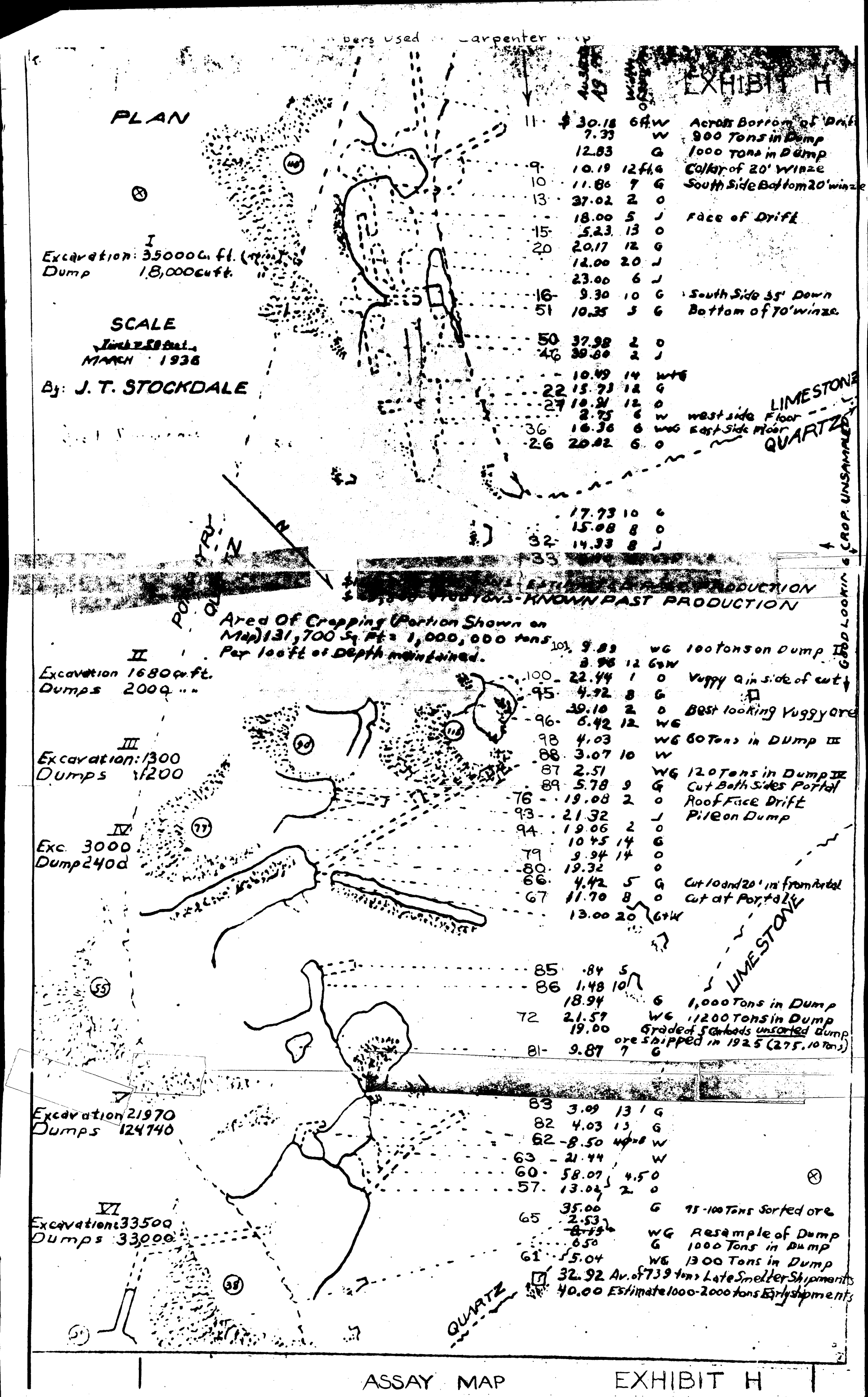

ASSAY MAP EXHIBIT H

STOCKDALE MAP ENLARGED to 1" = 40'

OFFICIAL
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upta

MME Form 40
Jan. 65

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

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

APPLICATION FOR FINANCIAL ASSISTANCE IN MINERALS EXPLORATION

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

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

AREX
Arizona Exploration Co., Inc.
2777 N. Campbell Ave.
Tucson, Arizona 85719

APPLICANT DO NOT USE THIS BLOCK

DOCKET NUMBER

DATE RECEIVED

REGION

DIVISION CODE

BUSINESS ORGANIZATION *(Check one)*

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

STATE IN WHICH FIRM IS ORGANIZED Arizona

LIST CORPORATE OFFICERS OR PARTNERS HERE, IF APPLICABLE

NAME	ADDRESS	TITLE
J. Harry Fieldman	2777 N. Campbell Ave.,	President
Arthur D. Filiatrault	4901 N. Camino Arenosa,	Vice President
Clare F. Filiatrault	4901 N. Camino Arenosa,	Secretary-Treasurer

All of Tucson, Arizona

MINERAL(S) FOR WHICH YOU WISH TO EXPLORE
Silver

ESTIMATED COST OF PROJECT
$ 38.023

PROPERTY NAME

LOCATION COUNTY STATE

GENERAL INSTRUCTIONS

Before filling out this application, please read the *OME Regulations for Obtaining Federal Assistance in Financing Explorations for Mineral Reserves* (30 CFR Chap. III). To assure prompt action, your application must provide all applicable material and information specified on the back of this application form. Avoid unnecessary correspondence and delays by submitting complete and accurate information. *Please submit two copies of this application and all accompanying papers* except as otherwise noted. Place your name and address on each sheet. Each item of information, maps, and reports required as a part of this application is described on the back of this form. Identify each attached statement by the item number to which it applies. If an item does not apply to your application, show the item number on your statement and after it write "not applicable." Maps or sketches should be used to supplement narrative descriptions of the property location and boundaries in item 2, existing mine workings and geology in item 3, and the proposed exploration work in item 5. When this information is not too complex, all of it may be shown on one map or sketch. All documents and other attachments submitted as a part of this application, except those in item 3(g) which you mark to be returned, become the property of the Government and will not be returned to the applicant. Send true copies, *not originals*, of leases, contracts, and other documents which are an essential part of your business records. *File this application with the Office of Minerals Exploration, Department of the Interior,* ~~Washington 25, D.C., or with the nearest OME Field Office.~~ Washington, D. C., 20242, or with the nearest OME Field Office.

CERTIFICATION

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

January 26, 1968
DATED

J. Harry Fieldman
BY *(Signature)*

President
TITLE

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

INFORMATION REQUIRED WITH THIS APPLICATION

1. Financial Eligibility:

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

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

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

2. Applicant's Rights in Land:

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

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

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

3. Physical Description:

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

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

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

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

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

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

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

4. Accessibility of Property:

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

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

5. Exploration Work:

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

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

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

6. Experience:

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

7. Estimate of Costs:

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

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

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

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

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

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

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

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

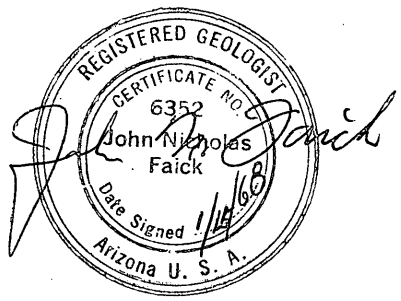
INT.-DUP. SEC., WASH., D.C

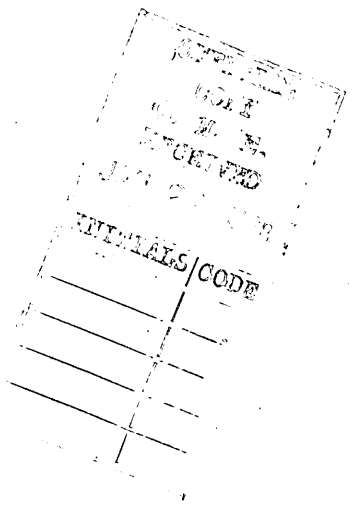
THE GREAT AMERICAN SILVER MINE

Cochise County, Arizona

by

John N. Faick, Ph.D.
Registered Geologist





Prepared for
AREX, ARIZONA EXPLORATION COMPANY
2777 North Campbell Avenue
Tucson, Arizona 85719
December 20, 1967

THE GREAT AMERICAN SILVER MINE
Cochise County, Arizona
by
John N. Faick

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8	Geologic Section B-B'	" "
9	Geologic Section C-C'	" "
10	" " D-D'	" "
11	" " E-E'	" "
12	" " F-F'	" "
13	" " G-G'	" "

TABLES
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1	Average grade of ore mined, sold or sampled.
2	Ore shipments to smelters
3	Samples by A. H. Gracey Nov. 1, 1922
4	Samples reported by C. L. Orem to A. H. Gracey Feb. 14, 1923
5	"A" Series of Samples by C. L. Orem, Oct. (?) 1935
6	Samples by C. L. Orem, Nov. 24, 1935
7	Assays shown on Longitudinal Section (fig. 6) in plane of workings, 60 ft. winze and sublevels

REGISTERED GEOLOGIST
CERTIFICATE NO. 6352
John Nicholas Faick
Date Signed 1/15/68
Arizona U. S. A.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The Great American silver mine, situated about 30 airline miles north of Douglas, Arizona, has long been known as a potential source of siliceous ores containing relatively small to moderate amounts of silver and a little gold. Records show about 720 tons of ore containing about 80 percent silica, and 30.394 ounces of silver and 0.309 ounces of gold per ton was selectively mined and shipped between 1912 and 1935 inclusive. About 51 tons of lead ore is also credited to the mine. Some ore was mined and milled on the property about 1936 or 1937. Total production probably was not over 10,000 tons. The mine was developed by about 1600 feet of underground workings and by numerous shallow cuts on the surface.

The ore occurs in quartzite and silicified limestone where silica has replaced Naco limestone in a zone about 1500 feet long and from 50 to 300 feet wide on the dip of the beds. In addition to small bodies of high-grade ore previously mined, it is said that the entire silicified zone contains scattered small high-grade veins, lenses, pods and replacement bodies in such abundance that most or all of the large silicified body constitutes low grade ore. Reserves have been variously estimated from 10,000 tons of

relatively high grade ore to 1,500,000 tons having an undetermined, but probably very low grade. This writer tentatively estimates the probable reserves to be about 500,000 tons in the zone which was explored and developed by previous operators. This is the most intensely mineralized zone and is estimated to contain about 5 ounces of silver and about 0.05 ounces of gold per ton. In addition there is about 1,000,000 tons of siliceous ore of undetermined but probably very low grade which is classified as possible ore. The grade is unknown as there are no assays of this material. An additional 500,000 tons of siliceous material is present but is not included in the estimate as it may be barren. The present high price of silver and the premium usually paid for silica would make it possible to profitably operate the Great American silver mine on a moderate scale by open pit methods for the production of low-grade, direct-shipping siliceous silver ore.

Block 1?

The mine should be explored by extensive drilling and the core and/or cuttings sampled and assayed to block out ore in sufficient quantities to be of interest to one or more of the Arizona smelters.

I strongly recommend that the Great American silver mine be explored and, if possible, be placed into production to supply low-grade siliceous silver ores to local smelters.

THE GREAT AMERICAN SILVER MINE
COCHISE COUNTY, ARIZONA

BY

John N. Faick

INTRODUCTION

The Great American silver mine in the Swisshelm district, Cochise County, Arizona, has long been known and frequent attempts have been made to work it because of moderate amounts of silver and gold and small amounts of lead in the ore. Some ore has been mined and shipped directly to smelters and some ore was milled on the property. Considerable development work has been done on the mine, and the work is reasonably well documented with old reports and assay records. The gradually increasing price and demand for precious metals makes it desirable to re-examine the Great American mine as a possible source of gold and silver, particularly at the present time when siliceous gold-silver ores are readily marketable at some smelters in the Southwest. An altered and mineralized zone about 1500 feet long and from 50 to 300 feet wide at the outcrop, and which extends

to unknown but probably shallow depth, is considered favorable for exploration and possible development.

This writer visited the property briefly on two occasions, April 26 and October 8, 1967, and carefully examined and mapped the deposit during the last two weeks of November. The report which follows was assembled from published and private sources of information supplemented by field work by the writer.

LOCATION AND ACCESSIBILITY

The Great American silver mine is located in the Swisshelm Mining district at the northern end of the Swisshelm Mountains, about 30 airline miles north of Douglas, and 18 miles east of Elfrida, Arizona, as shown on figure 1. It is about 134 miles by road from Tucson, Arizona and is easily reached by traveling east from Tucson about 86 miles on the Benson Highway, Interstate No. 10, to U. S. Highway 666 which is then followed southward 37 miles, thence turn east off the paved highway onto the graded and surfaced Rucker Canyon Road. This is followed eastward a distance of 12.4 miles to another branch road which turns right, or southward. The southward road is followed 2.3 miles to the Kuykendall Ranch and thence an additional 0.4 miles to a very sharp left turn onto an access road which leads directly to the mine only a short distance past the turn. The distance by road to the mine from Elfrida, Arizona is 20.3 miles.

