strong fault and the porphyry, if not forming the hanging wall on the vein of the San Xavier, is not far in the hanging wall. Where seen on the surface, where the road passes by the shaft on the San Xavier, the contact has a steep dip to the south the same as the Paleozic limestones. In the underground workings of the South San Xavier, the contact where first cut, about 100 feet north of the shaft on the 150 foot level, is quite steep, but it is much flatter where it crosses the shaft between the 150 and 200 foot levels.

It is believed that limestone will be found below the porphyry over the whole area of Olive Camp but at what depth it is impossible to say, as the thickness of the porphyry is unknown. South of this contact the limestone is again faulted to the surface on the Ruby, Hoosier, and Vienna claims. Here again the lime has a south dip and is in contact with the porphyry which extends then unbroken, save by later igneous intrusions, for about three miles south, where limestone hills and granite flats again limit it. To the east is uplifted limestone of Helmet Peak (mountain) and the wash covered flats which extend down to the Santa Cruz river.

On the west is a granite flat, the actual contact being covered by recent wash.

Throughout the rhyolite area, particularly in the neighborhood of the veins, there has been a slight dissemination of pyrite, some of which was sufficiently cupriferous to stain the walls of the old mine workings with copper salts.

Pieces of the wall rock taken from any of the mines at depths below surface oxidation show a few tiny crystals of pyrite. It is the oxidation of this iron which has seamed and rusted the porphyry in surface exposures.

On the Rich Hill claim of the Swastika Group, a 165 foot shaft enters intrusive granite identical in character with that responsible for the mineralization in the San Xavier-Mineral Hill and Twin Buttes districts.

Where cut in the shaft this granite has an east-west strike and a very flat dip to the south, while the main veins of the camp dip to the north. In the shaft the contact shows some alteration of the porphyry and a little sugar quartz but no mineralization. Laterial work from the station on the 150 foot level, following a streak of pyrite with a little chalcopyrite and galena having a strike N. 70° E. and a dip to the north, is now showing veinlets and bunches of galena and copper-iron sulphides and zones of alteration in the porphyry, which seems to have taken a south dip at about the same angle as the granite. The work at this point is probably but a few feet distant from the granite cut in the shaft.

Also, intruding the rhyolite and best seen between the mines and the north line of the rhyolite are tongues of adnesite porphyry and a similar but more coarsely crystalline rock which are younger than the intrusive granite. At surface no connection can be traced between these andesite dikes and the mineralization. However, the dump at the Alpha and one of the dumps at the Olivette, that of the shaft on the north-south vein which crosses the main east-west vein, show some of the andesite.

Deeper development in the district must prove the relation of these two intrusives to the mineralization, but the writer is very sure that one or both of them are responsible for the ore deposition. As the granite has been so clearly proven to be associated with the origin of the ore bodies in the adjacent limestone areas, it is expected that a similar relation exists here.

The presence of grey copper in the ores from the Olivette and the Alpha where andesite intrusions have been found, and the presence of galena only in the veins on the Swastika group, where granite has been found, may indicate that both of them were mineralizers.

The writer first became interested in the possibilities of the Olive Camp when making a study of the geology of one of the mines in the San Xavier-Mineral Hill District. Since then he has spent much time in a study of Olive Camp to determine, if possible, what chances exist for finding larger bodies of ore at depth. This study has strengthened his belief that all veins of Olive Camp owe their origin to the intrusion of underlying formations by granitic or porphyritic rocks related to those which mineralized the limestone in the adjacent districts. The siliceous porphyry being more uniform in structure, harder and less yielding than the limestones, was cracked and fissured rather than penetrated by these intrusions and in these cracks and fissures was localized the travel of the mineralizing solutions which accompanied the intrusions, and so were formed the silver veins of the Camp.

Following the progression of mineralization which has been observed by the writer in his study of a large number of mines and mining districts in southwestern Arizona, it is his belief that if these veins are followed down below their present workings there will be a gradual change from lead-silver ores of the past to ores containing more and more zinc and finally to copper. If these veins continue on down to an intrusive contact, as it is believed they will, they may be expected to change in strike and dip to conform with the strike and dip of the intrusive and will then continue on down as contact veins. If in depth, limestone is found under the porphyry, as is the firm belief of the writer that there will be at some depth, there are good reasons to expect that copper deposits will have been developed on the contact with the intrusive, similar to the big contact copper deposits on either side of the camp. Herein lies, the writer believes, the real future of the district.

Unquestionably the porphyry is older than the uplift of the sediments, as it is intruded by the same granite which elsewhere in the district intruded and uplifted the limestone.

While there is yet no definite evidence to prove it, it is thought to be a part of one of the early Tertiary flows which covered the country. While the crystallization of the component minerals, especially the quartz, is better developed than in most of the rhyolite flows, it nowhere shows the coarsely crystaline texture to be expected in a mass of plutonic rock of this extent, and on the hilltops it shows the characteristic felsitic texture of a surface flow.

The general geological history of this part of Arizona can perhaps best be pictured by conceiving of a vast extent of sedimentary formations of Paleozoic and Mesozoic age, in places wholly or in part eroded away, then covered by a succession of andesitic and rhyolitic flows in early Tertiary time, covering the country as an ice sheet covers the northern waters in winter. Into this cover of sediments and flows was intruded in Tertiary time a batholitic mass of granite which broke up just as in the spring break up, the thick sheet of ice is broken up and engulfed by the water. Thus you see great blocks of the older formations floating as in a sea of granite in all directions and dipping at all angles, sometimes near together, sometimes widely separated by broad stretches of granite, sometimes exposing one of the lower beds of the series on surface and sometimes all but submerged in the granite. Subsequently faulting and erosion has carved the country into high and low relief and filled many a broad valley with a great thickness of wash which still further obscures the correlation of the formations in one camp with those in another.

