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

224 New Customhouse
Denver 2, Colorado

October 24, 1951

Memorandum

To: Executive Secretary, Defense Minerals Administration

From: DMA Field Team, Region IV

Subject: Final Report, DMA Docket 1357, Jonathan Gordon; applicant, San Juan Zinc Mine, Dragoon Mining District, Cochise County, Arizona.

Enclosed herewith are the original and two copies of the report on the subject docket.

We concur with the conclusions and recommendations of the examining team that the development loan of $25,000 be denied.

The brochure is enclosed.

J. H. Eastt, Jr.

A. H. Koschmann

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Mining Division
Region IV

October 24, 1951

Memorandum

To: DMA Field Team, Region IV

From: Chief, Mining Division, Region IV

Subject: Final Report, DMA Docket 1357, Jonathan Gordon; applicant, San Juan Zinc Mine, Dragoon Mining District, Cochise County, Arizona

The application of the subject docket was for a development loan of $25,000.

The purpose of this loan was to replace present rented equipment with new equipment, purchase additional equipment and supplies and to provide working capital.

The ore deposits occur as sphalerite, associated with silicates, hematite and calcite of the metamorphic type in impure limestone.

Production since 1913 has amounted to about 25,000 tons of 15 to 25 percent zinc ore. At present, the measured and indicated reserves are confined to a few stope pillars and tongues of ore in walls and floors of the workings, estimated at 700 tons of from 15 to 25 percent zinc ore.

These reserves are insufficient to justify a direct loan.

The examining team recommends denial of the loan with which we concur.

Paul T. Allsman

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Arizona-New Mexico Branch
SOUTHWEST EXPERIMENT STATION
Box 4097
UNIVERSITY STATION

Mining Division
Date Rec'd.
OCT 19 1951
BUREAU OF MINES
Denver, Colorado

MINING DIVISION
REGION IV

TUCSON, ARIZONA

October 17, 1951

Memorandum

To : Paul T. Allsman, Denver, Colorado

From : Chief, Arizona-New Mexico Br., Mining Div., Region IV

Subject: Final Report, DMA Docket 1357, Jonathan Gordon's San Juan Zinc Mine, Dragoon Mining District, Cochise County, Ariz.

Enclosed are original and 7 copies of the section on Summary, Conclusions and Recommendations by J. N. Faick of the Geological Survey and T. M. Romslo of the Bureau of Mines, and the section on Engineering by Romslo. A separate section on Geology will be submitted by the Geological Survey.

This report has my approval.

Brochure is enclosed.

Walter R. Storms

Walter R. Storms

CC: P. T. Allsman (7)
C. A. Anderson
DMA 1357
DF

FOR VICTORY
BUY UNITED STATES SAVINGS BONDS AND STAMPS

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

200 New Customhouse
Denver 2, Colorado

October 15, 1951

Memorandum

To: DMA Field Team, Region IV

From: Ogden Tweto

Subject: DMA Docket 1357, San Juan Zinc Mine, Dragoon Mining District, Cochise County, Arizona

Enclosed are the original and 7 copies of the geologic report by J. N. Faick of the U. S. Geological Survey covering the above docket. It has been recommended that the loan be denied.

Ogden Tweto

Ogden Tweto, Alternate
Supervising Geologist
Colorado-Wyoming

Enclosures (8)

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
P.O.Box 4126, University Station
Tucson, Arizona

October 10, 1951

Memorandum

To: Field Team, Region IV, Denver, Colorado
Through: Mr. A. H. Koschmann

From: Mr. A. F. Shride, Tucson, Arizona

Subject: Geologic Report on Docket DMA 1357, San Juan Zinc Mine, Dragoon Mining District, Cochise County, Arizona

Enclosed are the original and 7 copies of the above geologic report by J. N. Faick of the Geological Survey.

This report and the recommendation that a production loan be denied for lack of ore reserves to amortize a loan have my approval.