The claims are situated in the low rolling hills near the head of a small tributary to Whitewater Draw, which many

years ago was known as Whitewater Basin. The maximum altitude on the claims is about 5300 feet above sea level and the minimum is about 5100 feet, a difference of about 200 feet.

The property is in sec. 1, T. 20 S., R. 27E. and sec. 6, T. 20 S., R. 28 E. as shown on the Swisshelm Mountain quadrangle map. The location of the Great American group of claims with respect to topography, land surveys and some other mines in the Swisshelm district is shown on figures 2 and 3.

RAILROAD TRANSPORTATION, POWER AND WATER

The distance from the mine to the main line of the Southern Pacific Railroad at Cochise is about 50 miles by good gravel and paved roads. The shortest distance to the railroad and smelter at Douglas, Arizona is about 33 miles over fair gravel roads, and is about 50 miles over paved Highway 666. (see fig. 1).

Electric power is available from a 7200 volt line at the Kuykendall Ranch. This line can be extended to the mine without cost to the mine and the voltage tripled if necessary for mine use. This power is provided by the Sulphur Springs Valley Electric Cooperative, Inc., Willcox, Arizona.

Water for camp and mine purposes probably will have to be obtained from shallow wells as it is scarce in the Swisshelm district.

PUBLISHED AND PRIVATE REPORTS

There are no published reports on the Great American silver mine other than scattered news accounts, however, several private reports are available. There are published and unpublished reports of the general geology of parts of the Swisshelm Mountains and a couple of reports describe the geology of mines located about one mile south of the Great American. The significant reports are listed in the attached bibliography. Copies of the private reports are on file in the office of the Arizona Exploration Company,

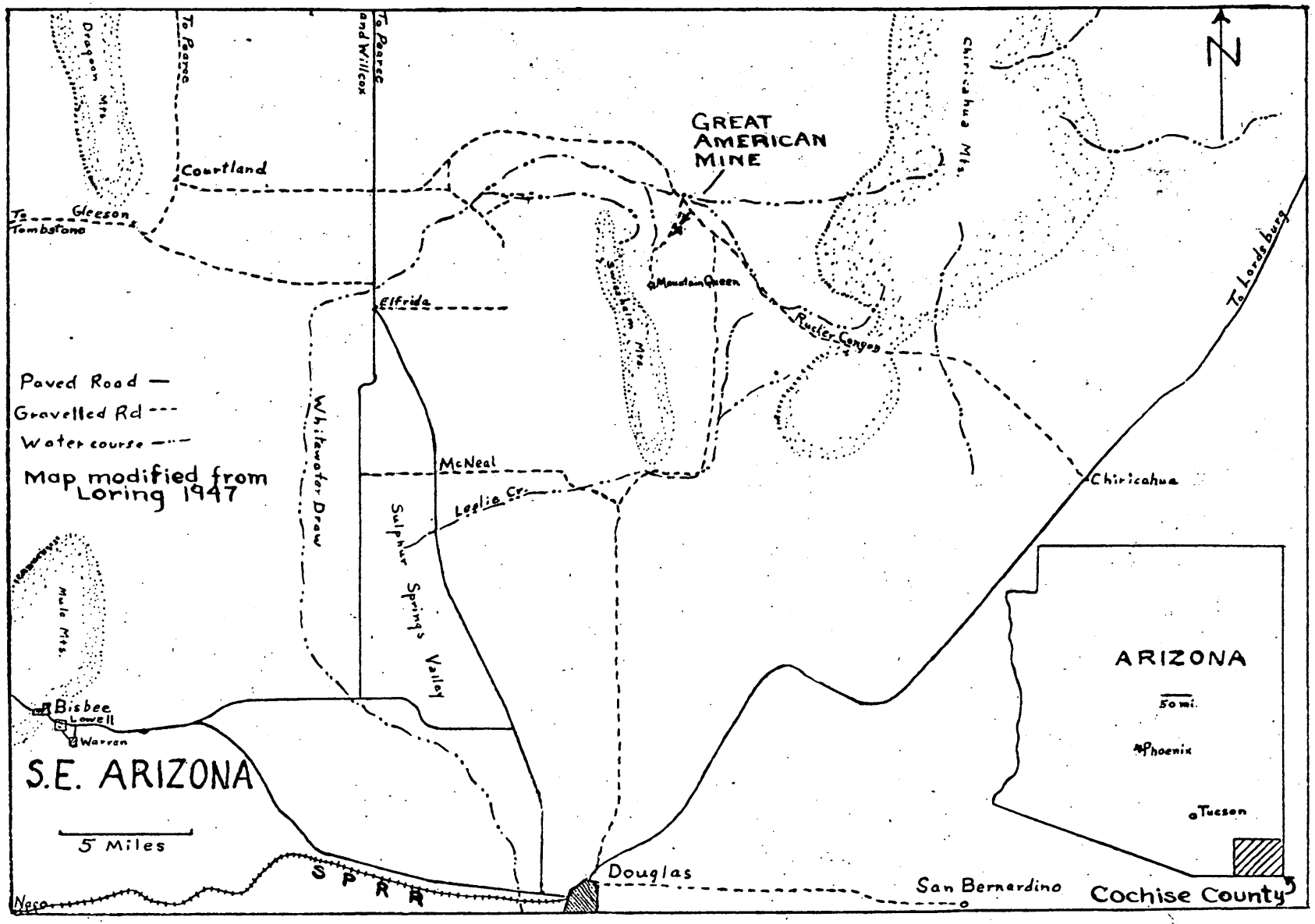

Figure 1 Location map of Great American Mine, Cochise County, Arizona

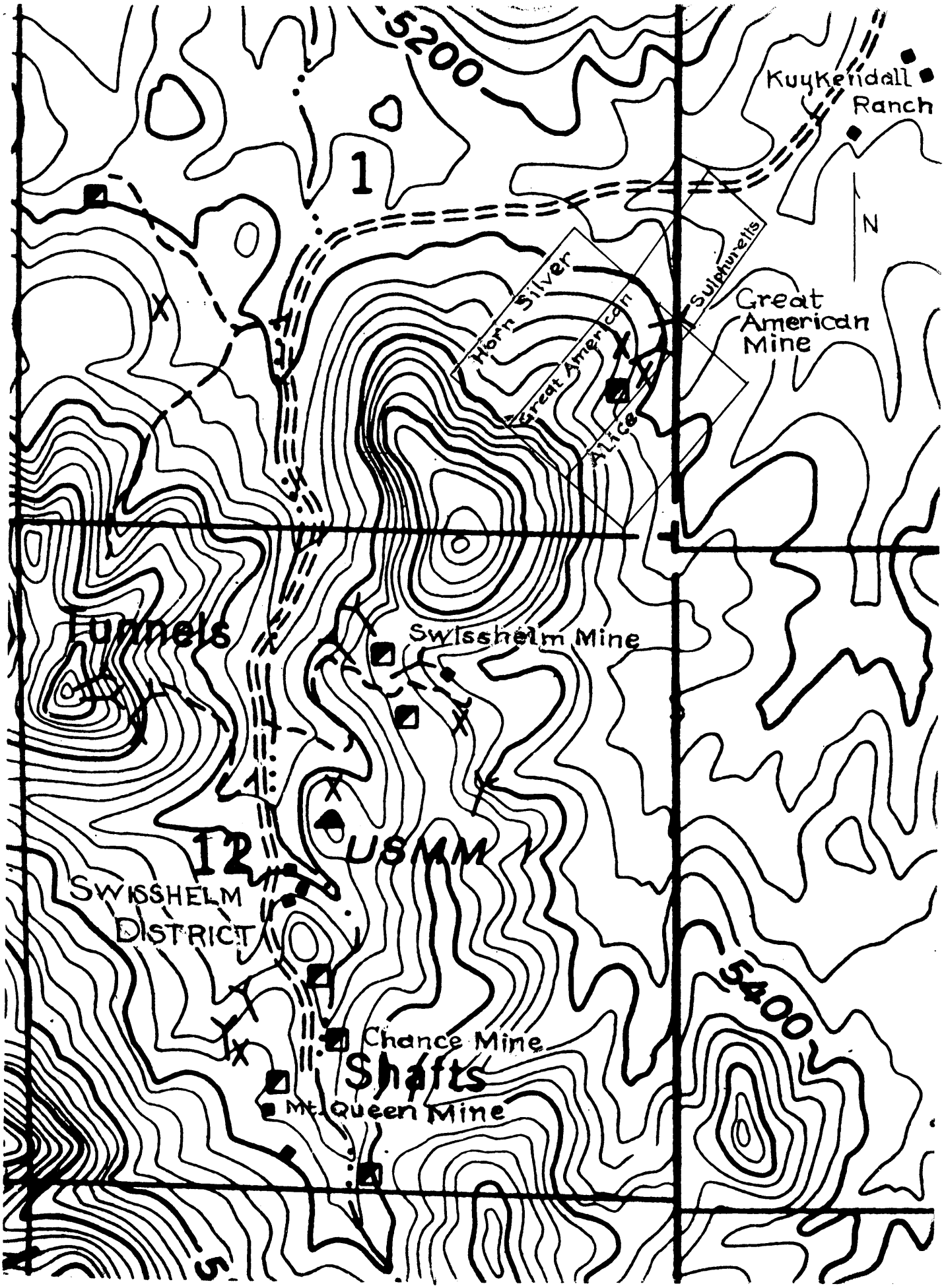

FIG. 2
SWISSHELM DISTRICT
SHOWING GREAT AMERICAN CLAIMS
Scale 1" = 1000'

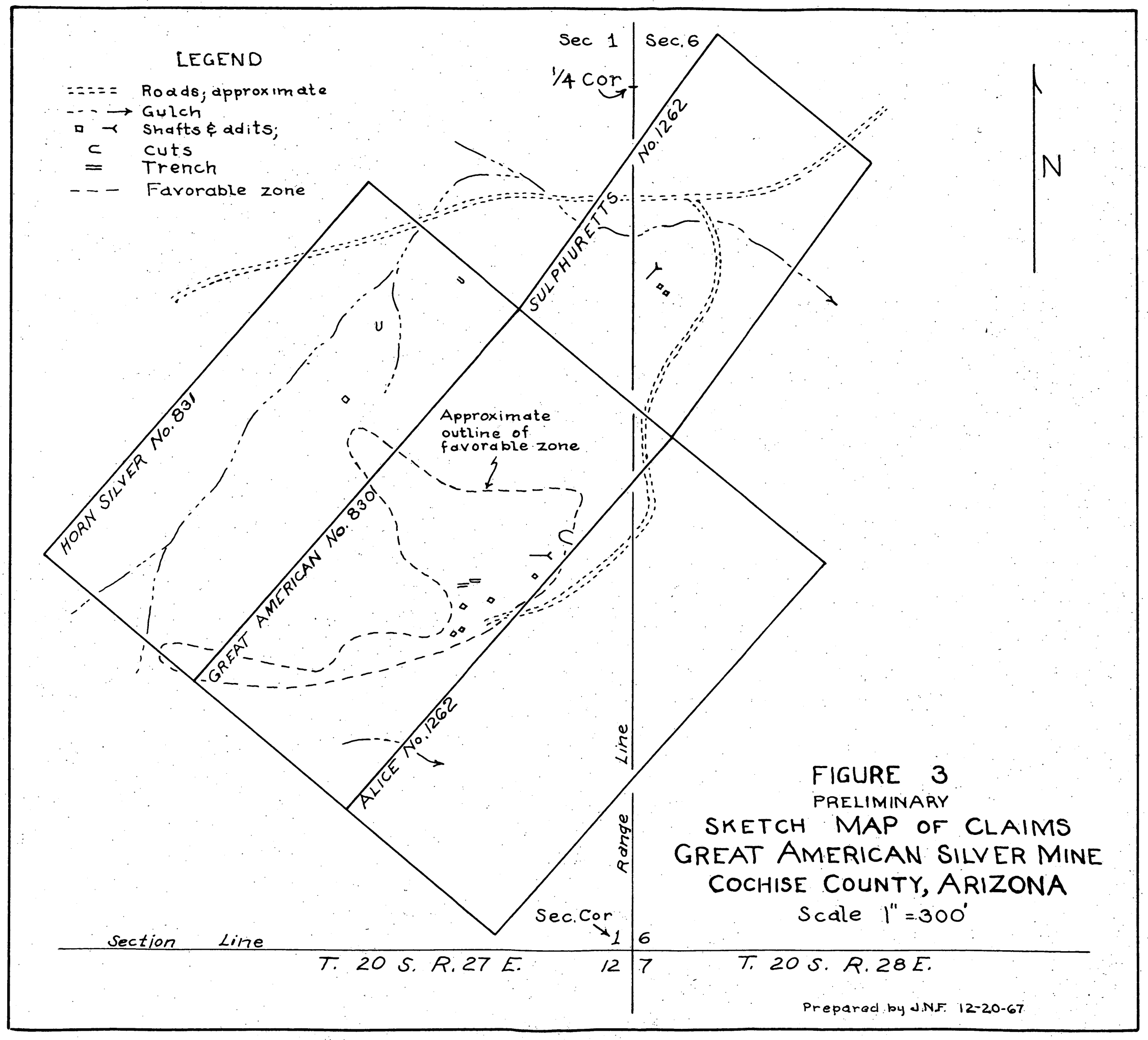

FIGURE 3
PRELIMINARY
SKETCH MAP OF CLAIMS
GREAT AMERICAN SILVER MINE
COCHISE COUNTY, ARIZONA
Scale 1" = 300'

and the published reports are available in the University of Arizona library. The private reports describe the geology of the property and include records of some of the ore shipped from the property and also include considerable sample and assay data. They also include comments on mill tests made on the ore. In 1963 Mr. Axel L. Johnson, Field Engineer, Arizona Department of Mineral Resources, summarized the old private reports.