In the case of the sedimentary rocks, which on fossil and lithological evidence can be studied and named and an age relation carried through and rocks of the same age recognized in many widely separated exposures. Much valuable work has been done along this line by Dr. Ransome, of the U. S. Geological Survey, in his paper,

"Some Paleozoic Sections in Arizona and their Correlation," and by others, but no attempt has ever been made to work out the much harder problem of a correlation of the igneous flow rocks which covered these sediments. The writer has not been able to find a single exposure of the rhyolite of Olive Camp where it is in other than fault contact with limestone which bound it on three sides, but feels quite sure that it is a part of these Tertiary flows, probably a thick one, and that at some depth below the present surface will be found the same series of Paleozoic sediments which abut its margins.

It has been widely believed to be the rule that the big end of an ore deposit was up and that a vein of good width and value could normally be expected to decrease in size and value with depth. However, the writer's observations and studies in southwestern Arizona are teaching him to look for exactly the opposite under certain geological conditions.

During the period of ore deposition which followed the intrusion of the granite batholith, extensive development of great fissure veins such as are found in other mining districts seem to have been lacking. Instead, contact and replacement bodies were formed in the intruded rocks near the intrusive granitic rocks or their related porphyritic offshoots. Travel of mineralizing solutions which accompanied these intrusions was confined to the contacts or to minor cracks and fissures and not to one or more main trunk channels such for instance as the big fault fissure gold veins in the flow rocks around Oatman.

Dikes and sills of porphyry reached far higher in the intruded rocks than the main contact and thus opened a way of escape for the solutions. Owing to the quick cooling of these dikes and sills, however, the upper, thinner portions were not open to the circulation of mineralizing solutions long enough for any large deposits to form on their contacts, nor was the force of the intrusion at its upper limit great enough to open big fractures in the intruded rocks. Some solutions carrying the lower temperature minerals, might, however, reach this high before their passage was sealed off, and branching off through such minor fractures as were developed, form small lead-silver veins. At greater depth and under slower cooling conditions, where the channels to the main magmatic mass below remained open a longer time, there was a long continued ore deposition, in favorable formations the solutions spreading farther and farther from the contact at greater depth.

The resultant ore deposit may never have reached to the present surface, or may be represented by surface outcrops almost insignificant in appearance and value. The outcrops of this type of deposit will vary in attractive appearance in proportion to the depth to which erosion has uncovered them. But at any point between the smallest of ore and the main contact below, if the structural conditions and enclosing wall rocks are favorable to the deposition of ores it is

probable that the big end of the deposit is down. A good illustration of this type of deposit is found at the Mineral Hill Consolidated where an intrusive sill of granite between quartzite and lime has formed a contact deposit of copper in the limestone which is much bigger and more continuous on each deeper level.

On surface there are scattering out-crops of copper carbonates below which shoots of carbonate ore were worked out to the 300 foot level without finding any big or continuous shoot of ore. On the 500 foot level, large bodies of garnet-chalcopyrite ore were found on top of the granite sill and on the 600 foot level, the garnet zone is still bigger. A cross-section of the ore deposit would be two inverted wedges. One of granite tapering out thinner and thinner as it approaches the surface and a similar one of ore.

MINERALIZATION:

The ores of the district as so far developed are of two classes: those silver-lead ores carrying their silver values in association with galena, and those in which the silver values are associated with grey copper. This second class of ore carries the higher silver values, shipments running up to 300 ounces of silver per ton, being reported. The straight galena ores are not known to have carried higher than 100 ounces silver per ton. The galena ores may be expected to carry less silver in depth, while the silver value in the veins carrying gray copper may persist to somewhat greater depths. Zinc blende is beginning to show in the ore from the bottom of the Richmond, as is also a little chalcopyrite or cupriferous pyrite; and according to Mr. Seward Brown, the bottom of the Annette and Olive beins was showing some zinc.

The zonal arrangement of the different metals in veins has been noted by a number of students of ore deposits in different regions, and the observations of the writer are continually adding proof to the zonal theory of the deposition of metals in southwestern Arizona. Of the commonly mined metals in Arizona the main contacts show, as a rule, clean copper-iron ores. At some distance above the contact the admixture with zinc begins, and still higher the ore will likely contain lead-zinc-copper, then lead-zinc, and in the more superficial veins, lead-silver. The vertical extent of these zones is variable, and there is usually a considerable overlapping of one zone with the next higher, which has given rise to the complex ores which are characteristic of many districts in this region. However, with few exceptions, it is safe to predict that the superficial lead-silver veins, from which the old timers took greater or less amounts of shipping ore, will have a limited vertical range, and that deeper development will find first zincy lead ores and finally copper ores. These ores will be lower in grade than the surface ores, but the increase in size of the deposit may far more than offset the lowering in grade.

The mines that are paying the great dividends in these days are the mines with large bodies of low grade ores, and in the opinion of the writer, the possibilities of silver veins like those of Olive Camp should not be considered as dependent on the finding of more and larger bodies of silver ores that the old timers took, but as to whether or not they are leaders to a large deposit of base metal ores. It is of course possible for properly directed lateral work byond the limited old workings to find additional shoots of the same silver ores, and once a working shaft is connected with the bottom of the old workings on the Richmond, drifts should be run as long as there is a vein to follow, even though the ore streak is very small, for the old timers found their ore by following the vein though it pinched down to but half an inch of ore.

VEIN SYSTEM:

The original vein of the Richmond has nearly an east-west strike and a dip of 25 to 50 degrees to the north, flattening somewhat in depth. This, or a parallel vein continues east and west through the endlining claims for a total distance of perhaps a mile, and several different ore shoots have been worked on the different claims. In the main incline of the Richmond it has well marked walls from 2 to 6 feet apart with vein filling of crushed country rock through which run streaks and veinlets of galena ore. The widest of these streaks now to be seen in the mine, in an east drift on the 90 foot level, is but 4 inches wide but it is reported, and is indicated by the old filled stopes, that these streaks would open out to as much as 3 feet in width. This seems to have been characteristic of the ore shoots in all of the old mines. A similar and probably related vein is opened on the Emma E. Claim, endlining the Richmond on the west, by a number of small inclines, which from the dump, must have followed one of these ore shoots.