A. F. Shride

A. F. Shride
Acting District Supervisor
Arizona-New Mexico

Enclosures 8

RECEIVED
OCT 1951
U.S. Geological Survey
Minerals Deposits Branch
Denver

UNITED STATES
DEPARTMENT OF THE INTERIOR
OSCAR L. CHAPMAN, SECRETARY

DEFENSE MINERALS ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMA-1357, Jonathan Gordon's San Juan Zinc Mine

Dragoon Mining District

Cochise County, Ariz.

John E. Frick, Geologist
U. S. Geological Survey

T. M. Romslo, Mining Engineer
U. S. Bureau of Mines

October 1951

als

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

By John N. Feick[1] and T. M. Romslo[2]

The San Juan Zinc mine, Cochise County, Ariz., was examined in connection with an application by Jonathan Gordon, P. O. Box 516, Tombstone, Ariz., for Governmental aid under the Defense Production Act of 1950. The applicant proposed to renew production of zinc ores and for this purpose requested a direct loan of $75,000 for equipment and working capital. The examination was made by the Defense Minerals Administration, under docket DMA-1357.

During the examination of the property on October 1, 1951, it was found that the mine had been equipped with rented equipment and had produced approximately 125 tons of ore in a period of about 2 months. The applicant told the examining engineers he still wanted the loan of $75,000 so he could replace much of the present equipment, purchase additional equipment and supplies and have sufficient working capital.

The San Juan mine, acquired as a prospect by Jonathan Gordon in 1913, has produced about 25,000 tons of 15 to 26 percent zinc ore. All but a few hundred tons of this ore was produced from 1947 to 1949.

The ore deposits occur in impure limestone beds and are separated from overlying limestone by a low-angle fault. The ore is localized by fractures of steep dip in a zone of structural deformation. The

---

1/ Geologist, Geological Survey
2/ Mining Engineer, Bureau of Mines

deposits are of the contact metamorphic type and the ore minerals, mainly sphalerite, are associated with silicates, hematite, and calcite. The ore also contains a little galena. An unidentified silver mineral of sporadic distribution also is present.

The known ore deposits were essentially worked-out during the last period of operation. At present, the measured and indicated ore reserves are confined to a few stope pillars and tongues of ore that remain in the walls and floors of the workings. These reserves have been estimated at 700 tons of ore containing 15 to 25 percent zinc.

Present operations are confined to the mining of the small exposures of ore in the walls and floors of the stopes. These operations may find a small amount of additional ore and may develop geologic evidence that will justify a small amount of exploratory work.

The ore reserves are insufficient to justify exploitation of the mine. Therefore it is recommended that the application for a direct loan of $25,000 be denied.

SAN JUAN ZINC MINE
DRAGOON MINING DISTRICT
COCHISE COUNTY, ARIZONA
DMA 1357

Geology

By John N. Frick
Geologist, U. S. Geological Survey

SAN JUAN ZINC MINE
DRAGOON MINING DISTRICT
COCHISE COUNTY, ARIZONA
DMA 1357

CONTENTS

	Page
Geology	1
Ore Deposit	2
Ore Reserves	3
Conclusions	3

GEOLOGY

The San Juan mine is located in the west central part of the Dragoon Mountains about 17½ miles by road from Tombstone, Arizona. The mine is at an altitude of 6400 feet on the west side of a southwestward trending ridge that forms the divide between two small gulches. The mine workings and the known ore bodies are confined to the ridge between the two gulches.

The area in the vicinity of the San Juan mine is underlain by thin-bedded limestones, shales, and quartzites. These have been intruded by a quartz monzonite stock, of probable Laramide age, that is exposed along the road to the mine and also a short distance west of the mine. According to Eldred Wilson[1] the sedimentary formations may be subdivided as shown below:

Thickness in feet	Age	Lithology	Description
?	Cretaceous	Shale	Thin-bedded dark to brownish shale, in part sandy.
30	Cretaceous	Limestone	Blue-gray limestone conglomerate and limestone.
		Low Angle Fault Zone	
40	Permian	Shale and limestone	Siliceous, novaculitic, with impure limestone beds locally metamorphosed to epidote, garnet, and hedenbergite tactite.
60	Permian	Quartzite	Light colored, fine grained.