DESCRIPTION AND OWNERSHIP OF THE PROPERTY

The Great American silver mine property as shown on figures 2 and 3 consists of four patented lode claims, namely: Hornsilver, Great American, Alice and Sulphuretts, having a total area of about 76.05 acres. The first two claims have numbers 830 and 831 respectively, the last two have survey number 1262. The claims were patented in 1891 and 1899 and were resurveyed in recent years by E. H. Jenkins, U. S. Mineral Surveyor, and all corners were clearly marked.

The Great American group of four claims is owned by Stanley M. Secrist and Helen W. Secrist, husband and wife of Tucson, Arizona, who purchased the property several years ago when it was sold at public auction for delinquent taxes. Title to the property is insurable and it is free of mortgages, liens or other encumbrances. The Arizona Exploration Company, AREX, acquired all rights to the property by lease with option to purchase by an agreement dated November 10, 1967. Copies of the agreement, explaining terms and conditions of the lease and option, are on file in the AREX office.

HISTORY

The earliest known record of mining activity in the Swisshelm district is in the Arizona Weekly Star for December 12, 1878, which reported that "John Swisshelm, Jim Bullard and Henry Henson are at work on their locations in the Whitewater Basin." This area is now generally known as Rucker Canyon but the Swisshelm name has been retained for the mining district and the mountains in which it is situated. The four claims were located in January 1884. The Great American and Hornsilver claims were surveyed for patent in 1888 and patent was granted in 1891. The Alice and Sulphuretts claims were surveyed in 1897 and patented in 1899. The patents were recorded June 24, 1901, in the records of Cochise County, Arizona.

At various times the property has been owned by the Great American Mining Company and the Alpine Mining Company, both Arizona corporations, and by Swisshelm Mining Company, a Colorado corporation. Apparently it was owned by C. L. Orem about 1935, or he may have represented unknown owners.

The first shipment of ore of which we have a record was made by J. V. Fryer in October 1912, and another was made by Sheerer and Hansen in December 1912. It is possible these two shipments came from a nearby mine rather than from the Great American, but proof is lacking. The next shipments of record were made late in 1920 by Ben Heney, Manager, Great American Mine. In August 1920 the Tombstone Epitaph reported a rich silver strike at the mine. In the fall of 1922 A. H. Gracey examined and reported on the mine with respect to geology, mine development, feasibility of treat-

ing the ore by cyanidation, and he included a list of 26 assays. In 1923 he was President of the Swisshelm Mining and Development Company which controlled the property. A report on the mine was prepared for Gracey by C. L. Orem, Mining Engineer, under date of February 14, 1923. This included sample and assay data for nine samples and comments on treating the ore by cyanidation.

The mine probably remained idle from 1923 until 1925 when the Old Dominion Co., Globe, Arizona operated for a short time and our records show five carloads of ore were shipped to the Copper Queen smelter in Douglas and to El Paso. Considerable siliceous ore was produced in 1925 and 1926, according to annual volumes of Mineral Resources, and this probably refers to production by the Old Dominion Company. The property presumably was idle from 1926 or 1927 until late 1934 or early 1935 when additional shipments were made by Frank R. Rickard for the account of the Four Horse Mining Company. In 1935 C. L. Orem again examined the property, submitted two sets of assays (representing 9 and 6 samples each) and commented on methods of treating the ore. Underground development was under way in 1935 and a 675-foot long adit was completed about 1937. A small mill was designed and built by Mark Gemmill and operated for a few months about 1936 or 1937 with Ben Heney as Superintendent. A dynamite box found in a stope bears the date June 28, 1937 and probably represents the last work done in the mine. Apparently the property has been idle since 1937.

PRODUCTION

The exact production from the Great American silver mine is not known. We have records of 19 car lots of ore, totaling about 770 tons having been shipped to smelters from 1912 to 1935 inclusive. About 50 tons of this ore was mined for its high lead content, the remainder was siliceous gold-silver ore. Undoubtedly there were other shipments of which we have no record. In 1935 Orem estimated more than 2000 tons of ore had been shipped from the old workings and he estimated that ore valued at from $25,000 to $50,000 had been shipped during the early days of operations. A small mill, having a capacity estimated at from 40 to 50 tons per day was operated for about 4 to 6 months in 1936 or 1937. When the mine was visited by Axel Johnson in 1963 he reported a large stope about 80 feet in diameter and 10 feet high probably had yielded from 4,000 to 5,000 tons of ore since 1935. Presumably this stope supplied most of the ore to the mill.

Although the records of production are incomplete I believe the total production from the Great American mine is probably not over 10,000 tons of ore. All of the ore produced was undoubtedly selectively mined from the richest ore zones for direct shipping or milling. Some of the ore, either shipped or milled, was taken from dumps left by earlier operators.

Shipments of ore to smelters, for which records are available, are shown in table 1. These are thought to be

reasonably reliable, however, it is possible that the two cars of high-lead, low-silica ore shipped in 1920 and 1935, and the two small shipments made in 1912 may have originated from another property. According to the annual volumes of Mineral Resources, the Great American mine was the largest producer in the district in 1925 when considerable siliceous silver-gold ore was shipped to the El Paso and Douglas smelters, and again in 1926 when several carload lots of siliceous ore were shipped.

MINE DEVELOPMENT

When the Great American group of four claims were surveyed for patent, about 15 years after the original discoveries were made, the survey showed several shallow shafts, open cuts and short adits. Considerable development work was done between 1899 and 1922 when Gracey described the workings in some detail. He reported five open cuts, some shallow shafts, and seven short adits which had been driven at random along the ore zone. At the north end an open cut in the ore zone is about 50 feet across and adjacent to it on the south side was a cut 100 feet long and 40 feet wide, and smaller cuts lie farther south. The ore zone explored by these cuts was said by Gracey (1922) to be about 500 feet long and 150 feet wide and trends southwest from the first cut mentioned above.

Near the south end of this ore zone Gracey (1922) described a 60-foot deep winze that was dug at the end of a short adit, and a 120-foot long drift and a short crosscut

that was driven from the winze on the 40-foot level. Subsequently the winze was deepened and other sublevels driven, as are shown on a longitudinal section map which was made by C. L. Orem to accompany his late 1935 reports. Additional development work during the years 1935, 1936 and 1937 resulted in completing a 675-foot long adit on the lowest practical level from the north end of the deposit. This adit extends in a southwesterly direction for 675 feet and a raise was put up to connect with the winze and sublevels mentioned above, and to stopes that probably were mined during the 1935-1937 period of operations.

The total amount of development workings is not precisely known. Gracey in 1922 reported underground workings "amounting to 325 feet of tunneling, 70 feet of sinking and 130 feet of drifting". In 1935 Orem estimated all the development workings including open cuts to amount to about 2000 feet. Information available in 1967 indicates that several adits in the aggregate amount to about 1020 feet. Sublevel drifts and crosscuts shown on the Orem sectional map amount to about 230 feet. Raises and winzes driven as connections between underground workings probably amount to about 350 feet. Thus, in 1967 it is estimated that there are about 1600 feet of underground workings at the Great American mine. At 1967 prices this amount of development work would cost about $100,000.

GENERAL GEOLOGY

The Great American silver mine is situated in the northern part of the Swisshelm mining district of which the geology of the main productive part has been described by Loring (1947) and by Galbraith and Loring (1951, p. 30-36). More recent studies of a regional nature have been made by Rogers (1957), Epis and Gilbert (1957), and Epis, Gilbert and Langenheim (1957), and Epis (1958).

The Swisshelm district is underlain by Paleozoic formations having a combined stratigraphic thickness of about 4200 feet. Resting on the Paleozoic formations are Cretaceous sandstones and conglomerates having a thickness in excess of 500 feet. In some parts of the Swisshelm Range these older rocks are covered by a thick section of Tertiary volcanics.

According to Galbraith and Loring (1951, p. 32) the sedimentary formations have been compressed into a tight anticlinal fold which plunges 15 degrees north-northwest. The formations on the eastern and western flank of the anticline dip steeply to the northeast and to the southwest respectively. The formations on the eastern flank of the anticline underlie most of the Swisshelm district but the formations of the western flank crop out in the foothill area west of the district. A body of granite has been intruded along the anticlinal axis and separates the eastern flank from the western flank.

The structure of the eastern flank of the anticline has been complicated by a low-angle thrust fault on which a plate of upper Paleozoic rocks has been moved over lower Paleozoic rocks. The outcrop of the fault is irregular but may be traced in a northwesterly direction across the central part of the district where it dips from 10 to 15 degrees to the northeast.

In the north part of the district Galbraith and Loring (1951, p. 32) report several parallel thrust faults which result in a complex imbricate structure. The main thrust fault in the Swisshelm district has been intruded by a tabular body of diorite porphyry which ranges from 4 to 50 feet thick.

In the main part of the district there were formerly productive mines including the Mr. Queen, Chance, Mammoth, Whale and others. These mines were developed on lead-zinc-silver replacement deposits in the Naco (Pennsylvanian) limestone. The ore bodies were localized where northeasterly and northwesterly trending tension fractures intersected favorable limestone beds and the most productive ore bodies are only a few feet above the diorite porphyry. The ore body on the Great American property has a nearly similar geological occurrence, but the character of the ore is different.

GEOLOGY OF THE MINE AREA

The geology of the Great American silver mine, shown on figure 4, seems to be quite similar to the general geology of the central part of the Swisshelm district as described by Galbraith and Loring (1951 p. 30-36). At the Great American mine the Naco (?) limestone, with beds dipping at a low to moderate angle to the north, rest on diorite. This diorite body is of unknown size or shape but it is assumed to be sill-like and may have intruded on a thrust fault in the same manner as the diorite body in the central part of the Swisshelm district.

The Great American ore deposit consists of a large siliceous mass described by Gracey (1922) as being over 1000 feet long, and by Orem (1923) as being at least 1500 feet long, and having a maximum width of about 200 to 300 feet. The geology map, figure 4, (in pocket) shows the siliceous zone to be shaped like a very irregular "V" which points in a north easterly direction. The outcrop of the south limb of the "V" is about 1500 feet long and from 50 to 175 feet wide. The north limb ranges from 150 to 300 feet wide and is a little over 600 feet long. The extent to which gold and silver may occur in this siliceous zone is not yet known.

The mineralized zone, which formed when siliceous solutions invaded and replaced limestone, underlies a low, rounded, gently sloping ridge which Orem (1935) reports is composed of "beds of limestone and quartzite underlain on the dip by a large porphyry sill" with tongues or dikes intruding the limestone. The main ore zone is a highly fractured and silicified zone lying just above

high Al_2O_3

the contact with the porphyry sill and it may be structurally related to this sill. The shape of the silicified zone and the fact that it seems to cut across the strata of the limestone host rock suggests that it is related in some way to the underlying diorite but it may have been localized by geologic structural conditions as yet unknown. The south and southeast boundary of the massive silica zone seems to have been determined by a high-angle, south-dipping fault. On the north side the silica is interlayered with the north-dipping limestone, thus suggesting that the silica selectively replaced certain beds of limestone. These relationships are shown by the geologic sections figures 7 through 13. High CaO?

The siliceous zone lies almost entirely on the Great American claim approximately as shown on figure 4. A small separate siliceous body lies on the Horn Silver claim. The vertical depth to which either of these siliceous bodies extend is unknown.

CHARACTER AND DISTRIBUTION OF THE ORE

The ore of the Great American silver mine occurs in an extensive zone of silicified limestone along or near its contact with diorite porphyry. Both Gracey (1922) and Orem (1923 and 1935) were of the opinion that the entire siliceous body contained some values in gold and silver with a little lead and traces of copper. It is reported (oral communication) by Mr. Secrist, the owner, that Ray Dye expressed the same opinion, i.e. that all of the silicified zone contained values in precious metal. The deposit is valuable only as silica flux, and for its silver and gold content as the other metals are not present in significant quantities.