In the main incline on the Richmond this east-west vein is cut by branching fractures of varying strike and dip, some of which show galena. It appears that there may be a series of small branching and intersecting fissures any of which may contain ore.

On the bottom level, about 80 feet northwest of the shaft is a 50 foot winze. Above this is an old partly filled stope about 40 feet long and extending at least that far above the level. It is here that the leaser in 1915 is said to have taken out the ore he shipped. The vein in the stope is quite flat and where the winze was sunk, is crossed by another break dipping about 55° which is the one followed by the winze. The main vein dips off in the hanging wall of the winze. Small stringers of galena show in both veins, but at this point are not of workable size.

Early in this year, the winze was sunk to 50 feet below the level, and 38 feet below the level a flat slip with a slight dip to the southwest crossed the winze, cutting off the clips on which it was sunk. Below this, all four sides of the winze showed low grade ore. The writer saw this showing when the winze was about 18 inches below the slip, and at that time noted with great interest the change and

manner in which the decending slips seemed to cut off. Above the slip is the north dipping vein with a little quartz and galena, below it is largely quartz and some galena. The winze continued in this ore for about 12 feet, cutting off in the bottom on another flat slip. All sides of the winze were in ore and some very good pieces of galena were taken out, but with the lower slip, water came into the shaft, rising nearly to the upper slip. This shut down the work as there was no way to handle the water.

The writer regrets very much that he did not have an opportunity to see the bottom of the winze before it was flooded and note exactly the change that came in below the ore for this is apparently a flat vein, probably conforming in strike and dip to the underlying property intrusion. This would have done much to furnish the information which is essential to a proper location of any new work. While the ore is not of shipping grade, it is mill ore and apparently a much stronger vein than those originally worked. Its encounter greatly increased the writer's opinion of the future possibilities of the property and confirmed his belief that the property warrants the expenditure of the amount necessary to prove it. It strengthens his theory as to the manner of formation of these veins, as does in a fuller measure, the finding of the intrusive granite in the bottom of the Rich Hill shaft.

About 230 feet northwest of this incline is a vertical shaft 65 feet deep, 4 ft. x 6 ft. in the clear and partly timbered, which was sunk as a prospect shaft by leasers. A little above the bottom, it cuts an east-west vein showing manganese stained quartz with some lead-silver values. This is probably a parallel vein in the hanging wall of the one in the incline and like it, may open out to workable size and value at some points. It appears to be widening fast in the few feet in which itis exposed.. None of the veins of Olive Camp have a strong outcrop, and while a number of ore shoots have been opened along a certain general strike, one cannot on surface follow on the vein from one end to the other end, but it is believed that at depth they will all be found to be in some manner connected.

On the Rich Hill claim several old cuts and shallow shafts open a well marked fault with a strike of about N. 70° E. and a dip to the north, showing some quartz and mineralization. The same break is opened again on the Alice claim to the east by a shaft originally 70 feet deep with small stope drifts at about 40 feet and at bottom. This work shows some quartz and a little mineralization but the vein is faulted just below 70 feet by a fault with a flat dip to the west. The present leasers have sunk this inclined shaft to 165 feet, cutting intrusive granite at 155 feet. In the shaft the upper contact of the granite has a flat dip to the south and a nearly east-west strike. On the 150 foot level they have cross-cut north and south in badly shattered rhyolite with tiny seams of pyrite and

occasionally of galena through it. About 40 feet south of the shaft a drift turns N. 70 ° E. following a notth dipping seam of pyrite beyond which small bunches and seams of phyrite and galena with a little chalcopyrite apparently dipping to the south are coming in. Some of these bunches of galena are very solid and heavy and of high grade. Zones of alteration in the rhyolite have a flat dip to the south and about like that of the granite in the shaft and probably in sympathy with it. The granite contact cannot be far distant and it appears as though mineralization was turning south to follow the contact. A winze is being started at this point and its progress will be watched with great interest.

RECOMMENDATIONS FOR DEVELOPMENT:

It is out of the question to carry on new development through the old incline. It would entail an added cost of mining that would soon exceed the cost of sinking a working shaft. The 65 foot vertical shaft might be continued but it is 190 feet west of the bottom of the winze and for a connection, would take 100 feet of sinking and 190 feet of cross-cutting. It would probably encounter the vein before going that distance, but our present knowledge of the way the vein is going is so limited that it might easily miss it until driven to a connection. And it is very probable that it would be found to be so located with respect to the ore that it would require excessively long cross-cuts on lower levels. If this shaft were deepened, it would have to be stripped and retimbered to make it 4 ft. x 7 ft. in the clear as with water to be handled, it is too small for the work to be done.

The few feet of sinking that was done in the winze last winter did more to predict a future for the property than all the work ever done in Olive Camp, and a few more feet of work there may easily do as much good in guiding the real work of development.

When the further development of this property is undertaken, it will be necessary to make provision for the handling of the water for it is certain that water must be handled in the sinking. The amount of water met in any of the old mines was small and can be easily handled in a vertical shaft with modern equipment. The greatest flow known in the Camp is that met by Mr. Charles Taylor on the 200 foot level of the Bonanza, the claim just north of the Richmond. In his recent work on that claim, he has had to handle a flow of about 40 gallons a minute from the 200 foot level. A small gas engine driven generator to furnish power for electric pumping will be the least expensive and most efficient provision for pumping water.

If, at that time, this equipment be utilized to get the water out of the winze to permit the doing of a little more work there with a windlass, or preferably by raising out to surface above the winze and then doing a little more work on the vein, the cost would be saved times over by determining the correct location of the new shaft. Not over 70 feet of raising will be necessary to connect this winze with the surface, and it could be done without any stops for hoisting and letting the muck fill up the winze and the old stopes and drifts on

the bottom level. Then the winze could be cleaned out rapidly, using the 8 H.P. gasoline hoist belonging to the property, then raise timbers up and use as a working shaft until enough was learned to show where the new shaft should be sunk.