The beds strike a few degrees east of north and dip from 12 to 30 degrees to the southeast. In the mine workings the prevailing

1/ Wilson, Eldred, Lead and Zinc Ore Deposits in Arizona, Part II: In Press, 1951.

southeastward dip of the beds is modified by broad low flexures. The beds have also been disturbed by faults which trend N. 30° W. and N. 70° E. and have effected relatively small displacements. The limestone formations are separated from the underlying shale formations by a strong low angle fault that appears to be parallel to the beds.

The side gulch immediately south of the mine apparently marks the location of a fault trending N. 65°-70° W., with its northern side downthrown. The main gulch east of the mine presumably marks a fault of northward trend with its west side downthrown. The mine is thus in a down-faulted wedge in which bedded limestone is the dominant rock type exposed. This is bounded on the east, south and southwest by siliceous gray shale, interbedded with cherty gray limestone, and capped by fine grained light colored quartzite. Quartz monzonite is exposed about 700 to 800 feet west of the mine.

ORE DEPOSIT

The ore bodies of the San Juan mine are small interconnected masses that have replaced a favorable bed of impure shaly limestone of probable Permian age. The ores are localized beneath a relatively strong bedding plane fault and have also been influenced by numerous high angle faults.

The ores of the San Juan mine are typical contact-metamorphic type with abundant sphalerite and very small amounts of galena occurring in a gangue of garnet and hedenbergite. Hematite, calcite, and pyrite are present in very small amounts, and the ore contains a small amount of silver.

The ore of the San Juan mine has been exceptionally high grade. About 25,000 tons have been produced which contained 15 to 25 percent zinc and some small shipments contained as much as 41.7 percent zinc.

ORE RESERVES

The mine is essentially exhausted and the remaining ore is confined to stope pillars and a few tongues of ore that project into the walls and floors of the stopes. The combined measured and indicated ore reserves total about 700 tons containing 15 to 25 percent zinc.

CONCLUSIONS

The applicant is interested only in a development loan, therefore little effort was made to study the possibilities of making further ore discoveries. Because of the lack of ore reserves a production loan cannot be recommended. This brief examination reveals that large reserves are probably not present at the San Juan mine. However, it is possible that an investigation that would include a careful study of the structure and the favorable beds could result in the discovery of a few thousand tons of ore.

JONATHAN GORDON'S SAN JUAN ZINC MINE
DRAGOON MINING DISTRICT
COCHISE COUNTY, ARIZ.
DMA-1357

Engineering Report

By T. M. Romslo
Mining Engineer
U. S. Bureau of Mines

October 1951

JONATHAN GORDON'S SAN JUAN ZINC MINE
DRAGOON MINING DISTRICT
COCHISE COUNTY, ARIZ.
DMA-1357

CONTENTS

Engineering Report	Page
Introduction	1
Location and accessibility	1
Physical features and climate	2
History and production	2
Property and ownership	4
Description of the deposit	4
Ore reserves	5
Present status	6
Project proposal	7
Conclusions	7
Recommendations	8

ILLUSTRATIONS

Figure		Following page
1	Location map	1
2	San Juan mine	5

INTRODUCTION

This report covers information obtained during the course of an examination of the San Juan mine, Dragoon Mining District, Cochise County, Ariz. The examination was made in connection with a request by Jonathan Gordon, P. O. Box 516, Tombstone, Ariz., for Governmental aid in a program designed to renew production of zinc-lead ores from the mine. It was carried out by the Defense Minerals Administration, under docket DMA-1357, as part of its program authorized by the Defense Production Act of 1950.

The applicant on May 24, 1951 requested a direct loan of $25,000 for the purpose of equipping the mine for production. During the examination on Oct. 1, 1951, it was found that the mine was producing ore and was being operated with rented equipment. The applicant told the examining engineers he still wished to secure the requested $25,000 so he could replace much of the present equipment, purchase additional equipment and supplies, and have sufficient working capital. He also stated some exploratory work might be justified but that he would not be interested in undertaking such work under present regulations governing Governmental participation.

The examination was made by J. N. Fisk, Geological Survey, and T. M. Romslo, Bureau of Mines.