The ore apparently consists of relatively high grade veins, lenses, pods and bedded replacement bodies scattered erratically throughout the silicified zone in sufficient abundance that the entire body constitutes very low grade siliceous gold-silver ore. Gracey reported the presence of native silver and free gold but considered most of the silver to be in the chloride form. He reported that the exposed ore was almost entirely oxidized, however, a little pyrite occurs in the ore and in a few places abundant limonite derived from weathered pyrite attest to its former presence.

Orem (1923) states that within the ore zone the mineralizing solutions followed fractures and seams and replaced limestone beds with some beds being more extensively replaced than others. He proposed developing the mine by drifts and crosscuts and inclined raises perpendicular to the bedding planes. Orem stated in 1935

that "the lower tunnel we are driving will cut the ore zone from 50 to 350 feet on the dip of the ore beds and will average about 200 feet of backs for 1000 feet." He stated that the ore bed had a width of 16 inches but that it had been mined in some places to widths of 8 or 10 feet. He stated there were many fissures (veins) and lenses of ore scattered through the large deposit that are wider than 16 inches. Orem (1935) reported by letter to J. T. Stockdale that "Additional assays and pannings indicate there are probably 50 places where ore higher than $20.00 per ton can be mined." The $20.00 per ton value was based on 1935 prices of $35.00 per ounce gold and $0.77 per ounce silver. In 1935 (?) Orem reported that some ore beds exposed 60 feet deep in mine workings were from 6 to 15 feet thick and contained as much as 15 ounces of silver per ton and from $5.00 to $11.00 per ton in gold. Presumably these were at the old 60-foot winze and sublevels which seem to have been driven in an attempt to selectively mine a narrow, elongate, nearly vertical zone containing above average values in gold and silver. These workings and the adits and open cuts were referred to by Gracey (1922) when he stated the work "has been done in the ore deposit and at many points ore of payable milling grade is exposed." Throughout the silicified zone values are sufficiently well distributed so that in 1935 Orem was considering mining the entire deposit by power shovel in an open pit and treating the ore in a 1000 ton per day mill using a combination concentration-flotation process.

The ore deposit apparently has been slightly modified by weathering. Studies of the silver to gold ratios suggest that silver may have gone into solution and migrated downward to be redeposited in a zone of secondary enrichment, whereas the gold apparently did

not migrate. The ratios referred to were derived from arithmetic averages of groups of assays; the relationship would be more evident if selected assays were used as was done for item No. 10 shown on the table 1. Near-surface samples show a higher proportion of gold and a lower proportion of silver than is apparent in samples from deeper workings.

Samples containing pyrite, the iron sulfide, are of special interest. As shown by samples Nos. 6, 8 and 9 (table 4) cut by Orem in 1923, these indicate that relatively high values accompany pyrite, and this mineral may serve as an indicator mineral during exploration, development and mining. These three samples average 0.353 ounces gold and 44.33 ounces silver per ton of ore. The silver values remain about average in the presence of lead, thus there does not appear to be any significant relationship between lead and silver. The copper content of the ore is very low and, like lead, does not seem to bear a close relationship to the silver.

Although most of the values are found in the silicified zone there is some evidence that some of the host rock is also mineralized. Gracey (1922) reports that two tunnels were driven out into limestone at right angles to the contact from the large open cut at the northeast end of the deposit and both tunnels were said to be mineralized throughout. I presume this means both the siliceous zone and the limestone were mineralized. Gracey (1922) in sample No. 3 reported altered country rock containing 1.2 ounces of silver per ton and 0.02 ounces of gold per ton. In sample No. 14 (table 3) of altered limestone he reported 2.1 ounces of silver and 0.08 ounces of gold per ton. A sample of

means pyrite? High Fe?

white quartz was reported by Orem (table 5) to contain 6.0 ounces of silver per ton and 0.12 ounces of gold. These few examples indicate that some silver and gold may have deposited in the country rock but we do not know to what extent.

GRADE OF ORE

The old reports, assay and shipping records of the Great American silver mine provide considerable documentary information pertaining to the grade of ore previously mined, but they provide little information as to the grade of ore that remains. Records are available for 19 carload-lots of ore shipped and for considerably more than 100 separate assays of samples cut in various parts of the property, however, some of the assays seem to have been made on duplicate or check samples. Unfortunately the records show mostly the grade of select ore in high grade parts of the ore body and few assays indicate overall grade of the entire siliceous zone, which is of most interest under present conditions for mining. The average grade of various groups of samples is summarized on table 1, shipping records are shown on table 2, and separate assays are given on tables 3 through 7, and on figure 6. All averages referred to in this report are arithmetic, i. e. not weighted.

Ten carloads of ore shipped from 1925 through 1935 inclusive averaged 0.068 percent copper, or about 1.4 pounds of copper per ton of ore, as shown on table 2. Most shipments were penalized for copper deficiency, i. e. for the amount of copper under eight pounds required by the smelters at that time.

Mark Gemmill, in a letter to Axel Johnson, dated Sept. 23, 1963, reported that when the mill operated in 1936 or 1937 the ore was expected to contain from 15 to 20 ounces of silver per ton but that mine run ore fed to the mill contained less than 10 ounces of silver per ton.

The ore previously sampled and assayed or shipped to the smelters obviously was selected in an effort to find the best grades for commercial purposes. We do not know the metal content of the remaining ore but we believe it all contains some precious metals as reported by Gracey (1922) and Orem (1923 and 1935). Both Gracey and Orem thought large reserves of low grade ore existed beyond the old mine workings. Mr. Ray Dye is reported (oral communication from Mr. Secrist) to have stated that the entire siliceous deposit would average about 2.0 ounces of silver per ton. It is noteworthy that the deposit was extensively prospected and it contained significant values in precious metals in all places where assay information is available. It is also noteworthy that Orem (Dec. 22, 1935) reported at least 50 places throughout the deposit where significant values were found by panning. An assay map compiled by Miles M. Carpenter Nov. 12, 1936 showed the locations and assays of 102 samples having an average of 10.98 ounces of silver and 0.177 ounces of gold with a ratio of silver to gold of 62.1. The location of some of these samples near the 60 foot winze is shown on figure 6, prepared by Orem, but Carpenter's assay map is not included with this report.

0.032 oz Au = $1.12 (0.03 oz. minimum smelter settlement)
62.1 / 2.0 oz Ag = 3.82 (0.5 oz " " ")
@ 1.91
+ 75% SiO_2 3.00 (after Fe, Ca, Al_2O_3 " ")
$7.94

ORE RESERVES

Available information on tonnage and grade of ore at the Great American mine has been summarized by Johnson (1963) but the estimates are not significant at present as they apply principally to the high-grade part of the ore body suitable for underground mining. Under present conditions we are interested in the reserves of low grade ore which might be mined on a relatively large scale by open pit methods, and these are difficult to determine due to lack of drill hole information and sample information beyond the old mine workings.

Gracey (1922) estimated 14,000 tons of proven ore having a value of $13.10 at 1922 prices and Orem (1935) estimated 20,000 tons of ore containing 16 ounces of silver and 0.20 ounces of gold valued at about $20.00 per ton in 1935. Orem (1935) also estimated the amount of ore available for open pit mining. He stated that if the ore body is 1000 feet long, 100 feet thick and extends 200 feet on the dip of the beds it would contain 1,500,000 tons of ore but he did not report the estimated grade. This is classed as inferred or possible ore, as the estimate is not supported by engineering date, but the estimate is not unreasonable. A map prepared by J. T. Stockdale in 1936 indicated a reserve of 1,000,000 tons of ore per 100 feet of depth in the formerly productive zone and in a short westerly extension of it.

Another estimate of ore reserves was made by Ray Dye, a well known Arizona mining man and a partner in the firm of Dye and Bathrick of Kingman. His ore reserve estimate was

obtained through the Arizona Department of Mineral Resources, Tucson, Arizona. Mr. Dye worked for Phelps-Dodge during WWII and at that time he is reported to have investigated the Great American deposit as a source of siliceous ore for the Douglas smelter. Mr. Dye estimated the reserve in three different ways depending on grade requirements. Mr. Dye's reserve estimates follow:

Estimate Number	Tons of Ore	Percent Silica	Oz. Gold per ton	Oz. Silver per ton
1	500,000	93	0.01	0.5
2	200,000	92.7	0.02	1.75
3	50,000	85.6 - 90.0	0.04	4.5

Probably most a source for [illegible]

We do not know how Mr. Dye determined his ore reserves and grade but it is noteworthy that he thought a significant amount of low-grade ore suitable for direct shipping to smelters existed at the Great American silver mine. This is shallow, near surface ore suitable for open pit mining. In addition to the shallow ore it is possible that the deposit is underlain by a steeply dipping vein type or pipe-like deposit which may have served as an ore inlet. If such a condition exists the ore reserve and grade estimates would be subject to considerable revision.

After carefully mapping the silica outcrop and studying all available records it appears to this writer that Dye's ore reserve and grade estimates are too low, and estimates by Orem (1935) and Stockdale (1936) were more realistic. I think 500,000 325,000 to depth of 60' tons of ore containing 80 percent silica, 5.0 ounces of silver and 0.05 ounces of gold per ton is a reasonable estimate of ore reserves remaining within the zone previously explored and mined.

This would be classed as possible ore, however, high costs of mining may prevent extraction of about one-half of it.

In addition to this previously developed zone there are extensions of it toward the northwest and southwest which may contain about 1,000,000 tons of siliceous material of undetermined grade, but it is expected to contain about two ounces of silver per ton. Thus my reserve estimate corresponds to the 1,500,000 tons reported by Orem in 1935. In addition there are at least 500,000 tons of siliceous material about which very little is known, consequently it is not considered part of the reserve.

$4.00 only

where?

COMMENTS ON PAST OPERATIONS AND FUTURE POSSIBILITIES

Most of the ore produced from the Great American silver mine was highly siliceous ore containing moderate amounts of silver with a little gold. This type of ore has always been favored by smelters, but the low content of silver and the low prices, hence low value of the ore, did not permit mining and shipping of ore directly to smelters. The ore, if mined in large quantities, simply was too low grade to pay mining and shipping costs and treatment charges. Likewise, it was not possible to selectively mine the richer ore by underground methods because production costs of a small operation using hand labor were too high. If we accept the Orem and Gracey reports as being reliable, then at some especially favorable time it may have been possible to mine and mill this ore on a large scale, say about 1000 tons per day as suggested by Orem (1935). However, large scale mining of low grade silver ore would not have been attractive at any time since the Great American mine came into existence. At no time has the price of silver been high enough or the demand great enough for sufficiently long periods to attract attention to low grade silver deposits. Possibly the mine could have been operated with Government regulated prices that existed for silver from about 1936 to the present time, however, this period was interrupted by WW II. For many years after the war the price of silver

remained too low and production costs increased too rapidly for the Great American ore to be mined profitably. Probably the main reason the Great American mine has not been successful was failure to "block out" or prove sufficiently large reserves of low-grade ore to justify a large scale operation during any of the more favorable periods such as existed during the early 1920's or early 1960's

SUGGESTED EXPLORATION

To prove the existence of significant ore reserves at the Great American mine an extensive exploration program of drilling, sampling and assaying is justified. This would serve the purpose of determining the depth to which the ore extends, would provide information for determining ore reserves and would provide samples from which the content of gold, silver and silica could be determined. This drilling need not be done in a single exploration program but might be divided into at least two stages and different methods might be employed for each stage. Probably a wagon drill equipped with a cyclone sample collector would be satisfactory for drilling from the surface to depths of about 50 or 60 feet, but diamond drilling would be required for greater depths. The rock probably is too hard for rotary drilling with rock-type bits. For sampling from underground workings it would be practical to use long-hole percussion drilling methods. Driving additional underground workings such as drifts, crosscuts and raises probably will not be necessary as adequate testing can be done from the old workings or by drilling.

This suggested exploration program should be adequate to

prove the existence of substantial reserves of low-grade siliceous ore suitable for open pit mining and direct shipping to smelters.

Respectfully submitted,

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NOTE

This page report, plus summary, conclusions, recommendations and bibliography was prepared by John N. Faick, Ph.D., Mining Geologist, from published and private reports and short trips to the property on April 26 and Oct. 7, 1967, and detail mapping during the last two weeks of November 1967.

Tucson, Arizona
Dec. 20, 1967

Table 1. Average grade of ore mined, sold or sampled.