As soon as a little additional work in the bottom of the winze has determined the question of the strike and dip of the vein there discovered and whether or not the north veins end on that vein or continue below it, a new shaft should be started to develop this ore showing at depth. At the present stage of development, a one and one-half compartment shaft 4 ft. x 7 ft. in the clear and timbered with 6" x 6" timbers is amply large to test the ground with the least expense and it is big enough to handle any high-grade ore that may be found in extending the old workings. It should be planned, located, and equipped to go at least 500 feet, with connections with the vein at 100 foot levels. On the correct location of the shaft will depend the distances to be cross-cut on the several levels and a poorly located shaft may easily entail excessive expense in cross-cutting.

Coincidentally with the deeper development of the property as soon as connection is made with the bottom of the old workings, drifts should be started to find shoots of high-grade ore which might easily pay very well for the work done.

CONCLUSIONS:

As with everything else which is under development in this region, the possibilities of the Swastika property cannot be judged nor measured by the size or value of the ore exposures left by old leasers who worked the mines for the high-grade silver ores. There is the possibility of finding other shoots of ore than those formerly worked, by well directed development, and in a property like the Swastika, where no small a proportion of the length of the veins have been prospected, and where the continuation of this vein system on adjoining property yielded such large returns, the chance for finding profitable shoots of high-grade ore well warrant their development.

The real future of the property lies in finding in depth of larger and more permanent bodies of base ores. The writer has made a long study of the geological conditions governing the formation of such deposits in southwestern Arizona and has tried in this report to clearly set forth his reasons for believing that the lead-silver veins of this property may lead down to them.

He believes therefore, that the development of this property is a good mining speculation with possibilities of profit more than warranting the risk of development.

Faithfully submitted,

(signed)
John Carter Anderson

Tucson, Arizona
August 30th, 1920

Copy: original on file

UNIVERSITY OF ARIZONA

TUCSON

College of Mines and Engineering
Department of Geology & Mineralogy

November 21st, 1929

Mr. A. L. Fritz
Tucson, Arizona

Dear Sir:

In accordance with your request, I here present an opinion on certain phases of the Geology of the Olive Camp area of the Pima Mining District, Pima County, Arizona.

It is the intention to discuss here not the detailed geology of individual properties, but rather the larger geological features of the area and district generally, which are of fundamental importance in the matter of ore occurence.

The discussion and opinion are based on brief personal observations made in the field, aided by a study of reports prepared by mining engineers and geologists for mining companies, by reports and maps prepared in the course of advanced degree studies by graduate students in Geology at the University of Arizona, and by the literature and government maps of the area and region.

The rocks of the immediate area comprise pre-Cambrian (?) granite, Mesozoic (Cretaceous) arkosic sedimentary beds, intrusive granitic rocks, and volcanic rocks which are chiefly andesite. The volcanics are either late Cretaceous or early Tertiary in age. Just outside of the area, particularly to the northward, occur thick formations of Paleozoic Limestone in quartzite.

The major structure of the area can not be definitely determined by the available surface or near surface geology. It is clear, however, that a great amount of fracturing, accompanied no doubt by at least some faulting has occured throughout the area. It is possible that folding is the most extensive type of minor deformation within the area and the cause of fracturing and faulting. Or it may be that the fractures were generated by stresses resulting from the uneven settling of a large volume of volcanic material from deep-seated to superficial positions. Or perhaps vertical upthrust of intruding magmas may have caused fracturing and faulting.

Mineralization apparently has been widespread. The rocks along fractures observed, whether on the surface or underground, have been more or less extensively altered. Ore deposition, in varying degree, seems

to have occurred wherever a master fracture was available to act as a channelway for ore-bearing solutions. The ore deposits are, in the main, of the fissure-filled type, locallized along major fractures, at the intersection of fractures, and in the brecciated zones.

It is fairly certain that intrusive granitic rocks underlie at variable depth the entire district of which the Olive Camp area forms a part. These intrusive rocks were probably the source of all primary mineralization in the district. The ore deposits that have been developed in the past in the Olive Camp area have been chiefly small high-grade silver-lead bodies, formed mainly by fissure-filling, but perhaps to some extent by wall-rock replacement, in the near-surface Cretacceous sedimentary and volcanic formations. In areas to the north and south important copper and zinc developments have been made and from which considerable tonnages of ore have been mined in the past. These deposits are principally replacement bodies in Paleozoic limestone. It appears, therefore, that replacement bodies in limestone form the important type of ore deposits for the district.

The question of major structures, and character and thickness of formations forming that structure, thus appear to be the essential questions relative to the probability of extensive ore occurrence at depth in the Olive Camp area. If the ore-bearing limestone formations of the Mineral Hill-San Xavier area to the north and of the Twin Buttes area to the south are continuous or occur under the Olive Camp area, then the probability of occurence of important commercial ore deposits at depth in the latter area is greatly increased. The problem would then become one of probable depth to the favorable horizon and the determination of dominant or master fracture zones.

Mr. J. C. Anderson, in his report on the Swastika property, page 4, sets forth certain evidence and a statement of belief that limestone does occur below the superficial formations of the area. That there is more than a possibility that these Paleozoic limestone formations do exist below the surface formations in the Olive Camp area is not an idle statement nor one made for convenience. Even brief field study of the stratigraphy and structure in this area and that immediately to the north, in the San Xavier area, justify the statement that this stratigraphy condition might exist. But more convincing still are similar indications in the results of recent detailed geologic mapping in that area to the immediate north.

The Olive Camp area appears to be a depressed geologic structure--either a down-warped (synclinal) or a down-faulted area.

The Paleozoic limestone formations of the San Xavier area distinctly dip to the south (20° - 25°), apparently plunging under the Olive Camp area. The contact between Paleozoic limestone and Cretaceous arkosic beds occur along the southern border of the San Xavier area. The origin of this contact is not clearly indicated; it may be a normal formation contact, produced by a break or time interval in the deposition of sediments which formed the beds; or it may be a fault contact, produced by a major rupture. If this contact is an unconformity, as the first case suggests, the limestones extend to the southward uninterruptedly below the Olive Camp area. In the event that it is a fault contract, the limestones with their overlying sedimentary beds and volcanic formations, in the Olive Camp block have

have been faulted downward.