LOCATION AND ACCESSIBILITY

The San Juan mine is about 12 air-miles northeast of Tombstone, Ariz. (fig. 1). It is accessible from Tombstone by traveling 2.2

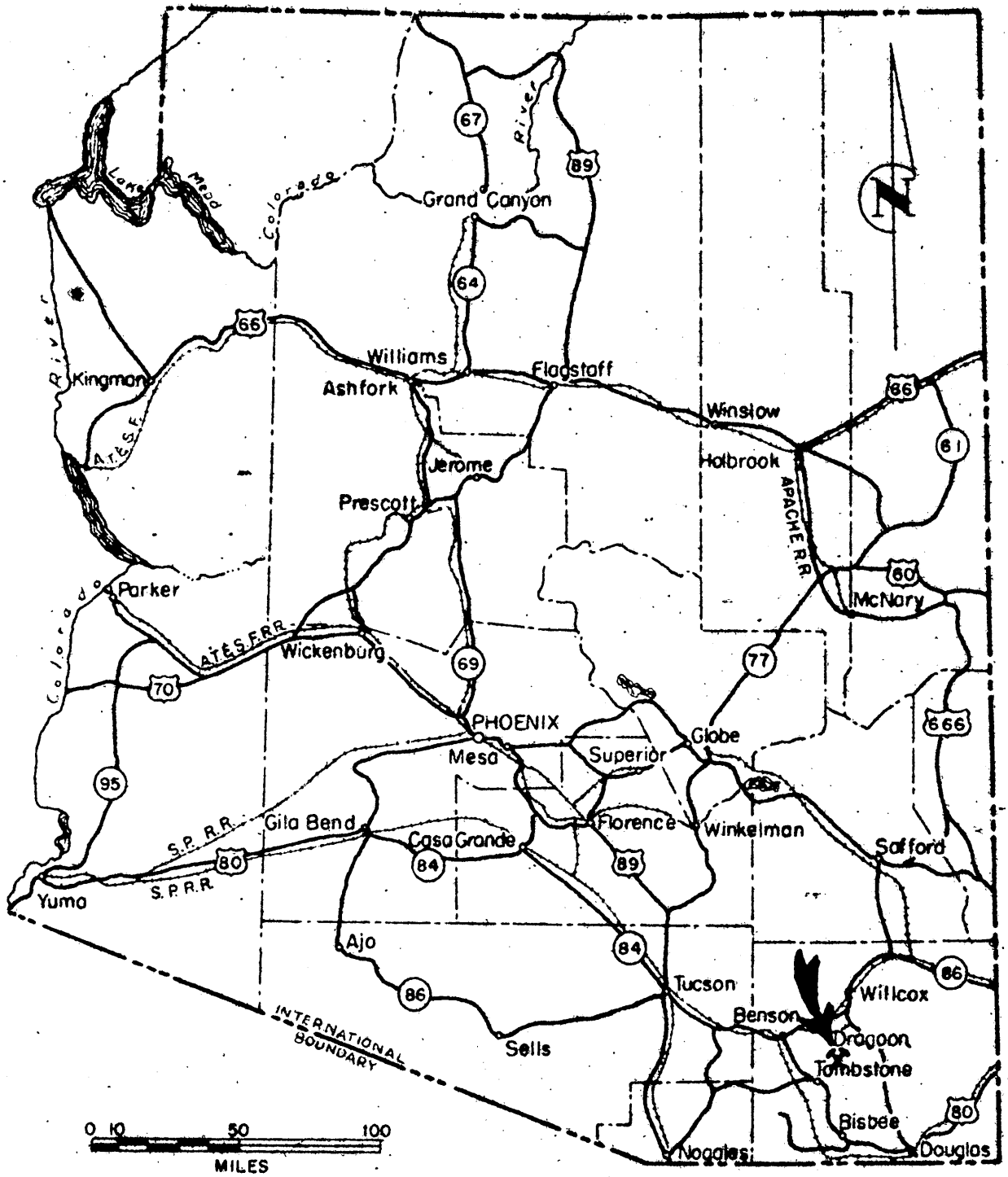


Figure 1 Location Map, San Juan Mine, Dragoon Mining District, Cochise County, Arizona. D.M.A. 1357

miles toward Benson, Ariz. on U. S. Highway 80, thence 12.1 miles northeasterly on a county-maintained dirt road, and thence northerly for 3 miles on a mine road to the principal workings. Steep grades are confined to a one-mile section of the mine road.