Item No.	Description	Av. gold in Oz. per ton	Av. silver in Oz. per ton	Ratio Silver to gold
1	Smelter settlement sheets of 17 carload lots of siliceous ore totaling 719.54 tons of crude ore, but excluding two high-lead shipments.	0.309	30.394	98.4:1
2	275.10 tons of unsorted dump ore shipped in 1925, also included in Item 1 above	0.169	17.69	104.7:1
3	26 samples reported by A. H. Gracey in 1922, from surface cuts, dumps and shallow mine workings	0.128	9.20	71.1:1
4	9 samples reported by C. L. Orem, 1923 from 40-ft. level in 60-ft. winze and portal of 105-ft. adit	0.31	22.3	71.9:1
5	9 samples ("A" Series ?) by C. L. Orem, Oct. (?) 1935 from dumps, 105-ft adit and 40-ft. level in 60-ft. winze.	0.306	11.5	37.5:1
6	6 samples ("B" Series) by C. L. Orem Nov. 24, 1935 from surface; and shallow workings near 60-ft. winze	0.45	16.5	36.6:1
7	17 of 19 samples shown on longitudinal section, mostly duplicating samples in items 3, 4 and 5 above.	0.175	14.76	84.3:1
8	List of 102 samples compiled by Miles M. Carpenter Nov. 12, 1936	0.177	10.98	62:1
9	Average grade of 20 samples of dumps	0.184	11.17	60.7:1
10	Average of 12 surface or near surface samples selected from Gracey and Orem reports.	0.226	6.8	30.1:1

Table 2.
ORE SHIPMENTS TO SMELTER

Date	Where Shipped	Dry Wt. in tons	Ounces per ton Gold	Ounces per ton Silver	Analysis in Percent: Copper	Lead	Zinc	Insoluble or Silica	Iron	Lime	Alumina	Sulphur
10/29/12	Douglas[1]	32.074	0.29	26.4				80				
12/24/12	"	30.720	0.38	35.9								
8/21/20	El Paso[2]	15.999	-	7.3		19.8		56.5	8.2	0.9		
8/21/20	" "	19.355	0.25	35.4				84.9	5.6	1.6		
9/13/20	" "	37.439	0.31	40.9				83.1	4.4	2.8		
10/5/20	Douglas[3]	44.005	0.393	36.54				77.0				
11/24/20	"	51.034	0.37	28.97				68.2				
1/3/21	"	54.292	0.313	22.83				75.0				
10/29/22	Douglas[1]	32.074	0.29	26.4				80.0				
10/15/25	Douglas[4]	54.905	0.185	19.23	0.09			80.4			2.3	
10/15/25	"	67.034	0.17	16.34	0.09			82.9			2.3	
10/19/25	"	44.481	0.18	19.10	0.08			83.6			3.2	
10/24/25	"	58.360	0.17	17.86	0.07			79.2			3.9	
10/24/25	"	50.312	0.14	15.90	0.09			79.0			3.0	
5/24/34	El Paso[5]	38.105	0.37	41.0	0.05							
7/25/34	" "	32.779	0.754	59.0	0.05							
11/6/34	" "	30.937	0.39	29.6	0.07		0.5	77.2	7.9		6.8	0.5
2/19/35	" "	41.937	0.305	45.4	0.03		0.2	85.0	5.4		0.8	0.3
3/19/35	" "	34.41	0.125	13.0	0.06	27.2	1.1	42.8	11.2		0.8	0.3
					.07			75.9	7.1	1.8	2.9	Arith. Av.

Total 19 shipments of record. The arithmetic average of 17 shipments, exclusive of two high-lead ore shipments, is 0.309 ounces of gold and 30.394 ounces of silver per ton. The indicated ratio of silver to gold by weight is about 98.4:1. A total of 719.543 tons of dry siliceous gold-silver ore is represented, plus 51.41 tons of high-lead ore.

1. Copper Queen Consolidated Min. Co., Douglas, Arizona
2. The Consolidated Kansas City Smelting and Refining Co., El Paso, Texas
3. Calumet and Arizona Mining Co., Douglas, Arizona
4. Phelps-Dodge Corp. Copper Queen Branch, Douglas, Arizona
5. American Smelting & Refining Co., El Paso, Texas

silica credit

SiO_2	75.9 %
Fe	− 7.1
CaO	− 1.8
Al_2O_3	− 29.0 (10×2.9)
SiO_2 credit	38.0 %
@ 8¢/stu	$.08
Net	$3.04

Table 3
SAMPLE AND ASSAY INFORMATION
(Samples reported by A. H. Gracey; Nov. 1, 1922)

Sample Number	Length or Width of Sample in ft.	Description	Gold Oz. per ton	Silver Oz. per ton
1	12	12 ft. across collar of 20 ft. winze opposite Station 1	0.17	5.5
2	7	7 ft. across southside at bottom of 20 ft. winze	0.11	10.4
3		Altered country rock	0.02	1.2
4	13	13 ft. across back of drift 25 ft. southwest of 50 ft. winze	0.06	4.0
5	10	10 ft. across south side of 50 ft. winze at depth of 35(?) ft.(?)	0.09	8.0
6	6	6 ft. across back of drift 17 ft. from northeast (end ?)	0.19	15.2
7	12	12 ft. across back of drift and short crosscut west, 25 ft. from winze	0.20	17.1
8	12	12 ft. along east crosscut 43 ft. from winze	0.17	12.7
9	6	6 ft. in two cuts east side of drift 25 ft. from winze	0.14	13.0
10	4	4 ft. small crosscut near face of drift	0.13	9.6

Sample Number	Length or Width of Sample in ft.	Description	Gold Oz. per ton	Silver Oz. per ton
11	6	6 ft. across face of northeast drift 84 ft. from winze	0.16	21.2
12	8	8 ft. in open cut near Station 3. This cut evidently an offshoot from main orebody	0.06	3.4
13	9	9 ft. at each side portal little tunnel near Station 4	0.11	2.5
14	5	5 ft. in two cuts 10 and 20 ft. in from portal tunnel Station 5 Altered limestone	0.08	2.1
15	8	8 ft. in two cuts at portal same tunnel. Tunnel passed through ore zone into altered limestone represented by sample 14. Location deep cut near Station 5	0.10	5.6
16	6	6 ft. up from top of tunnel, being continuation upward of sample 15. Location deep cut near Station 5	0.175	10.7
17	13	13 ft. across surface gossan, altered rock west side of ore zone. Ore in bottom of cut below this sample	0.06	2.5
18	15	15 ft. being continuation of sample 17	0.04	2.2
19	7	7 ft. across bench or ore between cuts	0.15	6.0

Sample Number	Length or Width of Sample in ft.	Description	Gold Oz. per ton	Silver Oz. per ton
20	5	5 ft. across bottom 50 ft. winze	0.10	8.9
21	-	1000 tons or over, of reject and dump material from workings Station 1 and 2. (3 samples, 21A, B & C)		
21A			0.11	10.0
21B			0.12	7.1
21C			0.19	13.8
22		1000 tons reject and dump Stations 5 and 6 (3 samples 22A, B & C)		
22A			0.26	23.8
22B			0.15	10.2
22C			0.19	12.5
		Arithmetic average of 26 samples by A. H. Gracey	0.128	9.20

Silver to gold ratio by weight 71.1:1

Table 4
SAMPLE AND ASSAY INFORMATION
Samples reported by C. L. Orem to A. H. Gracey, Feb. 14, 1923

Sample Number	Length or Width of Sample in ft.	Description	Gold Oz. per ton	Silver Oz. per ton
1	6 or 36 ft.(?)	7 cuts, each 6 ft. long from east drift of 40 ft. level in 60 ft. winze. Cuts 6 ft. apart extend from top to bottom of drift.	0.22	16.0
2	12	Cut across 12 ft. on side and 4 ft. at face of south crosscut on 40 ft. level.	0.16	6.9
3.	14	Cut across 14 ft. above 105 ft. tunnel portal.	0.16	5.5
4.	?	Cut below the 14 ft. which constitutes No. 3 sample.	0.20	16.0
5.	-	Lead ore on upper dump	0.20	19.0
6	-	Sample showing iron sulfides from 40 ft. level, northeast face.	0.18	30.4
7	-	Sample of oxidized ore on surface above 105 ft. tunnel portal.	0.76	4.2
8	-	Sample showing iron sulfides from 40-ft. level	0.40	49.7
9	-	Another sample showing iron sulfide from 40-ft. level	0.48	52.9
		Arithmetic average of 9 samples by C. L. Orem	0.31	22.3

Silver to gold ratio by weight is 71.9:1

Table 5
SAMPLE AND ASSAY INFORMATION
Probably "A" series of samples by C. L. Orem about Oct.-Nov.(?) 1935(?)

Sample Number	Length or Width of Sample in ft.	Description	Gold Oz. per ton	Silver Oz. per ton
1	-	Sample of dump at old windlass	0.14	3.6
2	3	Across 3 ft. portal 105 ft. tunnel	0.09	11.1
3	-	Sample of ore on dump	0.42	11.2
4	2	2 ft. sample ore above lower cut tunnel	0.13	11.0
5	4½	4½ ft. sample raise inside portal tunnel	0.90	34.5
6	2	2 ft. roof at end crosscut in 105 ft. tunnel	0.45	4.3
7	1¼	15 inches roof 20 ft. south 60 ft. winze 40 ft.	0.32	10.8
8	8	8 ft. sample across ore NE face 40 ft. level, 60 ft. winze.	0.18	11.4
9	-	Sample white quartz	0.12	6.0
		Arithmetic average of 9 samples	0.306	11.5

Silver to gold ratio by weight is 37.5:1

Table 6
SAMPLE AND ASSAY INFORMATION
Samples by C. L. Orem, Nov. 24, 1935

Sample Number	Length or Width of Sample in ft.	Description	Gold Oz. per ton	Silver Oz. per ton
1-B	2	Intersection of two lenses on north wall at top of 60-ft. winze, 2 ft.	0.25	8.2
2-B	2	West opencut east face 2 ft.	0.60	20.8
3-B	2	2 ft. roof 20-ft. east 60-ft. winze on level with collar	0.59	22.5
4-B	0.5-1	6 in. to 1 ft. upper workings on surface.	0.43	9.6
5-B	-	Best vuggy ore workings just below 4-B.	0.38	33.5
6-B	2	2-ft. right on north side bottom open cut workings below 5-B	0.45	4.3
		Arithmetic average of 6 samples by C. L. Orem	0.45	16.5

Silver to gold ratio by weight is 36.6:1

Table 7
SAMPLE AND ASSAY INFORMATION

Assays on Longitudinal Section in Plane of Workings

Reported By	Probable Date	Original Number	Width in ft.	Description	Gold Oz. per ton	Silver Oz. per ton
Gracey	11/1/22	1	12	12 ft. across collar of 20-ft. winze opposite Station 1	0.17	5.5
"	"	2	7	7 ft. across south side at bottom of 20-ft. winze	0.11	10.4
"	"	4	13	13 ft. across back of drift 25 ft. southwest of 50-ft. winze	0.06	4.0
"	"	5	10	10 ft. across south side 50 ft. winze at depth of 35 ft.	0.09	8.0
"	"	6	6	6 ft. across back of drift 17 ft. from northeast	0.19	15.2
"	"	7	12	12 ft. across back of drift and short crosscut west, 25ft. from winze	0.20	17.1
"	"	8	12	12 ft. along east crosscut 43 ft. from winze	0.17	12.7
"	"	9	6	6 ft. in two cuts east side of drift 25 ft. from winze	0.14	13.0
"	"	10	4	4 ft. small crosscut near face of drift	0.13	9.6

Table 7 cont'd

Reported By	Probable Date	Original Number	Width in ft.	Description	Gold Oz. per ton	Silver Oz. per ton
Gracey	11/1/22	11	6	6 ft. across face of northeast drift 84 ft. from winze	0.16	21.2
"	"	20	5	5 ft. across bottom of 50-ft. winze	0.10	8.9
Orem	2/14/23	1	-	7 six-ft. cuts from east drift of 40-ft. level in 60-ft. winze. Cuts are spaced 6 ft. apart and extend from top to bottom of the drift; 65 lb. sample.	0.22	16.0
"	"	2	-	Cut across 12 ft. on side and 4 ft. face of south crosscut on 40-ft. level in 60-ft. winze. 25 lb. sample	0.16	6.9
"	"	5	-	Lead ore on upper dump (probably from 55 level ?)	0.20	19.0
"	"	6	-	Sample showing little iron sulfide from 40-ft. level in 60-ft winze; on northeast face.	0.18	30.4
"	"	8	-	Sample showing iron sulfides from 40 ft. level	0.40	49.7
"	Oct.-Nov. 1935	7	1¼	15 inches of roof 20 ft. south 60-ft. winze 40 ft. level	0.32	10.8

Reported By	Probable Date	Original Number	Width in ft.	Description	Gold Oz. per ton	Silver Oz. per ton
Orem	Oct.-Nov. 1935	8	8	8 ft. sample across ore NE face 40-ft. level 60-ft. winze	0.18	11.4
Unidentified Orem (?)	--	-	-	4 ft. face lead ore on 55 ft. level SW of 60-ft. winze	0.16	13.6

If the two high lead samples shown on the Longitudinal Section are excluded then the remaining 17 samples hzve an arithmetic average of 0.175 oz. gold per ton and 14.76 ounces of silver per ton. The silver to gold ratio is 84.3:1