There is some basis, of course, for expecting that additional underground development may disclose other small high-grade silver-bearing ore shoots, such as were formerly worked in the area, or perhaps larger veins and breccia bodies or ore of commercial grade and size. But it is more logical to expect that, if commercially important ore bodies are to be developed in the area, they still occur as metasomatic replacement and contact deposits in limestone.

The problem of developing possible large ore bodies in the Olive Camp area thus resolves itself, in this opinion, to first ascertaining the presence or absence of underlying limestone beds.

Preferrably, such development should be carried on by drilling operations. And in so doing, if the location of drill holes is carefully planned, it is probable that relatively near-surface vein or breccia type of deposits of value may be encountered while the deeper prospecting is in progress.

The depth at which the limestone, if present, may occur is highly problematical; if in a synclinal structure, it may be comparatively shallow, if block-faulted, it may lie much deeper - 2000 feet or more.

Yours very truly,

(signed) R. J. Leonard

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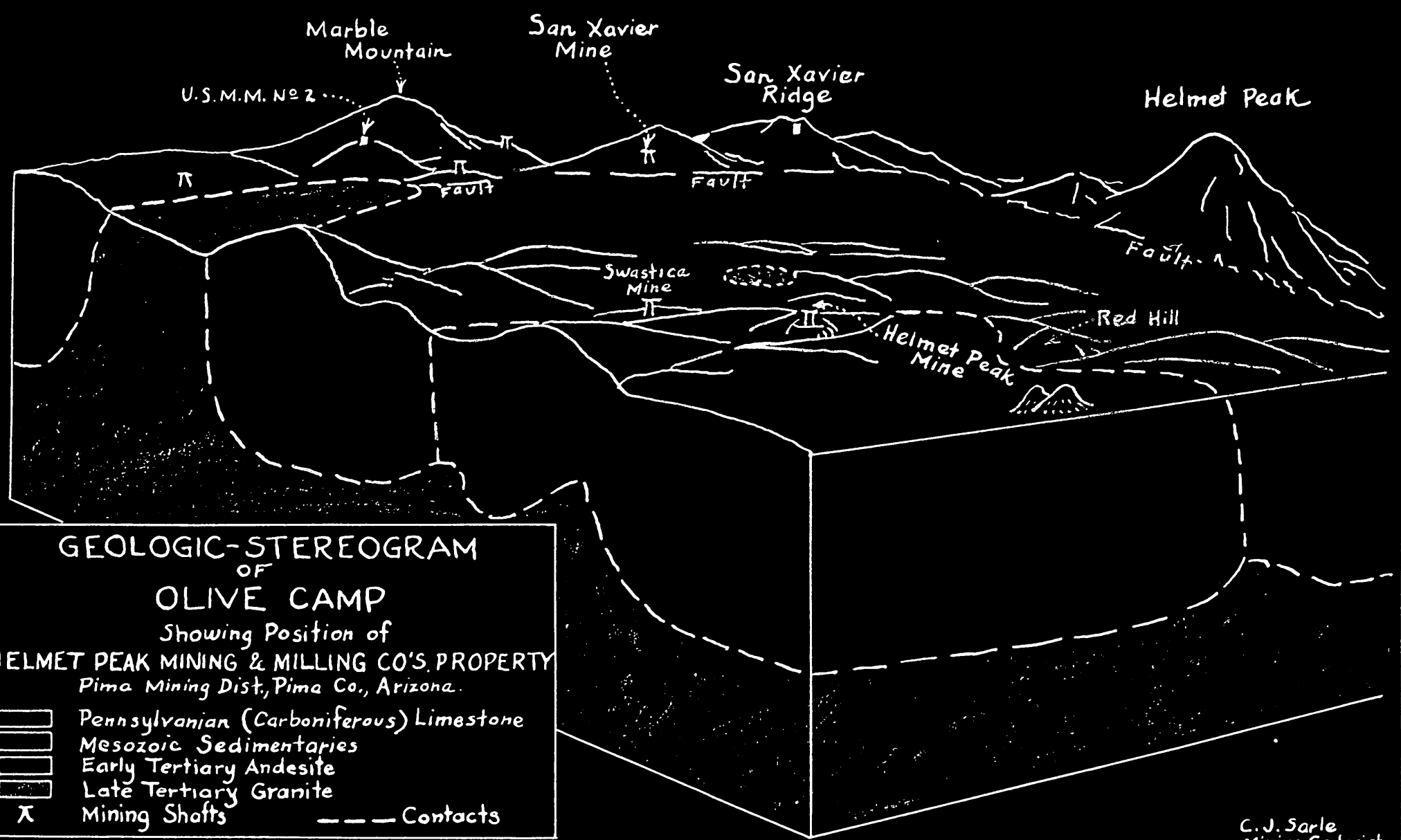
E-6