The nearest railroad shipping point is at Tombstone, where a custom milling plant is located.

PHYSICAL FEATURES AND CLIMATE

The San Juan mine is in the west-central part of the Dragoon Mountain range. This range trends northwesterly with a length of about 26 miles and a width of 3 to 12 miles. The crest of the mountain range rises 1,000 to 3,000 feet above the adjacent plains and has a maximum altitude of 7,512 feet above sea level. The principal workings of the mine, at an altitude of about 6,400 feet, are about a half mile south of China peak. This peak attains an altitude of 7,125 feet. The steep mountain slopes of the mine area are characteristic of the Dragoon Mountains.

The vegetation of the mine area is confined to native grasses and scattered growths of trees consisting of oak, juniper and pine. There is little or no timber suitable for mining purposes.

The climate is typical of the higher elevations of southern Arizona.

HISTORY AND PRODUCTION

The San Juan property was acquired by Jonathan Gordon in 1913. At that time it was a prospect and development was confined

to about 10 feet of workings at one of the present adits. To 1947, a few shipments of zinc ore had been made and the property had been developed by more than 1,000 feet of workings, largely at the Sulfide and Silver adits.

In 1947, Operations, Inc. leased the ground, constructed 3 miles of access road, and built a 100-ton concentrating plant at Tombstone. This corporation suspended operations before the end of the year. In September 194[illegible], the Billingsley Machinery Co. bought the mill and reopened the mine. This company operated the mine until May 1949. The owner reopened the mine in July 1951 and to October 1, 1951 had produced about 125 tons of ore of which approximately 95 tons had been treated in a custom-mill at Tombstone. This mill, formerly owned by the Billingsley Machinery Co., now is being operated by the Lomelino Minerals and Development Co.

Available records indicate the mine has produced a total of about 25,000 tons of ore. U. S. Minerals Resources volumes and U. S. Minerals Yearbooks credit the mine with a production to 1947 of 811,605 pounds of zinc. These records indicate that about 50 tons of ore was produced for each year from 1913 to 1915, and record a production of 4[illegible] and 4,000 tons for 1925 and 1947, respectively. Production for 1948 and 1949, according to data submitted in the loan application was 18,000 and 2,500 tons, respectively. There is little or no data available on the grade of ore produced. Ore shipped in 1915 carried 40 percent zinc and 8.5

ounces of silver a ton. Ore produced during 1947 is reported to have contained less than one percent lead and less than 2 ounces of silver a ton. According to Mr. Gordon the ore produced during 1948 and 1949 contained about 17 percent zinc and little or no lead and silver.

PROPERTY AND OWNERSHIP

The San Juan mine is situated on a property that comprises a group of 14 unpatented lode mining claims in secs. 10 and 15, T. 18 S., R. 23 E., Dragoon Mining District, Cochise County, Ariz. The property is owned by Jonathan Gordon, P. O. Box 516, Tombstone, Ariz.

DESCRIPTION OF THE DEPOSIT 1/

The mine workings are in a ridge on the west side of a southeastward trending gulch. In the ridge the lowest exposed rock is a light colored and fine grained quartzite, Permian in aspect. The quartzite is overlain successively by shale, limestone, and then shale that caps the eastern slope of the ridge. The limestone and overlying shale are presumably of Cretaceous age. The lower shale formation is composed mainly of gray shale, in part siliceous, and contains impure limestone beds that are locally metamorphosed to epidote, garnet and other silicates. The limestone formation, separated from the underlying shale formation by a low-angle fault, is composed of limestone and a bluish-gray limestone conglomerate. The shale member that caps

1/ Extracted from Dr. Eldred D. Wilson's report, now in publication, on Zinc and Lead Deposits of Ariz., Ariz. Bur. of Mines.