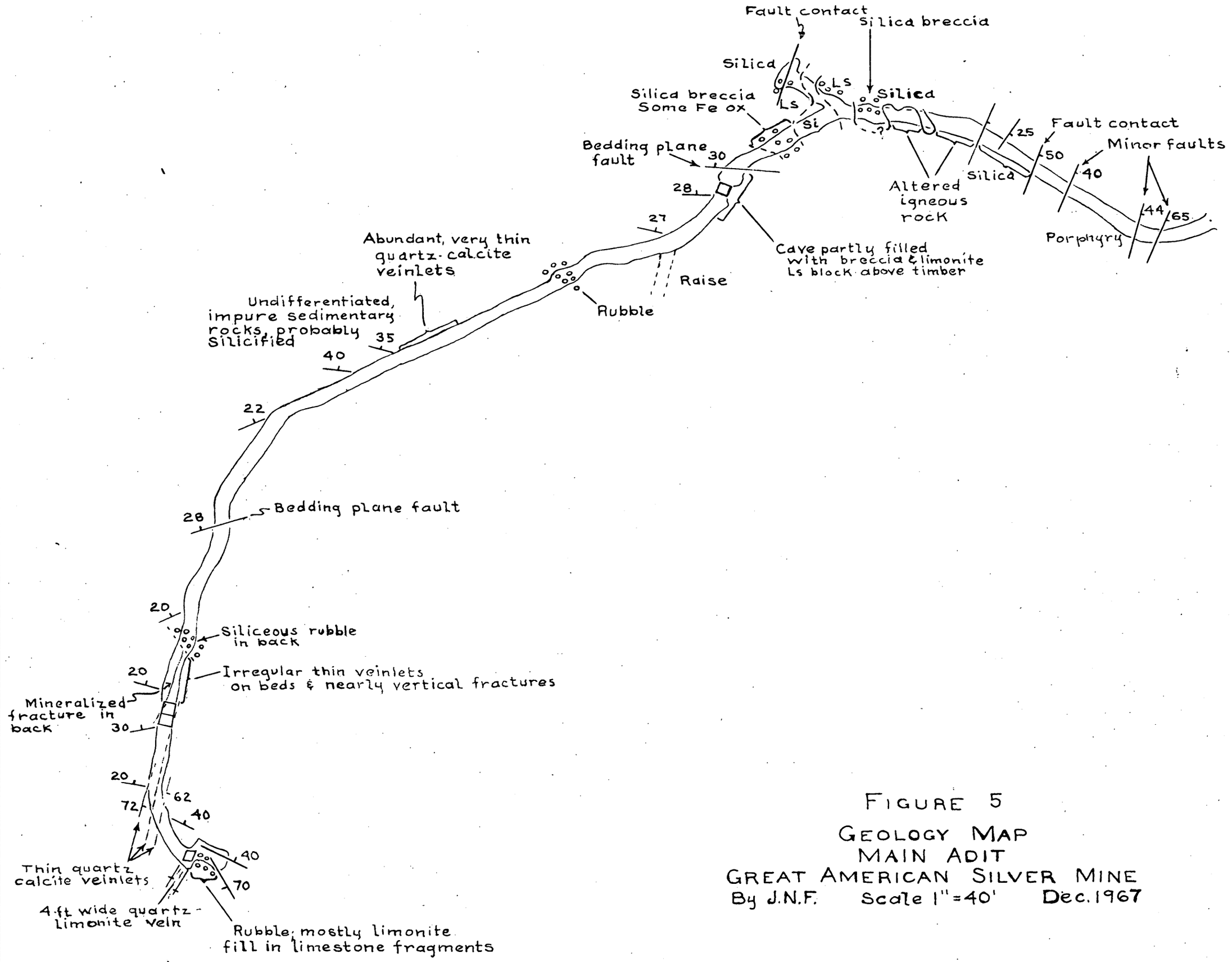


FIGURE 5

GEOLOGY MAP
MAIN ADIT
GREAT AMERICAN SILVER MINE
By J.N.F. Scale 1"=40' Dec. 1967

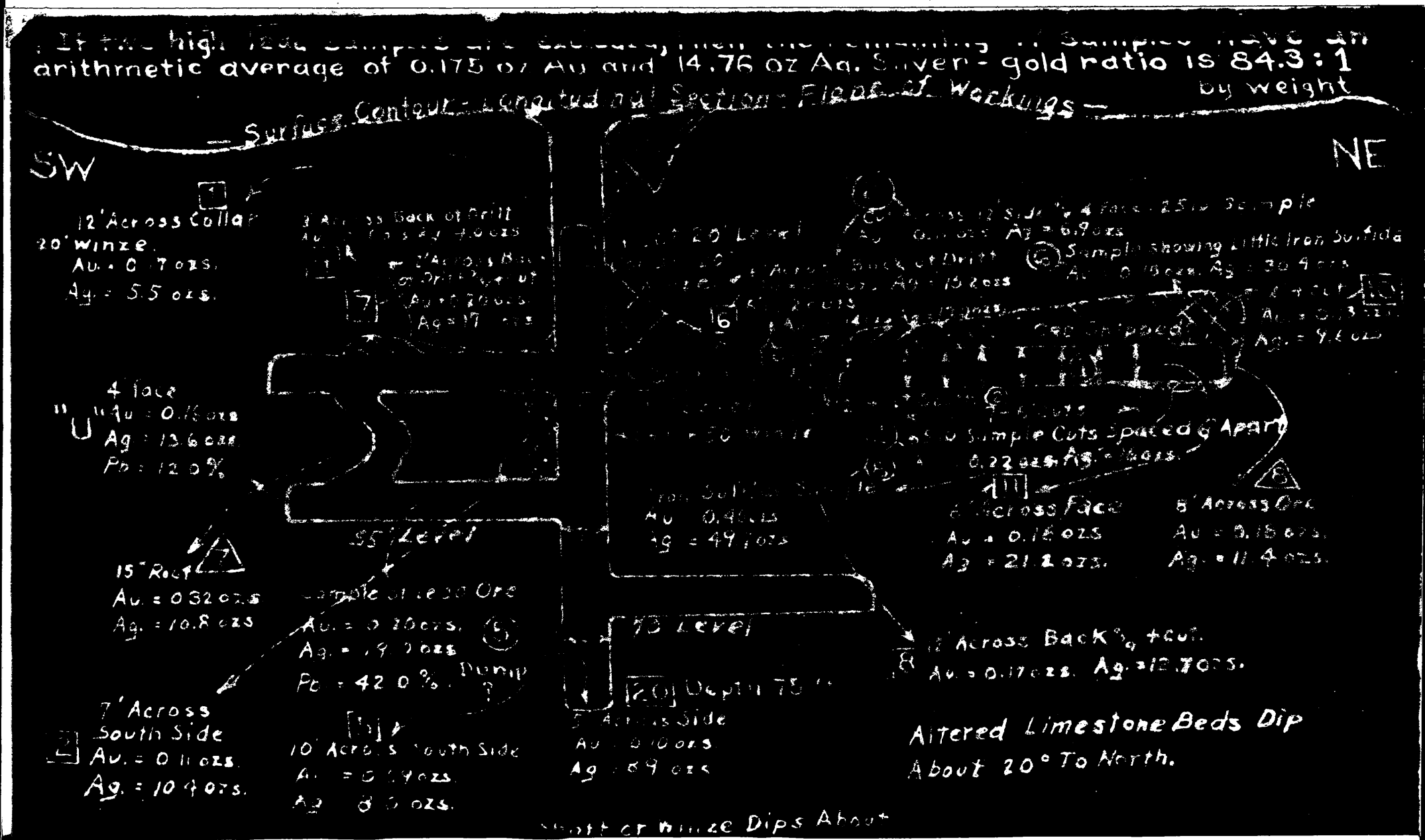

If two high lead samples are excluded, then the remaining 11 samples have an arithmetic average of 0.175 oz Au and 14.76 oz Ag. Silver - gold ratio is 84.3 : 1 by weight
Surface Contour Longitudinal Section - Floor of Workings
SW
NE
12' Across Collar
20' Winze
Au. = 0.17 ozs.
Ag. = 5.5 ozs.
4 face
"U"
Au = 0.16 ozs
Ag = 13.6 ozs
Pb = 12.0%
15' Roof
Au. = 0.32 ozs
Ag. = 10.8 ozs
7' Across South Side
Au. = 0.11 ozs.
Ag. = 10.4 ozs.
3' Across Back of Drift
Au = 0.15 ozs Ag = 4.0 ozs
2' Across Back of Drift
Au = 0.20 ozs
Ag = 17 ozs
55' Level
Composite of 12 Ore
Au. = 0.20 ozs.
Ag. = 19.2 ozs
Pb = 42.0%
Dump
10' Across South Side
Au = 0.14 ozs.
Ag 8.0 ozs.
Shaft or Winze Dips About
20' Level
Back of Drift
Au = 13.2 ozs
Iron Sulfide
Au 0.40 ozs
Ag = 49 ozs
75 Level
Depth 75'
5' Across Side
Au 0.10 ozs
Ag 8.9 ozs
Sample showing Little Iron Sulfide
Au 0.19 ozs. Ag = 30.4 ozs
Ag. = 9.6 ozs
Sample Cuts Spaced 6' Apart
0.22 ozs Ag. = 16 ozs.
6' Across Face
Au = 0.16 ozs
Ag = 21.2 ozs.
5' Across Ore
Au = 0.15 ozs.
Ag. = 11.4 ozs.
12' Across Back + cut.
Au = 0.17 ozs. Ag. = 13.7 ozs.
Altered Limestone Beds Dip About 20° To North.

Fig. 6

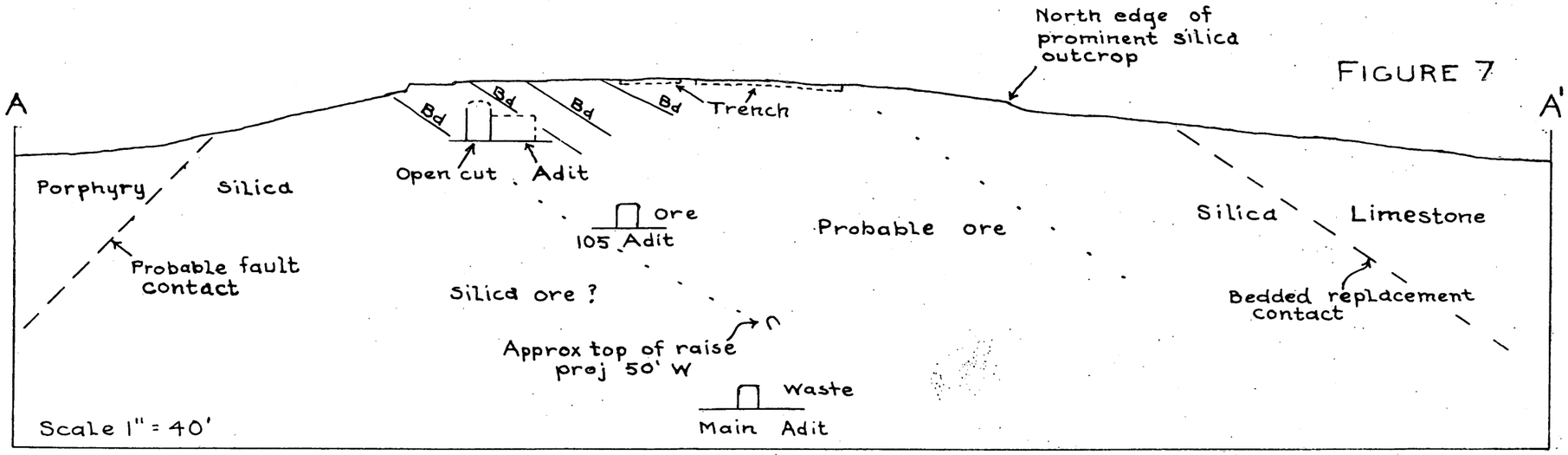


FIGURE 7

SECTION A-A'

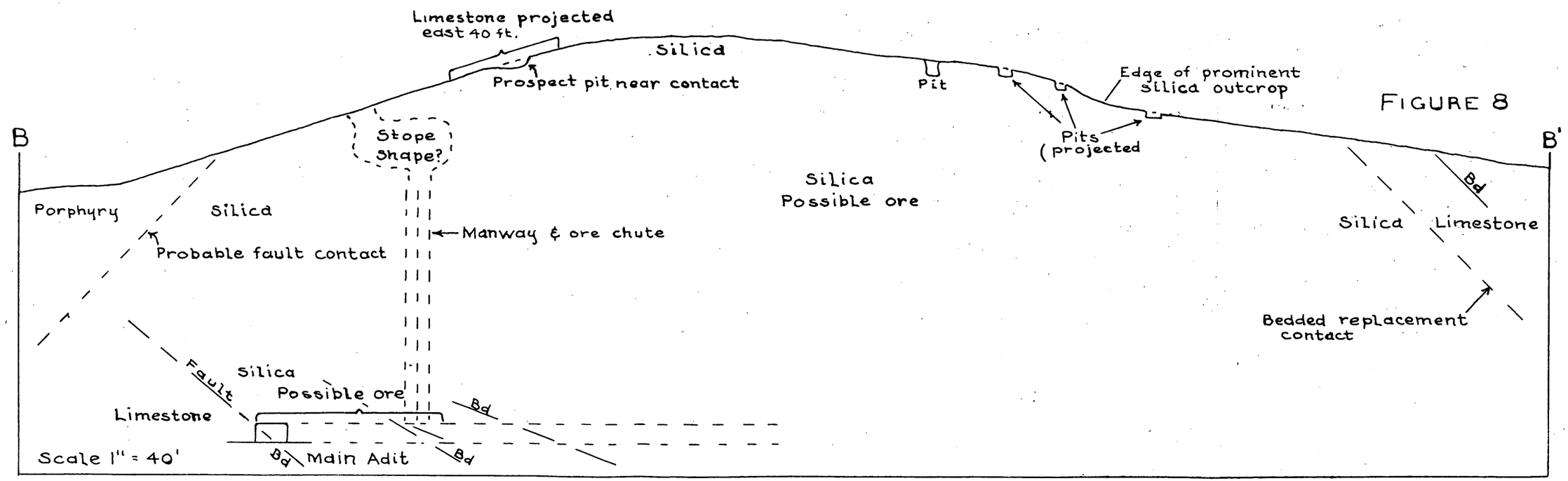


FIGURE 8

SECTION B-B'