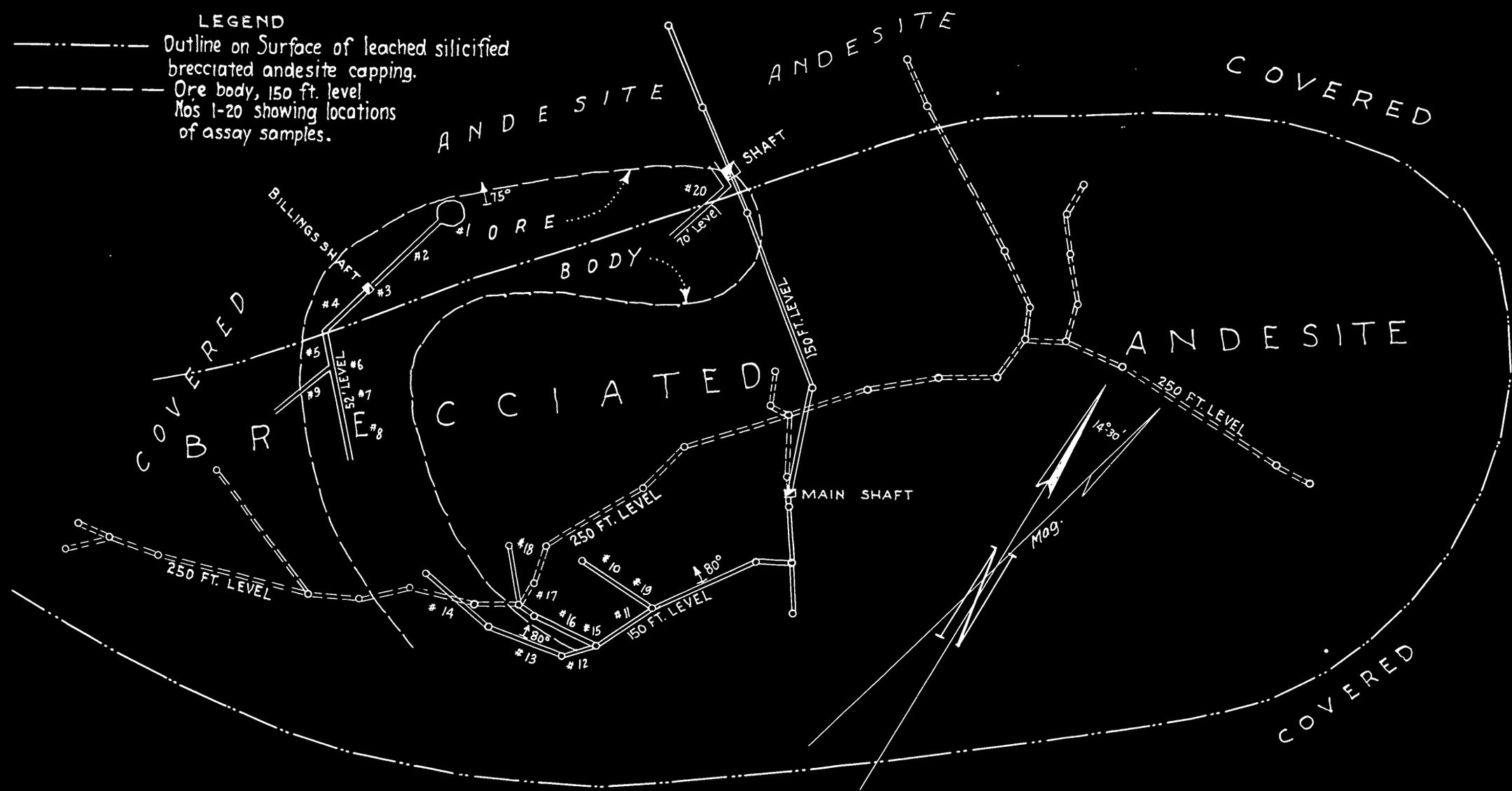
GEOLOGIC-STEREOGRAM
OF
OLIVE CAMP
Showing Position of
HELMET PEAK MINING & MILLING CO'S. PROPERTY
Pima Mining Dist., Pima Co., Arizona.

- Pennsylvanian (Carboniferous) Limestone
- Mesozoic Sedimentaries
- Early Tertiary Andesite
- Late Tertiary Granite
- Mining Shafts
- Contacts

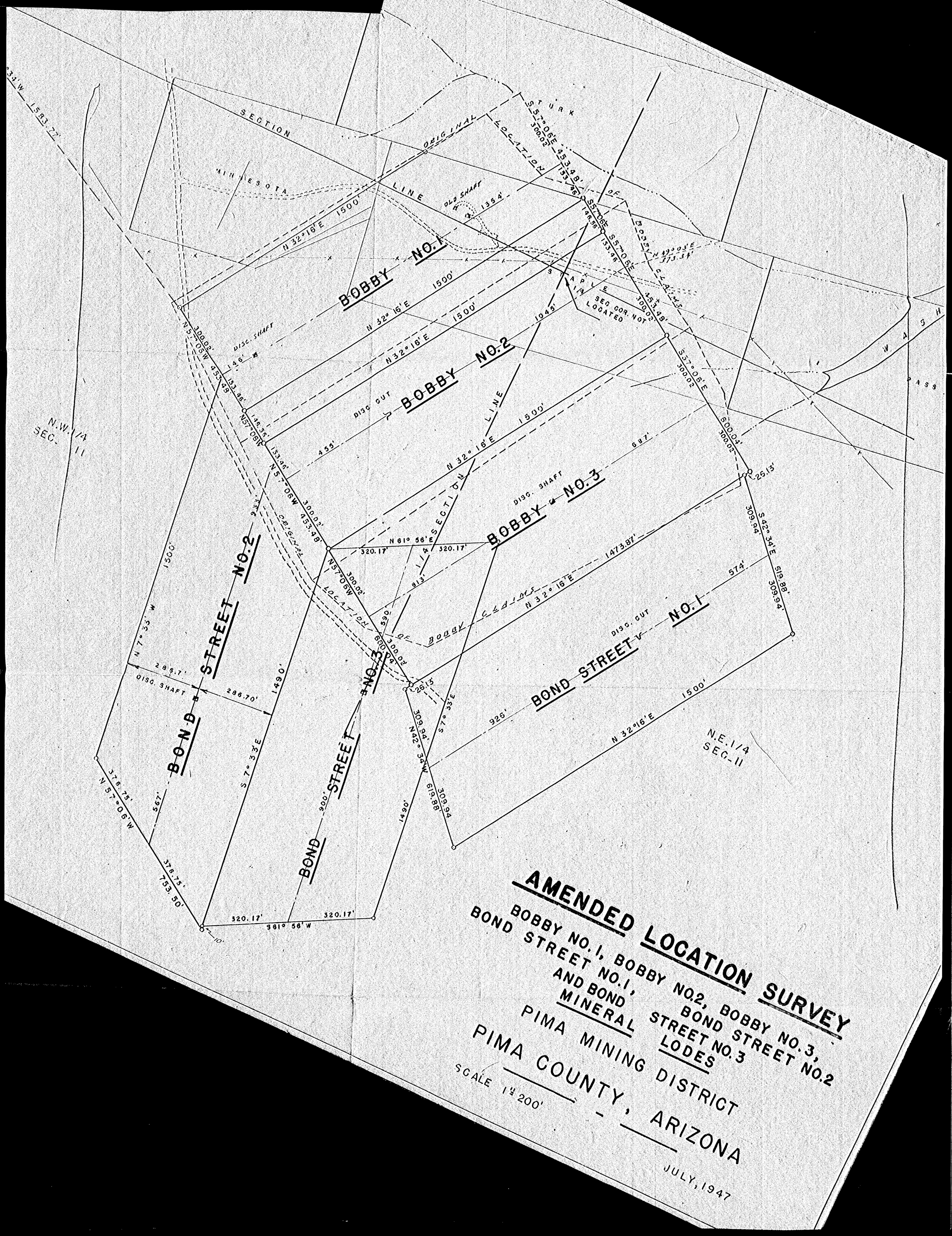
GEOLOGIC MAP SHOWING DEVELOPMENT OF HELMET PEAK MINING AND MILLING CO. PIMA MINING DISTRICT, PIMA COUNTY, ARIZ.