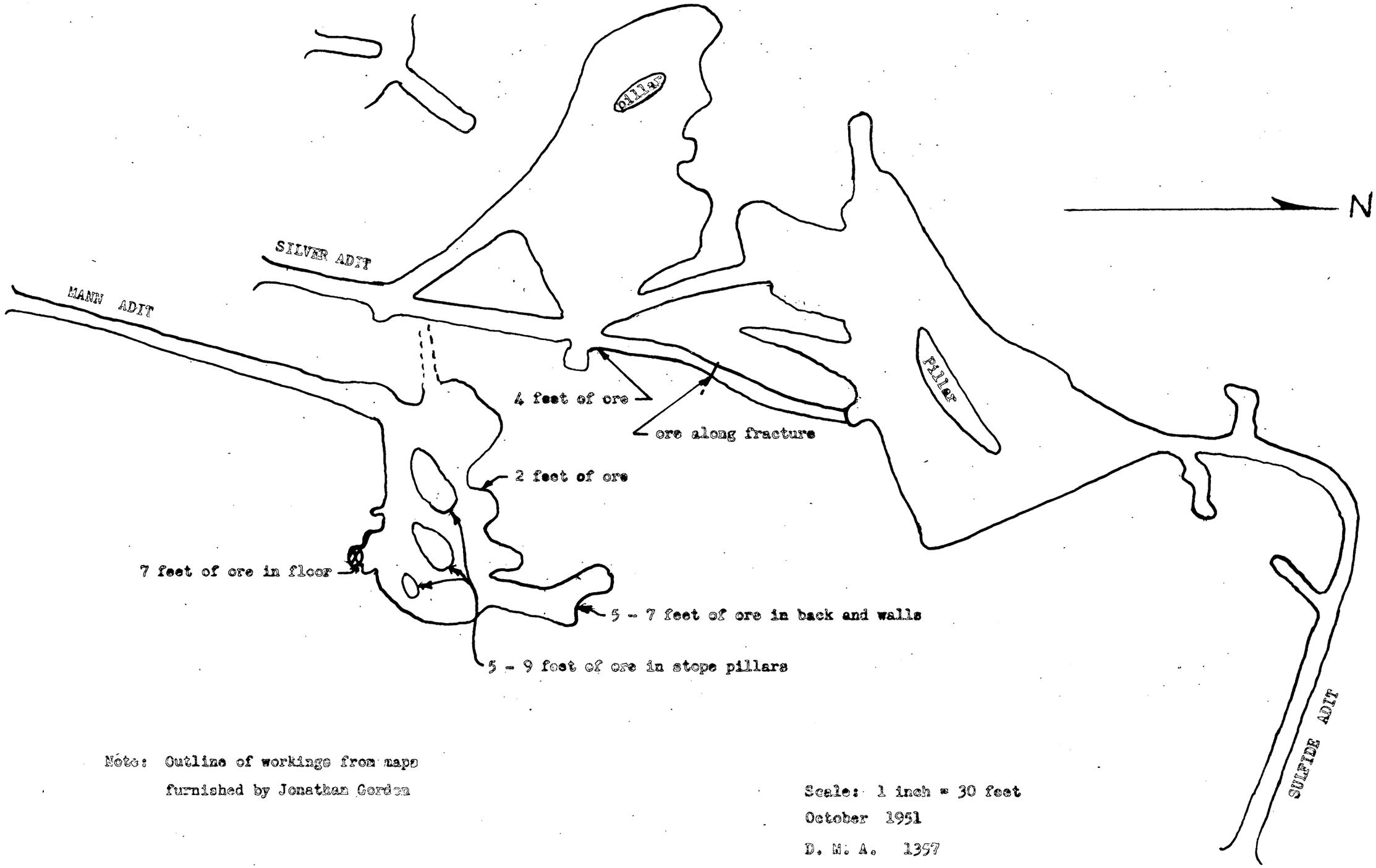
the limestone formation is composed of thin-bedded, dark to brownish shale, in part sandy. Granite intrudes the sedimentaries several hundred feet west of the property.

The main gulch east of the mine presumably marks a fault of northward trend, and a side gulch immediately south of the mine apparently marks the location of a fault trending N. 65 to 70 degrees W. The mine area forms the downthrown side of each of these faults.