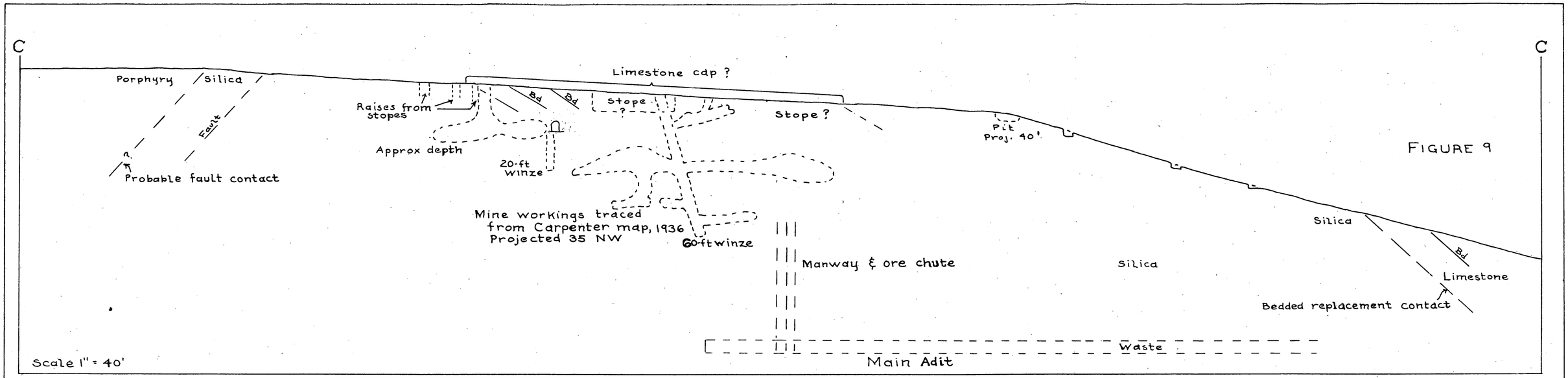
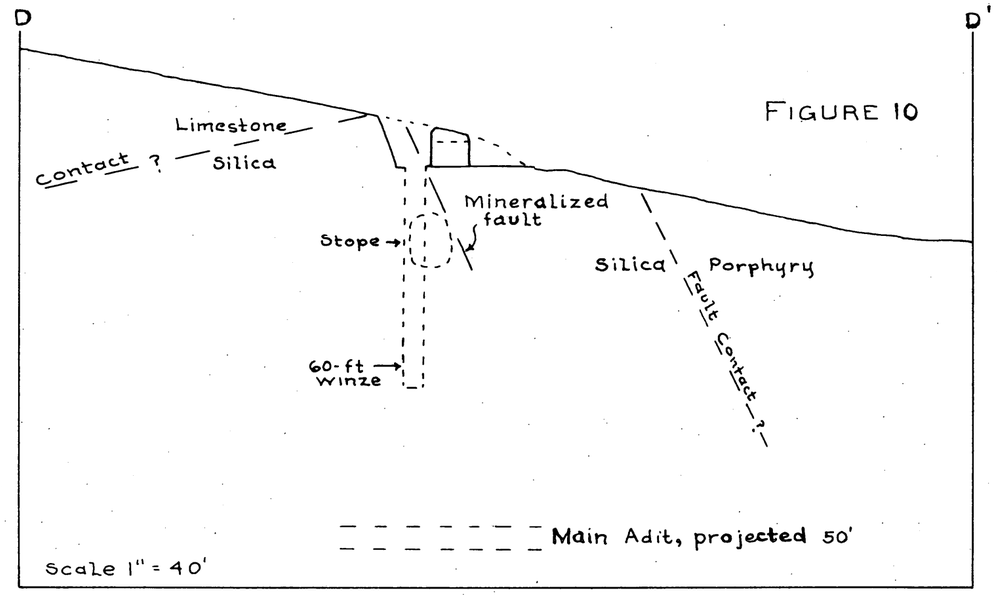
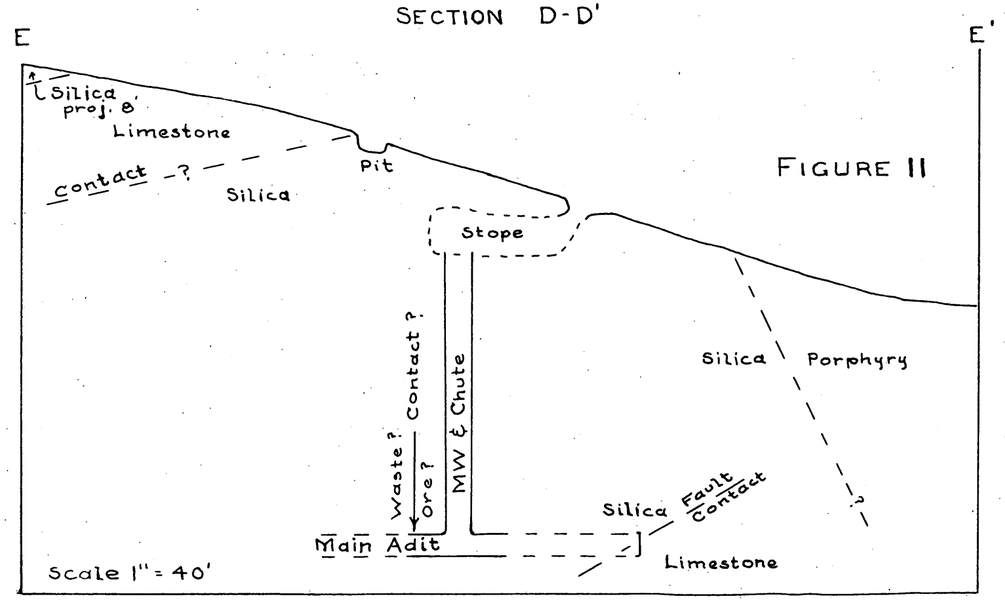


FIGURE 9

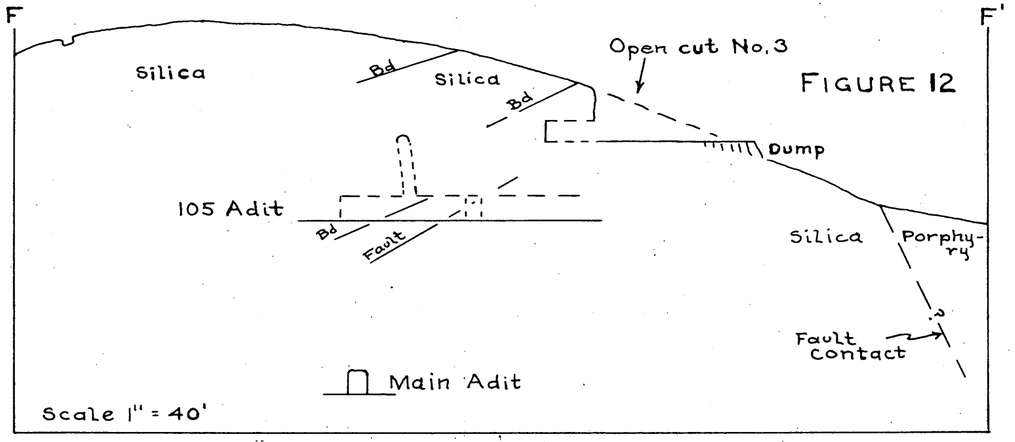
SECTION C-C'



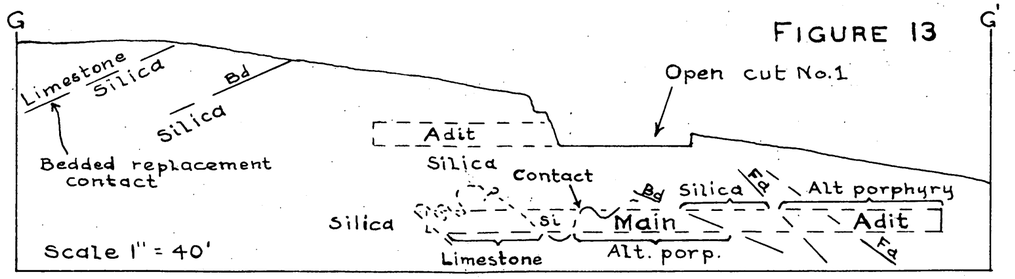
SECTION D-D'



SECTION E-E'



SECTION F-F'



SECTION G-G'

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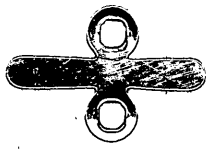


KARCLTON KLASPC
No. 30
KARCLTON ENVELOPE

FIGURE 4
GEOLOGY MAP
GREAT AMERICAN SILVER MINE
COCHISE COUNTY, ARIZONA
BY: J. N. FAICK Nov. 1967

1" = 40'

EXHIBIT I

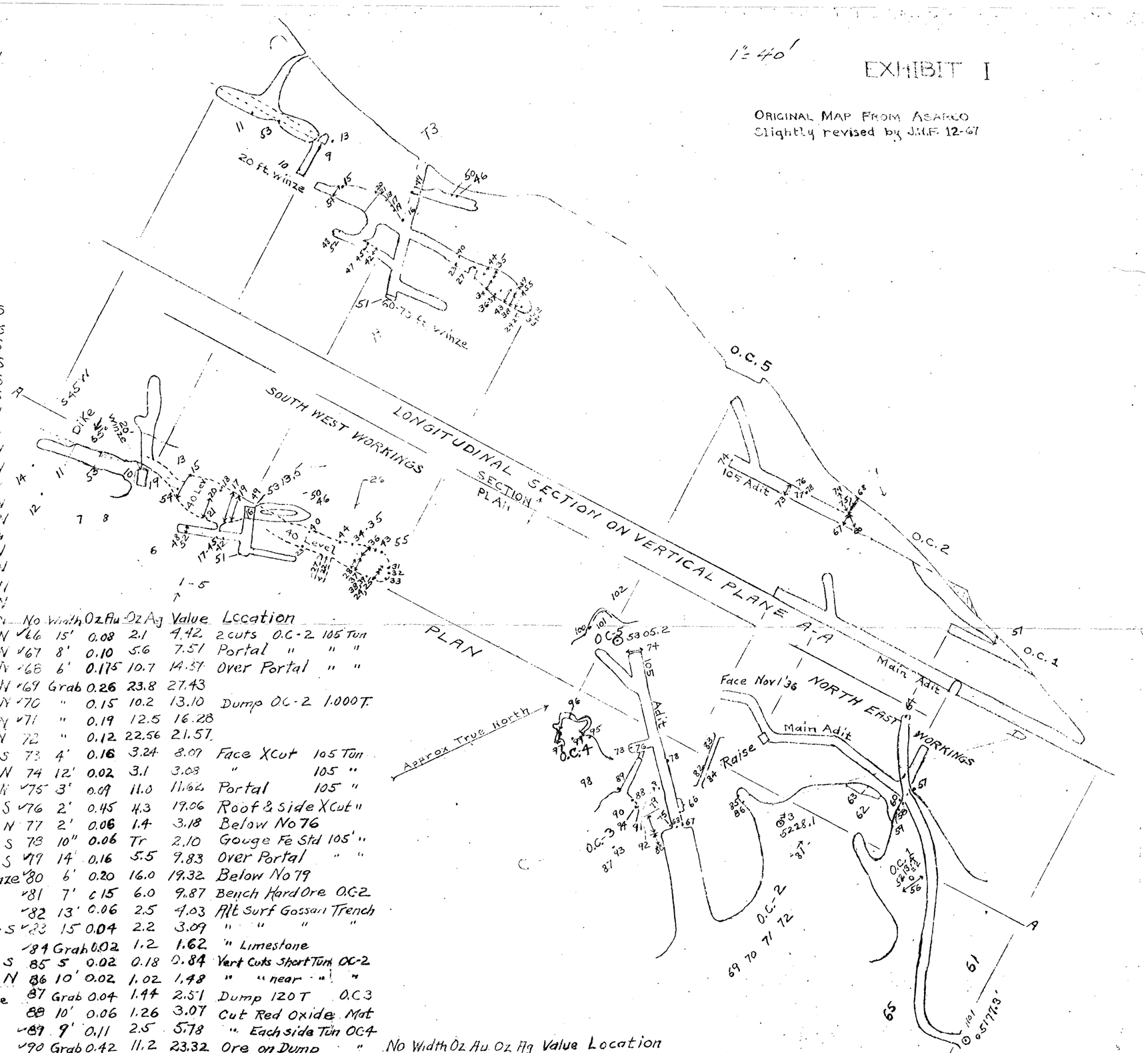
ORIGINAL MAP FROM ASARCO
Slightly revised by J.N.F. 12-67