As of April 1, 1927.

Scale 0 25 50 feet



C.J. Sarle
Mining Geologist, Tucson, Ariz.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BOBBY NO.1, BOBBY NO.2, BOBBY NO.3,
BOND STREET NO.1, BOND STREET NO.3
AND BOND STREET NO.2
MINERAL LODES
PIMA MINING DISTRICT
PIMA COUNTY, ARIZONA
SCALE 1" = 200'
JULY, 1947
BOBBY NO.1
BOBBY NO.2
BOBBY NO.3
BOND STREET NO.1
BOND STREET NO.2
BOND STREET NO.3
SECTION LINE
MINNESOTA
ORIGINAL LOCATION
OF BOBBY CLAIMS
SEC. COR. NOT LOCATED
N.W. 1/4 SEC. 11
N.E. 1/4 SEC. 11
N 32°16'E 1500'
N 57°06'W 453.48'
S 57°06'E 453.48'
N 61° 56'E 320.17'
S 61° 56'W 320.17'
N 42° 34'W 619.88'
S 42° 34'E 619.88'
S 7° 33'E 1490'
N 7° 33'W 1490'
N 57°06'W 376.75'
S 57°06'E 376.75'
753.50'
DISC. SHAFT
DISC. CUT
OLD SHAFT
1354'
1473.87'
1500'
1045'
926'
574'
309.94'
25.13'
300.02'
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697'
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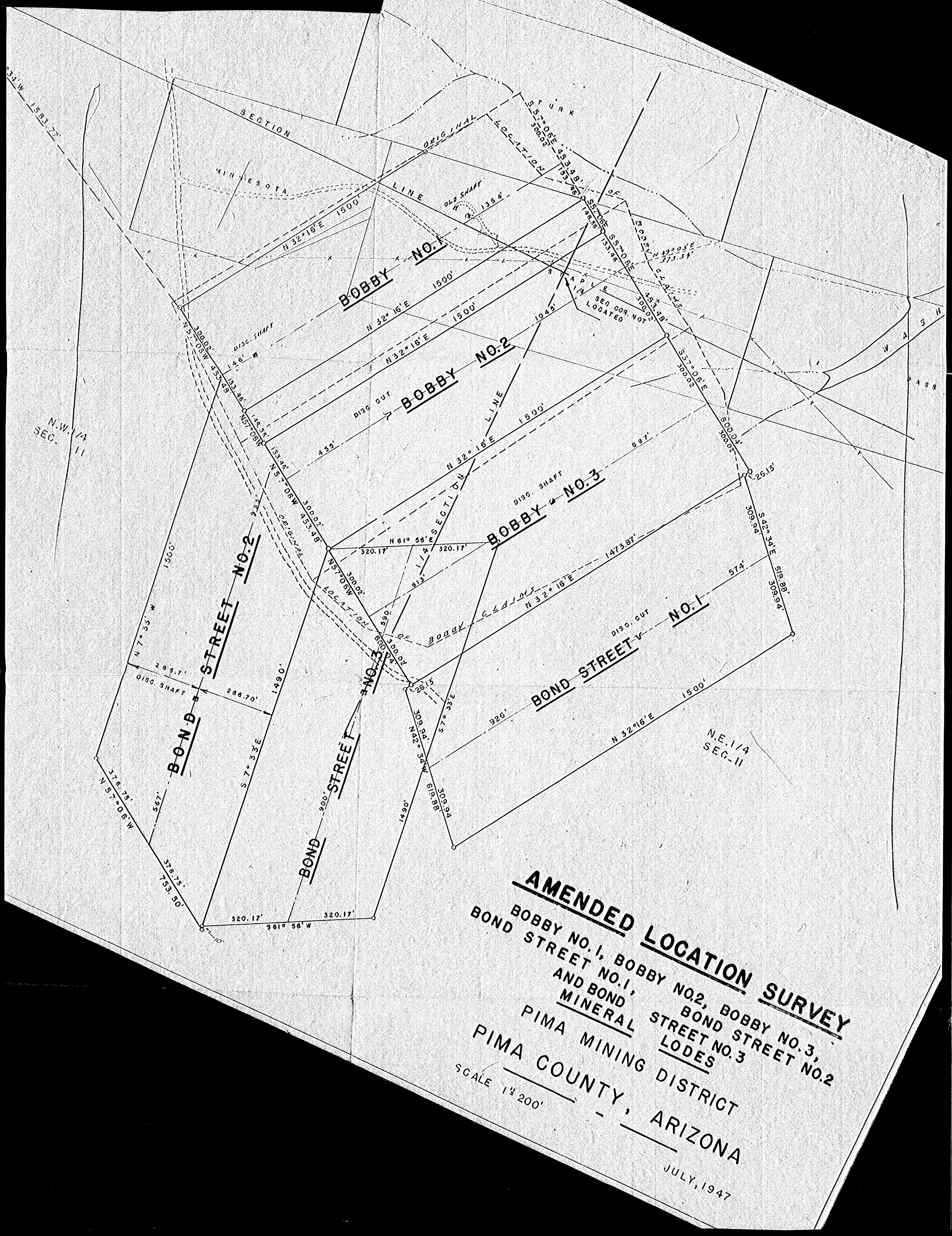
10'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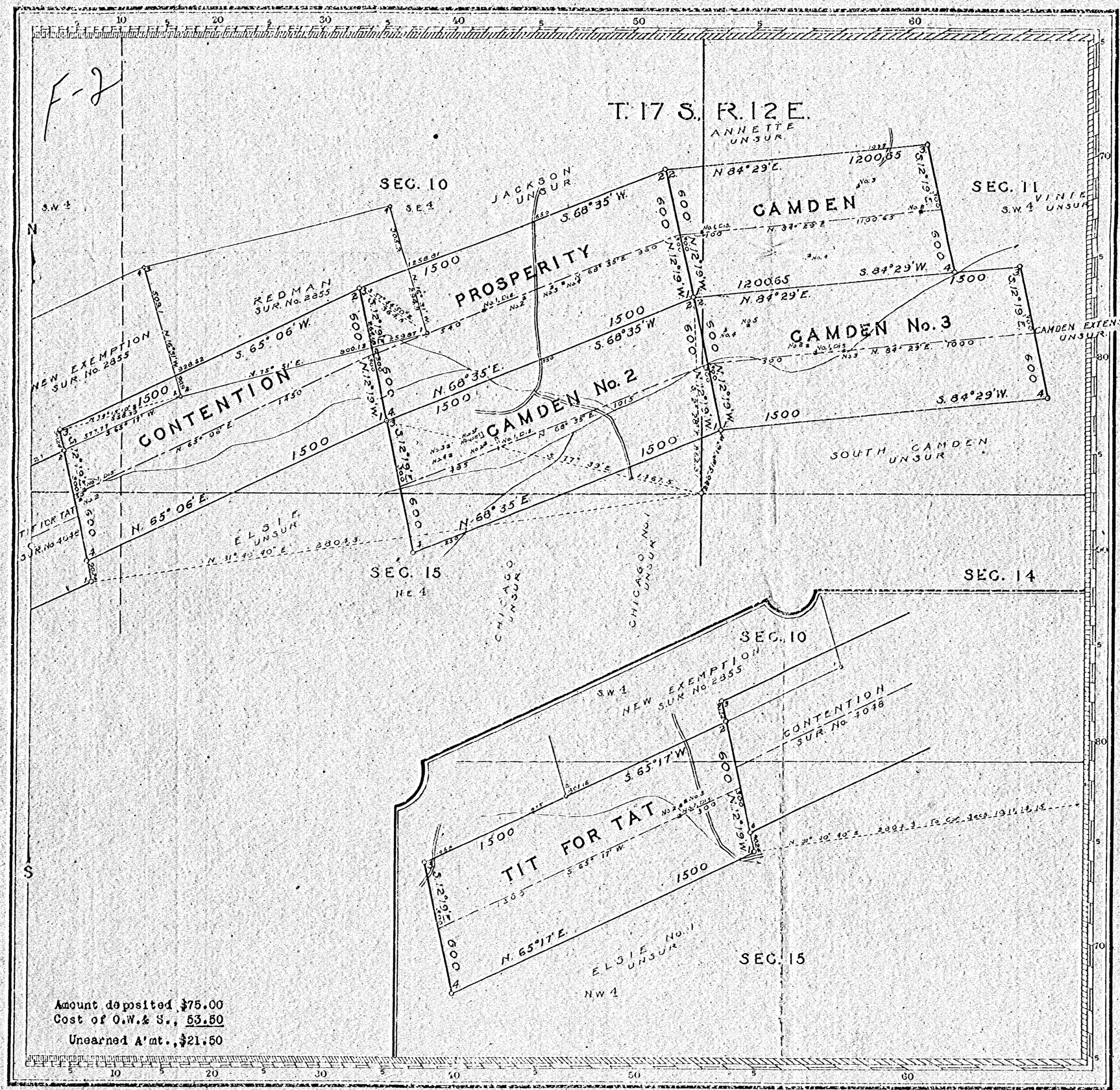