The ore deposits occur in the impure shaly limestone beds beneath the conglomeritic limestone. They are localized along northeast fissures and are associated with irregular masses of contact silicates, chiefly garnet, hedenburgite, and epidote. Hematite and calcite also are associated with the ore minerals. These ore minerals consist of sphalerite, a little galena, and silver in unrecognized form. The silver is erratically distributed.

ORE RESERVES

Ore remaining in the San Juan mine is confined to stope-pillars and a few tongues of ore that project into the walls and floors of the stopes (fig. 2). The pillars contain an estimated 300 tons of measured ore. This ore is not recoverable at present, because removal of the pillars would probably result in a collapse of the workings and make other sections of ore inaccessible for mining. The indicated reserves are estimated at 400 tons. Thus, the combined measured and indicated



Note: Outline of workings from maps furnished by Jonathan Gordon

Scale: 1 inch = 30 feet
October 1951
D. M. A. 1357

FIGURE 2 SAN JUAN MINE, DRAGOON MINING DISTRICT, COCHISE COUNTY, ARIZONA

ore reserves total 700 tons, containing an estimated 15 to 25 percent zinc.

Inferred reserves, confined to extensions of zones of indicated ore, are estimated at 400 tons containing 15 to 25 percent zinc. However, it is possible that present operations may encounter deposits similar to those mined, or may indicate the advisability of further exploration in the mine area.

PRESENT STATUS

Development

The principal workings are at the Silver, Sulphide, and Mann adits (fig. 2). These workings contain several hundred feet of drifts, cross-cuts, raises, winzes, and 3 stoped areas.

Equipment and Other Facilities

The principal mine equipment consists of a 315-cubic foot Ingersoll Rand compressor, an Atlas light-weight drill equipped with a feed-leg, 4 ore cars, and about 500 feet of track, of which 300 feet is installed in the Mann adit and the remainder is installed in the Silver adit. Structures near these workings consist of a 230-ton ore bin, and 2 small storage buildings of corrugated-iron construction.

At Gordon Camp, about 1/2 mile from the workings, there are several small buildings that were used as living quarters during periods when the mine was most active.

Operations

Present operations are under the supervision of Dougald Gordon, son of the owner of the property. Two miners, 2 muckers, and a

foreman are employed at the mine. Operations are confined to the mining of ore that remains in the walls of stopes at the Silver, and at the Mann adits. The ore is hand-trammed to the bin located within 100 feet of the portals of the adits.

The shipment of 95 tons of ore produced during July and August was hauled under contract to the mill at Tombstone at a cost of $3.00 a ton.

The charge for milling the above ore was $6.00 a ton. Accurate metallurgical results of milling the ore are not available because the ore was not sampled at the mine and because the mill is not equipped to properly sample either the ore or the mill products. Two samples of the heads assayed 28 and 14 percent zinc, and 2 samples of the tails showed zinc contents of 9.5 and 2.5 percent. On the basis of this sampling the mill recovery was about 71 percent. However, there is no check against this mill recovery because the weight and grade of concentrate has not been accurately determined. Estimates indicate 30 to 35 wet tons of concentrate containing 60 percent zinc was recovered.

PROJECT PROPOSAL

The applicant proposed to purchase equipment and supplies at an estimated cost of about $17,000 and to utilize the remaining $8,000 of the requested $25,000 for installing the equipment, and for operating capital.

CONCLUSIONS

The known ore deposits of the San Juan mine were exploited from 1947 to 1949 when about 25,000 tons or ore containing 15

to 25 percent zinc was produced. Present ore reserves are confined to an estimated 300 tons of 15 to 25 percent zinc ore that is present in stope-pillars, and 400 tons each of indicated and inferred ore reserves that occur at widely scattered zones in the walls of the stopes. The grade of these reserves is similar to that of the measured ore.

The mining of remnants of the known deposits may result in the finding of a small amount of new ore or may develop geologic evidence that will warrant a small amount of exploratory work.

RECOMMENDATIONS

The application of Jonathan Gordon for a loan of $25,000 for equipment and working capital at the San Juan mine should be denied because the estimated measured and indicated ore reserves, 700 tons containing 15 to 25 percent zinc, are insufficient to justify the proposed operation.