No	Width	Oz Au	Oz Ag	Value	Location
1	Gen	0.11	10.0	11.55	Dump 1000 T S W Wkg
2	"	0.12	7.1	9.67	" " " "
3	"	0.19	13.8	17.28	" " "
4	"	0.08	5.96	7.39	" " "
5	"	0.14	3.6	7.69	" " "
6	Grab	0.12	6.0	8.82	
7	"	0.74	6.8	31.80	
8	"	0.20	19.0	21.63	Lead Ore "
9	12'	0.17	5.5	10.19	Collar 20 Winze "
10	7'	0.11	10.4	11.86	S. Side bot " "
11	6'	0.34	23.74	30.18	Floor UH Stope "
12	1.5'	0.035	1.6	2.45	Surf. Qtz "
13	2.0'	0.60	20.8	37.02	Vert. Fracture "
14	3.0'	0.02	0.4	1.01	Surf Qtz
15	13'	0.06	4.0	5.23	Roof @ End Stope
16	10'	0.09	8.0	9.31	S Side Winze 40' Lev S
17	20'	0.18	7.3	11.92	Roof Stope 40 Lev S
18	1.25	0.32	10.8	19.52	" " " " S
19	20'	0.12	6.88	9.56	" " " " S
20	12'	0.20	17.1	20.17	" " " " S
21	12'	0.22	29.78	27.13	E Wall " " " S
22	12'	0.17	12.7	15.73	X Cut " " N
23	6'	0.14	13.0	14.91	E Side Drift " " N
24	4'	0.13	9.6	11.59	X Cut " " N
25	6'	0.16	21.2	21.92	Face " " " N
26	42'	0.22	16.0	20.02	7-6' Cuts " " " N
27	16'	0.16	6.9	10.91	X Cut & Face Hor- N
28	6'	0.19	15.2	18.35	Roof Old Drift " " N
29	Grab	0.40	49.7	52.87	Show'g Pyrite N
30	"	0.48	52.9	57.53	" " " " N
31	8.0'	0.18	11.4	15.09	Face " " N
32	8.0'	0.13	12.7	14.33	" " " "
33	6.5'	0.08	7.92	8.90	" " " N
34	8.0'	0.06	8.14	8.37	W side Stope " " N
35	6.0'	0.16	10.4	13.33	" " " " " N
36	5.0'	0.28	8.52	16.36	Floor " " " N
37	8.0'	0.04	1.72	2.72	" " " " N
38	6.0	0.08	6.2	7.57	E Side " " " N
39	6.0	0.32	27.9	32.68	" " " " " N
40	7.0'	0.30	14.1	21.36	W side " " " N
41	Grab	0.18	30.4	24.71	Show'g Pyrite " " N
42	4.0'	0.46	50.39	54.90	E. Side Drift 60 Lev S
43	8.5'	0.24	24.1	26.95	W Side Stope 40' N
44	6.0'	0.21	19.7	22.58	" " " " " N
45	4.0'	0.08	6.2	7.57	Pb 20.35% 60' " S
46	2.0'	0.56	26.24	39.80	Roof Narrow Stope N
47	4.0'	0.02	5.2	4.70	20.58% 60 Lev S
48	4.0'	0.02	5.5	4.94	15.57% Face " " S
49	2.0'	0.25	8.2	15.06	W Wall @ Collar Winze
50	2.0'	0.59	22.5	37.98	Roof Narrow Stope
51	5.0'	0.10	8.9	10.35	Bottom 70' Winze
52	5.0'	0.04	5.52	5.65	Walls & Back 60' Lev S
53	3.0'	0.02	10.58	8.85	Bottom 75' Drift
54	5.0'	0.08	2.88	5.02	Contact 40' Level S
55	7.0'	0.20	13.6	17.47	W. Side 40' N
56	2.5'	0.02	Tr	0.70	Floor O.C.-1 Alt Lime
57	2.0	0.13	11.0	13.02	Above Portal Ton.
58	2.5'	0.03	0.3	1.28	S. Side " "
59	3.0'	0.04	0.9	2.09	Below No 58
60	4.5	0.90	34.5	58.07	Inside Ton. in Raise
61	Grab	0.06	3.82	5.04	Lower Dump
62	"	0.08	7.4	8.50	Bottom Stope 8'x40'
63	18'	0.10	23.3	21.44	3-6' cuts Incl to OC-2
64	6'	0.01	0.12	0.44	3-6' " Face Ton O.C.-1
65	Grab	0.02	2.38	2.53	Lower Dump

No	Width	Oz Au	Oz Ag	Value	Location
66	15'	0.08	2.1	4.42	2 cuts O.C-2 105 Ton
67	8'	0.10	5.6	7.51	Portal " " "
68	6'	0.175	10.7	14.37	Over Portal " "
69	Grab	0.26	23.8	27.43	
70	"	0.15	10.2	13.10	Dump OC-2 1.000 T.
71	"	0.19	12.5	16.28	
72	"	0.12	22.56	21.57	
73	4'	0.16	3.24	8.07	Face X Cut 105 Ton
74	12'	0.02	3.1	3.08	" 105 "
75	3'	0.09	11.0	11.66	Portal 105 "
76	2'	0.45	4.3	19.06	Roof & side X Cut "
77	2'	0.06	1.4	3.18	Below No 76
78	10"	0.06	Tr	2.10	Gouge Fe Std 105' "
79	14	0.16	5.5	9.83	Over Portal " "
80	6'	0.20	16.0	19.32	Below No 79
81	7'	0.15	6.0	9.87	Bench Hard Ore O.C-2
82	13'	0.06	2.5	4.03	Alt Surf Gossan Trench
83	15	0.04	2.2	3.09	" " " "
84	Grab	0.02	1.2	1.62	" Limestone
85	5	0.02	0.18	0.84	Vert Cuts Short Ton OC-2
86	10'	0.02	1.02	1.48	" " near " "
87	Grab	0.04	1.44	2.51	Dump 120 T O.C 3
88	10'	0.06	1.26	3.07	Cut Red Oxide Mat
89	9'	0.11	2.5	5.78	" Each side Ton OC-4
90	Grab	0.42	11.2	23.32	Ore on Dump "
91	"	0.06	5.7	6.49	Type-Silicified L.S.
92	"	0.46?	4.2	18.43	Ox. Ore over 105 OC3
93	"	0.20	18.6	21.32	Ore on Dump OC-3
94	2'	0.45	4.3	19.06	N. Side bot OC-3
95	8'	0.06	3.4	4.73	O.C-4
96	15'	0.08	4.76	6.46	Hor Cut around OC-4

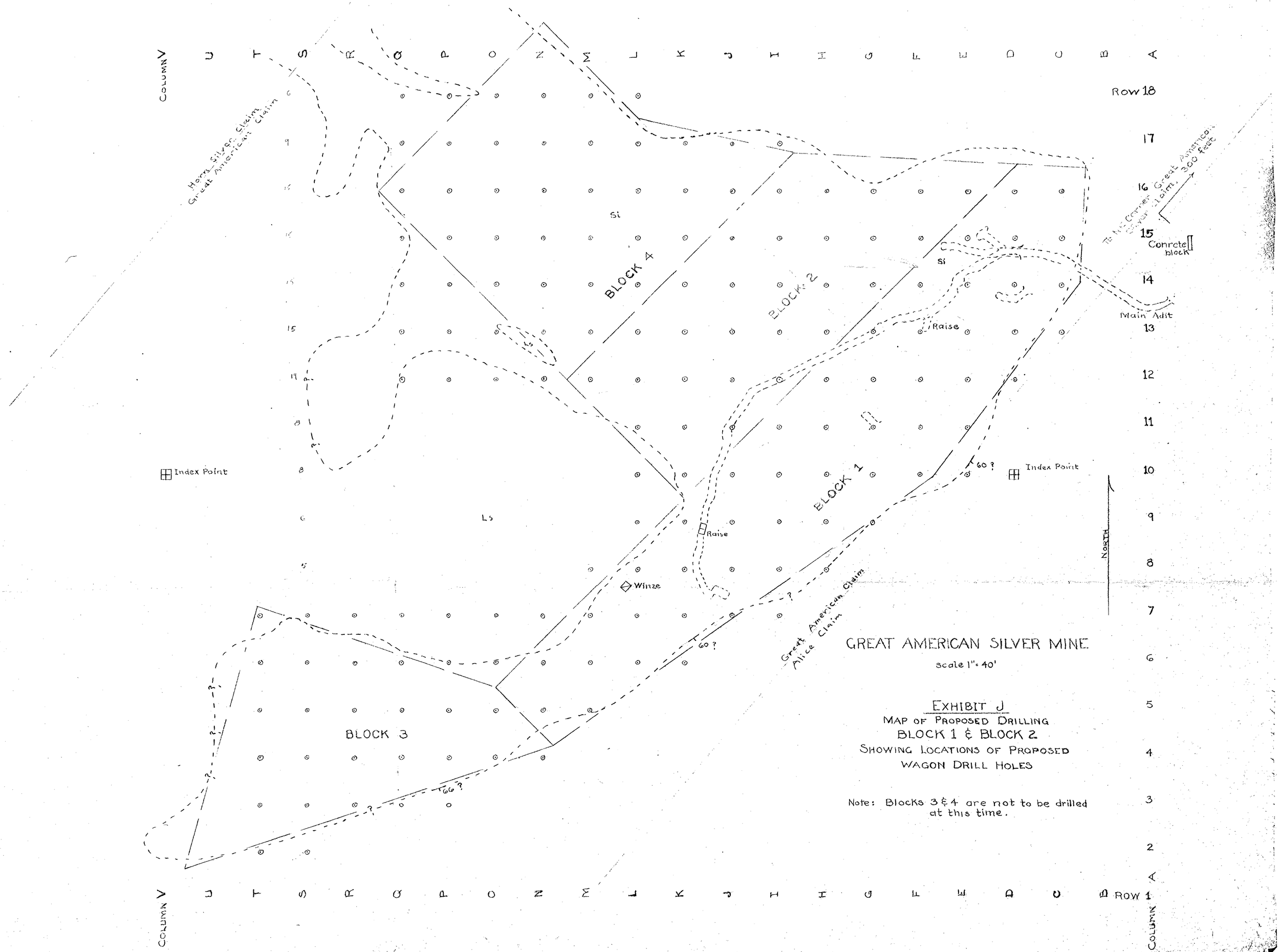
No	Width	Oz Au	Oz Ag	Value	Location	
97	6'	0.02	0.14	0.79	Hor Cut	OC-4
98	Grab	0.08	1.6	4.03	Dump 50 T	O.C-4
99	"	0.38	33.5	39.10	" Small	OC-4
100	1'	0.43	9.6	22.44	Ore	O.C-5
101	Grab	0.06	9.54	9.89	Dump 100 T.	O.C-5
102	15	0.04	3.32	3.96	Hor Cut around	O.C-5

Arithmetic average of 102 samples
is 10.98 oz silver & 0.177 oz gold per ton of ore.
Ratio Ag:Au 62:1



PRELIMINARY ASSAY MAP
GREAT AMERICAN MINE
COMPILED AND DRAWN FROM OWNERS DATA
BY
MILES M. CARPENTER, EM
Nov. 12, 1936 SCALE 1 in = 40 Ft

Minor additions by J.N.F. Nov. 1967.
Value shown is gross value of precious metal calculated with 1936 U.S. Producer price with gold at $35.00 and silver at $0.77 per ounce.


COLUMN V
Row 18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
ROW 1
Horn Silver Claim
Great American Claim
BLOCK 4
BLOCK 2
BLOCK 1
BLOCK 3
Si
Raise
Winze
Ls
Index Point
Index Point
Concrete block
Main Adit
To N.E. Corner Great American Silver Claim, 300 feet
Great American Alice Claim
60 ?
NORTH
GREAT AMERICAN SILVER MINE
scale 1" = 40'
EXHIBIT J
MAP OF PROPOSED DRILLING
BLOCK 1 & BLOCK 2
SHOWING LOCATIONS OF PROPOSED
WAGON DRILL HOLES
Note: Blocks 3 & 4 are not to be drilled at this time.