Amount deposited $75.00
Cost of O.W.& S., 53.50
Unearned A'mt., $21.50

Mineral Survey No. 4048

ARIZONA Land District.

PLAT

OF THE CLAIM OF
Myra A. Emery

KNOWN AS THE
CONTENTION, PROSPERITY, TIT FOR TAT, CAMDEN, CAMDEN NO. 2, and CAMDEN NO. 3 lodes

IN Pima *MINING DISTRICT,*
Pima *COUNTY,* Arizona
Containing an Area of 118.084 *Acres.*
Scale of 400 *Feet to the inch.*
Variation 13° 30' - 13° 45' E.
SURVEYED July 11 - August 13 *1927* *BY*
T. N. Stevens
U.S. Mineral Surveyor.

The Original Field Notes of the Survey of the Mining Claim from which this plat has been made under my direction, have been examined and approved, and are on file in this Office, and I hereby certify that they furnish such an accurate description of said Mining Claim as will, if incorporated into a patent, serve fully to identify the premises, and that such reference is made therein to natural objects or permanent monuments as will perpetuate and fix the locus thereof.
I further certify that Five Hundred Dollars worth of labor has been expended or improvements made upon, or for the benefit of, each location embraced in said mining claim by claimant ..... *or*
her ..... *grantors and*
that said improvements consist of 21 shafts, and
1 tunnel, total value $22,070.

that the location of said improvements is correctly shown upon this plat, and that no portion of said labor or improvements has been included in the estimate of expenditures upon any other claim.
And I further certify that this is a correct plat of said Mining Claim made in conformity with said original field notes of the survey thereof, and the same is hereby approved.

Public Survey Office
Phoenix, Arizona, *Office Cadastral Engineer*
September 29 *, 1927* Phoenix, Arizona